DRAFT
ENVIRONMENTAL IMPACT REPORT

ALAMITOS RIDGE RESIDENTIAL PROJECT

LONG BEACH, CALIFORNIA

VOLUME I

Prepared for:

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TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

APPENDICES

(bound separately in Volume II)

FIGURES AND TABLES

FIGURES

FIGURES AND TABLES (CONTINUED)

TABLES

FIGURES AND TABLES (CONTINUED)

1.0 EXECUTIVE SUMMARY

1.1 INTRODUCTION/PURPOSE

This Environmental Impact Report (EIR) has been prepared to evaluate specific environmental impacts associated with the proposed Alamitos Ridge Residential Project (the proposed project) in the City of Long Beach. The City of Long Beach is the Lead Agency with authority to prepare this EIR and, after the comment/response process, is the certifying agency for the Final EIR (FEIR).

An Initial Study, prepared by the City of Long Beach, indicated that the proposed project may have a significant effect on the environment and that an EIR would be required to more fully evaluate potential adverse environmental impacts that may result from development of the project. As a result, this EIR has been prepared in accordance with the California Environmental Quality Act of 1970 (CEQA), as amended (Public Resources Code Section 21000 et seq.), and the State CEQA Guidelines for Implementation of CEQA (California Code of Regulations, Title 14, Section 15000 et seq.). This EIR also complies with the procedures established by the City of Long Beach for implementation of CEQA.

The purpose of this EIR is to inform decision makers and the general public of any significant adverse environmental impacts that may be associated with the planning, construction, and operation of the proposed project and to identify appropriate feasible mitigation measures and alternatives that may be adopted to reduce or eliminate these impacts. This EIR also includes evaluation of reasonable alternatives to the proposed project, including a No Project/No Development alternative, a No Project/Existing General Plan alternative, an on-site lower intensity project alternative, and an off-site alternative for comparison with the proposed project.

Development of the proposed project will require discretionary approvals by the City of Long Beach and Responsible Agencies. The City of Long Beach discretionary actions include:

1) General Plan Amendment to the Land Use Element from Land Use District (LUD) No. 7, Mixed-Use, to LUD No. 1, Single-Family Residential.

2) Planned Development Plan PD-17 Amendment: Approval is requested to change the permitted uses for the site within PD-17 to allow residential development and for the land use regulatory framework for the proposed single-family residential development project in accordance with the development standards included in Chapter 3 of this EIR.

3) Site Plan Review by the Planning Commission

4) Vesting Tentative Tract Map 52702, subdividing the property into developable lots.

The project proponent must also obtain a stormwater runoff permit as required by the California Regional Water Quality Control Board - Los Angeles under regulations promulgated by the U.S.

Environmental Protection Agency (EPA). These regulations require that a National Pollution Discharge Elimination System (NPDES) permit be obtained for construction activities on any site of five or more acres. As a result, an NPDES permit will be required for the construction of the project.

1.2 PROJECT DESCRIPTION

The project goals and objectives are described in detail in Chapter 3. The principal objectives of the City of Long Beach regarding the proposed project are as follows:

- Approve discretionary permits that will allow residential development of the site, consistent with the Housing Element goal of increasing overall housing opportunities within the City of Long Beach.
- Promote pedestrian scale and a superior neighborhood ambiance consistent with the City of Long Beach's character through quality project design and streetscape standards subject to a City approved Planned Development Plan (PD) PD-17.
- Provide a circulation system designed to accommodate both automobile and pedestrian movement compatible with residential uses.
- Promote cohesive physical design schemes that enhance the quality of the surrounding neighborhood and Mixed Use District.
- Promote compatibility of proposed development with existing oil facilities and operations, consistent with provisions of Chapter 12 of the Long Beach Municipal Code, entitled "Oil Code."
- Enhance the economic vitality of the City of Long Beach through redevelopment of this underutilized property.

The applicant's primary goal is to develop the 14.1 net acre subject site to its highest and best use in the current market. The proposed development of 106 single family units also would achieve the applicant's objective to offer detached housing in a highly competitive price range not commonly found in Long Beach.[1]

The subject site is surrounded on three sides by the City of Signal Hill. The proposed project site is currently undeveloped, with limited ongoing oil extraction wells on the site. The project site is within the Long Beach Oil Field (Signal Hill East Unit, or SHEU), an active field since the early 1900s, which is currently operated by Signal Hill Petroleum. The project boundaries consist of Redondo Boulevard to the east, Obispo Avenue to the west, and 20th Street to the south. An undeveloped parcel is immediately north of the project site and is planned by the Long Beach Unified School District for development as an elementary through eighth grade (K-8) school. Access to the project site is via Redondo Avenue, Obispo Avenue and 20th Street.

[1] Source: Planning Permit Application—City of Long Beach, Alamitos Ridge LLC.

The new construction is proposed to begin immediately upon project approval by the City. Grading of the entire site and installation of utilities and internal streets will be carried out by the owner in one phase. The second phase involves development and construction of the residences by merchant builders. Infrastructure, drainage, and utility services are to be constructed on site and off site concurrent with the first phase of site development, with connections in public rights-of-way to City and other utility providers' facilities.

Years of operation as an oil field and maintenance yard have resulted in several areas of soil contamination from crude oil seepage and spillage. Remediation of the soil has begun at the site according to agency regulatory standards and permits issued to Signal Hill Petroleum for area wide oil operations cleanup.

1.3 PROJECT LOCATION

The proposed project site is located in the City of Long Beach, bordered on the east by Redondo Avenue, on the south by 20th Street, on the west by Obispo Avenue, and on the north by an undeveloped parcel of land.

The surrounding area is comprised of a mixture of land uses, including a water injection plant south of the site, National Guard Armory and high density residential east of the site, residential and light industrial uses to the west, and heavy industrial to the north. An elementary school has been proposed for the site immediately adjacent to the north of the proposed project site. Hill Street forms the northern boundary of the school district property.

Throughout this EIR, the terms "site," "proposed project site," "proposed project," and "subject property" are used interchangeably to indicate the project site that is the subject of this EIR.

1.4 ALTERNATIVES CONSIDERED

The analysis in Chapter 5.0 discusses four development alternatives to the proposed project. By examining the results presented in Chapter 5.0, a determination can be made as to which alternative scenarios generate fewer environmental impacts. Based upon this analysis, the Proposed Project is shown to be the environmentally superior alternative.

- **Alternative A - No Project/No Development Alternative.** Under this alternative, the project site would remain in its existing, primarily undisturbed condition. No development of the site would occur.
- **Alternative B - Lower Density Alternative.** Under this alternative, the project would reduce the number of single family units by 60 percent. This results in approximately 63 single family units in this planning area rather than 106 single family units of the proposed project, and results in an overall project density of approximately 4.2 units per acre rather than the 7.4 units per acre under the proposed project.
- **Alternative C - No Project/Implementation of Existing General Plan (Practical Results of Not Proceeding with Project).** This alternative consists of build out of the project site with 14.1

acres (net) of uses consistent with the existing "Mixed Use" designation of the Land Use Element. Under this designation, the site would include office, retail, and warehousing operations, as well as some high density residential units, instead of only the 106 single family units of the proposed project.

- **Alternative D - Off-Site Alternative.** This alternative reviews the potential to develop the proposed project at another location. The investigation of off-site alternative sites focuses on parcels of undeveloped land that are designated for residential use within the City's General Plan.

Based upon the analyses included in Chapter 5.0 of the EIR, the proposed project is environmentally superior to the alternatives. Among the alternatives, the No Project Alternative was not found to be environmentally superior to the proposed project because the project site would not be remediated, may pose a health risk, and may pose a risk to groundwater quality in its current condition. The site would remain undeveloped in its current vacant condition. CEQA does not require the lead agency to select the environmentally superior alternative.

1.5 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

The Initial Study identified environmental issues to be examined further in this EIR. In addition, public and agency responses to a Notice of Preparation (NOP) indicated several concerns that were requested to be included in the EIR. These issues and concerns are as follows:

- Impacts on existing landfills
- Grading and drainage issues
- Geology/soil impacts and seismic concerns
- Air quality
- Cultural resources
- Runoff and stormwater flows
- Adequate infrastructure
- Public health and safety
- Public services
- Traffic issues

This EIR addresses each of these issues and concerns in detail, examines project related and cumulative environmental impacts, identifies significant adverse environmental impacts, and proposes mitigation measures designed to reduce or eliminate potentially significant impacts. These issues are summarized in Table 1.6.A

This EIR also considers alternatives to the project that potentially could reduce or eliminate project impacts. Issues to be resolved include: 1) how to mitigate impacts identified in the EIR, and 2) the decision makers' choice among project alternatives.

1.6 ENVIRONMENTAL IMPACT/MITIGATION MATRIX

The impact and mitigation summary matrix (Table 1.6.A) provides a summary of project impacts, mitigation measures and level of impact significance after mitigation.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
4.1 Land Use		
• Short-Term Effects of Well Maintenance Operations	1.1 The developer/property owner shall provide documentation to the satisfaction of the Director, Department of Planning and Building, of an enforceable and irrevocable agreement with the oil well operator to provide access to occupied residences during oil well equipment maintenance/replacement. Access to all occupied residences must be provided during any construction or well maintenance activity, including the maintenance of at least one travel lane available for local traffic at all times. Affected property owners and public service providers and utility companies will be notified one week prior to any planned maintenance activity that will occur in the street. Traffic control personnel and/or signage shall be provided as necessary to direct local traffic. The access agreement is required to be in effect prior to issuance of the first development permit.	Mitigation measures described will reduce short-term effects of well maintenance to below a level of significance.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
	1.2 The developer/property owner shall provide documentation to the satisfaction of the Director, Department of Planning and Building, of an enforceable and irrevocable agreement with the oil operator to provide advance written notice of planned maintenance on any oil production facilities, as follows: The well operator will provide one week written notice (except in the case of emergency maintenance) to all property owners and occupants of properties within a 100-foot radius of the site of well maintenance activities. The agreement with the oil operator to provide notification shall be in place prior to issuance of the first building permit.	See above.
4.2 Population and Housing		
• No impacts.	None.	Not applicable.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
4.3 Geotechnical Conditions		
• Seismicity	3.1 The City of Long Beach Building Official (or designee) will review final design plans to ensure that the appropriate structural setback zones and restricted use areas required by the Alquist-Priolo Earthquake Fault Zone for the Northeast Flank Fault are implemented, subject to the recommendations of a final geotechnical investigation report. Along the Northeast Flank Fault, the minimum structural setback is 50 feet from the center of the fault zone. Prior to issuance of building permits, the Building Official shall ensure that all applicable UBC structural foundation requirements, fault setbacks, and recommendations of the final geotechnical investigation report are included in project design.	Mitigation measures described will reduce potential geologic, seismic, and soil related impacts to below a level of significance.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
• Slope stability	3.2 Prior to the issuance of grading permits, the project applicant will ensure to the satisfaction of the City of Long Beach Building Official/City Engineer that all cut slopes, back slopes, and keys will be geologically mapped in detail during grading. The cut portions of the fill over cut slopes shall be cut and geologically mapped prior to construction of the fill portion of the slope. Stability blanket fills shall be required to mitigate surficial instability and nuisance seepage out of the slope face; fill slopes will be constructed in accordance with the General Earthwork and Grading Specifications following typical key excavation, benching, and subdrainage procedures; the project developer will utilize appropriate lot capping procedures, including depth of overcut and undercut; the project developer shall propose special treatment for major slopes greater than ten feet in height; and the project developer will ensure that construction of stability buttresses at the toe of slope is incorporated.	
• Ground settlement	3.3 Prior to issuance of a grading permit, the project proponent shall demonstrate in the project geotechnical report for approval by the Director, Department of Planning and Building, all unsuitable compressible overburden materials shall be removed prior to fill or structure placement. Materials to be removed include recent alluvium deposited within incised drainage, uncontrolled artificial fills and underlying soils, landslide materials below proposed cuts, and colluvium and alluvium over bedrock.	

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
• Erosion	3.4 Prior to the issuance of grading permits, a geotechnically acceptable method of slope erosion control shall be proposed and, if acceptable to the Director, Building and Planning Department, indicated on project plans for implementation through completion of site landscaping. Slope erosion control shall be included in the Landscaping Plan, subject to the approval of the Director, Department of Planning and Building.	
4.4 Water Resources		
• Surface drainage	4.1 Prior to release of the Grading Permit, the applicant shall submit a final hydrology plan to the City of Long Beach Director of Public Works/City Engineer for approval. The hydrology plan shall include any on-site structures or modifications of existing drainage facilities necessary to accommodate increased runoff resulting from the proposed project and shall indicate project contributions to the regional stormwater drainage system.	Impacts to surface water quality will be reduced to less than significant levels by mitigation measures, compliance with existing regulatory requirements, and the improvement of site conditions as a result of remediation of contaminated soils.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
• Runoff water quality	4.2 Runoff from crude oil impacted soil exposed during grading operations could result in impacts to runoff water quality. All identified crude oil impacted soils shall be remediated and/or contained on site (no sediment shall be allowed to be transmitted off site) prior to or concurrent with commencement of residential project grading operations. Previously unidentified crude oil impacted soils encountered during the grading operations shall be remediated or isolated as soon as possible following discovery to limit exposure to stormwater runoff. All runoff from the site shall be contained by sand bags, berms, and sediment traps during the rainy season (October 1 through April 30).	

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
	4.3 The Construction Contractor shall be responsible for performing and documenting the application of BMPs identified in the Standard Urban Storm Water Mitigation Plan (SUSWMP). Weekly inspections shall be performed on the sand bag barriers and other sediment control measures called for in the SUSWMP. Monthly reports shall be maintained by the Director, Public Works. The applicant's contractor shall inspect BMP facilities before and after every rainfall event that is predicted to produce observable runoff, and at 24 hour intervals during extended rainfall events, excepting days when there is no ongoing site activity. Pre-storm activities will include inspection of the major storm drain grate inlets and examination of other on-site surface flow channels and swales, including the removal of any debris that blocks the flow path. Post-storm activities will include inspection of the grate inlets, looking for any ponded water on the site and determining the cause, and looking for surface erosion. The Construction Contractor shall implement corrective actions specified by the City's Public Works Department, as necessary, at the direction of the Director, Public Works. Inspection records and compliance certification reports shall be submitted to the Director, Public Works on a monthly basis and shall be maintained for a period of three years. Inspection schedules shall be monthly during the dry season and weekly during the wet season, for the duration of project construction or until all lots and common areas are landscaped.	

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
• Groundwater	None.	Not applicable.
4.5 Biological Resources		
• None.	None.	Not applicable.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
4.6 Archaeological and Paleontological Resources		
• Archaeological/historical resources	6.1 In conjunction with the submittal of applications for rough grading permits, the project proponent shall provide written evidence to the Director, Department of Planning and Building, that a Los Angeles County Certified Archaeologist has been retained, shall be present at the pregrading conference and shall establish procedures for temporarily halting or redirecting work if unrecorded archaeological resources are discovered during grading to permit the sampling, identification, and evaluation of archaeological materials as appropriate. The cultural resource management program will include resource monitoring during project grading of archaeologically sensitive sediments to ensure that unidentified cultural resources are not affected by the proposed undertaking. If archaeological materials are identified during construction, standard professional archaeological practices shall be initiated to characterize the resource and mitigate any impacts to those resources. Included within this program will be the development of a curation agreement for the permanent care of materials collected from the project. This agreement would be negotiated with a suitable repository.	Implementation of Mitigation Measure 6-1 will reduce potentially significant impacts to archaeological/historical resources to below a level of significance.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
	In the event human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendent (MLD). With the permission of the landowner or his/her authorized representative, the descendent may inspect the site of the discovery. The descendent shall complete the inspection within 24 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.	
• Paleontological resources	6.2 In conjunction with the submittal of applications for rough grading permits for the Tentative Tract Map, the applicant shall provide written evidence to the Director, Department of Planning and Building, that a paleontologist listed on the County of Los Angeles list of certified paleontologists has been retained and will be on site during all rough grading and other significant ground disturbing activities in paleontologically sensitive sediments.	With implementation of Mitigation Measure 6-2, potential impacts to unknown paleontological resources will be reduced to below the level of significance.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
	The paleontologist shall prepare a mitigation program consistent with County of Los Angeles regulations and the guidelines of the Society of Vertebrate Paleontology. This program should include, but not be limited to, the following: • Attendance at the pre-grading conference. • Monitoring of excavation by a qualified paleontological monitor in areas identified as likely to contain paleontological resources. The monitor should be equipped to salvage fossils as they are unearthed in order to avoid construction delays and to remove samples of sediments that have been determined likely to contain remains of small fossil invertebrates and vertebrates. The monitor must be empowered to temporarily halt or divert equipment in order to allow removal of abundant or large specimens. If major paleontological resources that require long-term halting or redirecting of grading are discovered, the paleontologist shall report such findings to the Department of Planning and Building.	

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
	• Because the underlying marine sediments may contain abundant fossil remains that can only be recovered by screening and picking matrix, it is recommended that if the excavations extend down into the Plio-Pleistocene marine unit then substantial matrix samples should be collected and processed to recover the fossils. • Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. • Identification and curation of specimens into a museum repository with permanent retrievable storage. • Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the Department of Planning and Building, would signify completion of the program to mitigate impacts to paleontological resources.	
4.7 Public Services and Utilities		
• None.	None.	Not applicable.
4.8 Recreation		
• None.	None.	Not applicable.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
4.9 Traffic and Circulation		
No significant impacts have been identified.	9.1 Prior to issuance of any building permit, the applicant is required to provide on-site and off-site dedications and improvements, as required by the City of Long Beach, described in the impacts section. All improvements shall be noted on development plans and specifications and approved by the Director, City of Long Beach Department of Planning and Building. This requirement will reduce overall traffic impacts.	Implementation of mitigation measures will reduce potentially significant traffic and circulation related impacts although no significant impacts were identified.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
	9.3 Concurrent with issuance of the first building permit and only after developer payment of transportation improvement fees, the City of Long Beach, Public Works Director, shall have prepared and shall have begun implementing a roadway and intersection improvement program to implement Mitigation Measures 9.1 and 9.2. The roadway and intersection improvements shall include a listing of improvements to be completed. Such improvements shall be fully implemented pursuant to development such that significant impacts are thereby avoided or mitigated below a level of significance at the time of completion of the project, or shall be substantially complete prior to issuance of occupancy permits.	
4.10 Air Quality		
• Equipment emissions	10.1 Dust generated by the development activities shall be contained to the site to the extent practical and kept to a minimum by following the dust control measures listed below:	
	is required along the property line for residential units that fall within the Group B Impact Zone, as identified herein, to reduce the traffic noise level in the outdoor activity area to below 65 dBA CNEL. The sound barrier wall shall be shown on project landscape plans, subject to the approval of the Director, Planning and Building Department, and shall be implemented prior to occupancy of affected units.	Noise impacts to the proposed residential uses from existing and projected traffic will be reduced to a less than significant level with the implementation of mitigation measures.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
	11.2 Balconies are not recommended for units impacted by 65 dBA CNEL or higher traffic noise. Sound walls (Plexiglas® with a minimum height of five feet) would be required for any second floor balconies directly exposed to traffic noise exceeding 65 dBA CNEL. Double pane windows are required for the second floor noise sensitive rooms in these units to achieve the required noise attenuation. Mechanical ventilation, such as air conditioning systems, is required for residences to ensure that windows can remain closed for a prolonged period of time.	
	11.3 Air conditioning systems shall be required for the development areas that would fall within Group C Impact Zone, as identified above, to achieve the 45 dBA CNEL interior noise standard. A freestanding sound barrier with a minimum six feet of effective height can be used in lieu of the mechanical ventilation mitigation to reduce both the ground floor exterior and interior noise levels for the above units in Group C. However, second floor bedrooms in Group C directly exposed to the traffic would need to have the mechanical ventilation mitigation, i.e., an air conditioning system, to achieve the interior noise standard. Prior to issuance of Building Permits, the Director, Planning and Building Department, shall ensure that building plans comply with this mitigation measure.	

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
• Oil pump operations	11.4 The developer/builder shall install a six foot high sound barrier around the small operating oil pumps where there are homes built within 158 feet of the pumps. If homes are built within 50 feet of the small operating oil pumps, the developer/builder shall install a ten foot sound barrier around the oil pump. The Director, Planning and Building Department, shall review building plans and associated landscape plans to ensure implementation of this noise attenuation measure prior to issuance of occupancy permits.	
	11.5 The developer/builder shall install a ten foot high sound barrier around the oil pump named Alamitos 58 for any residential houses that are located within 251 feet of the pump. No homes are to be built within 50 feet of the large oil pump. The Director, Planning and Building Department, shall review building plans and associated landscape plans to ensure implementation of this noise attenuation measure prior to issuance of occupancy permits.	
	11.6 The developer/builder shall install mechanical ventilation, such as air conditioning systems, in the homes to ensure that windows can be closed for prolonged periods of time to achieve the required sound attenuation. The Director, Planning and Building Department, shall review building plans and associated landscape plans to ensure implementation of this noise attenuation measure prior to issuance of occupancy permits.	

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
4.12 Aesthetics		
Short-Term Impacts from Well Maintenance Activities	12.1 Prior to the issuance of use and occupancy permits, the applicant will provide the Director of Planning and Building with a disclosure form from the State Department of Real Estate to be signed by all prospective residents in the Alamitos Ridge project. This disclosure form will include the acknowledgment of operating oil wells on the project site and the location of fuel storage facilities, and industrial areas east of the project area.	Not applicable. Less than significant impact.
View Impacts from Continuing Oil Operations Adjacent to Residential Dwellings	No mitigation measures are feasible, but project design will incorporate 8 to 10 foot screen walls as required by City regulations.	Significant.
4.13 Public Health and Safety		
• Contaminated soils	13.1 Prior to issuance of grading permits, the project proponent shall demonstrate to the satisfaction of the Building Official and the Chief of the Long Beach Fire Department that adequate clearance and access to idle and active wells on the project site will be maintained for mobile rigs and well work over equipment.	Implementation of mitigation measures, planned and ongoing remediation programs, and safety systems in place will reduce impacts associated with public health and safety to below a level of significance.

Table 1.6.A: Summary of Project Specific Impacts, Mitigation Measures, and Level of Significance

Potential Environment Effect	Mitigation Measure	Level of Significance After Mitigation
• Impacted soils	13.2 Prior to issuance of building permits, the project applicant shall provide plans and specifications to the Building Official and the Chief of the Long Beach Fire Department demonstrating the following: all active wells shall be provided with safety shut down devices. All active wells and associated equipment within the project site shall be enclosed by a minimum eight foot block wall with barbed wire on the inside at the seven foot level. All walls will be configured to allow necessary servicing. Suitable gates, capable of allowing passage of large workover equipment, shall be provided in the enclosures. Each enclosure shall be graded to ensure containment of potential spills within the enclosure. To restrict access, the use of climbable landscaping around the perimeters of the enclosures shall be avoided. The project proponent shall demonstrate to the satisfaction of the Chief of the Long Beach Fire Department (or his/her representative) that suitable safety and fire protection measures (i.e., setbacks) have been incorporated into the project design.	

2.0 INTRODUCTION

This Environmental Impact Report (EIR) has been prepared to evaluate environmental impacts that will result from the development of a residential project on an approximately 15 acre parcel in the City of Long Beach. The City of Long Beach, as the Lead Agency, has the authority for preparation of the DEIR and, after the comment/response process, certification of the Final EIR (FEIR) and approval of the proposed project. The City of Long Beach and Responsible Agencies have the authority to make decisions on discretionary actions relating to the development of the proposed project. This EIR is intended to serve as an informational document to be considered by the City of Long Beach and the Responsible Agencies during deliberations on the proposed project.

2.1 PROJECT DISCRETIONARY ACTIONS

Project implementation will require discretionary approvals from the Lead Agency, the City of Long Beach, and one Responsible Agency: California Regional Water Quality Control Board (for NPDES Permit). Proposed project entitlements analyzed in this EIR are fully described in Chapter 3.0, Project Description, and are summarized as follows:

- **General Plan Amendment**—Currently, the project site is designated as "Mixed Use" Land Use District (LUD) No. 7 according to the Land Use Element of the General Plan. The proposed project does not include a mix of land uses; therefore, an amendment to the General Plan Land Use Element is required to change the designation to LUD 1, "Single Family."
- **Zoning Ordinance and Planned Development Ordinance Amendment**—The project site is currently zoned as PD 17, Subarea 2, Alamitos Land Planned Development. The proposed single family residential development is inconsistent with Subarea 2 of PD 17, which prohibits residential uses. An amendment to the PD is required to accommodate the proposed project.
- **Vesting Tentative Tract Map**—Vesting Tentative Tract Map (No. 52702) will subdivide the properties into separate residential lots for financing and development purposes. This subdivision will establish the legal perimeter boundaries of each residential lot.
- **NPDES Permit Compliance**—Required prior to discharge of stormwater from the site.
- **Other Permits**—Other actions contemplated for approval of the proposed project include ancillary ministerial permits and approvals, such as grading permits, building permits, sign permits, lighting plan approvals, utility connection approvals, and street work permits issued by the City.
- **Site Plan Review**—Site Plan Review by the Planning Commission is required prior to approval of Tentative Tract Map.

2.2 PURPOSE AND TYPE OF EIR/INTENDED USES OF EIR

The purpose of this EIR is to inform decision makers and the general public of any significant adverse environmental effects associated with the proposed actions and to identify appropriate and feasible mitigation measures and alternatives that may be adopted to minimize or eliminate any significant project or cumulative effects. An evaluation of potential project alternatives is included in this EIR, including: 1) No Development/No Build Alternative, 2) No Project/Existing General Plan Alternative, 3) one lower intensity on-site alternative, and 4) one off-site alternative.

This EIR has been prepared in accordance with the California Environmental Quality Act of 1970 (CEQA), as amended (Public Resources Code, Section 21000 et seq.), and the State Guidelines for Implementation of CEQA (California Code of Regulations, Title 14, Section 15000 et seq.). This EIR also complies with the procedures for implementation of CEQA as required by the City of Long Beach.

The approach of this "Project EIR" is described in Section 15161 of the State CEQA Guidelines. A "Project EIR" focuses primarily on the changes in the environment that would result from transition of the project site to development of the proposed project. Therefore, this EIR will examine all phases of the project, including construction and ongoing operation of the project.

2.3 INITIAL STUDY AND NOTICE OF PREPARATION

On February 13, 2001, a Notice of Preparation (NOP) was distributed by the City of Long Beach via the State Clearinghouse for the proposed Alamitos Ridge residential project. Responses to the NOP were received from the following:

- California Department of Fish and Game
- California Department of Toxic Substances Control
- California Department of Transportation (Caltrans)
- South Coast Air Quality Management District
- Southern California Association of Governments
- County of Los Angeles Public Works
- County of Los Angeles Fire Department
- County Sanitation Districts of Los Angeles County
- City of Long Beach Department of Planning and Building
- City of Long Beach Police Department
- City of Signal Hill
- Native American Heritage Commission

2.4 EFFECTS FOUND NOT TO BE SIGNIFICANT

As required by CEQA Guidelines, Section 15128, this EIR must identify effects of the proposed project determined to be significant. The Initial Study prepared by the City of Long Beach (see Appendix A) determined that the following environmental effects of the proposed project will not be significant:

Water Resources

There are no direct or indirect impacts to water bodies or surface water resources resulting from the proposed project due to the distance from any open water body, stream, or tributary. Therefore, there are no significant adverse impacts of the proposed project related to these water resources.

Biological Resources

The project site is highly disturbed, and native vegetation is scarce. The area is within an urban built environment and is not connected to any wildlife corridor or established native habitat area nor is it included within a locally protected biological resource area. On September 11, 2000, an LSA Associates, Inc. biologist visited the site and performed a reconnaissance survey. No sensitive, threatened, or endangered species was observed (refer to Appendices A and B). A second survey was conducted on November 26, 2002, by LSA staff biologist Jim Harrison. No sensitive species, including the southern tar plant, was observed on site. Therefore, there is no conflict with any biological resource policy or ordinance. No impacts are expected.

2.5 FORMAT OF EIR

Chapter 1.0—Executive Summary

Chapter 1.0 contains the Executive Summary of the EIR document, listing all project impacts, mitigation measures that have been recommended to reduce any significant impacts of the proposed project, and the level of significance of each impact following mitigation. The summary is presented in a matrix (tabular) format.

Chapter 2.0—Introduction

Chapter 2.0 contains a discussion of the required discretionary actions, purpose and intended use of the EIR, background on project initiation and the Notice of Preparation. A summary discussion of effects found not to be significant and, therefore, not included in the EIR analysis is included in this chapter.

Chapter 3.0—Project Description

Chapter 3.0 includes discussion of the project's geographical setting, the site's previous use as an industrial and oil production use, and the project's goals, objectives, characteristics, components and phasing.

Chapter 4.0—Existing Setting, Impacts, and Mitigation Measures

Chapter 4.0 includes an analysis of the project's environmental impacts. It is organized into topical sections, including Land Use, Public Services and Utilities, Geotechnical Conditions, Water Resources, Aesthetics, Traffic and Circulation, Population and Housing, Air Quality, Noise, and Public Health and Safety.

The environmental setting discussions describe the "existing conditions" of the environment on the project site and in the vicinity of the site as it pertains to the environmental issues being analyzed (Section 15125 of the CEQA Guidelines). The project impact discussions identify and focus on the significant environmental effects of the proposed project. The direct and indirect significant effects of the project on the environment are identified and described, giving due consideration to both the short-term and long-term effects as necessary (Section 15126.2[a] of the CEQA Guidelines).

Cumulative impacts are based on the build out of the project and the surrounding area, including all other known proposed projects in the surrounding area.

The discussions of mitigation measures identify and describe feasible measures that could minimize or lessen significant adverse impacts for each significant environmental effect identified in the EIR (Section 15126[c] of the CEQA Guidelines). The level of significance after mitigation is reported in each section. Unavoidable adverse effects are identified where mitigation is not expected to reduce the effects to insignificant levels.

Chapter 5.0—Alternatives to the Proposed Project

In accordance with CEQA, the alternatives discussion in Chapter 5.0 describes a reasonable range of alternatives that could feasibly attain the basic objectives of the project and that are capable of eliminating any significant adverse environmental effects or reducing them to a level of insignificance. On-site alternatives analyzed in Chapter 5.0 include: No Project, No Development/No Build, and design alternatives.

Chapter 6.0—Long-Term Implications of the Project

Chapter 6.0 includes CEQA mandated discussions of the relationship between local short-term uses of the environment, significant irreversible environmental changes that would result from implementation of the proposed project and growth inducing impacts of the proposed project.

Chapter 7.0—Inventory of Mitigation Measures

Chapter 7.0 provides a listing of all proposed project mitigation measures.

Chapter 8.0—Inventory of Unavoidable Adverse Impacts

Chapter 8.0 describes those significant adverse environmental impacts for which either no mitigation or only partial mitigation is feasible.

Chapters 9.0, 10.0, and 11.0

Chapters 9.0, 10.0, and 11.0 provide the organizations and persons contacted, the EIR preparers, and the references used in this EIR.

2.6 CONTACT INFORMATION/LEAD AGENCY CONTACT

The Lead Agency for this Alamitos Ridge Residential Project EIR is the City of Long Beach. Questions regarding the preparation of this document and City review of the project should be referred to the following persons:

City of Long Beach
333 West Ocean Boulevard, Long Beach, California 90802
Attention: Mr. Gerry Felgemaker, Community and Environmental Planning Officer
(562) 570-6894

3.0 PROJECT DESCRIPTION

3.1 INTRODUCTION

Alamitos Ridge (LLC), Attention: Ms. Frawn Granados, LePlastier Management Company Inc., 19800 Mac Arthur Boulevard, Suite 750, Irvine, California, 92612, has submitted an application requesting City of Long Beach approval of the proposed Alamitos Ridge residential project consisting of 106 single family residences with private internal roadway access. This DEIR has been prepared by LSA for Alamitos Ridge LLC for submittal to the City of Long Beach, Department of Planning and Building, for processing, review, and distribution according to CEQA regulations, consistent with the CEQA Guidelines. Prior to release for public review and consideration by the City of Long Beach decisionmakers, this DEIR was independently reviewed and approved by the City of Long Beach. The City is circulating this DEIR on the environmental effects of development of the 106 single family dwelling unit development. This section describes the project, its location, and the discretionary actions and permits required for project implementation.

3.2 PROJECT LOCATION/SITE CONTEXT

The project site consists of 14.1 acres (net) total, and is located entirely within the City of Long Beach. The site is part of a larger parcel that is surrounded on three sides by the City of Signal Hill. The City of Long Beach is approximately 20 miles south of downtown Los Angeles and is adjacent to the Pacific Ocean. Figure 3.1 depicts the project location in a regional context.

The proposed project site is currently undeveloped, with limited ongoing oil extraction wells on the site. The project site is within the Long Beach Oil Field (Signal Hill East Unit, or SHEU), an active field since the early 1900s. The oil field is currently operated by Signal Hill Petroleum. The project site has active oil wells on it, and a portion of the site was formerly used as an oil field staging area known as the "boneyard."

The project boundaries consist of Redondo Boulevard to the east, Obispo Avenue to the west, and 20th Street to the south. A K-8 school has been proposed for the site immediately adjacent to the north of the proposed project site, and the Long Beach Unified School District has purchased the site. The project site boundary is shown in Figure 3.2.

Land uses surrounding the project site include a water injection plant south of the site, National Guard Armory and multiple family residential east of the site, residential and light industrial uses to the west, and heavy industrial to the north, beyond the school site.

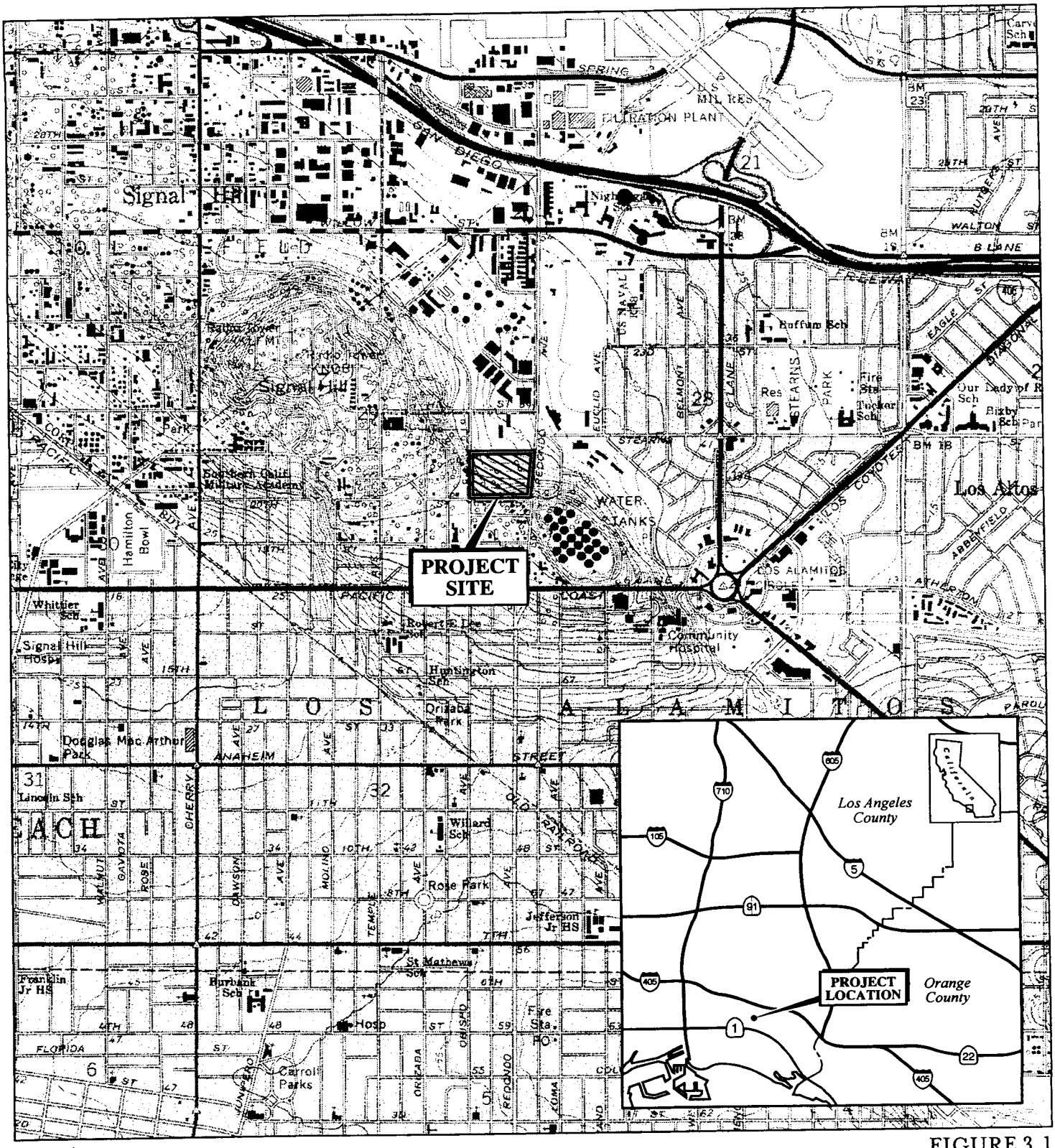

FIGURE 3.1

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BASE MAP SOURCE: USGS 7.5' QUAD - LONG BEACH, CALIF.

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Alamitos Ridge Residential Project EIR

Project Location

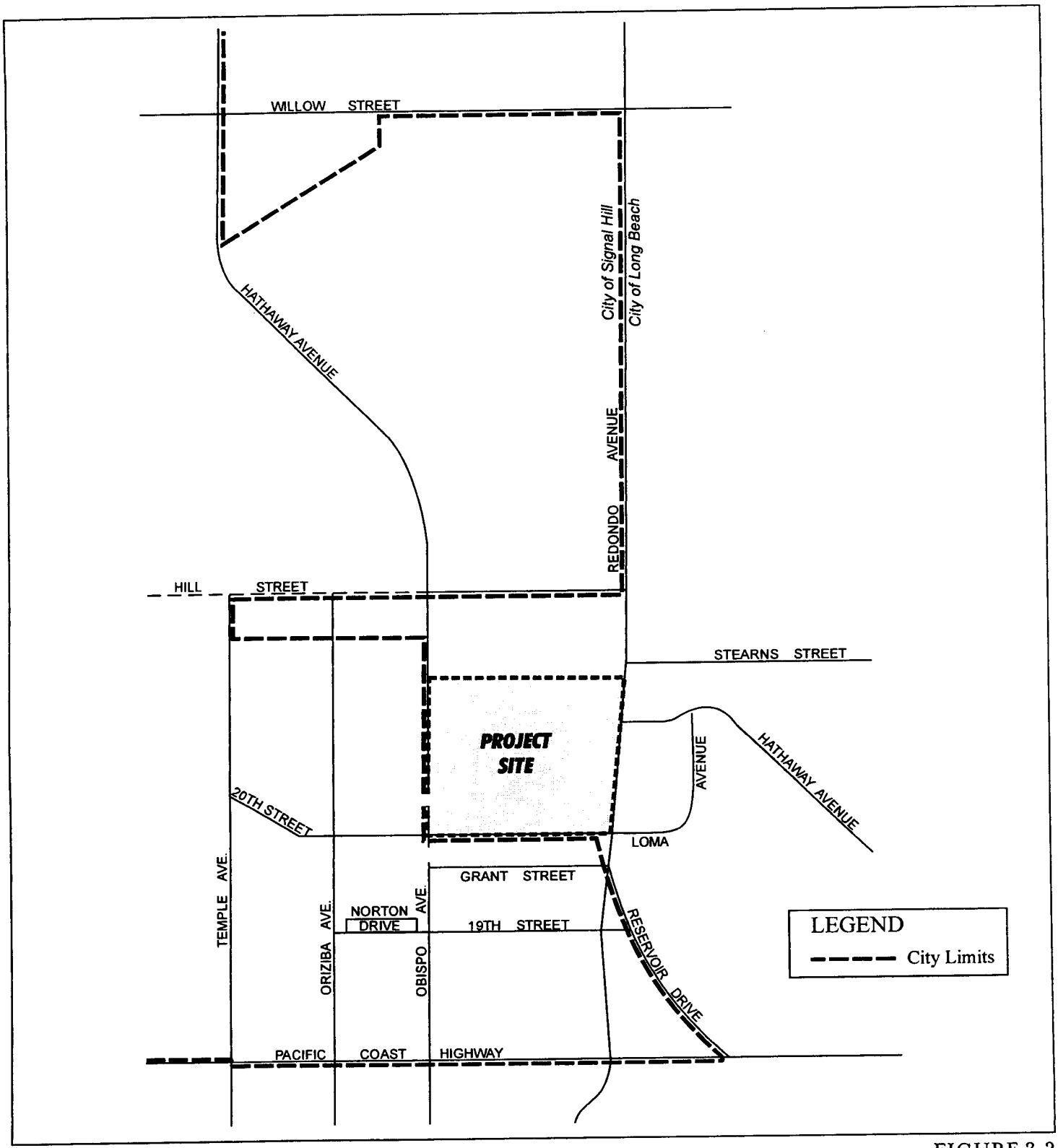

FIGURE 3.2

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Alamitos Ridge Residential Project EIR

Site Location Map

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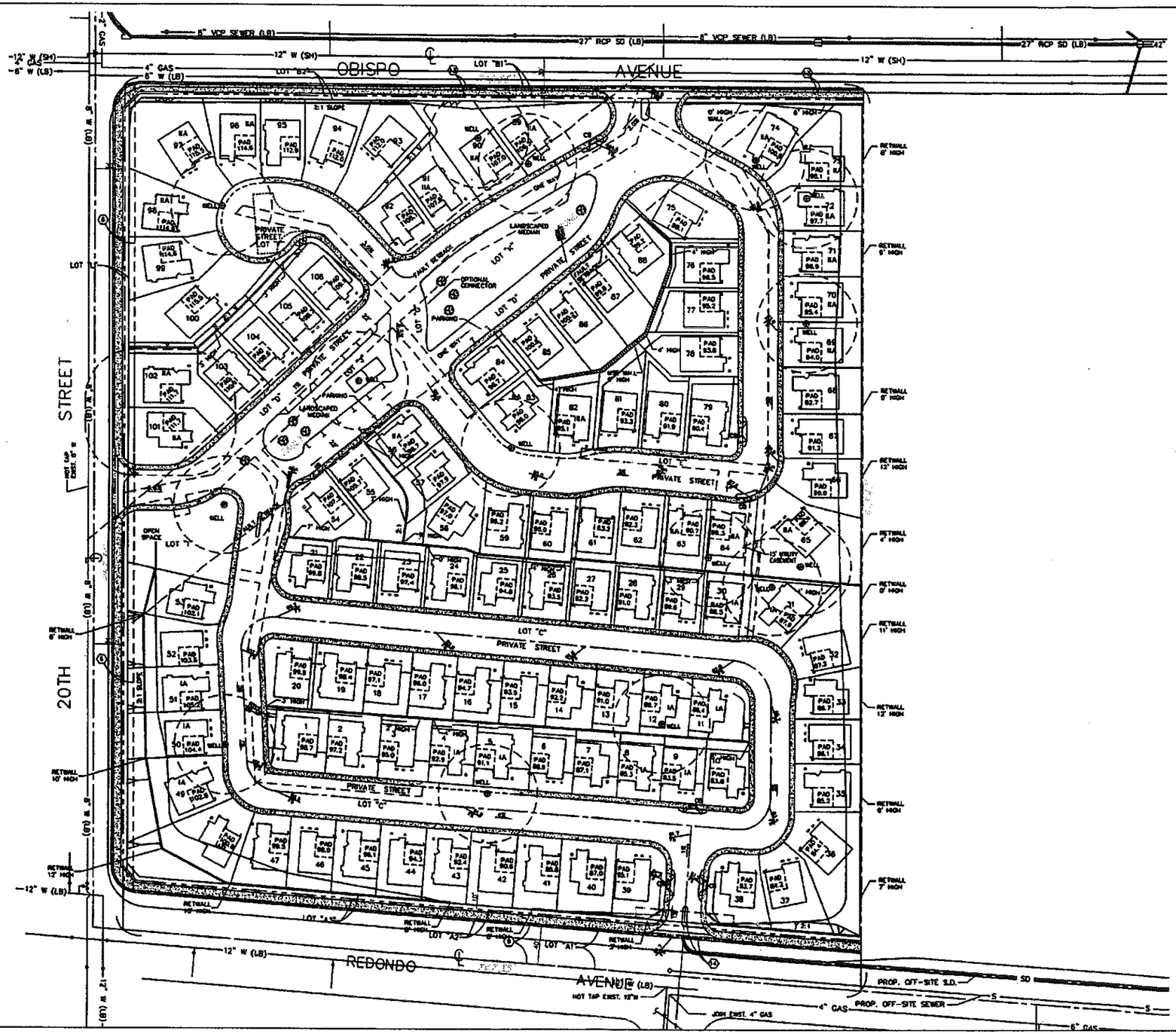

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FIGURE 3.3

SOURCE: DEVELOPMENT RESOURCE CONSULTANTS, INC.

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3.3.4 Utility Relocations

As part of the proposed project, the on-site oil pump station will be relocated off site from the southern portion of the project site to across Obispo Avenue east of the site.

3.3.5 National Pollutant Discharge Elimination System Permit

The project will need to comply with both the State General Construction Activity Stormwater Permit (99-08-DWQ) and the City of Long Beach Municipal Stormwater Permit (CA5004003 [C18052]). The project proponent must submit a Notice of Intent (NOI) to comply with the construction activity permit and a Storm Water Pollution Plan (SWPPP) to the City before a grading permit will be issued. Refer to Section 4.4, Water Resources, for further discussions on National Pollutant Discharge Elimination System Permit (NPDES).

3.3.6 Other Permits

Ministerial permits/approvals, such as grading permits, building permits, and street work permits, would be issued by the City to allow the applicant to prepare the site and to construct the proposed project.

3.4 PROJECT CHARACTERISTICS

3.4.1 Development Proposal

The proposed project, as outlined in the project application and depicted in Tentative Tract Map (TTM) No. 52702 (shown in Figure 3.3), subdivides the property, provides infrastructure, and provides City approvals allowing construction of up to 106 single family dwelling units and an integrated circulation system. The proposed project includes remediation of soil contamination from on-site oil production activities (Appendix F includes a Remedial Work Program). Table 3.4.A provides site acreage by land use area. Table 3.4.B identifies the development standards within the Planned Development. The architectural style of the proposed residences is characterized as bungalow/prairie/craftsman. The proposed overall maximum density of the project is approximately 7.5 units per net acre.

Table 3.4.A: Development Areas

Area	Acres
Development Area	9.4
Private Streets, Utility Easements, Emergency Access	3.9
Landscaped Areas/Open Space	0.8
TOTAL NET ACREAGE	**14.1**

Table 3.4.B: Development Standards Table

Standard	Unit
Maximum Density	7.5 du/net ac
Minimum Lot Site	3,000 S.F.
Minimum Floor Area (square footage)	1,670-2,600
Maximum Floor Area Ratio	67%
Maximum Building Height	29 feet/2 stories
Minimum Building Setbacks:	
Front	8 feet
Side	4 feet
Rear	8 feet
Minimum Covered Parking	2 enclosed spaces per unit
Minimum Driveway Length	18 feet
Usable Open Space[1]	6%

3.4.2 Internal Circulation

Proposed internal circulation is identified in Figure 3.3 and consists of a local residential collector that provides access to residential lots. There are three entries into the project site, one from each of the major roadways surrounding the site (Redondo Avenue, Obispo Avenue, and 20th Street).

3.4.3 Infrastructure Improvements and Extensions to the Site

On-Site and Off-Site Infrastructure. The single family residences and project infrastructure components to be implemented through PD-17 will require improvements to, and connection with, off-site and on-site infrastructure systems. These systems, consisting of water, electricity, natural gas, telephone and cable television/telecommunication lines, sewerage, storm drains, and street construction and maintenance, will be constructed on the project site at the cost of the developer and will be maintained by appropriate agencies. In addition, the infrastructure to serve the active wells will be reconstructed under the project streets, including water, electric, vacuum, water recovery, gas production, and gas recovery lines.

A backbone infrastructure plan has been developed to serve the proposed uses. Infrastructure plans and connections to off-site utilities are further described and assessed in Section 4.7, Public Services/Utilities.

[1] Exclusion of driveways and yards of less than 5 feet in width.

Water, Sewer, and Gas Utilities. The water, sewer, and gas distribution system is depicted on TTM No. 52702 (Figure 3.3). The water and sewer system will be constructed to City of Long Beach Water Department (LBWD) standards and maintained by the LBWD, the provider of potable water within the City. The natural gas lines will be constructed to City of Long Beach Gas Company (LBGC) standards and maintained by the LBGC, the provider of natural gas within the City. The proposed water, sewer, and natural gas improvements include the following components:

- Construction of water delivery and on-site sewer collection and elimination systems.
- Construction of a sewer connection to the existing sewer line is Redondo Avenue.
- Construction of a water pipeline connecting the development to an 8 inch water line is 20th Street and to a 12 inch water lines in Redondo Avenue and Obispo Avenues.
- Construction of a gas pipeline connecting the development to the four inch gas line in Redondo Avenue.

Storm Drain System. A surface drainage/storm drain system has been developed to collect and convey runoff on the project site into the existing and planned City storm drain system. A Preliminary Hydrology Study has been prepared for the project and is included in Appendix G of this EIR. Storm runoff from on-site development and slopes will be collected by on-site surface streets and conveyed to inlet structures. Runoff is then conveyed into a storm drain pipe located within the planned local street system, to be connected to a storm drain to be constructed within Redondo Avenue, near the northeast corner of the property. This drainage pipe would continue north along Redondo Avenue to connect with the existing drainage system near Hill Street. On-site drainage will be discharged via outlet structures into existing City storm drain facilities and public streets. The project is subject to the new Los Angeles County Standard Urban Storm Water Mitigation Plan and is required to implement structural or treatment control Best Management Practices (BMPs) as required (refer to Section 4.4, Water Resources). A Preliminary SUSMP is included in the project and is included in its entirety in Appendix H.

3.4.4 Design Guidelines

The project applicant has submitted Design Guidelines that define the proposed approach to site planning, architecture, lighting, landscaping, and other design elements of the proposed project. These guidelines include a framework for implementing the requirements of the Planned Development District (PDD) zone, the City's grading ordinance, and other City ordinances.

Architecture

The architectural goal of the proposed project is to create varied architecture that, is compatible with and complementary to the historic context of the City of Long Beach. The architectural styles proposed in Design Guidelines for the project are a mixed vernacular of bungalow/prairie/craftsman style.

Hardscape Elements

Several hardscape elements are proposed throughout the project and include walls, columns, fences, paving, and lighting. These elements are highlighted below.

Walls and Fences. Walls and fences are proposed to provide privacy and landscape definition within the project and are extensions of the overall architectural theme. Figure 3.3 depicts the wall and fence plan for the proposed project.

Lighting. All streets within the proposed project are proposed to feature uniform lighting standards with regard to style, materials, and colors. Lighting fixtures for individual homes all to be integrated into the architectural theme. All outdoor lighting is to be designed to prevent glare and illumination on adjoining property or open space areas.

Softscape/Landscape Elements

Figure 3.3 depicts the landscape concept for the project. Design features include enhanced project entries, local streetscapes, and meandering open space edges. All landscaped areas are to be planted with turf, groundcover, shrub, or tree materials, as specified in the plant palette for the development area. The proposed plant palette consists both of evergreen and semi-deciduous trees along the street edge, with a mix of deciduous and evergreen trees adjacent to the parkways in order to create a hierarchy of levels in the planting theme. Plant materials have been selected for their appropriateness to the community theme, climatic conditions, soil conditions, and maintenance requirements.

Entries and Signage

Several entries have been identified for the proposed project, including two main entries into the community from Redondo Avenue and Obispo Avenue and a secondary neighborhood entry from 20th Street. The proposed fencing and entries are similar to the Bixby Ridge (excluding the private entry gates) project adjacent to the northeast of the project, and include masonry pilasters at the entries. For the two main community entries, pilaster accented fencing is proposed to be incorporated, along with project identification signage and wall and plant materials integrated with fencing. Brick pilasters and decorative caps on walls will be used for the neighborhood entry.

3.4.5 Oil Facilities and Operations

The existing project site is an operating oil field with 13 wells on it. Most of the wells are operated and maintained as part of a unitized field known as the Signal Hill East Unit (SHEU). The well operator is Signal Hill Petroleum, Incorporated (SHPI). The unitized field wells are operated using secondary production methods, where water is pumped into the ground to force the oil trapped in geologic layers to the oil well, where it is pumped. There is one deep well on the site that is in primary production (pumping) and is wholly owned by the underlying landowners (well Alamitos 58). All of the operating oil wells will be located on legally subdivided lots as part of the proposed

Alamitos Ridge subdivision. The wells will continue to be operated as long as they remain economically productive. It is not possible to estimate how long they will remain productive; however, it is anticipated that different wells will be terminated and abandoned at different times in the future, at which time the lots on which they are located can be prepared and made available for development of a single family dwelling unit.

Wells Nos. 45, 46, Alamitos 48, 65, 67 and 960 have been abandoned in accordance with the requirements of the State (see below) and the City of Long Beach. There are five wells that inject reclaimed water into the field (Nos. 61. 62. 74. 84 and 953).[1] Producing wells that will remain operational with the implementation of the project are Nos. 54, 63, 64, 66, 73, 75, 83, and Alamitos 58.Producing and injection wells are described in Section 4.13, Public Health and Safety.

Abandonment of a well means the permanent plugging of a well in accordance with the California Division of Oil, Gas, and Geothermal Resources (DOGGR). The procedures are described in Section 4.13. All 13 operating wells will eventually be abandoned; however, the timing of abandonment will be determined by the oil well operator(SHPI). As the site is developed, some wells will remain in operation with a 50 foot building setback. Therefore, a total of 21 of the 106 subdivided lots will not be developed until the wells on or within 50 feet of the building envelope of these lots are terminated and abandoned. However, no operating oil well will occupy the same pad concurrently with a house. Figure 3.4, the Interim Site Plan, shows the wells that will remain in operation during site development. The project will not be built out until all wells have been abandoned. In addition, abandoned wells directly below or within 20 feet of a home will be vented in accordance with the DOGGR and the Long Beach Fire Code requirements. Well locations and status and venting are described in Section 4.13, Public Health and Safety.

3.4.6 Site Remediation

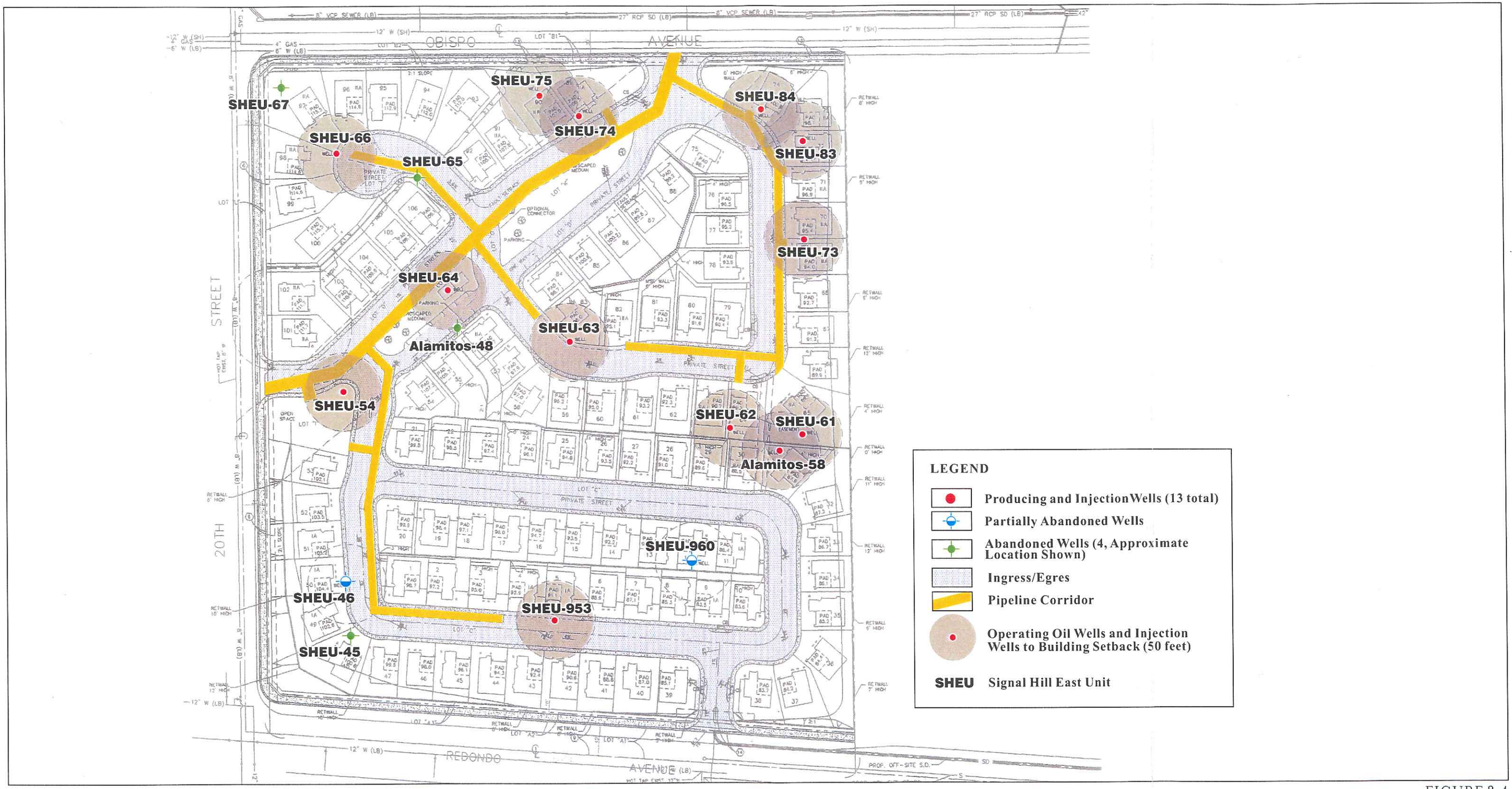
A Remedial Work Plan (RAP), which addresses the methods and procedures for treating petroleum hydrocarbon (crude oil) impacted soils on the site, has been prepared by Brecon (refer to Section 4.13, Public Health and Safety). The RAP is included in this project description and is hereby incorporated by reference. The RAP is included in this EIR, Appendix F.

The RAP includes methods and procedures to guide clean up of contaminated soils on the site. The primary objective of the RAP is to remediate soil conditions to achieve acceptable levels of contaminants and/or remove the pathways of contamination to comply with EPA published guidelines for residential development.

3.5 IMPLEMENTATION/PHASING

The implementation of the Alamitos Ridge project will include site remediation, site preparation, mass grading and fine grading, trenching, installation and connection of utilities, construction of internal streets and sidewalks, perimeter landscape, perimeter curbs, gutters and street sections, and

1 The water that is used for injection is water that is reclaimed from the production process and treated by a reclaimed water system.



SOURCE: DRC, Inc., Drilling & Production Company

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LSA

FIGURE 3.4

Alamitos Ridge Residential Project EIR

Phase I Interim Site Plan

connection of on-site public utilities to utilities into the public street rights-of-way. The scope of the project requires the removal and reconstruction of the well infrastructure, as described in Section 3.4.3. The well operations will be shut down while the new well infrastructure is constructed under the future streets. The project also includes coordination of public infrastructure improvements and connections for proposed project. Circulation, drainage, water, electrical, gas, and sewer system improvements will be integrated with the existing City and utility owned infrastructure.

INSERT 3

3.6 PROJECT OBJECTIVES

Pursuant to Section 15124 of the CEQA Guidelines, the description of the proposed project contains a statement of the objectives sought for development of the proposed project.

The primary goal of the applicant, Alamitos Ridge LLC, is to construct and have ready for occupancy 106 single family residences. The new dwelling units will offer detached housing in a competitive price range in the City of Long Beach, consistent with adopted City policies. The project objectives include the following:

1. Approve discretionary permits that will allow residential development of the site, consistent with the Housing Element goal of increasing overall housing opportunities within the City of Long Beach.
2. Promote pedestrian scale and a superior neighborhood ambiance consistent with the City of Long Beach's character through quality project design and streetscape standards subject to a City approved Planned Development Plan (PD) PD-17.
3. Provide a circulation system designed to accommodate both automobile and pedestrian movement compatible with residential uses.
4. Promote cohesive physical design schemes that enhance the quality of the surrounding neighborhood and mixed-use district.
5. Promote compatibility of proposed development with existing oil facilities and operations, consistent with provisions of Chapter 12 of the Long Beach Municipal Code, entitled "Oil Code."
6. Enhance the economic vitality of the City of Long Beach through redevelopment of this underutilized property.

The Alamitos Ridge project seeks to accomplish two primary goals. The first is to allocate land uses and densities consistent with the City's General Plan and sensitive to the physical constraints of the site. The second is to facilitate quality residential development that creates a cohesive and distinctive neighborhood, integrated with public access.

3.7 INTENDED USES OF THE EIR/PROJECT APPROVALS

The purpose of this EIR is to analyze the proposed development and activities further described and analyzed in Section 4.0.

Further, this EIR is intended to inform decision makers and the public of the environmental effects of implementing the proposed project and of the alternatives available that lessen or avoid significant impacts. This EIR analyzes and documents the impacts of the proposed Alamitos Ridge residential project and all discretionary and ministerial actions associated with the project. The City of Long Beach, as Lead Agency, will use this EIR in assessing the effects of the City actions detailed above.

The project will be regulated by the Regional Water Quality Control Board (RWQCB) for stormwater as well as oil well abandonment and remediation issues under regulations promulgated by the U.S. Environmental Protection Agency (EPA) and the California Environmental Protection Agency.

The Responsible Agencies that may use this EIR when making future discretionary actions related to the project are identified below. Section 15381 of the CEQA Guidelines defines Responsible Agencies as public agencies other than the Lead Agency that will have discretionary approval power over the "project," as defined under CEQA.

Responsible Agency	Action
Regional Water Quality Control Board	The project must comply with the State General Construction Activity Stormwater Permit. The project must remediate impacted soils at the site to levels approved by the RWQCB.

3.8 DOCUMENTS INCORPORATED BY REFERENCE

Section 15150 of the CEQA Guidelines permits an EIR to incorporate by reference documents that provide relevant data. The documents outlined in this section are hereby incorporated by reference, and the pertinent material is summarized throughout this EIR, where information is relevant to the analysis of impact of the proposed project. All documents incorporated by reference are available for review at the City of Long Beach, Community and Environmental Planning Department, 333 West Ocean Boulevard, 5th Floor, Long Beach, CA 90802.

- Draft and Final Environmental Impact Report for the Bixby Ridge Specific Plan. Prepared by LSA Associates. 1997.
- Health Risk Assessment for the Southeast Parcel for the Alamitos Land Company, Long Beach, California. Prepared by ENVIRON Corporation, Emeryville, California. June 3, 1999.
- Planning for Development Study for the Alamitos Land Company Properties Located Between Temple and Redondo Avenues, Cities of Long Beach and Signal Hill, Los Angeles County,

California. Prepared by Leighton and Associates, Geotechnical Consultants, Irvine, California. December 14, 1993.

- Traffic Impact Study, Alamitos Ridge Residential Project, Long Beach, California. Prepared by Linscott, Law & Greenspan Engineers, Pasadena, California. March 1, 1999, and updated in November 2002 (see Appendix I).

4.1 LAND USE

The following section analyzes the proposed project's potential impacts upon existing and planned land uses, as well as consistency with General Plan and Zoning designations.

4.1.1 EXISTING ENVIRONMENTAL SETTING ~~OF THE PROJECT~~

The project site is within the jurisdictional boundaries of the City of Long Beach. The City of Signal Hill borders to the south, west, and north (across Hill Street) of the project site. The site consists of 15.5 gross acres of land containing abandoned and operating oil wells, a storage yard/stockpile area, sumps, dry vegetation, and undeveloped land. The project site is bounded by Redondo Avenue (east), 20th Street (south), Obispo Avenue (west), and undeveloped land (north).

On-Site Land Uses

The project site is currently undeveloped with several oil extraction wells operated by Signal Hill Petroleum. The site has been an active oil field since the Long Beach Oil Field began oil production in 1921 and possibly since 1910. The oil field operations on the site have included oil well drilling, production, and associated support activities. Seven former sumps observed adjacent to the oil derricks were historically used for disposal of by-products from the oil production.

Adjacent Land Uses

The surrounding area is composed primarily of existing residential uses and undeveloped property planned and approved for residential use (east and west); to the north is undeveloped land owned by the Long Beach Unified School District and planned for a K-8 school, and light industrial uses are to the south. Figure 4.1.1 depicts the land uses surrounding the project site.

North: Property immediately north of the project site is undeveloped land within the City of Long Beach. Long Beach Unified School District has acquired this site to develop a K-8 school. Further north, across Hill Street, is a business park and the Arco Hathaway Terminal (tank farm) located within the City of Signal Hill.

South: South of the project site, across 20th Street, are light industrial uses, including office buildings, undeveloped property with oil wells, and oil reservoir tanks located within the City of Signal Hill.[1]

[1] Telephone conversation with Troy Helling, Planning Division, City of Signal Hill, August 14, 2000.

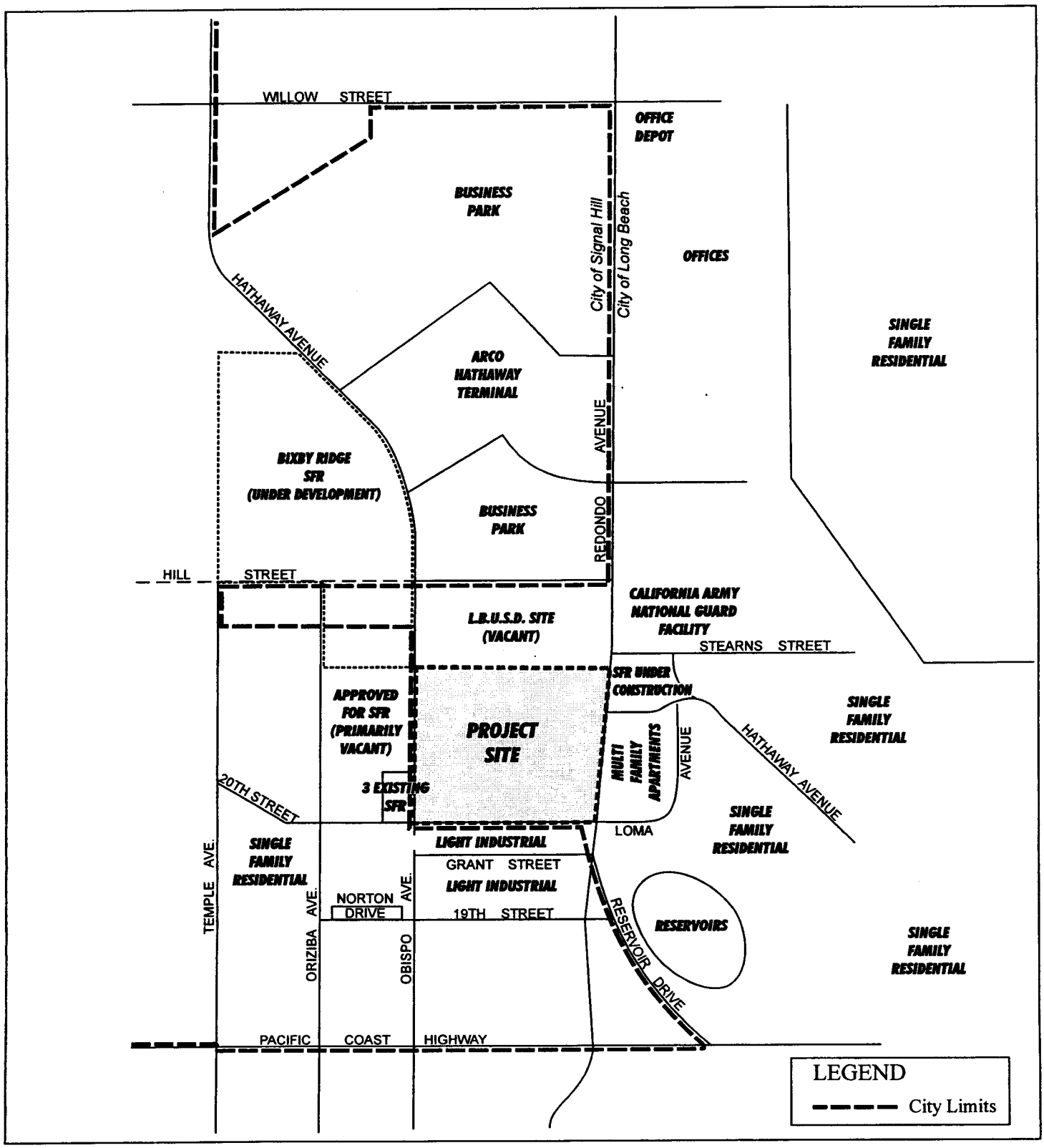

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FIGURE 4.1.1

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Alamitos Ridge Residential Project EIR

Project Area Land Uses

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West: To the west, across Obispo Avenue, are single family residential homes and land located within the City of Signal Hill. The undeveloped land is under development with single family residential homes.

East: To the east are apartment complexes and undeveloped land (northeast). According to the City of Long Beach Planning Department, a proposal to develop 14 single family dwelling units has been approved and is now under development for the undeveloped property.[1]

Surrounding Residential. Bixby Ridge is a 188 single family dwelling (SFD) unit residential area located northwest of the project site. Alamitos Green is a 14 single family residential development located just east of the project site, across Redondo Avenue. Four custom homes are located west of the site, just across Obispo Avenue. The homes are part of a large site being developed fully into a residential area with SFD units. Farther west, beyond the custom home site, is an existing residential area.

Plans and Regulations

Regional Plans. The Southern California Association of Governments (SCAG) adopted the Regional Comprehensive Plan and Guide (RCP&G) in September 1994. SCAG also prepared the 2000 Regional Housing Needs Assessment (RHNA) for the region and allocates the housing needs among the SCAG subregions. The City of Long Beach is within the Gateway Cities subregion.

General Plan. The City of Long Beach General Plan provides goals, objectives, and policies that guide City decision makers in directing future growth and development. At the heart of the General Plan is the Land Use Element, adopted in 1988 and revised April, 1997, which regulates the types of use and land use intensity within the City. The Land Use Element of the General Plan specifies various districts which comprise the land use portion of the General Plan. The four main categories of land uses are: 1) Residential, 2) Commercial, 3) Industrial, and 4) Others (Open Space, Institutional, and Port/Airport).

The purpose of the Land Use Element is to indicate the general location of land uses and the interrelationships of various land use patterns. In 1986, the Long Beach 2000 Strategic Plan was completed, outlining the long-range goals and policies for development in the City of Long Beach through the year 2000. The Strategic Plan established the goals for the General Plan. Those goals dealing with population growth, economic development, housing, infrastructure, and transportation relate most specifically to the Land Use Element of the General Plan. The goals of the Land Use Plan relevant to development of the subject parcel are as follows:

[1] Telephone conversation with Greg Carpenter and Ron Cruz, Planners, Planning Bureau, City of Long Beach, August 14, 2000.

Managed Growth. Guide growth to have an overall beneficial impact upon the City's quality of life.

New Housing Construction. Emphasize for-sale housing for first-time home buyers and upscale residential development in and around the downtown area.

Neighborhood Emphasis. Develop a citywide quality living environment by assisting and supporting the efforts of residents to maintain and strengthen their neighborhoods.

An update to the Long Beach 2000 Strategic Plan, "Long Beach 2010," was recently completed. The new strategic plan includes goals and actions to achieve the long-range vision of the General Plan. The Strategic Plan focuses on goals in five areas: neighborhoods, youth and education, safety, economic opportunity, and the environment. In preparing the new Citywide Strategic Plan, Long Beach 2010, a community survey, called the Community Scan, was conducted in 1997 to determine the key issues and concerns of residents, businesses, and community groups. The 2010 Strategic Plan incorporated the Community Scan input and set forth the following seven strategies:

- Becoming a community of neighborhoods
- Focusing on youth and education
- Providing community safety for everyone
- Creating economic opportunity
- Enabling a progressive environmental community
- Empowering citizens and linking communities using technology
- Ensuring accountability by measuring and reporting progress

Figure 4.1.2 illustrates the General Plan land use designations for the site. Currently, the project site is designated as "Mixed Use" Land Use District (LUD) No. 7 by the Land Use Element of the General Plan. The "Mixed Use" category allows a mix of residential uses along with commercial and office uses. The City has reserved the subject parcel for nonresidential use in the Planned Development (PD) zoning for the site (PD-17).

The proposed project includes both a General Plan amendment and an amendment to PD-17. The General Plan Amendment would change the Land Use designation of the site to LUD 1, "Single Family."

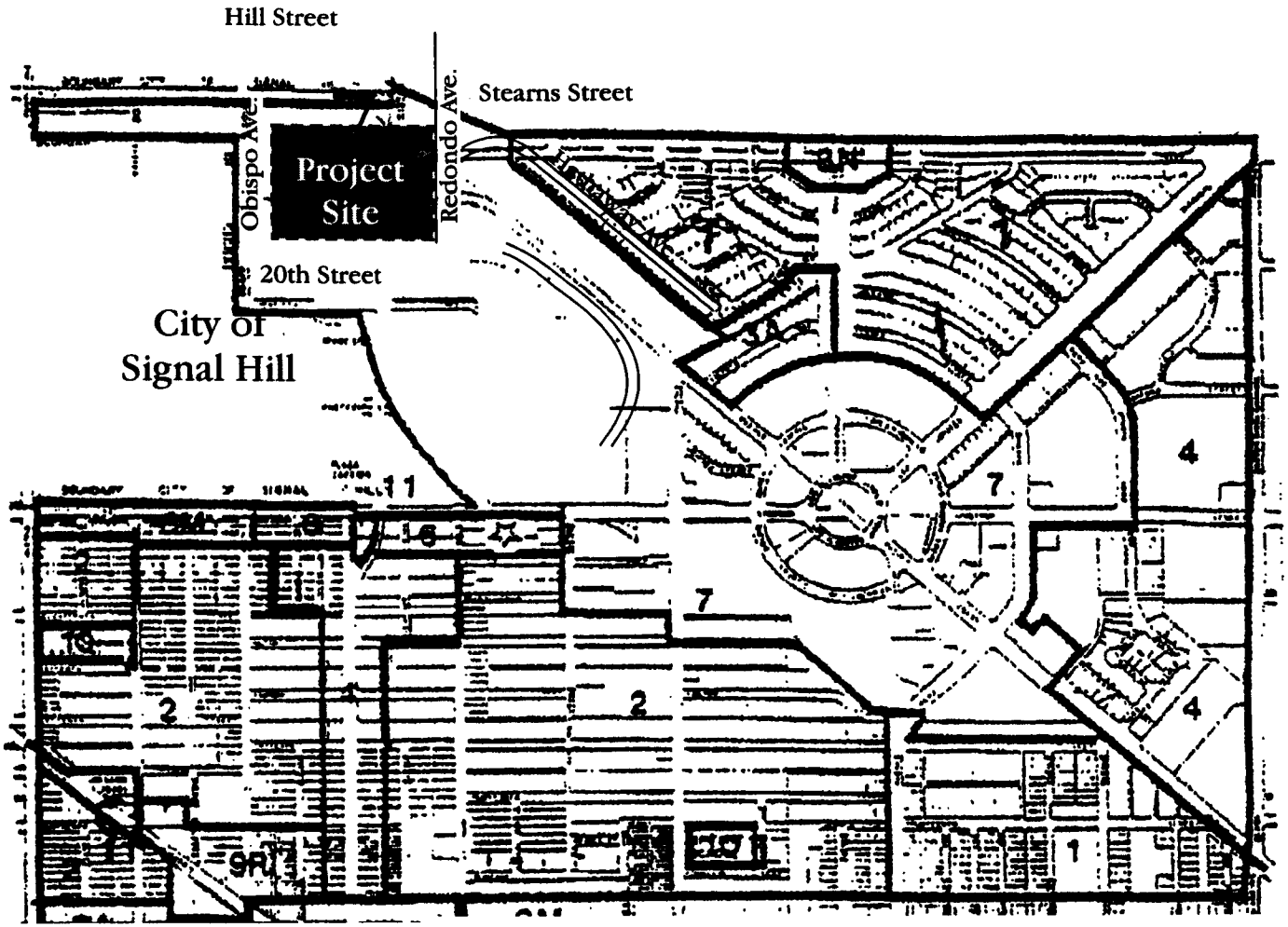

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FIGURE 4.1.2

N

NO SCALE

SOURCE: USGS 7.5' QUAD - EL TORO, 1988

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Alamitos Ridge Residential Project EIR

Current General Plan Designations

Zoning Ordinance and Property Zoning. Zoning is the division of a City into districts and the application of development regulations specific to each district. It is the intent of the City to have the General Plan Land Use Element and the Zoning Ordinance be consistent in order to ensure that long-term goals and objectives are implemented through land use regulations and other tools. The zoning ordinance and zoning designations of the land are primary tools implementing the City's General Plan.

Development of the property is regulated under the Planned Development No. 17 (PD-17), Alamitos Land Planned Development(Ordinance C-6186). Planned Development ordinances approved by the Long Beach City Council serves as the applicable zoning regulations for various areas within the City. An amendment to the PD-17 ordinance is requested by the project proponent to provide the land use regulatory framework for the project, as well as to illustrate the overall development concept and distribution of land uses within the proposed Alamitos Ridge residential project.

PD-17 is composed of 55 acres of Alamitos Land Company owned parcels and allows for a mix of residential, commercial, and business park development. The PD limits intensity of development equal to no more than 1,520 vehicle trips to and from the site in the p.m. peak hour. According to the planned development ordinance, the vehicle trip maximums are spread over a combination of the anticipated land uses within the area: multifamily residential units and office, retail, and warehouse space. PD-17 is made up of four "subareas," each of which is also allocated a specific development intensity. The proposed project site is within the area designated as Subarea 2. The remaining area within Subarea 2 is north of the project site, with frontage on Hill Street, and is scheduled for development as a Long Beach Unified School District K-8 school. Principal uses currently permitted within Subarea 2 include the following:

a. Offices, including professional, medical offices and financial institutions;

b. Research and development activities;

c. Retail sales;

d. Hotels and motels;

e. Movie theaters, private clubs;

f. Restaurants, including fast food restaurants;

g. Personal services, except minor or major auto repair, repair of major household items, and vehicle parts stores with installation;

h. Industrial-related uses as permitted by ML Zone[1] (Table 33-1 of Section 21.33.11 of the Zoning Code, except for properties 100 feet from the westerly edge of Redondo Avenue and of Obispo Avenue).

[1] The "ML" zone was the Medium Industrial Zone. As a result of a Zoning Code Amendment, the Medium Industrial Zone is now called "IM."

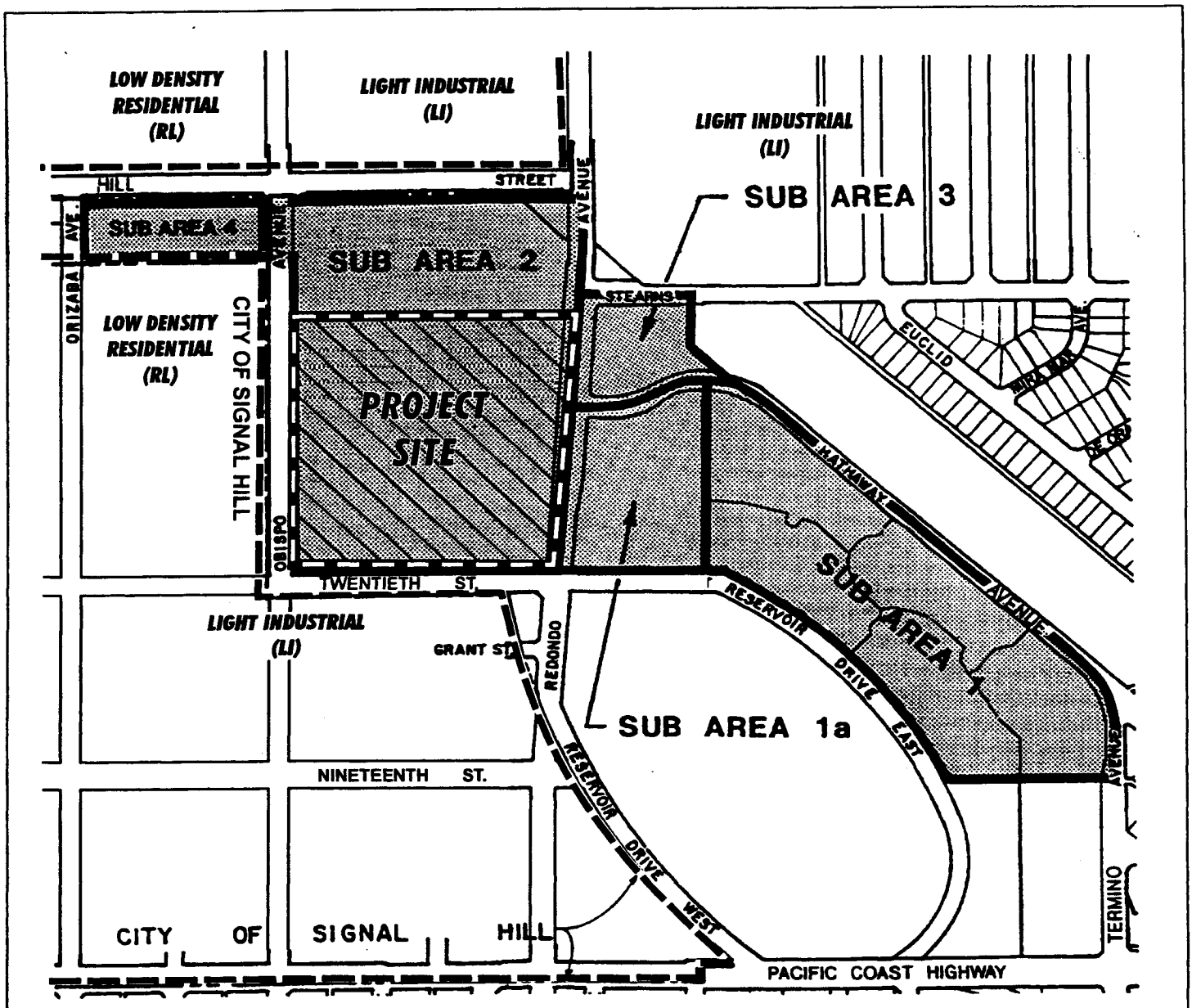
The permitted land uses for Subarea 2 in PD 17 include a range of office, commercial, and industrial uses. Office uses include professional offices, medical offices, and financial institutions. Research and development uses are also allowed. Permitted commercial uses include retail uses, hotels, motion picture theaters, and restaurants. Industrial uses are permitted, consistent with the Medium Industrial Zone (IM, formerly known as "ML"). The IM district generally allows industrial and manufacturing operations on a larger scale than those in the IL district. For example, factories with frequent truck traffic and outdoor storage yards might be located in the district. Outdoor storage and limited outdoor activities may be permitted.

Subarea 2 holds the largest share of the development intensity within PD-17 allowing for a total of 1,036,000 square feet of gross floor area (1,262 p.m. maximum peak hour trips). The maximum building area cannot exceed 500,000 square feet of gross useable floor area and the total building area for Subarea 2 is limited to a floor area ratio of 2:1. Furthermore, Subarea 2 is the only subarea of PD-17 that prohibits residential development. The other three subareas are all designated for residential use. Therefore, the proposed single family residential development requires an amendment to the PD-17 ordinance to allow residential uses in Subarea 2. Figure 4.1.3 illustrates the existing zoning designations for the project site and surrounding areas.

4.1.2 THRESHOLD OF SIGNIFICANCE CRITERIA

The proposed project may have a significant impact on the environment if the project would:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; or
- Conflict with any applicable habitat conservation plan or natural communities conservation plan.



LSA

FIGURE 4.1.3

NOT TO SCALE

Alamitos Ridge Residential Project EIR

Current Zoning Designations

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4.1.3 IMPACTS AND MITIGATION MEASURES

General Plan and Zoning Consistency

General Plan. The purpose of the mixed use LUD No. 7 Land Use District in the City's General Plan is to accommodate the City's desired activity centers and targeted mix of high, medium, and low- density residential uses, commercial centers, and institutional uses. Permitted land uses in LUD No.7 include a mix of uses such as retail, offices, medical facilities, and high density residences. Uses not intended in this district are those that may have a detrimental effect on the ambiance, environment, or general well-being of the population of the area. Examples of uses not intended for the mixed use area are medium industrial and manufacturing uses, warehousing activities, and outside/exterior storage.

The proposed single family residential project requires an amendment to the General Plan Land Use Element to change the land use designation from "mixed use" to LUD 1, "single family residential." The general plan amendment is incorporated into the project application and will be a component of the proposed project. Therefore, implementation of the proposed project includes any necessary change to the General Plan designation.

General Plan Land Use Goals and Policies. In considering project consistency with the General Plan, the proposed project is assessed against the City's adopted goals of the Land Use Element of the General Plan that was mentioned earlier in this section.

Managed Growth. Guide growth to have an overall beneficial impact upon the City's quality of life.

The proposed project is consistent with this policy, because the residential development of the 14-acre site will increase the overall housing opportunities with the City of Long Beach, consistent with the City's Housing Element. The master planned project is an infill development in an already urbanized area that is expected to support and further define the character of this portion of the city.

New Housing Construction. Emphasize for-sale housing for first-time home buyers, and upscale residential development in and around the downtown area.

The proposed project furthers the intent of this policy by providing new single family homes on moderately sized lots that will be suitable for first-time home buyers or move-up home buyers.

Neighborhood Emphasis. Develop a citywide quality living environment by assisting and supporting the efforts of residents to maintain and strengthen their neighborhoods.

The proposed project furthers the intent of this policy by introducing additional residential uses into an area that has been characterized by recent infill residential development. A trend has developed in the immediate area toward residential use. Also, use of the site for single family homes will be consistent with the future school that is planned for the area, directly abutting the project site to the north.

Implementation of the proposed residential development will promote General Plan land use goals and would have general aesthetic and land development benefits for the following reasons:

- The incompatible and non-conforming use of an oil extraction and maintenance yard with surrounding existing and approved residential land uses will be eliminated.
- The project will recycle an under-utilized and deteriorating parcel of land.
- A new single family residential development will contain architectural design features that are compatible with surrounding residential and school properties and will ultimately enhance the appearance of the area.
- Investment into the project area's infrastructure will provide various street and utility improvements. The project will provide adequate off-street parking.
- The project will add to the City's housing base.

The area within PD 17 is located adjacent to the Alamitos Traffic Circle Activity Center identified in the Land Use Element on page 210. The General Plan states that "dense residential development continues north of the Circle. These populations contribute to a strong retail market in this area," and that "(in)compatibilities with neighboring residential areas should not be permitted to develop." (p. 209 of the Land Use Element) The project site is located less than one mile northwest of the Alamitos Traffic Circle Activity Center. Retail development of the project site could compete with the existing business at the Traffic Circle. Industrial development of the project site could introduce adverse impacts to neighboring residential uses. For example, industrial use of the land under the current PD-17 regulation could introduce potentially adverse impacts on nearby residential uses and the future school use on the adjoining parcel. For example, industrial development could introduce new sources of noise from additional vehicle traffic and outdoor activity. Truck traffic associated with an industrial development could create increased air pollution and introduce potential safety issues with the future school site, as well as the existing and planned residential uses. Noise, odor, and pollution from the operation of manufacturing uses could also be introduced if the project site were to be developed with medium industrial uses, consistent with the existing PD-17 zoning of the site. The proposed residential development of the project site, however, is consistent with the adopted policy direction for the Traffic Circle Activity Center, since the increased residential development is consistent with the nearby land use pattern, and the increased residential population will further contribute to a strong retail market at the Circle. So although the current General Plan designation of the site is LUD 7 or "mixed use," residential development would further support the General Plan policies for the Alamitos Traffic Circle Activity Center.

The proposed project is consistent with key goals and policies of the General Plan and Strategic Plan. A General Plan amendment to LUD 1, "Single Family," has been incorporated into the proposed project. Therefore, no significant adverse environmental impacts are anticipated to result from the development in relationship to the General Plan Land Use plans, policies, and programs as a result of the proposed project.

Zoning. The proposed project includes an amendment to PD-17 that specifies development standards appropriate for this specific site. The proposed project is similar in character to the type of single family development that would be allowed under the R-1-M single family zone. Specifically, the R-1-M district is a single family residential district with moderate sized lots. This District recognizes the difficulty of developing odd sized and shaped parcels with normal sized lots. It also recognizes the City's objective of providing more affordable ownership housing and the effect of lot size on housing costs. The R-1-M district implements Land Use District No. 1 of the General Plan. The PD Amendment (Zone Change) necessary to permit single family dwelling units on the project site will be incorporated into the proposed project. Current Zoning Designations and respective General Plan designations of the property and property surrounding the project site are summarized in the table below:

Table 4.1.A: General Plan and Zoning Designations

	General Plan	Zoning
City of Long Beach		
East:	Mixed Use LUD No.7	PD-17, Subarea 3 and Subarea 1a (Residential)
North:[1]	Mixed Use LUD No. 7	PD-17, Subarea 2 (Commercial and Office)
City of Signal Hill		
West:	Low Density Residential (2.1)	RL Low Density Residential
South:	Light Industrial (4.1)	Light Industrial

[1] Long Beach Unified School District site. Undeveloped property planned to be developed with a K-8 school.

The project site abuts a future school site to the north, and is adjacent to residential uses on the east and west. Only the area south of the project site is currently non-residential, and is developed with a mix of light industrial uses. Development of the project site with nonresidential uses, as currently permitted by the PD zoning, would introduce potential land use conflicts with existing and approved surrounding uses, as described in the paragraphs above under "Neighborhood Emphasis." For example, medium industrial development could introduce new sources of noise, vehicle traffic, outdoor activity, increased air pollution, increased safety issues with the future school site, and odor. Commercial and office use of the site could have similar, if somewhat less intense, impacts compared to industrial development.

Located in a portion of Long Beach that is largely surrounded by the City of Signal Hill, the area included in PD 17 has remained vacant except for oil production uses, even though it is located in the middle of an urbanized area. Approvals of residential developments on nearby properties in recent

years, such as the Bixby Ridge and Alamitos Green properties, have defined the largely residential character of the area. The recent dedication of the school site is consistent with residential development of the immediate vicinity.

The Long Beach 2010 Strategic Plan focuses on goals in five areas: neighborhoods, youth and education, safety, economic opportunity, and the environment. The proposed project furthers the intent of two Strategic Plan goals: Goal 1—Build a strong network of healthy neighborhoods, and Goal 5—Improve the quality and availability of housing. The proposed project will ultimately increase housing stock in Long Beach by 106 units. The infill development of residential homes proposed in the Alamitos Ridge project, combined with the existing residences in the area, forms a critical mass of geographically connected residential development that can function as a neighborhood unit. The future school immediately north of the project site could become an educational, recreation, and social focal point for this newly defined neighborhood. Therefore, the proposed project is consistent with—and furthers the intent of—the Long Beach 2010 Strategic Plan goals for neighborhoods, youth and education, and housing.

Consistency with Regional Plans. SCAG adopted the Regional Comprehensive Plan and Guide (RCP&G) in September 1994. The adopted policies include the provision of housing choices in line with incomes of the work force. The proposed project furthers this objective by providing 106 single family homes that will be marketed to middle-income families.

It is also the policy of SCAG to "encourage efforts of local jurisdictions in the implementation of programs that increase the supply and quality of housing and provide affordable housing as evaluated in the Regional Housing Needs Assessment (RHNA)." The City of Long Beach was found to need construction of 1,463 units in order to meet the population growth and future housing needs according to the November 2000 RHNA. The proposed project will introduce 106 new single family units to the housing stock in Long Beach and, therefore, will further the intent of this goal for new housing.

Proposed Zoning Development Standards. The proposed project establishes development standards and regulations for development of single family residential units on the subject property. The standards generally reflect those for the R-1-M zoning district, as recommended by City staff in a staff report dated September, 1998.[1] The proposed development standards for the Alamitos Ridge project are as follows:

Minimum Lot Size:	3,000 s.f.
Minimum Setbacks:	
Front	8 feet
Sides	4 feet
Rear	8 feet

[1] City of Long Beach, Conceptual Site Plan Review Letter, September 21, 1998.

Maximum Building Height:	29 feet - Two Stories
Maximum Floor Area Ratio:	67% of Lot Area
Minimum Usable Open Space:	6% of lot area (exclusive of driveways, yards less than 5 feet in width, the front yard setback, or slope areas)
Minimum Driveway Length:	18 feet with zero clearance sectional garage doors

Source: DRC Engineering, September, 2001

Effects on Adjacent Properties and Residents

To further determine whether or not a change to the PD-17 plan (from mixed use to residential) is a significant impact, factors such as effects on adjacent properties and land use compatibility are considered. Land use compatibility and operational conflicts are considered significant if they lead to physical impacts on nearby properties or persons living or working in the area. Such incompatibilities and conflicts are characterized by substantial nuisances, such as significant unmitigated increases in traffic, noise, odor, activity level, or substantial incongruity and conflict (physical and visual) with the adjacent land use.

As described above, the existing land uses on the Alamitos Ridge project site include mostly undeveloped parcels, partially occupied by several operating and abandoned oil extracting wells and stockpile areas dispersed throughout the site. As reported in the table provided below, the surrounding vicinity includes residential areas to the east and west, and industrial and business complexes to the north across Hill Street and south.

Table 4.1.B: Existing and Proposed Uses

	Zoning	Existing/Proposed
City of Long Beach		
East/Upper	Subarea 3:	Undeveloped land/under development for SFR development
East/Lower	Subarea 1A:	Residential - Apartment Complexes
North	Subarea 2:	Undeveloped land/LBUSD school site
City of Signal Hill		
North (across Hill Street)	Light Industrial	Business park
West	RL Residential	Residential and under development for SFR development
South	Light Industrial	Offices, light manufacturing, oil wells, and residential farther to the east (see Figure 4.1.3, Sub-Area 12)

Residential Uses to the East and West. The proposed single family residential development is compatible with City development objectives, replacing the designation of the property for medium industrial use in close proximity to residential uses with a land use compatible with the adjacent residential uses to the east and west. As can be seen in Figure 4.1.1 (Project Area Land Uses), the requested change in the zoning to residential for the property is consistent with the pattern of land uses within the immediate vicinity of the project site in both the City of Signal Hill areas and the City of Long Beach, and is consistent with adjacent residential uses and the adjacent future school site. Single family residential uses are either approved or developed on both the west and east sides of the project site. The requested change in land use reflects a transition from underutilized land and unattractive industrial use (abandoned oil wells and outside storage) to a planned residential neighborhood.

Infill residential development of the site will connect the existing and developing residential uses to the east and west with the future school site to the north. The connectivity of residential neighborhoods and developments with the school site may help create a sense of neighborhood in an area that has formerly been characterized by a patchwork quilt of residential, industrial, undeveloped land, and oil production. Nonresidential development of the site would further divide the residential areas from each other and the future school site. Nonresidential development of the project site, even though consistent with the existing zoning, could have the effect of physically dividing an increasingly residential area.

Visual and aesthetic impact issues are discussed in detail in Section 4.12, Aesthetics.

Industrial Uses to the South. There are potential incompatibilities (primarily noise and visual, e.g., views of truck deliveries and other commercial activities, views of industrial and commercial structures) between the proposed residential units and the adjacent light industrial uses south of the project site. These land use incompatibilities are not considered to be significant because the proposed residential units will be oriented so that they face north, away from the industrial uses, and because project design features are incorporated into the project to buffer the proposed project residences from the existing light industrial uses. Less dense usage and lower traffic operations would be expected from residential development, as compared to office or commercial use. In addition, the width of 20th Street, the proposed landscaping design, and the noise wall required along this major road will act as a visual buffer between the proposed residential area and the existing industrial uses. Therefore, impacts related to this issue will be reduced to less than significant levels. These project design features are described in detail in Sections 4.11, 4.12, and 4.13 (Noise, Aesthetics, and Public Health and Safety).

On-Site Uses—Oil Extraction Wells. Currently there are several abandoned wells on the project site and 12 active wells. Some active wells will become closed and abandoned on an undetermined schedule. The closure and abandonment of the operating oil wells will occur over a period of years as individual wells are no longer economically productive.

The juxtaposition of producing oil wells and new residences is illustrated in Figure 3.4, Interim Site Plan. The figure identifies the minimum 50 building setback radius around producing wells. Lots

where operating wells are located and lots where the building footprints are within a setback radius of 50 feet per the City's ordinance will not be constructed until the applicable wells are closed. In areas where the wells will be located adjacent to future streets, the streets have been designed to include additional parkway where necessary to accommodate the wells.

The potential impacts of the operating wells on the proposed residences include potential noise, odors, air quality emissions, and visual incongruities with the residences. Implementation of mitigation measures from other sections benefit on-site and off-site uses, reducing potential land use conflicts, and include the following: 1) Noise - Mitigation Measures 11-1 through 11-6; and 2) Public Health and Safety - Mitigation Measures 13-1 through 13-3. These issues are addressed further in the respective sections.

Noise Effects of Operating Oil Wells. Potential noise impacts are addressed in Section 4.11, where it is noted that there are currently one large and five small oil pumps on the project site. The large pump generates a noise level of approximately 59 dBA at 50 feet, and the small pumps generate a noise level of approximately 55 dBA at 50 feet. These oil pumps do not and will not affect any residential properties outside of the project site. However, the proposed residential properties on the project site may be exposed to potentially significant noise levels. As the oil pumps run 24 hours a day, they must not exceed the City's nighttime noise standard of 45 dBA L_{50}. Housing in the following areas has the potential to be exposed to noise levels exceeding the City standard without the implementation of mitigation:

- Within 158 feet of the small pumps
- Within 251 feet of the large pump

No home will occupy the same lot as an operating oil well. The oil wells will be closed and abandoned over time, so that at build out of the project at an unknown time in the future no operating oil wells will remain. In the interim, mitigation measures to reduce the noise impacts to surrounding homes to below a level of significance will be required. The mitigation included in Section 4.11 includes the construction of a minimum six foot high sound barrier around all of the wells with the exception of the large well near the southwest corner of the site, where a 10 foot sound and barrier wall is called for. However, for safety purposes, a minimum eight foot high wall will be required for all wells. Therefore, the sound wall requirement will be exceeded at all locations where the eight foot wall is constructed. Noise mitigation also includes the provision of mechanical ventilation, such as air conditioning systems, in the homes to ensure that windows can be closed for prolonged periods of time if necessary to achieve the required sound attenuation.

In addition to these mitigation measures, Chapter 12 of the City's Municipal Code "Oil Production Regulations" includes standards for noise from oil operations. Chapter 12 includes restriction on activities between 9:30 p.m. to 7:30 a.m. in order to protect noise sensitive receptors. Also, Section 12.32.010 of the Oil Production Regulations states that it is unlawful to operate oil production wells in a manner that causes exterior and interior noise levels at the receiving property to be in excess of those limits provided in the City's Noise Ordinance, Chapter 8.8 of the Municipal Code.

As a result of compliance with the adopted nosie regulations specific to oil wells and implementation of the above mentioned mitigation measures, noise impacts to the proposed residential uses will be reduced to a less than significant level with the implementation of the above mitigation measures.

Aesthetic Effects of Operating Oil Wells. Aesthetic impacts related to the proposed Alamitos Ridge residential project include changes to the overall visual character of the project site from undeveloped, highly disturbed site conditions with oil extraction activities to planned single family residential. In the interim before the oil wells are closed, there will be a juxtaposition of operating wells and new residences. The interim operation of the oil wells will include screen walls as described in the noise mitigation measures, which will also serve to mitigate the visual impact of the wells on the adjacent residences. Inasmuch as the oil wells are incongruous with residences, the presence of oil wells within the proposed subdivision will have adverse visual impacts. However, because the oil wells will be operational at the time the homes are constructed and sold, future residents will be knowledgeable about the proximity of operating wells. The following mitigation measure is designed to further assure disclosure of the continued operation of the oil wells:

12.1 Prior to the issuance of use and occupancy permits, the applicant will provide the Director of Planning and Building with a disclosure form from the State Department of Real Estate to be signed by all prospective residents in the Alamitos Ridge project. This disclosure form will include the acknowledgment of operating oil wells on the project site and the location of fuel storage facilities, and industrial areas east of the project area.

The developed residences that are adjacent to operating oil wells will experience adverse visual effects of the presence of oil pumping operations, including operating pumps that are typically 15 to 18 feet high. While this effect will be partially mitigated through the use of 8-foot and 10-foot screen walls, and while the presence of operating wells will be disclosed to home buyers, this effect cannot be reduced to below the level of significance.

Public Health and Safety. There are potential safety impacts as a result of the juxtaposition of operating oil wells and residences. The potential impacts exist as a result of possible future trespass and spills. These potential impacts are mitigated to below a level of significance by Mitigation Measure 13.3, which states:

13-3 Prior to issuance of building permits, the project applicant shall provide plans and specifications to the Building Official and the Chief of the Long Beach Fire Department demonstrating the following: all active wells shall be provided with safety shutdown devices. All active wells and associated equipment within the project site shall be enclosed by a minimum eight foot block wall with barbed wire on the inside at the seven foot level. All walls will be configured to allow necessary servicing. Suitable gates, capable of allowing passage of large workover equipment, shall be provided in the enclosures. Each enclosure shall be graded to ensure containment of potential spills within the enclosure. To restrict access, the use of climbable landscaping around the

perimeters of the enclosures shall be avoided. The project proponent shall demonstrate to the satisfaction of the Chief of the Long Beach Fire Department (or his/her representative) that suitable safety and fire protection measures (i.e., setbacks) have been incorporated into the project design.

The oil wells will be fenced with walls eight to ten feet high, thereby restricting legal access and trespass to the extent reasonable and limiting the attractive nuisance of the operating wells.

Implementation of the above mitigation measures will reduce public health and safety impacts associated with operation of oil wells to below a level of significance.

Odors. While oil extraction operations can result in occasional background odors characterized by the odor of hydrocarbon substances from the well or transport of product, producing wells and water injection wells can be operated to be nearly odor free. The oil wells are designed as closed systems connected directly to pipelines; therefore, there are no fumes or emissions associated with the transfer of the product at the point of connection or via the underground pipelines. Signal Hill Petroleum operates its wells with a vacuum on the wellhead of producing wells via a field-wide gas vacuum system. All vapors and gases from producing wells are collected and transported to a central facility by this gas vacuum system. Injection wells process only brine, so there are no hydrocarbon vapors or gases associated with the injection wells.

Well Maintenance. Well maintenance typically occurs once per year and can be accomplished within one to seven days. Maintenance will be conducted by the well operator, who will also have fee title to the 21 lots for which construction is deferred until after well closure. During that time, a maintenance rig will be parked either entirely or partially on site and may extend into one travel lane of the street. The maintenance activities may therefore have a temporary, or short-term, adverse effect on local circulation within the Alamitos Ridge project. The mitigation measure below requires that at least one travel lane remain free and clear for local traffic at all times, and that affected residents receive written notice of a planned maintenance activity. Also, the design of the subdivision includes two loops and one cul-de-sac. Based on the ability to approach most of the properties from either of two directions, combined with implementation of the mitigation measure, adverse impacts to local access will not be significant.

1.1 The developer/property owner shall provide documentation to the satisfaction of the Director, Department of Planning and Building, of an enforceable and irrevocable agreement with the oil well operator to provide access to occupied residences during oil well equipment maintenance/replacement. Access to all occupied residences must be provided during any construction or well maintenance activity, including the maintenance of at least one travel lane available for local traffic at all times. Affected property owners and public service providers and utility companies will be notified one week prior to any planned maintenance activity that will occur in the street. Traffic control personnel and/or signage shall be provided as necessary to direct local traffic. The access agreement is required to be in effect prior to issuance of the first development permit.

The structure on the maintenance rig is approximately 100 feet in height. Therefore, the well maintenance activities will have an adverse short-term visual effect on the proposed single family residential uses.

Well maintenance activities include venting the well head. During well servicing operations, there may be some minor releases of hydrocarbon vapors, which consist mostly of methane, which is odorless. Methane gas dissipates quickly and will not create a substantial health risk for the residences, which are set back a minimum of 50 feet from the well.

In compliance with applicable codes and the mitigation measure below, the owners and occupants of properties within a 100-foot radius of each well site will be required to be notified of planned maintenance activities and advised of any necessary safety precautions.

The effects associated with well maintenance activities are short-term by definition and, with the incorporation of mitigation measures, will not substantially impair the residents' use of their property during the period of time that maintenance activities occur. Therefore, these effects are not considered to be significant.

Conclusion. Although oil or surface rights are separate from property rights, the lots containing operating oil wells on the site will be owned in fee by the well operator after the first 85 homes are constructed. The wells will be closed by the well operator when they are no longer economially profitable. In the interim, there will be a juxtaposition of active oil wells and new residences. Some of the residential lots will remain undeveloped until the wells that are within 50 feet of the future home are closed. While the wells continue to operate, there are potential noise, aesthetic, and safety impacts on the nearby residences. The noise and safety impacts can be mitigated to below a level of significance. The interim aesthetic impacts will be disclosed to future residents through the normal procedures of the California Department of Real Estate; however, they cannot be reduced to below a level of significance. **[Question to the City for discussion: Is it a significant environmental impact if this condition is known at the time of home sale, is accepted by the owner, and is built into the sales price?]** Short-term impacts from well maintenance activities are reduced to below a level of significance with mitigation.

Mitigation Measures

Short-term effects of well maintenance activities are reduced with implementation of Mitigation Measures 1.1 and 1.2.

1.1 The developer/property owner shall provide documentation to the satisfaction of the Director, Department of Planning and Building, of an enforceable and irrevocable agreement with the oil well operator to provide access to occupied residences during oil well equipment maintenance/replacement. Access to all occupied residences must be provided during any construction or well maintenance activity, including the maintenance of at least one travel lane available for local traffic at all times. Affected property owners and public service providers and utility companies will be notified one week prior to any planned maintenance

activity that will occur in the street. Traffic control personnel and/or signage shall be provided as necessary to direct local traffic. The access agreement is required to be in effect prior to issuance of the first development permit.

1.2 The developer/property owner shall provide documentation to the satisfaction of the Director, Department of Planning and Building, of an enforceable and irrevocable agreement with the oil operator to provide advance written notice of planned maintenance on any oil production facilities, as follows: The well operator will provide one week written notice (except in the case of emergency maintenance) to all property owners and occupants of properties within a 100-foot radius of the site of well maintenance activities. The agreement with the oil operator to provide notification shall be in place prior to issuance of the first building permit.

With the implementation of these mitigation measures, well maintenance activities will not substantially impair the residents' use of their property during the period of time that maintenance activities occur. Therefore, these effects are not considered to be significant.

4.1.4 CUMULATIVE IMPACTS

Construction of the proposed project, when considered in conjunction with several other existing and planned developments in proximity to the project, will continue the pattern of urban development within a currently under-developed project site. Planned and existing residential development includes the following:

- Bixby Ridge master planned residential community to the northwest
- Single family residential subdivision to the west
- The Alamitos Green single family residential subdivision to the northeast
- Multifamily residential apartments to the east
- The Hilltop Area Specific Plan development, also known as Promontory Point, single family and multifamily development in the City of Signal Hill
- Construction of an elementary school south of Hill Street between Redondo Avenue and Obispo Avenue

The proposed project will not have significant cumulative impacts to land use, as the projects that have been identified are similar in type of land use (residential) and are either extensions of existing developments or infill development. As analyzed earlier in this section, the proposed project is consistent with the adjacent residential land uses. Based on these conditions, the proposed project's contribution to potential cumulative land use compatibility impacts in this area is considered less than significant.

4.1.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed project results in an infill development on a parcel within an established urban community. As a result of project implementation, there will be a change in land use of the property from a relatively low-intensity combination of oil production and related uses to a neighborhood of single family homes on moderately-sized lots, with potentially adverse effects on the adjacent uses. However, these potential effects are below a level of significance, because:

- the proposed project is consistent in type and density to surrounding residential uses
- the proposed single family homes are less intense than, and are not expected to adversely affect, the mix of light industrial uses located south of the project site
- the proposed residential development is consistent with and supports the future school located directly north of the project site
- The design guidelines incorporated into the project, including the architectural standards, required screen walls and fences, uniform lighting standards, project entries, local streetscape standards, and meandering open space edges, will enhance the project's compatibility with nearby land uses.

The proposed project incorporates necessary changes to the General Plan and zoning, thereby resolving potential conflicts with adopted plans. Land use compatibility impacts are generally defined by the operational characteristics of the proposed project and adjacent or nearby uses. The only area of potential land use conflict is from the juxtaposition of oil operating wells on the site and the new residences that will be constructed as part of the project.

Potential impacts to the proposed on-site residences include long-term aesthetic, noise, air quality/odor, and safety impacts, as well as short-term effects of well maintenance activity. The aesthetic impact of the operating oil wells can be reduced through the implementation of screen walls but remains significant after mitigation. The potential operational conflicts as a result of noise effects of the well operations are addressed in Section 4.11 and are less than significant with mitigation. Potential air quality and odor effects are also less than significant. Mitigation measures in Section 4.13 of this EIR reduce the safety effects on future residential uses to below the threshold of significance.

In addition to the long-term effects associated with the juxtaposition of operating wells and residences, short-term effects may result from well maintenance activity. The effects of well maintenance activities are reduced with implementation of Mitigation Measures 1.1 and 1.2. Well maintenance activities will not substantially impair the residents' use of their property during the period of time that maintenance activities occur. Therefore, these effects are not considered to be significant.

4.2 POPULATION AND HOUSING

This section analyzes existing population, housing, and employment characteristics of the City of Long Beach and compares them to potential impacts created by the proposed project. Sources of demographic information consulted include agencies such as SCAG and the Department of Finance. Also analyzed is the relationship between the project and applicable objectives from the City of Long Beach General Plan Housing Element (April 2001).

4.2.1 EXISTING ENVIRONMENTAL SETTING

Long Beach is located in the South Bay region of Los Angeles County. The City is home to the Port of Long Beach, a rejuvenated and thriving downtown, major employers, tourist attractions, a State University, and varied residential communities. Long Beach is a major population and employment center in the South Bay region.

The Southern California Association of Governments (SCAG) is a regional agency responsible for developing demographic projections, including population, households, and employment, for the Southern California region. SCAG identifies demographic projections for the years 1990 through 2020. These growth projections are generated using the 1990 census data. The growth projections for the City of Long Beach and the County of Los Angeles are included below in Table 4.2.A.

Table 4.2.A: SCAG Growth Projections: City of Long Beach and Los Angeles County

	1990	2000	% Change 1990-2000	2010	% Change 2000-2010	2020
Total Population						
Long Beach	429,433	459,169	6.9%	487,288	5.7%	531,148
Los Angeles County	8,863,164	9,818,235	10.8%	10,868,875	10.7%	12,249,100
Total Households[1]						
Long Beach	158,975	159,812	0.5%	163,750	2.5%	172,283
Los Angeles County	2,989,552	3,131,606	4.8%	3,473,900	10.9%	3,984,119
Total Employment						
Long Beach	235,825	193,894	-17.8%	229,255	18.2%	252,948
Los Angeles County	4,615,644	4,557,900	-1.3%	5,223,355	14.6%	5,817,641

Source: Southern California Association of Governments

[1] The category "Total Households" is the total number of occupied housing units.

Population

Within the last decade, the City of Long Beach experienced a modest population growth compared to the previous decade. From 1990 to 1999, the population of the City of Long Beach increased by 6.9 percent, from 429,433 to 459,169 persons, as shown in Table 4.2.A. In the previous decade (1980-1989), population growth was much more rapid at 19 percent from 361,000 to 429,000. According to SCAG, the City can continue to expect a modest population growth increase at 5.7 percent during 2000 to 2010 and increase another 9 percent during 2010 to 2020.

Housing

Household Characteristics. According to SCAG's forecast (see Table 4.2.A), there were 158,975 households in Long Beach in 1990. From the year 1990 to 2000, SCAG estimates households to increase by one-half percent, from 158,975 to 159,802 households. From 2000-2010, the City's household growth is estimated to increase by 2.5 percent, reaching 163,750 households by the year 2010.

Housing Stock Characteristics. Housing in Long Beach includes single family homes, moderate density townhomes, higher density condominiums, and apartments. According to the City's Housing Element (April 2001), there were a total of 172,089 housing units in the City of Long Beach as of January, 2000. Single family detached homes comprise 45 percent of the housing stock. The majority are single family detached homes, with the balance comprised of attached units, such as townhomes and condominiums. Multifamily units comprise 53 percent of the housing stock, with the vast majority in complexes with five or more units. Mobile homes and other units comprise the remaining two percent of housing.

The City has an older housing stock, with the bulk of the City's housing stock being over 30 years old (75 percent); an estimated 38 percent of the units is more than 50 years old. In general, housing units more than 30 years old are likely to have rehabilitation needs, including new roofing, foundation work, new plumbing, etc. A large portion of the housing in the City of Long Beach is in need of repairs based on age alone. As housing stock ages, neighborhood preservation and improvement become significant concerns. Therefore, ensuring the affordability and quality of the housing stock is one of the challenges faced by the City of Long Beach over the 2000-2005 horizon of the Housing Element.

Housing Element Objectives. California housing law requires regional planning agencies to identify existing and future housing needs every five years. Existing need is defined by SCAG as the number of lower income households currently overpaying for housing (i.e., expending 30 percent or more of household income on housing costs). Future need is defined as the number of additional housing units by income level that need to be added to each jurisdiction's housing stock over the five-year planning period which the current Housing Element addresses (1998–2005), in order to 1) accommodate household growth, 2) compensate for demolitions and other inventory losses, and 3) achieve a vacancy rate that will allow the market to operate efficiently. As required by California housing law, the City of Long Beach General Plan Housing Element outlines existing and projected

housing needs within the City based on SCAG projections and identifies strategies that the City will employ to achieve its housing objectives. The City's Housing Element (April 2001) uses SCAG's adopted November 2000 Regional Housing Needs Assessment (RHNA).

The City's 2001 Housing Element identifies the median annual household income for Los Angeles County as $34,965 and $31,938 for the City of Long Beach in 1990. The Housing Element categorizes household income by four levels, which are based on the Long Beach-Los Angeles region's median family income (MFI). The levels are as follows:

- Very Low: Less than 50 percent of the median income.
- Low: 51 to 80 percent of the median income.
- Moderate: 81-120 percent of the median income.
- Upper: More than 120 percent of the median income.

As indicated in the City's Housing Element, the adopted RHNA assigned the City of Long Beach a construction need of 1,464 new housing units over a five-year planning period from 1998 to 2005. This includes 411 very low income households, 251 low income households, 296 moderate income households, and 506 upper income households. It should be noted that these figures indicate that 55 percent of the projected housing need falls into moderate and upper income categories.

Table 4.2.B summarizes a comparison of identified residential development potential in the City of Long Beach versus adopted RHNA planning targets for 1998–2005. As shown below, the City has excess development capacity above its RHNA allocation as well as excess capacity for all affordability levels, including lower-income households.

Table 4.2.B: City of Long Beach Residential Development Potential versus RHNA Targets

Income Category	1998–2005 RHNA Targets	Current Construction Credits	Land Capacity Credits	Surplus Capacity Credits
Very Low	411 units	63		
Low	251	388	1,201	+990
Lower	662	451		
Moderate	296	2,349	98	+2,151
Upper	506	2,111	–	+1,605
Total	1,464	4,911	1,299	+4,746

Sources: SCAG Regional Housing Needs Assessment, November 2000; Department of Planning and Building, City of Long Beach, 2000

Employment

As shown in Table 4.2.A, SCAG estimated the number of employees in the City of Long Beach in 1990 at 235,825. SCAG projected employment in the City of Long Beach would decrease by 17.8 percent from 1990 to 2000, while the County's employment growth was estimated to decrease by 1.3 percent for the same period. The 1990s saw a region-wide economic restructuring, which impacted Long Beach. Base closures and defense cutbacks contributed to a 31 percent decline in manufacturing jobs. Government related employment increased by 32 percent. In addition employment in finance, insurance, and real estate (FIRE) jobs increased 15 percent due to the resurgence of the local economy.

From 2000 to 2010, the City's employment growth is forecast by SCAG to expand by 18.2 percent. This is 3.6 percent higher than Los Angeles County job growth for the same period. A 10.3 percent increase in employment is forecast for Long Beach from 2010 to 2020; the County's job growth is forecast at 11.4 percent. Most of the city's employment expansion is expected to be generated by the continued transition of the region's economic base from manufacturing to a restructured economy built around educational institutions, higher skilled labor force, and venture capital.

4.2.2 THRESHOLD OF SIGNIFICANCE CRITERIA

The effects of the proposed project are evaluated to determine whether they will result in a significant adverse impact on the environment. The effects of a project on population, housing, and employment are considered to be significant if the proposed project:

- Induces substantial growth or concentration of population beyond City and regional projections;
- Alters the location, distribution, density, or growth rate of the human population of an area substantially beyond that projected in the City of Long Beach General Plan Housing Element;
- Results in a substantial increase in demand for additional housing; or
- Creates development that significantly reduces the ability of the City to meet housing objectives set forth in the City's Housing Element.

4.2.3 IMPACTS AND MITIGATION MEASURES

Less than Significant Impacts

Population. The proposed project would result in the addition of approximately 339 new residents to the City of Long Beach, assuming an average household size of 3.2 persons (Source: City of Long Beach General Plan, 1989). When added to the 2000 population estimate of 459,169, the City's population will increase to 459,508. As shown in Table 4.2.A, SCAG estimates that 459,169 persons will reside in the City of Long Beach by the year 2000 (a 6.9 percent [29,736 persons] increase in population in Long Beach from 1990-2000 and a 5.7 percent [28,119 persons] increase from 2000-2010, according to SCAG projections). The population growth that would result from the proposed project is consistent with the population projections upon which the Housing Element is based, as well as SCAG regional projections.

Housing. Implementation of the proposed project will add up to 106 single family dwelling units to the City's housing stock. Implementation of the proposed project would add 106 units in the moderate and upper income household categories. Accommodation of very low or low income level groups within the project is not programmed. The project will provide market rate single family homes which are not subsidized for very low or low income households.

The 2001 Housing Element, as previously illustrated in Table 4.2.B, indicates that the City of Long Beach has sufficient residential land resources to meet and exceed adopted RHNA targets. The Housing Element estimates that approximately 1,300 dwelling units could be constructed on existing residentially zoned sites. In addition, approximately 574 dwelling units in all price ranges are currently under construction in the City. The proposed project would add to the City's residential potential by converting land formerly utilized for industrial purposes. While the project is not proposed as an "affordable" housing project, the applicant has indicated that the conversion of such a site would allow construction of housing that is competitively priced in the marketplace. In any event, the conversion of the project site to residential use would add to the City's housing inventory, and would not in any way reduce or impair the ability of the City to meet objectives set forth in the Housing Element.

The project is proposed on an undeveloped site and will not affect existing housing, nor will housing displacement occur because of the project. The proposed project provides additional opportunity for housing and home ownership in Long Beach. The remaining portion of the project site is composed of existing oil extraction uses and will not result in displacement of housing. Therefore, implementation of the proposed project does not displace housing, rather, the project adds housing units to the housing supply in the City of Long Beach. Therefore, the effect on housing is considered beneficial.

Employment. The project is a residential development and will not directly generate new employment opportunities other than short-term construction related jobs. According to the 2001 Housing Element, current opportunities for employment within the City of Long Beach for the new residents would consist primarily of jobs related to Service Industry (Business, Professional & Repair), Manufacturing, and Wholesale and Retail. Government related and FIRE employment (finance, insurance, and real estate) jobs comprise the second largest group of employers within Long Beach. The City's unemployment rate has declined from 9 percent in 1993 to 5.4 percent in 1999 but may have increased in the recent economic slowdown. SCAG employment projections for Long Beach indicate an increase of 18.2 percent during 2000-2010 and 10.3 percent increase during 2010-2020. Following the employment pattern of the Los Angeles Metropolitan Area, most of the expansion is expected to be generated by the continued transition of the region's economic base from manufacturing to a restructured economy built around educational institutions, higher skilled labor force, venture capital. The proposed project will not substantially increase employment in the City or the region due to the relatively low number of employees generated by the population increase/demand for new services, given the context of the large number of existing jobs and the projected growth in jobs.

Less than Significant Impacts

There are no potentially significant impacts associated with the proposed project as the population growth resulting from the proposed project is consistent with the City's population projections in the current 2001 Housing Element. Also, implementation of the proposed project will provide for additional housing supply in Long Beach and will not impair the ability of the City to meet housing objectives set forth in the Housing Element. The project's impacts to employment are also considered less than significant as increases are anticipated in local employment opportunities and the City's employment base is expected to remain stable, according to SCAG projections.

4.2.4 CUMULATIVE IMPACTS

The cumulative impact area used to assess potential cumulative population and housing impacts is the City of Long Beach. The proposed project will add an insignificant number of people, approximately 0.07%, to the City's total population. The minor population increase, combined with other housing projects in the City, is consistent with growth projections identified in the Housing Element of the General Plan (April 2001) and SCAG's population projections (Table 4.2.A). Therefore, no significant cumulative impacts resulting from population growth are anticipated.

According to the 2001 Housing Element, the City anticipates residential growth of approximately 1,300 units on undeveloped residential sites and currently has over 574 units under construction or proposed for development. Therefore, the proposed project, combined with other planned and proposed projects, will assist Long Beach in meeting its RHNA for 1,463 units from 1998 through 2005. The proposed project's contribution to cumulative housing growth comprises a negligible proportion of housing growth projected to occur from 2000 to 2010 (3,938 housing units) and is therefore considered a less than significant impact.

Cumulative impacts to employment would not result, since the project is a residential development and would not generate substantial new employment opportunities. Whether future residents will choose to work within the City is unknown. An insignificant amount of indirect employment would be generated for long-term home, landscape and open space maintenance, and other incidental spin-off employment in support services.

4.2.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed project will not result in any significant adverse impacts to population, housing, or employment. No mitigation is necessary. The proposed project will beneficially impact the City by contributing to the City's 1998/2005 RHNA goal for providing additional housing opportunities.

4.3 GEOTECHNICAL CONDITIONS

This section addresses the potential for structural damage to occur due to the local geology underlying the Alamitos Ridge project site, as well as slope stability, ground settlement, soil conditions, grading, and regional seismic conditions. The document reviewed and incorporated as part of this analysis is the *Planning for Development Study for the Alamitos Land Company Properties Located Between Temple and Redondo Avenues, Cities of Long Beach and Signal Hill, Los Angeles County, California,* (Leighton and Associates, Inc., December 14, 1993). Due to the size of the document and the City's desire to limit paper copying, this report is available for review at the City of Long Beach.

4.3.1 EXISTING ENVIRONMENTAL SETTING

Regional Geologic Setting

The project site is in the Los Angeles Basin, which is in the Peninsular Range geomorphic province of Southern California. This province is characterized by the northwest trend of prominent topographic features, including a series of low-lying hills oriented in this northwesterly direction.

The City of Long Beach is located on the coastal margin of the Los Angeles Basin, which is underlain by over 15,000 feet of stratified sedimentary rocks of marine origin. This marine section is composed of interbedded units of sandstone, siltstone, and shale. The central portion of Long Beach has been elevated by regional uplift and local folding and faulting. The gap areas now occupied by the Los Angeles and San Gabriel rivers represent filled channels that were cut deeply into the marine sediments by ancestral rivers during the lower sea level stand of the last ice age in Late Pleistocene time. Over the last 10,000 to 15,000 years, the rivers have filled these channels to their present level with relatively unconsolidated sand, silt, and gravel (City of Long Beach General Plan, Public Safety Element, 1999).

Project Site Geologic Setting

The project site is primarily underlain by Pleistocene age sedimentary rocks of the Lakewood and San Pedro Formations (Leighton and Associates, 1993). These sediments represent deposition in shallow marine, lagoonal, and alluvial plain environments. Signal Hill, immediately west of the site, is one of a series of northwest-trending anticlinal uplifts that occur along the Newport-Inglewood Fault Zone.

Regional Seismic Setting

The project site is located in a seismically active region and has been subject to a number of large earthquakes in historic times. Seismic risk in the project area, and throughout Southern California, is

directly related to regional geologic fault activity. Seismic damage potential depends on proximity to fault zones and geologic structures. The project site is located within a region that contains two traversing faults, the Northeast Flank Fault and the Reservoir Hill Fault; both of these faults are part of the larger Newport-Inglewood Fault system. Figure 4.3.1 provides a representation of the locations of known faults within the region.

A fault is described as the area where two tectonic or continental plates meet. The San Andreas fault, which is approximately 50 miles north/northwest from the project site, is the State's largest and most active fault, where the western Pacific plate meets with the eastern North American plate. Seismologists have determined that the San Andreas Fault is moving at a rate of approximately two inches per year. The primary earthquake hazards within the project area are fault rupture and ground shaking.

One method of measuring the magnitude of earth movement is the Richter Scale. This scale measures the magnitude of energy released by an earthquake on a logarithmic scale, and is the most common scale used to compare the "size" of earthquakes, as it is an objective measure based on the energy released by a particular earthquake.

The concept of "maximum credible earthquake" (CE) is the controlling seismic event for the design of very critical or important structures, such as schools or hospitals. The maximum credible earthquake is the largest event likely to occur on an active fault, having a recurrence interval of greater than 200 years.

The index used to measure earthquake intensity is the modified Mercalli Intensity Scale. This scale ranges from I for earthquakes barely perceptible by human beings to XII for the "ultimate catastrophe." Table 4.3.A, below, describes the relationship of Richter magnitude and Modified Mercalli intensity scales.

In respect to potential ground shaking, the Newport-Inglewood Fault Zone appears to be the most important for design analysis of new development within the City. For sites on thick soil or deep alluvium (sediment deposited from streams), the seismic motion components are modified somewhat depending on soil consistency, soil depth, groundwater conditions, and ground acceleration. Each of the local and regional faults within the Newport-Inglewood Fault Zone most prone to shaking within the project area and their potential Richter magnitudes are identified in Table 4.3.B.

Alquist-Priolo Earthquake Fault Zone Act. The Alquist-Priolo Special Study Zones Act was adopted by the State of California in 1972. The purpose of the act was to define "Special Study Zones," which were to encompass all potentially active traces of the San Andreas, Calaveras, Hayward and San Jacinto faults, as well as other faults that could constitute a potential seismic hazard to structures. To assure that homes, offices, hospitals, public buildings, and other structures for human occupancy are not built on active faults, the Act requires a

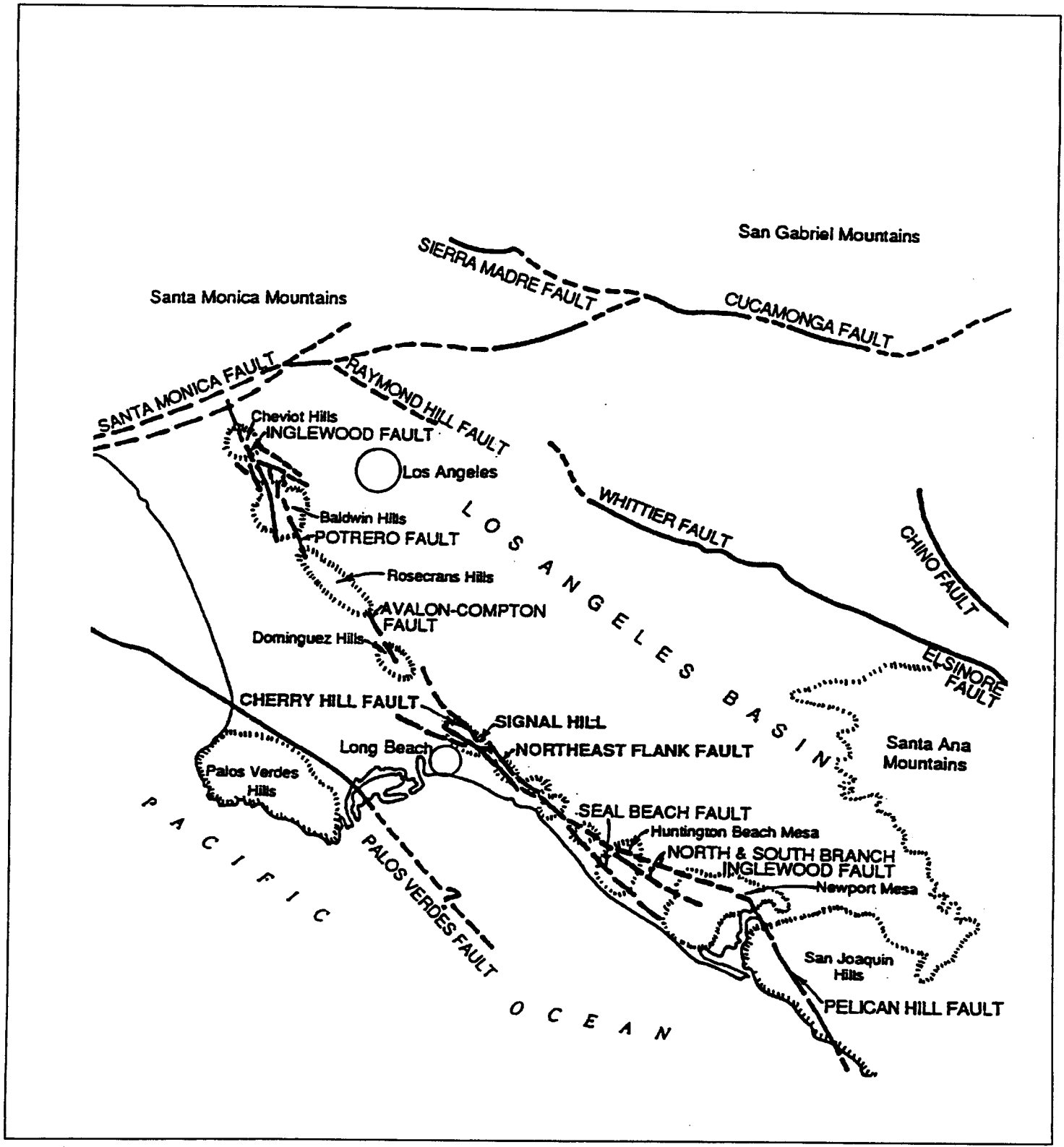

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FIGURE 4.3.1

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MILES

SOURCE: LEIGHTON & ASSOCIATES

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Alamitos Ridge Residential Project EIR

Regional Faults

Table 4.3.A: Relationship of Richter Magnitude and Modified Mercalli Intensity Scales to Expected Earthquake Damage

Richter Magnitude	Modified Mercalli Scale	Expected Earthquake Damage
2	I-II	Usually detected only by instruments.
3	III	Felt indoors. May not be recognized as an earthquake.
4	IV-V	Felt by most people; structures shake; windows and dishes rattle; wooden walls and frame creak; slight damage to unsecured objects.
5	VI-VII	Felt by all; many frightened and run outdoors; glassware breaks; items fall off shelves; furniture moves; cracks occur in unreinforced masonry; chimneys, cornices and other unreinforced architectural ornaments fall; some small slides can occur.
6	VII-VIII	Difficult to stand; steering of autos is affected; potentially moderate to major damage occurs to structures; frame houses move off foundations if not bolted; branches break off trees; elevated structures such as chimneys, water towers collapse.
7	IX-X	General panic; major total damage to masonry structures; underground pipes break; frame structures seriously damaged; cracks occur in ground; large landslides likely; serious damage occurs to dams, dikes, embankments.
8+	X-XII	Major and total damage to buildings and infrastructure.

Source: California Division of Mines and Geology, "CDMG Notes," after Charles F. Richter, 1958, *Elementary Seismology*.

Table 4.3.B: Seismic Parameters

			Maximum Credible Earthquake	Maximum Probable Earthquake (Design Earthquake)		
Potential Causative Fault/Fault Zone	Closest Distance from Fault to Site	Maximum Magnitude of Historic Earthquakes	Magnitude	Magnitude	Peak Horiz. Ground Accel. at Site (g).	Duration of Strong Shaking at Site (Sec.)
San Andreas South of Garlock Fault	78 Km. 48 Mi.	7.9 (1857) 6.0 (1948)	8.5	7.8	0.06	39
San Jacinto	76 Km. 47 Mi.	6.8 (1899) 6.0 (1923) 6.6 (1942) 6.5 (1968)	7.5	7.1	0.04	22
Whittier-Elsinore	26 Km. 16 Mi.	6.0 (1910) 5.5 (1938)	7.0	7.3	0.17	21
Sierra Madre/ San Fernando	42 Km. 26 Mi.	6.6 (1971)	7.5	7.5	0.11	27
Newport-Inglew-ood	On Site	6.2 (1933)	7.0	6.9	0.52	14
Offshore San Clemente	36 Km. 22 Mi.	None Known	6.9	6.9	0.09	15
Palos Verdes	11 Km. 7 Mi.	None Known	7.0	7.0	0.31	16
Raymond	35 Km. 22 Mi.	None Known	6.9	6.7	0.09	12

Source: Leighton and Associates, 1989

geological investigation before a local government can approve most development projects in Special Studies Zones. In January of 1994, the Act was renamed the "Alquist-Priolo Earthquake Fault Zoning Act," and the reference to "Special Studies Zones" was changed to "Fault-Rupture Hazard Zones."

The Newport-Inglewood Fault Zone is designated an Alquist-Priolo Earthquake Fault Zone. The precise location and identification of hazardous faults within or near a zone of potentially active faults can be determined only through detailed geologic investigations. The Alquist-Priolo Act states that an area within 50 feet of an active fault is expected to be underlain by active branches; therefore, before any structure can be built within the zone, a geologic investigation and the submission of a report by a geologist registered by the State of California are required. An exemption to this standard is provided in the Act for individual single family wood framed structures.

In 1933, the Long Beach earthquake struck and affected much of the City. This earthquake occurred on the Newport-Inglewood fault zone, a system of right-lateral strike-slip faulting. There was no surface rupture associated with this earthquake. It resulted in 120 deaths and over $50 million in property damage. Most of the damaged buildings were of unreinforced masonry.

Seismic Setting on the Project Site

Four faults that are part of the Newport-Inglewood Fault Zone occur in the immediate vicinity of Signal Hill. These are the Northeast Flank, Reservoir Hill, Cherry Hill, and Signal Hill faults.

Northeast Flank Fault. The Northeast Flank Fault passes through the project area on the north side of Signal Hill. The fault is contained primarily within the rocks of the San Pedro Formation. The southeast segment of this fault consists of a zone of closely spaced, subparallel splays that narrow to one major fault within the northwest segment.

Reservoir Hill Fault. Reservoir Hill Fault was discovered during previous fault trenching in the area. None of the sediments in this lineament appeared to be faulted.

Cherry Hill Fault. The location of the Cherry Hill Fault is well defined through most of the project study area by trench logging and an exposure created by the widening of Cherry Avenue. Mapping shows three moderately to steeply dipping fault splays offsetting the Lakewood and the San Pedro Formations. Rotated clasts, calcium carbonate filled fractures, and faults with at least 0.8 feet of apparent dip-slip displacement can be observed within shear zones of the Cherry Hill Fault.

Signal Hill Fault. Signal Hill Fault is an intermediate left-step between the Cherry Hill and Northeast Flank faults. The Signal Hill Fault is steeply dipping, generally in a north to west pattern, and offsets Lakewood and San Pedro Formation deposits.

Seismic Hazards

Primary Seismic Hazards. The primary seismic hazards associated with earthquakes are seismic shaking and ground rupture. In the Long Beach area, the primary seismic threat is surface rupture of earth materials along fault traces and damage to structures and foundations due to seismically induced ground shaking. The most damaging event related to faulting is seismic shaking. Seismic shaking is characterized by the physical movement of land surface subsequent to an earthquake. Seismic shaking has potential to cause fires by damaging or destroying gas or electrical utility lines, disruption of surface drainage, blockage of surface seepage and groundwater flow, changes in groundwater flow, dislocation of street alignments, displacement of drainage channels and drains, destruction or damage to buildings and property, and possible loss of life. Seismic shaking can also renew movement of old landslides as well as resulting in the formation of new slides.

The intensity of seismic shaking during an earthquake depends largely on geologic foundation conditions of the materials comprising the upper several hundred feet of the earth's surface. The greatest amplitudes and longest durations of ground shaking occur on thick, water saturated, unconsolidated alluvial sediments that often lead to liquefaction. Ground shaking can also cause ground failure or surface rupturing due to lurching and liquefaction.

Ground rupture, such as seismic fissures, refers to the displacement of the ground along a fault, which can occur during strong earthquakes. In addition to primary hazards, groundshaking can induce several kinds of secondary seismic hazards, including liquefaction, differential settlement, landslides, or seiching, all of which are described below.

The intensity of ground shaking at a given site depends primarily upon the earthquake magnitude, the distance from the earthquake origin, and the underlying rock and soil characteristics. The Newport-Inglewood Fault Zone is potentially capable of producing the most intense ground acceleration at the project site as it passes directly through Signal Hill. It is potentially capable of producing a maximum probable earthquake magnitude of 6.9 with a peak horizontal ground acceleration estimate at 0.52g (Leighton and Associates, 1993). Events along the Newport-Inglewood Fault Zone farther away from the site and from other regional causative faults could be expected to produce peak horizontal ground accelerations ranging from 0.04g to 0.31g. The project site lies within Seismic Zone 4 as defined by the Uniform Building Code.

Other major active and potentially active faults that could produce significant ground shaking at the site include the San Andreas, San Jacinto, Sierra Madre, Whittier-Elsinore, Palos Verdes, and offshore San Clemente and Raymond faults. Seismic parameters for the project site and the surrounding region that could result from a maximum probable earthquake are summarized in Table 4.3.B.

Secondary Seismic Hazards.

Liquefaction. Liquefaction occurs when groundshaking and high groundwater cause loose, sandy soil to behave like quicksand rather than solid material. Subsequently, these soils cannot support weight, which can result in the collapse or displacement of building foundations.

Because the faults near the project site have been designated under the Alquist-Priolo criteria, appropriate geologic investigations must be undertaken prior to the approval of building permits for structures located within 50 feet of these faults. Due to the absence of a shallow water table and the moderately high density of soil materials beneath the site, the liquefaction hazard on the project site is considered negligible.

Differential Settlement. The extremely thick alluvial deposits that underlie the project area are subject to differential settlement during any intense shaking associated with seismic events. This type of seismic hazard results in damage to property when an area settles to different degrees over a relatively short distance. The actual potential for settlement is, however, difficult to predict.

Landslides/Slope Instability. The downslope movement of loose rock or fill material during strong ground shaking is the most likely slope hazard. One landslide and four possible landslides were mapped on the site (Leighton, 1989). The landslide(s) most likely resulted from block glide slides, and consisted of fractured San Pedro Formation deposits. Landslides and slope instability are a potential hazard within the project area due to its location in the Newport-Inglewood Fault Zone.

Seiching. This phenomenon occurs when seismic groundshaking induces standing waves (seiches) inside water retention facilities, such as reservoirs and water tanks. Such waves can cause retention structures to fail and flood downstream properties. Water reservoir tanks are located southeast of the project site.

Non-seismic Geologic Hazards

Mudslides and Erosion. Mudslides and slumps are described as a shallower type of slope failure, usually affecting the upper soil mantle or weathered bedrock underlying natural slopes and triggered by surface or shallow subsurface saturation. Characteristics related to mudslide (mudflow) risks are 1) depth and type of soil; 2) direction and angle of slope; 3) surface drainage configuration; and 4) type and condition of natural ground cover. Historically, mudslides are most common during or shortly after a heavy rainfall or series of rainfalls. With its relatively high winter rainfall, 1994 was a year of increased slope failure throughout Los Angeles County.

Erosion typically occurs from concentrated runoff or unprotected slopes or along unlined channels that are underlain by relatively erosion prone earth materials (e.g., topsoil, soft alluvium, uncemented sandstone). These conditions may occur within the project area.

Settlement. The sinking, or settlement, of a structure, fill prism or other imposed load is usually the result of compaction or consolidation of the underlying soil. Commonly, such soils can be found in alluvial valley areas and where old pits or gullies have been filled in with trash and loose soil.

Subsidence. The phenomenon of widespread land sinking, or subsidence, is generally related to substantial over pumping of groundwater or petroleum reserves from deep underground reservoirs. Subsidence is not related to any surface activity.

Surficial Units

Surficial deposits are generally unconsolidated or weakly consolidated materials deposited over the last 11,000 years. These geologically young deposits are derived from older materials. The surficial deposits that occur on the Alamitos Ridge project site include topsoil, alluvium, colluvium, and artificial fill, and are described in detail below.

Topsoil. Most of the site is covered by a thin veneer of topsoil that has formed in place by weathering of the underlying units. Topsoil is generally thinner on hillsides and thicker on flat areas, especially where underlain by deposits of the Lakewood Formation. The topsoil at the site generally consists of a mixture of sand, silt, clay, and some decomposed organic matter. These deposits are dark brown to dark reddish brown, dry to moist, and loose to medium dense. Topsoil deposits are typically porous, collapsible, and compressible.

Alluvium. Alluvium consists of soil materials that have been eroded, transported, and deposited by running water. These deposits can exceed 20 feet in thickness in the larger drainages that drain eastward away from the project site.

Colluvium. Colluvium generally consists of porous, weathered sediments that have been transported by gravity, or as a result of weathering of the underlying deposits. These deposits are generally about 5 feet thick and consist of slightly porous to porous, moist, yellowish brown sand and clay.

Artificial Fill. Artificial fill has been placed without engineering control at several areas on the site. Artificial fill is found on many of the drilling pads, where fill consists of reworked natural materials that were placed to form a flat pad. Artificial fill, consisting of large fragments of brick, concrete, wood, and other debris, including sump materials. The sump materials include drilling fluid and cuttings containing detectable levels of hydrocarbons.

Groundwater

The subject site is located at the boundary of two groundwater basins, the Central Basin and the West Coast Basin. The Newport-Inglewood Fault Zone divides the tow basins. The regional groundwater flow is toward the south-southwest. However, local variations in the flow direction occur because of the presence of Signal Hill. Groundwater beneath the subject site is expected to flow toward the east-northeast (Gradient, 1999). Depth to groundwater is expected to be 150 feet below ground surface or more at the subject site (Leighton, 1997).

Regulatory Setting Relative to Structural and Seismic Safety Design

Prior to issuance of building permits, the City ensures that structural design shall comply with the current edition of the Uniform Building Code and City Building Codes applicable to structure design and construction in order to minimize the potentially damaging effect of severe ground shaking originating from earthquakes in the region.

Prior to issuance of grading permits, the City's engineering department ensures that rough and final grading plans and overexcavation plans incorporate the recommendations of required final geotechnical investigation reports. Standard City plan approval processes require that recommendations in the final geotechnical report are reflected in the notes of the grading plan and shall be implemented as conditions of any grading and/or construction permit.

4.3.2 THRESHOLD OF SIGNIFICANCE CRITERIA

The effects of a project due to geology and seismicity are considered to be significant if the proposed project results in any of the following:

- Exposures of people or property to geological hazards like landslides, mudslides, ground failure, or similar hazards; soil and/or seismic conditions so unfavorable that they could not be overcome by design using reasonable construction and/or maintenance practices.
- Rendering of soil incompetent for use as a foundation.
- Earthquake induced ground shaking capable of causing ground rupture, liquefaction, settlement, or surface cracks resulting in the substantial loss of use.
- Location of the site within an Alquist-Priolo Earthquake Fault Zone, or within a known active fault zone, or an area characterized by surface rupture that might be related to a fault.
- Deformation of foundations by expansive soils (those characterized by shrink/swell potential).

4.3.3 IMPACTS AND MITIGATION MEASURES

Less than Significant Impacts

Slope Stability. Most 2:1 slopes designed for the area are expected to be grossly as well as surficially stable. Stability blanket fills are recommended for the remaining slopes in order to mitigate surficial instability and nuisance seepage out the slope face. All slopes less than ten feet in height should be geologically mapped and evaluated during grading. Slopes greater than ten feet in height will need to be evaluated, and adequately engineered to City standards prior to grading. Project design will incorporate stability buttresses at the toe of slopes as required. Incorporating these design features will reduce any potential slope stability impacts to the project to below a level of significance.

Liquefaction, Ground Lurching, and Seismically-induced Settlement. Due to the proximity of the Alamitos Ridge project to the Newport-Inglewood Fault Zone, it is likely that secondary seismic hazards would occur on the project site. However, compliance with appropriate seismic and building standards will reduce the potential impacts to structures and people in the project area. Therefore, potential impacts to structures from liquefaction, ground lurching, or seismically induced settlement on the project site are reduced to an acceptable level and are, therefore, considered less than a significant impact.

Landslides. Due to the relatively flat topography of the project site (Leighton, 1993), the site is not prone to landslides or mudslides.

Expansive Soils. Laboratory test results on representative soil samples indicate very low expansion indices (Leighton & Associates, 1993). Therefore, special foundation requirements are not needed to mitigate expansive soils, and no impacts are anticipated. Therefore, impacts related to expansive soils are considered to be below a level of significance.

Potentially Significant Impacts

Ground Rupture. The project site is affected by the Newport-Inglewood Fault Zone. Structures built astride the surface traces of active faults could experience various degrees of damage, and possible catastrophic damage, if there is further fault movement. This would include damage resulting from surface rupture and ground failure.

To assure that homes and other structures for human occupancy are not built on active faults, the Alquist-Priolo Zone Act requires a geological investigation before a local government can approve development projects in earthquake fault zones. As stated previously, properties within 50 feet of an active fault may be underlain by active branches. Before any structure can be built within such a zone, a detailed and thorough geologic investigation must be conducted by a geologist registered by the State of California. Recommendations of the final geotechnical investigation are to be implemented as part of the City's plan check review and building permit approval process. Through compliance with all applicable regulations and as detailed in a final geotechnical investigation submitted to the City for review during the permitting process as required by State law, primary seismic hazards associated with ground rupture are mitigated.

As described earlier in this section, the Newport-Inglewood Fault is potentially capable of producing a maximum probable earthquake magnitude of 6.9 with a peak horizontal ground acceleration estimate of 0.52g and possible ground rupture. Due to the location of the project in relation to the Newport-Inglewood Fault Zone and the Northeast Flank Fault (illustrated on Figure 4.3.1), the project could be subject to substantial and significant groundshaking activity in the event of a major earthquake on this fault. The project site is within the Alquist-Priolo Zone, which requires structural setbacks from the fault that bifurcates the site. The Tentative Tract Map illustrated in Figure 3.3 incorporates a minimum 50-foot structural setback through the site, shown in Lots J, K, and L. The incorporation of appropriate building standards and inclusion of the required 50-foot setback from the

fault zone in the Tentative Tract Map will reduce potential seismic hazards to levels acceptable within the framework of the applicable State guidelines, as reflected in the Alquist-Priolo Zone Act. This results in an impact below a level of significance.

Seismic Ground Motion. As with all of Southern California, the project site is subject to strong ground motions resulting from major earthquakes on nearby faults. The project site is within a relatively high energy ground shaking zone (Seismic Zone 4). The City of Long Beach Building Official (or designee) is required to review and approve final design plans, to ensure that all structures are designed to resist earthquake forces as defined by the Uniform Building Code (UBC) for a Seismic Zone 4. The UBC outlines specific design requirements for structures based on expected potential ground acceleration, intended uses, surface rupture, and subsurface soils or bedrock conditions. As required by existing State and local laws, structures on the project site shall be designed in accordance with the current edition of the Uniform Building Code and/or City Building Code. Compliance with these laws will minimize the potentially damaging effect of severe ground shaking originating from major earthquakes in the region.

Ground Settlement. Topsoil, alluvium within drainages, colluvium, and artificial fills are present on the project site and have a high settlement potential. Excessive settlement could occur if foundations or fills were placed directly on these materials. Prior to the placing of additional fill or construction of structures, complete removal of these sediments down to firm strata and recompaction of these materials will be required to reduce the settlement potential to below a level of significance. Mitigation to this effect is provided later in this section.

Erosion. Poorly cemented sandstone and conglomerate will be moderately to highly erodible when exposed in cut slopes. Fill materials generated from these units are also expected to have a moderate to high potential for erosion. Slopes with a 2:1 ratio are expected to perform satisfactorily without excessive erosion, provided proper surface drainage is established and maintained. Any geotechnically acceptable method of slope erosion control shall be used to protect the slopes until vegetation is well established. Slopes are required to be designed in accordance with all requirements of the Uniform Building Code, as well as Title 15, Section 15.04.070(D) (City Review of Plans), of the City of Long Beach Municipal Code, which includes requirements for terrace drains. Implementation of these measures reduces project impacts to below a level of significance.

Mitigation Measures

The following mitigation measures are incorporated to offset potentially significant adverse soils and geotechnical impacts of the Alamitos Ridge Residential project.

Seismicity

3.1 The City of Long Beach Building Official (or designee) will review final design plans to ensure that the appropriate structural setback zones and restricted use areas required by the Alquist-

Priolo Earthquake Fault Zone for the Northeast Flank Fault are implemented, subject to the recommendations of a final geotechnical investigation report. Along the Northeast Flank Fault, the minimum structural setback is 50 feet from the center of the fault zone. Prior to issuance of building permits, the Building Official shall ensure that all applicable UBC structural foundation requirements, fault setbacks, and recommendations of the final geotechnical investigation report are included in project design.

Slope Stability

3.2 Prior to the issuance of grading permits, the project applicant will ensure, to the satisfaction of the City of Long Beach Building Official/City Engineer, that all cut slopes, back slopes, and keys will be geologically mapped in detail during grading. The cut portions of the fill over cut slopes shall be cut and geologically mapped prior to construction of the fill portion of the slope. Stability blanket fills shall be required to mitigate surficial instability and nuisance seepage out of the slope face; fill slopes will be constructed in accordance with the General Earthwork and Grading Specifications following typical key excavation, benching, and subdrainage procedures; the project developer will utilize appropriate lot capping procedures, including depth of overcut and undercut; the project developer shall propose special treatment for major slopes greater than ten feet in height; and the project developer will ensure that construction of stability buttresses at the toe of slope is incorporated.

Ground Settlement

3.3 Prior to issuance of a grading permit, the project proponent shall demonstrate in the project plans for approval by the Director, Department of Planning and Building that the following measure mitigates the geologic condition identified in the geotechnical report (Leighton and Associates, December 14, 1993). All unsuitable compressible overburden materials shall be removed prior to fill or structure placement. Materials to be removed include recent alluvium deposited within incised drainage, uncontrolled artificial fills and underlying soils, landslide materials below proposed cuts, and colluvium and alluvium over bedrock.

Erosion

3.4 Prior to the issuance of grading permits, a geotechnically acceptable method of slope erosion control shall be proposed and, if acceptable to the Director, Planning and Building Department, indicated on project plans for implementation through completion of site landscaping. Slope erosion control shall be included in the Landscaping Plan, subject to the approval of the Director, Department of Planning and Building.

4.3.4 CUMULATIVE IMPACTS

Potential geological resource impacts are limited to the exposure of additional residential structures and population to seismic hazards associated with the Newport-Inglewood Fault Zone and other regional faults. Cumulative geological impacts identified resulting from the project could be considered significant if the project, in addition to the cumulative project area, is not constructed consistent with adopted seismic regulations or exposes a substantial number of people or structures to major geologic hazards. However, incorporation of the identified mitigation measures and compliance with all applicable state laws, City ordinances and building codes, ensured through the plan review process of the Department of Planning and Building, will reduce cumulative impacts to a level below significance.

4.3.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The mitigation measures described above will reduce the potential geologic, seismic and soil related impacts to below a level of significance. Therefore, there are no significant unavoidable adverse impacts of the proposed project related to earth resources.

4.4 WATER RESOURCES

This section addresses potential impacts to potable water supplies, storm water, and flood control facilities resulting from implementation of the proposed project. Documents reviewed and incorporated as part of this analysis include the Preliminary Hydrology Study for Tentative Tract Map No. 52702 (Development Resource Consultants, Inc. [DRC], 2002) (Appendix G), Preliminary Standard Urban Storm Water Mitigation Plan (SUSMP) for Tentative Tract Map No. 52702 (DRC, 2001) (Appendix H), *Planning for Development Study for the Alamitos Land Company Properties* (Leighton and Associates, Inc., December, 1993), and *Phase I Environmental Site Assessment for Potential Hazardous Materials/Waste Contamination, Alamitos Land Company Properties* (Leighton and Associates, November, 1993). Additional references are cited within the text.

4.4.1 EXISTING ENVIRONMENTAL SETTING

Surface Drainage

Existing storm water runoff patterns are affected by on-site and off-site topography, surface permeability, and existing drainage conveyance structures. The project area consists of approximately 15 acres of predominantly open land and unpaved surfaces. West of the project site, Signal Hill rises more than 300 feet above the surrounding area and is the highest topographic feature in southwestern Los Angeles County. The hill itself slopes broadly to the northwest and southeast, and its slopes have been terraced to accommodate roads, drill pads, and residential structures. Waters draining from Signal Hill flow easterly towards the project site, and are conveyed via the existing storm drain system within the surrounding street system.

As detailed in the Preliminary Hydrology Study (DRC, 2002), the existing hydrology of the site consist of three drainage areas (E1-E3) (Figure 4.4.1). Area E1 is the largest, and runoff flows generally north towards the adjacent undeveloped property to the north. Runoff from Area E2 generally flows to the north into Redondo Avenue and the storm drain system, which discharges into the Los Cerritos Channel. Area E3 is off-site property bounded by Grant Avenue and 20th Street; runoff generally drains north and onto the site. Table 4.4.A provides calculated flows for the three drainage areas during a 10 year storm.

Due to the sharp relief of Signal Hill and the gradual sloping of the project site, the area is not prone to flooding (Leighton, 1993). The project site is not located in a Federal Emergency Management Administration flood zone (FEMA, 2000).

Surface Water Quality

Regulatory Setting. Both the State and federal governments have implemented programs that are intended to maintain or improve the quality of urban runoff. Since storm water runoff from the City of Long Beach eventually drains into the Pacific Ocean, these programs aim to ensure that the

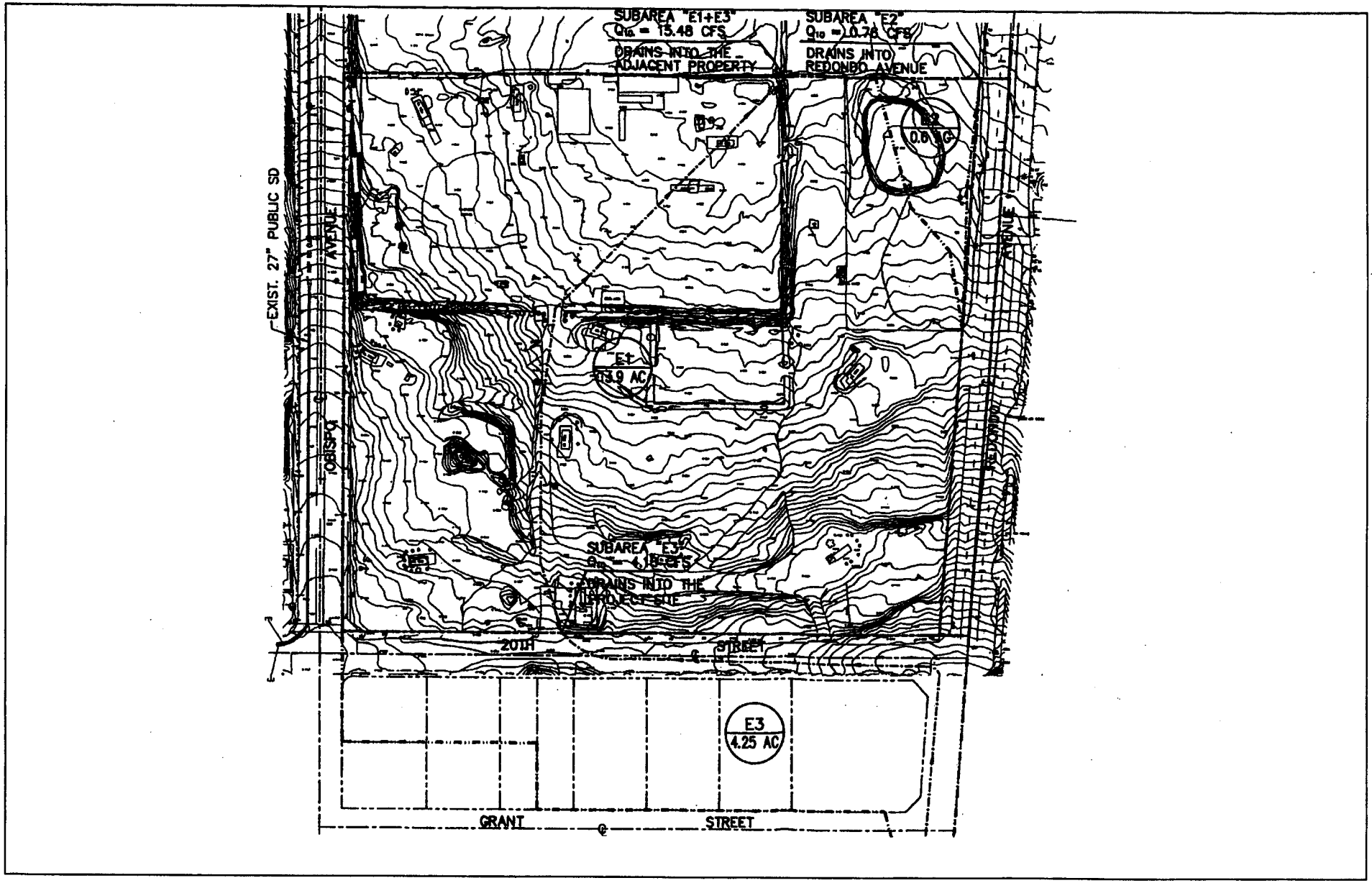

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FIGURE 4.4.1

Alamitos Ridge Residential Project EIR

Hydrology - Existing Conditions

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Table 4.4-A: Existing Condition Storm Water Runoff Flows -10 Year Storm

Drainage	Area (Acres)	Q_{10} (CFS)	Runoff Destination
Area E1	13.9	11.3	Adjacent undeveloped property
Area E2	0.6	0.76	Redondo Avenue
Area E3 (off site)	4.25	4.18	Project site
Total	18.75		

Source: DRC, 2002

Notes: Q_{10} = Flow for 10 year storm
CFS = cubic feet per second

quantities of harmful pollutants draining from urban streets and developments are minimized. The primary responsibility for regulating activities that affect the water quality of all waters within the State rests with the State Water Resources Control Board (SWRCB). In accordance with the Federal Pollution Control Act of 1972 and the Porter-Cologne Water Quality Control Act of 1969, water quality control plans were prepared for each of the 16 planning basins within the State. At the federal level, the Clean Water Act allows the Environmental Protection Agency (EPA) to delegate its National Pollutant Discharge Elimination System (NPDES) permitting authority to states with an approved regulatory program. The State of California is one of the delegated states. The California Water Code authorizes the SWRCB, through its Regional Boards, to regulate and control the discharge of pollutants into waters of the State by issuance of NPDES permits.

Municipal Storm Water Permit

In June of 1999, the City of Long Beach implemented a separate municipal storm water permit [CAS004003 (CI 8052)]. The NPDES permit requires development and implementation of management programs (Best Management Practices or BMPs) during the life of the permit to improve long-term quality of storm water discharge and improve the water quality of the receiving waters. The beneficial uses of the receiving waters will be protected through implementation of these BMPs. Source control BMPs to control constituents of urban runoff may include, but are not limited to: catch basin stenciling, street sweeping, waste oil recycling, household hazardous waste collection programs, water conservation practices, proper disposal practices for litter, green waste, and pet feces, public reporting program for illicit connections and discharges, reporting program for hazardous substances spills, and public and developer education programs.

The current permit requires Standard Urban Storm Water Mitigation Plans (SUSMPs) for all new developments and redevelopment projects falling under several priority project categories. These categories include: home subdivisions of ten housing units or more; commercial developments greater than 100,000 square feet; and environmentally sensitive areas. The SUSMP must incorporate the following requirements: 1) provisions associated with SUSMPs adopted by the RWQCB; 2) at a minimum, peak runoff rates can not exceed predevelopment levels, for developments where the potential for increased storm water discharge rates can result in an increase in downstream erosion potential; and 3) for new developments, 25 percent of required landscaped areas must be vegetated with xeriscape.

The RWQCB adopted an SUSMP on March 8, 2000, which details additional requirements to those listed above. Most importantly, the preceding project categories are now required to provide postconstruction structural or treatment control BMPs to infiltrate or treat storm water runoff to specific numeric criteria (refer to Los Angeles County SUSMP). The City of Long Beach has prepared a Storm Water Management manual that provides the quantitative methods for implementing the requirements of the SUSMP (City of Long Beach, 2001).

General Construction Activity Storm Water Permit

In accordance with NPDES regulations, to minimize the potential effects of construction runoff on receiving water quality, the State of California requires that any certain construction activity

disturbing five acres or more of soil must obtain a General Construction Activity Storm Water Permit. Permit applicants are required to submit a Notice of Intent to the SWRCB, prepare a Storm Water Pollution Prevention Plan (SWPPP), and implement Best Management Practices (BMPs) detailed in the SWPPP to reduce construction effects on receiving water quality by implementing erosion control measures using the best available or best conventional control technology. Because implementation of the proposed project (through build out) will collectively involve more than five acres, the project would be subject to permit requirements.

The City of Long Beach municipal permit requires that the project proponent submit proof that the NOI has been filed and that the SWPPP has been prepared before a grading permit will be issued.

Existing Surface Water Quality. The project site is an oil field with active and abandoned oil wells and water injection wells. Although containment walls are in place around the active wells, previous soil investigations documented petroleum stained soil outside of these walls. Potential runoff constituents from the site under its current use include oil and grease, sediment, trace metals, and trash.

Groundwater

The project site is located at the boundary of two groundwater basins: the Central Basin, and the West Coast Basin. The Newport-Inglewood Fault Zone divides the two basins. The regional groundwater flow is toward the south-southwest. However, local variations in the flow direction occur because of the presence of the Northeast Flank Fault that cuts across the site in the southwestern portion of the property (see Section 4.3, Geotechnical Conditions, for more detail on the Northeast Flank Fault). Local groundwater is expected to flow in a generally downhill direction, or radially away from Signal Hill. On the site, the groundwater flow is to the east-northeast.

Both the Lakewood and San Pedro formations, which are located below the project site, are water bearing. However, in the Signal Hill area, folding and erosion have thinned the Lakewood Formation, and groundwater occurs only within coarse sand and gravel beds of the San Pedro Formation and deeper units. The main water bearing zones in the site area are the Lynwood, Silverado and Sunnyside aquifers. The Silverado aquifer is the principal source of confined groundwater. Based on previous investigations, the groundwater table is expected to be situated at approximately 150 below ground surface at the project site (Leighton & Associates, 1993).

Groundwater beneath the site was historically reported by the USGS (Piper, 1953) as having elevated total dissolved solids (TDS) concentrations. In 1904, TDS concentrations within the vicinity of the site were reported at about 300 parts per million (ppm). In 1942, dissolved solids were reported at about 700 ppm. A considerable volume of oil field brine presumably infiltrated into groundwater and, as a result, elevated the concentration of total dissolved solids. Due to the faults (groundwater barriers) that are present in the project area, the groundwater does not appear to circulate well enough to reduce the concentration of dissolved solids (Leighton & Associates, 1993), and on-site groundwater is not considered a source of potable water, although about 42 percent of the City's water actually comes from area groundwater.

The local groundwater originates from the San Gabriel mountains watershed to the north and slowly makes its way underground to Long Beach. High-powered pumps extract groundwater from City of Long Beach Water Department-owned wells, most of which exceed 1,000 feet in depth. The Department currently has 25 active groundwater wells. These wells draw water from a deep aquifer, which will not be impacted by the project development due to the depth of the wells and intervening soils.

4.4.2 THRESHOLDS OF SIGNIFICANCE FOR WATER RESOURCES

In accordance with CEQA, the effects of the proposed project are evaluated to determine whether they will result in a significant adverse impact on the environment. The effects of the proposed project on hydrologic/water quality resources are considered to be significant if the project results in the following:

- Substantial degradation of groundwater quality; contamination of public water supply; substantial degradation or depletion of groundwater resources; interference with groundwater recharge or substantial flooding or siltation;
- Generation of on-site runoff rates that substantially exceed the capacity of existing storm drainage systems;
- Substantial and adverse increased inundation, sedimentation and/or damage from water forces to the subject project;
- Location of facilities within a flood prone area, or alterations to the course or flow of floodwater;
- Substantial degradation of the existing quality of storm water.

4.4.3 IMPACTS AND MITIGATION MEASURES

Less than Significant Impacts

Surface Drainage. In the developed condition, the site will be composed of six drainage areas (Figure 4.4.2). Areas A1, A2, A23, A4, and A5 will drain via a series of catch basins to a new storm drain line along Redondo Avenue, which will connect to the existing 57 inch storm drain located on Hill Street. Area B1 will drain via a catch basin to an existing 27 inch storm drain on Obispo Avenue. Area E3 will drain west along 20th Street and north on Obispo Avenue to the existing storm drain and will not affect the site. Table 4.4.B provides calculated flows for the six areas during a 10 year storm.

After build out of the project, approximately 70 percent of the site will be covered with impervious surfaces, including single family homes and paved surface streets. This increase in impervious area will result in a corresponding increase in the total volume of water draining from the site.

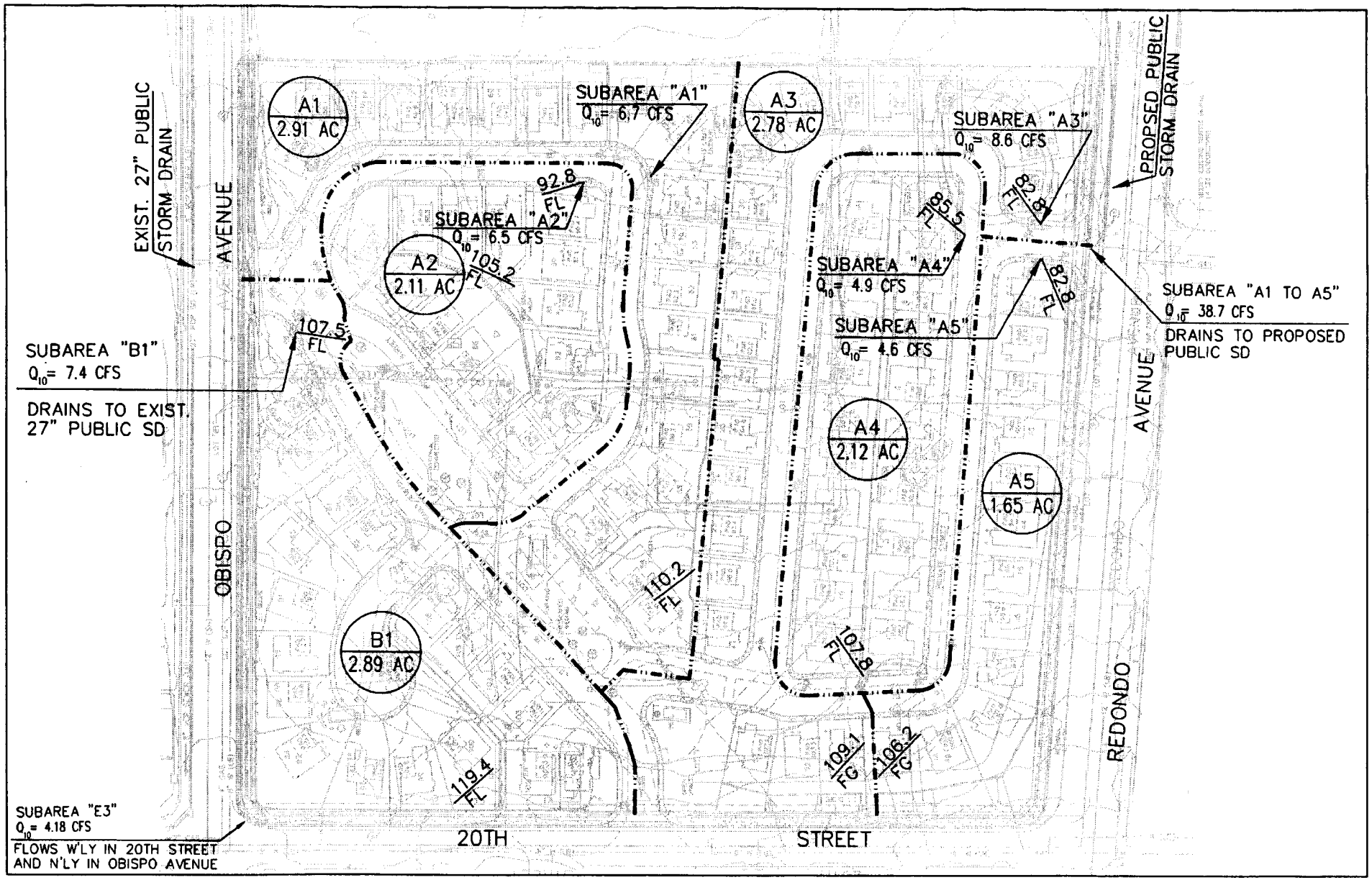

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FIGURE 4.4.2

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Alamitos Ridge Residential Project EIR

Drainage Plan

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Table 4.4-B: Developed Condition Storm Water Runoff Flows - 10 Year Storm

Drainage	Area (Acres)	Q_{10} (CFS)	Runoff Destination
Area A1	2.91	6.7	Redondo Avenue new storm drain
Area A2	2.11	6.5	Redondo Avenue new storm drain
Area A3	2.78	8.6	Redondo Avenue new storm drain
Area A4	2.12	4.9	Redondo Avenue new storm drain
Area A5	1.65	4.6	Redondo Avenue new storm drain
Area B1	2.89	7.4	Obispo Avenue storm drain
Total	14.46		

Source: DRC, 2001

Notes: Q_{10} = Flow for 10 year storm
CFS = cubic feet per second

The 10 year storm flow will increase from 16.24 cfs to 38.7 cfs. However, 31.3 cfs of the flow will drain to the new storm drain on Redondo Avenue, which has been designed to handle this increase. Drainage from Area E3 will be diverted from the site to the Obispo Avenue storm drain. Runoff from the project site will be contained within the new on-site storm drain system and off-site storm drains, reducing downstream erosion potential.

Surface Water Quality During Construction and Remediation

Construction activities such as grading, stockpiling, removal of vegetation, excavation, and trenching would result in disturbance of soils at the project site. Runoff from a construction site/oil field can contain sediments, petroleum products, and other materials from these activities. These runoff constituents could be transported into the storm drain system. Other potential hydrocarbon spills or leaks from heavy equipment and machinery, staging areas, or building sites could also enter the storm drain system. Pollutants introduced in this way could include petroleum products and trace (heavy) metals from equipment, and products such as paints, solvents, and cleaning agents that could contain hazardous constituents.

All construction activity shall conform to the requirements of the City of Long Beach municipal code, municipal storm water permit, and the General Construction Activity Storm Water Permit. Examples of construction BMPs include desilting basins, berms, hay bales, silt fencing, hydro-seeding of temporary slopes, and related measures. Table 4.4.C, Typical Construction BMPs, provides a list of typical BMPs and the constituents of concern that they address. BMPs used during construction shall be outlined in the SWPPP. These BMPs shall be utilized during the remediation process as applicable. Implementation of the foregoing procedures shall reduce construction erosion impacts to less than significant levels.

Surface Water Quality After Construction and Remediation

Studies have shown that storm water runoff from typical urban and industrial areas can contain some pollutants similar to those found in wastewater from industrial discharges. These runoff constituents typically can be present on impervious surfaces such as streets, sidewalks, parking lots, driveways, and other paved areas and can wash into the storm drain system via nuisance water (overirrigation, washing concrete surfaces, etc.) and during the first phase of a storm. During later phases of a storm, runoff constituents have been effectively removed from the impervious surfaces, and pollutant loads to the storm drain system decrease.

Unless controlled, development of a site has the potential to produce water quality impacts through introduction of additional impervious area and introduction of additional pollutants such as trace metals from cars, bacteria associated with pet waste, food waste and sewer system defects, nutrients from fertilizers, chemicals from household use, and trash from improper disposal methods. In accordance with the City of Long Beach Department of Planning and Building requirements, a preliminary Standard Urban Storm Water Mitigation Plan (SUSMP) (DRC, 2001) has been prepared for the project.

Table 4.4.C: Typical Construction BMPs

Typical BMPs to be Considered in Selection Process	Constituents Addressed by BMPs					
	Sediment	Nutrients	Pathogens	Pesticides	Metals	Other
Soil and slope stabilization utilizing the appropriate combination of natural and synthetic mattings, geotextiles, mulches, and temporary and permanent seeding.	X	X			X	
Temporary desilting basins constructed where necessary and consisting of ponds with outflow pipes designed to retain or detain runoff sufficiently to allow sediment to settle.	X	X			X	
Storm drain inlet protection utilizing an appropriate combination of barrier devices such as sand bags, straw rolls, hay bales, fiber rolls, gravel, silt fencing, screens, and temporary drain signs (raising awareness and limiting construction wastes from entering the storm drain system).	X	X			X	
Energy dissipation devices installed where necessary and consisting of physical devices such as rock, riprap, and concrete rubble intended to prevent scour of downstream areas.	X	X			X	
On-site dust control and street sweeping employed when and where necessary paying close attention to paved areas and areas susceptible to wind erosion (such as soil stockpiles).	X	X			X	
Stabilized construction entrance consisting of pads of aggregate and located where traffic enters public rights-of-way; when and where necessary, wash racks or tire rinsing may be employed (tire rinse waters being directed through on-site sediment control devices).	X				X	
Diversion Structures utilized where necessary to divert storm water flows from disturbed areas and consisting of devices such as silt fencing, temporary or permanent channels, V ditches, earthen dikes, downdrains, straw bales, and sandbag check dams.	X				X	

Typical BMPs to be Considered in Selection Process	Constituents Addressed by BMPs					
	Sediment	Nutrients	Pathogens	Pesticides	Metals	Other
Construction housekeeping practices consisting of practices such as barricading catch basins and manholes during paving activities; utilizing plastic sheeting, secondary containment, or bermed areas for construction materials when necessary; removing construction debris in a timely fashion; designating and lining concrete wash out areas; and berming or locating sanitary facilities away from paved areas.	X		X		X	Trash
Fertilizer, pesticide, and soil amendment management not over-applying such materials.		X		X		

Runoff from Active Oil Wells. Each existing active oil well has an adjacent cellar box that can accommodate approximately 479 gallons of liquid from the well area (spills and/or runoff). These cellar boxes are periodically pumped out to prevent overflow into the storm drain system. The project includes installation of piping from the cellar boxes to subsurface oil/water separators, which will be connected to the storm drain system. The number and locations of the separators will be determined during the design phase of the project and will be placed in order to filter oily runoff and/or a spill from any of the active oil wells. The separators are composed of a three baffle system, which traps oil on the surface and allows water to pass beneath the oil to the storm drain system.

Runoff from Residential Areas. The total peak mitigated runoff (the amount of runoff that needs to be treated prior to discharge to the storm drain system) is 2.0 cfs based on conceptual grading. The 0.4 cfs from Area B-1 will be treated by a catch basin Fossil Filter™ or equivalent prior to discharging into the existing storm drain in Obispo Avenue. The 1.65 cfs generated by Areas A1-A5 will be treated by one of the following:

- Fossil Filter™ or equivalent in each catch basin
- One central storm water pollution control unit installed at the end of the on-site storm drain system

Additional source control BMPs, including City street sweeping, are required to mitigate the impact from constituents not addressed by oil/water separators, Fossil Filters™ or equivalent, and water pollution control units. (Refer to Mitigation Measure 4-4.)

Implementation of source control BMPs and treatment control BMPs, as required by the City's Municipal Storm Water Permit, will reduce postconstruction water quality impacts to less than significant levels.

Groundwater

Build out of the project site will substantially reduce the total area of pervious land available for infiltration and conveyance of precipitation to groundwater. However, due to the oil resources and operations at the site, the site is not considered a groundwater recharge area. At the same time, reduction in infiltration will also reduce the amount of pollutants that could be transported to local groundwater. There may be local zones of intermittent or seasonally perched groundwater within 50 feet below ground surface that may be encountered during grading operations, but dewatering is not anticipated. Landscape irrigation may contribute to these perched zones but is not expected to significantly alter the flow of perched groundwater.

Remediation of the surface and subsurface crude oil contamination on the project site, as required for project implementation, will reduce the levels and amount of contaminants infiltrating the groundwater. In addition, based on an analysis of historic infiltration of saline formation water into local groundwater, the project will not change the dynamics of this infiltration and will not result in any increases in saline infiltration. Therefore, impacts to groundwater from the proposed project will be less than significant.

Fire Flow

Build out of the proposed project will result in increased demand on water flow for fire protection services within the project area. Fire flow standards for all new development are based on the Uniform Building Code (UBC). As discussed further in Section 4.7, Public Services and Utilities, the City of Long Beach Fire Department has indicated that the project will not create an adverse impact on the Fire Department's ability to meet the requirements set forth in the UBC and, therefore, will be able to serve the project. The proposed project will be required to comply with City minimum standards for fire flow available to the site prior to issuance of building permits. Fire flow requirements of the project are required by the City to comply with the UBC; therefore, the project will result in a less than significant impact.

Mitigation Measures

Surface Drainage.

4.1 Prior to release of the Grading Permit, the applicant shall submit a final hydrology plan to the City of Long Beach Director of Public Works/City Engineer for approval. The hydrology plan shall include any on-site structures or modifications of existing drainage facilities necessary to accommodate increased runoff resulting from the proposed project and shall indicate project contributions to the regional storm water drainage system.

Surface Water Quality.

4.2 Runoff from crude oil impacted soil exposed during grading operations could result in impacts to runoff water quality. All identified crude oil impacted soils shall be remediated and/or contained on site (no sediment shall be allowed to be transmitted off site) prior to or concurrent with commencement of residential project grading operations. Previously unidentified crude oil impacted soils encountered during the grading operations shall be remediated or isolated as soon as possible following discovery to limit exposure to storm water runoff. All runoff from the site shall be contained by sand bags, berms, and sediment traps during the rainy season (October 1 through April 30).

4.3 The Construction Contractor shall be responsible for performing and documenting the application of BMPs identified in the SWPPP. These BMPs shall be implemented during remediation activities as well as during construction activities. Weekly inspections shall be performed on the sand bag barriers and other sediment control measures called for in the SWPPP. Monthly reports shall be maintained by the Director, Public Works. The applicant's contractor shall inspect BMP facilities before and after every rainfall event that is predicted to produce observable runoff, and at 24 hour intervals during extended rainfall events, excepting days when there is no ongoing site activity. Pre-storm activities will include inspection of the major storm drain grate inlets and examination of other on-site surface flow channels and swales, including the removal of any debris that blocks the flow path. Post-storm activities will include inspection of the grate inlets, looking for any ponded

water on the site and determining the cause, and looking for surface erosion. The Construction Contractor shall implement corrective actions specified by the City's Public Works Department, as necessary, at the direction of the Director, Public Works. Inspection records and compliance certification reports shall be submitted to the Director, Public Works on a monthly basis and shall be maintained for a period of three years. Inspection schedules shall be monthly during the dry season and weekly during the wet season, for the duration of project construction or until all lots and common areas are landscaped.

4.4 The project proponent shall submit a SUSMP for the project in accordance with the City's municipal storm water permit and the Los Angeles County SUSMP approved by the RWQCB, to the City for approval. The project proponent shall include source control BMPs stipulated in the Long Beach Storm Water Management Plan (LBSWMP) such as proper land use planning/management, good housekeeping practices, safer alternative products, water conservation and irrigation control, proper waste handling and disposal, employee training, and proper materials storage. The implementation of treatment BMPs as described in the Impacts Section and source control BMPs as described above will comply with the water quality objectives stipulated in the Water Quality Control Plan (Basin Plan) for the Los Angeles Region and promulgated in the LBSWMP and the City's municipal storm water permit.

Groundwater. No mitigation needed.

4.4.4 CUMULATIVE IMPACTS

Cumulative development in the project area is a continuation of the existing urban pattern of development, which has already resulted in extensive modifications to watercourses in the area. The area's watercourses have been channelized and drainage systems have been put in place to respond to the urbanization that has occurred in this area over the past 80 to 90 years. For all cumulative analysis related to water resources and drainage, the cumulative projects being considered include all potential projected development within the City, as documented in the City's 1995 Urban Water Management Plan. Because cumulative drainage impacts are caused by build out of projects that cover pervious surfaces with structures and parking lots that are impervious, cumulative development is considered to be build out of the City over an extended time period, resulting in complete available parcel build out.

As noted earlier in this section, water drainage in this already urbanized area is accommodated through design that conveys on-site flows via an underground storm drain system to a regional channel and river system. Site drainage is tributary to an existing 57 inch reinforced concrete pipe (RCP) in Redondo Avenue at Hill Street that conveys storm water runoff farther downstream prior to connecting to the Los Cerritos Channel. Due to the existing capacity of the 57 inch storm drain, it may overflow during high event storms (i.e., a 100 year storm event) causing the storm water to be conveyed in the adjoining streets to a point further downstream prior to entering the regional system. Even with the implementation of project mitigation related to storm water flood control, cumulative impacts from area flooding along downstream streets are anticipated as a result of the proposed

project. Cumulative impacts related to area flooding at Redondo Avenue are considered significant and unavoidable.

The development of vacant lands in areas already committed to urban uses can result in increased urban pollutants in rain and irrigation runoff from project sites. Each project must comply with NPDES permitting requirements and include BMPs to avoid impacts on water quality from urban related runoff. In addition, due to the remediation requirements for the cleanup of oil extraction wastes from the site, after project storm water runoff quality will be better than under the existing conditions of the site. Therefore, the project contribution of storm water runoff to area watercourses will not result in a significant, long-term cumulative surface water quality runoff impact. The proposed Alamitos Ridge project will not have a net increase to contaminated runoff and, therefore, will not cumulatively impact groundwater or groundwater resources.

4.4.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Due to the creation of impermeable urban surfaces, the project will result in increases in the volume of storm water and quantities of urban pollutants draining from the project site. Increased storm water runoff from the project will add to cumulative drainage and street flooding problems experienced to the northeast of the project site due to the existing undersized and inadequate regional drainage facilities. Because these facilities serve a large drainage area and extend several miles to the San Gabriel River, there are no plans to increase capacity. Impacts to surface water quality are not considered significant due to implementation of mitigation and the regulatory NPDES Permits and BMP requirements, and to the improvement of site conditions as a result of site remediation.

4.5 BIOLOGICAL RESOURCES

4.5.1 EXISTING ENVIRONMENTAL SETTING

This baseline inventory of biological resources is for the project area, located in the City of Long Beach (see Figure 3.2.1). Much of the site is currently or has historically been used for oil extraction and other resource extraction activities. The site is nearly surrounded by urban/suburban development.

Methods

LSA conducted a biological survey of the study area on September 11, 2000. Staff biologist Richard Erickson was on site for one hour and walked over much of the site. LSA had also surveyed the adjacent Bixby Ridge residential development area in July, 1996, providing context for the current investigation. LSA biologist Jim Harrison conducted a follow up survey of the entire project site from 12:26 p.m. to 1:55 p.m. on November 26, 2002. All floral and faunal species observed were recorded.

Records of sensitive plant and animal species from within the project vicinity were obtained from the California Natural Diversity Data Base (CNDDB); the latest request for records was made on November 25, 2002, and included information from the Long Beach and Los Alamitos U.S. Geologic Survey 7.5' series topographic quadrangles.

Due to the variability of the common names of plants, scientific names are included in the discussions of all plant species. Scientific names are generally omitted for plant and animal species discussed elsewhere in the report because 1) the common names are virtually standardized for animal species, and 2) the scientific names for all plants and animals observed in the study area are included in the species lists in Appendices A and B. In the interest of clarity, scientific names are included for 1) all species treated in the Sensitive Species Section, and 2) species that are expected to occur on the site but that were not observed.

Vegetation

The entire site is highly disturbed, and native vegetation is scarce. Roadways and other disturbances associated with oil operations essentially cover the site. Ruderal (i.e., weedy) forbs are by far the most common plants on site, in particular the exotic Russian thistle (*Salsola tragus*) and the native horseweed (*Conyza canadensis*). Telegraph weed (*Heterotheca grandiflora*), western ragweed (*Ambrosia psilostachya*), and salt heliotrope (*Heliotropium curassavicum*) are also present. Herbs present include filaree (*Erodium* spp.), Bermuda grass (*Cynodon dactylon*), and other exotic grasses.

Woody vegetation is found mainly along the edges of the site and around various structures related to the oil extraction process. Various species of eucalyptus (*Eucalyptus* spp.) are the dominant species.

Other trees include Brazilian pepper tree (*Schinus terebinthifolius*), Mexican fan palm (*Washingtonia robusta*), wattle (*Acacia* spp.), and tree of heaven (*Ailanthus altissima*). None of the trees are taller than approximately 15 feet, and none are believed to be native to the site. The few shrubby species on site are also nonnative (e.g., tree tobacco, *Nicotiana glauca*; castor bean *Ricinis communis*; oleander, *Nerium oleander*; mesquite, *Prosopis* sp.), except for a single mulefat (*Baccharis salicifolia*), a single California buckwheat (*Eriogonum fasciculatum*), and what appear to be a cluster of narrow-leaved willows (*Salix exigua*). The latter species is confined to a small section of manufactured slope along Obispo Avenue where it is growing in what is a very unusual situation for this species (i.e., no evidence was found of a seep, drainage, or irrigation that could supply the moisture normally needed by this species). Vegetation within the project area has low value/sensitivity because it is predominately nonnative and generally unsuitable for wildlife habitat.

Wildlife

Because the site supports essentially weedy vegetation, it is frequented primarily by common, highly adaptable wildlife species typical of urban/industrial settings.

Amphibians. No amphibians were recorded during the field surveys and, due to the lack of consistently moist areas on the site, any amphibians that may occur would be limited to a few localized occurrences of the more common species, such as the Pacific slender salamander (*Batracoceps pacificus*) and Pacific treefrog (*Hyla regila*).

Reptiles. Many reptile species are not tolerant of disturbed areas and do not occur in large numbers in ruderal or urban areas. The western fence lizard (*Sceloporus occidentalis*) was observed on site. Other reptile species that may occur in such areas include the side-blotched lizard (*Uta stansburiana*) and southern alligator lizard (*Gerrhonotus multicarinatus*).

Birds

Most of the animals seen during the field survey were birds. The bird species present on the site are typical of semi-urban areas supporting mostly introduced species. For the most part, the species that occupy the site are species that readily adapt to human presence and man-made settings. A representative sampling of the species noted on the site includes American kestrel, rock dove, mourning dove, house sparrow, and American crow. Other species likely to be present (in season) include the cliff swallow (*Petrochelidon pyrrhonota*), northern mockingbird (*Mimus polyglottos*), California towhee (*Pipilo crissalis*), and house finch (*Carpodacus mexicanus*).

Mammals

A feral cat was observed on site during the November, 2002 survey, and distinct signs (i.e., tracks in dried mud) of domestic dogs, Virginia opossum, and California ground squirrels were also observed on site. Other mammal species that are relatively common and are adapted to living in close proximi-

ty to humans are expected to occur on site and include black rat (*Rattus rattus*), house mouse (*Mus musculus)*, and striped skunk (*Mephitis mephitis*), a native skunk to California.

Sensitive Resources

Sensitive Species. Legal protection of sensitive species varies widely, from the relatively comprehensive protection afforded for species listed as endangered and/or threatened to no legal status at present. The California Department of Fish and Game (CDFG), U.S. Fish and Wildlife Service (USFWS), local agencies, and various special interest groups (e.g., California Native Plant Society ([CNPS]) publish watchlists of declining species. These lists often describe the general nature and perceived severity of the species' decline. In addition, recently published findings and preliminary results of ongoing research provide a basis for consideration of species that are candidates for State and/or federal listing. Finally, species that are clearly not rare or threatened either statewide or regionally, but whose local populations are sparse, rapidly dwindling, or otherwise unstable, may be of "local interest."

For purposes of this discussion, the term "sensitive species" refers to those plants and animals occurring, or potentially occurring, on the project site and designated as endangered or rare (as defined by CEQA and its Guidelines), or of current local, regional, or State concern. These are species that are rare, locally restricted, or declining in a significant portion of their range. Inclusion in the sensitive species analysis for this project (Table 4.5.A) is based on the following criteria: 1) direct observation of the species on the property during one of the biological surveys conducted for this report; 2) sighting by other qualified and reputable observers; 3) record reported by the California Natural Diversity Data Base (CNDDB); or 4) property contains appropriate habitat and is within the known range of a given species. A variety of sources was used to establish the list of sensitive species potentially affected by a project. A foundation for the list of sensitive species within the project area is established by reviewing the CNDDB and CNPS databases. However, these databases are constantly being modified and are not considered a complete list of identified species within a particular area. Therefore, to augment these lists, LSA utilizes local expertise with knowledge of the project area, reconnaissance surveys, and agency biologists to enhance the information supplied by the databases.

No species listed or proposed for listing were observed during the survey, and those identified in Table 4.5.A either are not expected to occur or have a low probability of occurrence.

Sensitive Habitats. Habitats are considered to be sensitive biological resources based on 1) federal, State, or local laws regulating their development; 2) limited distributions; and/or 3) the habitat requirements of sensitive plants or animals occurring on the site. As discussed under "Vegetation," above, the entire site is considered ruderal, with essentially no native habitat present. Thus, no sensitive habitats are present on the project site.

Table 4.5.A: Summary of Potential Sensitive Species

Species	Habitat and Distribution	Activity/Blooming Period	Status Designation[1]		Probability of Occurrence[2]
SPECIES LISTED OR PROPOSED FOR LISTING					
BIRDS					
Willow flycatcher *Empidonax traillii*	Moist brushy areas; nests in western North America and winters in Middle America	Spring and fall	Fed.: State:	** CE	**Low.** May occur as a migrant only.
MAMMALS					
Pacific pocket mouse *Perognathus longimembris pacificus*	Sparsely vegetated areas on sandy soils in coastal Southern California	Summer	Fed.: State:	FE CSC	**Not expected.** Habitat appears unsuitable.
SPECIES NOT LISTED NOR PROPOSED FOR LISTING					
PLANTS					
Southern tarplant *Centromadia parryi* ssp. *australis*	Coastal Salt Marsh margins, vernally mesic Grasslands, Vernal Pools, often in ruderal, disturbed areas (ditches, road cuts, etc.).	Jun. - Nov.	Fed: State: CNPS:	** --- 1B	**Low.** Although conditions on site may be suitable, this conspicuous species was not observed on site during either of the surveys.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	Coastal Salt Marshes, Alkali Playas, Valley & Foothill Grasslands, and Vernal Pools below 3,000 ft. elev. Inland So. Calif. and along coast from San Luis Obispo Co. to Baja Calif.	Feb. - Jun.	Fed: State: CNPS:	** --- 1B	**Not expected.** Conditions appear unsuitable for this species.
Parish's brittlescale *Atriplex parishii*	Alkali Meadows, Alkali Flats, Chenopod Scrub, & Vernal Pools throughout cismontane So. Calif. to edges of deserts. Historically known from Los Angeles and San Bernardino Cos. s. to Baja Calif. Collected only once (1993) in Calif. since 1974.	Jun. - Oct.	Fed.: State: CNPS:	** --- 1B	**Not expected.** Historic records of occurrences in Long Beach area. Currently presumed extirpated from region. Habitat on site does not appear to be suitable for this species.
Salt spring checkerbloom *Sidalcea neomexicana*	Alkaline, usually mesic playas, springs, & marshes; Coastal Sage Scrub, Chaparral, & Creosote Bush Scrub. So. Calif. & Baja Calif. east to New Mexico & Sonora, Mex.	Mar. - Jun.	Fed.: State: CNPS:	** --- 2	**Not expected.** Currently presumed to be extirpated from Los Angeles County. Habitat lacking on site.

Species	Habitat and Distribution	Activity/Blooming Period	Status Designation[1]		Probability of Occurrence[2]
Prostrate navarretia *Navarretia prostrata*	Mesic conditions assoc. w/ Coastal Scrub, Valley & Foothill Grassland (alkaline), and Vernal Pools below 2,300 ft. elev. Los Angeles, Orange, San Diego, & w. Riverside Cos. Monterey and Merced Cos. in No. Calif.	Apr. - Jul.	Fed.: State: CNPS:	** --- 1B	**Not expected.** Conditions appear unsuitable for this species.
Mud nama *Nama stenocarpum*	Muddy places (lake margins, riverbanks, etc.) below 1,000 ft. Los Angeles Co. to Baja Calif. east across Colo. Desert to Texas & n. Mexico.	Jan. - Jul.	Fed.: State: CNPS:	** --- 2	**Not expected.** Known locally from Bixby Slough (1924) and Anaheim Marsh (1932). Habitat and conditions on site appear unsuitable for this species.
INSECTS					
Monarch *Danaus plexippus*	Widespread in North and South America	Year round	Fed.: State:	--- CSA	**Moderate.** Widespread.
REPTILES					
Coast horned lizard *Phrynosoma coronatum blainvillei*	Wide variety of habitats including coastal sage scrub, grassland, riparian woodland; typically on or near loose sandy soils; coastal and inland areas from Ventura Co. to Baja Calif.	Apr. - Jul. (with reduced activity Aug. - Oct.)	Fed.: State:	** CSC	**Not expected.** Habitat appears marginal.
BIRDS					
White-tailed kite *Elanus leucurus*	Open country in South America and southern North America	Year round	Fed.: State:	--- CSA	**Low.** Occasional visitors may forage on the site. Nesting sites unavailable.
Sharp-shinned hawk *Accipiter striatus*	Primarily forests and woodlands of the Americas	Winter	Fed.: State:	--- CSC	**Low.** Winter visitors may use the site on occasion.
Cooper's hawk *Accipiter cooperii*	Primarily forests and woodlands throughout North America	Primarily winter	Fed.: State:	--- CSC	**Low.** Occasional visitors may forage on the site. Nesting very unlikely.
Western burrowing owl *Speotyto cunicularia hypugaea*	Open country in western North America	Year round	Fed.: State:	** CSC	**Not expected.** Habitat appears marginal.
Loggerhead shrike *Lanius ludovicianus*	Open country in much of North America	Year round	Fed.: State:	--- CSC	**Low.** Occasional visitors may forage on the site. Nesting very unlikely.

Wetlands and Waters. The Corps of Engineers (Corps) regulates discharges of dredged or fill material into *waters of the United States*. These *waters* include *wetlands* and non-wetland bodies of water that meet specific criteria. Corps regulatory jurisdiction pursuant to Section 404 of the Clean Water Act is founded on a connection or *nexus* between the water body in question and interstate commerce. This connection may be direct, through a tributary system linking a stream channel with traditional navigable waters used in interstate or foreign commerce, or may be indirect, through a nexus identified in the Corps regulations. CDFG, through provisions of the State of California Administrative Code, is empowered to issue agreements for any alteration of a river, stream, or lake where fish or wildlife resources may be affected adversely. Streams (and rivers) are defined by the presence of a channel bed and banks, and at least an intermittent flow of water. CDFG regulates wetland areas only to the extent that those wetlands are part of a river, stream, or lake as defined by CDFG.

The entire project site shows signs of ongoing regular disturbance which has presumably been taking place for many years. There are no obvious drainage patterns that connect to off-site waters. Evidence of on site drainage is restricted to isolated erosion rills and low-lying channels at the bases of fill piles. These areas are either unvegetated or are composed of ruderal, nonnative, non-hydrophytic plants. These drainage areas do not appear to convey flows or retain standing water for any appreciable time, and have a very low resource value. With the exception of one small isolated wetland area, there are no wetlands, streambeds, or riparian habitat occurring on site.

A leaky water valve at the southeast corner of the site has created a small, artificial wetland area. Water is only trickling from the valve, and slowly meandering down a subtle slope. However, this leak has created a muddy patch with a very small amount of surface inundation. The leak appears to have been allowed to continue for some time. The associated vegetation is dominated by young hydrophytes, including Goodding's black willow, green willow-herb, and cat-tails. Other hydrophytes present include Bermuda grass, umbrella-sedge, bristly ox-tongue, and a couple of young arroyo willows. This area is artificially supported by the leaky valve, and the associated wetlands are not expected to persist when the leaky valve is repaired.

4.5.2 THRESHOLDS OF SIGNIFICANCE

The threshold for significance of impacts to biological resources is determined by scientific judgment and considers the relative importance of the habitat and/or species affected by project implementation. For the purposes of this analysis, the project's effects on biological resources are considered significant if they would:

1. Substantially affect a rare, threatened, endangered, or candidate plant or animal species, or the habitat of any such species;

2. Substantially diminish or degrade habitats (including wetlands) of native fish, wildlife, or plants;

3. Interfere substantially with the movement of any resident or migratory fish and wildlife species;

Legend: Status Designation

FEDERAL STATUS

FE	Federally listed as Endangered.
FT	Federally listed as Threatened.
PE	Federally proposed as Endangered.
PT	Federally proposed as Threatened.

Note: The U.S. Fish and Wildlife Service (USFWS) has recently revised its classification system for candidate taxa (species, subspecies, and other taxonomic designations), as described below.

C	Species formerly designated as "Category 1" (C1) candidate for federal listing are now known as "Candidate." Refers to taxa for which the U.S. Fish and Wildlife Service (USFWS) has sufficient information available to support a proposal to list as Endangered or Threatened. Issuance of the proposal(s) is anticipated, but precluded at this time.
**	Species formerly designated as "Category 2" (C2) candidate for federal listing; this designation has been discontinued by the USFWS. The USFWS will continue to assess the need for protection of these taxa and may, in the future, designate such taxa as Candidates.
C3a	Extinct species.
C3b	Former federal candidate for listing as Endangered or Threatened, but which is not believed by the Service to represent a distinct taxa meeting the Endangered Species Act's definition of a "species". Species taxonomically invalid.
C3c	Former federal candidate for listing as Endangered or Threatened, but which has been determined by the Service to be too widespread and/or not threatened at this time.

STATE STATUS

CE	State listed as Endangered.
CT	State listed as Threatened.
CR	State listed as Rare.
CFP	California Fully Protected. Species legally protected under special legislation enacted prior to the California Endangered Species Act.
CCE	State candidate for listing as Endangered.
CCT	State candidate for listing as Threatened.
CSC	California Species of Special Concern. These are taxa with populations declining seriously or otherwise highly vulnerable to human developments.

CALIFORNIA NATIVE PLANT SOCIETY LISTING

1A	List of plants that are presumed extinct in California.
1B	List of plants that are considered by the California Native Plant Society (CNPS) to be Rare, Threatened, or Endangered in California and elsewhere.
2	List of plants that are considered by CNPS to be Rare, Threatened, or Endangered in California, but more common elsewhere.
3	CNPS review list of plants suggested for consideration as Endangered but about which more information is needed.
4	CNPS watch list of plants of limited distribution, whose status should be monitored.

Wetlands and Waters. The Corps of Engineers (Corps) regulates discharges of dredged or fill material into *waters of the United States*. These *waters* include *wetlands* and non-wetland bodies of water that meet specific criteria. Corps regulatory jurisdiction pursuant to Section 404 of the Clean Water Act is founded on a connection or *nexus* between the water body in question and interstate commerce. This connection may be direct, through a tributary system linking a stream channel with traditional navigable waters used in interstate or foreign commerce, or may be indirect, through a nexus identified in the Corps regulations. CDFG, through provisions of the State of California Administrative Code, is empowered to issue agreements for any alteration of a river, stream, or lake where fish or wildlife resources may be affected adversely. Streams (and rivers) are defined by the presence of a channel bed and banks, and at least an intermittent flow of water. CDFG regulates wetland areas only to the extent that those wetlands are part of a river, stream, or lake as defined by CDFG.

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4.5.2 THRESHOLDS OF SIGNIFICANCE

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1. Substantially affect a rare, threatened, endangered, or candidate plant or animal species, or the habitat of any such species;

2. Substantially diminish or degrade habitats (including wetlands) of native fish, wildlife, or plants;

3. Interfere substantially with the movement of any resident or migratory fish and wildlife species;

4. Conflict with adopted environmental plans, goals, and policies relative to biotic resources of the community where it is located; or

5. Result in notable net loss of a biotic community that is subject to local, State, and/or federal regulations (e.g., riparian communities) or that is otherwise of very limited occurrence in the subregion.

4.5.3 IMPACTS AND MITIGATION MEASURES

Development of the Alamitos Ridge project would require the removal of essentially all of the existing disturbed habitat and limited revegetation on the project site.

General Biological Resources

The smaller, less mobile rodent and reptile species will experience a direct reduction in population numbers as a result of destruction during clearing and mass grading. More mobile small mammals and birds will be displaced and will attempt to find habitat elsewhere within the local area. To the extent that adjacent areas are not already at their carrying capacity for the displaced species, some individuals may be able to utilize these areas. However, this is not usually the case, and the increased competition for habitat, food, and water in surrounding areas will lead to a reduction in the total number of animals present within the local area.

Sensitive Resources

Sensitive Species. No threatened or endangered species or species proposed for listing are believed to be present on the project site. Several bird species listed in Table 4.5.A may occur on the project site occasionally, but none was observed or is expected to make regular use of it.

Wetlands and Waters. Because the discontinuous channels are very small and have essentially no resource value, impacts to these channels are not considered significant under CEQA. Impacts to the small, isolated wetlands area would likewise not be considered significant. Furthermore, the Corps does not typically assert jurisdiction over wetlands which are solely supported by artificial water sources that can be readily discontinued. Therefore, based on the conditions present on site and the existing regulations, there are no waters of the U.S., including adjacent wetlands, present on site that would be subject to Corps jurisdiction, nor are there any streambeds, rivers, lakes, or adjacent riparian habitat present on site that would be subject to CDFG jurisdiction.

Significance of Impacts

Implementation of the proposed project would result in a net loss of open space within the City of Long Beach and on Signal Hill. Biologically, the project impacts are not considered significant under CEQA in any context (e.g., local, regional), based on the following factors:

- No sensitive species are known to utilize the project site or nearby vicinity to any significant degree.
- Very few native plants occur on the site, and no native plant communities exist on the site. In addition, operating oil wells are scattered throughout the site, creating substantial noise and movement that further diminish the habitat values of the vegetation growing on the site.
- The animals that occupy the site are relatively common species that are expected to occur in and around developed and disturbed areas.
- The open spaces on the project site are not connected to off-site habitat areas that could serve to substantially elevate the importance of the on-site resources (e.g., as a wildlife movement corridor).

Mitigation Measures

Since the project's impacts to biological resources are not considered to be significant, no mitigation is required.

4.5.4 CUMULATIVE IMPACTS

Due to the urban and disturbed natural character of the project site and the surrounding area and the relatively small size of the project site, the cumulative impacts on biological resources are not considered significant.

4.5.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed Alamitos Ridge project will not result in significant, long-term adverse impacts to any biological resources.

4.6 ARCHAEOLOGICAL AND PALEONTOLOGICAL RESOURCES

The following discussion is summarized from cultural and scientific resource technical reports prepared for the proposed project. The cultural resources information is summarized from the literature and site records search conducted for the project area and a one half mile radius. The paleontological resources information is summarized from the Paleontologic Resource Assessment of July, 1997, and an addendum letter dated January 14, 1999. Given the sensitivity of these resources, neither of these reports is included in the Appendix; however, the reports are available for review through the City of Long Beach Planning and Building Department by a qualified archaeologist or paleontologist.

4.6.1 EXISTING ENVIRONMENTAL SETTING

Archaeological/Historical Resources

A literature and site records search was conducted through the South Central Coastal Information Center, California State University at Fullerton. Results of this records search indicate that the project area was surveyed. There is one historic property located within one-half mile of the project area, on the northeast corner of Temple Avenue and Hill Street. This property, the Alamitos 1 oil well, is listed as California Historical Landmark #580. There are no properties listed on the National Register, California Register, or California Points of Historical Interests within one-half mile of the subject property.

Field Survey. A pedestrian survey (2000) of the project area was conducted by walking parallel transects approximately 15 meters (49.2 feet) apart, where terrain and vegetation permitted. Some ground surface areas were not visible due to dense vegetation. No prehistoric cultural material or historic cultural resources were identified during this pedestrian survey.

Paleontological Resources

The Natural History Museum (NHM) of Los Angeles County reviewed pertinent literature and conducted a thorough search of their Vertebrate Paleontology records for the proposed project area. Records reveal that no localities are directly within the project site; however, there are vertebrate fossil localities within the same rock unit nearby.

The entire proposed project area contains surface exposures of older Quaternary terrace deposits, primarily terrestrial but also some marine components.

4.6.2 THRESHOLD OF SIGNIFICANCE CRITERIA

Criteria for determining the significance of impacts to cultural resources are based on the CEQA Guidelines and the Guidelines for nomination of resources to the *California Register of Historical Resources*. Impacts to cultural resources are potentially significant if the following occurs:

- Alteration or destruction of any known archaeological or historic resources that are on, or eligible for nomination to, the *California Register of Historical Resources*;
- Adverse physical or aesthetic effects to any significant archaeological or historic resources that are listed on, or potentially eligible for nomination to, the *California Register of Historical Resources*;
- Alteration or destruction of any paleontological resource.

4.6.3 IMPACTS AND MITIGATION MEASURES

Less than Significant Impacts

No resources on or eligible for the National or California Registers were identified within the project; therefore, direct impacts to archaeological and paleontological resources are considered less than significant.

Potentially Significant Impacts

Archaeological/Historical Resources. Based on archaeological sensitivity of the project area, unrecorded and unknown archaeological resources may be encountered during construction. Implementation of Mitigation Measure 6.1 will reduce potentially significant impacts to archaeological/historical resources to below a level of significance. Mitigation measures are described in Section 4.6.4.

Paleontological Resources. Based upon the high paleontological sensitivity in the project area, unknown paleontological resources may be encountered during grading activities.

Excavations in the entire proposed project area could encounter significant terrestrial vertebrate fossils Late Pleistocene (Quaternary) age, with the specimens representing the type of fauna found at the famous Rancho La Brea asphalt deposits ('tar pits') in Los Angeles. Furthermore, if substantial subsurface excavations are conducted in the proposed project area, there is a possibility that they will extend down into the underlying Plio-Pleistocene marine sediments and uncover significant invertebrate and vertebrate fossils from that geologic unit.

Implementation of Mitigation Measure 6.2 will reduce potentially significant impacts to paleontological resources to below a level of significance. Mitigation measures are described in Section 4.6.4.

Mitigation Measures

Archaeological/Historical Resources.

6.1 In conjunction with the submittal of applications for rough grading permits, the project proponent shall provide written evidence to the Director, Department of Planning and Building, that a Los Angeles County Certified Archaeologist has been retained, shall be present at the pregrading conference and shall establish procedures for temporarily halting or redirecting work if unrecorded archaeological resources are discovered during grading to permit the sampling, identification, and evaluation of archaeological materials as appropriate. The cultural resource management program will include resource monitoring during project grading of archaeologically sensitive sediments to ensure that unidentified cultural resources are not affected by the proposed undertaking. If archaeological materials are identified during construction, standard professional archaeological practices shall be initiated to characterize the resource and mitigate any impacts to those resources. Included within this program will be the development of a curation agreement for the permanent care of materials collected from the project. This agreement would be negotiated with a suitable repository.

In the event human remains are encountered, State Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. The County Coroner must be notified of the find immediately. If the remains are determined to be prehistoric, the Coroner will notify the Native American Heritage Commission (NAHC), which will determine and notify a Most Likely Descendent (MLD). With the permission of the landowner or his/her authorized representative, the descendent may inspect the site of the discovery. The descendent shall complete the inspection within 24 hours of notification by the NAHC. The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials.

Paleontological Resources.

6.2 In conjunction with the submittal of applications for rough grading permits for the Tentative Tract Map, the applicant shall provide written evidence to the Director, Department of Planning and Building, that a paleontologist listed on the County of Los Angeles list of certified paleontologists has been retained and will be on site during all rough grading and other significant ground disturbing activities in paleontologically sensitive sediments.

The paleontologist shall prepare a mitigation program consistent with County of Los Angeles regulations and the guidelines of the Society of Vertebrate Paleontology. This program should include, but not be limited to, the following:

- Attendance at the pre-grading conference.
- Monitoring of excavation by a qualified paleontological monitor in areas identified as likely to contain paleontological resources. The monitor should be equipped to salvage fossils as they are

unearthed in order to avoid construction delays and to remove samples of sediments that have been determined likely to contain remains of small fossil invertebrates and vertebrates. The monitor must be empowered to temporarily halt or divert equipment in order to allow removal of abundant or large specimens. If major paleontological resources that require long-term halting or redirecting of grading are discovered, the paleontologist shall report such findings to the Department of Planning and Building.

- Because the underlying marine sediments may contain abundant fossil remains that can only be recovered by screening and picking matrix, it is recommended that if the excavations extend down into the Plio-Pleistocene marine unit then substantial matrix samples should be collected and processed to recover the fossils.
- Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates.
- Identification and curation of specimens into a museum repository with permanent retrievable storage.
- Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the Department of Planning and Building, would signify completion of the program to mitigate impacts to paleontological resources.

4.6.4 CUMULATIVE IMPACTS

The cumulative impact area for cultural and paleontological resources is the City of Long Beach and the Southern California region. The project contribution to cumulative impacts to cultural resources is considered less than significant since the proposed development will not directly impact a known historic, archaeological, or paleontological resource. With implementation of Mitigation Measures 6.1 and 6.2, impacts to unknown archaeological and paleontological resources will be reduced to a level below significance.

4.6.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

There is the potential to encounter unknown archaeological and paleontological resources during grading and construction. Implementation of Mitigation Measures 6.1 and 6.2 will reduce potential impacts to unknown resources to a level below significance.

4.7 PUBLIC SERVICES AND UTILITIES

Questionnaires were sent to the public service utilities and other service providers requesting information on current service levels in the Alamitos Ridge residential project area. The following section provides an analysis of the public services and utilities for the City of Long Beach based on the questionnaires and Notice of Preparation responses.

4.7.1 EXISTING ENVIRONMENTAL SETTING

Police Protection

The Long Beach Police Department provides law enforcement services throughout the City of Long Beach. The East Division Substation, located at 4800 Los Coyotes Diagonal, will service the project area. The average citywide response time to priority one calls for service is 5.2 minutes. The Long Beach Police Department is the fifth largest police department in the state, with 880 sworn officers and 482 civilian employees. Currently, the police department provides a ratio of one police officer to every 493.6 residents. A new East Division Substation facility is planned for construction within the next five to ten years.

The Police Department operates a helicopter surveillance program; a canine unit; a full-service, 24 hour jail facility; a communications/dispatching center; an investigations bureau; and a firing range. Community oriented police activities include community relations, traffic and parking enforcement, Neighborhood Watch Program, crime prevention, bicycle patrol, and DARE Program. As part of the Department's service to the community, project site plans are reviewed by the Police Chief to determine the need for any additional crime prevention and safety measures.

Fire Protection

Fire and emergency medical response, fire prevention, and hazardous materials regulatory enforcement are provided to the project area by the City of Long Beach Fire Department. As part of its service to the community, project plans are reviewed by the Fire Chief to ensure compliance with all applicable fire code and ordinance requirements for construction, access, water mains, fire flows, and fire hydrant placement. The City of Long Beach has a total of 24 fire stations and a Fire Training Center, serving 462,033 residents in Long Beach and Signal Hill. Fire Station 17, located at 2141 Argonne Avenue, will serve the project area. This station is equipped with a four person assessment engine and a four person truck. If required, additional support is provided by fire and rescue apparatus from other nearby stations in the City of Long Beach's fire protection system. Response times from these units vary with their location and proximity to the project area. The average emergency response time is two to five minutes. Table 4.7.A shows the nearest Long Beach Fire Department service locations. Figure 4.7.1 depicts the location of local fire stations.

PROJECT SITE

LONG BEACH MEMORIAL MEDICAL CENTER

PACIFIC HOSPITAL OF LONG BEACH

FIRE STATION 23
2300 E. 27TH ST.

FIRE STATION 17
2141 ARGONNE AVE.

FIRE STATION 10
1417 PEARSON AVE.

LONG BEACH COMMUNITY MEDICAL CENTER

SAINT MARY MEDICAL CENTER

VETERANS AFFAIRS MEDICAL CENTER

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MAP SOURCE: USGS 7.5' QUADS - LONG BEACH & LOS ALAMITOS, CA.

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FIGURE 4.7.1

Alamitos Ridge Residential Project EIR
Surrounding Fire Stations and Hospitals

Table 4.7.A: Long Beach Fire Department Service Locations

Station	Location	Response Time Approximately	Equipment
Fire Station 10	1417 Peterson Ave.	4 minutes 30 sec.	4 Person Engine 2 Person Paramedic Ambulance
Fire Station 17	2141 Argonne Ave.	4 minutes	4 Person Assessment Engine 4 Person Truck/Training Facility
Fire Station 23	2300 E. 27th Street	5 minutes	4 Person Assessment Engine

Source: Long Beach Fire Department, 2000.

Hospitals

Table 4.7.B, below, lists hospitals within a five mile radius of the proposed project site. The location of each hospital in relation to the project site is shown in Figure 4.7.1.

Table 4.7.B: Locations of Hospitals in the City of Long Beach

Name	Address	Distance/Direction from site
Long Beach Community Medical Center	1720 Termino Ave. Long Beach, CA 90804	1.5 miles southeast
Long Beach Memorial Medical Center	2801 Atlantic Ave. Long Beach, CA 90806	4.5 miles northwest
Saint Mary Medical Center	1050 Linden Ave. Long Beach, CA 90813	4.5 miles southwest
Veterans Affairs Medical Center	5901 E. 7th Street Long Beach, CA 90822	4.7 miles southeast
Pacific Hospital of Long Beach	2776 Pacific Ave. Long Beach, CA 90806	5 miles northwest

Public Schools

The Long Beach Unified School District (LBUSD) provides public school services to the project area. School facilities in LBUSD include 61 elementary schools, 24 middle schools, and 10 high schools. Alvarado Elementary School, Buffum Elementary School, Jefferson Middle School, and Wilson High School are located nearest to the project area and are shown in Figure 4.7.2. As of October 19, 2001, enrollment in the LBUSD totaled 89,777 students

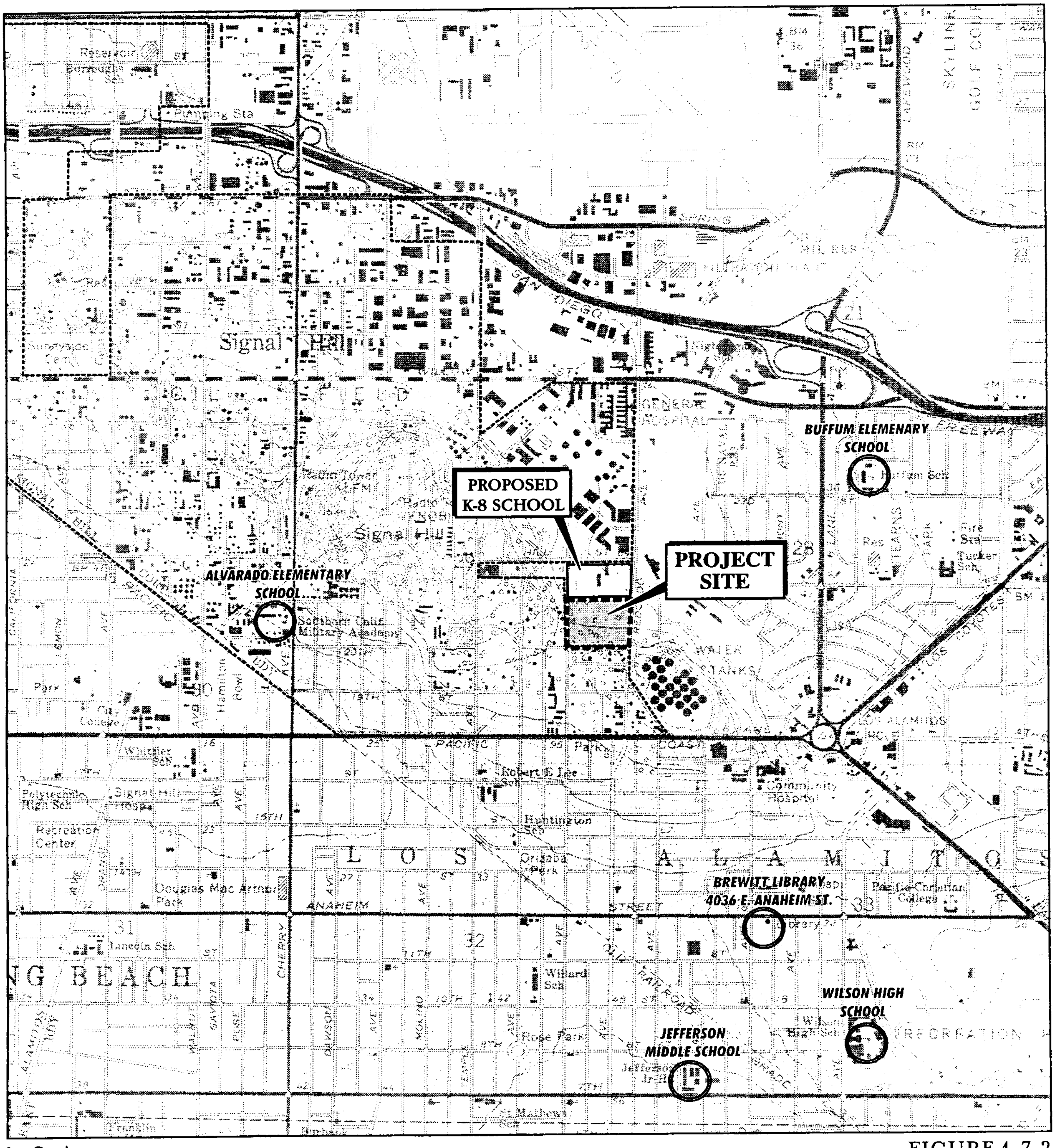

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FIGURE 4.7.2

MAP SOURCE: USGS 7.5' QUAD - LONG BEACH, CA.

Alamitos Ridge Residential Project EIR

Surrounding Schools and Libraries

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and includes grades kindergarten through 12. Growth has occurred in the LBUSD at an average annual rate of approximately 2.8 percent over the past ten years. Enrollment projections for these four schools are shown in Table 4.7.C. Table 4.7.D indicates the annual enrollment at these same schools from the years of 1990-91 to 1999-2000.

Table 4.7.C: Long Beach Unified School District Enrollment Projection

School	October 2001 Enrollment	Number of Classrooms	Grades Served
Alvarado Elementary	481	24	K-5
Buffum Elementary	570	25	K-5
Jefferson Middle School	1150	40	6-8
Wilson High School	3513	118	9-12

Source: Long Beach Unified School District, School Enrollment Projections, July 2000.

Table 4.7.D: Annual School Enrollment Long Beach Unified School District, 1990-2000

Year	Alvarado Elementary	Buffum Elementary	Jefferson Middle School	Wilson High School	Total District Enrollment	% Change from previous year
1990-91	412	443	944	3,032	71,091	--
1991-92	427	473	990	2,938	72,729	2.3
1992-93	457	495	1,018	2,984	73,517	1.0
1993-94	447	498	1,088	2,896	74,748	1.7
1994-95	441	498	1,002	3,074	76,501	2.3
1995-96	459	501	935	3,327	80,731	5.5
1996-97	455	470	1,014	3,205	83,701	3.6
1997-98	467	486	1,016	3,177	86,080	2.8
1998-99	470	506	1,108	3,126	89,408	3.9
1999-2000	466	542	1,100	3,206	91,706	2.6

Source: Long Beach Unified School District, Office of the Director of Budget, 2000. Calculations prepared by LSA, 2000.

Currently, the total number of students that are bused into these four schools from other areas of the District totals approximately 1,400. The numbers for each individual school are 1,136 for Wilson High School, 99 for Jefferson Middle School, 166 for Buffum Elementary School, and none for Alvarado Elementary School.

As of the 1997/98 school year, the LBUSD revealed an existing Districtwide capacity shortfall of 3,048 seats, shown in Table 4.7.E. From the 1997/98 data, the LBUSD developed its recent enrollment projections (referred to as the SAB 411) through the school year 2003/04, a six year planning horizon. Table 4.7.F displays these projections and illustrates the potential districtwide capacity shortfall if the LBUSD should be compelled to accommodate the projected enrollment in its existing facilities with the current capacity of 80,844 seats. Under this scenario, the projections indicate a capacity shortfall of about 5,500 seats in 1998/99, escalating to a deficit in excess of 16,000 seats within six years. The LBUSD has current plans for the construction of new schools to accommodate the growing student population. In addition, overcapacity will require overflow students to be bused to other schools in the LBUSD. At the present time, approximately 185 students are bused from the area surrounding the project site to schools in other neighborhoods.

A K-8 school is planned by the LBUSD on property immediately adjacent to the north of the proposed project. This new school is planned for a capacity of 1,450 students and construction is anticipated to be complete for the 2004/2005 school year. This new school would accommodate neighborhood students presently bused to other schools and would serve the proposed project as well. The new school site is depicted on Figure 4.7.2.

Funding for new facilities comes in part from the collection of developer fees. On January 26, 2000, the State Allocation Board (SAB) approved an increase in Statutory School Fees pursuant to Government Code Section 65995 (b) (3). The Statutory School Fee amounts have been increased by the SAB from $1.93 to $2.05 per square foot of assessable space for residential construction (Staff Report Update Regarding Statutory School Fee Increase, Long Beach Unified School District, March, 2000). In addition to developer fees, the LBUSD may also receive funding from the State of California for new facilities construction, portable classroom space, and deferred maintenance.

Libraries

The Alamitos Ridge project area is served by the Long Beach Public Library System, which is composed of 12 branches. The branch library nearest the project site is the Brewitt Branch, located at 4036 E. Anaheim Street in Long Beach, approximately one mile south of the project site (Figure 4.7.2). This branch contains about 47,000 items, including books, magazines, and audiovisual materials in a 5,000 square foot facility. The Brewitt Branch is the next to the smallest branch. The Long Beach Public Library System does have plans for adding an additional branch to the system in the next year or two. Therefore, the project will not impact library services in the area.

The library has eight computers for public use. All eight are equipped for browsing the library's catalog of volumes. Three of the eight computers also offer Internet connections and word processing.

Table 4.7.E: K-12 Housing Condition Comparing Permanent Capacity and Enrollment Long Beach Unified School District, 1997/98

School	Grades	Adequately Housed Capacity	Current Enrollment	Capacity Excess (Shortfall)
Alvarado	K-5	706	455	251
Buffum	K-5	206	471	(265)
Jefferson	6-8	1,101	1,051	50
Wilson	9-12	2,906	3,553	(647)
Total	K-12	80,844	83,892	(3,048)

Source: School Planning Services; Development Fee Justification Analysis LBUSD, July, 1998.

Table 4.7.F: Six-Year Districtwide Enrollment Projections Compared to Capacity Long Beach Unified School District 1997/98–2003/04

Year	Current Permanent Capacity	Projected Enrollment	Capacity Excess (Shortfall)
1998/99	80,844	86,333	(5,489)
1999/00	80,844	88,550	(7,706)
2000/01	80,844	89,857	(9,013)
2001/02	80,844	93,370	(12,526)
2002/03	80,844	94,657	(13,813)
2003/04	80,844	97,064	(16,220)

Source: School Planning Services; Development Fee Justification Analysis LBUSD, July, 1998.

Public Transit

Long Beach Transit services the general project area. One line serves the project area: Route 131 on Redondo Avenue. A standard 40 foot bus having a seating capacity of 40 passengers is used. Currently, Route 131 operates at approximately 33 percent capacity. LBT Route 131 operates every 30 minutes on weekdays, from 4:55 a.m. to 7:35 p.m. and every 35 minutes on weekends, from 5:54 a.m. to 7:34 p.m. There are no current plans for expansion. Service would be adjusted to accommodate future increases, as transit service levels are monitored routinely.

Long Beach Transit's main operating/maintenance facility and storage yard is located at the corner of Anaheim Street and Cherry Avenue (1963 E. Anaheim Street). This central operations and maintenance facility is equipped and staffed to perform all operations and revenue vehicle maintenance functions, including major vehicle overhaul. In addition, the new Jackson Transit Center is located at 68th Street and Cherry Avenue (6860 Cherry Avenue). This facility is equipped and staffed for operations, fueling, and light maintenance for approximately one-quarter of the total coach fleet.

Utility Services

Natural Gas. The Long Beach Gas Department, located at 2400 East Spring Street in Long Beach, is the natural gas provider in the City of Long Beach. According to the Long Beach Gas Department, service is provided by a portion of the 40 psi backbone system that is within 800 yards of the proposed development. The Long Beach Gas Department has stated that these facilities and the interconnecting system are currently in good operation. Currently, the Long Beach Gas Department does not plan for any expansion of existing facilities in the proposed project boundary. Service availability is based upon present gas supply conditions and regulatory policy. Figure 4.7.3 shows the backbone gas plan for the project site.

Electricity. The project site is within the service territory of the Southern California Edison Company (SCEC). SCEC supplies electrical power to the project area through an overhead facility that is located on Obispo Avenue, along the western boundary of the site. Currently, SCEC does not have plans for expansion of its current facilities.

Water. The Long Beach Water Department (LBWD) supplies water to the project area. LBWD provides 100 percent of the project water needs, mixing locally developed water from LBWD operated wells with water from the Metropolitan Water District (MWD). The City takes advantage of MWD's off-peak rate structure during the winter months, beginning in September. During the summer months, the City satisfies almost 42 percent of its demand by pumping its own wells and about 50 percent by importing water from MWD. The remaining eight percent of the water supply for non-drinking purposes is tertiary treated reclaimed water from the Sanitation Districts of Los Angeles County Long Beach Reclamation Plant (City of Long Beach, 2000). Water in the harbor area and north and west portions of Long Beach is purchased from MWD and distributed from the J. Will Johnson Reservoir. The remaining sections of the City, including the project site, receive a combination of imported water and deep well local groundwater (City of Long Beach, 2000).

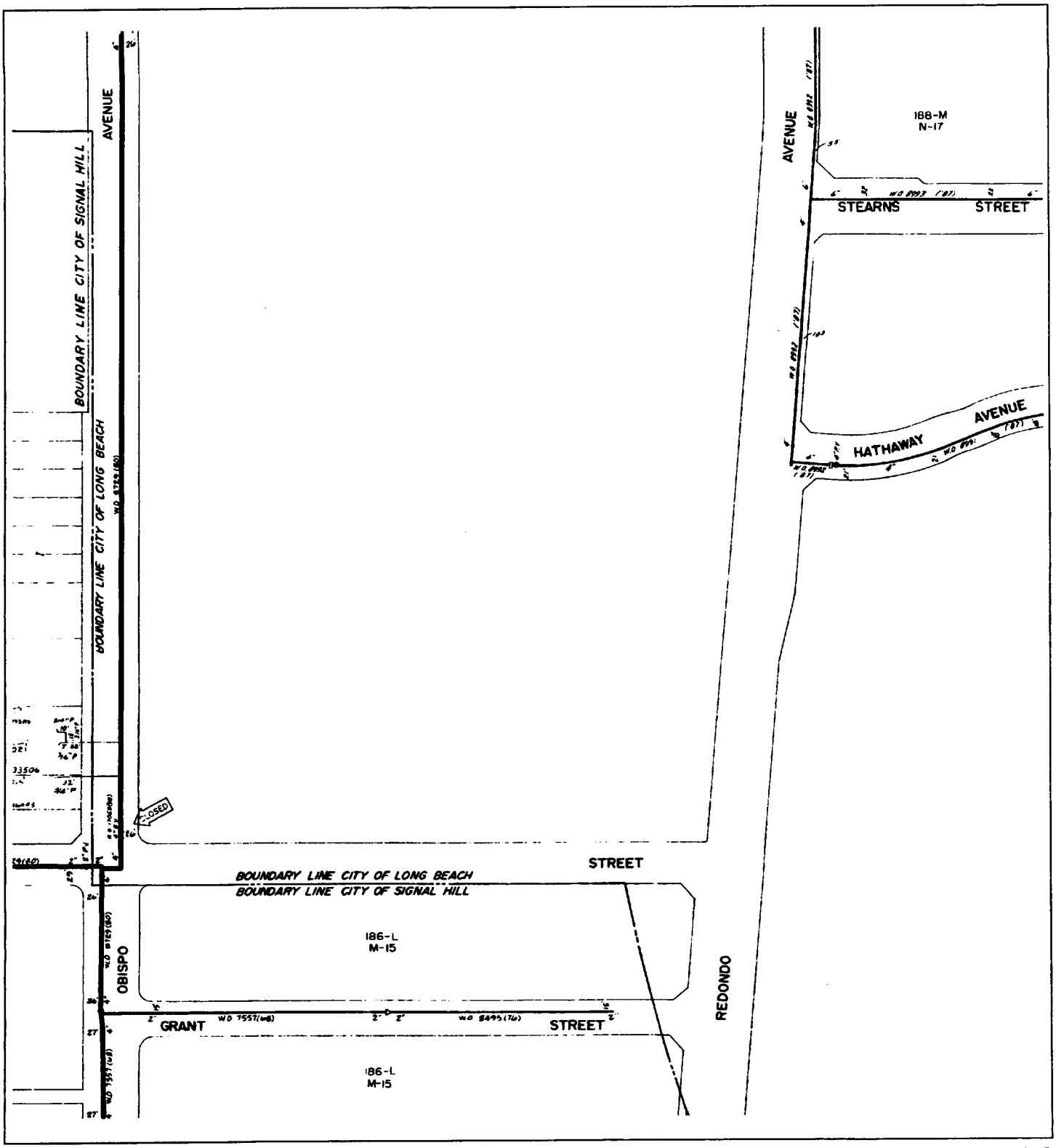

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FIGURE 4.7.3

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Alamitos Ridge Residential Project EIR

Existing Gas Lines

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The LBWD has two elevated distribution reservoirs with a combined storage capacity of 117,000,000 gallons of water. The Alamitos Reservoir consists of 23 steel storage tanks, and the Dominguez Reservoir consists of 12. Together these storage reservoirs could provide for approximately two average days' use in the event of an emergency.

Water mains available to the project site include an eight inch line in 20th Street that runs from Redondo Avenue to Obispo Avenue, and a six inch line on Obispo Avenue, as shown in the backbone water plan in Figure 4.7.4.

Wastewater. The Sanitation Districts of Los Angeles County (SDLAC) provide wastewater service to the project. The wastewater flow originating from land uses on the project site discharges to a local sewer line, which is not maintained by the SDLAC. The local sewer line is an eight inch vitrified clay pipe (VCP) that runs north on Obispo Avenue in the City of Signal Hill, as shown in the backbone sewer plan in Figure 4.7.5. It is then conveyed to the SDLAC's trunk sewers. A list of SDLAC's trunk sewers serving the project area is provided in Table 4.7.G.

The wastewater generated by the proposed project will be treated at the Joint Water Pollution Control Plant (JWPCP) located in the City of Carson or the Long Beach Water Reclamation Plant (WRP). The JWPCP has a design capacity of 385.0 million gallons per day (mgd) and currently processes an average flow of 332.4 mgd. The Long Beach WRP has a design capacity of 25.0 mgd and currently processes an average flow of 18.1 mgd.

Solid Waste. Solid waste disposal services are currently provided by the Long Beach Integrated Resources Bureau (LBIRB). Currently, refuse pickups are made once a week.

The waste is transported to the Southeast Resource Recovery Facility, located at 120 Henry Ford Avenue in Long Beach. The facility is owned by the City and operated through outside contracts. The City oversees the plant. This facility is permitted to receive 500,000 tons of solid waste per year, about 50 percent of which is generated from the City of Long Beach.

In addition to the collection of refuse, a curbside recycling program is contracted through Waste Management, which allows residents to place recyclable materials (i.e., paper, plastic, and aluminum) in one bin. The collection of green waste does not occur in the City at present.

Telephone. General Telephone (GTE) provides telephone service to the project site through a system of underground telephone cabling. The feed will be from either Obispo Avenue or Redondo Avenue.

Cable Television. Cable television service is currently provided by Charter Communications, located at 2931 Redondo Avenue in Long Beach, through a network of underground and overhead cabling.

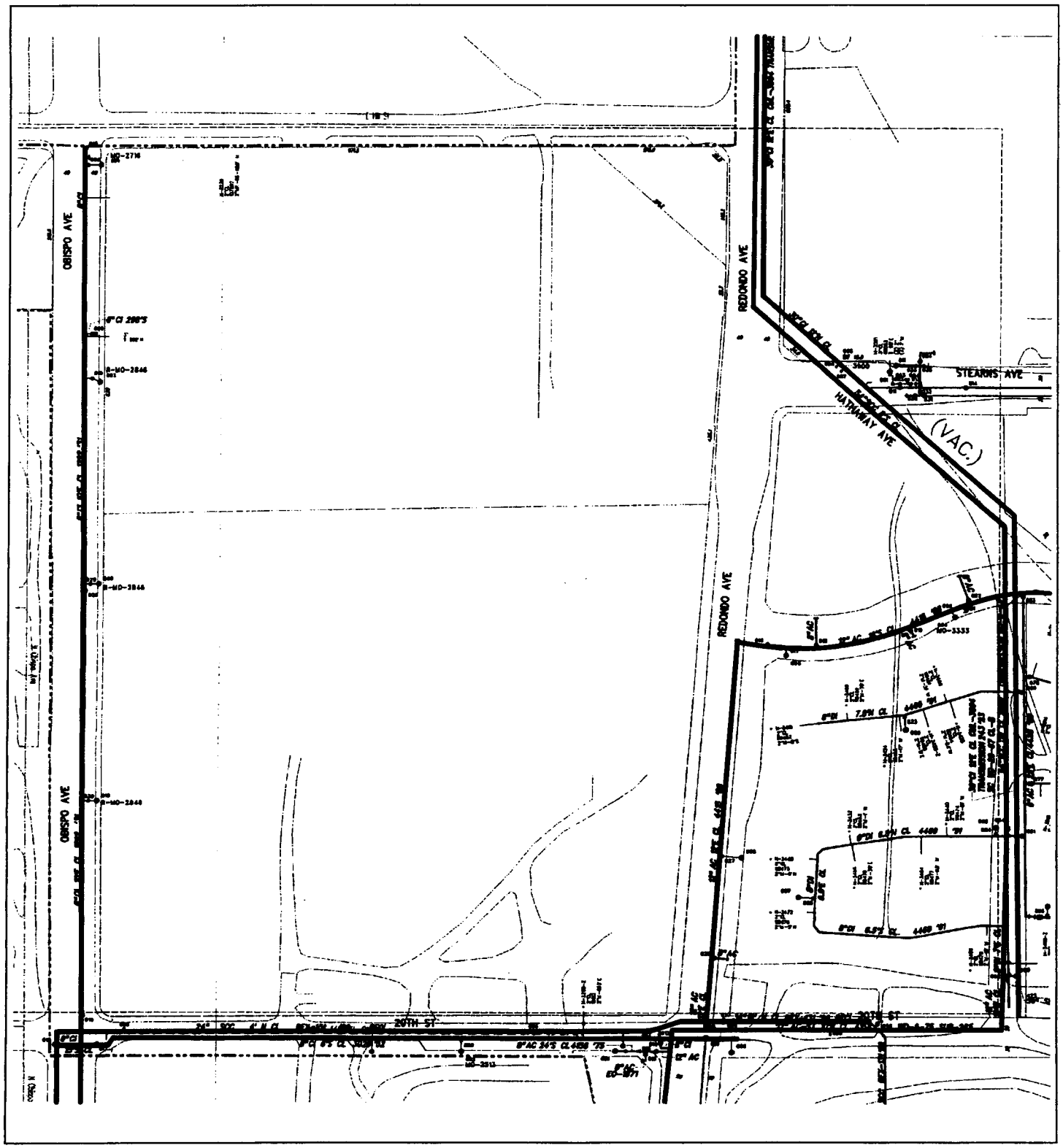

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FIGURE 4.7.4

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Alamitos Ridge Residential Project EIR

Existing Water Lines

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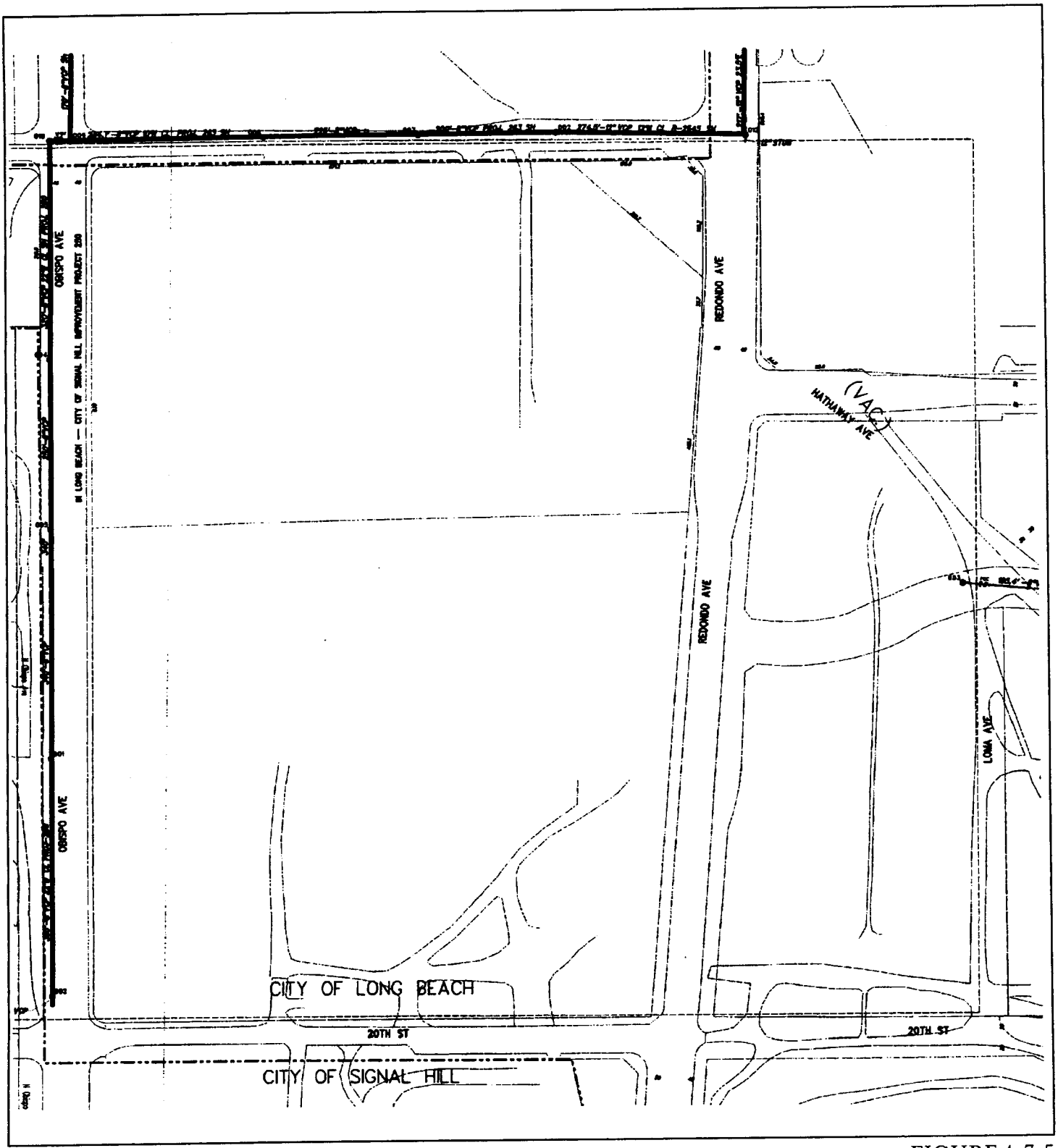

FIGURE 4.7.5

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Alamitos Ridge Residential Project EIR

Existing Sewer Lines

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Table 4.7.G: CSDLA Trunk Sewers

Name	Location	Size (dia.)	Design Capacity (mgd)	Peak Flow (mgd)	Last Measured
Anaheim Street Trunk Sewer	in Anaheim Street between Obispo and Loma Avenues	30"	7.0	4.8	1995
Marina Trunk Sewer, Section 1A	in Loma Avenue between Anaheim and 10th Streets	27"	6.5	4.8	1998
Joint Outfall "C" Unit 3C Trunk Sewer	in 11th Street between Obispo and Loma Avenues	57"	27.0	18.5	1998

Source: County Sanitation Districts of Los Angeles County 2000.

4.7.2 THRESHOLD OF SIGNIFICANCE CRITERIA

The effects of a project on public services, utilities, and infrastructure are considered to be significant if the project will result in the following impacts to the service provider:

Police Protection

The project alone, or in combination with other projects, creates a substantial increase in demand for staff, facilities, equipment, and other police related services that poses serious health and safety risks by substantially increasing emergency response time.

Fire Protection

The project alone, or in combination with other projects, substantially increases requests for multiple dispatches and creates a significant increase in demand for staff, facilities, equipment, and other fire protection related services that results in response times in excess of five (5) minutes for fire and emergency medical calls to the project area.

Schools

The project alone, or in combination with other projects, creates a substantial increase in student enrollment that would require busing of students outside the local attendance area that would generate significant adverse environmental impacts in association, or would require the provision of new or physically altered school facilities, the construction of which would cause significant environmental impacts in order to maintain acceptable classroom conditions.

Other Services and Utilities

- The demand generated by the project exceeds the capacity of existing public service systems, or otherwise requires their expansion or requires the construction of major new facilities leading to a significant physical impact.
- The project's demands for fuel or energy exceed existing supplies, or otherwise cause supply and/or capacity overload leading to disruption of service.
- The project's demands exceed the capacity of existing utility systems, or otherwise require the expansion or construction of major new facilities leading to a significant physical impact.
- The project causes significant disruption of service causing a significant physical impact or threat to human health.

4.7.3 IMPACTS AND MITIGATION MEASURES

Less than Significant Effects

Police Protection. According to the Long Beach Police Department, the project will not significantly or adversely impact police services to this area (Long Beach Police Department, 2000). The Police Department has indicated that existing staffing levels and existing facilities are adequate to meet the additional demand. Therefore, the increased service needs identified as a result of the proposed project will not require additional police staffing or equipment and will not create a significant impact on police protection in the area.

Fire Protection. The proposed project will incrementally increase demand for fire suppression, fire prevention, and emergency medical services, although, by itself, will not necessitate an expansion or increase in Fire Department operations or facilities (Long Beach Fire Department, 2000). There are 131 firefighters on duty every day. The Fire Department's primary role is to provide emergency response. Station No. 17 has two paramedics on staff; however, the station does not have a paramedic unit. The Fire Department anticipates that the continued growth in the area could trigger a need for additional emergency response capabilities. This project will generate a population increase of approximately 286 new residents (based on 2.70 persons per household, assuming 106 dwelling units)[1] to the City of Long Beach. The increased service needs identified as a result of the proposed project are so small as to not result in a measurable increase in demand and will not create a significant impact on fire protection and will not require additional fire protection staffing or equipment.

Public Schools. Based upon Section 15131 (a) of CEQA and recent court interpretations, the analysis of environmental impacts resulting from a project must focus on the physical effects of the project. For schools, this means that potential classroom overcrowding and the potential cost of constructing new classrooms are not in themselves adverse environmental effects. CEQA applies only to activities that will cause a physical change in the environment, such as busing students, or expanding or constructing additional classroom space.

This EIR describes the options for responding to increased student enrollment, including busing and construction of additional capacity at neighborhood schools. This EIR analysis also recognizes that the school district decides which solution to implement. It is not the purpose of this document to dictate policy to LBUSD to select a specific implementation program to address needs created by the students generated by the proposed project or to suggest that the LBUSD employ a particular mitigation approach. As the proposed project and future new development are implemented and student numbers increase, it is anticipated that the LBUSD will make decisions regarding the placement of the students on the basis of policies then in effect, and on current circumstances and options. The analysis that follows concentrates on the projected student population generated from the proposed project, possible measures (termed "theoretical" due to possible future decisions by the LBUSD Board of Trustees) that could be implemented to provide adequate facilities for that

[1] Source: Department of Finance (DOF); School Planning Services, May, 1998.

population, and the potential adverse physical impacts that could result from those choices. Among these choices is a decision to build and open a K-8 school at the LBUSD owned site adjacent to the project.

The schools within the LBUSD are currently operating at capacity. This project will have an effect within the LBUSD, incrementally increasing demand for classroom space as a result of school age children expected to reside within the project. According to LBUSD's enrollment projections, the total districtwide projected enrollment is expected to approach 102,930 students by the school year 2004-2005 (anticipated project build out).

Table 4.7.H identifies the student generation factors developed by the LBUSD and published in the LBUSD's Development Fee Justification Analysis LBUSD, July, 1998. These rates are the product of a student generation methodology characterized by cohort group survival and the progression of the student population matriculating through the public school system. These rates are identified in the Development Fee Justification Analysis for LBUSD. Student generation factors reflect the measurable peak student load generated by a typical representative new housing unit.

Table 4.7.H: Student Generation by Grade Level

	Actual Generation Rates		Peak Load Generation Rates	
Grade	**SGF* by Grade Level**	**Students**	**SGF* by Grade Level**	**Students**
K-5	0.30	31	0.33	35
6-8	0.10	10	0.11	12
9-12	0.13	14	0.15	15
Total	0.52	55	0.59	62

*SGF = Student Generation Factor

Source: School Planning Services; Development Fee Justification Analysis LBUSD, July, 1998. Calculations prepared by LSA, 2000.

The construction of approximately 106 single family dwelling units in the proposed project will generate approximately 55 to 62 K-12 students, as indicated in Table 4.7.H. Should the LBUSD not have capacity at the time the proposed residential units are occupied, portable classrooms may be needed to be temporarily installed and/or new construction or permanent expansion of school facilities may be required. Cost estimates for these expansions are provided in Table 4.7.I. The cost estimates are based on analysis provided in the LBUSD Development Fee Justification Study, July, 1998.

Table 4.7.I: Cost Estimates for New Facilities

Grade	Type of Expansion	Cost Per Student	Number of Students	Total Cost
K–12	Permanent Facilities	$22,403	55	$1,232,165
	Interim Facilities (Portables)	$1,500	55	$82,500
	Total Cost Per Student	$23,903		

Source: School Planning Services; Development Fee Justification Analysis LBUSD July 1998. Calculations prepared by LSA 2000.

As part of its response to the necessity of providing adequate classroom facilities for the expected growth in enrollment, the LBUSD has prepared and is implementing a Capital Facilities Plan, which identifies specific proposed new construction projects (Development Fee Justification Analysis LBUSD July 1998). The specifics of the plan include construction of three new elementary schools, additions to three others, a new middle school with an addition to Jefferson, a new high school, an addition at Avalon, and the completion of Cabrillo High School. This proposed new construction will result in an increase to LBUSD capacity of approximately 10,960 seats, with 4,909 spaces allocated to the K–5 elementary grades, 1,145 to the middle schools, and 4,906 to grades 9–12. The total estimated cost for the planned new construction will be approximately $244,200,000.

The developer must pay the statutory school impact fee of $2.05 per square foot of assessable space, which would generate approximately $869,200 in revenue to LBUSD (106 units multiplied by an average 4,000 square feet multiplied by $2.05). This revenue could be used to construct new school facilities or to replace old facilities at the district's discretion. Therefore, the developer fees collected by the LBUSD will provide for adequate school capacity for the students generated by the project. Payment of required fees does not, however, constitute a mitigation measure within the meaning of the California Environmental Quality Act.

As previously described, a new K–8 school is planned by the school district immediately adjacent to the proposed project. According to recent communications with LBUSD,[1] the capacity of that school will be approximately 1,450 students, and its completion is anticipated in time for the 2004–2005 school year. This time frame would coincide with the expected build-out of the Alamitos Ridge project. The new K–8 school would accommodate student generation from the proposed project and will act to relieve current bussing of students from the neighborhood attendance area to other District schools. Should completion of the Alamitos Ridge project precede completion of the new school, students generated would have to be bussed temporarily to other District schools with available capacity. Schools that could be involved cannot be determined at this time. It should also be noted that the proposed residential project will be built in and occupied in phases, most probably over several years, depending upon market conditions. Thus, the full impact of the project will be spread

[1] December 2002.

over a period of years. No significant impacts to schools are anticipated as a result of the proposed project, and no mitigation measures beyond compliance with existing regulations (payment of fees to the District at time of Building Permit issuance) are necessary.

Library Services. According to correspondence from the Brewitt Public Library, the proposed project is expected to increase library usage. Ms. Karen Chessy (City Librarian) indicated that the library can accommodate the needs of the additional residents created by the project by responding to public requests and assessing the demand on library services as it occurs.

Public Transit. Long Beach Public Transit anticipates that the frequency of service on its routes is contingent upon the demographics, travel characteristics, and behavior of the potential residents of the Alamitos Ridge development. Currently, Route 131 is at approximately 33 percent capacity.

Capacity of existing lines is determined through a service review that is conducted three times a year (February, June, and September). Systemwide ridership figures are collected on an annual basis. Service would be adjusted to accommodate future increases in population throughout the LBT service area. Rider profiles and population demographics, including income, age, and automobile availability, are used to determine future service demand. Therefore, regular review of service needs in the project area and the City as a whole will ensure that service is provided to the project area. This is not anticipated to result in a significant impact, since the LBT has anticipated continued service throughout the area.

The current transportation improvement fee being levied by the City of Long Beach is $1,125 per unit for residential development.

Utility Services.

Natural Gas. The Long Beach Gas Department Has Indicated That it Will Be Able to Provide Natural gas service to the Alamitos Ridge project without any adverse impacts on the. system's delivery capability or its current staffing levels (Long Beach Gas Department, 2000).

The existing natural gas main system was implemented to accommodate residential development in the Alamitos Ridge area. Since the project area is currently undeveloped, it will be necessary to install new gas mains throughout the Alamitos Ridge circulation network in order to provide gas service. This work will be completed as the project is constructed. Therefore, significant impacts related to natural gas service to the Alamitos Ridge project are not anticipated.

Electricity. The Southern California Edison Company has indicated that it would be able to service the Alamitos Ridge project without impacting the existing electrical facilities (SCE, 2000). Specific facility changes cannot be determined until final plans for the project have been submitted to Southern California Edison. However, it is anticipated that electrical service will be provided to the Alamitos Ridge project with no impacts to existing service facilities.

Water. The Long Beach Water Department will provide water to the Alamitos Ridge development through its water lines in the project vicinity (Redondo Avenue, Obispo Avenue and 20th Street) with no impact to existing service (Long Beach Water Department, 2000). The calculated static water pressures at different locations within the development may vary between 31 and 49 pounds per square inch, meeting City standards.

Wastewater. The Sanitation Districts of Los Angeles County (SDLAC) has estimated the average wastewater flow from the project to be 27,560 gallons per day. The SDLAC is empowered by the California Health and Safety Code to charge a fee for connecting, directly or indirectly, to their sewerage systems or increasing the existing strength and/or quantity of wastewater attributable to a particular parcel or operation already connected. This connection fee is required to construct an incremental expansion of the sewerage system to accommodate the proposed project, which will mitigate the impact of this project on the present sewerage system. The Districts intend to provide wastewater service up to the levels that are legally permitted (SDLAC, 2000).

Solid Waste. The Alamitos Ridge project is expected to generate approximately four tons of solid waste per week based on a standard waste generation of 78 pounds per week per household (telephone conversation with Arthur Cox). The LBIRB indicates that the project will not adversely impact its ability to service the Alamitos Ridge project area. The additional waste generated by the proposed project will be taken to the Southeast Resource Recovery facility for incineration. This facility has been designed and approved to accommodate future projects determined by land uses in the surrounding jurisdictions, including Long Beach. The Southeast Recovery facility will be able to accommodate the additional solid waste generated by the Alamitos Ridge project (LBIRB, 2000). Therefore, the generation of solid waste can be accommodated at regional facilities, and will not result in a significant impact related to solid waste.

State legislation (Assembly Bill [AB] 939) requires that, as of the year 2000, every city and county in California implement programs to recycle, reduce refuse at the source, and compost 50 percent of their solid waste. Currently, the City is at 47 percent compliance for its waste disposal diversion goals. In addition, AB 939 requires project developers to reduce and recycle by at least 50 percent the amount of construction generated waste disposed of in landfills. To meet the requirements of AB 939, contractors will reuse construction forms where practicable or applicable, attempt to balance soils on the site, minimize overcutting of lumber and polyvinyl chloride (PVC) piping where feasible, and reuse landscape containers to the extent feasible, thereby reducing the potential for project impacts to solid waste services to a less than significant level.

Telephone Service. Additional telephone facilities will be required to provide service to the Alamitos Ridge area. These include underground facilities, manholes, pull boxes, conduit, and new cabling. There are no significant impacts to telephone service or facilities anticipated as a result of the Alamitos Ridge project (GTE, 2000).

Cable Television Service. According to Charter Communications, existing facilities will be expanded to serve the Alamitos Ridge project area. Extending existing cable television facilities through the project site will occur as needed and as the project is built. Therefore, the project will not result in a significant impact to cable television service (Charter Communications, 2000).

Mitigation Measures

There are no significant impacts to public services and utilities resulting from the proposed project. Therefore, no mitigation measures are required.

4.7.4 CUMULATIVE IMPACTS

For purposes of this analysis, build out of the existing City of Long Beach General Plan has been used to assess potential cumulative public services and utilities impacts. Although the project applicant is requesting a General Plan Amendment and a zone change, the proposed project is consistent with surrounding existing and proposed land uses and planned land uses on site. Compliance with existing regulations and imposition of standard conditions of approval will lessen the project's cumulative contribution to public services and utilities impacts. The project's contribution to public service and utilities impacts is not cumulatively considerable because all services and utilities are readily available and are not adversely affected by the in-fill growth represented by the project. No significant cumulative service related impacts are anticipated.

4.7.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

There are no significant impacts to public services and utilities resulting from the proposed project. No mitigation measures are necessary.

4.8 RECREATION

4.8.1 EXISTING ENVIRONMENTAL SETTING

The City of Long Beach Parks, Recreation, and Marine Department operates and maintains all municipal parks and recreation facilities. There are approximately 2,600 acres of recreation open space in the City of Long Beach (Draft Open Space and Recreation Element 2002). The City of Long Beach Parks, Recreation, and Marine Department currently operates and maintains over 70 community parks, golf courses, public landscapes, marinas, and parkway areas. Facilities and programs also include recreation and adult centers, pools, beach bike paths, recreation and sports programs, adopt a beach or park programs, cultural arts facility and associated programs.

In October 2002, the City adopted a new Open Space and Recreation Element of the General Plan. The updated Element examined the current supply of open space, recreation facilities, and land resources, and determined that the per capita ratio of recreation open space in Long Beach has declined substantially over the past 28 years as population growth has outpaced development of recreation facilities. In 1973, it was estimated that the City had approximately 2,500 acres of "recreation open space," and a ratio of 7.0 acres per 1,000 residents. In 2001, the updated Open Space and Recreation Element estimates that approximately 2,600 acres of "recreation open space" exist in the City at a ratio of 5.6 acres per 1,000 residents. Developed public parks comprise approximately 1,425 acres, or 55 percent, of that total. Beaches, golf courses, and water recreation areas comprise the remainder.

In examining the appropriate standard for the ratio of recreation open space per capita, the updated Open Space and Recreation Element concluded that the City should adopt a ratio of 8 acres per 1,000 residents in order to account for the large proportion of water recreation resources in the City and to support the City's economic development objectives. Using this standard, the updated Open Space and Recreation Element estimates that the City should have approximately 3,700 acres of recreation open space.

Development fees are one means the City has to acquire and develop new recreation facilities. The updated Open Space and Recreation Element suggests that the current fee structure be reviewed and possibly revised in light of identified deficiencies, as well as the adoption of a higher standard for recreation open space. At the present time, park impact fees are $2,680 per single family unit.

Public Parks

There are two public parks, Stearns Champions Park and Orizaba Park, within a one mile radius of the center of the proposed project site. The locations of these parks are shown in Figure 4.8.1. Stearns Champions Park is 20.9 acres in area and is located on 23rd Street in the City of Long Beach. The park has night lighted basketball and volleyball courts, two baseball diamonds, a picnic area, two rentable rooms, and a restroom facility.

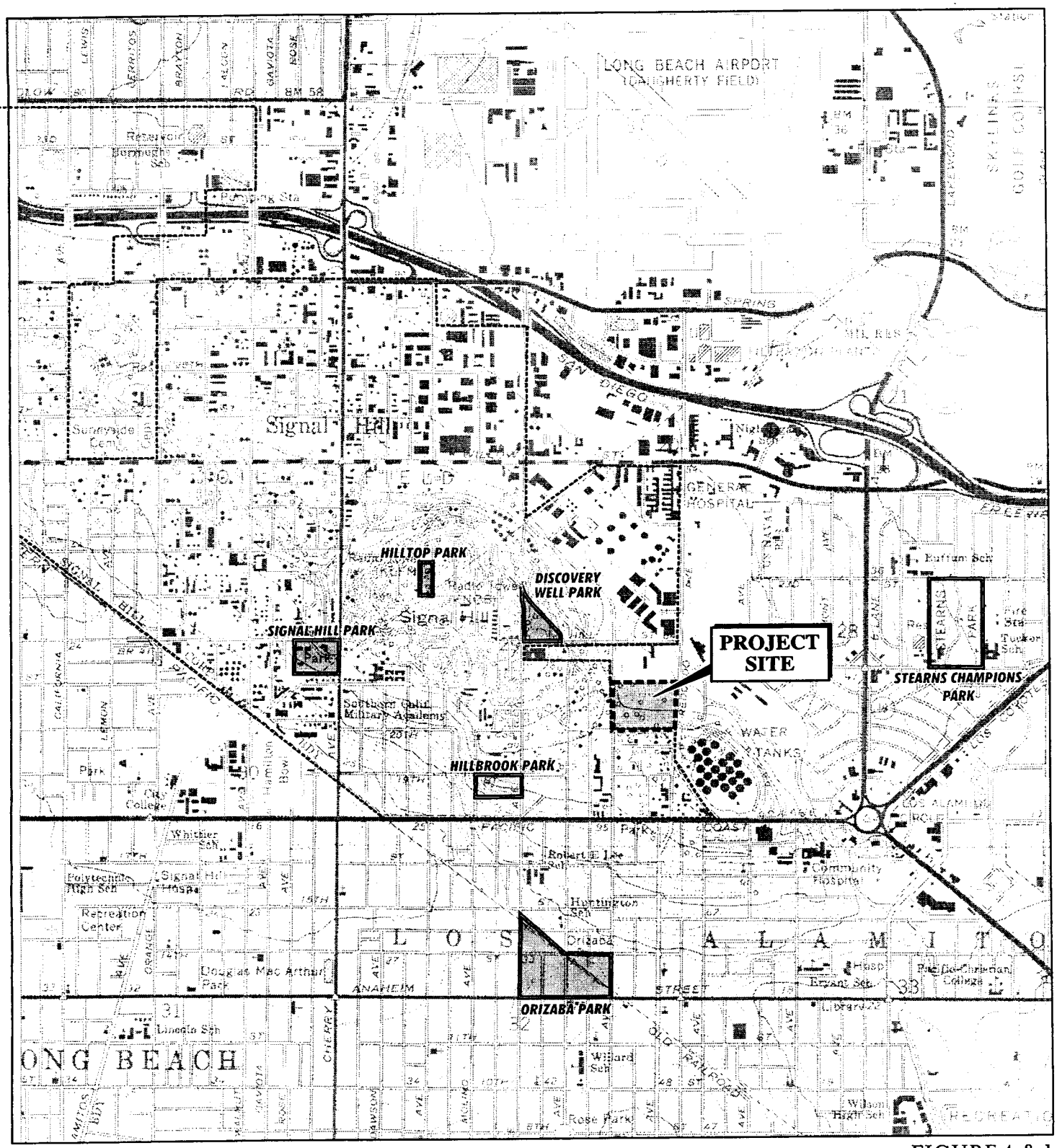

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FIGURE 4.8.1

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Alamitos Ridge Residential Project EIR

Parks Within One Mile of Site

BASE MAP SOURCE: USGS 7.5' QUAD - LONG BEACH, CALIF.

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Orizaba Park is 1.19 acres in area and is located at Orizaba and Spaulding in the City of Long Beach. Orizaba Park has been expanded with land from an adjacent railroad right-of-way. Landscaping, concrete paths, play equipment, a sand lot, and benches have been installed to improve this park.

In addition, four parks within a one mile radius of the project site are located in the City of Signal Hill (Figure 4.8.1). Hillbrook Park is 0.54 acre in area and is located at Wall Street and Temple Avenue. This park has a water feature as its focus and offers a covered picnic area, barbecue facilities, a tot lot, and restrooms. Hilltop Park is 3.2 acres in area and is located on Dawson Avenue. This park has two covered and two uncovered picnic tables, a barbecue, several benches, and a restroom facility. In addition, the park has art pieces on display, and telescopes are stationed for the public to view the local scenery. Hilltop Park has existing trails, and future trails are under construction for a trail connection. Signal Hill Park is located on 10.07 acres at Cherry Avenue and 21st Street. Active recreational facilities include a lighted softball diamond, a bandstand, community center, restrooms, a tot lot, and two full lighted basketball courts. The Discovery Well Park, located in Bixby Ridge at Temple and Hills, is currently under construction.

4.8.2 THRESHOLD OF SIGNIFICANCE CRITERIA

An impact shall be considered significant if it results in increased demand on the City's Parks, Recreation, and Marine Department services and facilities beyond their capacity, accelerating or leading to substantial physical deterioration of existing recreation facilities and human safety.

4.8.3 IMPACTS AND MITIGATION MEASURES

The proposed project is estimated to result in the addition of approximately 339 new residents to the City of Long Beach. Some portion of the residential population generated by the proposed project would potentially utilize area parks for after school sports and activities and during weekends. The additional residents generated by the proposed project would increase demand upon the City's Parks, Recreation and Marine Department's services and facilities. The neighboring parks may require additional staff hours by the Department for maintenance activities because of the increase in use. It is not anticipated, however, that increased usage by project residents will result in "substantial physical deterioration" of existing facilities.

Project applicants are required to pay all applicable park fees to comply with the Quimby Act (State of California, *Business and Professional Code*, Section 11546) enacted in 1965 by the California Legislature. Based on the current park impact fee schedule, the project will contribute park fees of $2,680 per unit to the City of Long Beach (or approximately $284,000 for the entire project as proposed) for residential development. Should fees be modified prior to actual construction, the developer would be required to comply with adjusted impact fee schedules.

Based on the direction of the City of Long Beach, an analysis of the increased demand for recreation open space as a result of the proposed project was performed. Utilizing the City of Long Beach ratio of 8 acres of recreation open space per 1,000 residents, a demand for 2.7 acres would be generated by the project. The proposed project does not include construction of park facilities, but does incorporate approximately .8 acre of open space/landscape area. The payment of all applicable

Quimby Act fees as described above will offset impacts to existing public recreation facilities resulting from the project. No significant impacts to recreation open space facilities and resources are anticipated.

Mitigation Measures

There are no significant impacts to parks and recreational services resulting from the proposed project. Therefore, no mitigation measures are required for Alamitos Ridge.

4.8.4 CUMULATIVE IMPACTS

Because park fees are collected for all new residential construction as discussed above, cumulative impacts will be avoided.

4.8.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed project would result in the addition of approximately 339 new residents to the City, which will increase demand upon the City's Parks, Recreation and Marine Department's services and facilities in the area. However, project applicants are required by State law to pay all applicable City park fees for residential development. No significant impacts are anticipated.

4.9 TRAFFIC AND CIRCULATION

This section provides an overview of the transportation system serving the project site and an analysis of potential traffic related impacts associated with the proposed residential development, and determines circulation mitigation measures for the project. This section summarizes and, where appropriate, incorporates portions of the information and findings presented in the "Traffic Impact Study Alamitos Ridge Residential Project" prepared by Linscott, Law & Greenspan, Engineers (LLG) in March, 1999, and updated December, 2002. The technical traffic study is presented in its entirety in Appendix I of this EIR.

4.9.1 EXISTING ENVIRONMENTAL SETTING

Circulation System and Access Routes

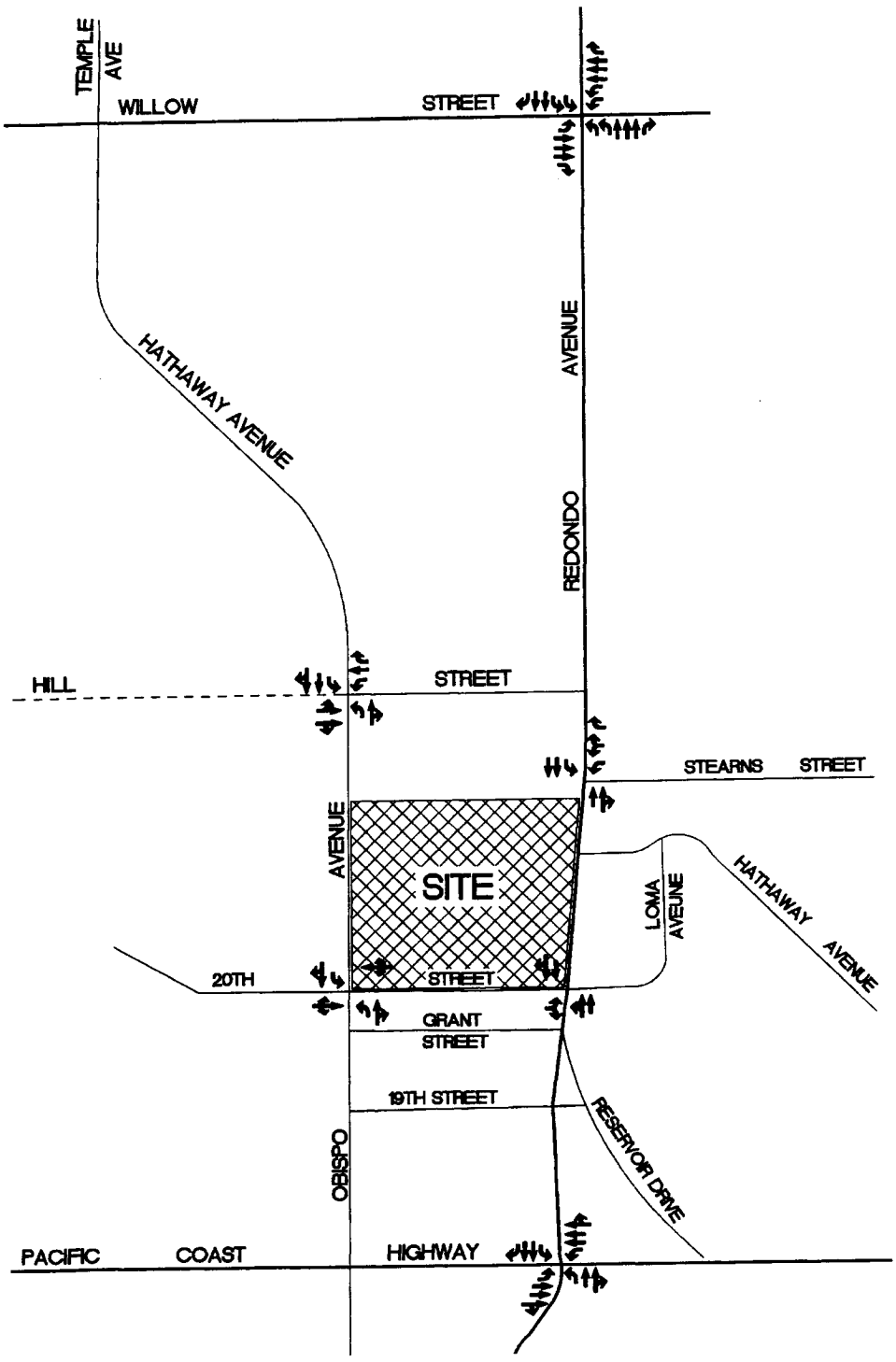
Primary regional access to the project site is provided by Interstate 405 (I-405), Interstate 710 (I-710), Highway 1/Pacific Coast Highway (PCH), and State Route 22 (SR-22). From I-405, traffic to and from the north can use the interchange at Cherry Avenue, Lakewood Boulevard, and Spring Street. From I-710, traffic to and from the west can use the interchange at PCH or Willow Street. From PCH, traffic can use Redondo Avenue or Obispo Avenue to reach the project site, to the north. The existing local access routes from the surrounding area to the project site are listed as follows, and illustrated in Figure 4.9.1.

- To and from the north, Redondo Avenue and Obispo Avenue serve as the primary access routes.
- To and from the east, the primary routes are Stearns Street, 20th Street, PCH, and Willow Street.
- To and from the south, Obispo Avenue and Redondo Avenue are the primary access routes.
- To and from the west, traffic can use 20th Street for direct site access, or use one of several east-west arterials to reach Obispo Avenue.

Site Access and Circulation

Access to the project site will be provided via three driveways. One driveway will be provided on each of the three roadways bordering the project site: Redondo Avenue on the east, Obispo Avenue on the west, and 20th Street on the south. It is anticipated that left-turn and right-turn ingress and egress will be accommodated at all three of the project site driveways.

Right-turn only channelization is incorporated into the project for the Redondo Avenue and 20th Street intersection to restrict traffic to right-turn movements only to and from 20th Street. This component is included in the project based on the limited sight distance between eastbound traffic on 20th Street and northbound traffic on Redondo Avenue. The right-turn only channelization was



Note: Hill Street west of Obispo Avenue closed for construction at time of study

FIGURE 4.9.1

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NOT TO SCALE

SOURCE: LINSCOTT LAW & GREENSPAN, ENGINEERS (11/26/02)

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Alamitos Ridge Residential Project EIR

Existing Lane Configurations

assumed to be included as part of the proposed project in the traffic analysis. Figure 4.9.2 illustrates recommended channelization at the intersection of Redondo Avenue and 20th Street.

A two-way circulation roadway will be provided internal to the site to provide access to the residential dwelling units. The internal circulation roadway will also provide access to all three project site driveways.

Study Intersections

Listed below are six arterial intersections adjacent to or in the vicinity of the project site that were selected for the analysis of potential traffic impacts. They will be referred to as Intersection No. 1, No. 2, etc., throughout the remainder of Section 4.9. Existing lane configurations at each study intersection are shown in Figure 4.9.1.

1. Hill Street and Obispo Avenue/Hathaway Avenue (all-way stop)
2. 20th Street and Obispo Avenue (all-way stop)
3. Willow Street and Redondo Avenue (signal)
4. Stearns Street and Redondo Avenue (signal)
5. 20th Street and Redondo Avenue (two-way stop on 20th Street)
6. PCH and Redondo Avenue (signal)

Level of Service Analysis

An intersection level of service analysis was conducted at the study area intersections for the a.m. and p.m. peak hours to determine current circulation system performance. Roadway operations and the relationship between capacity and traffic volumes are generally expressed in terms of levels of service (LOS). These levels recognize that, while an absolute limit exists as to the amount of traffic that can travel through a given intersection (the absolute capacity), the conditions that motorists experience rapidly deteriorate as traffic approaches the absolute. Under such conditions, congestion is experienced. There is general instability in the traffic flow, which means that relatively small incidents (e.g., momentary engine stall) can cause considerable fluctuations in speeds and delays. This near capacity situation is labeled LOS E (levels of service are defined A through F). Beyond LOS E, capacity has been exceeded, and arriving traffic will exceed the ability of the intersection to accommodate it. This condition is considered LOS F. For mathematical purposes, a range of volume-to-capacity (v/c) ratios is associated for each level of service. The following criteria are used in assigning a letter value to the resulting LOS:

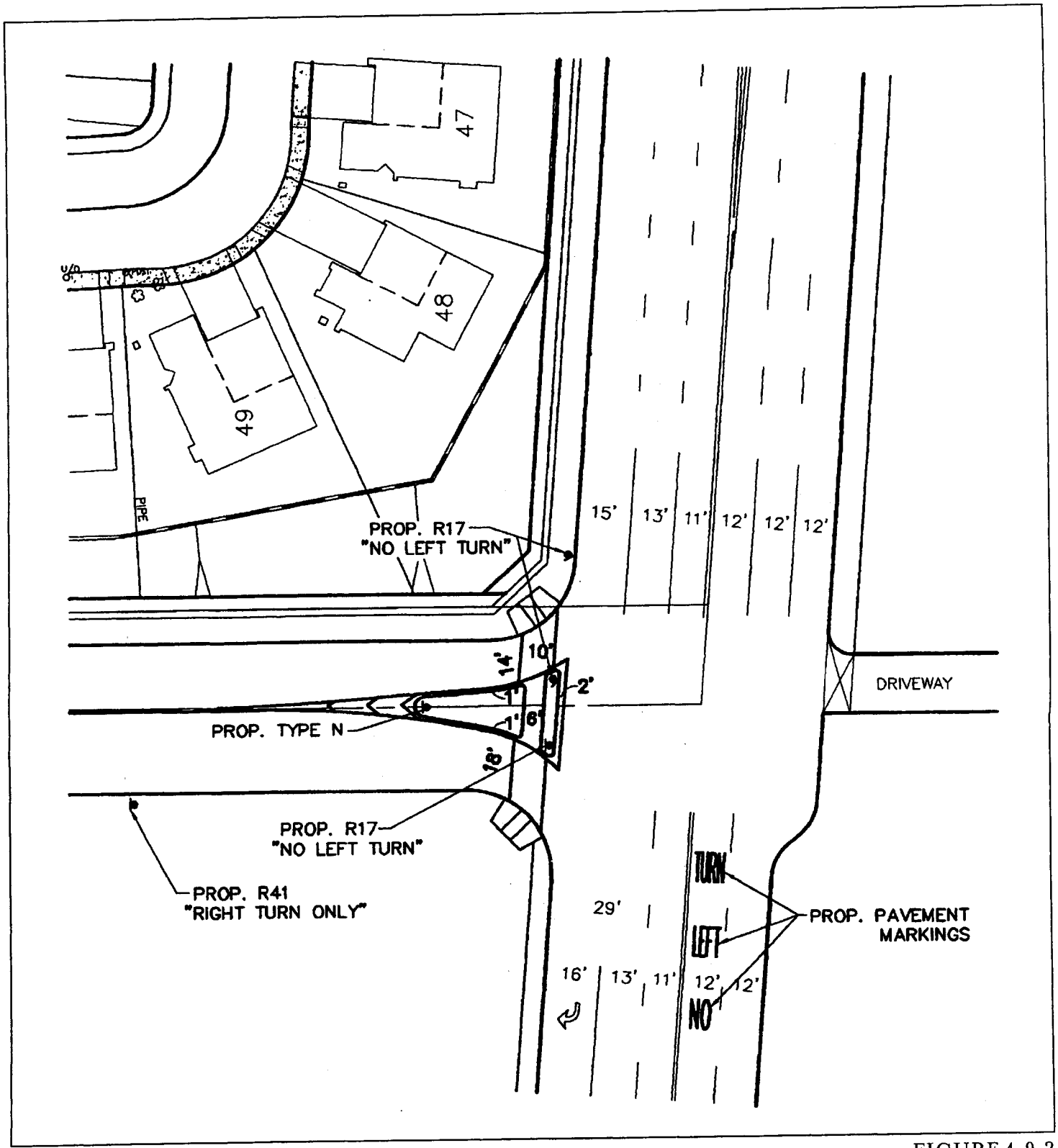

FIGURE 4.9.2

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SOURCE: LINSCOTT LAW & GREENSPAN, ENGINEERS (12/10/02)

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Alamitos Ridge Residential Project EIR

Recommended Channelization:
Redondo Avenue/20th Street

Table 4.9.A: Level of Service Criteria

Level of Service	V/C Ratio
LOS A	0.00 - 0.60
LOS B	0.61 - 0.70
LOS C	0.71 - 0.80
LOS D	0.81 - 0.90
LOS E	0.91 - 1.00
LOS F	> 1.00

Source: Linscott, Law & Greenspan, December 2002.

Intersection levels of service were determined based on the Intersection Capacity Utilization (ICU). This methodology generally represents the amount of total intersection capacity required to accommodate the subject hourly traffic volume. This analysis method correlates level of service to the range of v/c ratios shown above.

Existing Traffic Volumes and Traffic Impact Analysis Scenarios

LOS calculations have been prepared for the following scenarios:

a. Existing conditions (2002)- There is no traffic generated in the project area from the site, since the site is currently undeveloped. The examination of existing traffic conditions is required for a comparative analysis with projected traffic generation from the proposed project. The no project/existing conditions scenario, which assumes no development on the project site, is used as the baseline traffic conditions for this analysis.

b. Condition (a) plus two percent ambient growth through 2004

c. Condition (b) with completion and occupancy of the related projects

d. Condition (c) with completion and occupancy of the proposed project

e. Condition (d) with implementation of mitigation measures, where necessary

Table 4.9.B presents the 2002 existing condition LOS and v/c for the six study intersections. The existing traffic volumes for the a.m. and p.m. peak hours are shown in Figures 4.9.3 and 4.9.4, respectively. Existing traffic volumes represent traffic counts conducted in 1998 to which a 1 percent annual ambient growth factor has been applied to reflect year 2002 conditions (Methodology approved by Ed Norris, Department of Public Works, Traffic Engineering Division, November 2002). Two of the unsignalized study intersections are currently operating at acceptable levels of service (LOS D or better) during both the a.m. and p.m. peak hours. However, one of the unsignalized intersections (Intersection No. 5) is expected to operate at LOS E during the a.m. peak

Table 4.9.B: Existing Traffic Volumes

No.	Intersection	Peak Hour	2002 Existing V/C or Delay[1]	2002 Existing LOS
1	Obispo Avenue[2] and Hill Street	AM PM	15.1 19.6	C C
2	Obispo Avenue and 20th Street	AM PM	14.2 22.1	B C
3	Redondo Avenue and Willow Street	AM PM	0.676 0.925	B D
4	Redondo Avenue and Stearns Street	AM PM	0.736 0.857	C D
5	Redondo Avenue and 20th Street	AM PM	47.1 247.4[3]	E F
6	Redondo Avenue and Pacific Coast Highway	AM PM	0.823 0.896	D D

Source: Linscott, Law, and Greenspan, December 2002

[1] Average intersection delay (seconds).

[2] Signalized as part of the City of Long Beach "Long Term Comprehensive Traffic Plan."

[3] The delay calculated for these conditions exceeded software control limits. Please see traffic study for additional information.

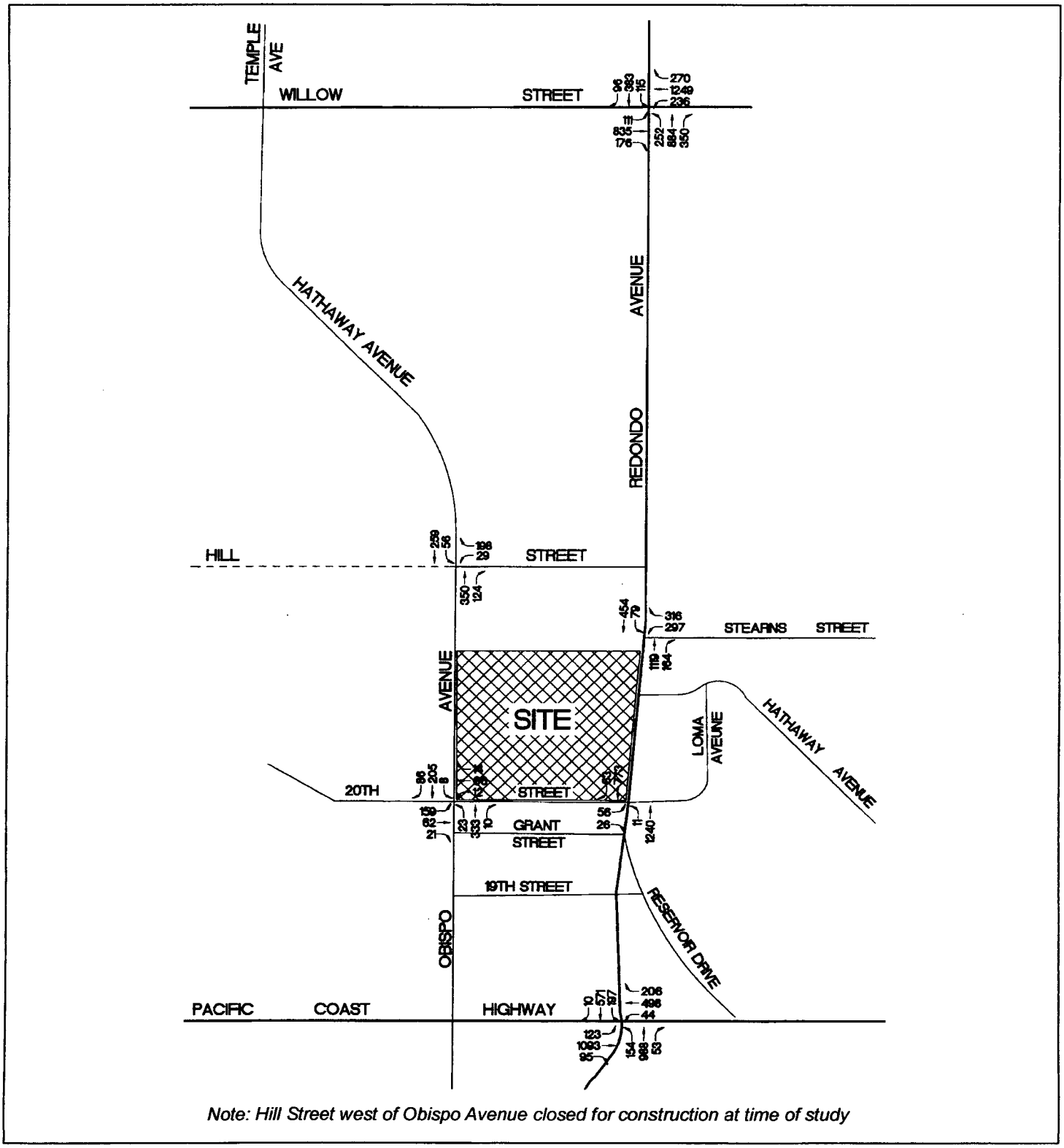

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FIGURE 4.9.3

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SOURCE: LINSCOTT LAW & GREENSPAN, ENGINEERS (11/26/02)

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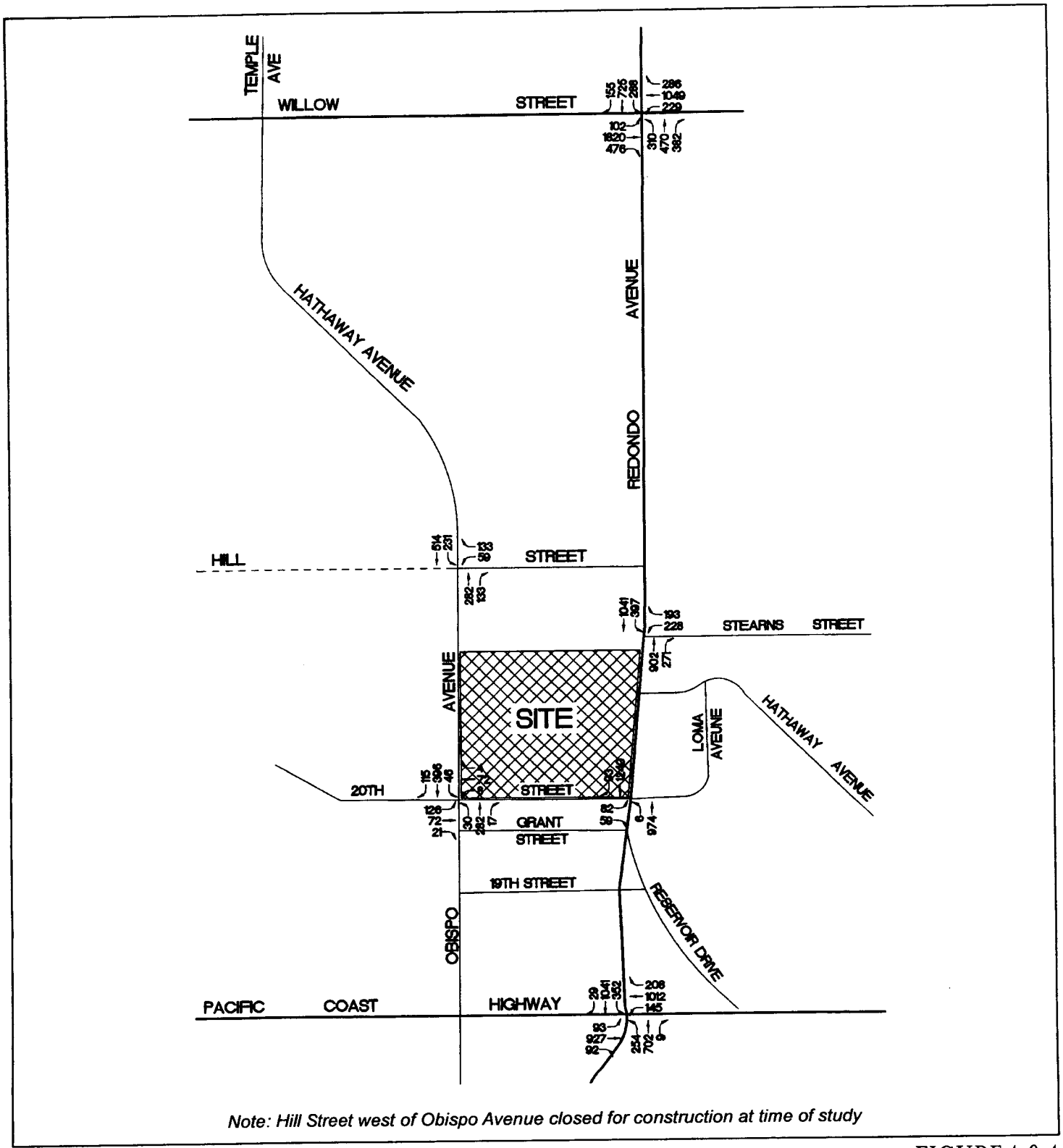
Alamitos Ridge Residential Project EIR

Existing Traffic Volumes, AM Peak Hour



Note: Hill Street west of Obispo Avenue closed for construction at time of study

FIGURE 4.9.4

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SOURCE: LINSCOTT LAW & GREENSPAN, ENGINEERS (12/26/02)

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Alamitos Ridge Residential Project EIR

Existing Traffic Volumes, PM Peak Hour

hour and LOS F during the p.m. peak hour. The p.m. peak hour intersection delay is beyond the software analysis control limits because the delay in seconds is beyond the limits used to quantify the level of impact. This is a result of the high delay on the 20th Street approach due to the heavy traffic volume on Redondo Avenue.

Transportation Improvement Fee

The City of Long Beach will require developer contributions to the transportation improvement fund at the time of issuance of building permits. This funding source is used to construct road and intersection improvements to increase roadway and intersection capacity. Improvements may include roadway paving, traffic signals, street signs, street lights, sidewalks, and utilities relocation.

Regional Transportation System Improvements

- The City and Caltrans are in final design stages for improvements of Hill Street. This action will improve regional access to the project site.
- The City of Signal Hill has identified the intersection of Obispo Avenue and Hill Street (Intersection No. 1) for future signalization on the list of projects supported by the City's Traffic Impact Fee program. Timing of the implementation of the signal is linked to traffic volumes and warrants.[1]

City of Long Beach Requirements/Recommendations[2]:

The City of Long Beach will impose conditions on the proposed project to implement the following improvements:

1. Research the feasibility of providing a pedestrian connection between this development and the future public school site to the north. The final plan may reflect a proposed pedestrian connection to the elementary school.
2. Street Dedication - A ten foot dedication for sidewalk widening purposes is required along Redondo Avenue. The final plan will reflect this street dedication.
3. Bus Stop Location - The existing bus stop on Redondo Avenue must be maintained. If the location must be adjusted, the applicant must coordinate the new location with Traffic Engineering and Long Beach Transit. The final plan will reflect any changes to the existing bus stop.

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1 Phone conversation, Charles Honeycutt, City of Signal Hill, Public Works Administrator, September 6, 2002.

2 Conceptual site plan review letter (Case No. 9809-2) from the City of Long Beach to Reed Jones, Le Plastrier Company dated September 21, 1998.

4. Private Street Gate Locations - The setback from the public street to any proposed gates must be adequate to provide vehicle queuing outside. The Final Plan will reflect the provision of this setback.

5. Lane Striping and Signage - A plan must be submitted for approval that details any changes to lane striping or traffic signage. The final plan will reflect necessary lane striping and signage.

6. Transportation Improvement Fees - The fee for residential development in the project area is $1,125.00/unit.[1]

The analysis of impacts that follows assumes implementation of these required conditions of the proposed project.

4.9.2 THRESHOLD OF SIGNIFICANCE CRITERIA

The City of Long Beach traditionally defines a significant adverse impact on traffic as occurring when an intersection has a peak hour level of service worse than LOS D and when project traffic increases the peak hour intersection volume/capacity ratio by at least 0.02 at future project build out (or a 2 percent increase in delay for unsignalized intersections) compared to the future baseline without the project.

On the regional highway system, the Los Angeles County Metropolitan Transportation Authority (MTA) defines a significant project impact as occurring when the proposed project increases traffic demand on a CMP facility by two percent of capacity, causing or worsening LOS F.

4.9.3 IMPACTS AND MITIGATION MEASURES

Project Trip Generation

Traffic generation estimates are based on factors (trip generation rates) documented in the Institute of Transportation Engineers (ITE) *Trip Generation* manual (Fifth Edition). The proposed project is anticipated to generate the following trips:

- 1,014 additional trips[2] in a 24 hour period
- 80 additional trips[2] during the morning peak hour
- 107 additional trips[2] during the afternoon peak hour

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[1] City of Long Beach, Department of Planning and Building, personal communication with Staff, October 31, 2000.

[2] One-way traffic movements, entering or leaving.

Figures 4.9.5 and 4.9.6 show the peak a.m. and p.m. hour project traffic volumes, respectively. Table 4.9.C describes the total daily and peak hour trip generation for the proposed residential project.

Table 4.9.C: Project Trip Generation

Land Use	Total Daily Trips	A.M. Peak Hour Trips Generated			P.M. Peak Hour Trips Generated		
		Inbound	Outbound	Total	Inbound	Outbound	Total
Single Family Residential	1,014	20	60	80	69	39	108
Total	1,014	20	60	80	69	39	108

Source: Linscott, Law & Greenspan Engineers 2002.

Ambient growth in traffic due to the combined effects of continuing development, intensification of existing developments, and other factors is specified to be 2 percent per year through 2004 (Methodology approved by Ed Norris, Department of Public Works, Traffic Engineering Division, November 2002). This ambient growth increases the v/c ratios at all of the study intersections and consequently affects the levels of service at some of the study intersections. Two signalized study intersections (Intersection Nos. 3 and 6) are expected to operate at LOS E during the p.m. peak hour with the addition of ambient growth traffic, as shown below:

- Int. 3: Redondo Avenue and Willow Street — PM Peak Hour: v/c = 0.925 (LOS E)
- Int. 6: Redondo Avenue and Pacific Coast Highway — PM Peak Hour: v/c = 0.928 (LOS E)

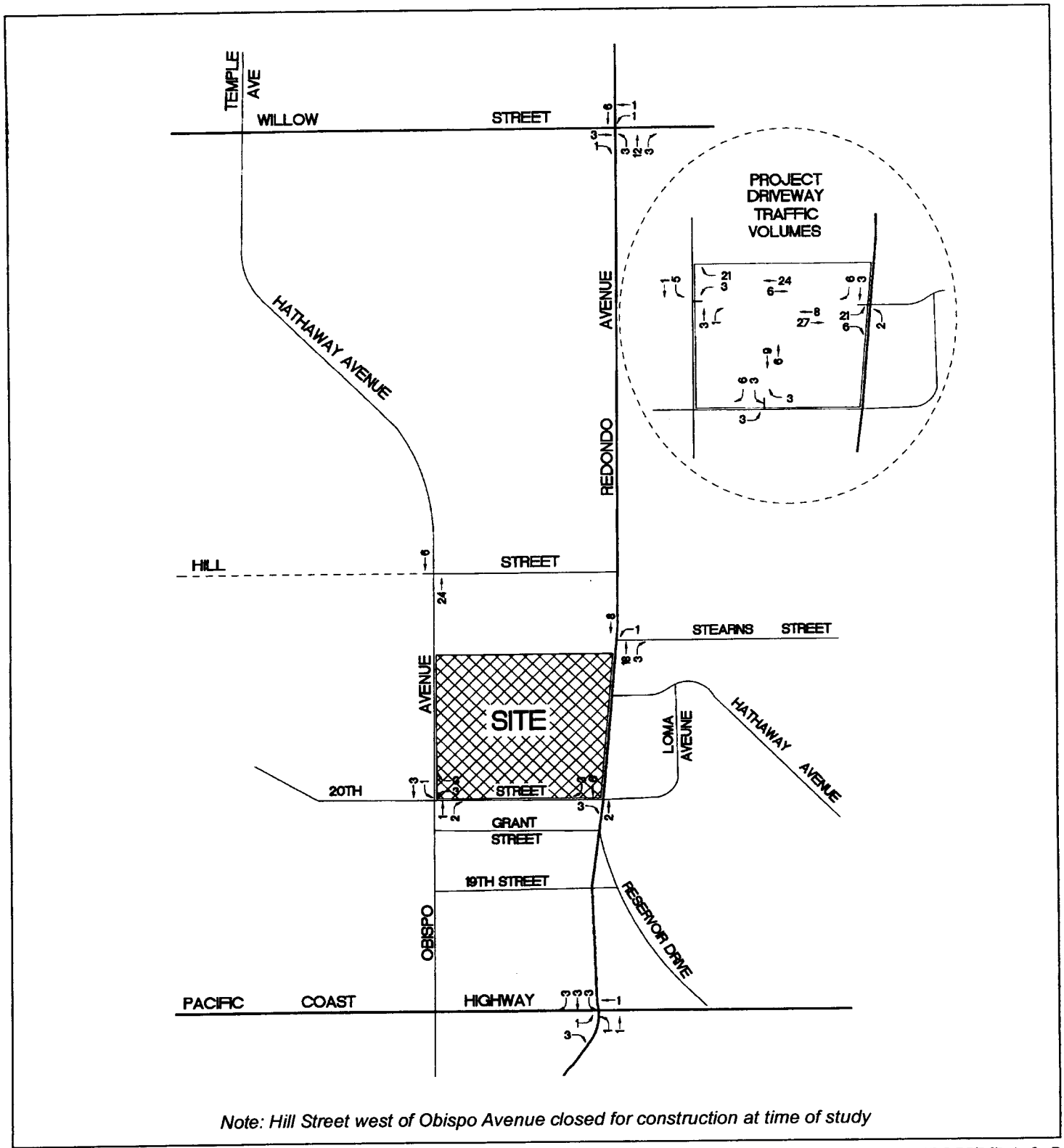
The above two study intersections are currently operating at acceptable levels of service during the a.m. peak hour. The remaining signalized study intersection (Intersection No. 4) is expected to continue operating at LOS D or better during both the a.m. and p.m. peak hours with the addition of ambient growth traffic.

Intersection No. 5 is expected to exceed the analysis limits in both the a.m. and p.m. peak hours. The heavy traffic volumes in the through movement on Redondo Avenue are expected to create long delays for the 20th Street left-turn movement. Consequently, Intersection No. 5 is not expected to adequately handle the project traffic during either the a.m. or p.m. peak hour.

The remaining unsignalized study intersections (Intersection Nos. 1 and 2) are expected to continue operating at LOS D or better during both the a.m. and p.m. peak hours with the addition of ambient growth traffic.

Cumulative Traffic Impacts from the Proposed Project and Related Projects

Traffic generation estimates for four nearby projects are included in the cumulative LOS analysis. The four related projects are Bixby Ridge (residential), Alamitos Green (residential), the Long Beach School District proposed K-8 school, adjacent to the proposed project, and the Hilltop Area Specific



Note: Hill Street west of Obispo Avenue closed for construction at time of study

FIGURE 4.9.5

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NOT TO SCALE

SOURCE: LINSCOTT LAW & GREENSPAN, ENGINEERS (12/19/02)

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Alamitos Ridge Residential Project EIR

Project Traffic Volumes, AM Peak Hour

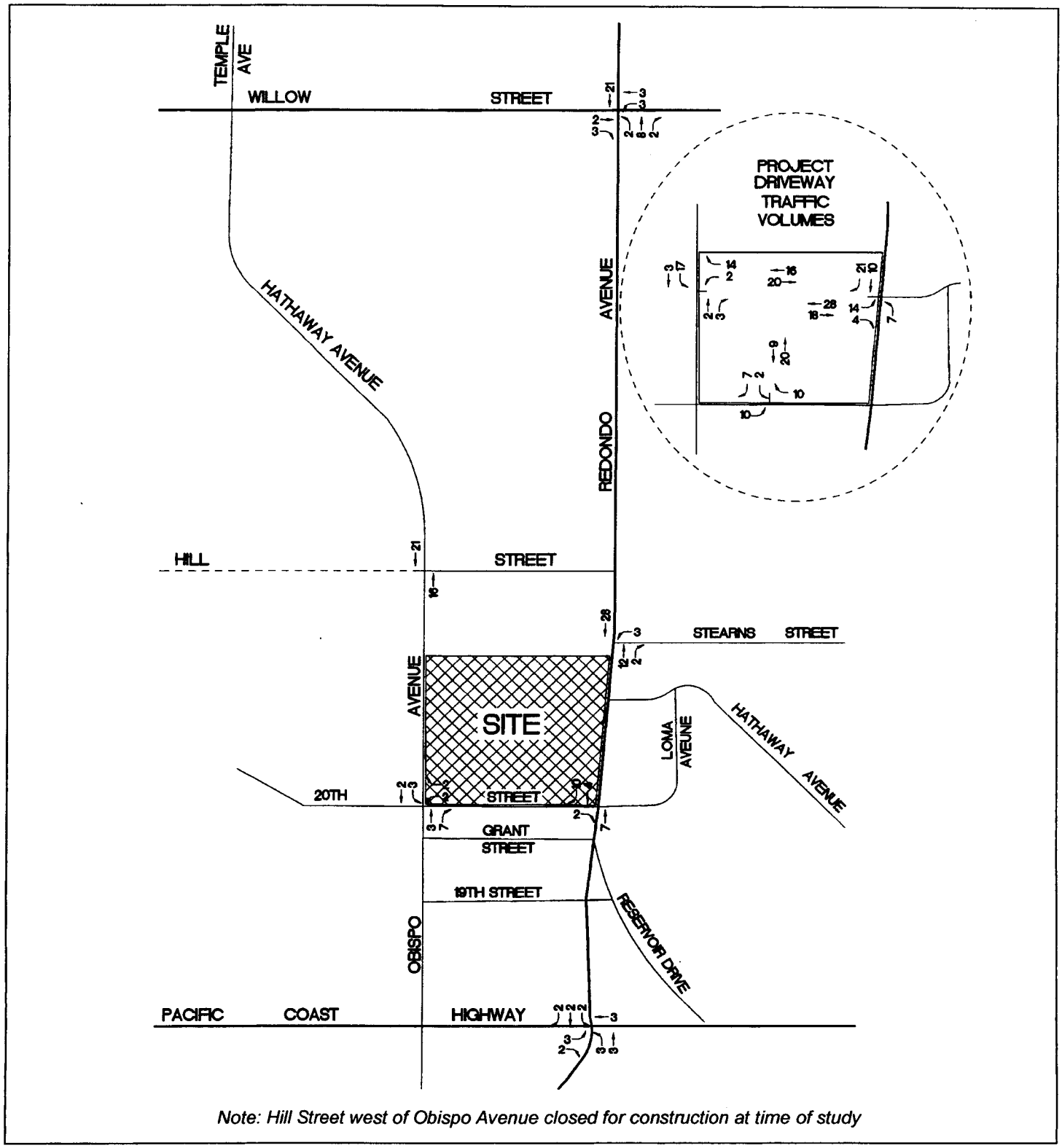

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FIGURE 4.9.6

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SOURCE: LINSCOTT LAW & GREENSPAN, ENGINEERS (11/26/02)

I:\LPL030\Project Vols-PM.cdr (12/19/02)

Alamitos Ridge Residential Project EIR

Project Traffic Volumes, PM Peak Hour

Plan in the City of Signal Hill. Descriptions of each related project are provided below in Table 4.9.D. The location of these cumulative traffic contributing projects are shown on Figure 4.9.7. Figures 4.9.8 and 4.9.9 show the peak a.m. and p.m. related project traffic volumes, respectively.

Table 4.9.D: List of Related Projects Alamitos Ridge Residential Project

Map No.	Project	Location	Land Use	Size	Status
1	Bixby Ridge	South of Willow Street and west of Obispo Street both north and south of Hill Street	Residential	188 DU	Nearly Complete and Occupied
2	Alamitos Green	East of Redondo Avenue between Stearns Street and Hathaway Avenue	Residential	15 DU	Completed
3	Long Beach School District	South of Hill Street between Redondo Avenue and Obispo Avenue	K-8 School	1,450 Students	Proposed
4	Hill Top Area Specific Plan	North of 21st Street between Cherry Avenue and Temple Avenue	Single Family Residential Multifamily Residential	270 DU 194 DU	Partially Completed

Sources: City of Long Beach and City of Signal Hill Planning Departments.

The v/c ratio for all of the signalized study intersections is incrementally increased with the addition of traffic generated by the related projects. Three study intersections are expected to continue operating at LOS E during the p.m. peak hour with the addition of project related traffic as shown below:

- Int. 3: Redondo Avenue and Willow Street — PM Peak Hour: v/c = 0.936 (LOS E)
- Int. 4: Redondo Avenue and Stearns Street — PM Peak Hour: v/c = 0.901 (LOS E)
- Int. 6: Redondo Avenue and Pacific Coast Highway — PM Peak Hour: v/c = 0.940 (LOS E)

The above three study intersections are expected to continue operating at acceptable levels of service during the a.m. peak hour with the addition of project related traffic.

Excessive delay is expected to continue to occur at Intersection No. 5.

The remaining unsignalized study intersections (Intersection Nos. 1 and 2) are expected to continue operating at LOS D or better during both the a.m. and p.m. peak hours with the addition of project related traffic.

Existing Plus Project Level of Service Analysis

To assess the direct project impacts on the existing study area circulation system, the project trip assignment is added to the existing traffic volumes, and levels of service are determined.

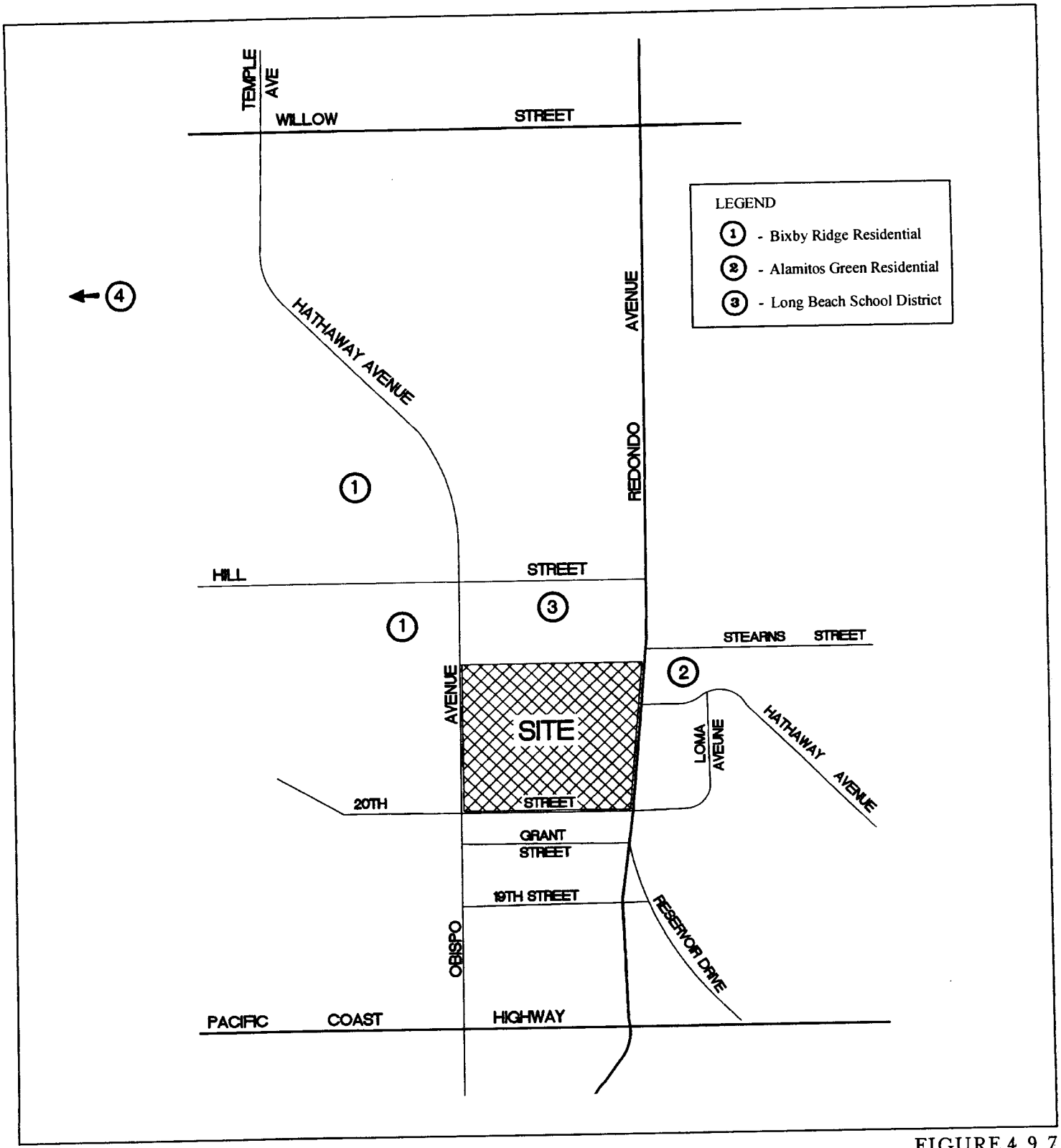

FIGURE 4.9.7

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SOURCE: LINSCOTT LAW & GREENSPAN, ENGINEERS (11/26/02)

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Alamitos Ridge Residential Project EIR

Location of Related Projects

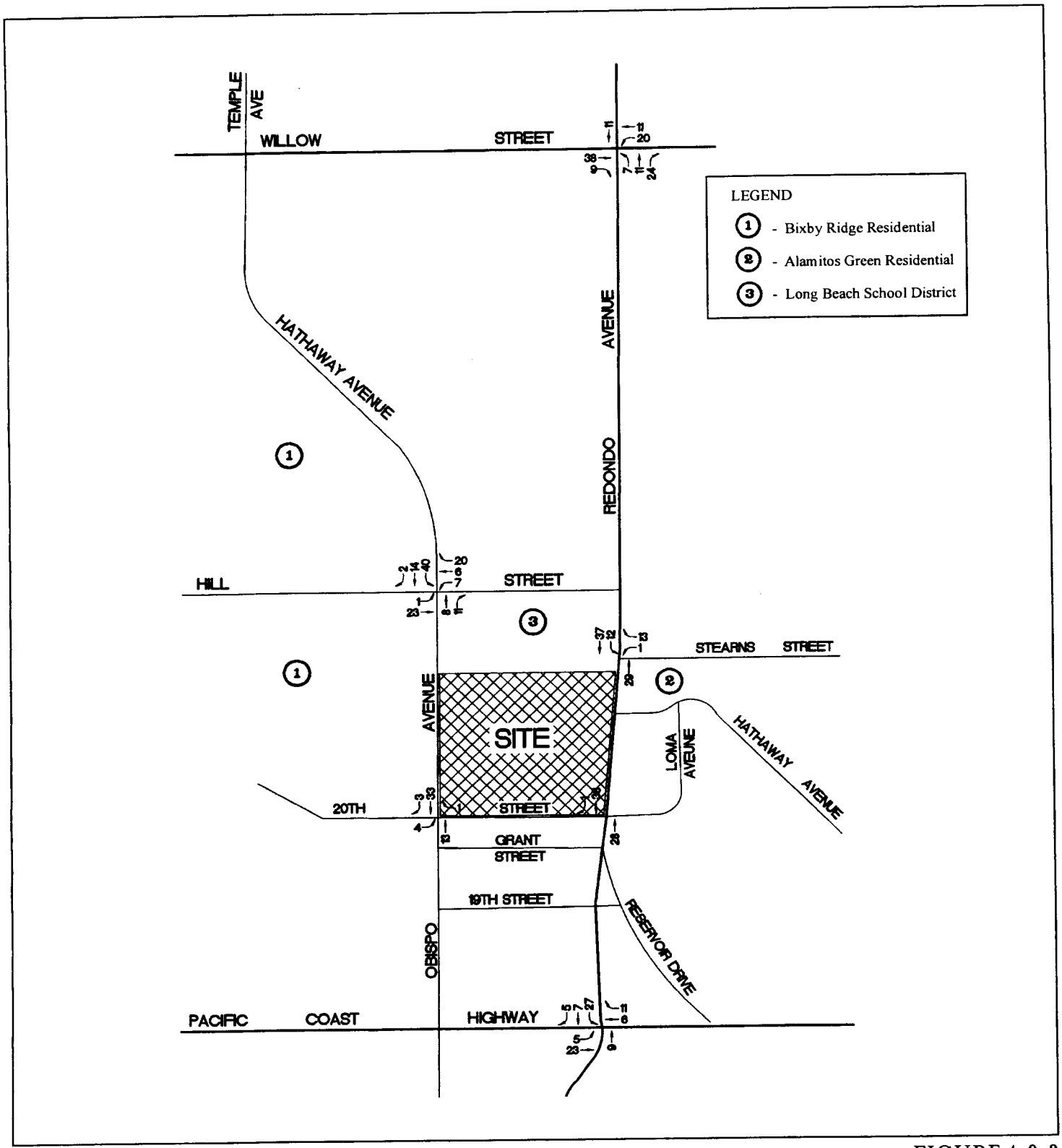

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FIGURE 4.9.8

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SOURCE: LINSCOTT LAW & GREENSPAN, ENGINEERS (12/09/02)

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Alamitos Ridge Residential Project EIR

Related Projects Traffic Volumes, AM Peak Hour

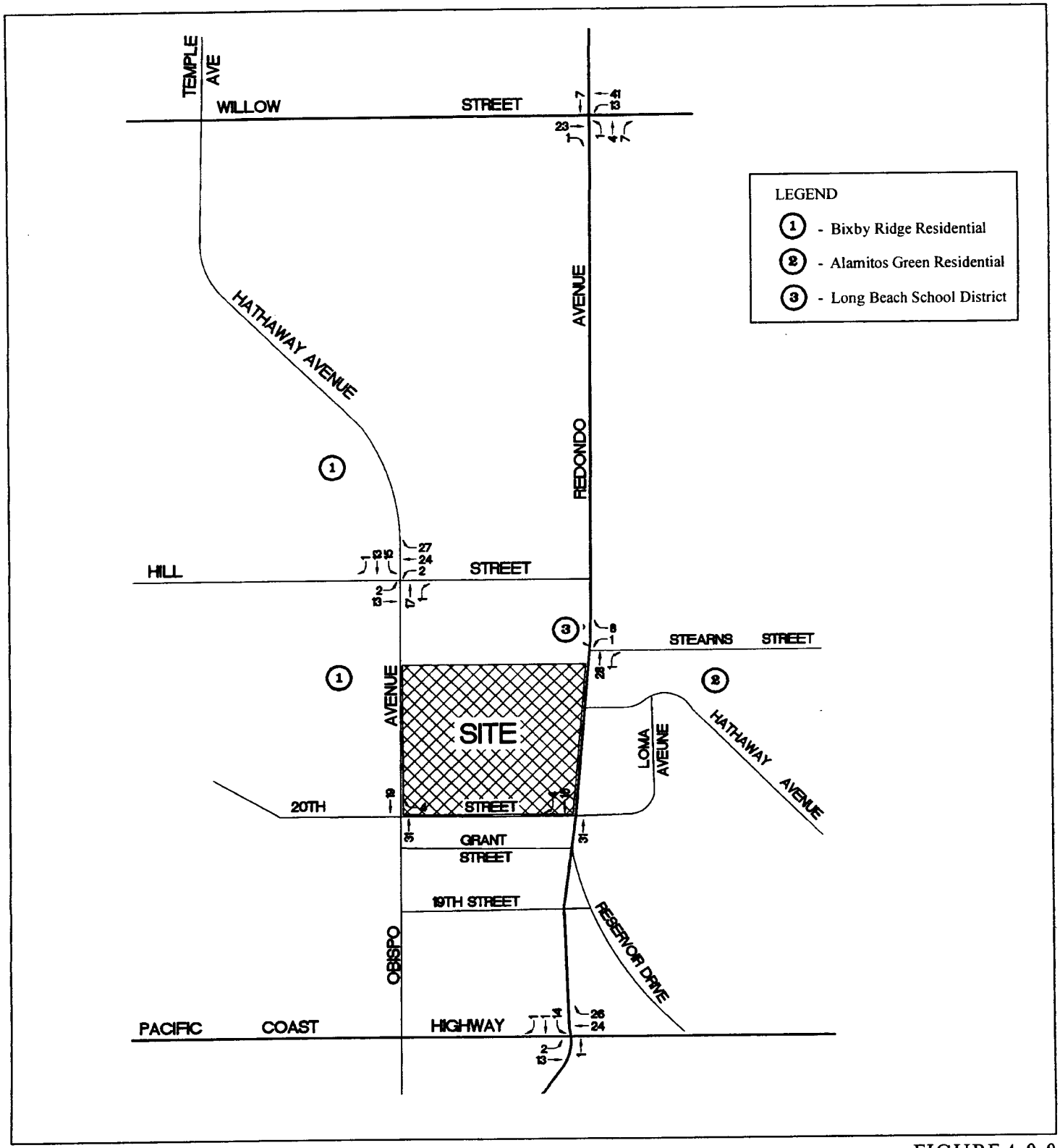

FIGURE 4.9.9

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SOURCE: LINSCOTT LAW & GREENSPAN, ENGINEERS (12/9/02)

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Alamitos Ridge Residential Project EIR

Related Projects Traffic Volumes, PM Peak Hour

Less than Significant Impacts

Arterial Intersections. The traffic channelization on 20th Street west of Redondo Avenue will eliminate left-turn movements onto 20th Street from Redondo Avenue and from 20th Street onto Redondo Avenue (i.e., right-turn only movements to and from 20th Street). Right-turn only channelization is provided at this location for two reasons. First, long left-turn delays already exist on 20th Street, and these delays are projected to increase in the future. Second, and more important, limited sight distance exists between vehicles stopped on eastbound 20th Street and northbound through traffic on Redondo Avenue. Both of these existing conditions will be eliminated upon installation of the recommended channelization.

The traffic channelization will also alter existing traffic patterns for a percentage of vehicles that utilize 20th Street between Obispo Avenue and Redondo Avenue. As mentioned earlier, the project traffic distribution assumes right turns only to and from 20th Street and therefore does not require any redistribution. However, the existing left-turn traffic to and from 20th Street has been redistributed to adjacent street segments to reflect the altered traffic patterns as a result of the right-turn only channelization.

Application of the City of Long Beach threshold criteria for traffic signal-controlled intersections to the with proposed project scenario indicates that none of the signalized study intersections are anticipated to be significantly impacted by the proposed project. Incremental, but not significant, increases in v/c are noted at two of the signalized intersections (Intersection Nos. 3 and 6) while incremental decreases in v/c are noted at the other signalized intersection (Intersection No. 4).

An incremental, but not significant, increase in delay is noted at Intersection Nos. 1 and 2, while a significant decrease in delay is noted at Intersection No. 5 as a result of the proposed project with the right-turn only channelization. While not significant, the increase in delay at Intersection No. 1 resulted in a level of service drop for LOS C to LOS D. This intersection has been identified for signalization by the City of Signal Hill and will be improved using Traffic Impact Fee monies collected by the City from this and other development projects.

Therefore, the project contribution would be less than significant at these intersections. Therefore, the proposed project will not have a significant traffic impact on arterial intersections.

Residential Street Segments. Five roadway segments in the vicinity of the proposed project were selected for analysis by City staff in order to determine the potential impact on local residential streets adjacent to the project site due to the proposed project and the right-turn only channelization. The five street segments listed below were selected for analysis:

1. Obispo Avenue north of 20th Street
2. Obispo Avenue south of 20th Street
3. 20th Street east of Obispo Avenue
4. Redondo Avenue north of 20th Street

5. Redondo Avenue south of 20th Street

Year 2004 with ambient growth and related projects has been projected based on the p.m. peak hour being 0.091 (9.1 percent) of 24-hour traffic. Analysis of existing p.m. peak hour intersection traffic volumes and measured 24-hour volumes indicates that, on average, the p.m. peak hour is equal to 0.091 (9.1 percent) of 24-hour traffic.

Year 2004 total average daily trips will increase on Obispo Avenue and on Redondo Avenue south of 20th Street, and traffic will decrease on 20th Street and on Redondo Avenue north of 20th Street.

A relatively small increase is projected to occur in daily trips along Obispo Avenue (3.2 percent north of 20th Street and 2.1 percent south of 20th Street) and Redondo Avenue (0.3 percent) south of 20th Street. Traffic on 20th Street is expected to be reduced by 20.7 percent and on Redondo Avenue north of 20th Street by 1.6 percent.

Therefore, no significant impacts are expected at the analyzed street segments due to the proposed project and the right-turn only channelization.

School Pedestrian Access and Safety. The proposed project is adjacent to the LBUSD proposed K–8 school. Pedestrian traffic to and from this school site to the project site will be via the internal private and gated street and sidewalk system to adjacent sidewalks on Obispo and Redondo Avenues. Because Obispo and Redondo Avenues lead directly to the school site, there is no need for the project's children to cross any street to access the school. There is no significant school access safety concern with this access plan. This concept is depicted on Figure 4.9.10.

Project Parking. Parking rates from the City of Long Beach parking requirements applicable to the proposed project require two spaces per dwelling unit for units with two or more bedrooms and one space per four units for guest parking. Based on the City Code parking rates, a total of 239 spaces are required ([106 units x 2 spaces/unit] + [106 units x 1 space/4 units] = 212 spaces + 27 spaces = 239 spaces) for the proposed project.

The proposed project will provide at least two off-street garage parking spaces for each unit, and there is ample on-street parking to satisfy the guest parking requirement. Thus, the proposed parking supply will exceed the City of Long Beach Parking Code requirements.

Congestion Management Program Roadway Impact Analysis. The Congestion Management Program (CMP) is a state-mandated program that was enacted by the State Legislature with the passage of Proposition 111 in 1990. The program is intended to address the impact of local growth on the regional transportation system. In Los Angeles County, the CMP is administered by the Los Angeles County Metropolitan Transportation Authority.

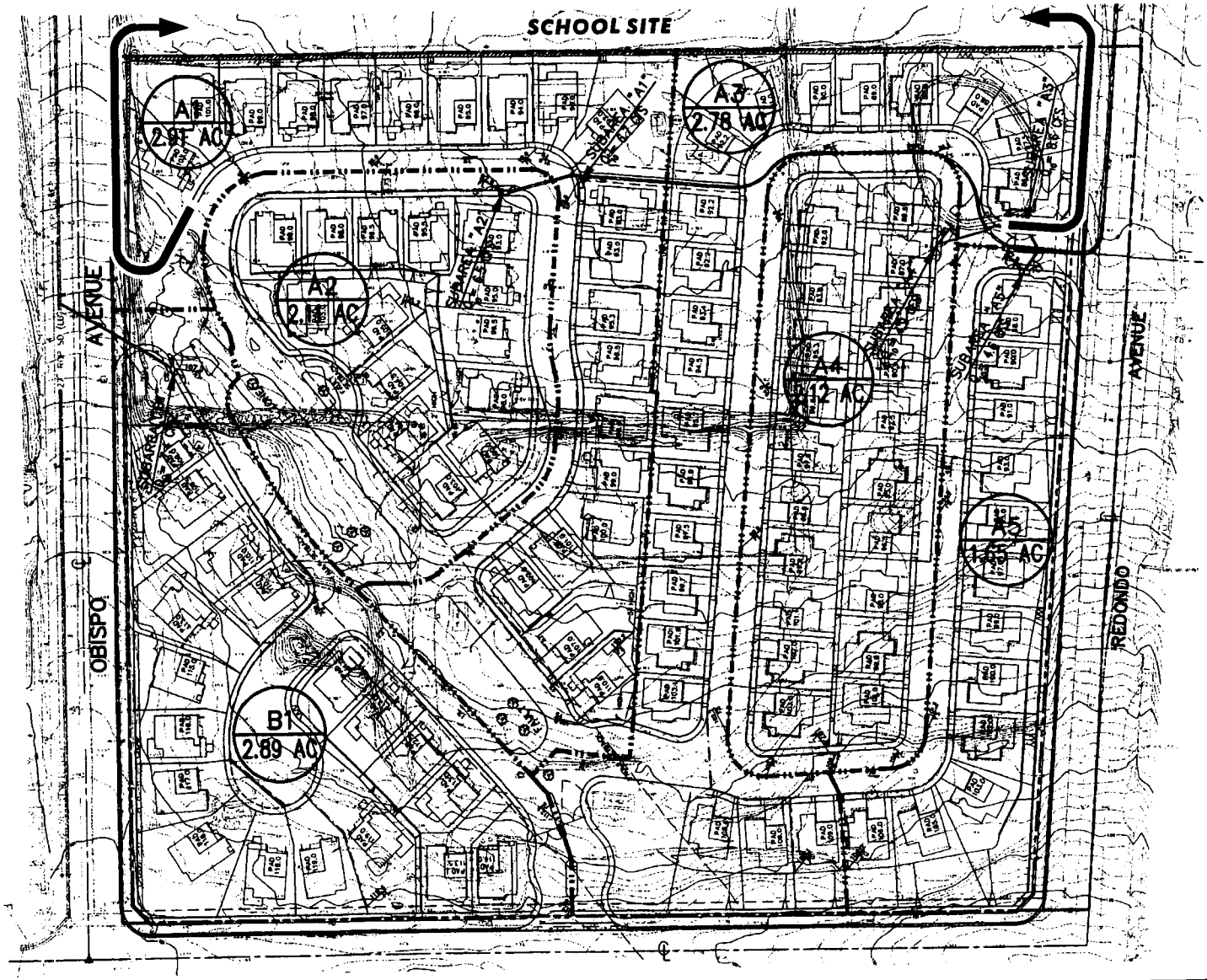

FIGURE 4.9.9

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Alamitos Ridge Residential Project EIR
School Access Plan

Table 4.9.E: Summary of Intersection Volume to Capacity Ratios, Delays, and Levels of Service A.M. and P.M. Peak Hours Alamitos Ridge Residential Project

No.	Intersection	Peak Hour	[1] Year 2002 Existing		[2] Year 2004 with Ambient Growth		[3] Year 2004 with Related Projects		[4] Year 2004 with Project		Change in V/C or Delay[1] [(4)-(3)]	Significant Impact
			V/C or Delay[1]	LOS	V/C or Delay[1]	LOS	V/C or Delay[1]	LOS	V/C or Delay[1]	LOS		
1	Obispo Avenue	AM	15.05 sec.	C	16.23 sec.	C	22.37 sec.	C	33.48 sec.	D	11.11 sec.	No
	and Hill Street[2,3]	PM	19.59 sec.	C	21.90 sec.	C	27.99 sec.	D	33.56 sec.	D	5.57 sec.	No
2	Obispo Avenue	AM	14.15 sec.	B	15.00 sec.	B	17.38 sec.	C	17.62 sec.	C	0.24 sec.	No
	and 20th Street[3]	PM	22.07 sec.	C	25.76 sec.	D	30.75 sec.	D	33.73 sec.	D	2.98 sec.	No

1 Average control delay.

2 Programmed for signalization by the City of Signal Hill.

3 Intersection Nos. 1, 2, and 5 are unsignalized intersections and therefore delay (in seconds) rather than v/c is calculated.

4 The delay calculated for these conditions exceeded the software control limits (i.e., there is a high delay on the minor 20th Street approach due to heavy traffic on Redondo Avenue).

5 Includes right turn only channelization on the west leg of the Redondo Avenue and 20th Street intersection.

No.	Intersection	Peak Hour	[1] Year 2002 Existing		[2] Year 2004 with Ambient Growth		[3] Year 2004 with Related Projects		[4] Year 2004 with Project		Change in V/C [(4)-(3)]	Significant Impact
			V/C or Delay[1]	LOS	V/C or Delay[1]	LOS	V/C or Delay[1]	LOS	V/C or Delay[1]	LOS		
3	Redondo Avenue	AM	0.654	B	0.676	B	0.683	B	0.686	B	0.003	No
	and Willow Street	PM	0.893	D	0.925	E	0.936	E	0.945	E	0.009	No
4	Redondo Avenue	AM	0.736	C	0.761	C	0.796	C	0.788	C	-0.008	No
	and Stearns Street	PM	0.857	D	0.887	D	0.901	E	0.882	D	-0.019	No
5	Redondo Avenue	AM	47.10 sec.	E	56.50 sec.[4]	F	69.70 sec.[4]	F	12.00 sec.[5]	B	-57.70 sec.	No
	and 20th Street[3]	PM	247.40 sec.[4]	F	323.20 sec.[4]	F	365.70 sec.[4]	F	16.30 sec.[5]	C	-349.40 sec.	No
6	Redondo Avenue	AM	0.823	D	0.852	D	0.885	D	0.888	D	0.003	No
	and Pacific Coast Highway	PM	0.896	D	0.928	E	0.940	E	0.945	E	0.005	No

Source: Linscott, Law, and Greenspan, December 2002

As required by the *2002 Congestion Management Program for Los Angeles County*, a review has been made of designated monitoring locations on the CMP highway system for potential impact analysis. There are no CMP arterial monitoring intersections or freeway monitoring locations in the vicinity of the proposed project. Furthermore, the proposed project will not add 50 or more trips during either the AM or PM weekday peak hours (of adjacent street traffic) at CMP monitoring intersections, or 150 or more trips (in either direction) during the AM or PM weekday peak hours at CMP mainline freeway monitoring locations. Accordingly, no CMP traffic impact assessment is required for the Alamitos Ridge Residential project.

Conclusions

Based on the above analysis of the proposed Alamitos Ridge Residential project, which includes the right-turn only channelization at the Redondo Avenue/20th Street intersection, the following is concluded:

1. A significant traffic impact is not expected to occur at any of the study intersections as a result of the proposed Alamitos Ridge Residential project.
2. The Redondo Avenue and 20th Street intersection (Study Intersection No. 5) will operate at LOS B during the AM peak hour and LOS C during the PM peak hour with the right-turn only channelization improvement to be provided in connection with the project. This is a major level of service and safety improvement over existing conditions.
3. The redistribution of street segment traffic as a result of the right-turn only channelization will not result in a project related impact.
4. The Obispo Avenue and Hill Street intersection (Study Intersection No. 1) is expected to operate at LOS D during the PM peak hour with the addition of project-related traffic. This intersection is currently stop-controlled and has been identified by the City of Signal Hill for signalization. This intersection will be improved using the Traffic Impact Fee monies collected by the City from this and other development projects.
5. The project parking supply will exceed the City of Long Beach Parking Code requirements of 239 parking spaces.

Mitigation

As required by the California Environmental Quality Act (CEQA), Section 15126(c), mitigation is required to be implemented to avoid or minimize the significant impacts noted in the EIR. Although the project will result in a significant traffic impact, mitigation is included to reduce overall traffic impacts. All on-site traffic circulation improvements are the responsibility of the developer. Depending on the project development schedule, issuance of building permits could push implementation of several of the roadway capacity improvements into the earliest development phase. As interpreted by the courts, EIR mitigation must be specified for each significant impact and assigned to a responsible party, or a discussion as to why mitigation is infeasible needs to be provided.

The funding of mitigation and the other non-fee supported roadway improvements are to be initiated concurrent with the start of development and must be implemented upon project completion. In most cases, the timing of improvements to enhance roadway capacity should be tied to performance criteria so that improvements are implemented prior to need, or timed such that level of service standards are maintained at LOS D or better. Because the project backbone improvements will be constructed in one phase, these improvements are required in the initial component of development and completed prior to the first occupancy permit.

Mitigation Measures

The following measures have been identified to reduce potentially significant traffic and circulation impacts.

9.1 Prior to issuance of any building permit, the applicant is required to provide on-site and off-site dedications and improvements, as required by the City of Long Beach. All improvements shall be noted on development plans and specifications and approved by the Director, City of Long Beach Department of Planning and Building. This requirement will reduce overall traffic impacts.

9.2 At the intersection of Redondo Avenue and 20th Street, the developer and the City shall work together to provide right turn only channelization for the Redondo Avenue and 20th Street intersection to restrict traffic to right-turn movements only to and from 20th Street, prior to issuance of an occupancy permit for the first unit.

9.3 Concurrent with issuance of the first building permit and only after developer payment of transportation improvement fees, the City of Long Beach, Public Works Director, shall have prepared and shall have begun implementing a roadway and intersection improvement program to implement Mitigation Measures 9.1 and 9.2. The roadway and intersection improvements shall include a listing of improvements to be completed. Such improvements shall be fully implemented pursuant to development such that significant impacts are thereby avoided or mitigated below a level of significance at the time of completion of the project, or shall be substantially complete prior to issuance of occupancy permits.

4.9.4 CUMULATIVE IMPACTS

The project traffic analysis included in Section 4.9.3 analyzed the cumulative traffic impacts associated with implementation of the proposed project, in conjunction with build out of the City's General Plan and regional growth in traffic, for the year 2004. The results of this cumulative assessment of traffic volume growth demonstrate that the proposed project's cumulative traffic/circulation impacts are below a level of significance and do not require mitigation.

4.9.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Traffic and circulation related impacts are below a level of significance.

4.10 AIR QUALITY

4.10.1 EXISTING ENVIRONMENTAL SETTING

Regional Air Quality

The project site is located within the South Coast Air Basin (Basin) that includes Orange County and the nondesert portions of Los Angeles, Riverside, and San Bernardino counties. Air quality in the Basin is regulated by the SCAQMD, a regional agency that regulates stationary sources of pollution in the Basin. Emission standards for motor vehicles are regulated by the California Air Resources Board (CARB). In addition, the SCAQMD has authority under the California Clean Air Act to manage transportation activities at indirect source locations. Indirect sources are facilities that do not have equipment that directly emits substantial amounts of pollution, but that attract large numbers of mobile sources of pollution.

Criteria pollutants are defined as those pollutants for which the federal and State governments have established ambient air quality standards, or criteria, for outdoor concentrations in order to protect public health. Both the State of California and federal governments have established health based Ambient Air Quality Standards (AAQS) for six criteria air pollutants: CO, ozone, nitrogen dioxide, sulfur dioxide, lead, and suspended particulate matter. Table 4.10.A shows both federal and State standards for these criteria pollutants. The Basin does not attain State and federal AAQS for three of the six criteria air pollutants. The Basin is in compliance with federal sulfur dioxide and lead standards, and is in maintenance status for nitrogen dioxide; however, CO, ozone, and particulate levels (PM_{10}) exceed the standards. The State AAQS are more stringent than the federal AAQS.

Climate and Meteorology

The Basin climate is determined by its terrain and geographical location. The Basin is a coastal plain with connecting broad valleys and low hills. The Pacific Ocean forms the southwestern border, and high mountains surround the rest of the Basin. The region lies in the semipermanent high pressure zone of the eastern Pacific. The resulting climate is mild and tempered by cool ocean breezes. This climatological pattern is rarely interrupted. However, periods of extremely hot weather, winter storms, or Santa Ana wind conditions do exist.

The annual average temperature varies little throughout the Basin, ranging from the low to middle 60s, measured in degrees Fahrenheit. With a more pronounced oceanic influence, coastal areas show less variability in annual minimum and maximum temperatures than inland areas. The climatological station nearest to the site that monitors temperature is the Long Beach WSCMO station (LBS).[1] The LBS monitored monthly average temperatures ranging from 56.2°F to 74.6°F for the last 40 years, with an annual average of 58.5°F. January is typically the coldest month in this area of the Basin.

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[1] Western Regional Climatic Center, June, 2000.

Table 4.10.A: Ambient Air Quality Standards

Pollutant	Averaging Time	STATE	FEDERAL	
		Concentration	Primary	Secondary
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m³)	0.12 ppm (235 µg/m³)	Same as Primary Std.
Nitrogen Dioxide (NO_2)	Annual Average	-	0.053 ppm (100 µg/m³)	Same as Primary Std.
	1 Hour	0.25 ppm (470 µg/m³)	-	
Carbon Monoxide (CO)	8 Hour	9 ppm (10 mg/m³)	9 ppm (10 mg/m³)	
	1 Hour	20 ppm (23 mg/m³)	35 ppm (40 mg/m³)	
Suspended Particulate Matter (PM_{10})	Annual Geometric Mean	30 µg/m³	-	
	24 Hour	50 µg/m³	150 µg/m³	Same as Primary Std.
	Annual Arithmetic Mean	-	50 µg/m³	
Sulfur Dioxide (SO_2)	Annual Average	-	80 µg/m³ (0.03 ppm)	-
	24 Hour	0.04 ppm (105 µg/m³)	365 µg/m³ (0.14 ppm)	-
	3 Hour	-	-	1,300 µg/m³ (0.5 ppm)
	1 Hour	0.25 ppm (655 µg/m³)	-	-
Lead	30 Day Average	1.5 µg/m³	-	-
	Calendar Quarter	-	1.5 µg/m³	Same as Primary Std.
Sulfates	24 Hour	25 µg/m³	-	-
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m³)	-	-
Vinyl Chloride (chloroethene)	2 Hour	0.010 ppm (26 µg/m³)	-	-
Visibility Reducing Particles	8 Hour (10 am-6 pm PST)	*	-	-

Notes: ppm = parts per million
mg/m³ = milligrams per cubic meter
µg/m³ = micrograms per cubic meter

* In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent. Measurement in accordance with CARB Method V.

Source: California Air Resources Board (CARB), 1992.

The majority of annual rainfall in the Basin occurs between October and March. Summer rainfall is minimal, and is generally limited to scattered thundershowers in coastal regions and slightly heavier showers in the eastern portion of the Basin and along the coastal side of the mountains. The climatological station nearest to the site that monitors precipitation is the LBS. Rainfall measured at the LBS for the last 40 years varied from 2.79 inches in January to 0.74 inch or less between April and October, with an annual total of 12.33 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuation in the weather.

Even though the Basin has a semi-arid climate, air near the surface is generally moist because of the presence of a shallow marine layer. With very low average wind speeds, there is a limited capacity to disperse air contaminants horizontally. The dominant daily wind pattern is an onshore 8 to 12 miles per hour (mph) daytime breeze and an offshore 3 to 5 mph nighttime breeze. The typical wind flow pattern fluctuates only with occasional winter storms or strong northeasterly Santa Ana winds from the mountains and deserts north of the Basin. Summer wind flow patterns represent worst case conditions, as this is the period of higher temperatures and more sunlight, which results in ozone formation.

During spring and early summer, pollution produced during any one day is typically blown out of the Basin through mountain passes or lifted by warm, vertical currents adjacent to mountain slopes. Air contaminants can be transported 60 miles or more from the Basin by ocean air during the afternoons. From early fall to winter, the transport is less pronounced because of slower average wind speed and the appearance of drainage winds earlier in the day. During stagnant wind conditions, offshore drainage winds may begin by late afternoon. Pollutants remaining in the Basin are trapped and begin to accumulate during the night and the following morning. A low morning wind speed in pollutant source areas is an important indicator of air stagnation and the build-up potential for primary air contaminants.

The vertical dispersion of air pollutants in the Basin is limited by temperature inversions in the atmosphere close to the earth's surface. Temperature normally decreases with altitude, and a reversal of this atmospheric state, where temperature increases with altitude, is called an inversion. The height from the earth to the inversion base is known as the mixing height.

Inversions are generally lower in the nighttime, when the ground is cool, than during the daylight hours, when the sun warms the ground and, in turn, the surface air layer. As this heating process continues, the temperature of the surface air layer approaches the temperature of the inversion base, causing heating along its lower edge. If enough warming takes place, the inversion layer becomes weak and opens up to allow the surface air layers to mix upward. This can be seen in the middle to late afternoon on a hot summer day when the smog appears to clear up suddenly. Winter inversions typically break earlier in the day, preventing excessive contaminant build-up.

The combination of stagnant wind conditions and low inversions produces the greatest pollutant concentrations. On days of no inversion or high wind speeds, ambient air pollutant concentrations are lowest. During periods of low inversions and low wind speeds, air pollutants generated in urbanized areas are transported predominantly onshore into Riverside and San Bernardino counties. In the winter, the greatest pollution problems are CO and oxides of nitrogen because of extremely low inversions and air stagnation during the night and early morning hours. In the summer, the

longer daylight hours and the brighter sunshine combine to cause a reaction between hydrocarbons and oxides of nitrogen to form photochemical smog.

Air Pollution Constituents

Both the State of California and the federal government have established health based AAQS for six air pollutants. As shown in Table 4.10.A, these pollutants include ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter (PM_{10}), and lead. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to primary and secondary AAQS, the State of California has established a set of episode criteria for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matter. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three.

Ozone

Ozone (smog) is formed by photochemical reactions between oxides of nitrogen and reactive organic gases rather than being directly emitted. Ozone is a pungent, colorless gas typical of Southern California smog. Elevated ozone concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, elderly, and young children. Ozone levels peak during the summer and early fall months.

Carbon Monoxide

Carbon monoxide (CO) is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions. CO passes through the lungs into the bloodstream, where it interferes with the transfer of oxygen to body tissues.

Nitrogen Oxides

Nitrogen oxides contribute to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition. Nitrogen dioxide (NO_2), a reddish-brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NO_X. NO_X is a primary component of the photochemical smog reaction. NO_2 decreases lung function and may reduce resistance to infection.

Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels in the Basin. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight.

Reactive Organic Compounds

Reactive Organic Compounds (ROC) are formed from combustion of fuels and evaporation of organic solvents. ROC is a prime component of the photochemical smog reaction. Consequently, ROC accumulates in the atmosphere much more quickly during the winter, when sunlight is limited and photochemical reactions are slower.

Particulate Matter

Particulate matter (PM_{10}) refers to small suspended particulate matter with an aerodynamic diameter of ten microns or less that is not readily filtered out by the lungs. Nitrates, sulfates, and dust particulates are major components of PM_{10}. These small particles can be directly emitted into the atmosphere as by-products of fuel combustion, through abrasion, such as tire or brake lining wear, or through fugitive dust (wind or mechanical erosion of soil). They can also be formed in the atmosphere through chemical reactions. Particulates may transport carcinogens and other toxic compounds that adhere to the particle surfaces, and can enter the human body through the lungs.

Local Air Quality

The SCAQMD maintains ambient air quality monitoring stations throughout the Basin, as shown in Figure 4.10.1. The air quality monitoring station closest to the project site is the North Long Beach station. The North Long Beach air quality monitoring station monitors the following criteria pollutants: CO, ozone, NO_2, and PM_{10}. Air quality trends identified from data collected at the North Long Beach air quality monitoring station from 1995 to 1999 are discussed below. As shown in Table 4.10.B, CO levels monitored for this period are below the relevant State and federal standards.

CO and NO_2 have not violated the federal or the State standards within the last five years. Ozone levels violated the State standard every year for the last five years, and the federal standard was violated only once in the last five years. Ozone violated the State one hour standard ranging from one to five days a year during this period and violated the federal one hour standard once in 1999. The PM_{10} level in the North Long Beach area violated the State standard every year during the five year period, but did not violate the federal standard during the same period. PM_{10} levels violated the State standard from 6 to 11 days each year for the last five years.

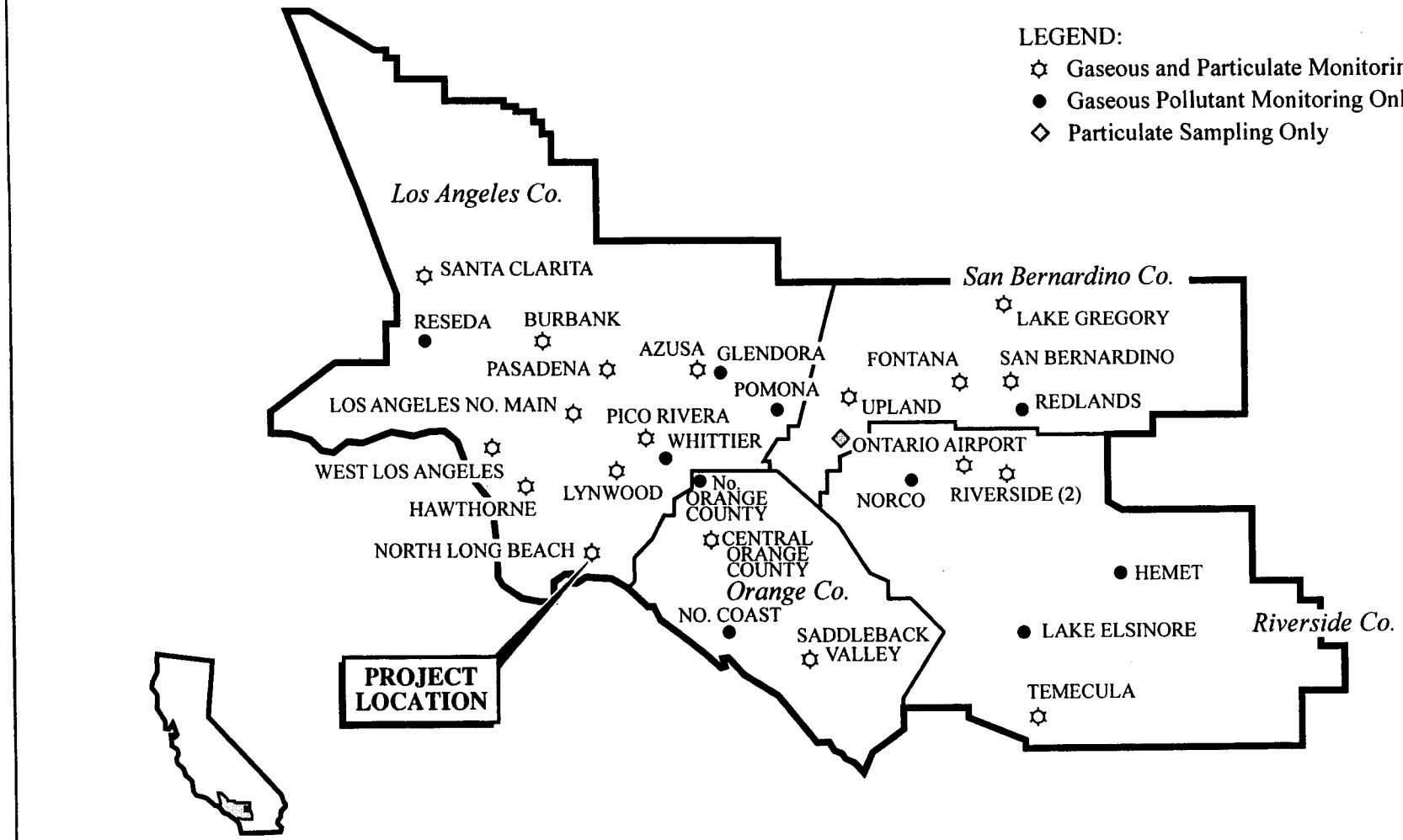

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FIGURE 4.

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MILES

Alamitos Ridge Residential Proj

SCAQMD Air Monitoring Ne
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Table 4.10.B: Ambient Air Quality at the North Long Beach Air Monitoring Station

	Carbon Monoxide				Ozone		PM_{10}		Nitrogen Dioxide	
	Maximum 1 Hour Conc. (ppm)	No. of Days Exceeded	Maximum 8 Hour Conc. (ppm)	No. of Days Exceeded	Maximum 1 Hour Conc. (ppm)	No. of Days Exceeded	Maximum 24 Hour Conc. (Ug/m^3)	No. of Days Exceeded	Maximum 1 Hour Conc. (ppm)	No. of Days Exceeded
State Stds.	> 20 ppm/1 Hour		≥ 9.1 ppm/8 Hour		> .09 ppm/1 Hour		> 50 ug/m^3, 24 hour		> .25 ppm/1 Hour	
1999	7.5	0	5.5	0	0.131	3	77	10	0.151	0
1998	8.1	0	6.5	0	0.116	2	69	6	0.160	0
1997	9.0	0	6.6	0	0.095	1	87	10	0.200	0
1996	9.7	0	6.8	0	0.112	5	113	7	0.168	0
1995	9.1	0	6.8	0	0.112	3	146	11	0.208	0
Maximum	**9.7**		**6.8**		**0.131**		**146**		**0.208**	
Federal Stds.	> 35 ppm/1 Hour		≥ 9.5 ppm/8 Hour		> .12 ppm/1 Hour		> 150 ug/m^3, 24 hour		0.053 ppm, annual average	
1999	7.5	0	5.5	0	0.131	1	77	0	0.034	0
1998	8.1	0	6.5	0	0.116	0	69	0	0.034	0
1997	9.0	0	6.6	0	0.095	0	87	0	0.033	0
1996	9.7	0	6.8	0	0.112	0	113	0	Nd[1]	0
1995	9.1	0	6.8	0	0.112	0	146	0	0.037	0
Maximum	**9.7**		**6.8**		**0.131**		**146**		**0.037**	

Source: SCAQMD Air Quality Data, 1995 to 1999.

[1] No data available.

Regional Air Quality Planning Efforts

The 1976 Lewis Air Quality Management Act established the SCAQMD and other air districts throughout the State. The Federal Clean Air Act Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the federal standards in nonattainment areas of the state.

The California Air Resources Board (CARB) coordinates and oversees both State and federal air pollution control programs in California. The CARB oversees activities of local air quality management agencies, and is responsible for incorporating air quality management plans for local air basins into a State Implementation Plan (SIP) for federal Environmental Protection Agency (EPA) approval. CARB maintains air quality monitoring stations throughout the State in conjunction with local air districts. Data collected at these stations are used by the CARB to classify air basins as "attainment" or "nonattainment" with respect to each pollutant and to monitor progress in attaining air quality standards.

The SCAQMD and Southern California Association of Governments (SCAG) are responsible for formulating and implementing the Air Quality Management Plan (AQMP) for the Basin. Regional AQMPs were adopted for the Basin for 1979, 1982, 1989, 1991, 1994, and 1997. The SCAQMD's effort to update the AQMP is delayed by the CARB's delay in the emission model EMFAC2000 and related control strategy plan. The SCAQMD expects to begin efforts to update its comprehensive AQMP in spring 2001.

Compliance with the provisions of the federal Clean Air Act and California Clean Air Act is the primary focus of the AQMP developed by SCAQMD and SCAG. The most current adopted AQMP, the 1997 AQMP, was prepared pursuant to federal and State clean air legislation, and addressed 1990 Clean Air Act (CAA) requirements with respect to particulate matter standards. Under the CAA, the AQMP must demonstrate attainment of PM_{10} standards by 2006 for both 24 hour and annual average ambient air quality standards. The 1997 AQMP responded to this requirement, relying mostly on the control measures outlined in the 1994 AQMP.

The 1997 AQMP carried forth the approach and key elements in the 1994 AQMP by focusing on market based strategies and incentives versus command and control regulations. New elements to the 1997 Plan included: 1) improved emission inventory and current air quality information; 2) refined control strategy, which allows for alternative approaches; 3) elimination of future indirect source measures; 4) amendments to the federal post-1996 Rate of Progress Plan and Federal Attainment Plans for ozone and CO; 5) a maintenance plan for NO_X; and 6) an attainment demonstration and SIP revision for PM_{10}.

Implementation of the AQMP is based on a series of control measures that vary by source type, such as stationary or mobile, as well as by the pollutant targeted. Similar to the 1994 AQMP, the Plan proposed two tiers of control measures, based on the availability and readiness of technology. Short-term and immediate term measures relied on known technologies, and were expected to be implemented between 1997 and 2005. Long-term measures rely on the advancement of technologies and control methods that can be reasonably expected to occur between 2000 and 2010.

The SCAQMD governing Board approved the 1997 AQMP on November 15, 1996. After approval, the AQMP was submitted to the California Air Resources Board (CARB) for their review and approval. CARB approved the ozone and PM_{10} portions of the 1997 AQMP on January 23, 1997, and submitted the plan to U.S. EPA as proposed revisions to the SIP. The EPA rejected the District's revision of its 1997 AQMP. The rejection, however, covered only the provisions of the AQMP designed to attain the federal ozone standard. As a result of the rejection, SCAQMD prepared a draft amendment in October, 1999, that was later approved by the EPA.

4.10.2 IMPACT SIGNIFICANCE CRITERIA

A project would normally be considered to have a significant effect on air quality if the project would violate any ambient air quality standards, contribute substantially to an existing air quality violation, expose sensitive receptors to substantial pollutants concentrations, or conflict with adopted environmental plans and goals of the community where it is located.

Specific criteria for determining whether the air quality impacts from a project are significant are set forth in the SCAQMD's *CEQA Air Quality Handbook*. The criteria include emissions thresholds, compliance with State and national air quality standards, and consistency with the current AQMP.

Thresholds for Construction Emissions

The following significance thresholds for construction emissions have been established by the SCAQMD:

- 2.5 tons per quarter or 75 pounds per day of ROC
- 2.5 tons per quarter or 100 pounds per day of NO_X
- 24.75 tons per quarter or 550 pounds per day of CO
- 6.75 tons per quarter or 150 pounds per day of PM_{10}
- 6.75 tons per quarter or 150 pounds per day of SO_X.

Projects in the Basin with construction related emissions that exceed any of the emission thresholds above are considered significant by the SCAQMD.

Thresholds for Operational Emissions

The daily operational emissions significance thresholds are as follows:

Regional Emissions Thresholds.

- 55 pounds per day of ROC
- 55 pounds per day of NO_X
- 550 pounds per day of CO
- 150 pounds per day of PM_{10}

- 150 pounds per day of SO_X.

Projects in the Basin with operational related emissions that exceed any of the above emission thresholds are considered significant by the SCAQMD.

Local Emission Standards.

- California State one hour CO standard of 20.0 ppm
- California State eight hour CO standard of 9.0 ppm

The significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. If ambient levels are below the standards, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or federal standard, project emissions are considered significant if they increase one hour CO concentrations by 1.0 ppm or more or eight hour CO concentrations by 0.45 ppm or more.

4.10.3 IMPACTS

This section addresses three areas of air quality impacts: 1) impacts associated with grading and construction, 2) human health risks during remediation of on-site contaminated soil, and 3) long-term regional air quality impacts from occupancy of the project (primarily related to air emissions from resident vehicle trips.

The human health risk assessment for site remediation addresses the health risk to off-site receptors. The analysis in this EIR is excerpted from the Human Health Risk Assessment in Appendix J, completed by Environ International Corporation, 2002.

Short-Term Construction Related Equipment, Vehicle, Earth Moving, and Construction Activity Impacts

Short-term construction related air quality impacts may occur during site preparation, including grading and equipment exhaust. Major sources of emissions during this phase include exhaust emissions from construction vehicles and equipment, fugitive dust generated as a result of construction vehicles and equipment traveling over exposed surfaces, and soil disturbances by grading and filling. NO_X and PM_{10} emission standards will be exceeded on a daily basis during peak construction days, causing a significant impact on the environment.

Construction activities would result in combustion emissions from general utility vehicle engines, on-site heavy-duty construction and earth moving vehicles, equipment hauling materials to and from the site, and motor vehicles transporting the construction crew. Exhaust emissions associated with the construction activities envisioned on site would vary daily as construction activity levels change.

Grading and Construction Emissions

Peak grading and construction emissions would exceed the South Coast Air Quality Management District daily thresholds for the criteria pollutants of NO_X and PM_{10}, which is 100 pounds per day and 150 pounds per day, respectively. This is a significant impact. Emissions of other criteria pollutants would be below the standards.

From the early 1900s to present, the project site was an active oil field and support area for the reclamation of oil. Review of an environmental site assessment document, *Health Risk Assessment for the Alamitos Land Company by Environ, Corp., September 1996*, revealed that the site is contaminated with petroleum hydrocarbons at various locations. For the purpose of this air quality analysis, it is assumed that all contaminants have been excavated and removed from the project site in accordance with all applicable regulatory requirements. In addition, soil certified as clean has been imported to backfill the project site to the original grade. Grading and construction activities would cause combustion emissions from electrical generating engines, heavy-duty construction vehicles, haul trucks, and vehicles transporting the construction crew. Exhaust emissions during grading and construction activities envisioned on-site would vary daily as construction activity levels change. It is assumed that construction or building erection would not begin until after mass grading on the project site is completed. Therefore, there would be no overlap in emissions from grading or building erection/construction. It is anticipated that peak grading days would generate larger amount of air pollutants than during peak construction building erection days. Therefore, assessing daily emissions during peak grading days, as is done in this analysis, would result in the worst case scenario analysis. The following assesses peak emissions during grading of the project site.

Based on the methodology outlined in the SCAQMD *CEQA Air Quality Handbook*, and analysis of similar projects, construction emissions associated with grading of the proposed project have been estimated and are shown in Table 4.10.C.

Fugitive dust emissions are generally associated with demolition, land clearing, soil exposure, vehicle and equipment travel on unpaved roads, and dirt/debris pushing. Dust generated during construction activities would vary substantially depending on the level of activity, operations, and weather conditions. Nearby sensitive receptors and workers may be exposed to blowing dust, depending upon wind conditions.

The SCAQMD estimates that each acre of graded surface creates about 26.4 pounds of PM_{10} per workday during the construction phase of the project and 21.8 pounds of PM_{10} per hour per dozer from dirt/debris pushing. The project area is approximately 10.15 acres and it is not expected that the entire project site would be graded or disturbed at the same time. A reasonable assumption is that up to a maximum of five acres of land would be under grading on any one day. It is also assumed that two dozers would be used up to eight hours a day each. Based upon the above assumptions, approximately 496 pounds of PM_{10} per day would be generated from soil disturbance without mitigation during peak construction phase. This level of dust emission would exceed the SCAQMD threshold of 150 pounds per day.

Table 4.10.C: Peak Grading Day Construction Emissions

Number and Equipment Type[1]	Hours of Operation	Pollutants (pounds/day) CO	ROG	NO_X	SO_X	PM_{10}
3 - Scrapers	8	30.0	6.48	92.16	11.04	9.84
1 - Motor Grader	8	1.21	0.31	5.70	0.69	0.49
2 - Tracked Tractors	8	5.6	1.92	20.16	2.24	1.79
1 - Wheeled Tractor	8	28.64	1.44	10.16	0.72	1.12
1 - Water Truck	8	5.4	1.2	13.6	1.14	1.12
Worker Commute Exhaust[2]		6.4	1.2	2.1	0.4	0.7
Subtotal Exhaust Emissions		**77.28**	**12.51**	**143.83**	**16.18**	**15.09**
Fugitive Dust Emissions						
Dirt/Debris Pushing[3]						348.8
Graded/Exposed Surface[4]						132.0
TOTAL GRADING ASSUMING NO MITIGATION		**77.28**	**12.51**	**143.83**	**16.18**	**495.89**
SCAQMD Threshold		**550**	**75**	**100**	**150**	**150**
Significant ?		**NO**	**NO**	**YES**	**NO**	**YES**

Note: [1] Emission factors from SCAQMD, *1993 CEQA Air Quality Handbook*, Tables A9-8-A and A9-9.
[2] Based on 25 miles each way commute length for 15 workers.
[3] Emissions by two dozers operating eight hours a day each.
[4] Emissions from five acres of graded/exposed surface.

Source: LSA Associates, Inc. 2000.

The project will be required to comply with regional rules, which would assist in reducing the short-term air pollutant emissions. SCAQMD Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 402 requires implementation of dust suppression techniques to prevent fugitive dust from substantially affecting off site areas. Implementation of these dust suppression techniques as required by the SCAQMD can reduce the fugitive dust generation (and thus the PM_{10} component) by 50 to 75 percent. Using a mitigating efficiency of 50 percent, suggested for use by SCAQMD and commonly used in EIRs in the SCAQMD, implementation of standard mitigation would reduce daily PM_{10} emissions from soil disturbance to approximately 241 pounds per day. Compliance with these rules would reduce impacts on nearby sensitive receptors.

On a peak grading day, the developer estimates that a total of 15 workers would be working on the project site. Assuming an average 25 miles each way commute length for every worker, emissions from the daily 750 miles travel by worker commute would generate approximately 6.4 pounds per day (ppd) of CO, 1.2 ppd of ROC, 2.1 ppd of NO_X, 0.4 ppd of SO_X, and 0.7 ppd of PM_{10} from vehicle exhaust and tire wear.

As shown in Table 4.10.C, peak grading day construction equipment emissions would exceed the SCAQMD daily thresholds for the criteria pollutant of NO_X and PM_{10}. As demonstrated in Table 4.10.C, emissions of other criteria pollutants would be below the standards.

Building erection or construction would have different types of equipment being used on the project site. Similarities do exist in terms of equipment exhaust emissions and fugitive dust emissions. Due to the nature of construction equipment being small (tools, welders, air compressors, and specialized equipment) versus the heavy earth moving equipment used during grading, it is anticipated that emissions during building erection phase would be below peak grading day emissions. Therefore, mitigation implemented for the peak grading day emissions would be adequate to reduce emissions during the building erection phase.

Application of architectural coatings would emit VOCs that are part of the ozone precursors. Due to insufficient information at this time for the proposed land uses, the VOC emissions associated with architectural coatings are not calculated. Emissions associated with architectural coating can be reduced by using precoated/natural colored building materials, water-based or low-VOC coating, and using coating transfer or spray equipment with high transfer efficiency. Furthermore, SCAQMD Rule 1113, Architectural Coating, restricts the amount of VOC allowed in architectural coating to control VOC emission in the Basin; therefore, the combination of low VOC architectural coating and use of high transfer efficiency coating equipment would reduce this potential impact to less than significant.

4.10.4 HUMAN HEALTH RISK FOR REMEDIAL ACTIVITIES

Methods of Analysis

ENVIRON International Corporation prepared a human health risk assessment (HHRA) to evaluate risks to nearest off-site receptors from potential exposures associated with proposed remedial

activities at the Alamitos Ridge Property (the "Site") in Long Beach, California. The remedial action scenarios evaluated in the risk assessment were developed based on information obtained from the Remedial Action Plan (RAP) for the Alamitos Ridge property and Brycon, LLC. The proposed remedial activity evaluated in the risk assessment was excavation and soil removal at exploratory trench (ET)-3 and ET-13. These activities can generate dusts and vapors resulting in chemical transport to off-site locations.

The methods used to conduct the remedial action risk assessment were consistent with guidance for human health risk assessments from the California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) (Cal/EPA 1994) and the U.S. Environmental Protection Agency (USEPA) (1989). The Cal/EPA and USEPA framework includes four basis elements: (1) data evaluation and identification of chemicals of potential concern (COPCs), (2) exposure assessment, (3) toxicity assessment, and (4) risk characterization. The methods for completing each of the four steps and the risk assessment results are summarized in the following sections. The complete HHRA for off-site receptors is documented in Appendix J of this report. An overview of risk assessment methods is presented in Appendix A, which documents the risk assessment for on-site residents. References are provided in Appendix J.

Data Evaluation and Identification of Chemicals of Potential Concern

This step of the risk assessment involves gathering and analyzing site-specific analytical data relevant to the risk assessment and identifying COPCs for evaluation in the risk assessment. Separate data sets and COPCs were identified for the two areas (ET-3 and ET-13) proposed for remediation. Environmental data obtained from the sampling conducted by Gradient Engineers (1998 and 1999) were used to identify the COPCs.

The analytical results for a surface soil sample collected from ET-3 were used to identify COPCs for this location. All BTEX constituents, polycyclic aromatic hydrocarbons, and metals detected in this sample were considered COPCs for this assessment and are listed in Table 2 of Appendix J.

Analytical data for a subsurface soil sample collected at 6 feet below ground surface (bgs) in ET-13 were used to identify COPCs for this location. All BTEX constituents and metals detected in this sample were considered COPCs and are listed in Table 3 of Appendix J.

Exposure Assessment

The exposure assessment identifies the potentially exposed populations (receptors), exposure assumptions for these receptors, and the pathways by which the receptors are potentially exposed to chemicals at the Site. Additional components of an exposure assessment include estimation of exposure point concentrations and chemical intakes.

Potentially Exposed Populations and Exposure Pathways. Based on human activity and land-use patterns in the vicinity of the Site, the off-site populations evaluated were residents (adults and children), construction workers, and elementary school children. The closest existing residence was

identified as the location for the residential receptor. Browning School (kindergarten through 8th grade), which is being constructed along the northern boundary of the Site, is scheduled to open in 2004. Workers involved in construction activities at the school site were identified as off-site receptors. Although unlikely, it is possible that planned remediation at the Site could be delayed until construction of the school has been completed. For this reason, risks to elementary school students were also evaluated.

The exposure pathway evaluated for the off-site resident, construction worker, and elementary school student was inhalation exposure to airborne dusts and vapors generated during remediation activities. Exposures to COPCs via other pathways (i.e., soil ingestion and dermal contact with soil) were not evaluated because direct contact with Site soils is not expected for off-site receptors.

Exposure Point Concentrations. Exposure point concentrations are representative concentrations of COPCs that are used in the risk assessment to evaluate potential exposures (or intakes). To evaluate the inhalation pathway, air concentrations of dusts and vapors at the nearest residence and Browning School property boundary resulting from the proposed remedial activities at ET-3 and ET-13 were modeled in the risk assessment. Figure 1 (Appendix J) shows the locations of ET-3 and ET-13 relative to the school boundary and nearest residence. Separate approaches were used to model the concentrations of metal COPCs as dusts and concentrations of volatile COPCs as vapors, as described in detail in Section 3.2.3 of Appendix J. Table 4 (Appendix J) presents the off-site air concentrations resulting from remedial activities at ET-3 and ET-13.

Population-Specific Exposure Assumptions and Chemical Intakes. The chemical intake (or dose) for the off-site receptors was estimated using standard exposure assumptions and intake equations from the Cal/EPA (1994) and the USEPA (1989). The intake equation for the inhalation pathway is shown in Section 3.2.4 of Appendix J and the values for the individual exposure assumptions for each population that were used to calculate the population-specific chemical intakes are presented in Table 7. For this risk assessment, all off-site receptors were assumed to be exposed to remediation-related chemicals for one eight-hour day, the anticipated duration of excavation and removal activities at the Site.

Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure to a chemical and potential adverse health effects. More specifically, the toxicity assessment identifies toxicity values that can be used to estimate the likelihood of adverse effects occurring in humans at different exposure levels.

For this human health risk assessment, chronic effects (that is, carcinogenic risks and chronic noncarcinogenic hazards) associated with off-site exposures to remedial activities were evaluated. However, chronic exposures refer to exposure periods of greater than 7 years (USEPA 1989). Because it is expected that the proposed remedial action activities will be performed in one eight-hour day, chronic exposures would not be expected to occur in association with remedial activities.

However, the potential for chronic effects was evaluated for completeness. Acute effects were also evaluated using available acute reference exposure levels (RELs). The hierarchy of sources for the chronic and acute toxicity values used for this analysis corresponds to the State's guidelines, as described in Section 3.3 of Appendix J. The acute and chronic toxicity values are presented in Table 8 of Appendix J.

Risk Characterization

Risk characterization combines the results of the exposure assessment and toxicity assessment to characterize the potential for adverse health effects to occur as a result of site-specific exposures. Two effects were characterized in the risk assessment: cancer risks and the potential for noncancer effects other than cancer. The hazard index is used as a measure of the potential for adverse health effects other than cancer. In addition to evaluating the potential for chronic health effects, the potential for acute effects was evaluated by comparing maximum one-hour concentrations with the acute RELs, as recommended by Cal/EPA (2000).

The National Contingency Plan (NCP) (40 CFR §300) is commonly cited as the basis for target risk levels. According to the NCP, lifetime incremental cancer risks posed by a site should not exceed one in a million (1×10^{-6}) to one hundred in a million (1×10^{-4}), and noncarcinogenic chemicals should not be present at levels expected to cause adverse health effects (i.e., a hazard index greater than 1). As a risk management policy, the Cal/EPA generally requires risks to be closer to the 1×10^{-6} end of the target risk range, with most approved remediations achieving incremental risk levels of ten in a million (1×10^{-5}) or lower. For noncancer health hazards, a target hazard index of 1 is identified. Individual chemical exposures that yield hazard indices of 1 or less are not expected to result in adverse noncancer health effects (USEPA 1989).

Chronic Risk Evaluation for the Nearest Off-Site Resident. The cumulative cancer risk for the off-site resident associated with remediation activities to be conducted at the Site (i.e., excavation) is 2×10^{-7}, which is below the lower end of the target risk range (i.e., 1×10^{-6} to 1×10^{-4}). The cumulative chronic noncancer hazard index of 0.01 for the off-site resident is below 1, indicating that adverse noncarcinogenic health effects are not likely to occur. Table 9 of Appendix J presents the chronic cancer risks and noncarcinogenic hazard indices for the nearest off-site resident.

Chronic Risk Evaluation for the Elementary School Student. The cumulative cancer risks for the off-site student and construction worker associated with remediation activities to be conducted at the Site (i.e., excavation) are 2×10^{-7} and 9×10^{-8}, respectively, which are below the lower end of the target risk range. The cumulative noncancer hazard indices for the off-site student and off-site construction worker are both below 1 (hazard indices of 0.01 and 0.005, respectively), indicating that adverse noncarcinogenic health effects are not likely to occur. Table 10 (Appendix J) presents the chronic cancer risks and noncarcinogenic hazard indices for the off-site receptors at the Browning School property.

Acute Risk Evaluation for All Off-Site Receptors. The cumulative acute noncancer hazard indices for off-site receptors at the nearest residence (0.07) and Browning School (0.07) are well below 1, indicating that acute noncarcinogenic health effects are not likely to occur. Table 11 of Appendix J presents the acute noncancer hazard indices for both receptors.

Removal Action to Address Lead Contamination at the Site. As discussed in the human health risk assessment (Appendix A), concentrations of lead did not exceed the Cal-modified residential preliminary remediation goal (PRG) of 150 mg/kg for this metal in any samples collected by Gradient Environmental (1989 and 1999). However, undocumented historical information regarding the site indicates that lead may have been detected at a concentration of approximately 700 mg/kg in one surface soil (6 inches) sample collected within the former pipe laydown area for Signal Hill East Unit 61(Environ 2002). Documented analytical data are not available for this sample and subsequent samples collected in the vicinity of this sample did not report lead above the residential soil PRG (Environ 2002). For these reasons, this sample was not evaluated in the on-site HHRA (Appendix A). A limited removal action is planned to address lead at this location. Based on other sampling conducted in the area, the extent of lead contamination is expected to be very limited and is likely related to historical use of joint sealing material ("pipe dope") rather than petroleum contamination. Sampling and analysis for lead will be conducted at the time of the removal to confirm the limited extent of the lead contamination.

Long-Term Regional Air Quality Impacts

Long-term air emission impacts are those associated with any change in permanent usage of a project site that produces emissions on an ongoing basis after construction, including stationary sources and mobile sources. Stationary emission sources include on-site natural gas usage and off-site emissions associated with the electrical consumption. Mobile source emissions result from vehicle trips associated with the proposed project.

Stationary Sources

The long-term occupancy of the proposed development of the residential dwelling units would consume natural gas and electricity. On-site stationary sources (i.e., energy consumption) emissions would be below the emission thresholds for all criteria pollutants established by the South Coast Air Quality Management District.

The proposed residential use would consume natural gas and electricity. LSA Associates, Inc. calculated stationary source pollutant emissions for the proposed project based on Table A9-11, Emissions from Electricity Consumption by Land Use, in SCAQMD *CEQA Air Quality Handbook*, and natural gas consumption calculated by the URBEMIS7G model. The results of these calculations indicate that the proposed project would generate pollutant emissions as shown in Table 4.10.D.

Table 4.10.D shows that emissions from on-site stationary sources (i.e., energy consumption) would be below the emission thresholds established by the SCAQMD for all pollutants.

Mobile Sources

Vehicular trips associated with the proposed project would produce emissions that could potentially exceed the South Coast Air Quality Management District daily thresholds for the criteria pollutants. Vehicular emissions associated with the trips are analyzed below and are not anticipated to have a significant impact on air quality.

Table 4.10.D: Emissions by Energy Consumption (pounds/day)

Land Use	CO	ROC	NO_X	SO_X	PM_{10}
Electricity Usage	0.33	0.02	1.88	0.20	0.07
Natural Gas Usage	0.94	5.36	2.21	–[a]	0.00
Subtotal -	1.27	5.38	4.09	0.20	0.07
SCAQMD Threshold	**550.0**	**55.0**	**55.0**	**150.0**	**150.0**
Significant?	**No**	**No**	**No**	**No**	**No**

a - URBEMIS7G does not estimate SO_X emission.
Source: LSA Associates, Inc. 2000.

A total of 1,014 daily trips would be associated with the proposed project as reported in the traffic report (Linscott, Law & Greenspan, Engineers, March 1999). Using the latest URBEMIS7G (Urban Emissions Model) regional mobile emission model using the traffic data reported in the traffic report, pollutant emissions were calculated for the proposed development and are illustrated in Table 4.10.E. Table 4.10.E shows that emissions from project related mobile sources alone would not exceed the operational threshold for any of the criteria pollutant established by the SCAQMD.

Table 4.10.E: Regional Mobile Source Emissions (pounds/day)

Mobile Sources	CO[a]	ROC	NO_X	SO_X	PM_{10}
Single Family Housing	155.70	19.01	26.94	–[b]	8.39
Total -	155.70	19.01	26.94	–	8.39
SCAQMD Threshold	**550.0**	**55.0**	**55.0**	**150.0**	**150.0**
Significant?	**No**	**No**	**No**	**No**	**No**

Notes: [a] - Emissions calculated in winter time for worst case scenario.
[b] - URBEMIS7G does not estimate SO_X emission.

Source: LSA Associates, Inc. 2000.

Total Regional Emissions

Total emissions from long-term project operations for the proposed development are estimated to be 156.97 pounds per day (ppd) of CO, 24.39 ppd of ROC, 31.03 ppd of NO_X, 0.20 ppd of SO_X, and 8.46 ppd of PM_{10}. Project emissions will not exceed SCAQMD regional emission pollutant thresholds; therefore, the proposed project is considered to have less than significant long term air quality impact.

Long-Term Localized Projections

The increase in traffic volume resulting from the proposed development of the 106 residential dwelling units would result in an increase in carbon monoxide (CO) emissions. CO hot spot analyses were conducted for the future without project and future with project conditions. The implementation of the proposed project would not have significant contribution to ambient CO levels. The proposed project would not have a significant impact on local air quality.

The primary mobile source pollutant of local concern is CO. CO is a direct function of vehicle idling time and, thus, traffic flow conditions. CO transport is extremely limited; it disperses rapidly with distance from the source under normal meteorological conditions. However, under certain extreme meteorological conditions, CO concentrations proximate to a congested roadway or intersection may reach unhealthful levels affecting local sensitive receptors (residents, school children, the elderly, hospital patients, etc). Typically, high CO concentrations are associated with roadways or intersections operating at unacceptable levels of service or with extremely high traffic volumes. In areas with high ambient background CO concentration, modeling is recommended in determining a project's effect on local CO levels.

An assessment of project-related impacts on localized ambient air quality requires that future ambient air quality levels be projected. The proposed project would contribute to an increase in traffic volume at intersections and along roadway segments in the project vicinity, thereby causing a deterioration in the level of service (LOS) at adjacent intersections. The LOS deterioration has the potential to result in a carbon monoxide (CO) hot spot. Therefore, the future without project conditions and future with project conditions were analyzed to evaluate the project's contribution and whether a CO hot spot would occur.

Existing CO concentrations in the immediate project vicinity are not available. Ambient CO levels monitored at the North Long Beach air monitoring station, the closest station with monitored CO data, showed a highest recorded one-hour concentration of 9.7 ppm (state standard is 20 ppm) and a highest eight-hour concentration of 6.8 ppm (state standard is 9 ppm) during the past five years (see Table 4.10.A).

The highest CO concentrations would occur during peak traffic hours, hence CO impacts calculated under peak traffic conditions represent a worst case analysis. Modeling of the CO hot spot analysis was based on traffic volumes generated by Linscott, Law & Greenspan, Engineers (March 1999), which identified the peak traffic levels generated in the project area for the future without the proposed project and the future with the proposed project.

The impact on local carbon monoxide levels was assessed with the CARB approved CALINE4 air quality model, which allows microscale CO concentrations to be estimated along a roadway corridor or near an intersection. This model is designed to identify localized concentrations of carbon monoxide, often termed "hot spots." A brief discussion of input to the CALINE4 model follows. The analysis was performed for the worst case wind angle and wind speed condition and is based upon the following assumptions:

- Selected modeling locations represent the intersections closest to the project site, with the highest project-related vehicle turning movements and the worst level of service deterioration;
- Twelve receptor locations with the possibility of extended outdoor exposure from eight meters (approximately 26 feet) to 24 meters (or approximately 82 feet) of the roadway centerline near intersections were modeled to determine carbon monoxide concentrations;
- The calculations assume a meteorological condition of almost no wind (0.5 meter/ second), a flat topographical condition between the source and receptor, and a mixing height of 1,000 meters, representing a worst-case scenario for CO concentrations;
- CO concentrations are calculated for the 1-hour averaging period and then compared to the 1-hour standards. CO 8-hour averages are extrapolated using techniques outlined in the South Coast Air Quality Management District *CEQA Air Quality Handbook*, April 1993, and compared to the 8-hour standards. A persistence factor of 0.7 was used to calculate the eight hour CO level from the calculated one hour CO level;
- Concentrations are given in ppm at each of the receptor locations;
- The "at-grade" link option with speed adjusted based on average cruise speed and number of vehicles per lane per hour was used rather than the "intersection" link selection in the CALINE4 model. (Caltrans has suggested that the "intersection" link should not be used due to inappropriate algorithm based on outdated vehicle distribution.) Emission factors for all vehicles based on the adjusted speed for the year 2000 were used; and
- The second highest CO concentrations at the North Long Beach air monitoring station during the last five years were used as background concentrations. The "background" concentrations were then added to the model results for the year 2002 with and without the proposed project conditions. The second highest one-hour concentration of 9.1 ppm and the second highest eight-hour concentration of 6.7 ppm were used as background concentrations for the project site.

Data in Table 4.10.F show the CO concentrations for the future condition with project and future condition without project. The one hour CO concentration near all six intersections analyzed ranges from 10.2 to 12.2 ppm, much lower than the 20 ppm state standard. The eight hour CO concentration ranges from 7.5 to 8.9 ppm, also lower than the 9.0 ppm state standard. Thus, no CO hot spots would occur.

Table 4.10.F: Carbon Monoxide Concentrations (ppm[1])
Alamitos Ridge Residential Development Future (Year 2002) Conditions With and Without Project

Intersection	Distance to Receptor Location from Roadway Centerline (meters)	Future Conditions Without Project CO Concentration one hour[2]/eight hour[2]	Future Conditions Without Project CO Concentration one hour[2]/eight hour[2]	Increase by the Project CO Concentration one hour[2]/eight hour[2]
Hathaway Avenue & Hill Street	8121414	10.5/7.7	10.6/7.8	0.1/0.1
		10.4/7.6	10.4/7.6	0.0/0.0
		10.3/7.5	10.4/7.6	0.1/0.1
		10.3/7.5	10.3/7.5	0.0/0.0
Redondo Avenue & Willow Street	19212224	12.2/8.9	12.2/8.9	0.0/0.0
		12.1/8.8	12.1/8.8	0.0/0.0
		11.8/8.6	11.9/.8.7	0.1/0.1
		11.8/8.6	11.8/8.6	0.0/0.0
Redondo Avenue & Stearns Street	8101214	11.4/8.3	11.4/8.3	0.0/0.0
		11.2/8.2	11.2/8.2	0.0/0.0
		11.1/8.1	11.1/8.1	0.0/0.0
		11.0/8.0	11.0/8.0	0.0/0.0
Redondo Avenue & 20th Street	771010	11.0/8.0	11.0/8.0	0.0/0.0
		11.0/8.0	10.9/8.0	-0.1/-0.1
		11.0/8.0	10.9/8.0	-0.1/-0.1
		10.9/8.0	10.9/8.0	0.0/0.0
Redondo Avenue & Pacific Coast Highway	14151617	11.4/8.3	11.4/8.3	0.0/0.0
		11.4/8.3	11.4/8.3	0.0/0.0
		11.3/8.2	11.3/8.2	0.0/0.0
		11.3/8.2	11.3/8.2	0.0/0.0
Obispo Avenue & 20th Street	881212	10.3/7.5	10.4/7.6	01./0.1
		10.2/7.5	10.2/7.5	0.0/0.0
		10.2/7.5	10.2/7.5	0.0/0.0
		10.2/7.5	10.2/7.5	0.0/0.0

Source: LSA Associates, Inc. 2000

[1] All data are in parts per million (ppm).

[2] Includes the second highest one hour CO concentration of 9.1 ppm and second highest eight hour CO concentration of 6.7 ppm from the North Long Beach air monitoring station.

Table 4.10.F shows that the future with project condition would result in minimal changes to ambient air quality. The CO concentration would have a maximum increase of 0.1 ppm for the one-hour CO concentrations and the eight hour CO concentrations. At one intersection, Redondo Avenue and 20th Street, there would be a 0.1 ppm reduction at two receptor locations in both one hour and eight hour CO concentrations, due to lower vehicle turn volumes as a result of the proposed project. These changes in CO concentrations are considered to have less than significant impact per the thresholds established by the SCAQMD which are 1.0 ppm and 0.45 ppm, respectively, for the one-hour and eight-hour CO levels. Therefore, the composite CO levels would be below both the state and federal one-hour and eight-hour CO standards. Implementation of the project would not have a significant impact on local air quality. Since CO hot spots were not identified, nearby sensitive receptors would not be affected by project-related local air quality impacts.

Air Quality Management Plan Consistency

The proposed project emissions are considered to have a less than significant impact on air quality and meet the growth and transportation assumptions made by SCAG for the project area; it is therefore considered to be consistent with the Air Quality Management Plan (AQMP).

A consistency determination plays an essential role in local agency project review by linking local planning and unique individual projects to the AQMP in the following ways. It fulfills the CEQA goal of fully informing local agency decision makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are addressed. Only new or amended General Plan elements, Specific Plans, and significantly unique projects need undergo a consistency review due to the AQMP strategy being based on projections from local General Plans.

CEQA requires that environmental documents assess a project's consistency with local plans such as the AQMP. As such, the AQMP includes criteria for judging the consistency of projects against the state-required plan.

Consistency with the AQMP is used by the SCAQMD to assess a project's cumulative impact on regional ozone levels. Consistency of indirect emissions associated with a commercial project intended to meet the needs of the population as forecast in the AQMP is determined by comparing the estimated current population of the city in which the project is to be located with the applicable population forecast in the AQMP. If the estimated current population does not exceed the forecasts, indirect emissions associated with the project are deemed to be consistent with the AQMP.

The proposed project will require an amendment to the City of Long Beach General Plan, which currently designates the project site as "Mixed Use" (Land Use District 7). The General Plan amendment would designate the project site as a "Residential." Although the proposed project is not included in the AQMP, the implementation of the proposed project would conform with the objectives of the integrated planning process; therefore, the proposed project will not conflict with the General Plan amendments. Any project that conforms to the General Plan is considered to be consistent with the AQMP; therefore, the proposed project is considered to be consistent with the AQMP.

There would be an increase in population anticipated as a result of the proposed project, although it is minor, it is still within the population forecast in the City's General Plan (as described in Section 4.2) and in the AQMP. No significant impact would occur as result of the proposed project, therefore no mitigation is necessary.

4.10.5 MITIGATION MEASURES

The following mitigation measures directly relate to the impacts described in the impact analysis discussion and reduce air pollutants generated during the project construction phase.

10.1 Dust generated by the development activities shall be contained to the site to the extent practical and kept to a minimum by following the dust control measures listed below:

- During clearing, grading, earth moving, excavation, or transportation of cut or fill materials, water trucks or sprinkler systems shall be used to prevent dust from leaving the site and to create a crust after each day's activities cease.
- During construction, water trucks or sprinkler systems shall be used to keep all areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this would include wetting down such areas in the later morning and after work is completed for the day, and whenever wind exceeds 15 miles per hour.
- After clearing, grading, earth moving, or excavation is completed, the entire area of disturbed soil shall be treated immediately with soil binders until the area is paved or otherwise developed so that dust generation will not occur.
- Soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation.
- Trucks transporting soil, sand, cut or fill materials and/or construction debris to or from the site shall have tires and wheels washed before exiting the site and shall have the transport covered for long trips over two miles or shall water the materials for short trips.

4.10.6 CUMULATIVE IMPACTS

The cumulative study area for air quality impacts encompasses the Basin, which is designated non-attainment for ozone, PM_{10}, and carbon monoxide. Emissions of NO_X and PM_{10} from construction of the proposed project and the project operations would cumulatively contribute to the non-attainment of PM_{10}. Emissions of fugitive dust from construction activity would result in mostly localized air quality impacts in the project vicinity. It is not anticipated that construction at other off-site locations would add to the project related localized air quality impacts.

Both long-term stationary (on-site energy consumption) and mobile (vehicular traffic) sources would contribute to regional criteria pollutant emissions. Considering the Basin is in a non-attainment status for three of the six criteria pollutants, and that the project would result in significant impacts

exceeding project levels impacts for NO_X and PM_{10}, these emissions would cumulatively contribute to significant regional air quality impacts.

4.10.7 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Short-term construction emissions would exceed the SCAQMD daily thresholds for the criteria pollutants of NO_X and PM_{10}. Long-term regional and local emissions of other criteria pollutants would be below the standards. Short-term construction emissions will remain significant after implementation of identified mitigation measures.

4.11 NOISE

A noise technical study that assessed the proposed project's noise effects was completed. The results of this assessment are described below and calculations provided in Appendix D. This noise assessment follows City of Long Beach guidelines on the preparation of noise studies, which include the City's Noise Element and Noise Control Ordinance (Municipal Code Section 8.80).

4.11.1 EXISTING ENVIRONMENTAL SETTING

Appendix D includes the description of the characteristics of sound, the measurement of sound, and the psychological and physiological effects of noise.

Existing Ambient Noise Monitoring Results

A noise survey was conducted in the project vicinity on June 1, 2000. Noise measurements were taken for 30 minutes at each location. The noise measurement locations are shown in Figure 4.11.1. Four measurements at representative noise sensitive locations around the project site were taken to document existing ambient noise levels. Table 4.11.A summarizes the noise measurement data from the four monitoring locations. As shown, the ambient noise levels range from 64.6 to 73.8 dBA L_{eq}.

Location 1 was on 20th Street midway between Obispo and Redondo Avenues. Location 2 was on Redondo Avenue midway between 20th Street and the project boundary. Residences across the street from this location do not have barriers along the property line. Location 3 was on Obispo Avenue midway between 20th Street and the project boundary. There are a few residences near the corner of 20th Street and Obispo Avenue, none of which has any barriers along the property line. Location 4 was on Hill Street midway between Obispo and Redondo Avenues. Directly across the street from this location are several commercial buildings.

Locations 2 through 4 were near a major roadway; therefore, traffic noise, especially buses and trucks, contributed the majority of the higher noise levels to the ambient noise during the monitoring periods. Traffic flow on 20th Street near Location 1 was infrequent. Traffic flow on Redondo Avenue and construction noise on the project site were the primary contributors to the ambient noise levels at this location. Aircraft overflight noise levels were captured at all four monitoring sites during the site measurements.

Due to space limitation, the locations used in monitoring the ambient noise around the project site were closer than 15 m (50 ft) from the roads, which may not reflect the noise attenuation from a line source. Because of this, the levels measured show higher noise than those calculated using the traffic noise prediction model. For example, on Redondo Avenue the ambient noise was measured at a

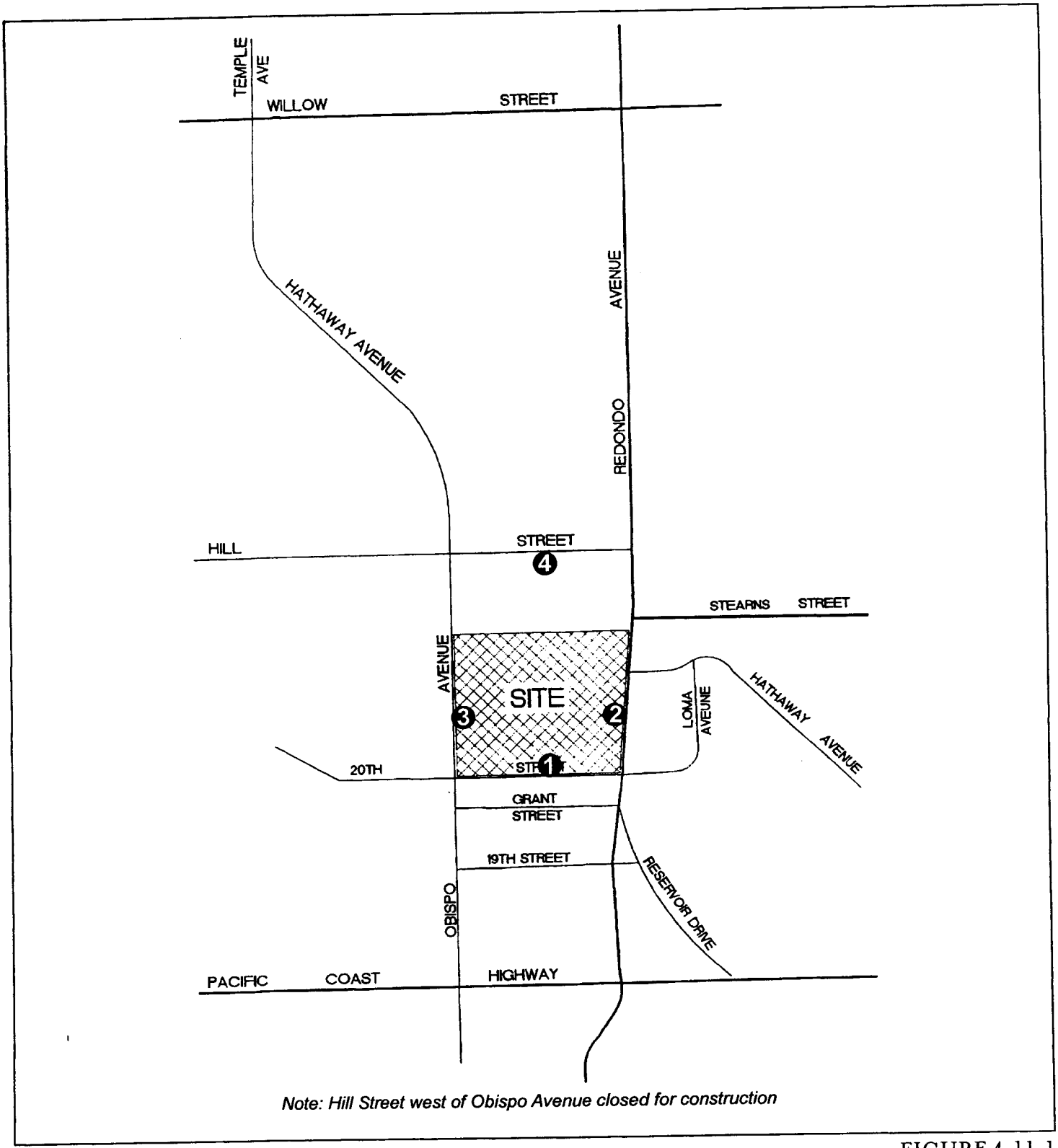

FIGURE 4.11.1

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Alamitos Ridge Residential Project EIR
On-Site and Off-Site Noise Measurement Locations

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Table 4.11.A: Locations of Ambient Noise Monitoring

Location	Start Time	Leq (dBA)	Noise Sources	Remark
1. 20th Street between Obispo and Redondo.	3:00 p.m.	64.6	Distant traffic on Redondo Avenue, light traffic on 20th Street, bulldozer on site, aircraft overflights, wind.	Bulldozer 75-100' behind sound level meter.
2. Redondo Avenue between Hill and 20th Streets.	3:35 p.m.	73.8	Traffic on Redondo Avenue, wind, aircraft overflights, bulldozer on site.	Traffic light at bottom of hill.
3. Obispo Avenue between 20th and Hill Streets.	4:20 p.m.	69.6	Traffic on Obispo Avenue, aircraft overflights, wind, hammering from site.	Hammering was intermittent.
4. Hill Street between Obispo and Redondo Avenues.	5:00 p.m.	69.1	Traffic on Hill Street, distant traffic on Redondo Avenue, wind, aircraft overflights.	Trees on both sides of sound level meter, commercial building across the street.

Source: LSA Associates, Inc. June 1, 2000.

distance of 38 feet from the centerline of the road. If the measured level of 73.8 dBA L_{eq} is recalculated at a distance of 86 feet from the centerline, the noise level becomes 67.8 dBA L_{eq}. The calculated traffic noise level at this point is 65 dBA L_{eq}.

Existing Traffic Noise

The Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA-RD-77-108), currently used throughout the United States, was used to evaluate highway traffic related noise conditions in the vicinity of the project site. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The existing average daily traffic (ADT) volumes in the area were taken from the traffic report prepared for this project by Linscott, Law & Greenspan, Engineers (March 1, 1999). The resultant noise levels are weighted and summed over 24 hour periods to determine the CNEL values. CNEL contours were derived through a series of computerized iterations to isolate the 60, 65, and 70 dBA CNEL contours for existing traffic noise levels in the area. Table 4.11.B provides the noise levels adjacent to roads near the proposed project site for the existing conditions. The specific modeling assumptions used in developing these noise levels and model printouts are provided in Appendix D. Under existing conditions, on all area roads with the exception of Redondo Avenue, the 65 dBA CNEL would be confined within the roadway right-of-way. The noise levels on Redondo Avenue are moderately high, with traffic noise levels of 65 dBA CNEL extending to 108 feet from the roadway centerline.

Table 4.11.B: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 feet from Outermost lane
Redondo Avenue	22,860	< 50[1]	108	229	68.1
Obispo Avenue	9,420	< 50	< 50	103	62.9
20th Street	2,210	< 50	< 50	< 50	57.6
Hill Street	5,350	< 50	< 50	72	60.4

Source: Linscott, Law & Greenspan, Engineers, 1999. Calculations prepared by LSA, 2000.

Existing Aircraft Noise

The Alamitos Ridge project area lies approximately two miles south of the Long Beach Municipal Airport. Therefore, it experiences low to moderate levels of aircraft noise. The Long Beach Municipal Airport's 65 dBA CNEL contours (Noise Element, 1973) do not infringe upon any portion

[1] Traffic noise within 50 feet of roadway centerline requires site specific analysis.

of the project area. Noise levels from individual flights would vary, depending on the type of aircraft and the distance to the sound level meter location. However, the proposed residences may be exposed to single event noise levels reaching 70 dBA L_{max} from individual aircraft flyovers. Although the Long Beach Airport has experienced growth in recent years, the increase in airport operations is not substantial enough to extend the 65 dBA CNEL airport noise contour to affect the project site.

Existing Oil Pump Noise

Measurements of oil pump noise levels were taken on July 20, 2000. Six measurements were taken at distances of 25 and 50 feet from three different pumps. The pump noise determines the L_{50} and L_{eq} for the ambient noise measured. The results of the noise monitoring are shown in Table 4.11.C. There are oil well maintenance activities that occur on a regular annual basis. These activities are intermittent and involve vehicle trips to the site by maintenance crews and testing of equipment. Noise associated with the maintenance activities is similar to or lower than the pump noise and is of short duration and sporadic.

Table 4.11.C: Noise Monitoring Results

Measurement Location	L_{eq}	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}	Notes
25 feet from pump #1	58.0	64.5	54	62.6	61.1	58.5	56.8	Pump inconsistent; pump noise 57 dBA
50 feet from pump #1	56.2	65.1	52.8	59.9	58.0	56.4	55.4	High ambient noise; pump noise 55 dBA
25 feet from pump #2	64.0	76.2	60.0	68.9	65.4	63.9	63.0	Largest pump on site; pump noise 63 dBA
50 feet from pump #2	59.9	68.8	56.3	64.1	61.4	60.1	59.3	Largest pump on site; pump noise 59 dBA
25 feet from pump #3	59.0	70.9	55.5	62.4	60.6	59.3	58.3	Pump noise 58 dBA
50 feet from pump #3	54.3	59.3	51.6	57.1	55.9	54.8	54.0	Pump noise 54 dBA

Source: LSA Associates, Inc. July 2000.

Pump Locations.

Pump #1: Pump #1 is located in the center of the project site. It is surrounded by four other pumps at distances ranging from 150 to 200 feet. Traffic noise near this pump is perceptible only when large trucks pass.

Pump #2: Pump #2 is located in the southwest corner of the project site, approximately 150 feet from both Obispo Avenue and 20th Street. This is the largest pump on site.

Pump #3: Pump #3 is located at the north end of the site halfway between Obispo Avenue and Redondo Avenue. This pump is the same type as pump #1. Traffic noise near this pump is perceptible only when large trucks pass.

4.11.2 THRESHOLDS OF SIGNIFICANCE CRITERIA

A project will normally have a significant effect on the environment related to noise if it will increase substantially the ambient noise levels for adjoining areas or conflict with adopted environmental plans and goals of the community where it is located.

The applicable noise standards governing the project site are set forth in the Long Beach Municipal Code (Section 8.80). The City of Long Beach has adopted the State of California noise guidelines established by the Office of Noise Control and the State Government Code Section 65302(g). The City's Noise Element does not provide specific noise standards for planning. A noise level of 65 dBA CNEL was used as the standard for the maximum allowable noise level in a residential area. This noise level standard is similar to the Department of Housing and Urban Development (HUD) site acceptability standard of 65 dBA in terms of the 24-hour weighted average day night equivalent level (Ldn). The Land Use Compatibility Standards of the Office of Noise Control are shown in Table 4.11.D.

In addition to the State noise guidelines, the City of Long Beach has a Noise Control Ordinance, which governs the maximum permissible noise levels generated by individual noise sources. The maximum interior and exterior levels are shown in Tables 4.11.E and 4.11.F, respectively.

The City's Noise Control Ordinance also governs the time of day that construction work can be performed. The Noise Ordinance prohibits construction, drilling, repair, alteration, or demolition work between the hours of 10:00 p.m. and 7:00 a.m. the following day, on weekdays, or at anytime on weekends or federal holidays if the noise would create a disturbance across a residential or commercial property line or violate the quantitative provisions of the ordinance.

4.11.3 IMPACTS AND MITIGATION MEASURES

Construction Noise Impacts

Two types of short-term noise impacts would occur during project construction. The first is an increase in traffic flow on the local streets associated with the transportation of workers, equipment, and materials to and from the project site. The heavy equipment for grading and construction will be moved to the site and will remain there for the duration of each construction phase. The increase in traffic on the surrounding roads due to construction vehicles is expected to be small. The associated increase in long-term traffic noise will not be perceptible. However, there will be short-term, intermittent high noise levels associated with truck passbys from the project site.

The second type of short-term noise impact is related to the noise generated by heavy equipment operating on the project site. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases

Table 4.11.D: Land Use Compatibility Standards
dBA CNEL

Land Use Category	50	55	60	65	70	75	80
Residential	a	a	b	b	c	d	d
Transient Lodging, Motels, Hotels	a	a	b	b	c	c	d
Schools, Libraries, Churches, Hospitals, Nursing Homes	a	a	b	b	c	c	d
Sports Areas, Outdoor Spectator Sports	a	a	b	b	c	d	d
Playgrounds, Neighborhood Parks	a	a	b	c	d	d	d
Golf Courses, Riding Stables, Water Recreation, Cemeteries	a	a	a	b	c	c	d
Office Buildings, Business Commercial and Professional	a	a	a	a	b	c	d
Industrial, Manufacturing, Utilities, Agriculture	a	a	a	a	b	c	c

KEY:

a. Normally Acceptable - land use satisfactory, buildings need no special noise insulation.
b. Conditionally Acceptable - new construction should be undertaken only after acoustic analysis and installation of noise insulation. Conventional construction but with closed windows and fresh air supply systems or air conditioning will normally suffice.
c. Normally Unacceptable - new construction should be discouraged. If construction does proceed, acoustic analysis is required to determine the insulation needed.
d. Clearly Unacceptable - new construction should not be undertaken.

Source: Office of Noise Control, California Department of Health Services.

Table 4.11.E: Maximum Interior Noise Levels
L_{50}

Receiving Land Use	Time Period	Noise Level, dBA
Residential	10:00 p.m.–7:00 a.m.	35
	7:00 a.m.–10:00 p.m.	45
School	7:00 a.m.–10:00 p.m. (while school is in session)	45
Hospital and other noise-sensitive zones	Anytime	40

Source: City of Long Beach Noise Control Ordinance, 1978.

Table 4.11.F: Maximum Exterior Noise Levels
L_{50}

Receiving Land Use	Time Period	Noise Level, dBA
Residential	Night: 10:00 p.m.–7:00 a.m.	45
	Day: 7:00 a.m.–10:00 p.m.	50
Commercial	Night: 10:00 p.m.–7:00 a.m.	55
	Day: 7:00 a.m.–10:00 p.m.	60
Industrial	Anytime	70[1]

Source: City of Long Beach Noise Control Ordinance, 1978.

[1] For use at boundaries rather than for noise control within industrial districts.

would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction related noise ranges to be categorized by work phase. Table 4.11.G lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor.

Typical noise levels range up to 91 dBA at 50 feet during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings.

Construction of the proposed project is expected to require the use of earthmovers, bulldozers, and water and pickup trucks. Noise typically associated with the use of construction equipment is estimated between 79 and 89 dBA at a distance of 50 feet from the construction effort for the grading phase. This equipment would be used on the project site. As seen in Table 4.11.E, the maximum noise level generated by each earthmover on the proposed project site is assumed to be 88 dBA at 50 feet from the earthmover. Each bulldozer would also generate 88 dBA at 50 feet. The maximum noise level generated by water and pickup trucks is approximately 86 dBA at 50 feet from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates as an individual noise source, the worst case composite noise level during this phase of construction would be 91 dBA L_{max} at a distance of 50 feet from an active construction area. As these noise sources are point sources, the noise decreases at a rate of 6 dB per doubling of distance.

The nearest residences to the project site are located on the east side of Redondo Avenue. These residences are approximately 100 feet from the project boundary and may be subjected to short-term noise reaching 85 dBA L_{max} generated by construction activities on the project site.

In accordance with Long Beach Municipal Code Section 8.80.202, no person shall operate or permit the operation of any tools or equipment used for construction or any related building activity that produce loud or unusual noise that annoys or disturbs a reasonable person of normal sensitivity between the hours of 7:00 p.m. and 7:00 a.m. the following day on weekdays, between the hours of 7:00 p.m. on Friday and 9:00 a.m. on Saturday, and after 6:00 p.m. on Saturday and at any time on Sunday, except for emergency work authorized by the building official. These restrictions will reduce construction noise impacts to residences.

Traffic Noise Impacts

The results of local roadway based noise modeling at various measurement locations are presented in Tables 4.11.H and 4.11.I for four major roadways for both the existing traffic noise levels and projected traffic noise levels.

Table 4.11.G: Construction Equipment Noise Levels

Type of Equipment	Range of Sound Levels Measured (dBA at 50 feet)	Suggested Sound Levels for Analysis (dBA at 50 feet)
Pile Drivers, 12,000 to 18,000 ft-lb/blow	81 to 96	93
Rock Drills	83 to 99	96
Jack Hammers	75 to 85	82
Pneumatic Tools	78 to 88	85
Pumps	68 to 80	77
Dozers	85 to 90	88
Tractors	77 to 82	80
Front-End Loaders	86 to 90	88
Hydraulic Backhoe	81 to 90	86
Hydraulic Excavators	81 to 90	86
Graders	79 to 89	86
Air Compressors	76 to 86	86
Trucks	81 to 87	86

Source: Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman, 1987.

Table 4.11.H: Future No Build Traffic Noise Levels
Year 2002

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 feet from outer-most lane	Change from Existing Level (dBA)
Redondo Avenue	25,410	56	115	246	68.6	0.5
Obispo Avenue	10,620	< 50	54	112	63.4	0.5
20th Street	2,430	< 50	< 50	< 50	58.1	0.4
Hill Street	6,250	< 50	< 50	79	61.1	0.7

Source: Linscott, Law & Greenspan, Engineers, 1999. Calculations prepared by LSA, 2000.

Table 4.11.I: Future Build Traffic Noise Levels
Year 2002

Roadway Segment	ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 feet from outer-most lane	Change from Existing Level (dBA)
Redondo Avenue	24,960	55	114	243	68.5	-0.1
Obispo Avenue	11,090	< 50	56	115	63.6	0.2
20th Street	1,790	< 50	< 50	< 50	56.7	-1.3
Hill Street	6,690	< 50	< 50	83	61.4	0.3

Source: Linscott, Law & Greenspan, Engineers, 1999. Calculations prepared by LSA, 2000.

As shown in Tables 4.11.H and 4.11.I, there is very little change in the traffic noise levels associated with the implementation of the project. The largest increase in traffic related noise is on Hill Street, which has a 0.3 dBA increase over the no build scenario.

Residential properties on the project site, however, may be exposed to potentially significant traffic noise impacts. Depending on the location of the units, mitigation measures may be required. Typically there are three types of traffic noise impacts that require measures to reduce the noise level:

- Group A: Areas that would be exposed to traffic noise exceeding 70 dBA CNEL. Residential homes with outdoor use areas exposed to traffic noise would require a freestanding sound wall or sound wall and berm combination with an effective height of eight feet above grade along the property line. This eight foot sound wall or sound wall/berm combination would provide 7 dBA or more in noise reduction for ground floor receptors when the direct line of sight to the traffic is blocked. Ground floor bedrooms facing the road would receive 7 dBA or more in noise attenuation provided by the sound wall or sound wall/berm combination. With a combination of walls, doors, and windows, standard construction for Southern California residential buildings would provide more than 20 dBA in exterior to interior noise reduction with windows closed and 12 dBA or more with windows open (national average is 25 dBA with windows closed, and 15 dBA with windows open). With windows closed, interior noise levels in ground floor units would be 45 dBA CNEL or lower. Therefore, no building facade upgrades would be required. However, with windows open, there is a potential for interior noise in the ground floor units to exceed the 45 dBA CNEL standard (e.g., 63 dBA - 12 dBA = 51 dBA). An air conditioning system or other type of mechanical ventilation would be required to ensure that windows can remain closed for a prolonged period of time.

  For second story bedrooms exposed to 70 dBA CNEL or higher traffic noise, the eight foot sound wall would not provide sufficient noise mitigation. Therefore, second story bedrooms with windows exposed to the traffic require building facade upgrades, such as double pane (or dual glazing) windows. In addition, mechanical ventilation, such as an air conditioning system, would be required.

- Group B: Areas that would be exposed to traffic noise between 65 and 70 dBA CNEL. Residential homes with outdoor active use areas exposed to the traffic would require a freestanding sound wall or sound wall and berm combination with an effective height of six feet above grade along the property line. This six foot sound wall or sound wall/berm combination would provide 5 dBA or more in noise reduction for ground floor receptors when the direct line of sight to the traffic is blocked. Ground floor bedrooms facing the road would receive 5 dBA or more in noise attenuation provided by the sound wall or sound wall/berm combination. With a combination of walls, doors, and windows, standard construction for Southern California residential buildings would provide more than 20 dBA in exterior to interior noise reduction with windows closed and 12 dBA or more with windows open. With windows closed, interior noise levels in ground floor units would be 45 dBA CNEL or lower. Therefore, no building facade upgrades would be required. However, with windows open, there is a potential for interior noise in the ground floor units to exceed the 45 dBA CNEL standard (e.g., 60 dBA - 12 dBA = 48 dBA). An air conditioning system or other type of mechanical ventilation should be provided to ensure that windows can remain closed for a prolonged period of time.

For second story bedrooms exposed to 65 to 70 dBA CNEL traffic noise, the six foot sound wall would not provide sufficient noise mitigation. Therefore, second story bedrooms with windows exposed to the traffic require building facade upgrades, such as double pane (or dual glazing) windows. In addition, an air conditioning system or other type of mechanical ventilation would be required.

- Group C: Areas that would be exposed to traffic noise between 57 and 65 dBA CNEL. Residential homes that fall within this category do not require mitigation measures for their outdoor active use areas, such as backyards or barbecue areas. Standard building construction for residential structures in Southern California would provide a minimum of 20 dBA in noise reduction from outdoors to indoors, with windows closed. However, with windows open, this outdoors to indoors noise reduction drops to 12 dBA. Therefore, Group C homes could potentially experience interior noise levels exceeding the 45 dBA CNEL (e.g., 60 dBA - 12 dBA = 48 dBA) standard adopted by the State of California when windows are open. Mitigation measures, such as an air conditioning system or other type of mechanical ventilation should be provided to ensure that windows can remain closed for a prolonged period of time. No building facade upgrades would be required.

Group A Homes. There are no areas that would be exposed to noise levels exceeding 70 dBA CNEL.

Group B Homes. Residential units located within the following areas, when no homes (such as Group A Homes, above) or other structures are built between the road and these residential units, would have the potential to be exposed to 65 dBA CNEL or higher traffic noise impacts:

- Within 114 feet of the roadway centerline of Redondo Avenue
- Within 56 feet of the centerline of Obispo Avenue

Group C Homes. Residential units located within the following areas, when no homes (such as Group A or Group B Homes above) or other structures are built between the road and these residential units, would have the potential to be exposed to 60 dBA CNEL or higher traffic noise impacts:

- Within 243 feet of the roadway centerline of Redondo Avenue
- Within 115 feet of the roadway centerline of Obispo Avenue
- Within 83 feet of the roadway centerline of Hill Street

Aircraft Noise Impacts

The primary noise impacts unrelated to roadway traffic would come from aircraft overflights. As discussed earlier, the Alamitos Ridge project is located outside of the 65 dBA CNEL noise contour and is not directly impacted by airport operations.

Oil Pump Impacts

There are currently one large and five small oil pumps on the project site. The large pump generates a noise level of approximately 59 dBA at 50 feet, and the small pumps generate a noise level of approximately 55 dBA at 50 feet. These oil pumps do not and will not affect any residential properties outside of the project site. However, the proposed residential properties on the project site may be exposed to potentially significant noise levels. Because the oil pumps run 24 hours per day, they are required to comply with the City's nighttime exterior noise standard of 45 dBA L_{50}. The nighttime standard is more restrictive than the daytime limit of 50 dBA. Housing in the following areas has the potential to be exposed to noise levels exceeding the City standard:

- Within 158 feet of the small pumps
- Within 251 feet of the large pump

No home will occupy the same lot as an operating oil well. Potential noise impacts to residential structures and outdoor yards will be reduced as a result of the 50-foot building setback from operating oil wells to residential structures and from the implementation of noise screen walls as described in Mitigation Measures 11.4 and 11.5. Mitigation Measure 11.6, requiring mechanical ventilation for all homes, will also result in a reduction of interior noise levels.

The six-foot screen wall will provide 10 dBA of noise attenuation for ground-floor receptors, and the 10-foot wall for the large well will provide a 15 dBA reduction. These reductions are sufficient to meet the standards for both ground-floor interior noise levels and day and night exterior noise levels, as defined in Tables 4.11.e and 4.11.f. For second-story bedrooms within 158 feet of the small oil pumps, the six-foot sound wall would reduce noise levels by approximately 5 dBA. With windows open, the noise would exceed the interior noise standard of 35 dBA L_{50} (55 dBA - 5 dBA - 12 dBA = 38 dBA). Similarly, for second-story bedrooms within 251 feet of the large oil pump, the 10-foot sound wall would reduce noise levels by approximately 8 dBA. With windows open, the noise would exceed the interior noise standard of 35 dBA L_{50} (59 dBA - 8 dBA - 12 dBA = 39 dBA). Therefore, second-story bedrooms with windows exposed to the pump noise require an air conditioning system or other type of mechanical ventilation to ensure that the windows can remain closed for prolonged periods of time. Mitigation Measure 11.6 requires such mechanical ventilation for all homes.

These measures reduce interior day and exterior and interior night noise levels to below the City's standard and below a level of significance. As discussed earlier, the oil well maintenance activities do not generate noise levels higher than the pump noise. Therefore, mitigation measures provided for the pump noise are sufficient for the maintenance activities as well.

Mitigation Measures

11.1 A six foot high sound barrier consisting of a concrete block wall is required along the property line for residential units that fall within the Group B Impact Zone, as identified herein, to reduce the traffic noise level in the outdoor activity area to below 65 dBA CNEL. The sound barrier wall shall be shown on project landscape plans, subject to the approval of the Director, Planning and Building Department, and shall be implemented prior to occupancy of affected units.

11.2 Balconies are not recommended for units impacted by 65 dBA CNEL or higher traffic noise. Sound walls (Plexiglas® with a minimum height of five feet) would be required for any second floor balconies directly exposed to traffic noise exceeding 65 dBA CNEL. Double pane windows are required for the second floor noise sensitive rooms in these units to achieve the required noise attenuation. Mechanical ventilation, such as air conditioning systems, is required for residences to ensure that windows can remain closed for a prolonged period of time.

11.3 Air conditioning systems shall be required for the development areas that would fall within Group C Impact Zone, as identified above, to achieve the 45 dBA CNEL interior noise standard. A freestanding sound barrier with a minimum six feet of effective height can be used in lieu of the mechanical ventilation mitigation to reduce both the ground floor exterior and interior noise levels for the above units in Group C. However, second floor bedrooms in Group C directly exposed to the traffic would need to have the mechanical ventilation mitigation, i.e., an air conditioning system, to achieve the interior noise standard. Prior to issuance of Building Permits, the Director, Planning and Building Department, shall ensure that building plans comply with this mitigation measure.

Oil Pump Operations

11.4 The developer/builder shall install a six foot high sound barrier around the small operating oil pumps where there are homes built within 158 feet of the pumps, or provide equivalent noise reduction methods, including pump reconstruction and placing the pumps in a vault. If homes are built within 50 feet of the small operating oil pumps, the developer/builder shall install a ten foot sound barrier around the oil pump. The Director, Planning and Building Department, shall review building plans and associated landscape plans to ensure implementation of this noise attenuation measure prior to issuance of occupancy permits.

11.5 The developer/builder shall install a ten foot high sound barrier around the oil pump named Alamitos 58 for any residential houses that are located within 251 feet of the pump, or provide equivalent noise reduction methods, including pump reconstruction and placing the pump in a vault. No homes are to be built within 50 feet of the large oil pump. The Director, Planning and Building Department, shall review building plans and associated landscape plans to ensure implementation of this noise attenuation measure prior to issuance of occupancy permits.

11.6 The developer/builder shall install mechanical ventilation, such as air conditioning systems, in the homes to ensure that windows can be closed for prolonged periods of time to achieve the required sound attenuation. The Director, Planning and Building Department, shall review building plans and associated landscape plans to ensure implementation of this noise attenuation measure prior to issuance of occupancy permits.

4.11.4 CUMULATIVE IMPACTS

Construction of the proposed project would not result in any significant increase in traffic noise in the surrounding areas. Construction activities are localized noise sources and would affect only land uses immediately adjacent to the project site with direct line of sight.

The project site does not lie within the 65 dBA CNEL noise contours for airport operations. However, the proposed residences may be exposed to single event noise levels reaching 70 dBA L_{max} from individual aircraft flyovers.

Table 4.11.I shows the cumulative traffic noise under the future build conditions in the project vicinity. Of the adjacent roadways, only Redondo and Obispo Avenues would have noise levels exceeding 65 dBA CNEL in areas more than 50 feet from the roadway centerline. Therefore, all proposed residential land uses adjacent to these roadways have the potential to continue to be exposed to significant noise levels.

4.11.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Impacts to the proposed residential uses will be reduced to a less than significant level with the implementation of the mitigation measures.

4.12 AESTHETICS

This section describes the visual character of the proposed project site in the context of its topographic scale, its relationship to the surrounding community, and the alterations that will result from development of the proposed project as defined in Section 3.0 (Project Description). The analysis describes the potential impacts of the proposed project to views from nearby sensitive viewers and to views from the community in general. Impacts from light and glare originating from the project are also analyzed.

Adjacent views were analyzed by establishing three basic viewing distance zones: foreground, middleground, and background. Foreground views include elements that can be seen at a close distance and that dominate the entire view. Middleground views include elements that can be seen at a moderate distance and that partially dominate the view. Background views include elements that are seen at a long distance and typically do not dominate the view, but that are part of the overall visual composition of the view. These distance zones are based on criteria for analysis of the potential visual impacts of the proposed project on surrounding adjacent areas. These distance zones depict the dominant visual character from a vantage point, taking into consideration topography, actual opportunities to view the site from sensitive land uses such as a residential use, and describe view impacts in terms that can be compared against threshold criteria.

4.12.1 EXISTING ENVIRONMENTAL SETTING

The aesthetic characteristics of the project site and the surrounding area are defined by topography, past and current land uses, and development intensity of the area. Figure 4.12.1 is an aerial view of the project site and shows its relationship to the surrounding existing land uses. There are no identified scenic vistas or designated scenic highways in the vicinity of the project site.

Topographical Setting

The 14.5 acre proposed project site is located on the north side of a gentle hill, which rises slightly in elevation from both north to south and east to west. The area is characterized as disturbed inland valley and foothills, visually affected as a result of oil extraction activities, outdoor storage, and grading and filling activity. Elevation on the subject site varies from approximately 75 feet above mean sea level (msl) in the northeast corner to approximately 118 feet above msl in the southwest corner. The rectangular parcel north of and adjacent to the project site is primarily flat.

Existing Visual Setting

Sparse vegetation, including a few eucalyptus trees, sparse grasses, and small shrubs, is scattered throughout the project site. Within the property, trees were planted to form an L-shaped perimeter or natural "fence" around the outdoor storage area (the Boneyard) and vehicle maintenance area.

FIGURE 4.12.1

LSA

N

NO SCALE

SOURCE: Aerial Images, 4/13/00 Photo#C04130002

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Alamitos Ridge Residential Project EIR

Current Project Site and Surrounding Land Uses

Detailed topography of the project site and the fauna/flora are described in Section 4.3 (Geotechnical) and Section 4.5 (Biological Resources), respectively.

The project site and surrounding areas have been used for oil extraction operations, storage, and equipment access roads for the past 60 years. In the eastern portion of the site, a sump (pit), pipe racks, and used equipment are adjacent to a small vehicle maintenance area. These past uses have done much to affect the current condition of the property, and have created an unsightly parcel amid an increasingly developed area.

The site is currently used for oil well facilities maintenance and storage. The western portion of the site has nine active oil wells, one water injection well, four abandoned and inactive oil wells, and a storage yard (also known as the "Boneyard") where oil extraction equipment was buried and/or stacked on the surface. A test station (No. 3) located near 20th Street is slated for relocation to the northern edge of the site upon development.[1] Aside from the oil facilities stated above, no other structures or buildings exist on the site.

Existing Land Uses, Surrounding Area

Urbanized areas surround the project site and are characterized by moderate to high density development, infrastructure, and ornamental landscaping. The project site is not highly visible from distant visual receptors; however, close viewers of the site include the following land uses:

- Light industrial uses are located south of the project site, across 20th Street at a higher elevation. The light industrial development area looks down on the proposed project site.
- Directly north of the project site, at a lower elevation, is an undeveloped lot owned by the Long Beach Unified School District (LBUSD). This parcel is slated for the development of a school.
- Both undeveloped and partially developed residential areas are found west and east of the project site.
- East of the project site, across Redondo Avenue, is high-density residential land use.

Adjacent Sensitive Land Uses

For EIR analysis purposes, sensitive viewers include the following land uses: residential, school, church, and recreational. In the project area, the primary existing sensitive viewer group is residential, located west and east of the project site. On the west side of Obispo Avenue at 20th Street are three single family units. These adjacent homes view the project site, oil extraction operations, graded earth, and scattered vegetation. High-density residential units are located across Redondo Avenue, east of the project site, at 20th Street. Views of the project site are limited due to a wall of trees and shrubs that borders the complex and the slightly lower elevation of the complex.

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[1] Source: Personal communication with James Chris Hall, Drilling and Production Co., July 26, 2000.

Existing Setting Photographs/Viewpoints

Photographs were taken of the project site to represent various observer viewpoints. The location and range of the photographs/viewpoints are plotted on Figure 4.12.2, and the actual views are shown in existing photographs on Figure 4.12.3a and Figure 4.12.3b. These locations were selected because they are representative of the existing views from and onto the site from sensitive residential visual receptors adjacent to the project site. The visual descriptions and characteristics of these viewpoints are included below.

View 1. This view to the north, taken from 20th street at Redondo, offers a perspective of the project site from a higher elevation. In the foreground is 20th street, the undeveloped east side of the subject site, Redondo Avenue, and the trees and bushes that border a high density residential complex. This photograph shows what an observer from the complex, looking onto the site, would see. In the middle ground is also the undeveloped eastern portion of the site, Redondo Avenue, and an undeveloped lot to the east. The background contains a business park and the Hathaway Oil Refinery.

View 2. This view to the north includes foreground views of the existing condition of the project site: a central dirt road, dirt mounds, oil wells, and some trees and shrubbery. The oil refinery is seen in the background.

View 3. This photograph was taken in front of the three homes to the west of the project. The view is characterized by foreground and middle views of the western undeveloped lot, Obispo Avenue, and the project site. In the background is the oil refinery.

View 4. This photograph, taken from a hill on an undeveloped lot zoned for low-density residential, reveals foreground and middle views of Obispo Avenue, the subject site, and the light industrial land uses across 20th street, to the south.

Existing Light and Glare

There are no existing light sources on the project site. There is existing street lighting along Obispo Avenue on the east side of the project site, Redondo Avenue west of the site, and on 20th Street to the south. Other existing light and glare sources in the adjacent cities of Signal Hill and Long Beach are related to light sources in the urban areas beyond the project site. These sources include the ARCO Hathaway Terminal and the light industrial complex east of Hathaway Avenue. Due to the relatively low incidence of outdoor lighting and low profile of area structures, glare is not a major impact from the uses in the vicinity of the project site.

FIGURE 4.12.2

LSA

N

NO SCALE

SOURCE: Aerial Images, 4/13/00 Photo#C04130002

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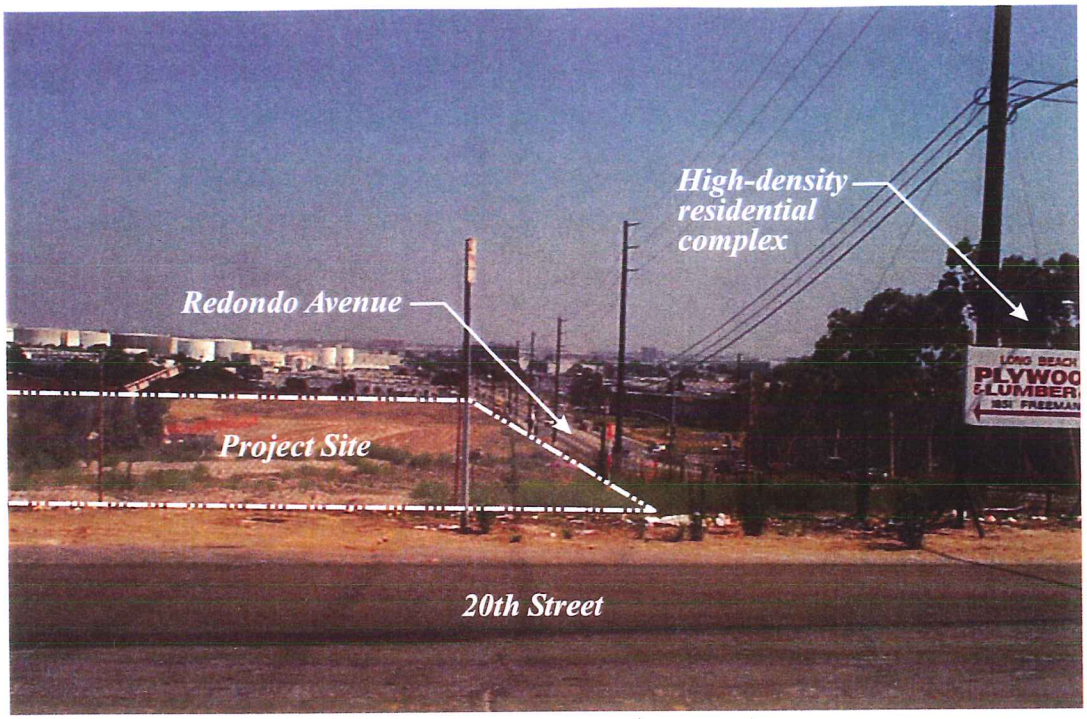
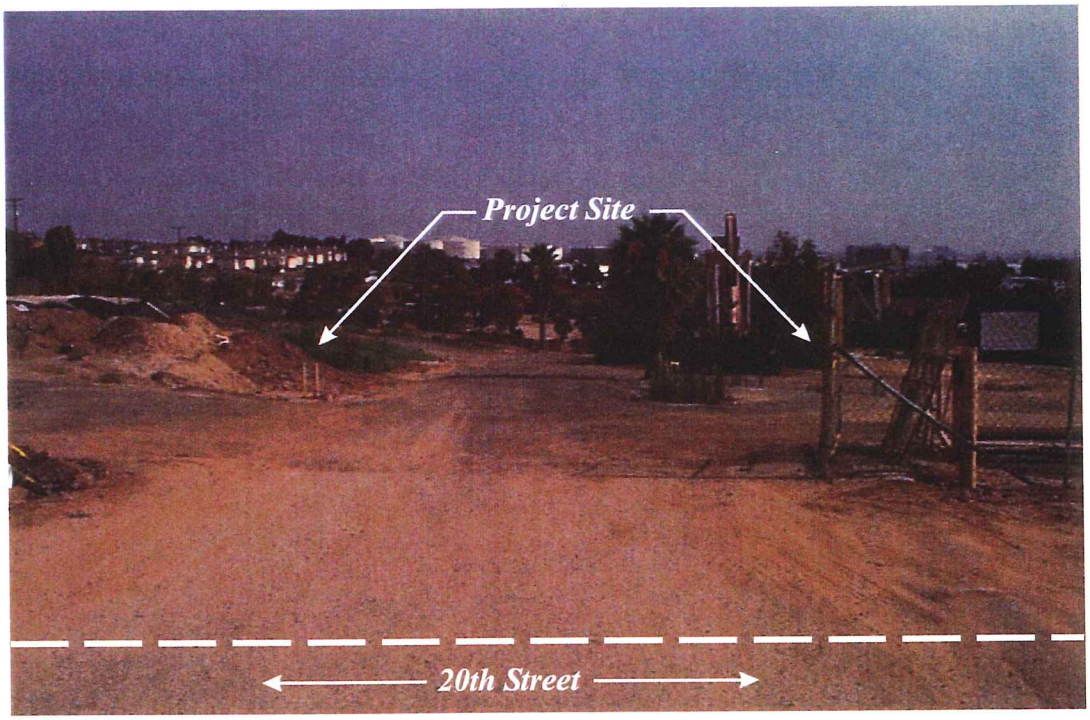
Alamitos Ridge Residential Project EIR

Photograph Locations and Views



View 1 - View to the north-northeast.



View 2 - View to the north from 20th Street.

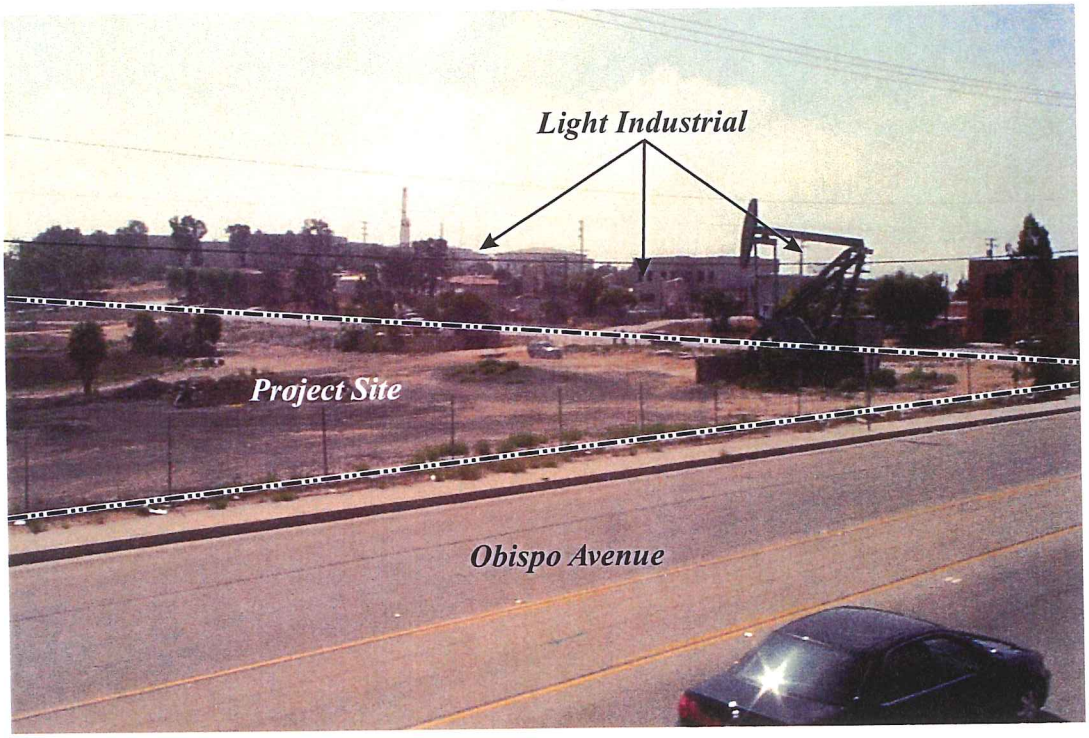
LSA

FIGURE 4.12.3A

Alamitos Ridge Residential Project EIR

Views 1 & 2

View 3 - View to the north-northeast on Obispo Avenue.



View 4 - View to the east-southeast.

LSA

FIGURE 4.12.3B

Alamitos Ridge Residential Project EIR

Views 3 & 4

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4.12.2 THRESHOLD OF SIGNIFICANCE

EIRs have traditionally used thresholds of significance based on guidance included in Appendix G of the State CEQA Guidelines before 1998. Although no longer included in the CEQA guidelines, this EIR will use the former CEQA thresholds of significance as criteria. A project will have a significant effect on the environment related to aesthetics, light, and glare if it will result in the following:

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
- Substantially degrade the existing visual quality of the development site and its surroundings. (The relationship between the severity of impacts on specific visual characteristics, the location of the visual impacts from sensitive land uses, and the length of time these visual impacts are visible are criteria for evaluating the significance of project impacts on visual resources in a particular community or area. For example, the conversion of undeveloped property to retail, commercial, and office land uses will have a significant visual impact to sensitive viewer groups [if foreground views are dominated by the project]).
- Create a new source of substantial light or glare that would substantially and adversely affect day or nighttime views of sensitive viewers. (The severity of impacts from light and glare is based on the location and intensity of the light source and the sensitivity of potential viewer groups. For purposes of this environmental document, light and glare were determined to have a potentially significant impact if a substantial number of light sources were to be located on elevated light standards that would have the potential to shine directly onto property occupied by sensitive viewers.)
- On an interim basis, during construction and/or while well pumping is active; substantially degrade the existing visual quality of the development site and its surroundings. (The relationship between the severity of impacts on specific visual characteristics, the location of the visual impacts from sensitive land uses, and the length of time these visual impacts are visible are criteria for evaluating the significance of project impacts on visual resources in a particular community or area. For example, the conversion of undeveloped property to retail, commercial, and office land uses will have a significant visual impact to sensitive viewer groups [if foreground views are dominated by the project]).

There is no designated scenic vista on or near the project site, nor are there any designated or recognized scenic resources, such as significant trees, rock outcroppings, or historic buildings, within a state scenic highway. Therefore, the first two thresholds of significance are not relevant to the proposed development of the project site. The impact of the proposed project on the visual character of the surrounding area is assessed based on the latter two criteria.

4.12.3 IMPACTS AND MITIGATION MEASURES

Aesthetics

Project Effects on the Project Site. Aesthetic impacts related to the proposed Alamitos Ridge Residential project include changes to the overall visual character of the project site from

undeveloped, highly disturbed site conditions with oil extraction activities to planned single family residential. The proposed project changes the overall visual characteristic of the site from disturbed inland valleys and foothills to urban. The existing visual condition of the project site and its relationship with the surrounding land uses are represented in Viewpoints 1 through 4. The proposed project's urban residential characteristics are similar to the areas west and east of the project site and are visually compatible.

The project site is designated for Mixed Use development by the City of Long Beach General Plan. Residential uses are allowed within this land use category. Therefore, development of the project site with the residential planned use would be consistent with the goals and policies of the General Plan to promote land uses compatible with each other in this designation.

These visual changes will not significantly impact the overall visual quality of the project site in the long term as seen from the majority of adjacent viewsheds because the proposed changes in land use are consistent with uses allowed by the General Plan and are similar to, and thus compatible with, adjacent residences. In addition, implementation of building and landscape design guidelines will enhance the visual character of the project site and general area.

Analysis of Potential Impacts from Construction and Well Operations. The potential juxtaposition of producing oil wells and new residences is illustrated in Figure 3.4, Phase I Interim Site Plan. The figure identifies the minimum 50 building setback radius around producing wells. The building footprints within the radius will not be constructed until the wells are closed. In several locations, the wells will be located adjacent to the future streets, which have been designed to include additional parkway where necessary to accommodate the existing wells.
Short-term construction emissions would exceed the SCAQMD daily thresholds for the criteria pollutants of NO_X and PM_{10}, including fugitive dust. While dust will be reduced during construction activities through the implementation of mitigation measure 10.1, short-term construction emissions will remain significant after implementation of identified mitigation measures. The presence of dust during construction will have an adverse effect on the aesthetic quality of the site in the short term.

The short term aesthetic impacts of the operating oil wells will occur as a result of well maintenance activities. Maintenance is generally performed for operating oil wells once a year. The maintenance activities are typically completed within a one to seven day period. The maintenance activities involve the presence of a maintenance rig comprising a flatbed truck with a pulling hoist attached. The hoisting rig can reach 100 feet high when fully extended. The major activities undertaken during maintenance are scheduled cleaning of the casing, pump and associated equipment. In some cases, the well casing and lifting rods are removed for replacement or maintenance. While the maintenance activity results in an adverse short-term impacts, the temporary nature of the effects and the fact that they will be disclosed to future residents and property owners result in adverse impacts that are below a threshold of significance.

Short-term visual impacts may also result from fugitive dust during construction. Thee impacts are short-term in nature, and will not affect any designated or protected views or vistas. Therefore, the short-term visual impacts associated with dust from construction is not a significant adverse impact.

The residences that are developed adjacent to operating oil wells will experience long term adverse visual effects from the presence of pumping operations, including operating pumps that are typically 15 to 18 feet high. The presence of the oil operations will affect the views from inside the homes, primarily from side windows, and views outside in the yards. While this effect will be mitigated through the use of 8- and 10-foot screen walls around the wells, the aesthetic impact of operating oil wells adjacent to residences cannot be reduced to below a level of significance.

Analysis of Potential Effects on Adjacent Properties. Several views were analyzed, including general views over the project site from the identified locations. The project site is visible to adjacent properties in the cities of Long Beach and Signal Hill. The proposed development of residences on the site would affect residential areas west and east of the project site. These visual impacts would affect foreground views from existing residential units on the west side of Obispo Avenue as seen from Viewpoint 1 (see Figure 4.12.2a).

There are two areas of potential impact:

1. There are three 2 story dwellings on the west side of Obispo Avenue north of 20th Street that have views northeasterly and easterly over the proposed project. These views were analyzed from outside of the units. The proposed project is situated approximately 60 to 100 feet away, across the street and slightly downhill from these residences. Due to the drop in elevation and the low profile of the proposed project, the project will have minimal impact on the existing views.

2. There is a medium-high density residential complex on the east side of Redondo Avenue. An existing border of trees and shrubbery surrounding this complex and its lower elevation limits the direct views of the project site from this complex.

In addition, the viewpoints displayed on Figures 4.12.3a and 4.12.3b are views of the proposed project site from industrial and undeveloped sites surrounding the project site. These adjacent sites are not considered sensitive viewers. Therefore, they would not be adversely impacted by the visual change resulting from the conversion of the site from undeveloped oil extraction parcels to an urban residential area.

In general, the proposed development will transform the unsightly conditions of the property, currently used as a staging and open space storage yard, to a well planned and landscaped neighborhood. This change will remove blight and improve a currently underutilized parcel. There are no identified scenic vistas or designated highways in the vicinity of the project site; therefore, the project will not impact such resources.

Light and Glare

Light and glare impacts will be minimal due to the nature of the residential development of the proposed project. Light sources will be created on the site through lighting along streets, around residential units, and along common open space. These light sources will add to the existing ambient light in this urban area. Because of the in-fill nature of the project, these new sources of light will

add to the urban fabric of lighting already established in the area by past development. The additional light will not be a significant impact due to the relatively low light emissions associated with street lights and residential light sources within this urban context.

Potential light and glare impacts associated with existing and future road improvements are not considered to be significant due to the nature and intensity of light emissions from light standards and traffic control devices, and the existing surrounding land use character.

Mitigation Measures

There are no significant impacts to views resulting from the project, and there are no significant light and glare impacts resulting from the project. Therefore, no mitigation measures are required. Mitigation Measure 12.1, below, is a precautionary measure intended to ensure that information is provided to future property owners and residents about the ongoing oil operations and nearby industrial areas.

12.1 Prior to the issuance of use and occupancy permits, the applicant will provide the Director of Planning and Building with a disclosure form from the State Department of Real Estate to be signed by all prospective residents in the Alamitos Ridge project. This disclosure form will include the acknowledgment of operating oil wells on the project site and the location of fuel storage facilities, and industrial areas east of the project area.

4.12.4 CUMULATIVE IMPACTS

Aesthetics, Light and Glare

Future projects that have been identified by the City are extensions of existing developments, or infill projects, and are located on relatively flat areas. The school proposed directly to the north will add night security lighting and parking lot lighting to this urban area.

The proposed project site encompasses the north flank of a gradually sloping hill, and is not visible from regional vantage points but is visible from adjacent residential areas. The adjacent residential developments have been analyzed earlier in this section, and are not anticipated to contribute to cumulative visual effects. For this reason, the proposed project, in conjunction with reasonably foreseeable future projects, will not result in significant cumulative aesthetic or light and glare impacts.

4.12.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

The proposed project will convert the existing disturbed site to an aesthetically improved planned residential community. There are no designated scenic vistas or scenic highways in the vicinity of the project site. The conversion from a partially undeveloped open storage yard and oil production area to residential use will enhance views from adjacent industrial and residential properties. The proposed project will result in a positive aesthetic improvement to the site and will improve

compatibility of existing development with surrounding development. The proposed project will reduce the existing blight of the undeveloped oil production site at build out.

Short term visual impacts may also result from fugitive dust during construction and from the maintenance of the active oil wells for up to one week, typically once per year. Thee impacts are short-term in nature and will not affect any designated or protected views or vistas. Therefore, the short-term visual impacts associated with dust from construction is not a significant adverse impact. The developed residences that are adjacent to operating oil wells will experience adverse visual effects from the presence of oil pumping operations, including operating pumps that are typically 15 to 18 feet high. While this effect will be mitigated through the use of 8-foot screening walls, and the presence of operating wells will be disclosed to home buyers, this effect cannot be reduced to below the level of significance.

4.13 PUBLIC HEALTH AND SAFETY

The following presents an evaluation of potential impacts to public health and safety resulting from occupation of the proposed residential project on the site of active and abandoned oil wells and oil contaminated soils. This evaluation is based on environmental conditions of the project site reported in several reports documenting site soil investigations, remediation activities, and health risk assessments as follows: Human Health Risk Assessment (ENVIRON 2002); Health Risk Assessment (Environ, June 1999); Health Risk Assessment—Signal Hill and Long Beach Sites (Environ, September 1996); Site Assessment (Gradient, July 1998); Supplemental Environmental Investigation (Gradient, February 1999); and Supplemental Environmental Investigation (Leighton 1997). These reports are available for review at the City of Long Beach. The evaluation of impacts is also based upon the Remedial Work Plan for Alamitos Ridge Development (Brencon, LLC, 2002), included as Appendix F.

4.13.1 ENVIRONMENTAL SETTING

Issues related to public health and safety on, and in the immediate vicinity of, the project site include the following:

- Potential fire, health, and safety issues associated with the past and current usage of the site as an oil field and an oil field construction staging area and equipment storage yard.
- Hazardous materials stored and transported to and from adjacent properties.
- Safety risks from catastrophic water reservoir failure of City operated reservoirs south and east of the project site.

Existing conditions and constraints related to hazardous waste/materials and fire hazards are discussed below. Issues related to seismic safety are discussed in Section 4.3, Geotechnical Conditions.

Hazardous Materials Regulatory Overview

In understanding the analysis and characterization of "hazardous" and "toxic" materials and "designated waste," it is useful to understand what qualifies a material under these terms, as defined by State and federal laws. In the most general terms, hazardous materials are toxic, ignitable, corrosive, reactive, and/or carcinogenic substances, any one of which would qualify a substance as hazardous. A regulated hazardous material may be pure in form or may exist as a constituent of a compound, such as compounds that are additives in common household cleansers, gasoline, or solvents. Once a hazardous material can no longer be used for its original purpose, it is considered to be a hazardous waste. Crude oil is not a hazardous waste; it is considered a "designated waste," potentially having impacts on soils, surface, and subsurface water resources. This substantially

simplifies the State and federal definitions of a hazardous material and waste. The State and federal regulations regarding hazardous materials and wastes are more specific and complex than this brief summary.

The handling, use, storage, emission, transport, and disposal of hazardous materials, hazardous wastes, and designated wastes are specifically regulated by a number of federal, State, and local agencies. These agencies implement a wide range of federal and State regulations with the intent to minimize potential risks to public health and safety.

At the federal level, the primary agencies responsible for regulating hazardous materials and wastes management practices include the United States Department of Transportation and the United States Environmental Protection Agency (EPA). Legislation that granted authority to these agencies includes the Hazardous Materials Transportation Act, the Resources Conservation and Recovery Act, the Federal Water Pollution Control Act, and the Clean Water Act, among others.

At the State level, agencies responsible for regulating the use and disposal of hazardous materials and wastes and for providing emergency response assistance include the Department of Health Services (DHS), the Department of Toxic Substances Control (DTSC), the Water Resources Control Board, the Offices of Emergency Services, the California Division of Oil, Gas, and Geothermal Resources (DOGGR), the California Department of Transportation (Caltrans), and the California Highway Patrol (CHP). Legislation granting authority to these agencies includes the California Hazardous Substance Control Law (Health and Safety Code Division 20, Chapter 6.5) standards established by the DHS, Office of Statewide Health and Planning, and the California Code of Regulations, Title 30, Chapter 22, among others.

At the local and regional levels, agencies responsible for regulating the reuse and disposal of hazardous materials, hazardous wastes, and designated wastes include the City of Long Beach, Los Angeles County Hazardous Materials Division, Long Beach Department of Health Services, Long Beach Fire Department, Los Angeles County Department of Health Services, Los Angeles County Sanitation District, the Regional Water Quality Control Board (RWQCB) and the South Coast Air Quality Management District (SCAQMD).

The regulation and control of hazardous materials, hazardous wastes, and designated wastes can vary, depending on the agency and the specific regulations, and can include the following:

- Permits required for the drilling and abandonment of oil wells.
- Permits required for handling, use, storage, transport, or disposal of hazardous materials or wastes.
- Restrictions and controls on the use or implementation of hazardous or toxic materials. For example, the operation, and/or abandonment of oil extraction wells in the vicinity of occupied residential units.
- Restrictions or controls on the quantity of hazardous materials or wastes that can be stored on the site; the labeling and signing of all containers, buildings, and vehicles containing hazardous materials.

Because the regulation and control of hazardous materials and wastes are extensively regulated by a variety of federal, State, and local agencies, most uses are regulated sufficiently and do not require additional mitigation to avoid significant impacts from hazardous materials and wastes.

Review of Regulatory Records

Databases of several State and federal regulatory agency records were reviewed with regard to the subject property and adjacent properties to determine whether any environmental problems currently exist or have existed in the past. A copy of the regulatory agency records search from VISTA Information Solutions, Inc., is included in Appendix E. A summary of the agency records reviewed is presented below.

Project site:

- UST/AST (Registered underground or aboveground storage tanks)

  The UST/AST list identifies the presence of registered underground and aboveground storage tanks on the site. Being included on the this database does not indicate a violation or release.

Within a one-eighth mile radius of project site:

- Cortese List (State Index of properties with hazardous waste)—1 site
- UST/AST—2 sites
- ERNS (Emergency Response Notification System of spills)—1 site
- GNRTR (RCRA registered small or large generators of hazardous waste)—4 sites

Between one-eighth mile to one-quarter mile radius of project site:

- LUST (Leaking Underground Storage Tanks)—3 sites
- Cortese List—2 sites
- UST/AST—6 sites

Between one-quarter mile to one-half mile radius of project site:

- LUST—3 sites
- Cortese List—3 sites

Between one-half mile to one mile radius of project site:

- SPL (State Equivalent Priority List)—1 site

Oil and Injection Wells

The proposed project site is located within the Long Beach Oil Field, an active oil production operation. The Long Beach Oil Field is extensive throughout the City of Long Beach and is operated by Signal Hill Petroleum. Oil extraction activities have been conducted on the project site for many decades. Currently, there are 19 wells located within the development project area boundaries; six are injection wells and 13 are oil wells, also called producing wells. Of these 19 wells, four are previously abandoned and two are partially abandoned.

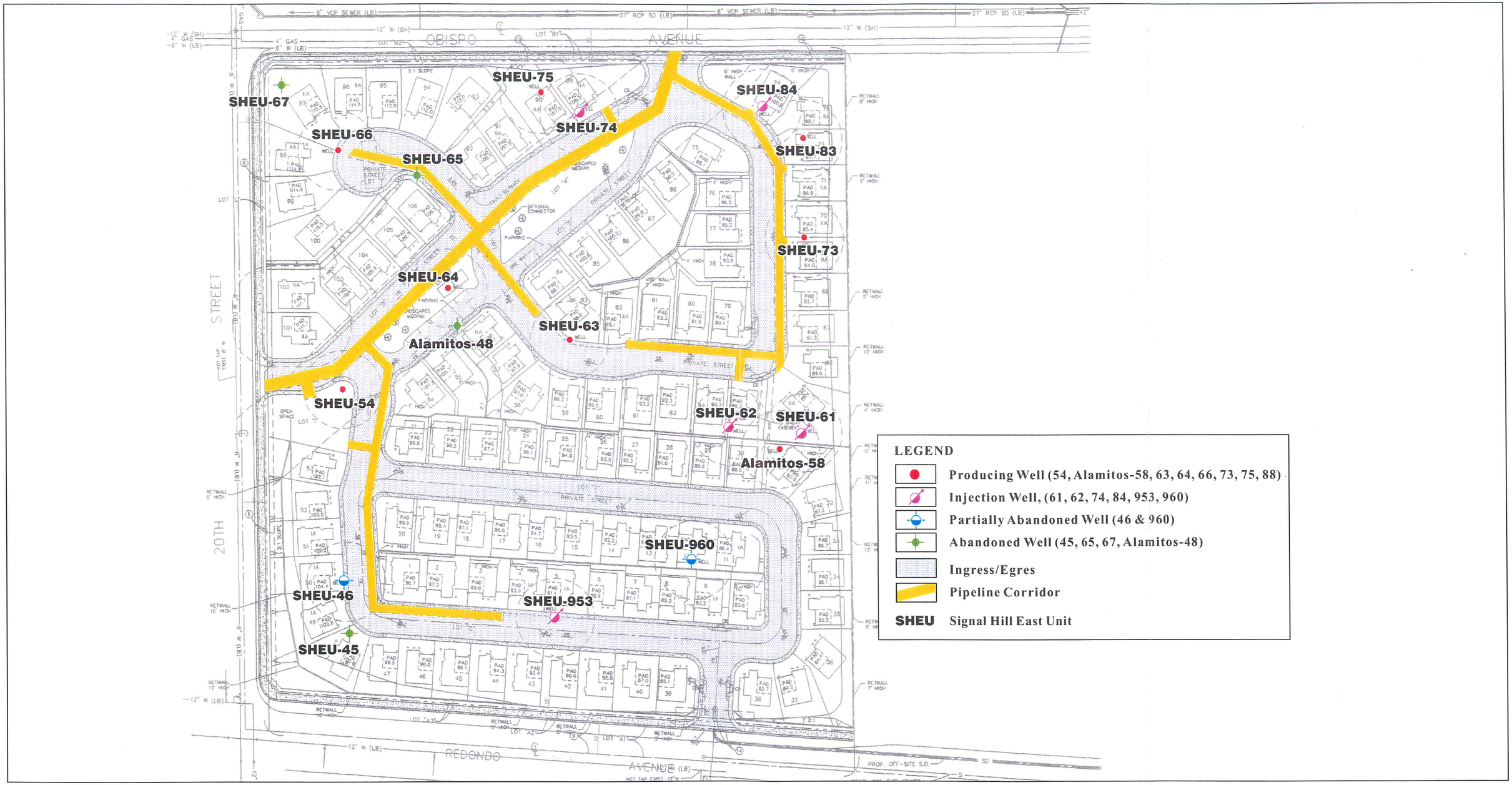
Producing Wells. These wells, generally called oil wells, pump petroleum, often mixed with water and gas, from the ground. Producing wells separate the petroleum and gas from the water. The water is transferred to an injection well for reuse. The main components of a completed well are a pumping unit, several lengths of steel pipe known as casing, and cement to hold the casing in place. The depth of the casing into the ground generally ranges from one-quarter to one-half mile. The project site has 13 producing wells, four of which are abandoned, and one that is partially abandoned. A partially abandoned well has had the well casing filled with cement. The casing slab, however, remains above ground for locating, and has not been capped. The abandoned wells are Alamitos-45, 48, 65, and 67. The partially abandoned well is 46, and the operating wells are Alamitos-54, 58, 63, 64, 66, 73, 75, and 83.

Injection Wells. The purpose of an injection well is to increase oil recovery and to safely dispose of the water produced with oil (and natural gas). Water is injected into petroleum reservoirs to increase pressure, thereby increasing oil production. The injected water, mixed with oil and gas, is pumped from a producing well. At a producing well, once the oil and gas are separated from the water, the water is transferred back to the injection well to repeat the injection cycle. There are six injection wells on the project site, numbers 51, 62, 74, 953, 360, and 960. All of the injection wells are operating except number 960, which is partially abandoned.

Four producing wells were previously abandoned, four will be abandoned as part of the project, five are active injection wells, and eight are active producing wells that will be abandoned prior to build out. The four abandoned wells were abandoned in accordance with the standards of the DOGGR (i.e., capped 15 feet to 20 feet below ground surface). Operating, abandoned, and partially abandoned producing and injection wells on the project site are shown in Figure 4.13.1.

Oil Extraction Spills and Drilling Contamination Hazards

Crude oil is considered a designated waste, not a hazardous waste, under current California regulations. Regulatory agencies consider designated wastes to have the potential to degrade the waters of the State. For sites that are contaminated by crude oil or other petroleum hydrocarbons, regulatory agencies in the Los Angeles area operate on a case by case basis in determining cleanup requirements. Therefore, once the "designated wastes" and/or "hazardous" constituents on a site are thoroughly identified, the appropriate regulatory agency is contacted to establish the cleanup



LSA

FIGURE 4.13.1

N

0 60 120
FEET

SOURCE: DRC, Inc., Drilling & Production Company

I:\LPL030\Existing Wells.cdr (8/1/02)

Alamitos Ridge Residential Project EIR

Existing Wells

guidelines for the site. This procedure has been implemented for the site and is further discussed later in this section. In this case, the Lead Agency for site cleanup has been identified as the RWQCB.

Evidence of on-site contaminant release locales was identified during the field investigation and supplemental environmental investigation performed by Environ (1999). During oil well drilling operations, drilling mud is mixed in an unlined pit (sump) excavated adjacent to the well being drilled. The sump serves as a settling basin for the removal of larger particles. After removal of larger particles, the drilling mud is pumped from the sump back down into the boring. After completion of the well, the drilling mud in the sump is typically allowed to dry naturally before being covered with soils and brought back to the original grade. Records of the locations of these sumps are not always maintained, but they are typically found adjacent to each well.

Drilling mud is slurry of various clays and additives, and commonly includes arsenic, barium, and chromium. Metal analyses of soil materials collected from the on-site sumps were reported with arsenic, barium, and chromium concentrations below the general background levels for the western United States (Conner and Schachlette 1975). By virtue of its exposure to the open boring, drilling mud within the sump could also contain crude oil encountered during drilling. In performing the site analysis, sampling of soils was conducted at the eastern portion of the site in May 1998, and the western portion of the site in December 1998, by Gradient Engineers (Environ 1999). It is clear from site records and inspection that sumps existed on the site.

Soil samples were analyzed for the following chemicals of concern: total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene, and total xylenes (BTEX); volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs, including polycyclic aromatic hydrocarbons); Title 22 metals; polychlorinated biphenyls (PCBs); and/or chlorinated pesticides. Groundwater was not encountered in any of the borings to 100 feet below ground surface and, therefore, was not sampled (Environ 1999).

The stained soils encountered throughout the site were generally reported with detectable petroleum hydrocarbons. Due to the general absence of VOCs, SVOCs, metals, and PCBs in the stained materials, the petroleum hydrocarbons reported are attributed to the presence of unrefined petroleum hydrocarbons (crude oil) (Gradient Engineers 1999). Regarding THP, according to the Preliminary Environmental Assessment (PEA) Guidance Manual, the California Environmental Protection Agency (CalEPA) Department of Toxic Substances Control does not consider TPH to be useful for risk assessment purposes (Environ 1999).

Well Cellars. As noted during Leighton's investigation, oil staining is common in the immediate vicinity of each of the on-site oil wells, and is expected adjacent to buried abandoned wells. A cement containment structure (well cellar) was constructed around each wellhead to capture spillage from well maintenance, equipment malfunction, and normal seepage. Not all of the spillage, however, was contained by the well cellars, and some petroleum hydrocarbons were released into the soil surrounding the wells (Leighton 1993).

The materials spilled from the well cellars consist primarily of crude oil. Some grease and brine may also be associated with the spills. The extent of crude oil staining immediately adjacent to and beneath the well cellars cannot be assessed until the cellars are physically removed during site preparation for the residential development.

Well Spillage. Crude oil spillage adjacent to the on-site wells is common on the project site. Near surface materials, 0 to 1.5 feet below ground surface (bgs) and up to 100 feet laterally from the oil wells, were frequently stained with petroleum hydrocarbons, often occurring as thin layers in the soil. The degree of staining varied from area to area.

Oil Pipelines. Leighton has documented the presence of numerous subsurface pipelines traversing the site, including crude oil pipelines, vacuum lines, and electric, telephone, and gas utility lines. These lines are generally either shallowly buried or exposed at the surface. It is not uncommon to encounter petroleum hydrocarbon releases from some of the pipes as a result of deteriorating piping due to age and faulty connections. These releases are generally present in the near surface (upper several feet) soils.

Due to the number and extent of oil pipelines traversing the site, the extent of crude oil staining adjacent to and beneath the pipelines cannot be assessed until the pipelines are physically removed as part of site preparation for the new development.

Fire Hazards on the Project Site

Because of current and historic oil extraction activities on the project site, there is a possibility of fire hazards from oil wells and active pipelines on the site. The oil wells and pipelines are maintained as specified by the City of Long Beach Oil Code.

Off-Site Hazards

Transport of Hazardous Materials. Interstate 405 (I-405), Willow Street, Cherry Avenue, Redondo Avenue, Hathaway Avenue/Obispo Avenue, and Pacific Coast Highway (PCH), all of which are existing public streets in the vicinity of the Alamitos Ridge site, are currently used by vehicles transporting hazardous materials and wastes. As a result, there is the potential for spills of hazardous and/or toxic substances on these roads. The potential for spills on roads in the project area is anticipated to be similar to other freeways and other local streets in the cities of Signal Hill and Long Beach (I-405, Willow Street, Cherry Avenue, Hathaway Avenue/Obispo Avenue, and PCH).

The transport of hazardous materials and wastes is regulated by federal and State law. Regulations strictly control the design and size of transport vehicles, the training of vehicle operators, the types of materials that can be transported, the documentation of the material from its source to its destination, and procedures in the event of an accidental spill. In addition, Caltrans, the CHP, and most local police and fire departments are trained in emergency response procedures for safely responding to accidental spills of hazardous and toxic substances on public roads.

City of Long Beach Water Reservoirs Southeast of the Site

Approximately 23 water tanks are located on a graded hilltop southeast of the project site. Should one or more of these tanks suffer catastrophic failure, water would be released from the hilltop area to surrounding lower elevation properties. Water released from these tanks would flow in a southerly and northeasterly direction. Based upon review of topography maps (U.S.G.S. Long Beach Quad), water flow in the vicinity of the project site would be primarily northeasterly, flowing in the general vicinity of Loma Avenue.

Standard Regulatory Requirements for Grading and Remediation Activities

The project applicant must prepare a Health and Safety Plan for all construction workers in accordance with federal, State, and local regulations, for use during construction, subject to review and approval by the Director of the Planning and Building Department. Federal regulations include the following:

- Occupational Safety and Health, Title 29 Code of Federal Regulations (CFR), Regulations for General Industry (Part 1910) and Construction (Part 1926).
- Environmental Protection Agency (EPA), Title 40 CFR, National Emissions Standard for Hazardous Air Pollutants (NESHAPS), (Part 61, Subpart A).
- United States Department of Transportation (USDOT) Regulations, Title 49 CFR.

California State and local regulations include the following:

- Title 8 California Code of Regulations (CCR), California Occupational Safety and Health Administration (Cal-OSHA) Regulations, Chapter 4, Division of Industrial Relations, General Industry Safety Orders and Construction Safety Orders.
- Title 22 CCR, Social Security, Division 2, Department of Social Services—Department of Health Services, and Division 4, environmental Health.
- South Coast Air Quality Management District (SCAQMD), Rules and Regulations regarding airborne transport of contaminants.

The Health and Safety Plan must include a summary of all potential risks to construction workers, monitoring programs, maximum exposure limits for all site chemicals, and emergency procedures. A Site Health and Safety Officer must be identified in the plan. The plan must specify methods of contact, phone number, office location, and responsibilities of the Site Health and Safety Officer. The Health and Safety Plan must specify that the Health and Safety Officer shall be contacted immediately by the contractor should any potentially toxic chemical be detected above the exposure limit or should evidence of soil contamination be encountered during site preparation and construction. The City Fire Department is to be notified due to evidence of soil contamination. Likewise, in accordance with the partial closure "No Further Action" (NFA) letter from the RWQCB, dated July 18, 1997, the agency ". . . must be notified and appropriate actions (e.g., determine extent, limit site worker exposure) must be taken if evidence of soil contamination are (sic)

encountered during site redevelopment at the subject property." The Health and Safety Plan is required to be amended as needed if different site conditions are encountered by the Site Health and Safety Officer.

On-Site Remediation

Remediation of the sumps and all contaminated soils was begun by Signal Hill Petroleum under rules and regulations governing the Long Beach Oil Field, under the oversight of the LARWQCB. Partial removal of the sumps has occurred. Removal of stained soil and all sumps is planned to begin after City approval of grading permits.

4.13.2 THRESHOLD OF SIGNIFICANCE CRITERIA

The City of Long Beach General Plan Safety Element identifies a number of goals and policies related to public safety and health hazards. In addition, the Safety Element includes implementation strategies and programs to ensure the protection of the public from a wide range of hazards, including hazardous materials and wastes, fire, flooding, and seismic hazards. An impact of the proposed Alamitos Ridge residential project related to public health and safety would be considered to be significant if it exceeded the CEQA thresholds or if it contradicted or violated the City of Long Beach General Plan Safety Element goals, policies, or implementation programs.

Potential impacts related to public health have to do with the risk of human or environmental exposure to contaminants resulting from project activities. This section addresses the potential impacts of known or suspected environmental contamination within the project area. Impacts resulting from project implementation that would be considered significant include the following:

- Creation of a substantial public health hazard involving the use, production, or disposal of hazardous materials that pose a hazard to people or animal or plant populations in the area.
- Contamination of a public water supply.
- Public or environmental exposure to chemicals of concern due to a hazardous material release or improper disposal practices.
- Creation of a public health hazard through the release of airborne emissions or substantial risk of upset.

Impacts to public health and safety were generally assessed using a qualitative approach, with certain impacts assessed using a quantitative approach. The identified impacts have been placed into three categories: less than significant, potentially significant, and significant.

- Less than significant impacts are those identified impacts that do not represent a chemical exposure that would negatively impact public health due to the implementation of standard requirements and the proposed uses/features of the project. An example of a less than significant impact is storage of small quantities of hazardous materials by the future occupants of the proposed project in accordance with all applicable regulations. In a quantitative risk assessment

for chemicals, estimated lifetime incremental cancer risks of less than one in a million are considered to be de minimi or insignificant risks by regulatory agencies. Similarly, Hazard Indices of less than one are considered to be insignificant.

- Potentially significant impacts are potential human exposures to chemicals at levels resulting in lifetime incremental cancer risks within the USEPA acceptable cancer risk range of one in a million to one hundred in a million or Hazard Index greater than one for noncarcinogenic effects. The Department of Toxic Substances Control within the Cal/EPA considers a lifetime incremental cancer risk of one in a million to be a "point of departure" for purposes of regulatory decisions, with most approved cleanups achieving risks of less than ten in a million.
- Significant impacts are defined herein as those identified impacts that would represent a significant risk to human health greater than the criterion of one in a million, even with agency oversight and implementation of the standard requirements identified in Section 4.13.1.

4.13.3 IMPACTS AND MITIGATION MEASURES

An evaluation of potential short-term and long-term impacts to public and resident health and safety is provided below based on the threshold criteria in the previous section.

Assessment of Potential Health Impacts Due to Exposure to Residual Concentrations of Chemicals On Site

In order to assess the potential for residual concentrations of chemicals to pose a potential health impact, an exposure pathway must be complete. An exposure pathway is the mechanism whereby a human receptor may be exposed to chemicals or residual concentrations of chemicals. The four elements of a complete exposure pathway are: 1) a source of chemical release, such as a spill; 2) a mechanism of release through a transport medium or media, such as migration through soil into indoor air; 3) a point of contact between the potential receptor and the transport medium or media, such as ingestion, inhalation, or dermal contact; and 4) a potential receptor, such as a construction worker or future on-site office worker. If any one of these four elements is missing, the exposure pathway is incomplete. Only complete exposure pathways may result in exposures of residual concentrations of chemicals to humans that may cause an impact to human health.

On-Site Hazardous Materials

Potential Impacts of Soil Contamination on the Alamitos Ridge Residential Project Site. The contamination on the project site as identified in the Environmental Setting Section is an existing condition on the site that will be remediated by Signal Hill Petroleum (the responsible party) prior to development of the proposed project. As noted in the Setting Section, partial removal of some of the sumps has already occurred. The remediation process is regulated by numerous federal, State, and local agencies as applied to the Long Beach Oil Field and currently regulated by the RWQCB. The remediation recommendations for the project site are discussed in detail later in this section. The following discussion details the potential overall adverse impact resulting from site contamination.

The Department of Toxic Substances and Control (DTSC) would be considered the lead environmental regulatory agency for the site if on-site materials were found to be hazardous. However, as noted earlier in this section, the existing contamination on the project site is limited to petroleum hydrocarbon materials (crude oil). Due to the nonhazardous nature of these materials, environmental oversight of any future remedial work on the site would be outside the jurisdiction of the DTSC. Therefore, the Lead Agencies for oversight would default to the Long Beach Department of Environmental Health (LBHD) or the RWQCB, or both agencies. Oversight of the nonhazardous materials, according to the LBHD, would fall under the CRWQCB.

According to RWQCB guidelines, a site characterization and assessment must be completed to a specific level of detail to understand the contaminants and the spatial extent of impacted soil before guidance can be applied to potential remediation procedures. Environ, the development applicant's consultant, considers the data collected from its recent site investigation and past investigations by Leighton and Associates and Gradient Engineers, Inc. to be sufficient to delineate the approximate boundaries and the character of impacted soils on the project site.

Remedial Work Plan

To prepare the site for development, a Remedial Work Plan (RWP) was prepared for the project by Brencon, LLC, Environmental Consultants (see Appendix F, Remedial Work Plan, Brecon, LLC, 2002). Environmental remediation of the oil field property at the site will involve the removal of identified impacted soil, the further investigation and subsequent delineation of areas identified during the grading of the site, and documentation of activities being conducted on site simultaneously. Previously identified areas of concern will be excavated and field checked for hydrocarbon staining and odors.

Soil Screening Levels. In evaluating the proposed levels of contaminant remediation, the primary documents utilized were the U.S. Environmental Protection Agency (EPA) Preliminary Remediation Goals (PRG) and the RWQCB guidance documents. The RWQCB review focused on the evaluation of Soil Screening Level (SSL) protocol. In reviewing the protocol documents, the following assumptions were used in evaluating maximum SSLs for total petroleum hydrocarbons as gasoline (TPH-g), and TPH as diesel (TPH-d) as derived from Table 4.1 of the RWQCB *Interim Site Assessment and Cleanup Guidebook*, May 1996 (RWQCB 1996).

The underlying Gage Aquifer is not used as a drinking water source because of the following:

- The underlying aquifer has been identified as containing high levels of total dissolved solids (TDS).
- Further water supply development in the area is unlikely.
- No municipal or domestic supply wells pumping from the Gage Aquifer are within a one mile radius of the subject site.
- A substantial aquitard (greater than 400 feet) separates the 200 foot Sand (Gage Aquifer) and the Upper Silverado Aquifer.

Based on a non-drinking water resource designation, Table 4.1 footnotes (RWQCB 1996) identify maximum SSLs for TPH as those for soil between 20 and 150 feet above groundwater. Applicable SSLs are 500 milligrams per kilogram (mg/kg) for carbon chain C4-C12, 1,000 mg/kg for carbon chain C13-C22, and 10,000 mg/kg for carbon chain C23-32. These values are the lowest SSLs to be applied and, in several cases, the RWQCB and the DTSC have granted much higher levels on a case by case basis.

Proposed Cleanup Criteria. The cleanup criteria proposed for the property are based on current understanding of standards typically accepted by the RWQCB and other relevant agencies, with consideration given to local site conditions and feasibility. The proposed cleanup criteria are founded on federal, state, and local regulations, none of which classify a material as "hazardous" based solely on the presence of petroleum hydrocarbons (crude oil).

The site specific considerations regarding the hydrogeology and risk analysis suggest that the corrective action levels currently published by the RWQCB are conservative and much lower than levels necessary to protect human health. The remedial measures outlined in the following sections of this RWP are designed in both size and performance based on the above identified RWQCB screening levels for soil.

It is proposed that the target soil cleanup levels for the subject site be higher than the above identified RWQCB SSLs. The proposed soil cleanup levels for carbon chain lengths of C6 to C12 is 1,000 mg/kg; 5,000 mg/kg for hydrocarbons with carbon chain lengths of C13 to C22; and 15,000 mg/kg for hydrocarbons with carbon chain lengths of C23 to C44 or more. Proposed cleanup levels will be approved by the RWQCB prior to the start of remediation.

The cleanup goal for total metals concentrations in the soil will be the EPA PRGs for each metal, except for arsenic. Arsenic was found on the site in concentrations exceeding the PRGs. However, these concentrations are indicative of background levels throughout Southern California. Therefore, the remediation of arsenic is not included in the remedial actions proposed in the RWP. If an area of soil containing concentrations of contaminants exceeding the cleanup levels proposed is designated to remain in place because of inaccessibility, the soil will be logged, sampled, and analyzed for the following constituents: TPH by EPA Method 8015M, total lead, and priority pollutants by EPA Method 8270.

Field Evaluation Techniques—Hydrocarbons. The proposed methods for field evaluating the presence of hydrocarbons are visual observation, organic vapor analyzer (OVA) screening, and confirmation sampling protocol. Crude oil contamination is readily identifiable and appears as a staining in the soil. Crude oil contamination will vary from black, oil material at high concentrations to grayish staining or discoloration of the soil at lower concentrations. Additionally, crude oil contaminated soil also tends to have an oily to musty odor. Crude oil odors are discernable even at lower concentrations. Field screening for the presence of crude oil will also be supplemented with the use of an organic vapor meter (OVM). The field technician will be charged with identifying visually stained soil or soil with odors on a daily basis.

Excavation—Hydrocarbons. When crude oil impacted soil is identified during field evaluation, the material will be excavated. Excavation will continue until visually stained soil has been removed. All excavation work will be conducted in accordance with SCAQMD Rule 1166 protocol as well as U.S. Office of Safety and Health Administration (OSHA) Trenching and Shoring guidelines. To confirm the removal of crude oil impacted soil, confirmation soil samples will be collected from the excavation bottom and sidewalls and analyzed for TPH using EPA Method 8015M.

Excavated impacted material will be stockpiled on site and evaluated for the presence of hydrocarbons by sampling and analyzing the stockpile in accordance with EPA Method 8015M. Based on the results of the aforementioned sampling, the soil may be reused on site, bioremediated, or transported off site to an appropriate permitted facility. The soil sample frequency shall be one sample per 500 cubic yards of stockpiled soil.

After physical evidence and field screening results indicate that any soil appearing to contain petroleum hydrocarbons in excess of the cleanup criteria have been removed as described above, verification soil samples will be collected for analysis at a state certified laboratory. If necessary, excavations will be sloped and/or shored for safe entry as required by OSHA.

Excavation Confirmation Sampling. When nearing the completion of a major excavation area, the appropriate representative of the Lead Agency will be notified to witness verification sampling. If the representative cannot be present at the sampling event, verifications samples will be collected using the protocol described below. All analytical results will be provided in the final report.

Soil samples will be collected by an environmental technician familiar with the RWP. The sampling locations and number of samples collected will be site specific, depending on the nature of the excavation. Typically, however, samples will be collected from the bottom and sidewalls of the excavations. The locations and approximate elevations of the sampling points will be recorded and kept in a daily log of all field activities.

The samples to be analyzed will be contained in laboratory supplied glass jars, appropriately sealed, labeled, stored in self-locking plastic bags, and placed in a cooler chilled with "blue ice" for transportation to a state certified laboratory under industry standard chain-of-custody protocols. Verification soil samples will typically be analyzed for TPH using EPA Method 8015M. If the presence of other compounds is suspected in the soil at concentrations exceeding site cleanup levels, soil samples will also be analyzed for those chemical compounds.

Soil Remediation. The proposed methods of treatment for soils impacted above action levels will be bioremediation via land farming and transportation off site. Potential bioremediation/land farming areas will be constructed on the subject property, in accordance with applicable regulations.

Land Farm Area. Prior to the introduction of soil containing petroleum hydrocarbons into the treatment areas, the native ground surface within the treatment areas will be compacted in order to minimize the potential for leaching (although the solubility of crude oil is low). In addition, a

berm will be constructed around the perimeter of the treatment areas in order to contain surface water runoff and run-on.

Bioremediation. The proposed remedial method for remediation of hydrocarbons for this project is bioremediation. In bioremediation, soil is typically placed into a treatment area until it reaches a height of several feet. Once the treatment area has reached the desired height, the upper 18 inches of soil will be treated until it has met the cleanup criteria. This upper lift will then be removed from the treatment area and stockpiled or backfilled into the excavations, and treatment of the next underlying lift will begin. This pattern of successive treatment of lifts will continue until all of the excavated soil is treated.

Operational activities of the land treatment units (LTUs) will conform with CCR Title 23, Division 3, Chapter 15, including Sections 2510 (b-5), 2540, 2550, 2580, 2584, and 2590 (Subchapter 15). The facility will comply with the notification requirements in Article 5 of Subchapter 15. Grading, waste discharge, air, and health permits will also be obtained before beginning land treatment operations. As part of the permitting process, Alamitos Land Company will prepare land treatment and excavation reports for submittal to the regulatory agency. In addition, the operation of the LTUs will be conducted to avoid adverse effects on water quality.

Treatment of the soil by land farming will consist of: 1) mechanically discing and/or pulverizing of the soil on a regular basis for aeration; 2) maintaining optimal moisture content through periodic watering in order to facilitate biodegradation by the indigenous soil bacteria; and 3) adding nutrients to facilitate microbial activity, if warranted. Typical nutrients used are ammonium phosphate or nitrogen (urea). Bacterial activities will biologically degrade petroleum hydrocarbons present in the soil to an end product consisting primarily of carbon dioxide, biomass, and water. Treatment progress will be monitored by random sampling and analysis for carbon-chain identification using EPA Method 8015-CC/ID. Nutrient concentrations, discing or pulverizing frequency, and other treatment parameters will be adjusted based on petroleum hydrocarbon degradation rates.

Odor/Vapor Control. Volatile air emissions are not anticipated to be significant during site construction operations. However, perimeter air monitoring, consisting of collecting perimeter air readings with a handheld flame ionizing detector (FID), will occur when site construction operations are being conducted. Air monitoring with a FID will occur during soil processing in the LTU. The soil in the LTU will be monitored immediately above the soil at several random locations. The FID will be used to detect the presence of volatile organic compounds (VOCs) that may have been generated by the remediation activities. A qualitative visual check also will be performed to assure that significant quantities of dust are not migrating off site.

Should perimeter monitoring indicate total VOC concentrations of 50 parts per million (ppm) or more above background, emissions will be immediately reduced by initiating an odor and vapor suppression program. Initially, water spray will be utilized. A biodegradable surfactant can be used for short-term vapor suppression and odor control, which is dissolved in a 4,000 gallon water truck and applied using spray bars. The use of biodegradable surfactants has been

approved by the SCAQMD in the reference to Rule 1166 for VOC emissions from decontamination of soil. The use of surfactants will suppress vapors and control odors, and will not be detrimental to the biodegradation process.

Once process monitoring indicates that the soil contained in the current treatment lift meets the proposed cleanup criteria for the site, final confirmation sampling will be conducted.

Confirmation Sampling—Hydrocarbons. When treatment lift confirmation sampling is to be performed, the appropriate representative of the Lead Agency will be notified to witness the sampling event. If the representative cannot be present at the sampling event, confirmation samples will be collected using the protocol described below. All analytical results will be provided in the final report.

Soil samples will be collected by an environmental technician familiar with the RWP. The sampling locations and number of samples collected will be site specific depending on the nature of the excavation. Typically, however, samples will be collected at a frequency of one per 1,000 cubic yards. The locations and approximate elevations of the sampling points will be recorded and kept in a daily log of all field activities.

Grading Operations. The site is slated for redevelopment as a residential development. The site plans call for overexcavation, recompaction, and grading of the entire project area. As such, it is proposed that an environmental technician familiar with the RWP and remediation operations be present on site during all grading operations.

Samples from the grading operations will be collected on a less frequent basis than proposed remediation operations, but will be geared to confirm that the general site soil is free of hydrocarbons in excess of the site cleanup goals. The grading material will be sampled at a target frequency of approximately one sample per 2,000 cubic yards. Sampling will be performed as the soil is placed to confirm and document that all material reused on site meets the cleanup criteria.

In addition, soil samples will be collected on a less frequent basis and tested for the full list of common environmental contaminants pursuant to the following analytical schedule:

Volatile Organic Compounds	EPA Method 8260
Semi-volatile Organic Compounds	EPA Method 8271
PCBs and Pesticides	EPA Method 8080
CAM Metals	EPA Method 6010/7000

This additional analytical testing will be performed to demonstrate the environmental quality of the soil. Soil samples will be collected by an environmental technician familiar with the requirements of the RWP. The sampling locations and approximate elevations of the sampling points will be recorded and kept in a daily log of all field activities.

The samples to be analyzed will be contained in laboratory supplied glass jars, appropriately sealed, labeled, stored in self-locking plastic bags, and placed in a cooler chilled with "blue ice" for transport to a state certified laboratory under industry standard chain-of-custody protocols.

Off-Site Disposal. The proposed remedial method for the soils containing elevated concentrations of lead and benzene is off-site disposal. Areas containing lead and benzene levels exceeding the PRGs will be excavated. Soils from these excavations will be placed on visqueen sheeting. Once an appropriate amount of soil is excavated, a technician will obtain samples from the sidewalls and bottom of the excavation.

The samples collected will be analyzed at a California state certified laboratory for either benzene or lead, as appropriate. If the excavation samples indicate that the chemical constituent is no longer present above the PRG, the excavation will be deemed complete. If the samples exceed the PRGs, additional soil will be removed and confirmation sampling retaken.

After complete removal has occurred, soil samples will be taken from the stockpiles generated. The stockpile samples will be analyzed in accordance with the appropriate permitted disposal site acceptance criteria. Once the soil is profiled into the facility, appropriate manifests will be completed and the stockpiled soil hauled off site. Alamitos Land Company reserves the right to alter this remediation approach if benzene and/or lead soil volumes increase above those currently expected.

Health and Safety Provisions. Maintaining adequate health and safety provisions on a work site where hazardous materials and/or hazardous work conditions are a potential is of paramount importance. All work on the Alamitos Ridge site will be conducted in accordance with an appropriate Corporate Occupational Health and Safety Program in compliance with OSHA Injury Illness and Prevention Plan requirements. These plans provide the policies and procedures governing project operations in accordance with State and federal government regulations (29 CFR 1910.120 and 1926, and CCR Title 8).

A site specific Health and Safety Plan (HSP) will be prepared for this project. The HSP addresses safe work practices associated with the remediation of the site. Site activities will be conducted under and governed by the HSP. Documentation of training and medical surveillance participation are required from personnel assigned to this project or project site. Personnel either working on the site or visiting will be required to read and acknowledge receipt, by signature, of the HSP.

Documentation/Closure Report. Data obtained during remediation of the property will be included in a comprehensive report presenting all data collected. The report will include detailed maps illustrating significant excavation locations and confirmation sample locations (fill and excavation bottom and sidewall samples). Tables will summarize all laboratory analytical results from samples collected and analyzed, as well as analytical laboratory reports and chain-of-custody documentation.

Field activities will be recorded by on-site personnel on a daily basis. The final report will be submitted to the Lead Agency for approval and sign-off, and to the RWQCB for site closure.

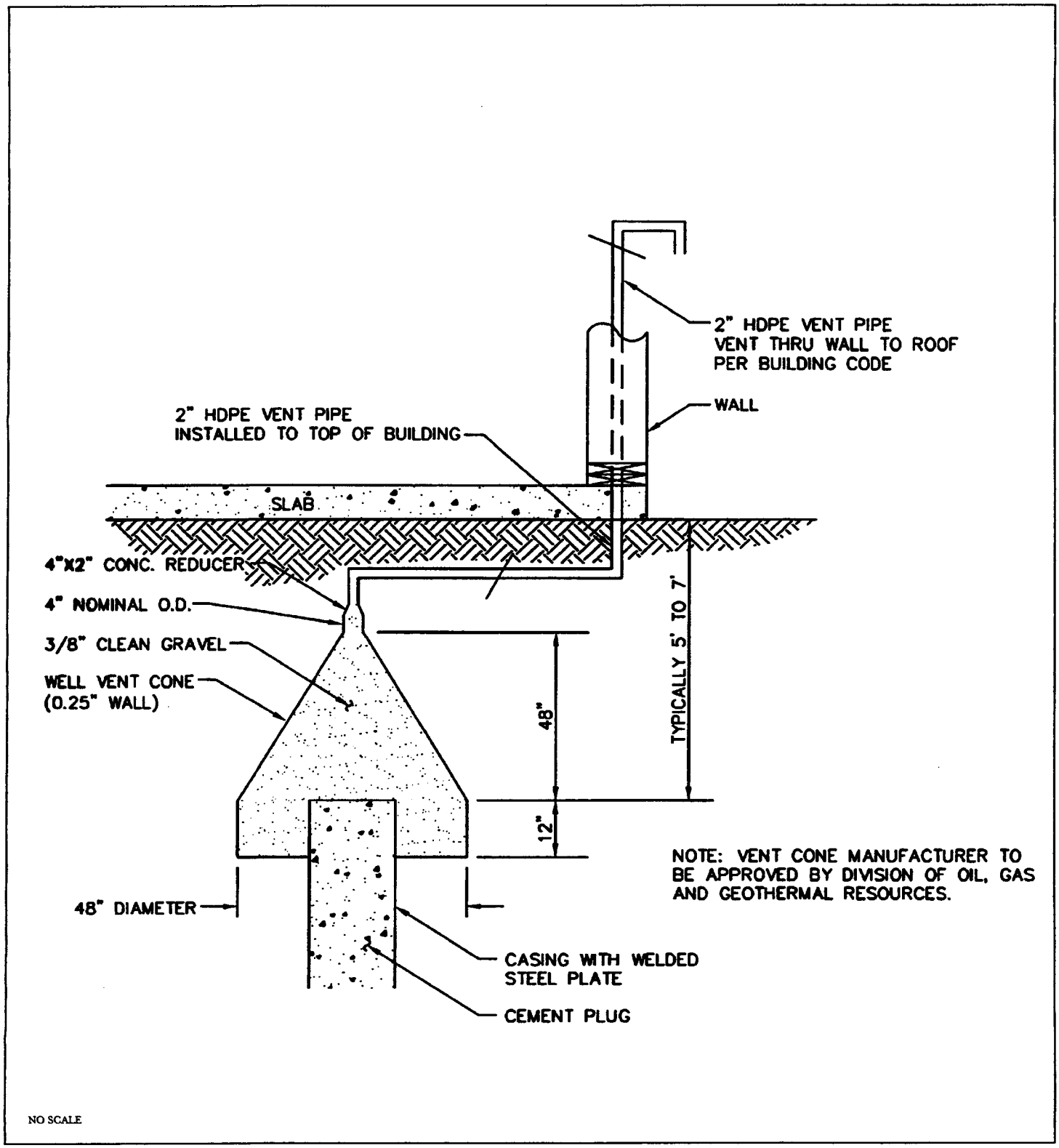
Well Abandonment Procedures. Oil and injection wells at the site will be abandoned in accordance with the California Code of Regulations, Title 14, Chapter 4. These standards require submission of a separate Notice of Intent (NOI) to abandon each well to the DOGGR. The DOGGR will review the notice and work program and, if approved, will issue a "Permit to Conduct Well Operations" for each well. A "History of Oil or Gas Well" form that records the abandonment must be completed and submitted to DOGGR. The DOGGR will issue a "Report on Operations" approving the abandonment or noting any deficiencies.

In general, onshore well abandonment involves plugging the well with at least a 245 foot cement plug, cutting off the well casing at least five feet below ground surface, and welding a steel plate at least as thick as the outer well casing around its circumference at the top of the casing, after DOGGR approval of the surface plug (§1723.5)

The four previously abandoned wells will be excavated to the well head, inspected for oil leakage, and tested for gas leakage by DOGGR or under its supervision, and evaluated for potential reabandonment. The oil field engineer shall submit recommendations to the DOGGR for review and approval. If required by DOGGR, the reabandonment procedures described above will be followed. The two partially abandoned wells shall be fully abandoned at project build out.

Methane Gas Venting from Abandoned Wells. In 1970, the DOGGR established standards for the abandonment of oil and gas wells if structures are to be constructed on or in the proximity of the wells. Any wells abandoned before these standards were in place must be evaluated for reabandonment. Previous well abandonment procedures for older wells on the property may not conform to standards currently required by the DOGGR. For example, current standards require an increased amount of concrete to plug the well, as compared to previous standards. Therefore, older wells located on the property may require reabandonment to bring them up to current State standards. If, during the construction process, any previously unknown well is discovered, DOGGR is required to be notified immediately so abandonment procedures or remedial plugging requirements can be determined. All remediation and/or methane gas venting plans must be approved by DOGGR to ensure safe conditions within structures. Methane in open air disperses and does not present a health or hazard concern.

Due to the potential for natural methane gas releases from abandoned on-site wells, a venting system will be installed for any well that lies within 20 feet of a proposed residential structure, regardless of the depth of fill. Venting requirements are the same for both abandoned oil wells and abandoned injection wells. Figure 4.13.2 illustrates a typical well vent and capped well below a slab. Venting systems would be constructed per plans approved by the City Building Official, the DOGGR, and the Uniform Fire Code (UFC) requirements as specified in the project description.



LSA

FIGURE 4.13.2

Alamitos Ridge Residential Project EIR

Typical Well Vent

Source: DRC, Inc.

I:\LPL030\Well Vent.cdr (7/26/01)

Uniform Fire Code. The City of Long Beach Fire Department uses the Uniform Fire Code (UFC) as its governing code. The UFC requires a 100 foot setback to any inhabitable structure. This setback is reducible to 50 feet with basic well design features and has been implemented in all recent residential projects in the area (e.g., Bixby Ridge).

Regulatory Agency Records Search Findings. According to the agency records search, two underground storage tanks are located on the northeastern end of the project site, near the boundary with the adjacent LBUSD site. The records only indicated the presence of two USTs; no violations or release of product have reportedly occurred. However, with the development of the proposed project, these potential UST locations will be investigated, and any USTs will be closed and removed pursuant to State and county regulatory requirements, as well as the requirements of the Long Beach City Fire Department.

Adjacent Properties Records Search Results. The records search of regulatory agency databases identified several sites within a one mile radius of the project site with environmental concerns. No Superfund or National Priority List properties were indicated in the vicinity. One site was listed on the State equivalent priority list; however, that site is approximately three-quarters of a mile north (downgradient) of the project site. For the other sites that indicated a release or violation, either they were undergoing remediation or the case was deemed closed by the regulatory agency. Several of the sites were listed because of registered USTs/ASTs or were registered as generators of hazardous wastes. However, the records did not indicate the release of product to the soil, groundwater, or air, or had no indications of violations. Therefore, impacts to the project site from other properties within a one mile radius are less than significant, and no mitigation is necessary.

Fire Hazards from On-site Oil Wells and Pipelines

A potentially significant impact has been identified related to the potential for oil well or pipeline failure and leakage, leading to a fire. A potentially significant impact could occur in the event of an oil well fire or pipeline rupture. It is impossible to accurately measure this risk due to the many variables involved (e.g., product type, age, and type of pipeline, etc.). This potential impact can be reduced through mitigation.

ON-SITE HUMAN HEALTH RISK ASSESSMENT

Introduction

A human health risk assessment (HHRA) was prepared by ENVIRON International Corporation (2002) to evaluate potential risks from exposures to chemicals in soils at the Alamitos Ridge property in Long Beach, California (the site). The purpose of the assessment was to evaluate risks to future residents from potential exposures associated with planned residential land use of the site. This EIR analysis of on-site risk is based upon ENVIRON's HHRA.

Method of Analysis

The methods used to conduct the risk assessment were based on guidance from the California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) and the US Environmental Protection Agency (USEPA) in *Preliminary Endangerment Assessment Guidance Manual (PEA)* (Cal/EPA 1994); *Risk Assessment Guidance for Superfund* (USEPA 1989); and *Human Health Evaluation Manual, Supplemental Guidance: Standard Default Exposure Factors* (USEPA 1991).

The Cal/EPA and USEPA risk assessment framework includes four basic elements: (1) data evaluation and identification of chemicals of potential concern (COPCs), (2) exposure assessment, (3) toxicity assessment, and (4) risk characterization. The methods for completing each of the four steps and the risk assessment results are summarized in the following sections. The complete HHRA is documented in Appendix K of this report. References are provided in Appendix K.

Data Evaluation and Identification of Chemicals of Potential Concern

This step of the risk assessment involves gathering and analyzing site-specific analytical data and identifying COPCs for evaluation in the risk assessment. The risk assessment was based on soil samples collected prior to the importing of fill soil and grading that is to be undertaken as part of the site development. Imported soil will be tested in accordance with standard practices and Cal/EPA guidelines.

The environmental data obtained from the sampling conducted by Gradient Engineers (1998 and 1999) was used to identify the site COPCs and to characterize the distribution of these chemicals in environmental media (i.e., soil) for risk assessment purposes. The site was investigated during two separate occasions: the eastern portion during May 1998 and the western portion during December 1998. These two portions, which comprise an area of approximately 14.5 acres, are shown on Figure 1 of Appendix K.

All chemicals detected in one or more samples were selected as COPCs and evaluated in the risk assessment, including component constituents of petroleum hydrocarbons. The detected chemicals were consistent with the previous oil-drilling activities at the site. The COPCs included the volatile organic compounds (VOCs) benzene, toluene, ethylbenzene, and xylenes (BTEX) and the polycyclic aromatic hydrocarbons (PAHs) fluorene, 2-methylnaphthalene, naphthalene, and phenanthrene. In addition, 14 inorganic compounds (arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, silver, vanadium, and zinc) were detected. Detection of metals is not unexpected because metals are naturally-occurring constituents of soil.

Health risks associated with potential exposures to petroleum hydrocarbons were evaluated using the detected concentrations of component constituents for which Cal/EPA or USEPA have published toxicity values, as recommended by Cal/EPA (1994). Those constituents include primarily BTEX and PAHs. All petroleum hydrocarbon constituents detected in one or more soil samples were included in the risk assessment.

Summary statistics for each COPC are presented in Table 2 (all soil data) and Table 3 (surface soil) of Appendix K.

Exposure Assessment

The exposure assessment identifies the potentially exposed populations (receptors), exposure assumptions for these receptors, and the pathways by which the receptors are potentially exposed to chemicals at the site. Exposure point concentrations are also developed. This information is then used to estimate the intake (or dose) of a chemical to the individual receptors.

Potentially Exposed Populations

Based on the proposed future development of the site for residential use, the populations evaluated in the risk assessment were residents. Separate risk estimates were not prepared for current on-site trespassers or workers. This is because a residential scenario typically provides the greatest potential for exposure to site COPCs, so that sites found to have acceptable risk for a residential receptor will also have acceptable risk for other receptors (e.g., trespassers, off-site residents, and on-site workers).

Potential Exposure Pathways

Soil was identified as the only contaminated environmental medium at the site. No surface water bodies are located at or within the vicinity of the site and ground water was not detected within 100 feet of the ground surface. Further, ground water within the vicinity of the site is considered nonpotable (Leighton and Associates, Inc. 1995).

Consistent with the PEA Guidance Manual (Cal/EPA 1994), the following exposure pathways were evaluated for the on-site resident:

- Inhalation of vapors released from soil to ambient air
- Inhalation of soil particulates released from soil to ambient air
- Incidental ingestion of soil
- Dermal contact with soil

Exposure Point Concentrations

Exposure point concentrations are representative concentrations of COPCs that are used in the risk assessment to evaluate potential exposures. For the soil ingestion and dermal contact pathways, exposure point concentrations in soil were derived by calculating the 95% upper confidence limit (95% UCL) of the arithmetic mean concentration of each COPC. For the air pathway, the PEA Guidance Manual (Cal/EPA 1994) recommends that risks be estimated for either exposure to volatile emissions (for VOCs) or to fugitive dusts (i.e., particulates, for metals and PAHs). The methods used to calculate exposure point concentrations for vapors and fugitive dusts are described in Section 4.2.2

of Appendix K. The exposure point concentrations for soil are listed in Tables 2 and 3, and those for air are listed in Table 8.

Population-Specific Exposure Assumptions and Chemical Intakes

The chemical intake (or dose) for the on-site resident was estimated using standard exposure assumptions and intake equations from the Cal/EPA (1994) and the USEPA (1989). The basic intake equation is shown in Section 4.3 of Appendix K and the values for the individual exposure assumptions for each population that were used to calculate the population-specific chemical intakes are presented in Table 10.

Toxicity Assessment

The toxicity assessment characterizes the relationship between the magnitude of exposure to a chemical and potential adverse effects. More specifically, the toxicity assessment identifies toxicity values that can be used to estimate the likelihood of adverse effects occurring in humans at different exposure levels.

The hierarchy of sources for the toxicity values used for this analysis corresponds to the Cal/EPA guidelines:

- Cal/EPA cancer slope factors (CSFs), summarized on Cal/EPA's *Office of Environmental Health Hazard Assessment (OEHHA) website* (Cal/EPA 2002a);
- Cal/EPA reference exposure levels (RELs), summarized on Cal/EPA's *OEHHA website* (Cal/EPA 2002b);
- CSFs, Reference Doses (RfDs), and Reference Concentrations (RfCs) developed by the USEPA and listed in the *Integrated Risk Information System (IRIS)* (USEPA 2002a);
- USEPA CSFs, RfDs, and RfCs listed in the *Health Effects Assessment Summary Tables (HEAST)* (USEPA 1997); and
- USEPA RfDs and RfCs recommended by USEPA's National Center for Environmental Assessments (USEPA 2002b).

The toxicity values are presented in Table 11 of Appendix K.

The potential for health effects from exposure to lead was evaluated by comparing the concentrations of lead detected in soil with the Cal-modified preliminary remediation goal (PRG) of 150 mg/kg. Cal/EPA developed this value to protect children exposed to lead in a residential setting.

Risk Characterization

Risk characterization, which is the final step of the risk assessment, combines the results of the exposure assessment and toxicity assessment to characterize the potential for adverse health effects as

a result of site-specific exposures. Two effects were characterized in the risk assessment: cancer risks and the potential for adverse health effects other than cancer. The hazard index is used as a measure of the potential for adverse health effects other than cancer. Because the development of carcinogenic and noncarcinongenic effects is assumed to occur by different mechanisms, different methods were used to evaluate these effects. This approach is consistent with Cal/EPA (1994) and USEPA (1989) guidance.

The National Contingency Plan (NCP) (40 CFR § 300) is commonly cited as the basis for target risk levels. According to the NCP, lifetime incremental cancer risks posed by a site should not exceed one in a million (1×10^{-6}) to one hundred in a million (1×10^{-4}), and noncarcinogenic chemicals should not be present at levels expected to cause adverse health effects (i.e., a hazard index greater than 1). As a risk management policy, the Cal/EPA generally requires risks to be closer to the 1×10^{-6} end of the target risk range, with most approved remediations achieving incremental risk levels of ten in a million (1×10^{-5}) or lower. For noncancer health hazards, a target hazard index of 1 is identified. Individual chemical exposures that yield hazard indices of 1 or less are not expected to result in adverse noncancer health effects (USEPA 1989). The risks associated with background concentrations of naturally-occurring metals and nonsite-related anthropogenic chemicals that may be present at a site are considered in interpreting incremental risk levels.

The cumulative cancer risk for a future on-site resident associated with exposure to COPCs through soil ingestion, dermal contact with soil, and inhalation of airborne particulates and VOCs is 3×10^{-5}, which is within the target risk range (i.e., 1×10^{-6} to 1×10^{-4}). The cancer risk is attributable primarily to arsenic (3×10^{-5}, accounting for 84% of the risk). Literature values were used to compare concentrations of arsenic at the site to naturally-occurring background levels found in California soils (Bradford et al. 1996). Arsenic concentrations at the site range from 0.34 to 22.9 mg/kg, with a mean concentration of 5.0 mg/kg. Although the maximum detected concentration of arsenic at the site is greater than the upper end of the range reported for California soils (0.6 to 11 mg/kg), the mean site concentration of 5.0 mg/kg falls well within that range. These comparisons suggest that the cancer risk estimated for arsenic reflects background risks for this metal.

The cancer risk for benzene of 4×10^{-6} (accounting for 13% of the risk) is at the lower end of the target risk range. The cancer risks for all other carcinogenic COPCs were less than 1×10^{-6}, with each contributing less than 2% to the cumulative risk.

The cumulative noncancer hazard index for the most sensitive receptor (the child resident) is 1, indicating little potential for noncarcinogenic health effects for this receptor.

The maximum detected concentration of lead of 110 mg/kg reported by Gradient Engineers (1998; 1999a) was less than the Cal-modified PRG of 150 mg/kg, indicating that concentrations of lead are not expected to result in adverse health effects. However, undocumented historical information regarding the site indicates that lead may have been detected at a concentration as high as 700 mg/kg in one surface soil sample collected within the former pipe laydown area for Signal Hill East Unit 61 (Brycon, 2002). Documentation of the analytical data is not available for this sample and subsequent samples collected in the vicinity of this sample did not report lead above the residential soil PRG (Brycon 2002). However, a limited removal action is planned to address lead at this location. Based

on other sampling conducted in the area, the lead concentration is expected to be isolated and likely related to historical use of joint sealing material ("pipe dope") rather than petroleum contamination. Sampling and analysis for lead will be conducted at the time of the removal to confirm the limited extent of lead contamination.

As discussed in Section 4.10, remediation (soil excavation and off-site disposal) is proposed for this site to address areas with benzene concentrations greater than the USEPA Region 9 PRG for residential soils. Although the cancer risk of 4×10^{-6} for benzene is at the lower end of the target risk range, this risk will be further reduced following removal of benzene-impacted soils. Assuming benzene concentrations are reduced to levels below the lower end of the target risk range (i.e., to less than 1×10^{-6}), and because arsenic concentrations are at background levels, the site would pose an incremental cancer risk of less than one in a million (1×10^{-6}) following remediation of benzene.

Finally, the cancer risks and hazard indices estimated in this risk assessment represent the risks associated with the site prior to the proposed remediation, and the importation of clean fill soil and grading that is to be undertaken as part of the site development. It is anticipated that fill will be placed over much of the current surface. Imported soil will be tested in accordance with standard practices and Cal/EPA guidelines, such as those described in the October 2001 documentation from DTSC entitled "Information Advisory, Clean Imported Fill Material." Because imported soil will be tested to assure than it meets residential standards, the risks associated with the site following development are expected to be compatible with residential development.

Off-Site Hazards

Transport of Hazardous Materials. All motor carriers and drivers involved in transportation of hazardous materials must comply with the requirements contained in federal and state regulations. The Enforcement Services Division of the California Highway Patrol (CHP) is responsible for enforcing the hazardous materials regulations. Since 1981, CHP has had statutory responsibility for managing on-highway incidents relating to hazardous materials or hazardous waste transportation. This authority pertains to all highways constructed as freeways, all State owned vehicular crossings (toll bridges), and most State and county highways within the unincorporated areas of California. CHP acts as the statewide information, assistance, and notification coordinator. On-scene investigators coordinate and assist appropriate federal, state, and/or local health and law enforcement agencies. CHP also coordinates first responder (Module 1), scene management (Module 11), and executive management (Module 111) training programs throughout the State. CHP works under an interagency agreement with the California Department of Health Services and various emergency fire services agencies to carry out training objectives.

City fire departments are alerted when particularly dangerous materials are due to pass through the city. The City of Long Beach has established Redondo Avenue, PCH, I-405, and I-710 as designated truck routes. Trucks carrying any hazardous substance from the site can take Redondo Avenue, which is adjacent to the site and connects to both PCH and I-405.

Reservoir Tanks. Several large water reservoir tanks are located immediately southeast of the proposed project site, across Redondo Avenue, and at a higher elevation. In the event of tank failure, there could be a potential for flooding of downstream properties. However, based on review of USGS topographic maps and assessments included in the geotechnical reports prepared for the project site, the gradient below the tanks is north-northeast of the project site. Therefore, the project site is offgradient from the reservoirs, and would most likely incur only minimal impact from a catastrophic flooding incident. No significant impact at this site is identified for reservoir failure.

The Alamitos Ridge project will not be adversely impacted by hazardous materials on the site, due to federal, State, and local (RWQCB) remediation regulations and requirements that will be in place prior to the development of the project site. Existing federal and State regulations with oversight by the RWQCB will also ensure that the contamination will be properly remediated and disposed of so that no contamination reaches a public water supply or surface water resources. As indicated for one sump on the property, remediation of the contaminated soil around the sump has reduced contaminant levels to below agency threshold levels (Leighton 1997, 1999; Gradient 1998, 1999). Documented compliance with required remediation actions will ensure that the Alamitos Ridge residential project will not be adversely impacted by hazardous materials and/or contaminated soils.

Significant Unavoidable Adverse Impacts

Prior to issuance of building permits for residential development, soils contaminated with petroleum hydrocarbons (visually identified) will have been excavated and removed according to remediation plans approved by the RWQCB.

There are no significant unavoidable adverse impacts to public health and safety resulting from development of the proposed project.

Mitigation Measures

Excavation and Remediation of Contaminated Soils. Special handling of potentially contaminated materials will be required during the development of the Alamitos Ridge residential project site. Petroleum hydrocarbon stained materials will require removal prior to the placement of clean fill materials. The following mitigation measures present recommendations for the removal of these materials, as well as options for their placement/ remediation:

13.1 Prior to issuance of grading permits, the project proponent shall demonstrate to the satisfaction of the Building Official and the Chief of the Long Beach Fire Department that adequate clearance and access to idle and active wells on the project site will be maintained for mobile rigs and well work over equipment.

13.2 The developer is required to provide an on-site monitor to perform monitoring and/or soil and air sampling during grading, trenching, and cut or fill operation, and the monitor shall be allowed inspection of developer's monitoring and testing under the direction of the City of Long Beach to ensure that surface soil conditions, conditions of exposed soils, and air conditions are safe and acceptable for on-site workers, as well as residents and workers of

properties adjacent to the site. The monitor should also be responsible for monitoring compliance with mitigation related to dust control, included in Section 4.8, Air Quality. The developer or developer's designated monitor will be responsible for preparing and submitting weekly activity reports and testing results to the City of Long Beach Planning and Building Department.

13.3 Prior to issuance of building permits, the project applicant shall provide plans and specifications to the Building Official and the Chief of the Long Beach Fire Department demonstrating the following: all active wells shall be provided with safety shutdown devices. All active wells and associated equipment within the project site shall be enclosed by a minimum eight foot block wall with barbed wire on the inside at the seven foot level. All walls will be configured to allow necessary servicing. Suitable gates, capable of allowing passage of large workover equipment, shall be provided in the enclosures. Each enclosure shall be graded to ensure containment of potential spills within the enclosure. To restrict access, the use of climbable landscaping around the perimeters of the enclosures shall be avoided. The project proponent shall demonstrate to the satisfaction of the Chief of the Long Beach Fire Department (or his/her representative) that suitable safety and fire protection measures (i.e., setbacks) have been incorporated into the project design.

13.4 Prior to the issuance of use and occupancy permits, the applicant will provide the Director of Planning and Building with a disclosure form from the State Department of Real Estate to be signed by all prospective residents in the Alamitos Ridge project. This disclosure form will include the acknowledgment of operating oil wells on the project site and the location of fuel storage facilities, and industrial areas east of the project area.

4.13.4 CUMULATIVE IMPACTS

Any potential impacts associated with public health and safety are limited to the Alamitos Ridge project site and the future development of the site as proposed. Potentially significant on-site impacts have been mitigated and will not contribute to cumulative impacts. Therefore, there are no cumulative impacts to the proposed project associated with public health and safety issues.

4.13.5 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Implementation of the above mitigation measures, planned and ongoing remediation programs, and safety systems in place for the water reservoir tanks will reduce impacts associated with public health and safety to below a level of significance. Therefore, no significant unavoidable adverse impacts are identified.

5.0 ALTERNATIVES

5.1 INTRODUCTION

5.1.1 Overview

CEQA requires that an EIR describe a range of reasonable alternatives to the project, or to the location of the project, that could feasiblely attain the basic objectives of the project, and that it evaluate the comparative merits of the alternatives. This chapter sets forth and evaluates potential alternatives to the proposed project, as required by CEQA.

Key provisions of the CEQA Guidelines on alternatives (Section 15126.6[a] through [f]) are summarized below to explain the foundation and legal requirements for the alternatives analysis in the EIR:

- "The discussion of alternatives shall focus on alternatives to the project or its location that are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly."
- The No Project Alternative shall be evaluated along with its impact. "The no project analysis shall discuss the existing conditions at the time the Notice of Preparation is published, as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved."
- "The range of alternatives required in an EIR is governed by a 'rule of reason' that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project."
- "Factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, General Plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site."
- For alternative locations, "only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR."
- "An EIR need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative."

This chapter identifies and analyzes a range of reasonable alternatives to the project that could attain the basic project objectives. Alternatives that do not attain all of the project objectives but that are capable of eliminating or reducing impacts that have been determined to be significant for the proposed project have also been evaluated. Each alternative is analyzed as follows:

- Description of the alternative.
- The impacts of the alternative and significance of those impacts (per the CEQA Guidelines, significant effects of an alternative shall be discussed, but in less detail than the significant effects of the project as proposed).
- Comparison of the alternative relative to the proposed project, specifically addressing project objectives, feasibility, the elimination or reduction of impacts, and comparative environmental merits.

5.1.2 Alternatives Evaluated in Detail

Based on the environmental impact analysis for the proposed project and input received during the public scoping process, the following alternatives were selected for analysis and review in this chapter:

- **Alternative A: No Project/No Development Alternative.** Under this alternative, the project site would remain in its existing, primarily undisturbed condition. No development of the site would occur.
- **Alternative B: No Project/Implementation of Existing General Plan (Practical Results of Not Proceeding with Project).** This alternative consists of build out of the project site with 15.15 acres of uses consistent with the existing "Mixed Use" designation of the Land Use Element.
- **Alternative C: Lower Density Alternative.** Under this alternative, the project would reduce the number of single family units by 60 percent. This results in approximately 63 single family units in this planning area rather than 106 single family units, an overall project density of approximately 4.2 units per acre rather than the 7.4 units per acre under the proposed project.
- **Alternative D: Delayed Development Alternative.** Under this alternative, development characteristics would be the same as those of the proposed project, but occupation of dwelling units would be delayed until all existing oil extraction activities on the site had ceased and all site remediation is complete.

A summary of the proposed project alternatives is shown in Table 5.1.A.

The CEQA Guidelines, Section 15126.6(f)(2)(A), describes the "key question and first step in analysis" of project alternatives as "whether any of the significant effects of the project would be avoided or substantially lessened by putting the project in another location." Further, only locations "that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR."

This EIR has not analyzed alternative locations, as explained below.

Table 5.1.A: Summary of Project Alternatives

Issue Topic	Proposed Project	No Project/ No Development (Alternative A)	No Project/ Implementation of Existing General Plan (Alternative B)	Lower Density Residential (Alternative C)	Delayed Development Alternative (Alternative D)
Characteristics	• 15.15 gross acres • 106 single family dwelling units	• Vacant, no development	• 15.15 gross acres • Mixed use (commercial, retail, high density residential)	• 15.15 gross acres • 63 single family dwelling units	• 15.15 gross acres • 106 single family dwelling units
Meets Project Objectives	• Meets all objectives.	• Would not satisfy any project objectives	• Does not meet objectives 1, 2, 3, and 4.	• Meets objectives, though to a lesser extent than the proposed project.	• Hampers achievement of all project objectives
Land Use	• No significant land use impacts • Project would result in conversion of vacant land to developed condition • Planned land use inconsistent with City GP and zoning	• No change in condition of site	• Reflects current GP and zoning designations • Not consistent with established land use pattern in surrounding area.	• Decreased residential density compared with existing, adjacent uses. • Not consistent with the City GP or zoning	• Land use impacts similar to the proposed project
Population and Housing	• No significant impacts.	• No impacts.	• Housing supply impacts.	• Housing, population, and employment impacts greater because this alternative provides less dwelling units.	• No significant impacts
Geotechnical	• No significant impacts or mitigated to below significant.	• Site subject to erosion. • No other impacts.	• Grading impacts similar to proposed project	• Grading impacts similar to proposed project	• Grading impacts similar to proposed project
Water Resources	• No significant project impacts • Significant and unavoidable cumulative area street flooding	• No impact.	• More impervious surfaces results in an increase in surface water runoff. Less than significant with mitigation. • Similar cumulative flooding	• Similar to proposed project. • Similar cumulative flooding	• Similar to proposed project. • Similar cumulative flooding
Biological Resources	• No impacts.	• No impacts.	• No impacts.	• No impacts.	• No impacts.

Issue Topic	Proposed Project	No Project/ No Development (Alternative A)	No Project/ Implementation of Existing General Plan (Alternative B)	Lower Density Residential (Alternative C)	Delayed Development Alternative (Alternative D)
Archaeological and Paleontological Resources	• No significant impacts with the implementation of mitigation measures	• No impacts.	• Same as proposed project.	• Same as proposed project.	• Same as proposed project.
Public Services and Utilities	• No significant impacts with the implementation of standard conditions of approval	• No services or utilities required.	• Same as proposed project.	• Same as proposed project, with slightly reduced service demand.	• Same as proposed project.
Recreation	• No significant impacts with the implementation of mitigation measures	• No impacts.	• Similar impacts to proposed project.	• Same as proposed project.	• Similar impacts to proposed project.
Traffic and Circulation	• 1,014 ADT • No significant impacts to traffic or circulation conditions.	• No traffic generated • No impacts to traffic or circulation conditions.	• 2,394 ADT • Increased significant impacts to traffic and circulation conditions.	• 603 ADT • Less significant impacts to traffic or circulation conditions than proposed project.	• Same as proposed project
Air Quality	• Construction impacts mitigated to below level of significance • No long-term microscale local air quality impacts • Significant and unavoidable NO_x and PM10 impacts	• No air quality impacts.	• Increase in air quality impacts from additional vehicle emissions.	• Same as proposed project.	• Same as proposed project.
Noise	• No significant impacts with the implementation of mitigation measures	• No noise impacts.	• Similar to proposed project noise impacts from construction. • Increase in long-term noise from additional vehicle trips to and from the site.	• Similar to proposed project construction noise impacts. • Less long-term noise impacts due to less vehicle trips.	• Same as proposed project

Issue Topic	Proposed Project	No Project/ No Development (Alternative A)	No Project/ Implementation of Existing General Plan (Alternative B)	Lower Density Residential (Alternative C)	Delayed Development Alternative (Alternative D)
Aesthetics	• Significant and unavoidable aesthetic impacts from ongoing oil operations. • Less than significant lighting impacts	• No change in aesthetic condition of site or views of the site from off-site vantage points	• No significant impacts with the implementation of mitigation measures	• Similar impacts to proposed project.	• Avoids aesthetic impacts associated with oil operations.
Public Health and Safety	• No significant impacts with the implementation of mitigation measures	• No impacts.	• Similar impacts to proposed project.	• Similar impacts to proposed project.	• Similar impacts to proposed project.
Summary Comparison of Impacts Relative to Proposed Project	• Not Applicable	• No environmental impacts; does not meet project objectives.	• Compatible land use. • Increased impacts related to housing, traffic, air quality; noise • Same level of effects on hydrology, geotechnical, visual impacts, recreation, public services and utilities, and public health and safety.	• Compatible land use. • Increased impacts related to housing, population, and employment. • Reduced impacts related to traffic, air quality, and mobile source noise. • Same level of effects on geotechnical, and hydrology; slightly reduced demand for public services and utilities.	• All impacts similar to the proposed project with exception of avoidance of significant adverse aesthetic impacts.

The City of Long Beach is nearly built out, with little vacant land available for development. One possible alternative site was considered in the process of selecting an appropriate range of project alternatives. A 10.3 acre site on Golden Avenue (situated on the corner of Baker Street and North Golden Avenue) was examined, on a preliminary basis, as a potential off-site alternative. This site is estimated to have a development capacity of approximately 75 units at a density of 7.3 du/ac. The General Plan designates this site as Land Use District 1 (Residential), and it is zoned R-1-N for residential, single family use. The General Plan designation and zoning are consistent with the proposed project's objectives.

Although the zoning of the Golden Avenue site could accommodate residential development at a density similar to the proposed project, it was not considered a feasible alternative location because the site is currently contaminated and, thus, may not be suitable for residential purposes. The site was an oil/water separation site and has soil contamination. Upon development, this site would have to undergo remediation, which may be more costly and time-consuming than that for the proposed site and would certainly create substantial delays in development. In addition, the Golden Avenue site is smaller than the project site and could not accommodate the project as it is proposed, resulting in a reduction in unit count by over 29 percent. This would not meet basic project objectives. In addition, the potential environmental impacts of development at this alternative site (with the exception of health and safety issues noted) could be expected to be similar to impacts associated with the proposed project, and thus would not meet the direction of CEQA described above. In conclusion, there are no special features or characteristics of the proposed project that warrant consideration of development on a different site. No off-site alternative is considered suitable or feasible, and consequently none are further analyzed in this EIR.

5.2 PROPOSED PROJECT

A summary of the proposed project, the objectives of the project, and impacts determined to be significant for the development as proposed are summarized in this section for reference in evaluating the comparative merits of the alternatives.

Description

The proposed project would construct 106 single family dwelling units on an approximately 14.1 acre parcel. Access to the project site is via Redondo Avenue, Obispo Avenue, and 20th Street.

Project Objectives

The project objectives as listed in Chapter 3.0 are as follows:

1. Increase the overall housing opportunities within the City of Long Beach consistent with the City's Housing Element.
2. Implement the City of Long Beach General Plan and Zoning Code, providing an infill project, master planned as an integral neighborhood extending the character of the City into a vacant undeveloped parcel.

3. Promote pedestrian scale and a superior neighborhood ambiance consistent with the City of Long Beach's character through quality project design and streetscape standards subject to a City approved planned Development Plan (PD) PD-17.
4. Provide a circulation system designed to accommodate both automobile and pedestrian movement compatible with residential uses.
5. Promote cohesive physical design schemes that enhance the quality of the surrounding neighborhood and mixed use district.
6. Promote compatibility of proposed development with existing oil facilities and operations, consistent with provisions of Chapter 12 of the Long Beach Municipal Code, entitled "Oil Code."
7. Enhance the economic vitality of the City of Long Beach through redevelopment of this underutilized property.

Environmental Impacts of the Project

As discussed above, a primary consideration in defining project alternatives is their potential to reduce or eliminate significant impacts compared to the proposed project. The impact analysis, as detailed in this EIR, concluded that the following impacts will remain significant after mitigation for the proposed project:

Localized Flooding of Public Streets. The proposed project will add stormwater runoff from a developed site to an already overcapacity stormwater drainage system. This will exacerbate existing flooding north and east of the project site, as stormwater drains to the San Gabriel River.

Air Quality. The proposed project will result in significant air quality impacts due to short-term construction emissions of airborne dust and emissions from heavy equipment. Specifically, construction equipment emissions would exceed the SCAQMD daily threshold for the criteria pollutants of NO_X and PM_{10}.

5.3 ALTERNATIVE A: NO PROJECT/NO DEVELOPMENT ALTERNATIVE

Description

The No Project/No Development Alternative would leave the project site in its present undeveloped condition (a vacant oil extraction and maintenance yard). This alternative supposes that no development or specific use of the property would occur, regardless of zoning, General Plan designation, or other prior determinations made by the City.

Environmental Analysis

The No Project/No Development Alternative would not implement the City's General Plan designation for development on the project site. In leaving the site in its current undeveloped condition (a vacant oil extraction and maintenance yard), all physical impacts associated with the proposed project would not occur on site. No additional traffic would be generated to and from the site, air emissions and noise would not be generated by the proposed site uses, the current views of the site would remain the same, and no topographic, hydrologic, or land use changes would occur. This alternative would not generate the need for additional public services and utility consumption as would the project.

Conclusion

This alternative would not result in any physical environmental effects. Maintenance of the site in its existing vacant condition would reduce impacts to physical resources, including impacts to earth resources, archaeological and paleontological resources, and visual resources. In comparison to the proposed project, it would eliminate significant impacts to short-term air quality, in particular dust or PM_{10} emissions, associated with project construction. Similarly, this alternative would eliminate impacts related to noise, water resources, visual resources, hazards/public health and safety, requirements for public services and utilities, and transportation and circulation.

However, this alternative would result in eliminating opportunities to provide housing and, therefore, is inconsistent with General Plan and Housing Element housing objectives. In addition, the parcel would remain undeveloped.

Regardless of the outcome of the proposed project application, the project site is likely to be developed in the future, as it is one of the few remaining vacant land parcels within the City. The General Plan and Zoning Code designate the site for development. The site is a potential infill site, with adequate infrastructure and community services for future development. Therefore, the No Project/No Development Alternative is realistically an interim use of the site, with some environmental effect to take place in the future.

5.4 ALTERNATIVE B: NO PROJECT/IMPLEMENTATION OF EXISTING GENERAL PLAN (PRACTICAL RESULTS OF NOT PROCEEDING WITH PROJECT)

Description

As outlined in CEQA Guidelines Section 15126.6(e)(2), the "no project" analysis shall discuss "what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services."

The No Project/Existing General Plan Alternative assumes the project site would be developed pursuant to the site's existing General Plan land use and zoning designations: Mixed Use, Land Use District (LUD) No. 7, and PD-17 zoning. The intent of this classification is to provide a combination

of land uses, for example: an employment center such as retail, offices, or medical facilities; higher density residences; visitor serving facilities; personal and professional services; or recreational facilities. Given the location of the site and its remoteness from the I-405 Freeway, Pacific Coast Highway, and other major arterial streets, the most feasible build out of the existing General Plan designation is 215,622 square feet (sf) of office uses. To determine the possible square footage for an office, a ratio of 3 (parking) to 1 (land) was used (a rule of thumb utilized by developers to determine potential build out of an office site). As defined in the zoning ordinance for PD-17, "office use" is use of a building for administrative, professional, or clerical tasks.

Alternative B can be accomplished in two ways: 1) consolidated building/option, and 2) split building/option. The consolidated option (B-1) consists of only one one-story office building, and it will cover the majority of the northeast portion of the site. The surface parking lot will cover the southwest portion of the site, covering the fault zone.

The split option (B-2) consists of two one-story office buildings: one small office building on the southwest corner of the site, and a larger office building on the northeast portion of the site. The surface parking lot will divide the two office buildings along the fault zone.

Both the B-1 option and the B-2 option under this alternative include 215,622 sf of office space, 862 parking spaces, driveways, special setbacks of a minimum 100 feet between the office building and the residential building (dwelling units) in Subarea 1, lot coverage, and maximum building heights of 45 feet. At 320 sf per parking space, the total area for surface parking is 275,840 sf.

Land Use

Alternative B would be consistent with the existing General Plan land use designations for the site and would not require a General Plan Amendment.

Residential Uses to the East and West. Alternative B is compatible with City development objectives with a mix of residential, commercial, and business park development. As shown in Figure 4.1.1 (Project Area Land Uses), residential uses lie east and west of the project site. Project traffic cutting through the residential tracts is unlikely, since the project site is bounded by two major streets, Obispo Avenue and Redondo Avenue (and the residential tracts are on either side of the two major streets). Alternative B will result in similar short-term construction noise impacts due to noise generated by operating heavy equipment and an increase in traffic noise as the proposed project. These impacts are considered to be nuisance impacts of short duration and would be mitigated to below a level of significance with implementation of mitigation, as described in Section 4.11, Noise.

Alternative B will not result in substantial visual or physical intrusion into the adjacent residential neighborhood uses, upon complying with the building height requirement of 45 feet for office maximum height for PD-17 (Ordinance No. C-7539).

On-Site Uses. Alternative B is in conflict with the existing on-site uses (continued operation of oil wells). Currently, there are 12 abandoned wells on the project site and 6 active wells. The current operating wells are spaced sporadically throughout the project site, fragmenting the site and prohibiting designing a large, consolidated office building. In addition, an active fault traverses the project site in the southwestern portion of the property and further fragments the site, making for an unusual amount of disruption of an office complex layout.

Compared to Alternative B, the proposed residential development has less of a constraint on design due to the smaller planning unit. Single family residential dwelling units are more easily designed around the active and abandoned wells. In addition, a parkway amenity for a residential development is more practical and feasible than for commercial/office uses.

Population and Housing

Alternative B would not add housing to the City's housing supply. Indirectly, housing and population may be affected due to operation of this alternative, which may employ people who choose to move to the City, creating additional demand for housing. Based on a generation rate of one employee per 350 square feet for office use, the 215,622 sf office building would generate approximately 616 employees (source: LSA Associates, Inc.). The increase in employment opportunities identified for Alternative B would be beneficial to the City and the region. Furthermore, Alternative B is consistent with City employment goals and City regional growth projections. However, Alternative B would not be consistent with the City's housing goals, as included in the Housing Element of the General Plan.

Geotechnical Conditions

Alternative B would require grading and site preparation similar to that required for the proposed project. All fault zone setbacks, and associated geotechnical conditions will require similar design treatments.

Water Resources

Alternative B would create similar water quality impacts related to the need for drainage improvements to conduct increased runoff from additional impervious surfaces. The potential for erosion of exposed soils during construction would also be similar to the proposed project. Alternative B will result in a long-term decrease in surface erosion, since presently exposed earth surfaces will be protected by structures, paved parking lot, and landscaping.

There would be similar impacts to runoff water quality from the additional urban pollutants or crude oil impacted soils exposed during grading operations as identified under the proposed project.

Although the project will not result in any significant unavoidable water quality impacts, Alternative B would have similar needs for project mitigation. Compared to the proposed project, as mitigated, Alternative B would have similar impacts on water quality and drainage impacts. Because

stormwater runoff from the site would adversely affect drainage systems that are overcapacity, flooding of local streets downstream of the site would occur, similar to the impacts caused by the proposed project.

Biological Resources

Although no significant biological resources occur on the site, Alternative B would remove open space and on-site vegetation, consisting of weedy fields and nonnative trees. This impact was found to be insignificant for the proposed project and for this alternative.

Archaeological and Paleontological Resources

Alternative B would result in similar effects on archaeological and paleontological resources as defined under the proposed project. There is the potential to encounter unknown archaeological and paleontological resources during grading and construction. However, with mitigation, the proposed project and this alternative will not result in any significant unavoidable adverse impacts to archaeological and paleontological resources.

Public Services and Utilities

Alternative B would increase the demand for public services and utilities. It is difficult to analyze precisely the indirect effects of employment growth on school enrollment. The LBUSD has suggested that the information on projected school enrollments and facility costs contained in the Development Impact Fee Justification Study (July, 1998) may be used to assess the impacts of the proposed alternative on the District. It should be noted that this study, prepared to justify the collection of impact fees as allowed by State law, does not provide sufficient information to assess the potential for secondary indirect impacts from a nonresidential project.

The K-12 Student Generation Factor (SGF) per employee for office development is 0.47. By multiplying the SGF by a projected number of 616 employees, Alternative B would generate approximately 289 students in the worst case scenario for new student enrollment for the District.

The statutory school fee for commercial/industrial construction within the District is $0.33 per square foot (Staff Report Update Regarding Statutory School Fee Increase, March, 2000). The 215,622 square foot office building would generate an estimated revenue of $71,115 of development impact fees. Mitigation of this impact is limited by State law. Senate Bill 50 (Chapter 407 of Statutes of 1998) (SB 50) set forth a State school facilities construction program that includes restrictions on a city's ability to condition a project to mitigate a project's impacts on school facilities, in excess of fees set forth in Education Code Section 17620. These fees are collected by school districts at the time of issuance of building permits for commercial, industrial, and residential projects. Payment of the maximum statutory school fee would reduce the impact to schools to below a level of significance, similar to the proposed project.

As with the proposed project, adequate police and fire services are anticipated to be available for the proposed project, and could also accommodate this alternative. Existing infrastructure would be able to accommodate Alternative B, and impacts to these services would be similar to the proposed project.

Recreation

Alternative B is anticipated to employ 616 employees. The employee population generated by Alternative B would potentially utilize area parks for lunchtime and after-hours sports and activities. The additional employees generated by the project would potentially increase demands upon Parks and Recreation Department services and facilities.

Fees would normally reduce the potentially significant impact on Parks and Recreation Department services and facilities to below a level of significance. However, in this case, because fees are not required for commercial development, there is the potential that Parks and Recreation Department services will be negatively affected by new and substantial demands for service from project employees and their families and visitors. However, due to the off-peak, occasional, and nonweekend uses of parks and recreation facilities by the office employees, Alternative B would not pose significant, unavoidable adverse impacts on parks and recreation.

Traffic and Circulation

Alternative B represents the development of 215,622 square feet of general office use on the project site. To compare the traffic impacts between this alternative and the proposed project (106 unit residential development), the information contained in the December, 2002, LLG study was used in this analysis.

Trip Generation Comparison. Table 5.5.A presents the comparison of trip generation between the proposed 106 unit residential project and the 215,622 square foot office land use alternative. According to the table, Alternative B would generate approximately 2,394 daily trips, 344 a.m. peak hour trips, and 321 p.m. peak hour trips, which is 1,380 daily trips, 264 a.m. peak hour trips, and 213 p.m. peak hour trips more than the proposed project's traffic volumes.

Impact Analysis. To determine the potential impacts of Alternative B, project trips for this alternative were distributed through the study area intersections based on the trip distribution percentages provided in the LLG report, which are based primarily on home-to-work travel patterns. For purposes of this analysis, this distribution was used for distributing office related trips to the study area network. Once the project alternative trips were distributed to the study intersections the volume-to-capacity (V/C) ratio or delay was determined. Any project-related significant traffic impacts were then identified. This alternative analysis is summarized in Tables B and C from Appendix G of the LLG study.

Table 5.5.A: Alternative B Trip Generation Comparison[1]

		A.M. Peak Hour			P.M. Peak Hour		
Land Use	**ADT**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
PROPOSED PROJECT							
106 Single Family Dwelling Units	1,014	20	60	80	69	39	108
Alternative B							
215.622 TSF General Office Building	2,394	303	41	344	55	266	321
Difference (Alternative - Proposed)	**1,380**	**283**	**-19**	**264**	**-14**	**227**	**213**
~~**Percent Increase**~~	~~**136%**~~			~~**330%**~~			~~**197%**~~

[1] Traffic Impact Study Alamitos Ridge Residential Project, Linscott, Law & Greenspan (LLG), December, 2002.

Generally, service levels (LOS A-F) are spaced within ten percent increments of volume-to-capacity ratio values. For example, a 10 percent change in critical traffic volume-to-capacity ratios would incur a change in one service level (e.g., LOS B to LOS C). Therefore, a project that contributes ten percent or more critical traffic volumes (based on the V/C ratio) to an intersection may potentially degrade the intersection one service level. The following presents a quantitative analysis of Alternative B traffic volumes at the project study intersections.

Intersection 1 - Obispo Avenue/Hill Street. The 215,622 square foot office alternative would generate approximately 107 a.m. peak hour trips and 123 p.m. peak hour trips at this intersection. Alternative B would add 77 more a.m. peak hour trips and 87 more p.m. peak hour trips than the proposed project at this intersection.

Per Table 5B of the LLG report, this intersection is forecast to operate at LOS D during both the a.m. and p.m. peak hours in the 2004 with project condition. With the development of Alternative B, as indicated in Table C of the LLG report, this intersection is forecast to operate at LOS E during both the a.m. and p.m. peak hours in the 2004 with alternative project condition. This intersection is expected to be significantly impacted in the future as a result of the project alternative. It should be noted, however, that this intersection is included in the City of Signal Hill's Long Term Comprehensive Traffic Plan and will be signalized in the future through Traffic Impact Fees.

Intersection 2 - Obispo Avenue/20th Street. With development of the proposed 106 unit residential project, the intersection is forecast to operate at LOS C during the a.m. peak hour and LOS D during the p.m. peak hour in the 2004 with project condition. Alternative B would generate approximately 67 a.m. peak hour trips and 51 p.m. peak hour trips at this intersection. This alternative would add 54 more a.m. peak hour trips and 31 more p.m. peak hour trips than the proposed project. As a result, this intersection is expected to operate at LOS C during the a.m. peak hour and LOS E during the p.m. peak hour in the 2004 with project alternative condition. This intersection would be expected to be significantly impacted in the future as a result of this project alternative.

Intersection 3 - Redondo Avenue/Willow Street. This alternative would generate approximately 151 a.m. peak hour trips and 118 p.m. peak hour trips at this intersection. This is 121 a.m. peak hour trips and 73 p.m. peak hour trips more than the proposed residential project. With development of the proposed residential project, this intersection is forecast to operate at LOS B during the a.m. peak hour and LOS E during the p.m. peak hour in the 2004 with project condition. For this project alternative, this intersection is expected to operate at LOS C during the a.m. peak hour and LOS E during the p.m. peak hour. No significant traffic impacts are anticipated as a result of this project alternative. However, the LOS and V/C ratios would be expected to degrade with the addition of the project alternative as compared to the proposed project.

Intersection 4 - Redondo Avenue/Stearns Street. With development of the proposed residential project, this intersection is forecast to operate at LOS C during the a.m. peak hour and LOS D during the p.m. peak hour in the 2004 with project condition. Alternative B would generate approximately

151 a.m. peak hour trips and 118 p.m. peak hour trips at this intersection. Alternative B would add 121 more a.m. peak hour trips and 73 more p.m. peak hour trips than the proposed project at this intersection. This intersection would be expected to operate at LOS C during the a.m. peak hour and LOS E during the p.m. peak hour in the 2004 with this project alternative condition. No significant traffic impacts are anticipated as a result of the project alternative. However, the LOS and V/C ratios are expected to degrade with the addition of this project alternative as compared to the proposed project.

Intersection 5 - Redondo Avenue/20th Street. Per the LLG traffic analysis, this intersection will operate at LOS B during the a.m. peak hour and LOS C during the p.m. peak hour in the 2004 with project condition. This analysis includes the construction of right-turn only channelization on the west leg of the intersection. Alternative B would generate approximately 82 a.m. peak hour trips and 54 p.m. peak hour trips at this intersection. This alternative would add 68 more a.m. peak hour trips and 31 more p.m. peak hour trips than the proposed project at this intersection. For this project alternative, this intersection is forecast to operate at LOS B during the a.m. peak hour and LOS C during the p.m. peak hour in the 2004 with project alternative condition. No significant traffic impacts are anticipated as a result of the project alternative. However, the delay would be expected to degrade with the addition of the project alternative as compared to the proposed project.

Intersection 6 - Redondo Avenue/Pacific Coast Highway. This alternative would generate approximately 69 a.m. peak hour trips and 64 p.m. peak hour trips to this intersection. This alternative would add 53 more a.m. peak hour trips and 43 more p.m. peak hour trips than the proposed project at this intersection.
Per the LLG report, this intersection is forecast to operate at LOS D during the a.m. peak hour and LOS E during the p.m. peak hour in the 2004 with project condition. This intersection would be expected to operate at LOS D during the a.m. peak hour and LOS E during the p.m. peak hour in the 2004 with this project alternative condition. No significant traffic impacts are anticipated as a result of the project alternative. However, the LOS and V/C ratios would be expected to degrade with the addition of the project alternative as compared to the proposed project.

Alternative B does not avoid or substantially lessen significant effects on intersection level of service when compared to the proposed project. In fact, Alternative B would generate more project traffic at all study area intersections than the proposed project, and have increased negative impact upon LOS at some of the intersections studied.

Air Quality

Short-Term Construction Related Impacts. The short-term construction impacts resulting from Alternative B are similar to those resulting from the proposed project. Air quality impacts may occur during site preparation, including grading equipment exhaust. Major sources of emissions during this phase include exhaust emissions from construction vehicles and equipment, fugitive dust generated as a result of construction vehicles and equipment traveling over exposed surfaces, and soil disturbances by grading and filling. NO_X and PM_{10} emission standards will be exceeded on a daily basis during

peak construction days, causing a significant impact on the environment, as demonstrated in Section 4.10 (Air Quality), Table 4.10.C.

Construction activities would result in combustion emissions from general utility vehicle engines, on-site heavy-duty construction and earth moving vehicles, equipment hauling materials to and from the site, and motor vehicles transporting the construction crew. Exhaust emissions associated with the construction activities envisioned on site would vary daily as construction activity levels change.

Alternative B does not avoid or substantially lessen significant effects on short-term construction emissions when compared to the proposed project.

Long-Term Regional Air Quality Impacts. *Stationary Sources.* Proposed on-site uses would consume natural gas and electricity. Based on Table A9-11 in the SCAQMD CEQA Air Quality Handbook, Alternative B is estimated to generate pollutant emissions as shown in Table 5.5.B.

Table 5.5.B: Emissions by Energy Consumption (pounds/day)

Land Use	CO	ROC	NO_X	SO_X	PM_{10}
Alternative B					
Electricity Usage	1.53	0.08	8.80	0.92	0.31
Natural Gas Usage	0.57	0.10	1.44	–[a]	0.00
Subtotal -	2.10	0.18	10.24	0.92	0.31
SCAQMD Threshold	**550.0**	**55.0**	**55.0**	**150.0**	**150.0**
Significant?	**No**	**No**	**No**	**No**	**No**

a - URBEMIS7G does not estimate SO_X emission.
Source: LSA Associates, Inc. 2000.

Mobile Sources. The traffic analysis indicates that 2,394 vehicular trips are associated with the proposed office uses under this alternative. Based on the latest URBEMIS5 air quality model, the proposed land uses would generate pollutant emissions as summarized in Table 5.5.C.

Table 5.5.C: Total Regional Emissions (pounds/day)

Category	CO[1]	ROC	NO_X	SO_X	PM_{10}
Stationary Sources	2.10	0.18	10.24	0.92	0.31
Mobile Sources	453.18	50.99	73.85	-	18.58
Total Emissions	455.28	51.17	84.09	0.92	18.89
SCAQMD Thresholds	550	55	55	150	150
Significant Impact?	No	No	Yes	No	No

Source: LSA Associates, Inc. 2000.

Total Regional Emissions. Total estimated emissions from long-term project operations are shown in Table 5.5.C. Emission levels of NO_X would exceed the SCAQMD threshold for long-term operations and would be significant. There would be increased incremental regional air quality impacts with Alternative B compared to the proposed project. However, these differences are not substantial.

Noise

Both construction related and long-term noise sources associated with this alternative would be greater due to the increased number of vehicle trips compared to the proposed project. However, the increase in the number of vehicle trips is not enough to create a substantial increase in perceived noise (trips would have to more than double to have a significant impact). Construction activities would comply with the noise ordinance and permitted levels for this alternative and the proposed project. Similar to the proposed project, this alternative's contribution to cumulative traffic noise in the vicinity is minimal and considered less than significant.

Aesthetics

Aesthetic impacts related to Alternative B include changes to the overall visual character of the project site from vacant, highly disturbed site conditions with oil extraction activities to a single story office building. These visual changes will not significantly impact the overall visual quality of Alternative B in the long term as seen from the majority of adjacent viewsheds because the land use is consistent with the General Plan. Alternative B will not result in substantial visual or physical intrusion into the adjacent residential neighborhood uses, upon complying with the building height requirement of 45 feet for office maximum height for PD-17 (Ordinance No. C-7539). In addition, implementation of building and landscape design guidelines will enhance the visual character of Alternative B and further reduce any adverse aesthetic impacts.

[1] Calculated in winter for worst case scenario.

Consistent with City regulations, all parking lots shall be illuminated with lights directed and shielded to prevent light intrusion into adjacent areas. In addition, City regulations require that light standards not exceed the height of the principal use structure, or one foot for each two feet of the distance between the light standard and the nearest property line (whichever is greater).

Light sources will be created on the site through lighting along streets, around the office building, and in parking areas for Alternative B. These light sources will add to the overall light and glare of the area. These additional light sources within the project area may create light and glare impacts to the adjacent residential areas west of the project site. These potential significant impacts are anticipated to include light and glare from the combination of street lights, parking lot security lights, and building lights associated with this type of development. Design features or mitigation would be required to minimize potential light and glare impacts associated with the proposed project.

The most potentially affected area is the residential area located west of the project site. This area would be subject to the security lighting and glare from office building use. However, implementation of mitigation measures such as directional lighting and other design features would reduce the light and glare effects.

Therefore, with implementation of mitigation, Alternative B and the proposed residential development would not create significant aesthetic effects.

Public Health and Safety

As with the proposed project, Alternative B would not result in a significant impact related to hazards or public health and safety. Existing, abandoned wells would be evaluated to determine any requirement for re-abandonment in accordance with CDOG regulations. Compliance with required remediation actions will ensure that the proposed project and Alternative B will not be adversely impacted by hazardous materials and/or contaminated soils. Overall hazard and public health and safety impacts would be similar to those of the proposed project.

Conclusion

The No Project/Implementation of Existing General Plan Alternative (Alternative B-1 or B-2) would be consistent with the existing General Plan and Zoning Code. However, the existing designation, which entails the development of the site for retail, office, and/or industrial purposes, would present potential land use conflicts within the project area. Because of the existing and approved residential projects adjacent to the project site and the proposed LBUSD school to the north, the proposed project would be consistent with these uses and, therefore, will not have a detrimental effect on adjacent uses and/or residents.

The proposed single family residential development is compatible with City development objectives, replacing the current heavy industrial use in close proximity to residential uses with a land use compatible with surrounding uses. The requested change in the zoning to residential for the property is consistent with the pattern of land uses within the immediate vicinity of the project site and is consistent with adjacent residential uses and the adjacent future school site. The proposed residential

development is a logical extension of the established land use patterns evolving in both the City of Signal Hill areas and City of Long Beach areas surrounding the property. The requested change in land use reflects a transition from underutilized land and unattractive industrial use (abandoned oil wells and outside storage) to a planned residential neighborhood. Furthermore, industrial use of the land is inconsistent and incompatible with adjacent residential uses and the proposed school use to the north.

An earthquake fault traverses the western side of the site. A parkway amenity for a residential development is more practical and feasible than for commercial or industrial uses, which would require an office or commercial complex to be split. Because the residential neighborhoods to the west and east of the project site have been established and because there is no residential displacement or new development that would be between residences in the same neighborhood, the project will not provide a new separation between any neighborhood or community. Therefore, the project will not result in substantial visual or physical intrusion into the adjacent residential neighborhood.

Traffic impacts with this Alternative are greater than with the proposed project, decreasing LOS by more than ten percent.

5.5 ALTERNATIVE C: LOWER DENSITY ALTERNATIVE

Under this alternative, the project would reduce the number of single family units by 60 percent. This results in approximately 63 single family units in this planning area rather than 106 single family units, and results in an overall project density of approximately 4.2 units per acre rather than the 7.4 units per acre under the proposed project.

Land Use

Similar to the proposed project, Alternative C would not be consistent with the existing General Plan land use designations for the site and would require a General Plan Amendment. In addition, the proposed single family residential development requires an amendment to the PD-17 zoning ordinance to allow residential uses in Subarea 2.

Similar to the proposed project, Alternative C is consistent with the pattern of land uses within the immediate vicinity of the project site and is also consistent with adjacent residential uses and the adjacent future school site.

Indirect effects on adjacent industrial uses to the south would decrease with Alternative C due to the decrease in number of dwelling units. Given that the proposed project's indirect effects are considered less than significant, there are no land use compatibility issues with existing off-site uses.

Population and Housing

Alternative C would introduce approximately 202 new residents into the City compared with the estimated 339 residents that are projected for the proposed project. Since the increase in population for the proposed project is not significant and is within population forecasts, this reduction is not considered to appreciably improve population impacts in comparison with the proposed project. Approximately 43 fewer homes would be constructed under Alternative C. Neither Alternative C nor the proposed project would generate new employment opportunities other than short-term construction related jobs; however, they will both provide additional persons to the available employment pool within Long Beach. The population, employment, and housing impacts of Alternative C are, therefore, considered greater (less beneficial) than the impacts of the proposed project.

Geotechnical Conditions

Under the Alternative C, up to 43 fewer residential units would be subjected to seismic hazards that could cause surface rupture and structural damage. Although with mitigation the project will not result in any significant unavoidable adverse impacts, this alternative would reduce the number of units exposed to the geologic hazards on the project site. All other aspects of project design and geotechnical constraints produce impacts similar to those of the proposed project.

Water Resources

Alternative C would create similar water quality impacts related to the need for drainage improvements to conduct increased runoff from additional impervious surfaces introduced by the project. The potential for erosion of exposed soils during construction would also be similar to the proposed project.

Impacts to water quality of runoff from the addition of urban pollutants or crude oil impacted soils exposed during grading operations would be similar to those of the proposed project.

Although the project will not result in any significant unavoidable water quality impacts, Alternative C would have a similar need for project mitigation. Compared to the proposed project, as mitigated, Alternative C would have similar impacts on water quality.

Biological Resources

Although no significant biological resources occur on the site, Alternative C would remove open space and on-site vegetation, consisting of weedy fields and nonnative trees. This impact was found to be insignificant for the proposed project and for this alternative.

Archaeological and Paleontological Resources

This alternative would result in similar impacts on archaeological and paleontological resources as defined under the proposed project, since the site will be graded under both options. These impacts would be associated with potential buried historic artifacts and paleontological resources. However, with mitigation the proposed project and this alternative will not result in any significant unavoidable adverse impacts to archaeological and paleontological resources.

Public Services and Utilities

Alternative C would have a marginally reduced demand on the police and fire departments, Southern California Edison Company, City and County public works departments, County Sanitation Districts of Los Angeles, General Telephone, and the Long Beach Unified School District, since there are fewer residential units. With the conditions of approval, the project impacts on all public services and utilities will be considered less than significant. Alternative C would further reduce the potential impacts associated with all public services and utilities.

Recreation

Alternative C would have a reduced demand on parks and recreation, since there will be fewer residents under this alternative. With the conditions of approval, the project impacts on parks and recreation will not be significant.

Traffic and Circulation

Alternative C would generate a reduced number of traffic operations on the arterial circulation network based on an overall project density of 4.2 units per acre, rather than the 7.4 units under the proposed project. Compared to the proposed project, Alternative C would result in 603 vehicle trips (ADT) compared to the proposed project of 1,014 trips (ADT), reducing traffic impacts.

Air Quality

Alternative C would create short-term air quality impacts from fugitive dust and construction equipment emissions similar to those generated by the project during construction because the same grading and construction activities would occur under both the Lower Density Alternative and the proposed project. The proposed project will also result in long-term cumulative air quality impacts; however, these regional impacts are less than significant. This alternative would reduce the vehicle trip emissions and energy emissions increases compared to the proposed project. However, this alternative would still result in a significant unavoidable impact to regional air quality due to construction.

Noise

The proposed project will not result in any potentially significant long-term noise impacts that would cause exceedances of any City noise standards. Under Alternative C, the noise generated by project traffic and construction activities would be reduced.

Aesthetics

Alternative C would result in similar visual alteration of the physical appearance and character of the inland valleys and foothills as viewed from the surrounding community as would result with the proposed project.

Public Health and Safety

Alternative C would reduce the number of people exposed to on-site contaminants. Compared to the project, this alternative would result in fewer public health and safety impacts; however, with the same mitigation proposed for the project, this alternative, similar to the proposed project, will not result in any significant unavoidable adverse impacts related to public health and safety.

Conclusion

The Lower Density Alternative would have similar and/or reduced significant adverse environmental impacts than the proposed project discussed in Section 4.0. In particular, significant adverse impacts due to construction emissions would be reduced under this alternative. However, this impact is still considered to be significant. All other impacts under this alternative would be similar to those discussed under the proposed project in Section 4.0 of this document. Because this alternative has similar and/or reduced impacts than those discussed for the proposed project in Section 4.0, the Lower Density Alternative is considered to be environmentally superior to the proposed project.

However, this alternative would fail to meet the primary objectives of the project and the City of Long Beach: to increase housing opportunities through the provision of a variety of housing types and residential densities, and to promote well planned and integrated urban infill development within the City of Long Beach.

5.6 ALTERNATIVE D: DELAYED DEVELOPMENT ALTERNATIVE

Under this Alternative, the characteristics of the development would be exactly the same as those of the proposed project, except that occupation of dwelling units would not occur until all existing oil extraction operations on the site had ceased and all site remediation is complete.

11.0 REFERENCES

American Ornithologists' Union. 1998. The A.O.U. Checklist of North American Birds, 7th Ed. American Ornithologists' Union, Washington, D.C.

Bolt, Beranek & Newman. 1987. Noise Control for Buildings and Manufacturing Plants.

Brencon, LLC, Environmental Consultants. 2001. Remedial Work Plan, Alamitos Ridge Development. Prepared for Alamitos Land Company/LePlastrier Development Companies, Newport Beach, CA. April 26.

California Regional Water Quality Control Board (RWQCB). 1996. Interim Site Assessment and Cleanup Guidebook. May.

CEQA Guidelines, Section 15125

CEQA Guidelines, Section 15126.2[a]

CEQA Guidelines, Section 15128

City of Long Beach, Zoning Code.

City of Long Beach. 1975. Noise Element of the General Plan. March.

City of Long Beach. 1975. Public Safety Element of the General Plan. March

City of Long Beach. 1973. Open Space Element of the General Plan. April.

City of Long Beach. 1988. Seismic Safety Element of the General Plan. October.

City of Long Beach. 1991. Transportation Element of the General Plan. December.

City of Long Beach. 1989. Housing Element of the General Plan. June.

City of Long Beach. 1997. Land Use Element of the General Plan.

City of Long Beach. Municipal Code.

City of Long Beach. 2000. Telephone conversation with Greg Carpenter and Ron Cruz, Planning Department, City of Long Beach. August 14.

City of Long Beach. 2000. Telephone conversation with Harold Simkons, Planner, and Ron Cruz, Planning Aide, City of Long Beach. August 10 and August 14.

City of Long Beach. 1998. Conceptual Site Plan Review Report, September 21.

City of Long Beach. 2001. Storm Water Management. May

City of Signal Hill. 2000. Telephone conversation with Troy Helling, Planning Division, City of Signal Hill. August 14.

DRC. 2000. Project Application. September.

DRC. 2001. Preliminary Hydrology Study for Tentative Tract Map No. 52702. November 21.

DRC. 2001. Preliminary Standard Urban Storm Water Mitigation Plan (SUSMP) for Tentative Tract Map No. 52702. November 21.

ENVIRON Corporation. 1999. Health Risk Assessment for the Southeast Parcel for the Alamitos Land Company, Long Beach, California. June 3.

Federal Highway Administration (FHWA). Highway Traffic Noise Prediction Model, FHWA-RD-77-108.

Gradient Engineers. Geotechnical Report.

Hickman, J.C., ed. 1993. The Jepson Manual: Higher Plants of California. University of California Press, Berkeley and Los Angeles, CA. 1400 pp.

Institute of Traffic Engineers. 1997. Trip Generation, 6th Edition.

Laudenslayer et al. 1991. A checklist of the amphibians, reptiles, birds, and mammals of California. California Fish and Game 77:109-141.

Leighton and Associates. 1993. Planning for Development Study for the Alamitos Land Company Properties Located Between Temple and Redondo Avenues, Cities of Long Beach and Signal Hill, Los Angeles County, California. December.

Linscott, Law, and Greenspan, Engineers. 1999. Traffic Impact Study Alamitos Ridge Residential Project Long Beach, California. March.

LSA Associates, Inc. 1997. Draft and Final Environmental Impact Report for the Bixby Ridge Specific Plan.

Mattoni. 1990. Butterflies of greater Los Angeles. Center for Conservation of Biodiversity/ Lepidoptera Research Foundation, Los Angeles.

Padon, Beth, Belmont. 1984. *Vista Development: Archaeological Records Search.*

Public Resources Code Section 21000 et seq.

Roberts, F.M., Jr. 1998. A Checklist of the Vascular Plants of Orange County, California, Second Edition. F.M. Roberts Publications, Encinitas, CA. 96 pp.

School Planning Services. 1998. Development Fee Justification Analysis LBUSD. July.

South Coast Air Quality Management District. October, 1993. CEQA Air Quality Handbook.

South Coast Air Quality Management District. 1997. Air Quality Management Plan.

Southern California Association of Governments (SCAG). Growth Projections. 1990-2020.

State of California. Business and Professional Code, section 11546.

Title 14 California Code of Regulations, Section 15000 et seq.

Uniform Building Code (UBC), Seismic Zone 4 Building Design.

Van Horn, David. 1982. Archaeological Survey Report: Proposed Termino Avenue Improvement in the City of Long Beach, California.