

**Dallas to Houston High-Speed Rail
Draft Environmental Impact Statement**

Appendix G



**TEXAS
CENTRAL**

**Dallas to Houston High-Speed Rail
Draft Environmental Impact Statement**

**Appendix G:
Dallas to Houston High-Speed Rail
Passenger Service from Houston to Dallas
Final Draft Conceptual Engineering
Plans and Details
Set 1 of 21**



**TEXAS
CENTRAL**

Transmittal

To	Megan Inman, AECOM	Date	November 17, 2017
Copies	FRA: K. Wright AECOM: J. Smiley TCRR: A. Greer File: HOU TCR	TRA Number	00211
From	Christopher Taylor, Arup		
Subject	FINAL DRAFT CONCEPTUAL ENGINEERING DESIGN DOCUMENTATION – FDCE v7 Transmittal Final Version for Publication with Draft Environmental Impact Statement (DEIS) FDCE for Public Release		

We Are Sending You: ENTER DOCUMENT TYPE CODE(S) ONLY

Date of Document	DEIS Appendix	Set # of #	Title of Document or Drawing Title
11/17/17	-	-	234180-AFN-TRA-00211 FDCEv7.PDF (this transmittal)
REPORTS			
9/15/17	F	1 of 2	TCRR FDCE v7 REPORT.PDF (<i>Final Draft Conceptual Engineering Report v7 – Project Definition for publication with Draft EIS</i>)
9/15/17	F	2 of 2	TCRR CONSTRUCTABILITY v4 REPORT.PDF
TCRR FDCE v7 DWGS VOLUME 1 (General Sheets and Typical Sections)			
9/15/17	G	1 of 21	TCRR FDCE v7 DWGS VOLUME 1.PDF (<i>General Sheets and Typical Sections</i>)
TCRR FDCE v7 DWGS VOLUME 2 (Railway Alignment Plan and Profile Sheets)			
9/15/17	G	2 of 21	TCRR FDCE v7 DWGS VOLUME 2-1.PDF (<i>Houston Segment</i>)
9/15/17	G	3 of 21	TCRR FDCE v7 DWGS VOLUME 2-2.PDF (<i>West of Teague Segment</i>)
9/15/17	G	4 of 21	TCRR FDCE v7 DWGS VOLUME 2-3.PDF (<i>IH-45 Segment</i>)
9/15/17	G	5 of 21	TCRR FDCE v7 DWGS VOLUME 2-4.PDF (<i>Navarro West Segment</i>)
9/15/17	G	6 of 21	TCRR FDCE v7 DWGS VOLUME 2-5.PDF (<i>Navarro East Segment</i>)
9/15/17	G	7 of 21	TCRR FDCE v7 DWGS VOLUME 2-6.PDF (<i>Ellis West Segment</i>)
9/15/17	G	8 of 21	TCRR FDCE v7 DWGS VOLUME 2-7.PDF (<i>Ellis East Segment</i>)
9/15/17	G	9 of 21	TCRR FDCE v7 DWGS VOLUME 2-8.PDF (<i>Dallas Segment</i>)
TCRR FDCE v7 DWGS VOLUME 3 (Stations, Maintenance Facilities, and Railway Systems Sheets)			
9/15/17	G	10 of 21	TCRR FDCE v7 DWGS VOLUME 3-1.PDF (<i>Stations</i>)
9/15/17	G	11 of 21	TCRR FDCE v7 DWGS VOLUME 3-2.PDF (<i>Maintenance Facilities, Yards and Shops</i>)
9/15/17	G	12 of 21	TCRR FDCE v7 DWGS VOLUME 3-3.PDF (<i>Rail Systems</i>)
TCRR FDCE v7 DWGS VOLUME 4 (Roadway Plan Sheets)			
9/15/17	G	13 of 21	TCRR FDCE v7 DWGS VOLUME 4-1.PDF (<i>Houston Segment</i>)
9/15/17	G	14 of 21	TCRR FDCE v7 DWGS VOLUME 4-2.PDF (<i>West of Teague Segment</i>)
9/15/17	G	15 of 21	TCRR FDCE v7 DWGS VOLUME 4-3.PDF (<i>IH-45 Segment</i>)
9/15/17	G	16 of 21	TCRR FDCE v7 DWGS VOLUME 4-4.PDF (<i>Navarro West Segment</i>)
9/15/17	G	17 of 21	TCRR FDCE v7 DWGS VOLUME 4-5.PDF (<i>Navarro East Segment</i>)

Document Format	Date of Document	Number of Copies	Title of Document or Drawing Title
9/15/17	G	18 of 21	TCRR FDCE v7 DWGS VOLUME 4-6.PDF (<i>Ellis West Segment</i>)
9/15/17	G	19 of 21	TCRR FDCE v7 DWGS VOLUME 4-7.PDF (<i>Ellis East Segment</i>)
9/15/17	G	20 of 21	TCRR FDCE v7 DWGS VOLUME 4-8.PDF (<i>Dallas Segment</i>)
TCRR FDCE v7 DWGS VOLUME 5 (<i>Wildlife Crossing Sheets</i>)			
9/15/17	G	21 of 21	TCRR FDCE v7 DWGS VOLUME 5.PDF (<i>Wildlife Crossing Sheets</i>)

These are transmitted as checked below:

- Deliverable For Information As requested For your use
 For approval For Review and Comment Return Other: Publication with DEIS

REMARKS:

The files transmitted herewith represent a final submittal of the Final Draft Conceptual Engineering (FDCE) design report and drawings for the Dallas to Houston High-Speed Rail Project. This v7 submittal of the FDCE report is intended for distribution on the FRA website with the Draft EIS (DEIS) for public review.



Delivered VIA Outlook Email Hand Delivery Courier PMS Notification USPS

PREPARED BY: Christopher Taylor **Date:** November 17, 2017

IF ENCLOSURES ARE NOT AS NOTED, KINDLY NOTIFY US AT ONCE.



**TEXAS
CENTRAL**



DALLAS TO HOUSTON HIGH-SPEED RAIL
PASSENGER SERVICE FROM HOUSTON TO DALLAS

**FINAL DRAFT
CONCEPTUAL ENGINEERING PLANS AND DETAILS**
VOLUME 1 - GENERAL NOTES

SEPTEMBER 15, 2017



U.S. Department of Transportation
Federal Railroad Administration

ARUP

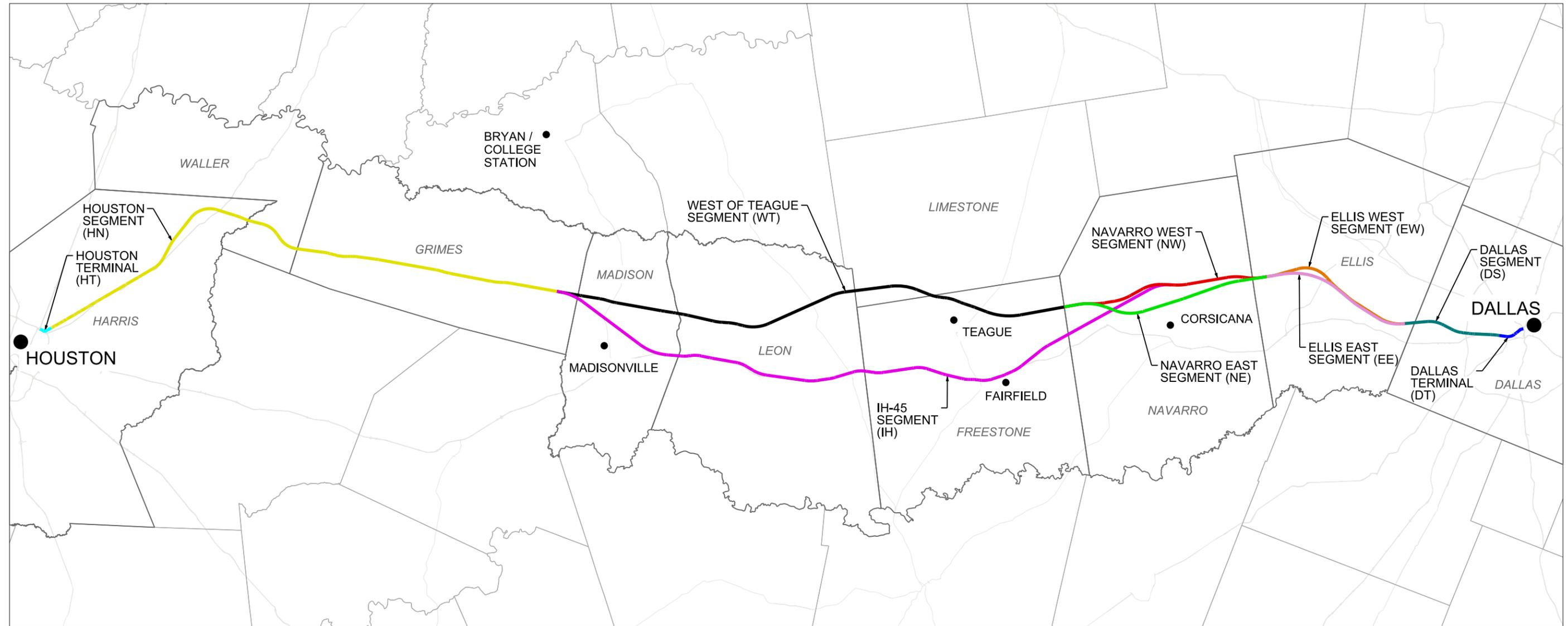
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COVER SHEET

1-1
GENERAL



ALIGNMENT ALTERNATIVE	OE SEGMENT ID	SEGMENT NAMES	SEGMENT ABBREVIATION
A	5, 4A, 3A, 2A, 1	DALLAS SEGMENT, ELLIS WEST SEGMENT, NAVARRO WEST SEGMENT, WEST OF TEAGUE SEGMENT, HOUSTON SEGMENT	DS, EW, NW, WT, HN
B	5, 4A, 3B, 2A, 1	DALLAS SEGMENT, ELLIS WEST SEGMENT, NAVARRO EAST SEGMENT, WEST OF TEAGUE SEGMENT, HOUSTON SEGMENT	DS, EW, NE, WT, HN
C	5, 4A, 2B, 1	DALLAS SEGMENT, ELLIS WEST SEGMENT, IH-45 SEGMENT, HOUSTON SEGMENT	DS, EW, IH, HN
D	5, 4B, 3A, 2A, 1	DALLAS SEGMENT, ELLIS EAST SEGMENT, NAVARRO WEST SEGMENT, WEST OF TEAGUE SEGMENT, HOUSTON SEGMENT	DS, EE, NW, WT, HN
E	5, 4B, 3A, 2A, 1	DALLAS SEGMENT, ELLIS EAST SEGMENT, NAVARRO EAST SEGMENT, WEST OF TEAGUE SEGMENT, HOUSTON SEGMENT	DS, EE, NE, WT, HN
F	5, 4B, 2B, 1	DALLAS SEGMENT, ELLIS EAST SEGMENT, IH-45 SEGMENT, HOUSTON SEGMENT	DS, EE, IH, HN

NOTES:
 1. REFER TO FDCE v5 FOR SEGMENT NAMES AND ALIGNMENT ALTERNATIVES.



REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
D. THOMPSON
 DRAWN BY
D. THOMPSON
 CHECKED BY
R. BURNS
 IN CHARGE
C. TAYLOR
 DATE
09/15/2017

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Client

TEXAS CENTRAL
 1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title
GENERAL LOCATION PLAN

Scale
 AS SHOWN
 Drawing Status
FINAL DRAFT
 Job No: 234180 Drawing No: GEN-00-00002 Rev: 01

VOLUME 1 - GENERAL SHEETS & TYPICAL SECTIONS

Table with columns: DRAWING NO., DRAWING DESCRIPTIONS. Includes sections: 1-1 GENERAL COVER SHEET, 1-2 RAILWAY TYPICAL SECTIONS, 1-3 ROADWAY AND GRADE SEPARATION TYPICAL SECTIONS, 1-4 CIVIL STRUCTURES TYPICAL DETAILS, 1-5 CIVIL UTILITIES TYPICAL DETAILS, 1-6 GENERAL - ALIGNMENT CURVE DATA TABLES.

VOLUME 2 - RAILWAY ALIGNMENT PLAN AND PROFILE SHEETS

Table with columns: DRAWING NO., DRAWING DESCRIPTIONS. Section: 2-1 HOUSTON SEGMENT. Lists drawing numbers and descriptions for Houston Segment alignment and profile sheets.

Table with columns: DRAWING NO., DRAWING DESCRIPTIONS. Lists drawing numbers and descriptions for Houston Segment alignment and profile sheets, continuing from Volume 2.

Table with columns: DRAWING NO., DRAWING DESCRIPTIONS. Lists drawing numbers and descriptions for West of Teague Segment alignment and profile sheets.

Table with columns: REV, DATE, BY, CHK, APP, DESCRIPTION. Revision table for the drawing.

Table with columns: DESIGNED BY, DRAWN BY, CHECKED BY, IN CHARGE, DATE. Design and drawing information table.



Table with columns: Client, Drawing Title, Scale, Drawing Status, Job No, Drawing No, Rev. Project information table.

VOLUME 2 - RAILWAY ALIGNMENT PLAN AND PROFILE SHEETS

Table with columns: DRAWING NO., DRAWING DESCRIPTIONS. Includes sections for 2-2 WEST OF TEAGUE SEGMENT and 2-3 IH-45 SEGMENT.

Table with columns: Drawing No., Description. Lists various drawing numbers and their corresponding descriptions for segments like IH-45 SEGMENT and NAVARRO WEST SEGMENT.

Table with columns: Drawing No., Description. Lists various drawing numbers and their corresponding descriptions for segments like NAVARRO WEST SEGMENT and ELLIS WEST SEGMENT.

Table with columns: REV, DATE, BY, CHK, APP, DESCRIPTION. Revision table for the drawing.

Table with columns: DESIGNED BY, DRAWN BY, CHECKED BY, IN CHARGE, DATE. Designer information table.

Project information block including logos for ARUP, FREESE & NICHOLS, TEXAS CENTRAL, drawing title 'GENERAL INDEX SHEET 2 OF 5', scale 'NO SCALE', and drawing status 'FINAL DRAFT'.

PLOT TIME: 9/27/2017 10:20:31 AM

PLOT BY: M-YPWICS01S

HOUSTON SEGMENT - CIVIL - KEY MAP - Sheet 2 of 4 - HN1 1024+00 TO HN1 2082+00

Table with columns: DRAWING NO., DRAWING DESCRIPTIONS. Includes sections for 2-6 ELLIS WEST SEGMENT, 2-7 ELLIS EAST SEGMENT, and 2-8 DALLAS SEGMENT.

VOLUME 3 - STATIONS, MAINTENANCE FACILITIES AND RAILWAY SYSTEMS SHEETS

Table with columns: DRAWING NO., DRAWING DESCRIPTIONS. Includes section 3-1 STATIONS with drawing numbers STA-00-02000 through STA-HN-01003.

Table with columns: DRAWING NO., DRAWING DESCRIPTIONS. Includes sections 3-2 MAINTENANCE FACILITIES, YARDS AND SHOPS and 3-3 STATIONS, MAINTENANCE FACILITIES AND RAILWAY SYSTEMS SHEETS with drawing numbers MNT-00-02002 through MNT-DS-04039.

Table with columns: REV, DATE, BY, CHK, APP, DESCRIPTION. Includes a 'DESIGNED BY' section for D. THOMPSON and 'IN CHARGE' for C. TAYLOR.

Project information block including logos for ARUP, FREESE & NICHOLS, and TEXAS CENTRAL. Includes drawing title 'GENERAL INDEX SHEET 3 OF 5', scale 'NO SCALE', and drawing status 'FINAL DRAFT'.

PLOT TIME: 9/25/2017 5:41:24 PM

VOLUME 3 - STATIONS, MAINTENANCE FACILITIES AND RAILWAY SYSTEMS SHEETS

Table with 2 columns: DRAWING NO. and DRAWING DESCRIPTIONS. Includes sections for 3-2 MAINTENANCE FACILITIES, YARDS AND SHOPS and 3-3 RAILWAY SYSTEMS.

VOLUME 4 - ROADWAY PLAN SHEETS

Table with 2 columns: DRAWING NO. and DRAWING DESCRIPTIONS. Includes section for 4-1 HOUSTON SEGMENT with numerous drawing entries.

Table with 2 columns: Drawing No. and Description. Includes sections for 4-2 WEST OF TEAGUE SEGMENT, 4-3 IH-45 SEGMENT, and 4-4 HOUSTON SEGMENT.

Table with 5 columns: REV, DATE, BY, CHK, APP, and DESCRIPTION. Used for revision tracking.

DESIGNED BY D. THOMPSON
DRAWN BY D. THOMPSON
CHECKED BY R. BURNS
IN CHARGE C. TAYLOR
DATE 09/15/2017



Drawing Title: GENERAL INDEX SHEET 4 OF 5
Scale: NO SCALE
Drawing Status: FINAL DRAFT
Job No: 234180
Drawing No: GEN-00-00006
Rev: 01

PLOT TIME: 9/25/2017 5:42:37 PM
PLOT BY: MYPWCS01S

GENERAL NOTES:

1. THESE DRAWINGS ACCOMPANY FINAL DRAFT CONCEPTUAL ENGINEERING REPORT (FDCE) V7 REPORT DATED SEPTEMBER 15, 2017.
2. DRAWING SET INCLUDES FIVE (5) VOLUMES.
3. CONCEPTUAL ENGINEERING WAS DEVELOPED TO IDENTIFY PROJECT LIMIT OF DISTURBANCE (LOD), OR "PROJECT FOOTPRINT". CONCEPTUAL ENGINEERING DRAWINGS AND FDCE REPORT ARE ISSUED TO PROVIDE PROJECT DEFINITION FOR ENVIRONMENTAL ANALYSES ONLY. FINAL DESIGN WOULD BE DEVELOPED TO MITIGATE ANY IMPACTS IDENTIFIED THROUGH ENVIRONMENTAL ANALYSES, NOT FOR CONSTRUCTION.
4. FOR STANDARD GENERAL ABBREVIATIONS, SEE DRAWING GEN-00-0009.
5. FOR STANDARD GENERAL SYMBOLS, SEE DRAWINGS GEN-00-0009.
6. "ORIGINAL GROUND" SHOWN ON PROFILES REFERS TO THE APPROXIMATE EXISTING GROUND LINE AT HSR CENTERLINE AS SHOWN ON PLAN AND PROFILE DRAWINGS.
7. ALL HORIZONTAL AND VERTICAL DISTANCES ARE IN US CUSTOMARY UNITS EXCEPT AS NOTED OTHERWISE.
8. GENERAL NOTES FOR PROJECT ELEMENTS INCLUDED ON GENERAL NOTES PAGES. REFER TO INDIVIDUAL DISCIPLINE DRAWINGS FOR ADDITIONAL NOTES.

BASEMAPPING NOTES:

1. DTM DATA SHOWN ON THE DRAWINGS WAS OBTAINED FROM THE TEXAS NATURAL RESOURCES INFORMATION SYSTEM (TNRIS) AND HOUSTON-GALVESTON AREA COUNCIL (HGAC).
 - DALLAS COUNTY LIDAR, 2009, SOURCED FROM TNRIS.
 - HGAC LIDAR, 2008.
 - TNRIS LIDAR, 2009-2013.
 - TNRIS STRATMAP CONTOURS, 1997.
2. LIDAR SOURCES WERE FILTERED TO SHOW ONLY BARE EARTH, AND SUPPLEMENTED BY CONTOUR DATA WHERE LIDAR SOURCES WERE NOT AVAILABLE.
3. NAD 83 HORIZONTAL CONTROL DATUM WAS USED FOR HORIZONTAL COORDINATE VALUES.
4. NAVD 88 VERTICAL DATUM WAS USED FOR ELEVATION VALUES.
5. ALL DATA HAS BEEN REPROJECTED TO TEXAS STATE PLANE, SOUTH CENTRAL, CENTRAL, AND NORTH CENTRAL ZONES, US SURVEY FEET.
6. AERIAL IMAGERY WAS OBTAINED FROM ARCGIS ONLINE SERVICES. SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEX, GETMAPPING, AEROGRIID, IGN, IGP, SWISSTOPO, AND THE GIS USER COMMUNITY.
7. THE BACKGROUND IMAGERY ON THE PLAN SHEETS MAY SHOW BUILDINGS AND OTHER INFRASTRUCTURE FEATURES THAT HAVE SUBSEQUENTLY BEEN REMOVED AND/OR DEMOLISHED. WHERE IT HAS BEEN VERIFIED THAT BUILDINGS HAVE BEEN REMOVED, THE AERIAL IMAGERY ON THE PLAN SHEET IS MARKED WITH HATCHING.

LOD NOTES:

1. THE PROJECT LOD WAS DEVELOPED TO DEFINE A CONSERVATIVE ESTIMATE OF THE POTENTIAL "PROJECT FOOTPRINT" FOR ENVIRONMENTAL ANALYSIS AND DOES NOT REPRESENT THE FINAL HSR RIGHT-OF-WAY (ROW). PROPERTY WITHIN THE LOD MAY BE RETURNED TO ADJACENT LANDOWNERS OR OTHER PRIVATE PARTIES FOLLOWING PROJECT CONSTRUCTION OR MAY BE TRANSFERRED TO ROADWAY OR UTILITY AUTHORITY AS APPROPRIATE. PROPOSED PROJECT WORKS WITHIN PRIVATE PROPERTIES WOULD BE SUBJECT TO NEGOTIATION WITH LANDOWNERS. ANY TEMPORARY OR PERMANENT USE OF LAND OWNED BY TXDOT, COUNTY, MUNICIPAL, OR OTHER PUBLIC ENTITIES WOULD REQUIRE APPROPRIATE APPROVALS.
2. LOD USED FOR EIS ANALYSIS FOOTPRINT.

TRACK NOTES:

1. THE ALIGNMENT SHOWN ON THE PLAN AND PROFILE DRAWINGS REPRESENTS THE CENTERLINE OF THE TWO-TRACK HSR MAINLINE TRACKS.
2. THE PROFILE SHOWN ON THE PLAN AND PROFILE DRAWINGS REPRESENTS THE TOP OF THE LOWER RAIL THROUGH HORIZONTAL CURVES AND SPIRALS FOR THE TWO-TRACK HSR SYSTEM.
3. THE PROPOSED HSR SYSTEM INCLUDES TWO TRACKS WITH ADDITIONAL TRACKS AT STATIONS, MAINTENANCE OF WAY, AND TRAINSET MAINTENANCE FACILITIES, AS SHOWN ON DRAWINGS.
4. MAINLINE CROSSOVERS ARE PROVIDED AT THE ENTRANCE AND EXIT OF ALL STATIONS, MAINTENANCE OF WAY (MOW) FACILITIES, AND TRAINSET MAINTENANCE FACILITIES (TMFS).

PLAN AND PROFILE GENERAL NOTES:

1. SECTION TYPE DETAIL SHOWN ON PROFILE SHEETS REPRESENT A SIMPLIFIED SUMMARY OF THE MAJOR STRUCTURAL TYPE OF THE PROPOSED HSR. THE ACTUAL PLAN DIMENSIONS TAKE PRECEDENCE OVER THE SECTION TYPE IDENTIFIED IN PROFILE.
2. ALL EXISTING AND PROPOSED STRUCTURAL ELEMENTS SHOWN ARE BASED ON CONCEPTUAL ENGINEERING DESIGN AND AERIAL IMAGERY AND MAY BE REVISED BASED ON MORE ADVANCED SURVEY AND DESIGNS.
3. SEE SHEET GEN-00-00010 FOR A KEY TO INFORMATION SHOWN ON PLAN AND PROFILE DRAWINGS.
4. LIMITS OF SPECIAL TRACK WORK ARE INDICATED ON THE PLAN SHEETS. ADDITIONAL DETAILS FOR MAINTENANCE OF WAY FACILITIES AND TRAINSET MAINTENANCE FACILITIES ARE SHOWN ON THE VOLUME 3 DRAWINGS.

ROADWAY NOTES:

1. EXISTING ROADWAY LOCATIONS ARE APPROXIMATE BASED ON AERIAL MAPS.
2. PROPOSED ROADWAY WORKS, INCLUDING NEW ROADWAYS, RECONFIGURATION AND REALIGNMENTS OF EXISTING ROADWAYS, AND ROADWAY REMOVALS ARE CONCEPTUAL IN NATURE AND WERE DEVELOPED TO IDENTIFY GENERAL CONFIGURATION AND LOCATION FOR ENVIRONMENTAL IMPACT ANALYSES. ROADWAY WORKS WOULD BE DETAILED DURING FINAL DESIGN AND WOULD COMPLY WITH APPLICABLE STATE, CITY, COUNTY, OR LOCAL REQUIREMENTS.
3. SEE SHEET GEN-00-00011 FOR A KEY TO INFORMATION SHOWN ON ROADWAY PLAN DRAWINGS.
4. ROADWAY GEOMETRY IS BASED ON TXDOT ROADWAY DESIGN MANUAL. ROAD DESIGN SPEEDS MATCH EXISTING POSTED SPEED LIMITS OR MATCH DESIGN SPEED DETERMINED FROM TXDOT ROADWAY FUNCTIONAL CLASSIFICATION SPEED GUIDELINES, WHICHEVER IS GREATER.
5. SUPERELEVATION TRANSITION LENGTHS WERE NOT DETAILED IN ROADWAY APPROACH DESIGN.
6. SEE DRAWINGS CVL-00-03030 TO CVL-00-03036 FOR TYPICAL ROADWAY CROSS SECTIONS.
7. ROADWAY REMOVALS ARE NOT SHOWN ON RAIL PLAN AND PROFILE SHEETS. REFER TO ROADWAY PLAN SHEETS IN VOLUME 3 FOR ALL ROADWAY REMOVALS.
8. NOT ALL PRIVATE ROADS AND DRIVEWAYS ARE REPRESENTED ON THE RAIL PLAN AND PROFILE SHEETS.
9. THE CLEARANCE ENVELOPES SHOWN ON THE RAIL PLAN AND PROFILE SHEETS REPRESENT THE APPROXIMATE ROADWAY CLEARANCE ENVELOPE. THE BOTTOM OF THE CLEARANCE ENVELOPE REPRESENTS THE TOP OF THE ROADWAY PAVEMENT. CLEARANCE ENVELOPE DOES NOT INCLUDE ROADWAY STRUCTURAL ELEMENTS.
10. ROADWAY ELEVATIONS FOR ROADWAY OVER RAILWAY CROSSING DO NOT REPRESENT THE PROPOSED ROADWAY ELEVATION, BUT RATHER THE MINIMUM HEIGHT REQUIRED FOR CLEARANCES, INCLUDING ALLOWANCES FOR ROADWAY STRUCTURAL ELEMENTS. SEE FDCE REPORT FOR ADDITIONAL INFORMATION.
11. ROADWAY TYPICAL SECTIONS ACCOUNT FOR THE NECESSARY SPACE TO CONSTRUCT TEMPORARY ROADWAYS DURING CONSTRUCTION. CLOSE COORDINATION WITH ROADWAY AUTHORITIES, COMMUNITIES, AND EMERGENCY RESPONSE ENTITIES WOULD BE UNDERTAKEN DURING FINAL DESIGN AND CONSTRUCTION TO ENSURE ACCESS DURING THE CONSTRUCTION PHASE.
12. USE OF TXDOT RIGHT-OF-WAY FOR PERMANENT IMPROVEMENTS WILL REQUIRED THE APPROPRIATE APPROVAL FROM TXDOT.

TYPICAL SECTIONS NOTES:

1. SECTIONS ILLUSTRATE TYPICAL REQUIREMENTS TO GUIDE CONCEPTUAL ENGINEERING DESIGN DEVELOPMENT. LOCATION SPECIFIC CONDITIONS WOULD ESTABLISH REQUIREMENTS AT EACH LOCATION AND OVERALL WIDTH OF LIMIT OF DISTURBANCE WOULD VARY AS IDENTIFIED ON DIMENSION LINES AND IN NOTES.
2. OFFSET BETWEEN INFRASTRUCTURE ELEMENTS SUCH AS DISTANCE BETWEEN EMBANKMENT, FENCES, DRAINAGE SWALE, ACCESS ROAD, ETC. WOULD VARY BASED ON LOCAL REQUIREMENTS AND SITE SPECIFIC CONDITIONS.
3. TYPICAL ROADWAY DRAINAGE SYSTEM PROVIDED AS SHOWN IN TYPICAL SECTIONS. LOCATION SPECIFIC CONFIGURATION AND SIZE WOULD BE ADVANCED DURING MORE DETAILED DESIGN.
4. LOCATION SPECIFIC CONDITIONS WOULD DICTATE FENCING REQUIREMENTS.
5. EMBANKMENT HEIGHTS AND CUT DEPTHS VARY WITH SURROUNDING GRADE AND RAIL PROFILE ELEVATION.
6. CRASH BARRIERS NOT SHOWN. LOCATION SPECIFIC CONDITIONS WILL DICTATE CRASH BARRIER REQUIREMENTS TO ENSURE SAFETY AND TO SATISFY APPLICABLE REGULATORY REQUIREMENTS.
7. SUBSURFACE GROUND IMPROVEMENTS ARE NOT SHOWN AND WILL BE BASED ON SITE SPECIFIC REQUIREMENTS.
8. RAIL HEIGHT VARIES WITH SURROUNDING GRADE AND RAIL PROFILE. THE BOTTOM OF SUBBALLAST SHALL BE NO LESS THAN 2FT ABOVE 100 YEAR FLOODPLAIN.

UTILITIES NOTES:

1. REFER TO THE FDCE REPORT FOR A LIST OF MAJOR UTILITY CROSSINGS, THEIR ASSUMED SIZE, AND ASSOCIATED LOCATIONS ALONG THE ALIGNMENT.
2. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE ONLY AND ARE BASED ON INFORMATION RECEIVED, AS DOCUMENTED IN THE FINAL DRAFT CONCEPTUAL ENGINEERING REPORT.
3. NO FIELD SURVEYS HAVE BEEN CONDUCTED TO LOCATE AND VERIFY UTILITY LOCATIONS.
4. NOT ALL EXISTING UNDERGROUND UTILITIES HAVE BEEN SHOWN. REFER TO THE FDCE REPORT FOR MAJOR UTILITIES INCLUDED IN PROJECT MAPPING.
5. LOD NOT SHOWN FOR UTILITIES THAT ARE NOT IMPACTED BY THE ALIGNMENT. ONLY MAJOR UTILITIES THAT ARE PROTECTED, RELOCATED OR ELEVATED ARE SHOWN ON THE PLAN AND PROFILE VIEW. REFER TO DRAWING NO. CUT-00-0100 FOR TYPICAL UTILITY CROSSING DETAILS. UTILITY LODS FOR FUTURE PROPOSED CONNECTIONS TO TPSS FACILITIES ARE SHOWN.
6. FOR PARALLEL TRANSMISSION LINE CROSSINGS OVER NEW ELEVATED ROADWAYS, A LOD IS SHOWN ON THE PLAN ONLY. REFER TO DRAWING NO. CUT-00-0100 FOR TYPICAL UTILITY CROSSING DETAILS.
7. MANY UTILITY CONFLICTS ALONG THE HEMPSTEAD ROAD CORRIDOR IN HOUSTON WOULD BE RESOLVED DURING FINAL DESIGN. A CONTINUOUS LOD IS SHOWN ON THE DRAWINGS TO REPRESENT THAT UTILITIES WOULD BE RELOCATED ON ONE OR BOTH SIDES OF THE ROADWAY AS REQUIRED. ALL WORK WOULD BE COORDINATED WITH UTILITY PROVIDERS TO MINIMIZE IMPACTS AND COORDINATE WITH OTHER PLANNED UTILITY PROJECTS ALONG CORRIDOR.
8. FOR UTILITY WORK REQUIRED BY UTILITY COMPANIES, EACH UTILITY OWNER WOULD DEVELOP THE DESIGN IN ACCORDANCE WITH APPLICABLE DESIGN STANDARDS AND REGULATORY AGENCY REVIEW PROCESSES.

DRAINAGE NOTES:

1. PROPOSED DETENTION BASIN LOCATIONS AND DIMENSIONS SHOWN ARE APPROXIMATE AND ARE INTENDED FOR PRELIMINARY PLANNING AND ENVIRONMENTAL IMPACT ANALYSIS PURPOSES ONLY. SITE SPECIFIC CONFIGURATIONS WOULD BE DEVELOPED DURING FINAL DESIGN IN ACCORDANCE WITH APPLICABLE REQUIREMENTS.
2. EXISTING CULVERTS ARE NOT SHOWN.
3. PROPOSED TRACK AND ROADWAY STORMWATER DRAINAGE WOULD BE DEVELOPED DURING FINAL DESIGN IN ACCORDANCE WITH APPLICABLE REQUIREMENTS. REFER TO TYPICAL SECTION DRAWINGS FOR PROPOSED CONFIGURATIONS.
4. EXISTING STORMWATER FACILITIES ARE NOT SHOWN.
5. TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ) WATER QUALITY CRITERIA WOULD BE MET FOR STORMWATER RUNOFF AND PROTECTION OF EXISTING WATER RESOURCES.
6. CONSTRUCTION OF THE RAIL MAY REQUIRE THE RECONFIGURATION OF PONDS OR STOCK TANKS IMMEDIATELY ADJACENT TO THE RAIL CORRIDOR. IN CASES WHERE THE CURRENT DESIGN NECESSITATES A FULL RELOCATION OF THE POND, ALLOWANCES HAVE BEEN MADE WITHIN THE LOD. IN CASES WHERE THE FULL RELOCATION OF THE POND IS NOT REQUIRED UNDER THE CURRENT DESIGN, ADDITIONAL LANDOWNER NEGOTIATIONS WILL BE REQUIRED TO DETERMINE LAND OWNER PREFERENCES.

STRUCTURES GENERAL NOTES:

1. TYPICAL SECTIONS WERE DEVELOPED TO IDENTIFY GENERAL ARRANGEMENTS AND ALLOWANCES FOR STRUCTURAL ELEMENTS. TYPICAL SECTIONS WERE USED AS THE BASIS FOR DEVELOPMENT OF LOD FOR ENVIRONMENTAL ANALYSIS.
2. APPROXIMATE HSR VIADUCT AND BRIDGE STRUCTURE LIMITS AND DEPTHS ARE SHOWN ON THE PROFILES TO SUPPORT ENVIRONMENTAL IMPACT ANALYSIS. LIMITS OF STRUCTURES AND EMBANKMENTS WOULD BE REFINED DURING FINAL DESIGN.
3. PLAN AND PROFILE DRAWINGS DO NOT SHOW LIMITS OF STRUCTURES IN PLAN VIEW. SITE SPECIFIC STRUCTURAL DESIGN WOULD BE DEVELOPED DURING FINAL ENGINEERING IN ACCORDANCE WITH APPLICABLE REQUIREMENTS. DESIGN OF FOUNDATIONS, ABUTMENTS, PIERS AND OTHER STRUCTURES WOULD BE DEVELOPED TO MITIGATE ANY IMPACTS IDENTIFIED THROUGH ENVIRONMENTAL ANALYSIS.
4. HSR PROFILE WAS DEVELOPED TO PROVIDE A MINIMUM 3FT VERTICAL CLEAR DISTANCE FROM ESTIMATED 100 YEAR FLOOD LEVEL TO BRIDGE SOFFIT FOR RIVER AND FLOODPLAIN CROSSINGS. FINAL DESIGN WOULD BE DEVELOPED TO MEET OR EXCEED THIS REQUIREMENT.
5. SPECIAL STRUCTURES WOULD BE REQUIRED TO MITIGATE IMPACTS OR ADDRESS UNIQUE SITE SPECIFIC ISSUES SUCH AS LONG SPANS, CROSSOVER STRUCTURES, AND STRADDLE BENTS TO AVOID OR MITIGATE IMPACTS. THE CONSTRUCTABILITY REPORT IDENTIFIES SPECIAL STRUCTURE LOCATIONS. PLAN AND PROFILE DRAWINGS IDENTIFY ADDITIONAL LOD EXPECTED FOR CONSTRUCTION STAGING AND WORKING AREAS FOR SPECIAL STRUCTURES.

SYSTEMS GENERAL NOTES:

1. SYSTEMS SCHEMATICS, SHOWN ON SHEETS SYS-00-02000 THROUGH SYS-00-02005, SHOW LOCATIONS OF SYSTEMS FACILITIES THAT HAVE BEEN INCLUDED FOR EACH END-TO-END ALTERNATIVE.
2. AREA FOR SYSTEMS FACILITY SITES HAVE BEEN INCLUDED WITHIN THE PROJECT LOD. THESE AREAS ARE GENERICALLY CALLED OUT AS "RAIL SYSTEMS SITES" ON THE PLAN AND PROFILE SHEETS. REFER TO FDCE REPORT TO DETERMINE THE SPECIFIC FACILITY TYPE AT EACH INDIVIDUAL LOCATION.
3. TYPICAL LAYOUT PLANS FOR EACH OF THE SYSTEMS FACILITIES ARE INCLUDED IN SHEETS SYS-00-01000 THROUGH SYS-00-01002.
4. LOD DEVELOPED FOR ENVIRONMENTAL IMPACT ANALYSIS OF SYSTEMS SITES INCLUDED SPACE FOR A DRIVEWAY AND SPACE TO PARK A LIMITED NUMBER OF MAINTENANCE VEHICLES.
5. SYSTEMS BUILDINGS WOULD BE DETAILED DURING FINAL DESIGN TO CONSIDER SITE SPECIFIC CONDITIONS, BE CONTEXT SENSITIVE, AND MINIMIZE VISUAL IMPACT. THE RADIO MAST AT COMMUNICATION FACILITIES WOULD BE APPROXIMATELY 50FT (15M) ABOVE THE TOP OF RAIL ELEVATION.
6. TPSS WOULD BE CONNECTED TO THE NEAREST 138KV TRANSMISSION LINES DESIGNED BY UTILITY PROVIDER AND SUBJECT TO ENVIRONMENTAL REVIEW.

FACILITY NOTES:

1. PROPOSED HSR FACILITIES WOULD INCLUDE STATIONS AND ASSOCIATED PARKING GARAGES, MAINTENANCE OF WAY (MOW) FACILITIES, TRAINSET MAINTENANCE FACILITIES (TMF), AND RAILWAY SYSTEMS SITES, INCLUDING TRACTION POWER SUPPLY FACILITIES, SIGNAL HOUSES, AND COMMUNICATIONS HOUSES. LOCATIONS, LIMITS OF DISTURBANCE, AND AREAS SHOWN FOR THE VARIOUS PROPOSED FACILITIES ARE FOR PRELIMINARY PLANNING PURPOSES ONLY.
2. ALL FACILITIES WOULD BE POWERED FROM THE LOCAL UTILITY GRID.
3. ACCESS, SECURITY, AND UTILITY PROVISION REQUIREMENTS FOR ALL FACILITIES WOULD BE DETAILED DURING FINAL DESIGN.

CONSTRUCTION CONSIDERATION NOTES:

1. CONSTRUCTION REQUIREMENTS WERE CONSIDERED DURING DEVELOPMENT OF THE CONCEPTUAL ENGINEERING AND ARE DOCUMENTED IN THE PROJECT CONSTRUCTABILITY REPORT.
2. TEMPORARY CONSTRUCTION AREAS REQUIRED FOR CONSTRUCTION ACCESS, CONSTRUCTION STAGING, AND PRECASTING FACILITIES WERE IDENTIFIED DURING DEVELOPMENT OF THE CONCEPTUAL ENGINEERING. CONSTRUCTION STAGING AREAS AND PRECAST FACILITIES ARE INCLUDED IN THE PROJECT LOD.
3. SPECIAL STRUCTURES REQUIRED TO MITIGATE IMPACTS OR ADDRESS UNIQUE SITE SPECIFIC ISSUES SUCH AS LONG SPANS, CROSSOVER STRUCTURES, AND STRADDLE BENTS ARE IDENTIFIED IN THE CONSTRUCTABILITY REPORT.
4. MEASURES REQUIRED TO MITIGATE NOISE, TRAFFIC, AND OTHER ENVIRONMENTAL IMPACTS WOULD BE IDENTIFIED THROUGH THE ENVIRONMENTAL ANALYSES. MORE DETAILED DESIGN INCLUDING DEVELOPMENT OF MAINTENANCE AND PROTECTION OF TRAFFIC AND OTHER CONSTRUCTION SPECIFIC PLANS AND PROCEDURES WOULD BE REQUIRED TO SECURE APPLICABLE PERMITS PRIOR TO COMMENCEMENT OF CONSTRUCTION WORKS.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY D. THOMPSON
DRAWN BY D. THOMPSON
CHECKED BY R. BURNS
IN CHARGE C. TAYLOR
DATE 09/15/2017



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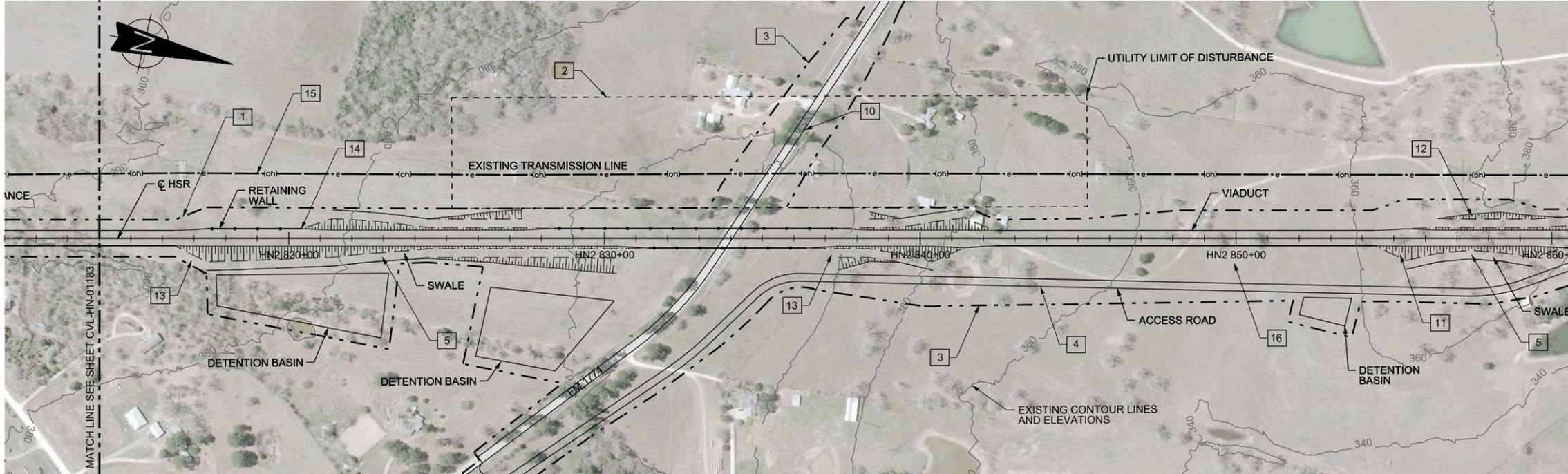


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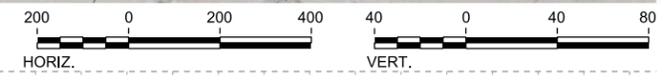


Client
Drawing Title
GENERAL NOTES

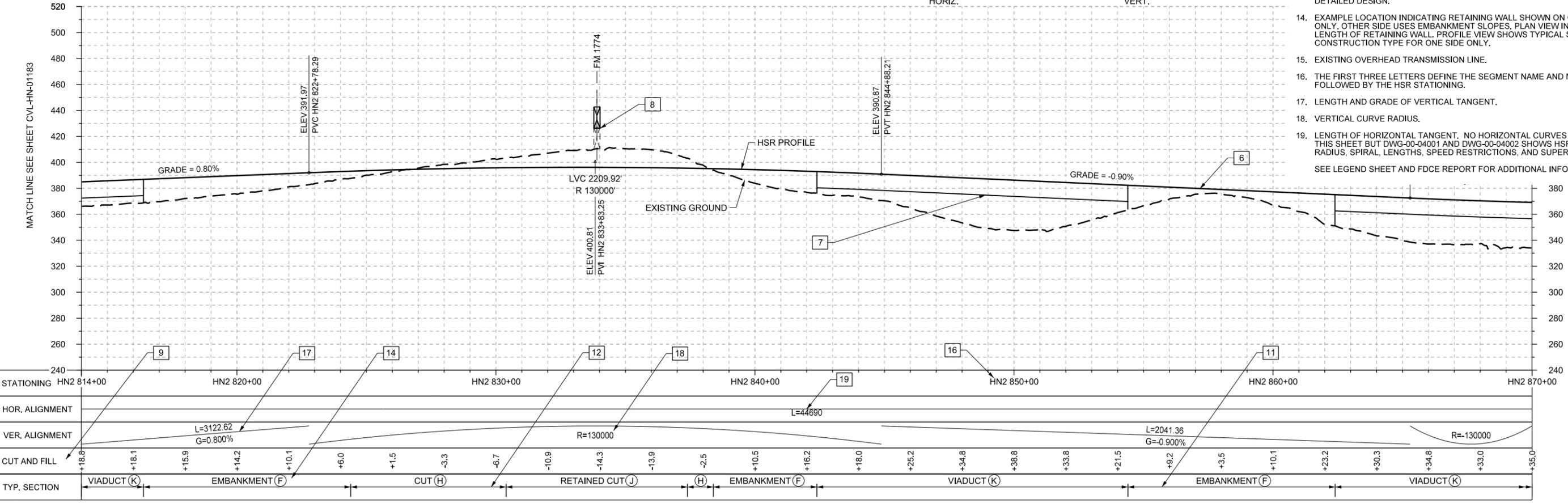
Scale NO SCALE		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No GEN-00-00008	Rev 01



PLAN



- NOTES:
- LIMIT OF DISTURBANCE (LOD) FOR THE PROJECT. LOD VARIES BASED ON IMPACT AT EACH LOCATION LOD USED FOR ENVIRONMENTAL ANALYSIS.
 - UTILITY LIMIT OF DISTURBANCE. TRANSMISSION LINE TO BE RAISED AS NECESSARY TO SUIT THE GRADE SEPARATION OF THE ROADWAY. REFER TO UTILITY TYPICAL DETAILS.
 - LOD IS OFFSET FROM THE EDGE OF PROPOSED ROADWAY TO ACCOMMODATE SIDE SLOPES ASSOCIATED WITH THE GRADE SEPARATION OF THE ROADWAY AND ACCESS ROAD.
 - DETAILS ON THE TYPE AND WIDTH OF THE ACCESS ROAD ARE SHOWN IN TYPICAL SECTIONS IN VOLUME 1.
 - SWALE EXTENTS SHOWN ON RAIL PLAN SHEETS ARE ONLY GENERATED BY COMPUTER MODEL FOR EMBANKMENT CONSTRUCTION TYPE AND WOULD EXTEND BEYOND THE LIMITS SHOWN. FINAL EXTENTS AND ARRANGEMENTS OF SWALES WOULD BE DEVELOPED DURING FINAL DESIGN AND BE BASED ON SITE SPECIFIC CONDITIONS AND REQUIREMENTS. LOCATION AND CONFIGURATION OF SWALES FOR OTHER CONSTRUCTION TYPES ARE SHOWN ON THE TYPICAL SECTIONS.
 - PROFILE OF THE HSR ALIGNMENT AT TOP OF RAIL.
 - START, END, AND APPROXIMATE UNDERSIDE OF VIADUCT STRUCTURES. TYPICAL STRUCTURE DEPTH SHOWN.
 - CLEARANCE BOX INDICATING GRADE SEPARATION BETWEEN RAIL AND ROADWAY ALIGNMENT. CLEARANCE BOX SHOWS APPROXIMATE SPACE OCCUPIED BY EXISTING OR PROPOSED ROADWAYS OR FREIGHT RAIL LINES. FOR DETAILS ON REQUIRED CLEARANCES REFER TO FDCE REPORT.
 - CUT AND FILL VALUES SHOW HEIGHT OF HSR PROFILE AT THE TOP OF RAIL ELEVATION RELATIVE TO GROUND. CUT AND FILL IS CUSTOMARY NOMENCLATURE. HOWEVER VALUES ARE NOT INTENDED TO PROVIDE DEPTHS OF EXCAVATIONS OR HEIGHTS OF EARTHWORKS. WHERE TOP OF RAIL IS WITHIN 6 FEET OF EXISTING GROUND A CUT SECTION MAY BE REQUIRED TO ACCOMMODATE DEPTH OF TRACK STRUCTURE AND DRAINAGE. LIMITS WILL VARY BY LOCATION AND SITE SPECIFIC TOPOGRAPHY. TYPICAL SECTIONS IN VOLUME 1 ILLUSTRATE RELATIONSHIP BETWEEN TOP OF RAIL LEVEL AND TRACK STRUCTURE.
 - REALIGNED OR REPROFILED ROADWAY.
 - EXTENTS OF RAIL EMBANKMENT SLOPES REFER TO SECTIONS.
 - EXTENTS OF CUT SLOPES REFER TO SECTIONS.
 - TRANSITION ZONE BETWEEN CONSTRUCTION TYPES. DETAILS OF TRANSITIONS ARE NOT SHOWN AND WILL BE DEVELOPED DURING MORE DETAILED DESIGN.
 - EXAMPLE LOCATION INDICATING RETAINING WALL SHOWN ON ONE SIDE ONLY. OTHER SIDE USES EMBANKMENT SLOPES. PLAN VIEW INDICATES LENGTH OF RETAINING WALL. PROFILE VIEW SHOWS TYPICAL SECTION CONSTRUCTION TYPE FOR ONE SIDE ONLY.
 - EXISTING OVERHEAD TRANSMISSION LINE.
 - THE FIRST THREE LETTERS DEFINE THE SEGMENT NAME AND NUMBER FOLLOWED BY THE HSR STATIONING.
 - LENGTH AND GRADE OF VERTICAL TANGENT.
 - VERTICAL CURVE RADIUS.
 - LENGTH OF HORIZONTAL TANGENT. NO HORIZONTAL CURVES SHOWN ON THIS SHEET BUT DWG-00-04001 AND DWG-00-04002 SHOWS HSR CURVE RADIUS, SPIRAL, LENGTHS, SPEED RESTRICTIONS, AND SUPERELEVATIONS.
- SEE LEGEND SHEET AND FDCE REPORT FOR ADDITIONAL INFORMATION.



PROFILE

STATIONING	HN2 814+00	HN2 820+00	HN2 830+00	HN2 840+00	HN2 850+00	HN2 860+00	HN2 870+00
HOR. ALIGNMENT							
VER. ALIGNMENT	L=3122.62 G=0.800%						
CUT AND FILL	+18.8	+18.1	+15.9	+14.2	+10.1	+6.0	+1.5
TYP. SECTION	VIADUCT (K)	EMBANKMENT (F)		CUT (H)	RETAINED CUT (J)	EMBANKMENT (F)	VIADUCT (K)

DESIGNED BY	J. ENRIQUEZ
DRAWN BY	P. TONKIN
CHECKED BY	R. BURNS
IN CHARGE	C. TAYLOR
DATE	09/15/2017

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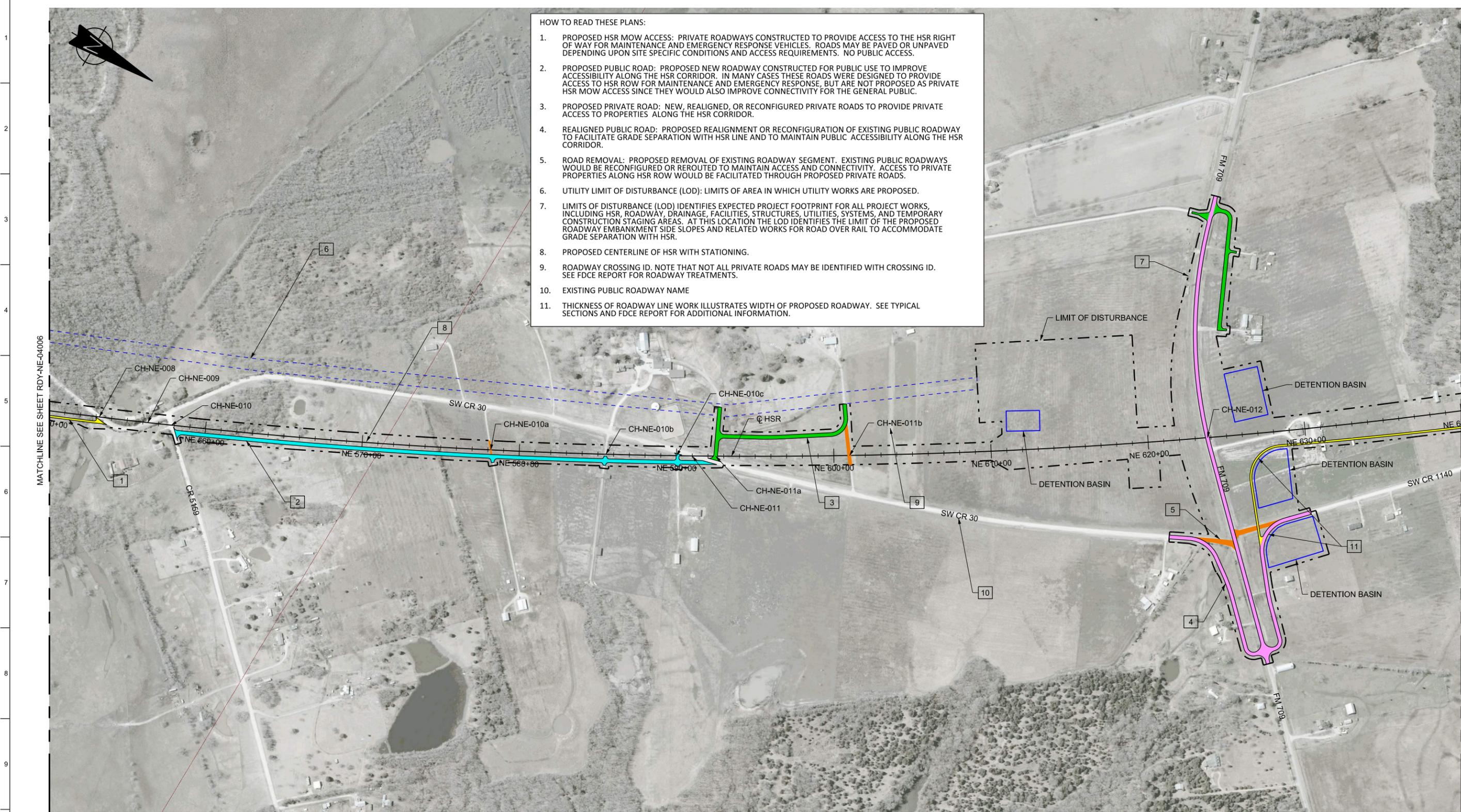
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Drawing Title
GENERAL
RAIL ANNOTATION TO CLARIFY DESIGN INTENT

Scale	AS SHOWN
Drawing Status	FINAL DRAFT
Job No	234180
Drawing No	GEN-00-00010
Rev	01



- HOW TO READ THESE PLANS:
1. PROPOSED HSR MOW ACCESS: PRIVATE ROADWAYS CONSTRUCTED TO PROVIDE ACCESS TO THE HSR RIGHT OF WAY FOR MAINTENANCE AND EMERGENCY RESPONSE VEHICLES. ROADS MAY BE PAVED OR UNPAVED DEPENDING UPON SITE SPECIFIC CONDITIONS AND ACCESS REQUIREMENTS. NO PUBLIC ACCESS.
 2. PROPOSED PUBLIC ROAD: PROPOSED NEW ROADWAY CONSTRUCTED FOR PUBLIC USE TO IMPROVE ACCESSIBILITY ALONG THE HSR CORRIDOR. IN MANY CASES THESE ROADS WERE DESIGNED TO PROVIDE ACCESS TO HSR ROW FOR MAINTENANCE AND EMERGENCY RESPONSE, BUT ARE NOT PROPOSED AS PRIVATE HSR MOW ACCESS SINCE THEY WOULD ALSO IMPROVE CONNECTIVITY FOR THE GENERAL PUBLIC.
 3. PROPOSED PRIVATE ROAD: NEW, REALIGNED, OR RECONFIGURED PRIVATE ROADS TO PROVIDE PRIVATE ACCESS TO PROPERTIES ALONG THE HSR CORRIDOR.
 4. REALIGNED PUBLIC ROAD: PROPOSED REALIGNMENT OR RECONFIGURATION OF EXISTING PUBLIC ROADWAY TO FACILITATE GRADE SEPARATION WITH HSR LINE AND TO MAINTAIN PUBLIC ACCESSIBILITY ALONG THE HSR CORRIDOR.
 5. ROAD REMOVAL: PROPOSED REMOVAL OF EXISTING ROADWAY SEGMENT. EXISTING PUBLIC ROADWAYS WOULD BE RECONFIGURED OR REROUTED TO MAINTAIN ACCESS AND CONNECTIVITY. ACCESS TO PRIVATE PROPERTIES ALONG HSR ROW WOULD BE FACILITATED THROUGH PROPOSED PRIVATE ROADS.
 6. UTILITY LIMIT OF DISTURBANCE (LOD): LIMITS OF AREA IN WHICH UTILITY WORKS ARE PROPOSED.
 7. LIMITS OF DISTURBANCE (LOD) IDENTIFIES EXPECTED PROJECT FOOTPRINT FOR ALL PROJECT WORKS, INCLUDING HSR, ROADWAY, DRAINAGE, FACILITIES, STRUCTURES, UTILITIES, SYSTEMS, AND TEMPORARY CONSTRUCTION STAGING AREAS. AT THIS LOCATION THE LOD IDENTIFIES THE LIMIT OF THE PROPOSED ROADWAY EMBANKMENT SIDE SLOPES AND RELATED WORKS FOR ROAD OVER RAIL TO ACCOMMODATE GRADE SEPARATION WITH HSR.
 8. PROPOSED CENTERLINE OF HSR WITH STATIONING.
 9. ROADWAY CROSSING ID. NOTE THAT NOT ALL PRIVATE ROADS MAY BE IDENTIFIED WITH CROSSING ID. SEE FDCE REPORT FOR ROADWAY TREATMENTS.
 10. EXISTING PUBLIC ROADWAY NAME
 11. THICKNESS OF ROADWAY LINE WORK ILLUSTRATES WIDTH OF PROPOSED ROADWAY. SEE TYPICAL SECTIONS AND FDCE REPORT FOR ADDITIONAL INFORMATION.

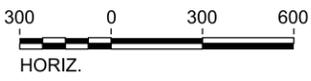
MATCHLINE SEE SHEET R01-NE-04006

MATCHLINE SEE SHEET R01-NE-04008

LEGEND

	PROPOSED HSR MOW ACCESS		ROAD REMOVAL
	PROPOSED PUBLIC ROAD		UTILITY LIMIT OF DISTURBANCE
	PROPOSED PRIVATE ROAD		ELECTRICAL TRANS. LINE
	REALIGNED PUBLIC ROAD		

PLAN



REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. ALMAGUER

DRAWN BY
P. TONKIN

CHECKED BY
G. VOWELS

IN CHARGE
C. TAYLOR

DATE
09/15/2017

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Client

TEXAS CENTRAL

1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title

GENERAL

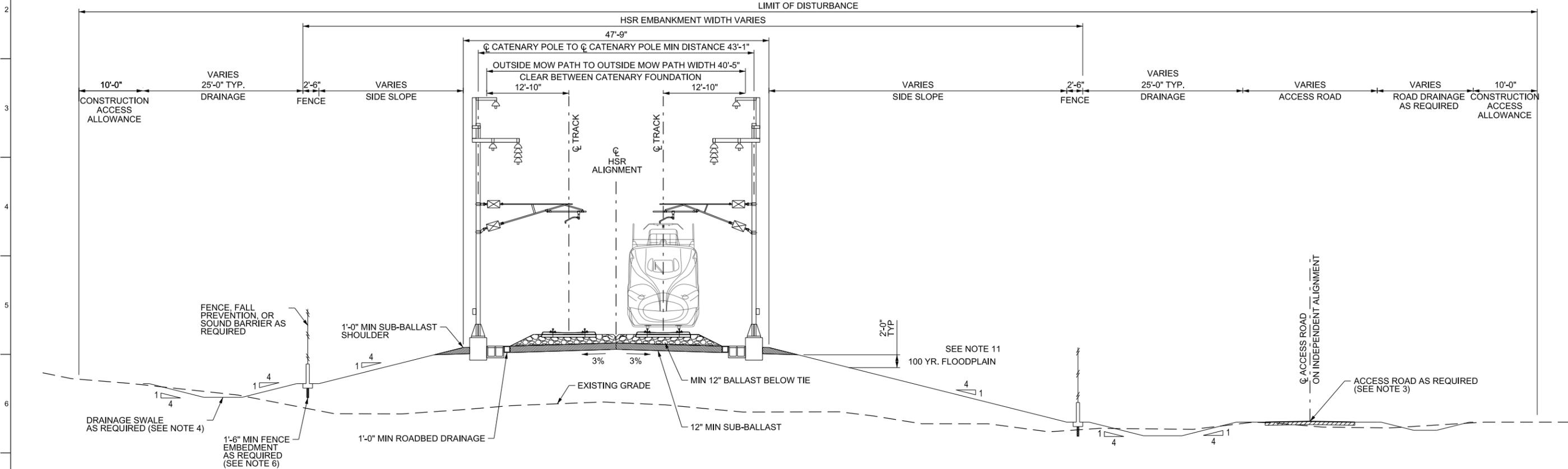
ROADWAY ANNOTATION TO CLARIFY DESIGN INTENT

Scale
AS SHOWN

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No GEN-00-00011	Rev 01
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1-2
RAILWAY TYPICAL SECTIONS



A TYPICAL EMBANKMENT

NOTES:

1. FOR DIMENSIONS OF TYPICAL TWO TRACK HSR SYSTEM, SEE DRAWING CVL-00-03020. FOR GENERAL NOTES ON TYPICAL SECTIONS, SEE DRAWINGS GEN-00-00008.
2. CENTERLINE HSR ALIGNMENT IS CENTERLINE OF TWO TRACK HSR ALIGNMENT AS SHOWN IN VOLUME 1 PLAN AND PROFILE DRAWINGS.
3. IT IS ASSUMED THAT AN ACCESS ROAD WOULD BE PROVIDED ON AT LEAST ONE SIDE OF THE HSR LINE. LOCATION AND CONFIGURATION OF THE ACCESS ROAD WILL VARY BASED ON SITE SPECIFIC CONSTRAINTS AND REQUIREMENTS. ALIGNMENT OF ACCESS ROAD INDEPENDENT OF HSR. FOR DETAILS SEE THE ACCESS ROAD TYPICAL SECTIONS AND ROADWAY PLANS.
4. DRAINAGE SWALE SIZE AND LOCATION WILL BE BASED ON SITE SPECIFIC CONSTRAINTS, TOPOGRAPHY, AND DRAINAGE REQUIREMENTS. A TYPICAL MINIMUM SWALE WIDTH OF 25 FT HAS BEEN PROVIDED AS SHOWN.
5. THE TRACKWAY WILL BE ENTIRELY SECURED BETWEEN DALLAS AND HOUSTON TO PREVENT UNAUTHORIZED ACCESS OR INTRUSION ON TO THE OPERATING RAILWAY. SOUND BARRIERS WILL BE PROVIDED WHERE REQUIRED TO MITIGATE NOISE IMPACTS AS IDENTIFIED THROUGH DETAILED ENVIRONMENTAL ANALYSIS. WHERE ON ELEVATED STRUCTURE TRACKWAY FENCING MAY BE REPLACED WITH FALL PREVENTION RAILINGS BASED ON SITE SPECIFIC CONDITIONS.
6. FENCE LIMITS, LOCATION, HEIGHT, EMBEDMENT, AND OTHER DETAILS WILL BE DEVELOPED DURING MORE DETAILED DESIGN. DETAILS FOR FENCING AND OTHER INTRUSION PROTECTION MEASURES WILL BE INFORMED BY HAZARDS AND RISKS ANALYSIS AND WOULD BE DEVELOPED IN CLOSED COORDINATION WITH APPLICABLE REGULATORY AUTHORITIES AND COMPLY WITH APPLICABLE REQUIREMENTS.
7. CONCEPTUAL SECTION SHOWN WITH SIDE SLOPES ON BOTH SIDES. RETAINING WALLS MAY BE UTILIZED ON ONE OR BOTH SIDES OF THE EMBANKMENT AS NECESSARY TO MINIMIZE IMPACTS TO ADJACENT PROPERTIES, UTILITIES, INFRASTRUCTURE OR ENVIRONMENTALLY SENSITIVE AREAS. SEE RETAINED FILL TYPICAL SECTION FOR DETAILS. LOCATION SPECIFIC CONFIGURATION WOULD BE ADVANCED DURING MORE DETAILED DESIGN.
8. A TYPICAL MINIMUM OF 10FT FOR CONSTRUCTION ACCESS HAS BEEN PROVIDED ON EACH SIDE OF CIVIL WORKS AS SHOWN FOR THE PURPOSES OF ENVIRONMENTAL ANALYSIS.
9. EMBANKMENT HEIGHT VARIES WITH SURROUNDING GRADE AND RAIL PROFILE.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. SERRANO

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

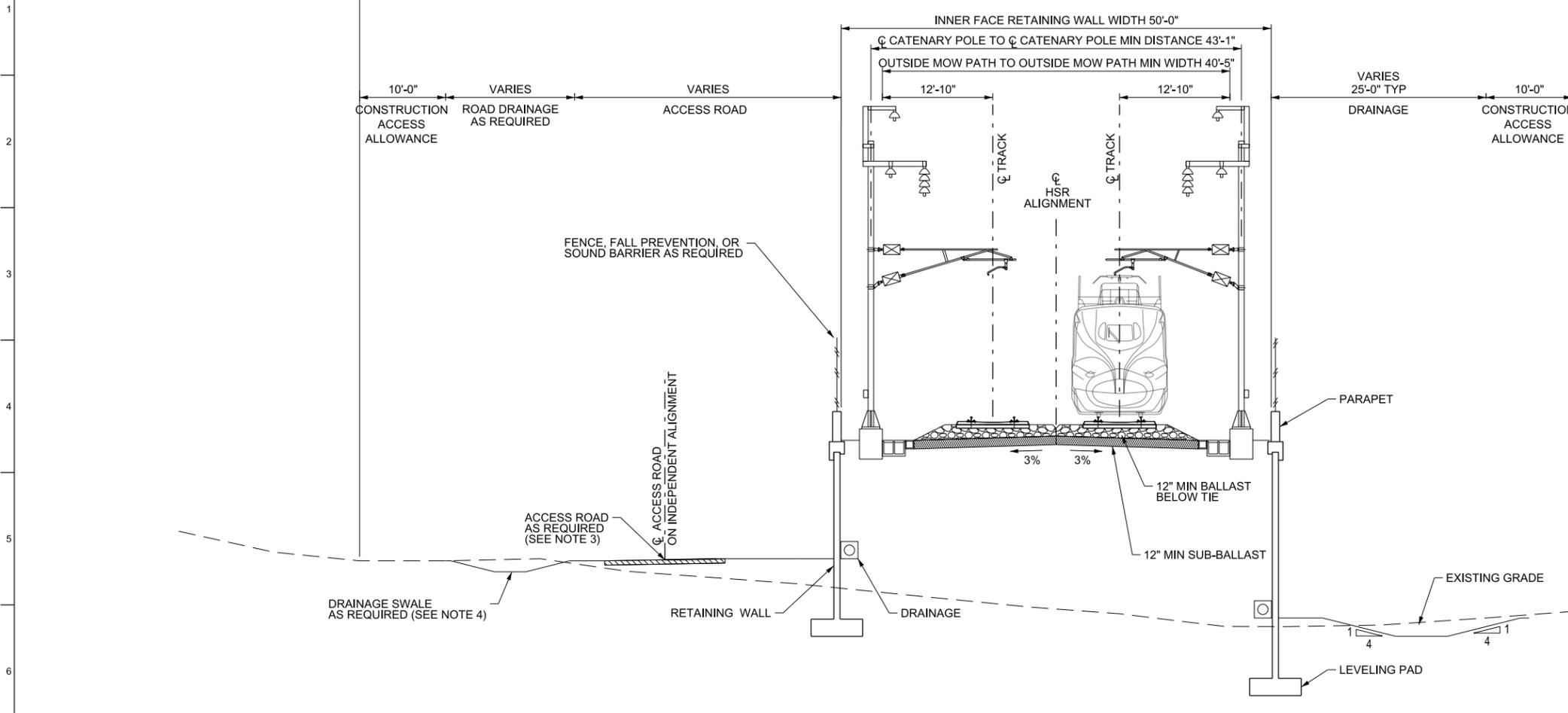
IN CHARGE
C. TAYLOR

DATE
09/15/2017



Drawing Title
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 1 OF 20

Scale 1 1/4" = 10'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03001	Rev 01



B TYPICAL RETAINED FILL

NOTES:

1. FOR DIMENSIONS OF TYPICAL TWO TRACK HSR SYSTEM, SEE DRAWING CVL-00-03020. FOR GENERAL NOTES ON TYPICAL SECTIONS, SEE DRAWINGS GEN-00-00008.
2. CENTERLINE HSR ALIGNMENT IS CENTERLINE OF TWO TRACK HSR ALIGNMENT AS SHOWN IN VOLUME 1 PLAN AND PROFILE DRAWINGS.
3. IT IS ASSUMED THAT AN ACCESS ROAD WOULD BE PROVIDED ON AT LEAST ONE SIDE OF THE HSR LINE. LOCATION AND CONFIGURATION OF THE ACCESS ROAD WILL VARY BASED ON SITE SPECIFIC CONSTRAINTS AND REQUIREMENTS. ALIGNMENT OF ACCESS ROAD INDEPENDENT OF HSR. FOR DETAILS SEE THE ACCESS ROAD TYPICAL SECTIONS AND ROADWAY PLANS.
4. DRAINAGE SWALE SIZE AND LOCATION WILL BE BASED ON SITE SPECIFIC CONSTRAINTS, TOPOGRAPHY, AND DRAINAGE REQUIREMENTS. A TYPICAL MINIMUM SWALE WIDTH OF 25 FT HAS BEEN PROVIDED AS SHOWN.
5. THE TRACKWAY WILL BE ENTIRELY SECURED BETWEEN DALLAS AND HOUSTON TO PREVENT UNAUTHORIZED ACCESS OR INTRUSION ON TO THE OPERATING RAILWAY. SOUND BARRIERS WILL BE PROVIDED WHERE REQUIRED TO MITIGATE NOISE IMPACTS AS IDENTIFIED THROUGH DETAILED ENVIRONMENTAL ANALYSIS. WHERE ON ELEVATED STRUCTURE TRACKWAY FENCING MAY BE REPLACED WITH FALL PREVENTION RAILINGS BASED ON SITE SPECIFIC CONDITIONS.
6. FENCE LIMITS, LOCATION, HEIGHT, EMBEDMENT, AND OTHER DETAILS WILL BE DEVELOPED DURING MORE DETAILED DESIGN. DETAILS FOR FENCING AND OTHER INTRUSION PROTECTION MEASURES WILL BE INFORMED BY HAZARDS AND RISKS ANALYSIS AND WOULD BE DEVELOPED IN CLOSED COORDINATION WITH APPLICABLE REGULATORY AUTHORITIES AND COMPLY WITH APPLICABLE REQUIREMENTS.
7. CONCEPTUAL SECTION SHOWN WITH RETAINING WALLS ON BOTH SIDES. ENVIRONMENTALLY SENSITIVITIES, UTILITIES, INFRASTRUCTURE, AND OTHER CONSIDERATIONS MAY ALLOW FOR SIDE SLOPES ON ONE SIDE OF THE RETAINED FILL. SEE EMBANKMENT TYPICAL SECTION FOR DETAILS. LOCATION SPECIFIC CONFIGURATION WOULD BE ADVANCED DURING MORE DETAILED DESIGN.
8. A TYPICAL MINIMUM OF 10FT FOR CONSTRUCTION ACCESS HAS BEEN PROVIDED ON EACH SIDE OF CIVIL WORKS AS SHOWN FOR THE PURPOSES OF ENVIRONMENTAL ANALYSIS.
9. RETAINING WALL DETAILS TO BE DEVELOPED DURING MORE ADVANCED DESIGN BASED UPON SITE SPECIFIC CONDITIONS AND GEOTECHNICAL INVESTIGATIONS. MECHANICALLY STABILIZED EARTH (MSE) WALLS ASSUMED FOR CONCEPTUAL ENGINEERING.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. SERRANO

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

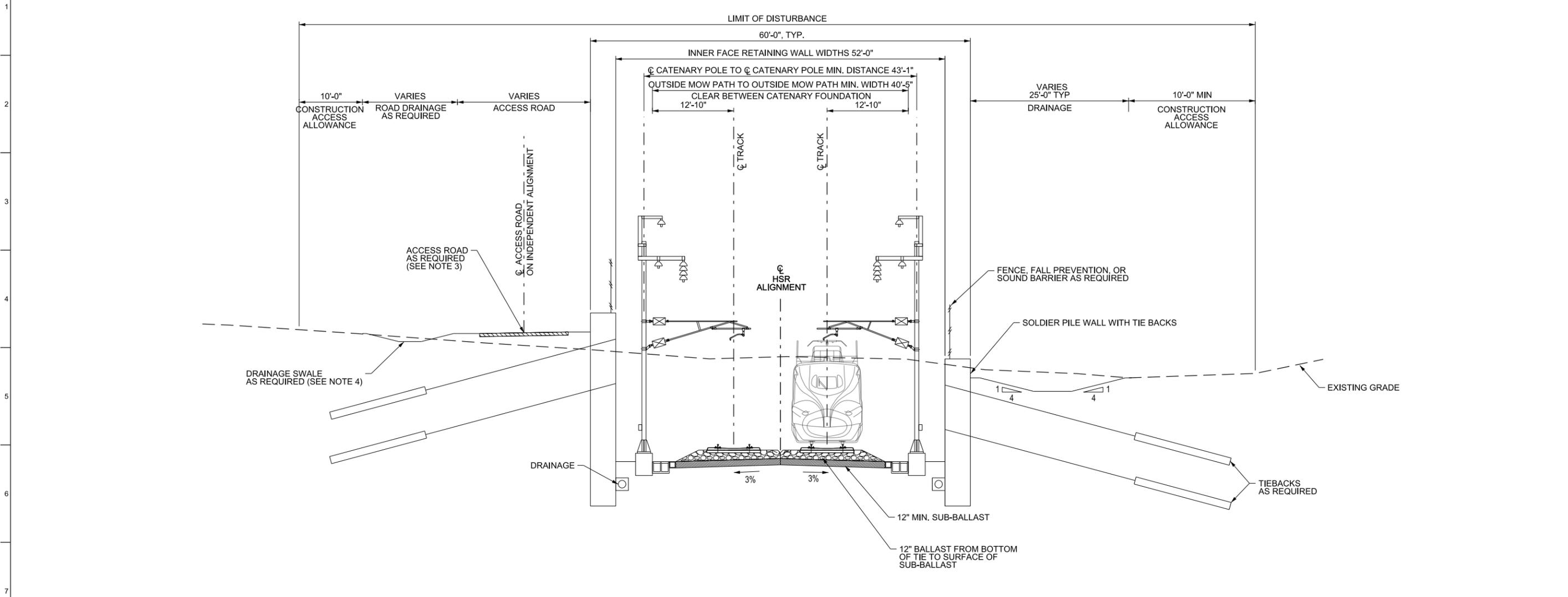
IN CHARGE
C. TAYLOR

DATE
09/15/2017



Drawing Title
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 2 OF 20

Scale 1 1/4" = 10'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03002	Rev 01



D TYPICAL RETAINED CUT

- NOTES:
- FOR DIMENSIONS OF TYPICAL TWO TRACK HSR SYSTEM, SEE DRAWING CVL-00-03020. FOR GENERAL NOTES ON TYPICAL SECTIONS, SEE DRAWINGS GEN-00-00008.
 - CENTERLINE HSR ALIGNMENT IS CENTERLINE OF TWO TRACK HSR ALIGNMENT AS SHOWN IN VOLUME 1 PLAN AND PROFILE DRAWINGS.
 - IT IS ASSUMED THAT AN ACCESS ROAD WOULD BE PROVIDED ON AT LEAST ONE SIDE OF THE HSR LINE. LOCATION AND CONFIGURATION OF THE ACCESS ROAD WILL VARY BASED ON SITE SPECIFIC CONSTRAINTS AND REQUIREMENTS. ALIGNMENT OF ACCESS ROAD INDEPENDENT OF HSR. FOR DETAILS SEE THE ACCESS ROAD TYPICAL SECTIONS AND ROADWAY PLANS.
 - DRAINAGE SWALE SIZE AND LOCATION WILL BE BASED ON SITE SPECIFIC CONSTRAINTS, TOPOGRAPHY, AND DRAINAGE REQUIREMENTS. A TYPICAL MINIMUM SWALE WIDTH OF 25 FT HAS BEEN PROVIDED AS SHOWN.
 - THE TRACKWAY WILL BE ENTIRELY SECURED BETWEEN DALLAS AND HOUSTON TO PREVENT UNAUTHORIZED ACCESS OR INTRUSION ON TO THE OPERATING RAILWAY. SOUND BARRIERS WILL BE PROVIDED WHERE REQUIRED TO MITIGATE NOISE IMPACTS AS IDENTIFIED THROUGH DETAILED ENVIRONMENTAL ANALYSIS. WHERE ON ELEVATED STRUCTURE TRACKWAY FENCING MAY BE REPLACED WITH FALL PREVENTION RAILINGS BASED ON SITE SPECIFIC CONDITIONS.

- FENCE LIMITS, LOCATION, HEIGHT, EMBEDMENT, AND OTHER DETAILS WILL BE DEVELOPED DURING MORE DETAILED DESIGN. DETAILS FOR FENCING AND OTHER INTRUSION PROTECTION MEASURES WILL BE INFORMED BY HAZARDS AND RISKS ANALYSIS AND WOULD BE DEVELOPED IN CLOSED COORDINATION WITH APPLICABLE REGULATORY AUTHORITIES AND COMPLY WITH APPLICABLE REQUIREMENTS.
- CONCEPTUAL SECTION SHOWN WITH RETAINING WALLS ON BOTH SIDES. ENVIRONMENTALLY SENSITIVITIES, UTILITIES, INFRASTRUCTURE, AND OTHER CONSIDERATIONS MAY ALLOW FOR SIDE SLOPES ON ONE SIDE OF THE RETAINED CUT. SEE TYPICAL CUT SECTION FOR DETAILS. LOCATION SPECIFIC CONFIGURATION WOULD BE ADVANCED DURING MORE DETAILED DESIGN.
- A TYPICAL MINIMUM OF 10FT FOR CONSTRUCTION ACCESS HAS BEEN PROVIDED ON EACH SIDE OF CIVIL WORKS AS SHOWN FOR THE PURPOSES OF ENVIRONMENTAL ANALYSIS.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. SERRANO

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

IN CHARGE
C. TAYLOR

DATE
09/15/2017

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Client

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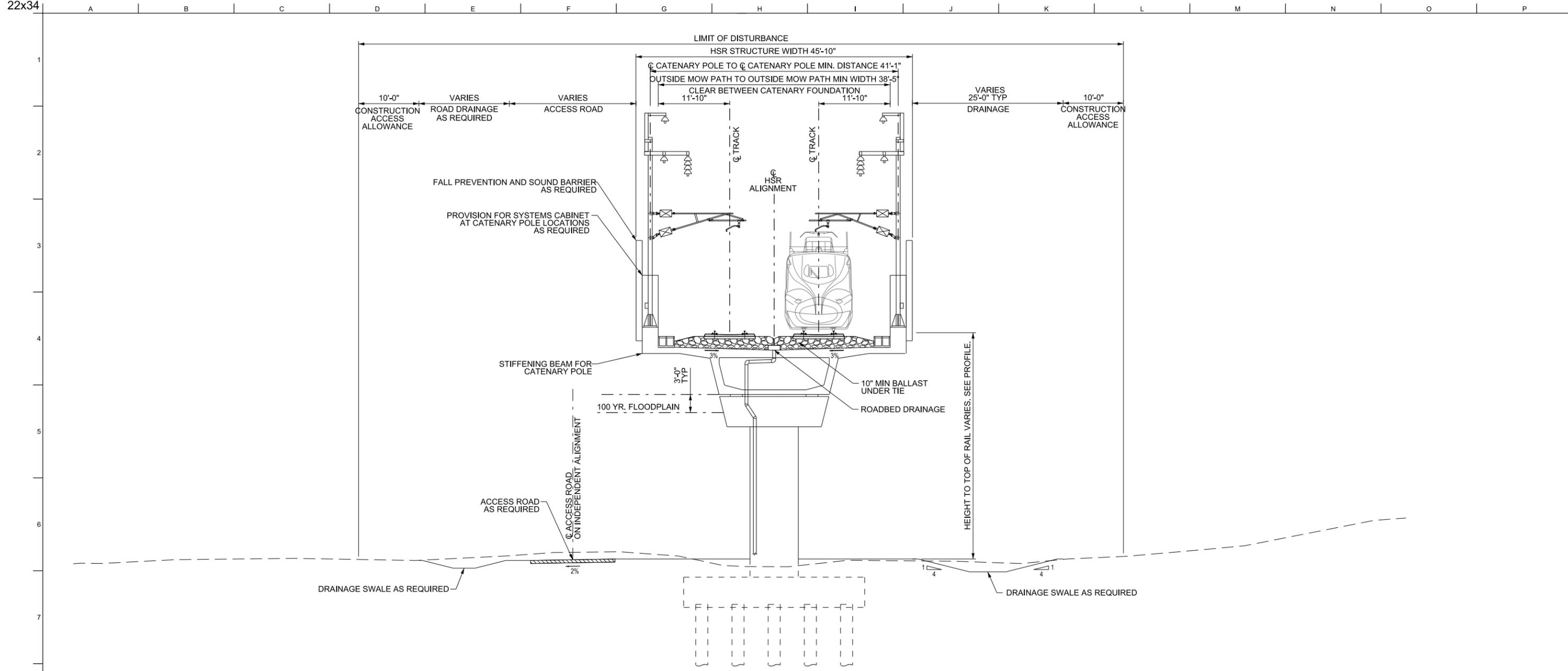
Drawing Title

GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 4 OF 20

Scale
1 1/4" = 10'

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No CVL-00-03004	Rev 01
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E TYPICAL VIADUCT

NOTES:

- FOR DIMENSIONS OF TYPICAL TWO TRACK HSR SYSTEM, SEE DRAWING CVL-00-03020. FOR GENERAL NOTES ON TYPICAL SECTIONS, SEE DRAWINGS GEN-00-00008.
- CENTERLINE HSR ALIGNMENT IS CENTERLINE OF TWO TRACK HSR ALIGNMENT AS SHOWN IN VOLUME 1 PLAN AND PROFILE DRAWINGS.
- IT IS ASSUMED THAT AN ACCESS ROAD WOULD BE PROVIDED ON AT LEAST ONE SIDE OF THE HSR LINE. LOCATION AND CONFIGURATION OF THE ACCESS ROAD WILL VARY BASED ON SITE SPECIFIC CONSTRAINTS AND REQUIREMENTS. ALIGNMENT OF ACCESS ROAD INDEPENDENT OF HSR. FOR DETAILS SEE THE ACCESS ROAD TYPICAL SECTIONS AND ROADWAY PLANS.
- DRAINAGE SWALE SIZE AND LOCATION WILL BE BASED ON SITE SPECIFIC CONSTRAINTS, TOPOGRAPHY, AND DRAINAGE REQUIREMENTS. A TYPICAL MINIMUM SWALE WIDTH OF 25 FT HAS BEEN PROVIDED AS SHOWN. THE PLACEMENT OF DRAINAGE SWALES IN WATERS OF THE U.S. WILL BE AVOIDED AND, IF UNAVOIDABLE, MINIMIZED AND CONSTRUCTED TO NOT DRAIN IN WATERS OF THE U.S.
- THE TRACKWAY WILL BE ENTIRELY SECURED BETWEEN DALLAS AND HOUSTON TO PREVENT UNAUTHORIZED ACCESS OR INTRUSION ON TO THE OPERATING RAILWAY. SOUND BARRIERS WILL BE PROVIDED WHERE REQUIRED TO MITIGATE NOISE IMPACTS AS IDENTIFIED THROUGH DETAILED ENVIRONMENTAL ANALYSIS. WHERE ON ELEVATED STRUCTURE TRACKWAY FENCING MAY BE REPLACED WITH FALL PREVENTION RAILINGS BASED ON SITE SPECIFIC CONDITIONS.
- FENCE LIMITS, LOCATION, HEIGHT, EMBEDMENT, AND OTHER DETAILS WILL BE DEVELOPED DURING MORE DETAILED DESIGN. DETAILS FOR FENCING AND OTHER INTRUSION PROTECTION MEASURES WILL BE INFORMED BY HAZARDS AND RISKS ANALYSIS AND WOULD BE DEVELOPED IN CLOSED COORDINATION WITH APPLICABLE REGULATORY AUTHORITIES AND COMPLY WITH APPLICABLE REQUIREMENTS.
- A TYPICAL MINIMUM OF 10FT FOR CONSTRUCTION ACCESS HAS BEEN PROVIDED ON EACH SIDE OF CIVIL WORKS AS SHOWN FOR THE PURPOSES OF ENVIRONMENTAL ANALYSIS.
- FOUNDATION REQUIREMENTS WILL VARY BASED ON SITE SPECIFIC CONDITIONS INCLUDING VIADUCT HEIGHT AND GEOTECHNICAL CONDITIONS.
- STAIRCASES NOT SHOWN WOULD BE PROVIDED AS REQUIRED TO SATISFY EMERGENCY ACCESS/EGRESS REQUIREMENTS. STAIRCASE LOCATIONS AND CONFIGURATIONS WOULD BE DEVELOPED DURING MORE DETAILED DESIGN IN CLOSE COORDINATION WITH EMERGENCY PROVIDERS AND BASED ON SITE SPECIFIC CONDITIONS, MAINTENANCE AND SAFETY REQUIREMENTS, AND ACCESS ROAD LOCATION.
- SITE SPECIFIC VIADUCT SPANS, VIADUCT DEPTHS, AND COLUMN WIDTHS SHALL BE DETERMINED DURING MORE DETAILED DESIGN. FOR CONCEPTUAL DESIGN, SPANS ARE ASSUMED TO BE 120 FT, VIADUCT DEPTH IS ASSUMED TO BE 13.5 FT, AND COLUMNS ARE ASSUMED TO BE RECTANGULAR IN SHAPE AND BETWEEN 28 SQUARE FT AND 196 SQUARE FT.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. SERRANO

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

IN CHARGE
C. TAYLOR

DATE
09/15/2017

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Client

TEXAS CENTRAL

1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

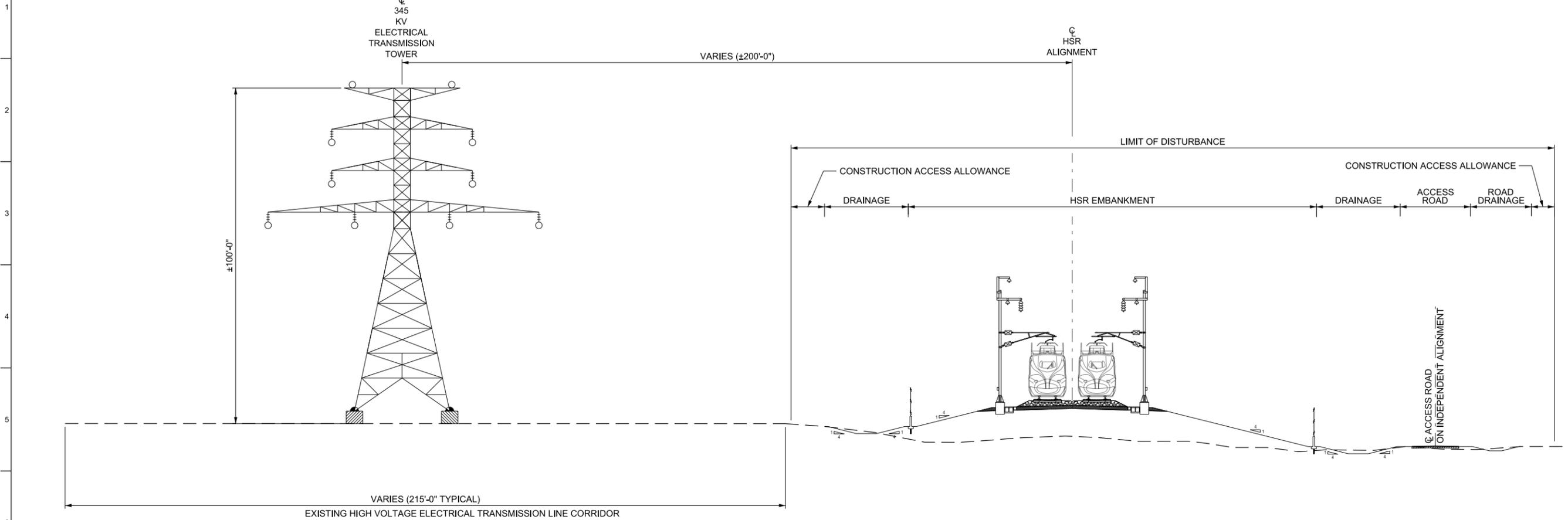
Drawing Title

GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 5 OF 20

Scale
1 1/4" = 10'

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No CVL-00-03005	Rev 01
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F TYPICAL EMBANKMENT SECTION ADJACENT TO UTILITY CORRIDOR

NOTES:

1. THIS SECTION ILLUSTRATES TYPICAL OFFSET BETWEEN THE PROPOSED HSR ALIGNMENT AND EXISTING ELECTRICAL TRANSMISSION LINE. HSR MAY BE ORIENTED ON EITHER SIDE OF UTILITY CORRIDOR AND OFFSETS TO ELECTRICAL TRANSMISSION TOWERS VARIES BASED ON SITE SPECIFIC GEOMETRY, TOPOGRAPHY, AND CONSTRAINTS. WIDTH OF EXISTING TRANSMISSION LINE ROW WILL VARY. WHERE KNOWN, OFFSETS WERE NECESSARY TO ACCOMMODATE PLANNED IMPROVEMENTS TO UTILITIES.
2. DURING DETAILED DESIGN DEVELOPMENT AND COORDINATION WITH UTILITY PROVIDER, EXISTING TRANSMISSION LINE ROW AND EASEMENTS WILL BE CONFIRMED. RETAINING WALLS MAY BE REQUIRED TO PREVENT ENCROACHMENT INTO THE UTILITY CORRIDOR. LOCATION AND HEIGHT WILL BE BASED ON SITE SPECIFIC TOPOGRAPHY, SWALE WIDTH, AND EMBANKMENT WIDTH.
3. WHERE PRACTICAL ROADS MAY BE CONSTRUCTED TO ALLOW FOR JOINT USE BY UTILITY PROVIDER AND TCRP FOR MAINTENANCE PURPOSES TO LIMIT IMPACTS.
4. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE EMBANKMENT TYPICAL SECTION. REFER TO DRAWING NO. CVL-00-03001 FOR ADDITIONAL NOTES FOR TYPICAL EMBANKMENT SECTION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. SERRANO

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J. BORGHESI

CHECKED BY
K. SEYMOUR

IN CHARGE
C. TAYLOR

DATE
09/15/2017

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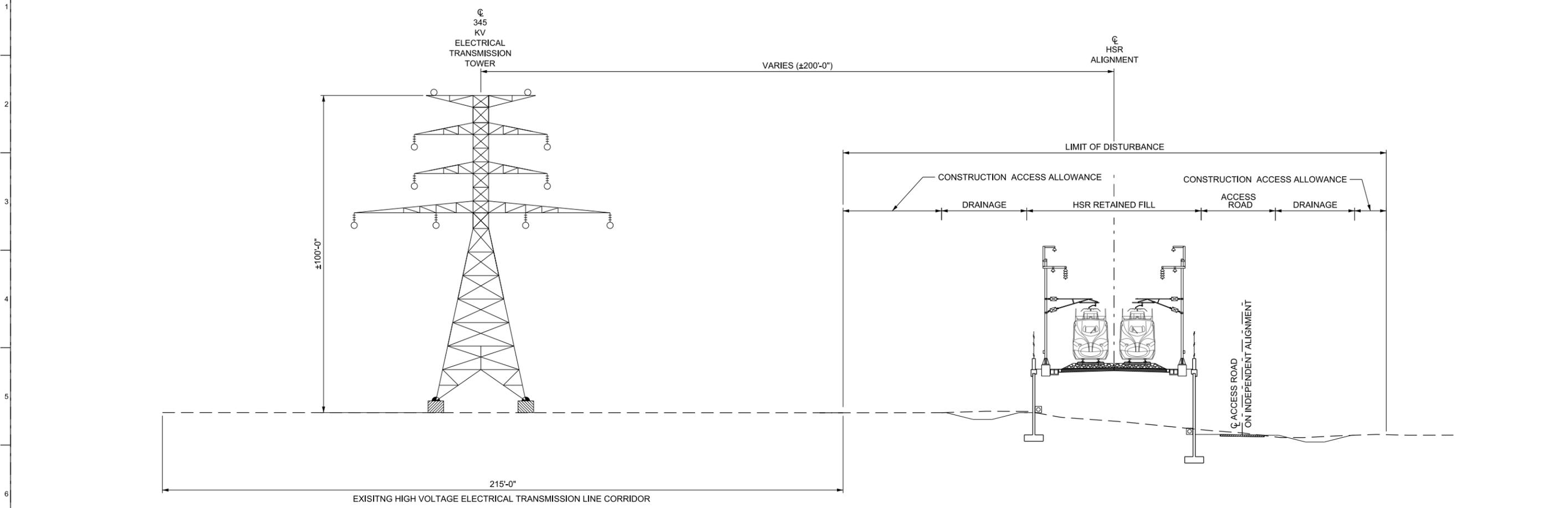
Drawing Title

GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 6 OF 20

Scale
5/8" = 10'

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No CVL-00-03006	Rev 01
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G TYPICAL RETAINED FILL SECTION ADJACENT TO UTILITY CORRIDOR

NOTES:

1. THIS SECTION ILLUSTRATES TYPICAL OFFSET BETWEEN THE PROPOSED HSR ALIGNMENT AND EXISTING ELECTRICAL TRANSMISSION LINE. HSR MAY BE ORIENTED ON EITHER SIDE OF UTILITY CORRIDOR AND OFFSETS TO ELECTRICAL TRANSMISSION TOWERS VARIES BASED ON SITE SPECIFIC GEOMETRY, TOPOGRAPHY, AND CONSTRAINTS. WIDTH OF EXISTING TRANSMISSION LINE ROW WILL VARY. WHERE KNOWN, OFFSETS WERE NECESSARY TO ACCOMMODATE PLANNED IMPROVEMENTS TO UTILITIES.
2. DURING DETAILED DESIGN DEVELOPMENT AND COORDINATION WITH UTILITY PROVIDER, EXISTING TRANSMISSION LINE ROW AND EASEMENTS WILL BE CONFIRMED.
3. WHERE PRACTICAL ROADS MAY BE CONSTRUCTED TO ALLOW FOR JOINT USE BY UTILITY PROVIDER AND TCRR FOR MAINTENANCE PURPOSES TO LIMIT IMPACTS.
4. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE RETAINED FILL TYPICAL SECTION. REFER TO DRAWING NO. CVL-00-03002 FOR ADDITIONAL NOTES FOR TYPICAL EMBANKMENT SECTION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
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IN CHARGE
C. TAYLOR

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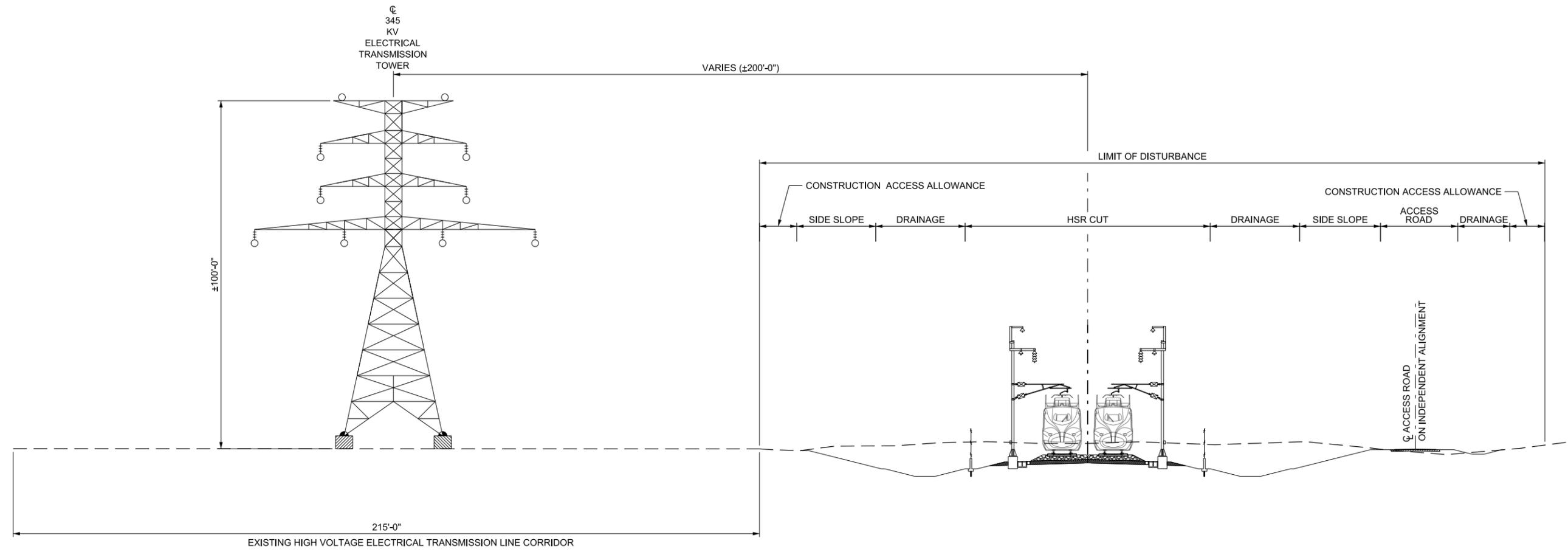
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GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 7 OF 20

Scale
5/8" = 10'

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No CVL-00-03007	Rev 01
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H TYPICAL CUT SECTION ADJACENT TO UTILITY CORRIDOR

NOTES:

1. THIS SECTION ILLUSTRATES TYPICAL OFFSET BETWEEN THE PROPOSED HSR ALIGNMENT AND EXISTING ELECTRICAL TRANSMISSION LINE. HSR MAY BE ORIENTED ON EITHER SIDE OF UTILITY CORRIDOR AND OFFSETS TO ELECTRICAL TRANSMISSION TOWERS VARIES BASED ON SITE SPECIFIC GEOMETRY, TOPOGRAPHY, AND CONSTRAINTS. WIDTH OF EXISTING TRANSMISSION LINE ROW WILL VARY. WHERE KNOWN, OFFSETS WERE NECESSARY TO ACCOMMODATE PLANNED IMPROVEMENTS TO UTILITIES.
2. DURING DETAILED DESIGN DEVELOPMENT AND COORDINATION WITH UTILITY PROVIDER, EXISTING TRANSMISSION LINE ROW AND EASEMENTS WILL BE CONFIRMED. RETAINING WALLS MAY BE REQUIRED TO PREVENT ENCROACHMENT INTO THE UTILITY CORRIDOR. LOCATION AND HEIGHT WILL BE BASED ON SITE SPECIFIC TOPOGRAPHY, SWALE WIDTH, AND EMBANKMENT WIDTH.
3. WHERE PRACTICAL ROADS MAY BE CONSTRUCTED TO ALLOW FOR JOINT USE BY UTILITY PROVIDER AND TCRP FOR MAINTENANCE PURPOSES TO LIMIT IMPACTS.
4. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE TYPICAL CUT SECTION. REFER TO DRAWING NO. CVL-00-03003 FOR ADDITIONAL NOTES FOR TYPICAL EMBANKMENT SECTION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY J. SERRANO
DRAWN BY J. BORGHESI
CHECKED BY K. SEYMOUR
IN CHARGE C. TAYLOR
DATE 09/15/2017

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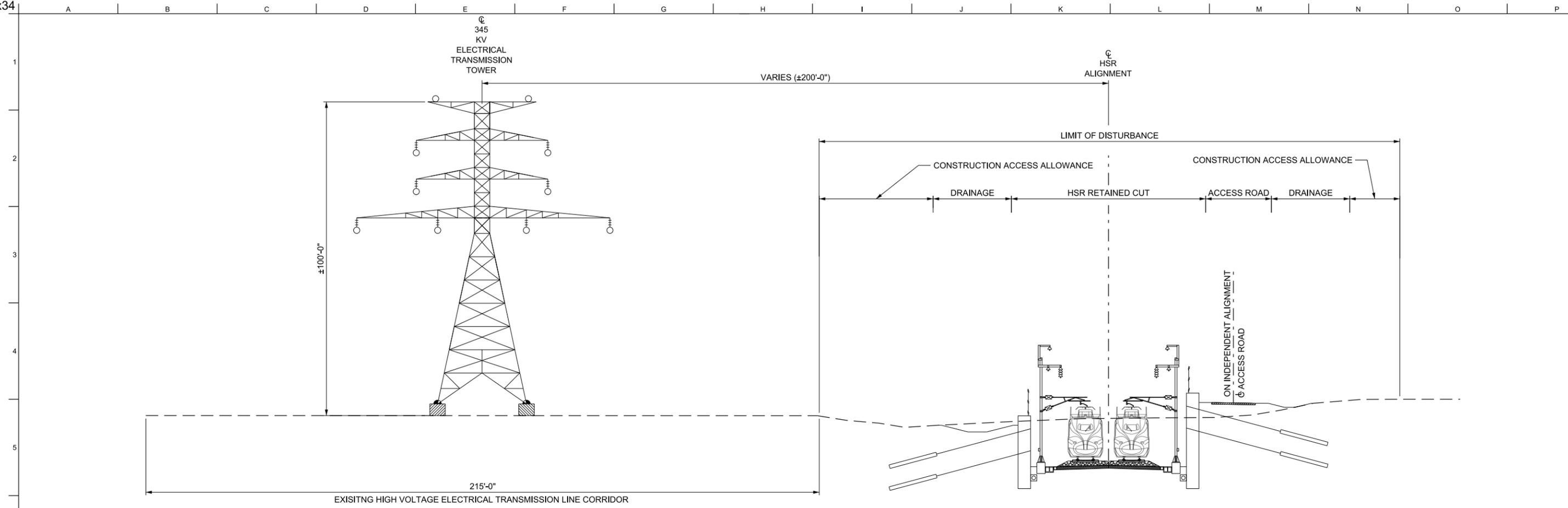
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Drawing Title
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 8 OF 20

Scale 5/8" = 10'	Drawing Status FINAL DRAFT	
Job No 234180	Drawing No CVL-00-03008	Rev 01



J TYPICAL RETAINED CUT SECTION ADJACENT TO UTILITY CORRIDOR

NOTES:

1. THIS SECTION ILLUSTRATES TYPICAL OFFSET BETWEEN THE PROPOSED HSR ALIGNMENT AND EXISTING ELECTRICAL TRANSMISSION LINE. HSR MAY BE ORIENTED ON EITHER SIDE OF UTILITY CORRIDOR AND OFFSETS TO ELECTRICAL TRANSMISSION TOWERS VARIES BASED ON SITE SPECIFIC GEOMETRY, TOPOGRAPHY, AND CONSTRAINTS. WIDTH OF EXISTING TRANSMISSION LINE ROW WILL VARY. WHERE KNOWN, OFFSETS WERE NECESSARY TO ACCOMMODATE PLANNED IMPROVEMENTS TO UTILITIES.
2. DURING DETAILED DESIGN DEVELOPMENT AND COORDINATION WITH UTILITY PROVIDER, EXISTING TRANSMISSION LINE ROW AND EASEMENTS WILL BE CONFIRMED.
3. WHERE PRACTICAL ROADS MAY BE CONSTRUCTED TO ALLOW FOR JOINT USE BY UTILITY PROVIDER AND TCRR FOR MAINTENANCE PURPOSES TO LIMIT IMPACTS.
45. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE RETAINED CUT TYPICAL SECTION. REFER TO DRAWING NO. CVL-00-03004 FOR ADDITIONAL NOTES FOR TYPICAL EMBANKMENT SECTION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. SERRANO

DRAWN BY
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CHECKED BY
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IN CHARGE
C. TAYLOR

DATE
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Drawing Title

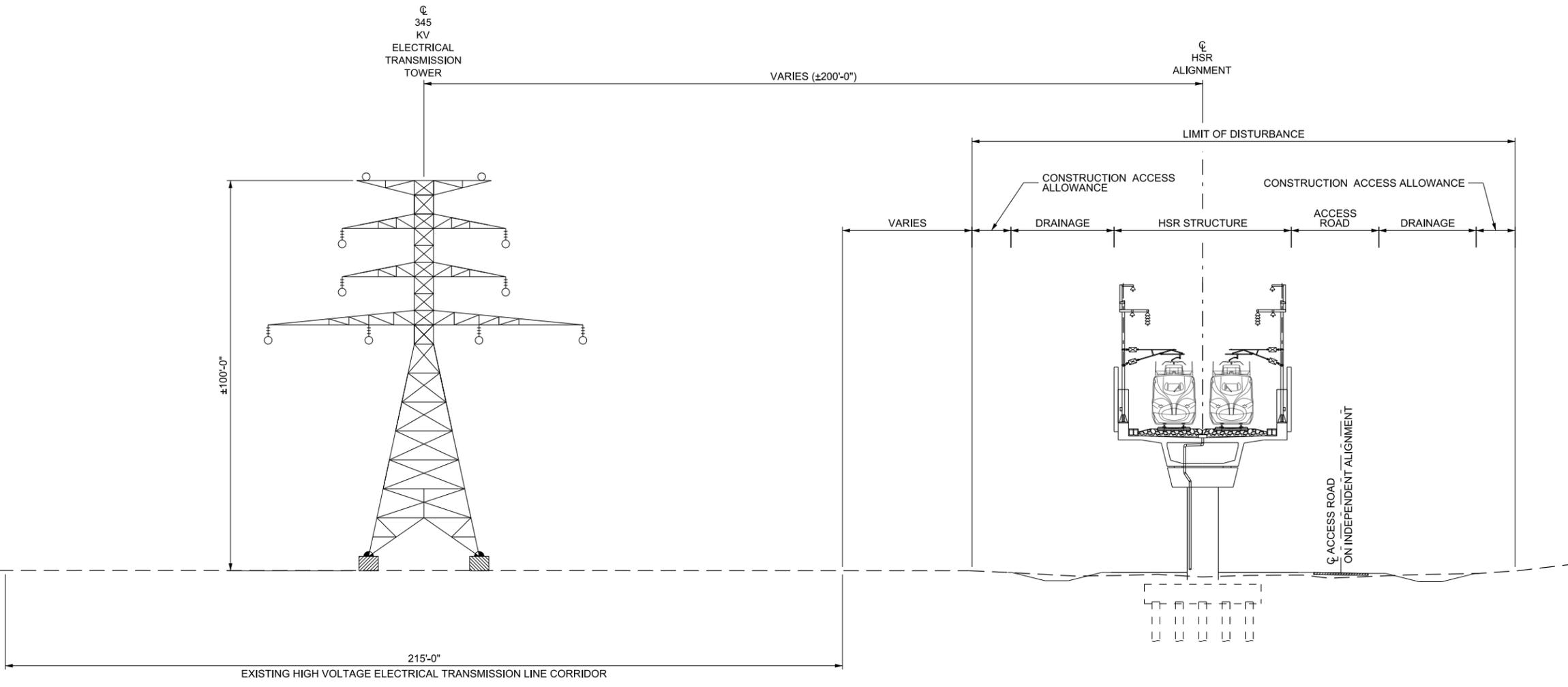
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 9 OF 20

Scale
5/8" = 10'

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No CVL-00-03009	Rev 01
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2
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10



K TYPICAL VIADUCT SECTION ADJACENT TO UTILITY CORRIDOR

NOTES:

1. THIS SECTION ILLUSTRATES TYPICAL OFFSET BETWEEN THE PROPOSED HSR ALIGNMENT AND EXISTING ELECTRICAL TRANSMISSION LINE. HSR MAY BE ORIENTED ON EITHER SIDE OF UTILITY CORRIDOR AND OFFSETS TO ELECTRICAL TRANSMISSION TOWERS VARIES BASED ON SITE SPECIFIC GEOMETRY, TOPOGRAPHY, AND CONSTRAINTS. WIDTH OF EXISTING TRANSMISSION LINE ROW WILL VARY. WHERE KNOWN, OFFSETS WERE NECESSARY TO ACCOMMODATE PLANNED IMPROVEMENTS TO UTILITIES.
2. DURING DETAILED DESIGN DEVELOPMENT AND COORDINATION WITH UTILITY PROVIDER, EXISTING TRANSMISSION LINE ROW AND EASEMENTS WILL BE CONFIRMED.
3. WHERE PRACTICAL ROADS MAY BE CONSTRUCTED TO ALLOW FOR JOINT USE BY UTILITY PROVIDER AND TCRR FOR MAINTENANCE PURPOSES TO LIMIT IMPACTS.
4. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE VIADUCT TYPICAL SECTION. REFER TO DRAWING NO. CVL-00-03005 FOR ADDITIONAL NOTES FOR TYPICAL EMBANKMENT SECTION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
J. SERRANO

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

IN CHARGE
C. TAYLOR

DATE
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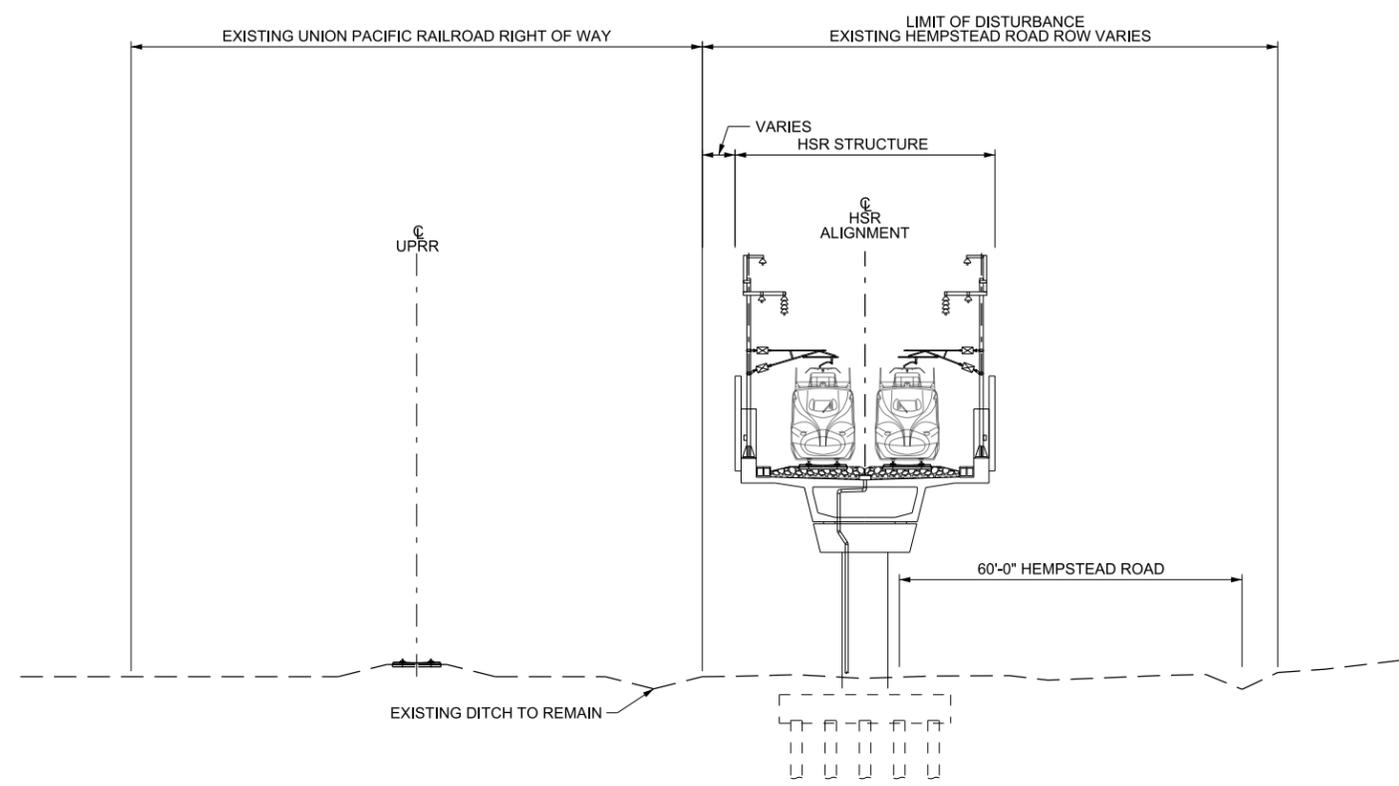
Drawing Title

GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 10 OF 20

Scale
5/8" = 10'

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No CVL-00-03010	Rev 01
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L VIADUCT SECTION ADJACENT TO HEMPSTEAD ROAD

NOTES:

1. THIS SECTION ILLUSTRATES TYPICAL CONFIGURATION ADJACENT TO HEMPSTEAD ROAD AND UPRR LOOKING NORTHWEST. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE VIADUCT SECTION. REFER TO DRAWING NO. CVL-00-03005 FOR ADDITIONAL NOTES FOR VIADUCT SECTION.
2. HSR STRUCTURE DRAINAGE IS CONNECTED TO DETENTION BASINS VIA PERIODIC CROSS DRAINAGE BENEATH HEMPSTEAD ROAD. DETENTION BASIN LOCATIONS AND SIZES ARE SHOWN ON PLAN.
3. OFFSET TO UPRR ROW VARIES BASED ON SITE SPECIFIC GEOMETRY AND CONSTRAINTS.
4. FOR DETAILS ON HEMPSTEAD RD, REFER TO DRAWING NO. CVL-00-03034.
5. LIMIT OF DISTURBANCE ALONG HEMPSTEAD ROAD GENERALLY TAKEN AS 100 FOOT WIDTH OF HEMPSTEAD ROAD RIGHT-OF-WAY FOR PURPOSES OF ENVIRONMENTAL ANALYSES. RECONSTRUCTION OF HEMPSTEAD ROAD AND RELOCATION OF UTILITIES TO BE DEVELOPED DURING MORE DETAILED DESIGN IN CLOSE COORDINATION WITH TXDOT AND CITY OF HOUSTON.
6. VIADUCT LOCATED JUST INSIDE OF HEMPSTEAD ROAD ROW TO AVOID PROPERTY IMPACTS TO UPRR. LOD AND TEMPORARY UTILITY LOD IS SET AT EDGE OF UPRR WITHIN THIS SECTION OF HEMPSTEAD ROAD. DUE TO DRAWING SCALE, THESE LOD LIMITS APPEAR JUST AT VIADUCT EDGE. SEE DRAWINGS CVL-HN-1108 THROUGH CVL-HN-0112.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY G. MEJIA
DRAWN BY J. BORGHESI
CHECKED BY K. SEYMOUR
IN CHARGE C. TAYLOR
DATE 09/15/2017

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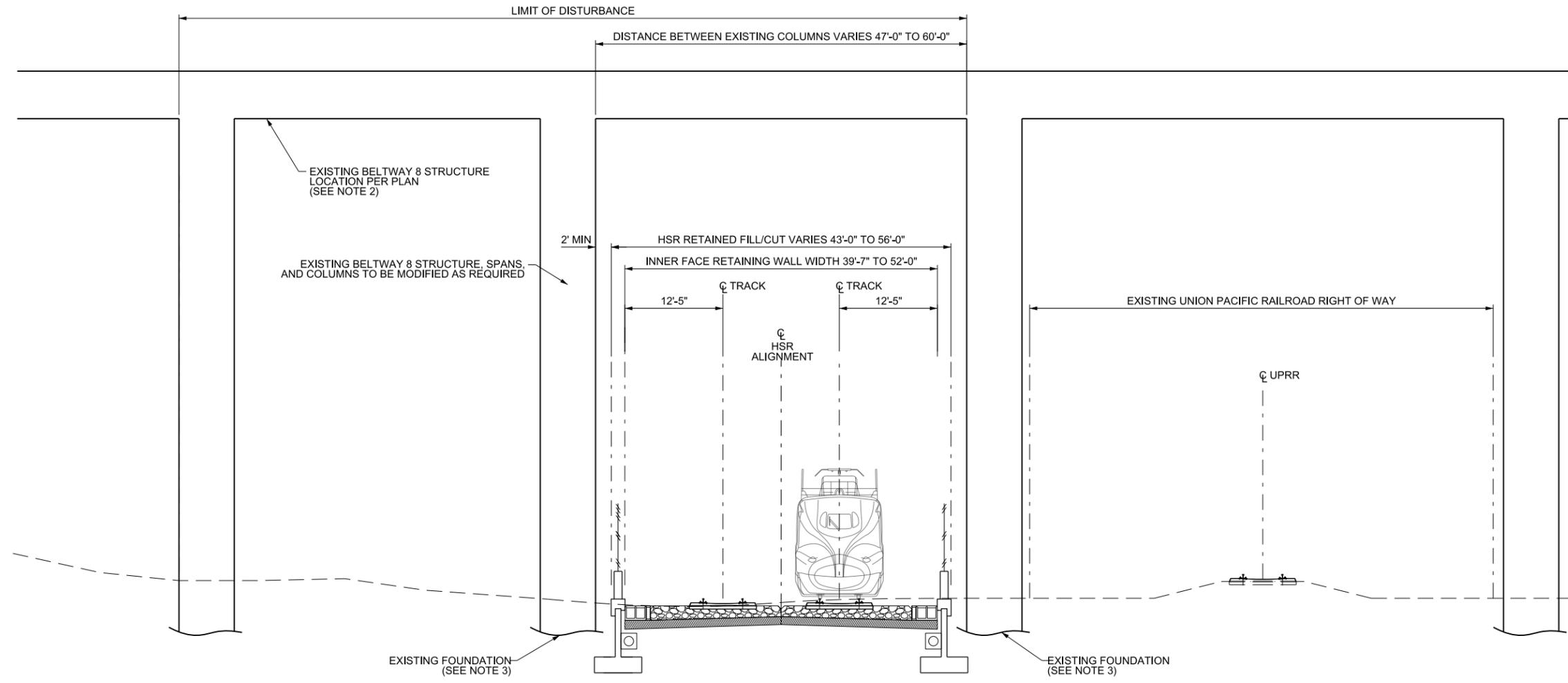
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Drawing Title
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 11 OF 20

Scale
5/8" = 10'
 Drawing Status
FINAL DRAFT
 Job No: **234180** Drawing No: **CVL-00-03011** Rev: **01**



M TYPICAL RETAINED FILL/CUT UNDER BELTWAY 8

- NOTES:
1. DETAILS OF INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE RETAINED FILL AND RETAINED CUT SECTIONS. REFER TO DRAWING NO. CVL-00-03002 AND CVL-00-03004 FOR ADDITIONAL NOTES FOR RETAINED FILL AND RETAINED CUT SECTIONS.
 2. TYPICAL SECTION INDICATES MOST CONSTRAINED SPAN UNDER BELTWAY 8, WHERE ADEQUATE HORIZONTAL CLEARANCE IS AVAILABLE STANDARD RETAINED CUT/ FILL SECTION WILL APPLY. OFFSET BETWEEN INFRASTRUCTURE ELEMENTS SUCH AS DISTANCE BETWEEN RETAINING WALL, WILL VARY BASED ON EXISTING COLUMN LOCATION UNDER BELTWAY 8.
 3. COLUMN LOCATION, FOOTINGS AND SPACING FOR EXISTING BELTWAY 8 TO BE VERIFIED BY STRUCTURAL AS BUILT DRAWINGS AND FIELD VERIFICATION. TYPICAL SECTION ILLUSTRATES CONCEPTUAL PLACEMENT OF HSR ELEMENTS. CLEARANCE AND PIER PROTECTION REQUIREMENTS TO BELTWAY 8 STRUCTURE TO BE CONFIRMED DURING FINAL DESIGN. MODIFICATION TO EXISTING STRUCTURE MAY BE REQUIRED.

4. OVERHEAD CATENARY SYSTEM NOT SHOWN. WHERE HSR PASSES BELOW EXISTING BELTWAY 8 STRUCTURE, CATENARY SHALL BE SUSPENDED FROM EXISTING STRUCTURE. DETAILED DESIGN TO BE CLOSELY COORDINATED WITH TXDOT.

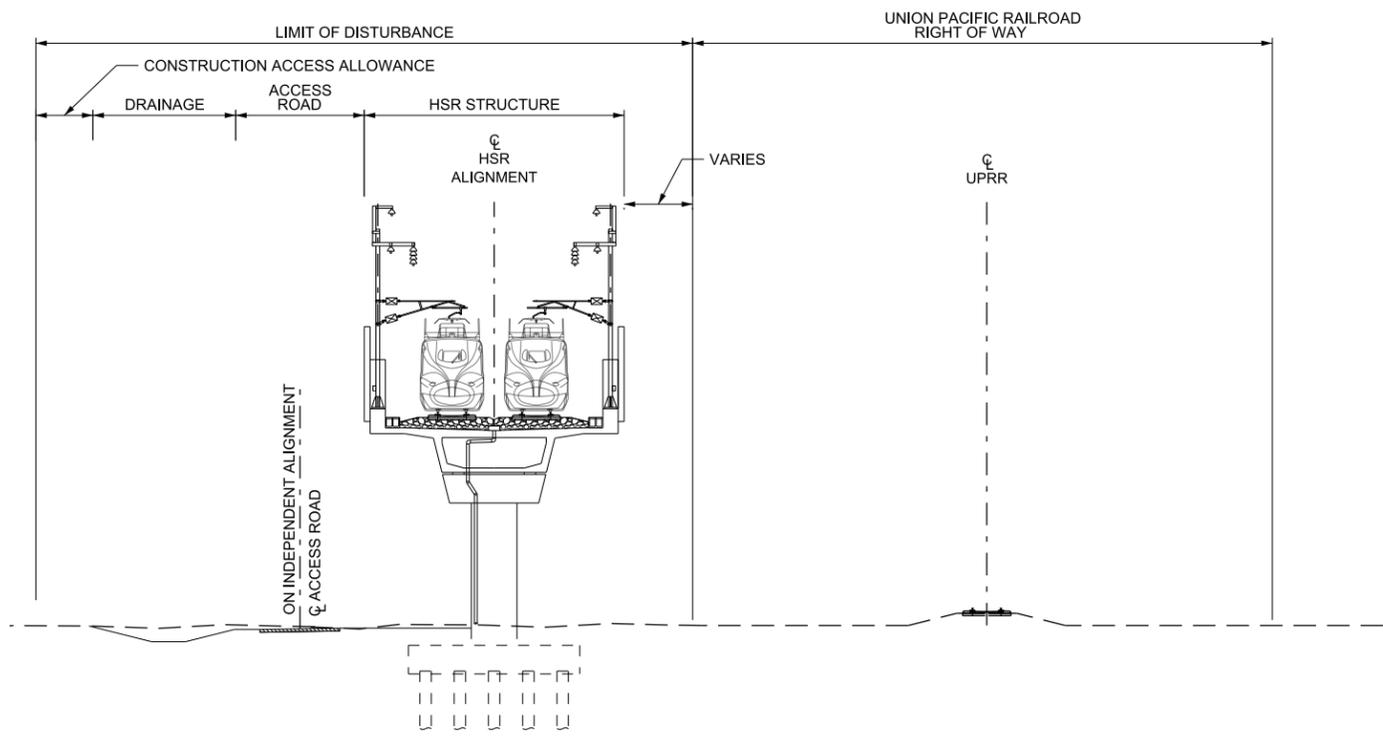
REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY G. MEJIA
DRAWN BY J. BORGHESI
CHECKED BY K. SEYMOUR
IN CHARGE C. TAYLOR
DATE 09/15/2017



Drawing Title
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 12 OF 20

Scale 1 1/4" = 10'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03012	Rev 01



N TYPICAL VIADUCT SECTION ADJACENT TO UPRR

- NOTES:
1. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE VIADUCT SECTION.
 2. REFER TO DRAWING NO. CVL-00-03005 FOR ADDITIONAL NOTES FOR VIADUCT SECTION.
 3. OFFSET TO UPRR VARIES. SEE PLAN AND PROFILE IN VOLUME 2 FOR LOCATION.
 4. IN SELECT LOCATIONS WHERE REQUIRED TO MITIGATE PROPERTY OR ENVIRONMENTAL IMPACTS, AND WHERE DRAINAGE AND ACCESS REQUIREMENTS COULD BE OTHERWISE ACCOMODATED, LOD FOR VIADUCT SEGMENT WAS LIMITED TO WIDTH OF VIADUCT. SEE DRAWING CVL-HN-01126.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
G. MEJIA

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

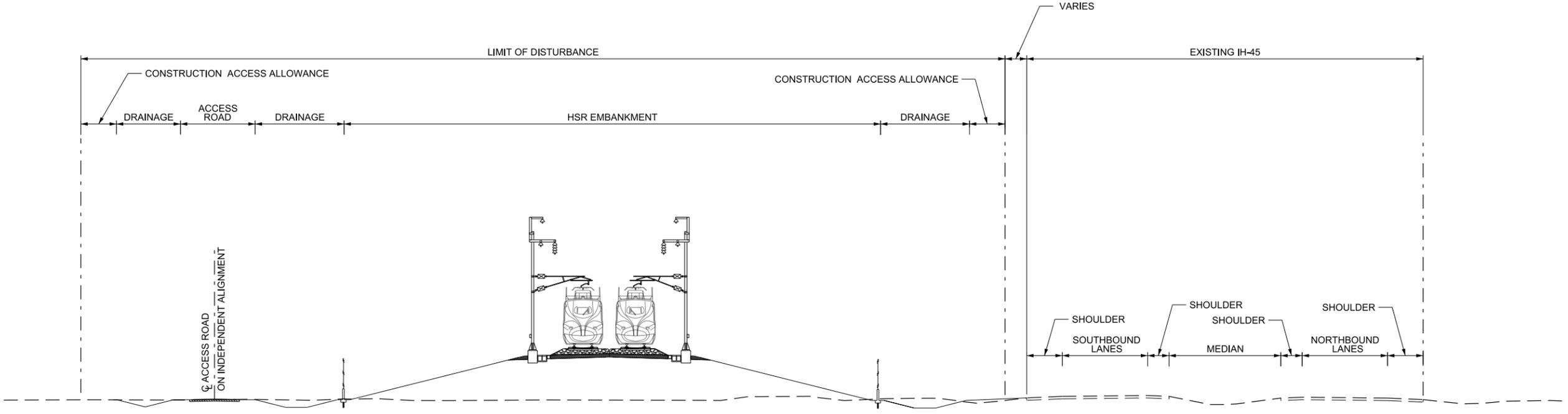
IN CHARGE
C. TAYLOR

DATE
09/15/2017



Drawing Title
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 13 OF 20

Scale 5/8" = 10'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03013	Rev 01



P TYPICAL EMBANKMENT SECTION ADJACENT TO IH-45

- NOTES:
1. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE EMBANKMENT SECTIONS.
 2. DURING DETAILED DESIGN DEVELOPMENT AND COORDINATION WITH TXDOT, HSR MAY BE ORIENTED ON EITHER SIDE OF IH-45 CORRIDOR AND OFFSETS TO IH-45 CORRIDOR VARIES BASED ON SITE SPECIFIC GEOMETRY, TOPOGRAPHY, AND CONSTRAINTS.
 3. REFER TO DRAWING NO. CVL-00-03001 FOR ADDITIONAL NOTES FOR EMBANKMENT SECTIONS.
 4. WIDTH OF EXISTING IH-45 CORRIDOR ROW WILL VARY. OFFSET TO IH45 VARIES, SEE PLAN AND PROFILE IN VOLUME 2 FOR LOCATION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S. DI BRATTO

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

IN CHARGE
C. TAYLOR

DATE
09/15/2017

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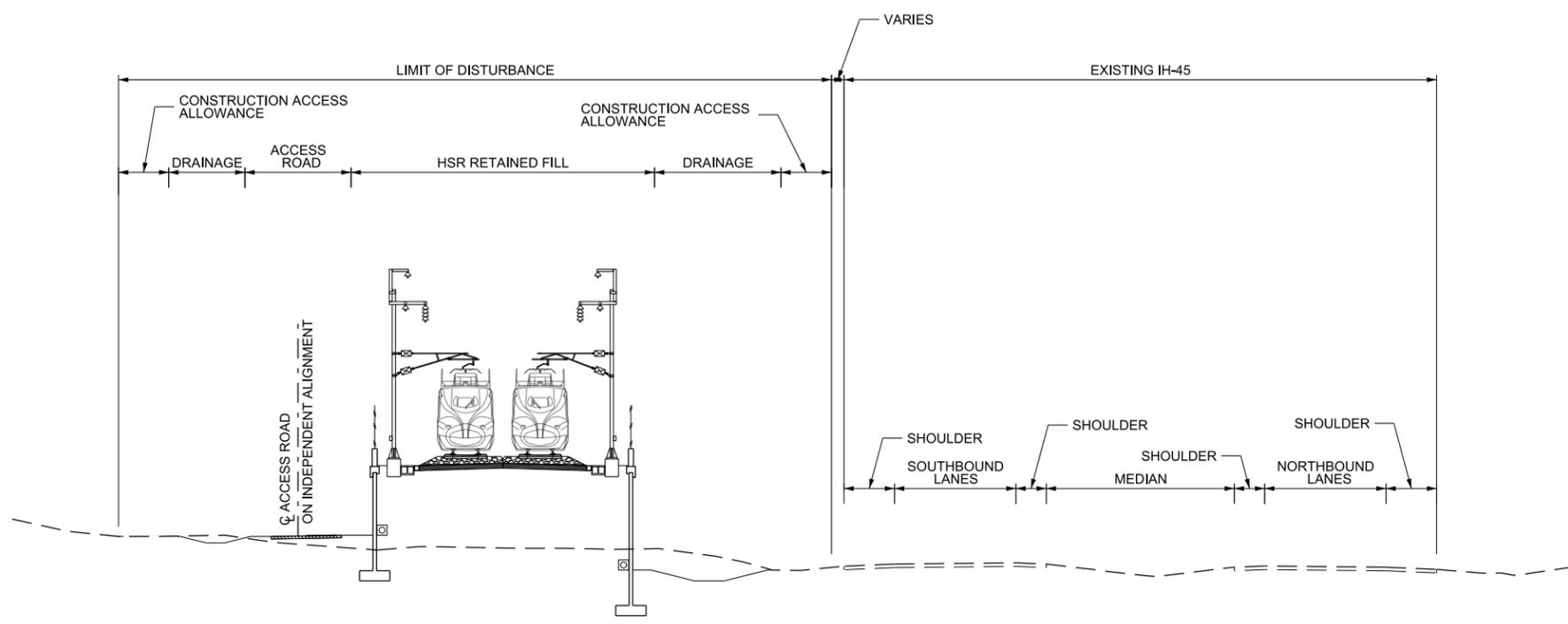
Drawing Title

GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 14 OF 20

Scale
5/8" = 10'

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No CVL-00-03014	Rev 01
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Q TYPICAL RETAINED FILL SECTION ADJACENT TO IH-45

NOTES:

1. DETAILS OF INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE RETAINED FILL SECTION.
2. OFFSET TO IH45 VARIES, SEE PLAN AND PROFILE IN VOLUME 2 FOR LOCATION.
3. REFER TO DRAWING NO. CVL-00-03002 FOR ADDITIONAL NOTES FOR RETAINED FILL SECTION.

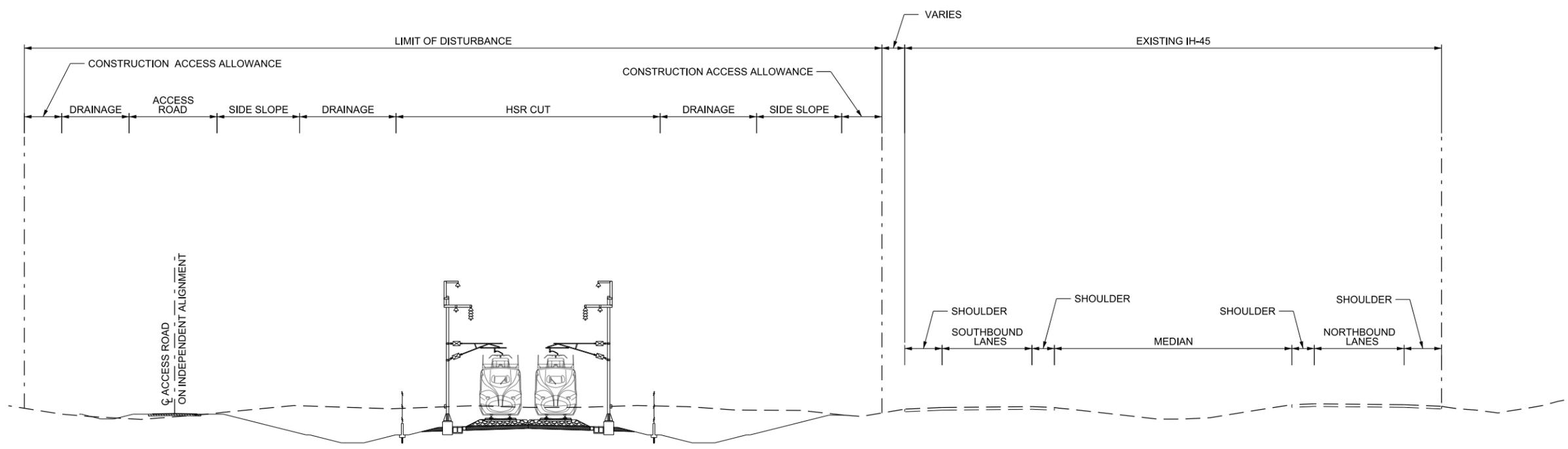
REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S. DI BRATTO
DRAWN BY
J. BORGHESI
CHECKED BY
K. SEYMOUR
IN CHARGE
C. TAYLOR
DATE
09/15/2017



Drawing Title
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 15 OF 20

Scale 5/8" = 10'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03015	Rev 01



(R) TYPICAL CUT SECTION ADJACENT TO IH-45

NOTES:

1. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE TYPICAL CUT SECTION.
2. OFFSET TO IH45 VARIES, SEE PLAN AND PROFILE IN VOLUME 2 FOR LOCATION.
3. REFER TO DRAWING NO. CVL-00-03003 FOR ADDITIONAL NOTES FOR TYPICAL CUT SECTION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S. DI BRATTO

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

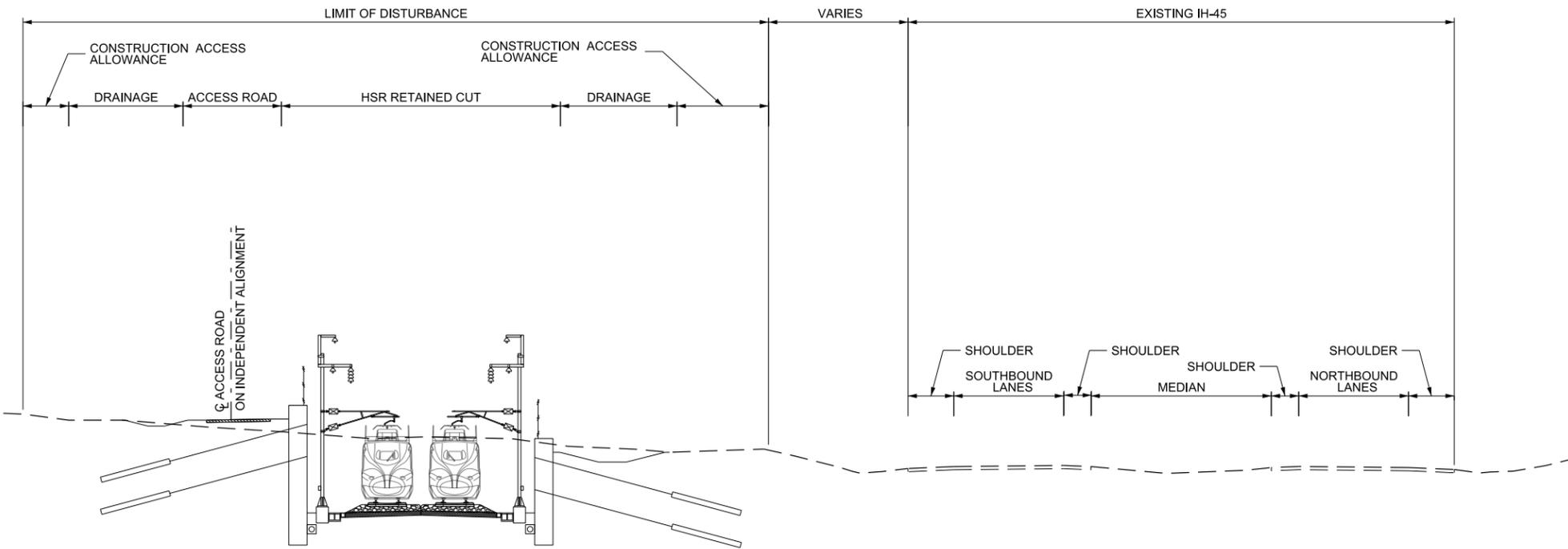
IN CHARGE
C. TAYLOR

DATE
09/15/2017



Drawing Title
**GENERAL CIVIL RAIL
TYPICAL SECTIONS
SHEET 16 OF 20**

Scale 5/8" = 10'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03016	Rev 01



S TYPICAL RETAINED CUT SECTION ADJACENT TO IH-45

- NOTES:
1. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE RETAINED CUT SECTION.
 2. OFFSET TO IH45 VARIES, SEE PLAN AND PROFILE IN VOLUME 2 FOR LOCATION.
 3. REFER TO DRAWING NO. CVL-00-03004 FOR ADDITIONAL NOTES FOR RETAINED CUT SECTION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S. DI BRATTO

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

IN CHARGE
C. TAYLOR

DATE
09/15/2017

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Client

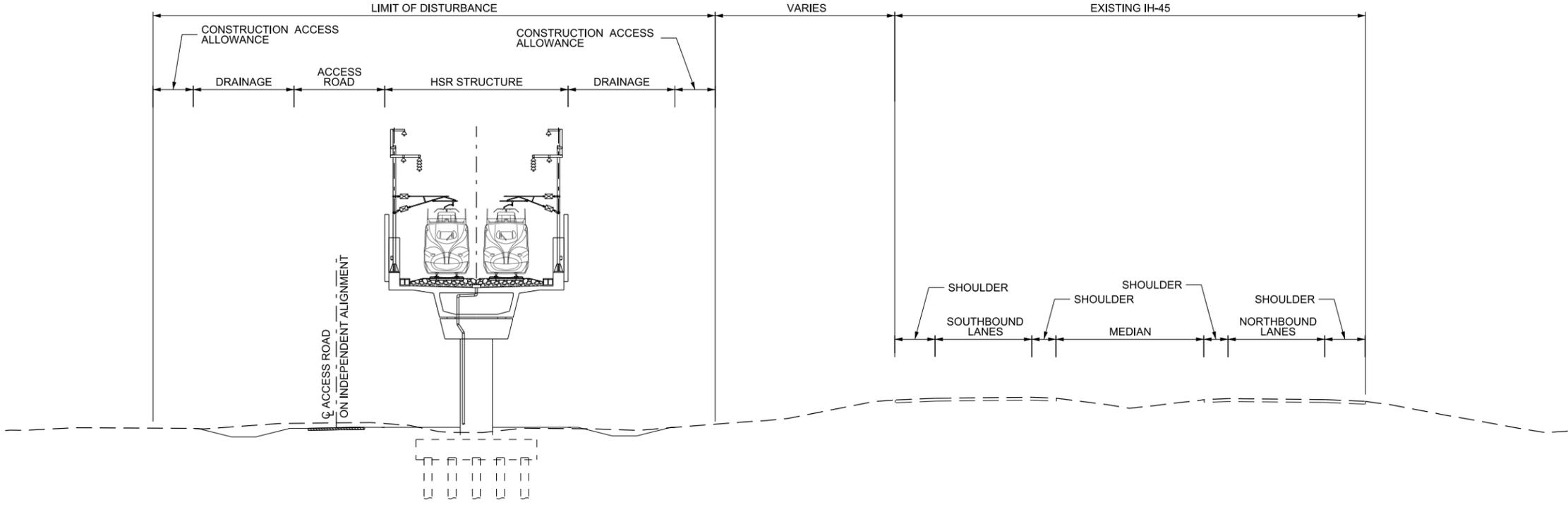
TEXAS CENTRAL

1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title

GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 17 OF 20

Scale 5/8" = 10'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03017	Rev 01



T TYPICAL VIADUCT SECTION ADJACENT TO IH-45

- NOTES:
1. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE VIADUCT SECTION.
 2. OFFSET TO IH45 VARIES, SEE PLAN AND PROFILE IN VOLUME 2 FOR LOCATION.
 3. REFER TO DRAWING NO. CVL-00-03005 FOR ADDITIONAL NOTES FOR VIADUCT SECTION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S. DI BRATTO

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

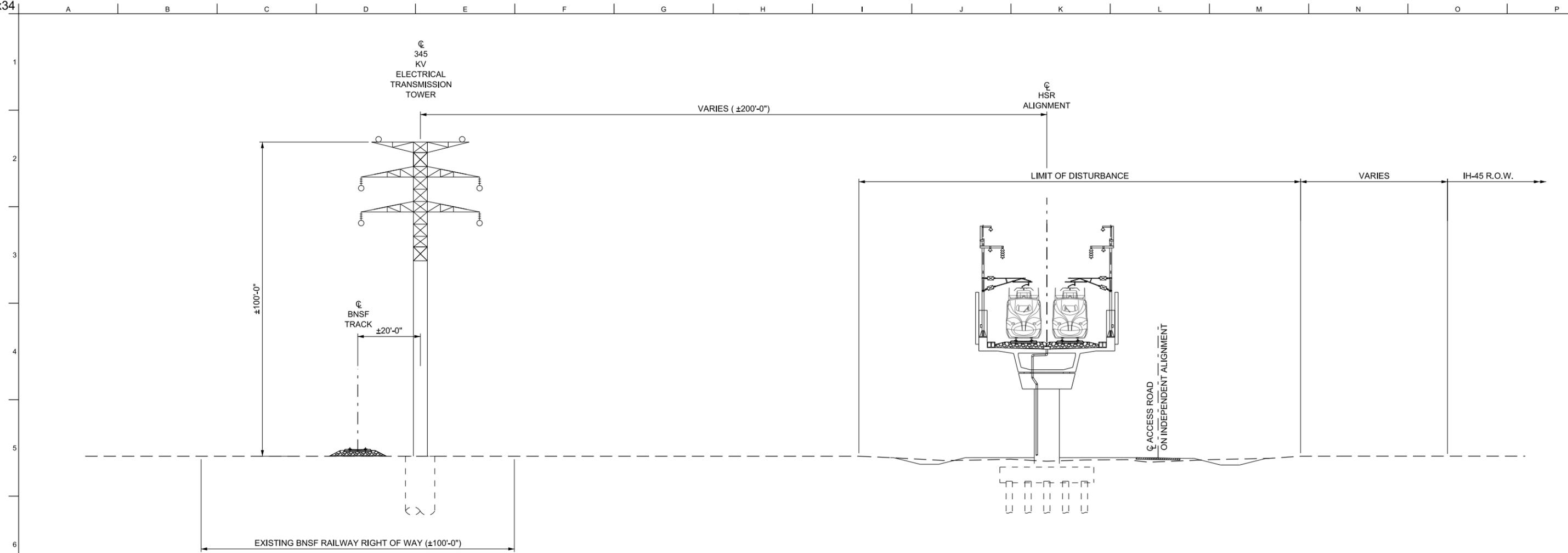
IN CHARGE
C. TAYLOR

DATE
09/15/2017



Drawing Title
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 18 OF 20

Scale 5/8" = 10'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03018	Rev 01



U TYPICAL VIADUCT ADJACENT TO IH-45, UTILITY CORRIDOR, AND BNSF RAILROAD

- NOTES:
1. DETAILS OF THE INFRASTRUCTURE ELEMENTS, SIZE, AND POSITION WITHIN THE LIMIT OF DISTURBANCE ARE SHOWN IN THE VIADUCT SECTION.
 2. DURING DETAILED DESIGN DEVELOPMENT AND COORDINATION WITH UTILITY PROVIDER, EXISTING TRANSMISSION LINE ROW AND EASEMENTS WILL BE CONFIRMED.
 2. OFFSET TO IH45, ELECTRICAL TRANSMISSION TOWER, AND BNSF VARIES, SEE PLAN AND PROFILE IN VOLUME 2 FOR LOCATION.
 3. REFER TO DRAWING NO. CVL-00-03005 FOR ADDITIONAL NOTES FOR VIADUCT SECTION.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
N. SMITH

DRAWN BY
J. BORGHESI

CHECKED BY
K. SEYMOUR

IN CHARGE
C. TAYLOR

DATE
09/15/2017



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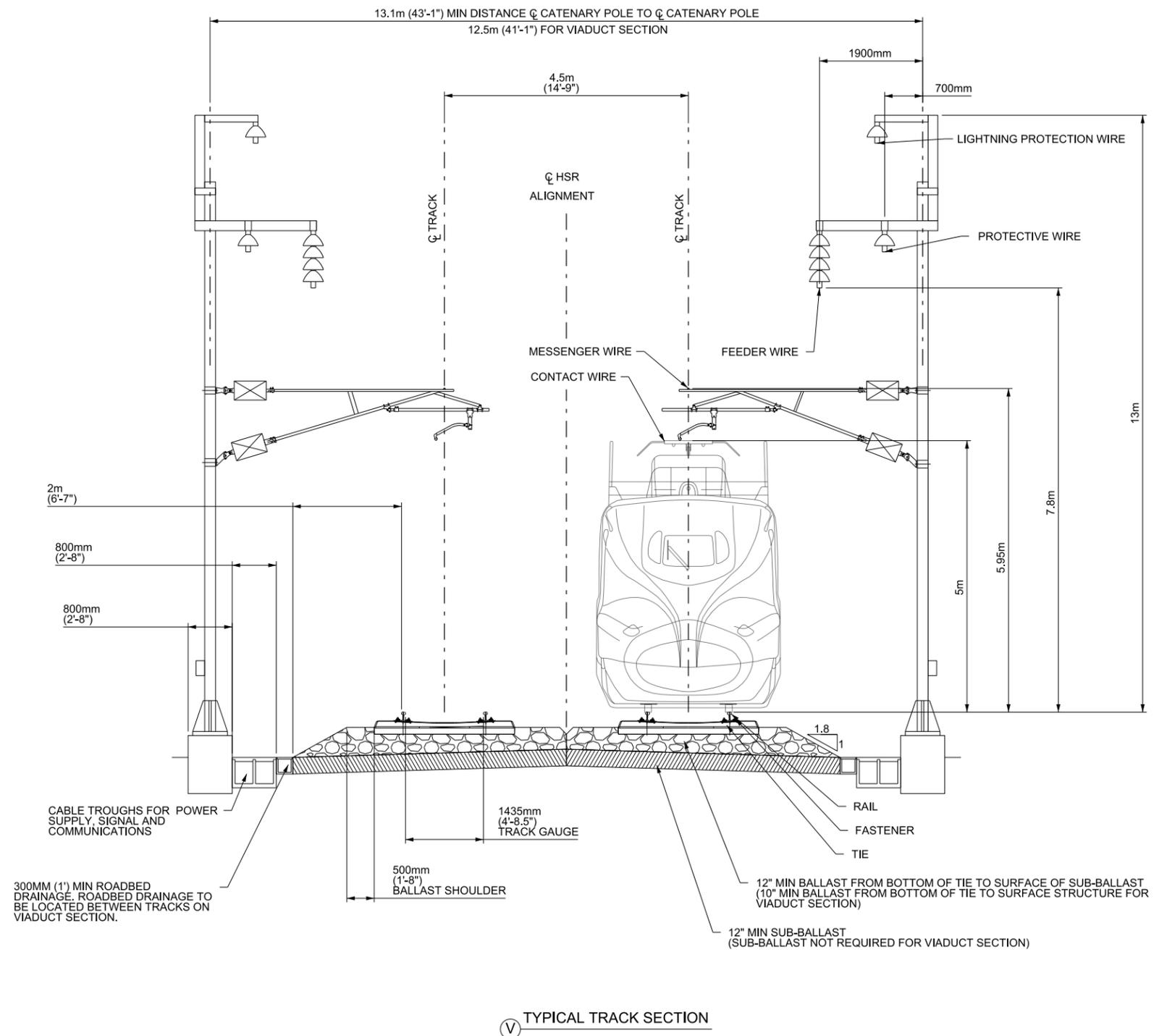
Drawing Title

**GENERAL CIVIL RAIL
TYPICAL SECTIONS
SHEET 19 OF 20**

Scale
5/8" = 10'

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No CVL-00-03019	Rev 01
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- NOTES:
1. TYPICAL SECTION FOR MAINLINE HSR SECTION BASED ON EMBANKMENT. SEE DRAWINGS CVL-00-03001 TO CVL-00-03005 FOR EACH SECTION TYPE. BALLAST SHOULDER SLOPE AND OTHER DIMENSIONS FROM TECHNICAL REGULATORY STANDARDS ON JAPANESE RAILWAY, ARTICLE 21.
 2. 300mm (1 FT) SUBBALLAST SHOULDER ALLOWANCE REQUIRED FOR TYPICAL EMBANKMENT AND CUT SECTIONS.
 3. CATENARY POLE FOUNDATION TO BE DEVELOPED DURING MORE DETAILED DESIGN.
 4. TWO CABLE TROUGHS ARE PROVIDED ON EACH SIDE OF THE HSR TRACKWAY, ONE FOR POWER SUPPLY AND ONE FOR SIGNALS AND COMMUNICATIONS.
 5. 2-8" MIN MOW PATH AT TOP OF CABLE TROUGH AS REQUIRED. CABLE TROUGHS WOULD BE DESIGNED AND CONSTRUCTED TO ENSURE AN ADEQUATE AND STABLE WORKING SURFACE FOR MOW ACCESS AND EMERGENCY EGRESS. MOW PATH TO SERVE AS EVACUATION, REFUGE, AND MAINTENANCE AISLE.
 6. ACCESS WALKWAY SET AT MINIMUM DISTANCE OF 2.0m (6'-7") FROM FIELD SIDE OF NEAREST RAIL TO PROVIDE FOR ROADWAY WORKER SAFETY.
 7. FOR TYPICAL MAINLINE, RAIL SHALL BE 60KG, TIES SHALL BE TYPE-3H OF JIS E 1201 PRESTRESSED CONCRETE SLEEPERS, AND FASTENERS SHALL BE JIS E 1118. FOR TRACK MATERIALS WITHIN YARDS, SHOPS, STATIONS, AND TURNOUTS, SEE JRC SPECIFICATION.
 8. KEY DIMENSIONS FOR SYSTEMS INFRASTRUCTURE DESIGN, INCLUDING TRACK GEOMETRY KEY DIMENSIONS SUCH AS GAUGE AND SUPERELEVATION LIMITS, ARE PROVIDED IN METRIC UNITS TO ALLOW FOR COORDINATION WITH RPA EFFORTS TO ACHIEVE REGULATORY APPROVAL FOR USE OF SHINKANSEN TECHNOLOGY TO THE PROJECT.

V TYPICAL TRACK SECTION

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY J.SERRANO
DRAWN BY J. BORGHESI
CHECKED BY C. ZWIBEL
IN CHARGE C. TAYLOR
DATE 09/15/2017

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Client

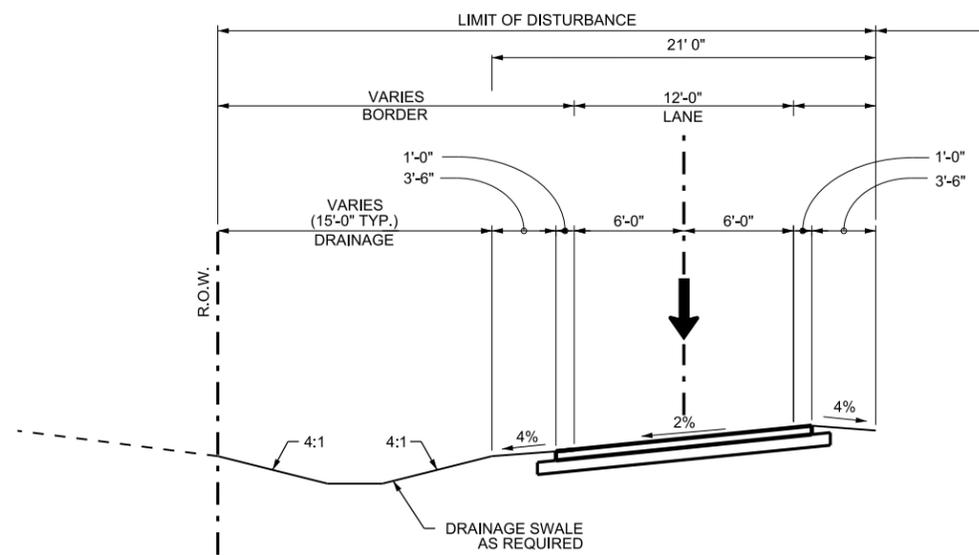
TEXAS CENTRAL
 1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title
GENERAL CIVIL RAIL TYPICAL SECTIONS SHEET 20 OF 20

Scale
 2 1/2" = 10'
 Drawing Status
FINAL DRAFT
 Job No: 234180 Drawing No: CVL-00-03020 Rev: 01

1-3

ROADWAY AND GRADE SEPARATION TYPICAL SECTIONS



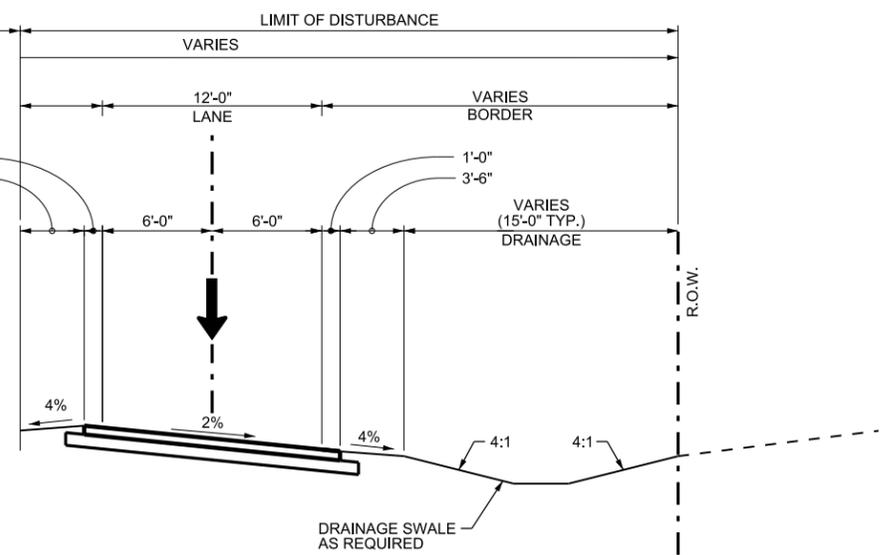
1 LEFT ACCESS ROAD PROPOSED TYPICAL SECTION
NOT TO SCALE

SEE RAIL TYPICAL SECTION FOR DETAILS

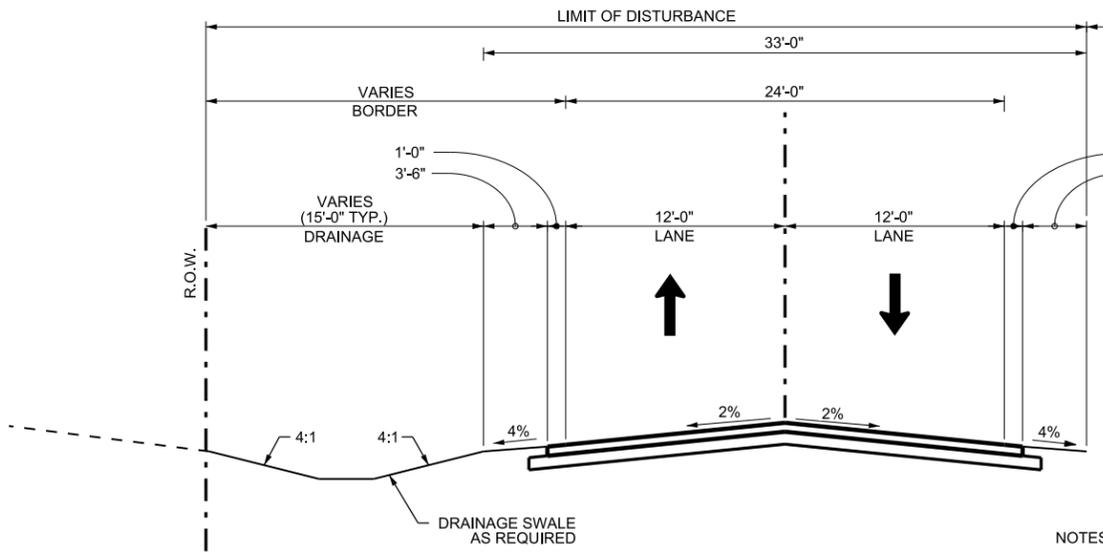
INSIDE CROSS SLOPE SHALL BE -2% AWAY FROM RAIL WHEN A DRAINAGE DITCH IS NOT LOCATED BETWEEN RAIL AND ROAD

NOTES:

- ACCESS ROADS TYPICALLY PROVIDED ALONG ONE SIDE OF HSR LINE. FOR LOCATIONS OF ACCESS ROADS SEE PLANS.
- ACCESS ROADS INTENDED FOR MAINTENANCE AND EMERGENCY ACCESS USE WILL TYPICALLY BE UNPAVED GRAVEL ROADS MAINTAINED BY TEXAS CENTRAL. COORDINATION WITH LOCAL EMERGENCY RESPONSE PROVIDERS SHALL BE UNDERTAKEN DURING MORE DETAILED DESIGN DEVELOPMENT TO ENSURE ACCESS REQUIREMENTS ARE SATISFIED.



2 RIGHT ACCESS ROAD PROPOSED TYPICAL SECTION
NOT TO SCALE



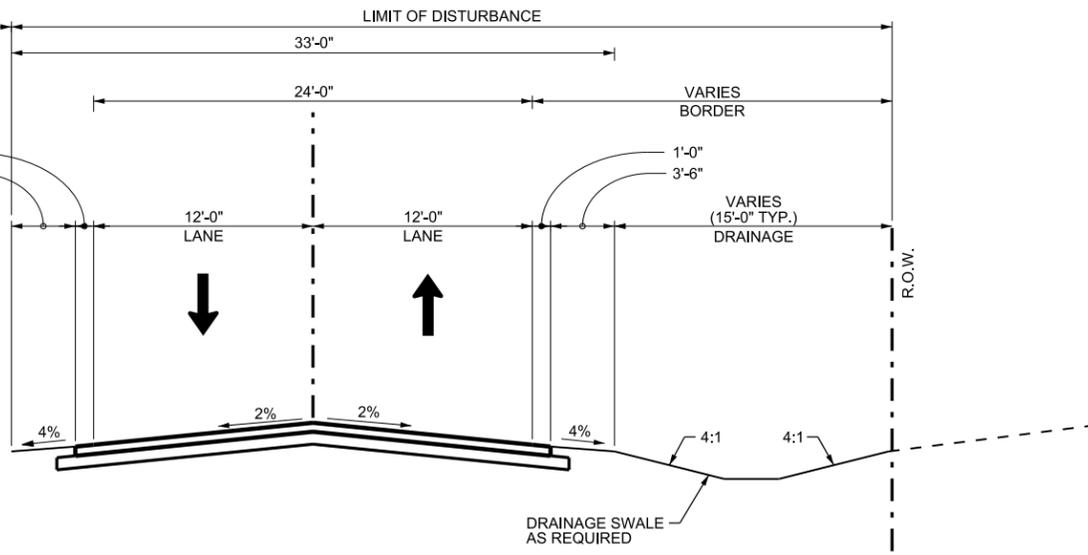
3 LEFT PUBLIC ROAD PROPOSED TYPICAL SECTION
NOT TO SCALE

SEE RAIL TYPICAL SECTION FOR DETAILS

ROAD CROSS SLOPE SHALL BE -2% AWAY FROM RAIL WHEN A DRAINAGE DITCH IS NOT LOCATED BETWEEN RAIL AND ROAD

NOTES:

- PUBLIC ROADS PAVING SURFACES AND LANE CONFIGURATIONS SHALL BE DEVELOPED IN CLOSE COORDINATION WITH APPLICABLE ROADWAY AUTHORITY DURING MORE DETAILED DESIGN. MINIMUM CONFIGURATION SHOWN. FOR PUBLIC ROAD LOCATIONS SEE PLANS.
- SEE FINAL DRAFT CONCEPTUAL ENGINEERING REPORT FOR DESCRIPTION OF ACCESS AND SHARED ACCESS ROADS ALONG HSR LINE.
- ACCESS ROAD TYPICALLY SERVES TO PROVIDE FOR TEXAS CENTRAL MAINTENANCE OPERATIONS AND EMERGENCY RESPONSE IN LIMITED LOCATIONS. ACCESS ROADS MAY SERVE TO PROVIDE PROPERTY ACCESS TO ADJACENT LAND OWNERS.
- PUBLIC ROADS TYPICALLY ARE NEW ROADS OR RECONFIGURED OR REROUTED EXISTING ROADS AND SERVE TO PROVIDE TEXAS CENTRAL MAINTANENCE ACCESS, EMERGENCY RESPONSE AND PUBLIC ACCESS FOR PROPERTIES ALONG THE HSR LINE.



4 RIGHT PUBLIC ROAD PROPOSED TYPICAL SECTION
NOT TO SCALE

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY T. SANSONE
DRAWN BY M. MARROQUIN
CHECKED BY S. BURGESS
IN CHARGE C. TAYLOR
DATE 09/15/2017



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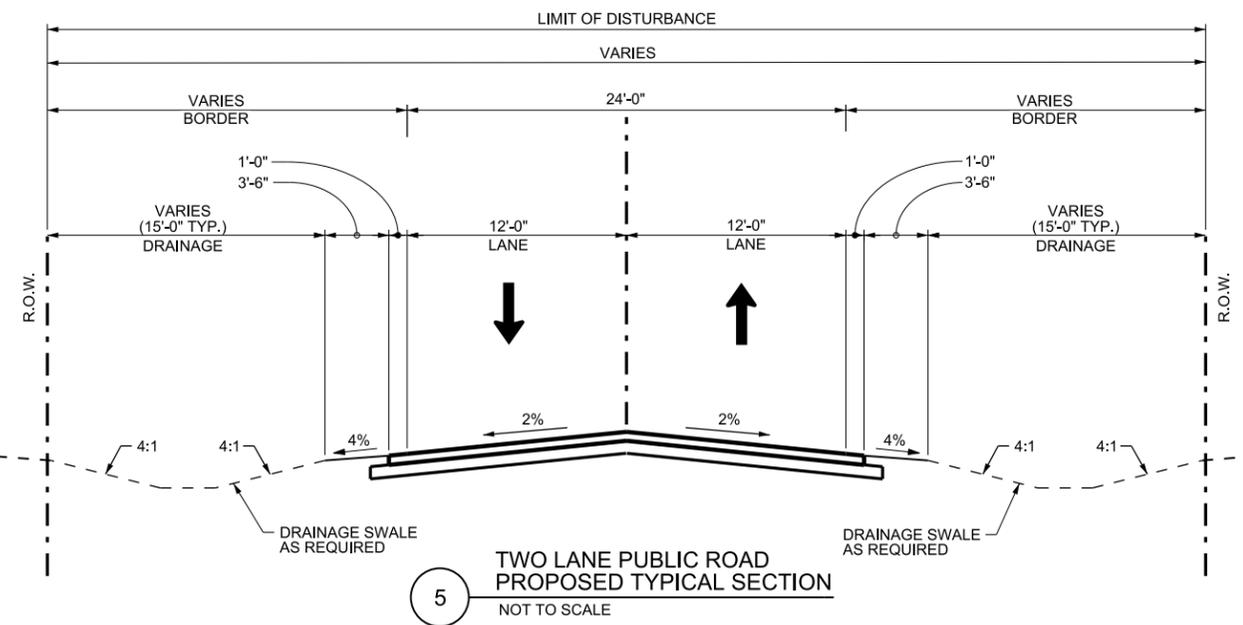
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1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

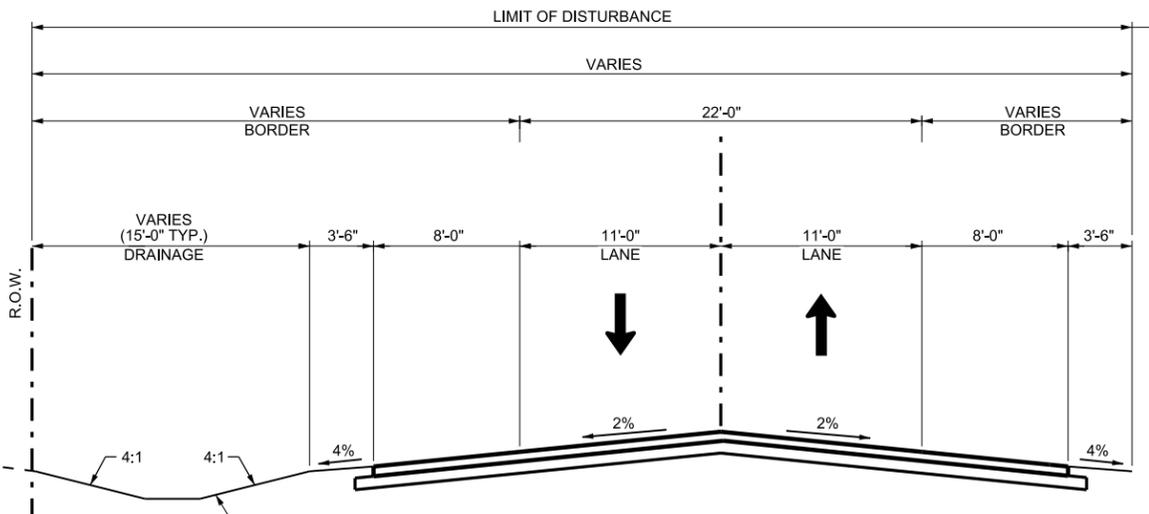
Drawing Title
GENERAL CIVIL HIGHWAY TYPICAL SECTIONS SHEET 1 OF 5

Scale NOT TO SCALE		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03030	Rev 01



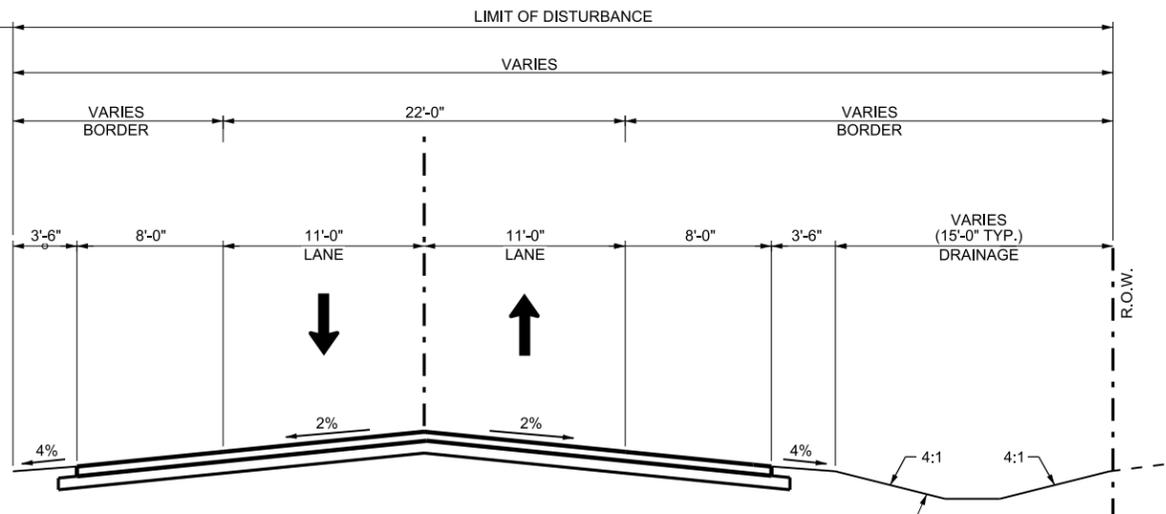
5 TWO LANE PUBLIC ROAD PROPOSED TYPICAL SECTION NOT TO SCALE

- NOTES:
1. PUBLIC ROADS PAVING SURFACES AND LANE CONFIGURATIONS SHALL BE DEVELOPED IN CLOSE COORDINATION WITH APPLICABLE ROADWAY AUTHORITY DURING MORE DETAILED DESIGN. MINIMUM CONFIGURATION SHOWN. FOR PUBLIC ROAD LOCATIONS SEE PLANS.
 2. SEE FINAL DRAFT CONCEPTUAL ENGINEERING REPORT FOR DESCRIPTION OF ACCESS AND SHARED ACCESS ROADS ALONG HSR LINE.
 3. PUBLIC ROADS TYPICALLY ARE NEW ROADS OR RECONFIGURED OR REROUTED EXISTING ROADS AND SERVE TO PROVIDE TEXAS CENTRAL MAINTENANCE ACCESS, EMERGENCY RESPONSE AND PUBLIC ACCESS FOR PROPERTIES ALONG THE HSR LINE.



6 IH-45 FRONTAGE ROAD PROPOSED TYPICAL SECTION NOT TO SCALE

SEE RAIL TYPICAL SECTION FOR DETAILS
ROAD CROSS SLOPE SHALL BE -2% AWAY FROM RAIL WHEN A DRAINAGE DITCH IS NOT LOCATED BETWEEN RAIL AND ROAD



7 IH-45 FRONTAGE ROAD PROPOSED TYPICAL SECTION NOT TO SCALE

- NOTES:
1. PUBLIC ROADS AND FRONTAGE ROADS LANE CONFIGURATIONS VARY BY LOCATION AND WOULD BE DEVELOPED DURING MORE DETAILED DESIGN IN CLOSE COORDINATION WITH TXDOT.
 2. SEE VOLUME 4 ROADWAY PLANS FOR LOCATIONS.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
T. SANSONE

DRAWN BY
M. MARROQUIN

CHECKED BY
S. BURGESS

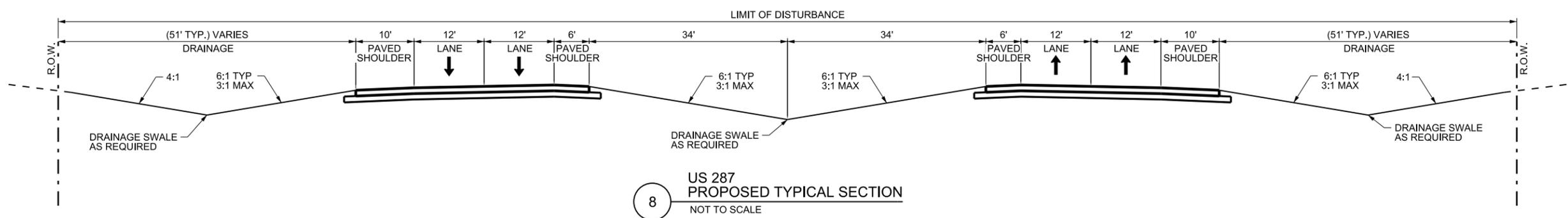
IN CHARGE
C. TAYLOR

DATE
09/15/2017

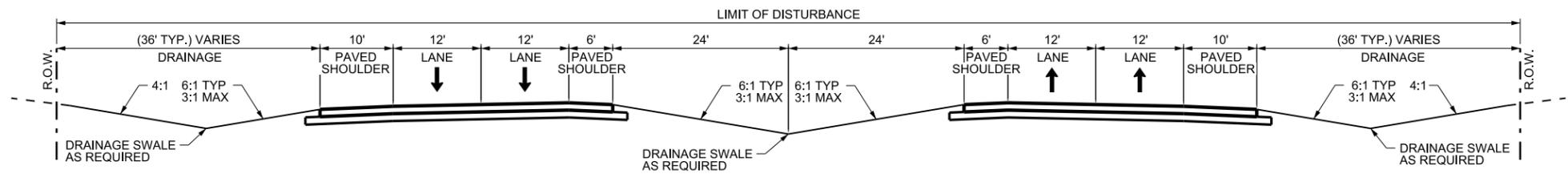


Drawing Title
GENERAL CIVIL HIGHWAY TYPICAL SECTIONS SHEET 2 OF 5

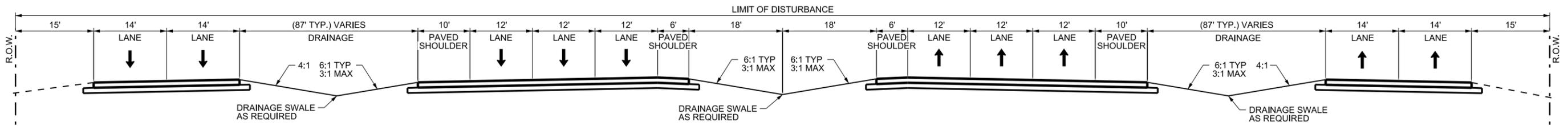
Scale NOT TO SCALE		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03031	Rev 01



8 US 287 PROPOSED TYPICAL SECTION NOT TO SCALE



9 SH 31 PROPOSED TYPICAL SECTION NOT TO SCALE



10 GRAND PARKWAY PROPOSED TYPICAL SECTION NOT TO SCALE

NOTES:
 1. SEE ROADWAY PLAN SHEETS FOR SPECIFIC ROADWAY TYPES. LANE CONFIGURATIONS WOULD VARY BY LOCATION AND WOULD BE DEVELOPED DURING MORE DETAILED DESIGN IN CLOSE COORDINATION WITH TXDOT.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
T. SANSONE
 DRAWN BY
M. MARROQUIN
 CHECKED BY
S. BURGESS
 IN CHARGE
C. TAYLOR
 DATE
09/15/2017

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Client

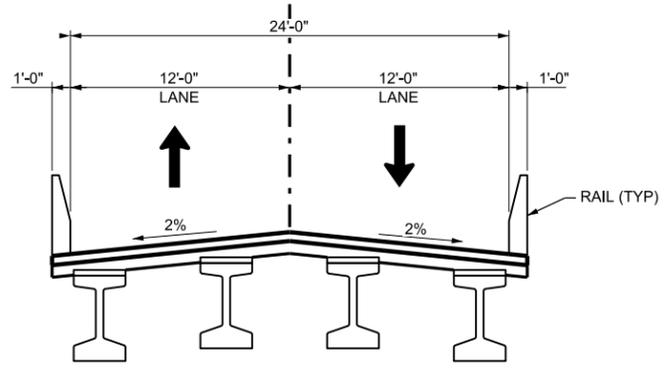
TEXAS CENTRAL
 1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title
GENERAL CIVIL HIGHWAY TYPICAL SECTIONS SHEET 3 OF 5

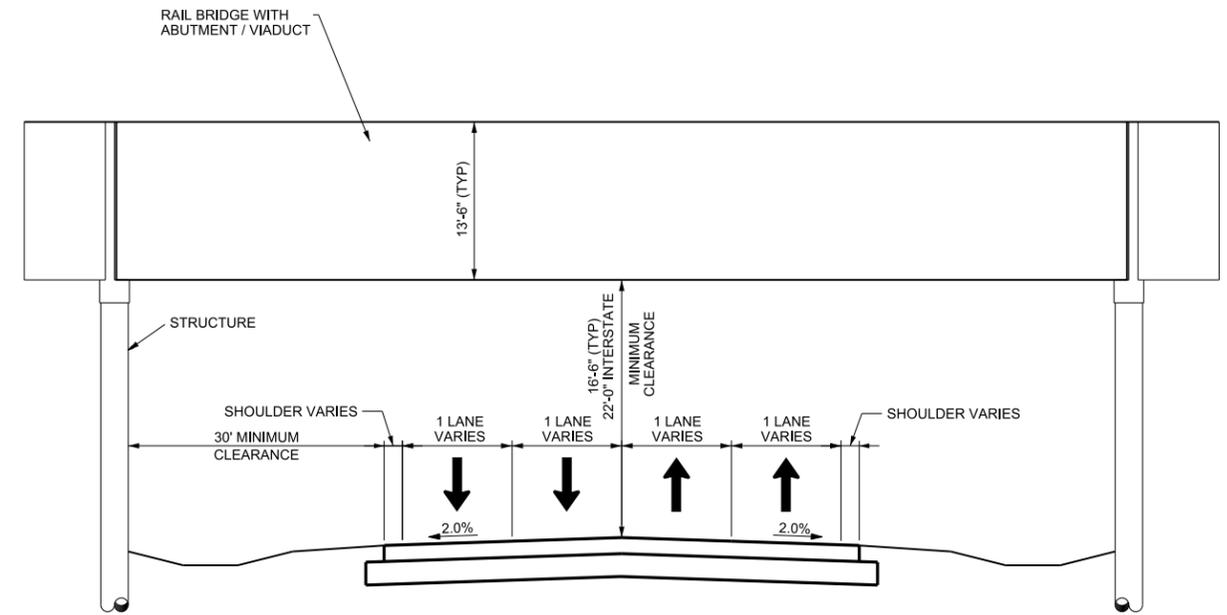
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Drawing Status
FINAL DRAFT

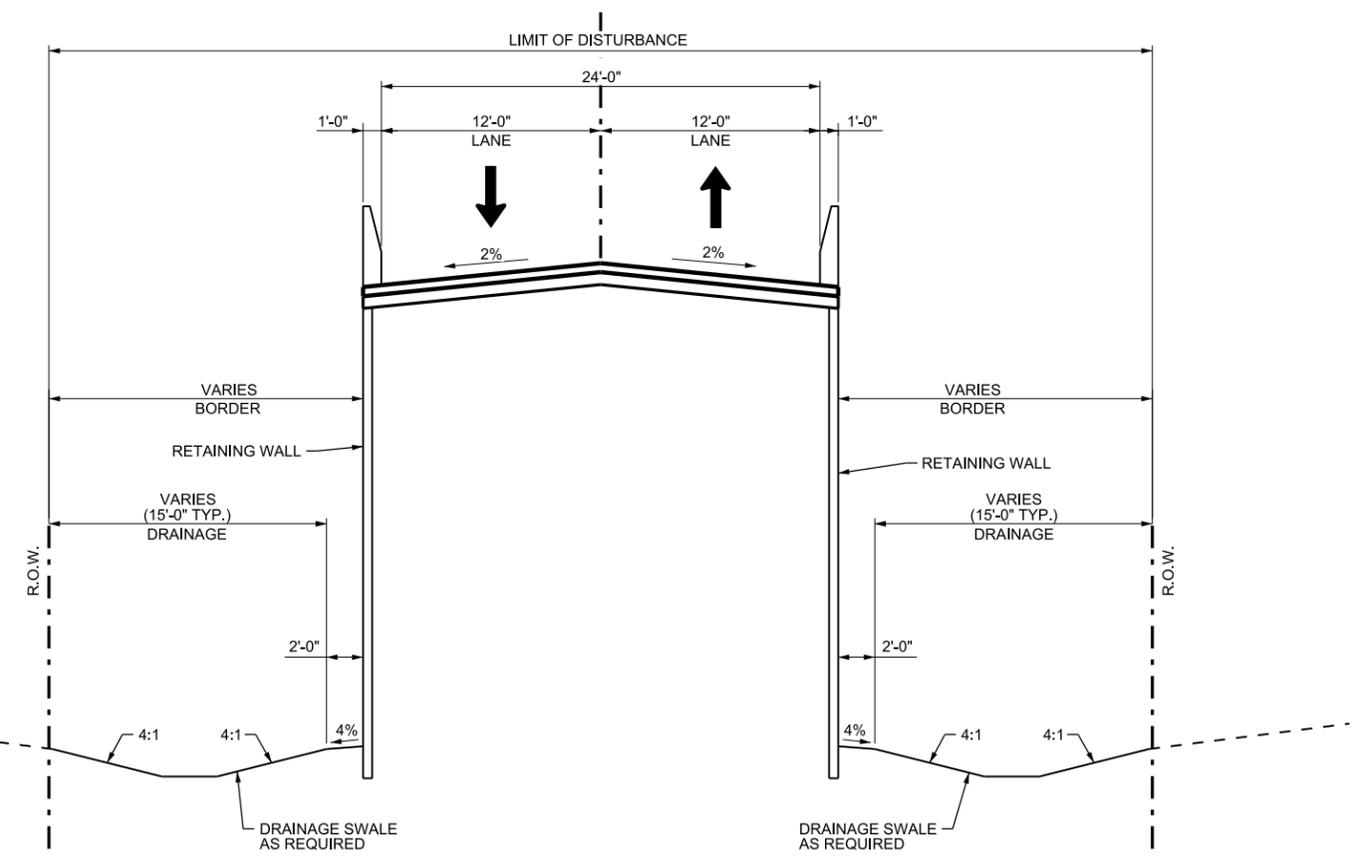
Job No 234180	Drawing No CVL-00-03032	Rev 01
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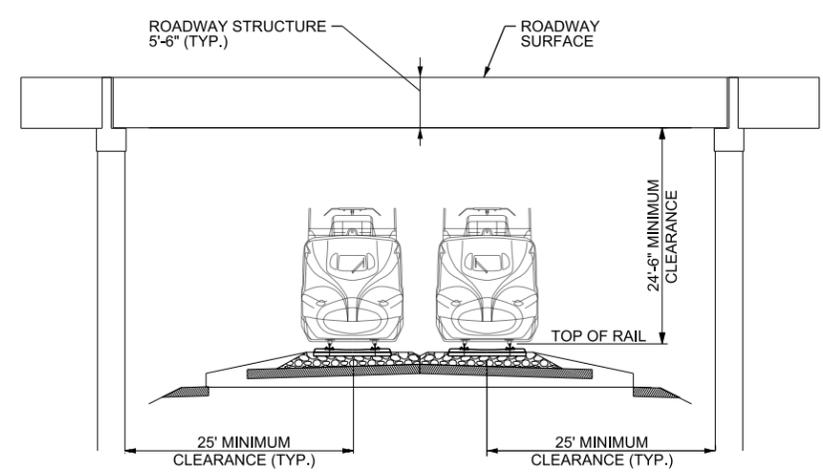
11 TYPICAL COUNTY ROAD AND ACCESS ROAD BRIDGE SECTION
NOT TO SCALE



12 TYPICAL RAIL OVER ROAD
NOT TO SCALE



13 TYPICAL RETAINING WALL SECTION
NOT TO SCALE



14 TYPICAL ROAD OVER RAIL
NOT TO SCALE

- NOTES:
- SECTION INTENDED TO ILLUSTRATE TYPICAL CLEARANCES USED IN DEVELOPMENT OF HSR PROFILE AT ROADWAY GRADE SEPARATIONS. DETAILED COORDINATION WOULD OCCUR DURING ADVANCED DESIGN WITH APPLICABLE ROADWAY AUTHORITY TO ENSURE DESIGN SATISFIES BOTH EXISTING CLEARANCE REQUIREMENTS AND LONG TERM ROADWAY IMPROVEMENT PLANS CORRECTLY.
 - INTERSTATE / CONNECTOR UNDERPASS WOULD MAINTAIN A MINIMUM OF 22' VERTICAL CLEAR DISTANCE FROM PROFILE GRADE TO RAILWAY BRIDGE SOFFIT.
 - VIADUCT CONFIGURATION SHOWN FOR HSR STRUCTURAL CONFIGURATION WILL VARY BASED ON SITE SPECIFIC CONDITIONS AND COULD INCLUDE VIADUCT OR RAIL BRIDGE WITH ABUTMENTS.
 - OCS WILL BE MOUNTED UNDER BRIDGE STRUCTURE. STRUCTURE DEPTH SHOWN USED FOR PLANNING PURPOSES TO ESTABLISH PROPOSED ROADWAY SURFACE ELEVATIONS. ROADWAY STRUCTURE DEPTH WILL VARY BY LOCATION BASED ON SITE SPECIFIC CONDITIONS, ROADWAY WIDTH AND SPAN LENGTH.
 - ROADWAY CROSS-SLOPE IS ASSUMED TO BE NORMAL (2%) CROWN, EXCEPT WHERE SUPERELEVATION IS REQUIRED.
 - RETAINING WALL DESIGN WOULD VARY BY LOCATION GIVEN SITE SPECIFIC CONDITIONS.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
T. SANSONE

DRAWN BY
M. MARROQUIN

CHECKED BY
S. BURGESS

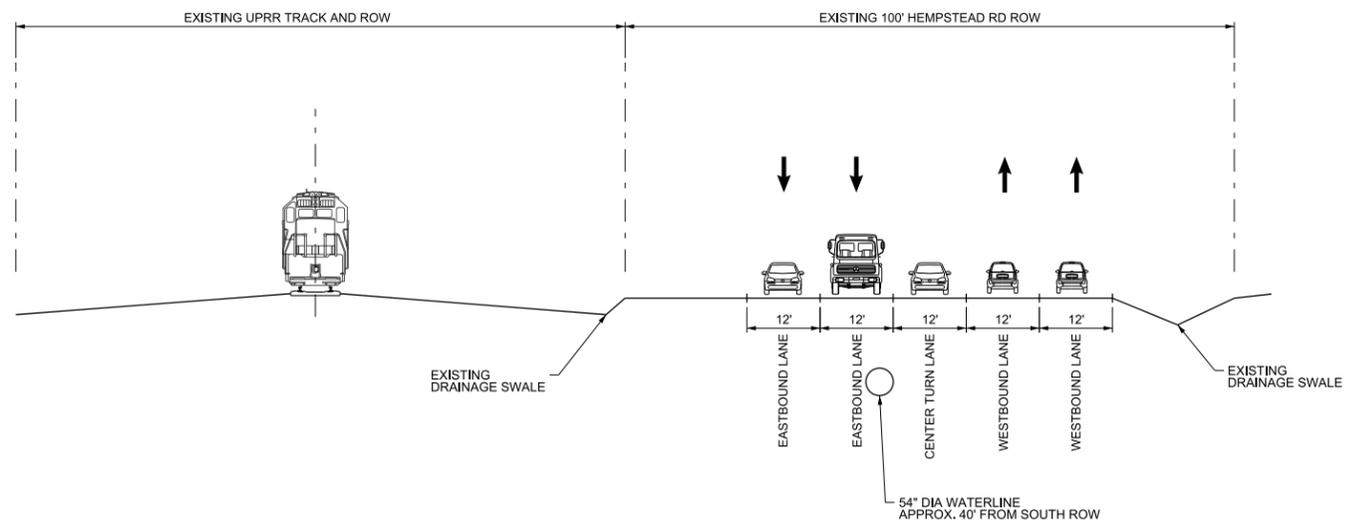
IN CHARGE
C. TAYLOR

DATE
09/15/2017

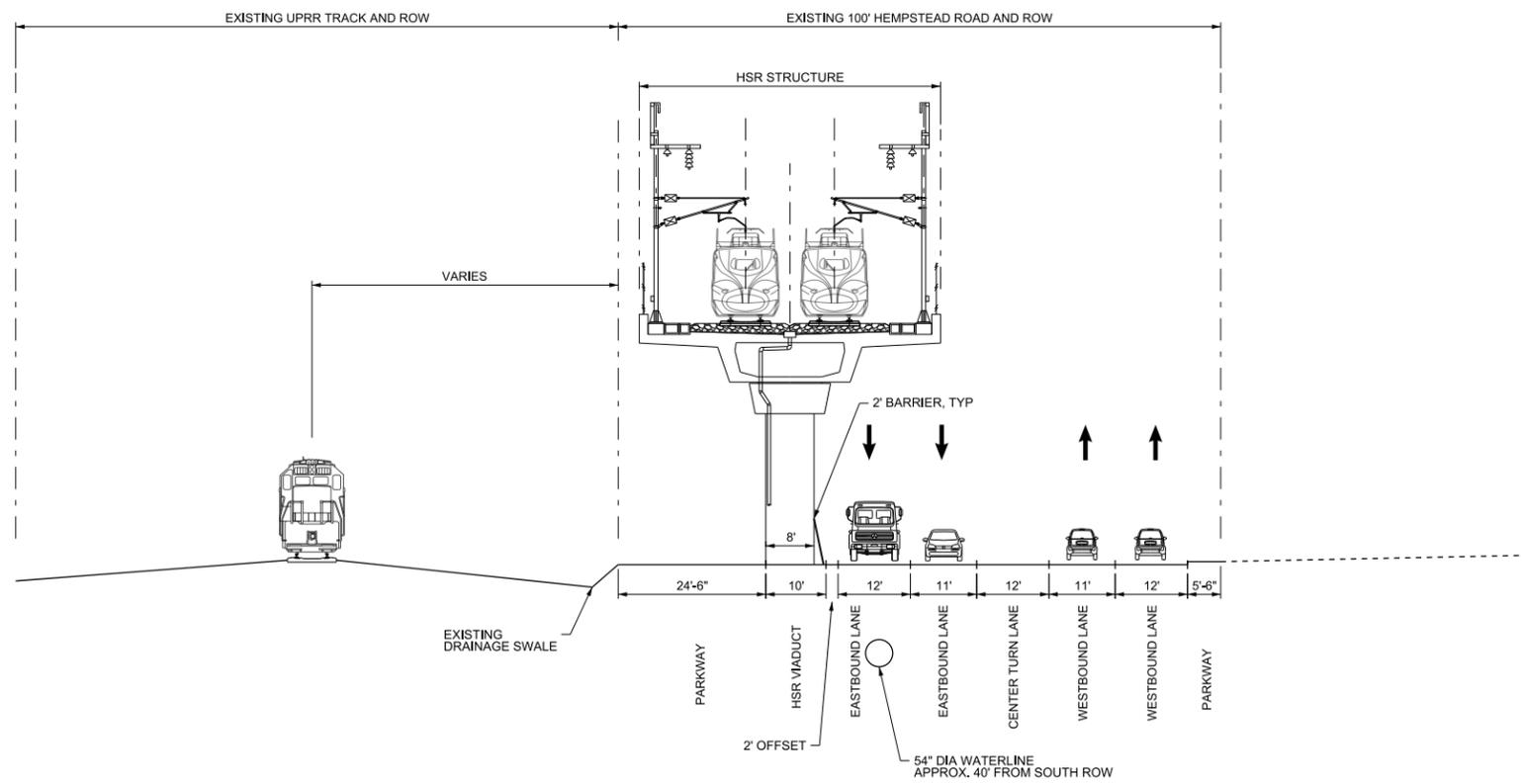


Drawing Title
GENERAL CIVIL HIGHWAY TYPICAL SECTIONS SHEET 4 OF 5

Scale NOT TO SCALE		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CVL-00-03033	Rev 01



15 HEMPSTEAD RD EXISTING CONDITIONS
NOT TO SCALE



16 PROPOSED TYPICAL HSR CONFIGURATION ALONG HEMPSTEAD ROAD
NOT TO SCALE

- NOTES:
1. SECTIONS LOOKING NORTHWEST, SOUTHEAST OF BELTWAY 8 NEAR GESSNER ROAD.
 2. TYPICAL SECTIONS DEVELOPED FOR THE FINAL DRAFT CONCEPTUAL ENGINEERING (FDCE) OF THE TEXAS CENTRAL HSR STUDY IN SUPPORT OF THE FRA ENVIRONMENTAL IMPACT ANALYSIS.
 3. LIMIT OF DISTURBANCE OR "PROJECT FOOTPRINT" GENERALLY TAKEN AS 100 FOOT WIDTH OF HEMPSTEAD ROAD RIGHT OF WAY FOR PURPOSES OF ENVIRONMENTAL ANALYSIS.
 4. PLANNED PROJECTS NOT CURRENTLY UNDER CONSTRUCTION NOT INCLUDED ON FDCE DRAWINGS AT THIS STAGE AND COORDINATION UNDERWAY FOR MORE ADVANCED PROJECT PLANNING.
 5. EXISTING UTILITIES BENEATH HEMPSTEAD ROAD TO BE SURVEYED DURING MORE ADVANCED DESIGN.
 6. RELOCATION OF UTILITIES AND DRAINAGE IMPROVEMENTS TO SHOULDER AREAS SHOWN TO BE CONSIDERED DURING MORE ADVANCED DESIGN TO FACILITATE CONSTRUCTION.
 7. LONG TERM MAINTENANCE SHOULDER AREA TO BE USED FOR SIDEWALKS, BIKE LANES OR SHOULDERS DURING MORE DETAILED DESIGN IN CLOSE COORDINATION WITH CITY OF HOUSTON AND APPLICABLE AUTHORITIES.
 8. CLOSE COORDINATION WITH TXDOT REQUIRED TO INTEGRATE HEMPSTEAD ROAD IMPROVEMENTS WITH "MY 290" PROJECT.
 9. PIER PROTECTION NOT SHOWN. WHERE SITE SPECIFIC CONDITIONS REQUIRE LESS THAN 25' CLEARANCE, PIER PROTECTION SHALL BE PROVIDED.
 10. CLEARANCE TO STRUCTURE OR CRASH BARRIER SHALL NOT BE LESS THAN 15'.
 11. FOR VIADUCT DETAILS SEE SHEET CVL-00-3005.
 12. VIADUCT LOCATED JUST INSIDE OF HEMPSTEAD ROAD ROW TO AVOID PROPERTY IMPACTS TO UPRR. LOD AND TEMPORARY UTILITY LOD IS SET AT EDGE OF UPRR WITHIN THIS SECTION OF HEMPSTEAD ROAD. DUE TO DRAWING SCALE, THESE LOD LIMITS APPEAR JUST AT VIADUCT EDGE. SEE DRAWINGS CVL-HN-1108 THROUGH CVL-HN-0112.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
T. SANSONE

DRAWN BY
M. MARROQUIN

CHECKED BY
S. BURGESS

IN CHARGE
C. TAYLOR

DATE
09/15/2017

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Client

TEXAS CENTRAL

1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

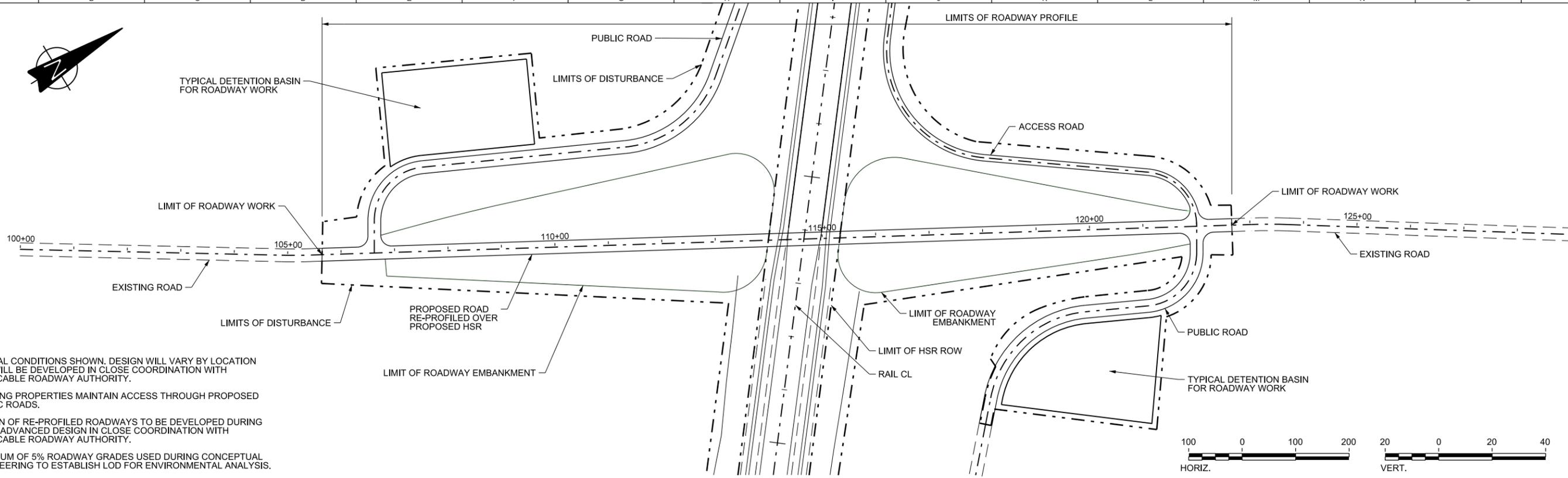
Drawing Title

GENERAL CIVIL HIGHWAY TYPICAL SECTIONS SHEET 5 OF 5

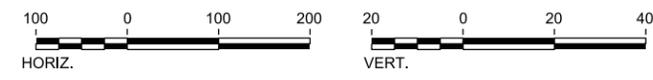
Scale
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Drawing Status
FINAL DRAFT

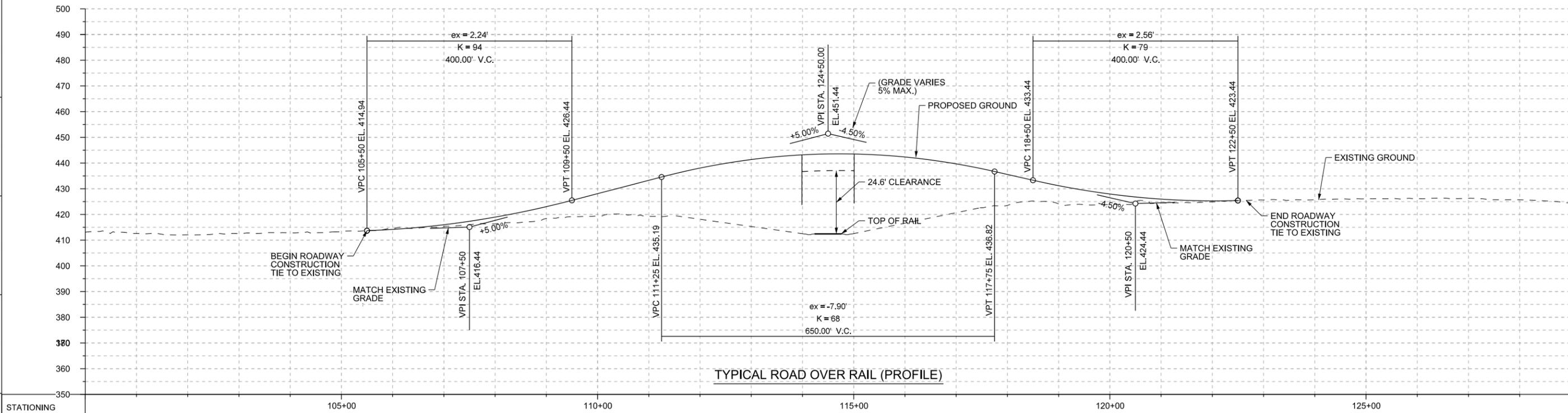
Job No 234180	Drawing No CVL-00-03034	Rev 01
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- NOTES:
1. TYPICAL CONDITIONS SHOWN. DESIGN WILL VARY BY LOCATION AND WILL BE DEVELOPED IN CLOSE COORDINATION WITH APPLICABLE ROADWAY AUTHORITY.
 2. EXISTING PROPERTIES MAINTAIN ACCESS THROUGH PROPOSED PUBLIC ROADS.
 3. DESIGN OF RE-PROFILED ROADWAYS TO BE DEVELOPED DURING MORE ADVANCED DESIGN IN CLOSE COORDINATION WITH APPLICABLE ROADWAY AUTHORITY.
 4. MAXIMUM OF 5% ROADWAY GRADES USED DURING CONCEPTUAL ENGINEERING TO ESTABLISH LOD FOR ENVIRONMENTAL ANALYSIS.
 5. LOCATION OF DETENTION BASINS VARY. SEE PLAN AND PROFILE.



TYPICAL ROAD OVER RAIL (PLAN)



TYPICAL ROAD OVER RAIL (PROFILE)

STATIONING	105+00	110+00	115+00	120+00	125+00
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DESIGNED BY	S. BARRY
DRAWN BY	M. MARROQUIN
CHECKED BY	S. BURGESS
IN CHARGE	C. TAYLOR
DATE	09/15/2017

REV	DATE	BY	CHK	APP	DESCRIPTION

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Client

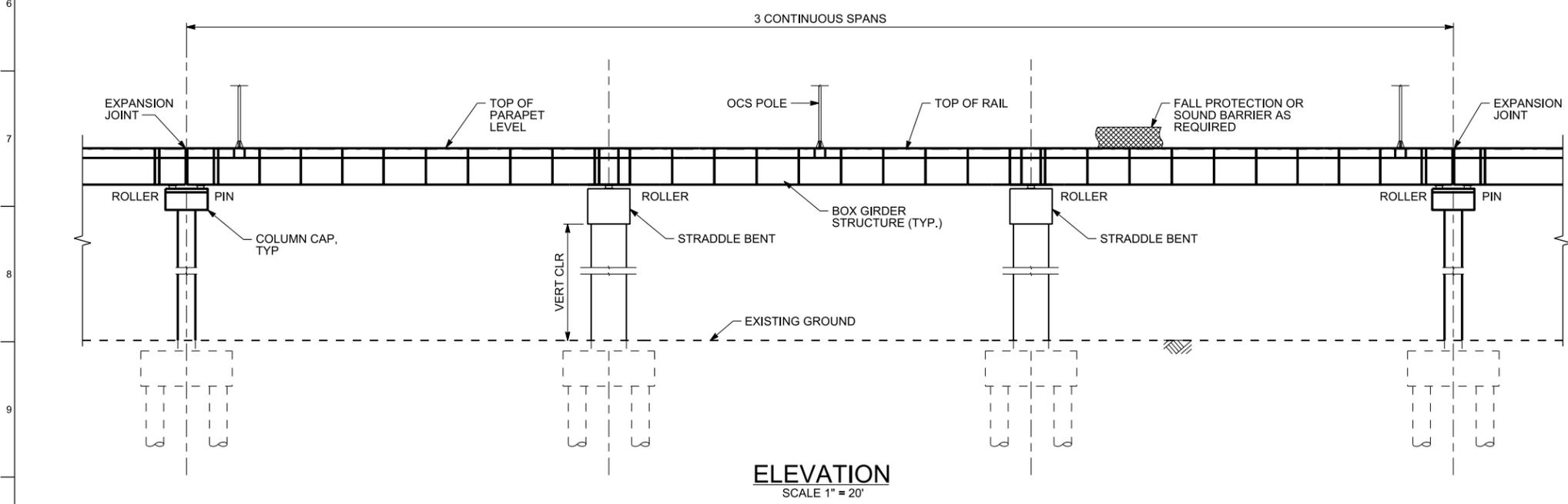
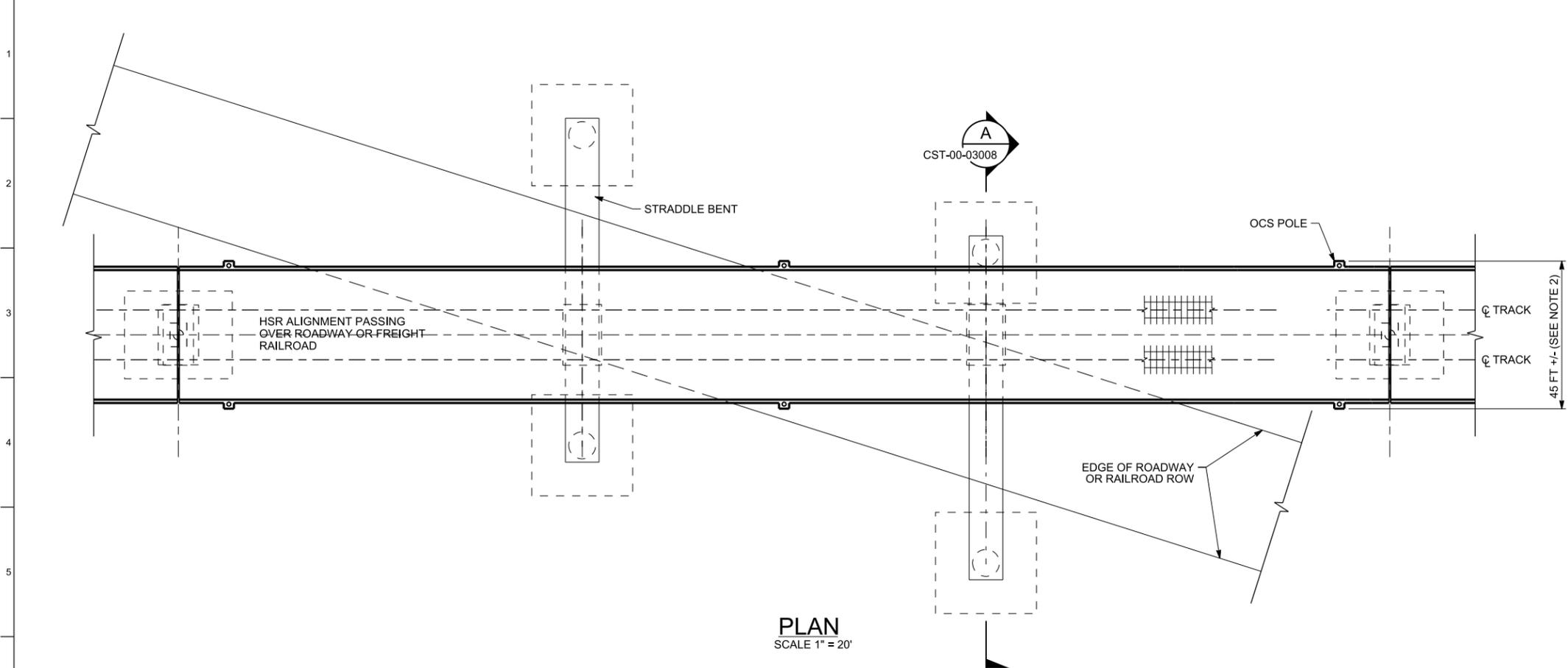
TEXAS CENTRAL
 1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title
GENERAL CIVIL HIGHWAY ROAD OVER RAIL GRADE SEPARATION

Scale	AS SHOWN
Drawing Status	FINAL DRAFT
Job No	234180
Drawing No	CVL-00-03036
Rev	01

1-4

CIVIL STRUCTURES TYPICAL DETAILS



- NOTES:
- FOR TYPICAL CROSS SECTION OF STRADDLE BENT, SEE SHEET CST-00-03008.
 - VIADUCT WIDTH VARIES DEPENDING ON LOCATION OF OCS POLES, SOUND BARRIERS, AND OTHER SITE SPECIFIC REQUIREMENTS.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S.T. MAK

DRAWN BY
R. GIBBINS

CHECKED BY
L. CHEN

IN CHARGE
C. TAYLOR

DATE
09/15/2017



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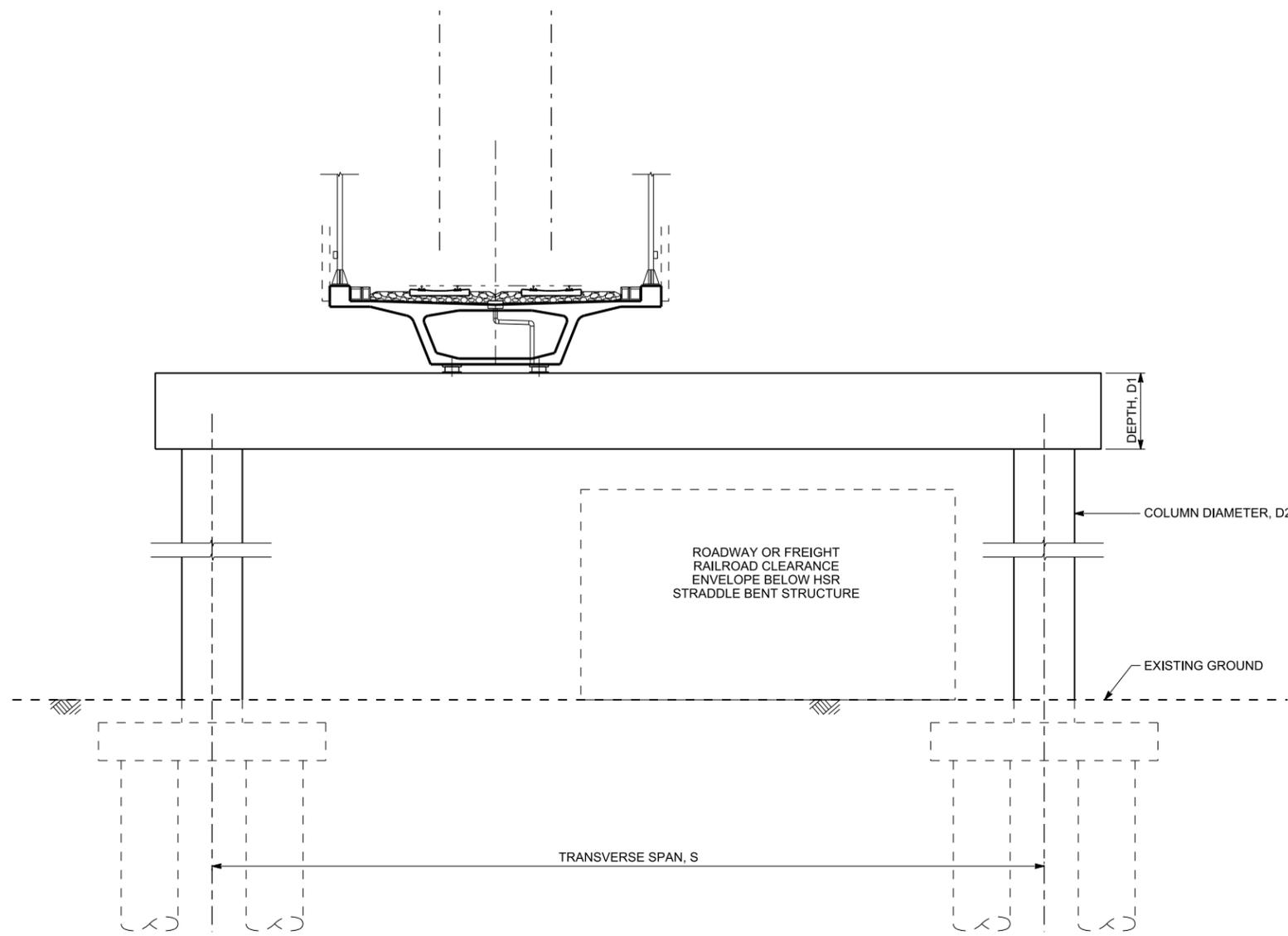
2711 North Haskell Ave., Suite 3300
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1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title
GENERAL CIVIL STRUCTURES STRADDLE BENT SHEET 1 OF 2

Scale 1" = 20'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CST-00-03007	Rev 01



A STRADDLE BENT STRUCTURE SECTION
SCALE 1" = 10'

- NOTES:
1. VIADUCT WIDTH VARIES DEPENDING ON LOCATION OF OCS POLES, SOUND BARRIERS, AND OTHER SITE SPECIFIC REQUIREMENTS.
 2. FOR VIADUCT BOX GIRDER DETAILS NOT NOTED, SEE SHEET CVL-00-03005.
 3. TYPICAL ARRANGEMENT AND STRUCTURAL SIZES SHOWN FOR ENVIRONMENTAL ANALYSIS. DETAILED DESIGN DEVELOPMENT WILL CONSIDER SITE SPECIFIC CONDITIONS, CLEARANCE REQUIREMENTS, CRASH BARRIERS, AND PIER PROTECTION REQUIREMENTS.
 4. INTERPOLATE TABLE VALUES BETWEEN DATA PROVIDED.

TRANSVERSE SPAN, S [ft]	STRADDLE BENT DEPTH, D1 [ft]	COLUMN DIAMETER, D2 [ft]
60	10	8
80	10	8
100	12	9
120	14	11
140	16	12

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S.T. MAK

DRAWN BY
E. SUDHAUSEN

CHECKED BY
Q. LIU

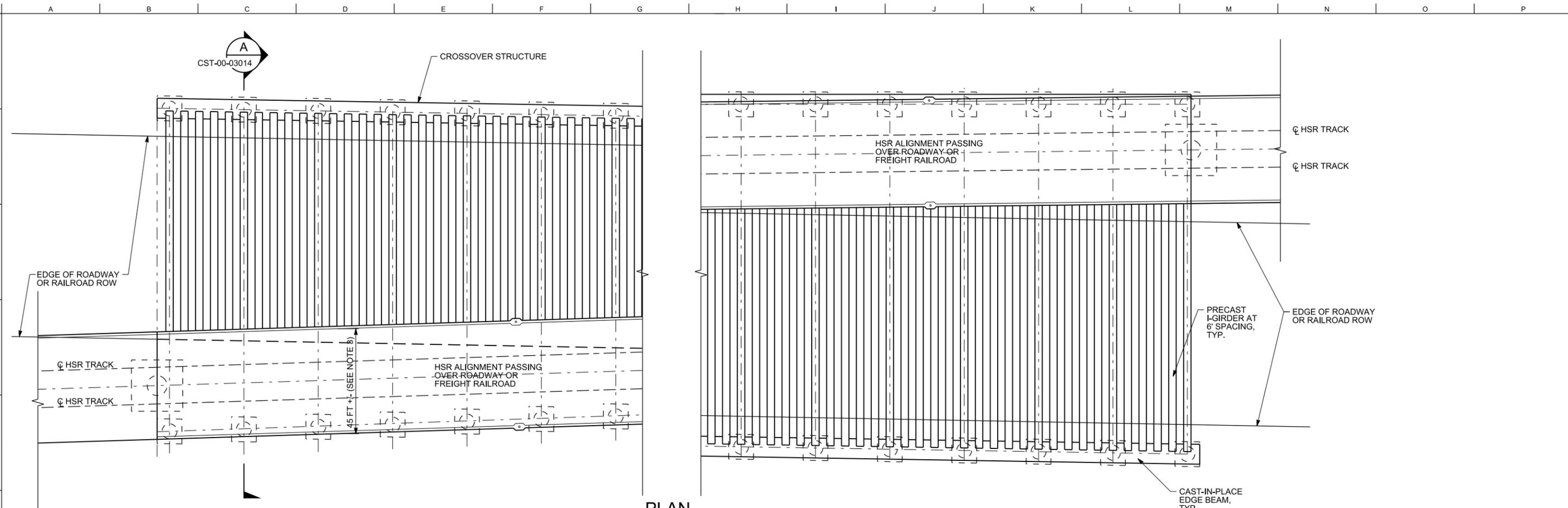
IN CHARGE
C. TAYLOR

DATE
09/15/2017

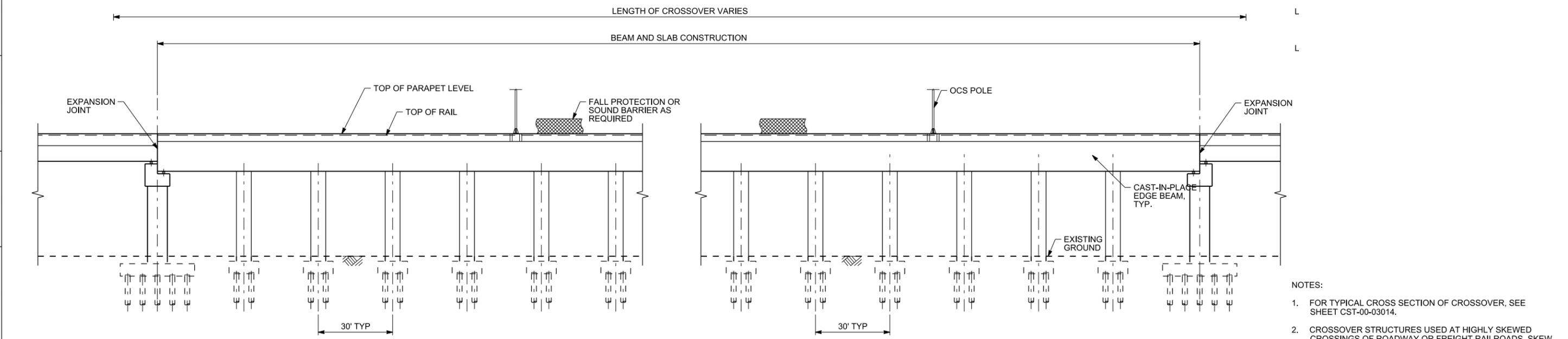


Drawing Title
GENERAL CIVIL STRUCTURES STRADDLE BENT SHEET 2 OF 2

Scale 1" = 10'		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CST-00-03008	Rev 01



PLAN SCALE 1" = 20'



ELEVATION SCALE 1" = 20'

- NOTES:
- FOR TYPICAL CROSS SECTION OF CROSSOVER, SEE SHEET CST-00-03014.
 - CROSSOVER STRUCTURES USED AT HIGHLY SKEWED CROSSINGS OF ROADWAY OR FREIGHT RAILROADS. SKEW ANGLE AND LENGTH OF CROSSING VARIES. FOR MORE INFORMATION SEE FDCE AND CONSTRUCTABILITY REPORTS.
 - VIADUCT WIDTH VARIES DEPENDING ON LOCATION OF OCS POLES, SOUND BARRIERS, AND OTHER SITE SPECIFIC REQUIREMENTS.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S.T. MAK

DRAWN BY
E. SUDHAUSEN

CHECKED BY
Q. LIU

IN CHARGE
C. TAYLOR

DATE
09/15/2017



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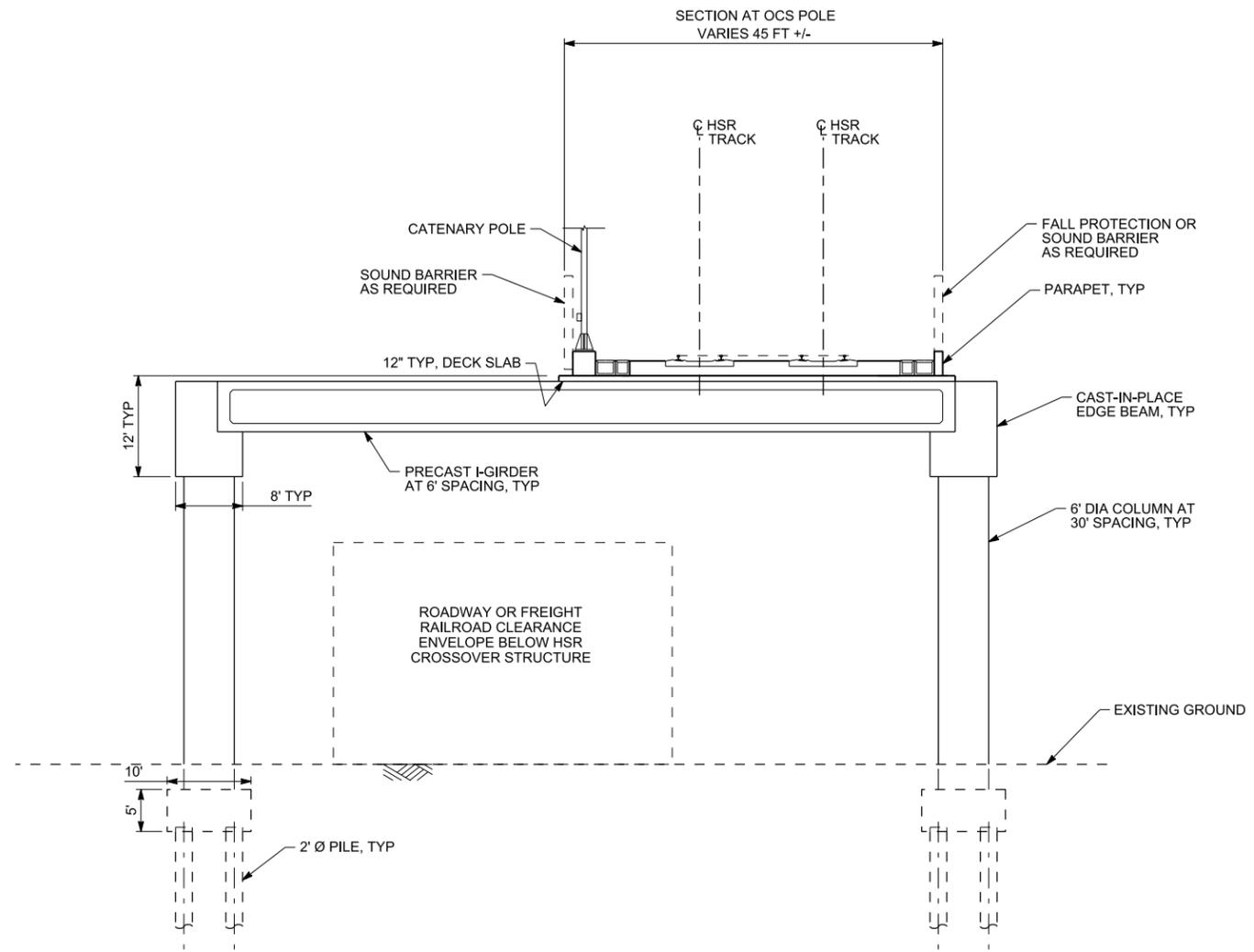
1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title
GENERAL CIVIL STRUCTURES CROSSOVER STRUCTURE SHEET 1 OF 2

Scale
AS SHOWN

Drawing Status
FINAL DRAFT

Job No 234180	Drawing No CST-00-03013	Rev 01
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A CROSSOVER STRUCTURE SECTION
SCALE 1" = 10'

NOTE:

1. VIADUCT WIDTH VARIES DEPENDING ON LOCATION OF OCS POLES, SOUND BARRIERS, AND OTHER SITE SPECIFIC REQUIREMENTS.
2. FOR VIADUCT BOX GIRDER DETAILS NOT NOTED, SEE SHEET CVL-00-03005.
3. TYPICAL ARRANGEMENT AND STRUCTURAL SIZES SHOWN FOR ENVIRONMENTAL ANALYSIS. DETAILED DESIGN DEVELOPMENT WILL CONSIDER SITE SPECIFIC CONDITIONS, CLEARANCE REQUIREMENTS, CRASH BARRIERS, AND PIER PROTECTION REQUIREMENTS.

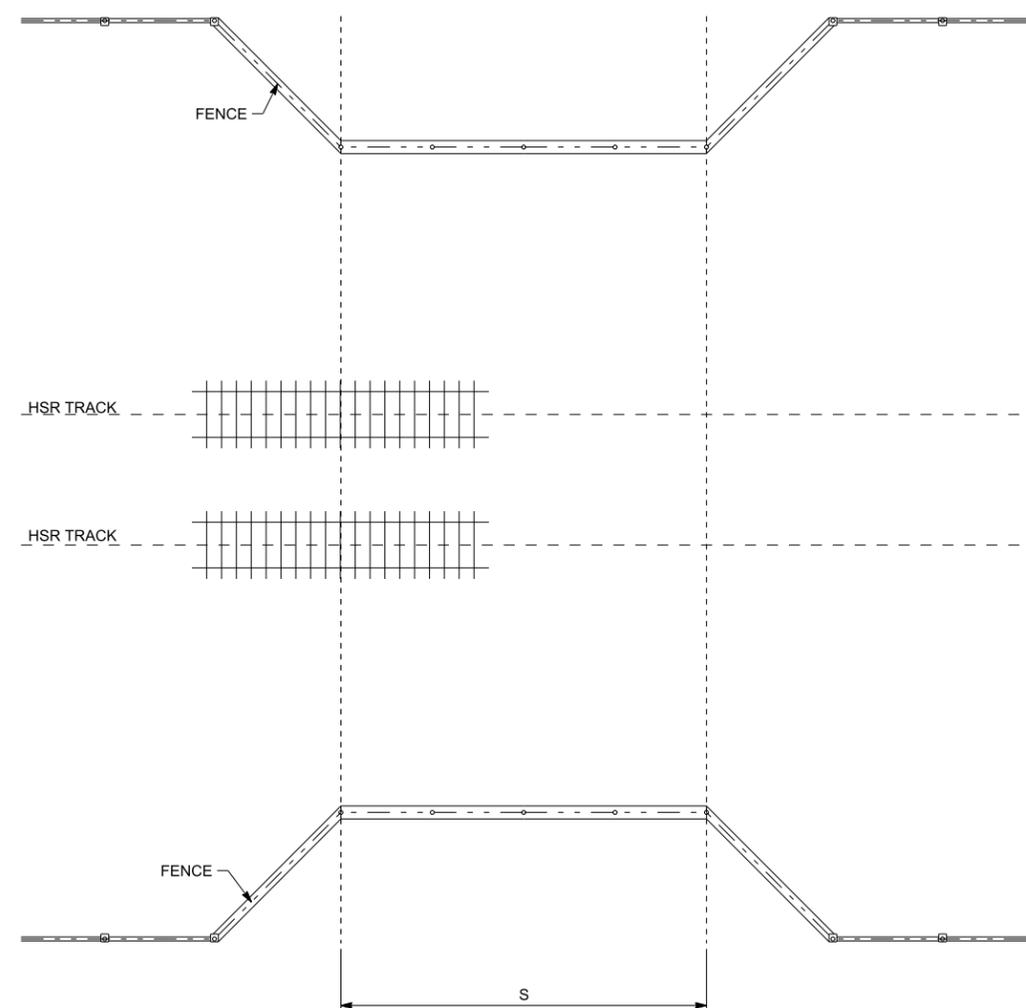
REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY S.T. MAK
DRAWN BY E. SUDHAUSEN
CHECKED BY Q. LIU
IN CHARGE C. TAYLOR
DATE 09/15/2017

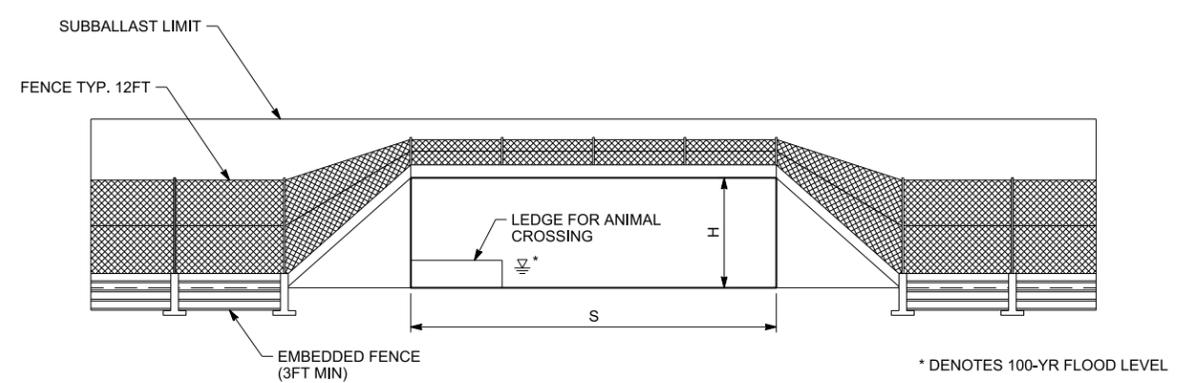


Drawing Title
GENERAL CIVIL STRUCTURES CROSSOVER STRUCTURE SHEET 2 OF 2

Scale AS SHOWN		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CST-00-03014	Rev 01



CULVERT AND ANIMAL CROSSING PLAN
SCALE 1" = 10'



CULVERT AND ANIMAL CROSSING ELEVATION
SCALE 1" = 10'

USAGE	STRUCTURAL TYPE	MINIMUM DIMENSIONS (FT)		RECOMMENDED DIMENSIONS (FT)		DRAWING No.
		S	H	S	H	
LARGE ANIMALS	SLAB BRIDGE	23	11.5	50	11.5	CST-00-03023
SMALL ANIMALS	BOX	6.5	6.5	>6.5	>6.5	CST-00-03021 CST-00-03022
MIXED USE (e.g. AGRICULTURAL)	SLAB BRIDGE	39	11.5	50	11.5	CST-00-03023
CULVERT	BOX	-	-	-	-	CST-00-03021 CST-00-03022

NOTE:
SEE FINAL DRAFT CONCEPTUAL ENGINEERING REPORT, SECTION 3.6.2.6 FOR ADDITIONAL DETAILS

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S.T. MAK
DRAWN BY
E. SUDHAUSEN
CHECKED BY
Q. LIU
IN CHARGE
C. TAYLOR
DATE
09/15/2017

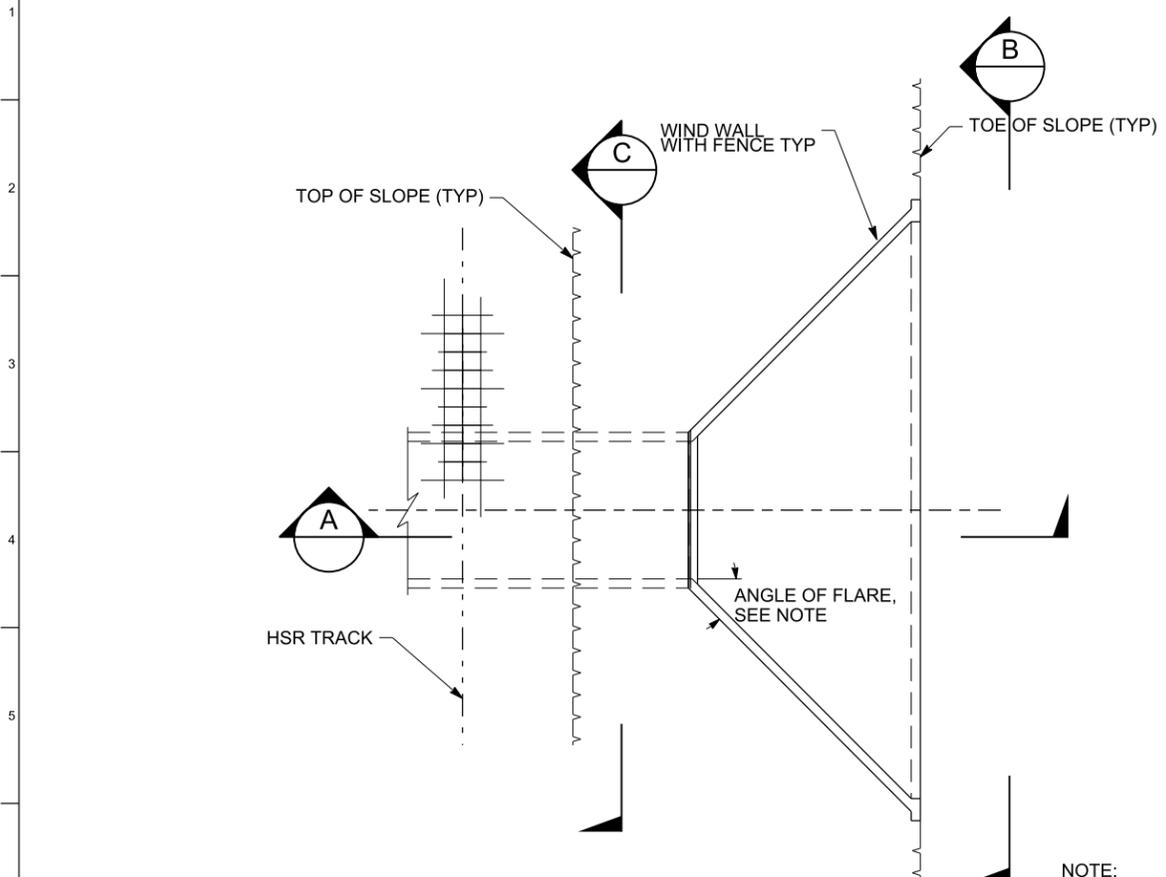
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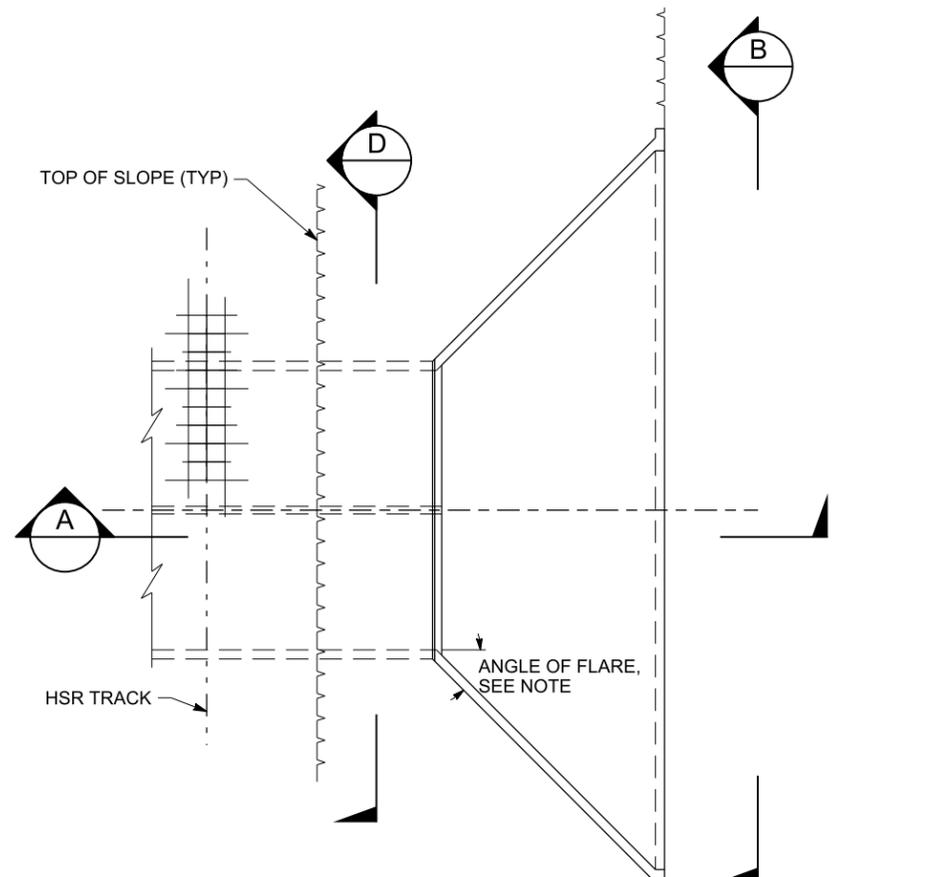
Client
TEXAS CENTRAL
1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title
**GENERAL CIVIL STRUCTURES
CULVERT & ANIMAL CROSSING
TYPICAL DETAIL**

Scale
AS SHOWN
Drawing Status
FINAL DRAFT
Job No. **234180** Drawing No. **CST-00-03020** Rev. **01**

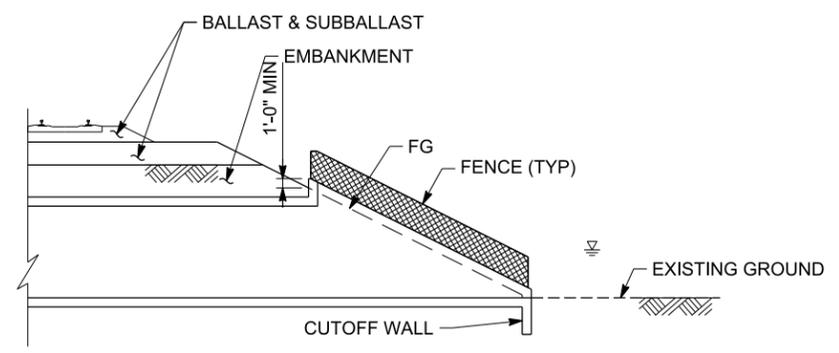


SINGLE-CELL BOX PLAN
SCALE: 1" = 10'

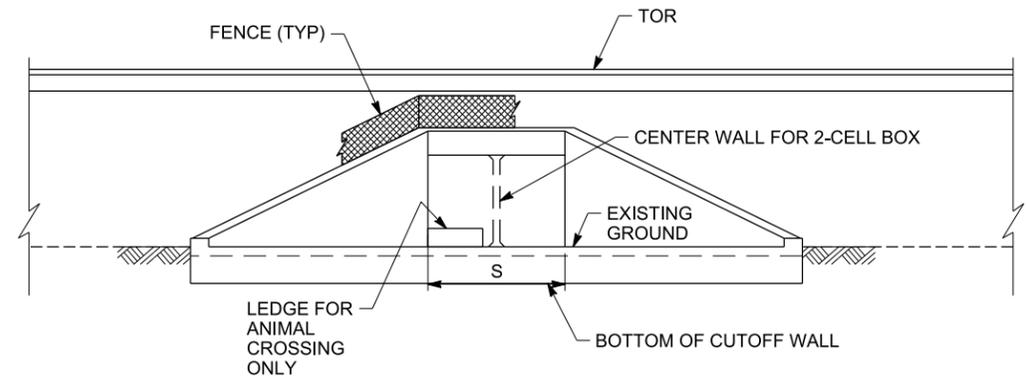


2-CELL BOX PLAN
SCALE: 1" = 10'

NOTE:
ANGLE OF FLARE TO BE DETERMINED
BASED ON FIELD CONDITION



A SECTION A
SCALE: 1" = 10'



B SECTION B
SCALE: 1" = 10'

NOTE:
OG = ORIGINAL GRADE

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S.T. MAK
DRAWN BY
E. SUDHAUSEN
CHECKED BY
Q. LIU
IN CHARGE
C. TAYLOR
DATE
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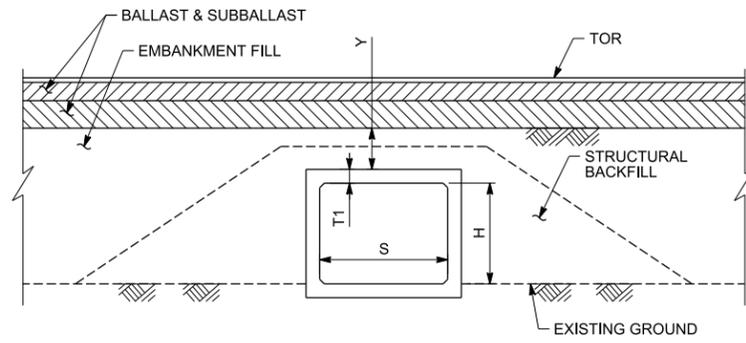


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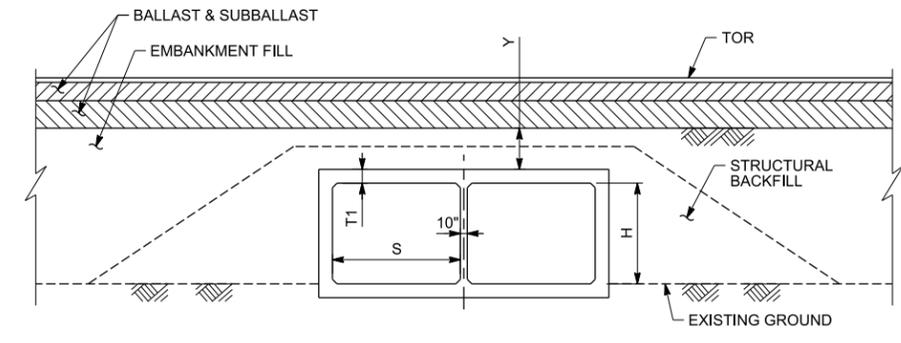
Client
TEXAS CENTRAL
Drawing Title
GENERAL CIVIL STRUCTURES BOX TYPICAL DETAIL SHEET 1 OF 2

Scale AS SHOWN		
Drawing Status FINAL DRAFT		
Job No 234180	Drawing No CST-00-03021	Rev 01

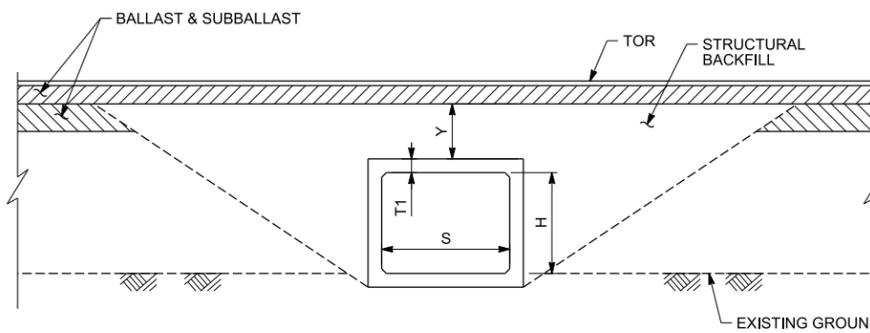
NOTE:
FINAL CULVERT DESIGN AND DETAILS TO BE DEVELOPED ON LOCATION-SPECIFIC GEOTECHNICAL CONDITIONS AND HYDRAULIC REQUIREMENTS. DETAILS TO BE FURTHER DEFINED THROUGH ENVIRONMENTAL REVIEW BY USACE, USFWS, AND APPLICABLE REGULATORY BODIES.



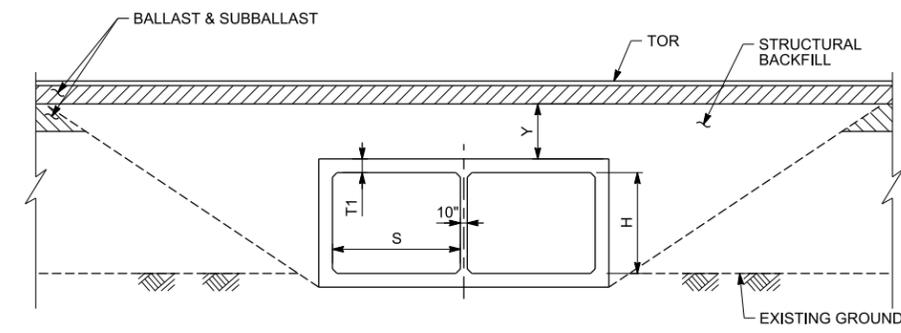
C SECTION C (Y > 4'-6")
SCALE: 1" = 10'



D SECTION D (Y > 4'-6")
SCALE: 1" = 10'



C SECTION C (Y < 4'-6")
SCALE: 1" = 10'



D SECTION D (Y < 4'-6")
SCALE: 1" = 10'

SINGLE-CELL BOX CULVERT

MAX. COVER (Y)	SPAN (S)	HEIGHT (H)	T1
10'-0"	10'-0"	5'-0"	1'-3"
10'-0"	10'-0"	10'-0"	1'-3"
10'-0"	15'-0"	5'-0"	1'-3"
10'-0"	15'-0"	10'-0"	1'-3"
20'-0"	10'-0"	5'-0"	1'-3"
20'-0"	10'-0"	10'-0"	1'-6"
20'-0"	15'-0"	5'-0"	1'-6"
20'-0"	15'-0"	10'-0"	2'-0"

2-CELL BOX CULVERT

MAX. COVER (Y)	SPAN (S)	HEIGHT (H)	T1
10'-0"	10'-0"	5'-0"	1'-3"
10'-0"	10'-0"	10'-0"	1'-3"
10'-0"	15'-0"	5'-0"	1'-3"
10'-0"	15'-0"	10'-0"	1'-3"
20'-0"	10'-0"	5'-0"	1'-3"
20'-0"	10'-0"	10'-0"	1'-6"
20'-0"	15'-0"	5'-0"	2'-0"
20'-0"	15'-0"	10'-0"	2'-0"

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S.T. MAK
DRAWN BY
E. SUDHAUSEN
CHECKED BY
Q. LIU
IN CHARGE
C. TAYLOR
DATE
09/15/2017

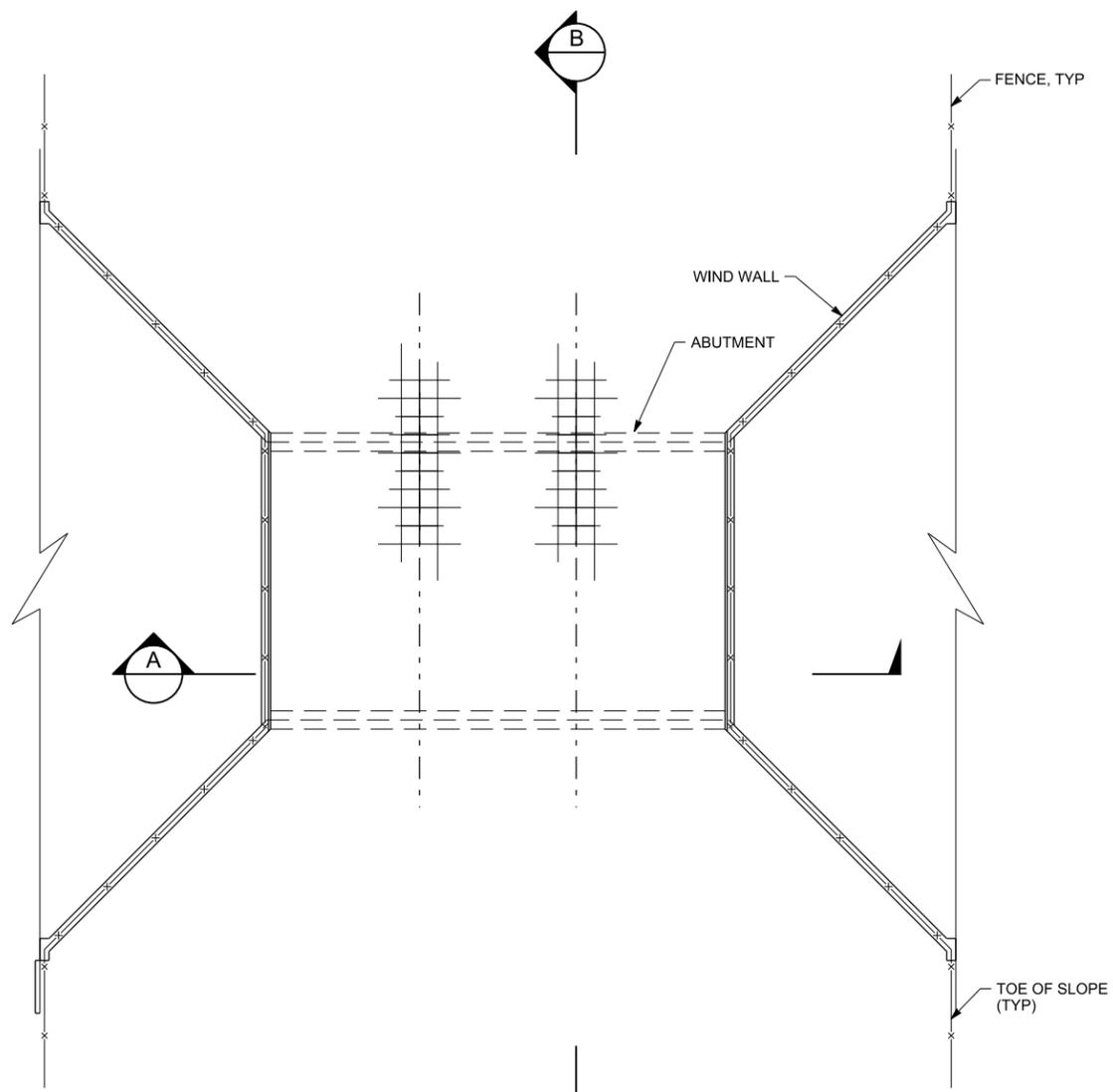
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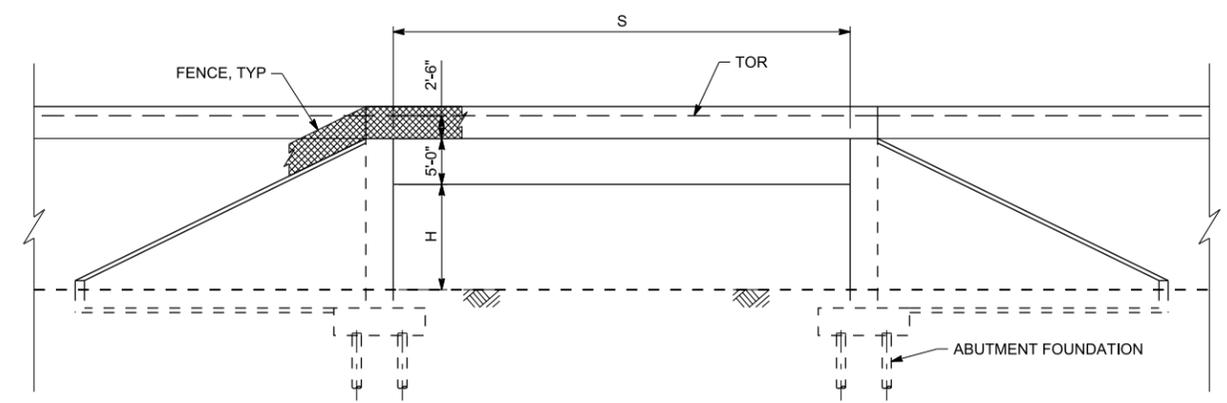
Client
TEXAS CENTRAL
1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title
GENERAL CIVIL STRUCTURES BOX TYPICAL DETAIL SHEET 2 OF 2

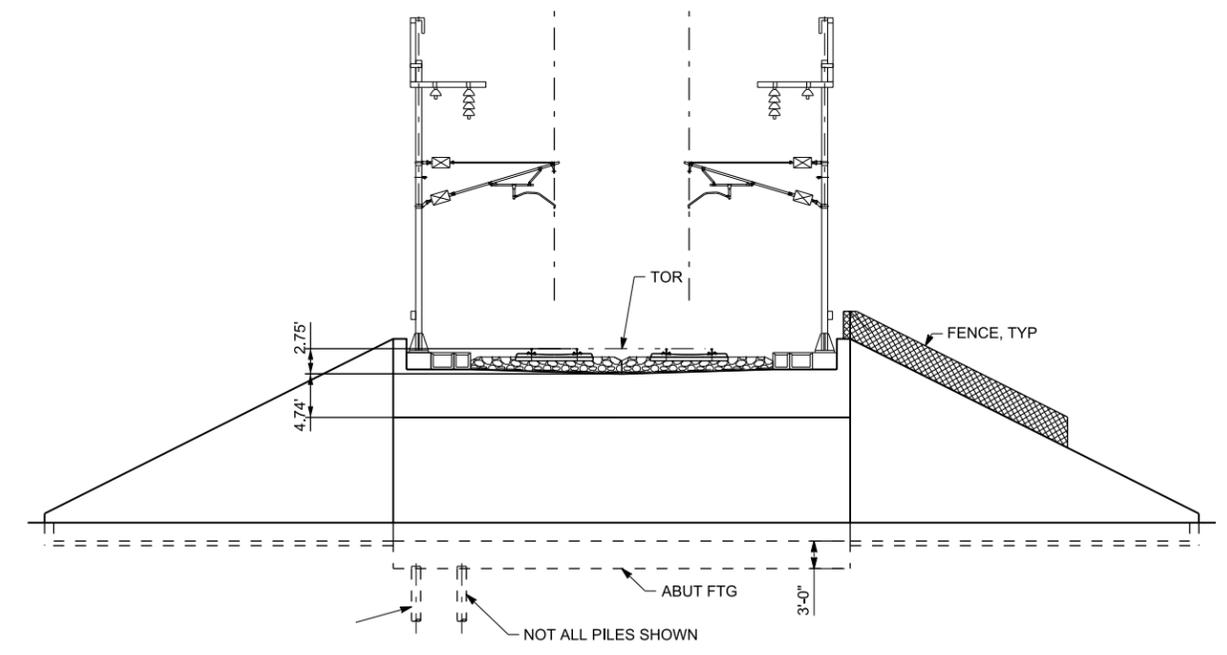
Scale
AS SHOWN
Drawing Status
FINAL DRAFT
Job No. 234180 Drawing No. CST-00-03022 Rev. 01



SLAB BRIDGE PLAN
SCALE: 1" = 10'



B ELEVATION B-B
SCALE: 1" = 10'



A SECTION A
SCALE: 1" = 10'

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
S.T. MAK
DRAWN BY
E. SUDHAUSEN
CHECKED BY
Q. LIU
IN CHARGE
C. TAYLOR
DATE
09/15/2017

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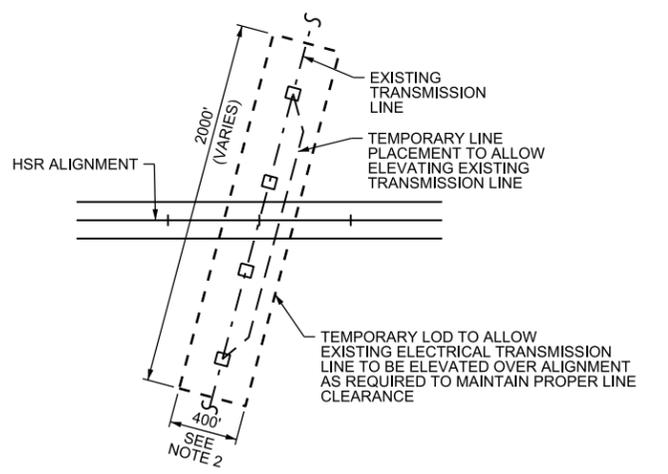
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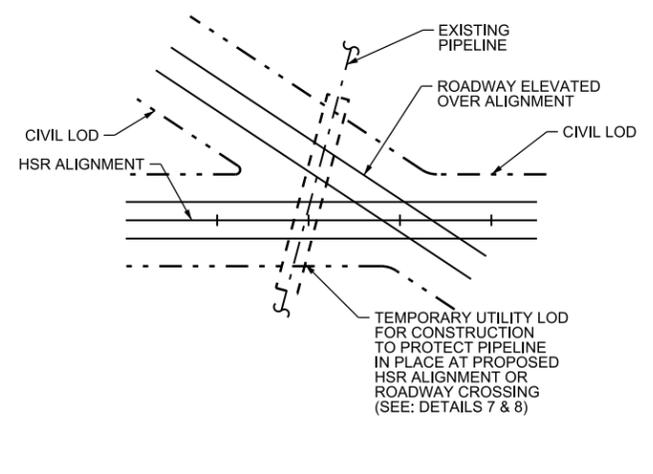
Drawing Title
**GENERAL CIVIL STRUCTURES
SLAB BRIDGE
TYPICAL DETAIL**

Scale
AS SHOWN
Drawing Status
FINAL DRAFT
Job No: 234180
Drawing No: CST-00-03023
Rev: 01

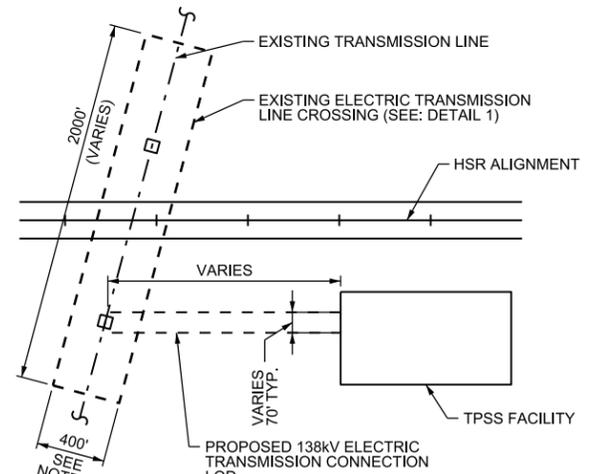
1-5
CIVIL UTILITIES TYPICAL DETAILS



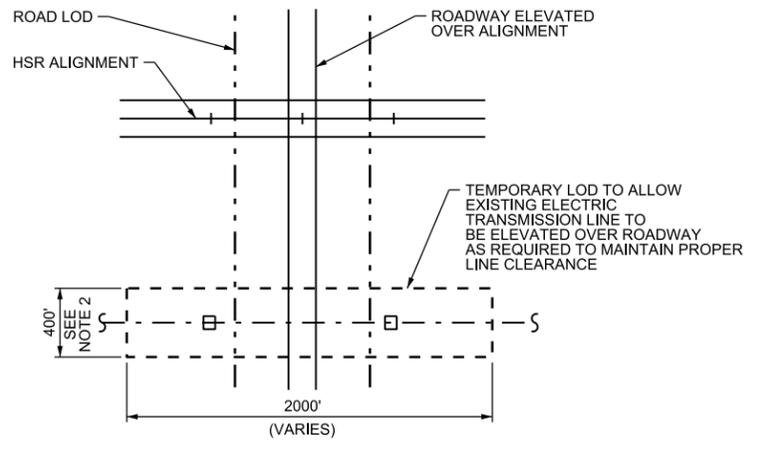
1 TYPICAL EXISTING ELECTRIC TRANSMISSION LINE ELEVATED OVER ALIGNMENT



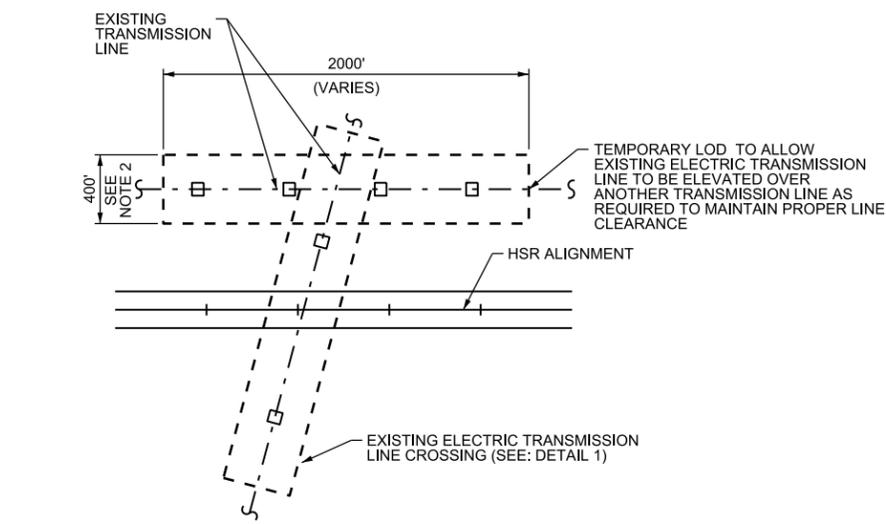
2 TYPICAL PIPELINE UTILITY CROSSING - "PROTECT"



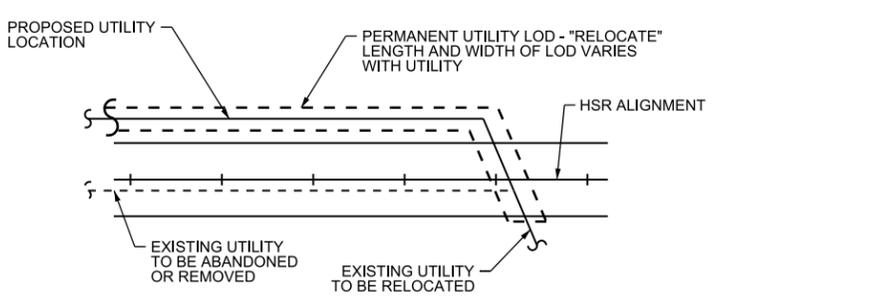
3 TYPICAL NEW ELECTRIC TRANSMISSION CONNECTION TO TPSS



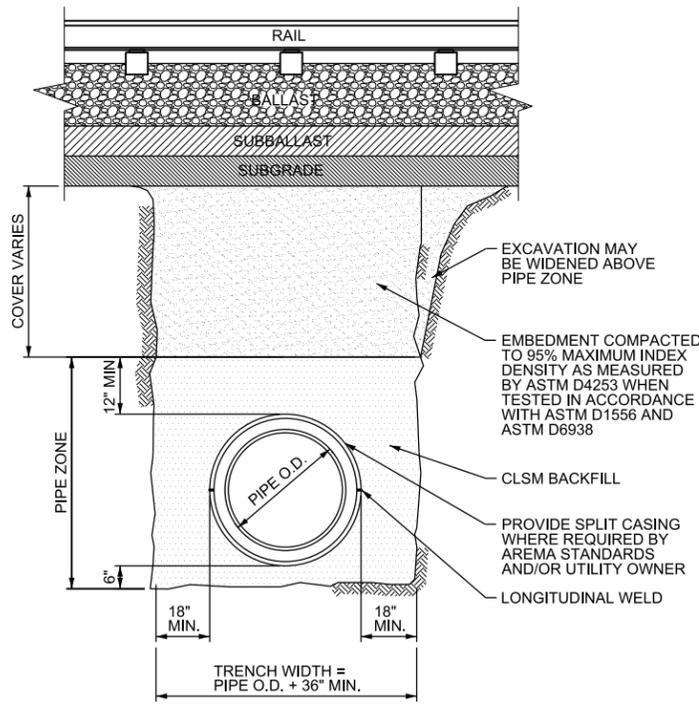
4 TYPICAL EXISTING ELECTRIC TRANSMISSION LINE ELEVATED OVER ROADWAY



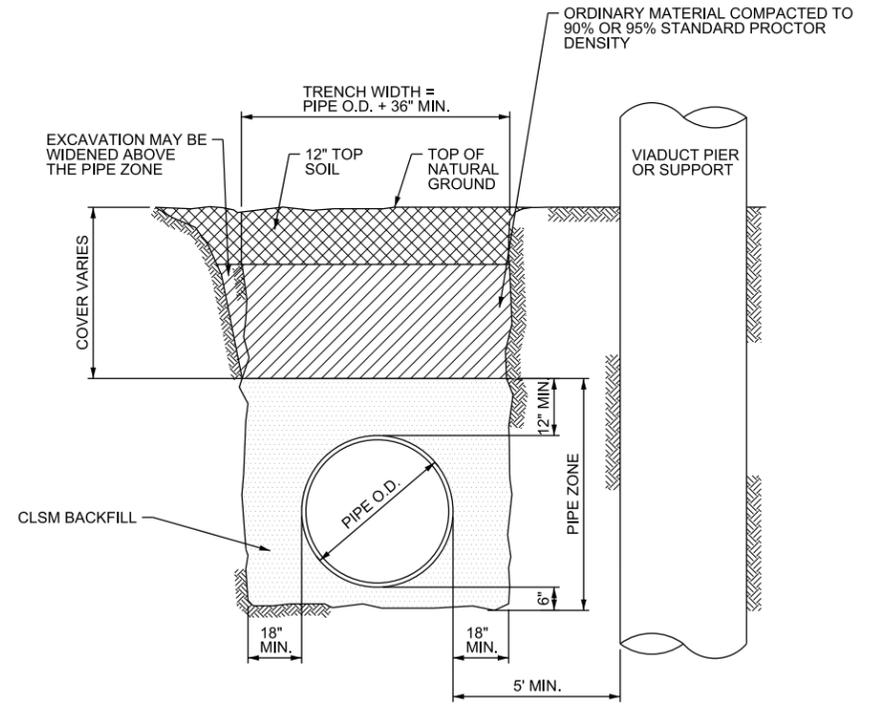
5 TYPICAL EXISTING ELECTRIC TRANSMISSION LINE ELEVATED OVER OTHER TRANSMISSION LINE



6 TYPICAL BELOW GRADE UTILITY CROSSING - "RELOCATE"



7 PIPELINE ENCASEMENT



8 PIPELINE NEAR VIADUCT SUPPORT

NOTE:
 1. REFER TO DRAWING NO. GEN-00-00008 FOR GENERAL CIVIL UTILITY NOTES.
 2. FINAL DESIGN TO BE DEVELOPED BY UTILITY PROVIDER. TEMPORARY LOD OF 400' ASSUMED FOR PURPOSES OF IDENTIFYING POTENTIAL IMPACTS OF ENVIRONMENTAL ANALYSIS.

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
A. YOUNG
 DRAWN BY
D. THOMPSON
 CHECKED BY
J. HAMMOND
 IN CHARGE
C. TAYLOR
 DATE
09/15/2017

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 Texas Registered Engineering Firm: F-2144

Client

 1409 South Lamar Street, Suite 1022, Dallas, Texas 75215

Drawing Title
GENERAL CIVIL UTILITIES TYPICAL CROSSING DETAILS SHEET 1 OF 1

Scale
NO SCALE
 Drawing Status
FINAL DRAFT
 Job No. 234180 Drawing No. CUT-00-01000 Rev. 01

1-6

GENERAL-ALIGNMENT CURVE DATA TABLES

CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								SPEED	Ea	Eu	SPEED	Ea	Eu		
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment HT1															
C-HT1-1	40+51.34	44+01.34	60+68.71	64+18.71	350	1667	350	2000	610	85	105	35	85	105	35

CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								SPEED	Ea	Eu	SPEED	Ea	Eu		
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment HT2															
C-HT2-1	29+80.78	30+70.78	33+45.89	34+35.89	90	275	90	1500	457	45	25	27	45	25	27

CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								SPEED	Ea	Eu	SPEED	Ea	Eu		
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment HT3															
C-HT3-1	18+49.97	19+59.97	21+28.49	22+38.49	110	169	110	1500	457.2	45	30	22	45	30	22
C-HT3-2	32+40.98	33+90.98	38+07.61	39+57.61	150	417	150	3000	914.4	80	45	38	80	45	38

CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								SPEED	Ea	Eu	SPEED	Ea	Eu		
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment HN1															
C-HN1-1	10+28.30	13+78.30	17+82.05	21+32.05	350	404	350	160000	48768	300	10	12	330	10	16
C-HN1-2	35+32.22	39+32.22	43+33.99	47+33.99	400	402	400	145000	44196	300	10	14	330	10	19
C-HN1-3	76+04.27	80+54.27	86+11.92	90+61.92	450	558	450	120000	36576	300	10	19	330	10	25
C-HN1-4	113+95.98	117+45.98	121+06.13	124+56.13	350	360	350	190000	57912	300	10	8	330	10	12
C-HN1-5	141+96.86	145+46.86	149+05.25	152+55.25	350	358	350	205000	62484	300	10	7	330	10	11
C-HN1-6	211+98.29	216+48.29	221+29.78	225+79.78	450	481	450	125000	38100	300	10	18	330	10	24
C-HN1-7	235+01.63	240+51.63	248+11.16	253+61.16	550	760	550	105000	32004	300	10	23	330	10	30
C-HN1-8	267+00.45	271+50.45	277+12.31	281+62.31	450	562	450	120000	36576	300	10	19	330	10	25
C-HN1-9	324+69.59	331+69.59	338+92.66	345+92.66	700	723	700	225000	6858	265	80	41	265	80	41
C-HN1-10	349+34.16	356+34.16	363+37.77	370+37.77	700	704	700	225000	6858	265	80	41	265	80	41
C-HN1-11	403+83.39	408+83.39	413+87.95	418+87.95	500	505	500	310000	9449	265	55	33	265	55	33
C-HN1-12	422+35.12	427+35.12	432+39.64	437+39.64	500	505	500	310000	9449	265	55	33	265	55	33
C-HN1-13	458+34.99	462+84.99	471+09.65	475+59.65	450	825	450	800000	24384	300	30	14	330	30	23
C-HN1-14	481+35.80	485+85.80	493+84.84	498+34.84	450	799	450	800000	24384	300	30	14	330	30	23
C-HN1-15	682+51.03	686+01.03	689+69.59	693+19.59	350	369	350	270000	82296	300	5	8	330	5	11
C-HN1-16	798+42.02	802+42.02	806+52.04	810+52.04	400	410	400	140000	42672	300	15	10	330	15	15
C-HN1-17	936+96.27	953+06.27	1039+23.22	1055+33.22	1610	8617	1610	187000	5700	300	150	36	330	150	75
C-HN1-18	1152+31.16	1165+41.16	1227+39.94	1240+49.94	1310	6199	1310	420000	12802	300	65	18	330	65	35
C-HN1-19	1427+58.59	1443+68.59	1652+50.18	1668+60.18	1610	20882	1610	187000	5700	300	150	36	330	150	75
C-HN1-20	1808+05.32	1817+85.32	1854+56.97	1864+36.97	980	3672	980	500000	15240	300	60	10	330	60	24
C-HN1-21	1878+97.89	1892+07.89	1939+06.36	1952+16.36	1310	4698	1310	420000	12802	300	65	18	330	65	35
C-HN1-22	2034+32.82	2050+42.82	2165+51.10	2181+61.10	1610	11508	1610	187000	5700	300	150	36	330	150	75
C-HN1-23	2217+44.42	2233+54.42	2371+08.31	2387+18.31	1610	13754	1610	187000	5700	300	150	36	330	150	75
Segment HN2															
C-HN2-1	208+48.75	226+48.75	246+73.21	264+73.21	1800	2024	1800	300000	9144	300	90	26	300	90	26
C-HN2-2	304+82.03	322+82.03	385+63.65	403+63.65	1800	6282	1800	300000	9144	300	90	26	300	90	26
C-HN2-3	429+63.65	447+63.65	0+00.00	490+20.81	1800	2457	1800	300000	9144	300	90	26	300	90	26
C-HN2-4	616+60.59	626+60.59	0+00.00	653+70.17	1000	1710	1000	600000	18288	300	45	13	300	45	13
C-HN2-5	1100+60.61	1114+10.61	385+63.65	1160+27.03	1350	3266	1350	420000	12802	300	65	18	300	65	18
C-HN2-6	1173+68.65	1187+18.65	472+20.81	1227+44.25	1350	2676	1350	420000	12802	300	65	18	300	65	18
C-HN2-7	1548+94.51	1562+44.51	0+00.00	1622+94.24	1350	4700	1350	420000	12802	300	65	18	300	65	18
C-HN2-8	1648+20.49	1661+70.49	0+00.00	1715+79.75	1350	4059	1350	420000	12802	300	65	18	300	65	18

NOTES:

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CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								SPEED	Ea	Eu	SPEED	Ea	Eu		
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment WT															
C-WT-1	192+11.27	197+61.27	207+40.07	212+90.07	550	979	550	105000	32004	300	15	18	330	15	25
C-WT-2	345+73.88	357+23.88	401+66.57	413+16.57	1150	4443	1150	42000	12802	300	65	18	330	65	35
C-WT-3	427+21.88	438+71.88	476+62.99	488+12.99	1150	3791	1150	42000	12802	300	65	18	330	65	35
C-WT-4	840+53.98	845+03.98	866+47.51	870+97.51	450	2144	450	115000	35052	300	15	15	330	15	22
C-WT-5	933+62.96	938+62.96	953+95.95	958+95.95	500	1533	500	110000	33528	300	15	17	330	15	23
C-WT-6	1015+08.06	1022+08.06	1051+06.73	1058+06.73	700	2899	700	70000	21336	300	35	15	330	35	25
C-WT-7	1256+29.88	1267+79.88	1322+49.85	1333+99.85	1150	5470	1150	42000	12802	300	65	18	330	65	35
C-WT-8	1371+25.16	1382+75.16	1448+73.75	1460+23.75	1150	6599	1150	42000	12802	300	65	18	330	65	35
C-WT-9	1492+16.10	1510+16.10	1692+91.58	1710+91.58	1800	18275	1800	30000	9144	300	95	21	330	95	46
C-WT-10	2222+85.75	2234+35.75	2346+78.69	2358+28.69	1150	11243	1150	42000	12802	300	65	18	330	65	35
C-WT-11	2705+98.39	2717+48.39	2913+59.86	2925+09.86	1150	19611	1150	42000	12802	300	65	18	330	65	35
C-WT-12	3024+36.72	3042+36.72	3098+90.15	3116+90.15	1800	5653	1800	30000	9144	300	95	21	330	95	46
C-WT-13	3153+36.22	3171+36.22	3232+64.86	3250+64.86	1800	6129	1800	30000	9144	300	95	21	330	95	46
C-WT-14	3276+09.81	3286+09.81	3308+45.80	3318+45.80	1000	2236	1000	50000	15240	300	55	15	330	55	29
C-WT-15	3366+83.50	3373+83.50	3394+21.12	3401+21.12	700	2038	700	70000	21336	300	35	15	330	35	25
C-WT-16	3495+09.60	3505+09.60	3764+61.74	3774+61.74	1000	25952	1000	50000	15240	300	55	15	330	55	29

CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								SPEED	Ea	Eu	SPEED	Ea	Eu		
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment IH1															
C-IH1-1	29+28.05	42+78.05	225+74.38	239+24.38	1350	18296	1350	42000	12802	300	65	18	330	65	35
C-IH1-2	782+09.10	795+59.10	1017+01.04	1030+51.04	1350	22142	1350	42000	12802	300	65	18	330	65	35
C-IH1-3	1130+16.04	1147+66.04	1174+67.72	1192+17.72	1750	2702	1750	22000	6706	300	130	28	330	130	62
C-IH1-4	1206+90.32	1224+40.32	1277+83.94	1295+33.94	1750	5344	1750	22000	6706	300	130	28	330	130	62
C-IH1-5	1358+54.24	1365+04.24	1372+35.03	1378+85.03	650	731	650	50000	15240	300	60				

CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								(ft)	(m)	SPEED	Ea	Eu	SPEED	Ea	Eu
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment EW															
C-EW-1	39+95.03	53+45.03	89+99.55	103+49.55	1350	3655	1350	42000	12802	300	65	18	330	65	35
C-EW-2	253+51.47	271+01.47	495+73.66	513+23.66	1750	22472	1750	22000	6706	300	125	33	330	125	67
C-EW-3	556+30.77	567+30.77	622+75.71	633+75.71	1100	5545	1100	50000	15240	300	60	10	330	60	24
C-EW-4	743+69.81	757+19.81	798+85.95	812+35.95	1350	4166	1350	42000	12802	300	65	18	330	65	35
C-EW-5	1025+91.04	1043+91.04	1222+22.22	1240+22.22	1800	17831	1800	30000	9144	300	95	21	330	95	46

CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								(ft)	(m)	SPEED	Ea	Eu	SPEED	Ea	Eu
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment EE															
C-EE-1	138+51.87	149+51.87	588+56.16	599+56.16	1100	43904	1100	53000	16154	300	50	16	330	50	30
C-EE-3	731+24.52	747+74.52	811+16.51	827+66.51	1650	6342	1650	60000	18288	300	45	13	330	45	25
C-EE-3	976+98.17	994+98.17	1172+78.93	1190+78.93	1800	17781	1800	30000	9144	300	95	21	330	95	46

CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								(ft)	(m)	SPEED	Ea	Eu	SPEED	Ea	Eu
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment DS															
C-DS-1	173+15.23	193+15.23	303+02.67	323+02.67	2000	10987	2000	23000	7010	300	130	21	330	130	53
C-DS-2	389+61.78	409+61.78	467+64.85	487+64.85	2000	5803	2000	22000	6706	300	130	28	330	130	62
C-DS-3	527+24.02	539+24.02	564+13.69	576+13.69	1200	2490	1200	50000	15240	300	60	10	330	60	24
C-DS-4	700+75.36	712+75.36	746+43.98	758+43.98	1200	3369	1200	50000	15240	300	60	10	330	60	24

CURVE #	STA TS	STA SC	STA CS	STA ST	LEADING TRANSITION CURVE LENGTH (ft)	CIRCULAR CURVE LENGTH (ft)	TRAILING TRANSITION CURVE LENGTH (ft)	RADIUS		INITIAL SERVICE LEVEL			FINAL SERVICE LEVEL		
								(ft)	(m)	SPEED	Ea	Eu	SPEED	Ea	Eu
								(ft)	(m)	(km/h)	(mm)	(mm)	(km/h)	(mm)	(mm)
Segment DT															
C-DT-1	61+33.71	69+83.71	129+12.51	137+62.51	850	5929	850	8550	2606	200	130	51	200	130	51
C-DT-2	148+76.10	150+36.10	154+06.51	155+66.51	160	370	160	15000	4572	140	30	21	140	30	21
C-DT-3	191+41.11	192+31.11	200+09.59	200+09.59	90	688	90	15000	457	45	25	27	45	25	27

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REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY K. SEYMOUR
DRAWN BY D. THOMPSON
CHECKED BY T. SMELCER
IN CHARGE C. TAYLOR
DATE 09/15/2017



Drawing Title
GENERAL ALIGNMENT AND CURVE DATA SHEET 2 OF 2

Scale NO SCALE	Drawing Status FINAL DRAFT
Job No 234180	Drawing No GEN-00-040002
Rev 01	