425 S. Palos Verdes Street

Post Office Box 151

San Pedro, CA 90733-0151

Tel/TDD 310 SEA-PORT

www.portoflosangeles.org

July 26, 2006

Honorable Members of the
City Council of the
City of Los Angeles **CD No. 15**

SUBJECT: EAST 74TH STREET BRIDGE OVER THE ALAMEDA CORRIDOR – EASEMENT DEED AND AGREEMENT BETWEEN THE PORTS OF LOS ANGELES AND LONG BEACH, THE ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY, AND THE COUNTY OF LOS ANGELES

Pursuant to Section 385 of the City Charter and related implementing provisions of the Los Angeles Administrative Code, enclosed for passage by your Honorable Body is an Ordinance, approved as to form by the City Attorney, approving Order No. 6873, which was adopted by the Board of Harbor Commissioners at its meeting held Wednesday, May 17, 2006.

RECOMMENDATION:

The City Council adopt the Ordinance approving Order No. 6873 which approves and authorizes the execution of proposed Easement Deed and Agreement (East 74th Street Bridge) (assigned Harbor Agreement No. 2481), by and among the City of Los Angeles acting by and through its Board of Harbor Commissioners, the City of Long Beach acting by and through its Board of Harbor Commissioners, the Alameda Corridor Transportation Authority (ACTA), and the County of Los Angeles (County) therein granting necessary easement rights to the County for public road and highway purposes to construct a new bridge and a new traffic signal over and across the Alameda Corridor at East 74th Street and Alameda Street to provide access to the Florence and Alameda Commercial Center.

ENVIRONMENTAL REVIEW:

The proposed activities were assessed in the Florence and Alameda Commercial Center Project Environmental Impact Report (SCH No. 2004021095), which was approved by the Los Angeles County Board of Supervisors on July 5, 2005. The Director of Environmental Management has determined that the proposed activity has been previously evaluated pursuant to the California Environmental Quality Act (CEQA) in accordance with Article II, Section 2(i) of the Los Angeles City CEQA Guidelines.

FINANCIAL IMPACT:

The proposed Easement Deed and Agreement will have no financial impact upon the Harbor Department. The County has also agreed to indemnify, defend, and hold harmless the Harbor Department from and against any and all liability.

Respectfully submitted,

Rose M. Dwarshak

AUDREY H. YAMAKI
for Commission Secretary

cc: Trade, Commerce, & Tourism Committee
Councilwoman Hahn, encs.
Councilman Rosendahl, encs.
Councilman Weiss, encs.
Maria Espinoza, City Clerk's office, encs.

RECOMMENDATION APPROVED;
AND ORDER NO. 6873 ADOPTED;
BY THE BOARD OF HARBOR COMMISSIONERS

May 17, 2006

Audrey H. Yamaki

SECRETARY

Executive Director's
Report to the
Board of Harbor Commissioners

DATE: May 2, 2006

SUBJECT: EAST 74TH STREET BRIDGE OVER THE ALAMEDA CORRIDOR – EASEMENT DEED AND AGREEMENT BETWEEN THE PORTS OF LOS ANGELES AND LONG BEACH, THE ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY, AND THE COUNTY OF LOS ANGELES

SUMMARY:

The County of Los Angeles is proposing to construct a new bridge at East 74th Street over the Alameda Corridor in an unincorporated area of the County, south of Huntington Park. The bridge is required to provide vehicular and pedestrian access to a new commercial development located southeast of Florence Avenue and Alameda Street. As a joint owner of the Alameda Corridor, the Port must execute an easement deed and agreement to enable the County to proceed with the bridge project. All costs connected to the planning, design, construction and maintenance of the bridge will be borne by the County. There will be no fee charged to the County for the proposed easement.

RECOMMENDATIONS:

It is recommended that the Board of Harbor Commissioners:

1. Adopt the Order and Ordinance approving and authorizing the execution of the proposed Easement Deed and Agreement by and between the City of Los Angeles acting by and through its Board of Harbor Commissioners, the City of Long Beach acting by and through its Board of Harbor Commissioners, the Alameda Corridor Transportation Authority (ACTA), and the County of Los Angeles (County) therein granting necessary easement rights to the County for public road and highway purposes to construct a new bridge and a new traffic signal over and across the Alameda Corridor at East 74th Street and Alameda Street to provide access to the Florence and Alameda Commercial Center;

2. Authorize and direct the Board Secretary to transmit the Order and Ordinance to the City Council for its approval pursuant to Section 385 of the City Charter; and

3. Authorize Board Secretary to execute the proposed Order upon approval of the City Council.

DISCUSSION:

1. ACTA is a joint powers authority created by the Ports of Los Angeles (POLA) and Long Beach (POLB) pursuant to California Government Code Sections 6500 *et seq.* for the purpose of constructing, operating, and maintaining the rail infrastructure project commonly known as the Alameda Corridor. In furtherance of the construction of the Alameda Corridor, the two ports acquired title to certain real property over, on and under which the Alameda Corridor has been constructed.

SUBJECT: EAST 74TH STREET BRIDGE OVER THE ALAMEDA CORRIDOR - EASEMENT DEED AND AGREEMENT BETWEEN THE PORTS OF LOS ANGELES AND LONG BEACH, THE ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY, AND THE COUNTY OF LOS ANGELES

2. The County desires to construct a bridge across and over the Alameda Corridor at East 74th Street and Alameda Street to provide vehicular and pedestrian access to a new commercial development known as the Florence and Alameda Commercial Center. The project also calls for installation of a traffic signal. It is expected that the new 74th Street Bridge would facilitate access to the commercial center and in effect benefit the community by improving traffic circulation in the surrounding area.

3. As set forth in the proposed easement deed, POLA, POLB and ACTA are willing to grant necessary easement rights to the County at no cost for public road and highway purposes to construct the 74th Street Bridge across and over a portion of the Alameda Corridor.

4. Pursuant to terms of the proposed agreement, the County will perform the necessary planning, engineering, and construction work associated with the project subject to ACTA review. It is noteworthy that all costs connected to the construction of the 74th Street Bridge will be borne by the County. In addition, the County will assume maintenance, repair, and replacement responsibilities and have non-exclusive easement rights over designated portions of the bridge.

ENVIRONMENTAL ASSESSMENT:

The proposed activities were assessed in the Florence and Alameda Commercial Center Project Environmental Impact Report (SCH No. 2004021095), which was approved by the Los Angeles County Board of Supervisors on July 5, 2005. The Director of Environmental Management has determined that the proposed activity has been previously evaluated pursuant to the California Environmental Quality Act (CEQA) in accordance with Article II, Section 2(i) of the Los Angeles City CEQA Guidelines.

FINANCIAL IMPACT:

The proposed Easement Deed and Agreement will have no financial impact upon the Harbor Department. The County has also agreed to indemnify, defend, and hold harmless the Harbor Department from and against any and all liability.

CITY ATTORNEY:

All of the proposed instruments have been approved as to form by the Office of the City Attorney. The Order and Ordinance were prepared and also approved as to form by the Office of the City Attorney.

SUBJECT: **EAST 74TH STREET BRIDGE OVER THE ALAMEDA CORRIDOR – EASEMENT DEED AND AGREEMENT BETWEEN THE PORTS OF LOS ANGELES AND LONG BEACH, THE ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY, AND THE COUNTY OF LOS ANGELES**

TRANSMITTALS:

1. Order and Ordinance approving and authorizing the execution of the proposed Easement Deed and Agreement by and between the City of Los Angeles acting by and through its Board of Harbor Commissioners, the City of Long Beach acting by and through its Board of Harbor Commissioners, the Alameda Corridor Transportation Authority, and the County of Los Angeles regarding the East 74th Street Bridge.

2. Easement Deed and Agreement concerning the East 74th Street Bridge.

PHILIP A. TONDREAULT
Director of
Real Estate Division

APPROVED:

mcc GERALDINE KNATZ, Ph.D.
Executive Director

PAT:MG:CCW:MLK
ADP #060419-060
BL156raw

RECEIVED
OFFICE OF
SECRETARY
06 MAY 11 PM 1:44
CITY OF LOS ANGELES
BOARD OF HARBOR
COMMISSIONERS

ORDER NO. 6873

IT IS HEREBY ORDERED by the Board of Harbor Commissioners that this Easement Deed and Agreement, by and among the CITY OF LOS ANGELES, the CITY OF LONG BEACH, Alameda Corridor Transportation Authority (ACTA), and the COUNTY OF LOS ANGELES, is hereby approved and the Executive Director and the Secretary of the Board are hereby authorized and directed to execute and attest to the Easement Deed and Agreement on behalf of the City of Los Angeles.

The Secretary shall certify to the adoption of this Order by the Board of Harbor Commissioners of the City of Los Angeles and shall cause a copy of the Order and the proposed Ordinance to be submitted to the City Council for adoption of the Ordinance pursuant to City Charter Section 385 and related implementing provisions of the Los Angeles Administrative Code.

I HEREBY CERTIFY that the foregoing Order was adopted by the Board of Harbor Commissioners of the City of Los Angeles at its Meeting of MAY 17 2006.

Audrey H. Yamaki
AUDREY YAMAKI, Board Secretary

APPROVED AS TO FORM

5-2, 2006
ROCKARD J. DELGADILLO, City Attorney

By Thomas J. Griego
THOMAS J. GRIEGO, Deputy City Attorney

TG:po
4/28/06

ORDINANCE NO._____

An Ordinance approving an Order of the Board of Harbor Commissioners for an Easement Deed and Agreement - by and among the City of Los Angeles, the City of Long Beach, the Alameda Corridor Transportation Authority (ACTA), and the County of Los Angeles.

THE PEOPLE OF THE CITY OF LOS ANGELES
DO ORDAIN AS FOLLOWS:

Section 1. The action of the Board of Harbor Commissioners of the City of Los Angeles on the 17th day of May 2006, approving the Easement Deed and Agreement, by and among the City of Los Angeles, the City of Long Beach, ACTA, and the County of Los Angeles is hereby ratified, confirmed, and approved. The approved Order reads:

ORDER NO. 6873

IT IS HEREBY ORDERED by the Board of Harbor Commissioners that the Easement Deed, by and among the CITY OF LOS ANGELES, the CITY OF LONG BEACH, ACTA, and the COUNTY OF LOS ANGELES is hereby approved and the Executive Director and the Secretary of the Board are hereby authorized and directed to execute and attest to the Easement Deed and Agreement on behalf of the City of Los Angeles.

The Secretary shall certify to the adoption of this Order by the Board of Harbor Commissioners of the City of Los Angeles and shall cause a copy of the Order and the proposed Ordinance to be submitted to the City Council for adoption of the Ordinance pursuant to City Charter Section 385 and related implementing provisions of the Los Angeles Administrative Code.

I HEREBY CERTIFY that the foregoing Order was adopted by the Board of Harbor Commissioners of the City of Los Angeles at its Meeting of May 17, 2006

Audrey H. Yamaki
AUDREY YAMAKI, Board Secretary

Sec. 2. Pursuant to Los Angeles Administrative Code Sections 7.21 and 7.27, the Council finds and determines that the public interest requires that the property owned by the City of Los Angeles and the City of Long Beach as tenants-in-common be conveyed as an Easement Deed and Agreement without notice of sale or advertisement for bids.

Sec. 3. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall; one copy on the bulletin board located at the Main Street entrance to the Los Angeles City Hall East; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this Ordinance was passed by the Council of the City of Los Angeles, at its meeting of _____.

FRANK T. MARTINEZ, City Clerk

By _____
Deputy

Approved _____

_____
ANTONIO R. VILLARAIGOSA, MAYOR

Approved as to Form and Legality

_____
ROCKARD J. DELGADILLO, City Attorney

By Thomas J. Griego
THOMAS J. GRIEGO,
Deputy City Attorney

Date 5.2.06

File No. _____

TJG:pko
4/28/06

RECORDING REQUESTED BY
AND WHEN RECORDED RETURN TO:

Alameda Corridor Transportation Authority
One Civic Plaza, Suite 350
Carson, CA 90745
Attention: Janine Garrison

SPACE ABOVE THIS LINE FOR RECORDER'S USE

This instrument is exempt from Recording Fees (Govt. Code § 27383)
and from Documentary Transfer Tax (Rev. & Tax. Code § 11922)

HARBOR DEPARTMENT
AGREEMENT 2481
CITY OF LOS ANGELES

EASEMENT DEED AND AGREEMENT

("East 74th Street Bridge")

This Easement Deed and Agreement ("Deed") is dated February __, 2006, among the Alameda Corridor Transportation Authority, a joint powers authority created under the laws of the State of California ("ACTA"), the City of Los Angeles acting by and through its Board of Harbor Commissioners, a municipal corporation ("POLA"), the City of Long Beach acting by and through its Board of Harbor Commissioners, a municipal corporation ("POLB"), and the County of Los Angeles, a political subdivision of the State of California ("COUNTY") and is with reference to the following:

RECITALS:

A. A new commercial development known as "Florence and Alameda Commercial Center" is proposed for construction in the unincorporated territory of the COUNTY southeast of the intersection of Alameda Street and Florence Avenue;

B. ACTA constructed and oversees a high speed freight railroad corridor (the "Alameda Corridor") between the Ports of Los Angeles and Long Beach and the continental rail network near downtown Los Angeles, and the Alameda Corridor is in a below grade trench in

the vicinity of the "Florence and Alameda Commercial Center." A vehicular bridge over and across the Alameda Corridor would facilitate vehicular traffic to the "Florence and Alameda Commercial Center" and would thereby improve traffic circulation in the surrounding area;

C. ACTA is a joint powers authority created by the City of Los Angeles and the City of Long Beach pursuant to California Government Code Sections 6500 *et seq.* for the purpose of constructing, operating and maintaining the rail infrastructure project commonly known as the Alameda Corridor in Los Angeles County, California;

D. In furtherance of the construction of the Alameda Corridor, POLA and POLB jointly acquired title to certain real property over, on and under which the rail network has been constructed;

E. Pursuant to that certain Use Permit dated as of October 12, 1998, POLA and POLB authorized ACTA, in its own name, to construct and operate the Alameda Corridor. In furtherance thereof and pursuant to ACTA's joint power authority, ACTA may also acquire, in its own name, title to certain real property over, on and under which the Alameda Corridor has been constructed and additional land in the vicinity of the Alameda Corridor;

F. COUNTY desires to construct such new bridge and a new traffic signal across the Alameda Corridor at East 74th Street and Alameda Street to provide access to the "Florence and Alameda Commercial Center", said new bridge and traffic signal hereinafter referred to as the Project;

G. The Project will be constructed in the area described in Exhibit A attached hereto ("Property"); the Property is depicted on Attachment A-1 attached hereto;

H. COUNTY is willing to perform the planning, detailed engineering, including preparation of plans, specifications, cost estimates, and material testing; advertise a contract for construction bids; award the construction contract, cause the work under the construction contract to be performed and perform construction contract administration, inspection, field engineering, coordination and survey for Project;

I. POLA, POLB and ACTA are desirous of assisting COUNTY in its Project since it will benefit the community by improving traffic circulation in the surrounding area;

J. POLA, POLB and ACTA are willing to grant necessary easement rights to the COUNTY pursuant to this Deed for public road and highway purposes to construct said Project on and over a portion of the Alameda Corridor and the COUNTY will assume maintenance, repair and replacement responsibilities and have non-exclusive easement rights over designated portions of the Project upon the terms and conditions for such construction, maintenance and ownership of the Project as herein provided;

K. COUNTY is willing to pay all costs and expenses for the planning, design, construction, repair, maintenance and replacement of said Project and to advance funds and otherwise pay to ACTA for all of ACTA's design and construction reviews, construction oversight, railroad flagging protection and biennial structural integrity reviews of Project over the Alameda Corridor as provided by this Agreement, it being expressly acknowledged by ACTA and COUNTY that COUNTY is obligated to advance all funds and/or reimburse to ACTA as provided herein;

L. Exhibit B attached hereto ("Depiction") is a cross-section of the Alameda Corridor reflecting the following; the terms set forth below are hereby defined terms for the purposes of this Deed:

- "Trench Walls"
- "Bridge Abutment and Footings"
- "Roadway Surface"
- "Barrier Wall"
- "Sidewalk"
- "Fence"
- "Bridge Structure"
- "Air Space Above the Surface"
- "Surface Improvements"

M. Attachment A-1 to Exhibit A attached hereto depicts the "Property";

N. Attachment E-1 to Exhibit E attached hereto depicts the "Form and Concrete Access Areas"; and

O. Exhibit D attached hereto depicts the "Landscape Area."

AGREEMENT

NOW, THEREFORE, in consideration of the mutual benefits to be derived by the parties hereunder and the promises herein contained, it is hereby agreed as follows:

ARTICLE A
EASEMENT DEED TO THE COUNTY

1. Subject to and excepting the matters set forth in Article A, Section 3 below, ACTA, POLA and POLB hereby grant to the COUNTY, to the extent of their respective interests therein, non-exclusive easements (the **"COUNTY Easements"**) for all of the following: (i) over, under and above the Property for the purpose of constructing the Project; (ii) over, under and above the real property described in Exhibit E attached hereto ("Form and Concrete Access Area") for the purposes of access in order to construct the improvements within the Property; (iii) on, over and above those Roadway Surfaces located on the Property and within six (6) inches below such Roadway Surfaces together with any traffic loops located therein for the purpose of maintaining, repairing and replacing such roadway improvements and for public road and highway purposes; (iv) on, over and above the Bridge Structure on the Property for the purpose of maintaining and repairing the "Barrier Walls," the "Fences," "Traffic Lights," surface and roadway lighting, drainage systems and crash protection system (collectively, the "Surface Improvements"); and (v) over, under and above the "Landscaping Area," as more particularly depicted in Exhibit D attached hereto for planting and maintaining landscaping improvements. The easements set forth in Article A, Section 1 (i) and Article A, Section 1 (ii) are temporary in nature and shall automatically terminate and be extinguished at the time the Project has been completed and all construction-related materials not integral to the final as-completed Project shall have been removed by the COUNTY. The COUNTY will use its best efforts to exercise its rights under this Deed in a manner that minimizes interference with ACTA's operations.

2. The grants provided for in this Article A, Section 1 are accepted concurrently with recording of this Deed and by the COUNTY executing and recording the Certificate of Acceptance attached hereto.

3. The following rights and interests shall be excepted or reserved by ACTA, POLA and POLB from the grant provided for in Article A, Section 1 herein:

(a) The portion of the Property below the Bridge Structure subject to railroad improvements or utilized for railway traffic and all rights in and to the Property not specifically granted by this Deed;

(b) The right of vehicular and pedestrian ingress and egress through the COUNTY Easement areas for the purposes of accessing, inspecting, maintaining, repairing, replacing, constructing or improving any portion of the Alameda Corridor or any rail corridor-related facilities;

(c) The right of entry on, under and through the COUNTY Easements to excavate portions of the COUNTY Easement areas in order to repair, reconstruct or improve portions of the Alameda Corridor, equipment or fixtures located therein or any rail corridor-related facilities; and

(d) The right of entry on, under and through any COUNTY Easements for the purpose of repairing or replacing any Bridge Structure improvements.

ARTICLE B
COUNTY AGREEMENT

COUNTY, at its sole cost and expense, agrees:

1. To perform the complete detailed engineering for Project, including preparation of plans, specifications, cost estimates, coordination, and material testing. Said design shall comply with the existing ACTA Design Criteria as attached in Exhibit C and incorporated into this Agreement, including but not limited to the integrity of the combined structural systems under the postulated "one strut removal" condition facilitated by the transverse shear transfer at the trench wall cap beam expansion joints. The Project shall not impose any additional loads or displacements onto the existing Alameda Corridor trench structure, and the structural integrity of the existing trench walls shall be maintained at all times during construction operations. A temporary service platform shall be installed between the bridge construction activities and the

operating rail system to preclude any objects falling onto the tracks or moving trains. Minimum rail clearances as determined or directed and approved in writing by ACTA for safe railroad operations shall be maintained below or adjacent to temporary shoring or falsework.

2. To obtain ACTA's written approval of final plans and specifications for Project ("Final Plans & Specs") prior to the start of any construction within the Property. In the event that ACTA requests any deviations, revisions, changes or other alterations of any such Final Plans & Specs, COUNTY shall so conform to and comply with ACTA's request at COUNTY's sole cost and expense. Such plans shall include but not be limited to the following: sequencing of the work, including staging of construction work, equipment locations, temporary support shoring or temporary bracing plans, locations where work is to be performed impacting railroad traffic, and utilities, details, locations and types of protective covering to be used, measures to assure that people, properties, utilities and improvements will not be endangered, arrangements to assure the appropriate level of security during the course of construction, and detail and measures for preventing material, equipment and debris from falling into the trench. COUNTY understands and acknowledges that ACTA may solicit comments, input and information from the railroads using the Alameda Corridor in connection with ACTA's review and approval of any matter under this Deed.

3. To restore the Property at completion of Project to conditions pre-existing prior to implementation of the Project, including but not limited to landscaping and landscaping irrigation.

4. To obtain any and all required regulatory and construction permits for Project from agencies having jurisdiction over said Project, including but not limited to any required environmental reviews, CPUC permit, authorizations and any other permits.

5. To pursue any and all community support for Project, as deemed necessary or desirable by COUNTY.

6. To issue notices to public utility organizations and owners of overhead, surface and subsurface utility facilities when the relocation or removal of said overhead, surface or

subsurface facility is needed due to interference with Project, and to incur any and all costs and expenses regarding any such utility relocation.

7. To timely pay for all costs and expenses of the Project, including without limitation, the advancement or payment of funds to ACTA as provided in Article B, for expenses incurred in the review and approval of design plans and specifications, coordination, meetings, construction oversight, railroad flagging protection and legal fees in preparation and review of legal documents.

8. To advertise a contract for construction bids; award the construction contract after written approval by ACTA of the contract, and perform construction contract, administration, inspection, field engineering and survey for Project. Any such contract shall provide that ACTA, POLA, POLB and the railroads using the Alameda Corridor are third party beneficiaries and are specifically covered by the indemnification and insurance provisions of any such contract.

9. To make changes to the Final Plans & Specs for Project necessitated by unforeseen or unforeseeable field conditions encountered during construction at no cost to ACTA, only after obtaining ACTA's prior written approval of any such changes.

10. To provide ACTA with a complete set of as-built plans for Project within thirty (30) days following completion of construction of Project.

11. To accept ownership, and thereafter be responsible for the operation, maintenance, repair and replacement of the roadway wear surface, sidewalks, crash protection devices, barrier rails, fencing, traffic signal, traffic loops, lighting, signs, surface and roadway drainage systems, and appurtenant utilities, all of which shall constitute Surface Improvements.

12. To construct the Project in accordance with the Final Plans & Specs.

13. To complete the Project on or before thirty-six (36) months from the date this Deed is recorded in the Official Records of the County of Los Angeles subject to extension upon the written concurrence of the COUNTY and ACTA.

14. To require any and all of COUNTY's construction, maintenance or other contractors to provide and keep in effect at all times the following insurance with minimum limits as indicated below, and issued by insurers with A.M. Best's ratings no less than A-: VI:

(a) Commercial general liability insurance equivalent to standard Insurance Services Office (ISO) form CG 00 01 with no exclusions for explosion, collapse or underground risks and providing coverage for completed operations. Policies shall provide coverage for, or shall be endorsed to eliminate any exclusions applicable to, liability assumed in contracts with railroads or for losses arising out of work within 50 feet of a railroad (e.g., ISO endorsement CG 24 17).

(b) Business auto coverage equivalent to standard Insurance Services Office form CA 00 01 covering owned, nonowned and hired autos.

(c) Workers' compensation (statutory) and employer's liability insurance.

(d) Railroad protective liability insurance in form and amounts required by the railroads and including ACTA as a named insured.

The minimum limit for all liability coverages is $1,000,000 with a $2,000,000 aggregate limit for general liability. In addition, prime contractors shall provide total general liability limits through any arrangement of excess or umbrella insurance to a minimum of $10,000,000 aggregate. Excess or umbrella insurance must include as insureds those parties included as insureds in the primary policies. Coverage shall be "follow form."

At all times during the term of this Agreement, COUNTY shall ensure that prime contractors provide to and maintain on file with ACTA evidence of insurance consisting of a certificate of insurance evidencing the required coverages and limits, and an additional insured endorsement adding ACTA, POLA, POLB and the railroads using the Alameda Corridor, its agents, officers, and employees, to the contractor's general liability policy. COUNTY's contracts shall specify that any actual or alleged failure on the part of ACTA or any other additional insured under these requirements to obtain proof of insurance required under this Agreement with the COUNTY in no way waives any right or remedy of ACTA or any additional insured, in this or any other regard.

Additional insured status shall include coverage for completed operations.

Coverage for the additional insureds shall apply to the fullest extent permitted by law excepting only the active negligence of the additional insureds as established by agreement between the parties or by the findings of a court of competent jurisdiction.

COUNTY shall require any and all prime contractors to include in their contracts with subcontractors, these requirements. Prime contractors shall be required to obtain and maintain copies of evidence of insurance complying with these requirements from subcontractors.

15. To indemnify, defend, and save harmless ACTA, POLA, POLB and the railroads operating within the Alameda Corridor, their agents, officers, and employees from and against any and all liability, costs, damages, claims and expenses (i) arising from negligence or willful misconduct on the part of COUNTY, its officers, employees, agents, contractors, or subconsultants of any tier in conjunction with Project; (ii) arising from or connected with the construction, completion, repair, maintenance, replacement or existence of the Project or any portion thereof; (iii) arising from the use of the Surface Improvements, the Surface Improvements or any matter occurring within or relating to the Air Space Above the Surface to a height of fifty (50) feet above the surface; or (iv) arising from a breach of this Deed by the COUNTY, including reasonable defense costs, legal fees, claims, actions, and causes of action for damages of any nature whatsoever. Notwithstanding the forgoing, COUNTY need not indemnify or hold ACTA, POLA, POLB or the railroads harmless to the extent of such entity's active negligence or willful misconduct as determined by a court of competent jurisdiction or by agreement between the parties. COUNTY shall require that a written indemnification in favor of ACTA, POLA, POLB and the railroads from any and all of COUNTY's contractors and subcontractors working on Project arising from the negligence or willful misconduct on the part of any such contractor or subcontractor, its officers, employees, agents or subconsultants or subcontractors of any tier in conjunction with the Project.

16. To comply with all ACTA, Railroad, Federal Railroad Administration, California Public Utility Commission and other regulatory agency requirements for work activities overhead or adjacent to Alameda Corridor railroad tracks. ACTA will be the ultimate authority

as to whether railroad flagging protection is required during any specific work activity, and COUNTY shall advance and/or pay to ACTA all costs associated with compliance with such requirements as provided in this Article B.

17. To deposit with ACTA concurrent with execution hereof, the amount of $60,000, which figure represents COUNTY's initial deposit of the estimated costs that have been or will be incurred for review of progress submittals to date, and for other required activities by ACTA during the first two months of Project. Such deposit shall in no way limit COUNTY's obligations under Article B to pay or reimburse ACTA for any costs and expenses.

18. To advance funds to ACTA without any deduction or offset whatsoever, no later than thirty (30) days following receipt of an itemized billing estimate from ACTA of the costs and expenses ACTA estimates it will incur regarding the Project, and to continue making such advance payments as invoiced by ACTA on a monthly basis until completion of Project. After completion of the Project, COUNTY shall continue to advance funds to ACTA for any and all estimated costs or expenses ACTA will incur for maintenance or inspection activities of ACTA as provided by this Agreement. All such invoices shall be submitted by ACTA pursuant to Article C, Section 5. It is the express covenant and agreement of COUNTY that it will advance all such amounts as invoiced by ACTA without deduction or offset, and that upon any failure to so advance such amounts to ACTA within said thirty (30) days from the COUNTY's receipt of such invoice, that ACTA has the right to suspend any further work within the Property right of way.

19. To pay to ACTA without any deduction or offset whatsoever, no later than thirty (30) days following receipt of an itemized billing of costs or expenses actually incurred by ACTA of the costs and expenses ACTA actually incurred in excess of any payments received by ACTA from the COUNTY based on billing estimates. It is the express covenant and agreement of COUNTY that it will pay all such amounts as invoiced by ACTA without deduction or offset, and that upon failure to do so pay such amounts to ACTA within said thirty (30) days from the COUNTY's receipt of such invoice, that ACTA has the right to suspend any further work within the Property right of way.

20. To perform all required maintenance, repair or replacement to the bridge abutments, footings, girders or understructure to the extent ACTA has not notified the COUNTY, in writing pursuant to Article C, Section 9, of its election to perform any specific task set forth in this Article B, Section 20.

21. To restore the Property to its original pre-Project condition or at the sole and absolute discretion of ACTA, to such condition as ACTA shall determine to permit the safe use and operation of the Corridor, in the event COUNTY no longer is funding the Project or decides not to complete the Project or is otherwise interrupted in the completion of the Project for an unreasonably prolonged period of time as determined in the sole discretion of ACTA.

22. COUNTY agrees and acknowledges that ACTA shall have no liability whatsoever regarding any inspection, approval or design review given or not given under this Deed except to the extent of ACTA's willful misconduct, if any.

23. That ACTA in an emergency situation may act to handle such emergency situation without prior consultation with the COUNTY and shall be entitled to the right of indemnification as provided for in Article B, Section 15 hereof regarding handling any such emergency situation.

24. That all obligations and responsibilities of COUNTY under this Deed shall be at COUNTY's sole cost and expense.

25. That at all times, the COUNTY shall own the improvements constituting the Project and shall be responsible for the maintenance, repair and replacement of such improvements.

26. After completion of the Project, to notify ACTA at least thirty (30) days prior to undertaking any work covered in Article B, Section 20.

ARTICLE C

ACTA AGREEMENT

ACTA agrees:

1. To review all plans and specifications for Project that the COUNTY is required to submit to ACTA pursuant to the terms of this agreement. To review construction submittals, work plans, and shop drawings. All such reviews by ACTA shall be completed by ACTA within thirty (30) days from the submittal by COUNTY. Should ACTA request COUNTY's revision, change or other alteration of any plans or specifications, COUNTY shall so comply as provided in Article B, Section 2.

2. To provide railroad flagging protection at COUNTY expense as ACTA deems necessary or desirable.

3. To relocate prior to COUNTY's contractor's Notice to Proceed, existing 4" fiber optic conduit and cables to a location so as not to interfere with temporary nor permanent construction work. Estimated cost to be advanced by COUNTY prior to commencement of work.

4. To prepare and submit to COUNTY itemized monthly invoices for estimated expenditures for review of design activities, oversight of construction activities and railroad flagging protection requirements one month in advance, as progress on Project proceeds and until Project completion. After completion, ACTA will from time to time invoice COUNTY for all estimated costs and expenses regarding any ACTA maintenance, repair or inspection activities under this Agreement.

5. To provide COUNTY with quarterly reports of actual expenditures compared to ACTA's invoiced estimates submitted to COUNTY. ACTA will monitor the actual versus the planned expenditures monthly for the purpose of tracking whether COUNTY's payments will be sufficient.

6. Within thirty (30) days from COUNTY's completion of Project and all work incidental thereto and at any time thereafter for any work done by ACTA for which it is entitled

to be paid for by the COUNTY pursuant to Article B above after completion of the Project, ACTA will furnish COUNTY with a detailed statement of all amounts advanced by COUNTY pursuant to Article B. If there remains any excess of advanced funds after all ACTA costs and expenses have been satisfied, then ACTA thereafter shall refund to COUNTY (without interest) promptly after completion of ACTA's accounting any amount of COUNTY's advancements remaining. If there is a deficit between ACTA costs and expenses and the amount of the advances ACTA will bill COUNTY for any additional amount required to complete COUNTY's financial obligations pursuant to this Agreement and COUNTY as provided in Article B shall pay within thirty (30) days after receipt of such accounting the remaining funds due to ACTA.

7. To require any contractors working on Project under ACTA's direction and control, to agree to indemnify, defend and save harmless COUNTY, its agents, officers, and employees from and against any and all liability and expenses arising out of that contractor's work performed on Project due to the negligence or willful misconduct of the contractor or of its officers, employees, agents, or subcontractors of any tier, except to the extent of COUNTY's negligence or willful misconduct as determined by a court of competent jurisdiction or by agreement between the parties.

8. To perform biennial bridge structural integrity reviews for the bridge abutments, footings, girders and understructure.

9. At COUNTY's sole cost and expense, ACTA by mutual agreement between COUNTY and ACTA may perform maintenance, repair or replacement work regarding the bridge, abutments, footings, girders or understructure and to maintain and repair the Project and to make any necessary replacement of any component of the Project requiring replacement.

ARTICLE D
MUTUAL COVENANTS

It is mutually understood and agreed by COUNTY and ACTA as follows:

1. COUNTY understands that ACTA may not proceed with any of its responsibilities or duties under this Deed unless funds have been advanced or paid by COUNTY pursuant to this Deed to cover each specific responsibility or duty.

2. Railroad traffic and operations occur continuously throughout the day and night on the ACTA tracks within the Alameda Corridor trench. Railroad operations shall take precedence and shall be maintained at all times, subject to extremely limited work windows during which time railroad operations on one or more tracks may be restricted. Any work activities, which could directly affect railroad operations must be performed within an approved, limited duration work windows at which time railroad operations will be temporarily restricted. However, it is mutually understood that opportunities for absolute work windows for specified, restricted time duration are extremely limited. Application by the COUNTY for work windows will be made to ACTA. All times, durations or other requirements regarding such work windows shall be reasonably considered subject to railroad operating requirements. Notwithstanding the foregoing, ACTA will act in good faith in attempting to accommodate COUNTY's schedule and to attempt to reduce any liquidated damages paid to COUNTY's contractor. During approved absolute work window(s) bridge construction activities will be given priority over railroad operations. However, ACTA may terminate, modify or otherwise impose restrictions on any ACTA approved work windows, and COUNTY so acknowledges ACTA's sole discretion in this regard, and releases and holds ACTA free and harmless regarding any such costs or expenses resulting from, or otherwise attributable to any ACTA termination or limitation of such work windows, or to any delays in completion of the Project attributable thereto. COUNTY acknowledges and agrees that ACTA's ability to impact railroad operations may be subject to agreements with railroads operating within the Alameda Corridor and those rights on use of the Alameda Corridor which are superior to any rights or obligations set forth in this Deed.

3. During construction of Project, COUNTY shall furnish an inspector or other representatives to perform the function of an inspector. ACTA may also furnish a representative to provide oversight of the construction activities of Project. Said representatives shall cooperate and consult with each other. ACTA representative shall not issue any directive(s) to any contractor, but shall work through the COUNTY representative. The orders of the COUNTY inspector to the contractor or any other COUNTY representative in charge of construction shall prevail and be final, except with respect to contractor activities affecting railroad operations where the authority of the ACTA representative and/or railroad flagger shall be absolute. ACTA will invoice COUNTY for the direct costs of ACTA's oversight representative.

4. If at any time COUNTY determines in its sole discretion that a material change has impacted Project, including but not limited to soil conditions, additional regulatory or permit requirements, or site requirements, and that said material change has rendered Project unfeasible, then in such event COUNTY and ACTA shall meet and confer in good faith to resolve the material change that renders Project unfeasible. If construction activities have commenced and the Project is still deemed to be unfeasible, then in addition to any other obligation under this Deed, COUNTY shall be obligated at COUNTY's sole cost and expense to remove any newly constructed facilities from the Alameda Corridor right-of-way and restore the Alameda Corridor trench structure to its original condition. In this event COUNTY remains obligated for all of ACTA's costs and expenses as provided in Article B.

5. This Deed shall only be modified by the mutual written consent of all the parties.

6. In contemplation of the provisions of Section 895.2 of the Government Code of the State of California imposing certain tort liability jointly upon public entities solely by reason of such entities being parties to an AGREEMENT (as defined in Section 895 of said Code), each of the parties hereto, pursuant to the authorization contained in Sections 895.4 and 895.6 of said Code, will assume the full liability imposed upon it or any of its officers, agents, or employees by law for injury caused by any act or omission occurring in the performance of this AGREEMENT to the same extent that such liability would be imposed in the absence of Section 895.2 of said Code. To achieve the above stated purpose, each of the parties indemnifies and hold harmless the other party for any liability, cost, or expense that may be imposed upon such other party solely by virtue of said Section 895.2. The provisions of Section 2778 of the California Civil Code are made a part hereof as if incorporated herein.

7. Pre-Litigation Mediation.

(a) In the event any dispute among the parties is not resolved among the parties hereto, and one or more parties intends to file a lawsuit with respect to such dispute, it shall be a condition to the filing of any lawsuit that the parties to such dispute shall first attempt to resolve the lawsuit by non-binding mediation. The parties, upon the request of one party, shall execute tolling agreements to toll any statute of limitations to the extent the mediation process could result in prejudicing a party from bringing a claim.

(b) Notwithstanding Article D, Section 7(a) above, said Section 7(a) provision shall not bar any party from seeking any injunctive or other extraordinary relief in the event that a time delay due to the mediation process would prejudice a party.

(c) The mediation shall commence upon written notice from the party desiring to file a lawsuit to the other parties indicating that such party is invoking Article D, Section 7 hereof, describing the dispute and listing three (3) potential mediators. The parties shall meet and confer by telephone and mutually decide in good faith within fifteen (15) days after receipt of said written notice on the mediator which mediator need not be one of the three originally suggested. After designation of the mediator, the parties shall set up a joint meeting with the mediator as quickly as is practical based on the mediator's schedule to attempt to resolve the dispute by non-binding mediation.

(d) Depending on the results of the mediation meeting, a party may or may not thereafter decide to file a lawsuit regarding the subject matter of the dispute.

(e) In the event, any party is not cooperative with regard to the mediation process set forth in this Article D, Section 7, then the mediation process shall not be a bar or limitation on proceeding with litigation.

IN WITNESS WHEREOF, the parties hereto have caused this Easement Deed and Agreement to be executed by their respective officers, duly authorized by the parties hereto.

COUNTY OF LOS ANGELES

By _____
Donald L. Wolfe
Director of Public Works

APPROVED AS TO FORM:

RAYMOND G. FORTNER, JR.
County Counsel

By: _____
Deputy

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY, a Joint Powers Authority

By _____ 3/28/06
John Doherty
Chief Executive Officer

Approve as to Form
Robert E. Shannon

By _____
Charles M. Gale
Deputy City Atty, ACTA Co. General Counsel

ATTEST:

By _____
Printed Name: Ruby Williams
Title: Exec Secretary

CITY OF LOS ANGELES ACTING BY AND THROUGH ITS BOARD OF HARBOR COMMISSIONERS

By _____
Printed Name: _____
Title: _____

ATTEST:

By _____
Printed Name: _____
Title: _____

APPROVED AS TO FORM:

By _____
Printed Name: Thomas A. Russell
Title: General Counsel, POLA

CITY OF LONG BEACH ACTING BY AND THROUGH ITS BOARD OF HARBOR COMMISSIONERS

By _____
Printed Name: Richard D. Steinke
Title: Executive Director, Port of Long Beach

ATTEST:

By _____
Printed Name: Gus T. Hem
Title: Executive Officer

APPROVED AS TO FORM:
Robert E. Shannon

By _____

Printed Name: Charles M. Gale

Title: Deputy City Attorney

6/13/06

CERTIFICATE OF ACCEPTANCE

This is to certify that the interests in real property conveyed by the within deed or grant is hereby accepted under the authority conferred by Ordinance No. 95-0052, duly and regularly adopted by the Board of Supervisors of the County of Los Angeles on the 26th day of September, 1995, and the Grantee consents to the recordation thereof by its duly authorized officer.

Dated _____

By _____
ASSISTANT DEPUTY DIRECTOR
Mapping & Property Management Division

ACKNOWLEDGMENT FORM

STATE OF CALIFORNIA)
) ss.
COUNTY OF _____)

On _____, before me, _____,
the undersigned, personally appeared _____,
(insert name and title)

_____

personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument, and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

_____
Signature

_____
(Name, Typed or Printed)

(Seal)

ACKNOWLEDGMENT FORM
(FOR COUNTY USE ONLY)

STATE OF CALIFORNIA)
) ss.
COUNTY OF LOS ANGELES)

On MARCH 21, 2006, before me, CONNY B. McCORMACK, Registrar-Recorder/County Clerk of the County of Los Angeles, personally appeared PATRICK V. DECHELLIS _____ personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument, and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

CONNY B. McCORMACK, Registrar-Recorder/
County Clerk of the County of Los Angeles

By: Wanda C. Dunkley
Deputy County Clerk

(Seal)

STATE OF CALIFORNIA)
) ss.
COUNTY OF _____)

On _____, before me, the undersigned, a Notary Public in and for said County and State, personally appeared _____, _____ personally known to me or proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument, and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

(AFFIX NOTARIAL SEAL)

_____
NOTARY PUBLIC

STATE OF CALIFORNIA)
) ss.
COUNTY OF Los Angeles)

On June 14, 2006, before me, the undersigned, a Notary Public in and for said County and State, personally appeared Richard D. Steinke, personally known to me or proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument, and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

(AFFIX NOTARIAL SEAL)

Nancy L. Mitchell
NOTARY PUBLIC

NANCY L. MITCHELL
Commission # 1615411
Notary Public - California
Los Angeles County
My Comm. Expires Oct 22, 2009

PSOMAS

EXHIBIT 'A'

LEGAL DESCRIPTION OF "PROPERTY"

That portion of Parcel 2, as shown on map filed in Book 159, pages 21 through 34, inclusive, of Records of Survey, in the Registrar-Recorder/County Clerk's office, and as described in Grant Deed to the Cities of Los Angeles and Long Beach, recorded December 29, 1994 as Document No. 94-2282144, of Official Records, in said Registrar-Recorder/County Clerk's office, described as follows:

Parcel MC-802-1

Commencing at the intersection of the center line of 74th Street with the westerly line of said Parcel 2, as both are shown on said map; thence along said westerly line North 10°14'36" West 41.67 feet to the **True Point of Beginning**; thence North 79°45'24" East 100.00 feet at right angles from said westerly line to a point on the easterly line of said Parcel 2; thence along said easterly line South 10°14'36" East 105.00 feet; thence South 79°45'24" West 100.00 feet at right angles from said easterly line to a point on the westerly line of said Parcel 2; thence along said westerly line North 10°14'36" West 105.00 feet to the **True Point of Beginning**.

Containing 10,500 square feet, more or less.

The distances shown hereon are grid distances. Ground distances may be obtained by dividing the grid distance by the combination factor of 1.00000507.

All as shown on Attachment "A-1" hereto and made a part thereof.

This legal description is not intended to be used in the conveyance of land in violation of the subdivision map act of the State of California.

This legal description was prepared by me or under my direction.

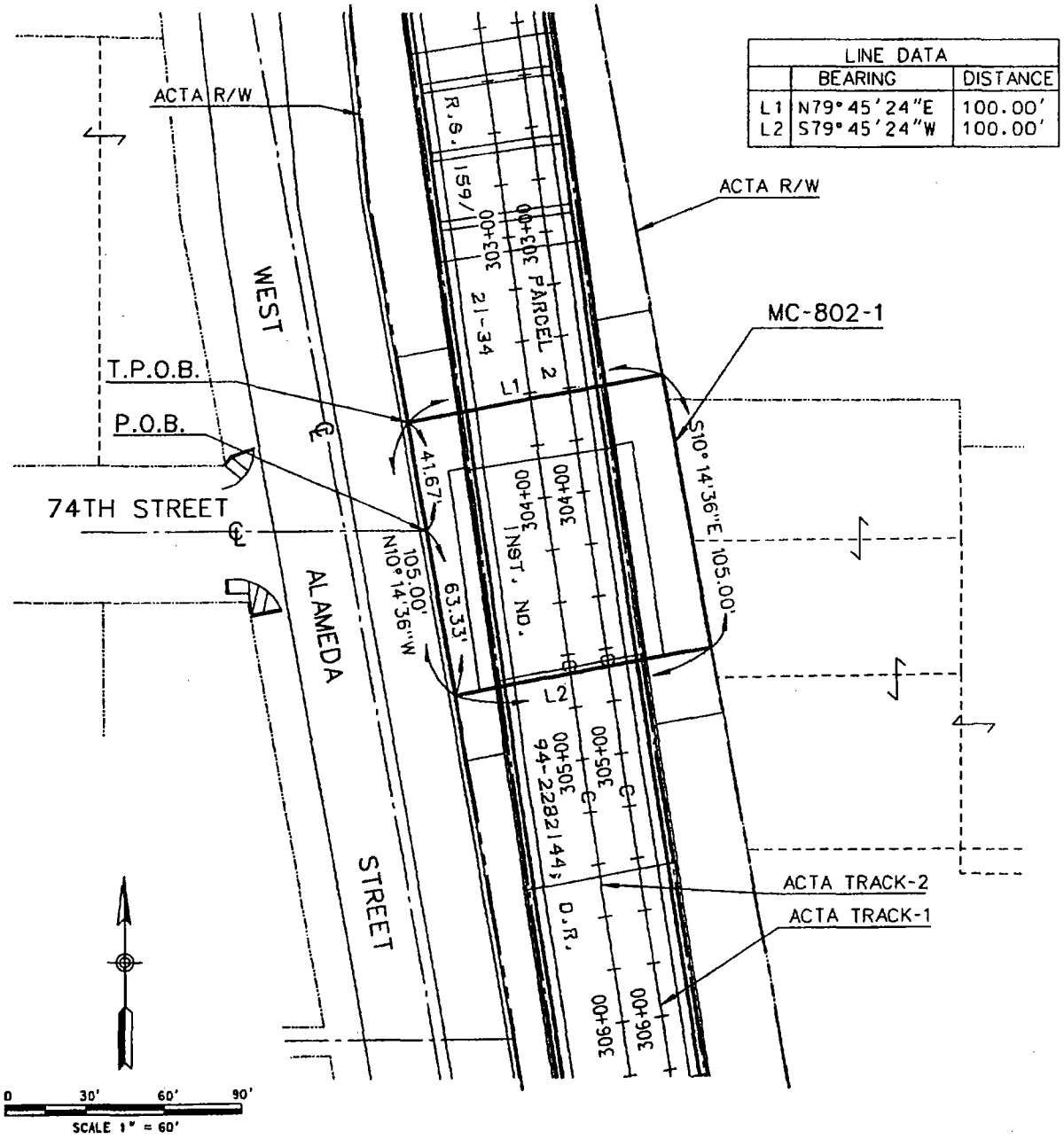
David A. Moritz 1-11-06

David A. Moritz, PLS 7388 Date

Expires 12/31/07

GRANTOR :		The dat... on plat are based on a field survey prepared by Psomas and ...ssociates dated May 1995. Bearings and distances are based on California Coordinate System 83 Zone 5 coordinates obtained from California H.P.G.N.		
DESCRIPTION :				
TITLE REPORT :				
ASSESSORS REF.	ROW REF :	NO.	DATE	REVISION DESCRIPTION

ATTACHMENT "A-1" TO EXHIBIT "A"
DEPICTION OF "PROPERTY"



LINE DATA		
	BEARING	DISTANCE
L1	N79°45'24"E	100.00'
L2	S79°45'24"W	100.00'

AREA					SHEET 1 OF 1
10,500 SQ. FT.					LETTER 713

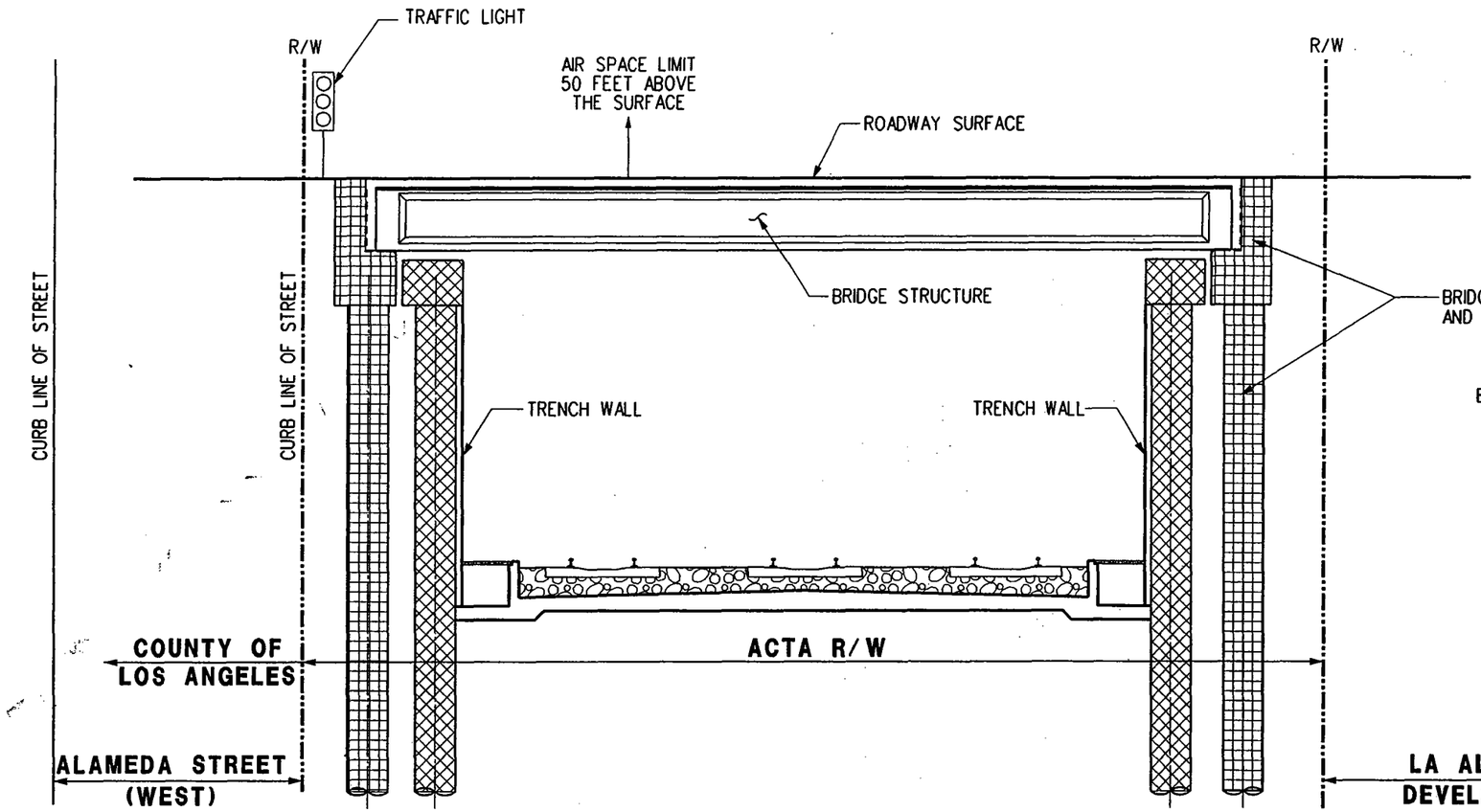
ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY

ALAMEDA CORRIDOR PARCEL PLAT
MC-802-1

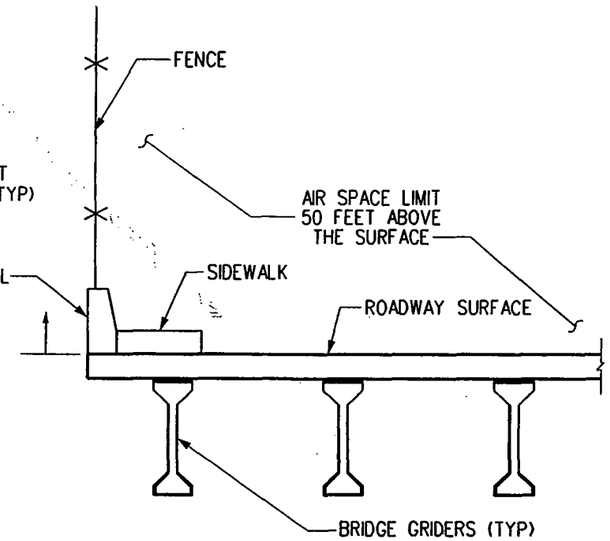
PREPARED BY:
PSOMAS
3187 Red Hill Avenue, #250
Costa Mesa, California 92626
714/751-7373
714/545-8883 (Fax)

CONTRACT NO.	2DMJ0107.41
SCALE	1" = 60'
DATE	9/16/05
DRAWN BY	R. NEWHOUSE
CHECKED BY	K.LAUNEN
REV. DATE	REV. NO.

EXHIBIT "B" - DEPICTION



TRENCH CROSS SECTION AT 74TH STREET BRIDGE



CROSS - SECTION
BRIDGE STRUCTURE

LEGEND:

EXISTING TRENCH WALLS

PROPOSED BRIDGE ABUTMENT AND FOOTINGS

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY

ALAMEDA CORRIDOR ENGINEERING TEAM
Dames, Mann, Johnson, & Mondonhall
Moffatt & Nichol, Engineers
Jordine-Gates & Martinez, Inc.
TCLACU

SUBMITTED NOT APPLICABLE

APPROVED NOT APPLICABLE

ALAMEDA CORRIDOR
MID-CORRDIOR DESIGN BUILD PROJECT

EASEMENT DEED EXHIBIT
ACTA /PORTS /COUNTY OF LOS ANGELES

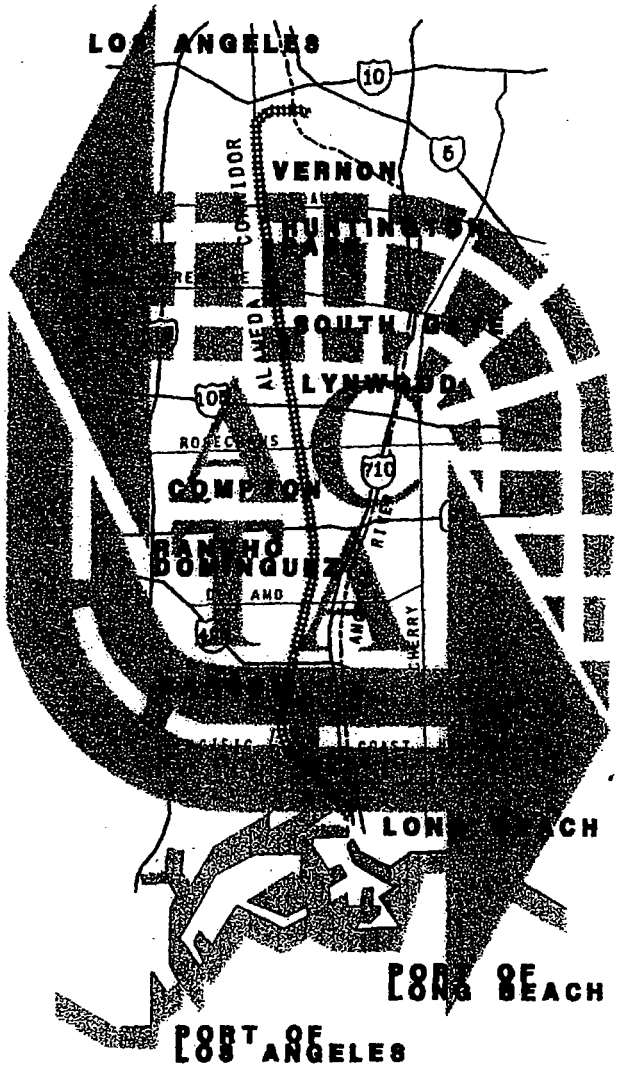
USER=sheth 06 FEB 2006 11:23:44 h:\acet\row\mc\c3\c3r311.plg

EXHIBIT C

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY

STANDARDS AND PROCEDURES

VOLUME 2 - DESIGN CRITERIA



ALAMEDA CORRIDOR
TRANSPORTATION AUTHORITY

ALAMEDA CORRIDOR ENGINEERING TEAM
Daniel, Mann, Johnson, & Mendenhall
Moffatt & Nichol, Engineers
Jenkins/Gales & Martinez, Inc.
TELACU

TABLE OF CONTENTS

FIGURES

TABLES

END OF TABLE OF CONTENTS

1.0 INTRODUCTION

The Alameda Corridor project is a consolidated railroad link between the Ports of Los Angeles and Long Beach extending 20 miles along Alameda Street to the rail freight yards and connections in downtown Los Angeles (see figure 1.0). The rail corridor is being developed to:

- Consolidate the operations of the three freight railroad carries (SP, UP, and Santa Fe) into one higher-speed, higher-capacity corridor.
- Dramatically improve railroad access to the Ports and accommodate a significant increase in Pacific Rim Trade.
- Significantly reduce the community impacts along the routes by eliminating over 200 at-grade vehicular crossings of the individual branch lines.

The Alameda Corridor Transportation Authority (ACTA) was formed in 1989 and is responsible for implementing the project. A number of Purchase and Sale Agreements and Memorandum of Understandings have been executed between the Railroads and the Ports in support of the Alameda Corridor project. The route, being constructed along Alameda Street, will consolidate 90 miles of branch line track into one 20-mile corridor. Projections for daily through-corridor freight train movements in the Alameda Corridor are 73 trains per day in 2010 and 97 in 2020. Projections for intercity and commuter passenger train movements over lines now crossing freight access routes to the Ports are 56 trains per day in 2010 and 84 in 2020.

As a result of the regional and national significance of the railroad activity between the Ports and downtown Los Angeles, ACTA initiated a conceptual engineering effort in 1990 to fully define the project. A range of alternatives was developed and subjected to environmental analysis, culminating in the issuance of draft EIR in August 1992 and certification of final EIR in January 1993 by the ACTA Governing Board. The Alameda Corridor consists of the following three primary components:

1. North End: Rail connections to the operating railroads and grade separation for highway and passenger rail.
2. Mid-Corridor: A depressed trainway from Los Angeles (25th Street) south to the vicinity of State Route 91 (SR91), including highway bridges at existing crossings and the reconstruction of Alameda Street.
3. South End: An at-grade trainway and storage tracks south of SR 91 to the rail connections to Terminal Island and the Ports of Long Beach and Los Angeles.

1.1 APPLICATION

These standards and procedures provide a uniform basis for the design of the Alameda Corridor project and can be expected to undergo refinement and expansion during preliminary engineering and final design.

These standards and procedures serve as guidelines and do not substitute for engineering judgment and sound engineering practice. Unless specifically noted otherwise in these standards and procedures, the latest edition of codes, regulations, and standards that are applicable at the time the design is initiated shall be used. If a new edition or amendment to a code, regulation, or standard is issued before the design is completed, the design shall conform to the new requirements to the extent presented or required by the agency enforcing the code, regulation, or

standard changed. Specific exceptions may apply in special cases. The Alameda Corridor Project designers are responsible for identifying any necessary departure from the standards and procedures contained in this document, and bringing it to the attention of the Alameda Corridor Engineering Team (ACET), program management consultant to the Alameda Corridor Transportation Authority (ACTA).

Any changes to the standards and procedures must be approved by ACTA prior to use in the design. Application for change of standards and procedures, addition to the standards and procedures, and other questions should be submitted in writing to:

Alameda Corridor Engineering Team
One Civic Plaza
Suite 600
Carson, California 90745

END OF SECTION 1

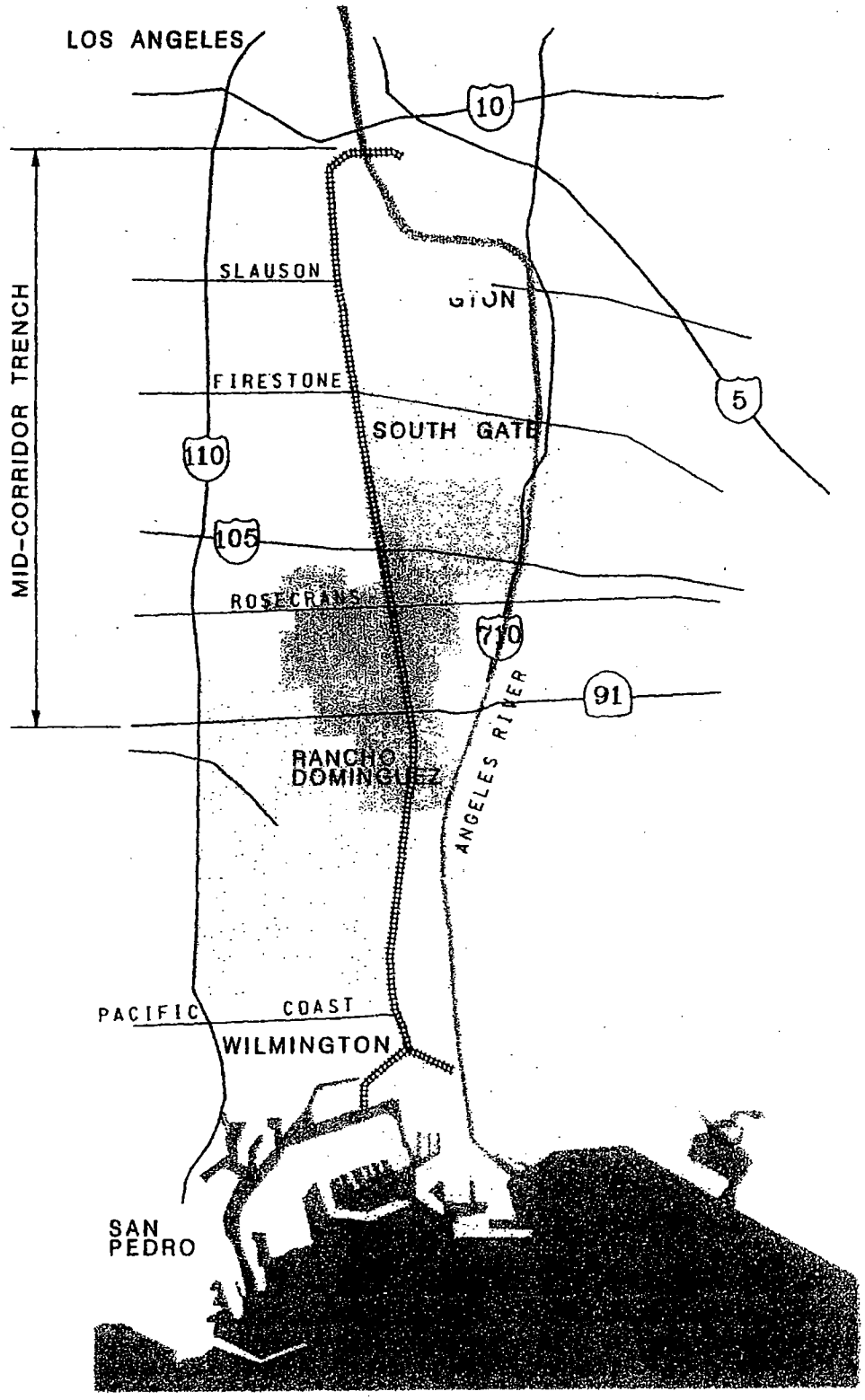


FIGURE 1.0
ALAMEDA CORRIDOR PROJECT LOCATION

2.0 ENVIRONMENTAL CONSIDERATIONS

2.1 INTRODUCTION

This chapter reviews the environmental setting for climate, wind, topography, soil and geology, air quality, hydrology and water quality, vegetation and wildlife, noise and vibration, traffic, community impacts, public services, and environmental mitigation plan.

This section does not give direction on design issues, rather it is incorporated to note the nature of environmental issues that may be addressed during the design process. Project designers shall be sensitive to all environmental issues, and to conduct their designs in accordance with the project's environmental impact statement and report. Environmental mitigation measures shall always be considered.

2.2 ENVIRONMENTAL CONDITIONS IN THE ALAMEDA CORRIDOR AREA

Goods movement from the San Pedro Ports is critically linked to the local economy and has significant impact on mobility, the environment, quality of life, and land use of communities alongside these movements. Foreign trade makes up a major part of regional goods movement and has emerged as a major sector in the region's economic base. This growth in economic activity has important implications for the transport modes which are relied upon to move goods to their desired destinations. By the year 2020, the ports are projected to handle approximately 200 million metric tons of cargo per year.

2.2.1 Climate

In general, southern California has a climate characterized by warm dry summers and mild winters, as a result of southern California's location on the southeastern edge of the pacific high pressure area, which forces most low climatic formations to the north and results in a prevailing stable weather pattern. Infrequent interruptions of this climatic pattern occur during extreme periods of hot weather, winter storms, or Santa Ana winds. Santa Ana winds occasionally disperse air contaminants within the basin; however, when the Santa Ana conditions are weak, air stagnates along the coastline and air quality at the coast may become worse than at inland sites.

2.2.2 Wind Velocity

Winds in the vicinity of the project blow predominantly from the southwest and west, with relatively low velocities. Wind speeds measured in the area average about five miles per hour. Summer wind speeds average slightly higher than winter wind speeds. Low average wind speeds, together with a persistent temperature inversion, limit the vertical dispersion of air pollutants throughout the basin.

2.2.3 Topography

The corridor is situated in the northern part of physiographic basin known as the Los Angeles Basin, or the coastal plain of Los Angeles. The most prominent landforms within the area of the corridor are the Dominguez Hills and Signal Hill, which represent the central portion of the Newport-Inglewood fault zone (or uplift), and the Palos Verdes Hills.

- Dominguez Hills and Signal Hill.

  The central portion of the corridor crosses the Newport-Inglewood uplift, which is evidenced by the Dominguez Hills and the northwesterly extension of Signal Hill.

  The Dominguez Hills lie immediately west of the corridor, between the Artesia Freeway on the north and Del Amo Boulevard on the south. The Dominguez Hills are a feature consisting of an elliptical, northwest-trending anticlinal dome that ranges in elevation from 6.096 meters (20 feet) to 59.436 meters (195 feet) above sea level.

  Signal Hill is the central feature of the Newport-Inglewood uplift. It spans three distinct elements: an eastern segment that includes Alamitos Heights, a central segment, and a northwestern segment closest to the corridor, about one mile to the east in the vicinity of the San Diego Freeway and the Los Angeles River.

- Palos Verdes Hills

  The extreme southerly end of the corridor is adjacent to the eastern flank of the Palos Verdes Hills. Within this area, the hills consist of a low lying wave cut terrace that gradually rises from about 15.240 meters (50 feet) above sea level near San Pedro to about 121.920 meters (400 feet) above sea level on the eastern and northern flanks of the hills (Poland and Piper 1956).

2.2.4 Soil and Geology

The proposed project is located in a seismically active area. A moderate to major earthquake on any of the major faults in the area during the operational lifetime of the proposed project would subject the project to strong ground shaking. Such ground shaking could result in the failure of structures along the proposed corridor and could disrupt service along the corridor. Actual displacement or fault movement is less likely, but could occur where the active Newport-Inglewood fault zone crosses the corridor.

The likelihood of severe earthquake occurring during the construction period is low. However, the possibility does exist and should not be discounted. If the area is subject to a substantial seismic event and associated severe ground shaking during the construction period, the effects of the shaking can be minimized through appropriate construction techniques. All available construction techniques for the safety of workers, pedestrians, motorists, and nearby residents shall be implemented. These measures include shoring and falsework.

2.2.5 Air Quality

The construction emissions have been estimated for the project for a range of construction operations and processes. Emissions were calculated for the various pieces of construction segments, and the results were compared with thresholds defined by the South Coast Air Quality Management District (SCAQMD). Emissions factors were taken from the SCAQMD Handbook (April 1993). In order to estimate regional effects, it was assumed that a worst case construction year, defined as two prototypical segments under construction at the same time, should be analyzed. Based on the SCAQMD thresholds, the construction impacts for reactive organic gases, nitrogen oxides, and fugitive dust shall be considered substantial.

2.2.6 Hydrology and Water Quality

The project shall be considered to have a substantial adverse impact, if (a) a substantial discharge into surface waters creates pollution, contamination, or nuisance, or (b) a substantial change in quantity/or quality of groundwater occurs, either by direct additions or withdrawals, or by puncture of an aquifer.

Construction of the proposed project requires a General Construction Storm Water Permit from the Regional Water Quality Control Board (RWQCB). This permit requires the completion of a Notice of Intent, a Storm Water Pollution Prevention Plan (SWPPP) identifying appropriate erosion control measures ("best management [BMPs] practices") and a monitoring program designed to check whether the BMPs identified in the SWPPP are adequate and properly implemented.

Areas where construction will extend down into groundwater will require separate permits for construction dewatering. The RWQCB has established limits for discharges of ground water to surface waters. General Order 97-045, General National pollutant Discharge Elimination System Permit and Waste DischargeRequirements for Groundwater Discharges form Construction and Project Dewatering to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties (Threat/Complexity Rating C-3), provides the waste discharge limits and monitoring requirements. Ground water discharges that do not conform to project NPDES permit will not be permitted.

In addition, those portions of the project requiring Section 404 (of the Clean Water Act) clearance shall require a 401 certification from the RWQCB.

In addition, a General Industrial Storm Water Permit will be required. Requirements of this permit are the same as those described above for the General Construction Storm Water Permit. The SWPPP for this permit contains or identifies pollutant sources, source controls, material inventory, preventive maintenance program, spill prevention and response program, employee training, facility inspections, record keeping, and elimination of non-storm water discharges. The SWPPPs are developed in coordination with the RWQCB.

In the event of surface water contamination during the operation of the proposed corridor, appropriate emergency procedures shall be followed to ensure minimum damage to surface water resources. An emergency response plan shall be developed and approved prior to operation of the proposed project. This plan shall include information on the nature of the materials likely to be transported along the corridor, the types of remedial actions required in the event of a spill of such materials, and an emergency notification and evacuation plan, if required. The plan shall be developed in cooperation with adjoining jurisdictions and appropriate state agencies.

In the event that contaminated materials are encountered within the Dominguez Channel, appropriate mitigation shall be developed in cooperation with appropriate agencies. In addition, coordination with the California Coastal Commission shall be initiated to determine the need for a coastal permit. Additional permits from the Cities of Los Angeles and Long Beach may also be required for construction within the coastal zone.

2.2.7 Vegetation and Wildlife

Existing landscaping and common urban vegetation shall be removed in the course of construction. This is not a substantial impact.

The project corridor is highly urbanized and has been for many years. Consultation with the NDDB indicates that no state or federally listed endangered species are found within the project corridor. The proposed project is not expected to affect any habitats of sensitive species and therefore does not adversely affect the biological resources within the proposed corridor.

The U.S. Fish and Wildlife Service has expressed concurrence with the finding of no adverse effect on federally-listed species relative to Section 7 of the Endangered Species Act of 1973, as amended.

Mitigation for the disturbance to vegetation and wildlife habitats could entail offsite revegetation. An offsite location must be revegetated when revegetation of the original site is not possible after construction. The extent , nature, and location of revegetation shall be finalized during the permitting process, which is completed prior to construction. Necessary permits from the U.S. Army Corps of Engineers and the California Department of Fish and Game shall be obtained.

Landscaping shall be provided when possible along the corridor. Native and/or drought resistant plants shall be used where feasible.

2.2.8 Noise and Vibration

Noise impact criteria has been developed to account for both traffic and train noise. Typically, proposed projects involving traffic components are evaluated using Federal Highway Administration (FHWA) standards. These standards are based on the noise levels during the loudest hour of the day, which is usually the peak traffic hour. In the noise analysis for the Alameda Corridor project, train traffic is distributed throughout the day and night. Using the typical FHWA peak hour noise impact criteria to evaluate this type of noise source underestimates noise impacts because it does not include an allowance for the sensitivity of most people to nighttime noise. Accordingly, it is established that FHWA noise criteria is not appropriate for the Alameda Corridor Project. To more appropriately account for noise during the nighttime hours, Community Noise Equivalent Level (CNEL) was selected to characterize residential noise levels. CNEL is a measure of the total sound energy over a 24-hour period with adjustments that account for evening and nighttime noise sensitivities. As a complement to this, noise impacts for non-residential sensitive receptors (e.g. schools, churches, and parks) are characterized with Daytime Energy Equivalent Level (Leq).

Noise impact criteria to assess the noise effects are as follows:

- A severe impact occurs when the projected CNEL with trains and auto traffic on Alameda Street is greater than 72 dBA and CNEL with trains alone is greater than 67 dBA.

- A substantial impact occurs when the projected CNEL with projected trains and traffic on Alameda Street is greater than 67 dBA (which is approximately equivalent to the FHWA standard with normal day/night traffic distribution) and causes an increase relative to future conditions without the project of at least 3 dBA. This is possible only

when train noise is the dominant noise source.

The projected CNEL of trains shall be at least 64 dBA for there to be an impact. If projected train noise exceeds 67 dBA and the total projected CNEL exceeds 72 dBA, there is a severe impact. Mitigation is required where the impact is severe.

Specific noise control requirements in the construction specifications help reduce noise. These require the contractor to:

- Perform all construction in a manner to minimize noise. The contractor shall be required to select construction processes and techniques that maintains noise levels as low as practicable. Some examples include using predrilled pipes instead of impact pile driving, mixing concrete offsite instead of onsite, and using hydraulic tools instead of pneumatic impact tools;

- Use equipment with effective mufflers. Contractors shall be required to employ equipment with effective commercially available mufflers;

- Perform construction in a manner to maintain noise levels below specific limits in the vicinity of noise sensitive land uses;

- Perform noise monitoring to demonstrated compliance with the noise limits. Independent noise monitoring shall be performed to check compliance in particularly sensitive areas;

- Minimize construction activities during evening, nighttime, weekend and holiday periods. Permits shall be required before construction begins in noise sensitive areas during these periods;

- Select haul routes to minimize intrusion to residential areas. Permits shall be required.

Construction activities have the potential of creating annoying levels of ground-borne vibration. In cases of extreme heavy construction, a few activities have the potential of creating vibration of sufficient amplitudes to cause building damage. Following is a summary of construction equipment and operations which could cause annoying or damaging vibration:

- Pile Driving: Impact pile driving can cause daytime annoyance out to a distance of approximately 76.200 meters (250 feet) and potential damage to structures at distances less than about 12.192 meters (40 feet);

- Vibratory Compaction: Vibratory compaction equipment is oftentimes used for compacting roadway subgrades. It is not uncommon for this type of equipment to cause intrusive vibration in nearby buildings. The shaking sometimes causes items sitting on shelves or hanging on walls to fall;

- Excavation Equipment: The main source of vibration is dropping the bucket into the excavation;

- Tracked Vehicles: Tracked vehicles such as bulldozers can create substantial vibration during earth moving operations. A large bulldozer could result in vibration that would cause daytime annoyance to residences within 22.860 meters (75 feet);

- Trucks: Ground-borne vibration from pneumatic tire vehicles on streets, even heavy trucks, is rare unless there is some sort of irregularity or bump in the road's surface. Loaded trucks on construction surfaces can create annoying vibration at distances up to 60.960 meters (200 feet);

- Bulldozers: Although processes such as earth moving with bulldozers can create annoying vibration, there should be only isolated cases where it is necessary to use this type of equipment in close proximity to residential buildings.

Following are procedures that shall be used to minimize the potential for annoyance or damage from construction vibration:

- Construction techniques that create high vibration levels shall be prohibited or severely limited. Processes such as pile driving will be prohibited at distances less than 76.200 meters (250 feet) from residences, unless no other alternative is possible by virtue of soil conditions or other engineering constraints. Setting piles using predrilled holes or the cast-in-drilled-hole (CIDH) method will eliminate most potential for vibration impact from pile driving, and therefore shall be established as the preferred technique.

- Procedures that contractors can use in vibration sensitive areas shall be restricted to techniques offering the least potential for producing intrusive vibration, within the limits of practicality.

- Monitoring during vibration intensive activities shall be conducted and corrective actions imposed if vibrations exceed established criteria.

2.2.9 Traffic/Transportation

In general, the proposed project does not involve the elimination of any crossings over the mid-corridor trench section that would increase traffic on other local roads in residential areas or otherwise increase the potential for pedestrian/vehicle conflict. In addition, by constructing the trainway in a trench, potential conflicts between pedestrians, vehicles and trains are eliminated.

The reconstruction of Alameda Street and the provision of overhead or just structures at existing Alameda cross streets, new left turn pockets at selected Alameda Street intersections (as noted on EIR) and improved signalization along Alameda Street will improve traffic conditions at most project intersections. However, aspects of the project that could result in adverse traffic impacts need to be identified and addressed. In order to identify these aspects, project designers are required to review the EIR, EIS, and ROD.

Construction of the proposed project will affect the circulation of traffic within the project area. With thoughtful planning, the adverse effects can be reduced substantially. Traffic parallel and perpendicular to the corridor will be impeded as a result of the loss of lanes and possible road closures during construction. Detours will be required to direct traffic around road closures, thus sending more traffic onto other streets. Although temporary road closures during construction will have the most impact on traffic, partial blockage of roadways will constrict traffic and cause congestion. Construction vehicles entering and leaving the work areas will contribute to traffic volumes. However, some traffic must be diverted to other streets due to the construction work. On-street parking will be temporarily prohibited on selected streets to increase the vehicle capacity on the detour

routes. Access to businesses and homes adjacent to the construction area will be impaired by road closures, blockage of driveways and traffic congestion.

Construction management plans shall be developed to identify ways to minimize traffic disruption during construction. Measures shall be taken to maintain access to driveways for residences and businesses during construction. The possibility of building the at-grade bridges first and then excavating the trench is under consideration and shall be implemented if practicable.

2.3 COMMUNITY IMPACTS

The Alameda Corridor project, generally, shall not involve the acquisition of residential property or the displacement of residents.

The proposed project shall not remove existing housing or otherwise deplete the local housing stock.

Because proposed project does not result in adverse effects on housing, population or neighborhoods, mitigation measures are not required.

2.4 PUBLIC SERVICES

Impacts on public services during the construction period include traffic obstructions and detours affecting police, fire, and paramedic vehicles, as well as reduced access to and potential disruption of community facilities. Although construction impacts are temporary, the potential disruptions could last three to four years at a given location.

Efforts shall be made to reduce the delays in emergency response time during the construction period. Police and fire personnel will be informed in advance of the location and duration of construction activities as well as any temporary street closures. An overall construction sequencing and traffic management plan shall be prepared and reviewed with fire and law enforcement officials. Cross streets scheduled for grade-separation within a particular jurisdiction shall be constructed in a sequence to ensure that traffic flow within the jurisdiction of the Alameda Corridor project is not completely cut-off.

Fire emergency access to buildings adjacent to construction activities shall be maintained at all times. Streets undergoing construction shall have the curb lane kept open for fire and emergency purposes. Fire hydrants in construction areas shall remain accessible.

Impacts on vehicular access to community facilities shall be lessened with proper installation of street signs indicating alternate routes to the facility. Pedestrian access to and from the facility shall be improved where necessary with construction of temporary walkways and protective fences. Construction sites which are located near a park or school shall be securely fenced and shielded to protect patrons and students from debris, falling objects, and construction equipment. School crossing guards shall be provided when necessary, to ensure students' safety.

Law Enforcement

Surveillance of the corridor shall be provided at as high a level as is practicable. This includes area flood lighting to be activated by corridor or law enforcement personnel and possibly, video cameras with recording capabilities at selected locations. An important element of corridor surveillance shall be a continuous open line of communications between personnel working in the corridor and law enforcement officials.

Fire Services

Access roads to the trench shall accommodate emergency fire equipment and be wide enough to provide for the effective use of emergency equipment and vehicles. Fire departments along the corridor have recommended that access to water be provided in the trench. The specific approach to providing water access shall be decided during subsequent project design in consultation with affected fire departments.

2.5 ENVIRONMENTAL MITIGATION PLAN

The project shall implement a variety of mitigation measures as mentioned in this chapter, and included in the Alameda Corridor Project Mitigation Monitoring Program.

Once constructed, the proposed project results in an improvement in the operating efficiency of the rail system that connects the San Pedro Bay ports with regional rail systems. This benefits the productivity of local and regional business, and industrial economies that are dependent on ports-related transportation. These benefits will be realized in the near term and will continue to grow in the future as rail transport activity increases at the ports. The tradeoff for these productivity benefits are short-term disruptions during the project's construction period, such as traffic flow obstructions near the construction sites, noise impacts on nearby residences, and lower air quality associated with the operation of construction equipment and the release of fugitive dust from construction site. Construction period impacts are temporary and are outweighed by the near-and-long-term productivity benefits of the project.

END OF SECTION 2

3.0 RAILROAD DESIGN

3.1 INTRODUCTION

The basic requirement for railroad geometric design is to provide a track structure that is consistent with economical and efficient train operation.

The criteria presented herein follows accepted engineering practices used on operating, Class 1 railroads. Applications of this criteria at specific locations are subject to revisions and approvals by the specific railroad at that location.

3.2 DESIGN CODES, MANUALS, STANDARDS, AND SPECIFICATIONS

3.2.1 General

The railroad design shall meet all applicable parts of the State of California general laws, California PUC requirements, FRA safety requirements, and the specific requirements of this section.

Where any conflict in criteria exists, the stricter criteria shall govern unless stated otherwise in this document, or approved in writing by ACTA.

Unless specifically noted otherwise in this criteria, the latest edition of the code, regulation, and standard that is applicable at the time the design is initiated shall be used. If a new edition or amendment to a code, regulation, or standard is issued before the design is completed, the design shall conform to the new requirements to the extent approved or required by the agency enforcing the code, regulation, or standard changed.

The guidelines/design criteria assembled in this document are based on industry standards, governmental regulations, local practices, and railroad guidelines/standards. The following publications and documents were utilized:

- CPUC general orders (see below)
- Burlington Northern Santa Fe
- Union Pacific (UP/SP)
- AREA Recommended Practice
- Caltrans Highway Design Manual
- SCRRA standards
- FRA safety standards
- CCFR Part 195 - Transportation of Hazardous Liquids by Pipeline
- Government Code of the State of California
- Cal OSHA - Safety Orders

The specific CPUC General Orders that shall govern are :

- CPUC G.O. No. 26 - Clearances
- CPUC G.O. No. 33 - Interlocking Plants
- CPUC G.O. No. 36 - Abolition of Services
- CPUC G.O. No. 72 - At-Grade Crossings
- CPUC G.O. No. 75 - Protection of Crossings
- CPUC G.O. No. 88 - Rules for Altering Public Grade Crossings

- CPUC G.O. No. 95 - Rules Governing Overhead Electric Line Construction
- CPUC G.O. No. 112 - Utility Construction
- CPUC G.O. No. 118 - Walkways Maintenance and Construction
- CPUC G.O. No. 128 - Rules for Underground Electric Construction

3.3 HORIZONTAL ALIGNMENT

3.3.1 General

The parameters for the design of horizontal alignments are established in accordance with the recommendations of the Manual for Railway Engineering, published by the American Railway Engineering Association (AREA), latest edition, and the appropriate standards cited herein.

The horizontal alignment of mainline tracks shall consist of tangents joined to circular curves by transition spirals. Spiral curves are not required in yards and auxiliary tracks.

The design operating speeds for main line tracks shall be:

LOSSAN Corridor (Amtrak, Metrolink)	79 mph (127 km/h)
ACTA Mainline (Freight)	40 mph (64 km/h)

Each route shall be stationed independently along the centerline of track. Stationing shall be based on the right hand track with increasing stationing toward the Ports.

Separate stationing shall be used for the other tracks where tracks are neither parallel or concentric, where widened track centers are required around curves, or where tracks are in separate structures. Reasonable deviations must be approved by ACTA.

3.3.2 Track Centers

Track centers distance between mainline or two yard tracks is 15 feet (4.572 m) minimum. The minimum distance between center lines of a main and a non-main parallel track is 16 feet.

The two main tracks shall generally be, where possible, parallel and concentric curves with spirals.

Fifteen feet (4.572 m) track centers are adequate for tangent track. Track centers in curves shall be increased either 1 foot or 2 inches per degree of curvature plus 3.5 inches per inch of superelevation (where applicable) , whichever is greater.

3.3.3 Tangent Alignment

The desired minimum tangent length (L) between curves or spirals shall be determined by the following formula:

$$L = 3V$$

where L = minimum tangent length, feet
V = design speed through the curve, mph

The minimum tangent length between curves or spirals shall be 100 feet (30.480 m).

3.3.4 Curved Alignment

A. Circular Curves

1. Circular curves shall, preferably, be defined by the chord definition of curvature and specified by their radii and/or degree of curvature.

2. Desirable minimum radii (Rmin) and maximum degrees of curvature (Dc) shall be as follows:

	Rmin	Dc
Main Line – LOSSAN	954 feet (291 m)	6°
Main Line - ACTA	573 feet (175 m)	10°
Yard Tracks	477 feet (146 m)	12°
Freight Connection Tracks	573 feet (175 m)	10°

Special approval for lesser radii shall be obtained from ACTA.

B. Superelevation

1. In the design of horizontal alignments, the allowable actual superelevation throughout curved sections shall be determined by considering actual speeds, allowable Eu, and passenger comfort. Superelevation is defined as the elevation difference in inches between high rail and low rail, and consists of the following elements:

$$Er = Ea + Eu$$

where Er = total amount of superelevation required for equilibrium, inches
Ea = actual superelevation, inches
Eu = unbalanced superelevation (the difference between the equilibrium superelevation and the actual superelevation), inches.

2. Superelevation shall be determined from the following formula:

$$Ea + Eu = 3.839\ V^2/R$$

where V = design speed through the curve, mph
R = Radius of curve, feet

3. The desired minimum length (L) of a superelevated circular curve shall be determined by the formula:

$$L = 3V$$

where L = minimum length of curve, feet
V = design speed through curve, mph

4. The desired maximum unbalanced superelevation for passenger lines is 3 inches. The maximum desired actual superelevation is 4 inches. Where the design speed of a section of alignment can be increased by the addition of actual superelevation above 4 inches, an absolute maximum of 5 inches may be utilized. Approval shall be obtained from ACTA and the effected passenger carriers for Ea to exceed 4 inches.

5. The desirable maximum unbalanced superelevation (Eu) throughout the freight system shall be 1 inches. The absolute maximum shall be 2 inches with the approval of ACTA. Non ACTA tracks shall follow the owner's standards.

6. Values for actual superelevation (Ea) shall be rounded to the nearest 1/8 inch.

7. 7. Actual superelevation (Ea) shall be achieved linearly throughout the full length of the spiral transition curve by adjusting the outside rail while maintaining the top of the inside rail at profile grade. The rate of change of superelevation shall be as defined in section C.

8. Yard and secondary tracks and special trackwork (turnouts, crossovers, etc.) shall not be superelevated.

9. **Tables 3-1 to 3-4**, show maximum operating speeds with 1 ¾ inches, 2 inches, 3 inches, and 4 inches of unbalance, respectively.

C. Spiral Transition Curves

1. Spiral transition curves shall be used in mainline tracks to connect tangents to circular curves or to connect compound circular curves. The spiral to be used shall be the clothoid spiral. Spiral curve functions and abbreviations are shown on ACTA standard plans.

2. No spirals shall be required for curves with radii of 10,000 feet (3048 m) or greater.

3. The desired minimum length of spiral (Ls) shall be the greater of the lengths as determined by the following formulae, rounded to the nearest 10 feet (3.048 m), but not less than 50 feet (15.24 m):

$$Ls = 31\,Ea$$
$$Ls = 1.17\,EaV$$
$$Ls = 1.22\,EuV$$

Where Ea and Eu are in inches, V in mph, and Ls in feet.

TABLE 3-1
DESIRED MAXIMUM OPERATING SPEED
FOR FREIGHT LINES (MPH)
(Eu = 1 3/4")

Degree of Curvature	Superelevation, Ea (inches)																Radius	
	0	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	(feet)	(meters)
0 30"	72	82	86	91	95	98	102	106	109	113	116	119	122	125	128	131	11459.16	3492.751
0 40"	63	71	75	78	82	85	89	92	95	98	100	103	106	108	111	113	8594.37	2619.563
0 50"	56	63	67	70	73	76	79	82	85	87	90	92	95	97	99	101	6875.49	2095.650
1 00"	51	58	61	64	67	70	72	75	77	80	82	84	86	89	91	93	5729.58	1746.375
1 15"	46	52	55	57	60	62	65	67	69	71	73	75	77	79	81	83	4583.66	1397.100
1 30"	42	47	50	52	55	57	59	61	63	65	67	69	71	72	74	76	3819.72	1164.250
1 45"	39	44	46	48	51	53	55	57	58	60	62	64	65	67	68	70	3274.04	997.929
2 00"	36	41	43	45	47	49	51	53	55	56	58	60	61	63	64	66	2864.79	873.188
2 15"	34	39	41	43	45	46	48	50	52	53	55	56	58	59	60	62	2546.48	776.167
2 30"	32	37	39	41	42	44	46	47	49	50	52	53	55	56	57	59	2291.83	698.550
2 45"	31	35	37	39	40	42	44	45	47	48	49	51	52	53	55	56	2083.48	635.046
3 00"	30	33	35	37	39	40	42	43	45	46	47	49	50	51	52	53	1909.86	582.125
3 15"	28	32	34	36	37	39	40	41	43	44	45	47	48	49	50	51	1762.95	537.346
3 30"	27	31	33	34	36	37	39	40	41	43	44	45	46	47	48	50	1637.02	498.964
3 45"	26	30	32	33	35	36	37	39	40	41	42	43	45	46	47	48	1527.89	465.700
4 00"	26	29	31	32	33	35	36	37	39	40	41	42	43	44	45	46	1432.39	436.594
4 15"	25	28	30	31	32	34	35	36	37	39	40	41	42	43	44	45	1348.14	410.912
4 30"	24	27	29	30	32	33	34	35	36	38	39	40	41	42	43	44	1273.24	388.083
4 45"	23	27	28	29	31	32	33	34	35	37	38	39	40	41	42	43	1206.23	367.658
5 00"	23	26	27	29	30	31	32	33	34	36	37	38	39	40	41	41	1145.92	349.275
5 15"	22	25	27	28	29	30	32	33	34	35	36	37	38	39	40	40	1091.35	332.643
5 30"	22	25	26	27	29	30	31	32	33	34	35	36	37	38	39	40	1041.74	317.523
5 45"	21	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	996.45	303.717
6 00"	21	24	25	26	27	28	30	31	32	33	33	34	35	36	37	38	954.93	291.063
6 15"	20	23	24	26	27	28	29	30	31	32	33	34	35	35	36	37	916.73	279.420
6 30"	20	23	24	25	26	27	28	29	30	31	32	33	34	35	36	36	881.47	268.673
6 45"	20	22	24	25	26	27	28	29	30	31	32	32	33	34	35	36	848.83	258.722
7 00"	19	22	23	24	25	26	27	28	29	30	31	32	33	33	34	35	818.51	249.482
7 15"	19	22	23	24	25	26	27	28	29	30	30	31	32	33	34	34	790.29	240.879
7 30"	19	21	23	23	24	25	26	27	28	29	30	31	32	32	33	34	763.94	232.850
7 45"	18	21	22	23	24	25	26	27	28	29	29	30	31	32	33	33	739.30	225.339
8 00"	18	20	22	23	24	25	26	26	27	28	29	30	31	31	32	33	716.20	218.297
8 15"	18	20	21	22	23	24	25	26	27	28	29	29	30	31	32	32	694.49	211.682
8 30"	18	20	21	22	23	24	25	26	27	27	28	29	30	30	31	32	674.07	205.456
8 45"	17	20	21	22	23	24	24	25	26	27	28	28	29	30	31	31	654.81	199.586
9 00"	17	19	20	21	22	23	24	25	26	27	27	28	29	30	30	31	636.62	194.042
9 15"	17	19	20	21	22	23	24	25	25	26	27	28	28	29	30	30	619.41	188.797
9 30"	17	19	20	21	22	23	23	24	25	26	27	27	28	29	29	30	603.11	183.829
9 45"	16	19	20	21	21	22	23	24	25	26	26	27	28	28	29	30	587.65	179.115
10 00"	16	18	19	20	21	22	23	24	24	25	26	27	27	28	29	29	572.96	174.638
10 15"	16	18	19	20	21	22	23	23	24	25	26	26	27	28	28	29	558.98	170.378
10 30"	16	18	19	20	21	21	22	23	24	25	25	26	27	27	28	29	545.67	166.321
10 45"	16	18	18	20	20	21	22	23	24	24	25	26	26	27	28	28	532.98	162.454
11 00"	16	17	18	19	20	21	22	23	23	24	25	25	26	27	27	28	520.87	158.761
11 15"	15	17	18	19	20	21	22	22	23	24	24	25	26	26	27	28	509.30	155.233
11 30"	15	17	18	19	20	21	21	22	23	23	24	25	25	26	27	27	498.22	151.859
11 45"	15	17	18	18	20	20	21	22	23	23	24	25	25	26	26	27	487.62	148.628
12 00"	15	17	18	18	19	20	21	22	22	23	24	24	25	26	26	27	477.46	145.531

TABLE 3-2
ABSOLUTE MAXIMUM OPERATING SPEED
FOR FREIGHT LINES (MPH)
(Eu = 2")

Degree of Curvature	Superelevation, Ea (inches)																Radius	
	0	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	(feet)	(meters)
0 30"	77	86	91	95	98	102	106	109	113	116	119	122	125	128	131	134	11459.16	3492.751
0 40"	67	75	78	82	85	89	92	95	98	100	103	106	108	111	113	116	8594.37	2619.563
0 50"	60	67	70	73	76	79	82	85	87	90	92	95	97	99	101	104	6875.49	2095.650
1 00"	55	61	64	67	70	72	75	77	80	82	84	86	89	91	93	95	5729.58	1746.375
1 15"	49	55	57	60	62	65	67	69	71	73	75	77	79	81	83	85	4583.66	1397.100
1 30"	45	50	52	55	57	59	61	63	65	67	69	71	72	74	76	77	3819.72	1164.250
1 45"	41	46	48	51	53	55	57	58	60	62	64	65	67	68	70	72	3274.04	997.929
2 00"	39	43	45	47	49	51	53	55	56	58	60	61	63	64	66	67	2864.79	873.188
2 15"	36	41	43	45	46	48	50	52	53	55	56	58	59	60	62	63	2545.48	776.167
2 30"	35	39	41	42	44	46	47	49	50	52	53	55	56	57	59	60	2291.83	698.550
2 45"	33	37	39	40	42	44	45	47	48	49	51	52	53	55	56	57	2083.48	635.046
3 00"	32	35	37	39	40	42	43	45	46	47	49	50	51	52	53	55	1909.86	582.125
3 15"	30	34	36	37	39	40	41	43	44	45	47	48	49	50	51	52	1762.95	537.346
3 30"	29	33	34	36	37	39	40	41	43	44	45	46	47	48	50	51	1637.02	498.964
3 45"	28	32	33	35	36	37	39	40	41	42	43	45	46	47	48	49	1527.89	465.700
4 00"	27	31	32	33	35	36	37	39	40	41	42	43	44	45	46	47	1432.39	436.594
4 15"	27	30	31	32	34	35	36	37	39	40	41	42	43	44	45	46	1348.14	410.912
4 30"	26	29	30	32	33	34	35	36	38	39	40	41	42	43	44	45	1273.24	388.083
4 45"	25	28	29	31	32	33	34	35	37	38	39	40	41	42	43	43	1206.23	367.658
5 00"	24	27	28	30	31	32	33	35	36	37	38	39	40	41	41	42	1145.92	349.275
5 15"	24	27	28	29	30	32	33	34	35	36	37	38	39	40	40	41	1091.35	332.643
5 30"	23	26	27	29	30	31	32	33	34	35	36	37	38	39	40	40	1041.74	317.523
5 45"	23	25	27	28	29	30	31	32	33	34	35	36	37	38	39	39	996.45	303.717
6 00"	22	25	26	27	28	30	31	32	33	33	34	35	36	37	38	39	954.93	291.063
6 15"	22	24	26	27	29	29	30	31	32	33	34	35	35	36	37	38	916.73	279.420
6 30"	21	24	25	26	27	28	29	30	31	32	33	34	35	36	36	37	881.47	268.673
6 45"	21	24	25	26	27	28	29	30	31	32	32	33	34	35	36	36	848.83	258.722
7 00"	21	23	24	25	26	27	28	29	30	31	32	33	33	34	35	36	818.51	249.482
7 15"	20	23	24	25	26	27	28	29	30	30	31	32	33	34	34	35	790.29	240.879
7 30"	20	22	23	24	25	26	27	28	29	30	31	32	32	33	34	35	763.94	232.850
7 45"	20	22	23	24	25	26	27	28	29	29	30	31	32	33	33	34	739.30	225.339
8 00"	19	22	23	24	25	26	26	27	28	29	30	31	31	32	33	33	716.20	218.297
8 15"	19	21	22	23	24	25	26	27	28	29	29	30	31	32	32	33	694.49	211.682
8 30"	19	21	22	23	24	25	26	27	27	28	29	30	30	31	32	32	674.07	205.456
8 45"	18	21	22	23	24	24	25	26	27	28	28	29	30	31	31	32	654.81	199.586
9 00"	18	20	21	22	23	24	25	26	27	27	28	29	30	30	31	32	636.62	194.042
9 15"	18	20	21	22	23	24	25	25	26	27	28	28	29	30	30	31	619.41	188.797
9 30"	18	20	21	22	23	23	24	25	26	27	27	28	29	29	30	31	603.11	183.829
9 45"	17	20	21	21	22	23	24	25	26	26	27	28	28	29	30	30	587.65	179.115
10 00"	17	19	20	21	22	23	24	24	25	26	27	27	28	29	29	30	572.96	174.638
10 15"	17	19	20	21	22	23	23	24	25	26	26	27	28	28	29	30	558.98	170.378
10 30"	17	19	20	21	21	22	23	24	25	25	26	27	27	28	29	29	545.67	166.321
10 45"	17	19	20	20	21	22	23	24	24	25	26	26	27	28	28	29	532.98	162.454
11 00"	16	18	19	20	21	22	23	23	24	25	25	26	27	27	28	29	520.87	158.761
11 15"	16	18	19	20	21	22	22	23	24	24	25	26	26	27	28	28	509.30	155.233
11 30"	16	18	19	20	21	21	22	23	23	24	25	25	26	27	27	28	498.22	151.859
11 45"	16	18	19	20	20	21	22	23	23	24	25	25	26	26	27	28	487.62	148.628
12 00"	16	18	18	19	20	21	22	22	23	24	24	25	26	26	27	27	477.46	145.531

TABLE 3-3
DESIRED MAXIMUM OPERATING SPEED
FOR PASSENGER LINES (MPH)
(Eu = 3")

Degree of Curvature	Superelevation, Ea (inches)																Radius	
	0	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	(feet)	(meters)
0 30"	95	102	106	109	113	116	119	122	125	128	131	134	137	139	142	145	11459.16	3492.751
0 40"	82	89	92	95	98	100	103	106	108	111	113	116	118	121	123	125	8594.37	2619.563
0 50"	73	79	82	85	87	90	92	95	97	99	101	104	106	108	110	112	6875.49	2095.650
1 00"	67	72	75	77	80	82	84	86	89	91	93	95	97	98	100	102	5729.58	1746.375
1 15"	60	65	67	69	71	73	75	77	79	81	83	85	86	88	90	91	4583.66	1397.100
1 30"	55	59	61	63	65	67	69	71	72	74	76	77	79	80	82	83	3819.72	1164.250
1 45"	51	55	57	59	60	62	64	65	67	68	70	72	73	74	76	77	3274.04	997.929
2 00"	47	51	53	55	56	58	60	61	63	64	66	67	68	70	71	72	2864.79	873.188
2 15"	45	48	50	52	53	54	56	58	59	60	62	63	64	66	67	68	2546.48	776.167
2 30"	42	46	47	49	50	52	53	55	56	57	59	60	61	62	63	65	2291.83	698.550
2 45"	40	44	45	47	48	49	51	52	53	55	56	57	58	59	61	62	2083.48	635.046
3 00"	38	42	43	45	46	47	49	50	51	52	53	55	56	57	58	59	1909.86	582.125
3 15"	37	40	41	43	44	45	47	48	49	50	51	52	54	55	56	57	1762.95	537.346
3 30"	36	39	40	41	43	44	45	46	47	48	50	51	52	53	54	55	1637.02	498.964
3 45"	35	37	39	40	41	42	43	45	46	47	48	49	50	51	52	53	1527.89	465.700
4 00"	33	36	37	39	40	41	42	43	44	45	46	47	48	49	50	51	1432.39	436.594
4 15"	32	35	36	37	39	40	41	42	43	44	45	46	47	48	49	50	1348.14	410.912
4 30"	32	34	35	36	38	39	40	41	42	43	44	45	46	46	47	48	1273.24	388.083
4 45"	31	33	34	35	37	38	39	40	41	42	43	43	44	45	46	47	1206.23	367.658
5 00"	30	32	33	35	36	37	38	39	40	41	41	42	43	44	45	46	1145.92	349.275
5 15"	29	32	33	34	35	36	37	38	39	40	40	41	42	43	44	45	1091.35	332.643
5 30"	29	31	32	33	34	35	36	37	38	39	40	40	41	42	43	44	1041.74	317.523
5 45"	28	30	31	32	33	34	35	36	37	38	39	39	40	41	42	43	995.45	303.717
6 00"	27	30	31	32	33	33	34	35	36	37	38	39	39	40	41	42	954.93	291.063
6 15"	27	29	30	31	32	33	34	35	35	36	37	38	39	39	40	41	916.73	279.420
6 30"	26	28	29	30	31	32	33	34	35	36	36	37	38	39	39	40	881.47	268.673
6 45"	26	28	29	30	31	32	32	33	34	35	36	36	37	38	39	38	848.83	258.722
7 00"	25	27	28	29	30	31	32	33	33	34	35	36	37	37	38	39	818.51	249.482
7 15"	25	27	28	29	30	30	31	32	33	34	34	35	36	37	37	38	790.29	240.879
7 30"	24	26	27	28	29	30	31	32	32	33	34	35	35	36	37	37	763.94	232.850
7 45"	24	26	27	28	29	29	30	31	32	33	33	34	35	35	36	37	739.30	225.339
8 00"	24	26	26	27	28	29	30	31	31	32	33	33	34	35	35	36	716.20	218.297
8 15"	23	25	26	27	28	29	29	30	31	32	32	33	34	34	35	36	694.49	211.682
8 30"	23	25	26	27	27	28	29	30	30	31	32	32	33	34	34	35	674.07	205.456
8 45"	23	24	25	26	27	28	28	29	30	31	31	32	33	33	34	35	654.81	199.586
9 00"	22	24	25	26	27	27	28	29	30	30	31	32	32	33	33	34	636.62	194.042
9 15"	22	24	25	25	26	27	28	28	29	30	30	31	32	32	33	34	619.41	188.797
9 30"	22	23	24	25	26	27	27	28	29	29	30	31	31	32	33	33	603.11	183.829
9 45"	21	23	24	25	26	26	27	28	28	29	30	30	31	32	32	33	587.65	179.115
10 00"	21	23	24	24	25	26	27	27	28	29	29	30	31	31	32	32	572.96	174.638
10 15"	21	23	23	24	25	26	26	27	28	28	29	30	30	31	31	32	558.98	170.378
10 30"	21	22	23	24	25	25	26	27	27	28	29	29	30	30	31	32	545.67	166.321
10 45"	20	22	23	24	24	25	26	26	27	28	28	29	29	30	31	31	532.98	162.454
11 00"	20	22	23	23	24	25	25	26	27	27	28	29	29	30	30	31	520.87	158.761
11 15"	20	22	22	23	24	24	25	26	26	27	28	28	29	29	30	30	509.30	155.233
11 30"	20	21	22	23	23	24	25	25	26	27	27	28	28	29	30	30	498.22	151.859
11 45"	20	21	22	23	23	24	25	25	26	26	27	28	28	28	29	30	487.62	148.628
12 00"	19	21	22	22	23	24	24	25	26	26	27	27	28	28	29	30	477.46	145.531

TABLE 3-4
ABSOLUTE MAXIMUM OPERATING SPEED
FOR PASSENGER LINES (MPH)
(Eu = 4")

Degree of Curvature	Superelevation, Ea (inches)																Raduis	
	0	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	(feet)	(meters)
0 30"	109	116	119	122	125	128	131	134	137	139	142	145	147	150	152	155	11459.16	3492.751
0 40"	95	100	103	106	108	111	113	116	118	121	123	125	127	130	132	134	8594.37	2619.563
0 50"	85	90	92	95	97	99	101	104	106	108	110	112	114	116	118	120	6875.49	2095.650
1 00"	77	82	84	86	89	91	93	95	97	98	100	102	104	106	108	109	5729.58	1746.375
1 15"	69	73	75	77	79	81	83	85	86	88	90	91	93	95	96	98	4583.66	1397.100
1 30"	63	67	69	71	72	74	76	77	79	80	82	83	85	86	88	89	3819.72	1164.250
1 45"	58	62	64	65	67	69	70	72	73	74	76	77	79	80	81	83	3274.04	997.929
2 00"	55	58	60	61	63	64	66	67	68	70	71	72	74	75	76	77	2864.79	873.188
2 15"	52	55	56	58	59	60	62	63	64	66	67	68	69	71	72	73	2546.48	776.167
2 30"	49	52	53	55	56	57	58	60	61	62	63	65	66	67	68	69	2291.83	698.550
2 45"	47	49	51	52	53	55	56	57	58	59	61	62	63	64	65	66	2083.48	635.046
3 00"	45	47	49	50	51	52	53	55	56	57	58	59	60	61	62	63	1909.86	582.125
3 15"	43	45	47	48	49	50	51	52	54	55	56	57	58	59	60	61	1762.95	537.346
3 30"	41	44	45	46	47	48	50	51	52	53	54	55	56	57	57	59	1637.02	498.964
3 45"	40	42	43	45	46	47	48	49	50	51	52	53	54	55	56	56	1527.89	465.700
4 00"	39	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	1432.39	436.594
4 15"	37	40	41	42	43	44	45	46	47	48	49	50	50	51	52	53	1348.14	410.912
4 30"	36	39	40	41	42	43	44	45	46	46	47	48	49	50	51	52	1273.24	388.083
4 45"	35	38	39	40	41	42	43	43	44	45	46	47	48	49	49	50	1205.23	367.658
5 00"	35	37	38	39	40	41	41	42	43	44	45	46	47	47	48	49	1145.92	349.275
5 15"	34	36	37	38	39	40	40	41	42	43	44	45	45	46	47	48	1091.35	332.643
5 30"	33	35	36	37	38	39	40	40	41	42	43	44	44	45	46	47	1041.74	317.523
5 45"	32	34	35	36	37	38	39	39	40	41	42	43	43	44	45	46	995.45	303.717
6 00"	32	33	34	35	36	37	38	39	39	40	41	42	42	43	44	45	954.93	291.063
6 15"	31	33	34	35	35	36	37	38	39	39	40	41	42	42	43	44	918.73	279.420
6 30"	30	32	33	34	35	36	36	37	38	39	39	40	41	41	42	43	881.47	268.673
6 45"	30	32	32	33	34	35	36	36	37	38	39	39	40	41	41	42	848.83	258.722
7 00"	29	31	32	33	33	34	35	36	37	37	38	39	39	40	41	41	818.51	249.482
7 15"	29	30	31	32	33	34	34	35	36	37	37	38	39	39	40	41	790.29	240.879
7 30"	28	30	31	32	32	33	34	35	35	36	37	37	38	39	39	40	763.94	232.850
7 45"	28	29	30	31	32	33	33	34	35	35	36	37	37	38	39	39	739.30	225.339
8 00"	27	29	30	31	31	32	33	33	34	35	35	36	37	37	38	39	715.20	218.297
8 15"	27	29	29	30	31	32	32	33	34	34	35	36	36	37	37	38	694.49	211.682
8 30"	27	28	29	30	30	31	32	32	33	34	34	35	36	36	37	37	674.07	205.456
8 45"	26	28	28	29	30	31	31	32	33	33	34	35	35	36	36	37	654.81	199.585
9 00"	25	27	28	29	30	30	31	32	32	33	33	34	35	35	36	36	636.62	194.042
9 15"	25	27	28	28	29	30	30	31	32	32	33	34	34	35	35	36	619.41	188.797
9 30"	25	27	27	28	29	29	30	31	31	32	33	33	34	34	35	35	603.11	183.829
9 45"	25	26	27	28	28	29	30	30	31	32	32	33	33	34	34	35	587.65	179.115
10 00"	24	26	27	27	28	29	29	30	31	31	32	32	33	33	34	35	572.96	174.638
10 15"	24	26	26	27	28	28	29	30	30	31	31	32	32	33	34	34	558.98	170.378
10 30"	24	25	26	27	27	28	29	29	30	30	31	32	32	33	33	34	545.67	166.321
10 45"	24	25	26	26	27	28	28	29	29	30	31	31	32	32	33	33	532.98	162.454
11 00"	23	25	25	26	27	27	28	29	29	30	30	31	31	32	32	33	520.87	158.761
11 15"	23	24	25	26	26	27	28	28	29	29	30	30	31	32	32	33	509.30	155.233
11 30"	23	24	25	25	26	27	27	28	28	29	30	30	31	31	32	32	498.22	151.859
11 45"	23	24	25	25	26	26	27	28	28	29	29	30	30	31	31	32	487.62	148.628
12 00"	22	24	24	25	26	26	27	27	28	28	29	30	30	31	31	32	477.46	145.531

4. The rate of change in superelevation throughout the spiral shall be approximately ½ inch per 31 feet for speeds up to 50 mph.

5. Where the desired spiral length is not adequate to accommodate this rate the Ea may be carried equally between the tangent and the curve linearly over a length equal to 1.5EaV, rounded to the next 10 feet (3.048 m), and divided equally between the tangent and curve.

D. Compound Circular Curves

1. Where compound circular curves are required a spiral shall be inserted between the circular curves. The minimum length of the spiral shall be the greater of the lengths determined by the following:

$$Ls = 1.17\,(Ea2 - Ea1)\,V,$$
or
$$Ls = 1.22\,(Eu2 - Eu1)\,V$$

where
- Ls= minimum length of spiral, feet
- Ea1= actual superelevation on the first circular curve, inches.
- Ea2= actual superelevation on the second circular curve, inches.
- Eu1= unbalanced superelevation on the first circular curve, inches.
- Eu2= unbalanced superelevation on the second circular curve, inches
- V= design speed through the circular curves, mph

2. The desired minimum length of spiral between compound curves shall be 100 feet (30.480 m).

3. If the calculated minimum length of spiral is 25 feet (7.620 m) or less, no spiral shall be required. The difference in superelevation shall be attained throughout a length of 25 feet (7.620 m) measured back from the point of compound curve (PCC) within the curve of larger radius.

E. Reverse Curves

The minimum desired tangent length between reversed curves shall be 200 feet (60.960 m) on main line tracks. The absolute minimum tangent length shall be 100 feet (30.480 m),

3.4 VERTICAL ALIGNMENT

3.4.1 General

A. The profile grade shall represent the elevation of the top of the low rail (T/R).

B. When T/R profile is given for one track only, the T/R elevations of the other tracks are to be equal to the profile track at points radially and perpendicularly opposite. Gradients and lengths of vertical curves to vary accordingly (slightly) to accommodate the differences in lengths through horizontal curves.

3.4.2 Grades

A. Main Line Segments

1. Passenger (LOSSAN)

a. For standard track installation, the maximum desired sustained grade for mainline shall be 2.0 percent; the absolute maximum sustained grade shall be 3.0 percent.

b. No minimum grade is specified, but adequate drainage shall be provided for all trackage.

c. For main line track, the desired length of constant profile grade between vertical curves shall be determined by the following formula, but not less than 100 feet (30.480 m).

$$L = 3V$$

where L = minimum tangent length, feet
V = design speed in the area, mph

2. Freight (ACTA main line)

a. Maximum desirable (long sustained grade) 1.0 percent

b. Maximum absolute (long sustained grade) 1.5 percent

c. Maximum absolute (short sustained grade) 2.0 percent
up to 1000 feet between PVI's (points of vertical intersections, with ACTA approval)

3. Freight (secondary)

a. Maximum desirable 2.0 percent

b. Maximum absolute (With railroad approval) 3.5 percent

c. Existing freight sidings and leads may be maintains at the existing grade and alignment.

B. Yard and Shop Tracks

1. For yard tracks, the absolute maximum grade shall be 1.0 percent. A grade of 0.0 percent is preferred, but adequate drainage at subgrade level shall be provided for all trackage.

C. Storage Tracks

1. It is desired that the grade of a stub end storage track descend toward the stub end, and if adjacent to a main line or secondary track, be curved away from the track at its stub end. If it is necessary to grade the storage track up toward the stub end, the grade shall not exceed .20 percent, a derailment device may be required by the owner.

2. It is desirable that through storage tracks have a sag in the middle of their profile to prevent rail cars from rolling to either end.

3.4.3 Vertical Curvature

A. Main Line Tracks

1. All changes in grade shall be connected by vertical curves. For main line tracks the minimum length of vertical curve shall be determined by the following formula:

$$L = D V^2(K)/A$$

where A = vertical acceleration in ft/sec²
D = absolute value of the difference in rates of grades expressed as a decimal
K = 2.15 conversion factor to give L in feet
L = length of vertical curve in feet
V = speed of train in miles per hour

2. The recommended vertical acceleration is 0.60 ft/sec/sec (0.02 g) for both sags and summits.

Table 3-5 calculates the "recommended minimum lengths of vertical curves"

3. The minimum length of vertical curves shall not be less than 100 feet (30.480 m).

4. Back-to-back reverse vertical curves may not be used. The minimum tangent length between vertical curves shall be 100 feet (30.480 m).

5. Compound and unsymmetrical vertical curves may be used, provided each curve conforms to requirements stated herein.

6. Vertical curves shall not be required for grade intersections where the algebraic difference in grade is less than 0.1 percent.

B. Combined Horizontal and Vertical Curves.

Where the combination of horizontal and vertical curves cannot be avoided the minimum distance between vertical control points (PVC and PVT) and horizontal control points (TS and ST) shall be 100 feet (30.480 m)

3.4.4 Turnouts

Turnouts for trackwork shall comply with ACTA Standard Plans and Specifications, and applicable railroad or AREA standards.

The following turnouts (frog number) shall be used on all ACTA tracks wherever possible:

No. 20 - 40 mph, mainline crossovers.

NO. 14 – 30 mph, Any connections to mainline tracks or mainline applications when No. 20 turnouts are not required (or possible) due to speed or alignment constraints

Sharper frog angles may be used for railroad connections providing that current railroad standards are met. Deviations from this must be approved by ACTA and the railroads.

Common Frog numbers for UPRR tracks are as follows:

No. 7 – Yard switching
No. 8 – Yard switching
No. 9 – Yard switching
No.10 – Standard mainline
No.14 – Standard mainline
No.15 – Standard mainline
No.20 – Standard mainline

Common Frog numbers for BNSF tracks are as follows:

No. 6 1/2 – Yard switching
No. 8 – Yard switching
No. 9 – Yard switching
No.10 – Standard mainline
No.11 – Standard mainline
No.14 – Standard mainline
No.20 – Standard mainline

Refer to **Table 3-6** for information required for the incorporation of turnouts in alignment designs.

TABLE 3-5

RECOMMENDED MINIMUM LENGTH OF VERTICAL CURVES (see notes next page)

Difference of Grade	40 MPH	50 MPH	60 MPH	70 MPH	80 MPH	90 MPH	100 MPH	110 MPH	120 MPH	130 MPH	140 MPH
0.001	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
0.002	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	103.25	121.18	140.54
0.003	100.00	100.00	100.00	100.00	100.00	100.00	107.56	130.14	154.88	181.77	210.81
0.004	100.00	100.00	100.00	100.00	100.00	116.16	143.41	173.52	206.51	242.36	281.08
0.005	100.00	100.00	100.00	100.00	114.73	145.20	179.26	216.90	258.13	302.95	351.35
0.006	100.00	100.00	100.00	105.40	137.67	174.24	215.11	260.28	309.76	363.54	421.62
0.007	100.00	100.00	100.00	122.97	160.62	203.28	250.96	303.66	361.38	424.13	491.88
0.008	100.00	100.00	103.25	140.54	183.56	232.32	286.81	347.04	413.01	484.71	562.15
0.009	100.00	100.00	116.16	158.11	206.51	261.36	322.67	390.42	464.64	545.30	632.42
0.010	100.00	100.00	129.07	175.67	229.45	290.40	358.52	433.81	516.26	605.89	702.69
0.011	100.00	100.00	141.97	193.24	252.40	319.44	394.37	477.19	567.89	666.48	772.96
0.012	100.00	107.56	154.88	210.81	275.34	348.48	430.22	520.57	619.52	727.07	843.23
0.013	100.00	116.52	167.79	228.38	298.29	377.52	466.07	563.95	671.14	787.66	913.50
0.014	100.00	125.48	180.69	245.94	321.23	406.56	501.92	607.33	722.77	848.25	983.77
0.015	100.00	134.44	193.60	263.51	344.18	435.60	537.78	650.71	774.40	908.84	1054.04
0.016	100.00	143.41	206.51	281.08	367.12	464.64	573.63	694.09	826.02	969.43	1124.31
0.017	100.00	152.37	219.41	298.64	390.07	493.68	609.48	737.47	877.65	1030.02	1194.58
0.018	103.25	161.33	232.32	316.21	413.01	522.72	645.33	780.85	929.28	1090.61	1264.85
0.019	108.99	170.30	245.23	333.78	435.96	551.76	681.18	824.23	980.90	1151.20	1335.12
0.020	114.73	179.26	258.13	351.35	458.90	580.80	717.03	867.61	1032.53	1211.79	1405.39
0.021	120.46	188.22	271.04	368.91	481.85	609.84	752.89	910.99	1084.15	1272.38	1475.65
0.022	126.20	197.18	283.95	386.48	504.79	638.88	788.74	954.37	1135.78	1332.96	1545.92
0.023	131.93	206.15	296.85	404.05	527.74	667.92	824.59	997.75	1187.41	1393.55	1616.19
0.024	137.67	215.11	309.76	421.62	550.68	696.96	860.44	1041.13	1239.03	1454.14	1686.46
0.025	143.41	224.07	322.67	439.18	573.63	726.00	896.29	1084.51	1290.66	1514.73	1756.73
0.026	149.14	233.04	335.57	456.75	596.57	755.04	932.14	1127.89	1342.29	1575.32	1827.00
0.027	154.88	242.00	348.48	474.32	619.52	784.08	968.00	1171.27	1393.91	1635.91	1897.27
0.028	160.62	250.96	361.38	491.88	642.46	813.12	1003.85	1214.65	1445.54	1696.50	1967.54
0.029	166.35	259.92	374.29	509.45	665.41	842.16	1039.70	1258.03	1497.17	1757.09	2037.81
0.030	172.09	268.89	387.20	527.02	688.35	871.20	1075.55	1301.42	1548.79	1817.68	2108.08
0.031	177.82	277.85	400.10	544.59	711.30	900.24	1111.40	1344.80	1600.42	1878.27	2178.35
0.032	183.56	286.81	413.01	562.15	734.24	929.28	1147.25	1388.18	1652.04	1938.86	2248.62
0.033	189.30	295.78	425.92	579.72	757.19	958.32	1183.11	1431.56	1703.67	1999.45	2318.89
0.034	195.03	304.74	438.82	597.29	780.13	987.35	1218.96	1474.94	1755.30	2060.04	2389.16
0.035	200.77	313.70	451.73	614.86	803.08	1016.39	1254.81	1518.32	1806.92	2120.63	2459.42
0.036	206.51	322.67	464.64	632.42	826.02	1045.43	1290.66	1561.70	1858.55	2181.22	2529.69
0.037	212.24	331.63	477.54	649.99	848.97	1074.47	1326.51	1605.08	1910.18	2241.80	2599.96
0.038	217.98	340.59	490.45	667.56	871.91	1103.51	1362.36	1648.46	1961.80	2302.39	2670.23
0.039	223.71	349.55	503.36	685.13	894.86	1132.55	1398.22	1691.84	2013.43	2362.98	2740.50
0.040	229.45	358.52	516.26	702.69	917.80	1161.59	1434.07	1735.22	2065.06	2423.57	2810.77
0.041	235.19	367.48	529.17	720.26	940.75	1190.63	1469.92	1778.60	2116.68	2484.16	2881.04
0.042	240.92	376.44	542.08	737.83	963.69	1219.67	1505.77	1821.98	2168.31	2544.75	2951.31
0.043	246.66	385.41	554.98	755.39	986.64	1248.71	1541.62	1865.36	2219.94	2605.34	3021.58
0.044	252.40	394.37	567.89	772.96	1009.58	1277.75	1577.47	1908.74	2271.56	2665.93	3091.85
0.045	258.13	403.33	580.80	790.53	1032.53	1306.79	1613.33	1952.12	2323.19	2726.52	3162.12
0.046	263.87	412.29	593.70	808.10	1055.47	1335.83	1649.18	1995.50	2374.81	2787.11	3232.39
0.047	269.60	421.26	606.61	825.66	1078.42	1364.87	1685.03	2038.88	2426.44	2847.70	3302.66
0.048	275.34	430.22	619.52	843.23	1101.36	1393.91	1720.88	2082.26	2478.07	2908.29	3372.92
0.049	281.08	439.18	632.42	860.80	1124.31	1422.95	1756.73	2125.65	2529.69	2968.88	3443.19
0.050	286.81	448.15	645.33	878.37	1147.25	1451.99	1792.58	2169.03	2581.32	3029.47	3513.46
0.051	292.55	457.11	658.24	895.93	1170.20	1481.03	1828.44	2212.41	2632.95	3090.06	3583.73
0.052	298.29	466.07	671.14	913.50	1193.14	1510.07	1864.29	2255.79	2684.57	3150.64	3654.00
0.053	304.02	475.03	684.05	931.07	1216.09	1539.11	1900.14	2299.17	2736.20	3211.23	3724.27
0.054	309.76	484.00	696.96	948.64	1239.03	1568.15	1935.99	2342.55	2787.83	3271.82	3794.54
0.055	315.49	492.96	709.86	966.20	1261.98	1597.19	1971.84	2385.93	2839.45	3332.41	3864.81
0.056	321.23	501.92	722.77	983.77	1284.92	1626.23	2007.69	2429.31	2891.08	3393.00	3935.08
0.057	326.97	510.89	735.68	1001.34	1307.87	1655.27	2043.55	2472.69	2942.70	3453.59	4005.35
0.058	332.70	519.85	748.58	1018.90	1330.81	1684.31	2079.40	2516.07	2994.33	3514.18	4075.62
0.059	338.44	528.81	761.49	1036.47	1353.76	1713.35	2115.25	2559.45	3045.96	3574.77	4145.89
0.060	344.18	537.78	774.40	1054.04	1376.70	1742.38	2151.10	2602.83	3097.58	3635.36	4216.16
0.061	349.91	546.74	787.30	1071.61	1399.65	1771.43	2186.95	2646.21	3149.21	3695.95	4286.43
0.062	355.65	555.70	800.21	1089.17	1422.59	1800.47	2222.80	2689.59	3200.84	3756.54	4356.69
0.063	361.38	564.66	813.12	1106.74	1445.54	1829.51	2258.66	2732.97	3252.46	3817.13	4426.96
0.064	367.12	573.63	825.02	1124.31	1468.48	1858.55	2294.51	2776.35	3304.09	3877.72	4497.23
0.065	372.86	582.59	838.93	1141.88	1491.43	1887.59	2330.36	2819.73	3355.72	3938.31	4567.50
0.066	378.59	591.55	851.84	1159.44	1514.37	1916.63	2366.21	2863.11	3407.34	3998.89	4637.77
0.067	384.33	600.52	864.74	1177.01	1537.32	1945.67	2402.06	2906.49	3458.97	4059.48	4708.04
0.068	390.07	609.48	877.65	1194.58	1560.26	1974.71	2437.91	2949.88	3510.60	4120.07	4778.31
0.069	395.80	618.44	890.56	1212.14	1583.21	2003.75	2473.77	2993.26	3562.22	4180.66	4848.58
0.070	401.54	627.40	903.46	1229.71	1606.15	2032.79	2509.62	3036.64	3613.85	4241.25	4918.85

Notes for table 3-5:

- Round lengths up to the nearest 25 feet
- Vertical tangents should be a car length long. 100 feet minimum.
- Vertical curves should not extend through turnouts and other special trackwork
- Vertical curves with a middle ordinate less than 0.10 feet are not required for design purposes
- Vertical curves with a middle ordinate less than 0.25 feet are not required for construction.
- Lengths for 120 mph approximate current AREA standards.

TABLE 3-6

TURNOUT DATA FOR TRACK ALIGNMENT DESIGN

ROG N	FROG ANGLE (note 3)				PI to PS (note 4)	SWITCH TIES (notes 1 & 4) from PI	SWITCH TIES (notes 1 & 4) from PS	HEEL OF FROG (notes 2 & 4) from PI	HEEL OF FROG (notes 2 & 4) from PS	TURNOUT EQUIVALENT CURVE (note 3) radius	TURNOUT EQUIVALENT CURVE (note 3) degree of curve				SPEED	1/2" POINT OF FROG TO PI
7	8.1712 DEG.	8 DEG.	10 MIN.	16 SEC.	28.92 FT	41 FT	70 FT	40.46 FT	69.38 FT	461.417 FT	12.4416 DEG.	12 DEG.	26 MIN.	30 SEC.	10 MPH	33.25 FT
8	7.1527 DEG.	7 DEG.	09 MIN.	10 SEC.	31.00 FT	57 FT	88 FT	44.92 FT	75.92 FT	602.667 FT	9.5180 DEG.	9 DEG.	31 MIN.	05 SEC.	10 MPH	38.00 FT
9	6.3597 DEG.	6 DEG.	21 MIN.	35 SEC.	30.48 FT	77 FT	107 FT	51.46 FT	81.92 FT	762.750 FT	7.5171 DEG.	7 DEG.	31 MIN.	02 SEC.	10 MPH	42.75 FT
10	5.7248 DEG.	5 DEG.	43 MIN.	29 SEC.	32.80 FT	83 FT	116 FT	56.03 FT	88.83 FT	941.667 FT	6.0874 DEG.	6 DEG.	05 MIN.	16 SEC.	15 MPH	47.50 FT
11	5.2051 DEG.	5 DEG.	12 MIN.	18 SEC.		124 FT	124 FT	103.56 FT	103.56 FT	1139.417 FT	5.0301 DEG.	5 DEG.	01 MIN.	48 SEC.	15 MPH	52.25 FT
14	4.0908 DEG.	4 DEG.	05 MIN.	27 SEC.	49.20 FT	111 FT	160 FT	74.38 FT	123.58 FT	1845.667 FT	3.1047 DEG.	3 DEG.	06 MIN.	17 SEC.	30 MPH	66.50 FT
20	2.8642 DEG.	2 DEG.	51 MIN.	51 SEC.	61.04 FT	169 FT	230 FT	114.84 FT	175.88 FT	3766.667 FT	1.5212 DEG.	1 DEG.	31 MIN.	16 SEC.	40 MPH	95.00 FT

note 1: Represents the minimum desirable point to begin horizontal and vertical curves. Where possible an additional 50 to 100 feet is desirable.
note 2: Represents the absolute minimum point to begin horizontal and vertical curves. To be used only when unusual circumstances preclude the use of the preferred point. To be used only when reviewed and approved by ACET Rail Engineer.
note 3: Calculated value, does not change. Set by frog number and/or track gauge.
note 4: Design value, varies with particular details of turnout.

3.5 CLEARANCES

3.5.1 General

Notwithstanding any of the following criteria, the design of the ACTA Corridor system shall not violate any of the regulations outlined in the California Public Utilities Commission (CPUC) General Orders. These general orders (GO) include, but are not limited to, GO 26-D with ST-7 included, GO 95.

3.5.2 Horizontal Clearances

All horizontal clearances are measured from center of track. The following minimum horizontal clearances shall apply:

A.	Adjacent parallel tracks(main and yard)	15 feet (4.572 m)
B.	Centerline of track to any obstruction - on curves.	10 feet (3.048 m) 11 feet (3.354 m)

C. Track centers be increased by either 1 foot or 2 inches per degree of curvature plus 3.5 inches per inch of superelevation (where applicable), whichever is greater.

3.5.3 Vertical Clearances

All vertical clearances shall be measured from top of rail (T/R).

The following minimum vertical clearances shall apply:

A.	ACTA main line	24 feet-8 inches (7.518 m)
B.	Other secondary tracks	23 feet (7.012 m)

At all times, the minimum clearances specified by the CPUC and the specific railroad at that location, must be met.

At clearance locations where superelevation is present, vertical clearances shall be measured from the high rail.

3.6 RAILROAD CONSTRUCTION

3.6.1 General

A. Track materials and special trackwork shall conform to recommendations set forth in the most current AREA Manuals, ACTA Standards, and specific railroad standards.

B. Track components shall be standardized to facilitate maintenance and minimize the inventory of materials.

3.6.2 Standard Type of Track Construction

There are three general types of tracks:

1. Mainline tracks (freight)-ACTA
2. Mainline tracks - passenger
3. Yard and secondary tracks

Trackwork for these three general types of track may be further summarized into a basic type of standard trackwork construction:

A. Ballasted Track

Ballasted track shall be the primary type used for the Alameda Corridor Project

The minimum depth of subballast measured from the bottom of the ballast to the top of subgrade shall be eight inches (.203 m) for mainline track and six inches (.152 m) for yard and secondary tracks.

The minimum depth of top ballast from the bottom of tie at the centerline of the rail to the top of subballast shall be twelve inches (.305 m) except where geotechnical requirements prevail. The minimum subgrade capacity required for 12 inches of top ballast is 25 psi. Lesser capacities will require greater ballast depths or the strengthening of the subgrade.

The ballast shoulders shall be at least twelve inches (.305 m) wide. If safety walkways are required, ballast shoulders shall be at least thirty inches (.762 m).

The final top of ballast elevation shall be one inch (.025 m) below top of tie. The area six inches (.152 m) on either side of the rail where the ballast will be cribbed shall also maintain one inch of clearance between the bottom of the rail and the top of ballast.

At least AREA size no. 4a ballast shall be used, except at grade crossings and embedded tracks where AREA size no. 5 ballast shall be used to reduce settlements.

If used, approach slabs shall be considered at structures so that the minimum depth of ballast under the tie is 12 inches

At locations where subgrade material is unsuitable, stabilizing solutions involving mesh, geotextiles, or other similar methods may be utilized.

3.6.3 Track Gauge

The standard track gauge shall be 4'-8½" (1.435 m). Track gauge shall be measured between the gauge sides of the heads of rails at a distance of 5/8 inch (.0159 m) below the top of rails.

Curves over 12 shall be gauge widened as follows

12° 01'-14°	4-8 5/8"
over 14°	4-8 3/4".

Gauge widening shall be distributed through the spiral curve for a spiral-circular-spiral type curve. For circular curves without spirals, the gauge widening

distance shall be distributed by placing half the distance on the tangent and half on the circular curve.

3.6.4 Construction Tolerances

Recommended track construction tolerances are shown in **Table 3-7**.

3.6.5 Rail

The standard rail section on the ACTA Mainline shall be 136 RE.

Rails shall be either control-cooled carbon steel or premium special alloy rails as manufactured in accordance with the requirements of AREA.

The laying and distribution of rail shall be as follows:

A. Standard strength rails shall be used outside the trench and where excessive rail wear is not anticipated. These rails shall be control-cooled carbon steel.

B. In the Mid-Corridor Trench and where excessive rail wear is anticipated, premium high strength rails shall be used. These rails shall be control-cooled, either heat treated or head hardened, or special alloy rails.

C. Premium high strength rails shall be used on mainline track curves with radii less than 780 feet (238 m). The high strength rail shall extend into the tangent track a minimum of 15 m beyond the point of tangency.

D. Premium high strength rail shall also be used within special trackwork units.

E. High strength rail shall not be used on secondary, emergency, storage, yard or drill tracks, unless heavy rail wear is anticipated and with the approval of ACTA.

3.6.5.1 Continuous Welded Rail

All rails shall be installed as continuous welded rail (CWR) except where other requirements prevail, such as those noted below:

A. Special trackwork: Where for signal system design, structural or maintenance reasons, insulated, huck belted or glued joints need to be used.

B. Structural joints: Where certain structural design features of tunnels, aerial structures, or bridges may require that the rail be jointed and/or provided with expansion joints.

TABLE 3-7

TRACK CONSTRUCTION TOLERANCES

Type of Track	Gauge Variation[1]	Cross Level and Superelevation Variation[1]	Vertical Track Alignment		Horizontal Track Alignment	
			Total Deviation[2]	Middle Ordinate In 62' Chord	Total Deviation[2]	Middle Ordinate In 62' Chord
Mainline Track	+/- 1/8"	+/- 1/8"	+/- 1/2"	+/- 1/8"	+/- 1/2"	+/- 1/8"
Yard Track	+ 1/4" - 1/8"	+/- 1/4"	+/- 1/2"	+/- 1/4"	+/- 1/2"	+/- 1/4"

Notes:

(1) per 31' of track.

(2) Total devation is measured between the theoretical and actual alignment at any point in the track.

3.6.5.2 Rail Anchoring

Anchorage for CWR shall be provided by the elastic rail clip fastening system of the concrete ties to control broken rail gaps and expansion and contraction of rail. At critical locations, it may be necessary to provide for the expansion and contraction of the rail to prevent damage to the track or to the supporting structure. Computations and conclusions for these areas must have ACTA's approval.

In conventional ballasted track construction, where timber ties and track spikes are used, rail anchors shall be applied. Details shall be in accordance with ACTA standard plans, railroad requirements or AREA recommended practice.

CWR shall be de-stressed to the specified neutral temperature in accordance with ACTA construction specifications and AREA procedures.

3.6.5.3 Rail Welding

Welding of rails into CWR strings shall be either by electric flash butt process or thermite process. Electric flash butt welding shall be used wherever feasible. In order to join strings of CWR in track, Thermite Welding or "portable" in-track electric-flash butt welding equipment is permissible.

Rail welding shall be in accordance with AREA recommendations and as modified in the technical specifications.

3.6.5.4 Rail Joints

Rail joints shall be used where rail welding is not practical or where insulated joints are required by signal track circuits.

Thirty-six inch long, six hole joint bars shall be used at rail joints. Drilling, punching, and track bolts shall be as specified by ACTA standard plans, railroad requirements on AREA recommended practice.

Where required by the track signal circuits, insulated rail joints shall be installed. These shall be prefabricated bonded joints and shall meet the following track requirements:

A. They shall conform with the requirements for bonded rail joints specified by ACTA standard plans for 36-inch joint bars.

B. They shall be compatible with the requirements for the CWR and be able to transfer the longitudinal rail loads due to thermal expansion and contraction.

C. They shall not interfere with the rail fasteners.

D. Their design shall prevent excessive wear damage to component parts.

3.6.5.5 Emergency Guard Rails

Emergency guardrails or check rails may be provided on ballasted bridges subject to approval by ACTA.

Guardrails may be made of either new or used tee rails, or standard structural shapes and shall be installed near the gauge side of both rails at a distance of approximately twelve inches (.305 m) from the running rail.

Guardrails shall extend twenty meters ahead of the abutment face on both ends.

Guardrails shall be attached on every other cross-tie. If the guard rails are continuously welded, the longitudinal forces they generate shall be considered.

3.6.5.6 Ties

All ACTA ballasted main line tracks and special trackwork shall use concrete ties. Timber ties may be used in railroad connections, yard track locations and their related special trackwork, unless otherwise required by owner.

Concrete ties on ACTA main tracks shall be spaced 24 inches (.508 m) center-to-center.

Timber ties shall be spaced 19 1/2 inches (.495 m) center to center on tangent and curved tracks with radii greater than or equal to 300 feet (92 m). On curves of radius less than 300 feet (92m), timber ties shall be spaced 18 inches (.457 m) center to center. Tie spacing on non-ACTA track will follow the owner's requirements.

For road crossings the tie spacing shall be in accordance with manufacturers specifications for paving material, for both timber and concrete ties.

Concrete ties shall conform to the ACTA Standard Plan for concrete ties.

Timber cross ties shall be 7 inches by 9 inches by 9 feet in length, conforming to ACTA, AREA, and railroad standards.

Switch ties for ACTA special trackwork shall be made of concrete. Switch ties for special trackwork shall be spaced as established by ACTA Standard Plans.

Timber switch ties, used in other tracks, shall be 7 inches x 9 inches (.178 m x .229 m) and of various lengths and spacing as required.

3.6.5.7 Rail Fastenings

ACTA tracks shall use a fastening system which electrically isolates the rail from the ties and the ballast.

Ballasted track with concrete ties shall use a fastening system consisting of an embedded rail clip shoulder, elastic "Safe-Lock" rail clips with insulators, and elastomer pads.

Railroad or yard ballasted track with timber ties shall use standard tie plates, spikes, and anchors, unless alternate fastening system is specified.

END OF SECTION

4.0 SYSTEMS AND OPERATIONS

<Refer to TP Section 13.1 of the Mid-Corridor Design-Build Contract Documents>

5.0 STRUCTURAL DESIGN

5.1 INTRODUCTION

The basic design criteria for structures on Alameda Corridor Projects are established in this section. Items in this category include bridges, retaining walls, trench walls, and miscellaneous structures. Where there are cases of special designs encountered that are not specifically covered by these criteria, the designer shall bring these to the attention of ACET to determine the applicable criteria to be used.

5.2 DESIGN CODES, MANUALS, STANDARDS, AND SPECIFICATIONS

5.2.1 General

The structural design shall meet all applicable portions of the State of California general laws and regulations and the current editions of the codes, manuals, or specifications identified in this section.

Where the requirements stipulated in any such document or by these criteria are in conflict, the stricter requirements shall govern unless stated otherwise in this document.

Unless specifically noted otherwise in these criteria, the latest edition of the code, regulation and standard that is applicable at the time the design is initiated shall be used. If a new edition or amendment to a code, regulation, or standard is issued before the design is completed, the design shall conform to the new requirement(s) as required by the governmental agency enforcing the code, regulation, or standard changed, or, if not so required, to the extent practical.

The governing codes, manuals, standards, and specifications are listed below:

CAL/OSHA

- California Code of Regulations Title 8, Sub chapter 7, "General Industry Safety Orders," Group 1, "General Physical Conditions and Structures, Article 2, "Standard Specifications.

Building Codes

- County of Los Angeles - The Los Angeles County Building Code
- City of Los Angeles - The City of Los Angeles Building Code
- City of Carson, City of Compton, City of Huntington Park, City of Long Beach, City of Lynwood, City of South Gate, City of Vernon - The Uniform Building Code (UBC) of the International Conference of Building Officials.

AASHTO

- Standard Specifications for Highway Bridges
- Standard Specifications for Structural Support for Highway Signs, Luminaries and Traffic Signals.

Caltrans

- Bridge Design Specification (BDS)
- Memo To Designers Manual
- Bridge Design Details Manual
- Bridge Design Aids Manual
- Bridge Design Practice Manual
- Highway Design Manual of Instructions (HDM1)
- Traffic Manual

American Railway Engineering Association

- Manual for Railway Engineering (AREA Manual).

American Institute of Steel Construction

- Specifications of Design, Fabrication and Erection of Structural Steel for Buildings (AISC Specifications).

American Concrete Institute

- Standard Building Code Requirements for Reinforced Concrete (ACI 318).

American Welding Society

- ANSI/AASHTO/AWS D1.5 Bridge Welding Code.
- AWS D1.1 Structural Welding Code.

National Forest Products Association

- National Design Specification for Stress-Grade Lumber and its Fastenings.

5.3 CLEARANCES

5.3.1 Vertical Clearances

A. Railroad

All railroad vertical clearances shall be measured from top of rail (T/R)as specified in Section 3.5.

The following minimum vertical clearances shall apply:

1.	ACTA main line	7.518 m (24'-8")
2.	Other secondary tracks	7.012 m (23'-0")

At all times minimum California Public Utilities Commission (CPUC) clearances shall be maintained.

At clearance locations where superelevation is present, vertical clearances shall be measured from the high rail.

B. Highway

All minimum highway vertical clearances over the entire roadway width shall be as follows:

1.	State highway	5.029 m (16'-6")
2.	Other highway/street	4.648 m (15'-3")

5.3.2 Horizontal Clearances

The following minimum railroad horizontalclearances, measured from centerline of track, shall apply:

ACTA trench on tangent	3.048 m (10'-0")
From bridge pier, abutments, and walls	3.048 m (10'-0") on tangent 3.354 m (11'-0") on curve greater than 5 degrees
From face of railing, barrier etc. on bridges	2.743 m (9'-0") on tangent 2.896 m (9'-6") on curve greater than 5 degrees on curve. 2.591 m (8'-6") for temporary conditions
At other locations	3.048 m (10'-0") on tangent 3.354 m (11'-0") on curve greater than 5 degrees

At all times minimum California Public Utilities Commission (CPUC) clearances shall be maintained.

5.4 SEISMIC DESIGN CRITERIA

5.4.1 Design Objective

The basic philosophy of seismic design for the project is to provide a high level of assurance that the overall system will be able to maintain operation following an Operating Level Earthquake (OLE), and will survive without collapse and provide for public safety following a Contingency Level Earthquake (CLE).

The definition of OLE and CLE, as well as the associated performance criteria, are as follows:

- The OLE is defined as the earthquake event which has a return period of 72 years. An OLE has a good possibility of occurring during the normal life expectancy of the structure. The probability of exceedance of this level of event is approximately 50 percent in 50 years (75 percent in 100 years). Structures shall be designed to respond to OLE without significant structural damage. The extent of damage should be such that repairs can take place while continuing operation and maintaining safety of trains at restricted speeds.

- The CLE is defined as the earthquake event which has a return period of 1000 years. The CLE has a low probability of being exceeded during the life expectancy of the

structure. The probability of exceedance of this level of event is approximately 5 percent in 50 years (10 percent in 100 years). Structures shall be designed to survive the CLE without collapse, but possibly with significant structural damage. For structures supporting passenger train operations, the structural damage should be such that passenger trains can be operated at reduced speed with minimum down time. The CLE shall not be taken as less than the Maximum Credible Earthquake, as defined by Caltrans.

5.4.2 Design Response Spectra

The 5 percent damping design response spectra in the horizontal and vertical directions shall be developed by the geotechnical consultant based on the site conditions.

5.4.3 Seismic Design Loads

In order to account for directional uncertainty of earthquake motions, the loads resulting from the analysis of the two horizontal (transverse and longitudinal) seismic events shall be combined into two load cases as follows:

- Seismic Load Case 1: Combine the loads resulting from the transverse earthquake loading with 30 percent of the corresponding loads from the longitudinal earthquake.
- Seismic Load Case 2: Combine the loads resulting from the longitudinal earthquake loading with 30 percent of the corresponding loads from the transverse earthquake.

For bridge structures with span lengths exceeding 200 feet, with outrigger bents, with superstructures above 50 feet from ground level, or with unusual configurations, the loads resulting from the analysis of the two horizontal (transverse and longitudinal) and one vertical seismic events shall be combined into three load cases as follows:

- Seismic Load Case 1: Combine the loads resulting from the transverse earthquake with 30 percent of the corresponding loads from the longitudinal and from the vertical earthquake.
- Seismic Load Case 2: Combine the loads resulting from the longitudinal earthquake with 30 percent of the corresponding loads from the transverse and from the vertical earthquake.
- Seismic Load Case 3: Combine the loads resulting from the vertical earthquake with 30 percent of the corresponding loads from the transverse and from the longitudinal earthquake.

For CLE, seismic design member loads shall be determined by dividing the individual seismic member loads by the force reduction coefficient, Z, which is interpolated from Figure 5.1. Limited-Ductility values shall be used for structures satisfying one or more of the following:

- Supporting passenger train operations,
- Required to provide secondary life safety,
- Time for restoration of functionality after closure would create a major economic impact, and
- Formally designated by a local emergency plan as critical.

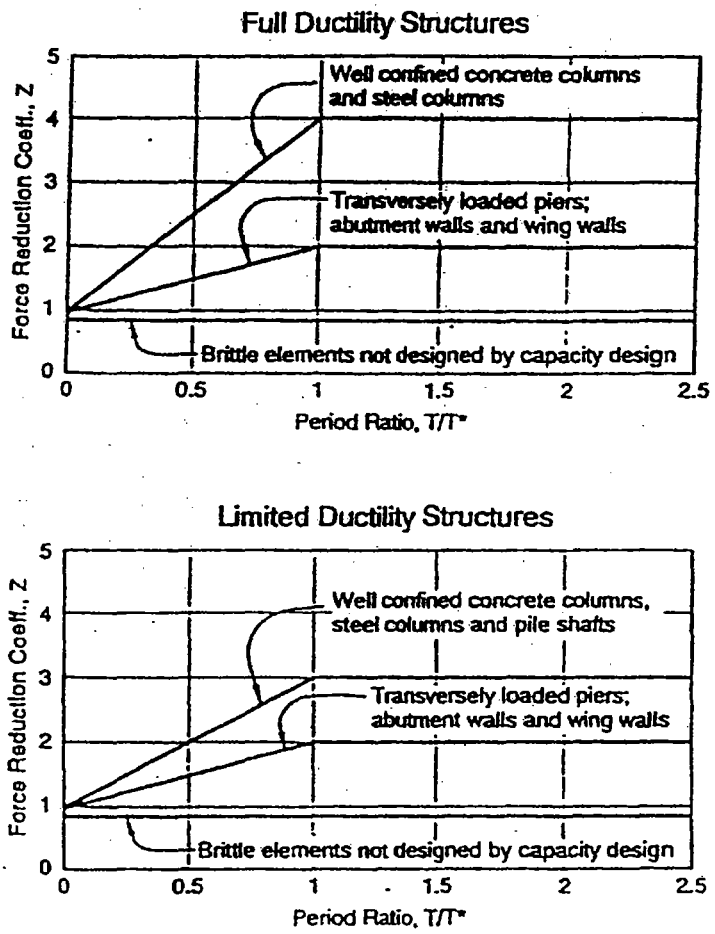


Figure 5.1 Force-reduction coefficient, Z.

Full ductility values shall apply only to structure when inelastic action (yielding) forms at locations accessible for inspection following a design earthquake and the structure does not fall within the above classification. The "Z" factor shall not exceed 4 and for ACTA trench walls shall not exceed 2.0. These factors are based on recommendation of ATC-32, dated June 1996. For OLE, the "Z" coefficient shall not exceed 1.0.

Where:

Z = Force reduction coefficient.

T = Natural period of the structure.

T*= In lieu of any Design Response Spectrum, characteristic ground motion period, corresponding to the peak of the input energy spectrum, T* may be taken equal to 0.5 sec for rock and firm soil sites, and 0.75 for sites with 80-150 feet of alluvium. T* shall be based on site-specific evaluation for soft soil sites.

5.4.4 Seismic Design Loads for Highway Structures

Seismic design of highway structures, except for those attached to the ACTA trench, shall be designed for the CLE loads in accordance with Caltrans BDS and the latest seismic design memos and guidelines issued by Caltrans with the following clarifications:

- The seismic design criteria for highway structures attached to, or spanning the ACTA trench shall be in accordance with the requirement for ACTA trench requirements.

5.4.5 Seismic Design Loads for Railway Structures

Railway structures shall be designed for the OLE and CLE loads in accordance with the AREA Manual with the following clarifications:

- Structure subject to OLE shall meet the performance criteria and serviceability limit state as defined in Chapter 9 of the AREA Manual and shall be designed for the following loading combinations and allowable stresses:

Service Load Design

D + E + B + SF + PS + EQ	For steel structure 150 percent allowable stress Not used for concrete structure

Load Factor Design

1.0 (D + E + B + SF + PS + EQ)	For concrete structure designed per AREA Manual For steel structure designed per Caltrans BDS

where

D = Dead load
E = Earth pressure load
B = Buoyancy load

SF	=	Stream flow load based on the average flow in the river/flood channel defined by the Army Corp of Engineers or the Los Angeles County Flood Control District
PS	=	Prestressing load
EQ	=	Earthquake load

- Structure subject to CLE shall meet the performance criteria and Survivability Limit State as defined in Chapter 9 of the AREA Manual and shall be checked for the loading combination:

1.0 (D + E + B + SF + PS + EQ)	For concrete structure, designed per AREA Manual
	For steel structure, designed per Caltrans BDS

Detailed requirements not specifically covered by AREA Manual shall be in accordance with Caltrans BDS supplemented by Caltrans Memo to Designers Manual and the latest seismic design memos and guidelines issued by Caltrans. The ultimate capacity of the foundation supporting mediums shall be used in conjunction with load combinations with earthquake load.

5.4.6 Seismic Design Loads for ACTA Trench and Retaining Walls

Walls shall be designed for OLE and CLE earthquake loads in accordance with the AREA Manual with the following clarifications:

- The earth retaining structures shall be designed to resist lateral earth pressure induced by earthquakes as recommended by the geotechnical consultant based on the type of wall construction, soil properties, and the ground accelerations for OLE and CLE. In the absence of such recommendations, the modified Mononobe-Okabe method recommended in Paragraphs 6.3.2, 6.4.2 and 6.5.2 of Section 6, Division I-A of AASHTO (Interim Specifications-Bridges-1993) shall be used.

- Loading combinations and allowable stresses concerning seismic loading for railway structures shall apply to ACTA trench and bridges (both railway and highway) attached to the trench.

5.4.7 Ductility Requirements

Sections of structural members that undergo inelastic deformation shall be designed for ductile behavior. In the case of concrete structural components, shear and bond failures shall not precede the formation of a flexural inelastic mechanism. Adequate confinement or other effective means approved by Caltrans shall be used to ensure ductility on concrete members.

5.5 HIGHWAY STRUCTURES

5.5.1 Introduction

Highway structures include bridges, retaining walls (other than those located along the

"trench" section), box culverts and other miscellaneous structures supporting highway loading. These structures shall be designed in accordance with the requirements of AASHTO/Caltrans BDS supplemented by Caltrans Memo to Designers Manual. In case of conflicts among the AASHTO and BDS, provisions of BDS shall govern over AASHTO.

5.5.2 Design Loads

The following clarifications to the AASHTO/BDS design loads requirements shall apply:

A. Live Loads - The design live load shall be HS-20-44 and permit design live load per Section 3.7 of Caltrans BDS.

B. Earthquake Loads - Seismic Design Criteria shall be in accordance with Section 5.4.

5.5.3 Design Details

Design details for highway structures shall be in accordance with the requirements of Caltrans Bridge Design Detail Manual and Standard Plans.

5.5.4 Existing Bridges

A. Seismic Retrofit

All existing bridges owned by ACTA shall be evaluated for their seismic load resistance capacity. Seismic retrofit strategy for existing bridges shall be developed and implemented. The existing highway bridges designated to be retrofitted to resist current seismic loading shall be evaluated and designed per requirements of Caltrans BDS supplemented by Caltrans Memo to Designers Manual, using the latest seismic design memos and guidelines issued by Caltrans.

5.6 RAILWAY STRUCTURES

5.6.1 General

Railway structures include bridges, retaining walls (other than those located along the "trench" section), box culverts, and miscellaneous structures supporting railway loading. These structures shall be designed in accordance with the requirements of the AREA Manual except as modified below:

In addition to AREA's requirements, special requirements of the railroad companies, shall be followed. For requirements that are not specifically covered in the railroad's design criteria and guidelines, it shall be brought to the attention of ACTA for determination of requirements.

Detailed requirements not specifically covered in the AREA Manual shall be in accordance with AASHTO/BDS.

5.6.2 Design Loads

The following clarifications to the AREA Manual design loads requirements shall apply:

A. Live Loads - The structures shall be designed for Cooper's E-80 loading, (see AREA Chapter 8, Part 2, Section 2.2, and Chapter 15, Part 1, Section 1.3), based on design speed of 64 km/h (40 mph) unless specified otherwise.

B. Earthquake Loads - Earthquake loads shall be in accordance with section 5.4.

C. Structures shall be designed for a minimum ballast depth of 0.305 m (12") from bottom of the top of deck. The maximum ballast depth to be designed for will allow for 0.152 m (6") track raise. Minimum overall ballast thickness equals 0.508 m (20") (top of tie to top of deck). Maximum overall ballast thickness equals 0.660 m (26") (top of tie to top of deck with 0.152 m (6") track raise).

5.6.3 Design Details

Design details for railroad structures shall be in accordance with the requirements of the railroad's design guides. If the details are not specifically covered in the railroad's guides, Caltrans Bridge Design Detail Manual and Standard Plans as modified by Section 17 of Caltrans Memo to Designers Manual shall apply.

5.6.4 Existing Bridges

A. Load Carrying Capacity Rating

All existing railroad bridges owned by ACTA shall be rated according to their load carrying capacity in accordance with the rules specified in AREA Manual, Chapter 7, Section 2.10 for timber bridges, Chapter 8, Part 19 for concrete bridges, and Chapter 15, Part 7 for steel bridges. If the normal operating loads exceed those permissible under the AREA rules, the designer shall bring the findings to the attention of ACTA to determine the appropriate action to be taken.

B. Seismic Retrofit

All existing bridges owned by ACTA shall be evaluated for their seismic load resistance capacity. Seismic retrofit strategy for the existing bridges shall be developed and implemented. Railroad bridges designated to be retrofitted to resist current seismic loading shall be evaluated and designed to meet the performance criteria of Survivability Limit State per Chapter 9 of AREA Manual. Detailed requirements not specifically covered by AREA Manual shall be in accordance with Caltrans BDS supplemented by Caltrans Memo to Designers manual and the latest seismic design memos and guidelines issued by Caltrans.

5.6.5 Pier Protection

To limit damage and to provide redirection and deflection of railroad equipment away from piers supporting bridges over railway tracks (highway of rail), crash walls shall be provided. The minimum requirements for crash walls are found in the AREA Manual for Railway Engineering, Chapter 8, Part 2.1.5, Pier Protection. These are the minimum requirements to be followed for ACTA tracks.

In the case where another operating railroad has a more restrictive or conflicting standard regarding crash walls, then ACTA's Program Manager shall be notified and the differences will be resolved.

5.7 ACTA TRENCH WALLS

5.7.1 General

A. Designed in accordance with the requirements of the AREA Manual when subjected to railroad live load surcharge loads, except as modified as follows:

- Detailed requirements not specifically covered in the AREA Manual, design shall be in accordance with AASHTO/BDS.
- Seismic design criteria shall be in accordance with Section 5.4.

B. In determining the ends of retaining walls and U-sections, consideration shall be given to providing protection against flooding resulting from local storm runoff.

C. Adequate provision shall be made for resistance to hydrostatic uplift and for effective removal of water from rainfall, drainage, groundwater infiltration, or any other source.

D. U-sections, are defined as structures with both walls supported on a common continuous full-width base slab, shall be used for open-cut sections where the top of rail is less than four feet above the maximum groundwater table. Above that level, independent retaining walls may be considered.

E. U-sections may be analyzed as continuous structures on elastic foundations. If at any location the two walls are of unequal heights, then the factor of safety against sliding shall be the minimum of:

1.5 with no passive resistance of the soil
2.0 with passive resistance of the soil

F. Wall thickness for U-sections shall be designed by using:

- The geotechnical soils report recommendations for coefficient of lateral earth pressure, at-rest case
- Hydrostatic pressure
- Surcharge effects

G. U-section grade slab design thickness shall be six inches greater than the wall thickness.

H. The final designer shall evaluate different retaining structure alternative designs suitable to the state-of-the-art construction methodology and site conditions and shall make a cost comparison analysis for approval by the manager of engineering and construction.

5.7.2 Design Loads

A. Live Loads

The actual surcharge loads due to railway and/or highway live loads shall be included. The minimum highway live load surcharge shall be no less than two feet of equivalent weight of earth. The minimum railway live load surcharge shall be per AREA requirements.

B. Earth Pressure

The design earth pressure shall be determined based on recommendations of the geotechnical consultant considering the soil and backfill properties, and wall type.

C. Earthquake Loads

Earthquake loads shall be in accordance with Section 5.4.

D. Other Loads

Other loads shall be in accordance with AREA Manual.

5.7.3 Stability Requirements

- Minimum sliding factor of safety = 1.5 for service condition
  = 1.1 for condition with OLE
  > 1.0 for condition with CLE

- Minimum overturning factor of safety = 2.0 for service condition (footings on soil)
  = 1.5 for service condition (footings on rock)
  = 1.2 for condition with OLE
  > 1.0 for condition with CLE

5.8 SUPPORT AND UNDERPINNING OF EXISTING STRUCTURES

5.8.1 General

The final designer, in consultation with the ACTA Project Manager shall investigate all structures to remain adjacent to the Alameda Corridor, and shall prepare all necessary designs for protection and temporary or permanent support and underpinning. Requirements of the California Civil Code, Section 832, "Lateral Support from Adjoining Owner", shall be complied with.

All buildings or structures which require such designs shall include, but will not be limited to, the following:

- Buildings or structures immediately adjacent to the Alameda Corridor, which must be carried on underpinning and braced to act as retaining elements supporting the sides of the excavation.

- Buildings or structures for which any part is within the zone of influence for the excavation. For the purpose of preliminary assessment, the zone of influence can be determined by drawing a line with a slope of one vertical to 1.25 horizontal from the bottom of the outer limit of the final excavation. The final zone of influence shall be determined in consultation with the ACTA Project Manager.

- Buildings or structures which may be affected by groundwater lowering. In certain areas uncontrolled lowering of the groundwater for corridor construction may cause settlements of buildings both adjacent to and some distance away from the excavation.

- Any other buildings or structures for which it is agreed by the manager of engineering and construction, that it is appropriate for the designer to prepare support or

underpinning designs.

- Underpinning walls or piers supporting buildings or structures and forming a portion of the excavation support system shall be extended to a minimum depth of four feet below subgrade elevation of the underground corridor structure. Methods used to underpin or protect these buildings or structures shall depend on local soil conditions and may include the following:

5.8.2 Pier, Pile, or Caisson Method of Underpinning

If soil conditions, structure size, and proximity to the corridor structure dictate underpinning by piers, piles or caissons, they shall, in general, extend below a sloped line drawn from the side of the excavation at a point two feet below subgrade elevation to intersect with the vertical projection of the underpinned foundation, or to sound bearing material whichever is greater. The slope of this line shall be established by the Designer in consultation with the ACTA Project Manager, based on the recommendations of the geotechnical consultant.

5.8.3 Retaining Wall Method of Structure Protection

Under some soil conditions, the supporting system for the excavation will be sufficient to protect light structures. Under heavier loading conditions a reinforced concrete cutoff wall, constructed in slurry filled trenches or bored pile sections braced with preloaded struts, could be considered as an alternate to underpinning or to avoid settlement due to dewatering.

In general, techniques such as freezing and chemical injections, which could result in "hard points", for the stabilization of soil under buildings in lieu of underpinning shall not be specified in the design phase. However, after consultation with the ACTA Project Manager, these techniques may be considered as alternatives to solve localized underpinning problems.

5.9 SHORING OF EXCAVATION

5.9.1 Traffic Control and Construction Staging

Contract drawings and specifications shall cover traffic diversions, mandatory restrictions, and necessary construction staging approved by public authorities and utility companies as applicable. Acceptable locations for construction access ramps, or any other construction facility that affects the work, shall also be indicated.

5.9.2 Design of Shoring

Detailed design of the temporary decking, shoring, and bracing shall be prepared by the contractor and reviewed by the designer, based upon criteria and design standards included in the contract drawings and specifications. Shoring adjacent to live railroad tracks shall consider the railroad live load surcharge on the shoring system. The final designer shall indicate special requirements for the installation and removal of the temporary bracing systems, such as the levels of bracing tiers, the maximum distances of excavation below an installed brace, and the amount of preloading. The detailed design of the temporary bracing system shall be the responsibility of the contractor.

The designer shall perform a conceptual/preliminary design of decking, shoring, and bracing utilizing the criteria that will appear in the contract documents. The design shall

be for the purposes of evaluating the support requirements of excavation associated with the underground construction, of determining the need for supplementing or revising the criteria, and of arriving at a cost estimate for decking, sheeting, and bracing.

The designs shall not be shown in the contract drawings except to the extent necessary to clarify unique situations not adequately addressed by the written criteria. In any event, detail design of decking, shoring, and bracing shall not be shown.

It shall be a requirement in the contract documents that the design of support of excavation structures be prepared and certified by a registered engineer in the State of California.

5.10 SOILS AND GEOLOGICAL DATA

5.10.1 General

Based upon available existing soils and geologic data, on data obtained from the geotechnical investigation and on the professional judgment of the designer, the designer shall identify and recommend for further investigation all known or suspected areas of the alignments where unusual soils or geologic conditions exist. These investigations shall conform to the requirements of Caltrans.

5.10.2 Pressure Loads on Underground Structures

Earth, rock, and water pressures on the underground structures may vary considerably with geographic location. These pressures and other geotechnical parameters shall be determined by the designer through reference to the approved geotechnical investigation report and by consultation with ACTA.

5.10.3 Allowable Design Parameters

Allowable bearing and frictional values for foundations shall be determined by the designer through reference to the approved geotechnical reports and by consultation with ACTA.

For structures subject to the jurisdiction of local authorities, the allowable bearing and frictional values for the foundations shall not exceed the limits given by the local building code, except for deviations as provided for in the code.

END OF SECTION 5

6.0 CIVIL

6.1 INTRODUCTION

The basic criteria for civil engineering design on the Alameda Corridor Project is established in this section. This section includes criteria for surveying and mapping, grading, roads and paving, drainage, storm water runoff management, utilities, and fencing and barriers.

6.2 DESIGN MANUALS, STANDARDS, AND SPECIFICATIONS

Unless otherwise stated, new facilities or alterations to existing facilities to be maintained by others shall be designed in conformance with published standards of the agency having jurisdiction or with the criteria contained herein, where such criteria exceed local agency standards.

Where the requirements stipulated in this document or any referenced sources are in conflict, the stricter requirement shall govern.

Unless specifically noted otherwise herein, the latest edition of the code, regulation, and standard that is applicable at the time the design initiated shall be used. If a new edition or amendment to a code, regulation, or standard is issued before the design is completed, the design shall conform to the new requirement(s) as required by the governmental agency enforcing the code, regulation, or standard changed, or, if not required, to the extent practical.

A variance from the above criteria, or approval for situations not covered by the above criteria may be available based upon the individual design, subject to approval from the director of public works/city engineer or department of transportation general manager for the affected jurisdiction.

American Railway Engineering Association (AREA)

- Manual for Railway Engineering
- Portfolio of Trackworks Plans

Los Angeles County Department of Public Works (LACDPW)

- Standard Plan Manual (1995) "Yellow Book"
- District Addition & Amendment to Standard Specification for Public Works (1995) "Grey Book"
- Hydrology & Sedimentation Manual (1991)
- Hydraulic Design Manual (1982)
- Project Preparation Instruction Manual For Drainage Facilities (1988)
- Pump-Station Design Manual
- Water Works Rules & Regulations
- Private Contract Sanitary Sewer Procedural Manual
- Title 20 County Code (1993)

Local Jurisdiction

- Standard Plans
- Municipal Code
- Metric Standards
- Storm Water Management Plan
- Other Documents as Required

American Public Works Association (APWA), Southern California Chapter

- Standard Plans for Public Works Construction
- Standard Specifications for Public Works Construction

American Association for State Highway Officials (AASHTO)

- A Policy on Geometric Design of Highways and Streets
- Roadside Design Guide

Federal Highway Administration (FHWA)

- Manual on Uniform Traffic Control Devices
- Hydraulic Engineering Circular No. 12 "Drainage of Highway Pavements," March 1984

California Department of Transportation (Caltrans)

- Standard Plans
- Standard Specifications
- Highway Design Manual
- Traffic Manual
- Uniform Sign Charts
- Storm Water Pollution Prevention Plan Handbook
- Manual on High and Low Risk Underground Facilities
- District 7, "Hydraulic Design and Procedures Manual," September 1985
- Bridge Design Aids, "Deck Drainage Design," October 1989

State of California Public Utilities Commission

- General Order No. 26-D: Regulation Governing Clearances on Railroads on Street Railroads with Reference to Side and Overhead Structures, Parallel Tracks, Crossings of Public Roads, Highways and Streets.
- General Order No. 88-A: Rules for Altering Public Railroad - Highway Grade Crossings.
- General Order No. 95: Rules for Overhead Electric Line Construction.
- General Order No. 112-D: Rules Governing Design, Construction Testing, Maintenance and Operation of Utility Gas Gathering, Transmission and Distribution Piping Systems.
- General Order No. 118: Regulations governing the construction, reconstruction, and maintenance of walkways adjacent to railroad trackage and the control of vegetation adjacent thereto.
- General Order No. 128: Rules for Construction of Underground Electric Supply and Communication Systems.

American Railway Engineering Association

- Manual for Railway Engineering (AREA Manual).

Burlington Northern &, Santa Fe standards.

Union Pacific and Southern Pacific standards.

SCRRA standards.

6.3 SURVEYING AND MAPPING

Horizontal controls shall be based on the North American Datum 1983 (1991.35, Sept. 1994

Adjust.), California Coordinate System of 1983, Zone 5, expressed in metric.

Vertical controls shall be based on the North American Vertical Datum 1988 (NAVD88 Sept 1994 Adjust), expressed in metric units.

The accuracy of the horizontal and vertical ground control and of supporting horizontal and vertical ground surveys shall be, as a minimum, Second Order, Class I, as defined by the Federal Geodetic Control Committee and published under the title "Classification, Standards of Accuracy and General Specifications of Geodetic Control Stations," authored by the National Geodetic Survey.

6.4 GRADING

All areas of proposed construction shall be cleared, grubbed, and stripped. Areas disturbed by construction shall be protected by an erosion control system.

Cut-and-fill slopes shall no be steeper than 2:1 or as recommended by the geotechnical consultant.

Construction of fills in areas that receive loading shall be engineered fill. The method and device of construction and rework of existing soil, fill placement, conditioning, and compaction shall be as recommended by the geotechnical consultant.

6.5 ROADS AND PAVING

6.5.1 Roadway Geometrics

The roadway geometrics derived in the preliminary engineering design phase should be used as a guide for final design. Roadway geometry must be evaluated utilizing appropriate truck and bus-turning radii.

Geometric design considerations shall include:

- Traffic safety
- Type of highway, interstate, freeway, major street, etc.
- Traffic volumes, existing and projected
- Types of design vehicles
- Necessary curves or curb radii required or determined by turn overlay templates
- Parking, legal or otherwise
- Stalled or broken-down vehicles
- Grades
- Sight distances
- Driveways
- Visibility, nighttime lighting, inclement weather, topography, etc.
- Mode of traffic signalization, hardware, software timing and phasing
- Pedestrian traffic
- Available or additional right-of-ways
- Public transportation, railroad, light rail, buses, etc.
- Site characteristics - industry, schools, shopping centers, etc.
- Emergency Services.

A. Traffic Lane Widths

The preferred traffic lane widths shall be determined in cosultation with the agencies having jurisdiction or, in cases where the agencies have no guidelines,

based on the following:

- Traffic lanes — 3.7 m (12') minimum; 3.4 m (11') preferred
- One lane with curbs right and left — 4.3 m (14')
- Turn lanes — 3.1 m (10')
- Left turn lane length — 33.5 m (110') minimum
- Curb lane with parking — 6.1 m (20')
- Parking lane — 2.4 m (8')
- Bike lane on street designated as bike route. — 1.2 m (4')

In cases of significant constraint, a width reduction may be necessary.

B. Number of Traffic Lanes

The number and type of traffic lanes (i.e., through, right, or left) shall be determined in consultation with the jurisdictions, generally based on a traffic analysis which considers projected traffic volumes, critical traffic movements, and geometric configurations. The lane configuration and signal timings shall, whenever possible, be designed to provide no worse than level of service D at signalized intersections in the peak hours during at least the year following completion of this project.

C. Parking Lanes

Parking locations shall be determined in consultation with the jurisdictions based on traffic analysis, safety considerations, and demand for on-street parking. Twenty-four hour parking prohibition shall be recommended at those locations where roadway width is not adequate to provide the necessary number of through lanes. Peak-hour parking prohibition shall be recommended at those locations where traffic analysis shows that the capacity of the traveled way without the parking lane will provide level of service D or worse.

D. Curb Return Radius

The following criteria indicate the minimum curb return radii. Design radii shall be in compliance with standards of the applicable jurisdiction for the design vehicle.

- Los Angeles County
- Master Plan Highway — 10.7 m (35')
- Other Roadways — 7.6 m (25')
- Parking areas — 4.6 m (15')

6.5.2 Sidewalks, Driveways, Ramps, and Bus Stops

A. Sidewalks

Sidewalks shall be in accordance with the standards of the applicable jurisdiction.

B. Driveways

Driveways shall be in accordance with the standards of the applicable jurisdiction.

C. Concrete Bus Pads

Concrete bus pads shall be provided at all bus stops which are reconstructed as part of ACTA in conformance with the Los Angeles Metropolitan Transportation Authority (LAMTA), local bus operator and the standards and specifications of the agency having jurisdiction.

D. Bus Turnouts

Single bus turnouts shall be a minimum of 3.0 m (10 feet) wide with a minimum 15.240 m (50 feet) curb parallel to through traffic lanes and 12.2 m (40 feet) transitions.

6.5.3 Paving

Roadway pavement sections shall be designed in accordance with standards of the applicable jurisdiction. Restored pavements shall be of materials equivalent to that originally employed.

6.6 DRAINAGE

Storm drainage system design shall be in conformance with the requirements of the agency where the system is located.

6.6.1 Hydrology

Hydrology shall be based upon standards and methods of computation used by the Los Angeles County Department of Public Works and the department's basic data.

6.6.2 Design Storm

The following design storm frequency or that required by the agencies having jurisdiction shall be used for runoff calculations:

• All culverts and drainage crossing ACTA tracks where flooding could damage system	50-year
• Track roadbed (to top of subballast)	10-year
• Main storm drains	10-year
• Parking lots	10-year
• All longitudinal drains or subdrains that could flood the roadbed	10-year

6.6.3 Rainfall Intensity

Rainfall intensity for calculation of design flows is as shown on Figure C-2, Recurrence Interval 50 Years, of the Los Angeles County Flood Control District Hydrology Manual.

For different recurrence intervals, the following factors shall be used:

Storm Frequency Rating	Relative One-Hour Maximum Rainfall mm/hr (in/hr)
1-year	10.87 (0.428)
5-year	16.74 (0.659)
10-year	19.35 (0.762)
25-year	22.81 (0.898)
50-year	25.40 (1.000)
100-year	28.14 (1.108)

6.6.4 Pipe Materials

All underground storm drains shall be reinforced concrete pipe. Reinforced concrete pipe under the tracks of the ACTA Projects or commercial railroad shall be provided with the cathodic protection as necessary. Plastic and nonreinforced pipe may be used where its use is approved by the governing agency. No steel pipe shall be used in the permanent underground drainage system.

6.6.5 Yards and Shops

A. Drainage Systems

A complete storm drainage system shall be provided at all yards. The system normally consists of a combination of graded subgrade areas and perforated self-cleaning subdrains connected to the necessary laterals, collectors, and outfall structures. A system of ditches, catch basins, and storm drain pipes shall be designed to direct surface runoff away from all track areas and also to handle flow from the subdrain and roof drain systems. In no case shall a storm drain flow into a subdrain.

The yard trackwork areas shall be underlain by a 150 mm (6 inches) minimum layer of semi-impervious subballast properly compacted and graded at a minimum slope of 2.5 percent to the subdrains. Open areas and material storage areas also shall be covered with a 150 mm (6 inches) layer of semi-impervious compactable material and shall be graded to area drains at a minimum slope of 2 percent.

The drainage system shall contain the following minimum slopes:

- Subdrains -0.5%
- Laterals -0.3%
- Main Collectors -0.25%
- Ditches -0.25%

Cleanouts shall be provided at the terminus of each subdrain. Manholes shall be provided at a maximum intervals of 91m (300 inches) on the laterals and main

collectors in order to facilitate the maintenance of the yard drainage system. The individual subdrain runs shall not be longer than 91m (300 inches).

B. Sewer Systems

The sanitary sewer, which serves the entire yard and is connected into the local sanitary sewer system, shall carry effluent that meets local standards. All lines carrying industrial waste from both interior and exterior pits and surface drains shall lead to interceptors where grease, oil, and other undesirable materials are removed before tying into the local sewer.

6.7 FENCING AND BARRIERS

Access to the ACTA tracks shall be controlled by fencing or other barriers. Fencing shall be parallel to the track, forming an open-ended envelope and allowing unrestricted ACTA movement.

Vehicle service, maintenance, and storage areas shall be secured by perimeter fencing.

Size and type of fencing or barrier shall be as determined by site-specific requirements.

All construction site and work areas shall be secured by temporary fences or barricades.

6.8 STORM WATER RUNOFF MANAGEMENT

The handling of storm water runoff shall be in compliance with the applicable regulations and requirements under the National Pollutant Discharge Elimination System (NPDES), part of the Clean Water Act rules.

6.9 UTILITIES

General guidelines for the maintenance relocation, replacement, or restoration of utilities encountered by the ACTA project are described in this section. Utilities shall be identified as one of the following:

- Supported and maintained complete and in place during construction and continued in service following completion of facilities.
- Temporarily relocated and maintained then, upon completion of ACTA facilities, restored to service.
- Temporarily relocated and maintained then, upon completion of ACTA facilities, replaced by new utilities.
- Permanently relocated beyond the immediate limits of ACTA construction.

The following design criteria shall apply to the handling of all utilities encountered by the ACTA project:

- Replacements for any existing utilities shall be designed to provide service equal to that offered by the existing installations.
- All designs involving maintenance, support, relocation, or other utility work shall conform to the applicable specifications, criteria, and standard drawings of the concerned utility owner and/or the California Public Utilities Commission. When directed by ACTA's Program

Manager, the consultant shall submit utility designs to the concerned corporations or agencies for review and approval.

- Record elevations of all utilities shall be adjusted to project datum. Pertinent utility elevations and locations shall be checked by field surveys and, where critical to design, by digging test holes.

- All utility undercrossings whose carrier pipes do not have sufficient strength to support ACTA tracks or do not have watertight joints shall be encased.

All work involving flammable substances such as gas lines, oil transmission lines, steam lines, and similar types of installation shall be performed by the owner of the installation unless stated otherwise. When directed by ACTA's Program Manager, the designee shall submit underground pipeline designs to the concerned agencies for review and approval.

Minimum cover over uncased pipe or over casings shall be 0.9 m (3 feet) at areas subject to vehicular traffic, unlined ditches, and other unpaved surfaces; and 0.610 m (2 feet) at lined ditches. Additional cover shall be provided where necessary to comply with the utility owner's policy or local design conditions. Minimum clearance between top of uncased pipe or top of casing pipe and base of ACTA rails shall be 1.7 m (5 feet 6 inches) unless special considerations are involved.

Casing pipe shall extend to the greater of the following distances, measured at right angles to centerline of track:

- A minimum distance of 0.3 m (1 foot) outside the fenced portion of the ACTA right-of-way, or wherever practicable, a minimum distance of 0.3 m (1 foot) outside the ACTA right-of-way.

- A minimum distance of 7.6 m (25 feet) each side from centerline of outside track when end of casing is sealed.

- A minimum distance of 13.7 m (45 feet) from centerline of outside track when end of casing is open.

Additional details are included in volume 3 - ACTA standard plans. Also, all requirements of AREA manual for utilities under railroad tracks, chapter 1- part 4 and 5, shall be met.

If additional tracks are to be constructed in the future, the casing shall be extended correspondingly.

END OF SECTION 6

7.0 TRAFFIC

7.1 INTRODUCTION

ACTA adopts existing widely-used and generally-respected policies and practices to guide the traffic design elements of the project. The traffic design standards of the local agencies shall comply with in the absence of local standards, Caltrans standards shall be used as described in the following paragraph.

7.2 DESIGN MANUALS, STANDARDS, AND SPECIFICATIONS

The following ACTA standards provide the basic general requirements for Alameda Corridor related improvements. These standards are based on the Caltrans Highway Design Manual and Traffic Manuals. For improvements under the jurisdiction, ownership and maintenance of other local or state agencies, their respective standards, procedures and specifications shall apply, so long as they (a) are not inconsistent with any aspect of driver expectancy which could diminish safety or operational efficiency, (b) do not place ACTA in a position of increased liability, and (c) do not cost appreciably more than the equivalent ACTA standard treatment.

Applicable standards for each element of each project or segment should be verified by the designer early on to prevent conflicts or late changes.

7.3 TRAFFIC SIGNALIZATION

Application and design of traffic signals, where installed or modified as a part of the project, shall be in accordance with requirements and philosophies set forth in Chapter 9 of the Caltrans Traffic Manual. Equipment, materials and installation processes shall be as specified in the latest editions of the Caltrans Standard Plans and Caltrans Standard Specifications.

In general, new signalized intersections shall not be created unless one of the established warrants set forth in the Caltrans Traffic Manual are met. Where new street configurations are developed and constructed, this shall entail projection of traffic volumes onto the new configuration in order to assess warrant satisfaction.

In general, existing signalized intersections will remain signalized, unless new street configurations and/or materially altered traffic patterns make such signalization clearly unnecessary and undesirable. In such cases, ACTA shall consult with the responsible local jurisdiction prior to developing signal removal plans.

In a number of locations, new street configurations and/or revised operating scenarios shall dictate the advisability of modifying the operational phasing of an existing traffic signal installation. This may involve addition of separate left-turn phasing, split phasing, removal or addition of pedestrian movements, modified traffic detection features, or a combination of such changes. In such cases, ACTA shall consult with the responsible local jurisdiction prior to developing signal modification plans.

7.4 TRAFFIC SIGNING

Application of traffic regulatory, warning, and guide signs installed as a part of the project shall be in accordance with the requirements and philosophies set forth in chapter 4 of the Caltrans Traffic Manual. Equipment, materials, and installation processes shall be as specified in the latest editions of the Caltrans Standard Plans and Caltrans Standard Specifications.

With the exception of street name signs and city limits signs, which have obvious jurisdictional individuality, all signs used shall be designed and installed in conformance with standards of uniformity conveyed by the above-referenced Caltrans publications. The project will also include fabrication and installation of those street name and city limits signs which are of a jurisdictionally-specific nature, providing (a) each local jurisdiction provides ACTA with the appropriate design specifications and (b) they can be acquired at no substantial cost increase to the project.

7.5 TRAFFIC STRIPING AND MARKINGS

Application of traffic striping, raised pavement markers, delineators, pavement legends, arrows and other markings installed as a part of the project shall be in accordance with the requirements and philosophies set forth in Chapter 6 of the Caltrans Traffic Manual. Equipment, materials and installation processes shall be as specified in the latest editions of the Caltrans Standard Plans and Caltrans Standard Specifications.

In general, striping patterns shall be applied as a combination of reflective paint and raised pavement markers (rather than using only raised pavement markers).

Where local jurisdictions have unique templates for arrows and/or other pavement design elements, and where such templates provide a design element which is deemed satisfactory, those design elements can be incorporated into the design and implemented in the construction process. The local jurisdiction will be required to loan the appropriate template(s) to the contractor at the time of work implementation.

Crosswalk markings, where used, shall consist of two parallel 12-inch-wide white or yellow stripes, as appropriate, 10 feet apart unless called out otherwise on plans. There will be no use of so-called "zebra" or "ladder" crosswalk designs.

7.6 TRAFFIC MANAGEMENT PROGRAM

ACTA's philosophy is that the project is to be constructed with the least possible negative impact to the public. The requires keeping focused on the following objectives and principles:

During construction, access to abutting properties within the immediate area of construction shall be maintained at all times.

Where possible, traffic during construction shall be kept on the same route or on an alternate roadway proximate to the route, rather than diverting traffic on remote and lengthy detours. However, when lane constrictions and/or other conditions would result in long queues and long delays, the detour option shall be considered as preferable. Where detours are designated, the alternative travel routes shall be well identified and clearly conveyed to the public. Alternative routes should avoid the use of streets in residential areas or other local streets which may become unduly congested as a result of diverted traffic.

7.7 CONSTRUCTION ZONE TRAFFIC CONTROL

Construction zone traffic control procedures should generally follow standards set forth in the latest edition of the Work Area Traffic Control Handbook (WATCH), published by Building News, Inc., or where applicable, Chapter 5 of the Caltrans Traffic Manual (also published as the Manual of Traffic Controls for Construction and Maintenance Work Zones).

END OF SECTION 7

8.0 SPECIFICATIONS

8.1 GENERAL

8.1.1 Purpose

This procedure defines the requirements for the preparation of specifications. Specifications are prepared to provide a legally binding text which defines the requirements for the contractor based on adopted standards. The procedures described herein apply to facilities that are the property of ACTA. Specifications for facilities owned by other agencies to follow those agencies standards.

8.1.2 Definitions

A specification is a document that describes or defines various functional, design, application, workmanship, and installation requirements for materials, equipment, systems, processes, or structures. The contract specifications forms the basis for acceptance of the finished project.

Drawings are prepared to graphically detail items in the specifications for a particular project. Drawings and specifications are a part of the bid documents, with the specifications governing in the event of conflicts with the drawing. The bid document is prepared and issued to obtain either competitive bids or to support a negotiated procurement.

8.1.3 Style

Specifications should be clear, concise, and complete; they should not contain jargon or highly embellished language. The use of adjectives should be avoided.

8.1.4 Types of Specifications

A. There shall be three types of specifications relating to the ACTA Contracts:

1. Construction
2. Systems
3. Procurement

8.2 FORMAT AND CONTENT

8.2.1 Format

A. The format for each of the specification types is described below.

1. Construction Specifications

Construction specifications shall follow the Construction Specifications Institute (CSI) format. Guideline specifications prepared by ACTA in the CSI format shall be used as baseline specifications. Contract designers shall mark up changes to the applicable divisions and/or sections of the guideline specifications, thus tailoring them to the unique requirements of their particular technical specification.

2. Systems Specifications

Specifications prepared for systems contracts shall be tailored by the contract final designer to the unique requirements of their contract. Some of these contracts shall be for manufacturing of unique equipment and may not follow the CSI format. Such specifications shall be organized by chapter instead of by component.

3. Procurement Specifications

The specifications for procurement contracts shall, like those for systems contracts, be tailored to the contracts' unique requirements. These generally shall not follow the CSI format.

8.2.2 Content

A. Quality Assurance

The contractor or supplier quality control (QC) requirements shall be noted in the specifications. Where the contract requires manufacturing, quality assurance requirements shall also be included.

B. System Assurance

Where electromechanical, mechanical, or electronic manufacturing is required in the contract, system safety, reliability, and maintainability requirements shall be included.

C. System Safety

Where a contract unit of work contains items to be verified by a safety certification checklist, such items shall be specified in such a manner as to provide evidence, from a contract submittal, of proper installation.

D. Verification of Existing Conditions

The requirement that the contractor or supplier verify project-specific conditions, such as existing facilities, shall be stated. The site-familiarization requirements of the contract terms and conditions are noted in the general conditions.

E. Interfaces

When required, interface information not stated on interface drawings or data sheets shall be stated in the specifications. The interface information shall include a narrative description of the objective and identify the related drawings. The specifications shall clearly detail all interface coordination by cross references within the affected contracts.

F. References and Standards

Standards, codes, and specifications written by national organizations such as ASTM, ANSI, AWS, and NFPA shall be read before they are referenced to verify that the reference is appropriate. The latest revision of each standard shall apply, except where a specific year is noted. Standards written by manufacturers'

organizations can become less stringent with each revision. The engineering and construction manager may wish to strengthen these standards by adding the requirements for a particular year of issue to the standards. Referenced standards shall be listed in part 1 of each CSI formatted specification under "Referenced Standards." This shall be prior to citing the actual reference. A "code search" shall be performed to prepare a complete listing of applicable codes.

G. Testing Requirements

Testing and inspection are the foundations for verification of acceptable work. The specifier shall clearly identify items to be tested or inspected and when such testing inspection is required. Once so identified, the criteria for acceptance must also be detailed. The specifier shall prepare a chart of items to be tested and note within such chart the applicable standards and acceptable values. For CSI-formatted specifications, a contract data requirements list (CDRL) shall be included.

H. Language

If substitutions are allowable, the specification shall state that ACTA or its designee, and not the contractor, shall decide if a substitute is "equal" to the specified product. Sole source items shall not be specified unless approved in writing by ACTA. The specifications shall advise the contractor that equal must include compatibility with existing related equipment and/or parts interchangeability.

I. Change

All changes to a set of contract specifications shall be processed only through ACET. ACTA shall review proposed changes and determine applicability for incorporation. Where changes are proposed that may impact more than one contract, those proposed changes shall be routed to the affected disciplines for review. For such changes a "specifications document change transmittal" shall be prepared by the requestor.

8.3 RESPONSIBILITIES

Discipline supervisors are responsible for the preparation and checking of specifications. They are also responsible for coordination with other disciplines, subconsultants, and ACET regarding the specifications. Duties include:

- Furnishing necessary reference codes, standards, and other project. Information to the specification writer
- Providing direction and technical resources.
- Reviewing the specifications.
- Verifying that specifications have been signed and sealed.
- Assigning qualified checkers.
- Coordinating specification content with drawings.

- Verifying that specifications are appropriate for the particular contracted scope of work.

The specification writer (or discipline supervisor) has the following responsibilities:

- Preparing each specification.
- Including product, material, and testing reference standards.
- Proofreading and processing the specifications for word processing.
- Ensuring that format, style, and contents are consistent with those of other specifications.
- Verifying that referenced codes and standards are correct.
- Specifying testing requirements, procedures, and acceptance criteria.

The checker has the following responsibilities:

- Verifying that appropriate abbreviations, definitions, codes and standards are included.
- Verifying that listed standards are actually referenced in the text.
- Proofreading the text for grammar and spelling.

8.4 ORGANIZATION

A. CSI or construction specifications shall be organized with each specification section separated into parts 1, 2, and 3. Part 1 shall contain "Scope of Work," "Quality Control Requirements," "Referenced Standards," "Submittal Requirements," "Measurement and Payment" and other standards requirements. Part 2 shall contain "Products" and uses. Part 3 shall detail "Execution" requirements and installation instructions.

B. Manufacturers' data shall be obtained and verified before specifying products. Where specific product references are made, such references shall include a minimum of two and preferably three products, in the format "Provide ... by Company A or .... by Company B, or .... by Company C or approved equal."

C. Systems or procurement specifications shall be arranged with the contents in the following order:

1. Scope of Work
2. Definitions
3. System Performance Requirements
4. Design Performance Requirements
5. Component Requirements
6. System Assurance
7. Quality Assurance

8. O & M Requirements

9. Management Plan

10. Contract Data Requirements List.

D. On CSI-based specifications, the section numbers and titles shall be taken from the current edition of "MASTER FORMAT" titles and numbers as published by The Construction Specifications Institute, CSI Document MP-2-1.

8.5 MEASUREMENTS AND PAYMENTS

The basis for measurements and payments shall be determined depending on the particulars of each specific contract. ACTA's approval on measurements and payments basis shall be obtained.

END OF SECTION 8

9.0 ESTIMATES

9.1 GENERAL

This section applies to any cost estimating of ACTA contracts, regardless of status of design, construction, and procurements. It defines the types of cost estimating; their uses and basis, and the general procedures for their development. The objective is to produce reasonably accurate estimates of ACTA contract costs, suitable for the various needs, in a consistent and uniform manner, organized and standardized in methods and format to facilitate reconciliation review and checking. The estimating of costs is a necessary part of cost control procedures, the evaluation of alternative design choices toward a most cost-effective selection, and the support of contracting and construction.

9.1.1 Definitions

Adder - Refers to any of several types of costs which become added to a construction or procurement cost estimate to allow for additional costs caused by and proportionate to the basic cost. Also found as "add-on" costs and recognized by ACTA. Usually a factor of the basic cost total.

Base Period - The past calendar period during which the base (unescalated) estimates would have been current.

Basis of Estimate - The specific types of costs and cost allowances to be included, referenced, or qualified in the development of a cost estimate.

Cost - As used herein, the first cost of construction and items of procurement, including the usual add-on allowances.

Design Allowance - An estimated cost for anticipated design known and unknown events, corrections, and variations of estimating methods, and quality and quantity of engineering data available.

Design Change Notice Estimate - A ROM estimate (see **rough order-of-magnitude cost estimate** below) of the cost to ACTA of the work directed by a design change notice.

Design Milestone Cost Estimate - An estimate of the projected total first cost of a contract or element, routinely called for and made at defined levels of design advancement. There are six such milestones, as follows:

A. Conceptual Design Level (approx. 5-10%)

B. Preliminary Design Level (approx. 30-35%)

C. In-Progress Level (approx. 60-65%)

D. Pre-Final Level (approx. 80-85%)

E. Final Design Completion (100%)

F. Engineer's Estimate

Design Study or Trade-Off Cost Estimate - A special estimate, possibly ROM, requested and prepared to assist a project manager or design discipline manager to

evaluate comparatively the projected first cost of two or more alternative designs at any time in the design process.

Estimate Structure - The standardized organization and format for assembly of a completed cost estimate.

Fair-Price Cost Estimate - An estimate made to support the processing of contract change orders, contractors' claims, and contractors' value engineering change proposals while a facility is being constructed or a systemwide feature is being fabricated or installed.

Life-Cycle Cost Estimate - An estimate which combines the initial cost of an item, facility or system with its amortized present-day worth of operations and maintenance cost for the projected life of the item, facility, or system. Life cycle cost estimating is used to comparatively evaluate two or more alternatives where first costs and annual costs differ widely.

Rough Order-of-Magnitude (ROM) Cost Estimate - An estimate made usually in support of conceptual and preliminary design studies to assist in making choices among design alternatives. ROM estimates frequently are differential cost estimates which omit cost items not germane to evaluation of choices. ROM cost estimates frequently employ general unit costs for typical facilities and systems.

9.2 RESPONSIBILITIES

It is emphasized that the security of cost estimate results, particularly that of engineer's estimates prior to the related opening of bids, is of utmost importance.
ACET is responsible for facilitating the preparation of cost estimates by the final designers. However this does not relieve the final designer from his responsibility to produce accurate and concise estimates.

9.3 PROCEDURES

9.3.1 General Considerations

ACET oversees the review of all cost estimates prepared by the designer. The general procedures which apply to cost estimating include:

A. Written approval of ACTA shall be obtained prior to release of estimates to outside persons.

B. All contract documents i.e. drawings, specifications, and other information needed by estimating to perform milestone estimates are expected to be presented on time, in accordance with approved project schedules.

C. All questions, correspondence, and telephone contacts relating to estimating are to be directed to the attention of ACTA.

D. All organizations or individuals preparing estimates under this procedure shall provide, in writing to ACTA, the name, address, and telephone number of the individual responsible for the estimate.

E. All estimates shall be transmitted to ACET for review and approval before presentation to ACTA, and the transmittal shall be in the format defined below.

1. A written narrative will accompany each estimate submitted for review, highlighting the details of the estimate differences from the previous estimate, and areas of concern that may require management decisions.

2. The presentation format will be consistent with earlier estimates submitted.

F. Unless otherwise directed, it is expected that all estimates generated are confidential in whole or part.

9.3.2 Types of Estimates

The various types of cost estimates are presented and described below.

A. ROM Estimates

A ROM Estimate describes a hypothetical installation and seldom becomes the basis for conceptual designs. It can be used to reject a project or project elements, but it is seldom adequate for positive acceptance. It may indicate the desirability of expanding an estimate to a higher level of detail.

1. Cost Development - Facility and systems costs are based on historical costs of similar projects. Engineered (permanent) equipment costs and indirects shall be estimated using factors.

2. Information Required for Cost Development - Includes facility description, geographical location, layout drawing, or sketch of the facility and all design information available.

B. Conceptual Design Estimates

These are estimates of projected total first cost, to approximately the 10-to-15 percent level of design completion.

A conceptual estimate describes an installation that might be built rather than one that will be built. Such estimates are typically those associated with alternative designs described in environmental impact reports. It is suitable to indicate feasibility but it may not be adequate for financial planning. It may indicate the desirability of expanding the estimate to higher level of detail.

1. Cost Development - Facility costs are based on historical costs of similar projects. Minimal amounts of quantity takeoffs shall be obtained from the available drawings. Engineered (permanent) equipment procurement costs for major items can be based either on historical costs or vendor quotations; installation costs shall be based on percentage factors. Other quantities shall not be taken off in detail; instead, a reasonable estimate shall be made from the drawings. Indirects may be based on percentage factors.

2. Information Required for Cost Development - includes facility description, geographical location, written description of the soil conditions and

anticipated foundation types, typical sections, plans and profiles, and outline design criteria.

C. Preliminary Design Estimate

These are estimates of projected total first cost, to approximately the 30 percent level of design completion.

A preliminary design estimate is generally considered suitable to determine design feasibility and to assist in establishing a financial program for the project. Trade-off studies have typically been completed for alternative design solutions and the preferred solutions have been selected, e.g., a steel bridge instead of concrete.

1. Cost Development - Costs are based on the preliminary design drawings that are available and on historical costs of similar projects. Quantities that can be identified shall be taken off. Detailed spread sheet estimates shall be prepared when possible; unit price estimates shall be prepared for other items of work. Quotations shall be obtained for the most significant material, subcontract, and engineered (permanent) equipment items. An outline estimate for the indirect costs shall be prepared.

2. Information Required for Cost Development - Includes preliminary civil-structural and architectural design drawings, equipment lists, a written description of the soil conditions indicating the type of foundations, accurate site drawings, and the outline specifications. For other disciplines requiring estimates, preliminary design, and general arrangement drawings are required.

D. Other Design Submittal Milestone Estimates

These are estimates of projected total first cost, to approximately the 60 percent (in-progress), 85 percent (pre-final), and 100 percent (final design completion) level of design completion. The final design completion estimate shall be recognized as the Engineer's Estimate. A definitive milestone estimate is developed from information pertaining to the project that will actually be built; the estimate is generally suitable for the end use that the estimate initiator may designate.

1. Cost Development - Project cost is based on quantity takeoffs and vendor and subcontractor quotations up to the pre-final design completion level. A detailed cost estimate shall be prepared for most direct and indirect items. Site visits shall be required.

2. Information Required for Cost Development - Includes partially completed and fully completed design drawings and specifications.

E. Updated Engineer's Estimate

An updated engineer's estimate, allowing for design changes after the final design completion estimate, shall serve as a comparison to bid estimates submitted by others, to assure ACTA that the quoted prices and total cost are fair and equitable.

1. Cost Development - Detailed quantity takeoffs and estimates of cost shall be prepared for the entire project. Detailed estimates of cost shall be prepared for the indirect items.

2. Information Required for Cost Development - Includes completed design drawings and specifications, all bid addenda, and any bid document reference materials.

F. Fair-Price Cost Estimate

A fair-price cost estimate is developed by the designer from information pertaining to a specific project or contract unit that is already under fabrication, installation, or construction. It may be used as the basis for negotiations with the contractor or as a comparison to estimates submitted by the contractor reflecting changes in the scope of the original contract (change orders or claims) to assure ACTA that the quoted price is fair and equitable.

1. Cost Development - Detailed quantity takeoffs and estimates of cost shall be prepared for the entire direct portion of the task. Detailed estimates of cost shall be prepared for the indirect items or, if applicable, contractually defined percentages shall be used. Site visits shall be required.

2. Information Required for Cost Development - Includes a conformed set of design drawings and specifications showing both the original and modified design, field inspectors' notes documenting changed field conditions and/or any other relevant information pertaining to the nature of the change, inventory of contractor's construction equipment and labor force prior to the change, and correspondence or any other written communication between the contractor and the designer on the subject.

G. Life-Cycle Cost (LCC) Estimate

A life-cycle cost estimate is appropriate when the designer desires to compare two or more alternative design choices where first-cost comparisons could lead to erroneous selection of a cost-effective solution. This estimate takes into account the annual costs (O & M) related to each alternative as well as the initial cost. It is usually used during the design phase.

1. Cost Development - The first cost is developed in the same manner as milestone estimates and must be all-inclusive (not a partial cost of variable items). The annual cost is estimated by the program office unit most familiar with operations and/or maintenance of the facility or system. The rules for determining present value, including amortization of annual cost, and including suggested interest rates and life spans to apply, are found in the estimating Guidelines.

2. Information Required for Cost Development - First-cost estimates require the same information as that required for design milestone estimates. For the LCC portion, a good assessment of all operating and maintenance costs over the life of the item (or for a lesser period assumed for LCC estimating). Care must be taken to recognize only the future costs accruing to ACTA consistent with the first-cost estimate.

H. Design Study or Trade-Off Cost Estimates

These design-phase support estimates are similar to design milestone estimates, but may be on ROM or differential bases and not absolute of the total cost of each alternative under study. Care must be taken to set boundaries for each alternative which are consistent, even though all required costs are not being estimated. When differential estimates are being prepared, the differential must be expressed in dollars and not as a percentage difference.

9.4 ESTIMATE STRUCTURE

All estimates shall be prepared on standard ACTA forms and in accordance with guidelines and procedures provided herein. The estimate shall be assembled in the following format:

- Letter of transmittal
- Basis of estimate
- Estimate reconciliation
- Estimate summary
- Details of estimate
- Direct costs
- Indirect cost evaluation
- Design allowance
- Escalation
- Quotations
- Labor rates
- Miscellaneous
- Quantity survey

9.4.1 Basis of Estimate

The basis of estimate shall be prepared by the individual responsible for developing the estimate. The basis of estimate gives specific information related to the estimate and shall consist of the following:

A. Scope of Estimate - provides the general parameters of what the estimate covers.

B. Drawings - the engineering drawings on which the estimate is based. The number of drawings is indicated, an index or drawing list is referenced.

C. Specifications - the specification on which the estimate is based.

D. Estimate Format - the format on which the estimate was based (all estimates shall be formatted in accordance with the current Construction Specification

Institute).

E. Quantities - indicates whether a quantity survey was made and if so, how extensive it was.

F. Labor and Burden - indicates what the labor and burden costs include and the effective date of the labor rates. Discusses unusual burdens, such as premium pay for overtime work.

G. Materials - indicates how material pricing was performed for the estimate and shows how consumables were calculated.

H. Sales Tax - if included, indicates the percent.

I. Equipment Usage - indicates how rental rates and/or depreciation rates are formulated.

J. Subcontracts - indicates what costs are included in the subcontract work.

K. Equipment - indicates whether owned or rental rates were used.

L. Design Allowance - indicates how the design allowance was calculated.

M. Escalation - indicates present-day cost or the date-of-expenditure cost when escalated, including the rate of annual escalation.

N. Construction Schedule - indicates start and finish dates and sequence of activities if pertinent to the estimate.

O. Cost Exclusions - provides a list of any items not included in the estimate that may become an ACTA expense.

P. Estimate Discussion/Comments - identifies any items that can affect either cost or schedule and have not been covered in any of the above paragraphs. It also lists observations, recommendations, or unusual features of the project, from the estimator's perspective.

Certain cost bases or increments can be omitted if and when they are not significant to achieving the desired quality of estimate.

9.4.2 Estimate Reconciliation

A reconciliation shall be made to the previous estimate, and shall include an explanation of any significant cost changes. Preparation of the estimate comparison shall be the responsibility of the estimate preparer. Comparison (reconciliation) to the current budget shall be the responsibility of the designer.

9.4.3 Estimate Approval and Summary

All estimates must be approved by ACTA prior to release and a summary of the estimate is required. This is usually a one-page summarization of the details of the estimate in CSI format. It shall be prepared on the standard estimate spread sheet.

9.4.4 Details of Estimate

All estimates shall be prepared on standard estimate detail sheet forms in Timberline format, and presented in clear and concise fashion to facilitate review. Use of the estimate spread sheet is generally limited to ROM and conceptual design estimates. ACTA has the authority to allow deviations from this rule, if circumstances so dictate. The detail sheets may be subdivided by items or categories of work, based on specific project requirements.

9.4.5 Direct Cost Evaluation

Direct costs may consist of the following items: labor, equipment, materials, and subcontracts. All these items shall be separately analyzed and evaluated within each category of work. If the estimate is prepared using unit costs, then all unit costs shall include one or more of the above items as applicable.

9.4.6 Indirect Cost Evaluation

Indirect costs may include all costs that can readily be charged to the contract unit, but cannot be charged to direct cost items as previously defined in Section 9.4.4 Details of Estimate and Section 9.4.5, Direct Cost Evaluation. Costs normally in this category are usually shown as line items on the estimate summary (estimate spread sheet). For ROM and conceptual design cost estimates, the add-on costs are usually combined into one cost allowance.

A. Contractors' Overhead and Profit Including Construction Plant

Evaluated for each contract based on the Contractor's Subcontractors' Overhead Expenses. Alternatively, for magnitude, conceptual and preliminary estimates, percentage adders shall be used. Profit percentage adders shall be evaluated for each contract based on the judgement of the individual preparing the cost estimate and considering such factors as the size of the contract, type of the work, current bidding climate, local practices, etc.

B. Construction Management

Typically developed for ROM and conceptual design estimates only and evaluated for each contract. Alternatively, percentage adders may be used.

C. Engineering, Supervision, and Procurement

Typically developed by ACTA for ROM and conceptual design estimates and evaluated for each contract. Alternately, percentage adders may be used.

D. ACTA Costs

Typically developed for ROM and conceptual design estimates; represents the costs expended by ACTA in administering, coordinating, and supervising consultants; interfacing with various public and private organizations having jurisdiction over any elements of the contract; and also administering and maintaining their own work forces. The costs of these and other items that might fall into this category are normally included as a fixed percentage in all estimates representing total contract costs.

9.4.7 Design Allowance

A design allowance shall not be used in lieu of good judgement and good estimating techniques. This cost shall be evaluated for all construction standards and major headings contained in an estimate; however, if it is apparent that a specific category of work has a lower or higher uncertainty factor than the remaining work in the major heading, then a more detailed breakdown shall be warranted. Normally, the material and labor of an estimate shall be analyzed separately.

9.4.8 Escalation

All estimates shall be estimated in base period dollars and an evaluation made to determine what effect inflation and wage increases may have on the cost of a project extending sometime into the future. Escalation shall be evaluated by separate computations for appropriate categories of work from the construction schedule, using the annual compounded rate, as determined by ACTA from time to time. These categories consist of direct labor (including fringe benefits and employer statutory labor cost), construction equipment, construction materials, and engineered (permanent) equipment.

9.4.9 Quotations

During the course of preparing construction cost estimates, up to the pre-final design level submittal, quotations shall be obtained for the significant material and subcontract items. All such quotations from vendors and subcontractors shall be recorded by the individual receiving the quote, and shall be made part of the estimating job file. Pricing information of major permanent equipment and certain specialty items shall normally be obtained by others for incorporation in the estimate.

9.4.10 Labor Rates

The designer shall use current prevailing wage rates for the construction industry in the various local jurisdictions for the appropriate craft classifications. In addition to the basic unit wage rates, the applicable fringe benefits and burden shall be included.

9.4.11 Miscellaneous

Information not falling in any of the above categories and deemed important for the development of the construction cost estimate shall be included in a narrative. Typically, such information consists of:

A. Record of site visits

B. Information received during the preparation of other estimates but judged to have bearing on the current task

C. Bid tabulations of similar projects

D. Documents that served as the basis for certain assumptions

E. Reference articles from newspapers and magazines

F. Documentation of unusual factors having influence on the final cost

G. Cost references

Any such information included in the estimating job file shall be subdivided into further categories under this main heading, as appropriate.

9.4.12 Quantity Survey

A quantity survey may be initiated for bid estimates, engineers' estimates, design milestone estimates, and for other estimates whenever sufficient information is available. To promote consistency, all quantity surveys shall be tabulated on quantity sheet forms. The performance of this task shall be the responsibility of the individual preparing the construction cost estimate. Its purpose is to identify and calculate quantity information from drawings and specifications. It shall be performed in a systematic manner and subtotaled to correspond to the Bid Schedule of Quality and Prices used for the estimate. This task shall also include the identification and referencing of all quantities, including those insufficient in detail or incomplete in any manner to carry out the performance of the survey in its entirety. A written description indicating sufficient information to identify the item shall be used to facilitate review and checking. All quantity sheets shall be filed in the estimating job file according to the format of the estimate, e.g., Schedule of Quality and Prices , bid items.

END OF SECTION 9

10.0 DESIGN SUBMITTALS

10.1 GENERAL

This section summarizes requirements and procedures for submitting documents defined herein, for review and acceptance by the Alameda Corridor Engineering Team (ACET).

10.2 QUALITY CONTROL

Prepare documents to a high standard of quality, as set forth in Volume 4 - CAD Drafting Standards, and Volume 5 - Design Quality Management.

10.3 SUBMITTAL REQUIREMENTS

10.3.1 Master List of Submittal

Identify submittal required and determine the date on which each submittal is required in conformance with scope of work and schedules. Within 30 days after the effective date of notice to proceed, furnish a master list of submittal, with corresponding submittal dates which allow for not less than 30 day cycles for review by ACTA. The design effort shall continue during ACTA's review. The order of submittals shall be as follows:

Conceptual Design Level - 15% design completion

Concept level plans intended to verify general form, function and configuration. Typical submittal includes, but not necessarily limited to, layout plan.

Preliminary Design Level - 30% design completion

Preliminary Engineering submittal with layout plans, including detailed geometry, profiles, typical sections, lane configuration, preliminary striping plans, bridge type selection reports and critical construction details. The intended use is to obtain concept or geometric approval from the local agencies.

In-Progress Design Level - 60% design completion

Intermediate design submittal at the approximate 60% point. Submittals will typically include final layouts, profiles and typical sections, together with in-progress drainage plans, construction staging and traffic handling plans and impacts, utility layout plans, bridge general plans and foundation plans, right of way and permit requirements and a detailed outline of specifications. The intended use is to confirm progress in the design and check coordination of design elements. This submittal may or may not be sent to external review agencies.

Pre-Final Design Level - 85% design completion

Pre-final design submittal, with plans, specifications and quantities essentially complete, including engineering seals. Intended use is for formal review and obtaining external agency final comments and approvals.

Final Design Level - 100% design completion

Final design submittal of plans, specifications and estimates as required in the scope of work to verify that all comments have been addressed and incorporated

as appropriate, and to verify submittal is complete and ready for printing.

Camera Ready

Submittal of final documents, with original signatures, ready for printing contract documents.

Engineer's Estimate Update

Update final Engineer's estimate to reflect any bid addenda or changes during the bid period.

10.3.2 Quantities

A. Conceptual Design Level

1. One full-size print and ten half-size prints
2. Five sets of Concept Reports
3. Five sets of cost estimates (if not included in report)

B. Preliminary Design Level

1. One full-size print and ten half-size prints
2. Five sets of Preliminary Reports including Hydrology, Geotechnical and Bridge Type Selection Reports
3. Five sets of cost estimates (if not included in reports)

C. In-Progress Design Level

1. One full-size print and ten half-size prints
2. Five sets of Final Reports
3. Five sets of specifications, cost estimates and schedule
4. Two sets of preliminary calculations
5. Five sets of Permit Requirements table with status
6. Five sets of Utility Impacts table
7. Five sets of ROW Requirements table with final easements/ROW descriptions

D. Pre-Final Design Level

1. One full-size print, ten half-size prints and one reproducible half-size print
2. Five sets of specifications, cost estimates and schedule
3. Five sets of specifications, cost estimates and schedule
4. Five sets of design calculations including computer printouts. All computer printouts to be supplemented with notes explaining input and output information
5. Five sets of Permits Requirements table with status
6. Five sets of updated Utility Impacts table
7. Five sets of ROW Requirements Table (If Revised)

E. Final Design Level

1. One full-size print, ten half-size prints and one reproducible half-size prints.
2. Five sets of Final Reports (If Revised)
3. Five sets of specifications, cost estimates and schedule
4. Five sets of revisions to design calculations

F. Camera Ready Level

1. Original full-size sealed plans, one reproducible fill-size print and one reproducible half-size print
2. Electronic data files for drawings and specifications
3. Original sealed specifications
4. Final cost estimate and schedule
5. Five sets of revisions to design calculations

G. Engineer's Estimate Update

1. Update Engineer's Estimate

All submittals shall include information deemed necessary to clarity the design, such as manufacture's catalogs and brochures.

All submittals are to be accompanied with a letter of transmittal indicating all attachments to ACET. The designer will certify that all the contract documents have been verified and checked in accordance with the Quality Assurance Plans.

10.3.3 Additional Submittals

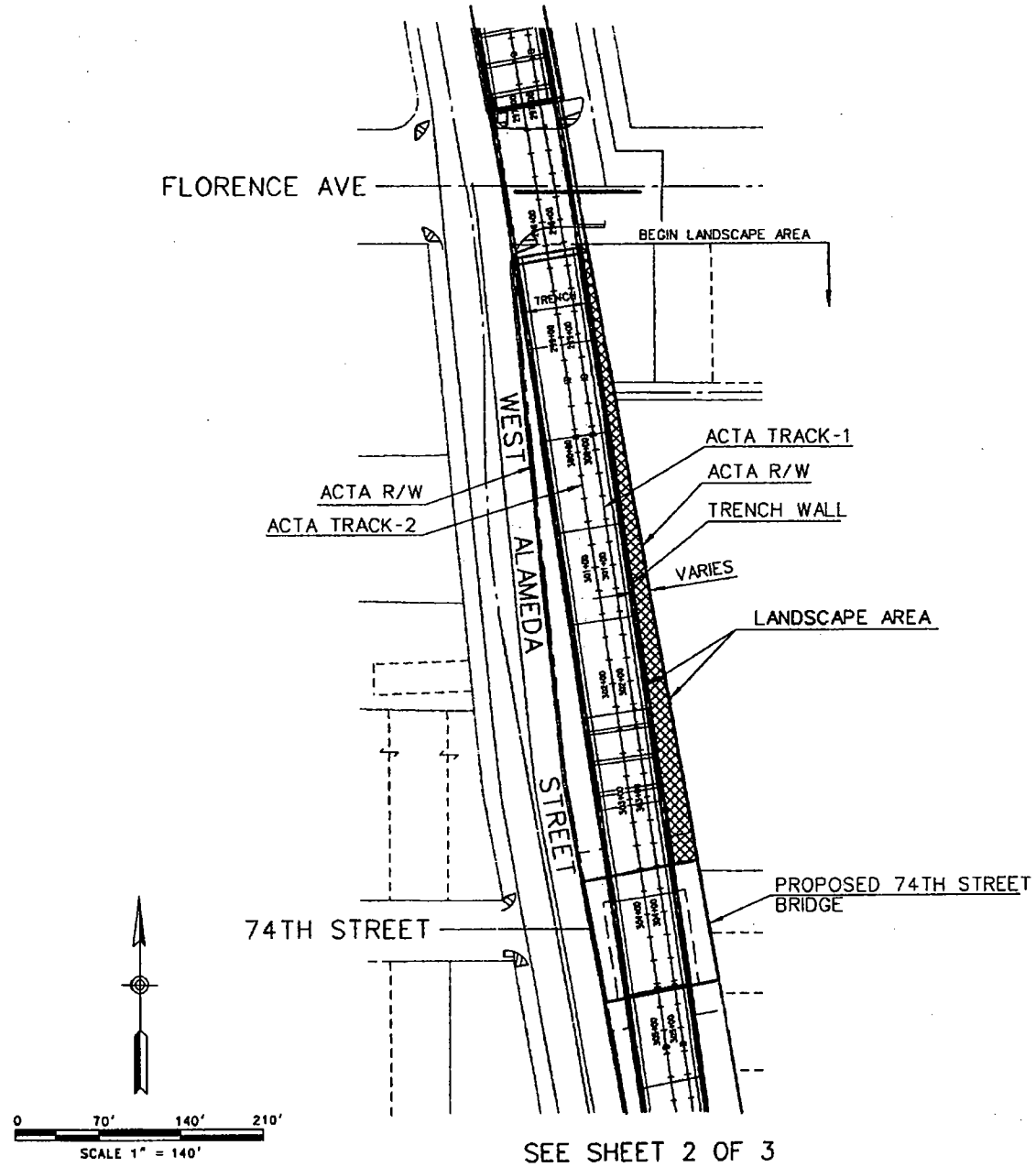
Additional submittals for third parties, e.g. utilities, municipalities, will be specific to each contract, and shall conform to the requirements of the agency.

END OF SECTION 10

GRANTOR :		The data ... on plat are based on a field survey prepared by Psomas and ...ociates dated May 1995. Bearings and distances are based on California Coordinate System 83 Zone 5 coordinates obtained from California H.P.G.N.		
DESCRIPTION :				
TITLE REPORT :				
ASSESSORS REF.	ROW REF :	NO.	DATE	REVISION DESCRIPTION

EXHIBIT "D"

"LANDSCAPE AREA"



SEE SHEET 2 OF 3

				SHEET 1 OF 3
				LETTER 713

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY

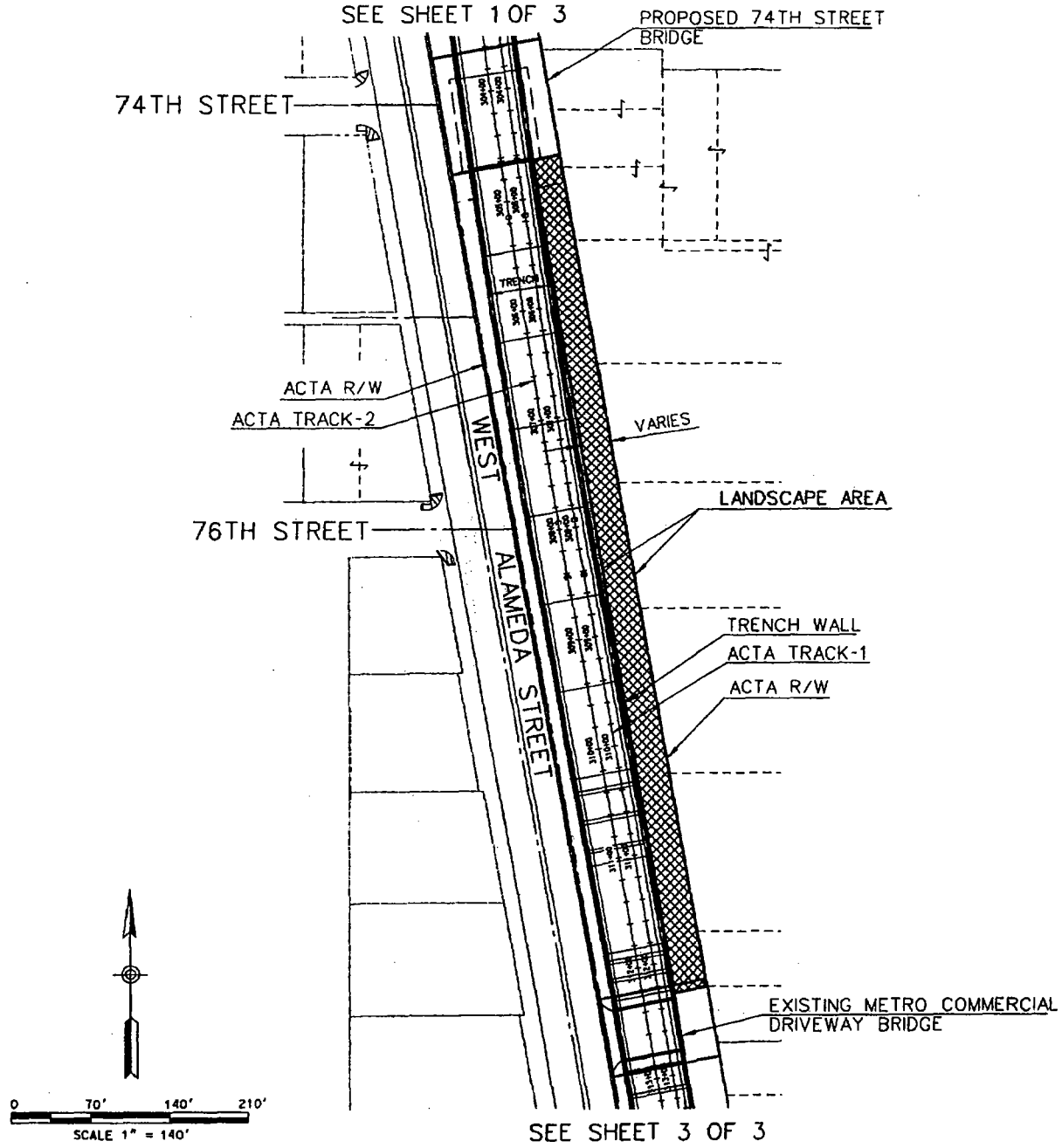
ALAMEDA CORRIDOR
PARCEL PLAT
LANDSCAPE AREA

CONTRACT NO.	2DMJ0107.41
SCALE	1" = 140'
DATE	9/16/05
DRAWN BY	R. NEWHOUSE
CHECKED BY	K.LAUNEN
REV. DATE	REV. NO.

PREPARED BY:
PSOMAS
3187 Red Hill Avenue, #250
Costa Mesa, California 92626
714/751-7373
714/545-8883 (Fax)

GRANTOR :		The data s n plat are based on a field survey prepared by Psomas and ociates dated May 1995. Bearings and distances are based on California Coordinate System 83 Zone 5 coordinates obtained from California H.P.G.N.		
DESCRIPTION :				
TITLE REPORT :				
ASSESSORS REF.	ROW REF :	NO.	DATE	REVISION DESCRIPTION

EXHIBIT "D" – "LANDSCAPE AREA"



				SHEET 2 OF 3
				LETTER 713

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY

ALAMEDA CORRIDOR PARCEL PLAT LANDSCAPE AREA

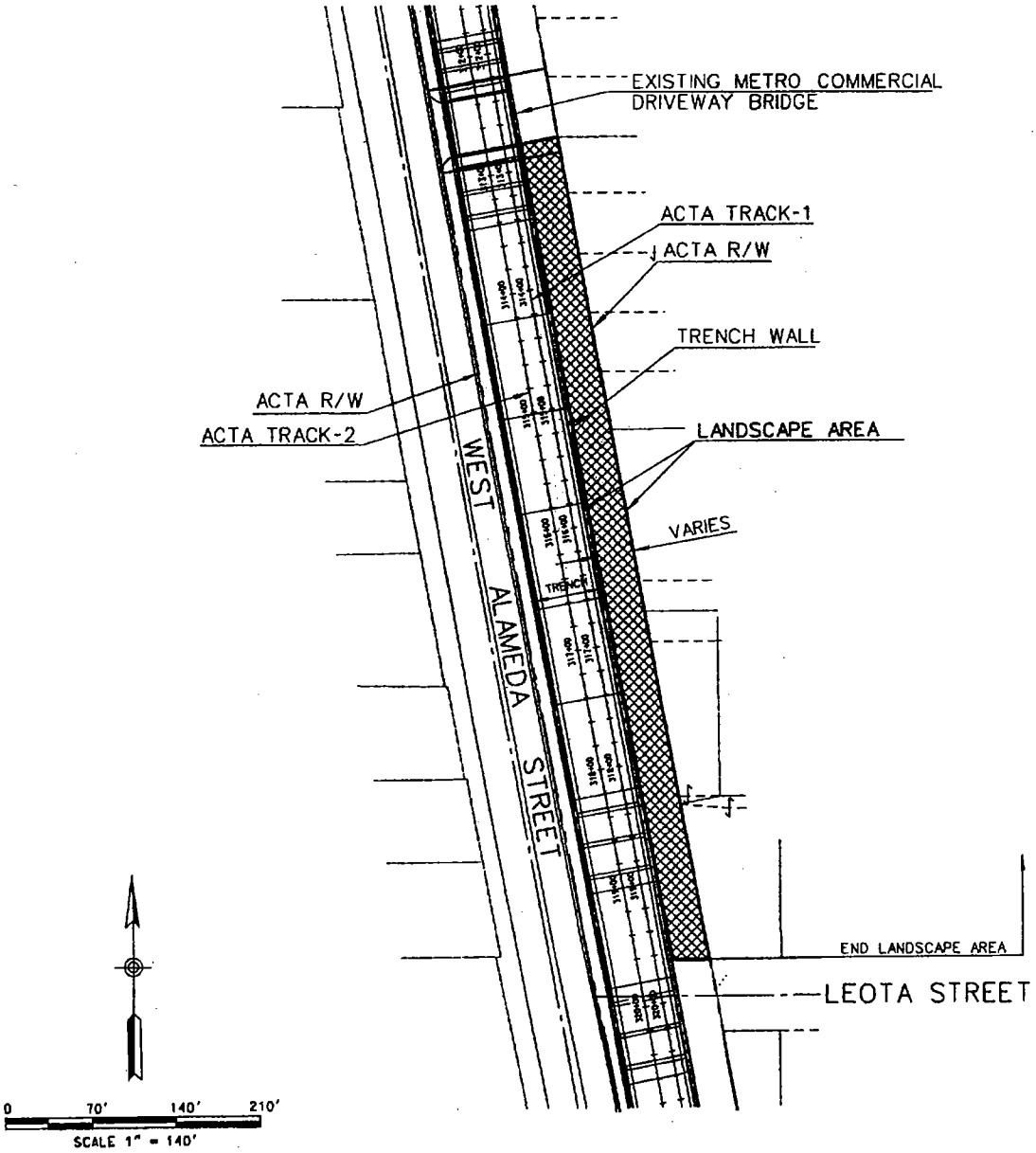
CONTRACT NO. 2DMJ0107.41
SCALE 1" = 140'
DATE 9/16/05
DRAWN BY R. NEWHOUSE
CHECKED BY K. LAUNEN
REV. DATE REV. NO.

PREPARED BY:
PSOMAS
3187 Red Hill Avenue, #250
Costa Mesa, California 92626
714/751-7373
714/545-8883 (Fax)

GRANTOR :		The data on plot are based on a field survey prepared by Psomas and Associates dated May 1995. Bearings and distances are based on California Coordinate System 83 Zone 5 coordinates obtained from California H.P.G.N.		
DESCRIPTION :				
TITLE REPORT :				
ASSESSORS REF.	ROW REF :	NO.	DATE	REVISION DESCRIPTION

EXHIBIT "D" – "LANDSCAPE AREA"

SEE SHEET 2 OF 3



SHEET 3 OF 3

LETTER 713

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY

ALAMEDA CORRIDOR
PARCEL PLAT
LANDSCAPE AREA

CONTRACT NO. 2DMJ0107.41
SCALE 1" = 140'
DATE 9/16/05
DRAWN BY R. NEWHOUSE
CHECKED BY K.LAUNEN
REV. DATE | REV. NO.

PREPARED BY:
PSOMAS
3187 Red Hill Avenue, #250
Costa Mesa, California 92626
714/751-7373
714/545-8883 (Fax)

PSOMAS

EXHIBIT 'E'

"FORM AND CONCRETE ACCESS AREA"

LEGAL DESCRIPTION

That portion of Parcel 2, as shown on map filed in Book 159, Pages 21 through 34, inclusive, of Records of Survey, in the Registrar-Recorder/County Clerk's office, and as described in Grant Deed to the Cities of Los Angeles and Long Beach, recorded December 29, 1994 as Document No. 94-2282144, Official Records, in said Registrar-Recorder/County Clerk's office, described as follows:

Parcel MC-802-3A

Commencing at the intersection of the center line of 74th Street with the westerly line of said Parcel 2, as both are shown on said map; thence along said westerly line North 10°14'36" West 41.67 feet to the **True Point of Beginning**; thence continuing along said westerly line North 10°14'36" West 25.00 feet; thence at right angles from said westerly line North 79°45'24" East 100.00 feet to the easterly line of said Parcel 2; thence along said easterly line South 10°14'36" East 25.00 feet; thence at right angles to said easterly line South 79°45'24" West 100.00 feet to the **True Point of Beginning**.

Containing 2500 square feet, more or less.

PSOMAS

Parcel MC-802-3B

Commencing at the intersection of the center line of 74th Street with the westerly line of said Parcel 2, as both are shown on said map; thence along said westerly line South 10°14'36" East 63.33 feet to the **True Point of Beginning**; thence at right angles from said westerly line North 79°45'24" East 100.00 feet to the easterly line of said Parcel 2; thence along said easterly line South 10°14'36" East 25.00 feet; thence at right angles to said easterly line South 79°45'24" West 100.00 feet to a point on said westerly line; thence along said westerly line North 10°14'36" West 25.00 feet to the **True Point of Beginning**.

Containing 2500 square feet, more or less.

The distances shown hereon are grid distances. Ground distances may be obtained by dividing the grid distance by the combination factor of 1.00000507.

All as shown on Attachment "E-1" hereto and made a part thereof.

This legal description is not intended to be used in the conveyance of land in violation of the subdivision map act of the State of California.

This legal description was prepared by me or under my direction.

David A. Moritz

2-3-06

David A. Moritz, PLS 7388 — Date

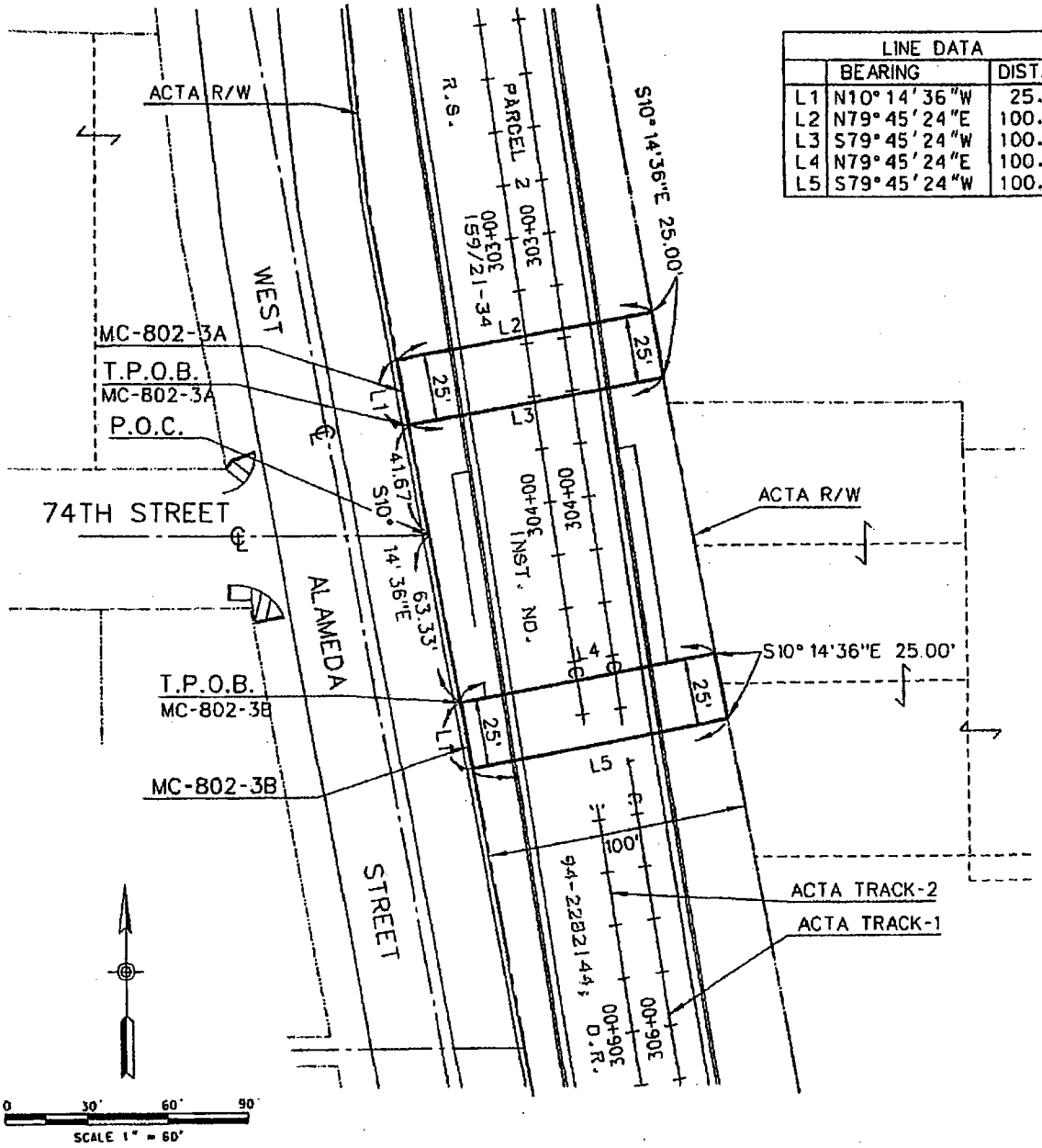
Expires 12/31/07

PROFESSIONAL LAND SURVEYOR
DAVID A. MORITZ
No. 7388
Exp. 12-31-07
STATE OF CALIFORNIA

GRANTOR :		The data shown on plat are based on a field survey prepared by Psomas and Associates dated May 1995 Bearings and distances are based on California Coordinate System 83 Zone 5 coordinates obtained from California H.P.G.N.		
DESCRIPTION :				
		A	2/3/06	REV. 802-3A & 802-3B.
TITLE REPORT :				DEL. 802-3C & 802-3D
ASSESSORS REF	ROW REF :	NO	DATE	REVISION DESCRIPTION

ATTACHMENT "E-1" TO EXHIBIT "E"

DEPICTION OF "FORM AND CONCRETE ACCESS AREA"



LINE DATA		
	BEARING	DISTANCE
L1	N10° 14' 36"W	25.00'
L2	N79° 45' 24"E	100.00'
L3	S79° 45' 24"W	100.00'
L4	N79° 45' 24"E	100.00'
L5	S79° 45' 24"W	100.00'

MC-802-3A	MC-802-3B				SHEET 1 OF 1
AREA- 2500 SQ.FT	AREA- 2500 SQ.FT				LETTER 713

ALAMEDA CORRIDOR TRANSPORTATION AUTHORITY

ALAMEDA CORRIDOR
PARCEL PLAT
MC-802-3A
MC-802-3B

CONTRACT NO. 2DMJ0107.41
SCALE 1" = 60'
DATE 9/16/05
DRAWN BY K. RHODENBAUGH
CHECKED BY D. MORITZ
REV. DATE 2/3/06 REV. NO. A

PREPARED BY
PSOMAS
3187 Red Hill Avenue, #250
Costa Mesa, California 92626
714/751-7373
714/545-8883 (Fax)

0220-04176-0000

TRANSMITTAL

TO	DATE	COUNCIL FILE NO.
Geraldine Knatz, Ph.D., Executive Director Harbor Department	JUL 18 2006	
FROM		COUNCIL DISTRICT
The Mayor		15

PROPOSED EASEMENT DEED AND AGREEMENT REGARDING THE EAST 74TH STREET BRIDGE OVER THE ALAMEDA CORRIDOR

Transmitted for further processing. See the City Administrative Officer report attached.

MAYOR

WTF:ABN:10070002t

CAO 649-d

REPORT FROM

OFFICE OF THE CITY ADMINISTRATIVE OFFICER

Date: July 10, 2006

CAO File No. 0220-04176-0000
Council File No.
Council District: 15

To: The Mayor

From: William T Fujioka, City Administrative Officer WTF by mt

Reference: Harbor Departmental Transmittal, referred by the Mayor

Subject: **PROPOSED EASEMENT DEED AND AGREEMENT REGARDING THE EAST 74TH STREET BRIDGE OVER THE ALAMEDA CORRIDOR**

SUMMARY

The Board of Harbor Commissioners (Board) Harbor Department (Port) requests approval to execute Order No. 6873 and the attached Ordinance to grant rights to an easement deed and agreement with the County of Los Angeles (County) to construct a new bridge and traffic signal over and across the Alameda Corridor (Corridor). The proposed bridge and traffic signal located at East 74th Street and Alameda Street will provide access to a new commercial development called the Florence and Alameda Commercial Center Project (Project). The easement deed is owned jointly by the Port of Los Angeles (POLA), Port of Long Beach (POLB) and Alameda Corridor Transportation Authority (ACTA) through a Tenancy in Common Agreement, which is an interest held by two or more entities in the same piece of land. As a joint owner of the Corridor, the Port must execute an easement deed and agreement to enable the County to proceed with the bridge and traffic light projects. According to the Port, the County will pay for all costs and expenses to plan, design, construct and maintain the bridge and traffic signal. As a result, POLA, POLB and ACTA are proposing that no fee be charged to the County for the proposed easement because of the mutual benefit to the area and all involved parties. In accordance with Charter Section 385, Council approval is required to dispose of real property. The attached Ordinance has been approved by the City Attorney as to form.

ACTA is a joint powers authority formed by POLA and POLB, under the State of California laws, to construct, operate and maintain railroad improvements primarily along and adjacent to Alameda Street extending from the two ports to downtown Los Angeles, a distance of approximately 20 miles. This property was conveyed to ACTA through a "use permit" that granted it authority to possess, use and improve the parcels of land for developing, constructing and operating the railroad. ACTA used this authority to negotiate with the municipalities along the corridor alignment for street right-of-way and easements to complete the railroad improvements. In April 2002, ACTA completed construction of the railroad project and began the Corridor rail operations. With the completion of the Corridor, the Port transferred selective property rights associated with the railroad rights-of-way by conveyance of easements and grant deeds without costs to municipalities in consideration of the mutual benefits to the parties and when the properties were not necessary for future use by POLA, POLB and ACTA.

The County requests the proposed easement deed for public road and highway purposes to construct the bridge and traffic signal to provide for vehicles and pedestrian access to the new commercial development. The total easement parcels are approximately 15,500 square feet. The Project is located in an unincorporated area of the County. The Port states that the bridge and traffic signal will facilitate access to the Project and benefit the community by improving traffic flow in the surrounding area. Therefore, the POLA, POLB and ACTA are willing to grant the non-exclusive easement rights to the County at no cost for the construction project. A non-exclusive easement is not exclusive to any one party and more than one entity can use it. POLA, POLB and ACTA would be able to grant a license or permit for the same area. The County will be responsible to maintain, repair and replace any future damages to the bridge.

The Port Director of Environmental Management has determined that the proposed actions have been previously evaluated pursuant to the California Environmental Quality Act (CEQA) in accordance with Article II, Section 2 (i) of the Los Angeles City CEQA Guidelines. In July 2005, the County Board of Supervisors approved an environmental impact assessment report of the Project.

RECOMMENDATION

That the Mayor approve the request of the Harbor Department (Port), Board of Harbor Commissioners, to execute the attached Ordinance and Order No. 6873 to grant the proposed rights to an easement deed and agreement to the County of Los Angeles (County) to construct a new bridge and traffic signal across the Alameda Corridor at East 74th Street and Alameda Street and return the documents to the Port for further processing and consideration by the Council.

FISCAL IMPACT STATEMENT

The proposed easement deed and agreement will have no financial impact on the City General Fund or Harbor Revenue Fund because the County of Los Angeles has agreed to pay for construction and maintenance costs, and indemnify and defend against any and all liability.

Attachment

WTF:ABN:10070002

ATTACHMENT

ORDINANCE NO._____

An Ordinance approving an Order of the Board of Harbor Commissioners for an Easement Deed and Agreement - by and among the City of Los Angeles, the City of Long Beach, the Alameda Corridor Transportation Authority (ACTA), and the County of Los Angeles.

THE PEOPLE OF THE CITY OF LOS ANGELES
DO ORDAIN AS FOLLOWS:

Section 1. The action of the Board of Harbor Commissioners of the City of Los Angeles on the _____ day of _____ 2006, approving the Easement Deed and Agreement, by and among the City of Los Angeles, the City of Long Beach, ACTA, and the County of Los Angeles is hereby ratified, confirmed, and approved. The approved Order reads:

ORDER NO. _____

IT IS HEREBY ORDERED by the Board of Harbor Commissioners that the Easement Deed, by and among the CITY OF LOS ANGELES, the CITY OF LONG BEACH, ACTA, and the COUNTY OF LOS ANGELES is hereby approved and the Executive Director and the Secretary of the Board are hereby authorized and directed to execute and attest to the Easement Deed and Agreement on behalf of the City of Los Angeles.

The Secretary shall certify to the adoption of this Order by the Board of Harbor Commissioners of the City of Los Angeles and shall cause a copy of the Order and the proposed Ordinance to be submitted to the City Council for adoption of the Ordinance pursuant to City Charter Section 385 and related implementing provisions of the Los Angeles Administrative Code.

I HEREBY CERTIFY that the foregoing Order was adopted by the Board of Harbor Commissioners of the City of Los Angeles at its Meeting of _____.

_____
AUDREY YAMAKI, Board Secretary

Sec. 2. Pursuant to Los Angeles Administrative Code Sections 7.21 and 7.27, the Council finds and determines that the public interest requires that the property owned by the City of Los Angeles and the City of Long Beach as tenants-in-common be conveyed as an Easement Deed and Agreement without notice of sale or advertisement for bids.