

CALIFORNIA HIGH-SPEED TRAIN

Program Environmental Impact Report/Environmental Impact Statement

Los Angeles - Orange County - San Diego

LAND USE AND PLANNING, COMMUNITIES AND NEIGHBORHOODS, PROPERTY AND ENVIRONMENTAL JUSTICE TECHNICAL EVALUATION

January 2004

Prepared for:

California High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration



U.S. Department
of Transportation
**Federal
Railroad
Administration**

CALIFORNIA HIGH-SPEED TRAIN PROGRAM EIR/EIS

Los Angeles - Orange County - San Diego

**Land Use and Planning, Communities and
Neighborhoods, Property, and
Environmental Justice
Technical Evaluation**

Prepared by:

HDR

for

IBI Group

January 2004

TABLE OF CONTENTS

1.0 INTRODUCTION 1

 1.1 ALTERNATIVES 2

 1.1.1 NO-PROJECT ALTERNATIVE 2

 1.1.2 MODAL ALTERNATIVE 5

 1.1.3 HIGH SPEED TRAIN ALTERNATIVE 8

2.0 BASELINE/AFFECTED ENVIRONMENT 17

 2.1 STUDY AREA 17

 2.2 REGULATORY SETTING 17

 2.3 LAND USE 18

 2.3.1 EXISTING, BASELINE LAND USE 18

 2.3.2 FUTURE BASELINE 21

 2.4 POPULATION CHARACTERISTICS 21

 2.4.1 TRENDS & GROWTH 21

 2.4.2 HOUSEHOLD SIZE 23

 2.4.3 ETHNICITY 24

 2.4.4 INCOME 26

 2.5 NEIGHBORHOOD & COMMUNITY CHARACTERISTICS 27

 2.6 HOUSING 27

3.0 EVALUATION METHODOLOGY 29

4.0 IMPACTS 32

 4.1 NO-PROJECT ALTERNATIVE 32

 4.2 MODAL ALTERNATIVE 32

 4.3 HIGH SPEED TRAIN ALTERNATIVE 34

 4.3.1 HIGH SPEED RAIL 34

 4.3.2 CONVENTIONAL RAIL 35

5.0 REFERENCES 54

6.0 REPORT PREPARERS 57

APPENDIX A - CONVENTIONAL RAIL ROUTE COMBINATIONS FOR IMPACT COMPARISON

LIST OF FIGURES

FIGURE 1-1 NO-PROJECT ALTERNATIVE – CALIFORNIA TRANSPORTATION SYSTEM..... 3

FIGURE 1-2 MODAL ALTERNATIVE – HIGHWAY COMPONENT..... 6

FIGURE 1-3 MODAL ALTERNATIVE – AVIATION COMPONENT 7

FIGURE 1-4 HIGH-SPEED TRAIN ALTERNATIVE – CORRIDORS AND STATIONS FOR CONTINUED INVESTIGATION..... 9

FIGURE 1-5A HIGH-SPEED TRAIN ALTERNATIVE: ALIGNMENT AND CONSTRUCTION TYPE BY SEGMENT
(LOS ANGELES TO FULLERTON) 14

FIGURE 1-5B HIGH-SPEED TRAIN ALTERNATIVE: ALIGNMENT AND CONSTRUCTION TYPE BY SEGMENT
(FULLERTON TO CAMP PENDLETON) 15

FIGURE 1-5C HIGH-SPEED TRAIN ALTERNATIVE: ALIGNMENT AND CONSTRUCTION TYPE BY SEGMENT
(CAMP PENDLETON TO SAN DIEGO) 16

FIGURE 2-1 GENERALIZED EXISTING LAND USE 19

LIST OF TABLES

TABLE 1-1 PROGRAMMED IMPROVEMENTS INCLUDED IN THE NO-PROJECT ALTERNATIVE..... 4

TABLE 1-2 MODAL ALTERNATIVE: HIGHWAY CAPACITY IMPROVEMENT OPTIONS FOR YEAR 2020..... 5

TABLE 1-3 ALIGNMENT AND STATION OPTIONS FOR HIGH-SPEED TRAIN ALTERNATIVE 10

TABLE 2-1 DOCUMENTS CONSULTED FOR REGULATORY SETTING..... 17

TABLE 2-2 MODAL EXISTING BASELINE LAND USE..... 18

TABLE 2-3 HSR EXISTING BASELINE LAND USE..... 20

TABLE 2-4 LOSSAN EXISTING BASELINE LAND USE 21

TABLE 2-5 2020 POPULATION PROJECTIONS 22

TABLE 2-6 MODAL EXISTING BASELINE HOUSEHOLD SIZE 23

TABLE 2-7 HSR EXISTING BASELINE HOUSEHOLD SIZE 23

TABLE 2-8 LOSSAN EXISTING BASELINE HOUSEHOLD SIZE..... 24

TABLE 2-9 MODAL EXISTING BASELINE ETHNICITY 24

TABLE 2-10 HSR EXISTING BASELINE ETHNICITY 25

TABLE 2-11 LOSSAN EXISTING BASELINE ETHNICITY 25

TABLE 2-12 MODAL EXISTING BASELINE POVERTY 26

TABLE 2-13 HSR EXISTING BASELINE POVERTY 26

TABLE 2-14 LOSSAN EXISTING BASELINE POVERTY 26

TABLE 2-15 MODAL EXISTING BASELINE HOUSING TYPE 27

TABLE 2-16 HSR EXISTING BASELINE HOUSING TYPE 28

TABLE 2-17 LOSSAN EXISTING BASELINE HOUSING TYPE..... 28

TABLE 3-1 EXISTING LAND USE COMPATIBILITY CATEGORIES..... 30

TABLE 3-2 EXISTING LAND USE COMPATIBILITY METHODS 30

TABLE 4-1 DETAILED ANALYSIS/COMPARISON TABLE 42

ACRONYMS

AUTHORITY	CALIFORNIA HIGH-SPEED RAIL
BG	BLOCK GROUP
CEQA	CALIFORNIA ENVIRONMENTAL QUALITY ACT
COG	COUNCIL OF GOVERNMENTS
EIR	ENVIRONMENTAL IMPACT REPORT
EIS	ENVIRONMENTAL IMPACT STATEMENT
EJ	ENVIRONMENTAL JUSTICE
EPA	ENVIRONMENTAL PROTECTION AGENCY
FAA	FEDERAL AVIATION ADMINISTRATION
FHWA	FEDERAL HIGHWAY ADMINISTRATION
FRA	FEDERAL RAILROAD ADMINISTRATION
FTA	FEDERAL TRANSIT ADMINISTRATION
HSR	HIGH-SPEED RAIL
HST	HIGH-SPEED TRAIN ALTERNATIVE
LAX	LOS ANGELES INTERNATIONAL AIRPORT
LOSSAN	LOS ANGELES TO SAN DIEGO CONVENTIONAL RAIL CORRIDOR
MTA	METROPOLITAN TRANSPORTATION AUTHORITY
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
SANDAG	SAN DIEGO ASSOCIATION OF GOVERNMENTS
SCAG	SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS
ROW	RIGHT-OF-WAY
RTP	REGIONAL TRANSPORTATION PLAN
UPRR	UNION PACIFIC RAILROAD
USACE	U.S. CORPS OF ENGINEERS
USFWS	U.S. FISH AND WILDLIFE SERVICE

1.0 INTRODUCTION

The California High-Speed Rail Authority (Authority) was created by the Legislature in 1996 to develop a plan for the construction, operation, and financing of a statewide, intercity high-speed passenger train system.¹ After completing a number of initial studies over the past six years to assess the feasibility of a high-speed train system in California and to evaluate the potential ridership for a variety of alternative corridors and station areas, the Authority recommended the evaluation of a proposed high-speed train system as the logical next step in the development of California's transportation infrastructure. The Authority does not have responsibility for other intercity transportation systems or facilities, such as expanded highways, or improvements to airports or passenger rail or transit used for intercity trips.

The Authority adopted a *Final Business Plan* in June 2000, which reviewed the economic feasibility of a 1,127-kilometer-long (700-mile-long) high-speed train system. This system would be capable of speeds in excess of 321.8 kilometers per hour (200 miles per hour [mph]) on a dedicated, fully grade-separated track with state-of-the-art safety, signaling, and automated train control systems. The system described would connect and serve the major metropolitan areas of California, extending from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego. The high-speed train system is projected to carry a minimum of 42 million passengers annually (32 million intercity trips and 10 million commuter trips) by the year 2020.

Following the adoption of the Business Plan, the appropriate next step for the Authority to take in the pursuit of a high-speed train system is to satisfy the environmental review process required by federal and state laws which will in turn enable public agencies to select and approve a high speed rail system, define mitigation strategies, obtain necessary approvals, and obtain financial assistance necessary to implement a high speed rail system. For example, the Federal Railroad Administration (FRA) may be requested by the Authority to issue a *Rule of Particular Applicability*, which establishes safety standards for the high-speed train system for speeds over 200 mph, and for the potential shared use of rail corridors.

The Authority is both the project sponsor and the lead agency for purposes of the California Environmental Quality Act (CEQA) requirements. The Authority has determined that a Program Environmental Impact Report (EIR) is the appropriate CEQA document for the project at this conceptual stage of planning and decision-making, which would include selecting a preferred corridor and station locations for future right-of-way preservation and identifying potential phasing options. No permits are being sought for this phase of environmental review. Later stages of project development would include project-specific detailed environmental documents to assess the impacts of the alternative alignments and stations in those segments of the system that are ready for implementation.

The decisions of federal agencies, particularly the Federal Railroad Administration (FRA) related to high-speed train systems, would constitute major federal actions regarding environmental review under the National Environmental Policy Act (NEPA). NEPA requires federal agencies to prepare an Environmental Impact Statement (EIS) if the proposed action has the potential to cause significant environmental impacts. The proposed action in California warrants the preparation of a Tier 1 Program-level EIS under NEPA, due to the nature and scope of the comprehensive high-speed train system proposed by the Authority, the need to narrow the range of alternatives, and the need to protect/preserve right-of-way in the future. FRA is the federal lead agency for the preparation of the Program EIS, and the Federal Highway Administration (FHWA), the U.S. Environmental Protection Agency (EPA), the U.S. Corps of Engineers (USACE), the Federal Aviation Administration (FAA), the U.S. Fish and Wildlife Service (USFWS), and the Federal Transit Administration (FTA) are cooperating federal agencies for the EIS.

A combined Program EIR/EIS is to be prepared under the supervision and direction of the FRA and the Authority in conjunction with the federal cooperating agencies. It is intended that other federal, state,

¹ Chapter 796 of the Statutes of 1996; SB 1420, Kopp and Costa

regional, and local agencies will use the Program EIR/EIS in reviewing the proposed program and developing feasible and practicable programmatic mitigation strategies and analysis expectations for the Tier 2 detailed environmental review process which would be expected to follow any approval of a high speed train system.

The statewide high-speed train system has been divided into five regions for study: Bay Area-Merced, Sacramento-Bakersfield, Bakersfield-Los Angeles, Los Angeles-San Diego via the Inland Empire, and Los Angeles-Orange County-San Diego. This Local Area Growth, Development, Planning, Land Use, Socioeconomics, & Environmental Justice Technical Evaluation for the LOSSAN Corridor is one of five such reports being prepared for each of the regions on the topic, and it is one of fifteen technical reports for this region. This report will be summarized in the Program EIR/EIS and it will be part of the administrative record supporting the environmental review of alternatives.

1.1 ALTERNATIVES

1.1.1 No-Project Alternative

The No-Project Alternative serves as the baseline for the comparison of Modal and High-Speed Train alternatives (Figure 1-1). The No-Project Alternative represents the state's transportation system (highway, air, and conventional rail) as it existed in 1999-2000 and as it would be after implementation of programs or projects currently programmed for implementation and projects that are expected to be funded by 2020. The No-Project Alternative addresses the geographic area serving the same intercity travel market as the proposed high-speed train (generally from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego). The No-Project Alternative satisfies the statutory requirements under CEQA and NEPA for an alternative that does not include any new action or project beyond what is already committed.

The No-Project Alternative defines the existing and future statewide intercity transportation system based on programmed and funded (already in funded programs/financially constrained plans) improvements to the intercity transportation system through 2020, according to the following sources of information:

- State Transportation Improvement Program (STIP)
- Regional Transportation Plans (RTPs) for all modes of travel
- Airport plans
- Intercity passenger rail plans (California Rail Plan 2001-2010, Amtrak Five- and Twenty-year Plans)

The No-Project Alternative for the Los Angeles-Orange County-San Diego Region includes highway expansion as well as conventional rail improvements to the existing LOSSAN corridor that are programmed and funded for implementation through 2020. Table 1-1 summarizes the infrastructure components of the No-Project Alternative for this Region. As with all of the alternatives, the No-Project Alternative will be assessed against the purpose and need topics/objectives for congestion, safety, air pollution, reliability, and travel times.

FIGURE 1-1
No-Project Alternative – California Transportation System

TABLE 1-1

**PROGRAMMED IMPROVEMENTS INCLUDED IN THE NO-PROJECT ALTERNATIVE
LOS ANGELES-ORANGE COUNTY-SAN DIEGO REGION
(from 1998 and 2000 Regional Transportation Plans)**

County	Type of Project	Description
INTERCITY HIGHWAY PROJECTS		
Los Angeles	HOV	HOV Project on SR-14 (Ave P-8 to Ave-L)
Los Angeles	HOV	HOV Project on I-710 (I-10 to I-210)
Los Angeles	HOV	HOV Project on I-5 (SR-19 to I-710)
Los Angeles	Highway Widening	I-710 (I-10 to I-210) Additional Mixed Flow Lane
Los Angeles	Highway Widening	I-5 (Rosecrans to Orange Co) Additional Mixed Flow Lane
Los Angeles	Highway Widening	I-405 (US-101 to I-105) Additional Mixed Flow Lane
Los Angeles	Highway Widening	SR-57 (SR-60 to Orange Co) Additional Mixed Flow Lane
Orange	HOV	HOV Project on I-5 (SR-1 to Avenida Pico)
Orange	Highway Widening	I-5 (SR-91 to Los Angeles Co) Additional Mixed Flow Lane
Orange	Highway Widening	SR-91 (westbound auxiliary lane SR-57 to I-5) Additional Mixed Flow La
Orange	Highway Widening	SR-91 (auxiliary lanes SR-241 to SR-71) Additional Mixed Flow Lane
Orange	Highway Widening	SR-57 (auxiliary lanes Los Angeles Co to SR-91) Additional Mixed Flow Lane
San Diego	Highway Interchange/Widening	I-5 at I-805 – New interchange with 10 freeway and 2 HOV lanes.
San Diego	Highway Widening	I-5 from Mission Bay Drive to SR-52 – Addition of a northbound auxiliary lane
San Diego	Highway Widening	I-5 at SR-78 Interchange: NB-EB Connector – Widen auxiliary lane and ramp.
San Diego	Highway Widening	I-15 from SR-163 to SR 78 – Addition of auxiliary lanes and meters. Bridge widening
San Diego	Highway Widening	I-15 from SR-56 to Centre City Parkway – Addition of 4 HOV/Managed lanes
San Diego	Highway Widening/HOV	I-5 from Del Mar Heights Road to Birmingham Drive – Upgrade from existing lane freeway to 12-lane freeway and 2 HOV lanes.
San Diego	Highway Interchange	I-15/SR-56 Interchange Ramp (EB-NB) – Loop ramp.
San Diego	Highway Widening/HOV	I-5 from Del Mar Heights Road to Encinitas Boulevard – Upgrade from 8-lane freeway to 12-lane freeway and 2 HOV lanes.
San Diego	Highway	I-5 from Encinitas Boulevard to La Costa Boulevard – Upgrade from 8-lane freeway to 10-lane freeway and 2 HOV lanes.
San Diego	Highway	I-15 from SR-163 to SR-56 – Addition of 4 HOV/Managed lanes.
San Diego	TSM	Intelligent Transportation Systems: Enhanced Incident/Emergency Response, Traveler/Commercial Vehicle Operations Information, and Management System Software.
CONVENTIONAL RAIL IMPROVEMENTS		
Los Angeles	Conventional Rail	Run through tracks at L.A. Union Station
Los Angeles	Conventional Rail	Continuous third main track from Union Station to Fullerton
Orange	Conventional Rail	Double tracking along Lincoln Avenue in Santa Ana
San Diego	Conventional Rail	Extension of Double-Track at San Onofre
San Diego	Conventional Rail	Extension of Double-Track in Oceanside
San Diego	Conventional Rail	Sorrento-Miramar Double-Tracking and Curve Realignment
San Diego	Conventional Rail	O'Neil to Flores Double-Tracking
San Diego	Conventional Rail	Santa Margarita River Bridge Replacement and Double-Tracking
San Diego	Conventional Rail	Fallbrook Junction Track Upgrades
San Diego	Conventional Rail	Del Mar Bluffs Stabilization
San Diego	Conventional Rail	False Bay Passing Track
San Diego	Conventional Rail	Tecolote Creek Track Improvements and Bridge Replacement

Source: Parsons Brinckerhoff, California High-Speed Train Program Environmental Impact Report/Environmental Impact Statement, *System Alternatives Definition*, November 18, 2002

1.1.2 Modal Alternative

There are currently only three main options for intercity travel between the major urban areas of San Diego, Los Angeles, the Central Valley, San Jose, Oakland/San Francisco, and Sacramento: vehicles on the interstate highway system and state highways, commercial airlines serving airports between San Diego and Sacramento and the Bay Area, and conventional passenger trains (Amtrak) on freight and/or commuter rail tracks. The Modal System Alternative consists of expansion of highways, airports, and intercity and commuter rail systems serving the markets identified for the High-Speed Train Alternative. (Figures 1-2 and 1-3) The Modal Alternative uses the same inter-city travel demand (not capacity) assumed under the high-end sensitivity analysis completed for the high-speed train ridership in 2020. This same travel demand is assigned to the highways and airports and passenger rail described under the No-Project Alternative, and the additional improvements or expansion of facilities is assumed to meet the demand, regardless of funding potential and without high-speed train service as part of the system.

The Modal Alternative for the Los Angeles-Orange County-San Diego Region is defined as further expansion of Interstate 5 (beyond the expansion planned under the No-Project Alternative), as well as expansion at the Long Beach Airport. Table 1-2 summarizes the highway expansion components of the Modal Alternative for this Region.

TABLE 1-2

Modal Alternative: Highway Capacity Improvement Options for Year 2020
Los Angeles – Orange County – San Diego Region
(2020 Intercity Travel Demand with Highway Expansion only)

Highway Corridor	Segment (To-From)	No. of Additional Lanes ¹ (Total – Both Directions)
I-5	L.A. Union Station to I-10	4
I-5	I-10 to Norwalk	2
I-5	Norwalk to Anaheim	2
I-5	Anaheim to Irvine	2
I-5	Irvine to I-405	2
I-5	I-405 to SR-78	2
I-5	SR-78 to University Town Center	2
I-5	University Town Center to San Diego Airport	2

Source: Parsons Brinckerhoff, California High-Speed Train Program Environmental Impact Report/
Environmental Impact Statement, *System Alternatives Definition*, November 18, 2002

1. Represents the number of through lanes, in addition to the total number of lanes in the No-Project Highway Network, that approximate an equivalent level of capacity to serve the representative demand.

FIGURE 1-2
Modal Alternative – Highway Component

FIGURE 1-3
Modal Alternative – Aviation Component

1.1.3 High-Speed Train Alternative

The Authority has defined a statewide high-speed train system capable of speeds in excess of 200 miles per hour (mph) (320 kilometers per hour [km/h]) on dedicated, fully grade-separated tracks, with state-of-the-art safety, signaling, and automated train control systems. State of the art high-speed steel-wheel-on-steel-rail technology is being considered for the system that would serve the major metropolitan centers of California, extending from Sacramento and the San Francisco Bay Area, through the Central Valley, to Los Angeles and San Diego (Figure 1-4).

The High-Speed Train (HST) Alternative includes several corridor and station options. A steel-wheel on steel-rail, electrified train, primarily on exclusive right-of-way with small portions of the route on shared track with other rail is planned. Conventional “non-electric” improvements are also being considered along the existing LOSSAN rail corridor from Los Angeles to San Diego. The train track would be either at-grade, in an open trench or tunnel, or on an elevated guideway, depending on terrain and physical constraints.

In the Los Angeles-Orange County-San Diego Region, the High-Speed Train Alternative consists of electrified rail options north of Irvine (described in this report as High-Speed Rail or HSR), and improvements and options for the existing LOSSAN rail corridor between Los Angeles and San Diego (described in this report as Conventional Rail).

For purposes of comparative analysis the HST corridors will be described from station-to-station within each region, except where a by-pass option is considered when the point of departure from the corridor will define the end of the corridor segment. Table 1-3 summarizes the segments, improvements, and alignment and station options evaluated for the Los Angeles-Orange County-San Diego Region. The alignment segments are shown (north to south) in Figures 1-5A, B and C. These figures also show the proposed construction type for each alignment option (open trench, covered trench, tunnel, at-grade, or elevated), and where the alignment options would be located outside of an existing rail corridor.

LOSSAN Corridor Screening Process

A strategic planning process was undertaken as part of the evaluation of Conventional Rail improvements in the LOSSAN Corridor. This process was used to gain additional public input on the various rail improvement options being considered, and to reduce the number of alternatives to those that most reasonably and feasibly can meet the objectives, purpose, and need for the project. There are four locations within the LOSSAN Corridor where the initial range of alternatives was sufficiently broad to allow for the screening, or narrowing, of the alternatives to be carried forward in the Program EIR/EIS: San Juan Capistrano, Dana Point/San Clemente, Encinitas, and Del Mar.

Based on public and agency input, and technical, environmental and economic evaluations, a number of alternatives described in this technical report were subsequently eliminated from further consideration. The alternatives eliminated are shown in Table 1-3 in italics and gray shading. The environmental evaluation of these alternatives is included in this technical report, and was considered in the screening process. More detail on the screening process for the LOSSAN Corridor can be found in the final *Los Angeles to San Diego via Orange County Conventional Improvements Screening Report* (Authority, 2003).

FIGURE 1-4
High-Speed Train Alternative – Corridors and Stations for Continued Investigation

TABLE 1-3

**Alignment and Station Options for High-Speed Train Alternative
Los Angeles – Orange County – San Diego Region**

Alignment Segments and Station Locations Evaluated¹	Description of Proposed Options & Improvements
HIGH-SPEED RAIL (HSR) & STATION OPTIONS	
LAX To Union Station	Construction of an electrified, grade-separated, dedicated track within an existing rail corridor. The train would be on an elevated structure from Union Station to Alameda Street, then transition into a trench that ends at LAX.
Stations	
LAX	New underground station.
Union Station To Anaheim Station via UPRR	Construction of an electrified, grade-separated, dedicated track within an existing rail corridor. Train would be on an elevated structure from Union Station, go into a trench at Slauson Avenue, move to at-grade across San Gabriel River, return to a trench up to La Canada Verde Creek, then become an aerial structure to Edison Field where it would go underground to a depressed station.
Stations	
Norwalk	New elevated station.
Anaheim	New underground station, built beneath existing station.
Union Station To Irvine Station via LOSSAN	Construction of fully grade-separated tracks within existing rail corridor, to be shared by electrified and conventional trains.
Stations	
Norwalk	Existing station. Proposed improvements include bypass tracks and additional parking.
Fullerton	Existing station. Proposed improvements include bypass tracks and additional parking.
Anaheim	Existing station. Proposed improvements include bypass tracks and additional parking.
Santa Ana	Existing station. Proposed improvements include bypass tracks and additional parking.
Irvine	Existing station. Expanded platform and parking, "terminal" tracks.
CONVENTIONAL RAIL (LOSSAN CORRIDOR) & STATION OPTIONS	
Union Station To Fullerton Station 4th Main Track	Construction of fourth main track in existing rail corridor between Commerce and Fullerton. Improvements can probably be accommodated within existing LOSSAN ROW except between Rio Hondo River and San Gabriel River.
Fullerton Station To Irvine Station	
Alignment Options:	
<i>AT-GRADE between Walnut Ave (Orange) and E. 17th St. (Santa Ana)</i>	Grade separations at street intersections between Walnut Ave. (in Orange) and E. 17 th Street in Santa Ana. At-grade curve straightening between Batavia Street and Walnut Ave. Improvements would be in existing rail corridor ROW, except for the curve realignment.
<i>TRENCH between Walnut Ave (Orange) and E. 17th St. (Santa Ana)</i>	Fully grade-separate existing rail corridor in a covered trench (same alignment as above), including curve straightening.
Stations	
Fullerton	Existing station. Proposed improvements include bypass tracks, platform reconfiguration, and additional parking.
Anaheim	Existing station. Proposed improvements include bypass tracks and additional parking.
Santa Ana	Existing station. Proposed improvements include bypass tracks and additional parking.
Irvine	Existing station. Proposed improvements include bypass tracks and additional parking.

¹ Conventional Rail (LOSSAN Corridor) alignment and/or construction options shown in italics and gray shading were eliminated from further evaluation during the LOSSAN Corridor Strategic Plan screening process. See text for more detail.

TABLE 1-3

**Alignment and Station Options for High-Speed Train Alternative
Los Angeles – Orange County – San Diego Region (continued)**

Alignment Segments and Station Locations Evaluated¹	Description of Proposed Options & Improvements
Irvine Station To San Juan Capistrano City Limits (no improvements)	No improvements are proposed for this conventional rail segment under the High-Speed Train Alternative.
San Juan Capistrano (City Limits to Avenida Aeropuerto)	
Alignments	
<i>Covered TRENCH/Cut-Fill between Trabuco Creek and Avenida Aeropuerto (trench goes under San Juan Creek); Double tracking</i>	<i>Double-tracking via an open trench along the approach to and departure from the San Juan Capistrano Station (relocated from the existing track location on the west side of the station to the east side of the station), and a covered trench under the parking area at the station. This option would include curve realignment at San Juan Creek</i>
TUNNEL along I-5 between Hwy 73 and Avenida Aeropuerto (tunnel under Trabuco Creek and San Juan Creek); Double tracking	Double-tracking in a tunnel running the length of the City of San Juan Capistrano under Interstate 5.
AT-GRADE and Open TRENCH along east side of Trabuco Creek	Double-tracking at grade and in an open trench along the east side of Trabuco Creek, west of the existing rail alignment.
Stations	
San Juan Capistrano	Existing station (for Covered Trench alignment only): Proposed improvements include double tracking (by-pass tracks) and parking expansion. New station would be constructed with the At-Grade/Open Trench option along Trabuco Creek. New station would be below-grade in open trench. No station would be included in San Juan Capistrano for the I-5 tunnel option.
Dana Point/San Clemente (Avenida Aeropuerto To San Onofre Power Plant)	
Alignments	
<i>Dana Point Curve Realignment; San Clemente - SHORT TRENCH; Double Tracking</i>	<i>Double-tracking and straightening existing curve at Dana Point between San Juan Creek and Avenida Aeropuerto along the existing rail corridor; double-tracking in existing rail alignment in San Clemente in a covered trench for about 1,000 feet either side of the pier.</i>
<i>Dana Point Curve Realignment; San Clemente - LONG TRENCH; Double Tracking</i>	<i>Double-tracking and straightening existing curve at Dana Point between San Juan Creek and Avenida Aeropuerto along the existing rail corridor; double-tracking generally along existing rail corridor through San Clemente in a covered trench from about one mile north of San Mateo Creek to about 4,000 feet north of the pier. This trench option includes one section that leaves the existing corridor and goes underneath residences located west of the corridor between the municipal pier and North El Camino Real.</i>
Dana Point Curve Realignment; San Clemente - SHORT TUNNEL; Double Tracking	Double-tracking and straightening existing curve at Dana Point in existing rail corridor; double-tracking via a short tunnel that follows Interstate 5 between Palm Drive and San Onofre State Beach, north of the power plant. The short tunnel alignment leaves the Interstate 5 corridor at Avenida Palizada, turns toward the coast and runs underneath residential, industrial and vacant areas, connecting with the existing rail corridor just south of Camino Capistrano.

¹ Conventional Rail (LOSSAN Corridor) alignment and/or construction options shown in italics and gray shading were eliminated from further evaluation during the LOSSAN Corridor Strategic Plan screening process. See text for more detail.

TABLE 1-3

**Alignment and Station Options for High-Speed Train Alternative
Los Angeles – Orange County – San Diego Region (continued)**

Alignment Segments and Station Locations Evaluated¹	Description of Proposed Options & Improvements
<i>San Clemente - LONG ONE-SEGMENT TUNNEL ; Double Tracking (crosses San Mateo and San Onofre Creeks)</i>	<i>Double-tracking via a long, one- segment tunnel following Interstate 5 from San Onofre State Beach to Avenida Aeropuerto in San Juan Capistrano. This option precludes the need for curve realignment at Dana Point. The existing rail corridor along the coast between southern San Clemente city limits to approximately Avenida Aeropuerto in San Juan Capistrano would be removed from service (or at least not be further improved from its existing condition).</i>
San Clemente - LONG TWO-SEGMENT TUNNEL; Double Tracking (crosses San Mateo and San Onofre Creeks)	Double-tracking via a long, two- segment tunnel following Interstate 5 from San Onofre State Beach to Avenida Aeropuerto in San Juan Capistrano. This option precludes the need for curve realignment at Dana Point. This tunnel would have the same alignment as the one-segment long tunnel above except in a one-mile stretch near Avenida Pico, it would veer to the east edge of I-5 and daylight into an open trench for about 1,000 feet. The existing rail corridor along the coast between southern San Clemente city limits to approximately Avenida Aeropuerto in San Juan Capistrano would be removed from service (or at least not be further improved from its existing condition).
Stations	
San Clemente	The trench options for this segment would include a proposed below-grade station south of the municipal pier to replace the existing San Clemente Station. The tunnel options would eliminate the need for a train station downtown; a new below-grade station would be constructed along the tunnel alignment where the tunnel transitions to a trench.
Camp Pendleton (San Onofre Power Plant to Oceanside City Limits - Double tracking; crosses San Mateo, San Onofre, and Santa Margarita Creeks)	Construction of an at-grade second main track, in portions of this segment covering about six miles, that are not already double-tracked or will be under the conventional rail improvements included in the No-Project Alternative.
Oceanside/Carlsbad (Oceanside City Limits to Encinitas City Limits)	
Alignments	
Carlsbad - AT-GRADE; double tracking; crosses San Luis Rey, Buena Vista , Aqua Hedionda, and Batiquitos Lagoons	Double-tracking through Carlsbad in existing rail alignment at grade.
Carlsbad -TRENCH; double-tracking; crosses San Luis Rey, Buena Vista, Aqua Hedionda, and Batiquitos Lagoons	Double-tracking through Carlsbad in existing rail alignment in trench.
Stations	
Oceanside	Existing station. Proposed improvements include bypass tracks and parking expansion.

¹ Conventional Rail (LOSSAN Corridor) alignment and/or construction options shown in italics and gray shading were eliminated from further evaluation during the LOSSAN Corridor Strategic Plan screening process. See text for more detail.

TABLE 1-3

**Alignment and Station Options for High-Speed Train Alternative
Los Angeles – Orange County – San Diego Region (continued)**

Alignment Segments and Station Locations Evaluated¹	Description of Proposed Options & Improvements
Encinitas/Solana Beach (Encinitas City Limits to Solana Beach Station)	
Alignments	
Encinitas - AT-GRADE; Double Tracking; crosses San Elijo Lagoon	Double-tracking primarily at-grade, with a short trench segment for the rail corridor on either side of Birmingham Drive. This option would include reconfiguring the street intersection at Birmingham Drive and San Elijo Avenue, and close Chesterfield Drive at San Elijo Avenue. Another grade separation would occur at Leucadia Boulevard where the tracks would be depressed. Pedestrian undercrossings would be placed along the route.
Encinitas - SHORT TRENCH; Double Tracking; crosses San Elijo Lagoon	Double-tracking in same alignment as at-grade option above, but with an additional covered trench under Encinitas Boulevard and a transitional open trench about 1,500 feet either side of Encinitas Boulevard.
<i>Encinitas - LONG TRENCH; Double Tracking; crosses San Elijo Lagoon</i>	<i>Double-tracking in same alignment as options described above. Tracks would be in an open trench south of the Batiquitos Lagoon, then drop into a covered trench as they approach the downtown area, then return to an open trench up to the north end of the San Elijo Lagoon, where they transition to at-grade. Chesterfield Drive at San Elijo Avenue would be closed. Pedestrian crossings would be placed along the route.</i>
Stations	
Solana Beach	Existing station. Proposed improvements include platform modifications and parking expansion.
Del Mar (Solana Beach Station to I-5/805 Split)	
Alignments	
<i>COVERED TRENCH on bluffs; crosses San Dieguito and Los Penasquitos Lagoons</i>	<i>Double-tracking in a covered trench in the existing rail corridor alignment along the bluffs.</i>
TUNNEL under Camino Del Mar; crosses San Dieguito and Los Penasquitos Lagoons	Double-tracking via a tunnel underneath Camino Del Mar. Tunnel would begin at Jimmy Durante Boulevard, and daylight at Carmel Valley Road where tracks would then connect with the existing alignment across Los Penasquitos Lagoon. The existing rail track on the bluffs would be removed from service.
TUNNEL along I-5; crosses San Dieguito and Los Penasquitos Lagoons	Double-tracking via a tunnel that would run under Interstate 5 and daylight along the southern boundary of San Dieguito Lagoon. Tracks would reconnect with the existing rail at-grade near the Del Mar race track. The existing rail track on the bluffs would be removed from service.
I-5/805 Split To Hwy 52	
Alignments	
Miramar Hill Tunnel	Double-tracking via a tunnel through Miramar Hill.
I-5 Tunnel	Double-tracking via a tunnel under Interstate 5.
Stations	
UTC (Only applies to Miramar Hill Tunnel)	New station, proposed only with the Miramar Hill tunnel option. Station would be constructed underground.
Hwy 52 To Santa Fe Depot (Curve realignment; Double Tracking; San Diego River Bridge; Trench between Sassafras St and Cedar St)	Double-tracking in existing rail corridor for full length of segment. An existing curve just south of Highway 52 would be straightened, requiring two new bridges over wetlands in San Clemente Canyon. New bridges would also be constructed over Tecolote Creek and San Diego River. Tracks would be placed in a trench between Sassafras Street and Cedar Street.
Stations	
Santa Fe Depot	Existing station. Proposed improvements include bypass tracks and parking expansion.

¹ Conventional Rail (LOSSAN Corridor) alignment and/or construction options shown in italics and gray shading were eliminated from further evaluation during the LOSSAN Corridor Strategic Plan screening process. See text for more detail.

Figure 1-5A
High-Speed Train Alternative: Alignment and Construction Type by Segment
(Los Angeles to Fullerton)

Figure 1-5B
High-Speed Train Alternative: Alignment and Construction Type by Segment
(Fullerton to Camp Pendleton)

Figure 1-5C
High-Speed Train Alternative: Alignment and Construction Type by Segment
(Camp Pendleton to San Diego)

2.0 BASELINE/AFFECTED ENVIRONMENT

2.1 STUDY AREA

The study area for land use compatibility, communities and neighborhoods, property, and environmental justice, is 0.25 mi (0.40 km) on either side of the centerline of the rail and highway corridors, and the same distance around stations, airports, and other HST-related facilities. This is the extent of area where either the Modal or HST Alternative might result in a change to land use, the level and patterns of development, and socioeconomic conditions. For the property impacts analysis the study area is narrower, 100 ft (30 m) on either side of the alignment centerlines, to better represent the properties most likely to be impacted by the improvements defined (e.g., highway widenings or new HST lines).

2.2 REGULATORY SETTING

Existing and proposed stations are the focus in evaluating land use and socioeconomic related issues. The potential conventional rail improvements along the LOSSAN Corridor are relatively minor and include a number of existing train stations where plans involve increasing vehicular parking and /or installing by-pass tracks. These stations are located in the following municipalities: Fullerton, Anaheim, Santa Ana, Irvine, San Juan Capistrano, San Clemente, Oceanside, Solana Beach, and San Diego. In addition, a new underground station is proposed at the University Town Center, as part of a tunnel option through Miramar Hill.

The high-speed rail option within the LOSSAN Corridor between Union Station and Irvine includes parking and by-pass track improvements at the existing stations in Norwalk, Fullerton, Anaheim, Santa Ana, and Irvine. In addition, new stations are proposed along two separate high-speed rail (HSR) corridors. The corridor between Union Station and Anaheim via the Union Pacific Railroad (UPRR) includes new stations in the cities of Norwalk and Anaheim, and the corridor between Los Angeles International Airport (LAX) and Union Station includes a new, underground station at LAX.

Local General Plans for the respective municipalities and regional transportation plans for the Metropolitan Planning Organizations of SCAG and SANDAG were reviewed for consistency with the proposed station improvements for conventional and high-speed rail. In addition, Amtrak's 20-year Improvement Plan and CALTRANS' 10-year California State Rail Plan defined projects included in the future baseline for this study. Table 2-1 lists documents consulted and the date of preparation.

TABLE 2-1
Documents Consulted for Regulatory Setting

General Plan	Date
City of Los Angeles	March 2001
City of Norwalk	February 1996
City of Irvine	March 1999
City of San Clemente	May 1993
County of San Diego	1997
City of Oceanside	2000
City of Carlsbad	September 1994
City of Encinitas	1995
City of Solana Beach	2001
City of Fullerton	November 2000
City of Anaheim	July 1984
City of Santa Ana	September 1982
City of San Juan Capistrano	December 1999
City of San Diego	May 1989

Other Documents Referenced	
Southern California Association of Governments Regional Transportation Plan	April 2001
San Diego Association of Governments Regional Transportation Plan	April 2000
Amtrak 20-Year Improvement Plan	March 2001
CalTrans 10-Year California State Rail Plan	March 2002

2.3 LAND USE

2.3.1. Existing, Baseline Land Use

Figure 2-1 shows a generalized representation of the land uses along the entire study area for the Los Angeles – Orange County – San Diego Region.

Modal Alternative

The Modal Alternative, although on the existing Interstate 5 corridor, has the potential to impact existing land uses because of highway widening. The study area of impact for the Modal Alternative is a 0.25-mile buffer on each side of the centerline. The major existing land uses within the Modal Alternative study area include Single Family Residential, Transportation and Utilities, and Community Parks. The existing land uses for the Modal Alternative are summarized in Table 2-2.

TABLE 2-2
Modal Existing Baseline Land Use

Land Use - Modal	Count	Acres	Percent of Study Area
Single Family Residential	751	13,623	26%
Transportation/Utilities	285	9,899	19%
Community Parks	627	5,901	11%
Low-intensity Industrial	261	4,789	9%
Service Commercial	174	4,219	8%
Commercial Recreation	536	3,384	6%
Business Park/Regional Commercial	327	2,745	5%
Agriculture	107	2,508	5%
Neighborhood Park	202	1,480	3%
High Intensity Industrial Park	165	1,270	2%
Multi-family Residential	144	1,010	2%
High Schools	85	671	1%
High Intensity Government Facilities	117	556	1%
College	20	436	1%
Elementary/Middle School	18	95	<1%
Hospitals	9	88	<1%
Total	3,828	52,672	100%

Figure 2-1
Generalized Existing Land use

High Speed Rail and Station Alternatives

The High Speed Rail segments evaluated are Union Station to Anaheim and LAX to Union Station. (A third HSR option exists between Union Station and Irvine along the existing LOSSAN rail corridor. Because this route is also evaluated for Conventional Rail improvements, it is included in the Conventional Rail discussion below.) The major existing land uses that fall within the 0.25-mile study area for these HSR options are Single Family Residential, Low-intensity Industrial, and Transportation and Utilities. These land uses are summarized in Table 2-3.

TABLE 2-3
HSR Existing Baseline Land Use

Land Use - High Speed Rail	Count	Acres	Percent of Study Area
Single Family Residential	429	7,147	27%
Low-intensity Industrial	262	7,006	26%
Transportation/Utilities	245	3,172	12%
High Intensity Industrial Park	260	2,277	9%
Commercial Recreation	296	2,199	8%
Business Park/Regional Commercial	139	1,037	4%
Community Parks	172	928	4%
High Intensity Government Facilities	94	687	3%
Agriculture	42	611	2%
College	23	429	2%
High Schools	65	421	2%
Neighborhood Park	79	344	1%
Service Commercial	33	222	<1%
Elementary/Middle School	2	3	<1%
Multi-family Residential	0	0	0%
Hospitals	0	0	0%
Total	2,141	26,483	100%

Conventional Rail and Station Alternatives

The LOSSAN rail corridor and station locations encompass a variety of existing land uses. The area of potential impact is considered to be a 0.25-mile buffer on each side of the segments of the rail line in which improvements are being considered. The existing land uses within this study area are summarized in Table 2-4, and primarily consist of Single Family Residential, Community Parks, and Low-Intensity Industrial.

TABLE 2-4

Conventional Rail (LOSSAN) Existing Baseline Land Use

Land Use - LOSSAN Corridor	Count	Acres	Percent of Study Area
Single Family Residential	428	7,461	27%
Community Parks	511	4,639	17%
Low-intensity Industrial	187	3,715	14%
Transportation/Utilities	251	2,969	11%
High Intensity Industrial Park	204	1,958	7%
Commercial Recreation	342	1,738	6%
Business Park/Regional Commercial	204	1,027	4%
Agriculture	67	785	3%
Multi-family Residential	157	645	2%
College	23	600	2%
Neighborhood Park	134	597	2%
High Intensity Government Facilities	80	587	2%
High Schools	47	346	1%
Service Commercial	82	151	<1%
Hospitals	7	47	<1%
Elementary/Middle School	14	35	<1%
Total	2,738	27,301	100%

2.3.2 Future Baseline 2020 Planned Land Use

The future baseline for planned land use (projected land use to the year 2020) is largely defined by the municipal and county general plans that encompass the corridor alignments for High Speed Train and Modal Alternatives. Regulatory agencies or special districts may also have future development plans for lands crossed by these alternatives. When known, these plans are also taken into consideration. (For a list of plans used, refer to Table 2-1.) In general, communities have recognized and accommodated the existing rail and highway corridors in their general plans, and encouraged transit-oriented development and supportive facilities to relieve highway congestion. Future land use in the study area evaluated will remain basically unchanged, due to the fact that the High Speed Train and Modal Alternatives are within or adjacent to existing, developed rail and highway corridors.

2.4 POPULATION CHARACTERISTICS

2.4.1 Trends & Growth

The population projections for 2020 that were used for the purpose of this report are from SCAG (Southern California Association of Governments) and SANDAG (San Diego Association of Governments). Projections are shown in Table 2-5 by the cities within which the Modal or HST alternative improvements would occur. Altogether, these cities are expected to grow by approximately 1.5 million people by the year 2020.

At the county level, the population of Los Angeles, Orange, and San Diego Counties increased by 10 percent between 1990 and 2000, from 13.8 million persons to 15.2 million. By 2020, population in this region is forecast to reach 18.6 million, an increase of 23 percent (source: U.S. Census Data 2000)

TABLE 2-5
2020 Population Projections

County	City	Population			Percent Change	
		1990	2000	2020	1990-2000	2000-2020
Los Angeles	Bell	34,365	38,185	46,121	11%	21%
Los Angeles	Bell Gardens	42,355	45,863	50,576	8%	10%
Los Angeles	Commerce	12,135	13,253	15,792	9%	19%
Los Angeles	Cudahy	22,817	25,217	26,719	11%	6%
Los Angeles	Downey	91,444	101,220	106,933	11%	6%
Los Angeles	Huntington Park	56,065	63,975	69,844	14%	9%
Los Angeles	Inglewood	109,602	120,786	127,741	10%	6%
Los Angeles	La Mirada	40,452	48,896	55,048	21%	13%
Los Angeles	Lakewood	73,557	79,801	83,225	8%	4%
Los Angeles	Long Beach	429,433	456,378	518,349	6%	14%
Los Angeles	Los Angeles	3,485,398	3,807,864	4,521,426	9%	19%
Los Angeles	Maywood	27,850	30,040	31,578	8%	5%
Los Angeles	Montebello	59,564	65,462	77,715	10%	19%
Los Angeles	Norwalk	94,279	103,895	115,216	10%	11%
Los Angeles	Pico Rivera	59,177	63,155	65,983	7%	4%
Los Angeles	Santa Fe Springs	15,520	16,137	16,757	4%	4%
Los Angeles	South Gate	86,284	93,728	108,219	9%	15%
Los Angeles	Vernon	152	98	215	-35%	119%
Orange	Anaheim	266,406	325,805	375,186	22%	15%
Orange	Buena Park	68,784	76,270	86,120	11%	13%
Orange	Dana Point	31,896	37,927	43,228	19%	14%
Orange	Fullerton	114,144	127,124	145,277	11%	14%
Orange	Irvine	110,330	139,345	189,917	26%	36%
Orange	Laguna Hills	46,731	30,326	35,701	-35%	18%
Orange	Laguna Niguel	44,400	58,909	66,700	33%	13%
Orange	Mission Viejo	72,820	90,359	100,217	24%	11%
Orange	Orange	110,658	127,833	148,643	15%	16%
Orange	San Clemente	41,100	50,636	61,320	23%	21%
Orange	San Juan Capistrano	26,183	31,664	39,402	21%	24%
Orange	Santa Ana	293,742	314,564	349,103	7%	11%
Orange	Tustin	50,689	68,650	81,499	35%	19%
San Diego	Carlsbad	63,126	78,247	120,057	24%	53%
San Diego	Del Mar	4,860	4,389	4,855	-10%	11%
San Diego	Encinitas	55,386	58,014	72,955	5%	26%
San Diego	Oceanside	128,398	161,029	208,846	25%	30%
San Diego	San Diego	1,110,549	1,223,400	1,507,242	10%	23%
San Diego	Solana Beach	12,962	12,979	13,726	<1%	6%
Totals		7,393,613	8,191,423	9,687,451	11%	18%

2.4.2 Household Size

Modal Alternative

The Modal Alternative passes through 407 Block Groups. These Block Groups have a population of 1,184,641 according to 2000 Census Data, and contain a high number of 1- and 2-person households. The range of household sizes is summarized in Table 2-6. The average (mean) household size in the Modal Alternative study area is a 4-person household.

TABLE 2-6

Modal Existing Baseline Household Size

Household Size	Count	Percent
2 Person	99,144	28%
1 Person	73,611	21%
3 Person	59,771	17%
4 Person	56,402	16%
5 Person	31,559	9%
6 Person	16,095	5%
7 Person	15,855	4%
Total	352,437	100%

High Speed Rail and Station Alternatives

The High Speed Rail alignments and stations that are not on the LOSSAN Corridor pass through 248 Block Groups. These Block Groups have a total population of 394,981 according to 2000 Census Data, and contain a high number of 1- and 2-person households. The range of household sizes is summarized in Table 2-7. The average (mean) household size in the High-Speed Rail study area is a 4-person household.

TABLE 2-7

HSR Existing Baseline Household Size

Household Size	Count	Percent
2 Person	22,596	21%
1 Person	20,713	19%
4 Person	17,937	17%
3 Person	17,778	16%
5 Person	12,870	12%
7 Person	8,676	8%
6 Person	8,049	7%
Total	108,619	100%

Conventional Rail and Station Alternatives

The study area for the LOSSAN rail corridor and station locations encompass a total of 332 Block Groups. These Block Groups have a population of 1,124,297 according to 2000 Census data, and contain a high number of 1- and 2-person households. The range of household sizes is summarized in Table 2-8. The average (mean) household size in the Conventional Rail study area is a 4-person household.

TABLE 2-8
Conventional Rail (LOSSAN) Existing Baseline Household Size

Household Size	Count	Percent
2 Person	96,138	29%
1 Person	77,658	23%
3 Person	54,074	16%
4 Person	48,866	15%
5 Person	27,573	8%
7 Person	16,286	5%
6 Person	14,837	4%
Total	335,432	100%

2.4.3 Ethnicity

Modal Alternative

The study area for the Modal Alternative passes through 407 Block Groups. These Block Groups have a total population of 1,184,641 people according to 2000 Census Data, and contain the ethnicities summarized in Table 2-9.

TABLE 2-9
Modal Existing Baseline Ethnicity

Ethnicity	Count	Percent
Not Hispanic or Latino - White Alone	524,982	44%
Hispanic or Latino	475,220	40%
Not Hispanic or Latino - Asian Alone	99,068	8%
Not Hispanic or Latino - Black or African American Alone	45,672	4%
Not Hispanic or Latino - Two or More Races	28,539	2%
Not Hispanic or Latino - American Indian and Alaska Native Alone	5,284	<1%
Not Hispanic or Latino - Native Hawaiian and Other Pacific Islander Alone	4,007	<1%
Not Hispanic or Latino - Some Other Race Alone	1,869	<1%
Total	1,184,641	100%

High Speed Rail and Station Alternatives

The study area for the High Speed alignments and station locations that are not on the LOSSAN Corridor pass through 248 Block Groups. These 248 Block Groups have a total population of 394,981 according to 2000 Census Data, and contain the ethnicities summarized in Table 2-10.

TABLE 2-10
HSR Existing Baseline Ethnicity

Ethnicity	Count	Percent
Hispanic or Latino	241,623	61%
Not Hispanic or Latino - White Alone	57,807	15%
Not Hispanic or Latino - Black or African American Alone	55,969	14%
Not Hispanic or Latino - Asian Alone	30,536	8%
Not Hispanic or Latino - Two or More Races	6,569	2%
Not Hispanic or Latino – American Indian and Alaska Native Alone	1,169	<1%
Not Hispanic or Latino - Native Hawaiian and Other Pacific Islander Alone	689	<1%
Not Hispanic or Latino - Some Other Race Alone	619	<1%
Total	394,981	100%

Conventional Rail and Station Alternatives

The study area for the LOSSAN rail corridor and stations encompass a total of 332 Block Groups. These Block Groups have a total population of 1,124,297 according to 2000 Census data, and contain the ethnicities summarized in Table 2-11.

TABLE 2-11
Conventional Rail (LOSSAN) Existing Baseline Ethnicity

Ethnicity	Count	Percent
Not Hispanic or Latino - White Alone	513,177	46%
Hispanic or Latino	447,131	40%
Not Hispanic or Latino - Asian Alone	84,080	7%
Not Hispanic or Latino - Black or African American Alone	40,979	4%
Not Hispanic or Latino - Two or More Races	28,139	2%
Not Hispanic or Latino – American Indian and Alaska Native Alone	6,028	<1%
Not Hispanic or Latino - Native Hawaiian and Other Pacific Islander Alone	3,044	<1%
Not Hispanic or Latino - Some Other Race Alone	1,719	<1%
Total	1,124,297	100%

At the county level, minority persons accounted for 51 percent of Los Angeles County in 2000, 35 percent of Orange County, and 34 percent of San Diego County. The Hispanic population accounted for 45 percent in Los Angeles County, 31 percent in Orange County, and 27 percent in San Diego County (source: U.S. Census Data 2000).

2.4.4 Income

Modal Alternative

The Modal Alternative passes through 407 Block Groups with a total population of 1,184,641 and 353,996 households, according to 2000 Census Data. The percent of households living below the federal poverty level is shown in Table 2-12. The poverty level is set at an income of \$17,603 or below per household.

TABLE 2-12

Modal Existing Baseline Poverty

Total Number of Households	Total Number in Poverty	Percent
353,996	33,567	9%

High Speed Rail and Station Alternatives

The High Speed Rail alignments and stations that are not on the LOSSAN Corridor pass through 248 Block Groups with a total population of 394,981 and 108,657 households, according to 2000 Census Data. The percent of households living below the federal poverty level is shown in Table 2-13.

TABLE 2-13

HSR Existing Baseline Poverty

Total Number of Households	Total Number in Poverty	Percent
108,657	20,062	18%

Conventional Rail and Stations

The LOSSAN rail corridor and stations pass through a total of 332 Block Groups with a total population of 1,124,297 and 336,305 households, according to 2000 Census data. The percent of households in these block groups living below the federal poverty level is shown in Table 2-14.

TABLE 2-14

LOSSAN Existing Baseline Poverty

Total Number of Households	Total Number in Poverty	Percent
336,305	36,060	11%

At the county level, in Los Angeles County, per-capita income was \$20,683, with 18 percent of the population below the federal poverty level (\$17,603). Per-capita income in Orange County was \$25,826, with 10 percent of the population below the federal poverty level. San Diego County had a per-capita income of \$22,926, with 12 percent of the population below the federal poverty level (source: U.S. Census Data 2000).

2.5 NEIGHBORHOOD AND COMMUNITY CHARACTERISTICS

The Modal, High-Speed Rail, and Conventional Rail corridors all have similar community characteristics. The corridors traverse three counties and multiple communities between Los Angeles and San Diego. The corridors cross through what could be viewed as three apparent geographical areas: the metropolitan area of Los Angeles, south Orange County, and the metropolitan area of San Diego. Communities that occur within these areas have both common and unique characteristics shaped by a variety of political, physical, social and economic factors. The Los Angeles metropolitan area can be characterized as a highly urbanized mix of single and multi-family neighborhoods, commercial and industrial development containing such communities as Los Angeles, Norwalk, Fullerton, and Anaheim. The area is strongly influenced by the existing transportation network. The south Orange County area can be characterized as smaller communities with strong ties to the coastline. The communities contain predominately single-family neighborhoods with supporting commercial and industrial development. Communities such as San Juan Capistrano, Dana Point, and San Clemente represent this area. The San Diego metropolitan area can be characterized as a highly urban area rimmed by bedroom communities that have close interaction with the coastal resources. Communities that represent this area are Oceanside, Carlsbad, Encinitas, Solana Beach, Del Mar and San Diego.

2.6 HOUSING

Modal Alternative

The study area of the Modal Alternative passes through 407 Block Groups with a population of 1,184,641, according to 2000 Census Data. One-unit detached dwellings are the most common housing type. The range of housing types is summarized in Table 2-15.

TABLE 2-15

Modal Existing Baseline Housing Type

Housing Type	Count	Percent
Single Family Dwellings	235,045	63%
Multi-Family Dwellings	136,454	37%
Total	371,499	100%

High Speed Rail and Station Alternatives

The High Speed Rail alignments and station locations that are not on the LOSSAN Corridor pass through 248 Block groups. These Block Groups have a population of 394,981, according to 2000 Census Data. One-unit detached dwellings are the most common housing type. The range of housing types is summarized in Table 2-16.

TABLE 2-16**HSR Existing Baseline Housing Type**

Housing Type	Count	Percent
Single Family Dwellings	64,151	56%
Multi-Family Dwellings	49,620	44%
Total	113,771	100%

Conventional Rail and Station Alternatives

The study area for the LOSSAN Corridor and stations passes through a total of 332 Block Groups with a population of 1,124,297, according to 2000 Census data. One-unit detached dwellings are the most common housing type. The range of housing types is summarized in Table 2-17.

TABLE 2-17**Conventional Rail (LOSSAN) Existing Baseline Housing Type**

Housing Type	Count	Percent
Single Family Dwellings	208,114	57%
Multi-Family Dwellings	155,476	43%
Total	363,590	100%

In 2000, there were 2.2 million housing units in Los Angeles County, of which approximately four percent were vacant. Single-family units accounted for 56 percent of total units. There were 969,500 housing units in Orange County, of which approximately four percent were vacant. Single-family units accounted for 63 percent of total units. San Diego County had 1.0 million housing units, of which approximately four percent were vacant; and single-family units accounted for 60 percent of total units.

3.0 EVALUATION METHODOLOGY

The analysis was conducted using existing U.S. Census 2000 tract information/data compiled in a geographic information system (GIS) format, local community general plans or regional plans, as well as land use information provided by the planning agencies in each of the regions. Existing and future baseline conditions were established for the No-Project by documenting existing information for existing and planned future land use policy in station and airport areas, development patterns for employment and population growth, demographics, communities and neighborhoods, housing, and economics. The No-Project was compared to the future baseline plans to see if there would be potential effects on future development. Chapter 2.0 lists and discusses the general and regional plans.

Ranking systems were established to evaluate potential impacts for all three alternatives for land use compatibility, communities and neighborhoods, property, and environmental justice. Because this is a programmatic environmental review, the analysis of these potential impacts was performed on a broad scale to permit a comparison of relative differences of proposed alternatives. A more detailed analysis would be required at the project-level environmental review, should a decision be made to proceed with the proposed HST system.

Land Use Compatibility

The compatibility of the alternatives with existing land use is evaluated for highways, airports, and proposed HST alignments, stations, and maintenance facility areas. Compatibility is based on the potential sensitivity of various land uses to the changes included with the Modal and HST Alternatives, and the impact of these changes on the land use. For example, homes and schools are more sensitive to changes that may result in increased noise and vibration (see *Noise and Vibration* technical reports) or increased levels of traffic congestion (see *Traffic and Circulation* technical reports). Industrial uses, however, are typically less sensitive to these types of changes because they interfere less with normal industrial activities. Given that an area's sensitivity or compatibility is based on the presence of residential properties, low, medium, and high levels of compatibility are identified based on the percentage of residential area affected, the proximity of the residential area to proposed modal or HST system facilities, and the presence of local or regional uses (such as parks, schools, and employment centers.). For highway corridors (under the No Project and Modal Alternatives) and for proposed HST alignments, land use compatibility was assessed using GIS layers (or aerial photographs where available) to identify proximity to housing and population and to determine whether the alignments would be within an existing right-of-way or a new transportation corridor in the area. Compatibility impacts are considered low if existing land uses within proposed alignment, station, airport, and maintenance facility areas are found to be compatible with proposed changes associated with either the Modal or HST Alternative. The type of improvement that would be associated with either the Modal or HST Alternative would also affect the level of potential impact, particularly for agricultural land. Improvements such as widening of the existing right-of-way or the need for new right-of-way were considered to have a low compatibility with agricultural land. Conversely, if the improvement would be contained within the existing right-of-way or within a tunnel, the alternative was considered to be highly compatible with agricultural land.

Future land use compatibility is based on information from general plans and other regional and local transportation planning documents. Each document was examined to determine whether a project alternative would be highly compatible with the goals and objectives defined therein. The Modal Alternative is considered compatible if the highway or airport improvement is in the regional transportation plan (RTP) or regional airport master plan. The HST Alternative is considered highly compatible if it would be located in areas planned for transportation multi-modal centers or corridor development, redevelopment, economic revitalization, transit-oriented development, or high-intensity employment. Impacts are considered low if a project alternative is determined incompatible with local or

regional planning documents. Table 3-1 summarizes the level of compatibility of existing land use types with proposed alignment options, station areas, maintenance facilities, and airports.

**Table 3-1
Compatibility of Land Use Types**

Low Compatibility	Medium Compatibility	High Compatibility
Single-family residential, neighborhood park, habitat conservation area, elementary/middle school, agricultural (widened or new right-of-way needed)	Multifamily residential, high schools, community parks, low-intensity industrial, hospitals	Business park/ regional commercial, multifamily residential, existing or planned transit center, high intensity industrial park, service commercial, commercial recreation, college, transportation/utilities, high-intensity government facilities, airport or train station, agricultural (tunnel or no new right-of-way needed)

Communities and Neighborhoods

A potential impact on a community or neighborhood was identified if any of the proposed alignment options or facilities associated with each of the project alternatives would create a new physical barrier, isolating one part of an established community from another and resulting in a physical disruption to community cohesion. Improvements to existing transportation corridors, including grade separations, would not generally result in a new barrier.

Property

Assessment of potential property impacts is based on the types of land uses adjacent to the particular proposed alignment, the amount of right-of-way potentially affected by the construction type, and the land use sensitivity to potential impacts. Impacts include potential acquisition, relocation, or demolition of properties. Potential property impacts were ranked high, medium, or low as summarized below in Table 3-2.

**Table 3-2
Rankings of Potential Property Impacts**

Facility Requirements	Type of Development						
	Residential			Non-residential			
	Rural/ Suburban	Suburban/ Urban	Urban	Rural Developed	Suburban Industrial/ Commercial	Urban Business Parks/ Regional Commercial	Rural Non- developed
No additional right-of-way needed (also applies to tunnel segments for HST Alternative)	Low	Low	Low	Low	Low	Low	Low
Widening of existing right-of-	Medium	Medium	High	Low	Medium	High	Low

way required							
New corridor (new right-of-way required; includes aerial and at-grade arrangements)	High	High	High	Medium	Medium	High	Low to medium

To determine potential property impacts, the 0.25-mi (.40-km) study area was characterized by its density of development. Densities of structures, buildings, and other elements of the built environment are generally higher in urbanized areas. *Rural/suburban* residential refers to low-density, single-family homes. *Suburban/urban* is medium density, multifamily housing such as townhouses, duplexes, and mobile homes. *Urban residential* refers to high-density multifamily housing such as apartment buildings. *Rural developed* non-residential uses typically occur in non-urbanized areas and often include developed agricultural land such as vineyards and orchards. *Suburban industrial/commercial* refers to medium density non-residential uses and includes some industrial uses, as well as transportation, utilities, and communication facilities. *Urban business parks/regional commercial* refers to non-residential uses that occur in urbanized areas and includes such uses as business parks, regional commercial facilities, and other mixed use/built-up uses. *Non-rural undeveloped land* includes cropland, pasture, rangeland, and barren land. The classification of development types was based on land use information provided by the planning agencies in each of the regions.

The complete property impact analysis was prepared separately from this technical report (“California High-Speed Train Program EIR/EIS Potential Property Impacts Technical Evaluation Memo,” P&D Environmental, August 15, 2003. Revised January 2004.)

Environmental Justice

This analysis is based on two basic criteria: 1) Is an environmental justice population (i.e., minority or low-income population) present in the study area (0.25 mi [0.40 km] from the alignment), and 2) What is the potential for an adverse impact (low or high)? This assessment was done using U.S. Census 2000 information and alignment information to determine if the populations exist within the study areas and if they do, whether the alignments would be within or adjacent to the right-of-way (low potential impact) or new alignments (high potential impact).

The presence of environmental justice populations was determined by following the guidelines mentioned in the regulatory section.

- At least 50% of the population in the project study is minority or low-income.
- The percentage of minority or low-income population in the project study area is at least 10% greater than the average in the county or community.

The potential for environmental justice impacts was assessed based on the size and type of right of way required for the project. For example, if an alignment was within an existing right-of-way, the potential impact was low. If the alignment was on a new alignment through an identified environmental justice neighborhood, then the potential impact was considered high. Since this is a program-level document with no preferred alternative, alignment, or stations, it is not possible to determine whether these populations would be adversely impacted disproportionately. Further study would be required to determine the type and extent of any possible impacts, and any potential benefits from the location of an HST station within the community. Such study would take place during project-level analysis.

4.0 IMPACTS

Table 4-1 at the end of this chapter summarizes the data evaluated for this technical report. The following discussion highlights the primary, potential impacts that could occur under the No-Project, Modal, and High-Speed Train Alternatives.

4.1 NO-PROJECT ALTERNATIVE

The No-Project Alternative assumes that others would complete projects including local, state, and interstate transportation system improvements designated in existing plans and programs. No additional land use impacts would result from the No-Project Alternative beyond those addressed in environmental documents for those projects.

The No-Project Alternative in the Los Angeles – Orange County – San Diego region would involve construction of highway and rail improvement projects programmed for completion between now and 2020 (refer to Table 1-1). Based on existing information, the programmed highway projects included in the No-Project Alternative are expected to fully utilize the remaining right-of-way (ROW) available along the existing highway systems in the region. The programmed rail improvement projects under the No-Project Alternative are expected to occur within the existing LOSSAN Corridor ROW, with the possible exception of a short curve realignment near Miramar. Because both the roadway and rail projects would involve improvements along established highway and rail corridors, the No-Project Alternative would not change the existing uses of the corridors, and would not introduce new transportation corridors in the study area.

The region is expected to experience a population growth of nearly 1.5 million between 2000 and 2020, so the region will be more densely developed than it is currently. Nonetheless, the established locations of the highway and rail corridors would remain essentially unchanged. Therefore, the future (2020) baseline condition in the study area evaluated in this report is not expected to be substantively different from the existing (2003) baseline, except for the fact that the highway ROW currently available would be fully utilized.

There are some design options under consideration as part of the High-Speed Train Alternative that would improve existing barrier effects or reduce the incompatibility of certain land uses with the existing LOSSAN rail corridor in some areas (see Section 4.3). The No-Project Alternative would preclude the opportunities presented by the High-Speed Train Alternative to reduce existing land use impacts in these areas.

4.2 MODAL ALTERNATIVE

Compatibility Issues of Major Airport Expansion or Highway System & Interchange Additions

The Modal Alternative involves the widening of Interstate 5 between Los Angeles and San Diego, and the addition of 9 gates at the Long Beach Airport. The addition of gates at the airport would have no impact on surrounding land uses, and would be compatible with existing and planned uses. The established I-5 ROW traverses through urban and suburban mixed-use areas, and crosses open space and coastal lagoons. The existing land uses within 0.25-mile on either side of the I-5 centerline are about 27 percent residential between Los Angeles and San Diego. The segments of I-5 crossing through areas with the highest percentage of residential uses within ¼ mile are between Encinitas and Solana Beach (51% residential), Oceanside and Carlsbad (34%), Dana Point and San Clemente (36%), and Union Station to Irvine (30%). Because the highway corridor is established, it is considered to be compatible with existing land uses, and with local plans that continue to recognize the presence I-5 as a major transportation corridor throughout the region.

The No-Project improvements through the year 2020 would use most or all of the available right-of-way of Interstate 5. The addition of Modal improvements would likely involve significant property/easement acquisition, due to improvements occurring outside of the existing ROW (discussed in more detail below).

Environmental Justice

To determine the potential for environmental justice concerns, this study evaluated both ethnicity and income levels (refer to Chapter 3). In the Los Angeles-Orange County-San Diego Region, no potential impacts of the Modal Alternative were identified related to income levels.

Block-group data for the Modal Alternative segment from Union Station to Irvine indicates a potential environmental justice issue due to the high percent of minorities living within ¼ mile of Interstate 5. The minority population in this area is approximately 72%, slightly higher than the Los Angeles County average of 69%. The Modal Alternative would involve widening the existing, established transportation corridor, so the potential for environmental justice impacts is somewhat reduced (as compared with the potential impacts that could occur from constructing a new highway corridor). However, the level of actual impact, and whether or not there would be environmental justice concern, would depend on several factors including the number of residential housing units displaced, the types of businesses displaced, and what (if any) role those businesses play in maintaining or supporting any established neighborhoods and communities in the area. These factors cannot be quantified at this program-level evaluation.

Block-group data for the remaining length of the Modal Alternative between Irvine and San Diego does not indicate any additional areas of concern related to environmental justice.

Community/Neighborhood Impacts

The Modal Alternative would result in widening an existing transportation corridor around which neighborhoods and communities have been established. For this reason, it is not expected that the Alternative would divide any existing neighborhood or otherwise substantially change the nature of the communities in the area. Improvements at the Long Beach Airport would have no effect on existing neighborhoods.

Property

The highest potential for property impacts due to Modal Alternative highway improvements would occur primarily in developed, urbanized areas. The LOSSAN region is primarily urbanized and consists of residential, commercial, and industrial land uses. High to medium property impacts are anticipated along I-5 from Los Angeles to San Juan Capistrano, and along I-5 from San Juan Capistrano to San Diego. The Camp Pendleton area along I-5 is undeveloped, and the alignment in this area would have a low property impact. There is potential for high property impacts along 59 mi (95 km) of highway alignment (28% of total highway alignment in the LOSSAN region) and potential for medium property impacts along 75 mi (121 km) of alignment (36% of total highway alignment distance in the LOSSAN region). The Lindberg Field expansion would affect 438 ac (177 ha) of high impact land uses and 10 ac (4 ha) of medium impact land uses.

4.3 HIGH SPEED TRAIN ALTERNATIVE

4.3.1 High Speed Rail

Compatibility Issues of Proposed Station Sites and Ancillary Facilities

There are two routes between Los Angeles and Irvine that are proposed for electrified high-speed rail. These routes would involve electrified trains with speeds in excess of 200 miles per hour on fully grade-separated tracks. Both alignments would be within existing rail corridors. One alignment would run between Union Station and Los Angeles International Airport (LAX). The other alignment would run between Union Station and Anaheim. Freight lines currently run along both of these routes.

Improvements proposed for the Union Station to LAX alignment include trench and aerial construction. The alignment crosses the local jurisdictions of Los Angeles, Vernon, Englewood, and Los Angeles County. The existing land use along the alignment is dominated by industrial and commercial development. Residential land uses that are located within ¼ mile of the rail corridor are typically buffered from the rail by non-residential uses. The proposed improvements appear to be compatible with existing and future land use.

Improvements proposed for the Union Station to Anaheim alignment option include trench, aerial and tunnel construction. There would be a new station built in Norwalk and an underground station at the existing Anaheim Station. The route crosses 17 local jurisdictions. The existing land use along the route is a mixture of industrial, commercial, and residential. The proposed station location in Norwalk is located at Imperial Highway and Firestone Boulevard. The site is located in a commercial area with residential and a community park located on the opposite side of the rail corridor. It is possible that a new high-speed train station would encourage the introduction of higher density residential development in the area. The general plan for Norwalk does not recognize a future location for a high-speed train station. However, several policies promote the enhancement of transit services and reduction of dependency on the automobile for residents and visitors. The proposed station location appears to be compatible with existing land use.

Another high-speed rail alignment (that would increase train speed but would not utilize electrified high-speed rail) is the LOSSAN Corridor alignment between Union Station and Irvine. The trains would use the existing tracks, however, the route would be fully grade-separated to allow for faster speeds. Station improvements at the existing stations in Norwalk, Fullerton, Anaheim, Santa Ana, and Irvine would accommodate the higher speed trains. Impacts to existing land uses along the alignment would be similar to that of conventional rail improvements along this section (see Section 4.3.2). The improvements proposed along the established rail route and around the existing stations appear to be compatible with existing and future land use.

Environmental Justice

To determine the potential for environmental justice concerns, this study evaluated both ethnicity and income levels (refer to Chapter 3). In the Los Angeles-Orange County-San Diego Region, no potential impacts of the High-Speed Train Alternative (high-speed or conventional rail) were identified related to income levels.

The proposed Norwalk Station along the UPRR corridor would be constructed in an area of approximately 81% minority population. As stated above, the station would be in an area of commercial and residential use. The station location along the existing rail corridor appears to be compatible with existing uses and local plans, and could provide some benefit to disadvantaged populations by improving access to a high-speed rail system. No environmental justice concern was identified for this station location. The new stations at LAX and Anaheim would be underground, and would not pose any environmental justice concerns. All other stations along the high-speed rail routes are existing, and improvements would not result in any environmental justice concerns.

Block-group data for the High-Speed Rail portion of the HST Alternative from LAX to Union Station, and from Union Station to Irvine indicates a potential environmental justice issue due to the high percent of minorities living within ¼ mile of the route options and station locations. The minority population in the area from LAX to Union Station is approximately 94%, and is between 81% (Union Station to Anaheim via UPRR) and 86% (Union Station to Irvine via LOSSAN). Along all of these routes, the minority population is over 50%, and more than 10 percentage points higher than the County-wide minority populations (69% for Los Angeles County, and 49% for Orange County). However, the High-Speed Train Alternative is not expected to result in any environmental justice impact because the proposed improvements are along existing, operating rail corridors. Residential land uses that are located within ¼ mile of the rail corridor are typically buffered from the rail by non-residential uses. The only area in which there is a potential for property takes is between Union Station and Fullerton (along the LOSSAN corridor), where the proposed improvements may require that the existing rail ROW be widened for a short section. Based on aerial photography and design information for this area, it is estimated that up to two acres of non-residential displacement could occur, and up to 26 housing units could be displaced. This level of potential displacement is rated as a Low impact, and is not expected to have any environmental justice impact.

Community/Neighborhood Impacts

The standard for this assessment is whether or not the proposed alignment(s) divides an existing residential neighborhood. Under the High-Speed Rail option, there would not be a type of barrier to neighborhood interaction that does not already exist. The residential areas were developed with the railroad already in place and the proposed alternative(s) does not increase the number of crossings. Some existing barriers at intersections with major cross-streets would be eliminated due to grade separation of the Union Station to Irvine high-speed rail route.

Property

Under the proposed HST Alternative, no more than 2 mi (3 km) of rail alignment and station locations (1% or less of total alignment distance in the LOSSAN region) would have a high potential for property impact, and no more than 2 mi (3 km) of alignment and station locations (1% or less of alignment distance in the LOSSAN region) would have a medium potential for property impacts. The impacts would occur primarily in the vicinity of the LAX, Anaheim, and San Juan Capistrano Stations, and between Solana Beach Station and University Towne Centre Station sites. These impacts would be due to new alignments within this region. However, because HST alignment options would use existing right-of-way, the overall potential for property impacts is minimized. Similarly, the conventional rail alignments would also minimize potential property impacts because they would use existing right-of-way.

4.3.2 Conventional Rail

Compatibility Issues of Proposed Station Sites and Ancillary Facilities

In general, plans and policies of the communities located along the LOSSAN Corridor promote the use of alternative modes of transportation that include rail. Land use and transportation plans encourage the co-location of activity centers with employment-generating businesses and train stations, to reduce dependency on the automobile. Strategies for increasing development intensity around stations should consider the need to be sensitive to community goals and desires.

Union Station to Irvine

The section of the LOSSAN Corridor from Union Station to Fullerton includes the Fullerton Station. The station is located in an urbanized area surrounded by industrial, commercial, and office land uses. Improvements at the station include bypass tracks, platform reconfiguration, and additional parking. These station improvements appear to be compatible with existing and future land use of the area.

Corridor improvements for the section between Union Station and Fullerton include a 4th main track. At build-out, two tracks would be dedicated to freight and two to passenger. For most of the route, the 4th main track would be in the rail ROW and, therefore, would have little impact on surrounding land use. However, there are segments that may require property acquisition due to limited ROW width, particularly between the Rio Hondo River and San Gabriel River. Residential and commercial uses adjacent to the corridor will likely be impacted. A more detailed study would be required to determine the extent of the acquisition (maximum estimates are provided in Table 4-1 and described in Section 4.3.1 above).

The section of the LOSSAN Corridor from Fullerton to Irvine includes proposed station improvements at Anaheim, Santa Ana, and Irvine. These improvements include bypass tracks and parking expansion at the existing stations.

The Anaheim Station is next to Edison Field and part of the Anaheim Stadium Business Center. Future plans for this area call for a transition of land uses from primarily industrial to a regional office center containing business office, mixed use, and industrial, with enhanced infrastructure and public services that includes transit-oriented mobility. The proposed station improvements appear to be compatible with the existing and future land use of the area.

The Santa Ana Station improvements include additional parking to the north and/or bypass tracks. The station is located in an urbanized area and is surrounded by land uses consisting of industrial and mixed use (residential/industrial). The proposed improvements appear to be compatible with the existing and future land use of the area.

The Irvine Station improvements include expanding the parking to the east and/or bypass tracks. The station is located in an urbanized area surrounded by industrial uses and the El Toro Marine Corps Air Station. The proposed improvements appear to be compatible with the existing and future land use of the area.

Major corridor improvements between Fullerton and Irvine include a covered trench or at-grade option between Walnut Avenue, in the City of Orange, and 17th Street, in the City of Santa Ana; and, a curve realignment between Batavia Street and Walnut Ave. There is the possibility of some property acquisition from businesses along the curve realignment. The covered trench and at-grade options would occur in the existing rail corridor right-of-way. The covered trench option would reduce existing impacts to adjacent residential development. The at-grade option proposes grade separations at the street intersections. This would improve pedestrian and vehicular access for businesses and residences in the area. Impacts to existing residential land uses that have developed adjacent to the rail corridor would remain unchanged.

San Juan Capistrano

The San Juan Capistrano Station is listed in the City's Inventory of Historical and Cultural Landmarks (IHCL). There is an ordinance in place that provides special protection to this and other cultural resources identified in the IHCL. Any improvements to this station would need to be done in a manner that allows for protection of this cultural resource. One option for double tracking through the City of San Juan Capistrano would involve relocating the tracks to the east side of the station and placing them in a covered trench. This would likely result in highly disruptive, temporary construction impacts to the existing parking structure adjacent to the station, businesses in the downtown area, and the Historic Town Center located to the east. The parking capacity in the downtown area is currently strained. This situation would be exacerbated by the need to remove and rebuild the existing parking structure to implement this option. This option appears to be compatible with existing and future land use and would reduce existing impacts to the historic residential neighborhood of Los Rios, located to the west of the station. However, it would place the tracks closer to the historic San Juan Capistrano Mission, a potentially incompatible situation. A detailed review of the land use impacts relative to the Mission would need to be performed to better determine potential impacts to these sensitive resources.

For the routing option mentioned above, major improvements along the existing corridor would include double-tracking in an open trench along the approach to and departure from the existing station, a covered trench at the station (discussed above), and curve realignment at San Juan Creek. The open trench segments are adjacent to residential and industrial land uses. This would reduce the impacts of the existing at-grade rail corridor on adjacent residential land uses. In addition, strategically placed pedestrian overpasses would increase connectivity between the residential areas to the west of the existing rail corridor and the downtown area. There is the likelihood of property acquisition for some industrial structures along the curve realignment between San Juan Creek and Avenida Aeropuerto.

Another alternative through the City is an alignment that runs along the east side of Trabuco Creek. This alignment would leave the existing LOSSAN corridor south of Del Obispo and continue at-grade along the east side of Trabuco Creek. The alignment would then transition into an open trench to a new, below-grade station site located south of Ramos Street. The site is currently being used as recreational vehicle storage. The alignment would transition back to at-grade north of the station and rejoin the existing corridor at the Trabuco Creek crossing. The bridge structure over Trabuco Creek would be rebuilt to accommodate the alignment.

This alignment would introduce rail into a new corridor. Residential uses exist along the western boundary of Trabuco Creek, and office/commercial development and a private high school are located along the eastern boundary of the creek. This alignment would have noise, visual, and possibly vibration impacts on the existing land uses west and east of the proposed alignment, particularly on residential areas to the west. There would be some property acquisition involving a high school at the northern end of the alignment and some non-residential property at the southern end. Strategically placed pedestrian crossings over Trabuco Creek would help connect the activities on either side. A benefit of this alignment is that it would remove the existing rail impacts on the historic neighborhood of Los Rios and downtown historic structures. It would also remove a major pedestrian barrier between the downtown area and the historic residential area.

The third routing option evaluated in San Juan Capistrano is a tunnel alignment along Interstate 5 that would run the length of the City. While most of the tunnel is under Interstate 5, there are transition areas at either end of the tunnel that would likely result in some property and/or easement acquisition. Also, this option would not allow for a train station. This option appears to be compatible with existing and future land use.

Dana Point/San Clemente

The Dana Point curve realignment, beginning just north of Stonehill Drive, cuts through the San Juan Creek Property. This 31-acre site is owned by the South Coast Water District, and contains a number of major water and sewer transmission lines, a well, a wastewater lift station and maintenance area, a variety of leasehold tenants including contractor storage yards and landscape nurseries, and unimproved land. The site is largely surrounded by urban industrial development. An Environmental Impact Report (EIR) was certified by the SCWD on November 13, 2002. The EIR identifies three land use alternatives for the site. All three alternatives would be greatly impacted by the proposed rail re-alignment. The proposed rail re-alignment appears to be compatible with the City of Dana Point General Plan. However, it appears to be incompatible with some of the existing land use on the site and inconsistent with the certified EIR. Property acquisition and infrastructure relocation would be necessary to implement this rail option.

The segment of the existing rail corridor located along the coast in Dana Point runs adjacent to a row of residences along North El Camino Real. Impacts from the existing rail line would be exacerbated with the proposed double tracking. The proposed long tunnel through San Clemente (described below) would remove any impact to these residences, due to the rail corridor following Interstate 5 in this area.

There are four rail alignment alternatives through the City of San Clemente. All the alternatives propose double tracking. The major differences between the alternatives are the alignment and construction

type. Two of the alternatives generally follow the existing corridor and include a covered trench design. The other two alternatives tunnel under Interstate 5.

The major issue involving the two covered trench alternatives along the existing corridor is the close proximity of the rail line to the coastline. There are segments of the existing rail line that are located directly on the back beach, an area undercut by waves and subject to increasing subsurface groundwater pressures. The rail is a barrier to recreational use of the coastline, increases beach erosion, and affects beach aesthetics. The lowered trench alternatives would require extensive shore protection and bluff stabilization structures to guard against beach and bluff erosion. In addition, there would be major construction activity directly on the beach to install the covered trenches. Land use compatibility and coastal access would be improved by relocating the rail away from the beach. However, in certain instances, the existing rail helps to provide storm protection to upland properties. Therefore, it would be important to commit the necessary financial resources to restore and maintain the beach/dune/bluff system if the existing rail corridor is eventually removed.

The covered trench alternatives would include a below-grade station south of the municipal pier, to replace the existing San Clemente Station. The station site is located in an area known as the Pier Bowl Area. The area is urbanized with a mix of residential and commercial uses. The proposed rail/station improvements in this area appear to be compatible with the existing and future land use, and with the Pier Bowl Specific Plan. While the proposed covered trench and below-grade station would reduce the barrier effect between the City and the coastline, it does little to reduce impacts on the coastline.

The northern most segment of the existing rail corridor in San Clemente runs adjacent to a row of residences along North El Camino Real. The two trench options would provide at-grade double tracking through this area, and would compound the existing impacts to the residences.

One of the covered trench alternatives (long trench) may require some property acquisition for a segment that leaves the existing corridor and goes underneath residences located west of the corridor between the municipal pier and North El Camino Real.

Three tunnel alignments were also evaluated in this area, a short tunnel and two long tunnel options. Each option follows Interstate 5 and has, as an endpoint, San Onofre State Beach, north of the power plant. The short tunnel leaves the Interstate 5 corridor at Avenida Palizada, turns toward the coast and runs underneath residential, industrial and vacant land uses, connecting with the existing rail corridor just south of Camino Capistrano. The tunnel section of this alignment appears to be compatible with existing and future land uses, due to the depth of the tunnel. However, the Dana Point curve realignment associated with the short tunnel option would have high impacts on the water and sewer infrastructure on the San Juan Creek property described previously. A new station would be located at Avenida Pico. The new station location appears to be consistent with the future land use plan which promotes the development of a major mixed use development, Rancho San Clemente Town Center, in the vicinity. Property acquisition would likely be necessary at the portal areas, as would underground easements along the alignment.

The two long tunnel options follow Interstate 5 from San Onofre State Beach to Avenida Aeropuerto in San Juan Capistrano. The difference between the two options is that one option would divide the tunnel into two segments with the rail daylighting at Avenida Pico where a new station would be located. The other long tunnel option would not provide for a station in San Clemente. The new station location does appear to be consistent with the future land use plan which advocates a major regional commercial center at the southwest corner of Interstate 5 and Avenida Pico. Property acquisition of some industrial businesses will likely be necessary at the portal area south of Avenida Aeropuerto. The long tunnel options appear to be compatible with existing and future land uses. Also, the long tunnel options would provide an opportunity to remove the existing track along the coastline, thereby eliminating impacts to residential development and the barrier to recreational use of the coastline.

Oceanside/Carlsbad

The Oceanside Station improvements include by-pass tracks and expanded parking. The surrounding land use is a mix of commercial and residential. The proposed improvements appear to be compatible with the existing and future land use. Any parking expansion would likely involve property acquisition.

Double tracking through Carlsbad would include two alternatives – at-grade or trench. Existing land uses abutting the rail corridor include residential, commercial and industrial. Both alternatives would have temporary construction impacts on adjacent land uses. The at-grade alternative would compound the barrier effect of the existing rail. The trench alternative would reduce certain impacts on adjacent land uses, and provide grade separation at key intersections through downtown, resulting in improved pedestrian and vehicular circulation.

Encinitas

Three rail alternatives were evaluated for the LOSSAN Corridor that runs through the City of Encinitas – at-grade, short trench, and long trench. All of the alternatives propose double tracking. Residential, commercial, and industrial land uses are adjacent to the rail corridor. The at-grade alternative would reconfigure the street intersection at Birmingham Drive and San Elijo Avenue, and close Chesterfield Drive at San Elijo Avenue. This proposal would involve a short trench segment for the rail corridor, on either side of Birmingham Drive, providing improved pedestrian and vehicular circulation across the existing rail corridor via Birmingham Drive. This action would focus the traffic on Birmingham Drive, a street that connects to Interstate 5. The Pacific Coast Highway would need to be elevated about 20 feet in this area, to intercept Birmingham Drive. This would impact adjacent commercial and residential land uses. Another grade separation would occur at Leucadia Boulevard. The rail lines would be depressed with Leucadia Boulevard going over the tracks and Pacific Coast Highway, connecting to Pacific Coast Highway via a switchback. This would require acquisition of some businesses along Pacific Coast Highway. Pedestrian undercrossings would be strategically placed along the total route, to reduce the physical barrier created by the existing rail corridor.

The short trench alternative is similar in approach and impacts as the at-grade alternative, except for a covered trench under Encinitas Boulevard and a transitional open trench about 1,500 feet either side of Encinitas Boulevard. This additional improvement would improve pedestrian and vehicular circulation through the downtown area.

The long trench alternative starts as an open trench south of the Batiquitos Lagoon, drops into a covered trench as it approaches the downtown area then returns to an open trench up to the north end of the San Elijo Lagoon, where it becomes at-grade. The closure of Chesterfield Drive at San Elijo Avenue is part of the alternative. Vehicular grade separations would be similar to that of the at-grade and short-trench alternatives. Pedestrian crossings would be placed along the route to allow for better access between the residential areas on the east side of the rail corridor and the commercial establishments on the west side. This alternative would reduce existing impacts to adjacent land uses and improve pedestrian and vehicular circulation over the rail corridor.

The existing rail corridor acts as a barrier to pedestrian and vehicular movement between residential and commercial areas on opposite sides of the corridor. Mitigation strategies could include frequent pedestrian crossings. Given the fact that there is an existing rail corridor and transit station, the proposed alternatives through Encinitas appear to be compatible with the existing and future land use.

Improvements at the Solana Beach Station include platform modifications and parking expansion. The surrounding land use is a mixture of residential and commercial. The proposed station improvements appear to be compatible with the existing and future land use for this area.

Del Mar

The section of the LOSSAN Corridor from the Solana Beach Station to the Interstate 5/805 split includes three alternative alignments through the City of Del Mar. All three alternatives involve double tracking. Land uses along the existing rail corridor include the Del Mar Fairgrounds and San Dieguito Lagoon on the north, Los Penasquitos Lagoon on the south, and residential development through most of Del Mar.

One alternative follows the existing rail corridor along the bluffs and includes a covered trench. The existing rail divides residential and recreational uses and impacts abutting residential development. The alternative would compound the problem except where a segment of covered trench is proposed. Major bluff stabilization would likely be required along with some property acquisition for construction. The alternative appears to be consistent with future land use plans/policies but does little to reduce the impacts on existing residential land use and coastal bluffs.

Another alternative is a tunnel underneath Camino Del Mar. The tunnel would begin at Jimmy Durante Boulevard. The improvements would involve a grade separation of the rail and road system in this area. Jimmy Durante Boulevard or Camino Del Mar would be redesigned to cross over the tracks and “T” into one or the other. This would likely require some property acquisition. Also, there would be temporary construction impacts to surrounding residences near the intersection and portal area. The tunnel would daylight at Carmel Valley Road, or curve under some residences before daylighting at Carmel Valley Road, and connect with the existing alignment across Los Penasquitos Lagoon. The route that avoids tunneling under residences would result in fewer land use impacts. The benefits of this overall alignment include removing the existing track from the bluffs and separating the rail from low-density residential land use. This alternative appears to be compatible with existing and future land use.

The third alternative is a tunnel that would run under Interstate 5 and daylight along the south boundary of San Dieguito Lagoon, reconnecting with the existing rail near the racetrack. While this alternative does provide the benefit of removing the rail from the bluffs, it shifts the impacts on residential development to a new location along the southern edge of San Dieguito Lagoon. Extensive property/easement acquisition would be necessary.

I-5/805 Split to Hwy 52

The section of the LOSSAN Corridor between the Interstate 5/805 split and Highway 52 include two different tunnel alignments. One tunnel alignment is under Interstate 5 and the other cuts through Miramar Hill. The Miramar Hill tunnel would have a new underground station at University Town Center. This tunnel runs under mixed land uses. It is likely that underground easements and/or property acquisition would be necessary. Both alignments would be at a depth where impacts to residential development would not be an issue, except at the portal areas. Both alignments appear to be compatible with existing and future land use. The Miramar Hill tunnel would have the added benefit of providing a station near a highly populated employment center.

Hwy 52 to Santa Fe Depot

Proposed improvements for the LOSSAN Corridor, between Highway 52 and the Santa Fe Depot, include a curve realignment just south of Highway 52, new bridges over Tecolote Creek and San Diego River, a trench between Sassafras Street and Cedar Street, and double tracking for the length of the section. The curve realignment would involve two new bridge structures over wetlands in San Clemente Canyon and potential property acquisition of a business. Existing land uses along the route are a mix of industrial and commercial. There would be temporary construction impacts to adjacent businesses. The improvements would enhance vehicular circulation and reduce impacts to businesses adjacent to the trench segment. These improvements appear to be compatible with existing and future land use.

Improvements to the Santa Fe Depot include by-pass tracks and parking expansion at the northwest corner of Broadway and Pacific Coast Highway. The surrounding land uses are commercial and industrial. The proposed improvements appear to be compatible with existing and future land use.

Environmental Justice

To determine the potential for environmental justice concerns, this study evaluated both ethnicity and income levels (refer to Chapter 3). In the Los Angeles-Orange County-San Diego Region, no potential impacts of the High-Speed Train Alternative (high-speed or conventional rail) were identified related to income levels.

Block-group data for the Conventional Rail portion of the HST Alternative from Union Station to Irvine indicates a potential environmental justice issue due to the high percent of minorities living within ¼ mile of the route options and station locations. The minority population in the area is approximately 86%, substantially higher than Los Angeles County as a whole (69%). However, this segment of the High-Speed Train Alternative is not expected to result in any environmental justice impact because the proposed improvements are along an existing, operating rail corridor. Residential land uses that are located within ¼ mile of the rail corridor are typically buffered from the rail by non-residential uses. The only area in which there is a potential for property takes is between Union Station and Fullerton where the proposed improvements may require that the existing rail ROW be widened for a short section. Based on aerial photography and design information for this area, it is estimated that up to two acres of non-residential displacement could occur, and up to 26 housing units could be displaced. This level of potential displacement is rated as a Low impact, and is not expected to have any environmental justice impact.

Data shown in Table 4-1 also indicate that there are potential environmental justice issues associated with the existing San Juan Capistrano Station, where the minority population within ¼ mile is approximately 66%. However, no environmental justice impacts are expected to occur from implementation of the proposed improvements because the station is already established in the neighborhood, and would not require additional property acquisition. (The alignment options that would leave the existing LOSSAN corridor would not affect the existing station, so there are no station impacts associated with those alignment options.)

Community/Neighborhood Impacts

The standard for this assessment is whether or not the proposed alignment(s) divides an existing residential neighborhood. There would not be a type of barrier to neighborhood interaction that does not already exist. The residential areas were developed with the railroad already in place and the proposed alternative(s) does not increase the number of crossings.

Property

The conventional rail alignment would use the existing rail corridor or would operate within tunnels if it left the existing alignment. Therefore, potential property impacts would be minimized.

TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice
(Los Angeles – Orange County – San Diego Region)

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ^{1, 2} Percent of Population Under Poverty Line/ Percent of Minority Population)	Divides an Established Community (Y/N)	Potential Property Impacts (Percent of Corridor/Overall Impact ³ H,M,L)
NO-PROJECT	The No-Project Alternative consists of highway and rail improvement project identified in existing plans and programs (see Table 1-1). Impacts related to those projects have been or will be addressed in the respective environmental documents for each project. No additional, direct impacts to land use, demographics, communities, or housing would occur beyond those identified in the environmental documents for the No-Project projects. The No-Project Alternative would preclude the opportunities presented by the High-Speed Train Alternative to reduce some existing community barriers and incompatibility between land uses and the existing LOSSAN rail corridor. See text in Chapters 1 and 4 for more detail.				
MODAL					
Union Station to LAX)	There are no Modal improvements proposed for this segment.				
Union Station To Fullerton Station	29%		P = 11% M = 77%	N	Low – 7% Medium – 54% High – 39% M
Fullerton Station To Irvine Station	32%		P = 10% M = 67%		
Irvine Station To San Juan Capistrano City Limits	24%		P = 5% M = 28%	N	Low – 44% Medium – 21% High – 35% L
San Juan Capistrano	20%		P = 6% M = 41%		
Dana Point/San Clemente	36%		P = 6% M = 34%		
Camp Pendleton	1%		P = 8% M = 43%		

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ^{1, 2} Percent of Population Under Poverty Line/ Percent of Minority Population)	Divides an Established Community (Y/N)	Potential Property Impacts (Percent of Corridor/Overall Impact H,M,L) ³
Oceanside/Carlsbad	34%		P = 10% M = 41%		
Encinitas/Solana Beach	51%		P = 6% M = 25%	N	Low – 28% Medium – 37% High – 34% M

TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L)	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
Del Mar	25%		P = 7% M = 24%		
I-5/805 Split To Hwy 52	21%		P = 12% M = 36%		
Hwy 52 To Santa Fe Depot	25%		P = 9% M = 25%		
Long Beach Airport	0% L	L	P = 6% M = 31%		
HST CORRIDORS & STATION OPTIONS					
<i>High-Speed Rail</i>					
LAX To Union Station	28%		P = 27% M = 94%	N	Low – 90% Medium – 8% High – 3% L
Stations					
LAX	0% L	L	P = 2% M = 45%	N	n/a
Union Station To Anaheim Station via UPRR	29%		P = 14% M = 81%	N	Low – 100% Medium – 0% High – 0% L
Stations					
Norwalk	18% L	L	P = 9% M = 81%	N	n/a

TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
Anaheim	0% L	L	P = 5% M = 59%	N	n/a
Union Station To Irvine Station via LOSSAN	25%		P = 12% M = 74%	N	Low – 100% Medium – 0% High – 0% L
Stations					
Norwalk	1% L	L	P = 10% M = 86%	N	n/a
Fullerton	0% L	L	P = 10% M = 39%	N	n/a
Anaheim	0% L	L	P = 5% M = 59%	N	n/a
Santa Ana	0% L	L	P = 27% M = 96%	N	n/a
Irvine	0% L	L	P = 0% M = 65%	N	n/a
Conventional Rail (LOSSAN)					
Union Station To Fullerton Station (4th main track)	21%		P = 12% M = 77%	N	Low - 100% Medium – 0% High – 0% L
Fullerton Station To Irvine Station					
Alignments					

TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
AT-GRADE between Walnut Ave (Orange) and E. 17th St. (Santa Ana)	30%		P = 13% M = 72%	N	Low - 100% Medium – 0% High – 0%
TRENCH between Walnut Ave (Orange) and E. 17th St. (Santa Ana)	30%		P = 13% M = 72%	N	Low - 100% Medium – 0% High – 0%
Stations					
Fullerton	0% L	L	P = 10% M = 39%	N	n/a
Anaheim	0% L	L	P = 5% M = 59%	N	n/a
Santa Ana	0% L	L	P = 27% M = 96%	N	n/a
Irvine	0% L	L	P = 0% M = 65%	N	n/a
Irvine Station To San Juan Capistrano City Limits)	There are no rail improvements proposed in this segment				

TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
San Juan Capistrano (City Limits to Avenida Aeropuerto)					
Alignments					
Covered TRENCH/Cut-Fill between Trabuco Creek and Avenida Aeropuerto (trench goes under San Juan Creek); Double tracking	24%		P = 9% M = 45%	N	Low - 100% Medium – 0% High – 0%
TUNNEL along I-5 between Hwy 73 and Avenida Aeropuerto (tunnel under Trabuco Creek and San Juan Creek); Double tracking	24%		P = 9% M = 45%	N	Low – 89% Medium- 7% High - 4% L
AT-Grade/Open Trench along east side of Trabuco Creek	66%		P = 11% M = 47%	N	Low - 100% Medium – 0% High – 0% L
Stations					
San Juan Capistrano (existing)	36%	L	P = 8% M = 66%	N	n/a

TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
Dana Point/San Clemente (Avenida Aeropuerto To San Onofre Power Plant)					
Alignments					
Dana Point Curve Realignment; San Clemente - SHORT TRENCH; Double Tracking (crosses San Mateo and San Onofre Creeks)	41%		P = 7% M = 33%	N	Low - 100% Medium – 0% High – 0% L
Dana Point Curve Realignment; San Clemente - LONG TRENCH; Double Tracking (crosses San Mateo and San Onofre Creeks)	41%		P = 7% M = 33%	N	Low - 100% Medium – 0% High – 0% L
Dana Point Curve Realignment; San Clemente - SHORT TUNNEL; Double Tracking (crosses San Mateo and San Onofre Creeks)	38%		P = 7% M = 33%	N	Low - 99% Medium – 1% High – 0% L

**TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)**

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
San Clemente - LONG ONE-SEGMENT TUNNEL; Double Tracking (crosses San Mateo and San Onofre Creeks)	42%		P = 7% M = 33%	N	Low - 98% Medium – 1% High – 1% L
San Clemente - LONG TWO-SEGMENT TUNNEL; Double Tracking (crosses San Mateo and San Onofre Creeks)	42%		P = 7% M = 33%		Low - 100% Medium – 0% High – 0% L
Stations					
San Clemente (existing)	0% L	L	P = 7% M = 33%	N	n/a
Camp Pendleton (San Onofre Power Plant to Oceanside City Limits - Double tracking; crosses Santa Margarita River)	26%		P = 8% M = 43%	N	n/a
Oceanside/Carlsbad (Oceanside City Limits to Encinitas City Limits)					

**TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)**

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
Alignments					
Carlsbad - AT-GRADE; double tracking; crosses San Luis Rey, Buena Vista, Aqua Hedionda, and Batiquitos Lagoons	37%		P = 10% M = 40%	N	Low - 100% Medium – 0% High – 0% L
Carlsbad - TRENCH; double-tracking; crosses San Luis Rey, Buena Vista, Aqua Hedionda, and Batiquitos Lagoons	37%		P = 10% M = 40%	N	Low - 100% Medium – 0% High – 0% L
Stations					
Oceanside	19% L	L	P = 17% M = 32%	N	n/a
Encinitas/Solana Beach (Encinitas City Limits to Solana Beach Station)					
Alignments					
Encinitas - AT-GRADE; Double Tracking; crosses San Elijo Lagoon	54%		P = 7% M = 20%	N	Low - 100% Medium – 0% High – 0% L

TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
Encinitas - SHORT TRENCH; Double Tracking; crosses San Elijo Lagoon	54%		P = 7% M = 20%	N	Low - 100% Medium – 0% High – 0% L
Encinitas - LONG TRENCH; Double Tracking; crosses San Elijo Lagoon	54%		P = 7% M = 20%	N	Low - 100% Medium – 0% High – 0% L
Stations					
Solana Beach	3% L	L	P = 4% M = 12%	N	n/a
Del Mar (Solana Beach Station to I-5/805 Split)					
Alignments					
COVERED TRENCH on bluffs; crosses San Dieguito and Los Penasquitos Lagoons	22%		P = 6% M = 20%	N	Low - 100% Medium – 0% High – 0% L
TUNNEL under Camino Del Mar; crosses San Dieguito and Los Penasquitos Lagoons	28%		P = 6% M = 20%	N	Low - 97% Medium – 0% High – 3% L

TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)

	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
TUNNEL along I-5; crosses San Dieguito and Los Penasquitos Lagoons	53%		P = 7% M = 22%	N	Low - 83% Medium – 2% High – 16% L
I-5/805 Split To Hwy 52					
Alignments					
Miramar Hill Tunnel	18%		P = 13% M = 38%	N	Low - 98% Medium – 2% High – 0% L
I-5 Tunnel	25%		P = 13% M = 38%	N	Low - 100% Medium – 0% High – 0% L
Stations					
UTC (Only applies to Miramar Hill Tunnel)	2% L	L	P = 16% M = 37%	N	n/a
Hwy 52 To Santa Fe Depot (Curve realignment; Double Tracking; San Diego River Bridge; Trench between Sassafras St and Cedar St)	14%		P = 11% M = 27%	N	Low - 100% Medium – 0% High – 0% L

TABLE 4-1
Detailed Analysis/Comparison Table
Impacts to Land Use and Planning, Communities and Neighborhoods, Property, and Environmental Justice (Los Angeles – Orange County – San Diego Region) (continued)

Stations	Incompatibility with Existing Land Uses (Linear Corridors: % Residential Acreage; Station Areas/ Airports/Maintenance Facilities: % Residential and H, M, L)	Incompatibility with Local Plans (Station Areas/ Airports/Maintenance Facilities (H,M,L))	Environmental Justice Impacts ¹ (Percent of Population Under Poverty Line/ Percent of Minority Population)	Potential Property Impacts (Percent of Corridor /Overall Impact H,M,L) ²	
Santa Fe Depot	0% L	L	P = 12% M = 25%	N	n/a

Notes:

High, Medium and Low ratings were determined based on methodology described in Chapter 3. The impact comparison among alignment segments was normalized by calculating the estimated number of housing units displaced per mile, and the number of non-residential acres per mile. Appendix B provides the per-mile figures for each alternative alignment.

1. Percentage of population below federal poverty level (P) and percentage minority population (M) are based on the Block Groups encompassed within the 0.25-mile study area around alignment segments and station areas. Percentage of population below poverty level in Block Groups was compared with the total County population below poverty level as follows: Los Angeles County, 15%; Orange County, 8%; and San Diego County, 10%. Percentage of minority population in Block Groups was compared to County minority populations as follows: Los Angeles County, 69%; Orange County, 49%; and San Diego County, 45%.
2. "Y" in the Environmental Justice column means that minority or low-income populations have been identified within the study area at some location along the potential alignment.
3. The analysis of potential property impacts is based on the types of land uses adjacent to the particular alignment, the amount of right-of-way potentially affected by the construction type and the land use sensitivity to potential impacts and was ranked "high," "medium," and "low" as summarized in Chapter 3.0 of this document. Proposed station sites were analyzed as part of each rail alignment and were not analyzed separately.

5.0 REFERENCES

Parsons Brinckerhoff. *Screening Report*. Prepared for California High-Speed Rail Authority, April 2002.

Parsons Brinckerhoff. *Plans and Profiles*. Prepared for California High-Speed Rail Authority, November 2002.

Parsons Brinckerhoff. *Final Draft Environmental Analysis Methodologies*. Prepared for California High-Speed Rail Authority, November 7, 2002.

GIS Data

Census Block Groups, U.S. Census Bureau, 2000

Los Angeles County Existing Land Use, Southern California Association of Governments, 1993

Orange County Existing Land Use, Southern California Association of Governments, 1993

San Diego County Existing Land Use, San Diego Association of Governments, 2000

City Boundaries, U.S. Census Bureau, 2000

General Plans

County of Los Angeles General Plan, Adopted November 1980; Revised 1986 to 1992

City of Los Angeles General Plan, March 2001

City of Vernon General Plan, Adopted April 1989; Revised June 1992

City of Commerce General Plan, July 1987

City of Bell General Plan, October 1996

City of Montebello General Plan, October 1990

City of Downey General Plan, Adopted 1973; Revised October 1992

City of Pico Rivera General Plan, August 1993

City of Santa Fe Springs General Plan, 1991-1994

City of Whittier General Plan, August 1992

City of Norwalk General Plan, February 1996

City of La Mirada General Plan, July 1981

City of Buena Park General Plan, October 1997

City of Orange General Plan, August 1989

City of Tustin General Plan, January 2001

City of Irvine General Plan, March 1999

City of Lake Forest General Plan, May 2000

City of Mission Viejo General Plan, April 1992

City of Laguna Hills General Plan, 1994

City of Laguna Niguel General Plan, August 1992
City of San Clemente General Plan, May 1993
County of San Diego General Plan, January 1997
City of Oceanside General Plan, 2000
City of Carlsbad General Plan, September 1994
City of Encinitas General Plan, May 1995
City of Solana Beach General Plan, 1986; amended thru 2001
City of Del Mar General Plan, July 1985
City of Maywood General Plan, February 1990
City of Inglewood General Plan, 1990
City of Huntington Park General Plan, February 1991
City of El Segundo General Plan, 1992
City of South Gate General Plan, November 1986
City of Paramount General Plan, October 1990
City of Bellflower General Plan, 1995
City of Bell General Plan, October 1996
City of Cerritos General Plan, May 1988
City of Artesia General Plan, June 1993
City of Cudahy General Plan, May 1992
County of Orange General Plan, 2000
City of Fullerton General Plan, November 2000
City of Anaheim General Plan, July 1984
City of Santa Ana General Plan, September 1982; Land Use February 1998
City of San Juan Capistrano General Plan, December 1999
City of Dana Point General Plan, July 1991, Land Use 1999
City of Laguna Woods General Plan, January 2001
City of Cypress General Plan, February 1993
City of Stanton General Plan, January 1992
City of Garden Grove General Plan, October 1995
City of Costa Mesa General Plan, 1990
City of La Palma General Plan, March 1999
City of San Diego General Plan, May 1989
Other Documents Referenced

San Juan Creek Property Draft EIR, South Coast Water District, August 2002

Southern California Association of Governments Regional Transportation Plan, April 2001

San Diego Association of Governments Regional Transportation Plan, April 2000

Pier Bowl Specific Plan, October 1993

Amtrak 20-Year Improvement Plan, March 2001

CalTrans 10-Year California State Rail Plan, March 2002

6.0 PREPARERS

Name, Title	Education/Credentials, Years of Experience in field. • Project Involvement
Jack Gorzeman, Project Manager	MRCP, Master of Regional and City Planning. Twenty years of experience in land use planning. <ul style="list-style-type: none"> Principal Investigator, Local Area Growth, Development, Planning, Land Use, and Environmental Justice
Caroline Brundage, City Planner/ GIS Analyst	MCP, Master of City Planning. Four years of experience in land use planning and GIS analysis. <ul style="list-style-type: none"> GIS analyst and document co-author, Local Area Growth, Development, Planning, Land Use, and Environmental Justice

APPENDIX A

Appendix A

Conventional Rail Route Combinations for Impact Comparison

As described in Chapter 1 of this Technical Evaluation, there are numerous alignment and construction options in the Conventional Rail portion of the High-Speed Train Alternative for the Los Angeles – Orange County – San Diego Region. To allow a reasonable comparison of impacts among the No-Project, Modal, and High-Speed Train Alternative, the Conventional Rail improvement options are summarized by showing a range of potential impacts (Table 1-4, Chapter 1). This range is represented by two of many possible route combinations between Union Station and San Diego: (1) a Higher Level Infrastructure route, and (2) a Lower Level Infrastructure route. The Higher Level route is based on combining the alignment/construction options (one from each sub-segment) that would involve the most extensive infrastructure investment and/or construction complexity. For example, where a sub-segment has both an at-grade option and a trenching option in the same general alignment, the trenching option was used for the Higher Level route, and the at-grade option was used in the Lower Level route. Where two tunnel options are the only options in one sub-segment, the longer tunnel was included in the Higher Level route. In this way, a range of potential impacts could be bracketed to allow a valid comparison of the High-Speed Train Alternative to the No-Project and the Modal Alternative.

The specific alignment and construction options included in both the Higher and the Lower Level routes are shown in Tables A-1 and A-2. These representative routes do not include any of the options that were eliminated from further consideration during the LOSSAN screening process. It must be emphasized that these routes serve only to provide a reasonable range of impacts for comparative purposes. They do *not* represent any selection of a particular option as preferred. No selection of preferred alignment options will be done until subsequent stages of this project.

**Table A-1
LOWER LEVEL INFRASTRUCTURE IMPROVEMENTS**

CONVENTIONAL RAIL (LOSSAN) & STATION OPTIONS
Union Station To Fullerton Station (4th main track)
Fullerton Station To Irvine Station
Alignment
AT-GRADE between Walnut Ave (Orange) and E. 17th St. (Santa Ana)
Stations
Fullerton
Anaheim
Santa Ana
Irvine
Irvine Station To San Juan Capistrano City Limits (no improvements)
San Juan Capistrano (City Limits to Avenida Aeropuerto)
Alignment
AT-GRADE and Open TRENCH along east side of Trabuco Creek
Stations
San Juan Capistrano (New, below-grade station)
Dana Point/San Clemente (Avenida Aeropuerto To San Onofre Power Plant)
Alignment
Dana Point Curve Realignment; San Clemente - SHORT TUNNEL; Double Tracking (crossing San Mateo and San Onofre Creeks)
Stations
San Clemente (New Station – location to be determined)
Camp Pendleton (San Onofre Power Plant to Oceanside City Limits - Double tracking; crosses Santa Margarita River)
Oceanside/Carlsbad (Oceanside City Limits to Encinitas City Limits)
Alignments
Carlsbad - AT-GRADE; double tracking; crosses San Luis Rey, Buena Vista , Aqua Hedionda, and Batiquitos Lagoons
Stations
Oceanside
Encinitas/Solana Beach (Encinitas City Limits to Solana Beach Station)
Alignment
Encinitas - AT-GRADE; Double Tracking; crosses San Elijo Lagoon
Stations
Solana Beach
Del Mar (Solana Beach Station to I-5/805 Split)
Alignment
TUNNEL under Camino Del Mar; crosses San Dieguito and Los Penasquitos Lagoons
I-5/805 Split To Hwy 52
Alignment
I-5 Tunnel
Hwy 52 To Santa Fe Depot (Curve realignment; Double Tracking; San Diego River Bridge; Trench between Sassafras St and Cedar St)
Stations
Santa Fe Depot

**Table A-2
HIGHER LEVEL INFRASTRUCTURE IMPROVEMENTS**

CONVENTIONAL RAIL (LOSSAN) & STATION OPTIONS
Union Station To Fullerton Station (4th main track)
Fullerton Station To Irvine Station
Alignment
TRENCH between Walnut Ave (Orange) and E. 17th St. (Santa Ana)
Stations
Fullerton
Anaheim
Santa Ana
Irvine
Irvine Station To San Juan Capistrano City Limits(no improvements)
San Juan Capistrano (City Limits to Avenida Aeropuerto)
Alignment
TUNNEL along I-5 between Hwy 73 and Avenida Aeropuerto (tunnel under Trabuco Creek and San Juan Creek); Double tracking
Dana Point/San Clemente (Avenida Aeropuerto To San Onofre Power Plant)
Alignment
San Clemente - LONG TWO-SEGMENT TUNNEL; Double Tracking (crosses San Mateo and San Onofre Creeks)
Stations
San Clemente (New below-grade station between tunnel segments)
Camp Pendleton (San Onofre Power Plant to Oceanside City Limits - Double tracking; crosses Santa Margarita River)
Oceanside/Carlsbad (Oceanside City Limits to Encinitas City Limits)
Alignment
Carlsbad -TRENCH; double-tracking; crosses San Luis Rey, Buena Vista, Aqua Hedionda, and Batiquitos Lagoons
Stations
Oceanside
Encinitas/Solana Beach (Encinitas City Limits to Solana Beach Station)
Alignment
Encinitas - SHORT TRENCH; Double Tracking; crosses San Elijo Lagoon
Stations
Solana Beach
Del Mar (Solana Beach Station to I-5/805 Split)
Alignment
TUNNEL along I-5; crosses San Dieguito and Los Penasquitos Lagoons
I-5/805 Split To Hwy 52
Alignment
Miramar Hill Tunnel
Stations
UTC
Hwy 52 To Santa Fe Depot (Curve realignment; Double Tracking; San Diego River Bridge; Trench between Sassafras St and Cedar St)
Stations
Santa Fe Depot