

CALIFORNIA HIGH-SPEED TRAIN

Program Environmental Impact Report/Environmental Impact Statement

ALIGNMENT CONFIGURATION AND CROSS SECTIONS

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**

**Alignment Configuration and
Cross Sections**

January, 2004

TABLE OF CONTENTS

1.0	INTRODUCTION	11
1.1	STATION CONFIGURATION	11
1.2	ALIGNMENT CONFIGURATION AND CROSS SECTIONS	13

APPENDICES

LIST OF TABLES

1-1	HIGH-SPEED TRAIN PASSENGER STATION CONFIGURATION	5
-----	--	---

LIST OF FIGURES

STATION CONFIGURATION TYPICAL CROSS SECTIONS

FIGURE S-1	TERMINAL STATION CONFIGURATION-SACRAMENTO
FIGURE S-2	TERMINAL STATION CONFIGURATION-SAN DIEGO
FIGURE S-3	TERMINAL STATION CONFIGURATION-OAKLAND
FIGURE S-4	TERMINAL STATION CONFIGURATION-ANAHEIM/IRVINE
FIGURE S-5	TERMINAL/INTERMEDIATE STATION-LOS ANGELES
FIGURE S-6	TERMINAL/INTERMEDIATE STATION-SAN JOSE
FIGURE S-7	TERMINAL CONFIGURATION-LOS ANGELES AIRPORT
FIGURE S-8	INTERMEDIATE STATION CONFIGURATION
FIGURE S-9	INTERMEDIATE STATION "OFF-LINE" CONFIGURATION
FIGURE S-10	TERMINAL STATION CONFIGURATION-SAN FRANCISCO TRANSBAY
FIGURE S-11	TYPICAL SHARED-USE STATION-LOSSAN
FIGURE S-12	TYPICAL SHARED-USE STATION-CALTRAIN

BAY AREA-MERCED REGION

MAPS

MAP 1	ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—SAN FRANCISCO TO SAN JOSE
MAP 2	ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS-SECTIONS—OAKLAND TO SAN JOSE
MAP 3A	ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—SAN JOSE TO MERCED—NORTHERN TUNNEL/PACHECO PASS ALIGNMENTS
MAP 3B	ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—SAN JOSE TO MERCED—TUNNEL UNDER PARK ALIGNMENT
MAP 3C	ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—SAN JOSE TO MERCED—MINIMIZE TUNNEL ALIGNMENT

FIGURES

- FIGURE A.1 TYPICAL AT-GRADE MAINLINE SECTION-DIABLO RANGE DIRECT ALIGNMENT OPTION SAN JOSE TO ATWATER/GILROY TO LOS BANOS
- FIGURE A.2 TYPICAL AERIAL STRUCTURE-DIABLO RANGE DIRECT ALIGNMENT OPTION—SAN JOSE TO ATWATER/GILROY TO LOS BANOS
- FIGURE A.3 TYPICAL TWIN SINGLE TRACK TUNNEL—TUNNEL LENGTH LESS THAN 6 MILES DIABLO RANGE DIRECT ALIGNMENT OPTION—SAN JOSE TO ATWATER/GILROY TO LOS BANOS
- FIGURE A.4 FIGURE LEFT INTENTIONALLY BLANK
- FIGURE A.5 TYPICAL AERIAL STRUCTURE (DEVELOPED AREAS)—DIABLO RANGE DIRECT ALIGNMENT OPTION—SAN JOSE TO ATWATER/GILROY TO LOS BANOS
- FIGURE A.6 SAN JOSE TO OAKLAND—NILES/COAST SUBDIVISION FROM INDUSTRIAL PARKWAY TO 14TH AVE
- FIGURE A.7 SAN JOSE TO OAKLAND—NILES/COAST SUBDIVISION—INDUSTRIAL PARKWAY TO NILES JUNCTION
- FIGURE A.8 SAN JOSE TO OAKLAND-NILES/COAST SUBDIVISION—NILES JUNCTION
- FIGURE A.9 SAN JOSE TO OAKLAND—NILES/COAST SUBDIVISION—NILES JUNCTION TO WILDLIFE REFUGE
- FIGURE A.10 SAN JOSE TO OAKLAND—NILES/COAST SUBDIVISION—NATIONAL WILDLIFE REFUGE
- FIGURE A.11 SAN JOSE TO OAKLAND—NILES/COAST SUBDIVISION—ALVISO TO MONTAGUE EXPRESSWAY
- FIGURE A.12 SAN JOSE TO OAKLAND—NILES/COAST SUBDIVISION—MONTAGUE EXPRESSWAY TO DE LA CRUZ
- FIGURE A.13 SAN JOSE TO OAKLAND—NILES/COAST SUBDIVISION/I-880—PENINSULA-EAST BAY JUNCTION
- FIGURE A.14 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—INDUSTRIAL PARKWAY TO 14TH AVE.
- FIGURE A.15 FIGURE LEFT INTENTIONALLY BLANK
- FIGURE A.16 FIGURE LEFT INTENTIONALLY BLANK
- FIGURE A.17 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—BART ACCESS ROAD TO NORTH OF INDUSTRIAL PARKWAY
- FIGURE A.18 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—F STREET TO BART ACCESS ROAD
- FIGURE A.19 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—UNION CITY STATION TO F STREET
- FIGURE A.20 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—ALVARADO NILES TO UNION CITY STATION.
- FIGURE A.21 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—ALAMEDA FLOOD CONTROL CHANNEL TO NORTH OF ALVARADO NILES ROAD
- FIGURE A.22 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—SR-238 TO WASHINGTON BLVD.
- FIGURE A.23 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—I-880 CORRIDOR FRO SR-87 TO SR-238

- FIGURE A.24 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—TRANSITION AT SR-87 IN I-880 CORRIDOR FROM SUBWAY TO AERIAL STRUCTURE
- FIGURE A.25 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—COLEMAN/TAYLOR TO I-880 CORRIDOR
- FIGURE A.26 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—JULIAN STREET TO LENZEN AVE.
- FIGURE A.27 SAN JOSE TO OAKLAND—NILES SUBDIVISION/I-880—DIRIDON STATION TO JULIAN STREET
- FIGURE A.28 TYPICAL AERIAL STRUCTURE—SR-152 ALIGNMENT OPTIONS—MORGAN HILL TO GILROY
- FIGURE A.29 TYPICAL AT-GRADE SECTION—SR-152 ALIGNMENT OPTIONS—MORGAN HILL TO GILROY
- FIGURE A.30 SAN JOSE TO MERCED—DIRECT ROUTE-NORTHERN MERCED—PACHECO PASS-MERCED SIMILAR FROM I-280 TO SAN CARLOS STREET
- FIGURE A.31 SAN JOSE TO MERCED—DIRECT ROUTE-NORTHERN MERCED—PACHECO PASS-MERCED SIMILAR FROM SR-87 TO I-280
- FIGURE A.32 SAN JOSE TO MERCED—DIRECT ROUTE-NORTHERN MERCED—PACHECO PASS-MERCED SIMILAR FROM ALMADEN EXPRESSWAY TO SR-87
- FIGURE A.33 SAN JOSE TO MERCED—DIRECT ROUTE-NORTHERN MERCED—PACHECO PASS-MERCED SIMILAR FROM I-5 JUNCTION WITH CAHSR CENTRAL VALLEY LINE
- FIGURE A.34 SAN JOSE TO MERCED—DIRECT ROUTE-NORTHERN MERCED—PACHECO PASS-MERCED SIMILAR FROM I-5 TO JUNCTION WITH CENTRAL VALLEY LINE
- FIGURE A.35 SAN JOSE TO OAKLAND—WEST OAKLAND STATION—WEST OAKLAND STATION FROM HARRISON STREET TO MARKET STREET
- FIGURE A.36 SAN JOSE TO OAKLAND—WEST OAKLAND STATION—WEST OAKLAND STATION FROM 14TH AVENUE TO HARRISON STREET
- FIGURE A.37 TYPICAL TUNNEL APPROACH AT SANTA CLARA SECTION—CALTRAIN SHARED USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE
- FIGURE A.38 TYPICAL FOUR TRACKS AT GRADE—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE
- FIGURE A.39 TYPICAL AT-GRADE AND EMBANKMENT IN SAN FRANCISCO—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE
- FIGURE A.40 TYPICAL MAINLINE HIGHWAY UNDERPASS/OVERPASS—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE
- FIGURE A.41 TWIN SINGLE TRACK TUNNELS (-6 MILES)—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE
- FIGURE A.42 TYPICAL FREEWAY OVERPASS—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE
- FIGURE A.43 SINGLE TRACK TUNNELS (-6 MILES)—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE
- FIGURE A.44 RETAINED FILL SECTION—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE

FIGURE A.45 DOUBLE TRACK BOX SECTION—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE

FIGURE A.46 TYPICAL EMBANKMENT HIGHWAY UNDERPASS—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE

FIGURE A.47 RETAINED FILL SOUTH OF TUNNEL PORTAL, SAN JOSE-ALTERNATIVE 1—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE

FIGURE A.48 RETAINED FILL SOUTH OF TUNNEL PORTAL, SAN JOSE-ALTERNATIVE 2—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE

FIGURE A.49 RETAINED FILL SOUTH OF TUNNEL PORTAL, SAN JOSE-ALTERNATIVE 3—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE

FIGURE A.50 TWIN SINGLE TRACK TUNNELS (-6 MILES)—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE

FIGURE A.51 TWIN SINGLE TRACK TUNNELS (-6 MILES)—CALTRAIN SHARED-USE ALIGNMENT—SAN FRANCISCO TO SAN JOSE

SACRAMENTO TO BAKERSFIELD

MAPS

MAP 4A ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—SACRAMENTO-UPRR ALIGNMENT

MAP 4B ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—SACRAMENTO-BNSF ALIGNMENT

MAP 5A ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—STOCKTON-UPRR ALIGNMENT

MAP 5B ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—STOCKTON-BNSF ALIGNMENT

MAP 6 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—MODESTO-UPRR AND BNSF ALIGNMENTS

MAP 7A ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—MERCED-UPRR ALIGNMENT

MAP 7B ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—MERCED-BNSF ALIGNMENT

MAP 8 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—MERCED TO FRESNO

MAP 9A ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—FRESNO UPRR ALIGNMENT

MAP 9B ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—FRESNO BNSF ALIGNMENT

MAP 10 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—HANFORD/VISALIA

MAP 11A ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—BAKERSFIELD UPRR ALIGNMENT

MAP 11B ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—BAKERSFIELD BNSF ALIGNMENT

FIGURES

FIGURE B.1 TYPICAL AT-GRADE MAINLINE SECTION ON NEW ALIGNMENT—UPRR ALIGNMENT

- FIGURE B.2 TYPICAL AERIAL MAINLINE SECTION-FLYOVER HIGHWAY OR RAILROAD—UPRR ALIGNMENT
- FIGURE B.3 TYPICAL AT-GRADE MAINLINE SECTION-WITHIN EXISTING RAILROAD ROW—UPRR ALIGNMENT
- FIGURE B.4 MAINLINE SECTION-TYPICAL AERIAL FLYOVER OVER RR & FREEWAY—UPRR ALIGNMENT
- FIGURE B.5 TYPICAL MAINLINE SECTION-ADJACENT TO EXISTING RAILROAD—UPRR ALIGNMENT
- FIGURE B.6 TYPICAL MAINLINE SECTION-ADJACENT TO SR-99—UPRR ALIGNMENT
- FIGURE B.7 TYPICAL AT-GRADE MAINLINE SECTION ADJACENT TO SR-99—UPRR ALIGNMENT
- FIGURE B.8 TYPICAL EMBANKMENT MAINLINE SECTION-ADJACENT TO EXISTING UPRR—UPRR ALIGNMENT
- FIGURE B.9 TYPICAL AT-GRADE MAINLINE SECTION FRESNO RAIL CONSOLIDATION—UPRR ALIGNMENT
- FIGURE B.10 TYPICAL BRIDGE APPROACH-RETAINED FILL—UPRR ALIGNMENT
- FIGURE B.11 TYPICAL BRIDGE APPROACH-EMBANKMENT—UPRR ALIGNMENT
- FIGURE B.12 TYPICAL AT-GRADE MAINLINE SECTION ON NEW ALIGNMENT—CCT/BNSF ALIGNMENT
- FIGURE B.13 TYPICAL AT-GRADE MAINLINE SECTION ON NEW ALIGNMENT (CONSTRAINED)—CCT/BNSF ALIGNMENT
- FIGURE B.14 TYPICAL AERIAL MAINLINE SECTION-FLYOVER HIGHWAY OR RAILROAD—CCT/BNSF ALIGNMENT
- FIGURE B.15 TYPICAL AT-GRADE MAINLINE SECTION-WITHIN EXISTING RAILROAD ROW—CCT/BNSF ALIGNMENT
- FIGURE B.16 TYPICAL MAINLINE SECTION-ADJACENT TO EXISTING RAILROAD—CCT/BNSF ALIGNMENT
- FIGURE B.17 TYPICAL MAINLINE SECTION-ADJACENT TO SR-43—CCT/BNSF ALIGNMENT
- FIGURE B.18 TYPICAL AT-GRADE MAINLINE SECTION ADJACENT TO SR-99—CCT/BNSF ALIGNMENT
- FIGURE B.19 TYPICAL MAINLINE HIGHWAY UNDERPASS—CCT/BNSF ALIGNMENT
- FIGURE B.20 TYPICAL BRIDGE APPROACH-RETAINED FILL—BNSF ALIGNMENT
- FIGURE B.21 TYPICAL BRIDGE APPROACH-EMBANKMENT—BNSF ALIGNMENT
- FIGURE B.22 TYPICAL MAINLINE SECTION ON UNUTILIZED RAILROAD ROW—CCT/BNSF ALIGNMENT

BAKERSFIELD TO LOS ANGELES

MAPS

- MAP 12 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—BAKERSFIELD TO SYLMAR
- MAP 13 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—SYLMAR TO LOS ANGELES

FIGURES

- FIGURE C.1 AT-GRADE MAINLINE SECTION ON NEW ALIGNMENT (CONSTRAINED)—WHEELER RIDGE ALIGNMENT

- FIGURE C.2 AT-GRADE MAINLINE SECTION, ADJACENT TO SJVR—WHEELER RIDGE ALIGNMENT
- FIGURE C.3 AT-GRADE MAINLINE SECTION ON NEW ALIGNMENT—WHEELER RIDGE ALIGNMENT
- FIGURE C.4 EMBANKMENT MAINLINE SECTION, ADJACENT TO UNION AVENUE—WHEELER RIDGE ALIGNMENT
- FIGURE C.5 AERIAL MAINLINE SECTION ON NEW ALIGNMENT—UNION AVENUE ALIGNMENT
- FIGURE C.6 EMBANKMENT MAINLINE SECTION, ADJACENT TO UNION AVENUE—UNION AVENUE ALIGNMENT
- FIGURE C.7 AT-GRADE MAINLINE SECTION—SR-58 ALIGNMENT
- FIGURE C.8 CUT-AND-FILL MAINLINE SECTION, ADJACENT TO SR-58—SR-58 ALIGNMENT
- FIGURE C.9 AT-GRADE MAINLINE SECTION, ADJACENT TO SCRRA—ANTELOPE VALLEY ALIGNMENT
- FIGURE C.10 AERIAL MAINLINE SECTION, OVER SCRRA AND HIGHWAYS—METROLINK/UPRR ALIGNMENT AND I-5 ALIGNMENT
- FIGURE C.11 TRENCH MAINLINE SECTION, ADJACENT TO SAN FERNANDO ROAD—UPRR/METROLINK ALIGNMENT AND I-5 ALIGNMENT
- FIGURE C.12 AT-GRADE MAINLINE SECTION, ADJACENT TO SAN FERNANDO ROAD—UPRR/METROLINK ALIGNMENT AND I-5 ALIGNMENT
- FIGURE C.13 AERIAL MAINLINE SECTION WITH SCRRA—METROLINK/UPRR ALIGNMENT AND I-5 ALIGNMENT
- FIGURE C.14 AT-GRADE MAINLINE SECTION, ADJACENT TO SCRRA UNDER HIGHWAYS—METROLINK/UPRR ALIGNMENT
- FIGURE C.15 CUT-AND-COVER TUNNEL MAINLINE SECTION, ELYSIAN PARK—I-5 ALIGNMENT
- FIGURE C.16 TUNNEL SECTION, ELYSIAN PARK—I-5 ALIGNMENT
- FIGURE C.17 2-TRACK AT-GRADE ON RETAINED FILL, BRIDGE APPROACH—METROLINK/UPRR ALIGNMENT
- FIGURE C.18 AERIAL MAINLINE SECTION, OVER SCRRA AND HIGHWAYS—LAUS CONNECTIONS
- FIGURE C.19 TYPICAL AT-GRADE MAINLINE SECTION—BAKERSFIELD TO SYLMAR
- FIGURE C.20 TYPICAL AERIAL STRUCTURE (UNDERDEVELOPED AREAS)—BAKERSFIELD TO SYLMAR
- FIGURE C.21 TYPICAL TWIN SINGLE TRACK TUNNEL—TUNNEL LENGTH LESS THAN 6 MILES—BAKERSFIELD TO SYLMAR
- FIGURE C.22 FIGURE LEFT INTENTIONALLY BLANK
- FIGURE C.23 TYPICAL AERIAL STRUCTURE (DEVELOPED AREAS)—BAKERSFIELD TO SYLMAR
- FIGURE C.24 TYPICAL AERIAL STRUCTURE (URBAN/SUBURBAN AREAS)—BAKERSFIELD TO SYLMAR
- FIGURE C.25 TYPICAL FILL SECTION (UNDEVELOPED AREAS)—BAKERSFIELD TO SYLMAR
- FIGURE C.26 TYPICAL AERIAL STRUCTURE (URBAN/SUBURBAN AREAS)—BAKERSFIELD TO SYLMAR

FIGURE C.27 CUT-AND-FILL SECTION (URBAN/SUBURBAN AREAS)—BAKERSFIELD TO SYLMAR

FIGURE C.28 AT-GRADE MAINLINE SECTION, ADJACENT TO SCRRA—ANTELOPE VALLEY ALIGNMENT

LOS ANGELES-RIVERSIDE-SAN DIEGO

MAPS

MAP 14 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—LOS ANGELES TO RIVERSIDE

MAP 15 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—RIVERSIDE TO MIRA MESA

MAP 16 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—MIRA MESA TO SAN DIEGO

FIGURES

FIGURE D.1 URBAN AERIAL OVER FREIGHT CORRIDOR

FIGURE D.2 URBAN AT-GRADE WITH FREIGHT CORRIDOR

FIGURE D.3 URBAN DEPRESSED WITH FREIGHT CORRIDOR

FIGURE D.4 URBAN AERIAL

FIGURE D.5 RURAL AT-GRADE WITH 1 BNSF TRACK

FIGURE D.6 RURAL AT-GRADE (CUT AND FILL)

FIGURE D.7 RURAL AERIAL

FIGURE D.8 RURAL DEPRESSED

FIGURE D.9 TUNNEL SECTION

FIGURE D.10 RURAL AERIAL OVER 1 METROLINK TRACK

FIGURE D.11 RURAL AT-GRADE WITH 1 METROLINK TRACK

FIGURE D.12 URBAN AERIAL OVER LOSSAN CORRIDOR

FIGURE D.13 AT-GRADE WITH LOSSAN CORRIDOR

FIGURE D.14 FREEWAY MEDIAN AERIAL

FIGURE D.15 FREEWAY MEDIAN AERIAL

FIGURE D.16 FREEWAY ADJACENT AERIAL

FIGURE D.17 FREEWAY ADJACENT AT-GRADE

FIGURE D.18 CARROLL CANYON

LOS ANGELES-ORANGE-SAN DIEGO

MAPS

MAP 17 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—LA UNION STATION TO LAX

MAP 18 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—LA UNION STATION TO IRVINE

FIGURES

FIGURE E.1 AT-GRADE MAINLINE SECTION ON NEW ALIGNMENT (CONSTRAINED)

FIGURE E.2 TYPICAL AERIAL STRUCTURE (DEVELOPED AREAS)

FIGURE E.3 CUT-AND-COVER TUNNEL MAINLINE SECTION

FIGURE E.4 TRENCH

FIGURE E.5 TUNNEL SECTION

FIGURE E.6 AT-GRADE MAINLINE SECTION ON EXISTING LOSSAN CORRIDOR—LA UNION STATION TO FULLERTON

FIGURE E.7 AT-GRADE MAINLINE SECTION ON EXISTING LOSSAN CORRIDOR—FULLERTON TO IRVINE

LOS ANGELES-ORANGE-SAN DIEGO LOSSAN CONVENTIONAL (NON-ELECTRIC)

MAPS

MAP 19 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—IRVINE TO OCEANSIDE

MAP 20 ALIGNMENT STRUCTURE TYPES AND CORRESPONDING CROSS SECTIONS—OCEANSIDE TO SAN DIEGO

FIGURES

FIGURE F.1 TYPICAL TUNNEL SECTION-DEL MAR TWIN BORE TUNNEL.

FIGURE F.2 TYPICAL AT-GRADE SECTION-DANA POINT-ALONG PCH.

FIGURE F.3 TYPICAL (LOW) AERIAL STRUCTURE-PENASQUITOS LAGOON.

FIGURE F.4 TYPICAL RETAINED FILL SECTION-PENASQUITOS LAGOON.

FIGURE F.5 AT-GRADE MAINLINE SECTION ON EXISTING LOSSAN CORRIDOR.

FIGURE F.6 TYPICAL TUNNEL SECTION-SAN CLEMENTE, DEL MAR, AND U.T.C. TWIN BORE TUNNEL.

FIGURE F.7 TYPICAL TUNNEL SECTION-U.T.C. TWIN BORE TUNNEL.

FIGURE F.8 CUT-AND-COVER TUNNEL MAINLINE SECTION.

1.0 INTRODUCTION

1.1 STATION CONFIGURATION

There are two principal types of stations: terminus and intermediate. Terminus stations are those where all trains are planned to stop and perhaps lay-over during non-peak periods. San Diego, Los Angeles Union Station, Los Angeles Airport, San Francisco, Oakland, and Sacramento are all planned as terminus stations; however, Los Angeles Union Station would also have the characteristics of an intermediate station. Depending upon the examination of shared use issues on the LOSSAN Corridor and policy decisions affecting the high-speed rail system configuration end points and associated service, a location in Irvine or Anaheim may be identified as a terminal station. All other potential stations are intermediate stations. Intermediate stations would provide off-line passenger platforms allowing for pass-through express services on the dual track mainline.

Intermediate stations are defined as "line" stations providing service along the dedicated high-speed rail route and located between San Diego, Los Angeles, Sacramento and San Francisco. The desirable configuration for intermediate stations is an arrangement of two "off-line" platforms as presented in Figure S-8.

In addition, there are some cases where off-line station areas are being considered. In these cases separate tracks are diverted from the mainline dual track alignment to provide service to urban areas that cannot support the more rigid mainline geometric design requirements. For example, there are potential station locations serving communities in the San Joaquin valley, such as Stockton, where the main trunk of the High-Speed Rail Corridor would not pass directly through the town center. An optional configuration for these locations, as presented in Figure S-9, is a grade separated, "off-line" double track alignment seamlessly connected (including flyovers) to the dual main tracks of the High-Speed Rail Corridor trunk. This alignment would support speeds up to 174 kph positioned strategically to provide train service to an island platform located in, or near, the town center.

A siding length of 5 kilometers was determined to be the desirable arrangement for intermediate stations. This arrangement allows for diverging speeds of 174 kph (108 mph) and allows for safe and efficient processing of both stopping and through movements with negligible impact to travel times and system capacity.

In some cases, land use and other limitations may necessitate a deviation from the desirable (desirable) typical intermediate station configuration. In these cases, a shorter station siding track length may be considered to decrease the spatial area requirements influenced by this dimension. Siding lengths vary according to diverging speed assumptions and as represented by the following examples: 145 kph (90 mph, 3350m siding length), 130 kph (81 mph, 2430m siding length), 100 kph (62 mph, 1280m siding length), and 90 kph (56mph, 940m siding length).

The station options are listed in Table 1-1 along with there general profile configuration and associated cross section. The cross sections show general track and platform configuration, but not necessarily specific profile or site conditions for each station option.

**Table 1-1
High-Speed Train Passenger Station Configuration**

Station	Grade Profile	Figure Number ¹
Terminal Station		
San Francisco Transbay Terminal	Tunnel	Figure S-10
San Francisco 4th & King Station (Segment 2 - Caltrain Urban)	Coved Trench	Figure S-10
West Oakland Station (Segment 4 - Urban)	Tunnel	Figure S-3
Oakland 12 th Street/City Center Station (Segment 5 - Urban)	Tunnel	Figure S-3
Sacramento Downtown Valley Station (Urban)	Aerial	Figure S-1
Sacramento Power Inn Road Station (Urban)	Aerial	Figure S-1
San Diego Qualcomm Station (Urban)	Aerial	Figure S-2
San Diego International Airport Station (Urban)	Aerial	Figure S-2
San Diego Downtown Station (Urban)	Aerial	Figure S-2
Los Angeles Airport Station (Urban)	Tunnel	Figure S-7
Anaheim Station (Urban)	Tunnel	Figure S-4
Irvine Station (Urban)	Tunnel	Figure S-4
Terminal/Intermediate Station		
Existing LAUS with South Connection (Urban)	Aerial	Figure S-5
Existing LAUS with East Connection (Urban)	Aerial	Figure S-5
LAUS South (Urban)	Aerial	Figure S-5
LAUS East Bank (Over 110-Fwy Variant) (Urban)	Aerial	Figure S-5
LAUS East Bank (Under 110-Fwy Variant) (Urban)	Aerial	Figure S-5
San Jose Diridon Station (Segment 9 - Urban)	Aerial	Figure S-6
Intermediate Station		
Millbrae - San Francisco Airport Shared Use Station (Urban) ³	At-Grade	Figure S-12
Redwood City Station Shared Use (Suburban) ³	At-Grade	Figure S-12
Palo Alto Station Shared Use (Suburban) ³	At-Grade	Figure S-12
Santa Clara Station Shared Use (Urban) ³	At-Grade	Figure S-12
Oakland Airport (Coliseum BART) Station (Segment 6 - Urban)	At-Grade	Figure S-8
Union City Station (Segment 7 & 8 - Suburban)	At-Grade	Figure S-8
Auto Mall Parkway Station (Suburban)	At-Grade	Figure S-8
Gilroy Station (Segment 12 - Undeveloped)	Aerial	Figure S-8
Los Banos Station (Segment 13 - Undeveloped)	At-Grade	Figure S-8
Morgan Hill Station (Segment 14 - Suburban)	Aerial	Figure S-8
Stockton ACE Downtown Station (Suburban) ⁴	At-Grade	Figure S-9
Modesto SP Downtown Station (Suburban) ²	Aerial	Figure S-8 or S-9
Amtrak Briggsmore Station (Suburban)	At-Grade	Figure S-8
Merced SP Downtown Station (Suburban)	At-Grade	Figure S-8
Merced Municipal Airport Station (Suburban)	At-Grade	Figure S-8
Castle Air Force Base Station (Suburban) ²	At-Grade	Figure S-8 or S-9
Fresno Downtown Station (Urban)	At-Grade	Figure S-8
Visalia Airport Station (Undeveloped) ²	At-Grade	Figure S-8 or S-9
Hanford Station (Undeveloped) ⁴	At-Grade	Figure S-9
Bakersfield Airport Station (Suburban)	At-Grade	Figure S-8
Bakersfield Golden State Station (Urban)	At-Grade	Figure S-8

Station	Grade Profile	Figure Number ¹
Bakersfield - Truxton Union Avenue Station (Urban)	At-Grade	Figure S-8
Bakersfield - Truxton Amtrak Station (Urban)	Aerial	Figure S-8
Palmdale Transportation Center (Suburban)	At-Grade	Figure S-8
Sylmar Metrolink Station (Urban)	Aerial	Figure S-8
Burbank Airport Station (Urban)	Trench	Figure S-8
Burbank Metrolink/Media City Station (Metrolink/UPRR Variant) (Urban)	Aerial	Figure S-8
Burbank Metrolink/Media City Station (I-5 Variant) (Urban)	Aerial	Figure S-8
El Monte Station (Suburban)	At-Grade	Figure S-8
Pomona Station (Suburban)	Aerial	Figure S-8
Ontario Airport Station (Urban)	At-Grade	Figure S-8
UP Colton Station (Suburban)	At-Grade	Figure S-8
UC Riverside (Urban)	Aerial	Figure S-8
South El Monte Station (Suburban)	At-Grade	Figure S-8
City of Industry Station (Suburban)	At-Grade	Figure S-8
San Bernardino/Santa Fe Station (Urban)	Aerial	Figure S-8
March ARB Station (Suburban)	At-Grade	Figure S-8
Murrieta (I-15/I-215 Interchange) Station (Suburban)	Aerial	Figure S-8
Escondido at SR-78/I-15 Station (Suburban)	Aerial	Figure S-8
Escondido Transit Center (Suburban)	Tunnel	Figure S-8
Mira Mesa Station (Suburban)	Aerial	Figure S-8
University City Station (Suburban)	At-Grade	Figure S-8
Norwalk LAUS-UP Santa Ana Station (Suburban)	At-Grade	Figure S-8
Norwalk LOSSAN Shared Use Station (Suburban) ³	At-Grade	Figure S-11
Anaheim LOSSAN Shared Use Station (Urban) ³	At-Grade	Figure S-11
Irvine LOSSAN Shared Use Station (Urban) ³	At-Grade	Figure S-11

¹ Cross section shows general track and platform configuration, but not necessarily site conditions for each location.

² Station has option of using either a full intermediate station or an on-line station with an off-line express loop.

³ Shared Use Stations

⁴ Only Local Service

Typical passenger station cross section figures are presented in the following "S" figures.

1.2 ALIGNMENT CONFIGURATION AND CROSS SECTIONS

Alignment configuration maps were created for each alignment option in each region of the proposed HST. Each map displays in a color coded format the proposed alignment options and the basic structural cross section. Each color coded segment in the map has a figure call-out that corresponds to a typical cross section that applies to the segment.

The alignment configuration maps and cross sections are divided into six sets of plans.

- Bay Area to Merced: Map 1 - Map 3C and its corresponding "A" cross section figures.
- Sacramento to Bakersfield: Map 4 - Map 11B and its corresponding "B" cross section figures.
- Bakersfield to Los Angeles: Map 12 – Map 13 and its corresponding "C" cross section figures.
- Los Angeles to San Diego via Riverside: Map 14 – Map 16 and its corresponding "D" cross section figures.
- Los Angeles to San Diego via Orange: Map 17 – Map 18 and its corresponding "E" cross section figures.
- Los Angeles to San Diego LOSSAN Conventional (Non-Electric): Map 19 – Map 20 and its corresponding "F" figures.

BAY AREA TO MERCED

SACRAMENTO TO BAKERSFIELD

BAKERSFIELD TO LOS ANGELES

LOS ANGELES TO SAN DIEGO VIA RIVERSIDE

LOS ANGELES TO SAN DIEGO VIA ORANGE

LOS ANGELES TO SAN DIEGO LOSSAN CONVENTIONAL (NON-ELECTRIC)