

California High-Speed Rail Authority



RFP No.: HSR 14-32

**Request for Proposals for Design-Build
Services for Construction Package 4**

**Book II, Part B.1
Directive Drawings Changes**

STRUCTURAL DIRECTIVE NOTES:

A. SPECIFICATIONS FOR DESIGN AND CONSTRUCTION

1. CONSTRUCTION SPECIFICATION SHALL BE THE DESIGN-BUILD STANDARD SPECIFICATION, CALIFORNIA HIGH SPEED TRAIN.
2. THE STRUCTURAL DESIGN OF STRUCTURES SUPPORTING HIGH SPEED TRAINS SHALL BE BASED ON THE REQUIREMENTS OF THE CALIFORNIA HIGH SPEED RAIL AUTHORITY.
3. DESIGN CRITERIA FOR HIGHWAY BRIDGES SHALL BE THE CALIFORNIA BRIDGE DESIGN SPECIFICATION. FOR HIGHWAY BRIDGES PASSING OVER THE HIGH SPEED TRAIN THE BRIDGE DESIGN SPECIFICATION SHALL BE SUPPLEMENTED BY THE CALIFORNIA HIGH SPEED TRAIN REQUIREMENTS FOR SEISMIC DESIGN.
4. DESIGN CRITERIA FOR RAILROAD STRUCTURES NOT SUPPORTING HIGH SPEED TRAINS SHALL BE THE AMERICAN RAILWAY ENGINEERING AND MAINTENANCE-OF-WAY ASSOCIATION (AREMA) MANUAL FOR RAILWAY ENGINEERING (APRIL 2008). FOR RAILROAD BRIDGES PASSING OVER THE HIGH SPEED TRAIN THE BRIDGE DESIGN SPECIFICATION SHALL BE SUPPLEMENTED BY THE CALIFORNIA HIGH SPEED TRAIN REQUIREMENTS FOR SEISMIC DESIGN.

B. DESIGN METHOD

1. DESIGN SHALL BE PERFORMED TO THE LOAD AND RESISTANCE FACTOR (LRFD) DESIGN METHOD.
2. THE DESIGN OF PRESTRESSING AND PARTIAL PRESTRESSING SHALL CONFORM TO THE REQUIREMENTS OF SUBSECTION 5.9 OF AASHTO LRFD WITH CALIFORNIA AMENDMENTS WITH THE FOLLOWING EXCEPTION: NET TENSION STRESSES ARE NOT ALLOWED IN THE PRECOMPRESSED TENSILE ZONE AFTER ALL LOSSES HAVE OCCURRED.

C. GENERAL

1. SEE GENERAL DIRECTIVE DRAWINGS FOR ACRONYMS AND ABBREVIATIONS.
2. ALL STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE SPECIFICATIONS AND ALL OTHER DRAWINGS RELATED TO THE WORK.
3. EMBEDDED ITEMS SUCH AS PIPES, INSERTS, SLEEVES AND CONDUITS, AND ANY RECESSES, NICHE OR OPENINGS REQUIRED FOR UTILITY, ARCHITECTURAL, MECHANICAL AND ELECTRICAL INSTALLATIONS ARE NOT SHOWN ON THE STRUCTURAL DRAWINGS. CONTRACTOR SHALL REFER TO THE UTILITY, ARCHITECTURAL, MECHANICAL AND ELECTRICAL DRAWINGS FOR THE LOCATIONS AND DETAILS OF THESE ITEMS. CONTRACTOR SHALL REVIEW AND APPROVE ALL PENETRATIONS PRIOR TO CONSTRUCTION. PENETRATIONS WHICH LOCAL THICKENING OF CONCRETE OR STEEL MEMBERS AND /OR SUPPLEMENTAL REINFORCING SHALL BE SHOWN ON THE STRUCTURAL DRAWINGS.
4. THE VERTICAL CONTROL OF ALL TRACK STRUCTURES IS BASED ON THE TOP OF LOW RAIL ELEVATION IN SUPERELEVATED STRUCTURES.

5. CONTRACTORS ATTENTION IS DIRECTED TO THE AREAS OF SAG VERTICAL CURVES. IN SUCH AREAS CAUTION SHOULD BE EXERCISED THAT THE DIMENSION TO THE INVERT OF CONCRETE OF GUIDEWAY IS NEVER LESS THAN THAT SHOWN FOR INVERT DETAILS.
6. ALL CONSTRUCTION JOINTS IN EARTH RETAINING STRUCTURES AND IN STRUCTURES BELOW THE FINISH GRADE SHALL CONTAIN CONTINUOUS WATERSTOPS, AND SHALL HAVE REINFORCEMENT CONTINUOUS ACROSS ALL JOINTS. HYDROSWELLING STRIPS SHALL BE INSTALLED ON ALL JOINT SURFACES WHICH WILL BE EXPOSED TO EARTH AND PERMANENTLY UNDER THE GROUNDWATER ELEVATION.
7. ALL WATERSTOPS SHALL BE INSTALLED SECURELY IN ACCORDANCE WITH THE SPECIFICATIONS. THE WATERSTOPS SHALL BE PLACED CONTINUOUSLY THROUGHOUT THE LENGTH OF THE CONSTRUCTION JOINT. LAPPING OF WATERSTOPS SHALL NOT BE PERMITTED. SPLICING SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS.
8. UNLESS INDICATED OTHERWISE, CONCRETE SURFACES LEADING TO DRAINS SHALL BE SLOPED A MINIMUM OF 1/8 INCH PER FOOT TOWARD THE DRAIN AND THE ADJACENT SURFACES WARPED AS REQUIRED TO SATISFY AN ADEQUATE DRAINAGE FLOW.
9. CAST-IN-PLACE CONCRETE DECKS ON PRECAST CONCRETE GIRDERS OR STEEL GIRDERS OF PRIMARY TYPE 1, PRIMARY TYPE 2 AND SECONDARY STRUCTURES SHALL HAVE A SHRINKAGE VALUE OF 0.025 PERCENT OR LESS WHEN MEASURED AT 28 DAYS AND OF 0.035 PERCENT OR LESS WHEN MEASURED AT 180 DAYS IN ACCORDANCE WITH ASTM C157, STANDARD TEST METHOD FOR LENGTH CHANGE OR HARDENED HYDRAULIC-CEMENT MORTAR AND CONCRETE. CRACK CONTROL OF THESE DECKS MAY BE ACHIEVED THROUGH USE OF MATERIALS SUCH AS SHRINKAGE REDUCING ADMIXTURE (SRA), SYNTHETIC FIBER REINFORCEMENT AND WATER-REDUCING ADMIXTURE.

D. MATERIAL PROPERTIES

1. CONCRETE 28 DAY COMPRESSIVE STRENGTH (MINIMUM)
 - a) DRILLED SHAFTS: $f'c=4,000$ PSI
 - b) PRECAST-PRESTRESSED PILES: $f'c=6,000$ PSI
 - c) FORMED CAST-IN-PLACE STRUCTURAL CONCRETE:
 - $f'c$ (UNDER GROUND)=4000 PSI
 - $f'c$ (ABOVE GROUND)=5000 PSI
 - d) PRECAST GIRDERS OR SEGMENTS OF GIRDERS: $f'c=6,000$ PSI
 - e) UNLESS NOTED OTHERWISE ON THE DRAWINGS, OR SPECIFIED, MINIMUM STRUCTURAL CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI.
 - f) ALL EXPOSED CONCRETE EDGES AND CORNERS SHALL BE CHAMFERED WITH A 3/4 INCH, 45 DEGREE CHAMFER UNLESS NOTED OTHERWISE.
2. REINFORCING STEEL SHALL CONFORM TO THE SPECIFICATIONS OF ASTM A 706 GRADE 60.

3. PRESTRESSING STEEL

- a) STRAND: ASTM A416/AASHTO M203, GRADE 270, LOW RELAXATION
 FRICTION COEFFICIENT: 0.25
 WOBBLE COEFFICIENT: 0.0002 PER FT
 ANCHOR SET: 0.375"
 APPARENT MODULUS: 28,500 KSI
 MINIMUM JACKING STRESS: 216 KSI (80% ULTIMATE)
 MAXIMUM ANCHORING STRESS: 189 KSI (70% ULTIMATE)
 MAXIMUM STRESS AFTER ANCHOR SET: 202 KSI (75% ULTIMATE)
 STRAND DIAMETER: 0.6" (AREA=0.216 SQ IN)
 - b) POST TENSIONING BARS:
 ASTM A722/AASHTO M275, GRADE 150, TYPE II
 ANCHOR SET: 0.0625"
 APPARENT MODULUS: 30,000 KSI
 MAXIMUM JACKING STRESS: 113 KSI
 MAXIMUM ANCHORING STRESS: 105 KSI
 MAXIMUM STRESS AFTER LOSSES: 96 KSI
4. STRUCTURAL STEEL SHAPES SHALL CONFORM TO ASTM A6 WITH A YIELD STRENGTH OF $F_y = 50$ KSI UNLESS NOTED OTHERWISE. THE FOLLOWING MATERIAL PROPERTIES SHALL APPLY:
- a) WIDE FLANGE SHAPES: ASTM A992
 - b) M-SHAPES, S-SHAPES, HP SHAPES: ASTM A572
 - c) ANGLES, CHANNELS: ASTM A572
 - d) RECTANGULAR AND SQUARE HSS: ASTM A500 GR B (46 KSI)
 - e) ROUND HSS: ASTM A500 GR B (42 KSI)
 - f) STEEL PIPE: ASTM A53 GR B (35 KSI)
 - g) PLATES, BARS: ASTM A36 (36 KSI)
 - h) BOLTS: ASTM A325
 - i) NUTS: ASTM A563
 - j) WASHERS: ASTM F436

5. STEEL FABRICATIONS

- a) WELDING OF BUILT UP MEMBERS AND STEEL FABRICATIONS SHALL COMPLY WITH AASHTO/AWS D 1.5
- b) WELDING OF HSS SECTIONS AND PIPES SHALL COMPLY WITH AWS D 1.1
- c) MISCELLANEOUS STEEL ITEMS SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION UNLESS COMPLETELY EMBEDDED IN CONCRETE AND UNLESS NOTED OTHERWISE.

6. FASTENERS

- a) ALL HIGH STRENGTH BOLTS NUTS AND WASHERS SHALL BE ZINC COATED
- b) ALL BOLTED CONNECTIONS SHALL COMPLY WITH RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC) "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS".
- c) ALL BOLTS ARE ASTM A325 HIGH STRENGTH SLIP CRITICAL WITH THREADS EXCLUDED FROM THE SHEAR PLANE

E. CONCRETE COVER

1. UNLESS OTHERWISE NOTED, MINIMUM CONCRETE COVER SHALL CONFORM TO AASHTO LRFD WITH CALTRANS AMENDMENTS TABLE 5.12.3-1 WITH THE FOLLOWING EXCEPTIONS:
 - a) UNCASSED DRILLED SHAFTS: 6 INCHES
 - b) CASSED DRILLED SHAFTS WITH TEMPORARY CASING: 4 INCHES

F. SEISMIC LOADING AND DESIGN

1. THERE ARE TWO LEVELS OF DESIGN EARTHQUAKES:
 - a) MAXIMUM CONSIDERED EARTHQUAKE (MCE): GROUND MOTIONS CORRESPONDING TO GREATER OF (1) A PROBABILISTIC SPECTRUM BASED UPON A 10% PROBABILITY OF EXCEEDANCE IN 100 YEARS (i.e., A RETURN PERIOD OF 950 YEARS) AND (2) A DETERMINISTIC SPECTRUM BASED UPON THE LARGEST MEDIAN RESPONSE RESULTING FROM THE MAXIMUM RUPTURE (CORRESPONDING TO M) OF ANY FAULT IN THE VICINITY OF THE STRUCTURE.
 - b) OPERATING BASIS EARTHQUAKE (OBE): GROUND MOTIONS CORRESPONDING TO A PROBABILISTIC SPECTRUM BASED UPON AN 86% PROBABILITY OF EXCEEDANCE IN 100 YEARS (i.e., A RETURN PERIOD OF 50 YEARS).

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RFP No.: HSR 14-32 - Addendum No. 2 - 10/09/2015

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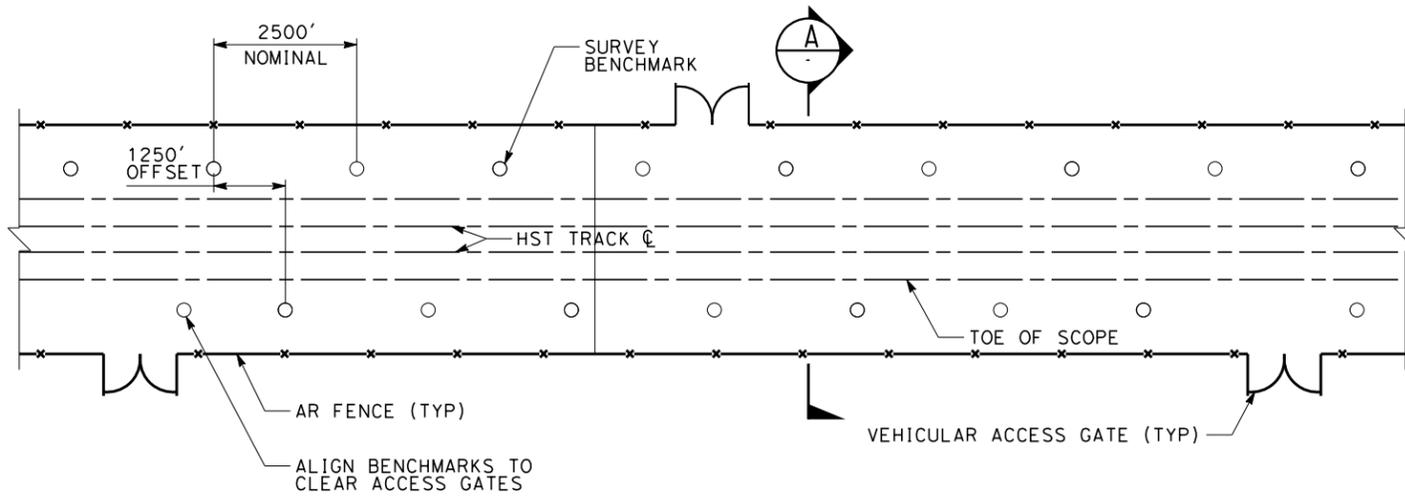
DESIGNED BY P. LIN
DRAWN BY R. MINCIO
CHECKED BY T. JACKSON
IN CHARGE J. CHIRCO
DATE 04/17/2015



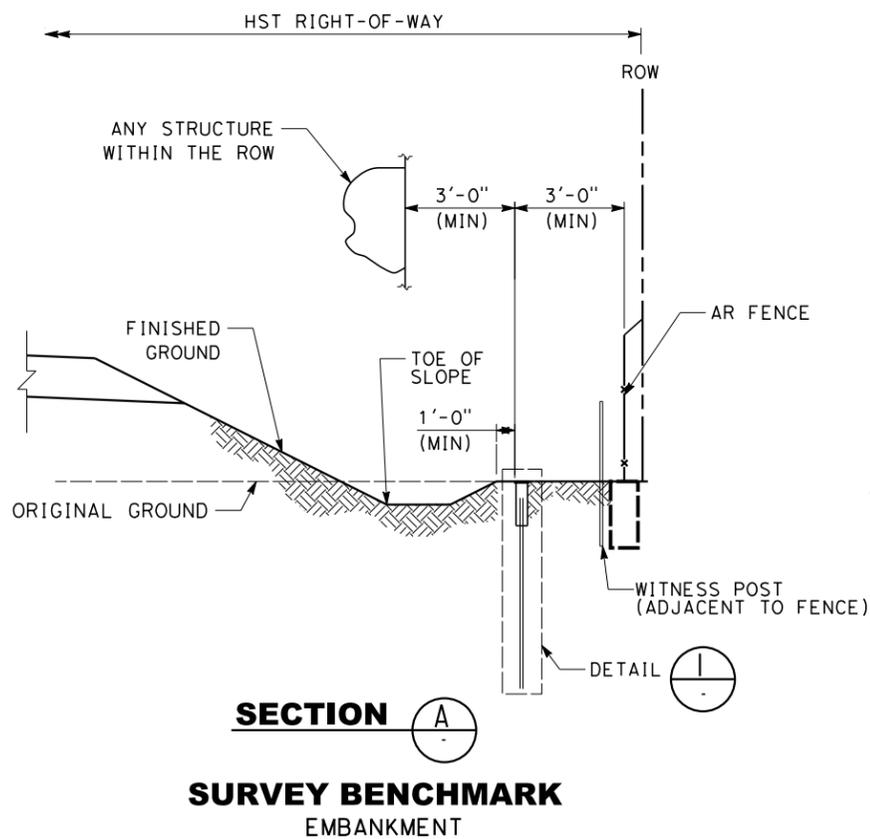
CALIFORNIA HIGH-SPEED TRAIN PROJECT
GENERAL DIRECTIVE

GENERAL DIRECTIVE NOTES
 STRUCTURAL

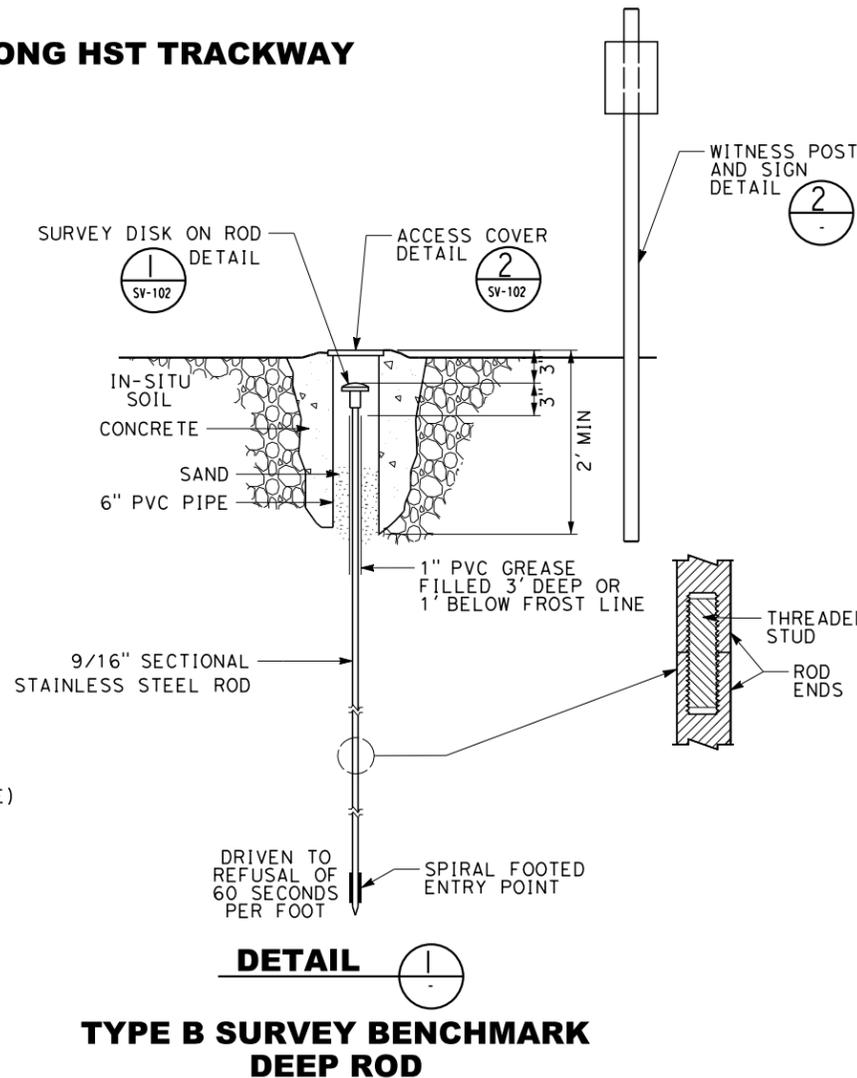
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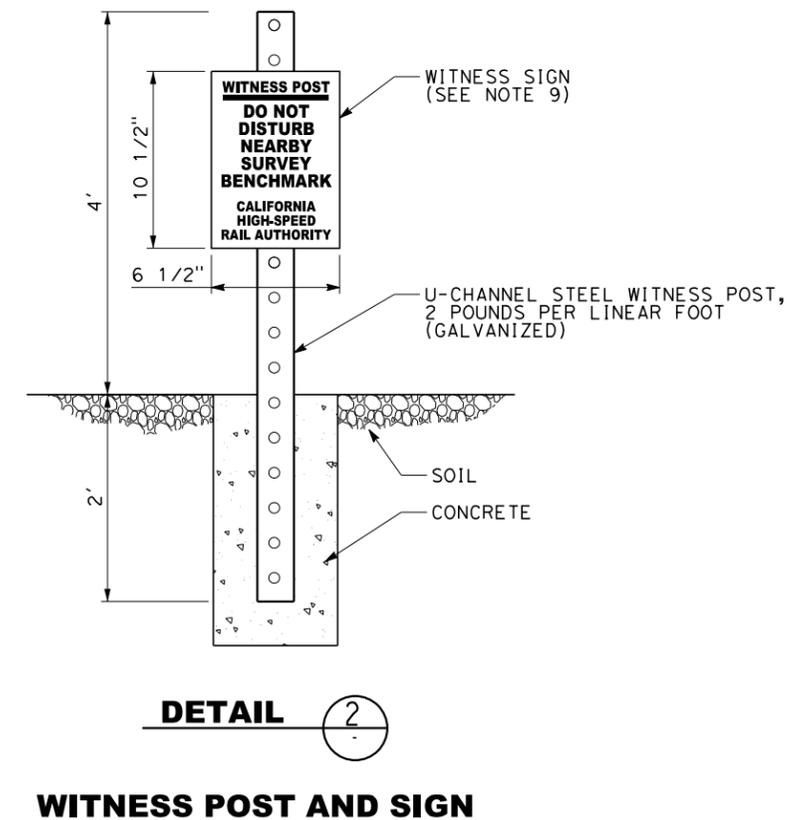
SURVEY BENCHMARK LOCATION ALONG HST TRACKWAY EMBANKMENT



SECTION A SURVEY BENCHMARK EMBANKMENT



DETAIL 1 TYPE B SURVEY BENCHMARK DEEP ROD



DETAIL 2 WITNESS POST AND SIGN

NOTES:

1. THIS DRAWING DEPICTS THE REQUIREMENTS OF PLACING SURVEY BENCHMARKS WITHIN THE AUTHORITY'S ROW DUE TO THE POSSIBLE PRESENCE OF GROUND SUBSIDENCE. BENCHMARKS TO BE PLACED ON EACH SIDE OF THE EMBANKMENT AT APPROXIMATELY 2500' INTERVALS WITH 1250' OFFSET ON EACH SIDE OF THE EMBANKMENT. ALL BENCHMARKS SHALL BE PLACED IN A CLEAR LINE OF SIGHT OF THE FUTURE TOP OF RAIL.
2. FOR ADDITIONAL INFORMATION ON BENCHMARK INSTALLATION REFER TO SURVEY MARKERS AND DOCUMENTATION, US ARMY CORPS OF ENGINEERS, EM 1110-1-1002, TYPE B MONUMENT-DEEP ROD.
3. PROVIDE A GPS BASED SURVEY OF THE MONITORING SURVEY BENCHMARKS.
4. ESTABLISH NON-MOVING BENCHMARK CONTROL POINT, SOME OF WHICH WILL BE LOCATED OUTSIDE OF THE CENTRAL VALLEY SUBSIDENCE AREA AND 20-30 MILES TO THE EAST OF THE SIERRA NEVADA FOOTHILLS
5. SUBMIT AS-BUILTS OF THE MONUMENTS GIVING EXACT COORDINATE LOCATIONS, ELEVATIONS, NUMBERING, INSTALLATION DATES, LENGTH OF RODS INSTALLED, AND OTHER PERTAINENT DATA.
6. INSTALL SURVEY BENCHMARKS AND OBTAIN BASELINE READINGS AGREED BY THE AUTHORITY AT LEAST 90 CALENDAR DAYS BEFORE THE START OF ANY CONSTRUCTION.
7. PROVIDE A WEB-BASED USER INTERFACE THAT CAN BE RUN FROM ANY WEB BROWSER TO ALLOW A COMPLETE REVIEW OF THE SURVEY DATA IN GRAPHICAL FORMAT. TABULATED DATA SHALL BE PRESENTED AS SHOWN ON DETAIL 3 ON DIRECTIVE DRAWINGS TITLED "SURVEY BENCHMARK DETAILS."
8. DO NOT DISCLOSE ANY SURVEY DATA TO ANY THIRD PARTIES OTHER THAN THE AUTHORITY OR OTHER APPROVED THIRD PARTIES AND DO NOT PUBLISH DATA FOR OTHER THAN PROJECT USE WITHOUT PRIOR WRITTEN CONSENT OF THE AUTHORITY. SEE DIRECTIVE DRAWING TITLED "SURVEY BENCHMARK" FOR CONTROL POINT TABLE REQUIREMENTS.
9. WITNESS POST SIGN SHALL BE MADE OF ALUMINUM WITH A THICKNESS OF 1/16 INCH, WITH A DURABLE DECAL. THE SIGN SHALL BE FASTENED TO THE POST EITHER USING GALVANIZED OR STAINLESS STEEL BOLTS, NUTS AND WASHER, WITH SAID BOLT BEING 3/8 INCH DIAMETER AND LONG ENOUGH TO PROTRUDE 1/2 INCH OR LONGER BEYOND THE REAR OF THE POST.

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RFP No.: HSR 14-32 - Addendum No. 2 - 10/09/2015

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY B. VALENTI
DRAWN BY V. LAVERDE
CHECKED BY T. LEE
IN CHARGE J. ELLIOT
DATE 08/24/2015



CALIFORNIA HIGH-SPEED TRAIN PROJECT
SURVEY DIRECTIVE

SURVEY BENCHMARK

CONTRACT NO.
DRAWING NO. DD-SV-101
SCALE NO SCALE
SHEET NO.

SURVEY DATA

POINT NAME	LATITUDE	LONGITUDE	NORTHING	EASTING	GRID FACTOR	COMBINED FACTOR	CONVERGENCE	POINT ELEVATION	DESCRIPTION
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COMPARISON DATA

SURVEY DATA FROM YYYY/MM/DD*				DELTA		
POINT NAME	POINT ELEVATION	NORTHING	EASTING	ELEV	X SHIFT	Y SHIFT

*SURVEY DATA SHALL BE COMPILED EVERY SIX MONTHS

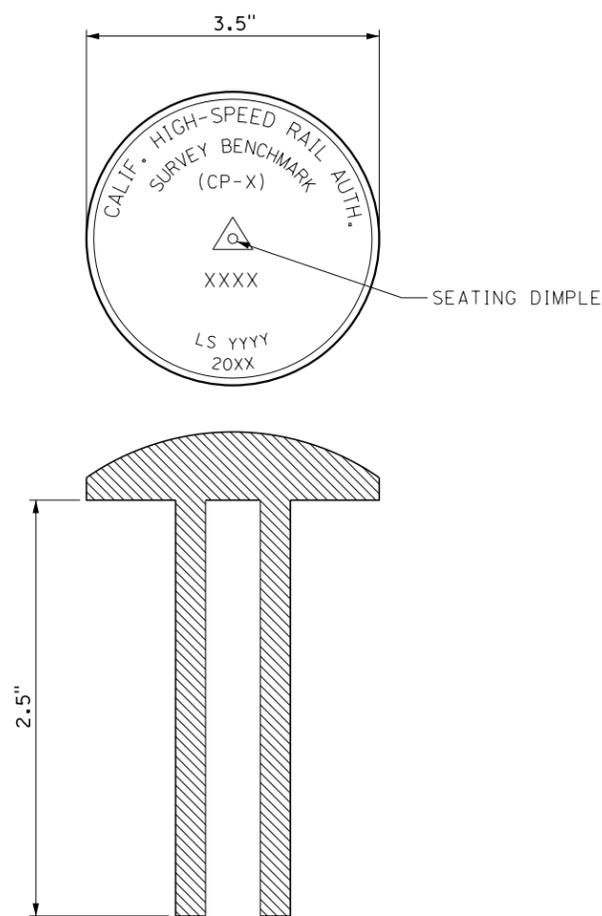
NOTES:

1. THIS DRAWING DEPICTS THE REQUIREMENTS OF PLACING SURVEY BENCHMARKS WITHIN THE AUTHORITIES ROW DUE TO THE POSSIBLE PRESENCE OF GROUND SUBSIDENCE.
2. FOR ADDITIONAL INFORMATION ON BENCHMARK INSTALLATION REFER TO SURVEY MARKERS AND DOCUMENTATION, US ARMY CORPS OF ENGINEERS, EM 1110-1-1002, TYPE B MONUMENT-DEEP ROD.

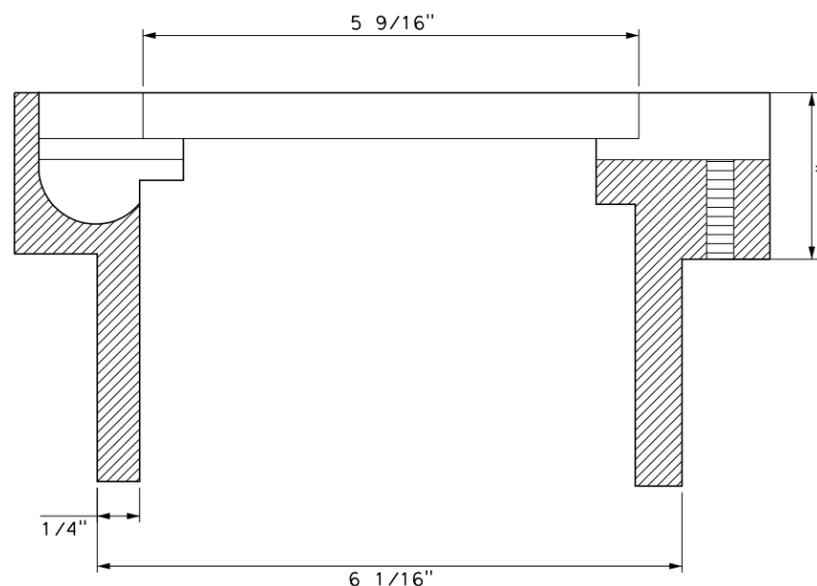
XXXX INDICATES POINT DESIGNATION (NAME)
 YYYY LAND SURVEYOR NUMBER
 20XX INDICATES YEAR
 CP-X INDICATES CONSTRUCTION PACKAGE

DETAIL 3

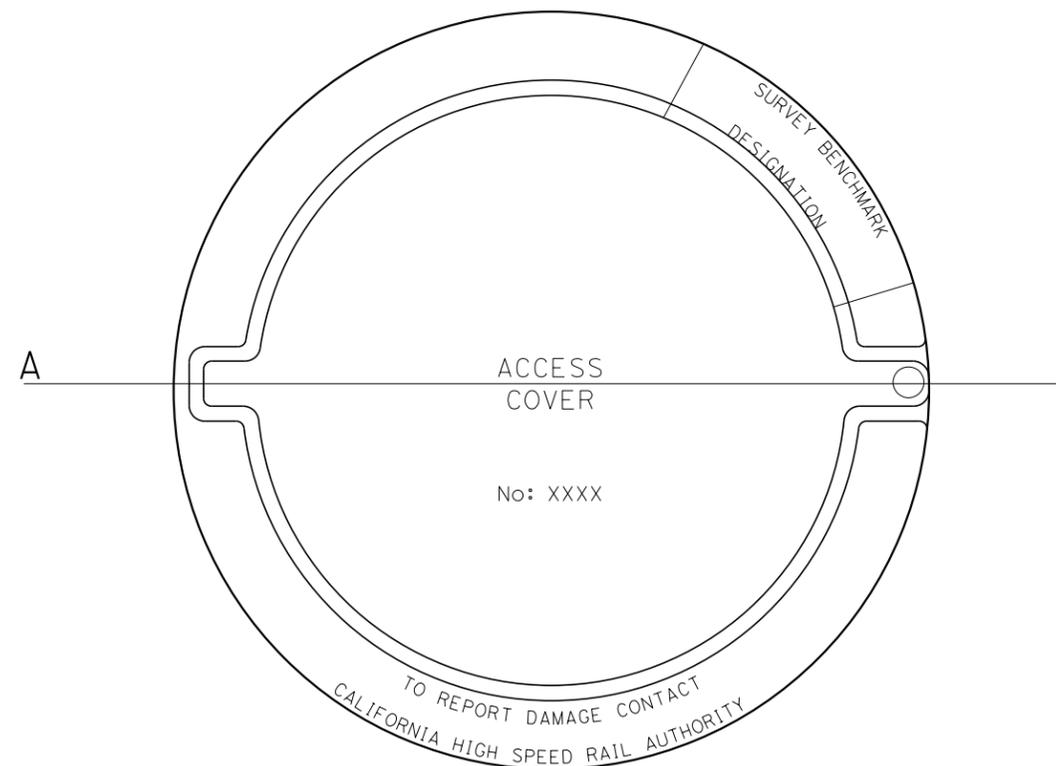
SAMPLE BENCHMARK SURVEY DATA TABLE



DETAIL 1
 SV-101
SURVEY DISK ON ROD



DETAIL 2
 SV-101
ACCESS COVER



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RFP No.: HSR 14-32 - Addendum No. 2 - 10/09/2015

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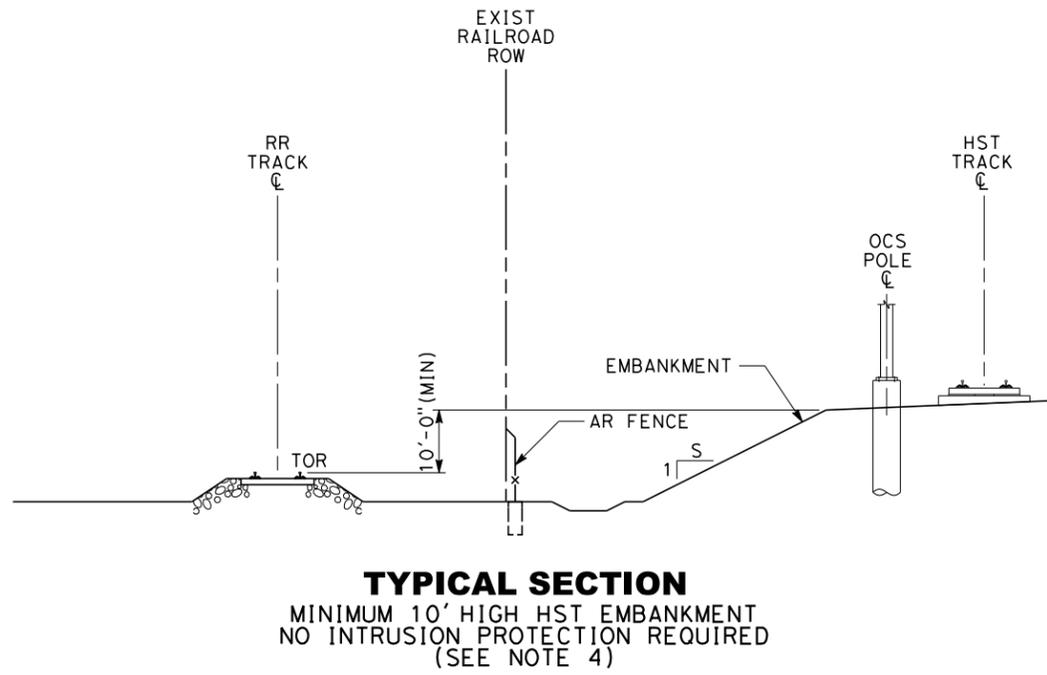
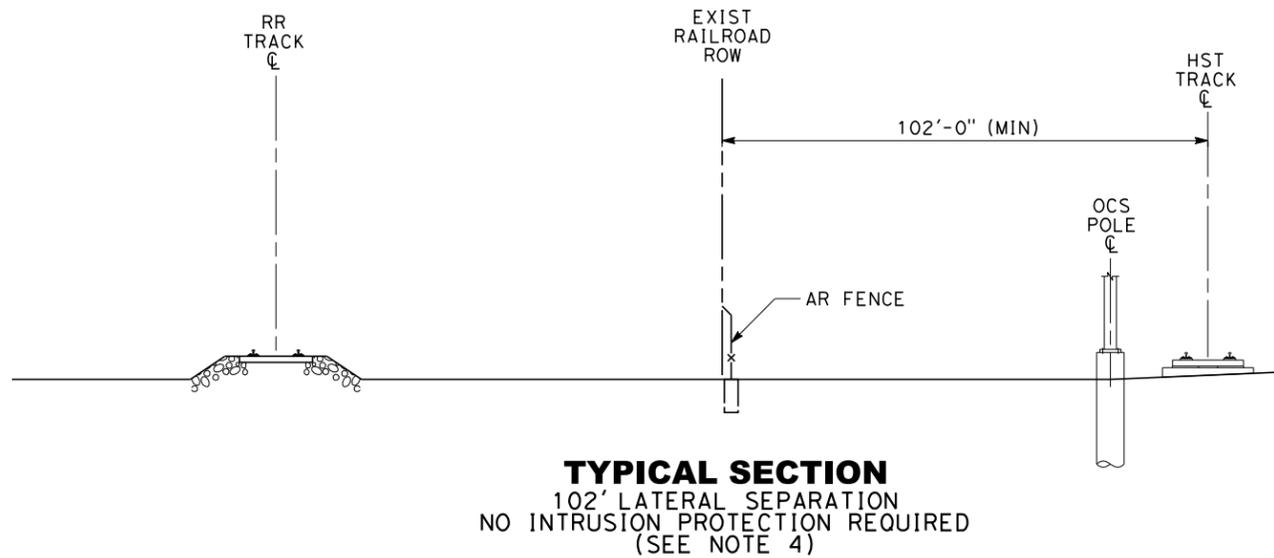
DESIGNED BY B. VALENTI
DRAWN BY V. LAVERDE
CHECKED BY T. LEE
IN CHARGE J. ELLIOT
DATE 08/28/2015



CALIFORNIA HIGH-SPEED TRAIN PROJECT
SURVEY DIRECTIVE
 SURVEY BENCHMARK DETAILS

CONTRACT NO.
DRAWING NO. DD-SV-102
SCALE NO SCALE
SHEET NO.

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NOTES:

1. TRACK, SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN.
2. AR FENCE AND ITS FOUNDATION SHALL BE INSTALLED INSIDE AUTHORITY RIGHT-OF-WAY.
3. FOR COMMON EMBANKMENT FILL ONLY, USE 2:1 SIDE SLOPES.
4. SUBJECT TO FINAL APPROVAL BY CONVENTIONAL RAILROAD OPERATOR.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
A. ABTAHI
DRAWN BY
V. HUANTE
CHECKED BY
H. NGUYEN
IN CHARGE
G. LUSHEROVICH
DATE
08/24/2015



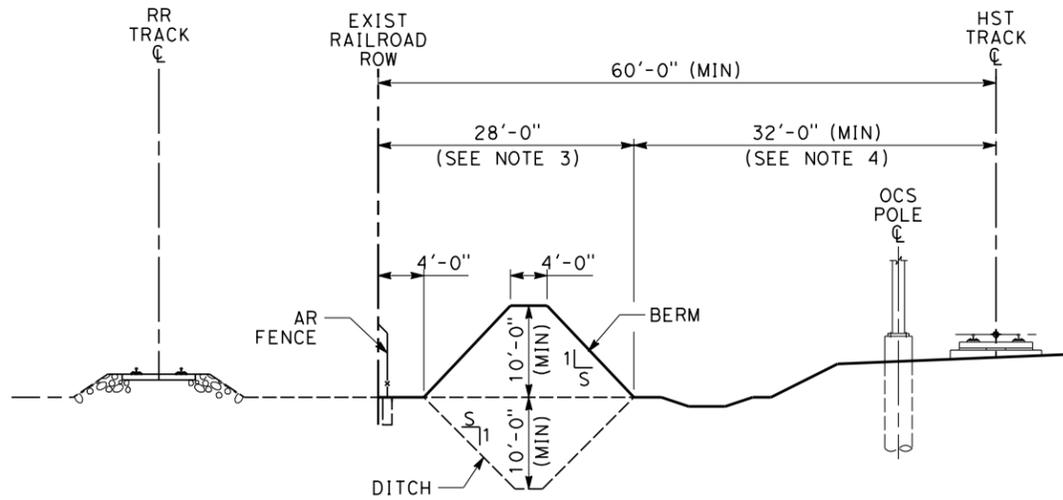
**CALIFORNIA HIGH-SPEED TRAIN PROJECT
INTRUSION PROTECTION DIRECTIVE**

RAILROAD ADJACENT TO HST
AT-GRADE WITHOUT INTRUSION PROTECTION

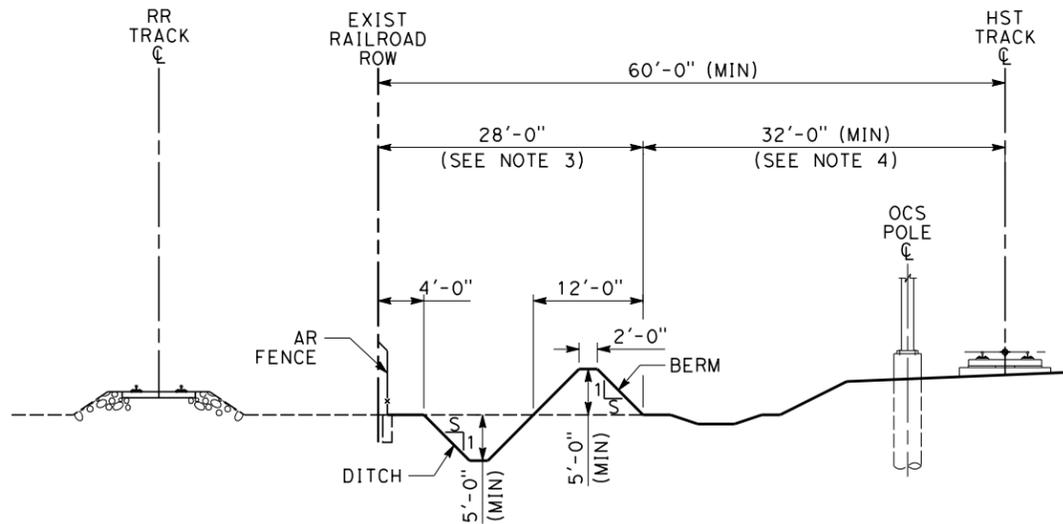
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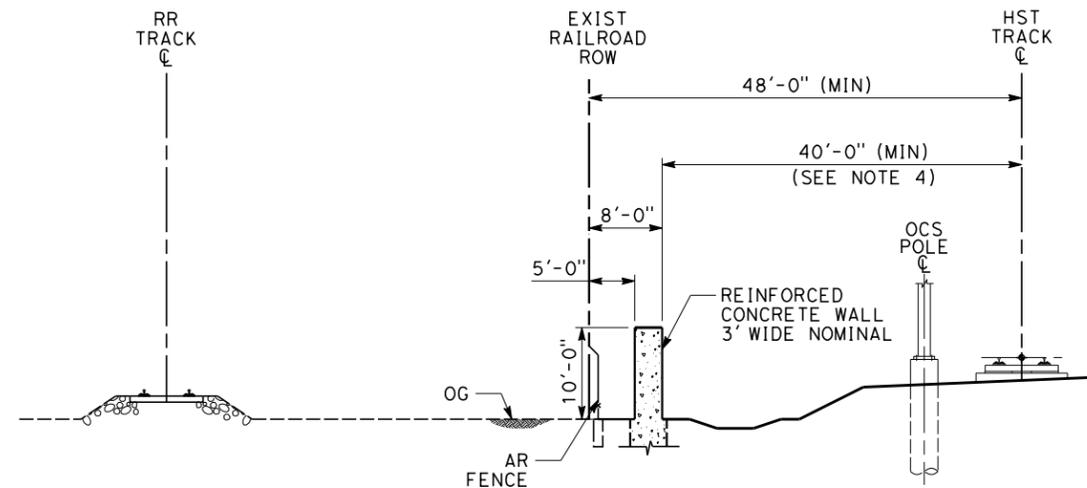
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TYPICAL SECTION
EARTHEN BERM OR DITCH
(SEE NOTE 6)



TYPICAL SECTION
EARTHEN BERM AND DITCH
(SEE NOTE 6)



TYPICAL SECTION
CONCRETE WALL BARRIER
(SEE NOTE 6)

NOTES:

1. TRACK, SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN.
2. SIDE SLOPES (S:1) DETERMINED THROUGH SLOPE STABILITY ANALYSIS. FOR COMMON EMBANKMENT FILL ONLY, USE 2:1 SIDE SLOPES.
3. MINIMUM DISTANCE IS BASED ON S=1.
4. MINIMUM DISTANCE CONSIDERS A MINIMUM OF 3'-6" HIGH EMBANKMENT, INCLUSIVE OF SUBBALLAST.
5. BERM MATERIAL AND COMPACTION SHALL BE SIMILAR TO EMBANKMENT.
6. SUBJECT TO FINAL APPROVAL BY CONVENTIONAL RAILROAD OPERATOR.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
A. ABTAHI
DRAWN BY
V. HUANTE
CHECKED BY
H. NGUYEN
IN CHARGE
G. LUSHEROVICH
DATE
09/18/2015



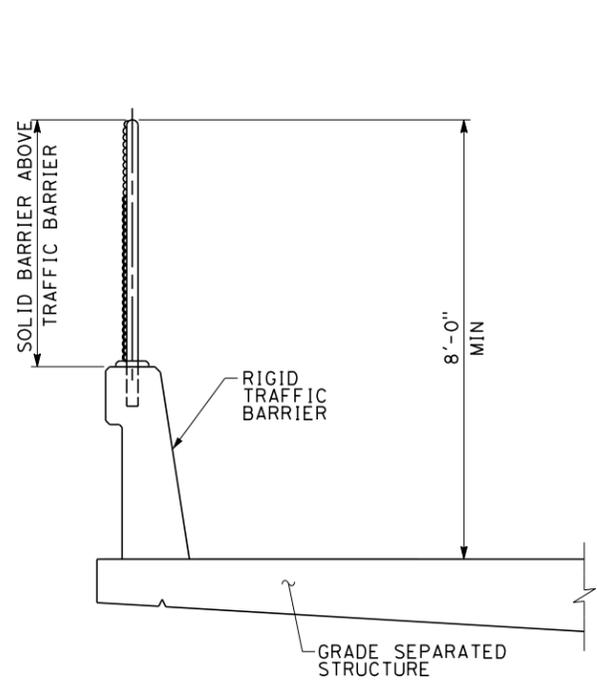
CALIFORNIA HIGH-SPEED TRAIN PROJECT
INTRUSION PROTECTION DIRECTIVE

RAILROAD ADJACENT TO HST
AT-GRADE WITH INTRUSION PROTECTION

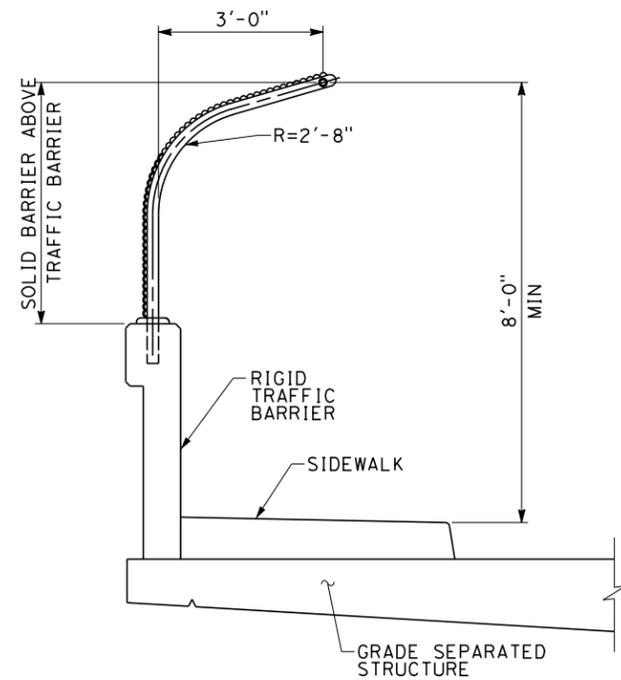
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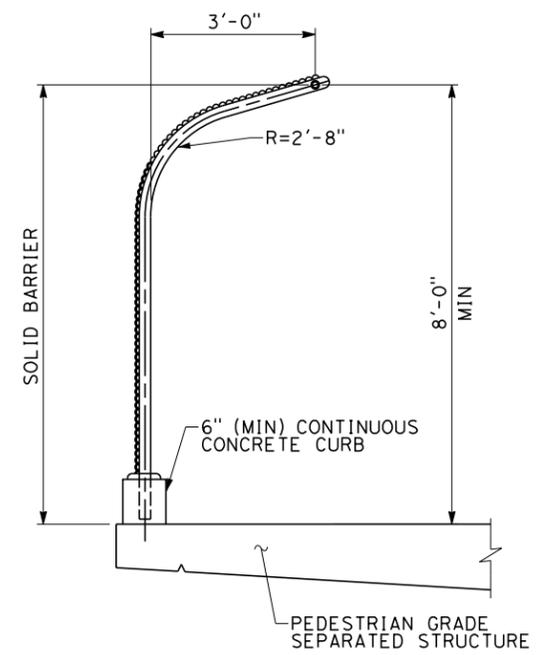
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CROSS SECTION
SOLID BARRIER AT GRADE SEPARATED
STRUCTURES WITHOUT SIDEWALK

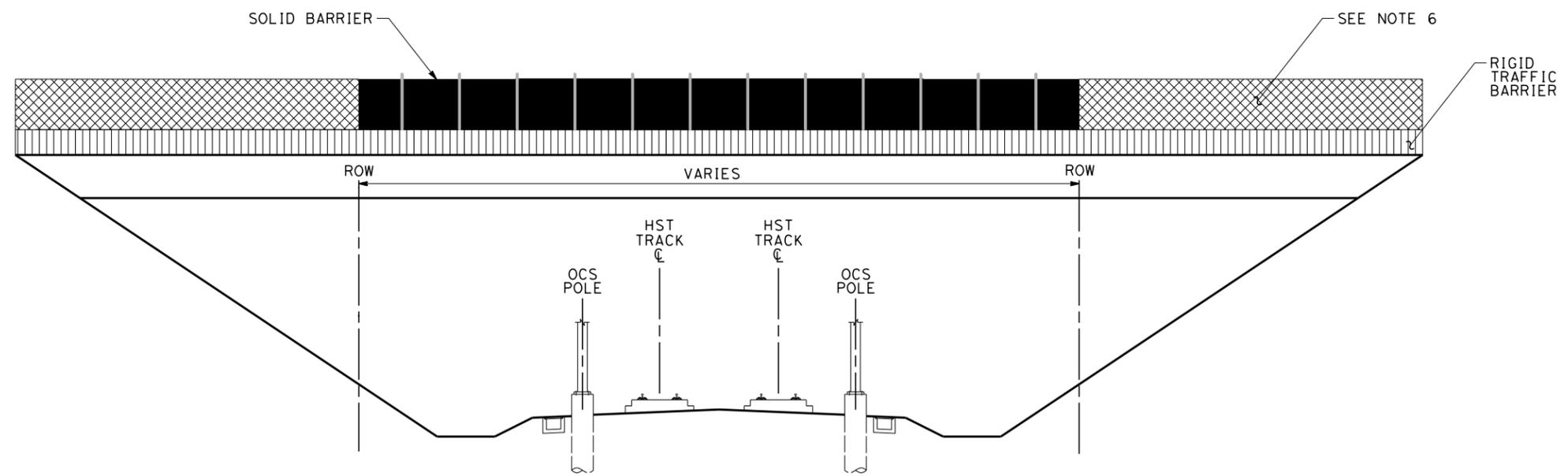


CROSS SECTION
SOLID BARRIER AT GRADE SEPARATED
STRUCTURES WITH SIDEWALK



CROSS SECTION
SOLID BARRIER AT PEDESTRIAN
GRADE SEPARATED STRUCTURE

- NOTES:**
1. TRACK, SYSTEMS, STRUCTURES AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN.
 2. THE SOLID BARRIER SHALL BE AN OPAQUE SOLID PLATE WEIGHING NO MORE THAN 40 POUNDS PER LINEAR FOOT. SOLID BARRIER TO BE SUBMITTAL FOR AUTHORITY APPROVAL.
 3. FOR PEDESTRIAN GRADE SEPARATED STRUCTURES A CONTINUOUS CONCRETE CURB SHALL BE USED.
 4. FOR ADDITIONAL SOLID BARRIER REQUIREMENTS RELATED TO OCS, SEE OVERHEAD CONTACT SYSTEM AND TRACTION POWER RETURN SYSTEM CHAPTER OF THE DESIGN CRITERIA.
 5. EXTEND SOLID BARRIER 30 FEET FROM CENTERLINE OF OUTERMOST TRACK, OR 10 FEET BEYOND THE OUTERMOST ENERGIZED CONDUCTOR OR COMPONENT, WHICHEVER IS GREATER.
 6. FENCING OR RAILING AS REQUIRED BY CALTRANS OR AGENCY HAVING JURISDICTION.



OVERHEAD STRUCTURE ELEVATION

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
A. ABTAHI
DRAWN BY
V. LAVERDE
CHECKED BY
S. MILITELLO
IN CHARGE
G. LUSHEROVICH
DATE
09/18/2015



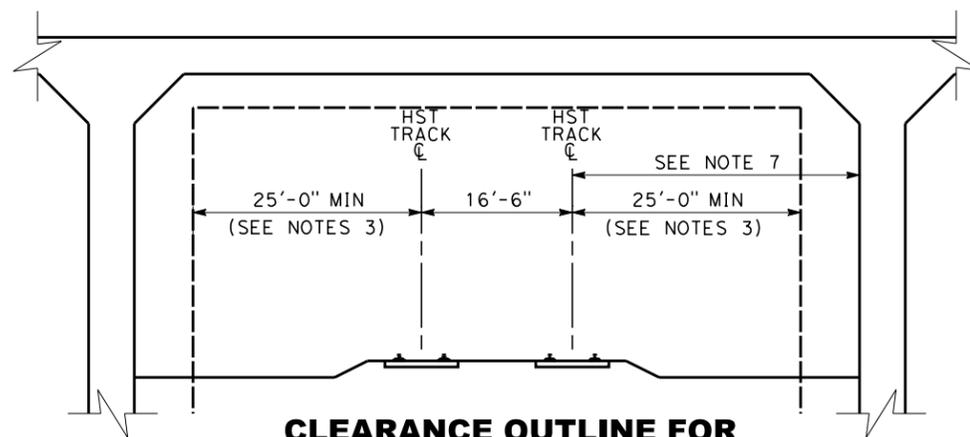
CALIFORNIA HIGH-SPEED TRAIN PROJECT
CIVIL DIRECTIVE

ACCESS DETERRING
SOLID BARRIER ON GRADE SEPARATED STRUCTURES

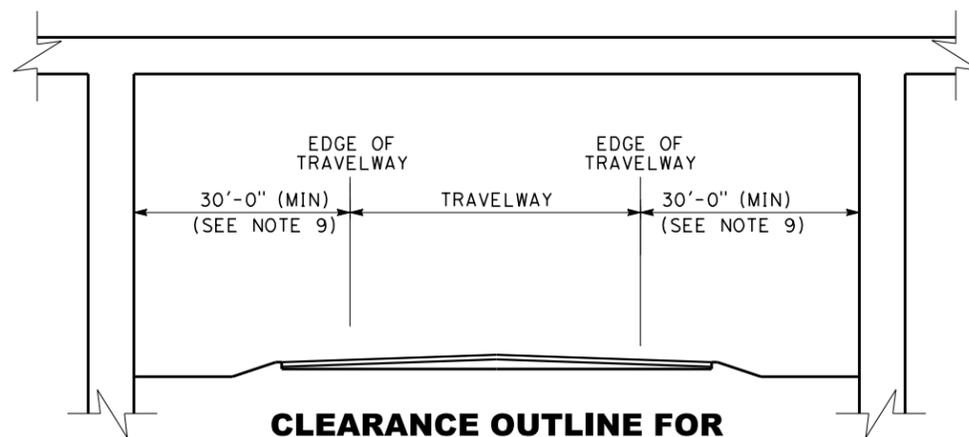
CONTRACT NO.
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CLEARANCE OUTLINE FOR NEW STRUCTURE OVER HST

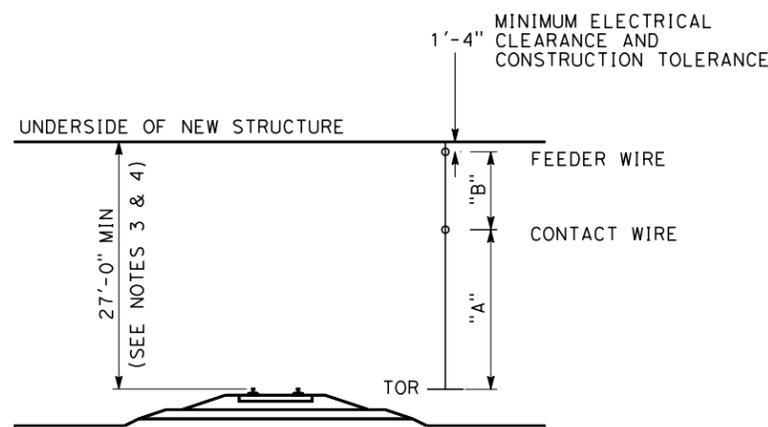


CLEARANCE OUTLINE FOR NEW HST STRUCTURE OVER ROADWAY

NOTES:

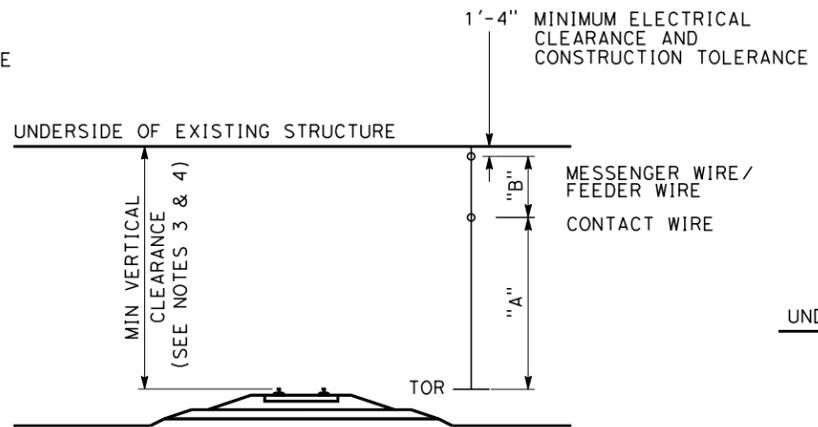
1. TOLERANCES ARE NOT ADDITIVE FOR INCREMENTAL DISTANCES.
2. HST TRACKFORM IS SCHEMATIC AND DOES NOT REPRESENT THE DESIGN.
3. AT LOCATIONS WHERE SUPERELEVATION IS PRESENT, VERTICAL CLEARANCES SHALL BE MEASURED FROM THE HIGH RAIL. MINIMUM VERTICAL CLEARANCES SHOULD BE CARRIED TO POINT 25 FEET LATERALLY FROM THE CENTERLINE OF THE MOST OUTSIDE TRACK.
4. DEFINED CLEARANCES ASSUMES GRADE SEPARATED STRUCTURE LENGTH ALONG TRACK IS NO MORE THAN 160 FEET FOR HST TRACK OVER 125 MPH. THE OCS SHALL BE FREE RUNNING UNDER GRADE SEPARATED STRUCTURES WITH NO SUPPORTS. STRUCTURES WIDER THAN 160 FEET REQUIRE FURTHER APPROVAL.
5. PROTECTIVE PANEL IS REQUIRED FOR VERTICAL CLEARANCES LESS THAN THE PANTOGRAPH ZONE HEIGHT (26 FEET - 3 INCHES) FOR STRUCTURES OVER HST TRACKS.
6. FOR LOCAL ROADWAYS, 15 FEET MINIMUM VERTICAL CLEARANCE SHALL BE CONFIRMED BY AGENCY HAVING JURISDICTION.
7. ADDITIONAL HORIZONTAL CLEARANCE SHALL BE PROVIDED AS NECESSARY TO MEET DRAINAGE AND MAINTENANCE ACCESS REQUIREMENTS PER THE CIVIL AND DRAINAGE CHAPTERS OF THE DESIGN CRITERIA.
8. PROTECTIVE TRAFFIC BARRIER REQUIREMENTS SHALL BE CONFIRMED BY AGENCY HAVING JURISDICTION. ADDITIONAL HORIZONTAL CLEARANCE SHALL BE PROVIDED AS NECESSARY TO MEET MAINTENANCE ACCESS REQUIREMENTS PER THE CIVIL CHAPTER OF THE DESIGN CRITERIA.
9. SIDE CLEARANCE DESIGN CRITERIA SHALL BE CONFIRMED BY AGENCY HAVING JURISDICTION.

	MIN SIDE CLEARANCE
FREEWAY/EXPRESSWAY	30'-0"
OTHER	SEE NOTE 9



NEW STRUCTURE OVER HST TRACKS

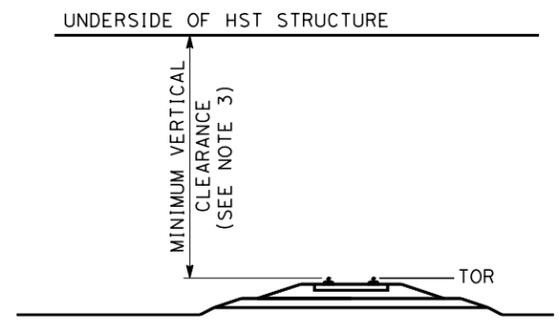
	HEIGHT "A"	HEIGHT "B"	MIN VERTICAL CLEARANCE
DEDICATED HST TRACK	17'-5"	8'-3"	27'-0"
SHARED USE TRACK	18'-9"	6'-11"	27'-0"



EXISTING STRUCTURE OVER HST TRACKS

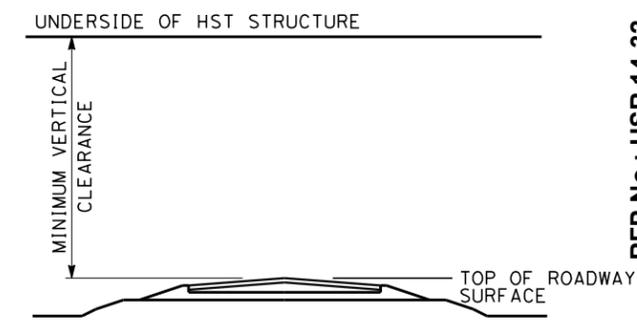
	HEIGHT "A"	HEIGHT "B"	MIN VERTICAL CLEARANCE
DEDICATED HST TRACK	17'-5"	8'-3"	27'-0"
DEDICATED HST TRACK (V ≤ 125 MPH)	17'-5"	5'-3"	24'-0"*
SHARED USE TRACK	18'-9"	4'-0"	24'-6"**

* SEE NOTE 4
** PER CALTRAIN



NEW HST STRUCTURE OVER TRACK

	MIN VERTICAL CLEARANCE
<u>FREIGHT TRACKS</u>	
BNSF	23'-4"
UPRR	23'-0"
<u>NON-FREIGHT TRACKS</u>	
METROLINK	24'-0"
CALTRAIN	24'-6"



NEW HST STRUCTURE OVER ROADWAY

	MIN VERTICAL CLEARANCE
FREEWAY/EXPRESSWAY	16'-6"
LOCAL ROADWAY	15'-0" *
EXTRA LEGAL LOAD NETWORK(ELLN)	20'-3"

* SEE NOTE 6

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S. MILITELLO
DRAWN BY
V. HUANTE
CHECKED BY
H. NGUYEN
IN CHARGE
G. LUSHEROVICH
DATE
09/18/2015

**PARSONS
BRINCKERHOFF**

CALIFORNIA
HIGH-SPEED RAIL AUTHORITY

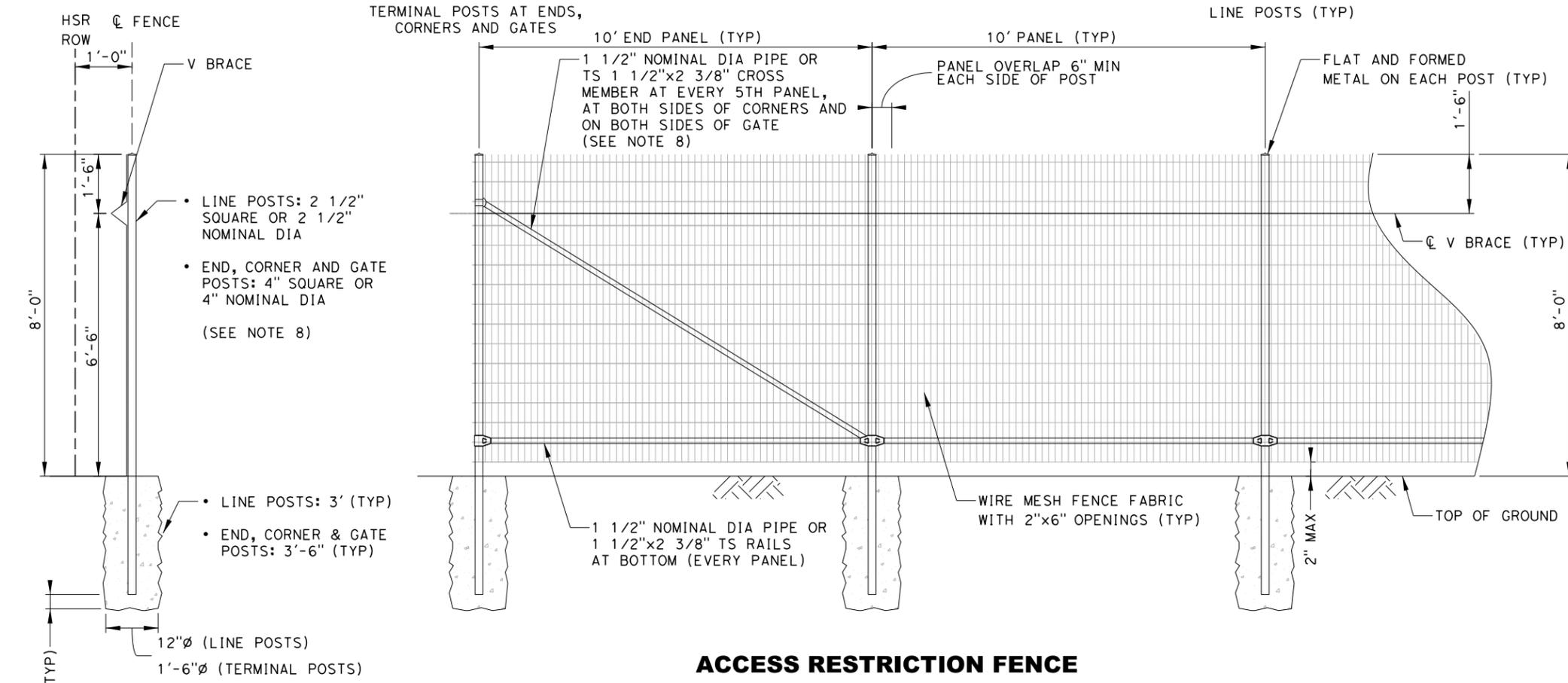
**CALIFORNIA HIGH-SPEED TRAIN PROJECT
CIVIL DIRECTIVE**

MINIMUM CLEARANCE
GRADE SEPARATED STRUCTURES

CONTRACT NO.
DRAWING NO. DD-CV-904
SCALE NO SCALE
SHEET NO.

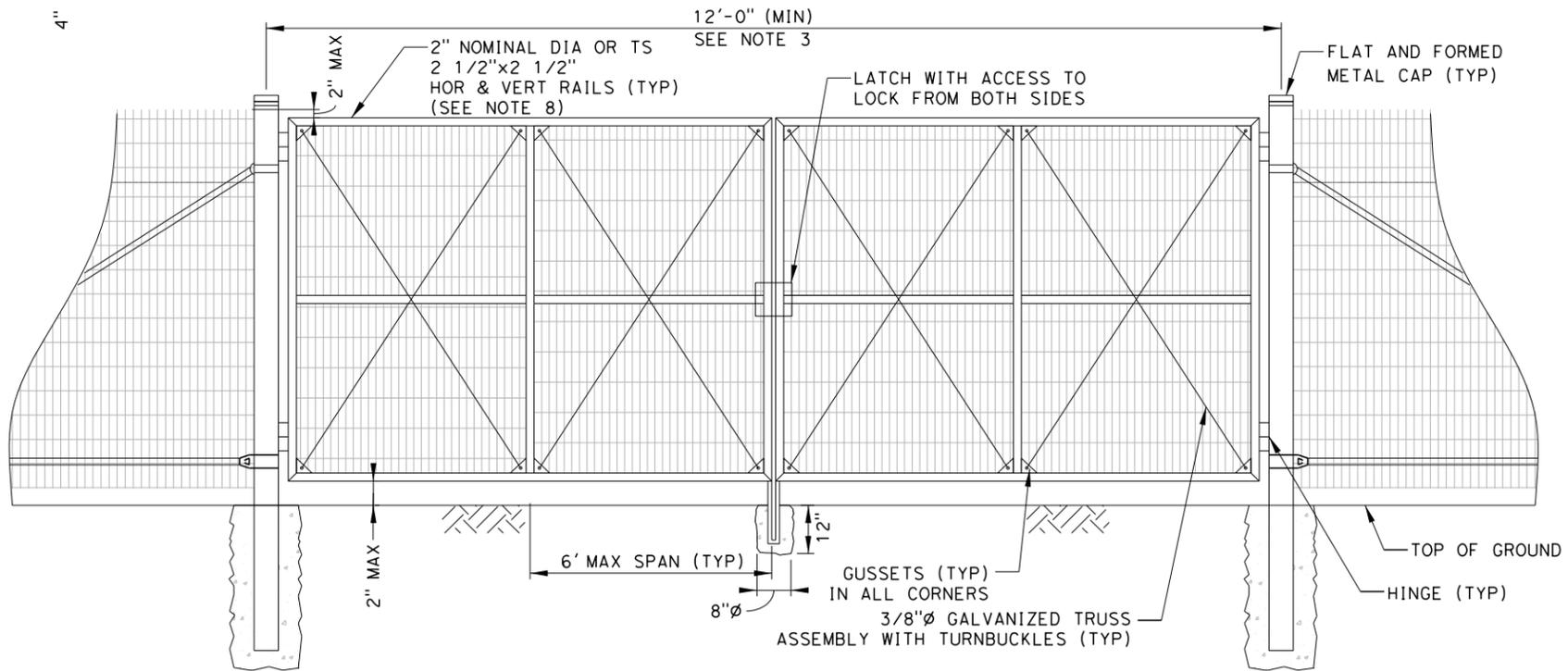
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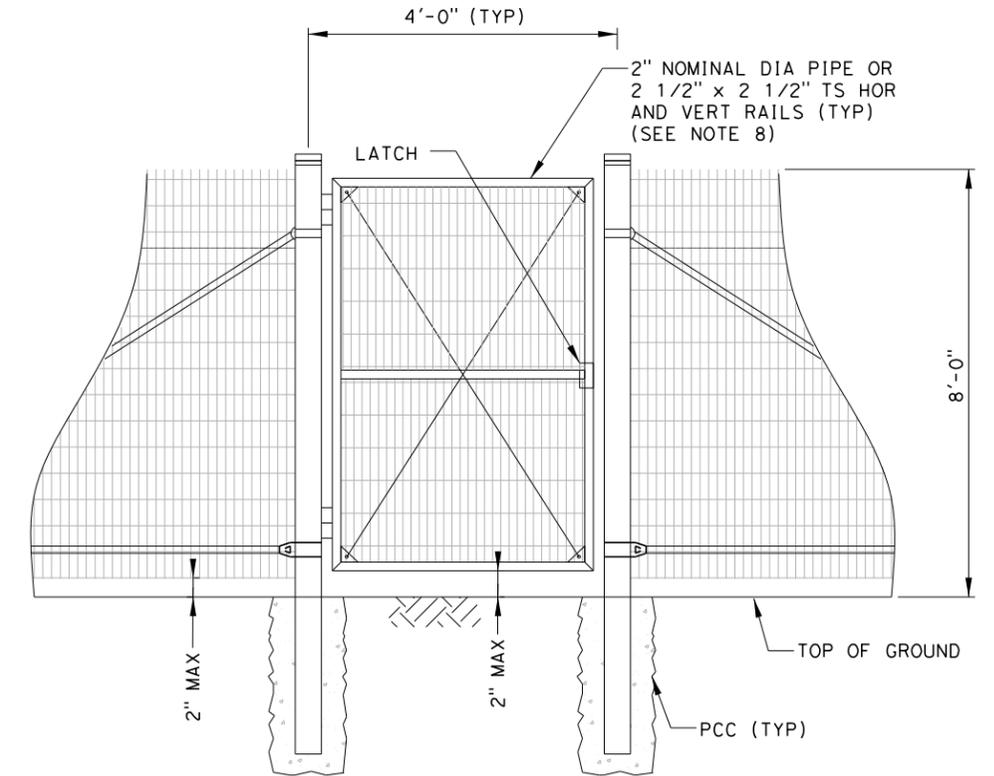


ACCESS RESTRICTION FENCE

- NOTES:**
1. ALL PERMANENT FENCING AND GATES SHALL BE BONDED GROUNDING AND INSULATED TO PREVENT ELECTRIC SHOCK.
 2. ACCESS RESTRICTION (AR) FENCING SHALL BE 8 FEET HIGH MINIMUM (AS SHOWN HERE). ACCESS DETERRENT (AD) FENCING (NOT SHOWN) SHALL BE 6 FEET HIGH.
 3. GATES FOR VEHICULAR ACCESS (DRIVING GATES) SHALL BE SIZED IN COORDINATION WITH EMERGENCY RESPONDERS AND MAINTENANCE EQUIPMENT. IF NO OTHER INFORMATION IS AVAILABLE THESE GATES SHOULD HAVE A MINIMUM WIDTH OF 12 FEET.
 4. GATES CAN EITHER BE SWINGING OR SLIDING TYPE. VEHICULAR ACCESS SWINGING GATES SHALL BE A PAIR AND SHALL BE HINGED FROM THE INSIDE. PROVISIONS SHALL BE MADE FOR SWINGING GATES TO SWING NOT LESS THAN 90 DEGREES AWAY FROM THE HST FACILITIES.
 5. GATES SHALL BE DESIGNED AND INSTALLED TO NOT PRECLUDE FUTURE INSTALLATION OF TYPICAL FENCE MOUNTED ELECTRONIC ACCESS CONTROL.
 6. WELDED WIRE MESH SHALL BE TYPHOON AND HOT GALVANIZED.
 7. QUANTITY/SIZE AND TYPE OF FASTENERS, HAT BRACKETS AND GAUGE TIES SHALL BE AS PER THE MANUFACTURERS RECOMMENDATIONS.
 8. TUBULAR MEMBERS ARE ACCEPTABLE ONLY IF COMPATIBLE TO WIRE MESH INSTALLATION AND APPROVED BY MANUFACTURER.



VEHICLE ACCESS GATE ALONG AR FENCE



PEDESTRIAN ACCESS GATE ALONG AR FENCE

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
A. ABTAHI
 DRAWN BY
V. LAVERDE
 CHECKED BY
S. MILITELLO
 IN CHARGE
G. LUSHEROVICH
 DATE
09/18/2015

**PARSONS
BRINCKERHOFF**



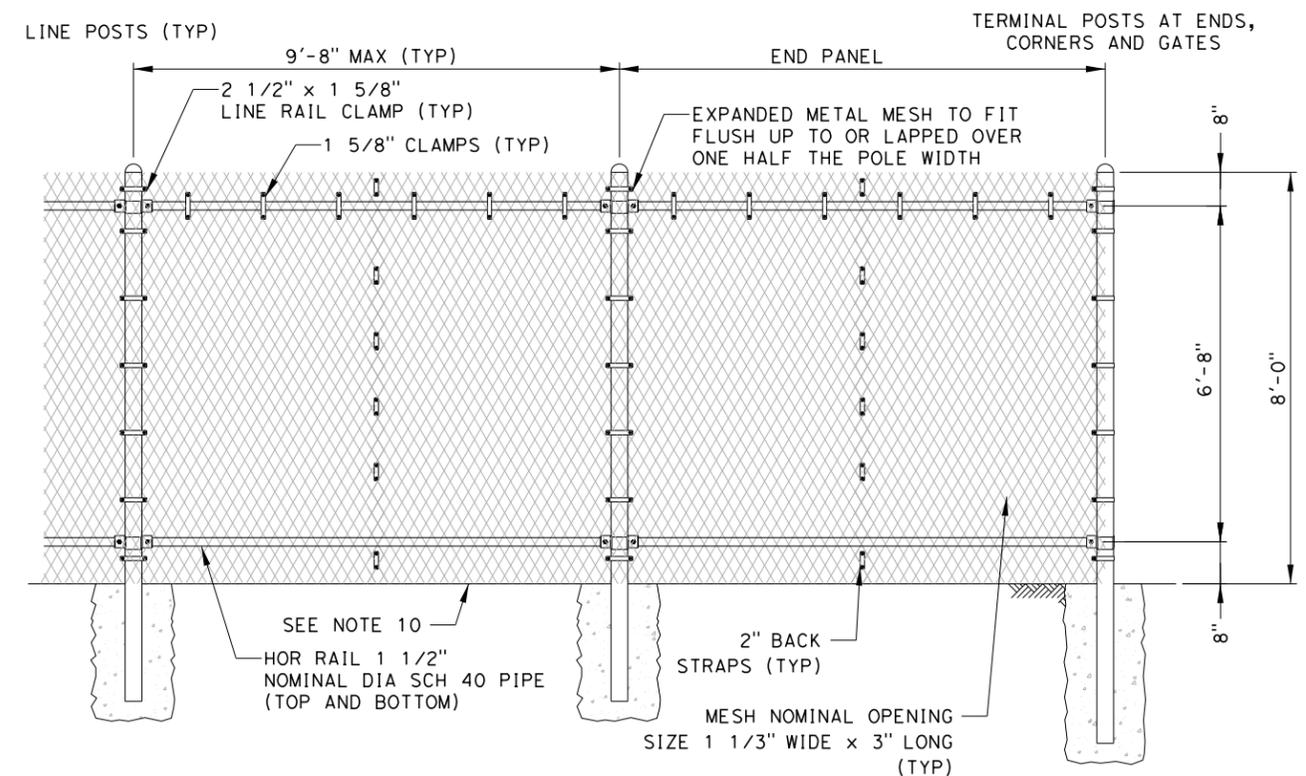
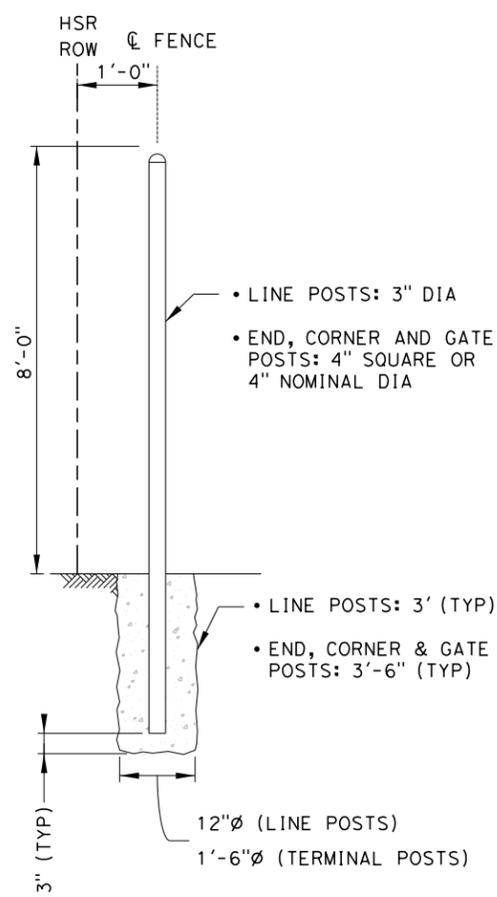
CALIFORNIA
HIGH-SPEED RAIL AUTHORITY

CALIFORNIA HIGH-SPEED TRAIN PROJECT
CIVIL DIRECTIVE
 NON-HIGH SECURITY AREA ACCESS RESTRICTION
 FENCE AND GATE DETAILS
 WELDED WIRE MESH

CONTRACT NO.	
DRAWING NO.	DD-CV-920
SCALE	NO SCALE
SHEET NO.	

RFP No.: HSR 14-32 - Addendum No. 2 - 10/09/2015

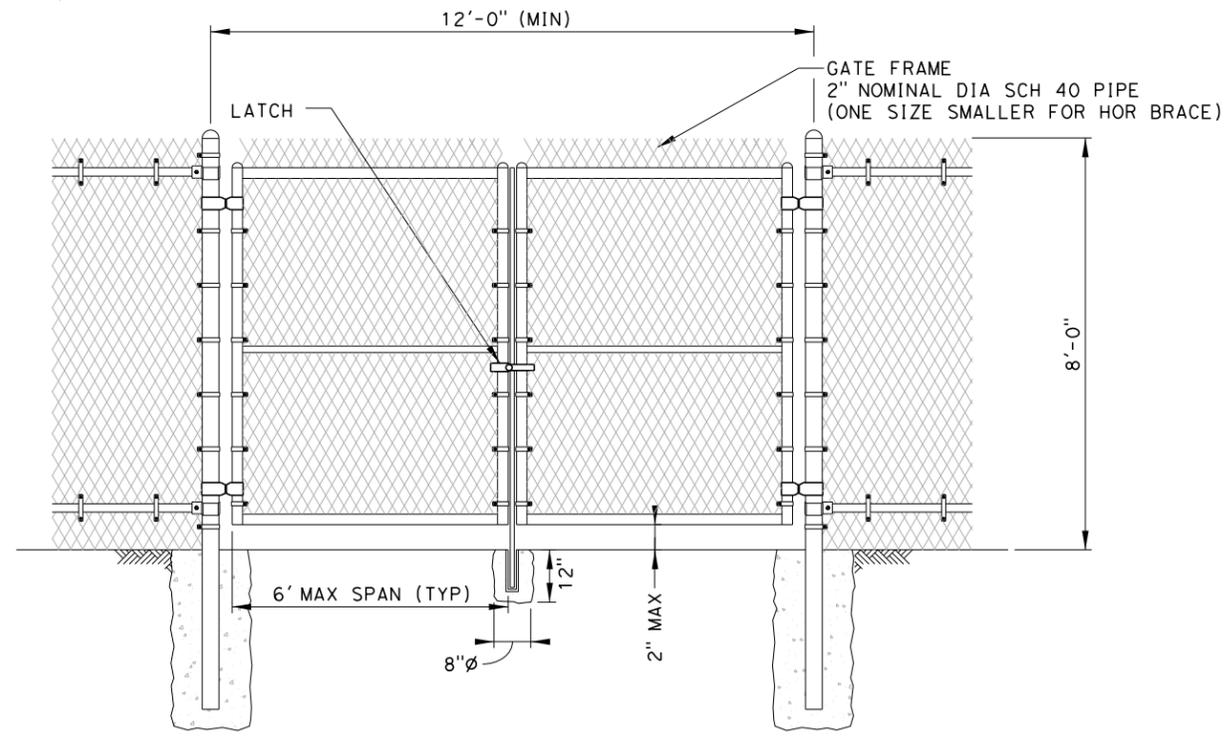
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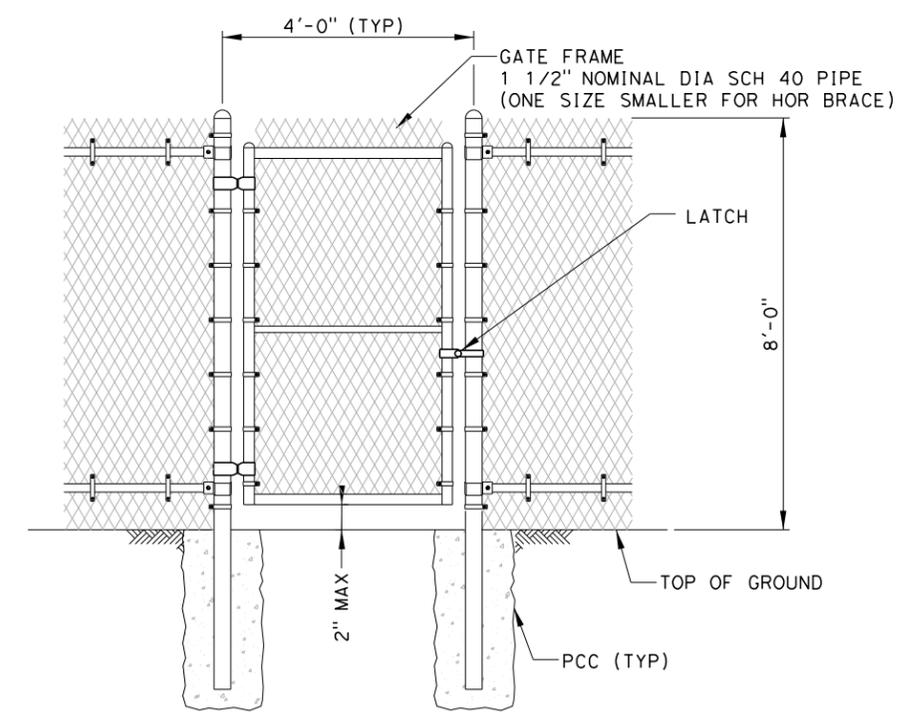
ACCESS RESTRICTION FENCE

NOTES:

1. ALL PERMANENT FENCING AND GATES SHALL BE BONDED GROUND AND INSULATED TO PREVENT ELECTRIC SHOCK.
2. FENCE MESH SHALL BE SECURA 13 GAGE (REGULAR) WITH MESH DIAMOND SIZE 0.500" x 1.200" WITH MINIMUM 24 DIAMONDS PER LINEAR FOOT.
3. ACCESS RESTRICTION (AR) FENCING SHALL BE 8 FEET HIGH MINIMUM (AS SHOWN HERE). ACCESS DETERING (AD) FENCING (NOT SHOWN) SHALL BE 6 FEET HIGH.
4. GATES FOR VEHICULAR ACCESS (DRIVING GATES) SHALL BE SIZED IN COORDINATION WITH EMERGENCY RESPONDERS AND MAINTENANCE EQUIPMENT. IF NO OTHER INFORMATION IS AVAILABLE THESE GATES SHOULD HAVE A MINIMUM WIDTH OF 12 FEET.
5. GATES CAN EITHER BE SWINGING OR SLIDING TYPE. VEHICULAR ACCESS SWINGING GATES SHALL BE A PAIR AND SHALL BE HINGED FROM THE INSIDE. PROVISIONS SHALL BE MADE FOR SWINGING GATES TO SWING NOT LESS THAN 90 DEGREES AWAY FROM THE HST FACILITIES.
6. GATES SHALL BE DESIGNED AND INSTALLED TO NOT PRECLUDE FUTURE INSTALLATION OF TYPICAL FENCE MOUNTED ELECTRONIC ACCESS CONTROL.
7. WELDED WIRE MESH SHALL BE HOT GALVANIZED.
8. QUANTITY/SIZE AND TYPE OF FASTENERS, HAT BRACKETS AND GAUGE TIES SHALL BE AS PER THE MANUFACTURERS RECOMMENDATIONS.
9. TUBULAR MEMBERS ARE ACCEPTABLE ONLY IF COMPATIBLE TO EXPANDED METAL MESH INSTALLATION AND APPROVED BY MANUFACTURER.
10. FENCE FABRIC SHALL BE BURIED MINIMUM OF 1 FOOT INTO THE GROUND.



VEHICLE ACCESS GATE ALONG AR FENCE



PEDESTRIAN ACCESS GATE ALONG AR FENCE

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
 A. ABTAHI
 DRAWN BY
 V. LAVERDE
 CHECKED BY
 S. MILITELLO
 IN CHARGE
 G. LUSHEROVICH
 DATE
 09/18/2015

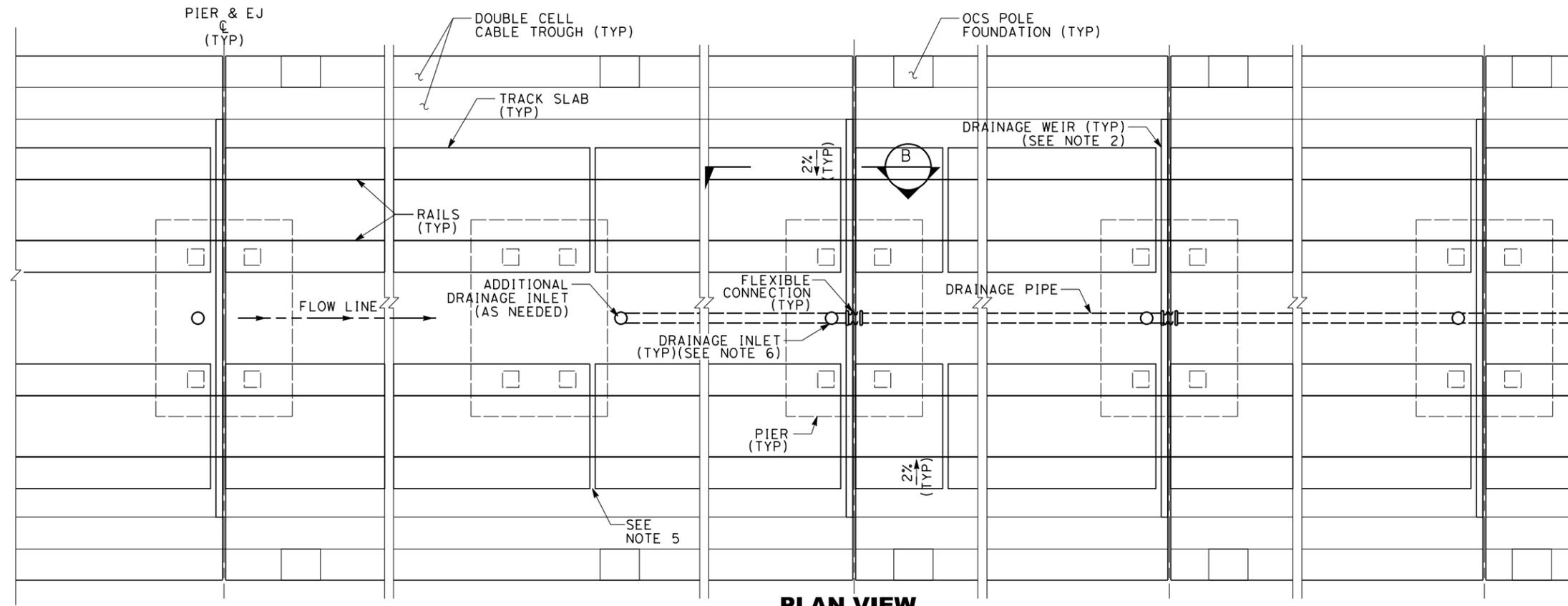


CALIFORNIA HIGH-SPEED TRAIN PROJECT
CIVIL DIRECTIVE
 ACCESS RESTRICTION FENCE AND GATE DETAILS
 HIGH SECURITY AREA
 EXPANDED METAL MESH

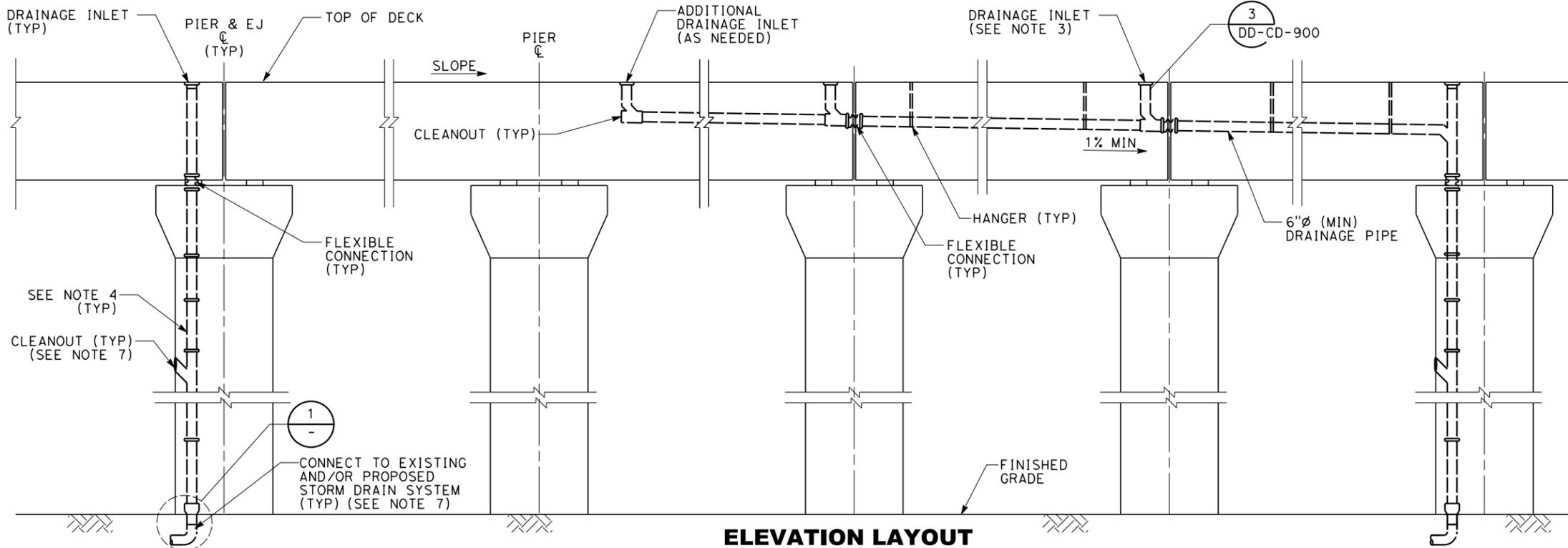
CONTRACT NO.
 DRAWING NO.
 DD-CV-921
 SCALE
 NO SCALE
 SHEET NO.

RFP No.: HSR 14-32 - Addendum No. 2 - 10/09/2015

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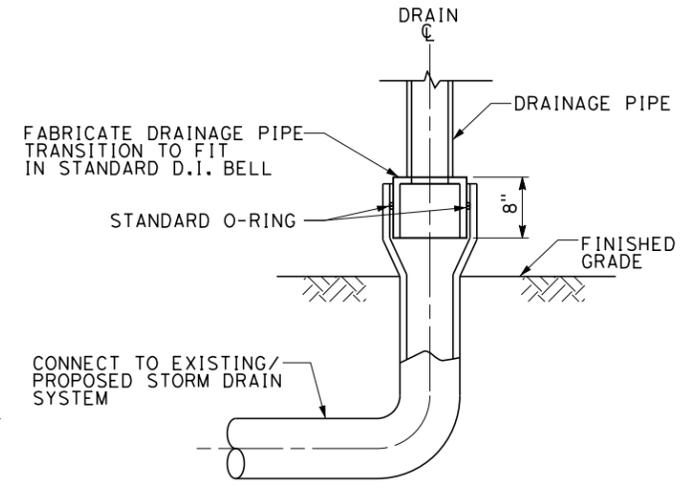


PLAN VIEW



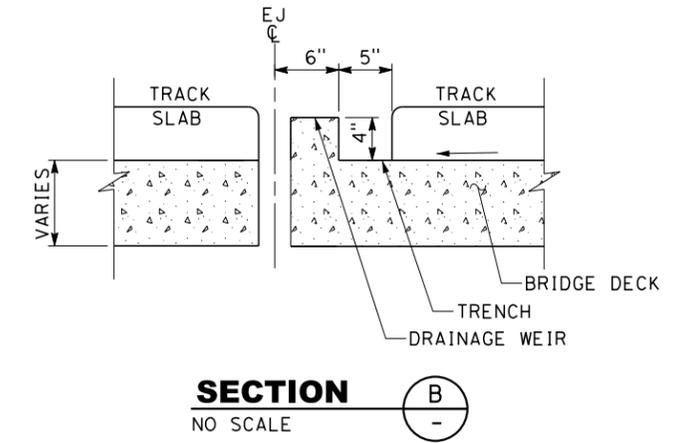
ELEVATION LAYOUT

- NOTES:**
1. TRACK, SYSTEMS AND STRUCTURES ARE SCHEMATIC AND DO NOT REPRESENT DESIGN.
 2. WEIR AND INLET SHALL BE PROVIDED UPSTREAM OF EVERY EXPANSION JOINT.
 3. IF DOWNSPOUT IS NOT FEASIBLE AT EXPANSION JOINT, COLUMN CONNECTED STORM WATER MAY BE CONVEYED THROUGH DRAINAGE PIPE, USING FLEXIBLE CONNECTIONS AT EXPANSION JOINTS, UNTIL DOWNSPOUT CAN BE CONNECTED TO EXISTING/ PROPOSED STORM DRAIN SYSTEM.
 4. PROVIDE MINIMUM 1'-6" GAP BETWEEN PVC PIPE AND FACE OF COLUMN WALL.
 5. PROVIDE A 5-INCH WIDE GAP IN TRACK SLAB, 20'-0" ON CENTER AND ONE JUST UPSTREAM OF THE WEIR, SEE DETAIL.
 6. REFER TO DRAINAGE DRAWING "AERIAL STRUCTURE BRIDGE DECK DRAINAGE INLET DETAIL" FOR DRAINAGE INLET DETAIL.
 7. CLEANOUTS AND PIPE PENETRATIONS FROM THE COLUMNS SHALL FOLLOW THE "COLUMN REINFORCEMENT AT DRAIN OUTLET" OF CALTRANS BRIDGE DESIGN AID 17-1, DECK DRAINAGE DESIGN.



TRANSITION DETAIL

NO SCALE



SECTION

NO SCALE

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
K. SISTLA
DRAWN BY
V. HUANTE
CHECKED BY
A. ABTAHI
IN CHARGE
G. LUSHEROVICH
DATE
08/10/2015

**PARSONS
BRINCKERHOFF**

CALIFORNIA
HIGH-SPEED RAIL AUTHORITY

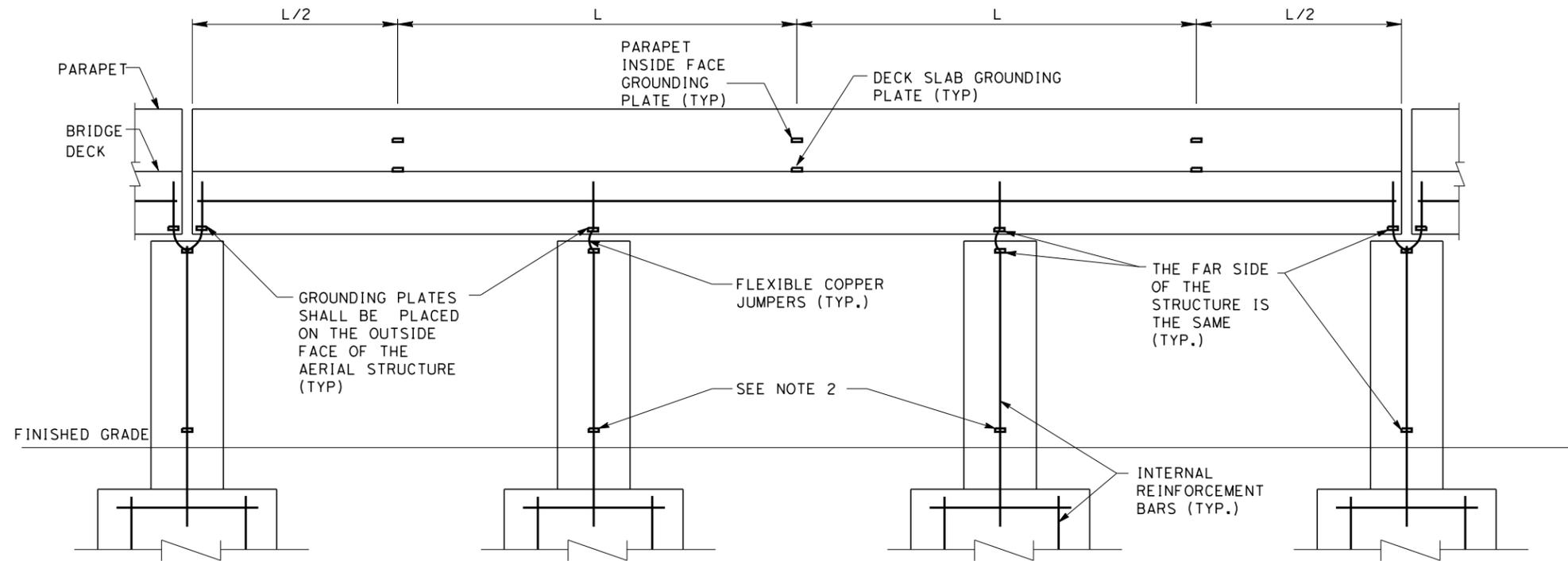
**CALIFORNIA HIGH-SPEED TRAIN PROJECT
DRAINAGE DIRECTIVE**

NON-BALLASTED AERIAL STRUCTURE
DECK DRAINAGE SYSTEM

CONTRACT NO.	
DRAWING NO.	DD-CD-001
SCALE	NO SCALE
SHEET NO.	

NOTES:

1. FOR SUPERSTRUCTURE UNITS THAT ARE GREATER THAN 150 FEET IN LENGTH, THE DECK SLAB AND PARAPET GROUNDING PLATES SHALL BE POSITIONED AT SPACING (L) = 150 FEET.
2. THE LOCATION OF THE LOWER COLUMN GROUNDING PLATE SHALL BE DETERMINED BY THE CONTRACTOR WITH CONSIDERATION FOR DESIGN LIFE AND RAMS.
3. IF COPPER BRAIDS ARE USED AS THE FLEXIBLE COPPER JUMPERS A STUD SUITABLE FOR CONNECTING THE BRAID LUG MUST BE EXOTHERMICALLY WELDED TO EACH GROUNDING PLATE.



AERIAL STRUCTURE WITH CONTINUOUS BEAM

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REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. LAU
DRAWN BY
V. HUANTE
CHECKED BY
M. HSIAO
IN CHARGE
R. SCHEDES
DATE
08/29/2015



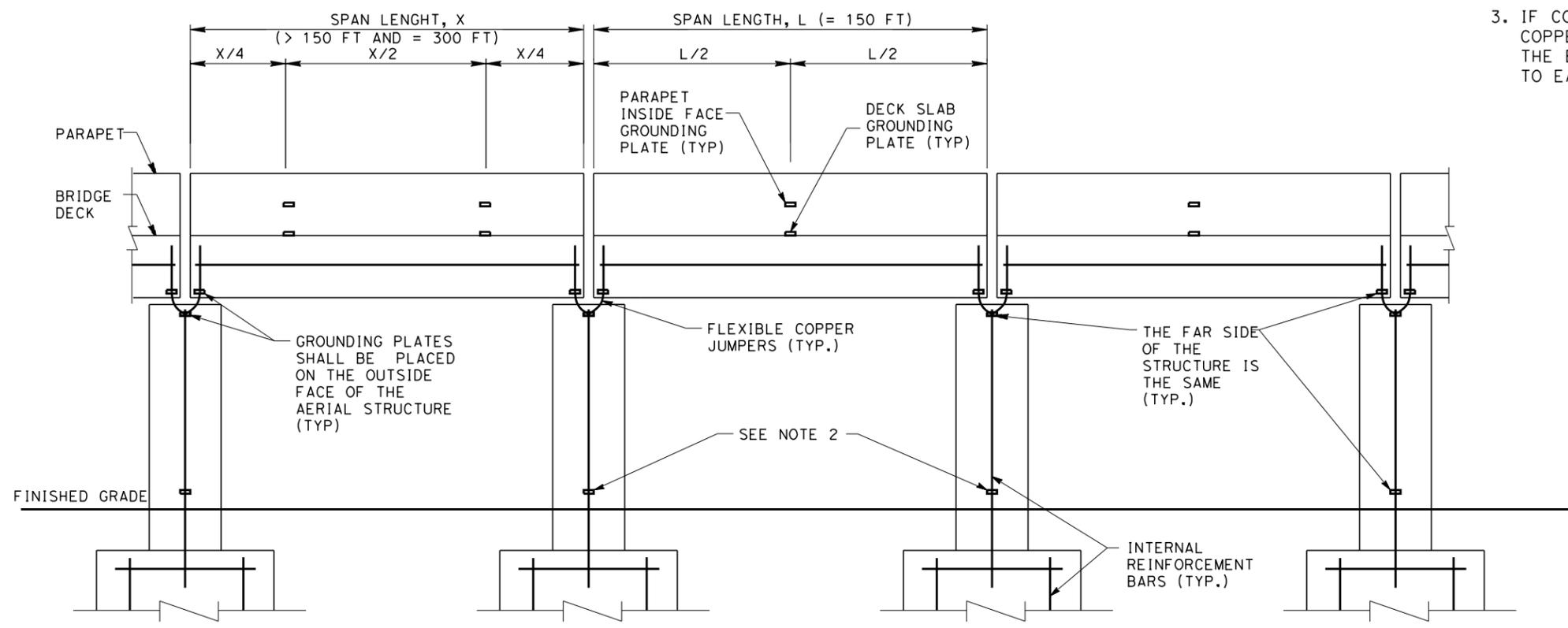
**CALIFORNIA HIGH-SPEED TRAIN PROJECT
OVERHEAD CONTACT SYSTEM DIRECTIVE**

GROUNDING AND BONDING ARRANGEMENT
AERIAL STRUCTURE WITH CONTINUOUS BEAM

CONTRACT NO.
DRAWING NO.
DD-OC-2050
SCALE
NO SCALE
SHEET NO.

RFP No.: HSR 14-32 - Addendum No. 2 - 10/09/2015

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AERIAL STRUCTURE WITH SIMPLY SUPPORTED BEAMS

NOTES:

1. FOR SUPERSTRUCTURE UNITS THAT ARE GREATER THAN 150 FEET IN LENGTH, THE DECK SLAB AND PARAPET GROUNDING PLATES SHALL BE POSITINED AT SPACING (L) = 150 FEET.
2. THE LOCATION OF THE LOWER COLUMN GROUNDING PLATE SHALL BE DETERMINED BY THE CONTRACTOR WITH CONSIDERATION FOR DESIGN LIFE AND RAMS.
3. IF COPPER BRAIDS ARE USED AS THE FLEXIBLE COPPER JUMPERS A STUD SUITABLE FOR CONNECTING THE BRAID LUG MUST BE EXOTHERMICALLY WELDED TO EACH GROUNDING PLATE.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. LAU
DRAWN BY
V. HUANTE
CHECKED BY
M. HSIAO
IN CHARGE
R. SCHEDES
DATE
08/29/2015



**CALIFORNIA HIGH-SPEED TRAIN PROJECT
OVERHEAD CONTACT SYSTEM DIRECTIVE**

GROUNDING AND BONDING ARRANGEMENT
AERIAL STRUCTURE WITH SIMPLY SUPPORTED BEAMS

CONTRACT NO.
DRAWING NO.
DD-OC-2051
SCALE
NO SCALE
SHEET NO.

RFP No.: HSR 14-32 - Addendum No. 2 - 10/09/2015