

California High-Speed Rail Authority



RFP No.: HSR 13-57

**Request for Proposals for Design-Build
Services for Construction Package 2-3**

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

California High-Speed Rail Authority



RFP No.: HSR 13-57

**Request for Proposals for Design-Build
Services for Construction Package 2-3**

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

General

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, NICHES 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.

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 $FY = 50$ 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_{max}) 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.: 13-57 - Addendum No. 5 - 10/09/2014

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY P. LIN
DRAWN BY R. MINCIO
CHECKED BY T. JACKSON
IN CHARGE J. CHIRCO
DATE 08/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
GENERAL DIRECTIVE

GENERAL DIRECTIVE NOTES
 STRUCTURAL

CONTRACT NO.
DRAWING NO. DD-GE-003
SCALE NO SCALE
SHEET NO.

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 ATEL
 ATM
 ATO
 ATP
 ATPB
 ATPM
 ATR
 ATS
 AUX
 AVE
 AVG
 AVL
 AWG

AT
 ARCHITECTURAL AND ENGINEERING
 AT-GRADE
 AVERAGE ANNUAL DAILY TRAFFIC
 AGGREGATE BASE,
 ANCHOR BOLT
 ASBESTOS BONDED BITUMINOUS COATED
 AIR-BLOWN MORTAR
 ABANDON
 ABUTMENT
 ABOVE
 ALTERNATING CURRENT,
 ASPHALT CONCRETE
 ASPHALT CONCRETE BASE
 AC DISTRIBUTION PANEL MAIN BREAKER
 ACOUSTICAL
 ASBESTOS CEMENT PIPE
 ACCESS CONTROL ROOM
 ALUMINUM CONDUCTOR STEEL REINFORCED
 AREA DRAIN,
 ACCESS DETERRING
 ADJACENT,
 ADJUST,
 ADJUSTABLE
 ADDED DEAD LOAD
 AC DISTRIBUTION PANEL
 AVERAGE DAILY TRAFFIC
 AERIAL EARTH (GROUND) CONDUCTOR
 AUTOMATED EXTERNAL DEFIBRILLATOR
 AUTOMATIC FARE COLLECTION
 ALTERNATIVE FLARED END SECTION
 AERIAL GROUND WIRE
 AHEAD
 ALUMINUM
 ALIGNMENT
 ALTERNATE
 TIME FROM MIDNIGHT TO NOON
 ANCHOR
 AUTOMATIC NUMBER IDENTIFICATION
 ANNUNCIATOR
 AMBIENT NOISE SENSOR
 ALTERNATIVE PIPE
 ALTERNATIVE PIPE CULVERT
 AREA OF POTENTIAL EFFECTS
 ALQUIST-PRIOLO EARTHQUAKE FAULT ZONE
 APPLICATION PROGRAMMING INTERFACE
 APPROXIMATE
 ALTERNATIVE PIPE UNDERDRAIN
 ACCESS RESTRICTION
 ARCHITECTURAL
 ACCELERATION RESPONSE SPECTRUM
 AGGREGATE SUBBASE
 ASPHALT
 ALUMINUM SPIRAL RIB PIPE
 ASSEMBLY
 AUTOTRANSFORMER,
 AUTOMATIC TENSION
 AUTOMATIC TRAIN CONTROL
 ADMINISTRATIVE TELEPHONE
 ALONG TRACK MOVEMENT
 AUTOMATIC TRAIN OPERATION
 AUTOMATIC TRAIN PROTECTION
 ASPHALT TREATED PERMEABLE BASE
 ASPHALT TREATED PERMEABLE MATERIAL
 ABOVE TOP OF RAIL
 AUTOMATIC TRAIN SUPERVISION,
 AUTOTENSIONED SYSTEM
 AUXILIARY
 AVENUE
 AVERAGE
 AUTOMATIC VEHICLE LOCATION
 AMERICAN WIRE GAUGE

B

B/SPAN
 B/W
 BAGR
 BAR
 BAT
 BB
 B-B
 BC

BODY SPAN
 BLACK & WHITE
 BRIDGE APPROACH GUARD RAILING
 BARRIER
 BATTERY
 BEGINNING OF BRIDGE
 BACK-TO-BACK
 BOLT CIRCLE

B CONTINUED

BCR
 BD
 BDA
 BDD
 BDP
 BDS
 BEC
 BEG
 BFA
 BIL
 BITUM
 BK
 BKF
 BKR
 BL
 BLDG
 BLKG
 BLM
 BLST
 BLVD
 BM
 BN
 BND
 BOC
 BOCC
 BOS
 BOT
 BOW
 BR
 BRG
 BRKT
 BRS
 BRT
 BS
 BSC
 BT
 BTM
 BTS
 BTWN
 BW
 BWA
 BWLAN
 BZ

BEGIN CURB RETURN
 BOARD
 BI-DIRECTIONAL AMPLIFIER
 BRIDGE DESIGN DETAILS (CALTRANS)
 BRIDGE DESIGN PRACTICE (CALTRANS)
 BRIDGE DESIGN SPECIFICATIONS (CALTRANS)
 BURIED EARTH (GROUND) CONDUCTOR
 BEGIN
 BY PASS FEEDER ANCHOR
 BASIC IMPULSE INSULATION LEVEL
 BITUMINOUS
 BACK
 BACKFILL
 BREAKER
 BASE LINE
 BUILDING
 BLOCKING
 BRIDGE-LOG MILE
 BALLAST
 BOULEVARD
 BENCH MARK
 BACKBONE NETWORK
 BOUND
 BOTTOM OF CURB
 BACK-UP OPERATIONAL CONTROL CENTER
 BOTTOM OF SLOPE
 BOTTOM
 BOTTOM OF WALL
 BRIDGE
 BEARING
 BRACKET
 BROADBAND RADIO SYSTEM
 BUS RAPID TRANSIT
 BODY SPAN WIRE
 BASE STATION CONTROLLER
 BUS TIE
 BOTTOM
 BASE TRANSCEIVER STATION
 BETWEEN
 BARBED WIRE,
 BALANCE WEIGHT
 BALANCE WEIGHT ANCHOR
 BROADBAND WIRELESS LOCAL AREA NETWORK
 BRONZE

C

C
 CA
 CAA
 CAB
 CADD
 CAH
 CAI
 CALP
 CANT
 CAP
 CAPA
 CAS
 CAT
 CATF
 CATP
 CB
 CBTC
 CBW
 C-C
 CCO
 CCS
 CCTV
 CCVT
 CEG

CLOSE,
 CONTACT,
 CONTROL
 CERTIFICATION ACCEPTANCE
 CABLE ANCHOR ASSEMBLY
 CABINET
 COMPUTER-AIDED DESIGN AND DRAFTING
 CONTROLLED ACCESS HIGHWAY
 CUSTOMER ASSISTANCE INTERCOM
 CORRUGATED ALUMINUM PIPE
 CANTILEVER
 CAPACITY,
 CAPACITOR,
 CORRUGATED ALUMINUM PIPE
 CORRUGATED ALUMINUM PIPE ARCH
 CONSTRUCTION AREA SIGN
 CATEGORY,
 CATEGORY SPECIFICATION FOR
 TWISTED PAIR CABLING,
 CATENARY
 CANTENARY FOUNDATION
 CATENARY POLE
 CATCH BASIN,
 CIRCUIT BREAKER
 CONCRETE BARRIER
 COMMUNICATIONS BASED TRAIN CONTROL
 CONCRETE BLOCK WALL
 CENTER LINE TO CENTER LINE
 CONTRACT CHANGE ORDER
 CALIFORNIA COORDINATE SYSTEM
 CLOSED CIRCUIT TELEVISION
 COUPLING CAPACITOR VOLTAGE TRANSFORMER
 CERTIFIED ENGINEERING GEOLOGIST

C CONTINUED

CEM
 CER
 C&G
 CG
 CGS
 CHNL
 CI
 CIC
 CIDH
 CIF
 CIP
 C-I-P
 CIPCP
 CIS
 CISS
 CJ
 CJP
 CKT
 CL
 CL2
 CL-6
 CLG
 CLK
 CLKG
 CLO
 CLR
 CM
 CMP
 CMU
 CNTR
 CO
 COL
 COMM
 CONC
 COND
 CONN
 CONST
 CONT
 CONTR
 COORD
 CORR
 CP
 CPT
 CPU
 CR
 CRC
 CRCP
 CRSP
 CRZ
 CS
 CSA
 CSP
 CSPA
 CT
 CTB
 CTPB
 CTPM
 CTR
 CTSK
 CTVT
 CTW
 CU
 CULV
 CV
 CVR
 CW
 CWA
 CWH
 CWR
 CWT

CEMENT
 COMMUNICATIONS EQUIPMENT ROOM
 CURB & GUTTER
 CENTER OF GRAVITY
 CALIFORNIA GEOLOGICAL SURVEY
 CHANNEL
 CAST IRON
 COMMUNICATIONS INTERFACE CABINET
 CAST-IN-DRILLED-HOLE
 COMMON INTERMEDIATE FORMAT
 CAST IRON PIPE
 CAST-IN-PLACE
 CAST-IN-PLACE CONCRETE PIPE
 CUSTOMER INFORMATION SIGN
 CAST-IN-STEEL-SHELL
 CONSTRUCTION JOINT
 COMPLETE JOINT PENETRATION
 CIRCUIT
 CLASS
 CLASS 2
 CHAIN LINK FENCE (6 FT)
 CEILING
 CHAIN LINK
 CAULKING
 CLOSET
 CLEAR,
 CLEARANCE
 CONTROL MODULE,
 CORRUGATED METAL
 CORRUGATED METAL PIPE
 CONCRETE MASONRY UNIT
 COUNTER
 CLEANOUT,
 COUNTY
 COLUMN
 COMMUNICATIONS
 CONCRETE
 CONDUIT
 CONNECTOR,
 CONNECTION
 CONSTRUCT,
 CONSTRUCTION
 CONTINUOUS,
 CONTINUATION
 CONTRACTOR
 COORDINATE
 CORRIDOR
 CONTROL POINT
 CONE PENETRATION TEST,
 CONTROL POWER TRANSFORMER
 CENTRAL PROCESSING UNIT
 CREEK,
 CONDUIT RISER
 COMBINED RELAY AND CONTROL PANEL
 CONTINUOUS REINFORCED CONCRETE PAVEMENT
 CONCRETED ROCK SLOPE PROTECTION
 CLEAR RECOVERY ZONE
 CONTROL SWITCH
 CONSTRUCTION STAGING AREA
 CORRUGATED STEEL PIPE
 CORRUGATED STEEL PIPE ARCH
 CERAMIC TILE,
 COURT,
 CURRENT TRANSFORMER/TRANSUDCER
 CEMENT TREATED BASE
 CEMENT TREATED PERMEABLE BASE
 CEMENT TREATED PERMEABLE MATERIAL
 CENTER
 COUNTERSUNK
 COMBINED CURRENT TRANSFORMER AND
 VOLTAGE TRANSFORMER
 COUNTERWEIGHT TAIL WIRE
 COPPER
 CULVERT
 CURVE
 COVER
 CONTACT WIRE
 CONTACT WIRE ANCHOR
 CONTACT WIRE HEIGHT
 CONTINUOUSLY WELDED RAIL
 COUNTER WEIGHT

D

D
 DB
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 DNS
 DO
 DPDT
 DR
 DS
 DSC
 DSCW
 DSG
 DSHA
 DST
 DTBB
 DTM
 DVR
 DWG
 DWY
 DXO

DEPTH
 DESIGN-BUILD
 DESIGN BASIS EARTHQUAKE
 DOUBLE
 DIRECT CURRENT
 Dc DISTRIBUTION PANEL MAIN BREAKER
 Dc DISTRIBUTION PANEL
 DOWNDRAIN,
 DEVICE DRIVER
 DEAD END
 DELINEATOR
 DEMOLISH
 DEPARTMENT
 DETOUR
 DIRECT FIXATION,
 DRINKING FOUNTAIN
 DOWN GUY ANCHOR
 DESIGN HOURLY VOLUME
 DRAINAGE INLET
 DIAGONAL
 DIAPHRAGM
 DIFFERENTIAL
 DIMENSION
 DROP INLET
 DIRECTION
 DISCONNECT
 DISPENSER
 DISTANCE
 DISTRIBUTION
 DOUBLE METAL BEAM BARRIER
 DOWN
 DOMAIN NAME SYSTEM
 DOOR OPENING
 DOUBLE-POLE DOUBLE-THROW
 DRIVE
 DOWNSPOUT,
 DISCONNECT SWITCH
 DIFFERING SITE CONDITIONS
 DIRECT SUSPENSION CONTACT WIRE
 DISCONNECT SWITCH GROUP
 DETERMINISTIC SEISMIC HAZARD ANALYSIS
 DISTRICT
 DOUBLE THRIE BEAM BARRIER
 DIGITAL TERRAIN MODEL
 DIGITAL VIDEO RECORDERS
 DRAWING
 DRIVEWAY
 DOUBLE CROSSOVER

E

E
 EA
 EB
 EC
 ECR
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 EHS
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 E-LAN
 ELAST
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 ELOCK
 EMB
 EMC
 EMER
 EMF
 EMI
 EMS
 EMU
 ENCL
 ENGR
 EOB

EAST
 EACH
 EASTBOUND,
 END OF BRIDGE
 END HORIZONTAL CURVE,
 ELECTRICAL CONDUCTOR
 END CURB RETURN
 EACH END
 EACH FACE
 EMERGENCY GROUND SWITCH
 EXTRA HIGH STRENGTH
 EMERGENCY INTERCOM
 EXPANSION JOINT
 ETHERNET LAN
 ELASTOMERIC
 ELECTRICAL,
 ELECTRIC
 ELECTROLIER
 ELEVATION
 ELECTRONIC LOCK
 EMBANKMENT
 ELECTROMAGNETIC COMPATIBILITY
 EMERGENCY
 ELECTROMAGNETIC FIELD
 ELECTRO MAGNETIC INTERFERENCE
 ELEMENT MANAGEMENT SYSTEM
 ELECTRIC MULTIPLE UNIT
 ENCLOSURE
 ENGINEER,
 ENGINEERING
 END OF BRIDGE

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
R. MINCIO
 DRAWN BY
V. LAVERDE
 CHECKED BY
S. MILITELLO
 IN CHARGE
G. LUSHEROVICH
 DATE
08/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
DIRECTIVE DRAWING

ACRONYMS AND ABBREVIATIONS 1

CONTRACT NO.
 DRAWING NO.
 DD-GE-100
 SCALE
 NO SCALE
 SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

^{VC} **California High-Speed Rail Authority**



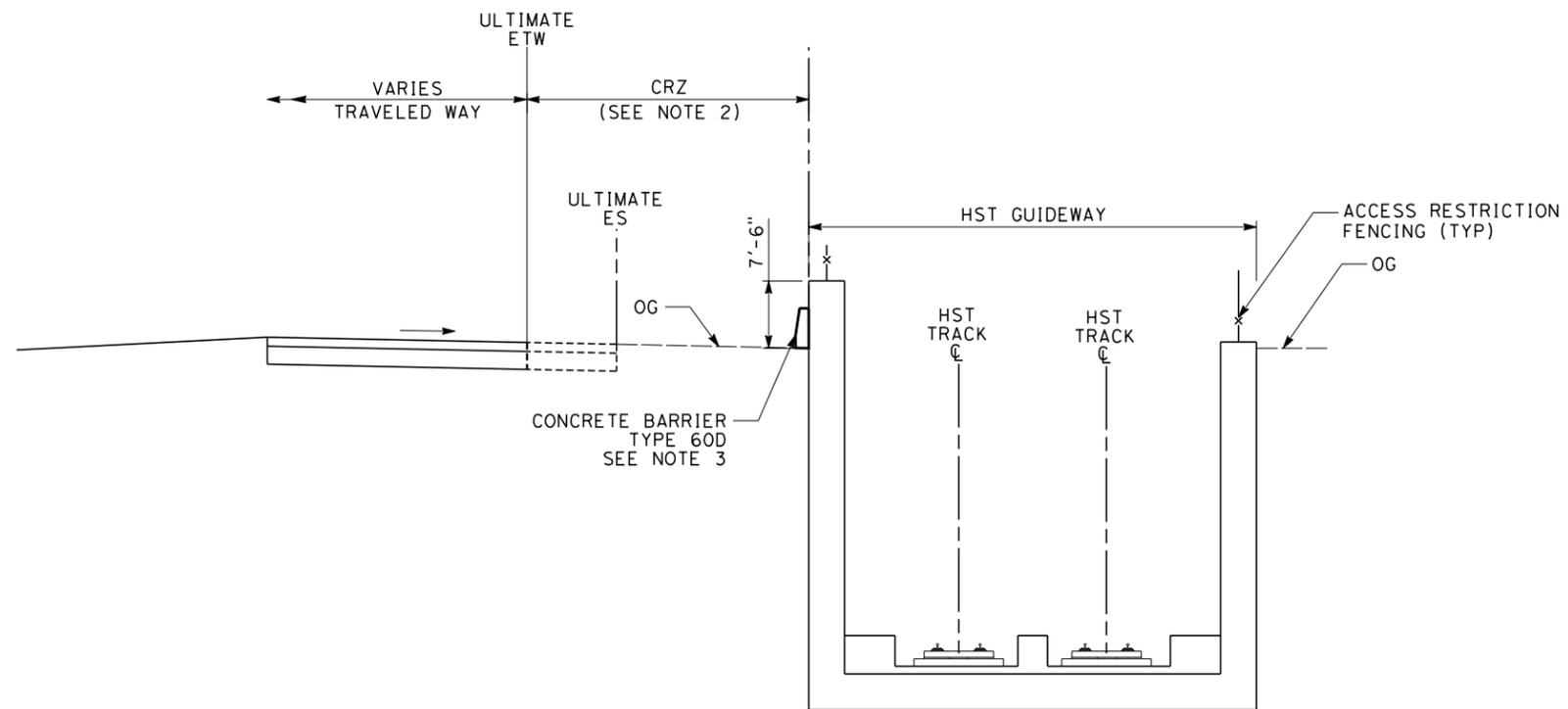
RFP No.: HSR 13-57

**Request for Proposals for Design-Build
Services for Construction Package 2-3**

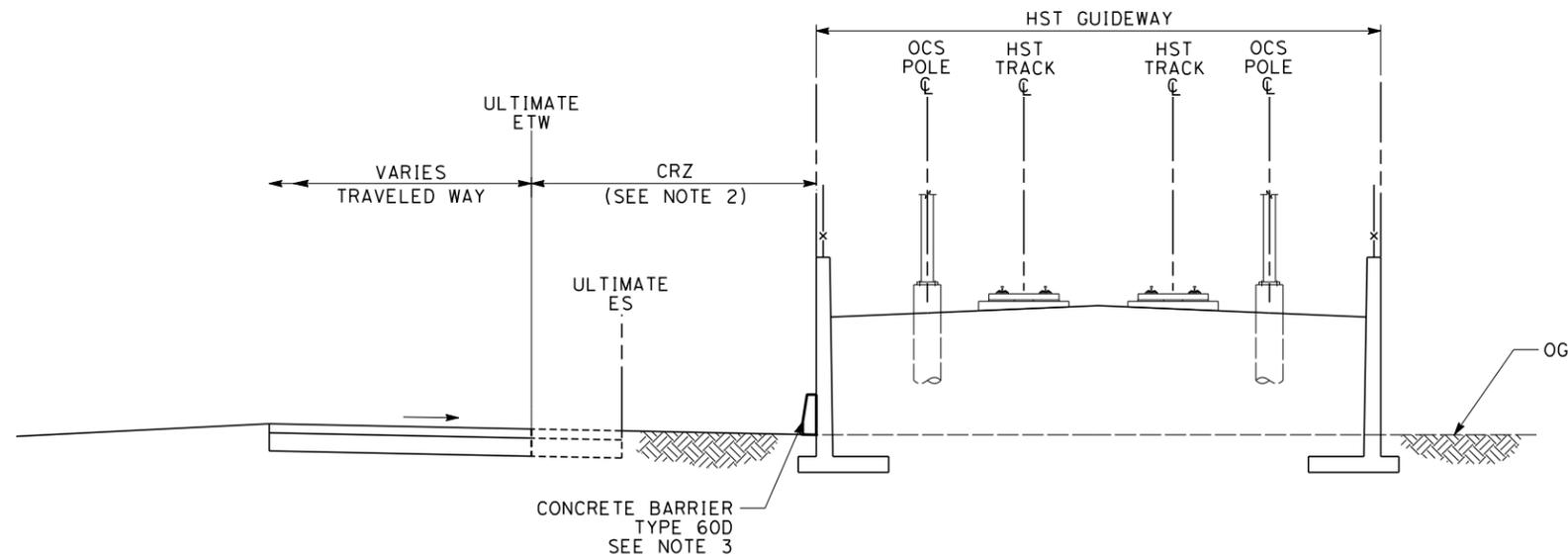
**Book II, Part B.1
Directive Drawings**

Intrusion Protection

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HIGHWAY/ROADWAY AT GRADE ADJACENT TO HST TRENCH



HIGHWAY/ROADWAY AT GRADE ADJACENT TO HST RETAINED FILL

NOTES:

1. TRACK, SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN.
2. IF THE DISTANCE BETWEEN HST WALL AND THE ULTIMATE ETW IS LESS THAN 52'-0", THE WALL HEIGHT SHALL BE 7'-6" ABOVE THE GROUND SURFACE AND CALTRANS CONCRETE BARRIER TYPE 60D SHALL BE INCLUDED IN CONSTRUCTION OF THE WALL.
3. FOR CONCRETE BARRIER TYPE AND THE END TREATMENT OF THE CONCRETE BARRIER REFER TO CHAPTER 7 OF CALTRANS TRAFFIC MANUAL AND CALTRANS STANDARD PLANS.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
A. ABTAHI
DRAWN BY
V. HUANTE
CHECKED BY
H. NGUYEN
IN CHARGE
G. LUSHEROVICH
DATE
08/29/2014



**CALIFORNIA HIGH-SPEED TRAIN PROJECT
INTRUSION PROTECTION DIRECTIVE**
HST TRENCH AND RETAINING WALL PROTECTION

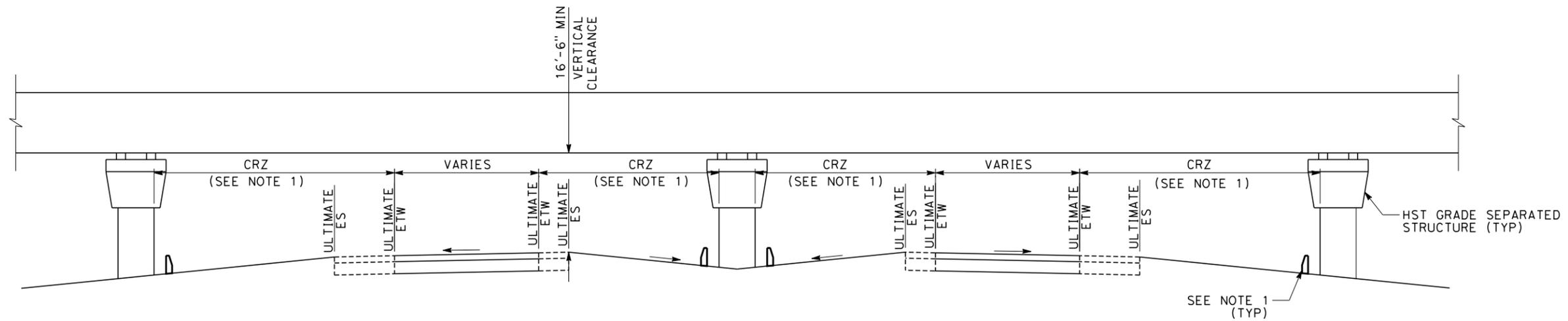
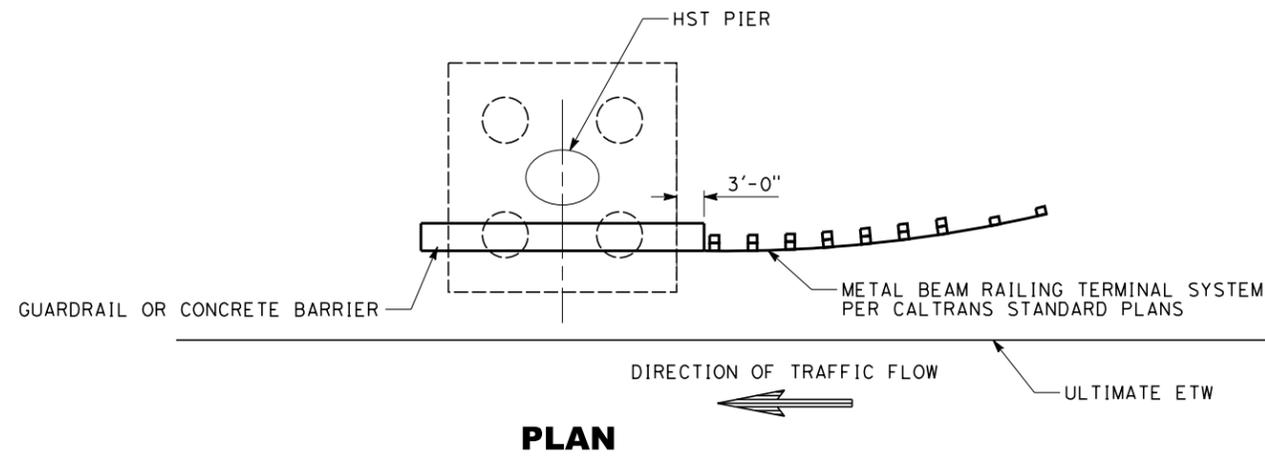
CONTRACT NO.
DRAWING NO.
DD-IP-104
SCALE
NO SCALE
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

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NOTES:

- METAL BEAM GUARDRAIL OR CONCRETE BARRIER SHALL BE REQUIRED AT HST FIXED OBJECT IF THE DISTANCE FROM ULTIMATE ETW TO HST FIXED OBJECT IS LESS THAN 30'-0". REFER TO CHAPTER 7 OF CALTRANS TRAFFIC MANUAL AND CALTRANS STANDARD PLANS.



HST GRADE SEPARATED STRUCTURE OVER HIGHWAY/ROADWAY WITH MEDIAN

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
A. ABTAHI
DRAWN BY
V. HUANTE
CHECKED BY
H. NGUYEN
IN CHARGE
G. LUSHEROVICH
DATE
08/29/2014



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

HST PIER PROTECTION
IN HIGHWAY/ROADWAY RIGHT-OF-WAY

CONTRACT NO.
DRAWING NO. DD-IP-105
SCALE NO SCALE
SHEET NO.

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California High-Speed Rail Authority

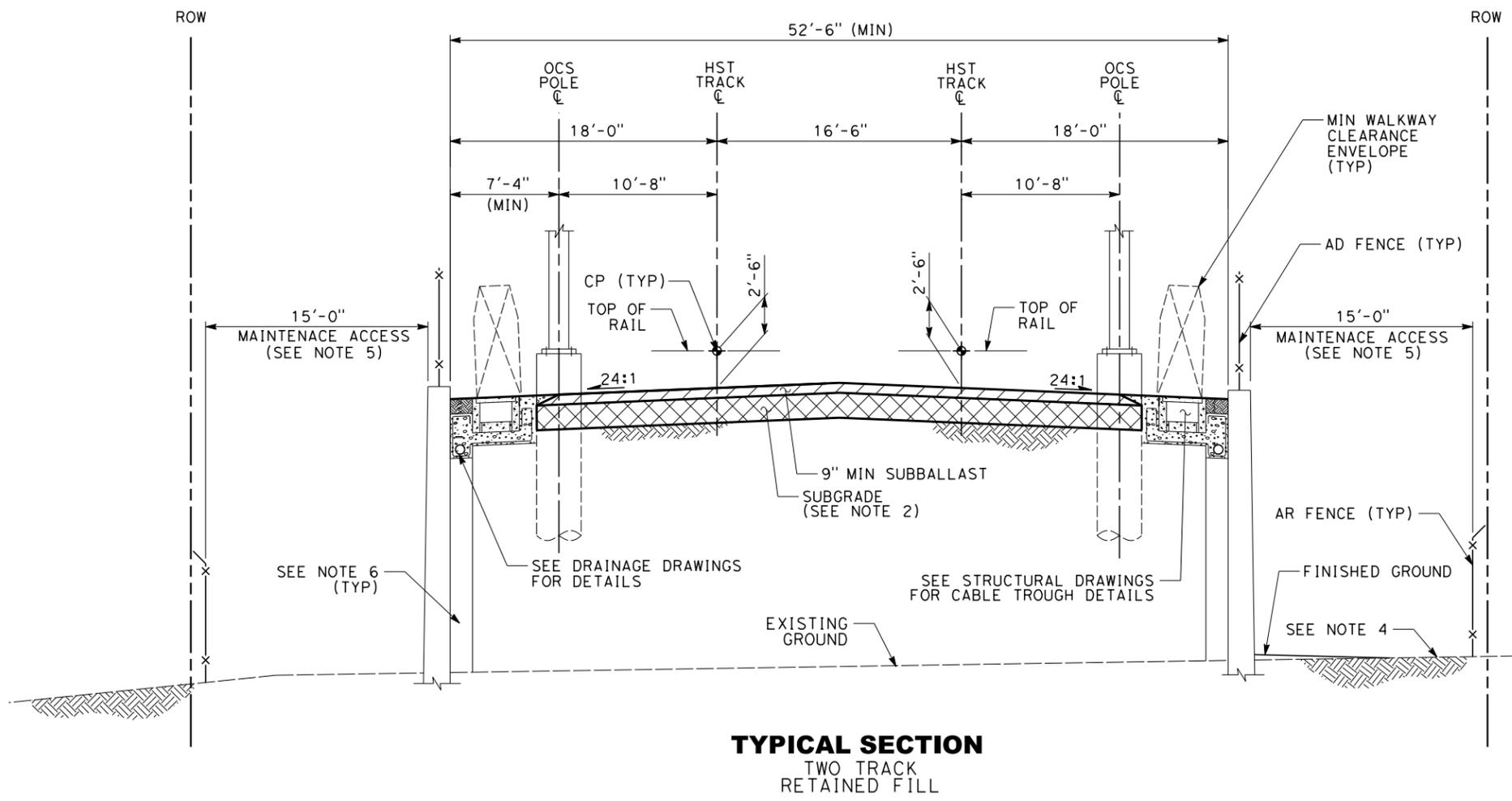


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**Request for Proposals for Design-Build
Services for Construction Package 2-3**

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

Civil



- NOTES:**
1. TRACK, SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN.
 2. SUBGRADE THICKNESS SHALL BE DETERMINED BASED ON THE EXISTING GROUND CONDITION.
 3. THE CONTROL POINT (CP) SHALL BE 2'-6" ABOVE THE TOP OF SUBBALLAST.
 4. PROTECTIVE BARRIER, SUCH AS A BERM OR A DIKE, SHALL BE INSTALLED AT THE RIGHT-OF-WAY BOUNDARY TO INTERCEPT STORM WATER RUN OFF, WHERE THERE IS A POTENTIAL FOR STORM WATER RUN OFF TO ENTER CHST RIGHT-OF-WAY FROM ADJACENT PROPERTY.
 5. 10' MIN MAINTENANCE ACCESS REQUIRED WHEN THERE IS NO FENCE OR CONTINUOUS OBSTRUCTION.
 6. PROVIDE APPROPRIATE DRAINAGE SYSTEM FOR THE TYPE OF RETAINING WALL.



9/30/2014 12:28:14 PM CAHSRP.tbl CAHSRP.tbl c:\projectwise\pb\projectwise\int\mincio\dms32166\DD-CV-102.dgn

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S. MILITELLO

DRAWN BY
R. MINCIO

CHECKED BY
G. HARRIS

IN CHARGE
G. LUSHEROVICH

DATE
08/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
CIVIL DIRECTIVE

TYPICAL CROSS SECTION
TWO TRACK
RETAINED FILL

CONTRACT NO.

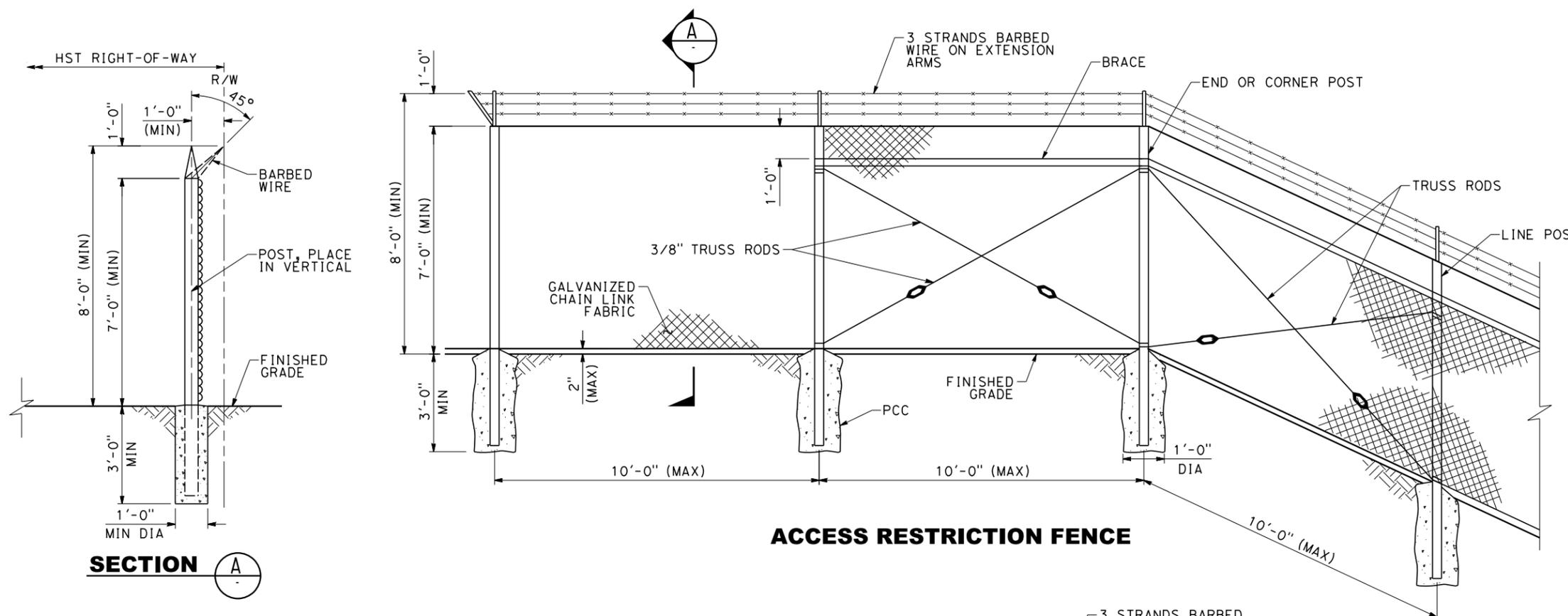
DRAWING NO.
DD-CV-102

SCALE
AS SHOWN

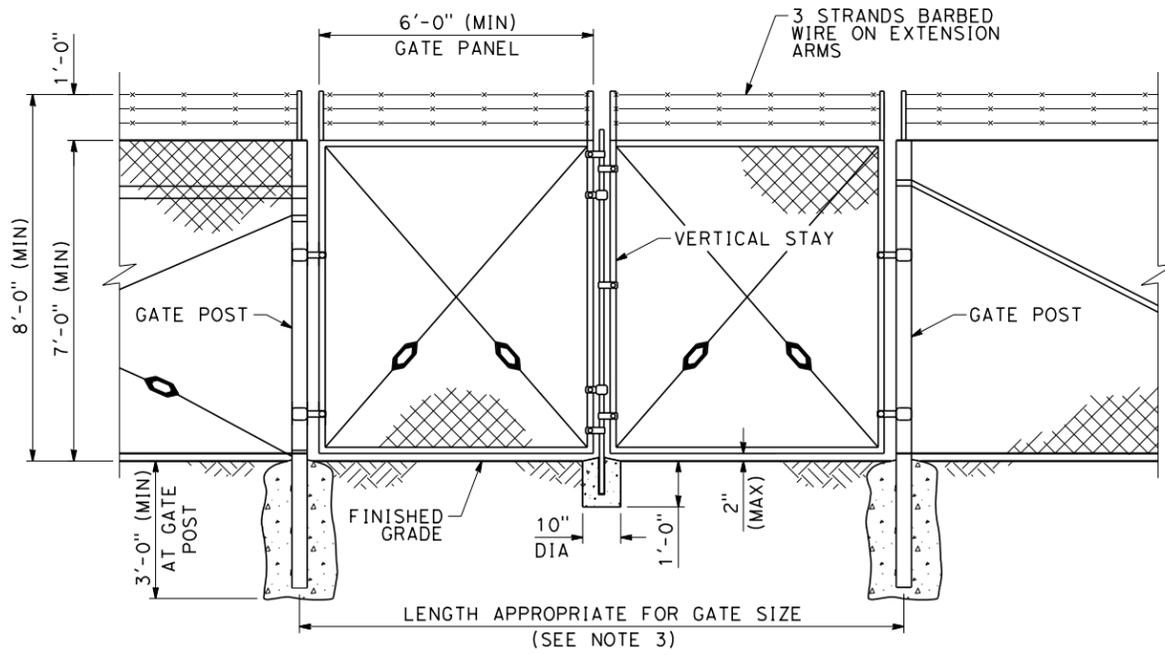
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

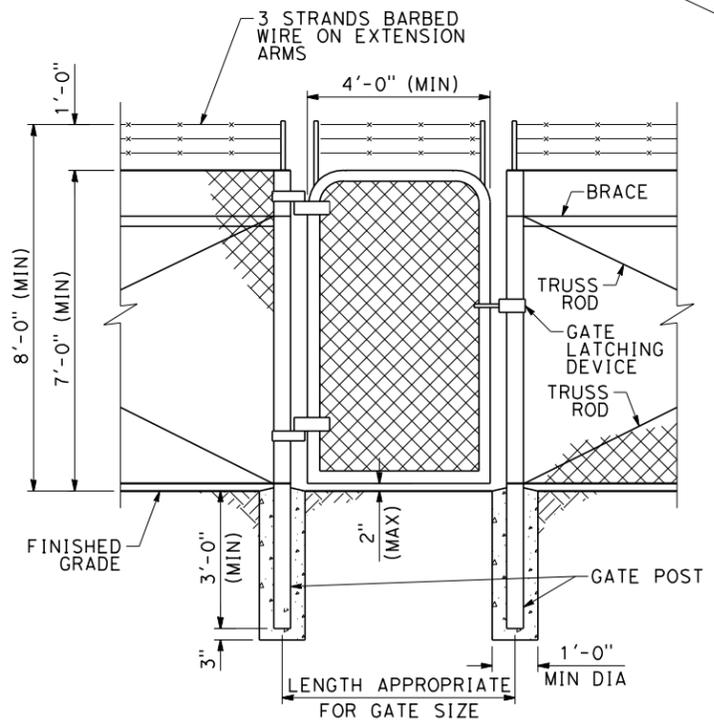
9/30/2014 11:40:16 AM CAHSR.tbl CHSR_PDF_half_black.plt c:\projects\hst\project\hst\laverdev\dms32166\DD-CV-900.dgn



ACCESS RESTRICTION FENCE



VEHICLE ACCESS GATE ALONG AR FENCE



PEDESTRIAN ACCESS GATE ALONG AR FENCE

NOTES:

1. ALL PERMANENT FENCING AND GATES SHALL BE BONDED, GROUNDED AND INSULATED TO PREVENT ELECTRIC SHOCK.
2. ACCESS RESTRICTION (AR) FENCING SHALL BE 8 FEET HIGH MINIMUM (AS SHOWN HERE). ACCESS DETERRING (AD) FENCING (NOT SHOWN) SHALL BE 6 FEET HIGH, WITH NO BARBED WIRE.
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. THIS DRAWING DEPICTS MINIMUM STANDARDS FOR RIGHT-OF-WAY FENCING AND GATE. ALTERNATIVE FENCE TYPE OF EQUIVALENT OR ENHANCED KIND MAY BE ALLOWED UPON APPROVAL OF THE AUTHORITY.
6. FENCE AND GATES SHALL BE DESIGNED AND INSTALLED TO NOT PRECLUDE FUTURE INSTALLATION OF TYPICAL FENCE MOUNTED ELECTRONIC ACCESS CONTROL.
7. FOR ADDITIONAL FENCE INSTALLATION DETAILS SEE CALTRANS STANDARD PLANS.



REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S. MILITELLO
DRAWN BY
V. LAVERDE
CHECKED BY
A. ABTAHI
IN CHARGE
G. LUSHEROVICH
DATE
08/29/2014



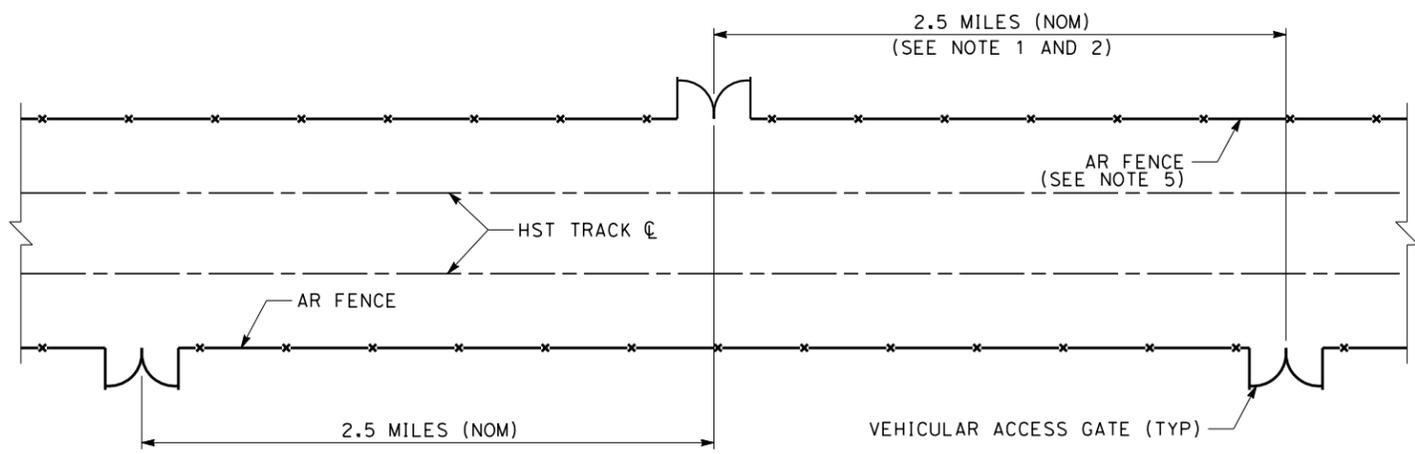
CALIFORNIA HIGH-SPEED TRAIN PROJECT
CIVIL DIRECTIVE

ACCESS RESTRICTION
FENCE AND GATE DETAILS

CONTRACT NO.
DRAWING NO.
DD-CV-900
SCALE
AS SHOWN
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

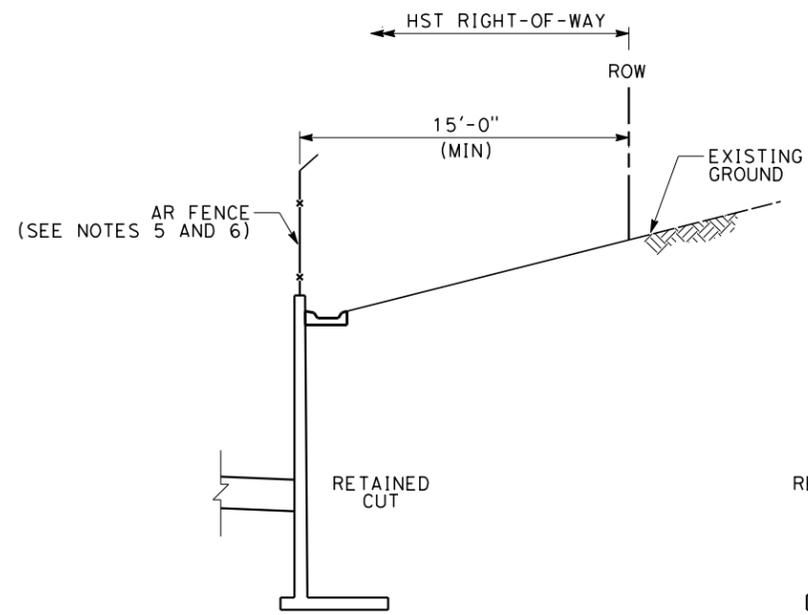
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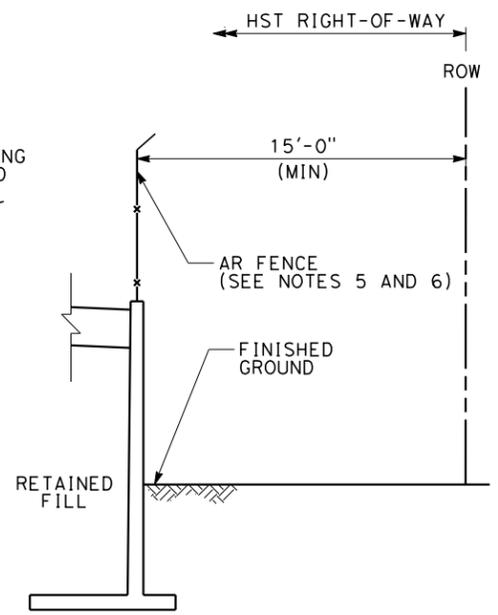
**GATE LOCATIONS ALONG HST TRACKWAY
AT GRADE**

NOTES:

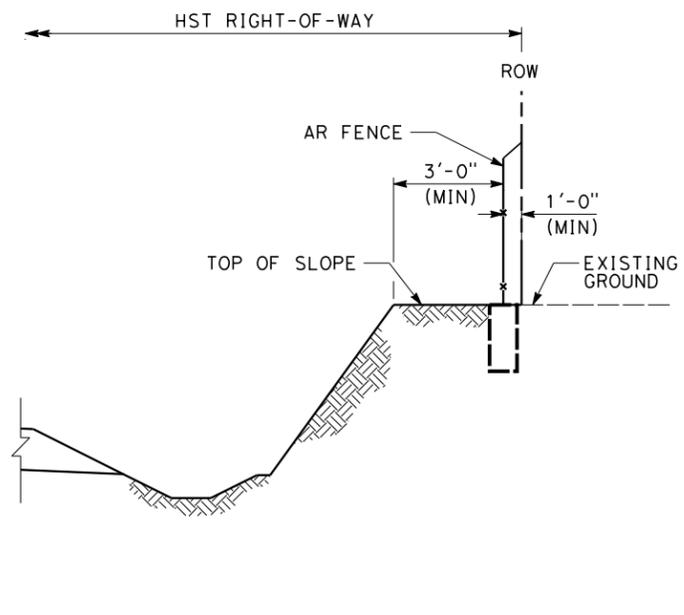
1. LOCATION OF GATES ALONG RIGHT-OF-WAY FENCING MAY REQUIRE COORDINATION WITH THE LOCAL FIRE PROTECTION AGENCY AND EMERGENCY RESPONDERS.
2. IN GENERAL VEHICULAR ACCESS GATE ALONG AT-GRADE TRACKWAY, SHALL BE LOCATED NOMINALLY AT 2.5 MILE INTERVALS AND COORDINATED WITH THE LOCATION OF HST WAYSIDE FACILITIES.
3. GATE LOCATIONS ALONG FENCING WITHIN FREEWAY RIGHT-OF-WAY REQUIRE CALTRANS APPROVAL.
4. VEHICULAR ACCESS GATES SHALL BE PROVIDED IN CONJUNCTION WITH EITHER ACCESS ROADS OR AT LOCATIONS WHERE EXISTING ROADS MAKE IT PRACTICABLE FOR MAINTENANCE AND EMERGENCY VEHICLE TO ACCESS THE TRACKWAY.
5. FOR ADDITIONAL DETAILS SEE CIVIL DRAWING "ACCESS RESTRICTION FENCE AND GATE DETAILS".
6. AD FENCE CAN BE USED IF AR FENCE IS PLACED ALONG THE RIGHT-OF-WAY OR THE HEIGHT OF THE WALL IS GREATER THAN 10 FEET. 15 FOOT MINIMUM REQUIRED TO THE FENCE WHEN AD FENCE IS PLACED ALONG THE RIGHT-OF-WAY.



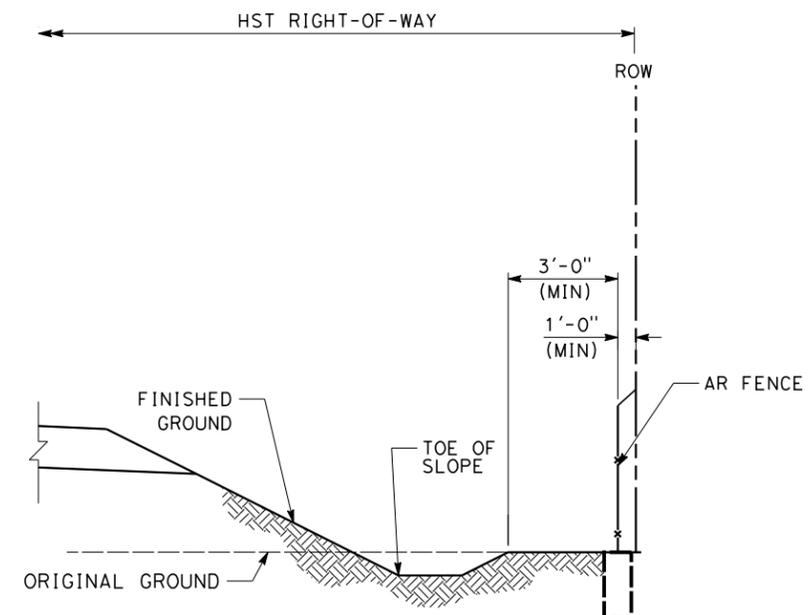
**FENCE LOCATION ALONG
HST TRACKWAY
RETAINED CUT SECTION**



**FENCE LOCATION ALONG
HST TRACKWAY
RETAINED FILL SECTION**



**FENCE LOCATION ALONG
HST TRACKWAY
OPEN CUT SECTION**



**FENCE LOCATION ALONG
HST TRACKWAY
EMBANKMENT SECTION**

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S. MILITELLO
DRAWN BY
V. LAVERDE
CHECKED BY
A. ABTAHI
IN CHARGE
G. LUSHEROVICH
DATE
08/29/2014



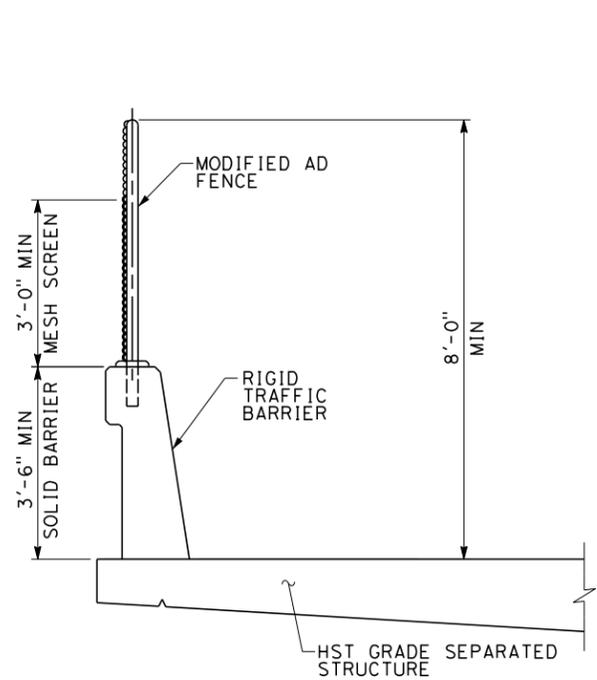
**CALIFORNIA HIGH-SPEED TRAIN PROJECT
CIVIL DIRECTIVE**

ACCESS RESTRICTION
FENCE AND GATE LOCATIONS

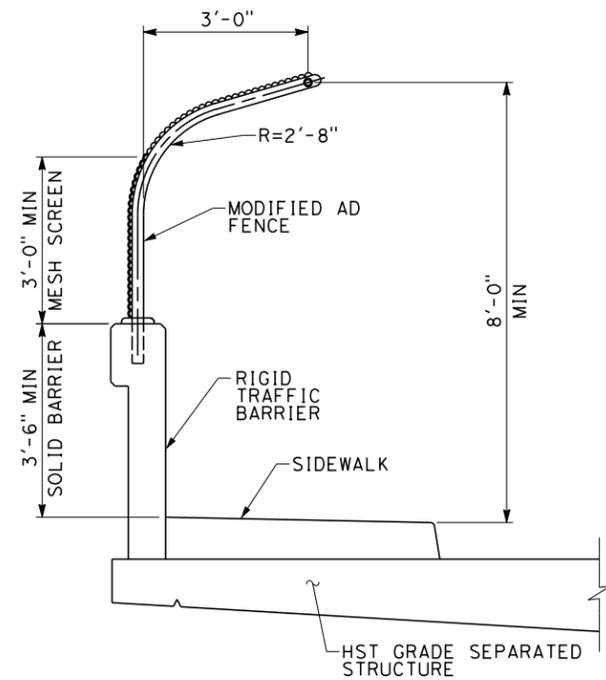
CONTRACT NO.
DRAWING NO.
DD-CV-901
SCALE
NO SCALE
SHEET NO.

RFP No. 13-57 - Addendum No. 5 - 10/09/2014

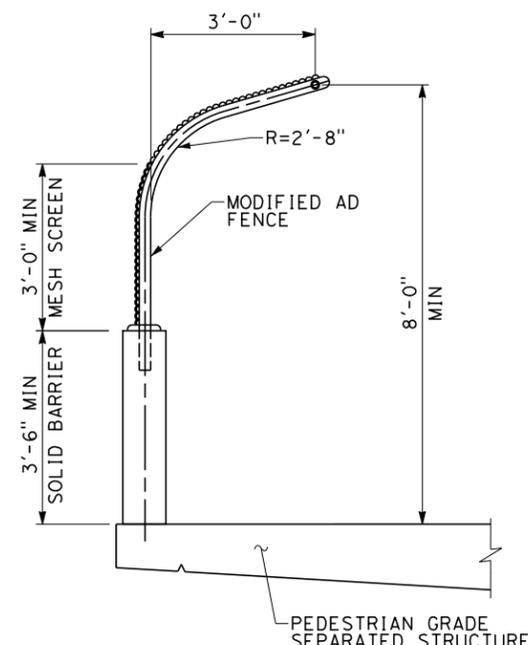
9/30/2014 11:41:34 AM CAHSR.tbl CHSR_PDF_half_black.plt c:\projectwise\pb\projectwise\int\laverdev\dms32166\DD-CV-902.dgn



CROSS SECTION
FENCE AT GRADE SEPARATED STRUCTURES
WITHOUT SIDEWALK



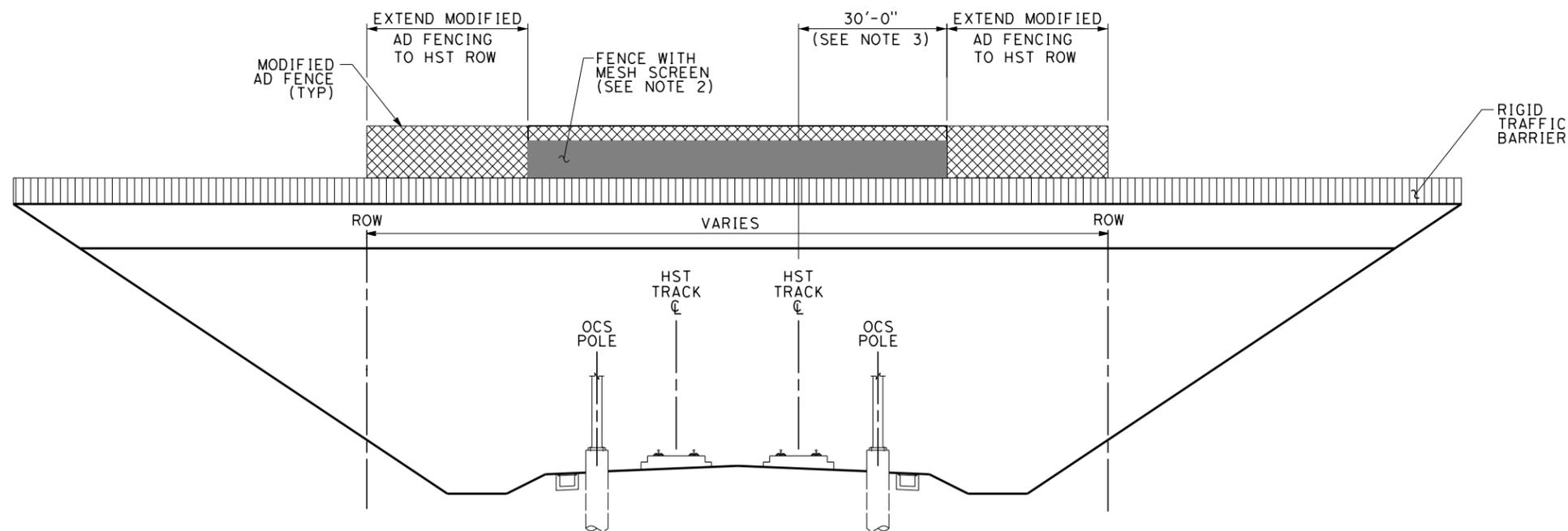
CROSS SECTION
FENCE AT GRADE SEPARATED STRUCTURES
WITH SIDEWALK



CROSS SECTION
FENCE AT PEDESTRIAN
GRADE SEPARATED STRUCTURE

NOTES:

1. TRACK, SYSTEMS, STRUCTURES AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN.
2. FOR MESH SCREEN REQUIREMENT, SEE OVERHEAD CONTACT SYSTEM AND TRACTION POWER RETURN SYSTEM CHAPTER OF THE DESIGN CRITERIA.
3. EXTEND MESH SCREEN 30 FEET FROM CENTERLINE OF OUTERMOST TRACK, OR 10 FEET BEYOND THE OUTERMOST ENERGIZED CONDUCTOR OR COMPONENT, WHICHEVER IS GREATER.



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
08/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
CIVIL DIRECTIVE

ACCESS DETERRING
FENCING ON GRADE SEPARATED STRUCTURES

CONTRACT NO.
DRAWING NO.
DD-CV-902
SCALE
NO SCALE
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

California High-Speed Rail Authority



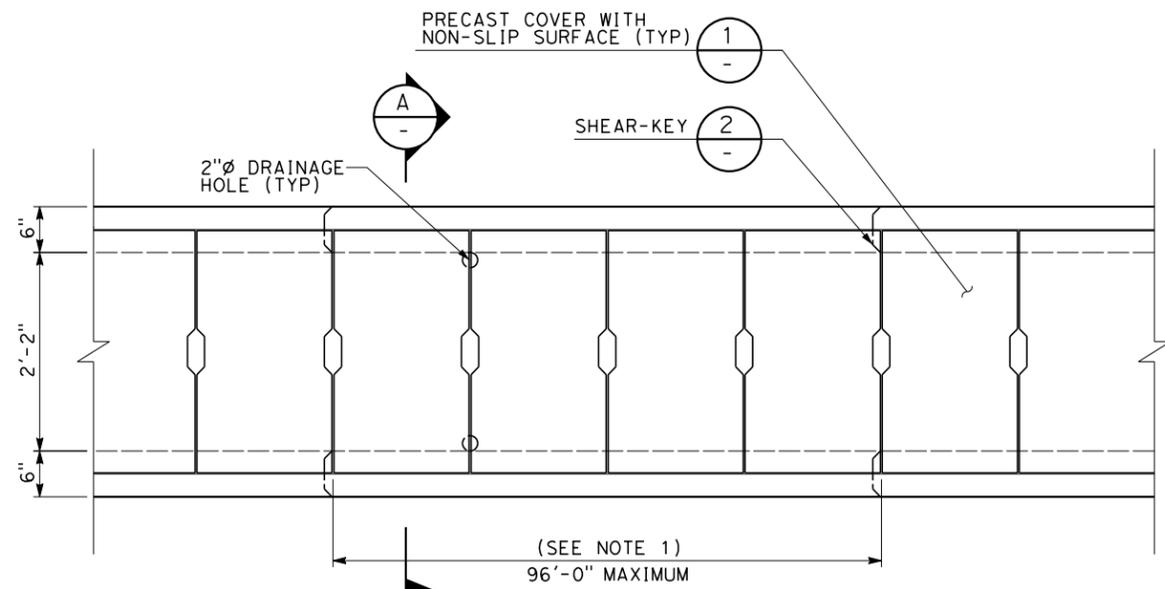
RFP No.: HSR 13-57

**Request for Proposals for Design-Build
Services for Construction Package 2-3**

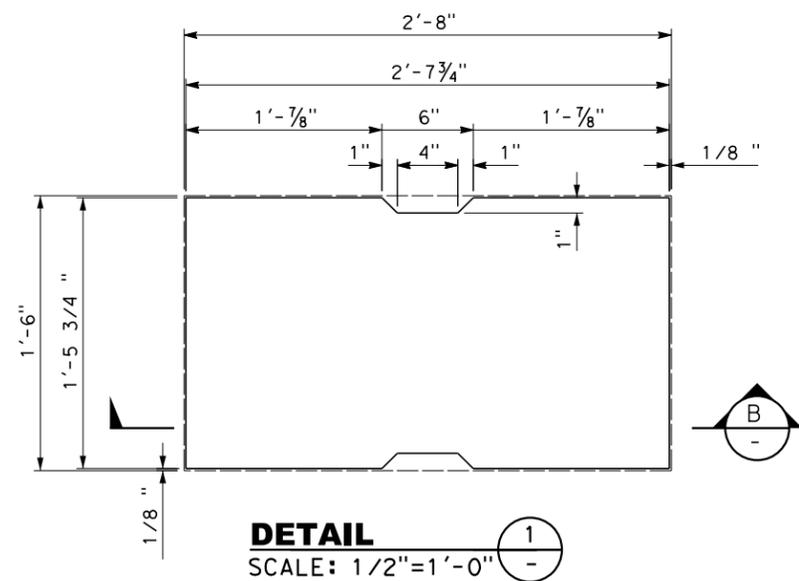
**Book II, Part B.1
Directive Drawings**

Structure

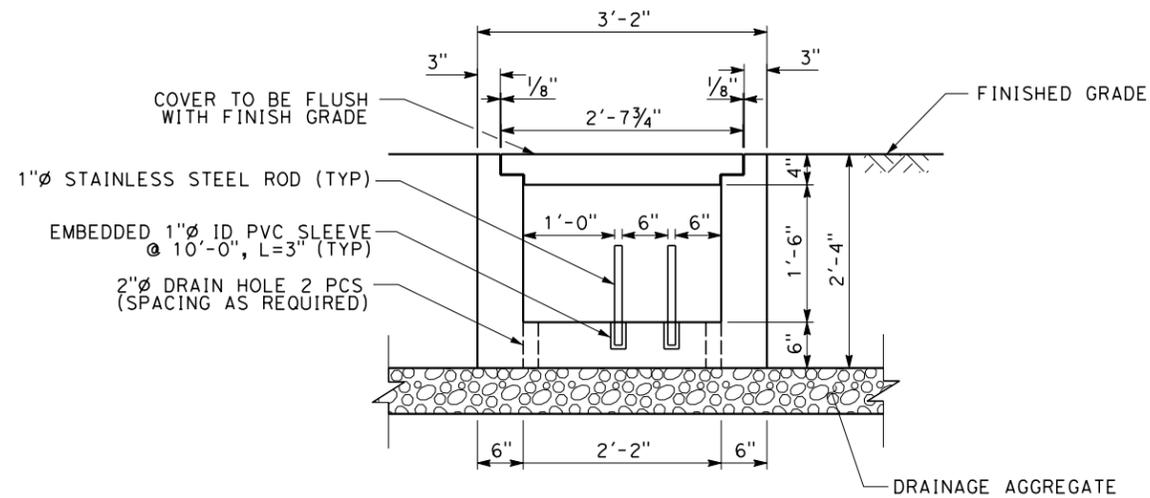
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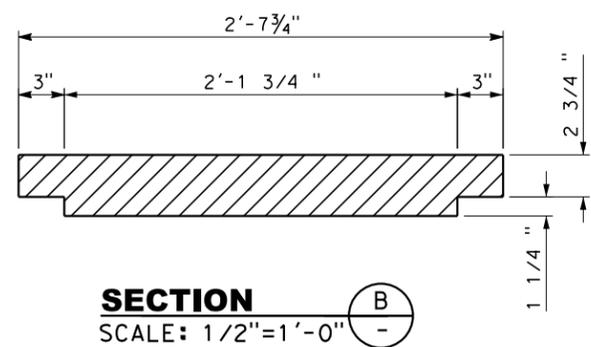
PRECAST CABLE TROUGH PLAN
SCALE: 1"=1'-0"



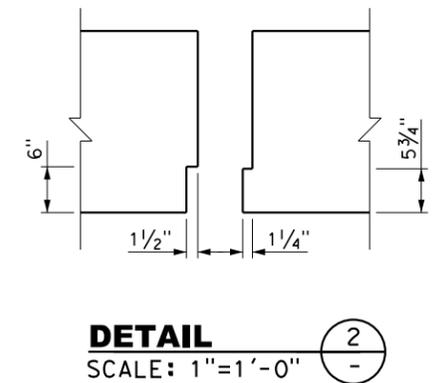
DETAIL 1
SCALE: 1/2"=1'-0"



SECTION A-A
SCALE: 1"=1'-0"



SECTION B-B
SCALE: 1/2"=1'-0"



DETAIL 2
SCALE: 1"=1'-0"

NOTES:
1. CONTRACTOR SHALL DETERMINE WORK SEGMENT LENGTH BASED ON CONSTRUCTION METHOD.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
B. VALENTI
DRAWN BY
V. LAVERDE
CHECKED BY
P. LIN
IN CHARGE
G. LUSHEROVICH
DATE
08/29/2014

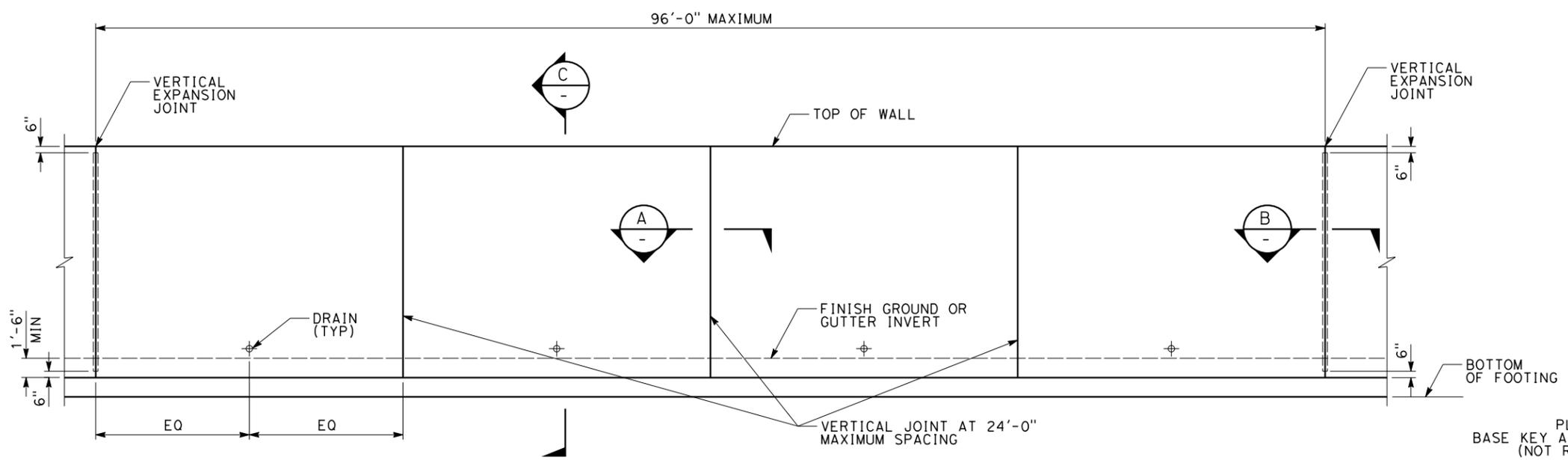


CALIFORNIA HIGH-SPEED TRAIN PROJECT
STRUCTURAL DIRECTIVE
TYPICAL CABLE TROUGH DETAILS
EMBANKMENT/CUT

CONTRACT NO.
DRAWING NO.
DD-ST-901
SCALE
AS SHOWN
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

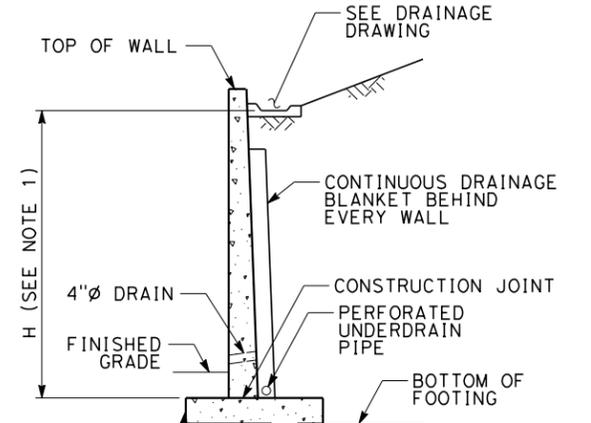
9/30/2014 11:46:22 AM CAHSR_PDF_half_black.plt c:\projectwise\bb\projectwise\int\laverdev\dms32172\DD-ST-920.dgn



RETAINING WALL ELEVATION

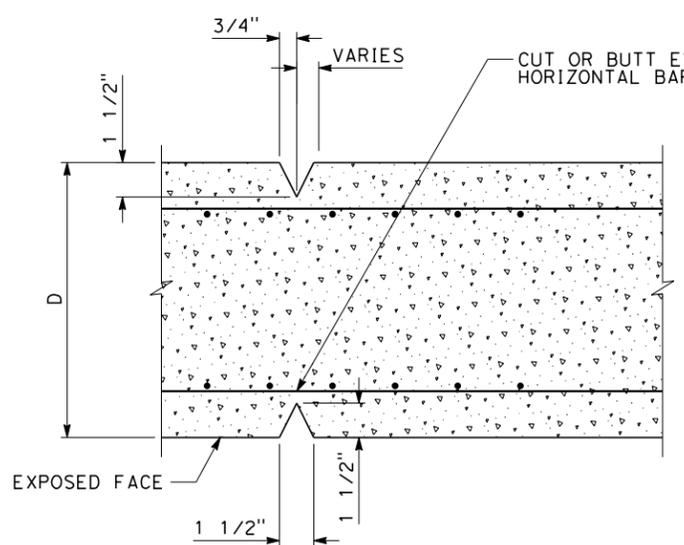
NOTES:

- ELEVATION OF TOP OF WALL AND BOTTOM OF FOOTING SHALL BE AS SHOWN ON OTHER CONTRACT DRAWINGS, VALUES OF H ARE DESIGN HEIGHTS ONLY.
- WALL OFFSET SHALL BE DETERMINED BY THE PROJECT STRUCTURAL ENGINEER IN CONSULTATION WITH THE PROJECT GEOTECHNICAL ENGINEER BASED ON THE CONSTRUCTION METHOD AND SEQUENCING AND IN ACCORDANCE WITH PROJECT DESIGN CRITERIA.
- WHEN A RETAINING WALL IS USED AS A CUT WALL (INCLUDING TRENCH WALLS) ALL JOINTS INCLUDING THE WEAKENED PLANE JOINTS SHALL CONTAIN A WATER STOP.



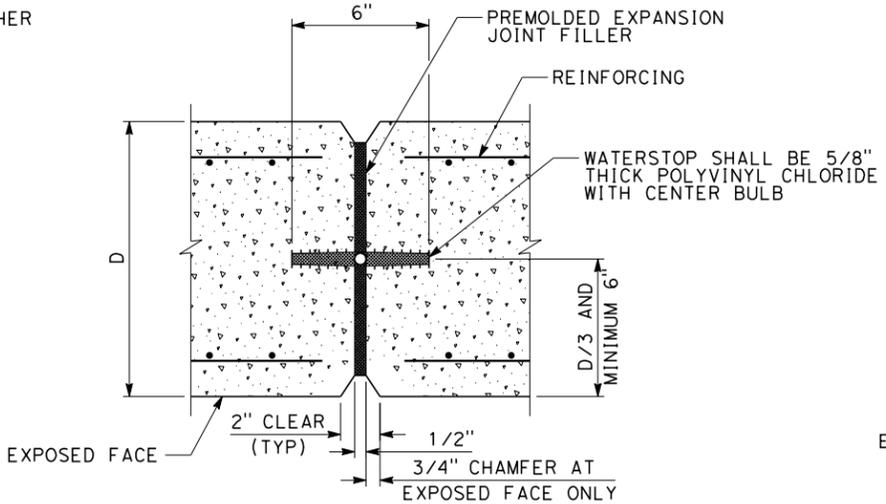
TYPICAL SECTION

PLACE CONCRETE IN TOE AND IN BASE KEY AGAINST UNDISTURBED MATERIAL (NOT REQUIRED WITH PILE FOOTINGS)

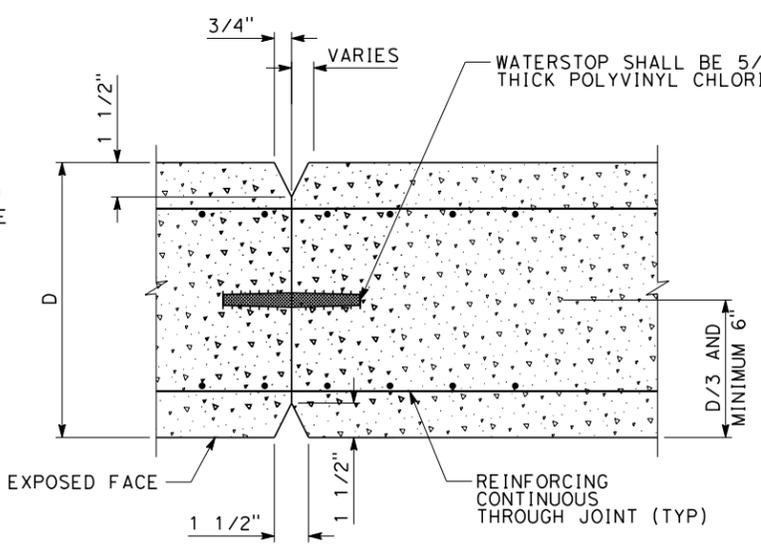


TYPICAL WEAKEND PLANE JOINT

(SEE NOTE 3)

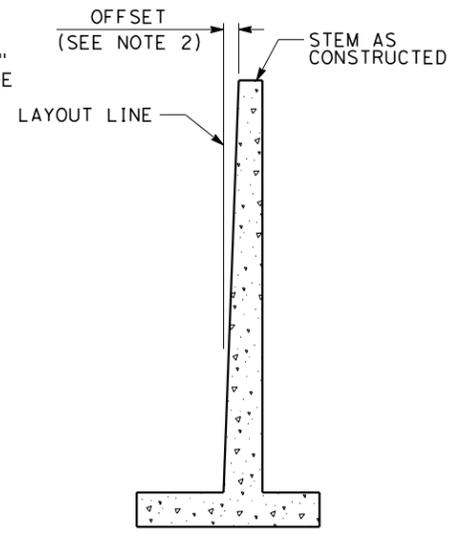


TYPICAL EXPANSION JOINT



TYPICAL CONSTRUCTION JOINT

LOCATE AS REQUIRED TO SUITE CONSTRUCTION SEQUENCE



WALL OFFSET VALUES

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
B. VALENTI
DRAWN BY
V. LAVERDE
CHECKED BY
P. LIN
IN CHARGE
G. LUSHEROVICH
DATE
08/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
STRUCTURAL DIRECTIVE

RETAINING WALL
LAYOUT AND DETAILS

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

RFP No. 13-57 - Addendum No. 5 - 10/09/2014

California High-Speed Rail Authority



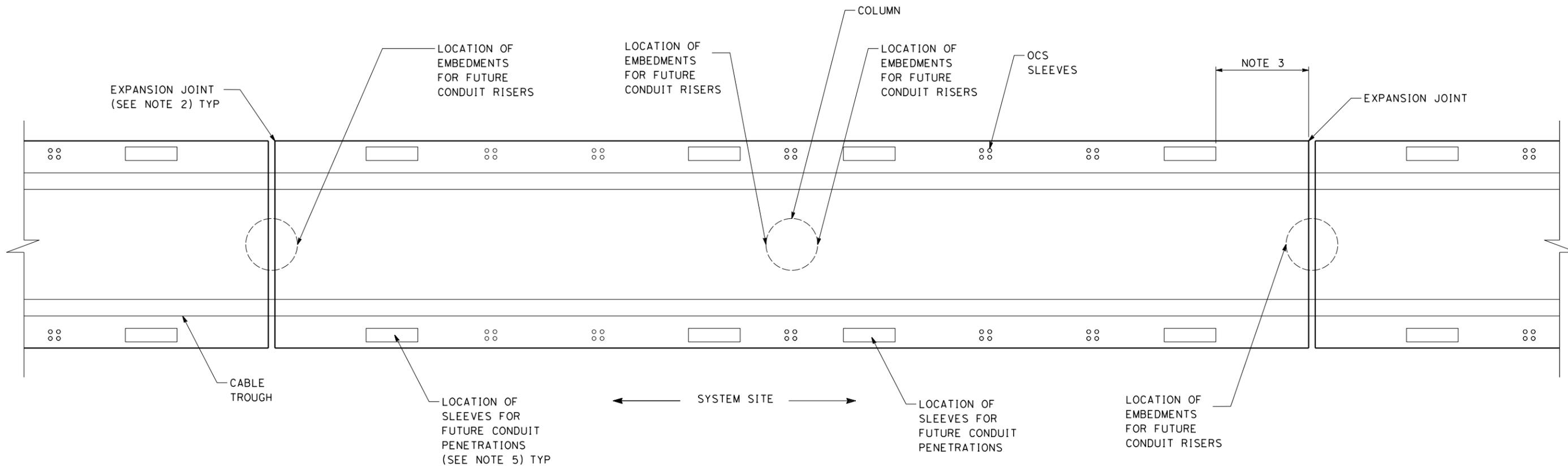
RFP No.: HSR 13-57

**Request for Proposals for Design-Build
Services for Construction Package 2-3**

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

System Overall

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PLAN

NOTES:

1. STRUCTURAL DESIGN DETAILS, CABLE TROUGH AND OCS SLEEVES SHOWN HERE ARE SCHEMATIC ONLY.
2. SLEEVE PENETRATION LOCATIONS SHALL BE LOCATED NOMINALLY 10³/₃₂ FROM THE EXPANSION JOINT.
3. SLEEVE PENETRATION LOCATIONS FOR FUTURE CONDUIT PENETRATIONS SHALL BE PROVIDED IN LINE WITH THE OCS POLE FOUNDATIONS.
4. FOR EACH SLEEVE PENETRATION, AREA SHALL BE SIZED TO HOUSE 10 TRADE SIZE 4 CONDUITS.
5. FOR CONDUIT RISER EMBEDMENTS AND PENETRATIONS ON AERIAL STRUCTURE REQUIREMENTS, REFER TO STRUCTURES CHAPTER OF THE DESIGN CRITERIA. PENETRATIONS SHALL BE PLACED AT THE NEAREST 3 COLUMNS TO THE SYSTEMS SITE OR FACILITY AS SHOWN.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
G. SPADAFORE
DRAWN BY
V. LAVERDE
CHECKED BY
B. MCNALLY
IN CHARGE
B. BANKS
DATE
8/29/2014



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

SYSTEMS SITE LOCATION AT AERIAL STRUCTURE
EMBEDMENTS AND KNOCKOUTS

CONTRACT NO.
DRAWING NO.
DD-SY-030
SCALE
NO SCALE
SHEET NO.

California High-Speed Rail Authority



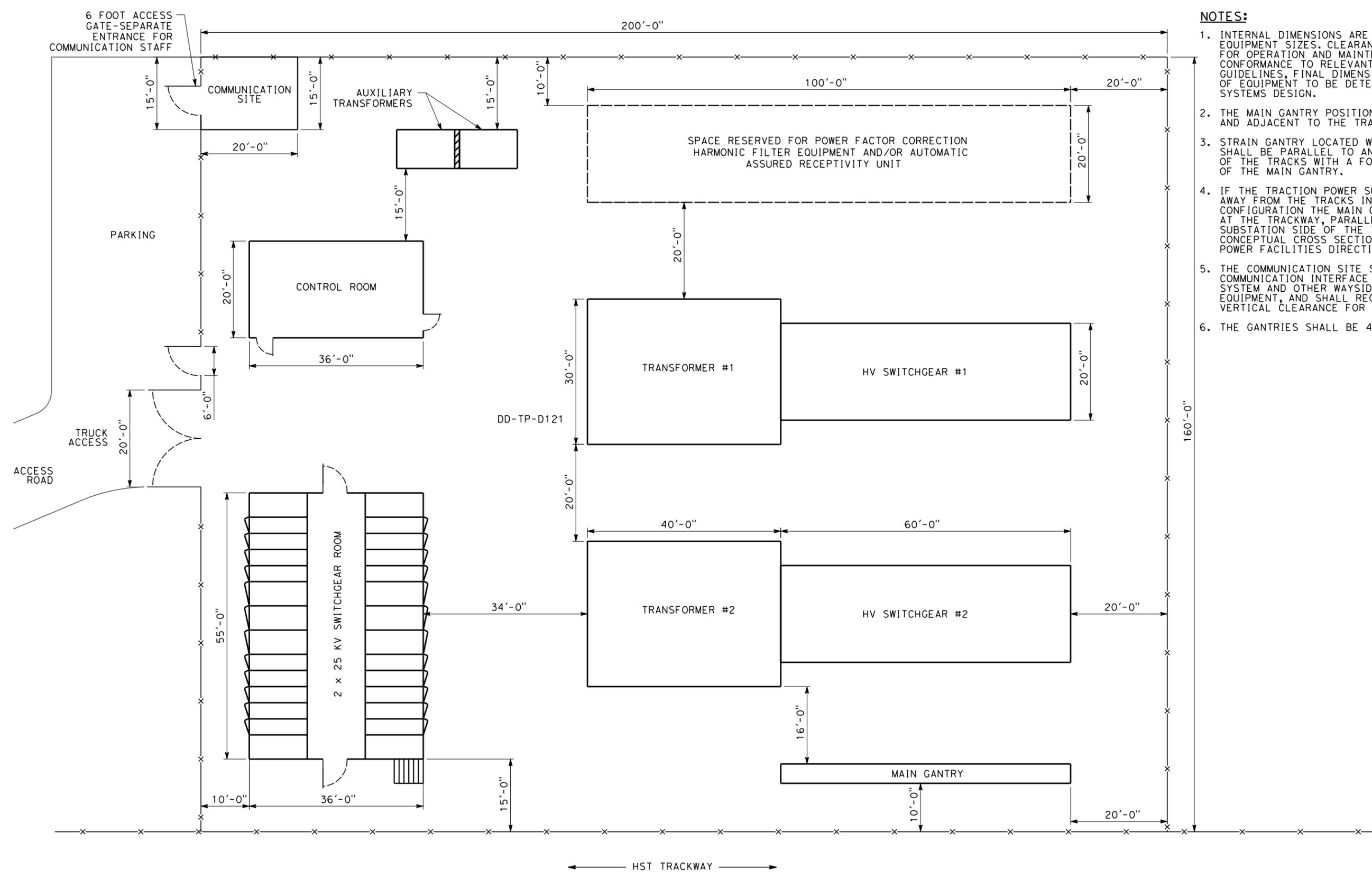
RFP No.: HSR 13-57

**Request for Proposals for Design-Build
Services for Construction Package 2-3**

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

Traction Power

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- NOTES:**
- INTERNAL DIMENSIONS ARE SHOWN FOR TYPICAL EQUIPMENT SIZES. CLEARANCES AND ACCESSIBILITY FOR OPERATION AND MAINTENANCE OF EQUIPMENT AND CONFORMANCE TO RELEVANT CODES, STANDARDS, AND GUIDELINES, FINAL DIMENSIONS AND CONFIGURATION OF EQUIPMENT TO BE DETERMINED DURING FINAL SYSTEMS DESIGN.
 - THE MAIN GANTRY POSITION SHALL BE PARALLEL TO AND ADJACENT TO THE TRACKWAY.
 - STRAIN GANTRY LOCATED WITHIN THE RIGHT-OF-WAY, SHALL BE PARALLEL TO AND ON THE OPPOSITE SIDE OF THE TRACKS WITH A FOOTPRINT EQUAL TO THAT OF THE MAIN GANTRY.
 - IF THE TRACTION POWER SUBSTATION IS LOCATED AWAY FROM THE TRACKS IN AN UNDESIRABLE CONFIGURATION THE MAIN GANTRY SHALL BE LOCATED AT THE TRACKWAY, PARALLEL TO AND TOWARDS SUBSTATION SIDE OF THE TRACKS. REFER TO CONCEPTUAL CROSS SECTIONS OF AWAY TRACTION POWER FACILITIES DIRECTIVE DRAWINGS.
 - THE COMMUNICATION SITE SHALL HOUSE COMMUNICATION INTERFACE EQUIPMENT FOR SCADA SYSTEM AND OTHER WAYSIDE COMMUNICATION EQUIPMENT, AND SHALL REQUIRE MINIMUM 100' VERTICAL CLEARANCE FOR RADIO TOWER.
 - THE GANTRIES SHALL BE 40 FEET HIGH (TYP).

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
M. PAZ
DRAWN BY
V. HUANTE
CHECKED BY
V. SIBAL
IN CHARGE
B. BANKS
DATE
8/29/2014



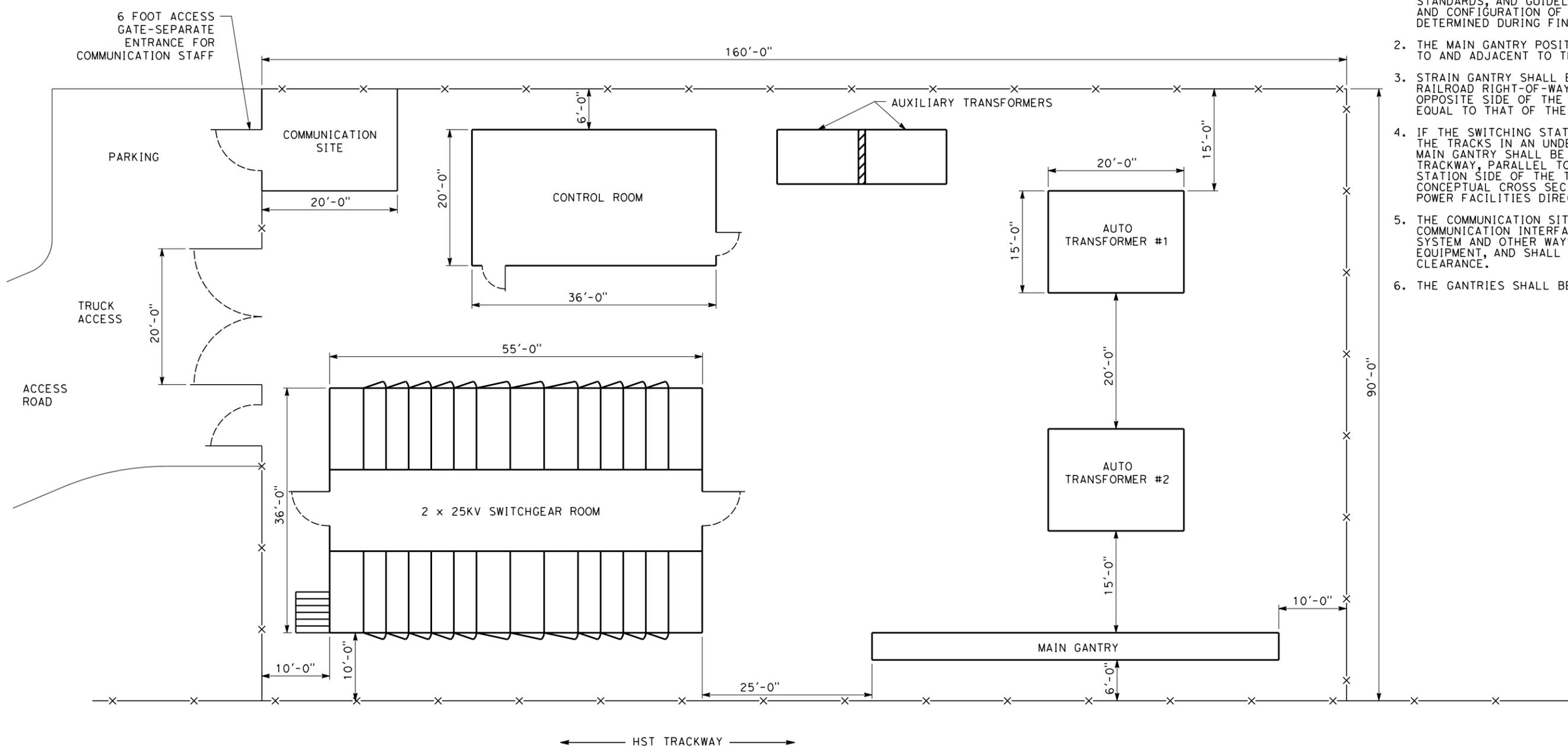
CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE

CONCEPTUAL LAYOUT
TRACTION POWER SUBSTATION
WITH TWO HIGH-VOLTAGE TRANSFORMERS

CONTRACT NO.
DRAWING NO.
DD-TP-D101
SCALE
NO SCALE
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

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- NOTES:**
- INTERNAL DIMENSIONS ARE SHOWN FOR TYPICAL EQUIPMENT SIZES. CLEARANCES AND ACCESSIBILITY FOR OPERATION AND MAINTENANCE OF EQUIPMENT AND CONFORMANCE TO RELEVANT CODES, STANDARDS, AND GUIDELINES, FINAL DIMENSIONS AND CONFIGURATION OF EQUIPMENT TO BE DETERMINED DURING FINAL SYSTEMS DESIGN.
 - THE MAIN GANTRY POSITION SHALL BE PARALLEL TO AND ADJACENT TO THE TRACKS.
 - STRAIN GANTRY SHALL BE LOCATED WITHIN THE RAILROAD RIGHT-OF-WAY, PARALLEL TO AND ON THE OPPOSITE SIDE OF THE TRACKS WITH A FOOTPRINT EQUAL TO THAT OF THE MAIN GANTRY.
 - IF THE SWITCHING STATION IS LOCATED AWAY FROM THE TRACKS IN AN UNDESIRABLE CONFIGURATION, THE MAIN GANTRY SHALL BE LOCATED AT THE TRACKWAY, PARALLEL TO AND TOWARDS SWITCH STATION SIDE OF THE TRACKS. REFER TO CONCEPTUAL CROSS SECTIONS OF AWAY TRACTION POWER FACILITIES DIRECTIVE DRAWINGS.
 - THE COMMUNICATION SITE SHALL HOUSE COMMUNICATION INTERFACE EQUIPMENT FOR SCADA SYSTEM AND OTHER WAYSIDE COMMUNICATION EQUIPMENT, AND SHALL REQUIRE 100' VERTICAL CLEARANCE.
 - THE GANTRIES SHALL BE 40 FEET HIGH (TYP).

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
M. PAZ
DRAWN BY
V. HUANTE
CHECKED BY
V. SIBAL
IN CHARGE
B. BANKS
DATE
8/29/2014

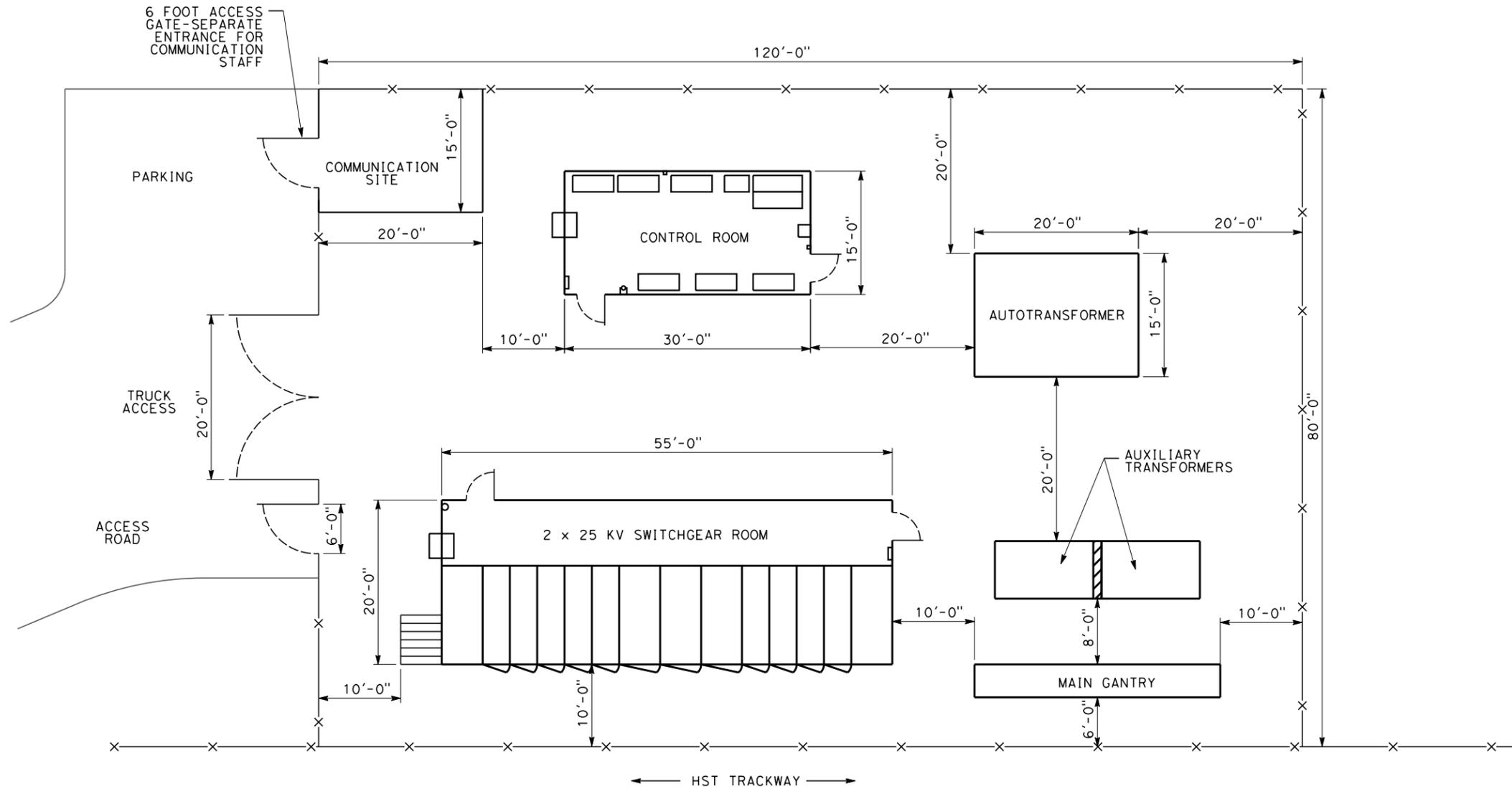


**CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE**

CONCEPTUAL LAYOUT
SWITCHING STATION

CONTRACT NO.
DRAWING NO.
DD-TP-D201
SCALE
NO SCALE
SHEET NO.

9/30/2014 12:15:26 PM CAHSR.tbl CAHSR_PDF_half_black.plt c:\projectwise\pb\projectwise\int\laverdev\dms17831\DD-TP-D301.dgn



- NOTES:**
- INTERNAL DIMENSIONS ARE SHOWN FOR TYPICAL EQUIPMENT SIZES. CLEARANCES AND ACCESSIBILITY FOR OPERATION AND MAINTENANCE OF EQUIPMENT CONFORMANCE TO RELEVANT CODES, STANDARDS, AND GUIDELINES, FINAL DIMENSIONS AND CONFIGURATION OF EQUIPMENT TO BE DETERMINED DURING FINAL SYSTEMS DESIGN.
 - THE MAIN GANTRY POSITION SHALL BE PARALLEL TO AND ADJACENT TO THE TRACKS.
 - STRAIN GANTRY SHALL BE LOCATED WITHIN THE RAILROAD RIGHT-OF-WAY, PARALLEL TO AND ON THE OPPOSITE SIDE OF THE TRACKS WITH FOOTPRINT EQUAL TO THAT OF THE MAIN GANTRY.
 - IF THE PARALLELING STATION (PS) IS LOCATED AWAY FROM THE TRACKS IN AN UNDESIRE CONFIGURATION, THE MAIN GANTRY SHALL BE LOCATED AT THE TRACKWAY, PARALLEL TO AND TOWARDS PS SIDE OF THE TRACKS. REFER TO CONCEPTUAL CROSS SECTIONS OF AWAY TRACTION POWER FACILITIES.
 - THE COMMUNICATION SITE SHALL HOUSE COMMUNICATION INTERFACE EQUIPMENT FOR SCADA SYSTEM AND OTHER WAYSIDE COMMUNICATION EQUIPMENT, AND SHALL REQUIRE 100' VERTICAL CLEARANCE.
 - THE GANTRIES SHALL BE 40 FEET HIGH (TYP).

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
M. PAZ
DRAWN BY
V. LAVERDE
CHECKED BY
V. SIBAL
IN CHARGE
B. BANKS
DATE
8/29/2014



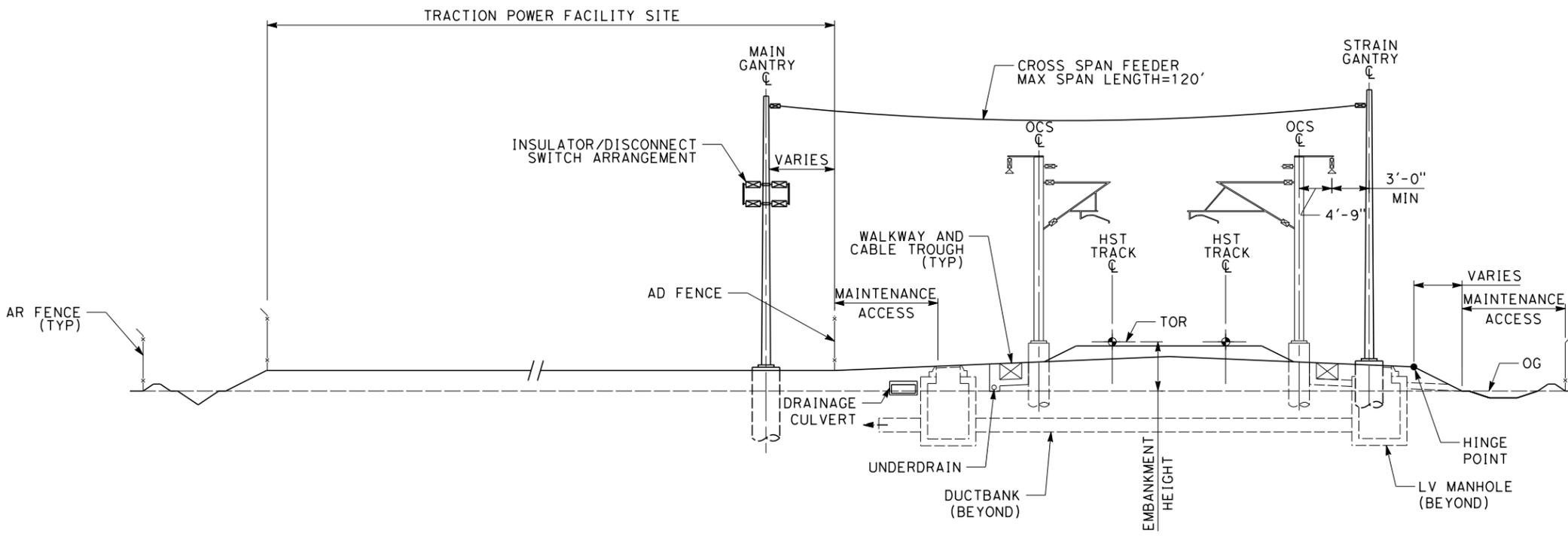
**CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE**

CONCEPTUAL LAYOUT
PARALLELING STATION

CONTRACT NO.
DRAWING NO.
DD-TP-D301
SCALE
NO SCALE
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

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TYPICAL SECTION
 TRACTION POWER FACILITY SITE ADJACENT TO AT-GRADE HST TRACKWAY
 WITH EMBANKMENT HEIGHT (TOR-OG) ≤ 10 FEET

- NOTES:**
1. TRACK AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN.
 2. TYPICAL CROSS SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR MINIMUM LENGTH EQUAL TO THE LONGITUDINAL WIDTH OF THE SYSTEMS SITE.
 3. DRAWING SHOWS CROSS SECTION OF TYPICAL CATENARY FEEDING ARRANGEMENT WITH TRACTION POWER FACILITY AND TRACKWAY.
 4. FOR TRACTION POWER SITE REQUIREMENTS SEE TRACTION POWER CONCEPTUAL SITE LAYOUT DIRECTIVE DRAWINGS.
 5. A LOW VOLTAGE UNDERTRACK DUCTBANK TERMINATING AT LOW VOLTAGE MANHOLES SHALL BE PROVIDED AT EACH SYSTEMS SITE. SEE COMMUNICATIONS DESIGN CRITERIA MANUAL AND DIRECTIVE DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE REQUIREMENTS.
 6. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, SEE CIVIL DIRECTIVE DRAWINGS.
 7. FOR SITE DRAINAGE REQUIREMENTS, SEE DRAINAGE DIRECTIVE DRAWINGS.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
M. PAZ
 DRAWN BY
V. LAVERDE
 CHECKED BY
V. SIBAL
 IN CHARGE
B. BANKS
 DATE
8/29/2014



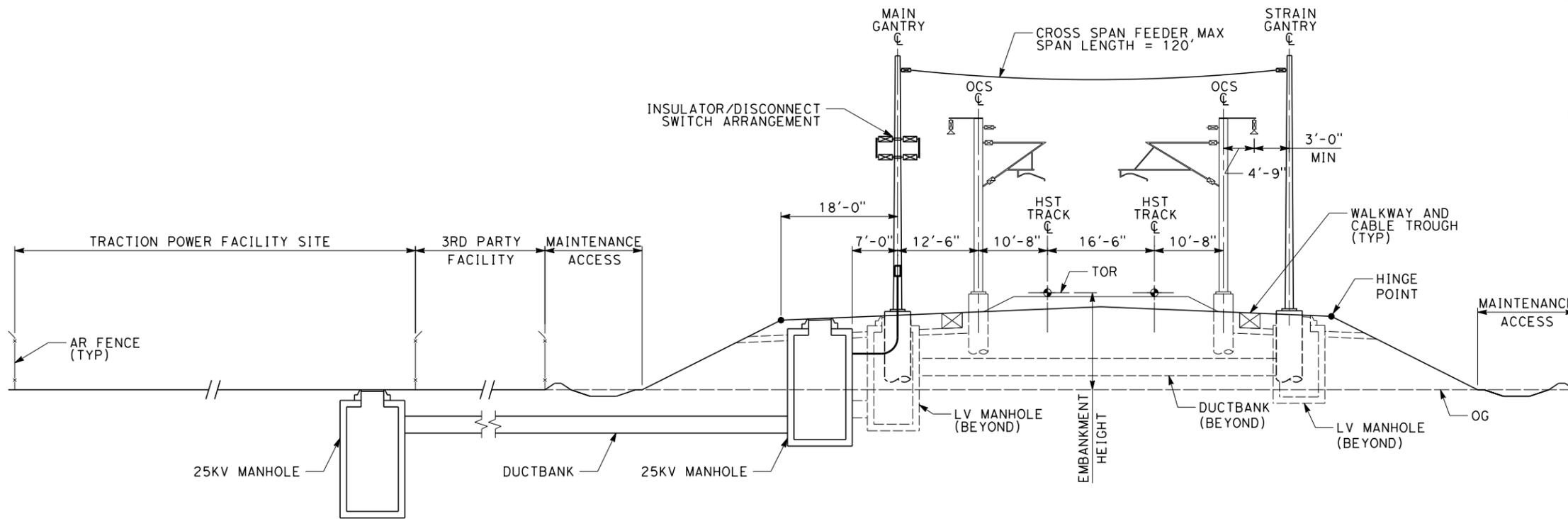
CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE

TYPICAL CATENARY FEEDING GANTRY ARRANGEMENT
 TRACTION POWER FACILITY SITE
 ADJACENT TO TRACKWAY

CONTRACT NO.
DRAWING NO. DD-TP-F101
SCALE NO SCALE
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

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TYPICAL SECTION
 TRACTION POWER FACILITY SITE AWAY FROM AT-GRADE HST TRACKWAY OR
 EMBANKMENT HEIGHT (TOR-OG) >10 FEET

NOTES:

1. TYPICAL CROSS SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR MINIMUM LENGTH EQUAL TO THE LONGITUDINAL WIDTH OF THE SYSTEMS SITE.
2. SYSTEM SITES AWAY FROM TRACKWAY, SEPARATED BY A THIRD-PARTY RIGHT-OF-WAY ARE UNDESIRE. AWAY CROSS-SECTION IS ONLY APPLICABLE IF ADJACENT SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA. FOR SITE REQUIREMENTS REFER TO TRACTION POWER SITE REQUIREMENTS.
3. A LOW VOLTAGE UNDERTRACK DUCTBANK WITH 2 LOW VOLTAGE MANHOLES PROVIDED AT SYSTEMS SITE. REFER TO COMMUNICATIONS DESIGN CRITERIA MANUAL AND DIRECTIVE DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE REQUIREMENTS.
4. LOW VOLTAGE UNDERGROUND DUCTBANK AND MANHOLE PROVIDED UNDERNEATH 3RD PARTY RIGHT-OF-WAY TO CONNECT TO LOW VOLTAGE UNDERTRACK MANHOLES AND DUCTBANK.
5. FOUR ASSEMBLIES, EACH CONSISTING OF A 25KV UNDERGROUND DUCTBANK WITH 2 25KV MANHOLES, PROVIDED AT EACH TRACTION POWER FACILITY SEPARATED FROM THE TRACKWAY BY THIRD PARTY RIGHT-OF-WAY.
6. FOR TRACTION POWER DUCT BANKS AND MANHOLE DETAILS, REFER TO "TYPICAL 25KV DUCT BANK DETAIL" AND "TYPICAL 25KV MANHOLE DETAIL" DIRECTIVE DRAWINGS.
7. FOR TRACTION POWER SITE REQUIREMENTS, REFER TO TRACTION POWER CONCEPTUAL SITE LAYOUT DIRECTIVE DRAWINGS.
8. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
9. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
10. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
M. PAZ
 DRAWN BY
V. HUANTE
 CHECKED BY
V. SIBAL
 IN CHARGE
B. BANKS
 DATE
8/29/2014

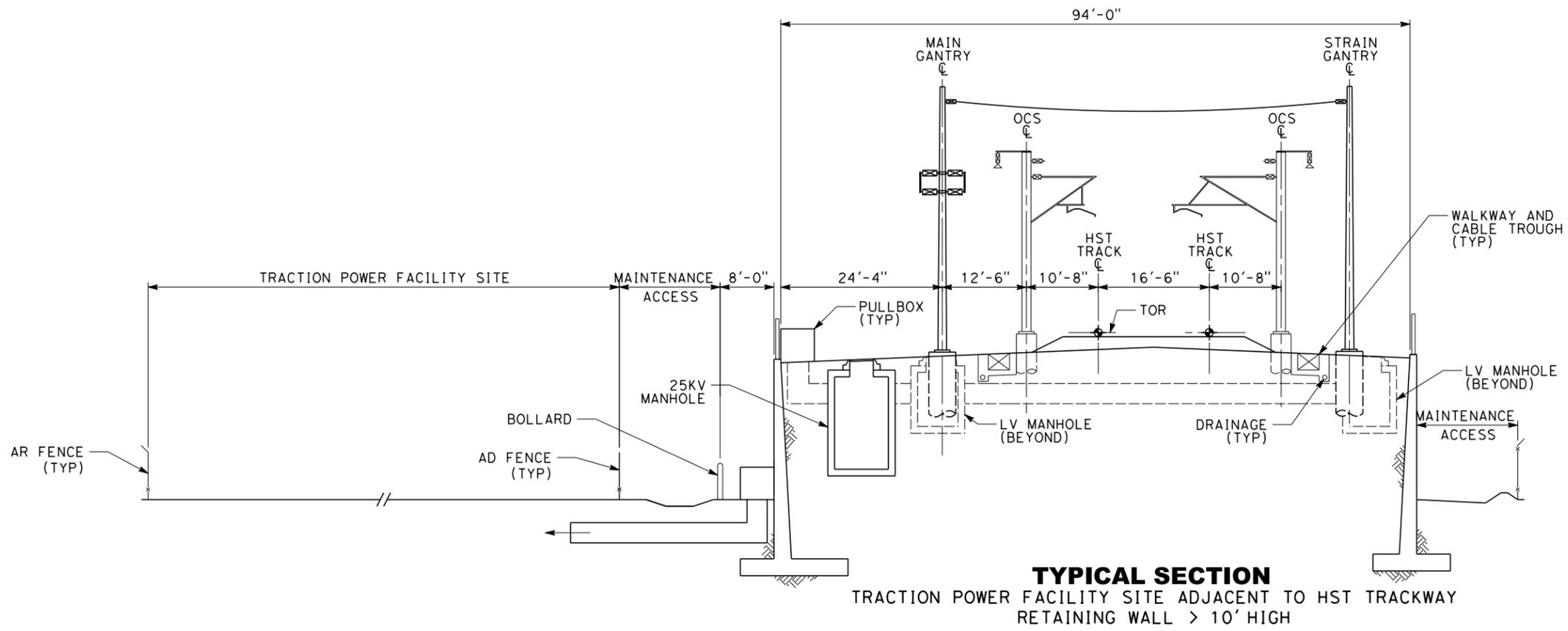


CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE

TYPICAL CATENARY FEEDING GANTRY ARRANGEMENT
 TRACTION POWER FACILITY SITE
 AWAY FROM TRACKWAY

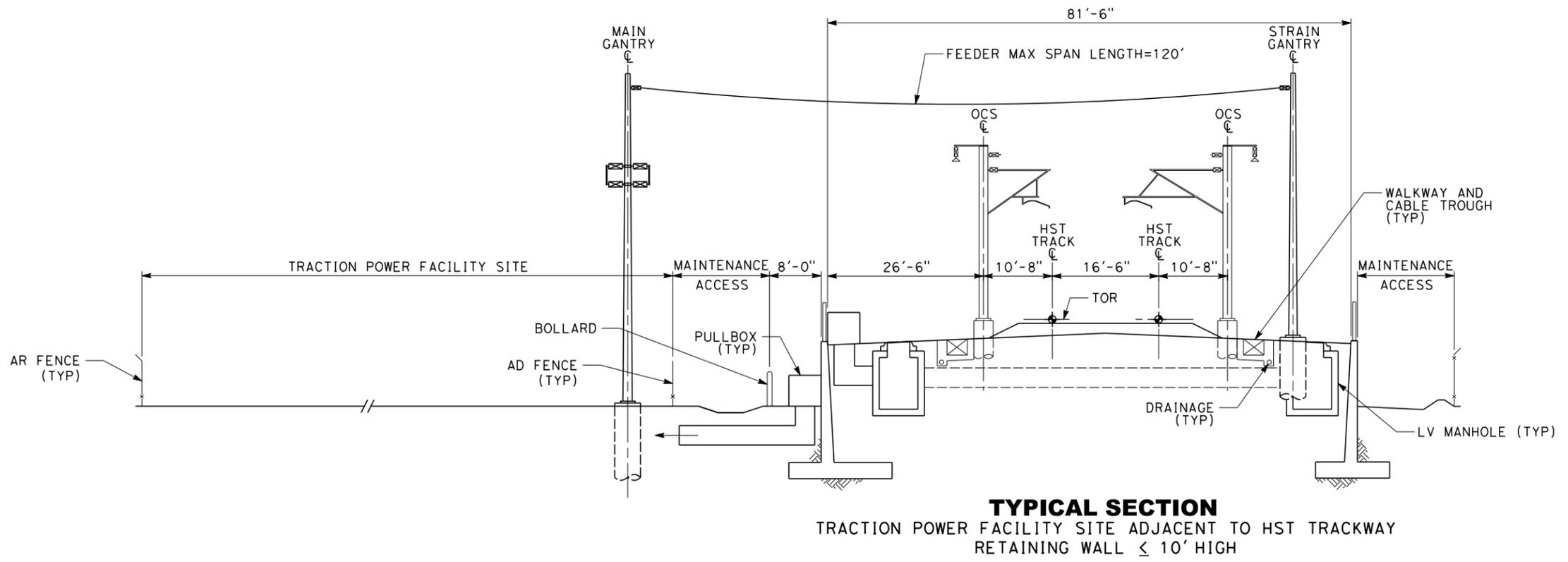
CONTRACT NO.
DRAWING NO. DD-TP-F102
SCALE NO SCALE
SHEET NO.

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TYPICAL SECTION
TRACTION POWER FACILITY SITE ADJACENT TO HST TRACKWAY
RETAINING WALL > 10' HIGH

- NOTES:**
1. SYSTEM SITES AT RETAINED FILL TRACKWAY ARE UNDESIRABLE. THESE CROSS-SECTIONS ARE ONLY APPLICABLE IF AT-GRADE SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
 2. FOR RETAINED-FILLED TRACKWAYS, REINFORCED CONCRETE RETAINING WALLS SHALL BE USED AT SYSTEMS FACILITY SITES.
 3. TYPICAL CROSS SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR MINIMUM LENGTH EQUAL TO THE LONGITUDINAL WIDTH OF THE SYSTEMS SITE.
 4. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
 5. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
 6. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.
 7. A LOW VOLTAGE UNDERTRACK DUCTBANK WITH 2 LOW VOLTAGE MANHOLES SHALL BE PROVIDED AT SYSTEMS SITE. REFER TO COMMUNICATIONS DESIGN CRITERIA MANUAL AND DIRECTIVE DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE REQUIREMENTS.
 8. FOR TRACTION POWER SITE REQUIREMENTS, REFER TO TRACTION POWER CONCEPTUAL SITE LAYOUT DIRECTIVE DRAWINGS.



TYPICAL SECTION
TRACTION POWER FACILITY SITE ADJACENT TO HST TRACKWAY
RETAINING WALL ≤ 10' HIGH

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
M. PAZ
DRAWN BY
V. HUANTE
CHECKED BY
V. SIBAL
IN CHARGE
B. BANKS
DATE
8/29/2014



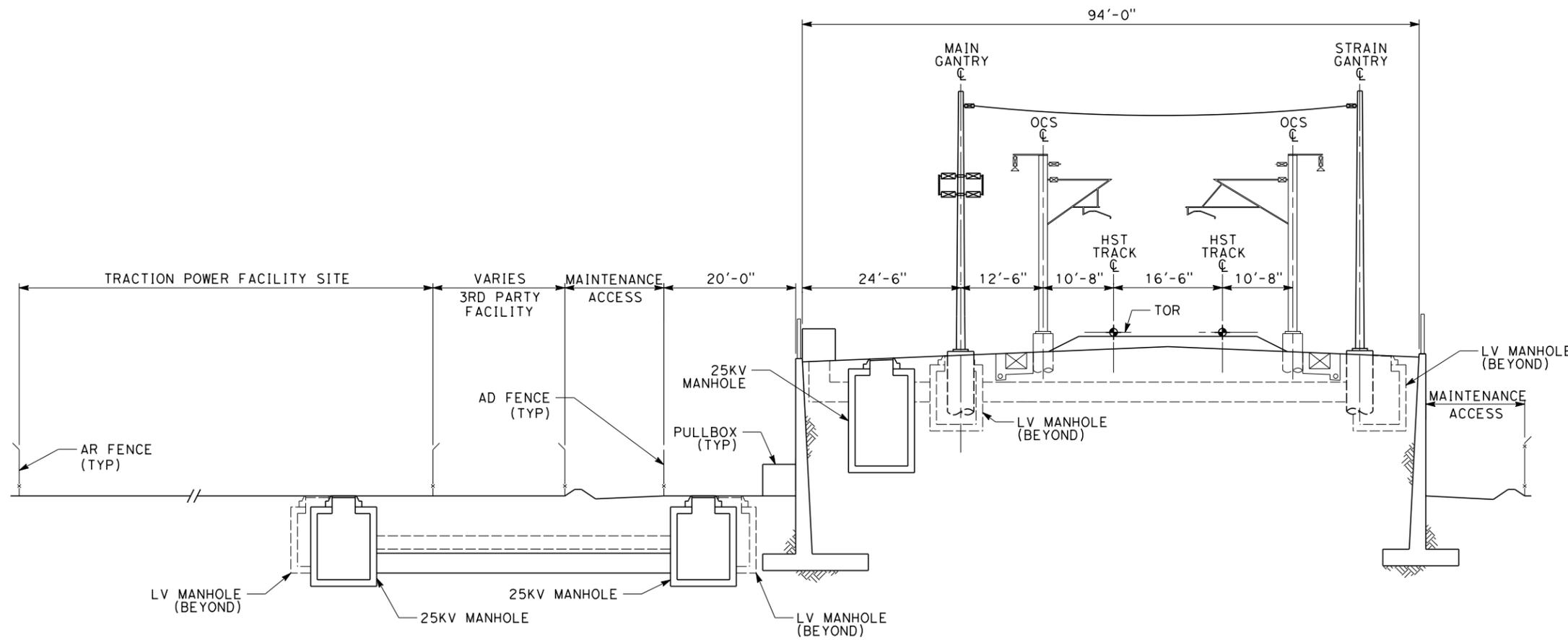
CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE

TYPICAL CATENARY FEEDING ARRANGEMENT
IN RETAINED-FILL FOR TRACTION POWER FACILITIES
ADJACENT TO TRACKWAY

CONTRACT NO.
DRAWING NO.
DD-TP-F103
SCALE
NO SCALE
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

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TYPICAL SECTION
TRACTION POWER FACILITY SITE AWAY FROM RETAINED-FILL HST TRACKWAY

- NOTES:**
1. SYSTEM SITES AT RETAINED FILL TRACKWAY ARE UNDESIRABLE. THESE CROSS-SECTIONS ARE ONLY APPLICABLE IF AT-GRADE SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
 2. FOR RETAINED-FILLED TRACKWAYS, REINFORCED CONCRETE RETAINING WALLS SHALL BE USED AT SYSTEMS FACILITY SITES.
 3. SYSTEM SITES AWAY FROM TRACKWAY SEPARATED BY A THIRD-PARTY RIGHT-OF-WAY ARE UNDESIRABLE. AWAY CROSS-SECTION IS ONLY APPLICABLE IF ADJACENT SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
 4. TYPICAL CROSS SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR MINIMUM LENGTH EQUAL TO THE LONGITUDINAL WIDTH OF THE SYSTEMS SITE.
 5. FOR TRACTION POWER DUCT BANKS AND MANHOLE DETAILS, REFER TO "TYPICAL 25KV DUCT BANK DETAIL AND TYPICAL 25KV MANHOLE DETAIL" DIRECTIVE DRAWINGS.
 6. A LOW VOLTAGE UNDERTRACK DUCTBANK WITH 2 LOW VOLTAGE MANHOLES SHALL BE PROVIDED AT SYSTEMS SITE. REFER TO COMMUNICATIONS DESIGN CRITERIA MANUAL AND DIRECTIVE DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE REQUIREMENTS.
 7. LOW VOLTAGE UNDERGROUND DUCTBANK AND MANHOLE TO BE PROVIDED UNDERNEATH 3RD PARTY RIGHT-OF-WAY.
 8. FOUR ASSEMBLIES, EACH CONSISTING OF A 25KV UNDERGROUND DUCTBANKS WITH 2 25KV MANHOLES, PROVIDED AT EACH TRACTION POWER FACILITY SEPARATED FROM THE TRACKWAY BY THIRD PARTY RIGHT-OF-WAY.
 9. FOR TRACTION POWER SITE REQUIREMENTS, REFER TO TRACTION POWER CONCEPTUAL SITE LAYOUT DIRECTIVE DRAWINGS.
 10. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
 11. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
 12. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

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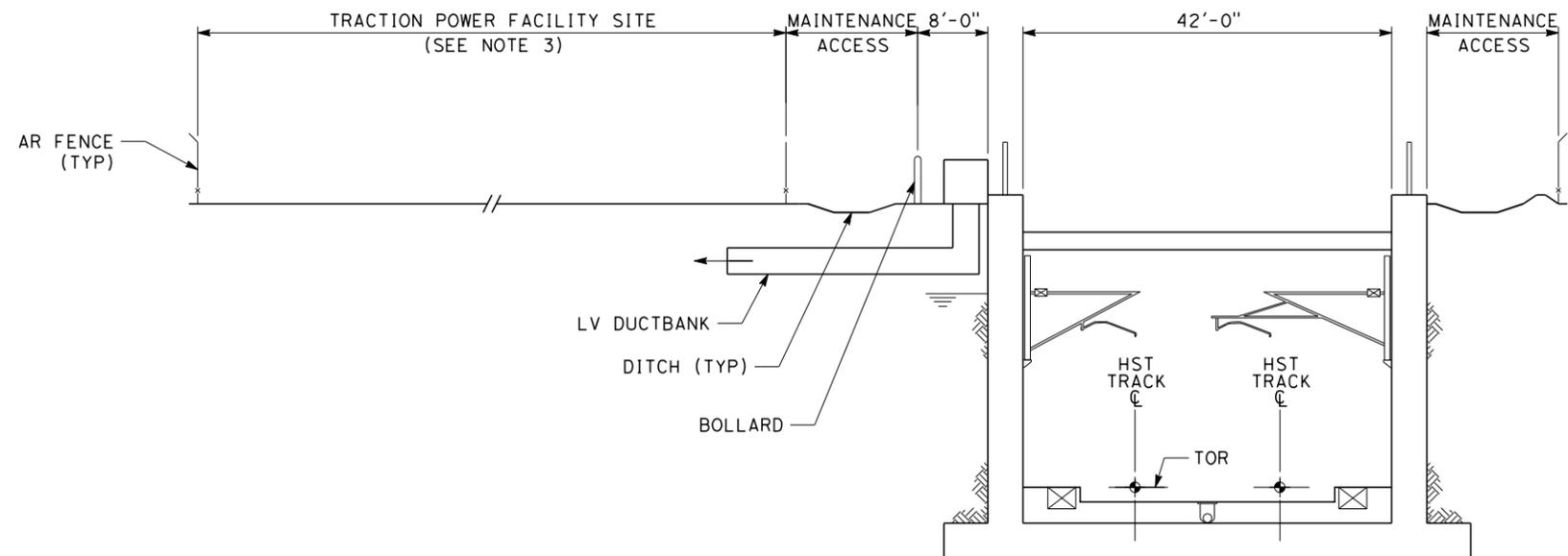
DESIGNED BY
M. PAZ
 DRAWN BY
V. HUANTE
 CHECKED BY
V. SIBAL
 IN CHARGE
B. BANKS
 DATE
8/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE
 TYPICAL CATENARY FEEDING ARRANGEMENT
 FOR TRACTION POWER FACILITIES
 IN RETAINED-FILL AWAY FROM TRACKWAY

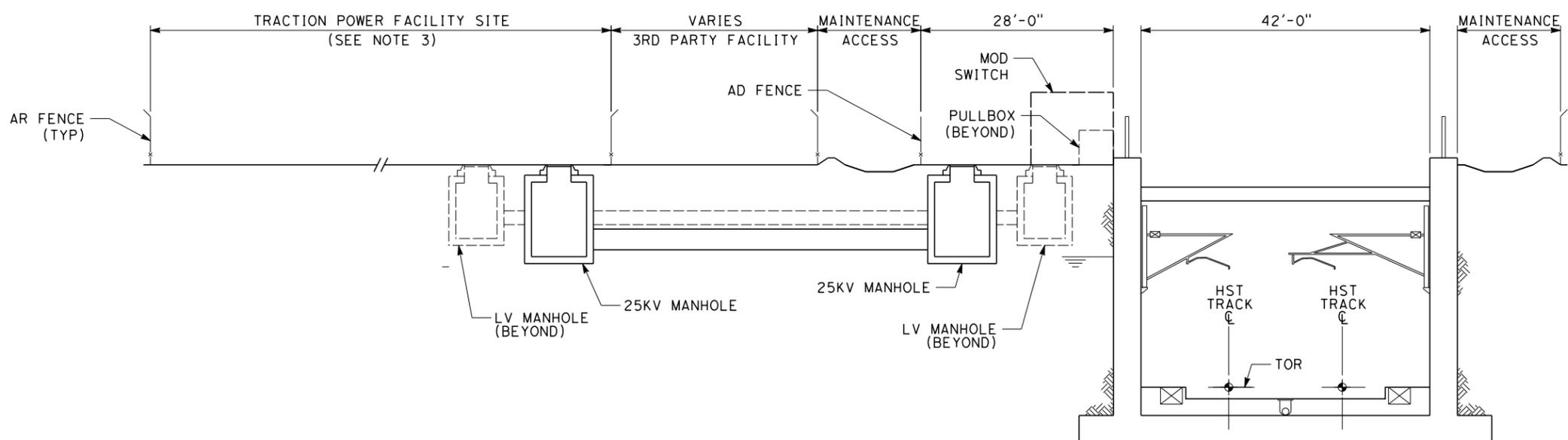
CONTRACT NO.
DRAWING NO. DD-TP-F104
SCALE NO SCALE
SHEET NO.

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TYPICAL SECTION

TRACTION POWER FACILITY SITE ADJACENT TO TRENCH HST TRACKWAY



TYPICAL SECTION

TRACTION POWER FACILITY SITE AWAY FROM TRENCH HST TRACKWAY

NOTES:

1. SYSTEM SITES AT TRENCH TRACKWAY ARE UNDESIRABLE. THESE CROSS-SECTIONS ARE ONLY APPLICABLE IF AT-GRADE SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
2. FOR RETAINED-FILLED TRACKWAYS, REINFORCED CONCRETE RETAINING WALLS SHALL BE USED AT SYSTEMS FACILITY SITES.
3. SYSTEM SITES AWAY FROM TRACKWAY SEPARATED BY A THIRD PARTY RIGHT-OF-WAY ARE UNDESIRABLE. AWAY CROSS-SECTION IS ONLY APPLICABLE IF ADJACENT SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
4. TYPICAL CROSS-SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR MINIMUM LENGTH EQUAL TO THE LONGITUDINAL WIDTH OF THE SYSTEMS SITE.
5. FOR TRACTION POWER DUCT BANKS AND MANHOLE DETAILS, REFER TO "TYPICAL 25KV DUCT BANK DETAIL" AND "TYPICAL 25KV MANHOLE DETAIL" DIRECTIVE DRAWINGS.
6. LOW VOLTAGE UNDERGROUND DUCTBANK AND MANHOLE SHALL BE PROVIDED UNDERNEATH THIRD PARTY RIGHT-OF-WAY TO CONNECT TO LOW VOLTAGE UNDERTRACK MANHOLES AND DUCTBANK. REFER TO COMMUNICATIONS DESIGN CRITERIA MANUAL AND DIRECTIVE DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE REQUIREMENTS.
7. FOUR ASSEMBLIES EACH CONSISTING OF 25KV UNDERGROUND DUCTBANKS WITH 2 25KV MANHOLES PROVIDED AT EACH TRACTION POWER FACILITY SEPARATED FROM THE TRACKWAY BY THIRD PARTY RIGHT-OF-WAY.
8. FOR TRACTION POWER SITE REQUIREMENTS, REFER TO TRACTION POWER CONCEPTUAL SITE LAYOUT DIRECTIVE DRAWINGS.
9. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
10. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
11. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
M. PAZ
DRAWN BY
V. HUANTE
CHECKED BY
V. SIBAL
IN CHARGE
B. BANKS
DATE
8/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE

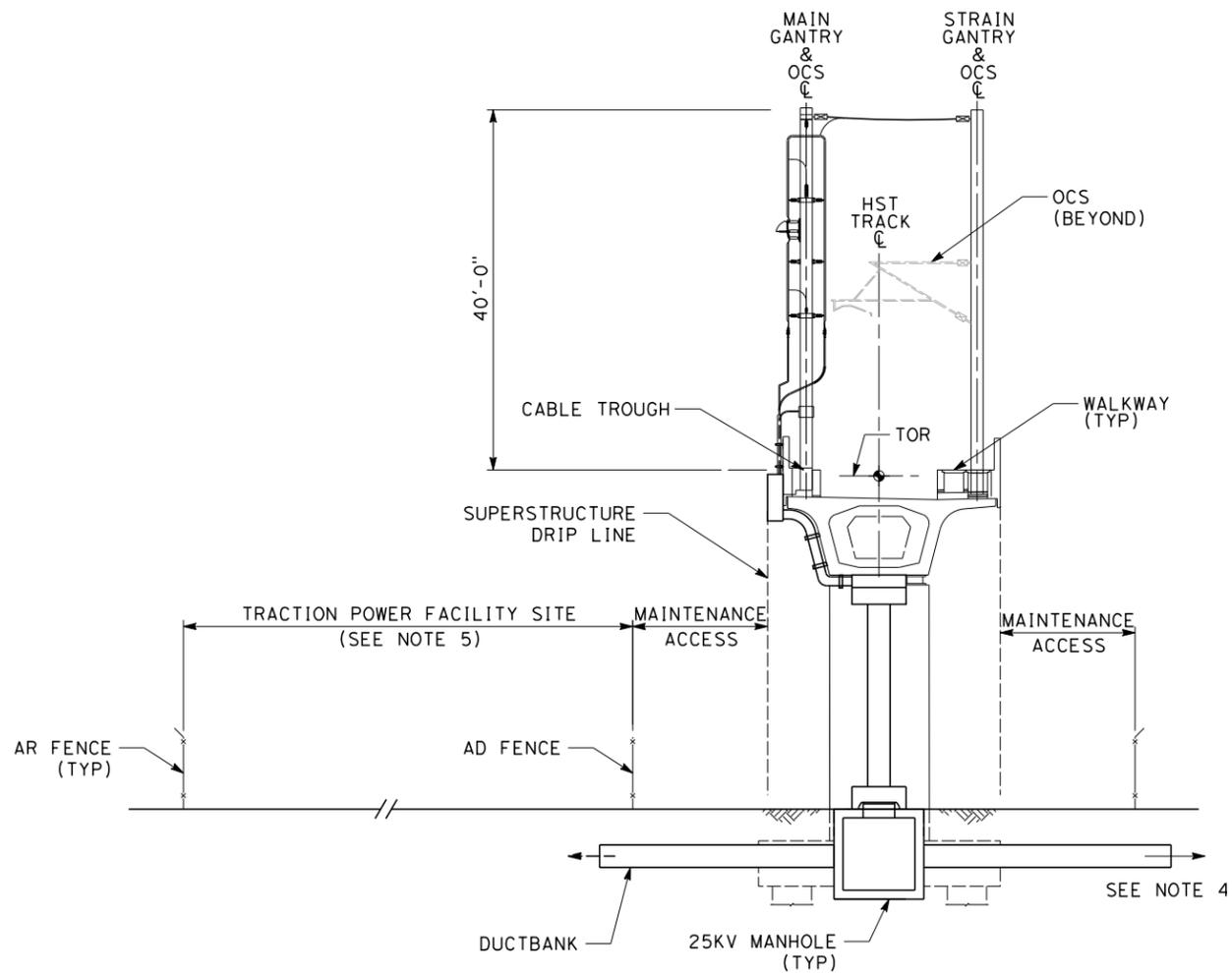
SYSTEMS SITE
TRACTION POWER FACILITY
TRENCH

CONTRACT NO.
DRAWING NO.
DD-TP-F105
SCALE
NO SCALE
SHEET NO.

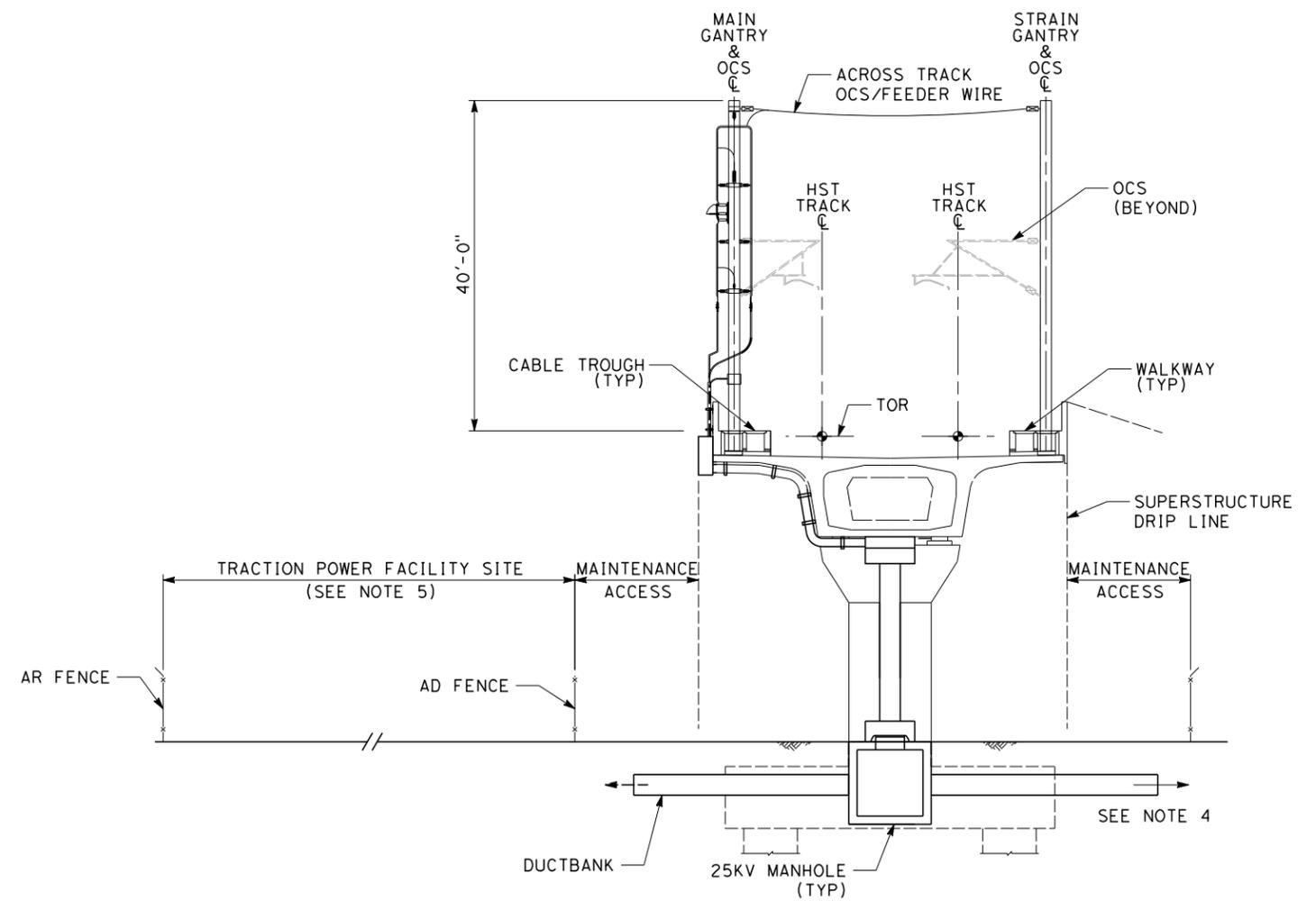
RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

NOTES:

1. TRACTION POWER FACILITY SITES ALONG 2 TRACK OR SINGLE TRACK AERIAL TRACKWAY ARE UNDESIRABLE. THESE CROSS-SECTIONS ARE ONLY APPLICABLE IF AT-GRADE SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA. ADDITIONAL DUCTBANKS AND MANHOLES REQUIRED BETWEEN SINGLE TRACK AERIAL STRUCTURES AND BETWEEN TRACTION POWER FACILITY SITE AND AERIAL TRACKWAY(S).
2. DRAWING SHOWS CROSS SECTION OF TYPICAL CATENARY FEEDING ARRANGEMENT AT TRACTION POWER FACILITY AND TRACKWAY TYPICAL GANTRY FEEDING ARRANGEMENT ON AERIAL STRUCTURES AT TRACTION POWER FACILITY LOCATIONS SHOWN. HIGH VOLTAGE CABLING ROUTED OUTSIDE OF STRUCTURE.
3. THE GANTRIES WILL BE LOCATED ON THE AERIAL STRUCTURES ALONG THE ALIGNMENT AND BETWEEN ADJACENT OCS POLES.
4. TRACTION POWER FACILITY SITES AWAY FROM TRACKWAY SEPARATED BY A THIRD PARTY RIGHT-OF-WAY ARE NOT DESIRABLE. SUCH A CROSS-SECTION IS ONLY APPLICABLE IF ADJACENT SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
5. FOR TRACTION POWER DUCT BANKS AND MANHOLE DETAILS, REFER TO "TYPICAL 25KV DUCT BANK DETAIL" AND "TYPICAL 25KV MANHOLE DETAIL" DIRECTIVE DRAWINGS.
6. LOW VOLTAGE UNDERGROUND DUCTBANK AND MANHOLE SHALL BE PROVIDED UNDERNEATH THIRD PARTY RIGHT-OF-WAY.
7. FOUR ASSEMBLIES, EACH CONSISTING OF A 25KV UNDERGROUND DUCTBANKS WITH 2 25KV MANHOLES, SHALL BE PROVIDED AT EACH TRACTION POWER FACILITY SEPARATED FROM THE TRACKWAY BY THIRD PARTY RIGHT-OF-WAY.
8. FOR TRACTION POWER SITE REQUIREMENTS, REFER TO TRACTION POWER CONCEPTUAL SITE LAYOUT DIRECTIVE DRAWINGS.
9. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
10. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
11. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.



TYPICAL SECTION
TRACTION POWER FACILITY SITE AT SINGLE-TRACK AERIAL TRACKWAY



TYPICAL SECTION
TRACTION POWER FACILITY SITE AT TWO-TRACK AERIAL TRACKWAY

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REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY M. PAZ
DRAWN BY V. HUANTE
CHECKED BY V. SIBAL
IN CHARGE B. BANKS
DATE 8/29/2014

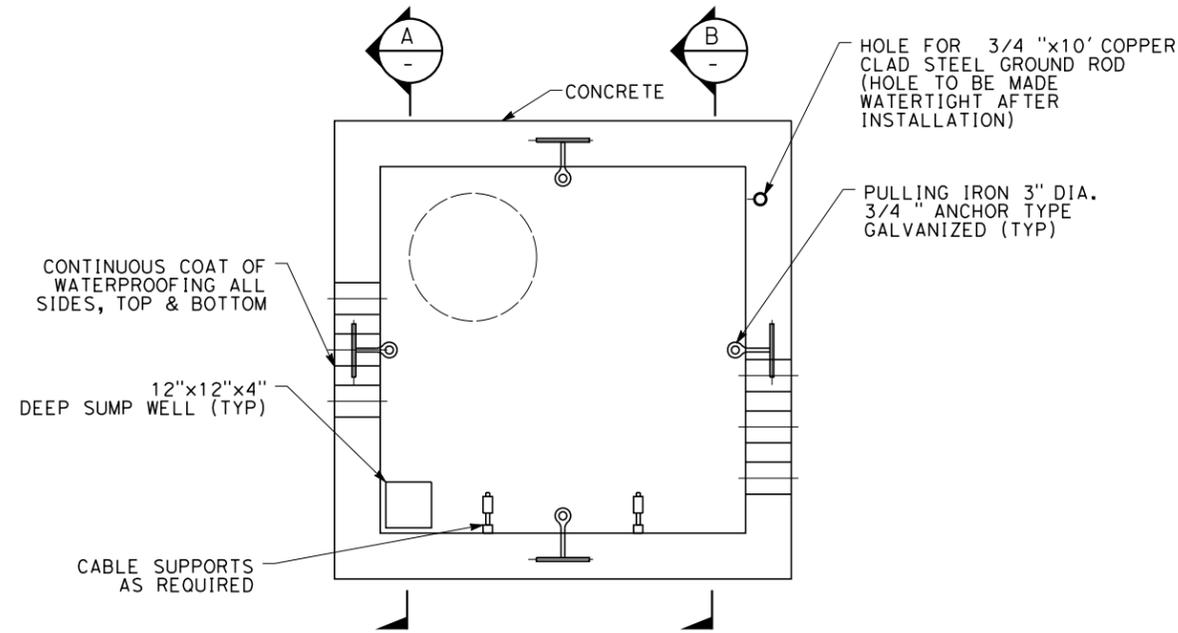


CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE

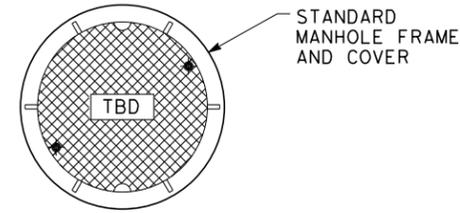
TYPICAL CATENARY FEEDING GANTRY ARRANGEMENT ON AERIAL STRUCTURE

CONTRACT NO.
DRAWING NO. DD-TP-F201
SCALE NO SCALE
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014



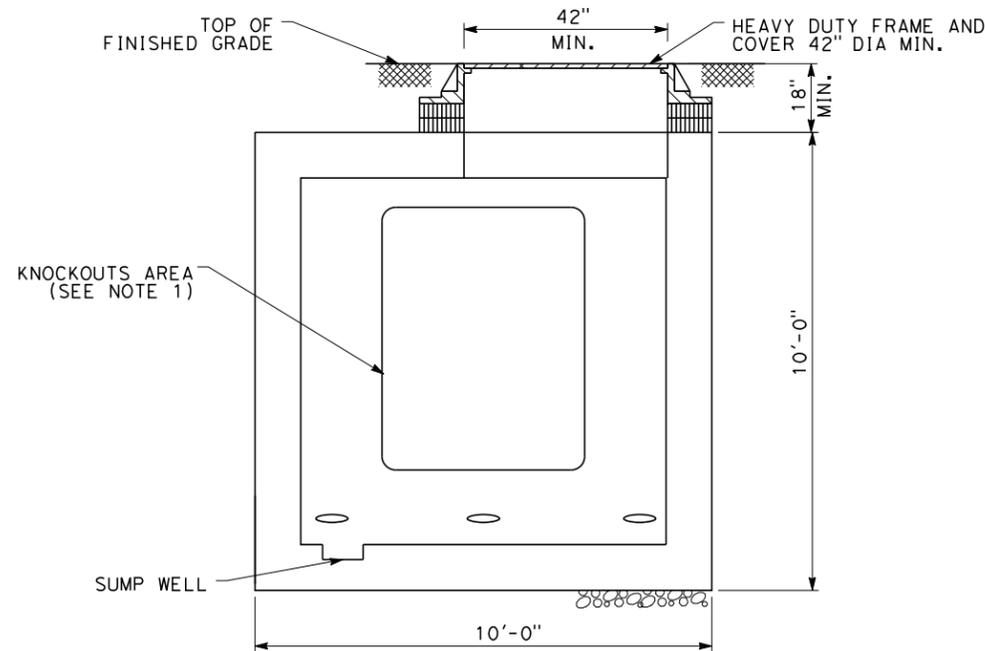
PLAN
TYPICAL PRECAST ELECTRIC MANHOLE



PLAN
ELECTRIC MANHOLE FRAME AND COVER DETAIL

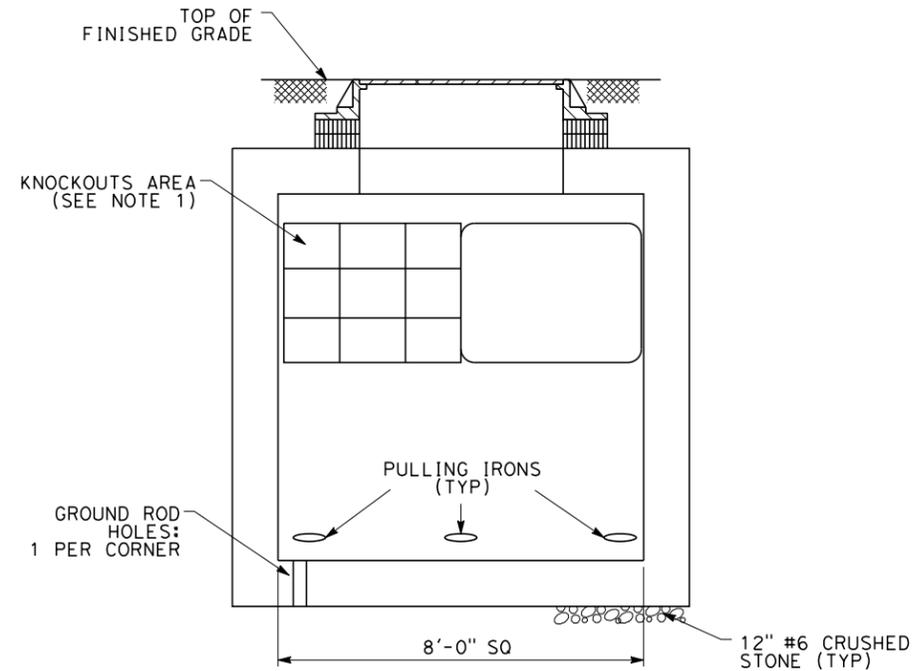
NOTES:

1. THIS DRAWING SHOWS TYPICAL DUCT BANK KNOCKOUTS IN A PRECAST MANHOLE. EXACT DETAILS TO BE WORKED OUT AT DETAILED DESIGN LEVEL.
2. ALL TRACTION POWER MANHOLES SHALL BE TYPICALLY 10'-0" L X 10'-0" W X 10'-0" DEEP AND BE WATERTIGHT WITH SILICON SEALING COMPOUND, OR APPROVED EQUAL.
3. THE MANHOLE FRAME SHALL BE GROUTED TO THE ROOF SLAB.
4. THICKNESS OF MANHOLE WALL SHALL BE 8" MINIMUM.
5. APPROVED CABLE RACK ARMS TO BE INSTALLED TO ACCOMMODATE CABLE, MINIMUM 2 RACKS PER WALL (TYP).
6. PULLING HOOKS SHALL BE GALVANIZED STEEL, SUPPLIED AND CAST INTO WALLS BY PRECASTER, AND ANCHORED BEHIND REINFORCEMENT. QUANTITY AND LOCATION TO SUIT.
7. CONNECT ALL METALLIC PARTS, FRAME, PULLING HOOKS, ETC., TO THE TRACTION POWER FACILITY GROUND GRID OR GROUND ROD.
8. PROVIDE FOR CONNECTION TO A PORTABLE PUMP TO REMOVE ACCUMULATED WATER FROM THE MANHOLE OR OTHER SITE SPECIFIC DRAINAGE SYSTEM.
9. 25KV CATENARY FEEDER, 25KV NEGATIVE FEEDER, TRACTION RETURN CABLING, HV/MV CABLES FOR FACILITY/AUXILIARY POWER SUPPLY, AND LOW VOLTAGE CABLES (AUXILIARY POWER SUPPLY, COMMUNICATIONS, SIGNALING AND TRAIN CONTROL) SHALL BE ROUTED IN SEPARATE MANHOLES.



TYPICAL PRECAST ELECTRIC MANHOLE

SECTION A
NO SCALE



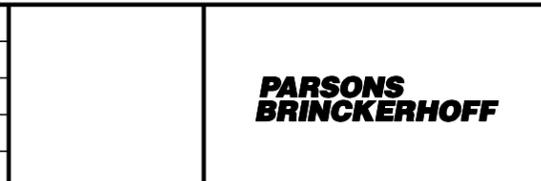
TYPICAL PRECAST ELECTRIC MANHOLE

SECTION B
NO SCALE

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REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
M. PAZ
DRAWN BY
V. HUANTE
CHECKED BY
V. SIBAL
IN CHARGE
B. BANKS
DATE
8/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRACTION POWER DIRECTIVE
TYPICAL 25KV MANHOLE DETAILS

CONTRACT NO.
DRAWING NO.
DD-TP-N111
SCALE
NO SCALE
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

California High-Speed Rail Authority



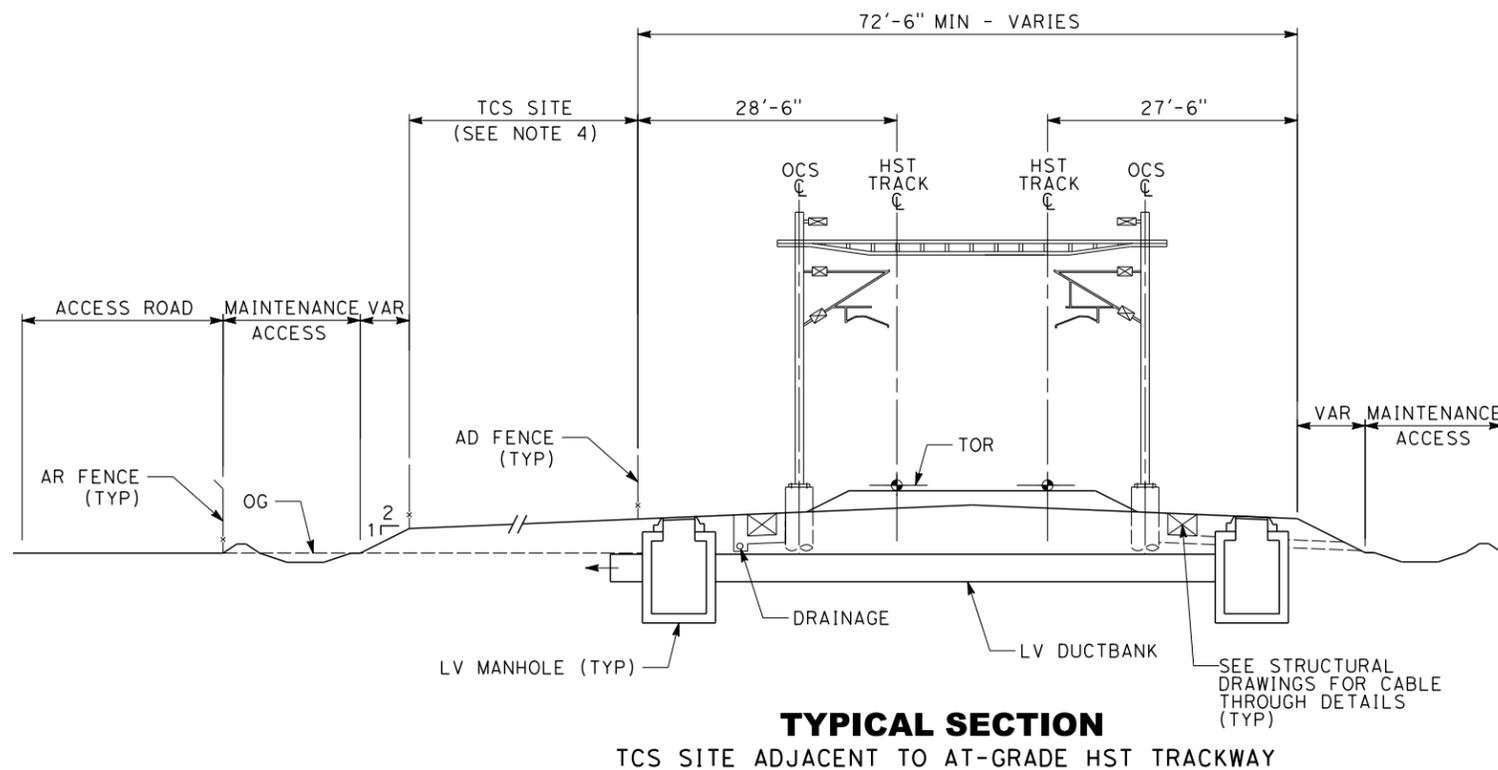
RFP No.: HSR 13-57

**Request for Proposals for Design-Build
Services for Construction Package 2-3**

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

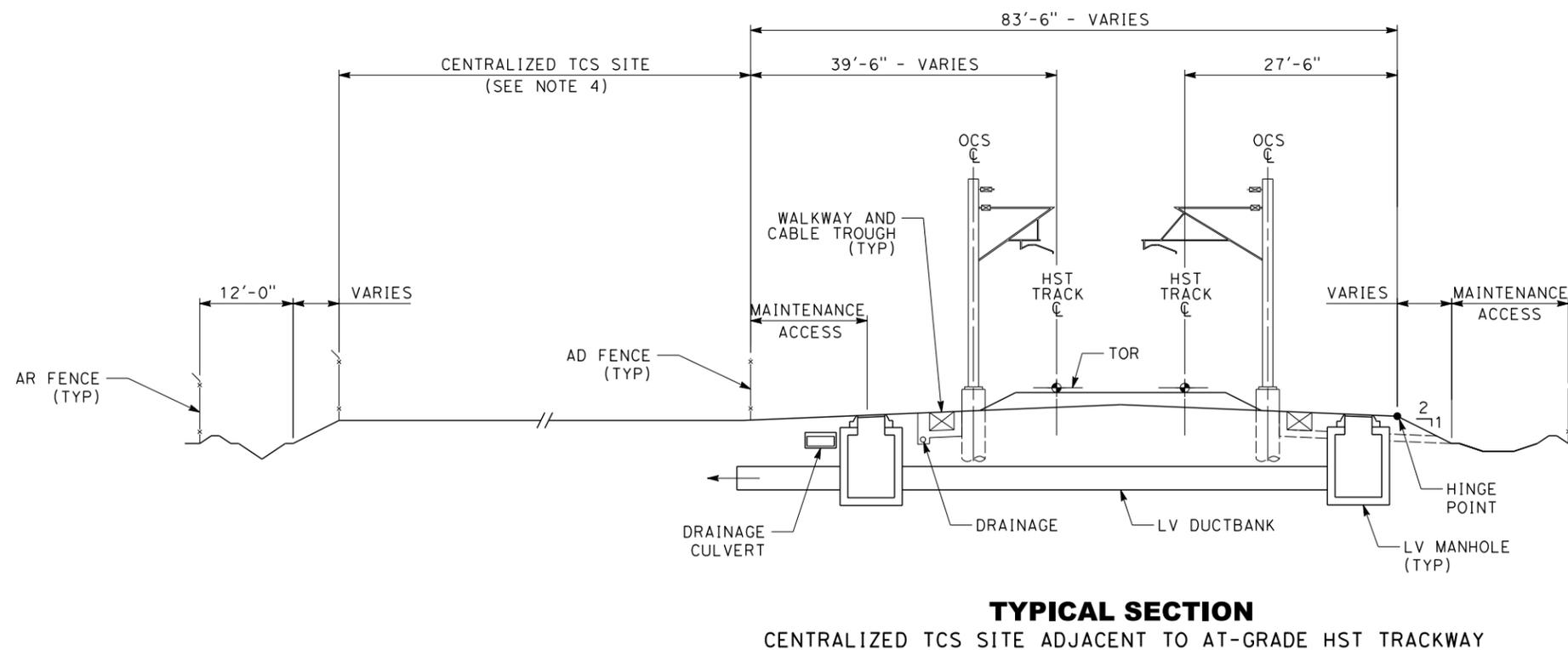
Automatic Train Control

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NOTES:

1. TYPICAL CROSS SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR MINIMUM LENGTH EQUAL TO THE LONGITUDINAL WIDTH OF THE CENTRALIZED TRAIN CONTROL SITE OR FOR THE LONGITUDINAL DISTANCE BETWEEN FURTHEST TRAIN CONTROL SITES AT AN INTERLOCKING.
2. FOR TRAIN CONTROL SITE REQUIREMENTS REFER TO TYPICAL TRAIN CONTROL SITES LAYOUT DIRECTIVE DRAWINGS.
3. A LOW VOLTAGE UNDERTRACK DUCTBANK WITH 2 LOW VOLTAGE MANHOLES PROVIDED AT EACH SYSTEMS SITE. REFER TO COMMUNICATIONS DESIGN CRITERIA MANUAL AND DIRECTIVE DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE REQUIREMENTS.
4. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
5. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
6. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.



REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
I. MUFTIC
 DRAWN BY
V. LAVERDE
 CHECKED BY
B. MCNALLY
 IN CHARGE
B. BANKS
 DATE
8/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRAIN CONTROL DIRECTIVE

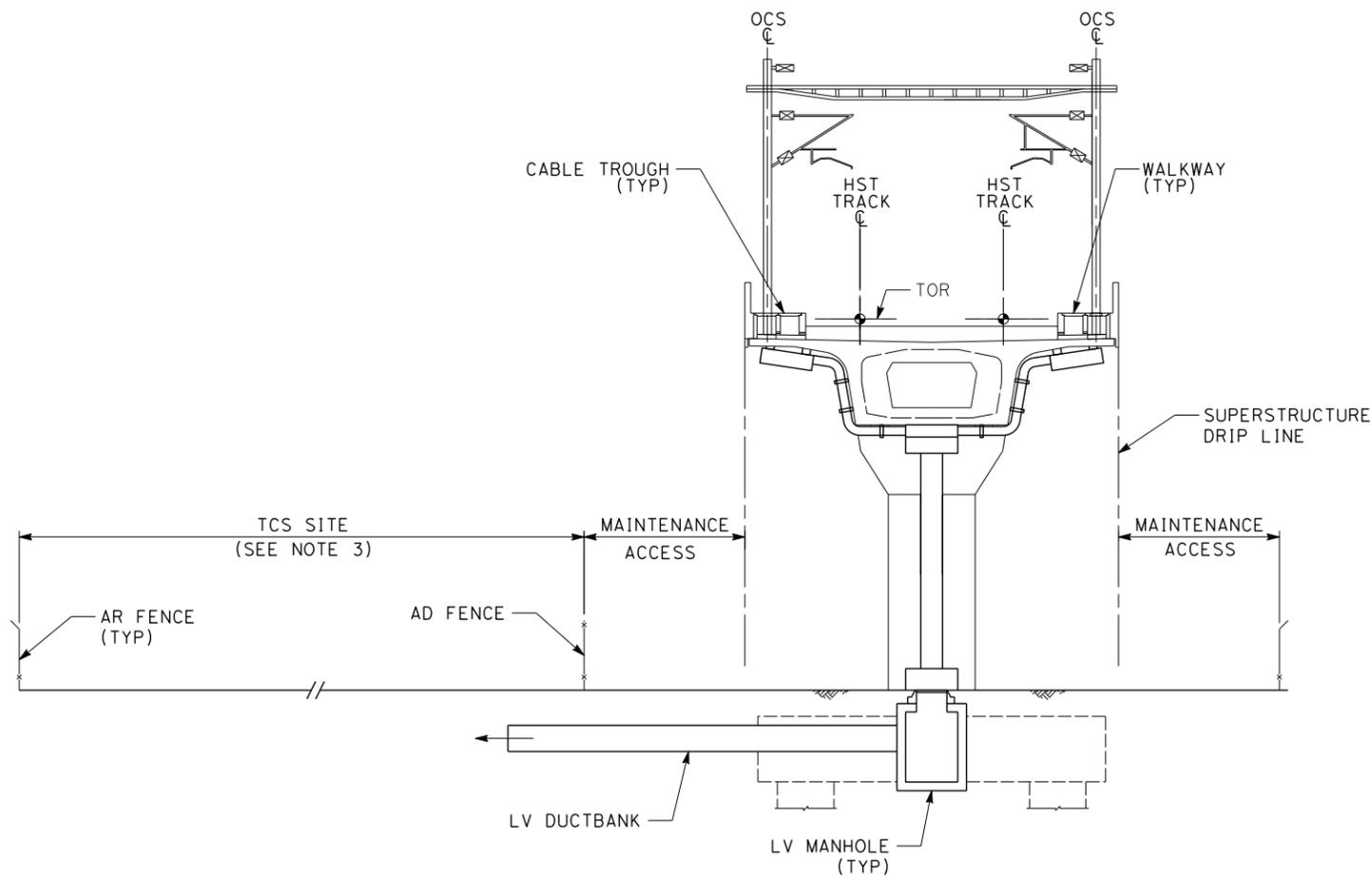
 SYSTEMS SITE
 TCS
 AT GRADE

CONTRACT NO.
DRAWING NO. DD-TC-100
SCALE NO SCALE
SHEET NO.

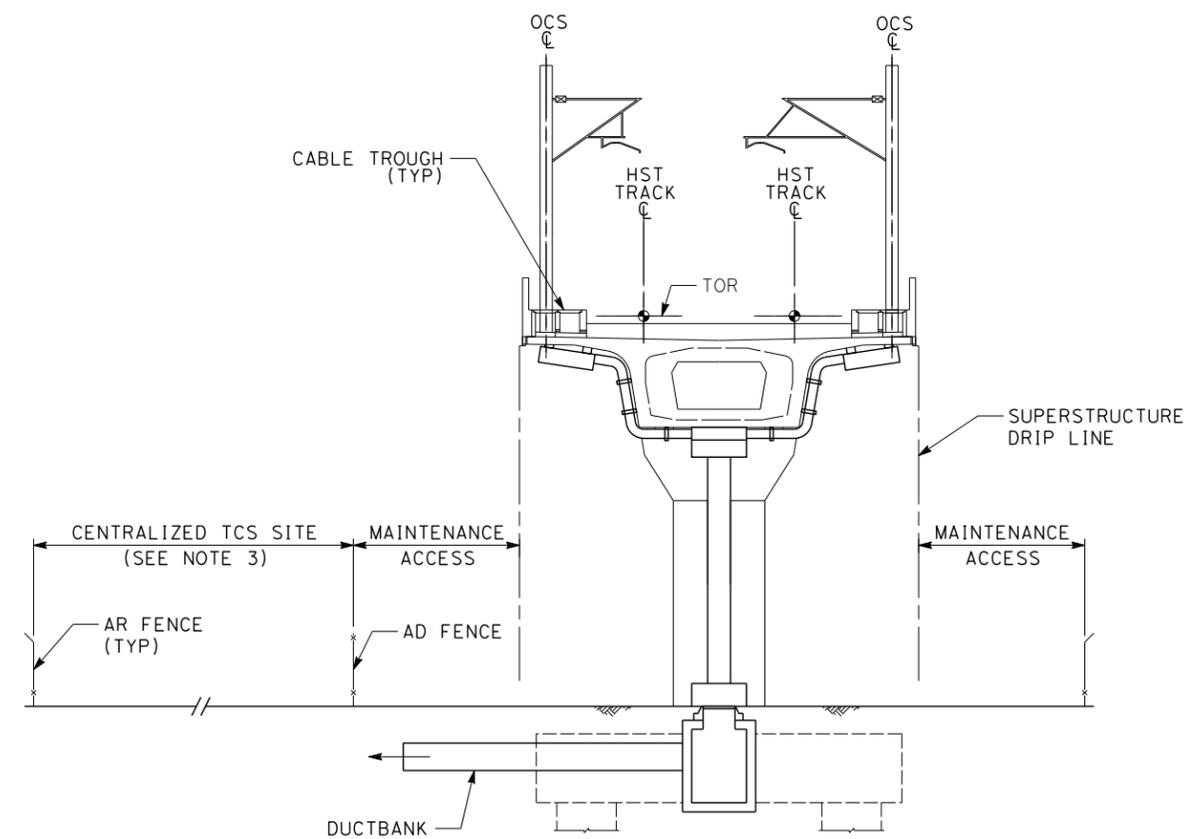
RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

NOTES:

1. SYSTEM SITES AT AERIAL TRACKWAY ARE UNDESIRABLE. THESE CROSS-SECTIONS ARE ONLY APPLICABLE IF AT-GRADE SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
2. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
3. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
4. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.
5. TYPICAL CROSS SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR MINIMUM LENGTH EQUAL TO THE LONGITUDINAL WIDTH OF THE CENTRALIZED TRAIN CONTROL SITE OR FOR THE LONGITUDINAL DISTANCE BETWEEN FURTHEST TRAIN CONTROL SITES AT AN INTERLOCKING.
6. FOR TRAIN CONTROL SITE REQUIREMENTS REFER TO TYPICAL TRAIN CONTROL SITES LAYOUT DIRECTIVE DRAWINGS.



TYPICAL SECTION
TCS SITE AT AERIAL TRACKWAY



TYPICAL SECTION
CENTRALIZED TCS SITE AT AERIAL TRACKWAY

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REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
I. MUF TIC
DRAWN BY
V. LAVERDE
CHECKED BY
B. MCNALLY
IN CHARGE
B. BANKS
DATE
8/29/2014

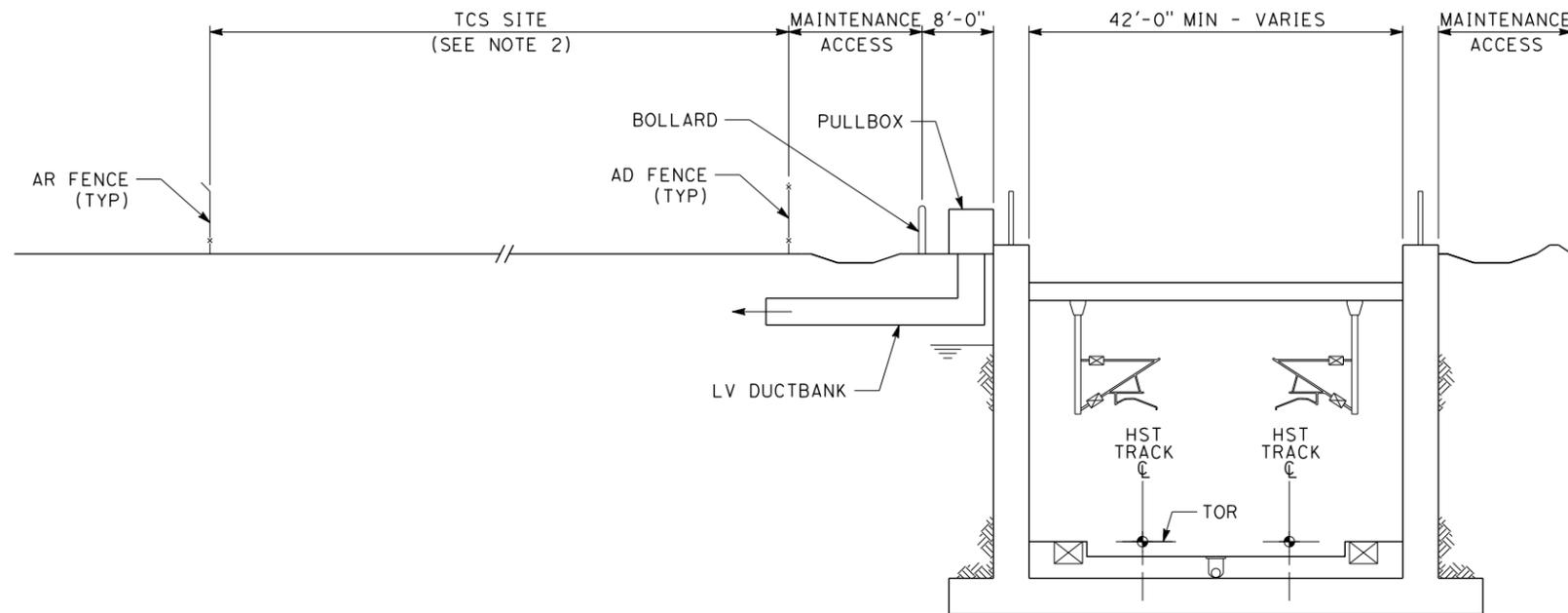


CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRAIN CONTROL DIRECTIVE

SYSTEMS SITE
TCS
AERIAL

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

RFP No.: 13-57 – Addendum No. 5 - 10/09/2014



TYPICAL SECTION
TCS SITE ADJACENT TO HST TRACKWAY
TRENCH

NOTES:

1. TYPICAL CROSS SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR MINIMUM LENGTH EQUAL TO THE LONGITUDINAL WIDTH OF THE TRAIN CONTROL SITE D OR FOR THE LONGITUDINAL DISTANCE BETWEEN FURTHEST TRAIN CONTROL SITES AT AN INTERLOCKING.
2. FOR TRAIN CONTROL SITE REQUIREMENTS REFER TO TYPICAL TRAIN CONTROL SITES LAYOUT DIRECTIVE DRAWINGS.

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RFP No.: 13-57 – Addendum No. 5 - 10/09/2014

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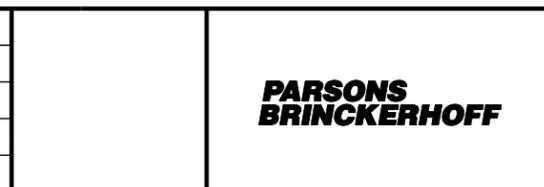
DESIGNED BY
I. MUF TIC

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V. HUANTE

CHECKED BY
B. MCNALLY

IN CHARGE
B. BANKS

DATE
8/29/2014

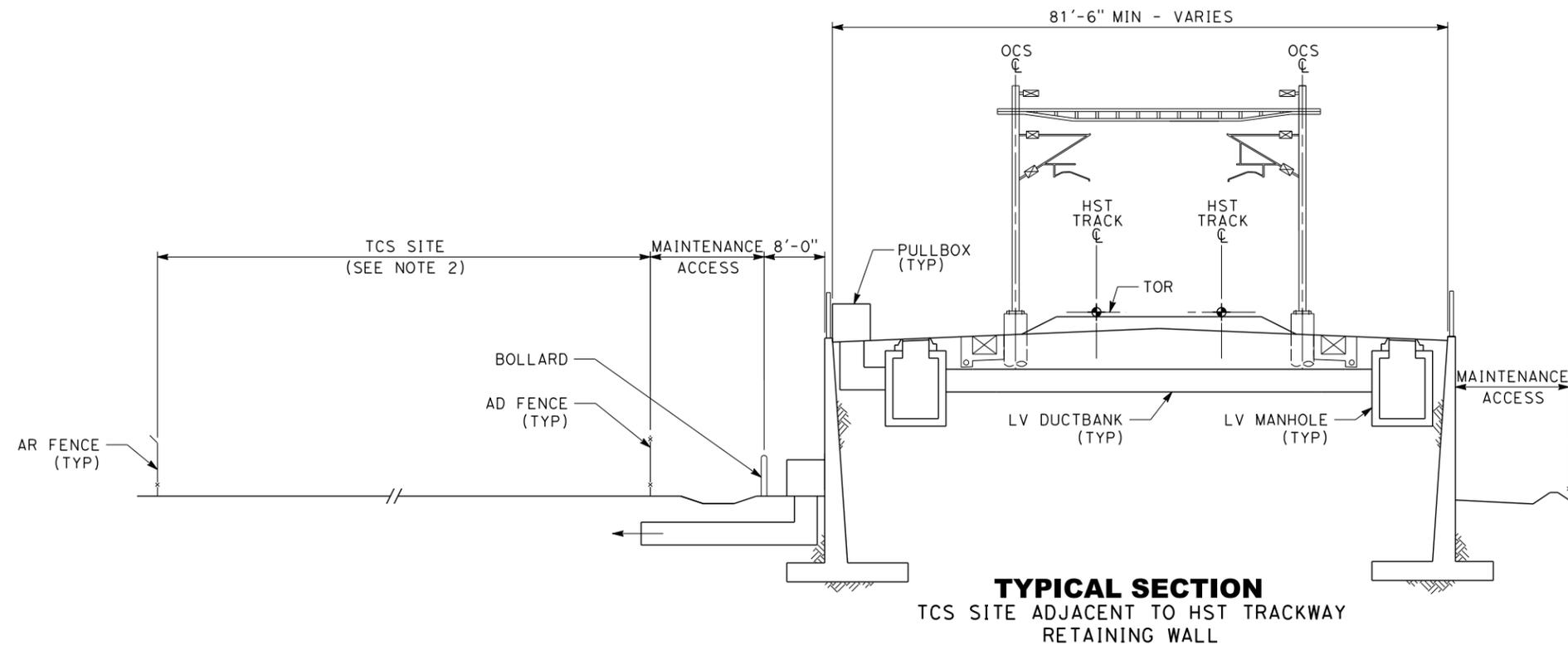


CALIFORNIA HIGH-SPEED TRAIN PROJECT
AUTOMATIC TRAIN DIRECTIVE

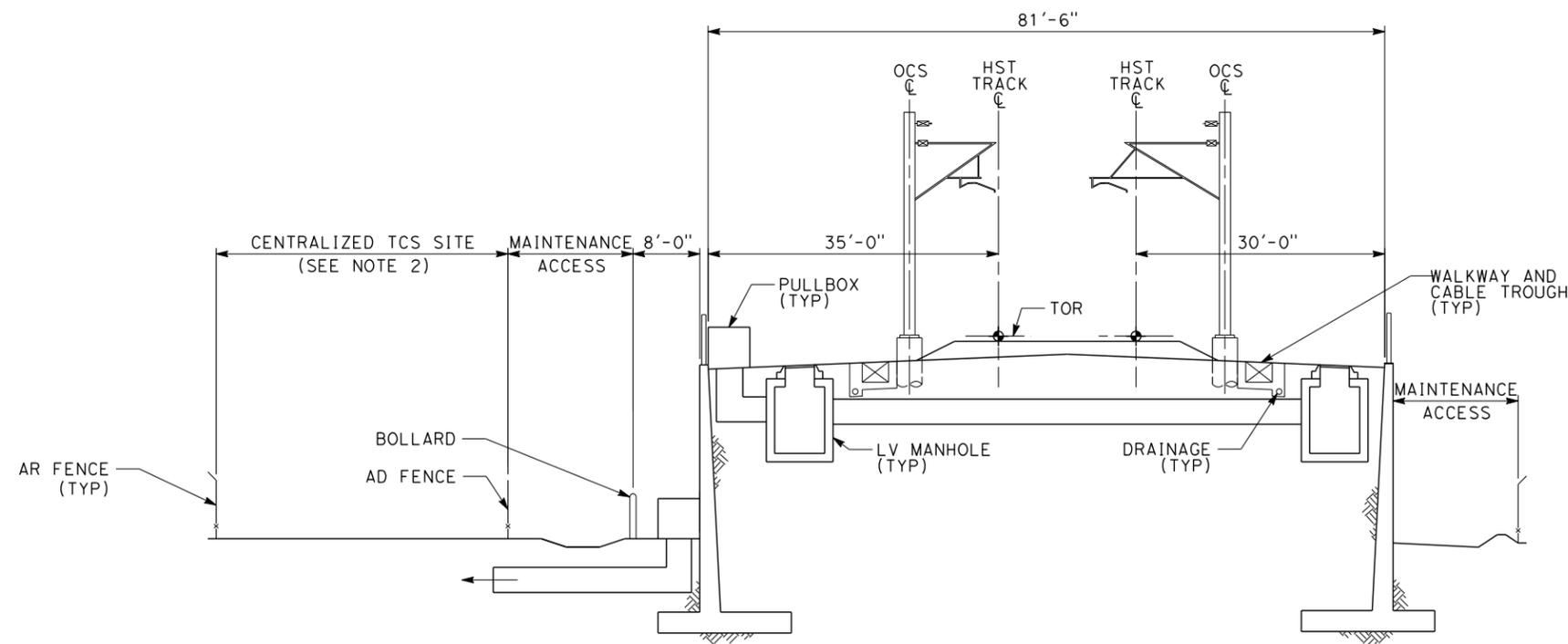
SYSTEMS SITE
TCS
TRENCH

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

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TYPICAL SECTION
TCS SITE ADJACENT TO HST TRACKWAY
RETAINING WALL



TYPICAL SECTION
CENTRALIZED TCS SITE ADJACENT TO HST TRACKWAY
RETAINING WALL

NOTES:

1. FOR RETAINED-FILLED TRACKWAYS, REINFORCED CONCRETE RETAINING WALLS SHALL BE USED AT SYSTEMS SITES.
2. TYPICAL CROSS SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR MINIMUM LENGTH EQUAL TO THE LONGITUDINAL WIDTH OF THE CENTRALIZED TRAIN CONTROL SITE OR FOR THE LONGITUDINAL DISTANCE BETWEEN FURTHEST AUTOMATIC TRAIN CONTROL SITES AT AN INTERLOCKING.
3. FOR TRAIN CONTROL SYSTEM SITE REQUIREMENTS REFER TO TYPICAL TRAIN CONTROL SITES LAYOUT DIRECTIVE DRAWINGS.
4. A LOW VOLTAGE UNDERTRACK DUCTBANK WITH 2 LOW VOLTAGE MANHOLES PROVIDED AT EACH SYSTEMS SITE. REFER TO COMMUNICATIONS DESIGN CRITERIA MANUAL AND DIRECTIVE DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE REQUIREMENTS.
5. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
6. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
7. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.

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 CHECKED BY
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 IN CHARGE
B. BANKS
 DATE
8/29/2014

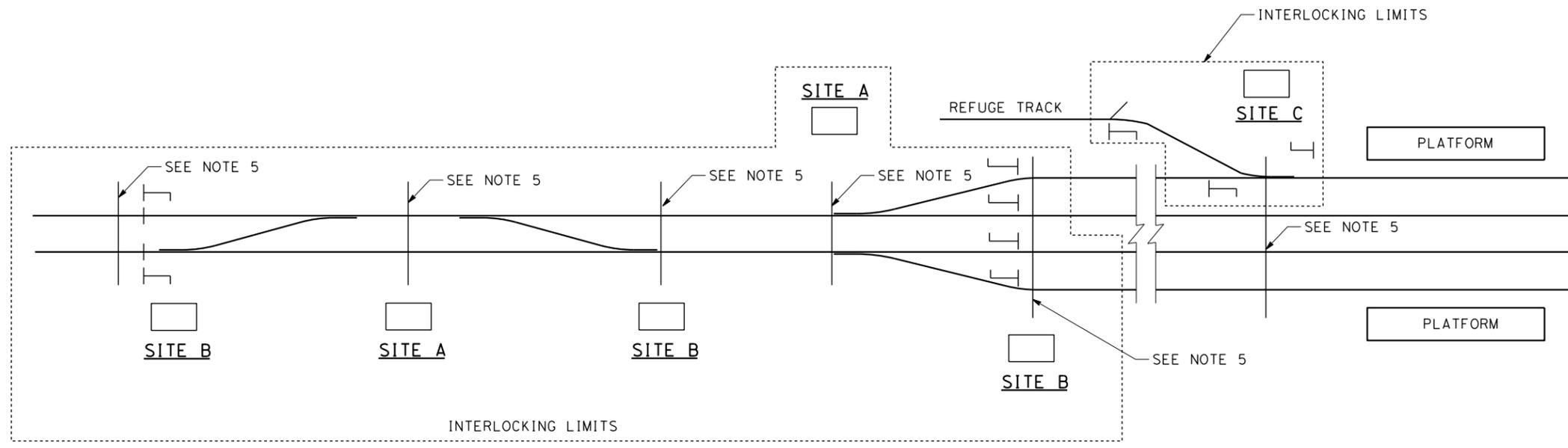


CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRAIN CONTROL SYSTEM DIRECTIVE

 SYSTEMS SITE
 TCS
 RETAINED FILL

CONTRACT NO.
 DRAWING NO.
DD-TC-103
 SCALE
NO SCALE
 SHEET NO.

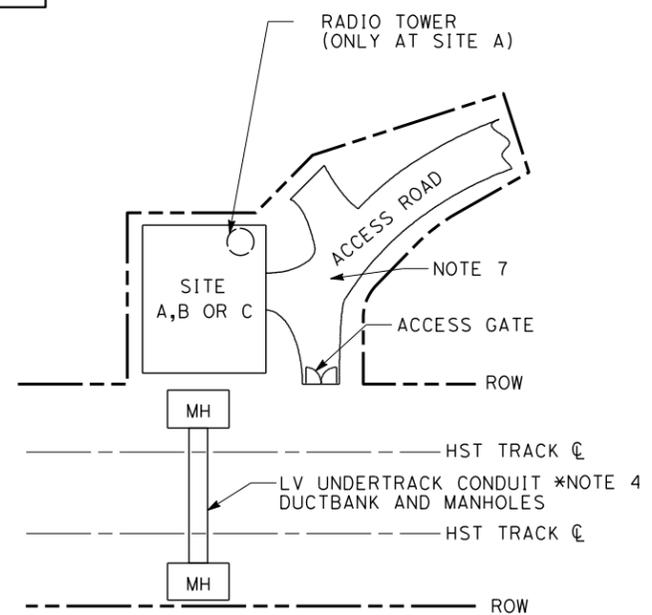
RFP No.: 13-57 – Addendum No. 5 - 10/09/2014



PLAN

NOTES:

1. SITES A AND B MAY BE LOCATED ON EITHER SIDE OF THE TRACK.
2. WHERE POSSIBLE, FOR SITES A AND B, ALTERNATIVES SHALL BE PROVIDED ON THE OPPOSITE SIDE OF THE TRACK.
3. SITE A WILL ACCOMMODATE TRAIN CONTROL SYSTEM EQUIPMENT, COMMUNICATIONS SYSTEM EQUIPMENT WITH THE RADIO TOWER, AND WAYSIDE POWER CONTROL (WPC) EQUIPMENT.
4. AN ACCESS ROAD AND AN ACCESS GATE SHALL BE PROVIDED FOR EACH SITE PER THE CIVIL DESIGN CRITERIA.
5. AN ASSEMBLY, CONSISTING OF A LOW VOLTAGE UNDERTRACK DUCTBANK WITH 2 LOW VOLTAGE MANHOLES, SHALL BE PROVIDED AT EACH TRAIN CONTROL SITE. REFER TO COMMUNICATIONS DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE DETAIL REQUIREMENTS.
6. FOR NUMBER OF CONDUITS REFER TO COMMUNICATIONS DESIGN CRITERIA AND DRAWING "TYPICAL CROSS SECTION SYSTEMS LOW-VOLTAGE CONDUIT DUCTBANK".
7. ACCESS ROADS AND ACCESS GATES ARE SHOWN FOR INFORMATION ONLY. REFER TO CIVIL DESIGN CRITERIA FOR ACCESS ROADS AND ACCESS GATES DETAIL REQUIREMENTS.



SITE A, B OR C

WITH LOW-VOLTAGE UNDERTRACK CONDUIT DUCTBANK, ACCESS ROADS AND GATES

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IN CHARGE
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DATE
8/29/2014

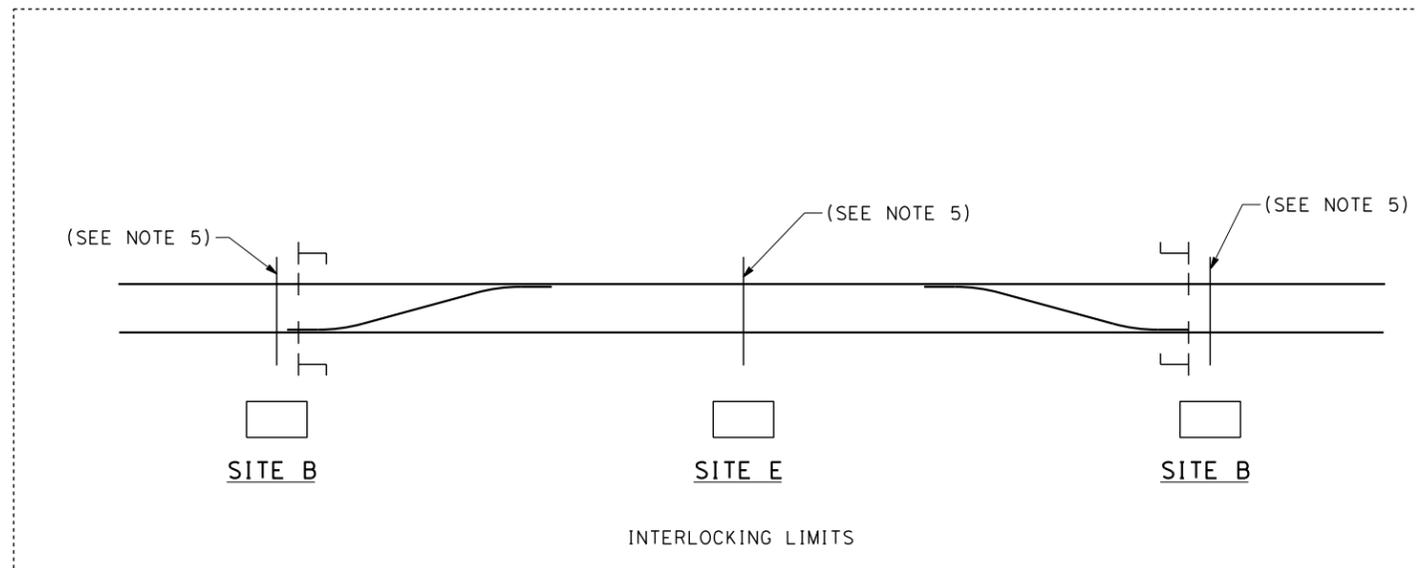


**CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRAIN CONTROL DIRECTIVE**

TYPICAL TCS SITES
LAYOUT AT STATION AND INTERLOCKINGS

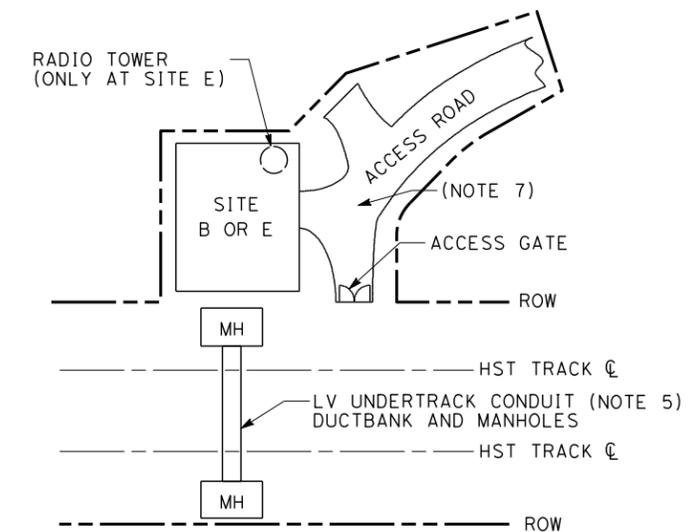
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SCALE NO SCALE
SHEET NO.

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NOTES:

1. SITES B AND E MAY BE LOCATED ON EITHER SIDE OF THE TRACK.
2. WHERE POSSIBLE, FOR SITES B AND E, ALTERNATIVES SHALL BE PROVIDED ON THE OPPOSITE SIDE OF THE TRACK.
3. SITE E WILL ACCOMMODATE TRAIN CONTROL SYSTEM EQUIPMENT, COMMUNICATIONS SYSTEM EQUIPMENT WITH THE RADIO TOWER, AND WAYSIDE POWER CONTROL (WPC) EQUIPMENT.
4. AN ACCESS ROAD AND AN ACCESS GATE SHALL BE PROVIDED FOR EACH SITE PER THE CIVIL DESIGN CRITERIA.
5. AN ASSEMBLY, CONSISTING OF A LOW VOLTAGE UNDERTRACK DUCTBANK WITH 2 LOW VOLTAGE MANHOLES, SHALL BE PROVIDED AT EACH TRAIN CONTROL SITE. REFER TO COMMUNICATIONS DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE DETAIL REQUIREMENTS.
6. FOR NUMBER OF CONDUITS REFER TO COMMUNICATIONS DESIGN CRITERIA AND DRAWING "TYPICAL CROSS SECTION SYSTEMS LOW-VOLTAGE CONDUIT DUCTBANK".
7. ACCESS ROADS AND ACCESS GATES ARE SHOWN FOR INFORMATION ONLY. REFER TO CIVIL DESIGN CRITERIA FOR ACCESS ROADS AND ACCESS GATES DETAIL REQUIREMENTS.



SITE B OR E

WITH LOW-VOLTAGE UNDERTRACK CONDUIT DUCTBANK, ACCESS ROADS AND GATES

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B. MCNALLY
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B. BANKS
 DATE
8/29/2014



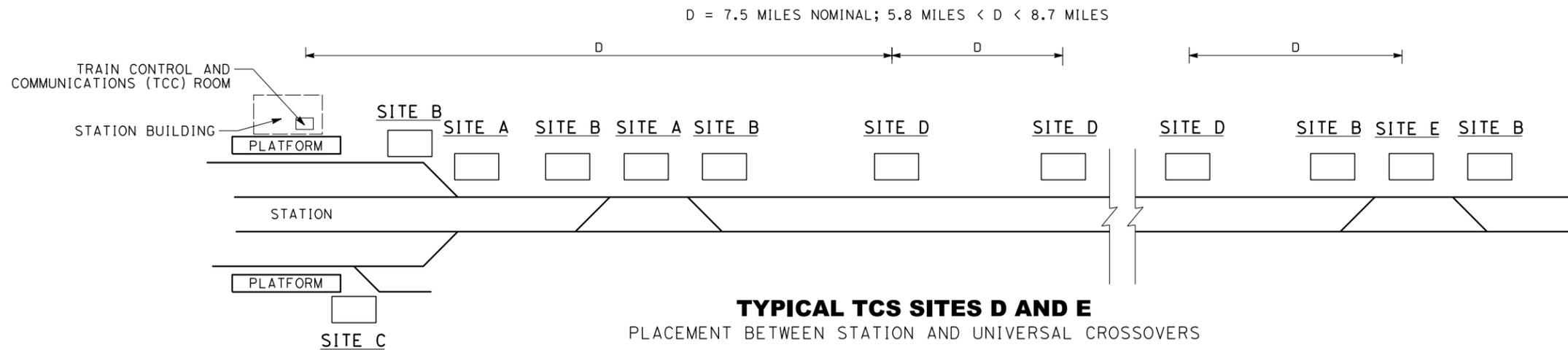
CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRAIN CONTROL DIRECTIVE
 TYPICAL TCS SITES AND
 INTERLOCKINGS LAYOUT AT UNIVERSAL CROSSOVERS

CONTRACT NO.
DRAWING NO. DD-TC-201
SCALE NO SCALE
SHEET NO.

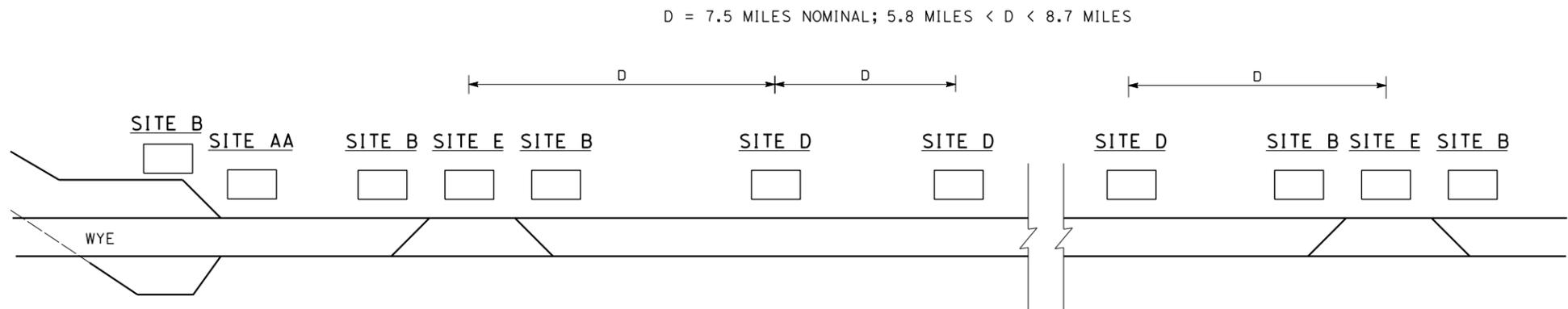
RFP No.: 13-57 – Addendum No. 5 - 10/09/2014

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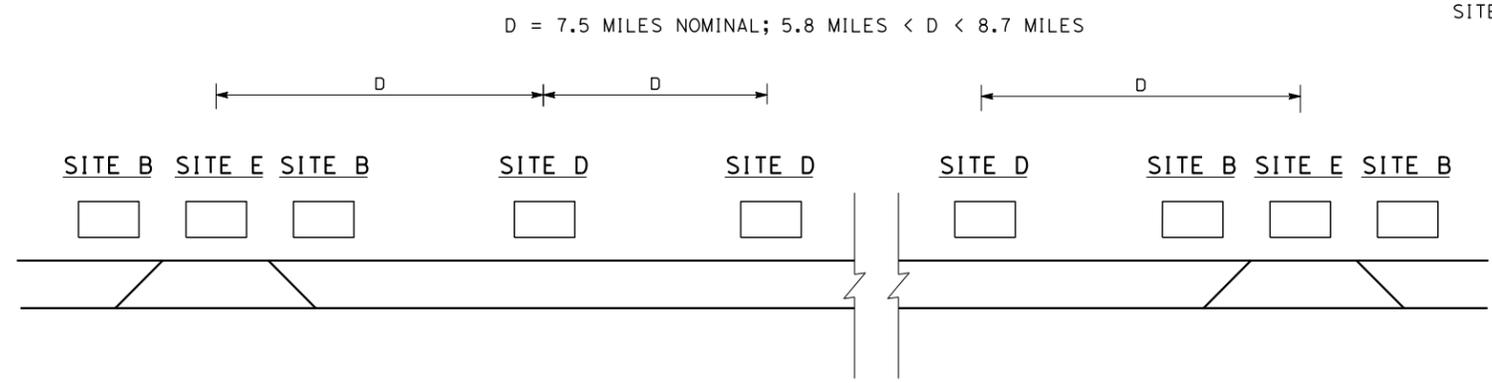
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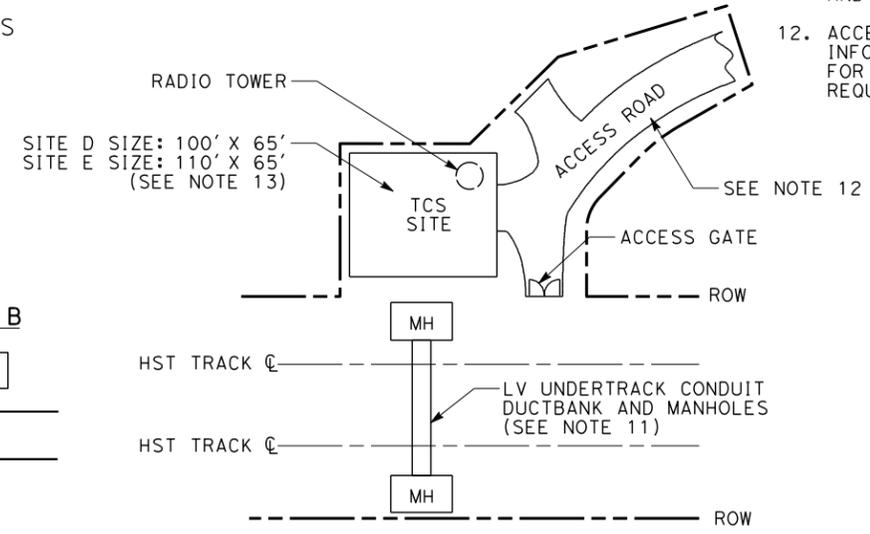
TYPICAL TCS SITES D AND E
PLACEMENT BETWEEN STATION AND UNIVERSAL CROSSOVERS



TYPICAL TCS SITES D AND E
PLACEMENT BETWEEN WYE AND UNIVERSAL CROSSOVERS



TYPICAL TCS SITES D AND E
PLACEMENT BETWEEN TWO ADJACENT UNIVERSAL CROSSOVERS



TYPICAL SITES D & E CONFIGURATION
WITH LOW-VOLTAGE UNDERTRACK CONDUIT DUCTBANK, ACCESS ROADS AND GATES

NOTES:

1. THIS DRAWING SHOWS A TYPICAL SPACING BETWEEN STATION TRAIN CONTROL AND COMMUNICATIONS (TCC) ROOM, D SITES, AND E SITES AT UNIVERSAL CROSSOVERS.
2. IF THE STATION DESIGN IS NOT AVAILABLE, THE CENTER LINE OF PLATFORM SHALL BE USED AS A REFERENCE POINT INSTEAD OF THE EXACT LOCATION OF THE TCC ROOM.
3. D SITES SHALL BE PROVIDED AT THE NOMINAL DISTANCE OF 7.5 MILES BETWEEN STATION TCC ROOM AND ADJACENT SITE D, BETWEEN 2 ADJACENT D SITES, AND BETWEEN ADJACENT D SITE AND E SITE AT UNIVERSAL CROSSOVERS.
4. MINIMUM SPACING BETWEEN STATION TCC ROOM AND ADJACENT SITE D, BETWEEN 2 ADJACENT D SITES, AND BETWEEN ADJACENT D SITE AND E SITE AT UNIVERSAL CROSSOVERS IS 5.8 MILES.
5. MAXIMUM SPACING BETWEEN STATION TCC ROOM AND ADJACENT SITE D, BETWEEN 2 ADJACENT D SITES, AND BETWEEN ADJACENT D SITE AND E SITE AT UNIVERSAL CROSSOVERS IS 8.7 MILES.
6. D SITES MAY BE LOCATED ON EITHER SIDE OF TRACK.
7. FOR EACH D SITE, AN ALTERNATIVE SHALL BE PROVIDED.
8. IF THERE IS AN EXISTING STAND ALONE RADIO SITE (SRS) WITHIN THE SPACING LIMITS FOR A D SITE, THE SRS CAN BE REPLACED WITH A NEW D SITE.
9. IF THERE IS A TRACTION POWER FACILITY (TPF) WITHIN THE SPACING LIMITS FOR AN ATC D SITE, THE ATC D SITE CAN BE PLACED CLOSE TO THE TPF SITE TO UTILIZE THE SAME ACCESS ROAD.
10. THIS CRITERIA IS NOT APPLICABLE FOR TUNNELS LONGER THAN 6 MILES AND THOSE WILL BE CONSIDERED AS A SPECIAL CASE.
11. AN ASSEMBLY, CONSISTING OF A LOW VOLTAGE UNDERTRACK DUCTBANK WITH 2 LOW VOLTAGE MANHOLES, SHALL BE PROVIDED AT EACH TRAIN CONTROL SITE. REFER TO COMMUNICATIONS DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE DETAIL REQUIREMENTS.
12. ACCESS ROADS AND ACCESS GATES ARE SHOWN FOR INFORMATION ONLY. REFER TO CIVIL DESIGN CRITERIA FOR ACCESS ROADS AND ACCESS GATES DETAIL REQUIREMENTS.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

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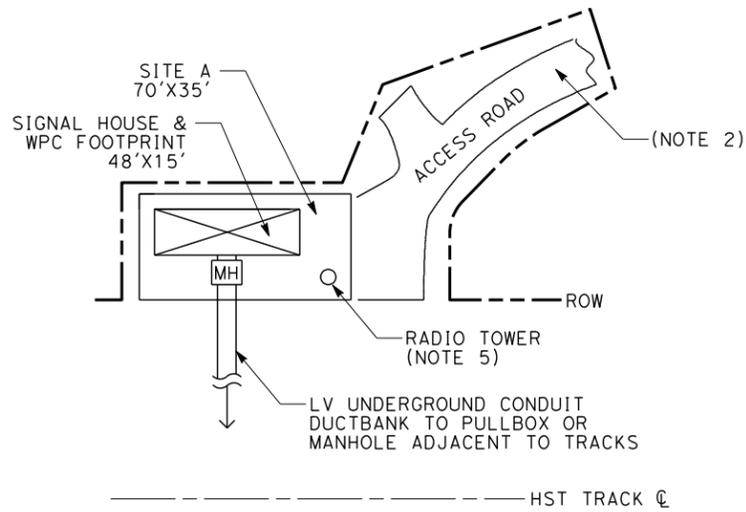
DESIGNED BY
I. MUF TIC
DRAWN BY
V. LAVERDE
CHECKED BY
B. MCNALLY
IN CHARGE
B. BANKS
DATE
8/29/2014



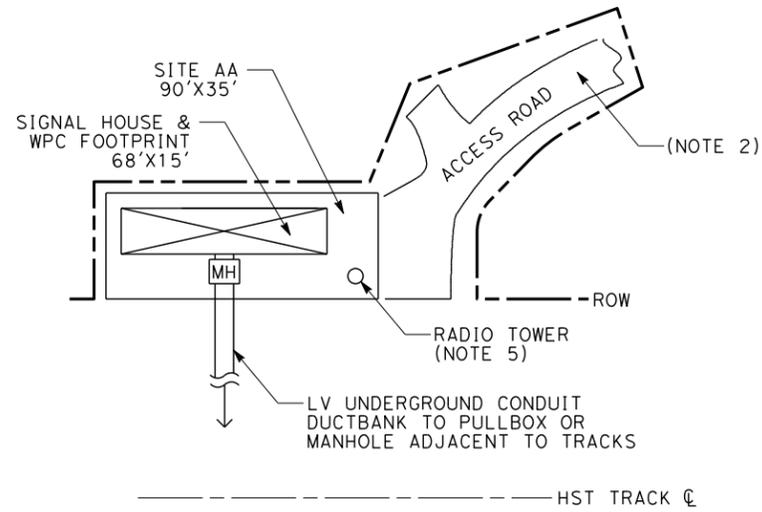
CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRAIN CONTROL DIRECTIVE

TYPICAL TCS
SITES D AND E CONFIGURATION

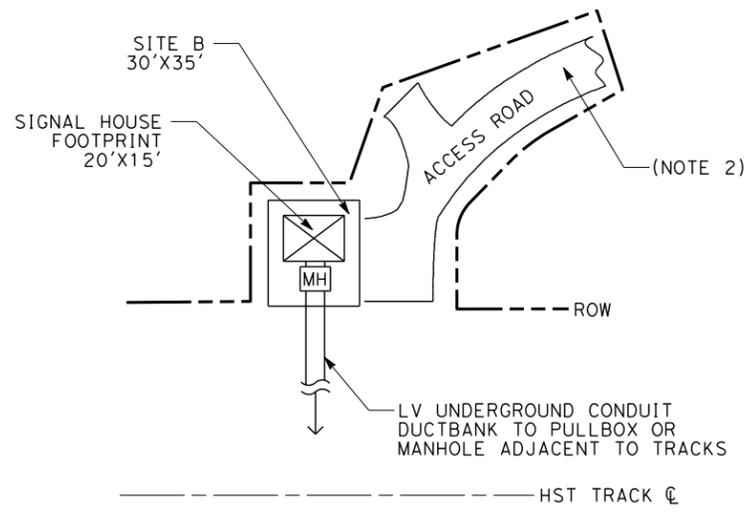
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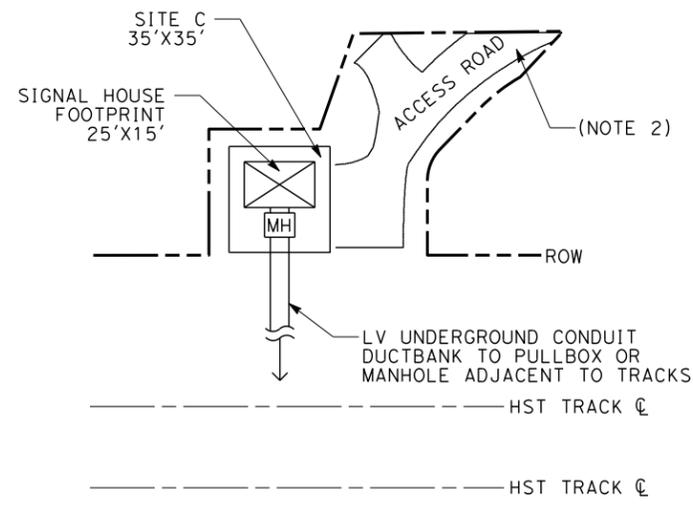
SITE A TYPICAL CONFIGURATION



SITE AA TYPICAL CONFIGURATION



SITE B TYPICAL CONFIGURATION



SITE C TYPICAL CONFIGURATION

NOTES:

1. SITES A AND AA WILL ACCOMMODATE TRAIN CONTROL, COMMUNICATIONS SYSTEM (WITH RADIO TOWER), AND WAYSIDE POWER CONTROL (WPC) EQUIPMENT. A SEPARATE ROOM OF 25 SQUARE FEET SHALL BE RESERVED FOR WPC WITHIN THE SIGNAL HOUSE.
2. REFER TO COMMUNICATIONS DRAWINGS FOR DUCTBANK, MANHOLE CROSS SECTIONS, DETAILS AND ELEVATIONS.
3. FOR NUMBERS OF CONDUITS REFER TO COMMUNICATION DESIGN CRITERIA AND DRAWING "TYPICAL CROSS SECTION SYSTEMS LOW-VOLTAGE CONDUIT DUCTBANK".
4. FOR RADIO TOWER REQUIREMENTS AND CLEARANCES REFER TO COMMUNICATIONS DESIGN CRITERIA AND DRAWINGS.

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DATE
8/29/2014



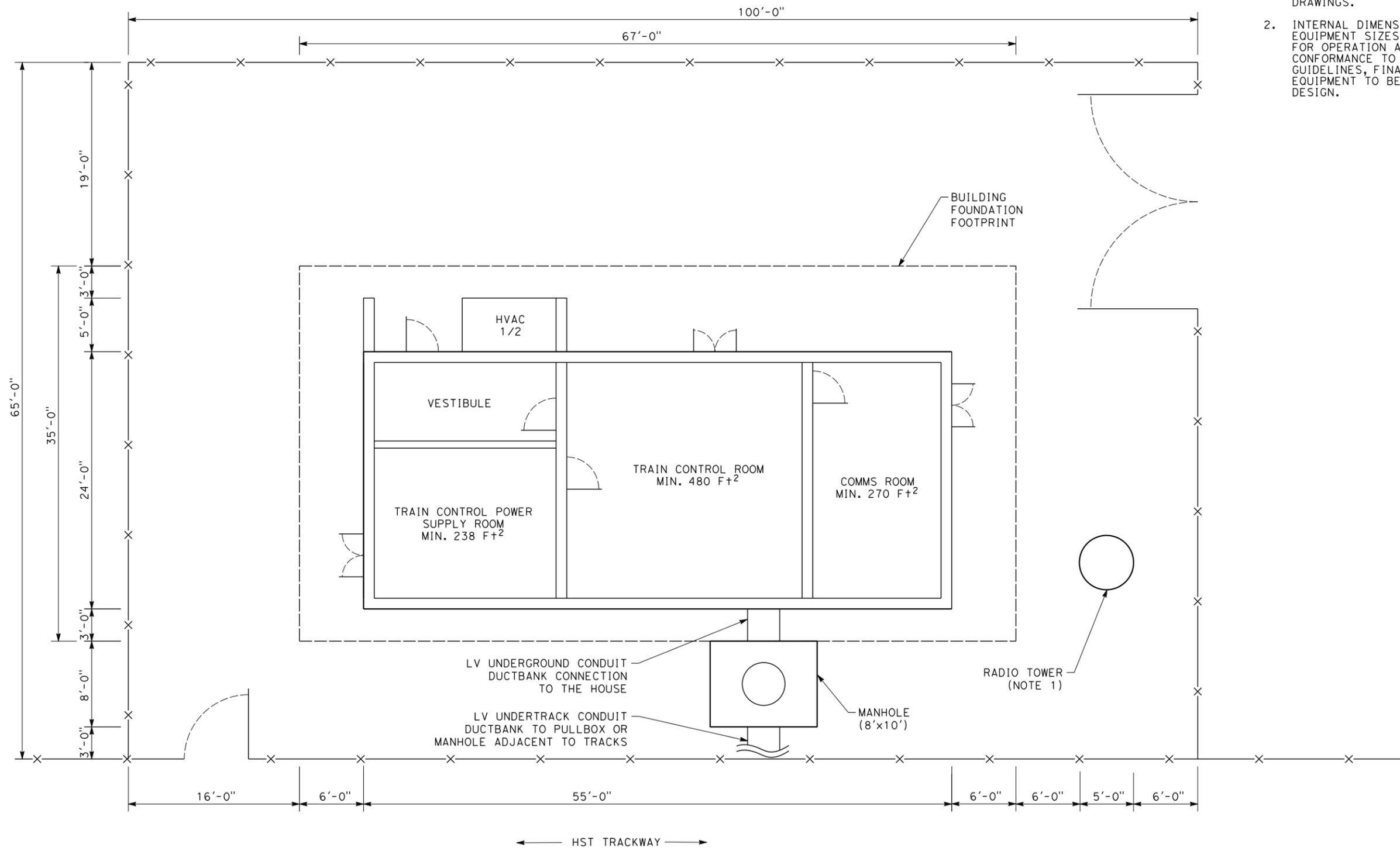
**CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRAIN CONTROL DIRECTIVE**

TYPICAL TCS SITES
A, AA, B, & C LAYOUT

CONTRACT NO.
DRAWING NO. DD-TC-203
SCALE NO SCALE
SHEET NO.

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- NOTES:**
1. FOR RADIO TOWER REQUIREMENTS AND CLEARANCES REFER TO COMMUNICATIONS DESIGN CRITERIA AND DRAWINGS.
 2. INTERNAL DIMENSIONS ARE SHOWN FOR TYPICAL EQUIPMENT SIZES, CLEARANCES AND ACCESSIBILITY FOR OPERATION AND MAINTENANCE OF EQUIPMENT CONFORMANCE TO RELEVANT CODES, STANDARDS, AND GUIDELINES, FINAL DIMENSIONS AND CONFIGURATION OF EQUIPMENT TO BE DETERMINED DURING FINAL SYSTEMS DESIGN.

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DESIGNED BY
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V. LAVERDE
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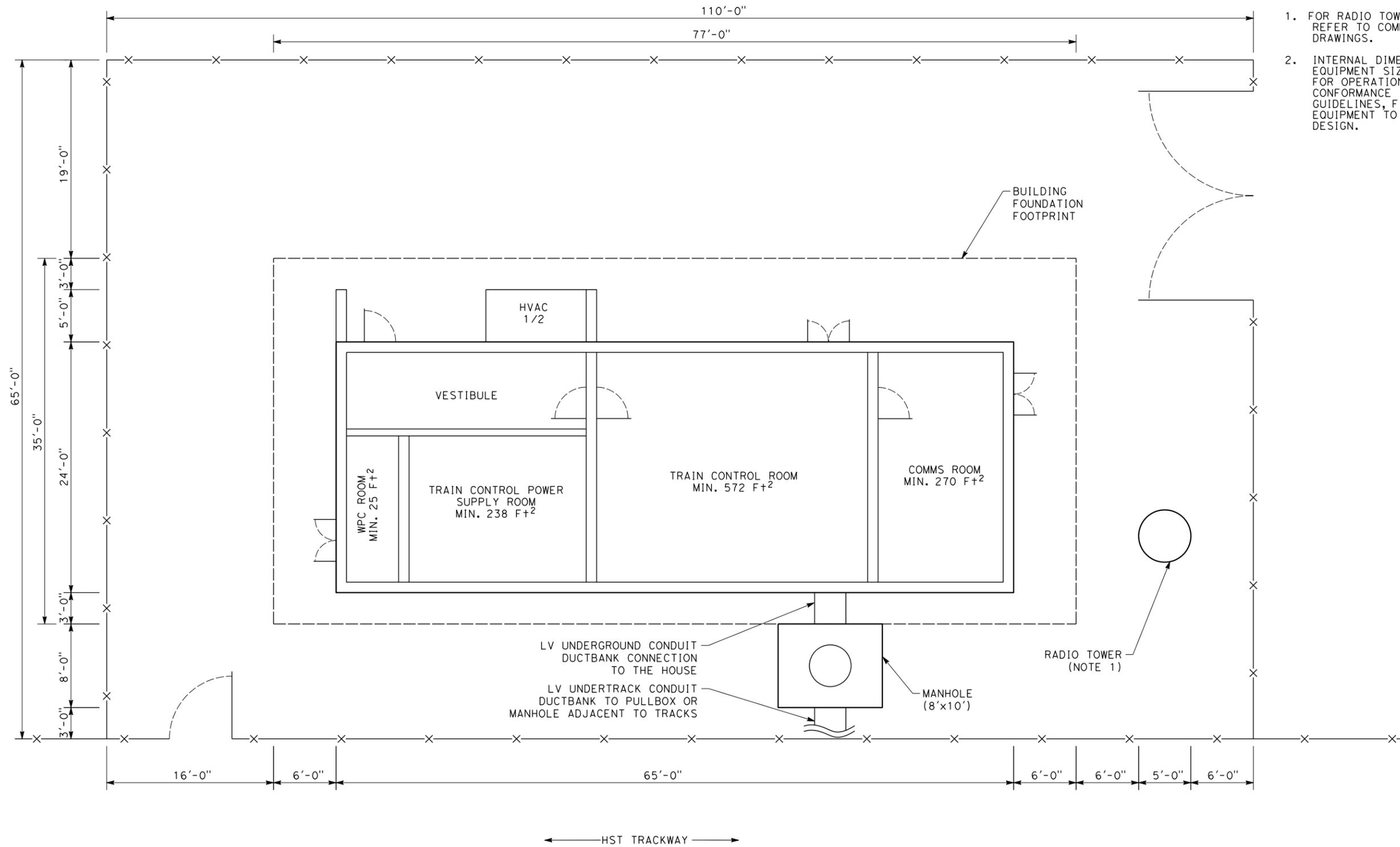


CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRAIN CONTROL DIRECTIVE
 TYPICAL TCS SITE D LAYOUT

CONTRACT NO.
DRAWING NO. DD-TC-204
SCALE NO SCALE
SHEET NO.

RFP No.: 13-57 – Addendum No. 5 - 10/09/2014

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NOTES:

1. FOR RADIO TOWER REQUIREMENTS AND CLEARANCES REFER TO COMMUNICATIONS DESIGN CRITERIA AND DRAWINGS.
2. INTERNAL DIMENSIONS ARE SHOWN FOR TYPICAL EQUIPMENT SIZES, CLEARANCES AND ACCESSIBILITY FOR OPERATION AND MAINTENANCE OF EQUIPMENT CONFORMANCE TO RELEVANT CODES, STANDARDS, AND GUIDELINES, FINAL DIMENSIONS AND CONFIGURATION OF EQUIPMENT TO BE DETERMINED DURING FINAL SYSTEMS DESIGN.

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B. MCNALLY
 IN CHARGE
B. BANKS
 DATE
8/29/2014



CALIFORNIA HIGH-SPEED TRAIN PROJECT
TRAIN CONTROL DIRECTIVE

 TYPICAL TCS SITE E LAYOUT

CONTRACT NO.
DRAWING NO. DD-TC-205
SCALE NO SCALE
SHEET NO.

RFP No.: 13-57 – Addendum No. 5 - 10/09/2014

California High-Speed Rail Authority



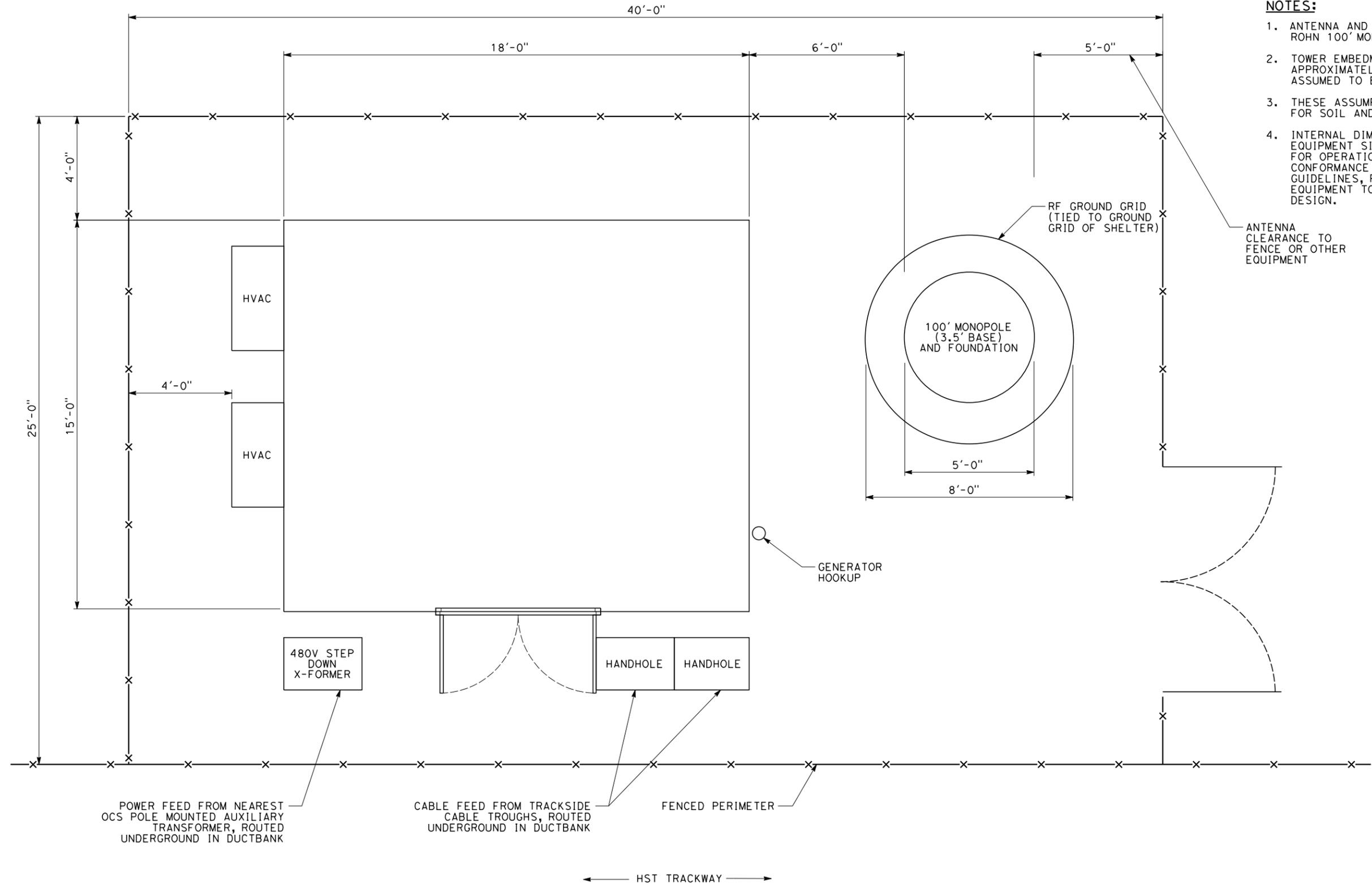
RFP No.: HSR 13-57

**Request for Proposals for Design-Build
Services for Construction Package 2-3**

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

Communications

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- NOTES:**
1. ANTENNA AND SUPPORT DIMENSIONS ARE BASED ON ROHN 100' MONOPOLE T100HA.
 2. TOWER EMBEDMENT DEPTH ASSUMED TO BE APPROXIMATELY 25 FEET TOWER BASE AND FOUNDATION ASSUMED TO BE 5 FOOT DIAMETER.
 3. THESE ASSUMPTIONS SHALL BE VALIDATED BY DESIGN FOR SOIL AND ENVIRONMENTAL CONDITIONS.
 4. INTERNAL DIMENSIONS ARE SHOWN FOR TYPICAL EQUIPMENT SIZES. CLEARANCES AND ACCESSIBILITY FOR OPERATION AND MAINTENANCE OF EQUIPMENT AND CONFORMANCE TO RELEVANT CODES, STANDARDS, AND GUIDELINES, FINAL DIMENSIONS AND CONFIGURATION OF EQUIPMENT TO BE DETERMINED DURING FINAL SYSTEMS DESIGN.

ANTENNA CLEARANCE TO FENCE OR OTHER EQUIPMENT

POWER FEED FROM NEAREST OCS POLE MOUNTED AUXILIARY TRANSFORMER, ROUTED UNDERGROUND IN DUCTBANK

CABLE FEED FROM TRACKSIDE CABLE TROUGHS, ROUTED UNDERGROUND IN DUCTBANK

FENCED PERIMETER

← HST TRACKWAY →

REV	DATE	BY	CHK	APP	DESCRIPTION

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C. DALOIA
DRAWN BY
V. LAVERDE
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B. MCNALLY
IN CHARGE
B. BANKS
DATE
8/29/2014

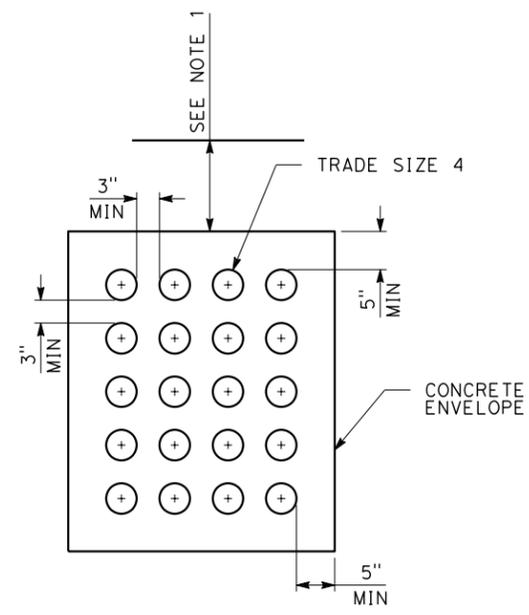


**CALIFORNIA HIGH-SPEED TRAIN PROJECT
COMMUNICATIONS DIRECTIVE**

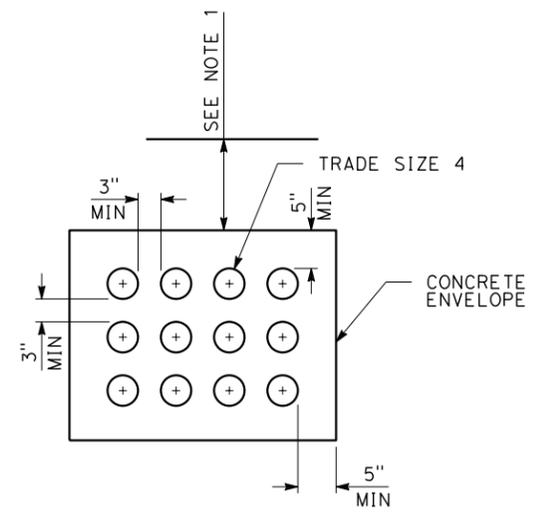
CONCEPTUAL LAYOUT
COMMUNICATIONS SPACES
PHYSICAL SITE LAYOUT

CONTRACT NO.
DRAWING NO. DD-CO-F080
SCALE NO SCALE
SHEET NO.

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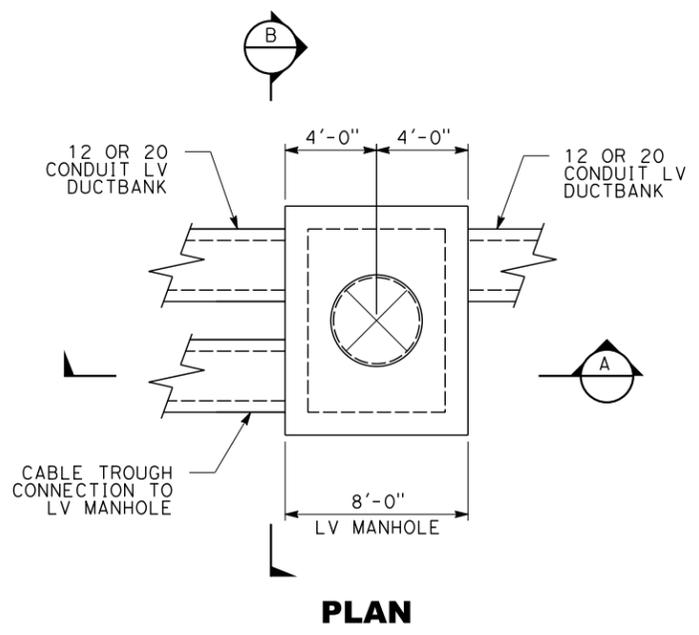
20 CONDUIT CONCRETE ENCASED DUCT BANK



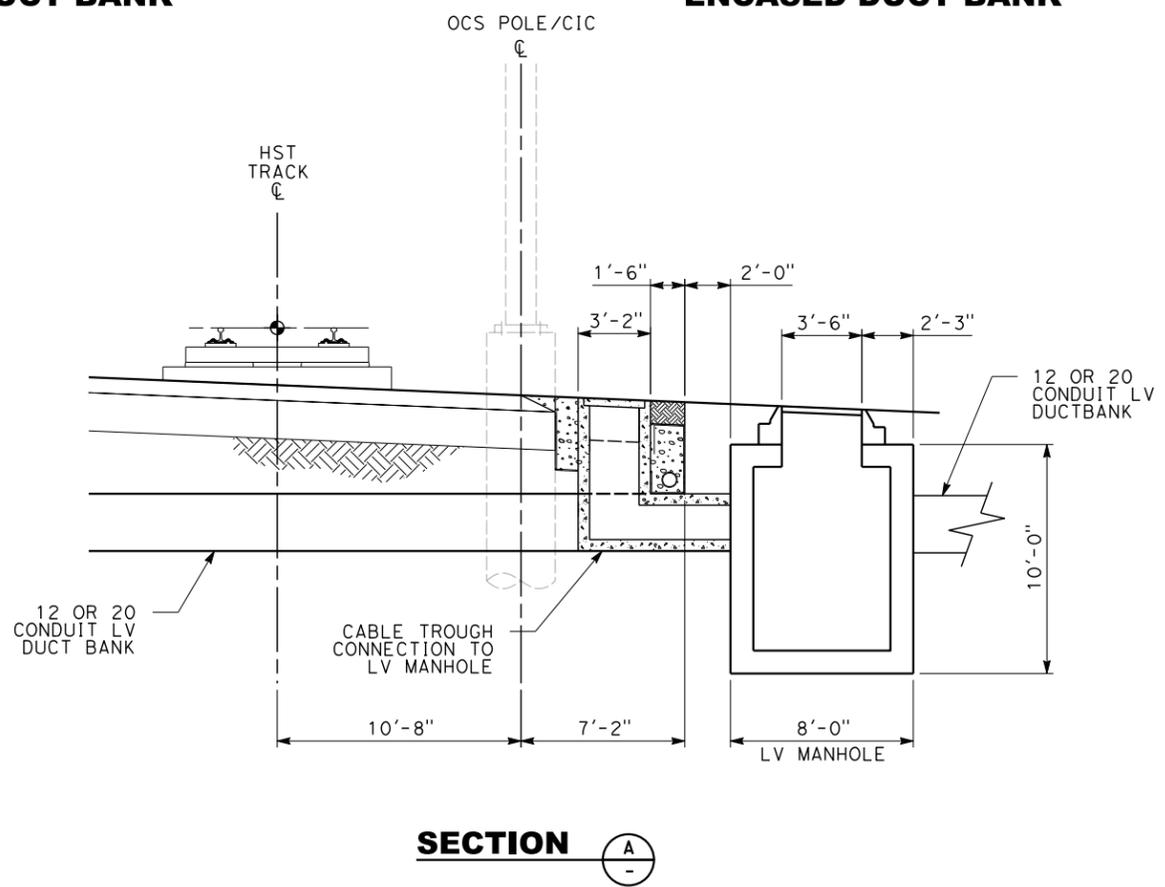
12 CONDUIT CONCRETE ENCASED DUCT BANK

NOTES:

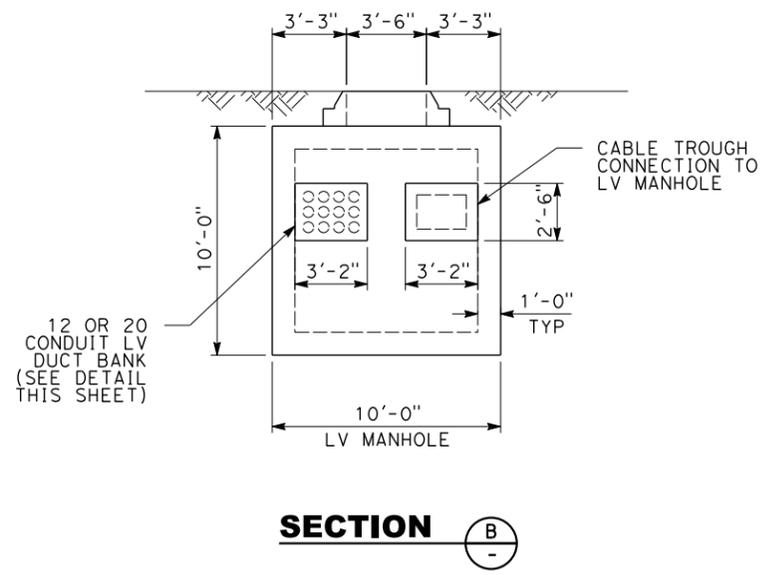
1. CONCRETE ENCASED DUCT BANK TO BE PLACED A MINIMUM 6' BELOW TOP OF RAIL AND MINIMUM 3' BELOW GRADE WHEN NO RAIL IS PRESENT.
2. LOW VOLTAGE DUCT BANK TO BE LOCATED PER THE CRITERIA LISTED IN THE COMMUNICATIONS DESIGN CRITERIA CHAPTER.



PLAN



SECTION A



SECTION B

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
C. DALOIA
 DRAWN BY
V. LAVERDE
 CHECKED BY
B. MCNALLY
 IN CHARGE
B. BANKS
 DATE
8/29/2014

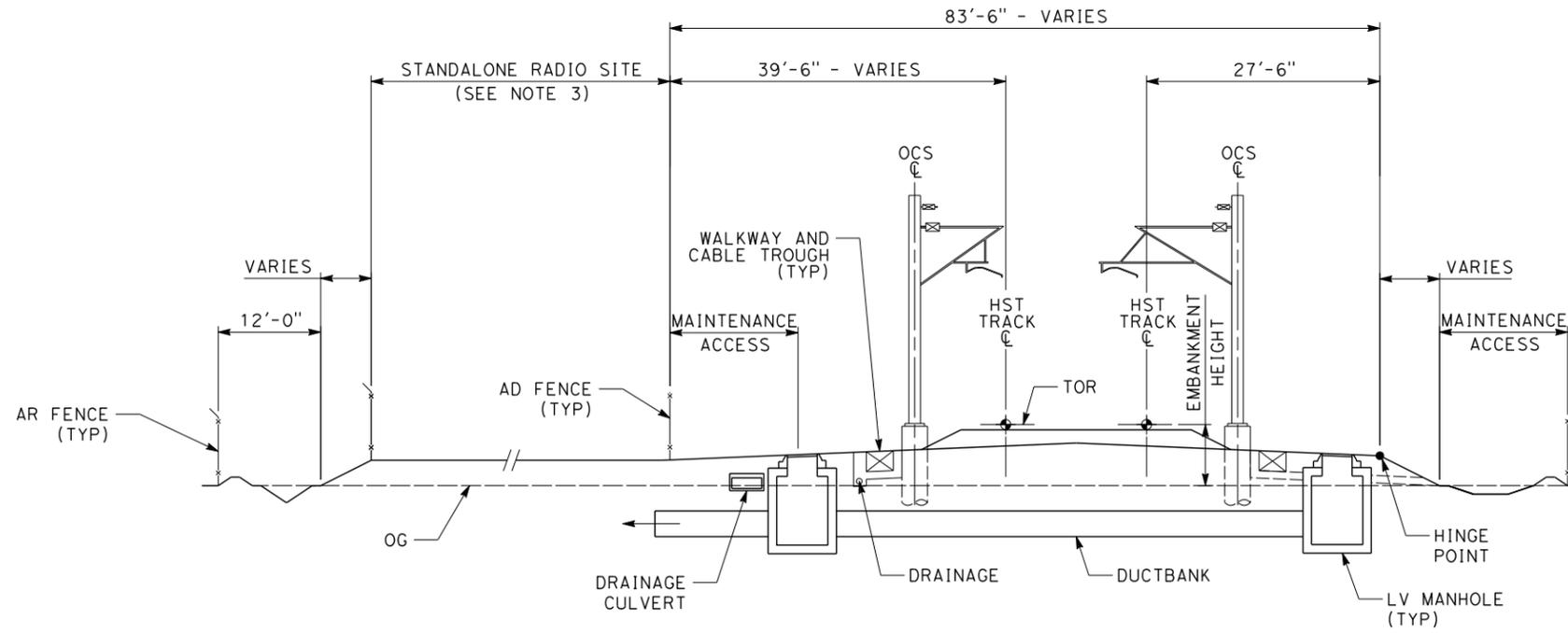


CALIFORNIA HIGH-SPEED TRAIN PROJECT
COMMUNICATIONS DIRECTIVE
 TYPICAL CROSS SECTION
 LOW VOLTAGE MANHOLE / CABLE TROUGH / DUCTBANK
 DETAILS

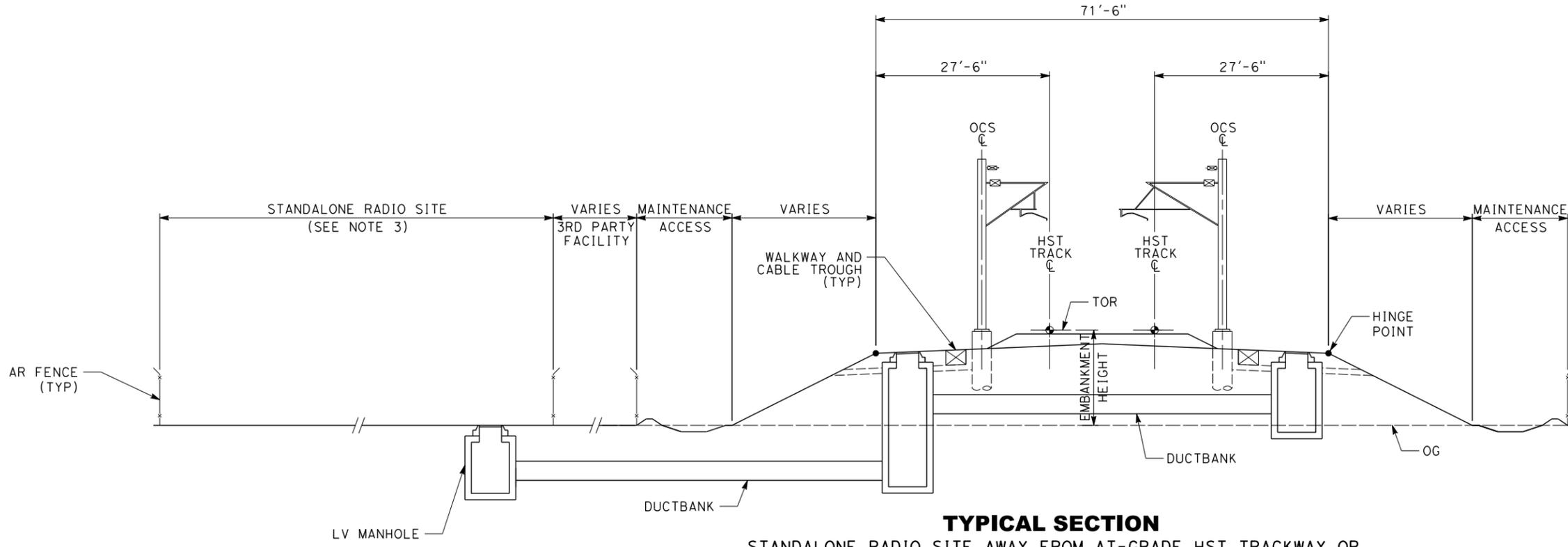
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DRAWING NO.	DD-CO-G023
SCALE	NO SCALE
SHEET NO.	

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TYPICAL SECTION
 STANDALONE RADIO SITE ADJACENT TO AT-GRADE HST TRACKWAY
 WITH EMBANKMENT HEIGHT (TOR-OG) ≤ 10 FEET



TYPICAL SECTION
 STANDALONE RADIO SITE AWAY FROM AT-GRADE HST TRACKWAY OR
 EMBANKMENT HEIGHT (TOR-OG) > 10 FEET

- NOTES:**
1. TYPICAL CROSS-SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR A MINIMUM LENGTH EQUAL TO THE LONGITUDINAL DIMENSION OF THE SYSTEMS SITE.
 2. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
 3. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
 4. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.
 5. FOR STANDALONE RADIO SITE REQUIREMENTS REFER TO COMMUNICATIONS SYSTEMS SITE REQUIREMENTS.
 6. A LOW VOLTAGE UNDERTRACK DUCTBANK WITH 2 LOW VOLTAGE MANHOLES TO BE PROVIDED AT SYSTEMS SITE. REFER TO COMMUNICATIONS DESIGN CRITERIA MANUAL AND DIRECTIVE DRAWINGS FOR LOW VOLTAGE UNDERTRACK CONDUIT DUCTBANK AND MANHOLE REQUIREMENTS.
 7. SYSTEM SITES AWAY FROM TRACKWAY, SEPARATED BY A THIRD-PARTY RIGHT-OF-WAY ARE UNDESIRABLE. AWAY CROSS-SECTION IS ONLY APPLICABLE IF ADJACENT SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
 8. LOW VOLTAGE UNDERGROUND DUCTBANK AND MANHOLE TO BE PROVIDED UNDERNEATH 3RD PARTY RIGHT-OF-WAY TO CONNECT TO LOW VOLTAGE UNDERTRACK MANHOLES AND DUCTBANK.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
C. DALOIA
 DRAWN BY
V. LAVERDE
 CHECKED BY
B. MCNALLY
 IN CHARGE
B. BANKS
 DATE
8/29/2014

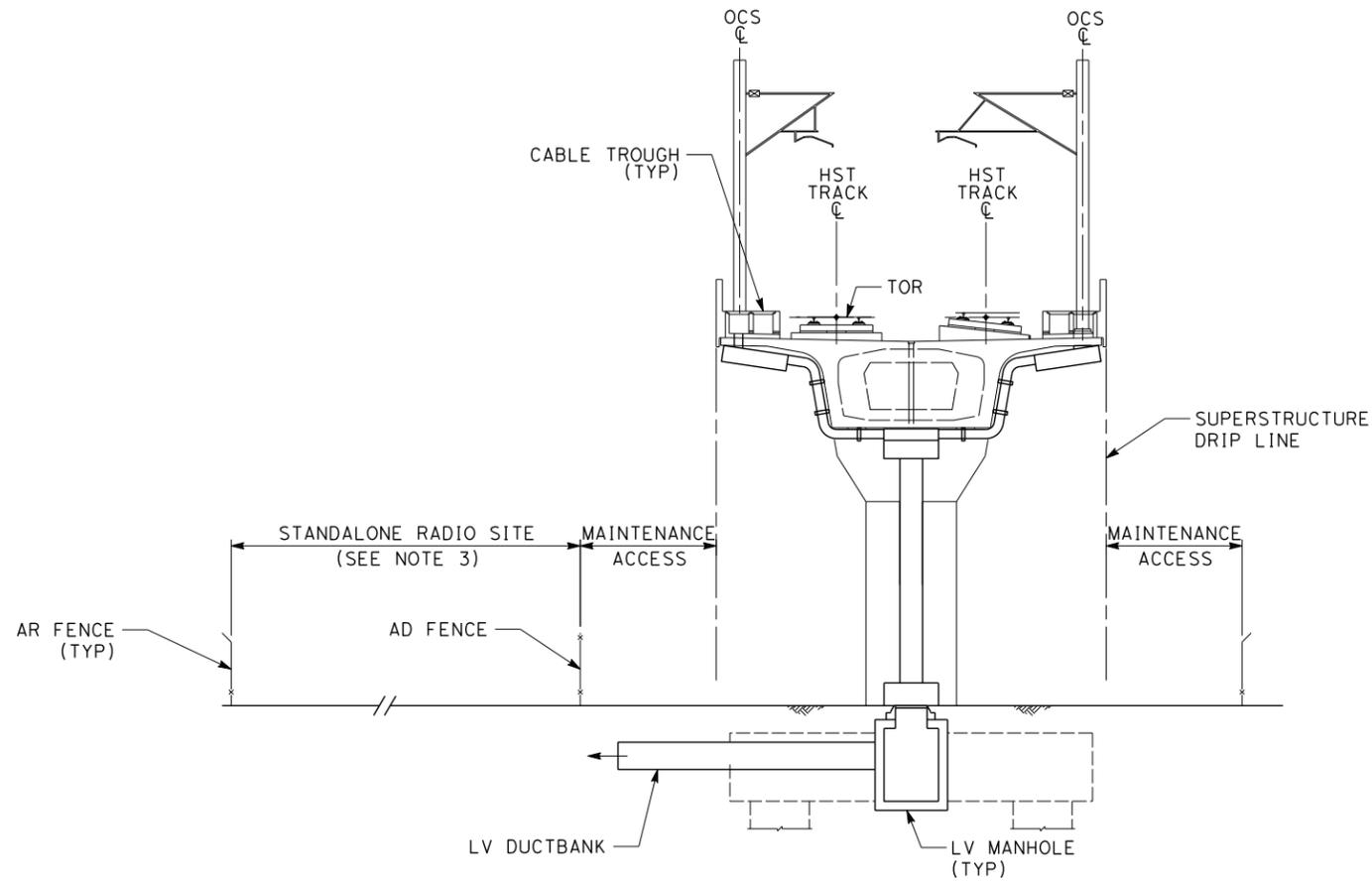


CALIFORNIA HIGH-SPEED TRAIN PROJECT
COMMUNICATIONS DIRECTIVE

 SYSTEMS SITE
 STANDALONE RADIO SITE
 AT-GRADE

CONTRACT NO.
DRAWING NO. DD-CO-G050
SCALE NO SCALE
SHEET NO.

RFP No.: 13-57 – Addendum No. 5 - 10/09/2014



TYPICAL SECTION
STANDALONE RADIO SITE AT AERIAL TRACKWAY

NOTES:

1. SYSTEM SITES AT AERIAL TRACKWAY ARE UNDESIRABLE. THESE CROSS-SECTIONS ARE ONLY APPLICABLE IF AT-GRADE SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
2. TYPICAL CROSS-SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR A MINIMUM LENGTH EQUAL TO THE LONGITUDINAL DIMENSION OF THE SYSTEMS SITE.
3. FOR STANDALONE RADIO SITE REQUIREMENTS REFER TO COMMUNICATIONS SYSTEMS SITE REQUIREMENTS.
4. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
5. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
6. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
C. DALOIA
DRAWN BY
V. LAVERDE
CHECKED BY
B. MCNALLY
IN CHARGE
B. BANKS
DATE
8/29/2014

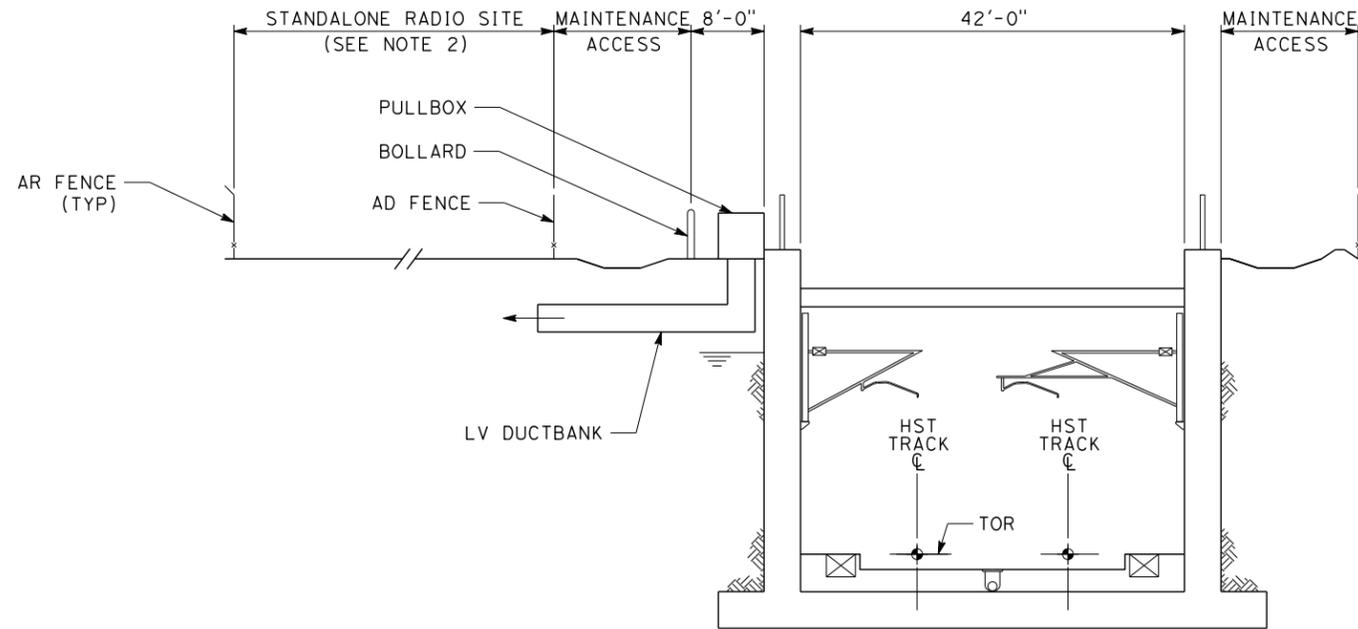


CALIFORNIA HIGH-SPEED TRAIN PROJECT
COMMUNICATIONS DIRECTIVE

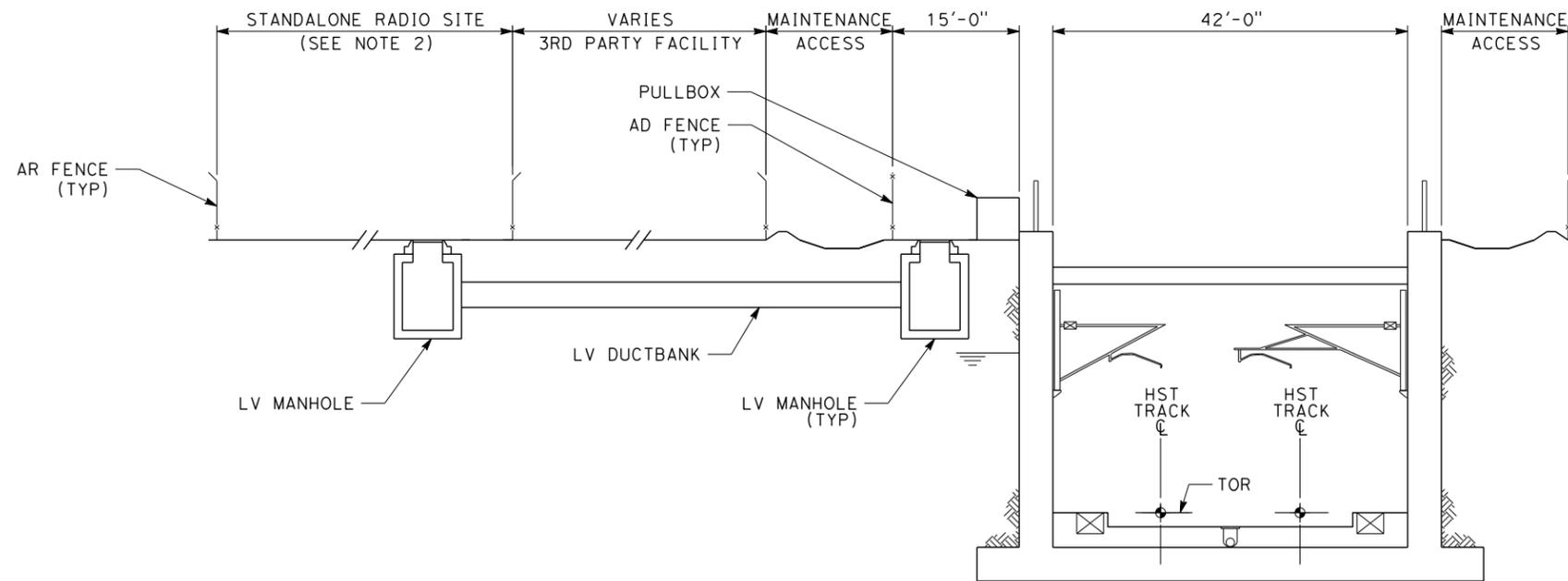
SYSTEMS SITE
STANDALONE RADIO SITE
AERIAL

CONTRACT NO.
DRAWING NO. DD-CO-G051
SCALE NO SCALE
SHEET NO.

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TYPICAL SECTION
STANDALONE RADIO SITE ADJACENT TO TRENCH HST TRACKWAY



TYPICAL SECTION
STANDALONE RADIO SITE AWAY FROM TRENCH HST TRACKWAY

NOTES:

1. SYSTEM SITES AT TRENCH TRACKWAY ARE UNDESIRABLE. THESE CROSS-SECTIONS ARE ONLY APPLICABLE IF AT-GRADE SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
2. FOR RETAINED-FILLED TRACKWAYS, REINFORCED CONCRETE RETAINING WALLS SHALL BE USED AT SYSTEMS SITES.
3. TYPICAL CROSS-SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR A MINIMUM LENGTH EQUAL TO THE LONGITUDINAL DIMENSION OF THE SYSTEMS SITE.
4. FOR STANDALONE RADIO SITE REQUIREMENTS REFER TO COMMUNICATIONS SYSTEMS SITE REQUIREMENTS.
5. FOR ACCESS RESTRICTION FENCING AND BERM DETAILS, REFER TO CIVIL DIRECTIVE DRAWINGS.
6. TRACK SYSTEMS AND DRAINAGE ARE SCHEMATIC AND DO NOT REPRESENT DESIGN. FOR SITE DRAINAGE REQUIREMENTS REFER TO DRAINAGE DIRECTIVE DRAWINGS.
7. FOR ACCESS ROADS, ACCESS GATE AND ACCESS TO TRACKWAY REQUIREMENTS REFER TO SAFETY AND SECURITY DESIGN REQUIREMENTS FOR INFRASTRUCTURE ELEMENTS AND CIVIL DESIGN CRITERIA.
8. SYSTEM SITES AWAY FROM TRACKWAY, SEPARATED BY A THIRD-PARTY RIGHT-OF-WAY ARE UNDESIRABLE. AWAY CROSS-SECTION IS ONLY APPLICABLE IF ADJACENT SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
9. LOW VOLTAGE UNDERGROUND DUCTBANK AND MANHOLES TO BE PROVIDED UNDERNEATH 3RD PARTY RIGHT-OF-WAY.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
C. DALOIA
 DRAWN BY
V. LAVERDE
 CHECKED BY
B. MCNALLY
 IN CHARGE
B. BANKS
 DATE
8/29/2014



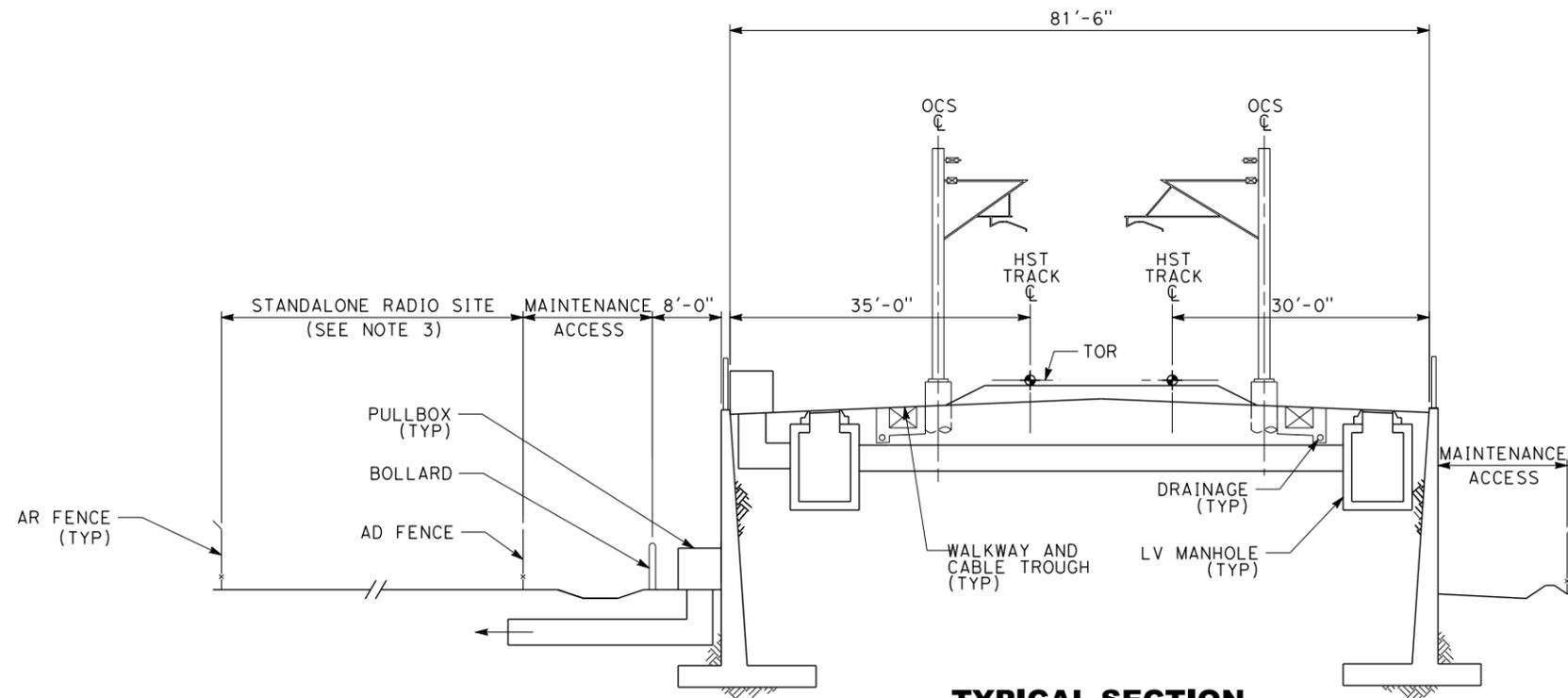
CALIFORNIA HIGH-SPEED TRAIN PROJECT
COMMUNICATIONS DIRECTIVE

 SYSTEMS SITE
 STANDALONE RADIO SITE
 TRENCH

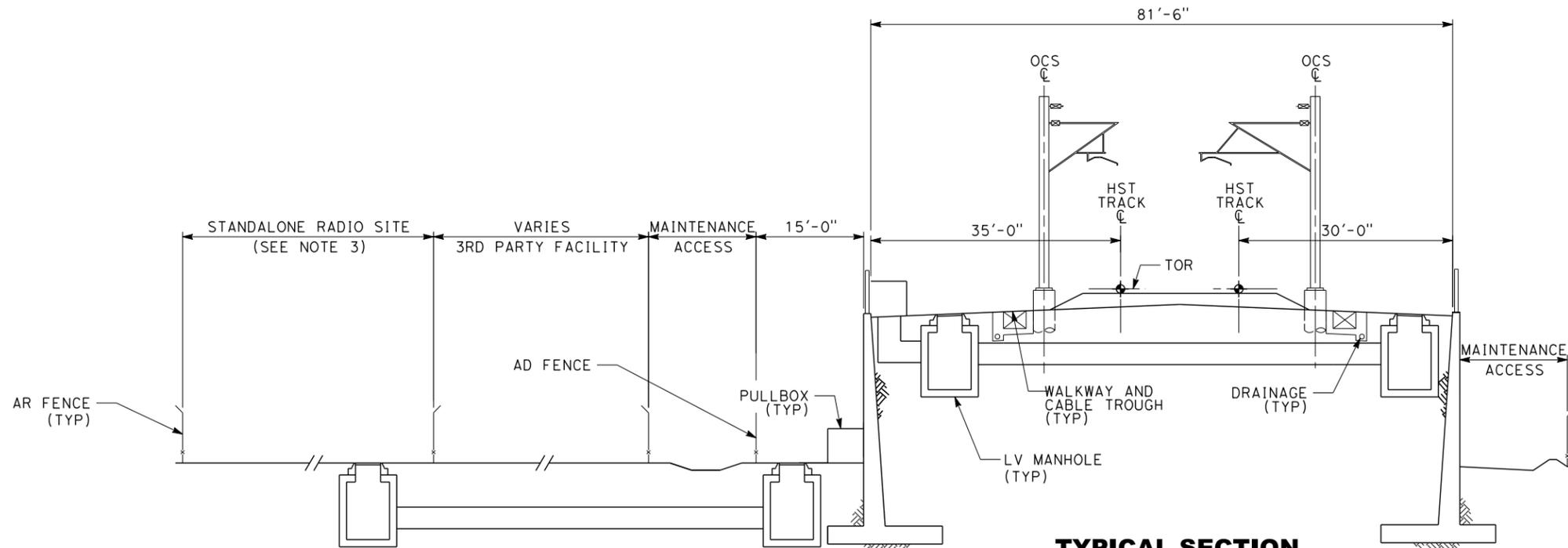
CONTRACT NO.
DRAWING NO. DD-CO-G052
SCALE NO SCALE
SHEET NO.

RFP No.: 13-57 - Addendum No. 5 - 10/09/2014

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TYPICAL SECTION
STANDALONE RADIO SITE ADJACENT TO HST TRACKWAY
RETAINING WALL



TYPICAL SECTION
STANDALONE RADIO SITE AWAY FROM HST TRACKWAY
RETAINING WALL

NOTES:

1. SYSTEM SITES AT RETAINED FILL TRACKWAY ARE UNDESIRABLE. THESE CROSS-SECTIONS ARE ONLY APPLICABLE IF AT-GRADE SOLUTION IS DEMONSTRATED TO VIOLATE SITE SPACING REQUIREMENTS OR OTHER CRITICAL CRITERIA.
2. FOR RETAINED-FILLED TRACKWAYS, REINFORCED CONCRETE RETAINING WALLS SHALL BE USED AT SYSTEMS SITES.
3. TYPICAL CROSS-SECTIONAL WIDTH SHOWN SHALL BE PROVIDED FOR A MINIMUM LENGTH EQUAL TO THE LONGITUDINAL DIMENSION OF THE SYSTEMS SITE.
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REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
C. DALOIA
 DRAWN BY
V. LAVERDE
 CHECKED BY
B. MCNALLY
 IN CHARGE
B. BANKS
 DATE
8/29/2014

**PARSONS
BRINCKERHOFF**



CALIFORNIA
HIGH-SPEED RAIL AUTHORITY

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

SYSTEMS SITE
STANDALONE RADIO SITE
RETAINED-FILL

CONTRACT NO.
DRAWING NO.
DD-CO-G053
SCALE
NO SCALE
SHEET NO.

RFP No.: 13-57 – Addendum No. 5 - 10/09/2014