Supplemental Fact Sheet Exceptions to Mandatory Design Standards

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G3

1. PROPOSED PROJECT

A. Project Description

The San Francisco-Oakland Bay Bridge (SFOBB), as a component of Interstate 80 (I-80), serves as one of the principal corridors linking the San Francisco Peninsula, San Francisco, and East Bay. To improve the seismic safety of the bridge, the California Department of Transportation (Caltrans) is in the process of implementing various projects to replace and/or retrofit sections of the bridge. The SFOBB seismic safety projects that have already been completed include retrofit of the West Span, the west Yerba Buena Island (YBI) viaduct, and the YBI tunnel, as well as the interim retrofit of the East Span. The replacements of the West Approach and of the East Span are currently in progress. In particular, the East Span consists of four primary components:

1. Oakland Touchdown (OTD) – consists of the Oakland Geofill and the Oakland Approach;
2. Skyway – an elevated roadway supported by reinforced concrete;
3. Self-Anchored Suspension (SAS) Span – a steel 510-foot tower supporting a bridge deck; and
4. Yerba Buena Island Transition Structure (YBITS) – a structure transitioning the parallel road decks to the upper and lower decks of the YBI tunnel.

This supplemental Design Exception Fact Sheet will cover additional non-standard mandatory design features not covered in the original mandatory fact sheet. See Attachment D for the original Mandatory Fact Sheet dated 9/23/98. See Attachment A for a Project Location Map. See Attachment B for Mandatory Exception Location and Summary Sheet.

B. Existing Bridge

The existing double-decked bridge, with five traffic lanes in each direction and spanning across two separate sections (the East Span and the West Span), currently serves an annual average daily traffic (AADT) demand of approximately 285,000 vehicles. Both the eastbound (EB) and westbound (WB) levels are striped with five 3.4-m lanes without left or right shoulders. Toll is collected from WB traffic at the east approach of the bridge in the City of Oakland. Route 80 within project limit is not a part of the FHWA Rural and Single Interstate Routing System.

C. Safety Improvements

The new East Span will consist of two side-by-side bridge structures separated by 15 m (49 ft). Each bridge structure will include five travel lanes, each 3.6 meters (12 feet) wide. The bridge structures will also include left and right shoulders, each measuring 3.0 m (10 ft) wide. In addition, a 5.80 m (19 ft) pedestrian/bicycle path will be located in most locations 0.3 m (one ft) above the roadway along the south side of the eastbound bridge deck. The eastbound (EB) and westbound (WB) YBI transition structures will have similar features. Also, a new eastbound on-ramp will be constructed to provide standard freeway entrance from YBI to the City of Oakland and beyond.

The standard cross slope and superelevation will be maintained to comply with the HDM.

D. Total Project Cost

Total cost for the project is estimated at approximately $6.20 billion.

2. NONSTANDARD FEATURES REQUIRING EXCEPTIONS

A. Design Exception Feature No. 1

Nonstandard Feature
This project proposes right shoulder widths of **0.3 m** from E Line Station 54+27.150 to 55+80.000.

Standard for Which Exception is Requested
HDM, Index 302.1, Table 302.1 – Standards for Paved Shoulder Width, the standard paved shoulder width for freeways with 6 or more lanes shall be **3.0 m**. See Attachment C1.

Reason for Requesting Exception
The full width of the permanent right shoulder and the pedestrian/bicycle path interfere with the South-South Detour (SSD) structure and the existing E1 column hence may not be constructed until the SSD structure is demolished under a separate contract. However, demolition of the SSD structure may not be accomplished until traffic is diverted to the EB transition structure. A subsequent project will provide a standard right shoulder width of 3.0 m for the final configuration.

Added Cost to Make Standard
Realign the new EB transition structure. This option will require the realignment of the EB transition structure to avoid the SSD structure and the existing SFOBB foundation pier E1 footing. The proposed realignment

will only affect the EB transition structure and not the WB transition structure. The proposed realignment will rotate the EB transition alignment and reduce the curve radius from 1475 m to 1000 m to allow for the full construction of the EB transition structure (including standard shoulders and the pedestrian/bicycle path). The recently completed footing for the SAS Bridge will be required to be demolished and moved to a new location to conform to this realignment. The SAS Bridge design may have to be reevaluated and changed as needed. A new permit or amendments to the existing permits may also have to be secured with the BCDC and the Army COE. This option will delay the SFOBB completion by over 2 years and will cost over $150 million.

Due to the temporary nature of this exception as well as the structural, environmental, funding, and schedule constraints, these alternatives are considered infeasible.

B. Design Exception Feature No. 2

Nonstandard Feature
Lane width of **3.6 m** on a curve radius of <40 m and shoulder widths of **0.0 m** on the temporary EB entrance ramp. The temporary EB entrance ramp will have a 3.6 m lane and no shoulders from T7 Line Station 50+59.000 to 51+41.978. See Attachment C2.

Standard for Which Exception Is Requested
HDM, Index 504.3, Table 504.3A – Ramp Widening for Trucks – Lane width for ramps with a radius of less than 40 m shall be 5.6 m.

HDM, Index 302.1, Table 302.1 – Standards for Paved Shoulder Width – Standard paved shoulder width for single-lane ramps shall be 1.2 m on the left and 2.4 m on the right.

Reason for Requesting Exception

Space constraints and existing conditions necessitate a reduction in ramp radius, which leads to the temporary substandard shoulder width. Also, existing structures do not allow for an increase in lane width. A truck turning template was used to determine the layout of the temporary K-rail to accommodate California semitrailers. For safety reason, the lane width will be striped at 3.6 m at the request of Traffic. The temporary EB entrance ramp is need in order for the SSD Structure to be demolished and a standard ramp to be constructed. The final EB entrance ramp will have standard lane width and shoulder widths.

Added Cost to Make Standard

The reason for the reduced geometry on the eastbound entrance ramp is to minimize the number and size of the outrigger supports on YBI. A standard configuration requires longer and more outrigger beams to support the upper deck. The proposed geometry allows the columns to be placed between the ramp and the mainline structure. This reduces the beam spans and enables longer longitudinal spans, which eliminates two bents. Cost to the project to standardize the ramp geometry is approximated at $12 million.

C. Design Exception Feature No. 3

Nonstandard Feature

A nonstandard superelevation of **2.0%** is proposed from T7 Line Station 50+59.000 to 51+41.978. See Attachment C3.

Standard for Which Exception Is Requested

HDM, Index 202.2, Table 202.2 – Standard Superelevation Rates – The superelevation for ramps with a curve radius of 189 m and under shall be **12%**.

Reason for Requesting Exception

Space constraints and existing conditions necessitate a reduction in ramp geometry. These constraints also do not allow for the standard superelevation run off and rate. The Maximum Comfortable Speed on Horizontal Curves for this ramp is 30 km/hr or 20 mph. The posted speed for this ramp will be 20 mph.

Added Cost to Make Standard
The reason for the reduced geometry on the eastbound entrance ramp is to minimize the number and size of the outrigger supports on YBI. A standard configuration requires longer and more outrigger beams to support the upper deck. The proposed geometry allows the columns to be placed between the ramp and the mainline structure. This reduces the beam spans and enables longer longitudinal spans, which eliminates two bents. Cost to the project to standardize the ramp geometry is approximated at $12 million.

D. Design Exception Feature No. 4

Nonstandard Feature
A nonstandard superelevation of 0.5% is proposed from W Line Station 51+29.000 to 52+06.000. See Attachment C4.

Standard for Which Exception Is Requested
HDM, Index 202.2, Table 202.2 – Standard Superelevation Rates – The superelevation for freeways with a curve radius in the range of 1065-1369 m and shall be **3%.**

Reason for Requesting Exception
To match the existing conditions in the YBI Tunnel, it is necessary to provide a substandard superelevation transition from the new SFOBB to the existing viaduct. The Maximum Comfortable Speed on Horizontal Curves is 130 km/hr or 80 mph. The posted speed for WB mainline will be 55 mph. The superelevation rate will be similar to existing conditions.

Added Cost to Make Standard
The reason for the reduced superelevation on the curve is to match the existing conditions at the existing viaduct. To make the superelevation standard, it will require redesign of the YBITS and additional BCDC and Army COE permits. It will also require extensive overlay on the existing deck and reinforcing the existing girders and columns to support the additional load. The option could delay the construction by over a year and cost an additional $90 million.

3. TRAFFIC DATA

The SFOBB currently serves approximately 285,000 vehicles per day and frequently operates at capacity. The metering of vehicles on the bridge is controlled by metering lights at the Oakland Toll Plaza in the WB direction and the ramp system in San Francisco in the EB direction, which is a

result of the two entrance ramps merging with the three through lanes on EB I-80 at the beginning of the bridge. Traffic flow on the SFOBB is vulnerable to congestion due to stalls, accidents, lane closures required for bridge maintenance, and the lack of shoulders for clearing stopped vehicles.

The freeway ramps to and from the SFOBB and YBI typically operate with no more than 300 vehicles during the peak hour. Despite the low traffic volumes, the ramps operate at capacity due to severely restricted design limitations (e.g., restricted merge lanes). All local streets on YBI currently operate with low volumes of traffic.

In the future, peak hour travel demand for the approaches to the SFOBB is expected to increase for travel between the East and West Bay. However, traffic volumes on the bridge itself are expected to remain fairly constant due to the metering lights in the WB direction at the Oakland Toll Plaza and the geometric meter in the EB direction in San Francisco.

4. ACCIDENT ANALYSIS

Table 1 shows the most recent traffic accident rates for the EB I-80 mainline between YBI and Oakland, as well as the EB entrance ramp from YBI to Oakland.

Table 1 Accident Data

Location	Period	Total Accidents	Fatalities	Injuries	Actual Accident Rate[1]	Average Accident Rate[2]
EB I-80	01/01/03 to 12/31/05	315	2	71	0.87	0.78
EB entrance ramp		8	0	1	4.71	0.80

[1] The Actual Accident Rate is the rate of accidents per million vehicles miles on the facility described.
[2] The Average Accident Rate is the rate of accidents per million vehicles miles on similar facilities in the State.

The accident rate for the EB I-80 mainline is slightly higher than that experienced on similar facilities in the State, with the prevalent accident types being Rear End (45%), Side Swipe (27%), and Hit Object (22%). The high traffic volumes that are often in stop-and-go conditions, along with the lack of shoulders, may be factors that contribute to these prevalent accident types.

The accident rate for the EB entrance ramp from YBI to Oakland is considerably higher than that experienced on similar facilities in the State, with the prevalent accident type being Rear end (100%). Factors such as high mainline traffic volumes limiting the number of adequate gaps for merging, and the high speed differential required for merging, might attribute to collisions.

The proposed nonstandard geometric features for the temporary EB on ramp are not expected to worsen the current safety performance. The project proposes to utilize the 3.0 m right shoulder as a merging lane. The current condition does not have a merging lane. This could explain the high rear end accidents. The merging lane should improve the current safety performance.

5. PROPOSED EXCEPTION REVIEW AND CONCURRENCE

The proposed design exceptions were reviewed by Gordon Brown on November 14, 2007.

6. ATTACHMENTS

Attachment A – Project Location Map

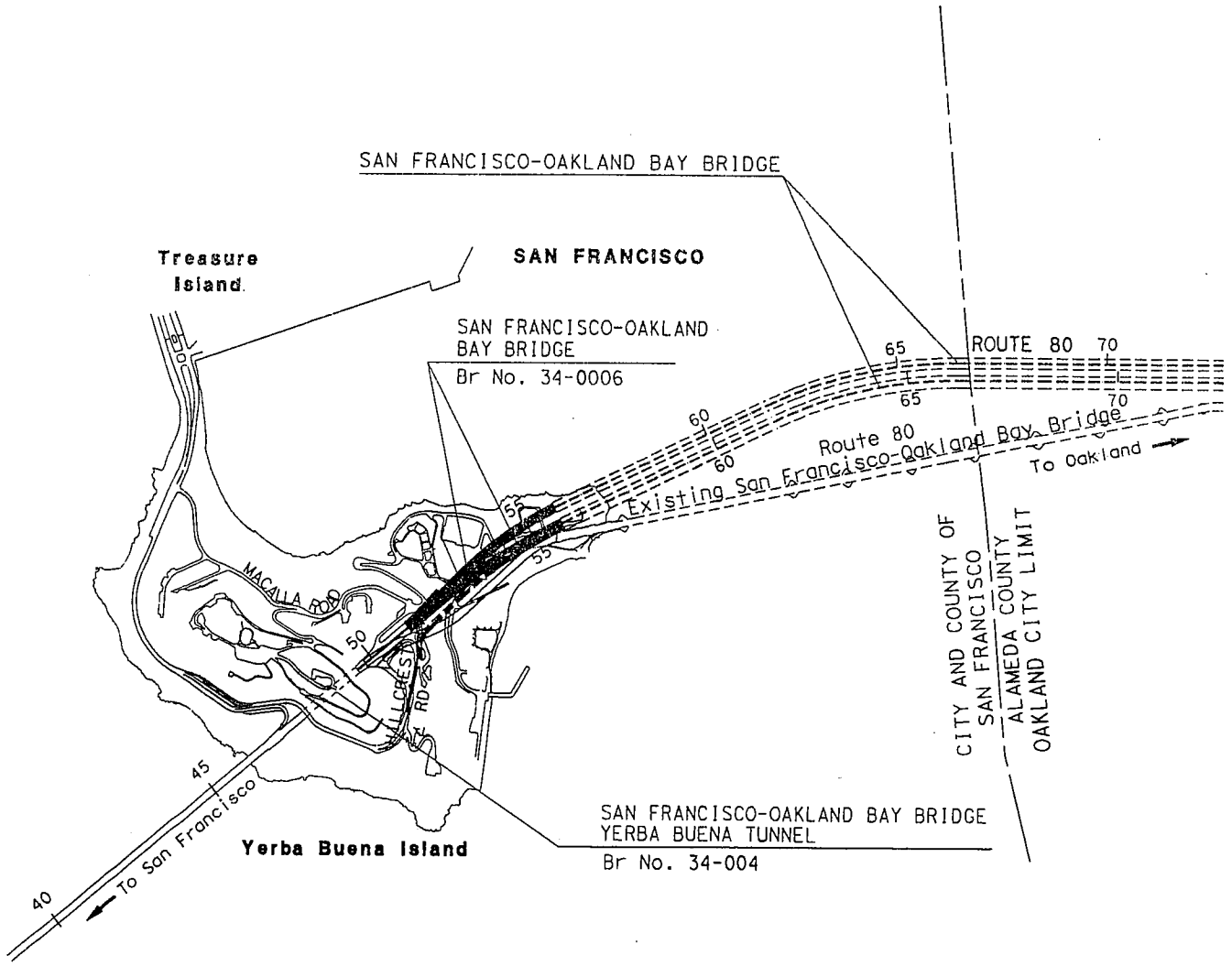
Attachment B – Mandatory Exception Location and Summary Sheet

Attachment C – Project Layout, Profile and Superelevation

Attachment D – Mandatory Design Exceptions Dated September 23, 1998

Attachment A

Project Location Map



ATTACHMENT A

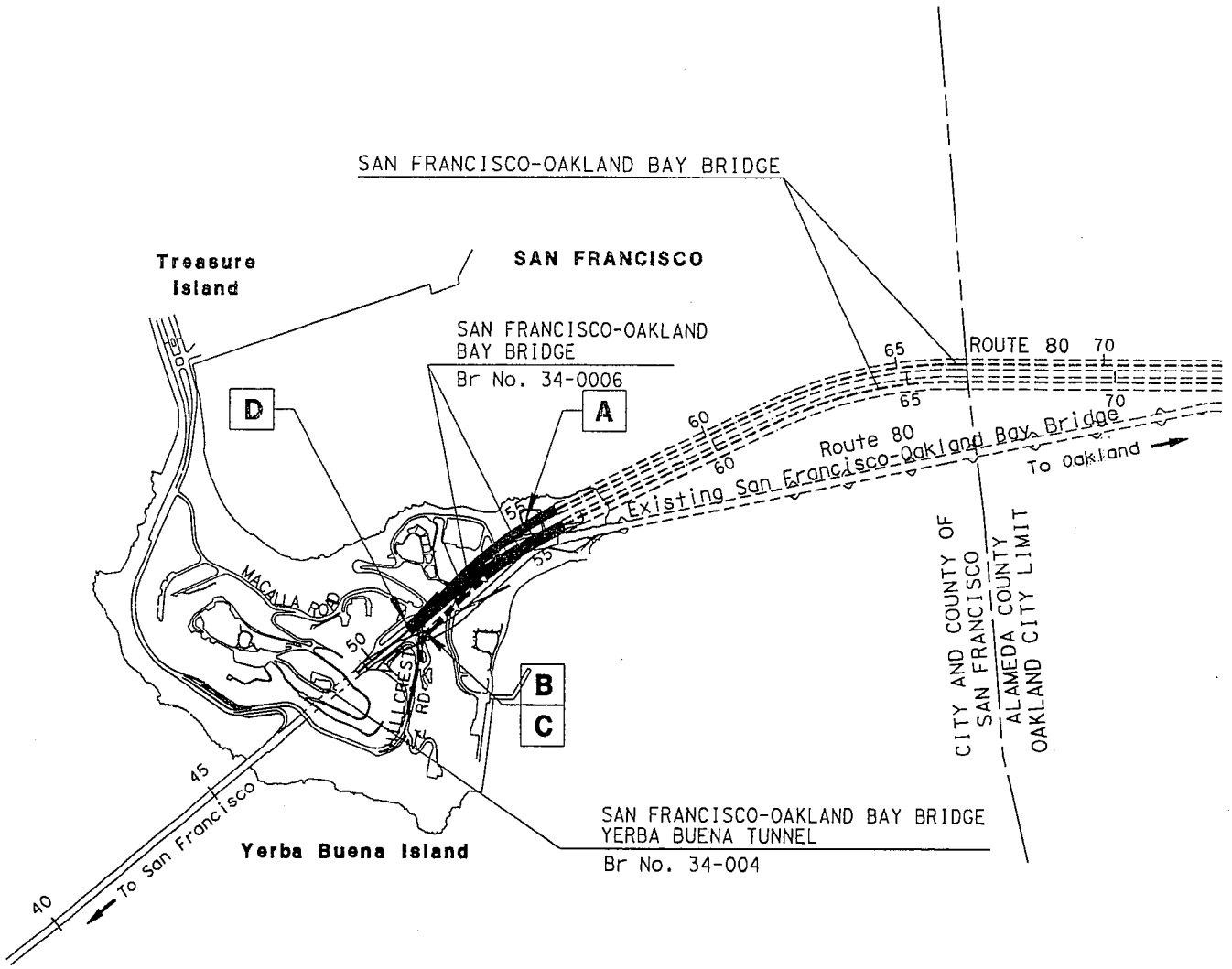
LOCATION MAP

SFOBB SEISMIC SAFETY PROJECT
YBI CONTRACT 1

Attachment B

Mandatory Exception Location and Summary Sheet

04-SF-80, KP 12.7 / KP 13.2
EA 0120S1
CU 04251



MANDATORY DESIGN EXCEPTION LOCATION IDENTIFICATION

SFOBB SEISMIC SAFETY PROJECT
YBI CONTRACT 1

SFOBB Seismic Safety Project - YBI Project 1

Mandatory Design Exception Table

Number	Location	Description	Station	Highway Design Manual (HDM)				Existing Condition	Nonstandard Feature	Estimated Cost (2007 Dollars)
				Section	Reference	Category	Requirement			
1	A	EB I-80, EB transistion structure	E - 54+27.150 to 55+80.000	302.1	Paved Shoulder Width	Table 302.1	3.0 m	0.3 m	Right Shoulder - 0.3 m	Cost to Make Standard: $150 million
2	B	Temporary EB 1-80 entrance ramp	T7 - 50+59.000 to 51+41.978	504.3	Ramp Widening for Trucks	Table 504.3A	5.6 m (R < 40 m)	5.0 m	3.6 m	Cost to Make Standard: $12 million
			T7 - 50+59.000 to 51+41.978	302.1	Paved Shoulder Width	Table 302.1	Left Shoulder - 1.2 m Right Shoulder - 2.4 m	0.0 m	0.0 m	
3	C	Temporary EB 1-80 entrance ramp	T7 - 50+59.000 to 51+41.978	202.2	Superelevation Rates	Table 202.2	e=+12% (R < 189 m)	2.00%	2.00%	Cost to Make Standard: $12 million
4	D	WB I-80, conform location of the new SFOBB and the existing YBI tunnel	W - 51+29.000 to 52+06.000	202.2	Superelevation Rates	Table 202.2	e=+3% (1065 > R > 1369 m)	0.50%	0.50%	Cost to Make Standard: $90 million

Attachment C

Project Layout, Profile and Superelevation

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
04	SF	80	12.7/13.2		

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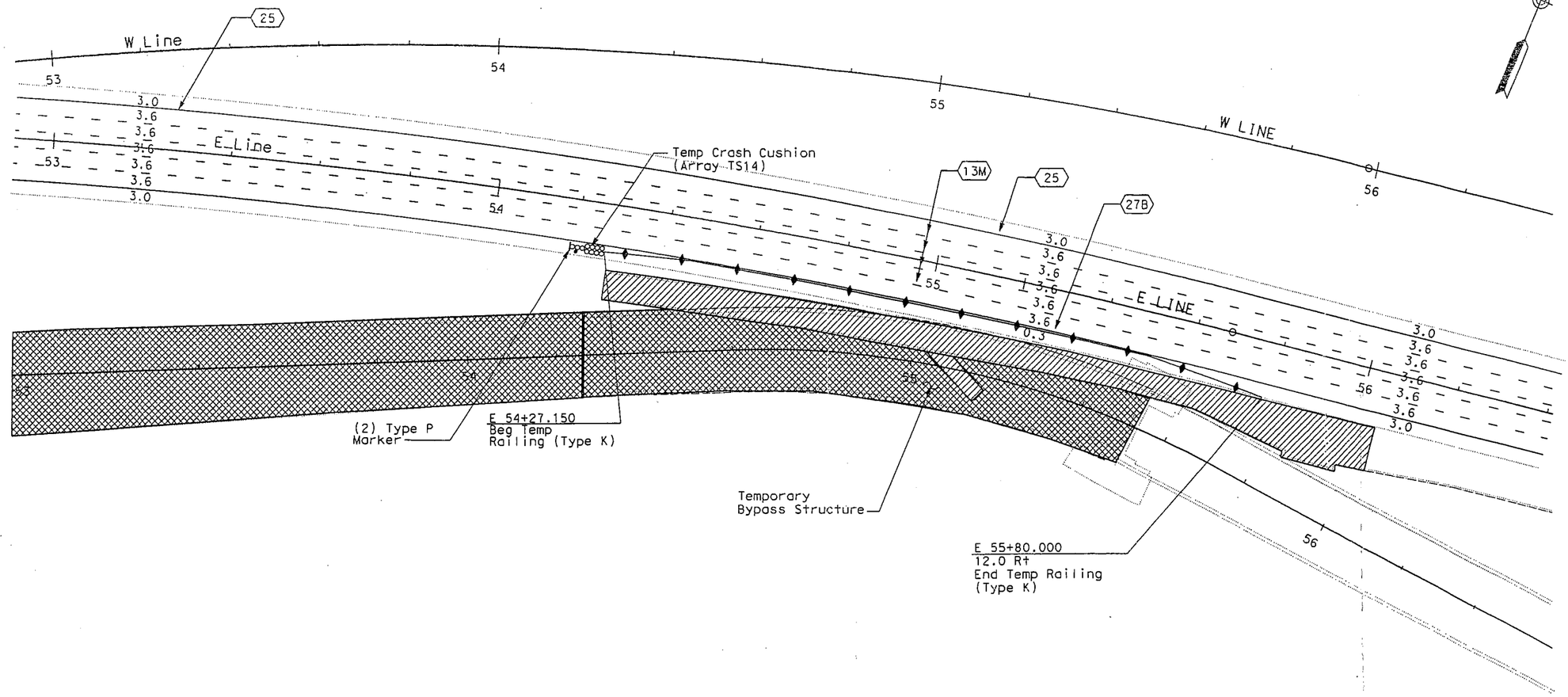

SFOBB EAST SPAN SEISMIC SAFETY PROJECT
YBI CONTRACT 1
DESIGN EXCEPTION FEATURE NO. 1

ATTACHMENT C1

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

DATE	REVISED BY	DATE REVISED

CALCULATED/ DESIGNED BY

CHECKED BY

PROJECT ENGINEER

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

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TIME PLOTTED => 14:47

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CU 04251

EA 0120S1

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
04	SF	80	12.7/13.2		

Caltrans Metric

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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

"T7" 50+93.127 EC

"T7" 50+84.910 EC

"T7" 50+59.989 BC

"T7" N 6°59'40.58" W
27.299

"T7" 51+09.877 PCC

51

51

3.60

T7 LINE

EB ON-RAMP

N 36°15'13.50" W
8.217

SOUTH-SOUTH DETOUR EB ON-RAMP

SOUTH-SOUTH DETOUR

ED1 LINE

EB ROUTE 80

TO OAKLAND

"T7" 51+42.663 EC

SFOBB EAST SPAN SEISMIC SAFETY PROJECT
YBI CONTRACT 1
DESIGN EXCEPTION FEATURE NO. 2

ATTACHMENT C2

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TIME PLOTTED => 10:48

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SU 04251

EA 0120S1

Dist	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
04	SF	80	12.7/13.2		

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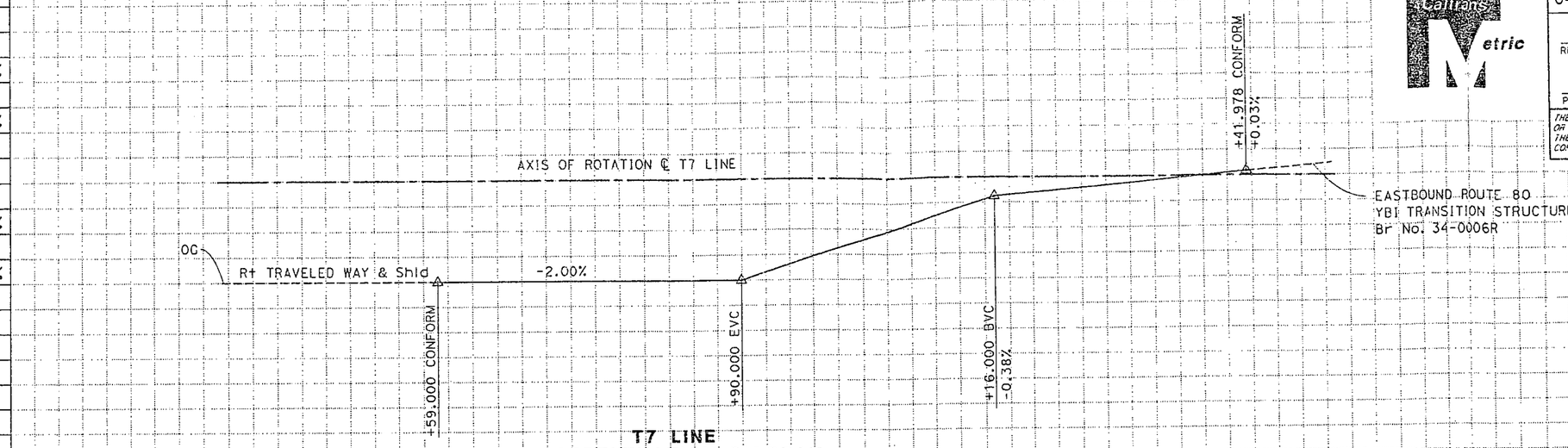
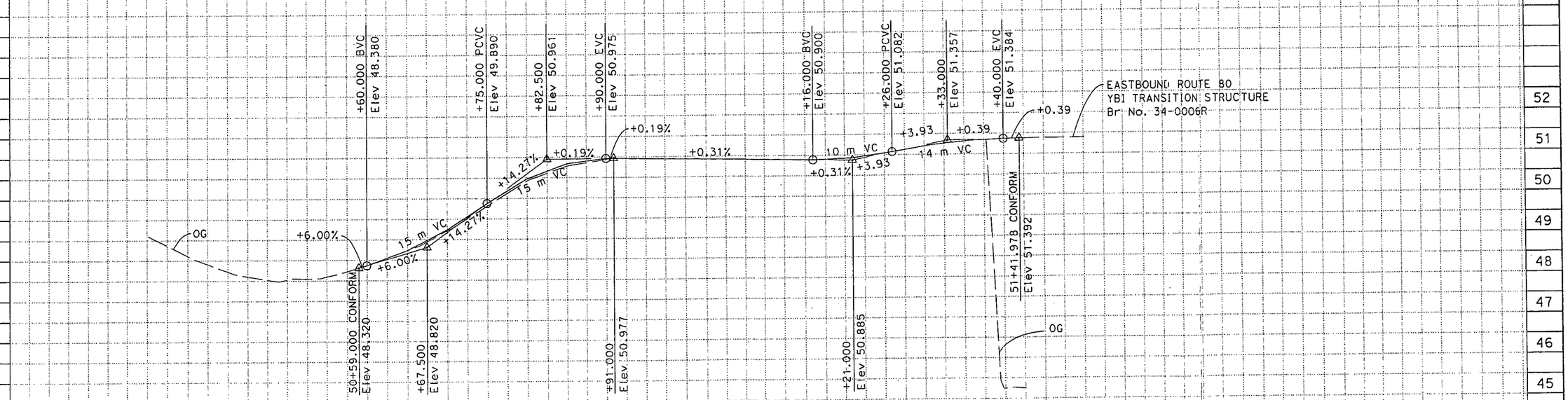


T7 LINE
SUPERELEVATION DIAGRAM



T7 LINE PROFILE

SCALE HORIZ 1:250
VERT 1:50

SFOBB EAST SPAN SEISMIC SAFETY PROJECT
YBI CONTRACT 1
DESIGN EXCEPTION FEATURE NO. 3
ATTACHMENT C3

Station	+30	+40	+60	+80	51+00	+20	+40
m³ Exc							
m³ Emb							

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN
FUNCTIONAL SUPERVISOR: BOB ZANDIPOUR
CALCULATED-DESIGNED BY: A
CHECKED BY: A
REVISED BY: A
DATE REVISED: A

LAST REVISION 11-14-07
DATE PLOTTED => 15-NOV-2007
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CU 04251
EA 0120S1

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
04	SF	80	12.7/13.2		

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PROJECT ENGINEER

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

SUPERELEVATION DIAGRAM

W 50+79.253 BC

W 51+73.562 EC

R 1070 m Lt

Rt TRAVELED WAY & Shld +0.50%

AXIS OF ROTATION ℄ W-LINE

+0.50%

-0.50%

Lt TRAVELED WAY & Shld -0.50%

W 51+28.280 BB
CONFORM

+06.000

SEE SHEET PS-2

52+80

+4% +2% 0% -2% -4%

W LINE PROFILE

W 51+28.280 BB
Elev 58.844
CONFORM

W 51+43.753 BVC
Elev 59.117

W PROFILE GRADE
YBI TRANSITION STRUCTURE
Br No. 34-0006L

+1.748% +1.100%

W 52+59.876
Elev 61.147

232.247 m VC

+1.760% +1.764%

OG

OG

E PROFILE GRADE
EASTBOUND SFOBB
Br No. 34-0006R

63 61 59 57 55 53 51 49

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

Station +40 +60 +80 50+00 +20 +40 +60 +80 51+00 +20 +40 +60 +80 52+00 +20 +40 +60 +80

m^3 Exc / Emb

SFOBB EAST SPAN SEISMIC SAFETY PROJECT
YBI CONTRACT 1
DESIGN EXCEPTION FEATURE NO. 4
ATTACHMENT C4

SCALE: HORIZ 1:500
VERT 1:100

LAST REVISION 11-14-07 | DATE PLOTTED => 15-NOV-2007 | TIME PLOTTED => 14:56

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DGN: MS_JEFF

Attachment D

Mandatory Design Exceptions Dated September 23, 1998

04-SF-80-KP 12.2/14.3
04-ALA-80 KP 0.0/2.1
RU 4251 - EA 012000
Project Cost $1.3 to $1.6 billion

Fact Sheet

EXCEPTION TO MANDATORY DESIGN STANDARDS

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Caltrans Metric

1. PROPOSED PROJECT AND NONSTANDARD FEATURES

A. Project Description

The State of California, Department of Transportation (Caltrans) proposes retrofitting or replacing the eastern span of the San Francisco/Oakland Bay Bridge (SFOBB) for seismic safety reasons. The design exceptions discussed in this fact sheet apply to the replacement alternatives only. For replacement Alternatives N2, N6 and S4, the span would be replaced from the Yerba Buena Island Tunnel east to the Oakland Shore, and the project will conform to existing conditions west of the Toll Plaza. The SFOBB currently serves approximately 274,000 vehicles per day. The SFOBB provides regional access between the San Francisco Peninsula and the East Bay. As a component of Interstate 80 (I-80), it is a critical link in the interstate network.

The San Francisco-Oakland Bay Bridge (SFOBB) East Span Seismic Safety Project provides a lifeline vehicular connection that:

- Connects Yerba Buena Island (YBI) in San Francisco and the SFOBB Toll Plaza in Oakland;
- Connects to a lifeline route linking the East Bay, San Francisco, and the San Francisco Peninsula;
- Maintains the current vehicular capacity of the existing East Span;
- Provides for safety of bridge users during a maximum credible earthquake (MCE); and
- Improves operational and safety design to meet current standards to the greatest extent possible.

See Attachments A and B for project information.

B. Non-Standard Features

The proposed eastbound entrance ramp from YBI for the replacement alternatives has non-standard superelevation rates on two of its horizontal curves. The 55-meter radius horizontal curve has a 6% superelevation rate; the standard rate is 12%. The comfortable design speed for the curve is therefore 40 kilometers per hour (km/hr). The 593-meter radius horizontal curve has a 2% superelevation rate; the standard rate is 6%. The comfortable design speed for the curve is therefore 102 km/hr. The mainline design speed for the project is 100 km/hr and the ramp terminal design speed is 40 km/hr. The proposed eastbound entrance ramp is an improvement over the existing configuration.

C. Mandatory Standard for Which Exception is Being Requested

HDM Index 202.2 states that "Based on an e_{max} selected by the designer for one of the conditions, superelevation rates from Table 202.2 shall be used within the given range of curve radii. If less than standard superelevation rates are approved (see Index 82.1), Figure 203.2 shall be used to determine superelevation based on the curve radius and comfortable design speed."

D. Existing Highway

The existing bridge has several nonstandard features: the lane widths, shoulder widths, horizontal curves, superelevation rates and decision sight distances are all below current standards. The proposed mainline alignment has been designed to meet current Caltrans standards to the greatest extent possible, and it significantly improves what currently exists. The mandatory design exception documented in this fact sheet is the only mandatory exception, whereas the current alignment has several nonstandard mandatory and advisory design features. The existing highway is not part of the FHWA 42,000km Priority Network.

E. Safety Improvements

The proposed alignment will improve safety by designing the mainline geometry to meet current Caltrans standards to the greatest extent possible, including standardizing the horizontal curves and installing standard-width shoulders and travel lanes.

F. Total Project Cost

Total cost for the project has been estimated to range between $1.3 and $1.6 billion.

2. REASON FOR REQUESTING EXCEPTION

The 6% superelevation rate for the 55-meter horizontal curve is proposed because the curve is of insufficient length to develop the standard 12% superelevation rate. As stated in HDM 504.3(3) on superelevation for ramps, "where the length of curve is too short to develop standard superelevation, the highest obtainable rate should be used."

The 2% superelevation rate for the 593-meter radius horizontal curve is proposed because this curve parallels the mainline structure, which has a standard 2% cross-slope. This curve was selected to approximate the convergence angle of a standard entrance ramp. It is equivalent to the 1000-meter radius horizontal curve of a standard entrance ramp on a tangent which generally follows the cross slope of the mainline. HDM Figure 504.2A, Note 8, states that "2% superelevation may be acceptable for the 1000 m radius curve on entrance ramps." The standard 6% superelevation rate for curves of this radius would require a grade break across the gore area of the ramp. See attachment C and D for a layout and superelevation diagram for the eastbound entrance ramp.

3. ADDED COST TO MAKE STANDARD

Providing the standard superelevation rate on the eastbound entrance ramp curves would cost approximately $1 million.

4. TRAFFIC DATA

The SFOBB currently serves approximately 274,000 vehicles per day. The westbound approaches to the SFOBB frequently operate at capacity during peak commuter periods and are also heavily traveled during off-peak periods. The SFOBB generally operates just at capacity due to the metering of vehicles on the bridge by the San Francisco ramp system and metering lights at the SFOBB Toll Plaza. Traffic flow on the SFOBB is vulnerable to congestion due to stalls, accidents, lane closures required for bridge maintenance, and the lack of shoulders for clearing stopped vehicles.

The freeway ramps to and from the SFOBB from YBI typically operate with no more than 200 vehicles during the peak hour. Despite low traffic volumes, the ramps operate at capacity due to severely restricted design limitations (e.g., restricted merge lanes). All of the local streets on YBI currently operate with low volumes of traffic.

In the future, peak-hour traffic demand for the approaches to the SFOBB are expected to increase. These increases will be due to increased demand for travel between the East and West Bay Area. However, traffic volumes on the bridge itself are expected to remain fairly constant due to the metering lights in the westbound direction at the Oakland Toll Plaza and the geometric meter in the eastbound direction in San Francisco. The geometric meter is a result of the three through lanes on eastbound I-80 and the two entrance ramps from downtown San Francisco merging at the beginning of the bridge.

5. ACCIDENT ANALYSIS

Table 1 shows the most recent traffic accident rates for eastbound traffic on I-80 from YBI to Oakland. The accident rate for eastbound I-80 is higher than that experienced on similar facilities around the State. This may be attributed to several factors: the absence of shoulders on I-80, the mix of entrance ramps entering from the right and exit ramps exiting to the right, and high traffic volumes on I-80.

Table 1 Accident Data

Source: Caltrans District 4

Location	Period	Total Accidents	Fatalities	Injuries	Actual Accident Rate[1]	Average Accident Rate[2]
I-80 Eastbound	01/01/95 to 12/31/97	549	2	160	1.46	1.03

[1] The Actual Accident Rate is the rate of accidents per million vehicles miles on the facility described
[2] The Average Accident Rate is the rate of accidents per million vehicles miles on similar facilities in the State.

A selective retrieval of accident data on eastbound I-80 in this area revealed a total of 61 accidents for the three-year period from January 1995 to December 1997. Of these accidents, 11.4% were at the ramp intersection.

The proposed project provides a standard entrance ramp while maintaining the existing exit ramp for the eastbound YBI ramps. The existing entrance ramp operates as an intersection where merging vehicles must wait for a gap in the mainline traffic. The proposed entrance ramp is expected to reduce the number of collisions associated with vehicles merging.

6. INCREMENTAL IMPROVEMENTS

The eastbound entrance from YBI will be constructed entirely on structure. There are no incremental improvements which could increase the superelevation rates on the ramp.

7. FUTURE CONSTRUCTION

The City of San Francisco is considering replacing the existing ramps that provide access to Yerba Buena and Treasure Islands as part of the redevelopment of these Islands. The conform of the proposed eastbound entrance ramp may be realigned at that time and standard superelevation provided. However, the merge configuration for the entrance ramp will remain as proposed and therefore cannot be made standard in the future.

8. PROJECT REVIEW AND CONCURRENCE

The proposed design exceptions were reviewed by John Roccanova, HQ Geometric Reviewer, on August 19, 1998 and he has concurred with the proposed design exceptions.

9. ATTACHMENTS

Attachment A - Location Map

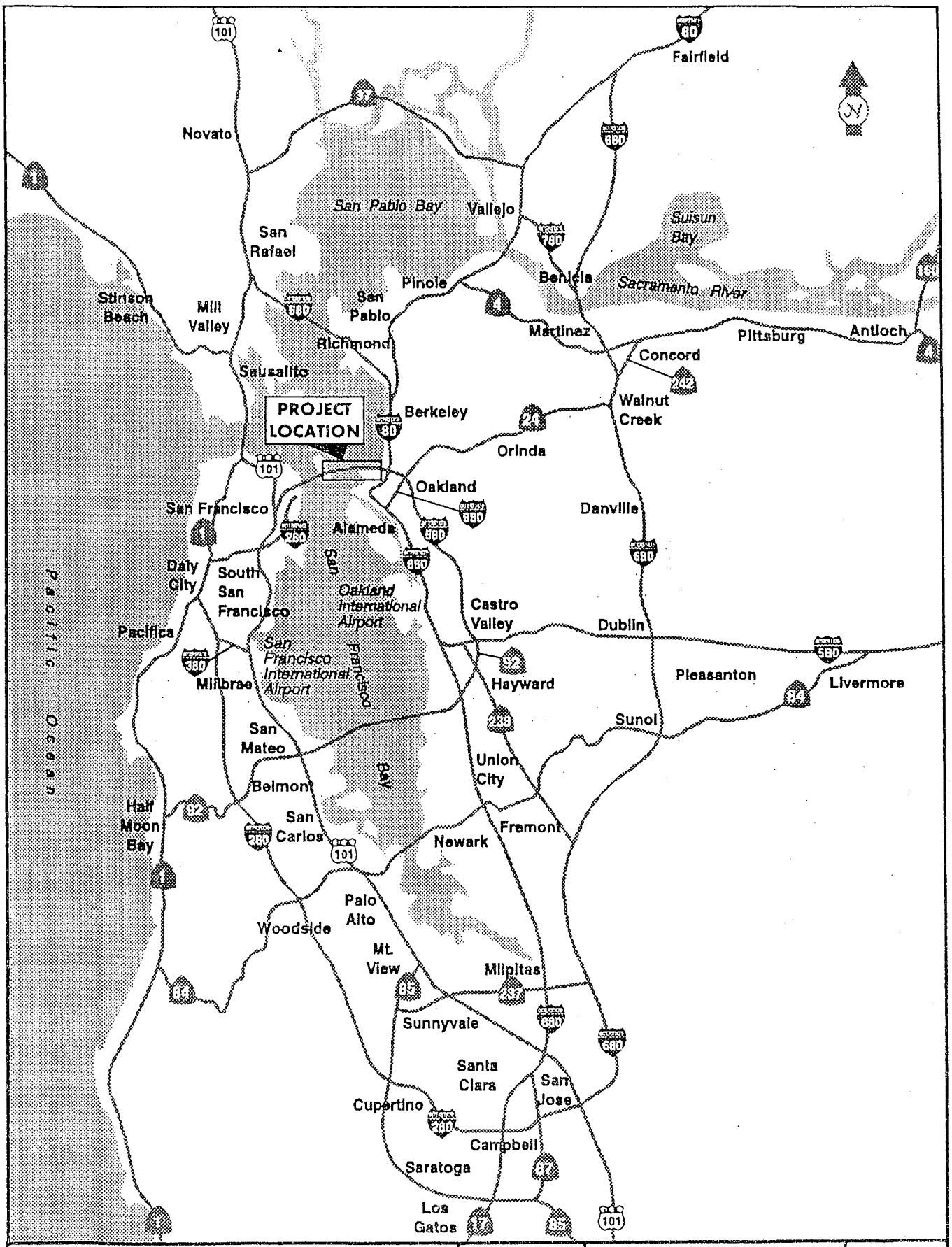
Attachment B - Project Area

Attachment C – Entrance Ramp Layout

Attachment D – Entrance Ramp Superelevation Diagram

Attachment A

Location Map



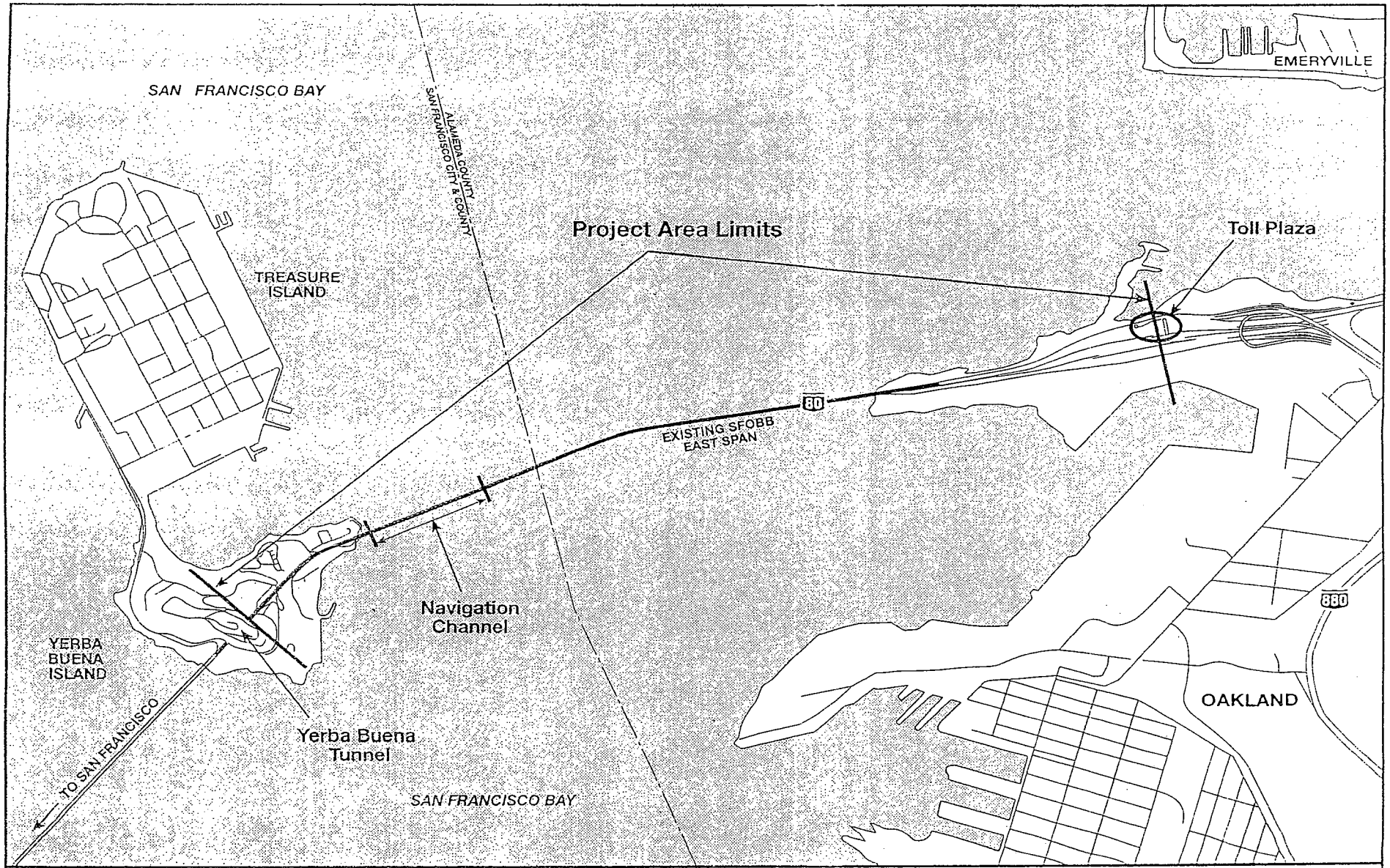
SFOBB EAST SPAN SEISMIC SAFETY PROJECT

GRAPHIC SCALE 0 10km

Project Location

Attachment B

Project Area



SFOBB
EAST SPAN
SEISMIC SAFETY
PROJECT

GRAPHIC SCALE 1:27,500

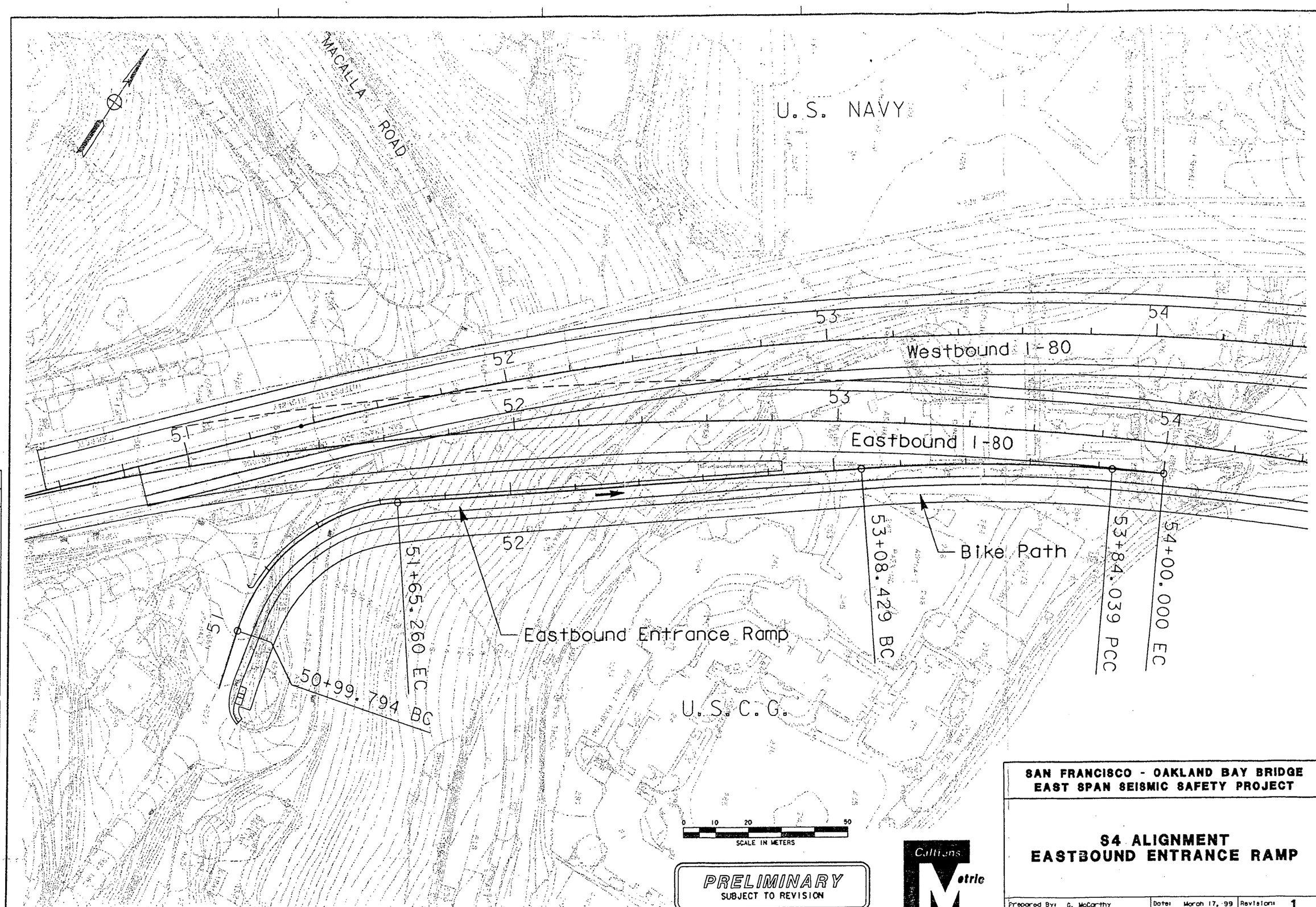
0 250 500 1000 m

Project Area Limits

PBQ&D F-2 8/16/98

Attachment C

Entrance Ramp Layout



PRELIMINARY
SUBJECT TO REVISION

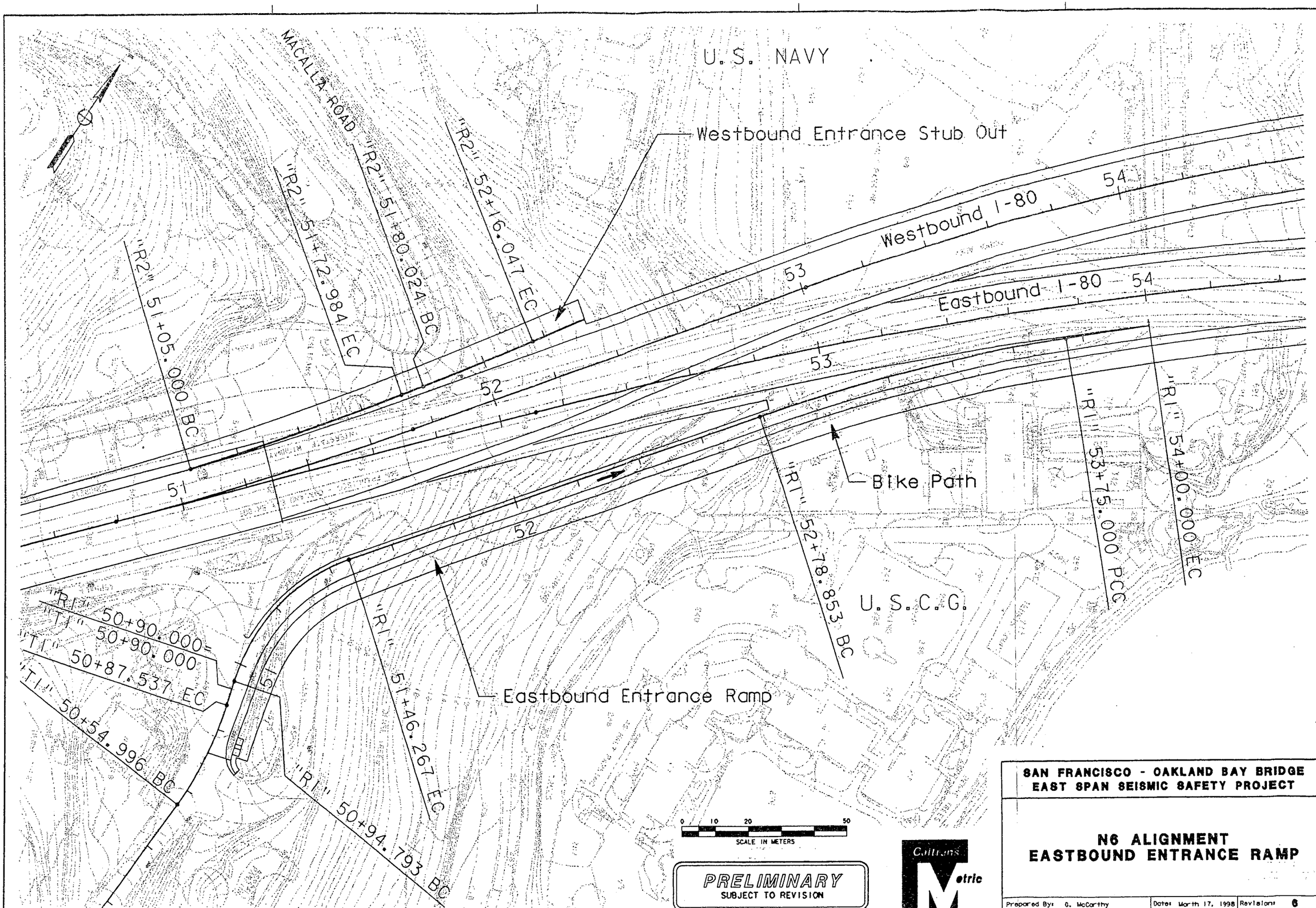
Caltrans Metric

SAN FRANCISCO - OAKLAND BAY BRIDGE
EAST SPAN SEISMIC SAFETY PROJECT

S4 ALIGNMENT
EASTBOUND ENTRANCE RAMP

Prepared By: G. McCarthy	Date: March 17, 99	Revision: 1

REV	CK	REVISIONS	DATE	REV	CK	REVISIONS	DATE



SAN FRANCISCO - OAKLAND BAY BRIDGE
EAST SPAN SEISMIC SAFETY PROJECT

N6 ALIGNMENT
EASTBOUND ENTRANCE RAMP

Prepared By: G. McCarthy | Date: March 17, 1998 | Revision: 6

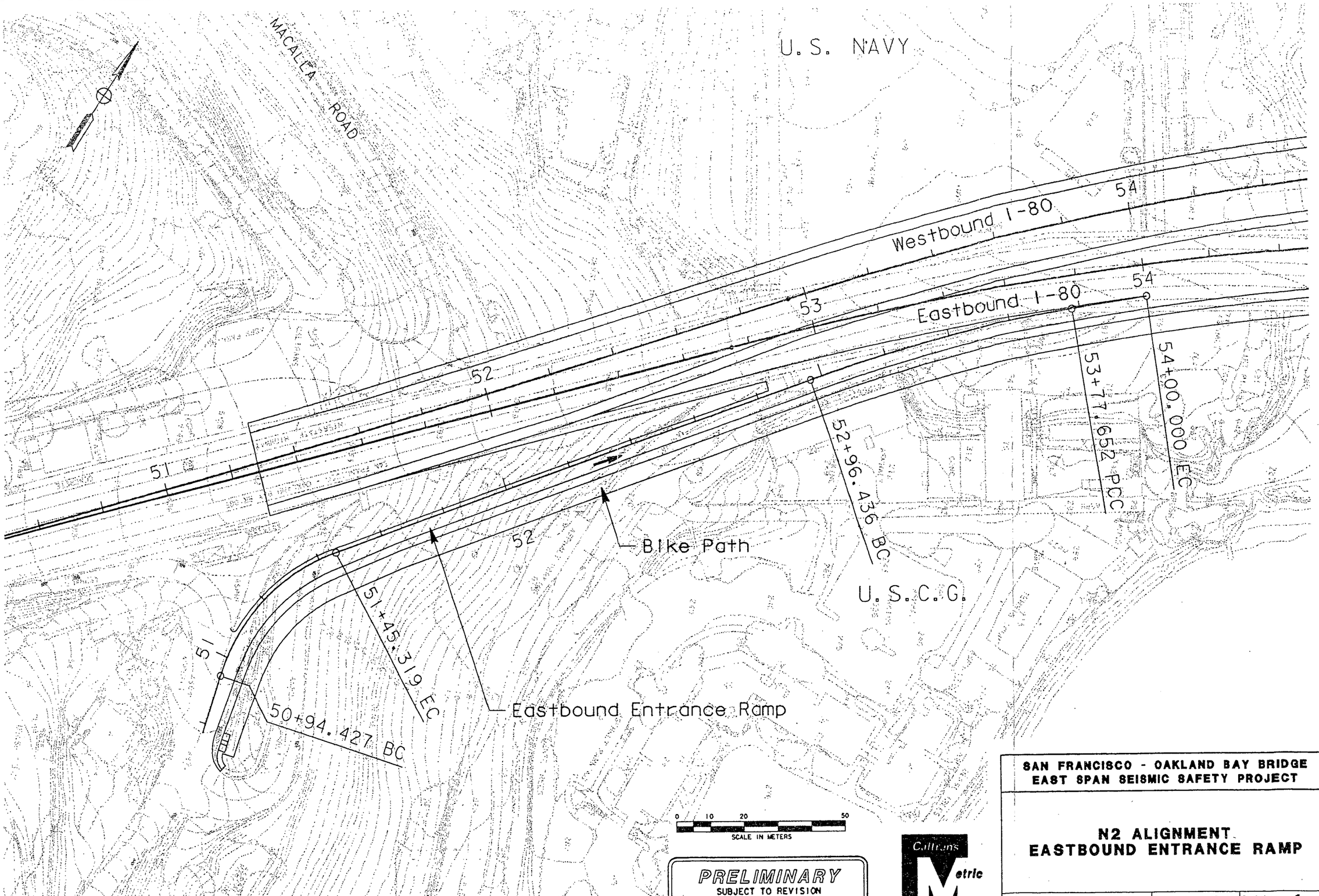
DATE PLOTTED => $DATE

REVISIONS | REV | CK | DATE

REVISIONS | REV | CK | DATE

Attachment D

Entrance Ramp Superelevation Diagram



PRELIMINARY
SUBJECT TO REVISION

Caltrans Metric

SAN FRANCISCO - OAKLAND BAY BRIDGE
EAST SPAN SEISMIC SAFETY PROJECT

N2 ALIGNMENT
EASTBOUND ENTRANCE RAMP

Prepared By: G. McCarthy	Date: March 17, 99	Revision: 1
Checked By: X	Date: X	Dwg No. M2E03

DATE PLOTTED => $DATE

REV	CK	REVISIONS	DATE

REV	CK	REVISIONS	DATE

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SF, Ala	80	12.2 / 14.3, 0.0 / 2.1	30	43

REGISTERED CIVIL ENGINEER DATE

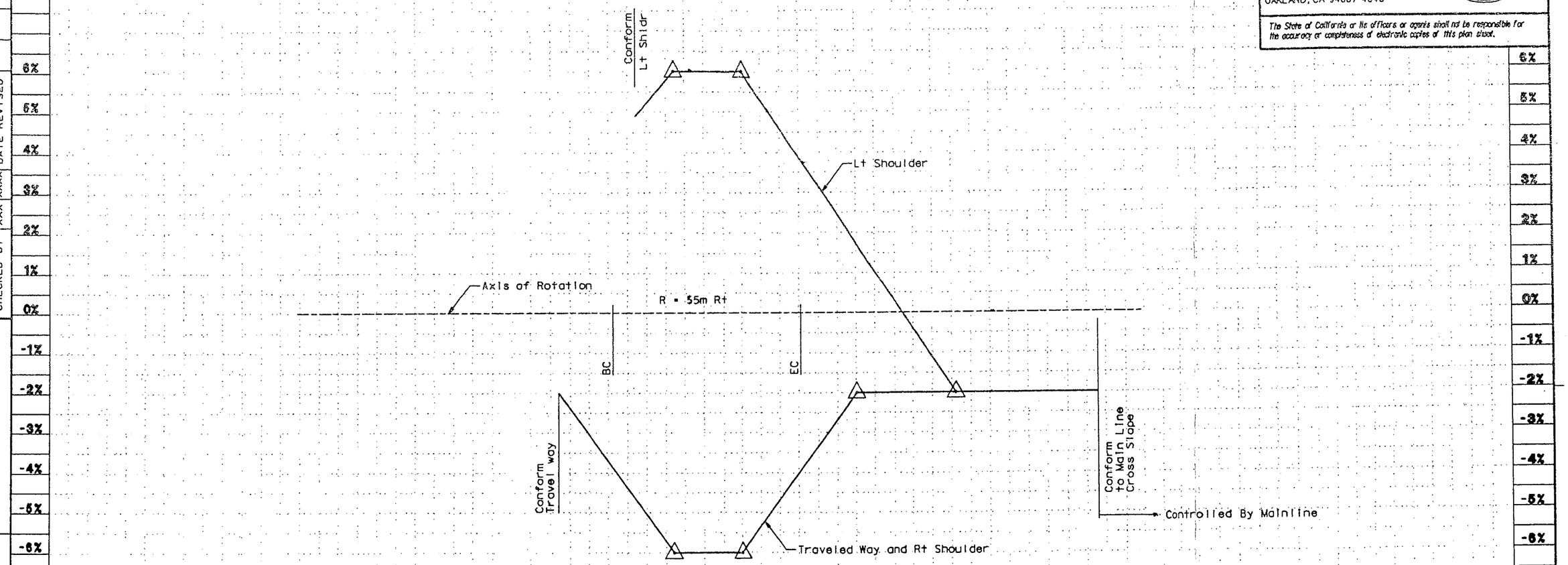
PLANS APPROVAL DATE

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.
1000 BROADWAY, SUITE 250
OAKLAND, CA 94607-4040

REGISTERED PROFESSIONAL ENGINEER No. Exp. STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

Metric



TYPICAL EASTBOUND ENTRANCE RAMP SUPERELEVATION DIAGRAM

SCALE: 1:1000 HORIZ

SUPERELEVATION DIAGRAM

ALL DIMENSIONS ARE IN METER UNLESS OTHERWISE SHOWN

SCALE AS SHOWN

SE-X

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

DESIGN OVERSIGHT XXXXXXXXXXXXX

CALCULATED/DESIGNED BY XXX DATE XXXX REVISED BY

CHECKED BY XXX DATE XXXX DATE REVISED

Station

Cu.

Yds. Exp. Emb.

LAST REVISION