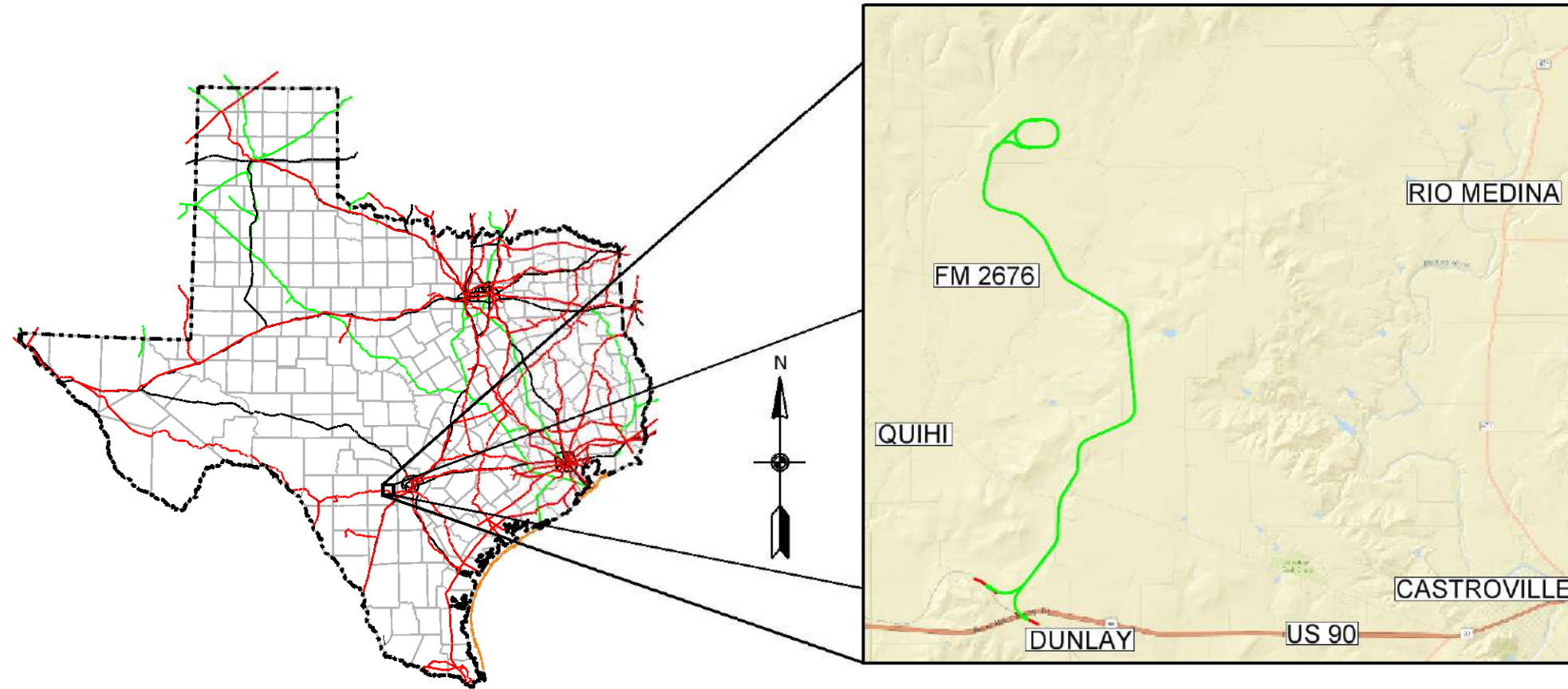


SGR

SOUTHWEST GULF RAILROAD



State of Texas

HDR

Project Location Map



3/6/2017

MEDINA COUNTY, TEXAS
DEL RIO SUBDIVISION
MILE POST - 249.48
MEDINA COUNTY RAIL SPUR

PRELIMINARY
NOT FOR CONSTRUCTION

FINAL DESIGN
LAST REVISED
MARCH 3, 2017

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GENERAL			TRACK DETAILS CONTINUED			ROADWAY PLANS CONTINUED		
SHEET NO.	DRAWING	DESCRIPTION	SHEET NO.	DRAWING	DESCRIPTION	SHEET NO.	DRAWING	DESCRIPTION
G001	SGR_G001	COVER SHEET WITH VICINITY MAP	TD002	SGR_TD002	SPIKING DETAIL	R005	SGR_R005	ROADWAY CROSSING PLAN & PROFILE MP 8.04 - CR 353
G002	SGR_G002	PROJECT INDEX	TD003	SGR_TD003	RAIL DETAIL	R006	SGR_R006	ROADWAY CROSSING PLAN & PROFILE MP 9.06 - CR 353
G003	SGR_G003	GENERAL NOTES	TD004	SGR_TD004	TIE PLATE DETAIL	R007	SGR_R007	ROADWAY CROSSING PLAN & PROFILE MP 0.14 - CR 454
G004	SGR_G004	ABBREVIATIONS AND LEGEND	TD005	SGR_TD005	TURNOUT FROG DETAIL	R008	SGR_R008	ROADWAY RELOCATION PLAN & PROFILE
G005	SGR_G005	GEOMETRY DEFINITIONS	TD006	SGR_TD006	NO.11 TURNOUT PANEL #1 DETAIL	R009	SGR_R009	ROADWAY RELOCATION PLAN & PROFILE
G006	SGR_G006	TRACK GEOMETRY REPORTS	TD007	SGR_TD007	NO.11 TURNOUT PANEL #2 DETAIL	R010	SGR_R010	ROADWAY RELOCATION PLAN & PROFILE
G007	SGR_G007	ROADWAY GEOMETRY REPORTS	TD008	SGR_TD008	NO.11 TURNOUT PANEL #3 DETAIL	R011	SGR_R011	ROADWAY RELOCATION 1 PLAN & PROFILE
G008	SGR_G008	SHEET KEYMAP	TD009	SGR_TD009	NO.11 TURNOUT PANEL #4 DETAIL	R012	SGR_R012	ROADWAY RELOCATION 2 PLAN & PROFILE
G009	SGR_G009	SCHEMATIC OVERVIEW	TD010	SGR_TD010	NO.15 TURNOUT PANEL #1 DETAIL	RT001	SGR_RT001	FM 2676 TYPICAL SECTIONS
G010	SGR_G010	WASTE LOCATIONS	TD011	SGR_TD011	NO.15 TURNOUT PANEL #2 & #3 DETAIL	RT002	SGR_RT002	FM 2676 TRAFFIC CONTROL PLAN TYPICAL SECTIONS
TRACK PLANS			TD012	SGR_TD012	NO.15 TURNOUT PANEL #4 DETAIL	XL001	SGR_XL001	ROADWAY CROSSING LAYOUT MP 0.13 - CR 454
SHEET NO.	DRAWING	DESCRIPTION	TD013	SGR_TD013	NO.15 TURNOUT PANEL #5 DETAIL	XL002	SGR_XL002	ROADWAY CROSSING LAYOUT MP 1.97 - CR 4516
P001	SGR_P001	TRACK B PLAN & PROFILE	TD014	SGR_TD014	ROW FENCE DETAIL	XL003	SGR_XL003	ROADWAY CROSSING LAYOUT MP 3.75 - CR 4512
P002	SGR_P002	TRACK B PLAN & PROFILE	TD015	SGR_TD015	WHISTLE POST SIGN DETAIL	XL004	SGR_XL004	ROADWAY CROSSING LAYOUT MP 6.47 - FM 2676
P003	SGR_P003	TRACK B PLAN & PROFILE	TD016	SGR_TD016	MILEPOST SIGN DETAIL	XL005	SGR_XL005	ROADWAY CROSSING LAYOUT MP 8.04 - CR 353
P004	SGR_P004	TRACK B PLAN & PROFILE	TD017	SGR_TD017	SIGN DETAIL STEEL MOUNTING POST DETAIL	XL006	SGR_XL006	ROADWAY CROSSING LAYOUT MP 9.06 - CR 353
P005	SGR_P005	TRACK B PLAN & PROFILE	TD018	SGR_TD018	CURVE TAGS SIGN DETAIL	XL007	SGR_XL007	ROADWAY CROSSING LAYOUT MP 0.14 - CR 454
P006	SGR_P006	TRACK B PLAN & PROFILE	TD019	SGR_TD019	SWITCH STAND DETAIL	ROADWAY DETAILS		
P007	SGR_P007	TRACK B PLAN & PROFILE	TD020	SGR_TD020	SINGLE SWITCH POINT DERAIL DETAIL	SHEET NO.	DRAWING	DESCRIPTION
P008	SGR_P008	TRACK B PLAN & PROFILE	TD021	SGR_TD021	DOUBLE SWITCH POINT DERAIL DETAIL	RD001 - RD012	BC(1)-14 - BC(12)-14	BARRICADE AND CONSTRUCTION-GENERAL NOTES AND REQUIREMENTS
STRUCTURAL PLANS			STRUCTURAL PLANS			RD013	SGR_TC001	TCP-LONG TERM ONE-LANE TWO-WAY CONTROL
SHEET NO.	DRAWING	DESCRIPTION	SHEET NO.	DRAWING	DESCRIPTION	RD014 - RD015	CSB(1)-10	CONCRETE SAFETY BARRIER (F-SHAPE)
1	SGR_BR 2.48	GENERAL ARRANGEMENT	1	SGR_BR 2.48	GENERAL ARRANGEMENT	RD016	RCD(1)-16	RAILROAD CROSSING DETAILS SIGNING, STRIPING, AND DEVICE PLACEMENT
2	SGR_BR 2.48	GENERAL NOTES, DRILLED SHAFT NOTES, & BILL OF MATERIAL	2	SGR_BR 2.48	GENERAL NOTES, DRILLED SHAFT NOTES, & BILL OF MATERIAL	RD017	RCD(2)-16	RAILROAD CROSSING DETAILS SIGNING AND STRIPING
3	SGR_BR 2.48	DRILLED SHAFT NOTES CONTINUED	3	SGR_BR 2.48	DRILLED SHAFT NOTES CONTINUED	RD018	SMDGEN	SIGN MOUNTING DETAILS-GENERAL NOTES/DETAILS
4	SGR_BR 2.48	SUBSTRUCTURE DETAILS	4	SGR_BR 2.48	SUBSTRUCTURE DETAILS	RD019	SMD(SLIP-1)-08	SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS
5	SGR_BR 2.48	SUBSURFACE INFORMATION (SHEET 1 OF 2)	5	SGR_BR 2.48	SUBSURFACE INFORMATION (SHEET 1 OF 2)	RD020	SMD(SLIP-2)-08	SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS
6	SGR_BR 2.48	SUBSURFACE INFORMATION (SHEET 2 OF 2)	6	SGR_BR 2.48	SUBSURFACE INFORMATION (SHEET 2 OF 2)	RD021	SMD(SLIP-3)-08	SIGN MOUNTING DETAILS SMALL ROADSIDE SIGNS
1	SGR_BR 6.12	GENERAL ARRANGEMENT (SHEET 1 OF 3)	1	SGR_BR 6.12	GENERAL ARRANGEMENT (SHEET 1 OF 3)	RD022	SMDTWT	WEDGE & UNIVERSAL ANCHOR WITH TW TUBING
2	SGR_BR 6.12	GENERAL ARRANGEMENT (SHEET 2 OF 3)	2	SGR_BR 6.12	GENERAL ARRANGEMENT (SHEET 2 OF 3)	RD023	SMDFRP	UNIVERSAL ANCHOR SYSTEM W/ FRP POST
3	SGR_BR 6.12	GENERAL ARRANGEMENT (SHEET 3 OF 3)	3	SGR_BR 6.12	GENERAL ARRANGEMENT (SHEET 3 OF 3)	RD024	EC(1)-16	TEMPORARY EROSION, CONTROL MEASURES (FENCE & VERTICAL TRACK)
4	SGR_BR 6.12	GENERAL NOTES AND BILL OF MATERIAL	4	SGR_BR 6.12	GENERAL NOTES AND BILL OF MATERIAL	RD025	EC(2)-16	TEMPORARY EROSION, CONTROL MEASURES (ROCK FILTER DAMS)
5	SGR_BR 6.12	DRILLED SHAFT NOTES CONTINUED	5	SGR_BR 6.12	DRILLED SHAFT NOTES CONTINUED	RD026	EC(3)-16	TEMPORARY EROSION, CONTROL MEASURES (CONSTRUCTION EXITS)
6	SGR_BR 6.12	SUBSTRUCTURE DETAILS	6	SGR_BR 6.12	SUBSTRUCTURE DETAILS	RD027	SCP-6	SINGLE BOX CULVERTS PRECAST 6'-0" SPAN
7	SGR_BR 6.12	DRILLED SHAFT SCHEDULE	7	SGR_BR 6.12	DRILLED SHAFT SCHEDULE	RD028	SCP-MD	BOX CULVERTS PRECAST MISCELLANEOUS DETAILS
8	SGR_BR 6.12	SUBSURFACE INFORMATION (SHEET 1 OF 2)	8	SGR_BR 6.12	SUBSURFACE INFORMATION (SHEET 1 OF 2)	RD029 - RD031	SETB-CD	SAFETY END TREATMENT FOR 15° & 30° SKEW BOX CULVERTS
9	SGR_BR 6.12	SUBSURFACE INFORMATION (SHEET 2 OF 2)	9	SGR_BR 6.12	SUBSURFACE INFORMATION (SHEET 2 OF 2)	RD032	SETP-SC	SAFETY END TREATMENT TYPE II
1	SGR_BR 7.90	GENERAL ARRANGEMENT	1	SGR_BR 7.90	GENERAL ARRANGEMENT	RD033 - RD034	SETP-SC	SAFETY END TREATMENT FOR 12" DIA TO 60" DIA PIPE CULVERTS
2	SGR_BR 7.90	GENERAL NOTES, DRILLED SHAFT NOTES, & BILL OF MATERIAL	2	SGR_BR 7.90	GENERAL NOTES, DRILLED SHAFT NOTES, & BILL OF MATERIAL	RD035 - RD036	TSR(4)-13 - TSR(5)-13	TYPICAL SIGN REQUIREMENTS
3	SGR_BR 7.90	DRILLED SHAFT NOTES CONTINUED	3	SGR_BR 7.90	DRILLED SHAFT NOTES CONTINUED	RD037	PM(1)-12	TYPICAL STANDARD PAVEMENT MARKINGS
4	SGR_BR 7.90	SUBSTRUCTURE DETAILS	4	SGR_BR 7.90	SUBSTRUCTURE DETAILS	DRAINAGE PLANS		
5	SGR_BR 7.90	SUBSURFACE INFORMATION (SHEET 1 OF 2)	5	SGR_BR 7.90	SUBSURFACE INFORMATION (SHEET 1 OF 2)	SHEET NO.	DRAWING	DESCRIPTION
6	SGR_BR 7.90	SUBSURFACE INFORMATION (SHEET 2 OF 2)	6	SGR_BR 7.90	SUBSURFACE INFORMATION (SHEET 2 OF 2)	C001 - C016	SGR_C001 - SGR_C016	CULVERT CROSS SECTIONS
STRUCTURAL DETAILS			STRUCTURAL DETAILS			DRAINAGE DETAILS		
SHEET NO.	DRAWING	DESCRIPTION	SHEET NO.	DRAWING	DESCRIPTION	SHEET NO.	DRAWING	DESCRIPTION
1		GENERAL NOTES	1		GENERAL NOTES	DD001	SGR_DD001	CULVERT MARKER DETAIL
2		TYPICAL SECTIONS AND DETAILS (SHEET 1 OF 2)	2		TYPICAL SECTIONS AND DETAILS (SHEET 1 OF 2)	SWPPP DETAILS		
3		TYPICAL SECTIONS AND DETAILS (SHEET 2 OF 2)	3		TYPICAL SECTIONS AND DETAILS (SHEET 2 OF 2)	SHEET NO.	DRAWING	DESCRIPTION
4		CAST-IN-PLACE CONCRETE END BENT FRAMING DETAILS	4		CAST-IN-PLACE CONCRETE END BENT FRAMING DETAILS	SWD001	SGR_SWD001	SWPPP DETAILS
5		CAST-IN-PLACE CONCRETE END BENT REINFORCING DETAILS	5		CAST-IN-PLACE CONCRETE END BENT REINFORCING DETAILS	SWD002	SGR_SWD002	SWPPP DETAILS
6		CAST-IN-PLACE CONCRETE INTERIOR BENT FRAMING AND REINFORCING DETAILS	6		CAST-IN-PLACE CONCRETE INTERIOR BENT FRAMING AND REINFORCING DETAILS	CROSS SECTIONS		
7		PRESTRESSED CONCRETE DOUBLE BOX BEAM DETAILS (SHEET 1 OF 2)	7		PRESTRESSED CONCRETE DOUBLE BOX BEAM DETAILS (SHEET 1 OF 2)	SHEET NO.	DRAWING	DESCRIPTION
8		PRESTRESSED CONCRETE DOUBLE BOX BEAM DETAILS (SHEET 1 OF 2)	8		PRESTRESSED CONCRETE DOUBLE BOX BEAM DETAILS (SHEET 1 OF 2)	X001-X419	SGR_X001-SGR_X419	TRACK B CROSS SECTIONS
9		MISCELLANEOUS STEEL DETAILS	9		MISCELLANEOUS STEEL DETAILS	X420-X445	SGR_X420-SGR_X445	TRACK A CROSS SECTIONS
ROADWAY PLANS			ROADWAY PLANS			X446-X463	SGR_X446-SGR_X463	TRACK E CROSS SECTIONS
SHEET NO.	DRAWING	DESCRIPTION	SHEET NO.	DRAWING	DESCRIPTION			
R001	SGR_R001	ROADWAY CROSSING PLAN & PROFILE MP 0.13 - CR 454	R001	SGR_R001	ROADWAY CROSSING PLAN & PROFILE MP 0.13 - CR 454			
R002	SGR_R002	ROADWAY CROSSING PLAN & PROFILE MP 1.97 - CR 4516	R002	SGR_R002	ROADWAY CROSSING PLAN & PROFILE MP 1.97 - CR 4516			
R003	SGR_R003	ROADWAY CROSSING PLAN & PROFILE MP 3.75 - CR 4512	R003	SGR_R003	ROADWAY CROSSING PLAN & PROFILE MP 3.75 - CR 4512			
R004	SGR_R004	ROADWAY CROSSING PLAN & PROFILE MP 6.47 - FM 2676	R004	SGR_R004	ROADWAY CROSSING PLAN & PROFILE MP 6.47 - FM 2676			
TRACK DETAILS			TRACK DETAILS					
SHEET NO.	DRAWING	DESCRIPTION	SHEET NO.	DRAWING	DESCRIPTION			
TD001	SGR_TD001	COMP JOINTS DETAIL	TD001	SGR_TD001	COMP JOINTS DETAIL			



HDR Engineering, Inc.
Firm No. 754



CALL BEFORE YOU DIG
1-800-336-9193



3/6/2017

DRAWN BY: LBB

CHECKED BY: MAM

DATE: 3 MARCH 2017

SHEET NUMBER: G002 of G010

LEGEND:

- Existing Railroad Owned Trackage
- Proposed Railroad Owned Trackage
- Existing Industry Owned Trackage
- Proposed Industry Owned Trackage
- Future Industry Owned Trackage
- Fiber Optic Cable
- Railroad Right Of Way
- Fence

For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
PROJECT INDEX

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SCOPE OF WORK MATRIX

	Southwest Gulf Railroad				UPRR			
	Supply	Assemble	Install	Dispose	Supply	Assemble	Install	Dispose
1 EA No. 15 RH POTO					X	X	X	
1 EA No. 15 LH POTO					X	X	X	
1 EA No. 11 RH DTMF	X	X	X					
2 EA No. 11 LH HTTO	X	X	X					
6 EA No. 11 RH HTTO	X	X	X					
1 EA No. 15 RH DTMF	X	X	X					
2 EA DPSS Derail	X	X	X					
Remove 360 TF Existing Track								X
390 TF 136# On Wood					X		X	
452 TF 136# On Wood Inside UP ROW	X	X	X					
82168 TF 136# On Wood	X	X	X					
Mainline Ballast	X						X	X
Other Ballast	X		X					
4 EA Insulated Joints (Inside UPRR 13' Clear Point)					X	X	X	
2 EA Insulated Joints (Outside UPRR 13' Clear Point)	X	X	X					
4 EA Mainline Signals					X	X	X	
6 EA Sign Protection at Grade Crossings	X	X	X					
12 EA Signal Protection at Grade Crossings	X	X	X					
3 EA Bridges and Access Roads	X	X	X					
2 EA Crew Parking Areas	X		X					
22192 LF Remove Fence				X				

WORK RESPONSIBILITY

WORK BY UPRR

Install 1 EA No. 15 Right Hand Power Turnout
Install 1 EA No. 15 Left Hand Power Turnout
Remove 360 TF of Existing Track
Install 452 TF of 136#CWR Track
Install 4 EA Mainline Signals
Install 4 EA Insulated Joints
Install Mainline Ballast

WORK BY CONTRACTOR

Install 2 EA DPSS Derail
Install 452 TF of 136#CWR Track inside UPRR ROW
Install 82168 TF of 136#CWR Track
Install 1 EA No. 11 Right Hand Dual Tone Multi Frequency (DTMF) Hand Throw Turnout
Install 2 EA No. 11 Left Hand Hand Throw Turnout
Install 6 EA No. 11 Right Hand Hand Throw Turnout
Install 1 EA No. 15 Right Hand Dual Tone Multi Frequency (DTMF) Hand Throw Turnout
Install 2 EA Insulated Joints
Install Other Ballast
Install 6 EA Sign Protection at Grade Crossings
Install 12 EA Signal Protection at Grade Crossings
Construct 3 EA Bridges and Access Roads
Construct 2 EA Crew Parking Areas
Remove 22192 LF of Fencing

SURVEY NOTES

- Railroad stationing for project profiles and alignments is based on stations established for chord definition spiraled curves at the centerline of the existing UPRR Main Line unless otherwise noted.
- The contractor is responsible for the preservation of all survey control monuments. In the event monuments are damaged or destroyed by the contractor, the Engineer will replace the monument solely at the contractor's expense.

	DATUM
HORIZONTAL	TEXAS CENTRAL STATE PLANE FIPZONE 4203, NAD83 - US SURVEY FEET (MODIFIED STATE PLANE)
VERTICAL	NAVD-88 - GEOID 2009

COORDINATES ARE MODIFIED STATE PLANE SCALED UP TO GROUND
AROUND (0,0) USING GRID TO GROUND FACTOR = 1.000105728

GENERAL NOTES

- Contractors shall notify Service Alert, (800) 642-2444 and UPRR Fiber Optics Hotline (800) 336-9193, 48 hours prior to any excavation. The USA Authorization Numbers shall be kept at the job site.
- No work within UPRR whatsoever shall be commenced without first notifying the UPRR Engineer.
- The Contractor shall comply with all instructions, rules, regulations, directions, policies and procedures of Federal, State, County, and City Laws and Ordinances and Regulations of the Department of Industrial Relations, OSHA, Federal Railroad Administration (FRA), Union Pacific Railroad (UPRR), Texas Department of Transportation (TxDOT), NPDES and Industrial Accident Commission related to the safety and character of the work, equipment and labor personnel.
- The Contractor and all project personnel under the direction/supervision of the Contractor shall comply with all FRA rules and regulations for working on or about Railroad Right-of-Way, including but not limited to Railroad Worker Safety Rules (FRA Part 214, Subpart C).
- The Contractor will obtain all permits and Right-of-Entry Agreements for working in Right-of-Way owned by UPRR, TxDOT, and/or Medina County.
- Contractor shall be responsible for coordinating with all Utility agencies.
- Contractor shall protect in place (by any means necessary) all existing utilities to remain unless otherwise specified herein, contractor shall be responsible for the complete repair at his expense, for any damage to existing utilities, structures, or other site features, as a result of his work.
- Prior to placing curbs, pavements, base, subbase, track, etc., all underground utilities shall be installed, backfill completed, and the Engineer notified by each of the utility companies having facilities within the work area, that the utility installation has satisfactorily passed acceptance tests.
- Contractor shall verify locations and elevations of existing utilities whether known or unknown prior to beginning construction.
- Any existing conditions found to be a variance with these drawings must be immediately reported to the Engineer.
- Contractor shall maintain and clean all access and service roads used during construction to the satisfaction of the Engineer.
- Contractor shall perform all construction in such a manner as to protect adjacent existing buildings and other site elements which are to remain in service.
- No field changes will be permitted without direct written authorization from the Engineer or his representative.
- Contractor shall coordinate work which affects adjacent property owners. Any questions or agreements between adjacent property owners and contractor shall be made in writing. A copy of such agreement shall be provided to the UPRR Engineer or his representative.
- The contractor is responsible for developing and maintaining a Stormwater Pollution Prevention Plan (SWPPP) in conjunction with Southwest Gulf Railroad to comply with State regulations prior to construction. Work conducted at roadway crossing FM 2676 shall comply with TxDOT Specification Item 506 Temporary Erosion Control from TxDOT Standard Specifications (Nov 1, 2014). TxDOT requires that an SW3P be created, and seeding and soil retention blankets are to be used at all areas disturbed along FM 2676.
- Right-of-way lines shown on the plans were taken from existing UPRR Valuation Maps and were physically staked in the field.
- Match lines for sheets are based on the proposed stationing unless otherwise specified.
- The contractor is responsible for the removal of all pavement markings that will be in conflict with the proposed work.
- Contractor shall comply with all TxDOT, COUNTY, and CITY standard specifications for construction of public improvements requirements. Standard Specifications for TxDOT are found in TxDOT Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges (Nov 1, 2014).
- Contractor shall contact TxDOT 2 weeks prior to impacting FM 2676 lanes so that TxDOT can put narrow lane information into their Highway Condition Reporting System (HCRS). Portable changeable message boards will be used to relay the narrow lane and/or one lane/two way traffic conditions to FM 2676 users.
- Contractor shall maintain at least one access to all affected businesses, residences, and fields. Multiphase construction shall be utilized.
- All mainline track construction is new 136# CVWR on 9' 0" wood ties at 19.5" tie spacing.
- All mainline turnouts are new 136# with wood ties.
- The Contractor shall field locate and verify all tie in points to existing rail prior to beginning construction. Discrepancies in horizontal and vertical location of tie in points shall be reported to the Engineer prior to beginning construction.
- Minor adjustment of existing tracks may be required at tie-ins.
- The track design speed unless otherwise noted is 25 MPH.
- All existing mainline track on UPRR is 133/136 LB rail.
- All signals and associated grading shall be constructed by contractor per plans.
- Contractor shall maintain positive drainage at all time during construction and provide temporary drainage when necessary.
- Contractor shall provide a minimum 3:1 safety slope along all vertical cuts greater than 1" within the clear zone per the TxDOT guidelines for the treatment of pavement drop-offs in work zones. Clear zone is defined as 30' from edge of travel lane.
- Quantities provided in design package are for estimating purposes only.
- All workmanship and specifications shall conform to UPRR Industrial Standards at a minimum.
- Contractor to provide as-builts for all items that vary from these plans.
- All culverts under rail to be designed for Cooper E-80 loading. All culverts under access roads where the culvert does not cross the rails shall be HS-20 rated.
- Utility relocations are to be completed prior to construction operations and by others.

PROJECT EXCEPTIONS

- Proposed vertical curves exist within proposed horizontal curves.

TRAFFIC NOTES

- All barricades, warning signs, lights, devices, etc. for the guidance of vehicle traffic and pedestrians shall be provided by the Contractor and must conform to the installation shown in the Texas Manual on Uniform Traffic Control Devices (TMUTCD), current edition.
- Contractor shall make twice daily inspections, and one monthly night inspection of barricades and flashing lights to ensure proper placement, functioning, and reflectivity of warning devices.
- Contractor shall submit traffic control plans to Medina County/TxDOT for approval at least 2 weeks prior to any construction in TxDOT or County Right-of-WAY. Plans shall be 11" x 17" engineered drawings, sealed by a professional engineer licensed in the State of Texas.
- The contractor is responsible for the prompt replacement and/or repair of all traffic control devices and appurtenances damaged or disturbed due to construction.
- All traffic control devices shall have ASTM Type III High Density Reflective Sheeting.
- If at any time during construction the Contractor's proposed plan of operation for handling traffic does not provide for the safe & comfortable movement of traffic, the Contractor shall immediately change his operation to correct the unsatisfactory condition.
- Refer to TxDOT Item 502 for reference to Barricades, Signs, and Traffic Handling.
- Medina County roads can only be closed during the months of November through February. No two county roads can be under construction at the same time without approval from Medina County.
- TxDOT road (FM 2676) can only be under construction during the months of November through February.

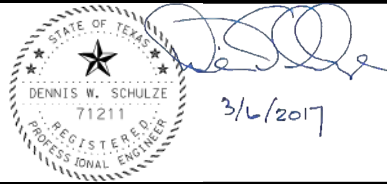
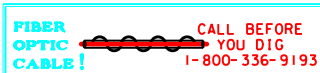
TxDOT/TRAFFIC CONTROL NARRATIVE

Phase 1

- Set Project Limit Signing in accordance with Standard RD002.
- Set Barricades, Warning Signs, Portable Traffic Control, and other traffic control appurtenance as shown on RD013.
- Switch traffic to one-lane, two-way traffic operation on existing travel lane, then construct eastbound portion of roadway.

Phase 2

- Set Barricades, Warning Signs, Portable Traffic Control, and other traffic control appurtenance as shown on RD013.
- Switch traffic to one-lane, two-way traffic operation on new travel lane, then construct Westbound portion of roadway.
- Open Eastbound and Westbound travel lanes to the two-way traffic operation.
- Remove all barricades and warning signs.



DRAWN BY:	LBB
CHECKED BY:	MAM
DATE:	3 MARCH 2017
SHEET NUMBER	G003 of G010

LEGEND:	
Existing Railroad Owned Trackage	
Proposed Railroad Owned Trackage	
Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
Future Industry Owned Trackage	
Fiber Optic Cable	
Railroad Right Of Way	
Fence	

For Use in Agreement with:	UNION PACIFIC RAILROAD And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:	MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX
	FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR GENERAL NOTES

ABBREVIATIONS

MISCELLANEOUS

Ac.	Acres
Ave.	Avenue
Blvd.	Boulevard
Bldg.	Building
BNSF	BNSF Railway
C.Y.	Cubic Yards
Conc.	Concrete
°	Degree (s)
Dia.	Diameter
Dr.	Drive
Dwg.	Drawing
E	East
EL	Elevation
EX	Existing
'	Foot, Feet or Minute (s)
F.S.	Finished Surface
Horiz.	Horizontal
"	Inch, Inches or Second (s)
Inv.	Invert
Lt.	Left
L	Length
L.F.	Lineal Feet
Max.	Maximum
Min.	Minimum
N	North
NTS	Not to Scale
No.	Number
OH	Overhead
Prop	Proposed
RR	Railroad
Rwy	Railway
R/W	Right of Way
Rt.	Right
S	South
S.F.	Square Feet
Sta.	Station
Std.	Standard
St.	Street
Twp.	Township
Typ.	Typical
UG	Underground
UPRR	Union Pacific Railroad
V	Velocity
Wt.	Weight
W	West
X-ing	Crossing

SIGNAL

ABS	Automatic Block Signal
ATC	Automatic Train Control
CTC	Centralized Traffic Control
DED	Dragging Equipment Detector
DTC	Direct Traffic Control
ELTO	Electric Lock Turnout
HBD	Hot Box Detector
HTTO	Hand Throw Turnout
HWD	High Wide Detector
POTO	Power Operated Turnout
TWC	Track Warrant Control
WILD	Wheel Impact Load Detector

STRUCTURES

Bldg.	Building
Br.	Bridge
CB	Catch Basin
CPT	Concrete Pile Trestle - Ballast Deck
CIP	Cast Iron Pipe
CMP	Corrugated Metal Pipe
CMPA	Corrugated Metal Pipe Arch
CSP	Corrugated Steel Pipe
Culv.	Culvert
DI	Drop Inlet
DPGBD	Deck Plate Girder - Ballast Deck
DPGOD	Deck Plate Girder - Open Deck
EBW	East Backwall
F.L.	Flowline
F.F.	Finished Floor
GIP	Galvanized Iron Pipe
Hdwl	Headwall
NBW	North Backwall
PSCT	Prestressed Concrete Trestle
RCA	Reinforced Concrete Arch
RCB	Reinforced Concrete Box
RCP	Reinforced Concrete Pipe
SBW	South Backwall
SSP	Smooth Steel Pipe
SPTBD	Steel Pile Trestle - Ballast Deck
SPTOD	Steel Pile Trestle - Open Deck
SPP	Structural Plate Pipe
TPGBD	Through Plate Girder - Ballast Deck
TPGOD	Through Plate Girder - Open Deck
TPTBD	Timber Pile Trestle - Ballast Deck
TPTOD	Timber Pile Trestle - Open Deck
TTBD	Through Truss - Ballast Deck
TTOD	Through Truss - Open Deck
TWB	Treated Wood Box
VCP	Vitrified Clay Pipe
Viad.	Viaduct
WBW	West Backwall
WIP	Wrought Iron Pipe

TRACK

ATR	Above Top of Rail
Align.	Alignment
BBR	Below Base of Rail
Cntrs.	Centers
CVR	Continuous Welded Rail
DPSS	Double Switch Point Derail
EOT	End of Track/Alignment
HTTO	Hand Throw Turnout
HH	Head Hardened
Jtd.	Jointed Rail
LH	Left Hand
ML	Main Line
MM	Mile Marker
MP	Mile Post
NSC	Not Sufficient Clearance
OTM	Other Track Material
PCC	Point of Compound Curve
PC	Point of Curve
PCS	Point of Curve to Spiral
POC	Point on Curve
PF	1/2" Point of Frog
PI	Point of Intersection
PITO	Point of Intersection of Turnout
PS	Point of Spiral
PSC	Point of Spiral to Curve
POS	Point on Spiral
PT	Point of Tangent
POB	Point of Beginning
POT	Point on Tangent
POTO	Power Operated Turnout
PT SW	Point of Switch
PVC	Point of Vertical Curve
PVI	Point of Vertical Intersection
PVT	Point of Vertical Tangent
RH	Right Hand
SH	Second Hand
SSPD	Single Switch Point Derail
T/R	Top of Rail
TC	Track Centers
T.F.	Track Feet
Trk.	Track
UXO	Universal Cross-Over
X-Over	Cross-Over

UTILITIES

AIR	Compressed Air
F/O	Fiber Optic Cable
G	Gas Pipeline
OSP	Overhead Power Line
	Sanitary Sewer
	Overhead Signal Line
SS	Steam Line
SS	Storm Sewer
T	Telephone
UG	Underground Electric
W	Water Main
	Underground Wire
V.	Valve
M.H.	Manhole
C.B.	Catch Basin
F.H.	Fire Hydrant

TRACK

	Existing Mainline
	Existing Siding or Spur
	Proposed UPRR Track
	Proposed Industry Track
	Remove
	Shift
	Future
	Foreign Railroad or Industry
	In Buildings or Under Structures
	Turnout
	Wheel Stop
	Bumping Post
	Earthen Bumper
	Inert Retarder
	Dowty Retarder
	Derail
	Switch Point Derail or Double Switch Point Derail

PROPERTY

	Section Line
	Center Section Line
	Parcel or Easement Line
	Right of Way
	Former Right of Way
	Right of Way to be Acquired
	Foreign Right of Way
	Temporary Construction Easement

SYMBOLS

ROAD CROSSING WARNING DEVICES

⊗	Crossbuck Sign
⚡	Flashing Light Warning Device
⚡	Flashing Light Warning Device with Gate
⚡	Cantilever Flashing Light Warning Device
⚡	Cantilever Flashing Light Signal with Gate

SIGNAL

⊙	Absolute Signal
⊙	Signal Bridge
⊙	Cantilever Signal
⊙	ACS or CTC Signal
⊙	Dwarf Signal
⊙	Begin CTC
⚡	Microwave Tower
⚡	AEI
⚡	AEI Reader

STRUCTURES

	Culvert
	Culvert with Headwalls
	Double Culvert
	Railroad Bridge
	Highway Overpass
	Highway Underpass
	Tunnel
	Building
	Remove Building
	Remove Culvert

CONSTRUCTION

Note	Note (Work by Contractor)
Note	Note (Work by Others)
—	Cut Lines
—	Fill Lines
—	Ditch Lines

SIGNS

⊙	Stop
⊙	Yard Limit
⊙	1 Mile to Yard Limit
⊙	Whistle Post
⊙	Flanger
⊙	Station
⊙	Reduce Speed
⊙	Resume Speed
⊙	General Purpose

FENCES

—	Barbed Wire
—	Chain Link
—	Snow / Sand
—	Remove Fence

LIGHTING

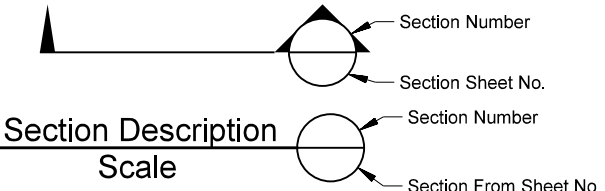
⊙	Light Pole
⊙	Light Tower

ROADS

—	Paved Road
—	Unimproved Road
⊙	Interstate Highway
⊙	Federal Highway
⊙	State Highway
⊙	County Highway

OTHER

⊙	Wetlands-Potential Waters of the US
⊙	Non-Jurisdictional Features
⊙	Temporary Construction Impact Limits
⊙	River or Lake
⊙	Embankment
⊙	Flow Line
⊙	Ground Survey Limit
⊙	Milepost
⊙	Milemarker
⊙	Control Point
⊙	Soil Boring
⊙	Revision Number
⊙	Revision Cloud
⊙	Irrigation Well



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LEGEND:	
Existing Railroad Owned Trackage	—
Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	F/O
Railroad Right of Way	—
Fence	—

For Use in Agreement with:	UNION PACIFIC RAILROAD And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:	MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX
	FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR ABBREVIATIONS AND LEGEND

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Alignment Name: Track B

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	-5	13675633.5871	1967928.7788	N 64°07'05.12" W	PI	13675869.3000	1967442.9610	N 64°07'05.12" W	539.98		-3°49'06.00"
Linear	PI	0+39.98	13675869.2979	1967442.9612	N 60°17'59.12" W	PS	13676008.9100	1967198.1930	N 60°17'59.12" W	281.79		0°00'00.00"
Clothoid	PS	3+21.77	13676008.9128	1967198.1926	N 60°17'59.12" W	PSC	13676072.6100	1967090.6530	N 57°29'16.72" W	125.00		0°00'00.00"
Circular	PSC	4+46.77	13676072.6066	1967090.6531	N 57°29'16.72" W	PCS	13677872.7200	1966728.8920	N 34°45'42.27" E	2050.52	1273.57	0°00'00.00"
Clothoid	PCS	24+97.29	13677872.7218	1966728.8919	N 34°45'42.27" E	PT	13677973.0200	1966803.4760	N 37°34'24.67" E	125.00		0°00'00.00"
Linear	PT	26+22.29	13677973.0160	1966803.4755	N 37°34'24.67" E	PS	13681649.2000	1969631.8090	N 37°34'24.67" E	4638.29		0°00'00.00"
Clothoid	PS	72+60.58	13681649.1954	1969631.8090	N 37°34'24.67" E	PSC	13681713.1100	1969679.9230	N 35°46'26.34" E	80.00		0°00'00.00"
Circular	PSC	73+40.58	13681713.1055	1969679.9228	N 35°46'26.34" E	PCS	13682352.1900	1969915.8360	N 4°44'54.34" E	689.63	-1273.57	0°00'00.00"
Clothoid	PCS	80+30.22	13682352.1921	1969915.8363	N 4°44'54.34" E	PT	13682432.0400	1969920.7880	N 2°56'56.01" E	80.00		0°00'00.00"
Linear	PT	81+10.22	13682432.0352	1969920.7879	N 2°56'56.01" E	PS	13684916.0500	1970048.7480	N 2°56'56.01" E	2487.30		0°00'00.00"
Clothoid	PS	105+97.52	13684916.0452	1970048.7476	N 2°56'56.01" E	PSC	13684995.8900	1970053.6990	N 4°44'54.34" E	80.00		0°00'00.00"
Circular	PSC	106+77.52	13684995.8883	1970053.6991	N 4°44'54.34" E	PCS	13685541.6900	1970228.4220	N 30°45'12.15" E	578.04	1273.57	0°00'00.00"
Clothoid	PCS	112+55.56	13685541.6917	1970228.4217	N 30°45'12.15" E	PT	13685609.5700	1970270.7580	N 32°33'10.48" E	80.00		0°00'00.00"
Linear	PT	113+35.56	13685609.5672	1970270.7578	N 32°33'10.48" E	PS	13687285.0800	1971340.3510	N 32°33'10.48" E	1987.80		0°00'00.00"
Clothoid	PS	133+23.36	13687285.0763	1971340.3513	N 32°33'10.48" E	PSC	13687352.9500	1971382.6870	N 30°45'12.15" E	80.00		0°00'00.00"
Circular	PSC	134+03.36	13687352.9519	1971382.6874	N 30°45'12.15" E	PCS	13687980.0800	1971561.5530	N 1°05'04.11" E	659.48	-1273.57	0°00'00.00"
Clothoid	PCS	140+62.84	13687980.0781	1971561.5530	N 1°05'04.11" E	PT	13688060.0700	1971561.3920	N 0°42'54.23" W	80.00		0°00'00.00"
Linear	PT	141+42.84	13688060.0744	1971561.3921	N 0°42'54.23" W	PS	13688908.7200	1971550.8000	N 0°42'54.23" W	848.72		0°00'00.00"
Clothoid	PS	149+91.55	13688908.7236	1971550.8002	N 0°42'54.23" W	PSC	13688988.7200	1971550.6390	N 1°05'04.09" E	80.00		0°00'00.00"
Circular	PSC	150+71.55	13688988.7200	1971550.6394	N 1°05'04.09" E	PCS	13690111.6700	1972270.5950	N 64°14'43.80" E	1403.94	1273.57	0°00'00.00"
Clothoid	PCS	164+75.49	13690111.6746	1972270.5947	N 64°14'43.80" E	PT	13690144.9200	1972343.3570	N 66°02'42.12" E	80.00		0°00'00.00"
Linear	PT	165+55.49	13690144.9182	1972343.3566	N 66°02'42.12" E	PS	13691454.2300	1975290.3440	N 66°02'42.12" E	3224.75		0°00'00.00"
Clothoid	PS	197+80.25	13691454.2271	1975290.3438	N 66°02'42.12" E	PSC	13691487.4700	1975363.1060	N 64°14'43.80" E	80.00		0°00'00.00"
Circular	PSC	198+60.25	13691487.4707	1975363.1057	N 64°14'43.80" E	PCS	13692077.9500	1976081.1710	N 3°18'18.22" W	1501.51	-1273.57	0°00'00.00"
Clothoid	PCS	213+61.76	13692077.9536	1976081.1709	N 3°18'18.22" W	PT	13692787.7000	1976074.8880	N 5°06'16.54" W	80.00		0°00'00.00"
Linear	PT	214+41.76	13692787.7030	1976074.8878	N 5°06'16.54" W	PS	13699357.9200	1975487.9800	N 5°06'16.54" W	6596.38		0°00'00.00"
Clothoid	PS	280+38.14	13699357.9241	1975487.9802	N 5°06'16.54" W	PSC	13699437.5200	1975480.0290	N 6°54'14.87" W	80.00		0°00'00.00"
Circular	PSC	281+18.14	13699437.5244	1975480.0288	N 6°54'14.87" W	PCS	13700361.7400	1974894.9490	N 57°46'05.41" W	1130.60	-1273.57	0°00'00.00"
Clothoid	PCS	292+48.74	13700361.7373	1974894.9492	N 57°46'05.41" W	PT	13700402.9800	1974826.4020	N 59°34'03.74" W	80.00		0°00'00.00"
Linear	PT	293+28.74	13700402.9770	1974826.4019	N 59°34'03.74" W	PS	13702746.1200	1970837.7680	N 59°34'03.74" W	4625.96		0°00'00.00"
Clothoid	PS	339+54.70	13702746.1176	1970837.7680	N 59°34'03.74" W	PSC	13702787.3600	1970769.2210	N 57°46'05.41" W	80.00		0°00'00.00"
Circular	PSC	340+34.70	13702787.3573	1970769.2208	N 57°46'05.41" W	PCS	13703256.2500	1970329.6320	N 28°32'12.79" W	649.75	1273.57	0°00'00.00"
Clothoid	PCS	346+84.46	13703256.2496	1970329.6321	N 28°32'12.79" W	PT	13703327.3100	1970292.8960	N 26°44'14.46" W	80.00		0°00'00.00"
Linear	PT	347+64.46	13703327.3121	1970292.8956	N 26°44'14.46" W	PS	13706028.5500	1968932.1080	N 26°44'14.46" W	3024.64		0°00'00.00"
Clothoid	PS	377+89.09	13706028.5488	1968932.1080	N 26°44'14.46" W	PSC	13706099.6100	1968895.3720	N 28°32'12.79" W	80.00		0°00'00.00"
Circular	PSC	378+69.09	13706099.6112	1968895.3715	N 28°32'12.79" W	PCS	13706377.2000	1968861.3890	N 44°04'55.61" W	345.54	-1273.57	0°00'00.00"
Clothoid	PCS	382+14.63	13706377.2031	1968861.3891	N 44°04'55.61" W	PT	13706433.4900	1968634.5460	N 45°52'53.94" W	80.00		0°00'00.00"
Linear	PT	382+94.63	13706433.4902	1968634.5456	N 45°52'53.94" W	PS	13707722.0100	1967305.7460	N 45°52'53.94" W	1850.94		0°00'00.00"
Clothoid	PS	401+45.57	13707722.0117	1967305.7464	N 45°52'53.94" W	PSC	13707777.1000	1967247.7370	N 47°40'52.27" W	80.00		0°00'00.00"
Circular	PSC	402+25.57	13707777.0964	1967247.7368	N 47°40'52.27" W	PCS	13708056.1000	1966753.4670	N 73°25'54.39" W	572.38	-1273.57	0°00'00.00"
Clothoid	PCS	407+97.96	13708056.0977	1966753.4674	N 73°25'54.39" W	PT	13708077.3000	1966676.3320	N 75°13'52.72" W	80.00		0°00'00.00"
Linear	PT	408+77.96	13708077.2989	1966676.3315	N 75°13'52.72" W	PS	13708513.8000	1965020.5750	N 75°13'52.72" W	1712.33		0°00'00.00"
Clothoid	PS	425+90.28	13708513.8007	1965020.5752	N 75°13'52.72" W	PSC	13708535.0000	1964943.4390	N 73°25'54.39" W	80.00		0°00'00.00"
Circular	PSC	426+70.28	13708535.0019	1964943.4393	N 73°25'54.39" W	PCS	13709968.5100	1964050.9460	N 9°37'10.17" E	1846.06	1273.57	0°00'00.00"
Clothoid	PCS	445+16.34	13709968.5097	1964050.9461	N 9°37'10.17" E	PT	13710047.0800	1964065.9620	N 11°25'08.51" E	80.00		0°00'00.00"
Linear	PT	445+96.34	13710047.0842	1964065.9623	N 11°25'08.51" E	PS	13712705.4100	1964602.8940	N 11°25'08.51" E	2712.01		0°00'00.00"
Clothoid	PS	473+08.35	13712705.4095	1964602.8936	N 11°25'08.51" E	PSC	13712748.4700	1964611.9210	N 12°40'46.33" E	44.00		0°00'00.00"
Circular	PSC	473+52.35	13712748.4726	1964611.9207	N 12°40'46.33" E	PCS	13713236.9200	1964881.2660	N 45°04'04.48" E	565.28	1000.00	0°00'00.00"
Clothoid	PCS	479+17.63	13713236.9192	1964881.2655	N 45°04'04.48" E	PT	13713267.5300	1964912.8670	N 46°19'42.30" E	44.00		0°00'00.00"
Linear	PT	479+61.63	13713267.5342	1964912.8668	N 46°19'42.30" E	PS	13715291.4200	1967032.8410	N 46°19'42.30" E	2930.94		0°00'00.00"
Clothoid	PS	508+92.57	13715291.4153	1967032.8414	N 46°19'42.30" E	PSC	13715321.5600	1967064.8880	N 47°35'20.13" E	44.00		0°00'00.00"
Circular	PSC	509+36.57	13715321.5634	1967064.8883	N 47°35'20.13" E	PCS	13715582.9000	1967713.4620	N 88°31'02.95" E	714.34	1000.00	0°00'00.00"
Clothoid	PCS	516+50.91	13715582.9037	1967713.4615	N 88°31'02.95" E	PT	13715583.4000	1967757.4580	N 89°46'40.77" E	44.00		0°00'00.00"
Linear	PT	516+94.91	13715583.3969	1967757.4578	N 89°46'40.77" E	PS	13715588.0200	1968950.7440	N 89°46'40.77" E	1193.30		0°00'00.00"
Clothoid	PS	528+88.20	13715588.0206	1968950.7443	N 89°46'40.77" E	PSC	13715587.8700	1968994.7430	S 88°57'41.40" E	44.00		0°00'00.00"
Circular	PSC	529+32.20	13715587.8684	1968994.7431	S 88°57'41.40" E	PCS	13714613.9000	1969976.2840	S 1°28'57.05" E	1526.80	1000.00	0°00'00.00"
Clothoid	PCS	544+59.00	13714613.9046	1969976.2841	S 1°28'57.05" E	PT	13714569.9100	1969976.7770	S 0°13'19.23" E	44.00		0°00'00.00"
Linear	PT	545+03.00	13714569.9083	1969976.7773	S 0°13'19.23" E	PS	13714430.2100	1969977.3190	S 0°13'19.23" E	139.70		0°00'00.00"
Clothoid	PS	546+42.70	13714430.2104	1969977.3186	S 0°13'19.23" E	PSC	13714386.2100	1969977.1660	S 1°02'18.60" W	44.00		0°00'00.00"
Circular	PSC	546+86.70	13714386.2116	1969977.1664	S 1°02'18.60" W	PCS	13713405.1400	1969017.3890	S 87°42'15.10" W	1512.60	1000.00	0°00'00.00"
Clothoid	PCS	561+99.30	13713405.1385	1969017.3893	S 87°42'15.10" W	PT	13713404.0200	1968973.4050	S 88°57'52.92" W	44.00		0°00'00.00"
Linear	PT	562+43.30	13713404.0209	1968973.4045	S 88°57'52.92" W	PS	13713374.3700	1967332.4160	S 88°57'52.92" W	1641.26		0°00'00.00"
Clothoid	PS	578+84.56	13713374.3660	1967332.4155	S 88°57'52.92" W	PSC	13713373.8900	1967288.4190	N 89°46'29.25" W	44.00		0°00'00.00"
Circular	PSC	579+28.56	13713373.8936	1967288.4190	N 89°46'29.25" W	PCS	13713531.9000	1966752.8490	N 57°21'01.18" W	565.91	1000.00	0°00'00.00"
Clothoid	PCS	584+94.47	13713531.9009	1966752.8487	N 57°21'01.18" W	PT	13713556.1800	1966716.1540	N 56°05'23.35" W	44.00		0°00'00.00"
Linear	PT	585+38.47	13713556.1792	1966716.1542	N 56°05'23.35" W	PS	13713680.9300	1966530.5780	N 56°05'23.35" W	223.61		0°00'00.00"
Clothoid	PS	587+62.08	13713680.9295	1966530.5775	N 56°05'23.35" W	PSC	13713705.2100	1966493.8830	N 57°21'01.18" W	44.00		0°00'00.00"
Circular	PSC	588+06.08	13713705.2078	1966493.8831	N 57°21'01.18" W	PCS	13713659.6900	1965349.6990	S 52°47'38.13" W	1219.21	-1000.00	0°00'00.00"
Clothoid	PCS	600+25.29	13713659.6886	1965349.6986	S 52°47'38.13" W	PT	13713632.5700	1965315.0490	S 51°32'00.30" W	44		

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Alignment Name: CR 454-B

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	10+00.00	13676106.8608	1967161.3779	N 66°16'29.30" W	PC	13676183.5489	1966986.8860	N 66°16'29.30" W	190.60		0°00'00.00"
Circular	PC	11+90.60	13676183.5489	1966986.8860	N 66°16'29.30" W	PT	13676204.1917	1966944.5171	N 61°46'22.96" W	47.14	600.00	0°00'00.00"
Linear	PT	12+37.69	13676204.1917	1966944.5171	N 61°46'22.96" W	PC	13676348.6739	1966675.3631	N 61°46'22.96" W	305.48		0°00'00.00"
Circular	PC	15+43.17	13676348.6739	1966675.3631	N 61°46'22.96" W	PT	13676365.9701	1966640.4698	N 65°29'33.56" W	38.95	-600.00	-0°00'00.00"
Linear	PT	15+82.08	13676365.9701	1966640.4698	N 65°29'33.56" W	EOT	13676383.6174	1966601.7596	N 65°29'33.56" W	42.54		

Alignment Name: CR 4516

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	10+00.00	13684767.2753	1969685.0277	S 83°03'57.82" E	EOT	13684687.9142	1970337.5916	S 83°03'57.82" E	657.37		

Alignment Name: CR 4512

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	10+00.00	13691833.4881	1975313.9692	S 0°17'35.12" E	EOT	13691205.3036	1975317.1826	S 0°17'35.12" E	628.19		

Alignment Name: FM 2676

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	10+00.00	13702716.1987	1970480.1014	N 50°08'32.94" E	EOT	13703091.2935	1970929.3863	N 50°08'32.94" E	585.28		

Alignment Name: CR 353-S

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	10+00.00	13708120.8300	1965162.1491	N 0°18'25.06" E	PC	13708229.1673	1965162.7295	N 0°18'25.06" E	108.34		0°00'00.00"
Circular	PC	11+08.34	13708229.1673	1965162.7295	N 0°18'25.06" E	PT	13708260.0538	1965162.6564	N 0°34'40.39" W	30.89	-2000.00	0°00'00.00"
Linear	PT	11+39.22	13708260.0538	1965162.6564	N 0°34'40.39" W	EOT	13708707.9624	1965158.1387	N 0°34'40.39" W	447.93		

Alignment Name: CR 353-N

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	10+00.00	13713181.08	1964473.499	N 89°18'05.82" E	EOT	13713187.5517	1965004.3000	N 89°18'05.82" E	530.84		

Alignment Name: CR 454-A

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	10+00.00	13678380.7137	1964540.1888	S 51°03'26.38" E	PC	13678236.5812	1964718.5423	S 51°03'26.38" E	229.31		-0°00'00.00"
Circular	PC	12+29.31	13678236.5812	1964718.5423	S 51°03'26.38" E	PT	13678202.4984	1964763.2299	S 54°16'40.32" E	56.21	-1000.00	0°00'00.00"
Linear	PT	12+85.50	13678202.4984	1964763.2299	S 54°16'40.32" E	PC	13678044.0130	1964983.6060	S 54°16'40.32" E	271.45		0°00'00.00"
Circular	PC	15+56.94	13678044.0130	1964983.6060	S 54°16'40.32" E	PT	13677595.3364	1965434.3159	S 35°58'52.32" E	638.67	2000.00	0°00'00.00"
Linear	PT	21+95.55	13677595.3364	1965434.3159	S 35°58'52.32" E	EOT	13677513.7627	1965493.5417	S 35°58'52.32" E	100.81		

Alignment Name: Access Roadway

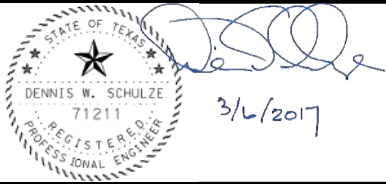
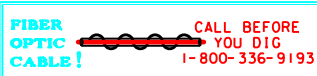
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Linear	POB	10+00.00	13698422.3015	1975802.4737	N 5°06'16.54" W	PC	13699418.3354	1975713.4995	N 5°06'16.54" W	1000.00		0°00'00.00"
Circular	PC	20+00.00	13699418.3354	1975713.4995	N 5°06'16.54" W	PT	13700580.9747	1974977.4823	N 59°34'03.74" W	1429.23	-1503.57	0°00'00.00"
Linear	PT	34+29.23	13700580.9747	1974977.4823	N 59°34'03.74" W	PC	13701372.9130	1973629.3977	N 59°34'03.74" W	1563.49		0°00'00.00"
Circular	PC	49+92.72	13701372.9130	1973629.3977	N 59°34'03.74" W	PT	13701362.2419	1973588.3354	S 30°25'57.32" W	47.12	-30.00	0°00'00.00"
Linear	PT	50+39.84	13701362.2419	1973588.3354	S 30°25'57.32" W	PC	13701327.7526	1973568.0742	S 30°25'57.32" W	40.00		0°00'00.00"
Circular	PC	50+79.84	13701327.7526	1973568.0742	S 30°25'57.32" W	PT	13701317.0814	1973527.0119	N 59°34'03.74" W	47.12	30.00	0°00'00.00"
Linear	PT	51+26.97	13701317.0814	1973527.0119	N 59°34'03.74" W	PC	13702094.8655	1972203.0213	N 59°34'03.74" W	1535.55		0°00'00.00"
Circular	PC	66+62.51	13702094.8655	1972203.0213	N 59°34'03.74" W	PT	13702084.2035	1972161.9643	S 30°27'10.27" W	47.11	-30.00	0°00'00.00"
Linear	PT	67+09.63	13702084.2035	1972161.9643	S 30°27'10.27" W	PC	13701911.7757	1972060.5876	S 30°27'10.27" W	200.02		0°00'00.00"
Circular	PC	69+09.65	13701911.7757	1972060.5876	S 30°27'10.27" W	PT	13701901.1137	1972019.5306	N 59°34'03.74" W	47.11	30.00	0°00'00.00"
Linear	PT	69+56.76	13701901.1137	1972019.5306	N 59°34'03.74" W	EOT	13702428.2149	1971122.2674	N 59°34'03.74" W	1040.63		

Alignment Name: Access Roadway 1

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	10+00.00	13703241.3388	1971141.4962	N 89°09'14.08" W	PC	13703249.5988	1970582.1818	N 89°09'14.08" W	559.38		0°00'00.00"
Circular	PC	15+59.38	13703249.5988	1970582.1818	N 89°09'14.08" W	PT	13703359.5967	1970406.5194	N 26°44'14.46" W	217.88	200.00	0°00'00.00"
Linear	PT	17+77.25	13703359.5967	1970406.5194	N 26°44'14.46" W	EOT	13703908.9784	1970129.7603	N 26°44'14.46" W	615.16		

Alignment Name: Access Roadway 2

Element	Point Type	Station	Start Northing	Start Easting	Start Direction	Point Type	End Northing	End Easting	End Direction	Length	Radius	Angular Difference
Linear	POB	10+00.00	13702934.7475	1970360.7678	N 26°44'14.46" W	EOT	13704017.2948	1969815.4187	N 26°44'14.46" W	1212.15		

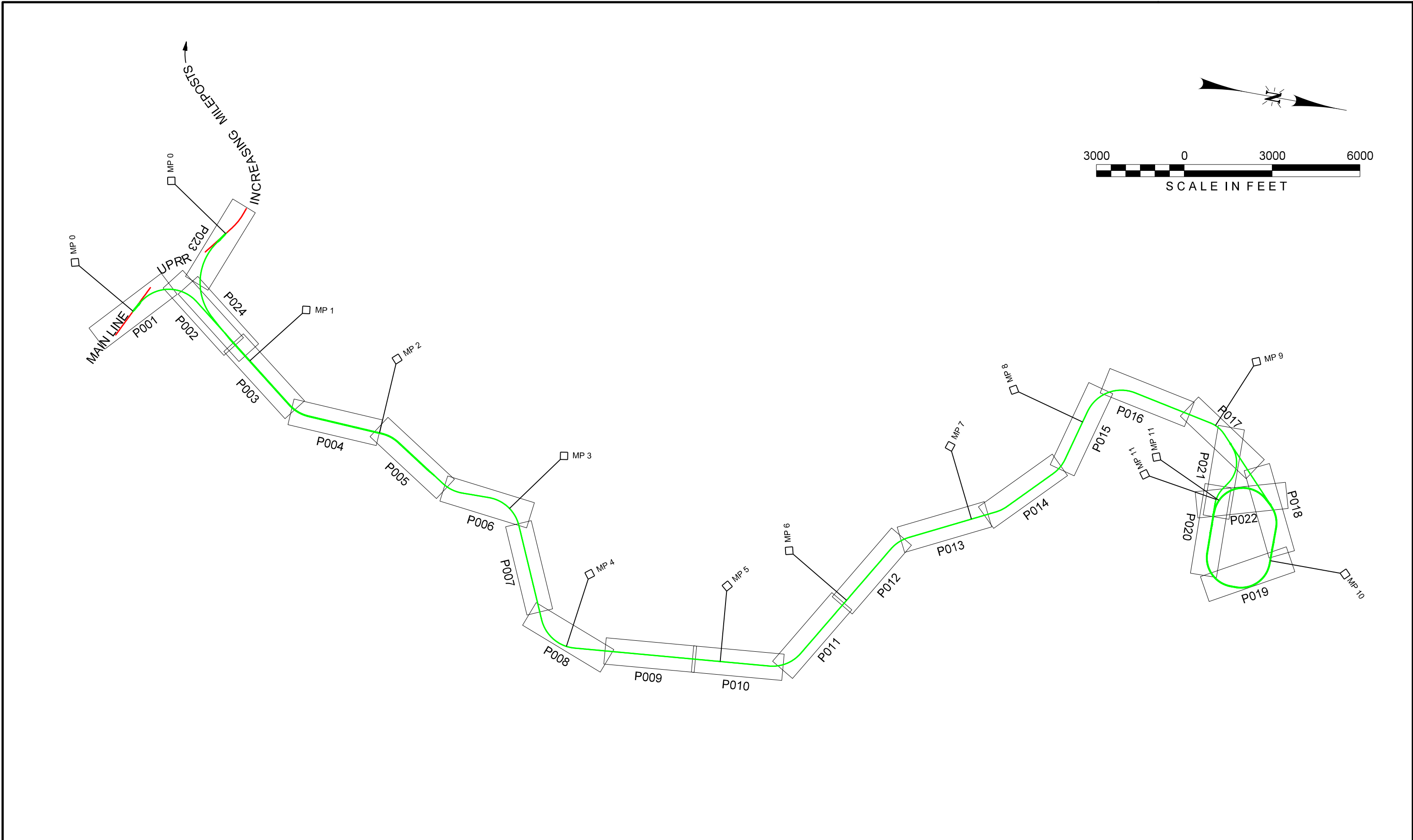


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Proposed Railroad Owned Trackage	
Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
Future Industry Owned Trackage	
Fiber Optic Cable	
Railroad Right Of Way	
Fence	

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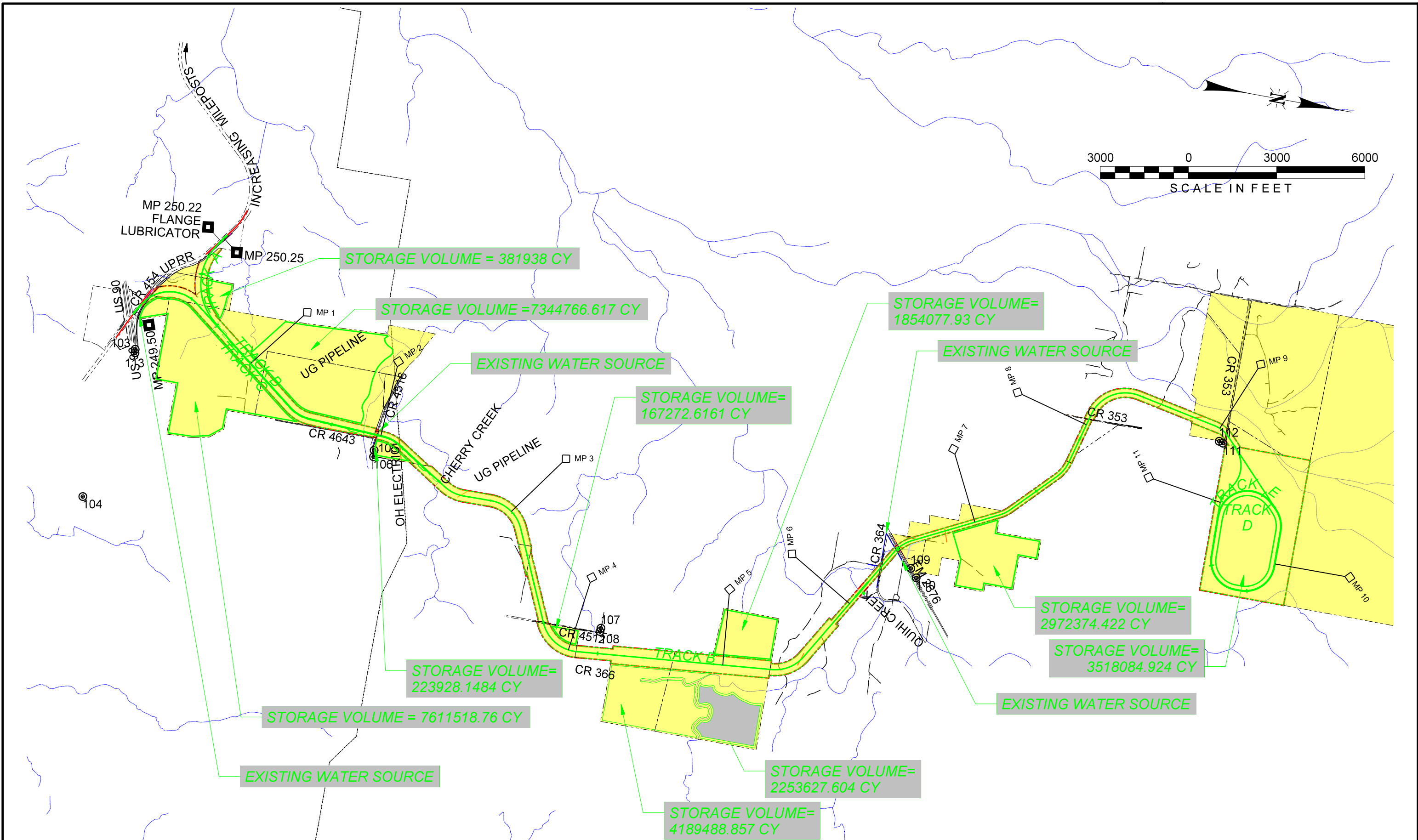
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Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
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Fiber Optic Cable	
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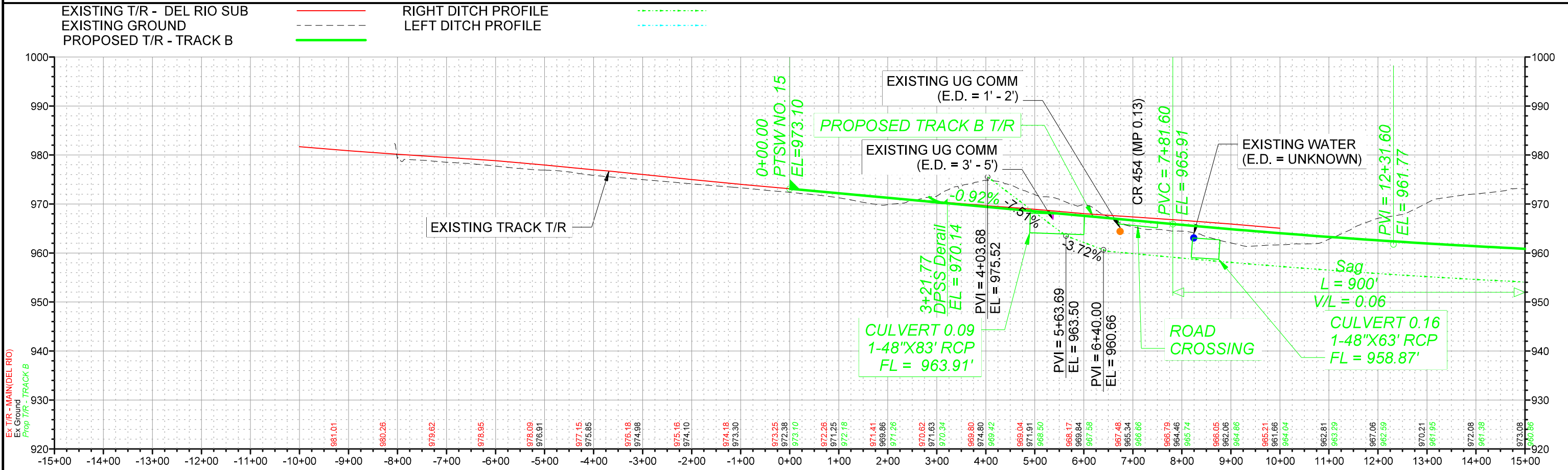
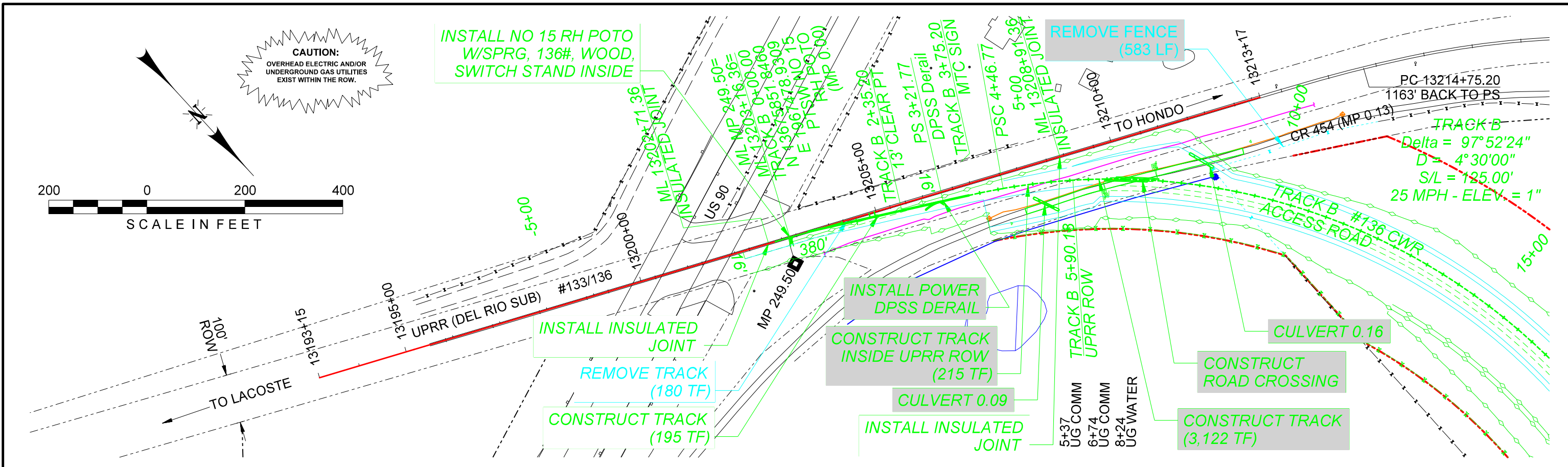
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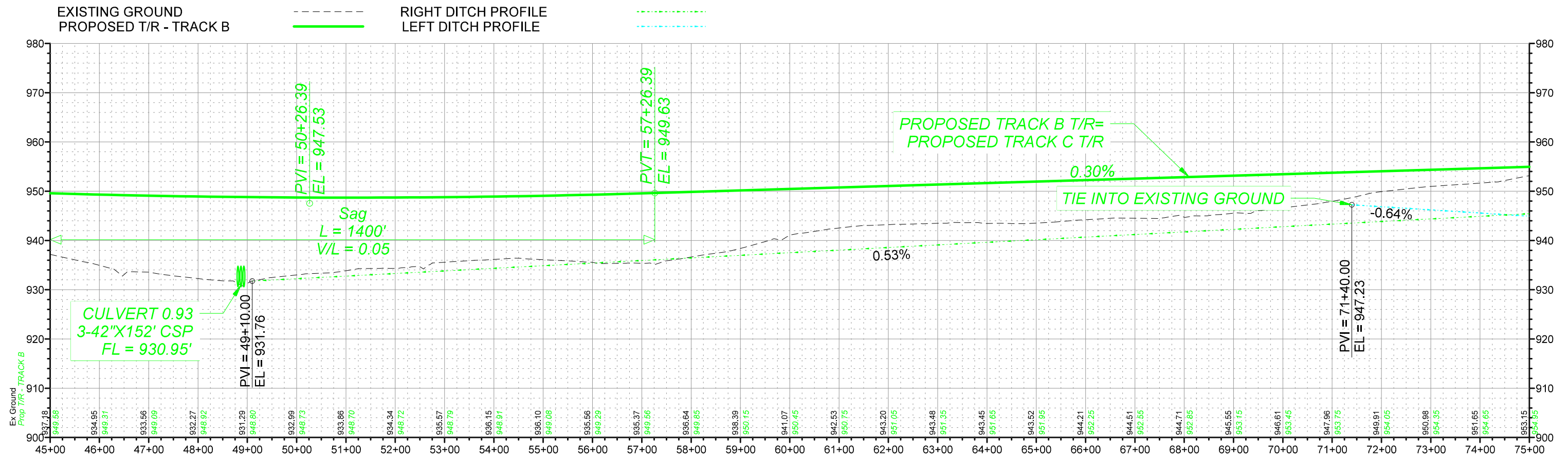
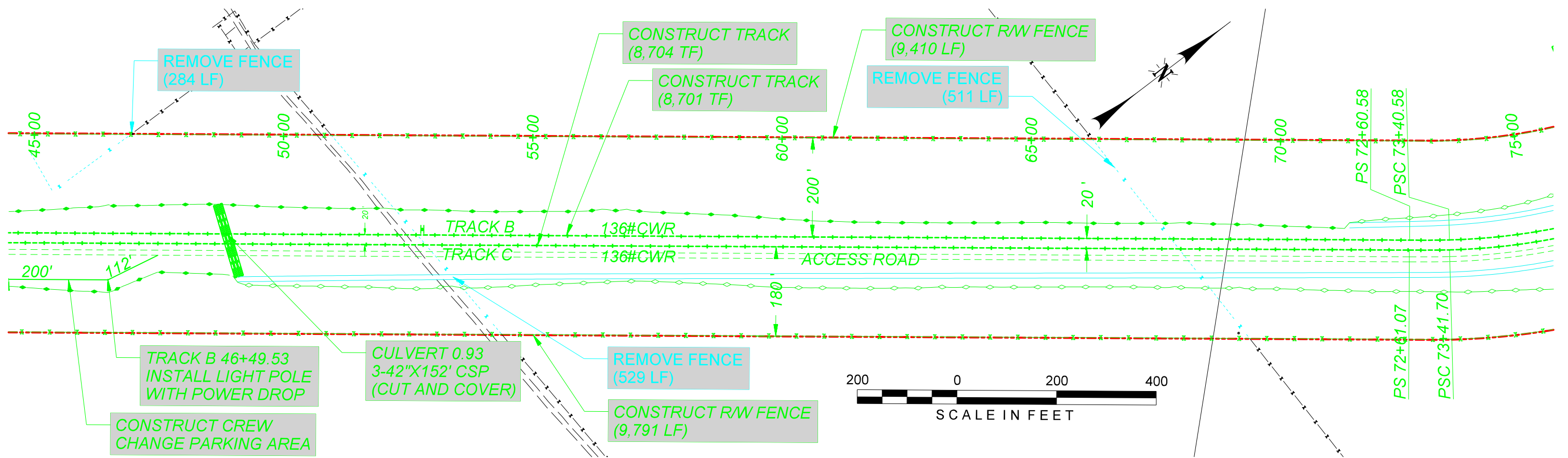
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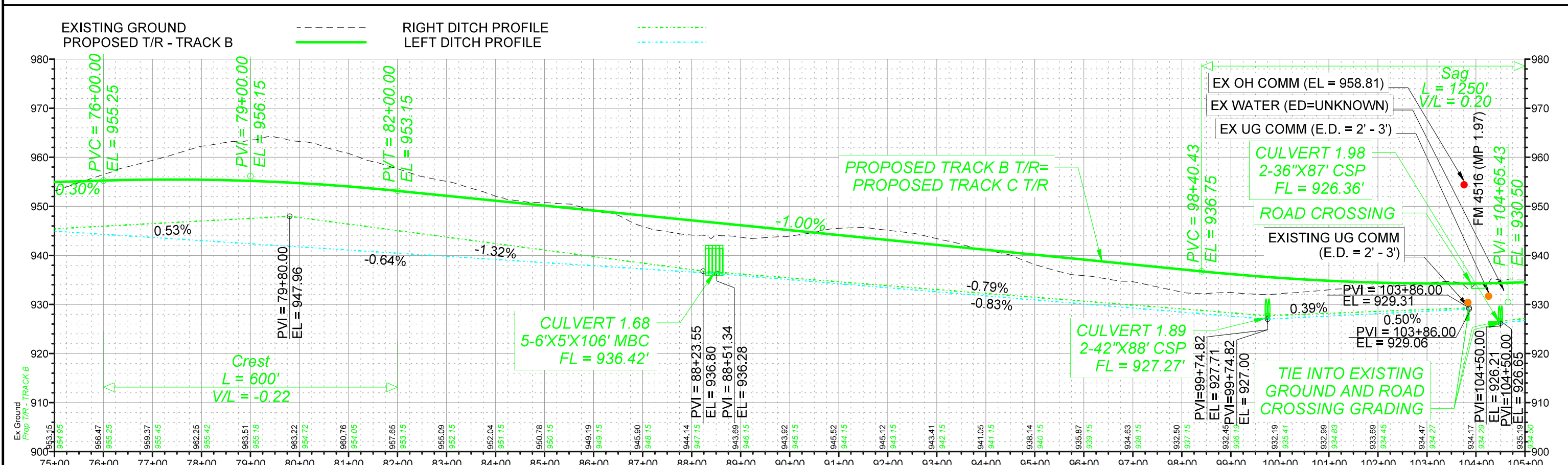
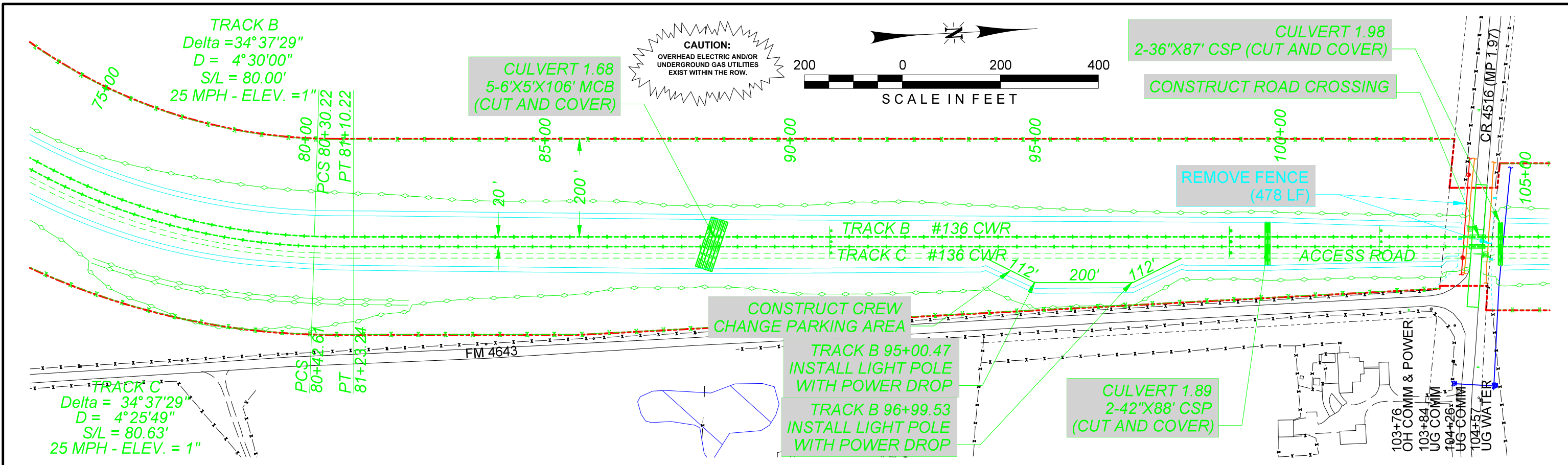


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LEGEND:
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Proposed Railroad Owned Trackage
Existing Industry Owned Trackage
Proposed Industry Owned Trackage
Future Industry Owned Trackage
Fiber Optic Cable
Railroad Right Of Way
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UNION PACIFIC RAILROAD
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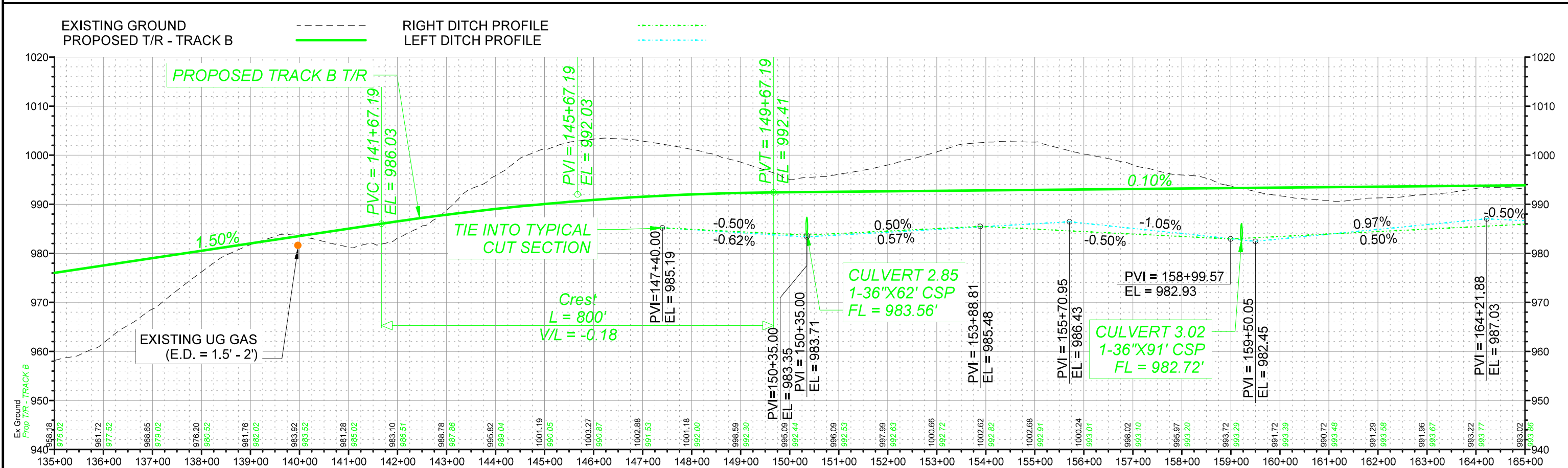
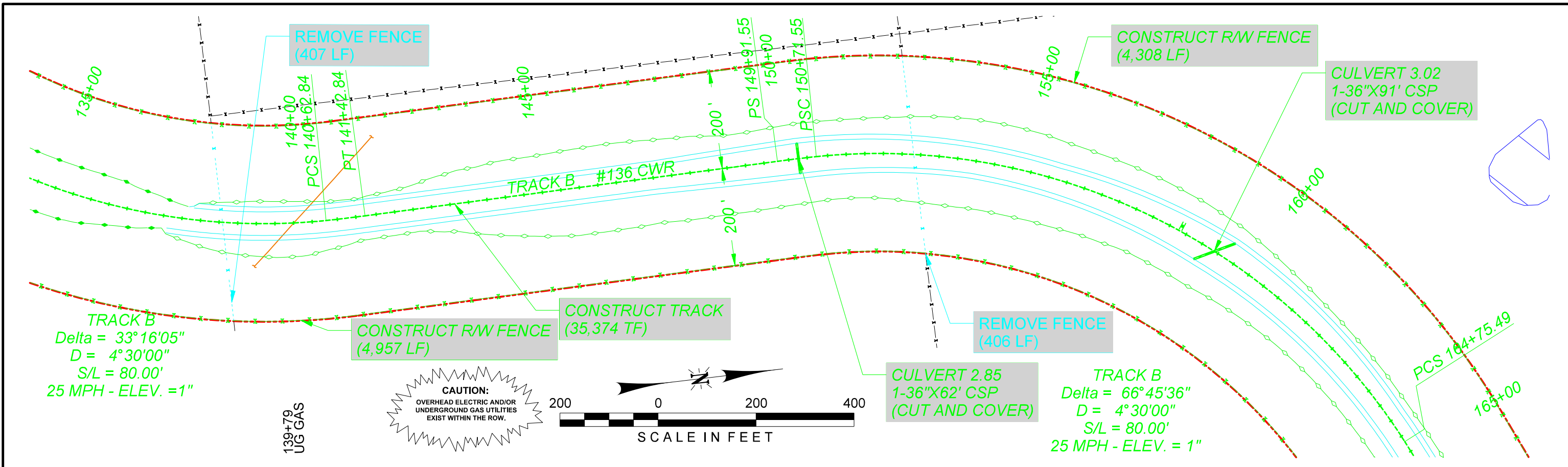
- Existing Railroad Owned Trackage
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- Existing Industry Owned Trackage
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- Future Industry Owned Trackage
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- Railroad Right Of Way
- Fence

UNION PACIFIC RAILROAD
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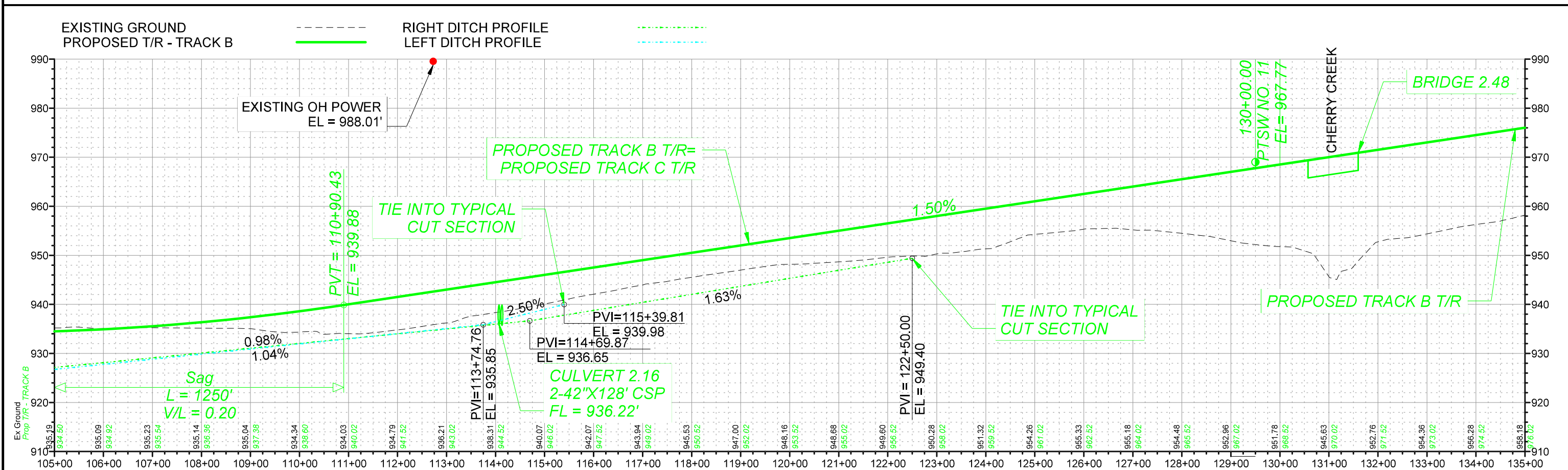
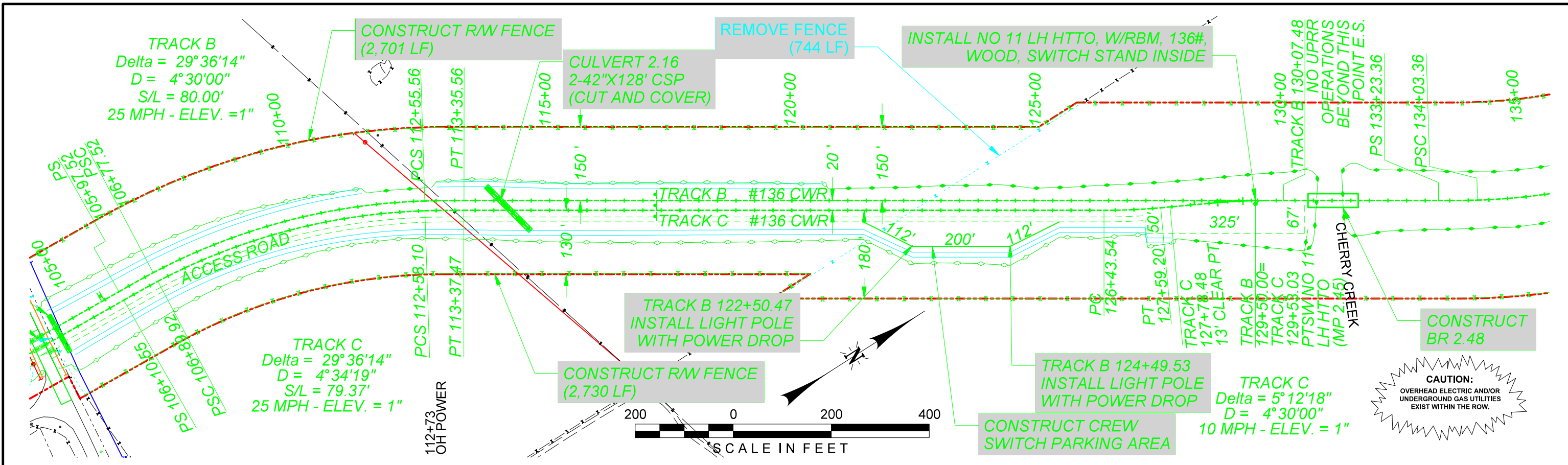


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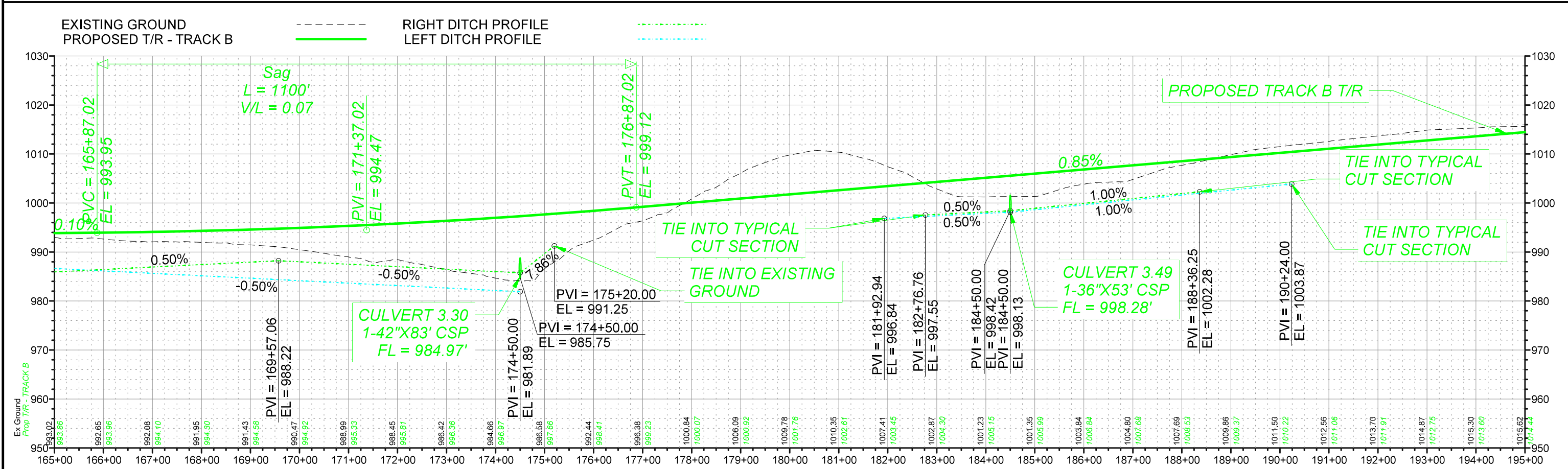
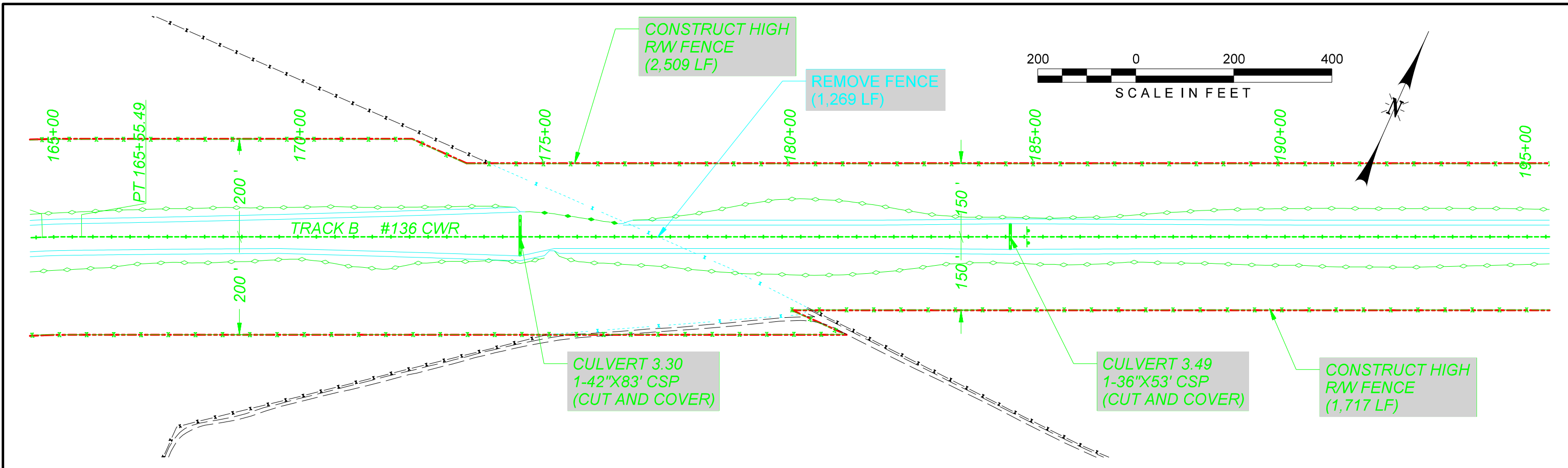
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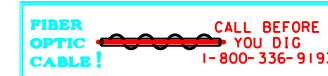
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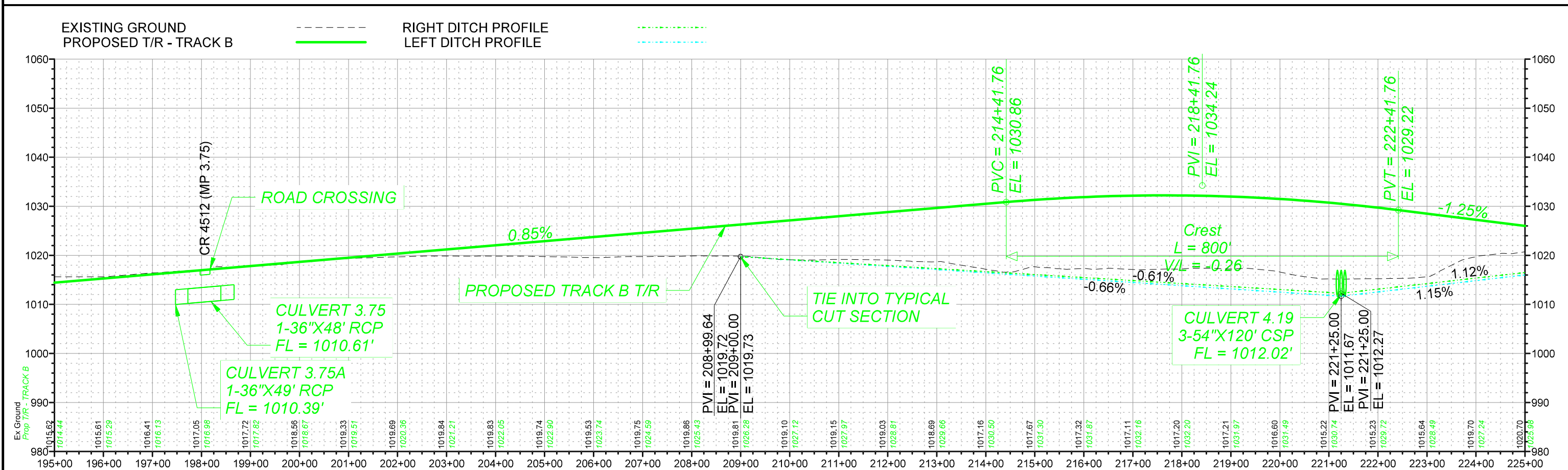
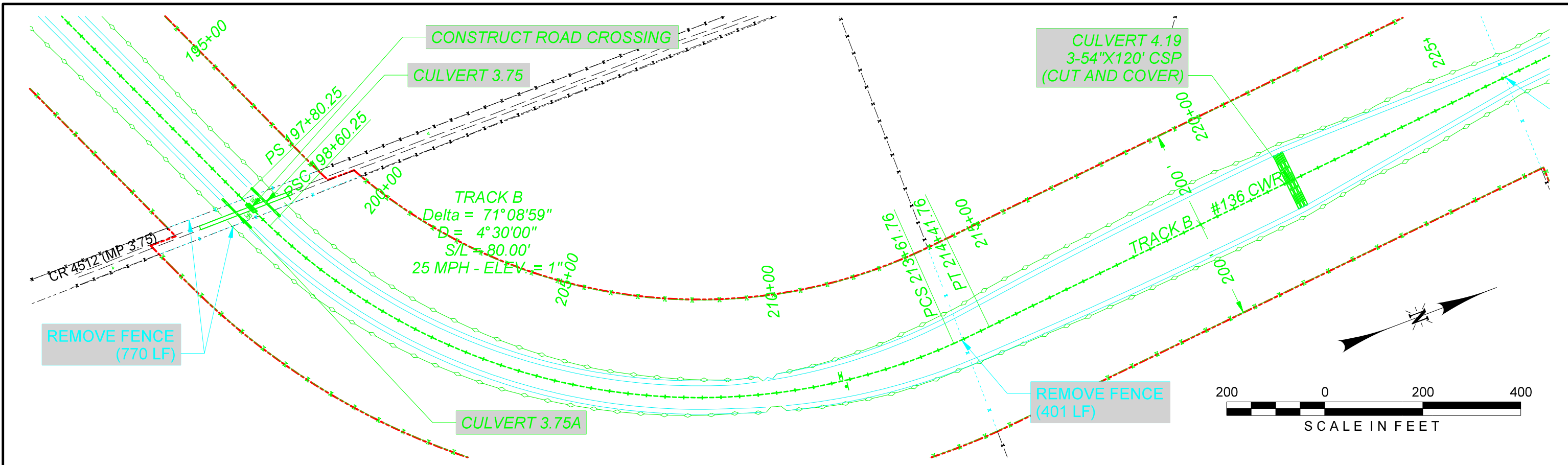
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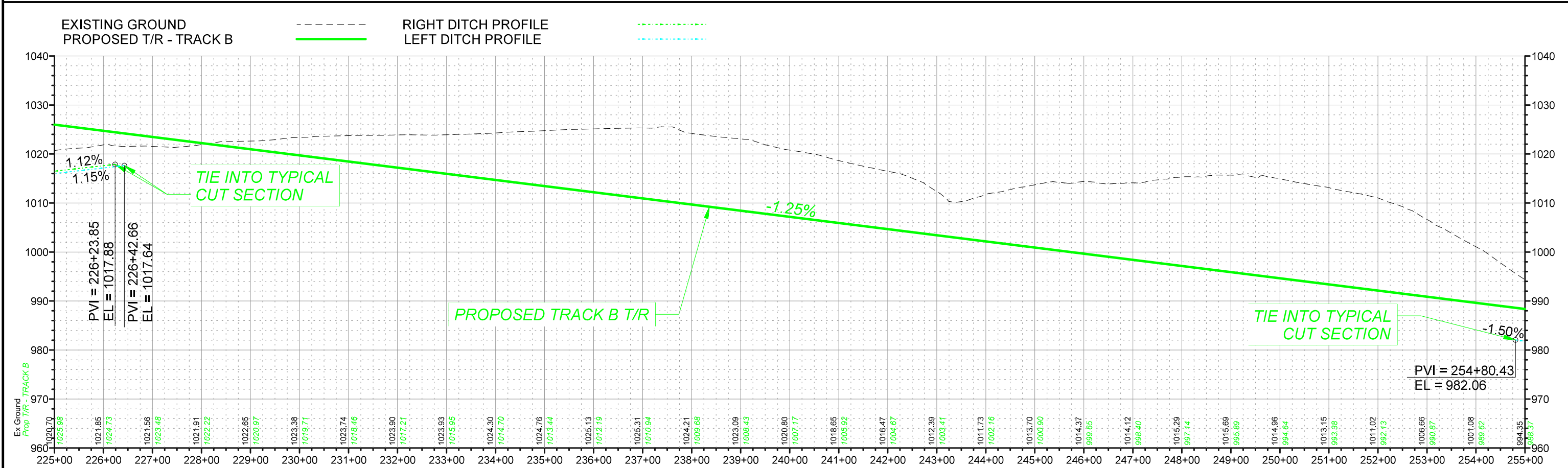
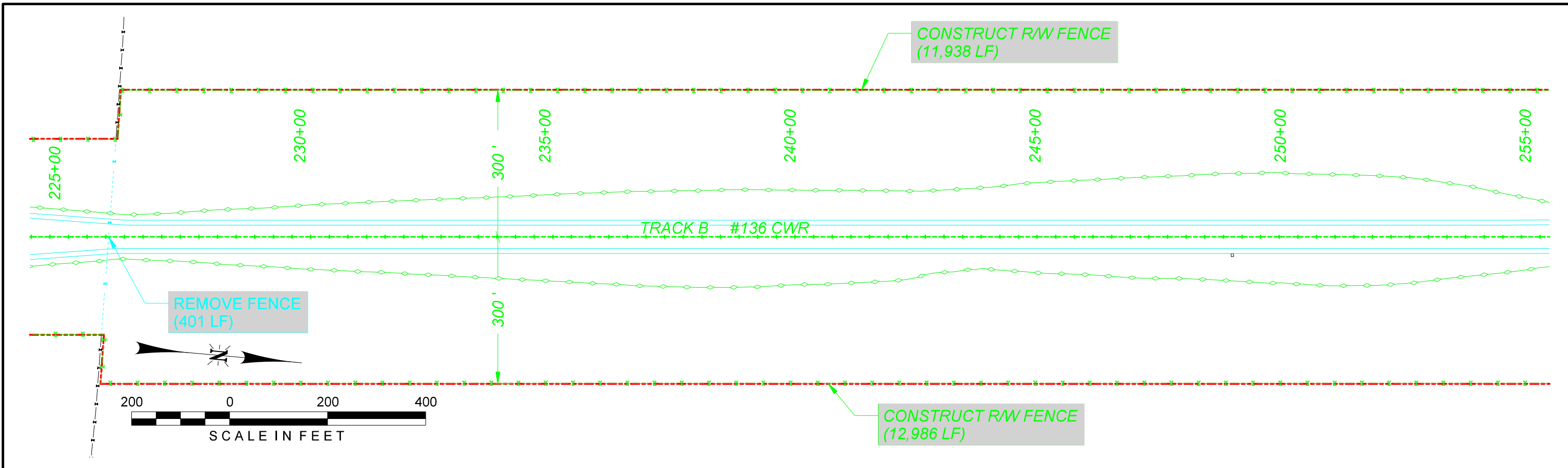
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Existing Industry Owned Trackage

Proposed Industry Owned Trackage

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UNION PACIFIC RAILROAD

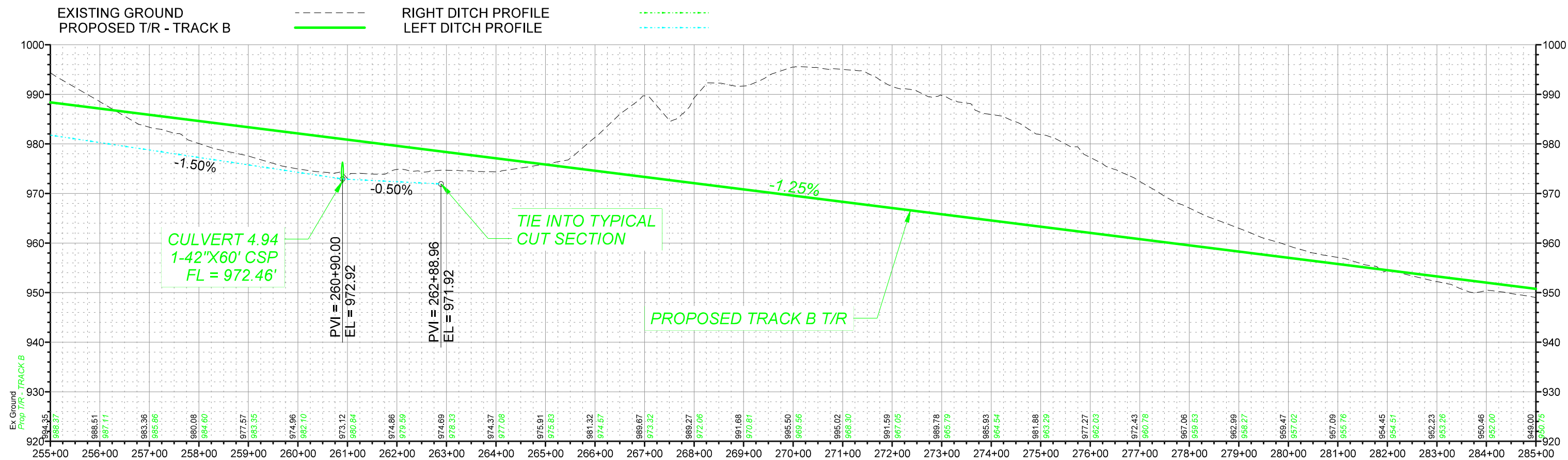
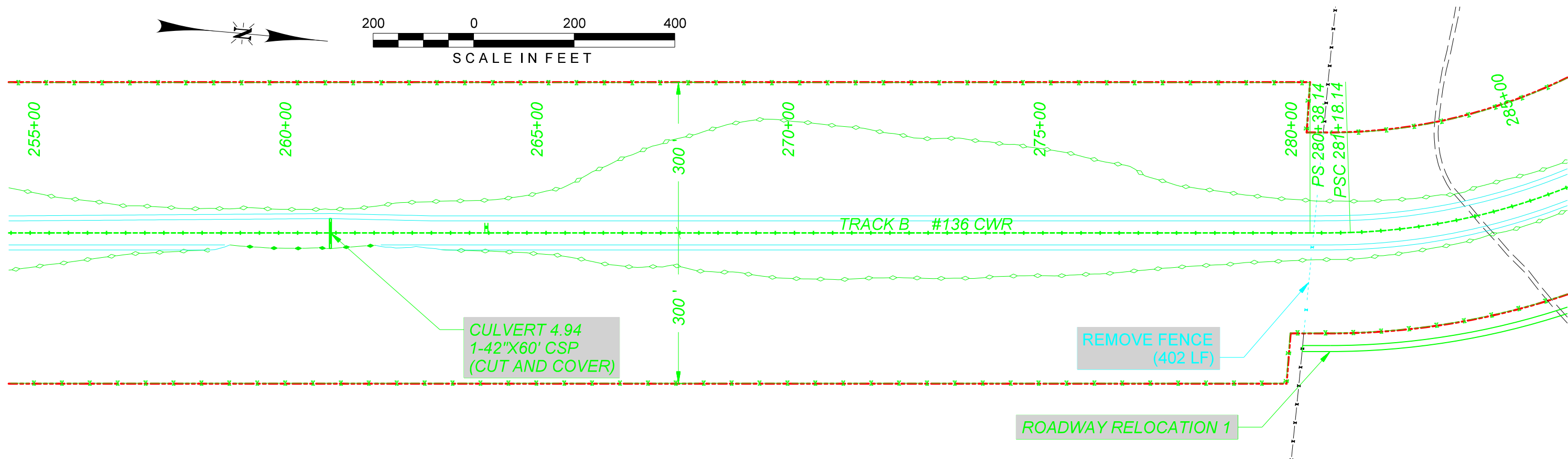
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:

MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK B PLAN & PROFILE

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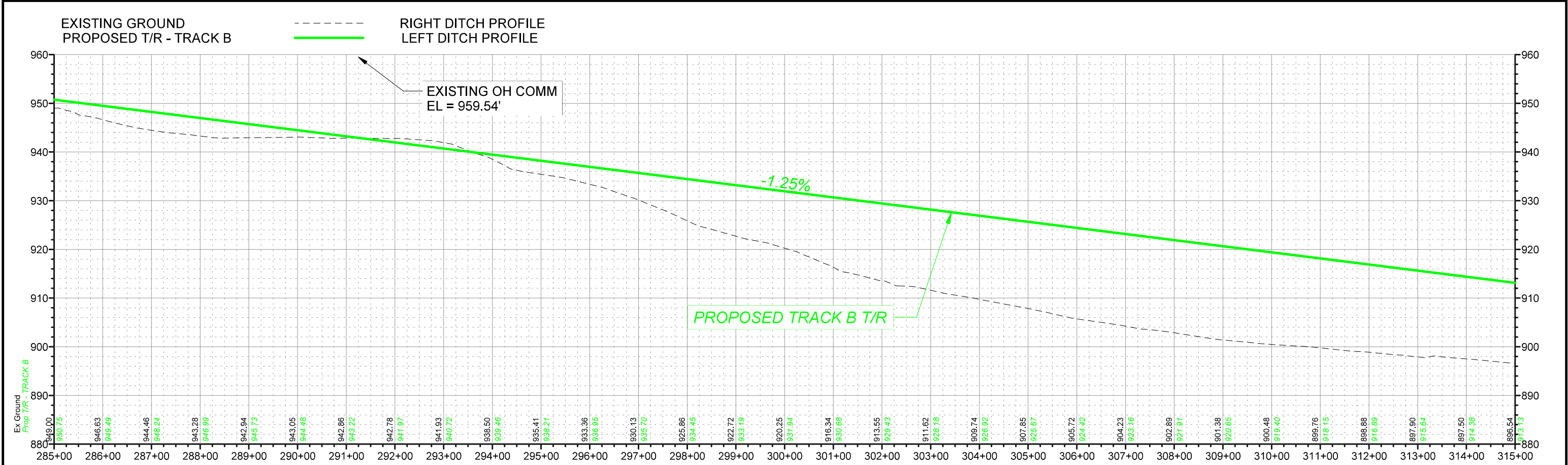
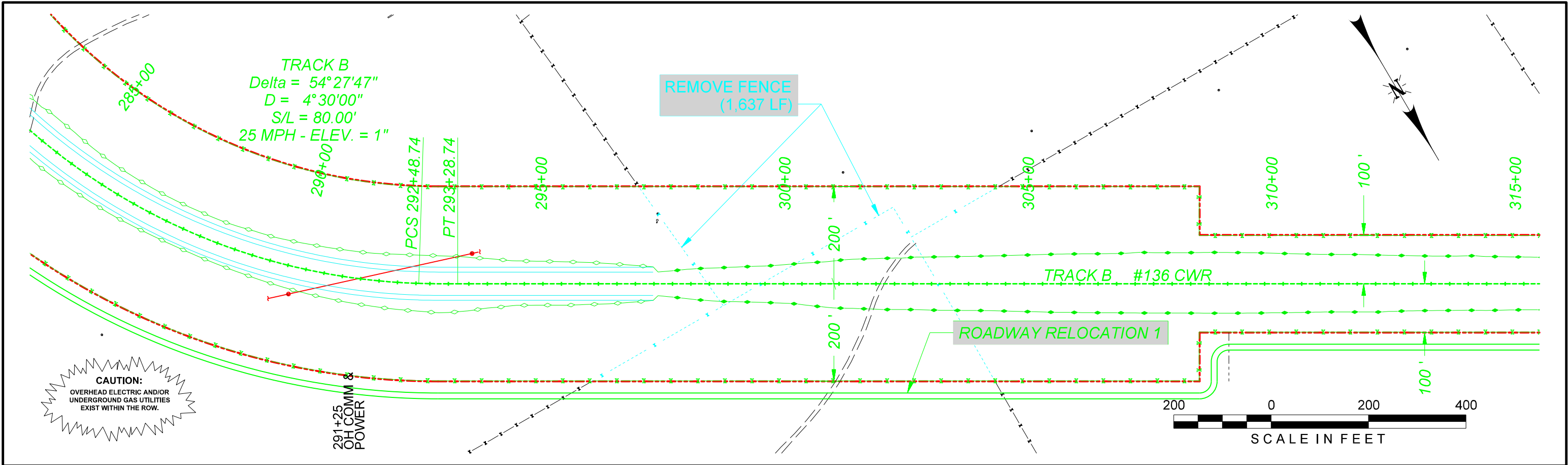


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DATE: 3 MARCH 2017
SHEET NUMBER
P010 of P024

LEGEND:
Existing Railroad Owned Trackage
Proposed Railroad Owned Trackage
Existing Industry Owned Trackage
Proposed Industry Owned Trackage
Future Industry Owned Trackage
Fiber Optic Cable
Railroad Right Of Way
Fence

For Use in Agreement with:
UNION PACIFIC RAILROAD
And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK B PLAN & PROFILE

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SHEET NUMBER
P011 of P024

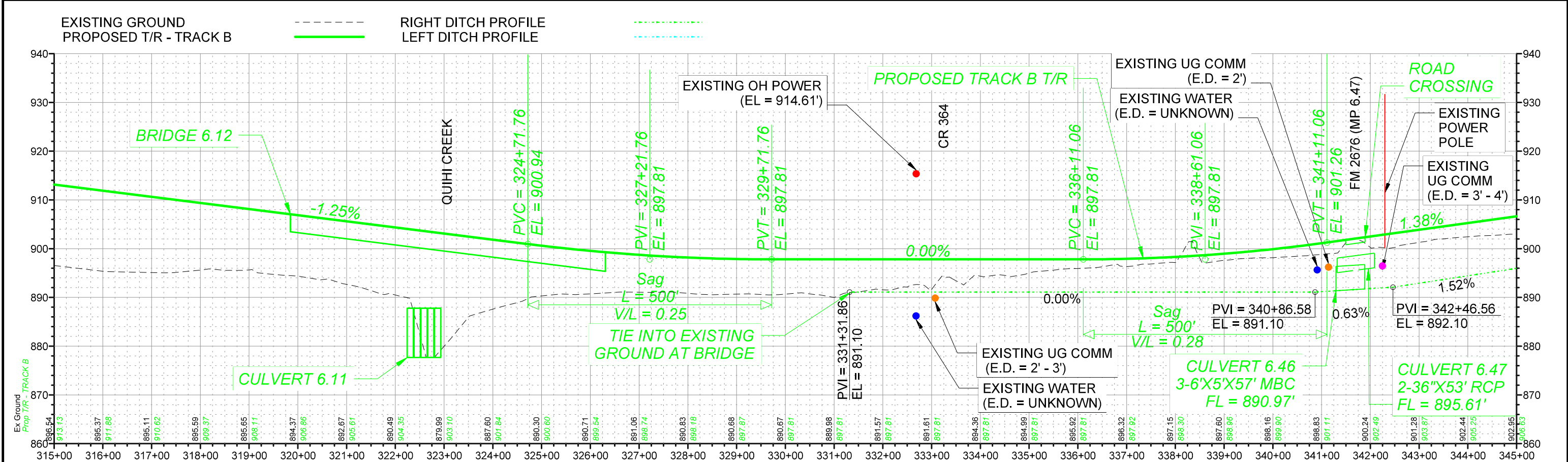
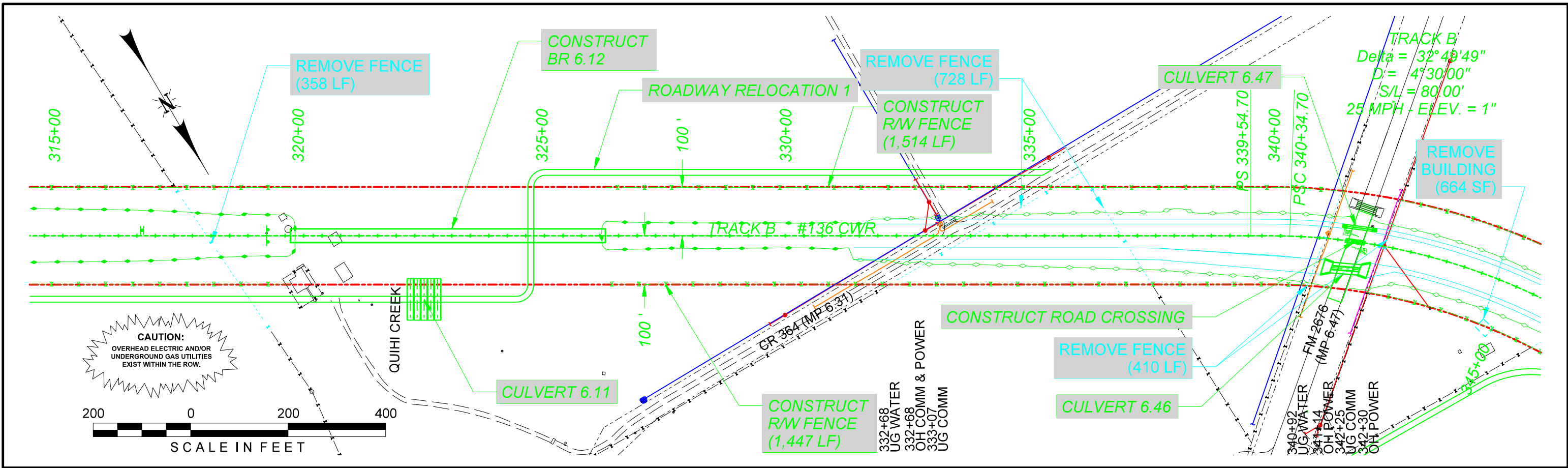
LEGEND:	
Existing Railroad Owned Trackage	—
Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	F/O
Railroad Right Of Way	— X — X — X — X — X
Fence	— X — X — X — X — X

For Use in Agreement with:
UNION PACIFIC RAILROAD
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK B PLAN & PROFILE

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DATE: 3 MARCH 2017
SHEET NUMBER: P012 of P024

LEGEND:

- Existing Railroad Owned Trackage
- Proposed Railroad Owned Trackage
- Existing Industry Owned Trackage
- Proposed Industry Owned Trackage
- Future Industry Owned Trackage
- Fiber Optic Cable
- Railroad Right Of Way
- Fence

For Use in Agreement with:

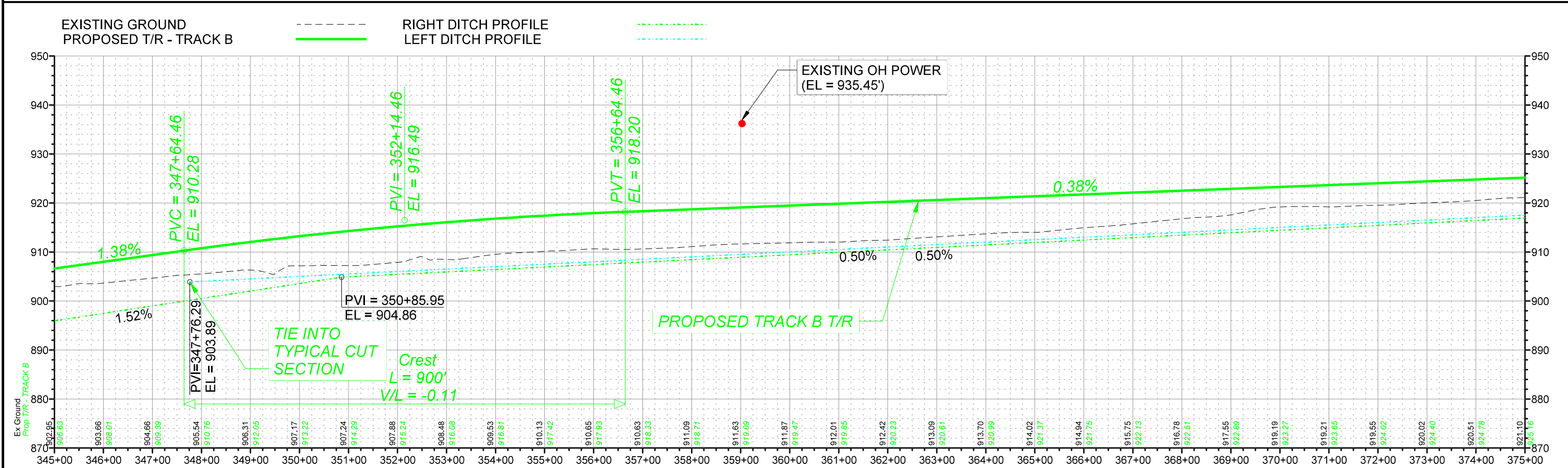
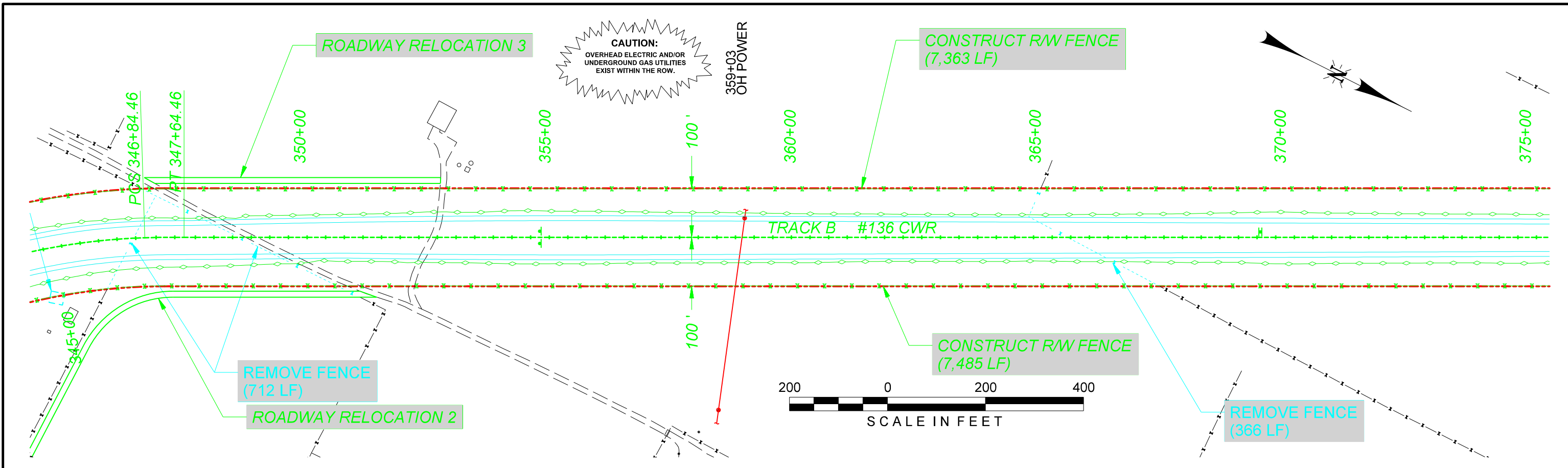
UNION PACIFIC RAILROAD
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:

MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

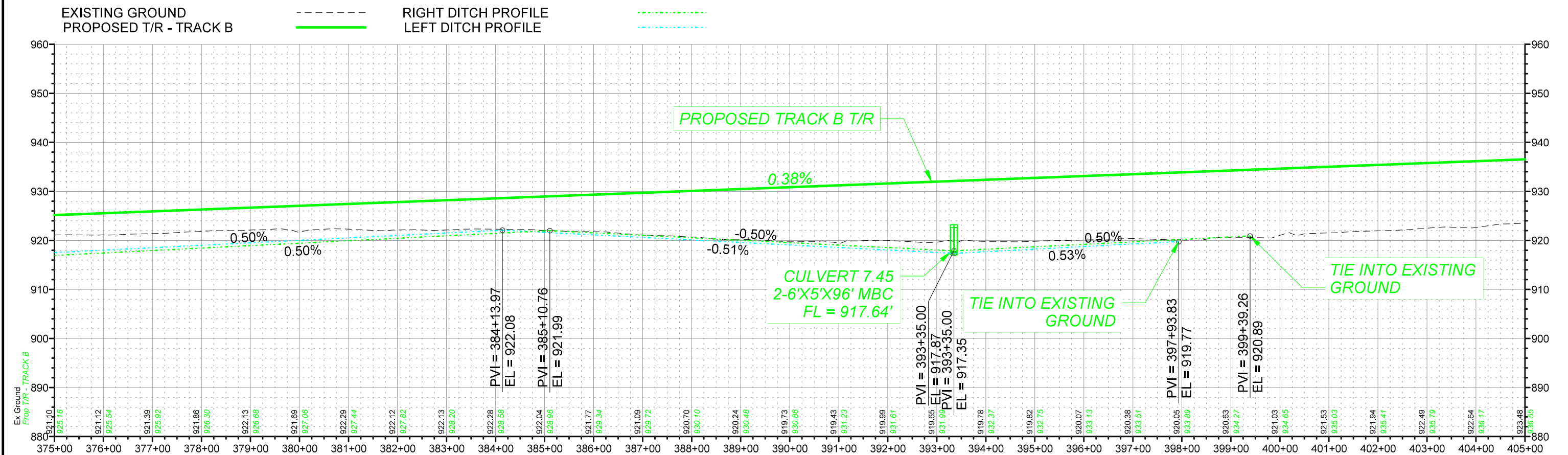
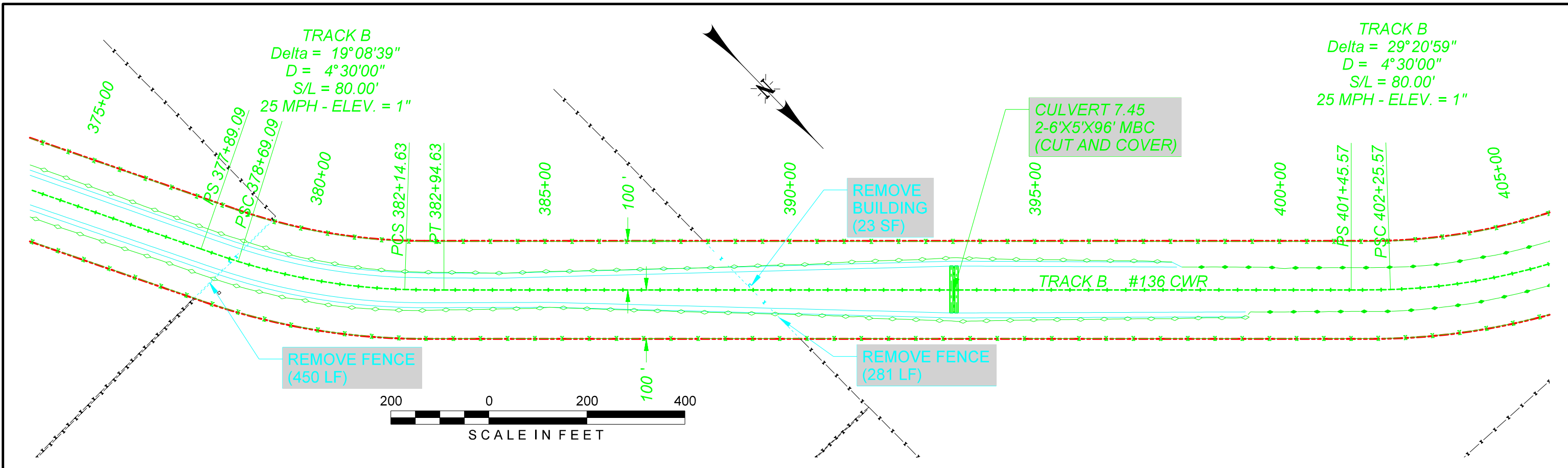
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK B PLAN & PROFILE

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			CHECKED BY: MAM		

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DATE: 3 MARCH 2017
SHEET NUMBER: P014 of P024

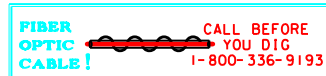
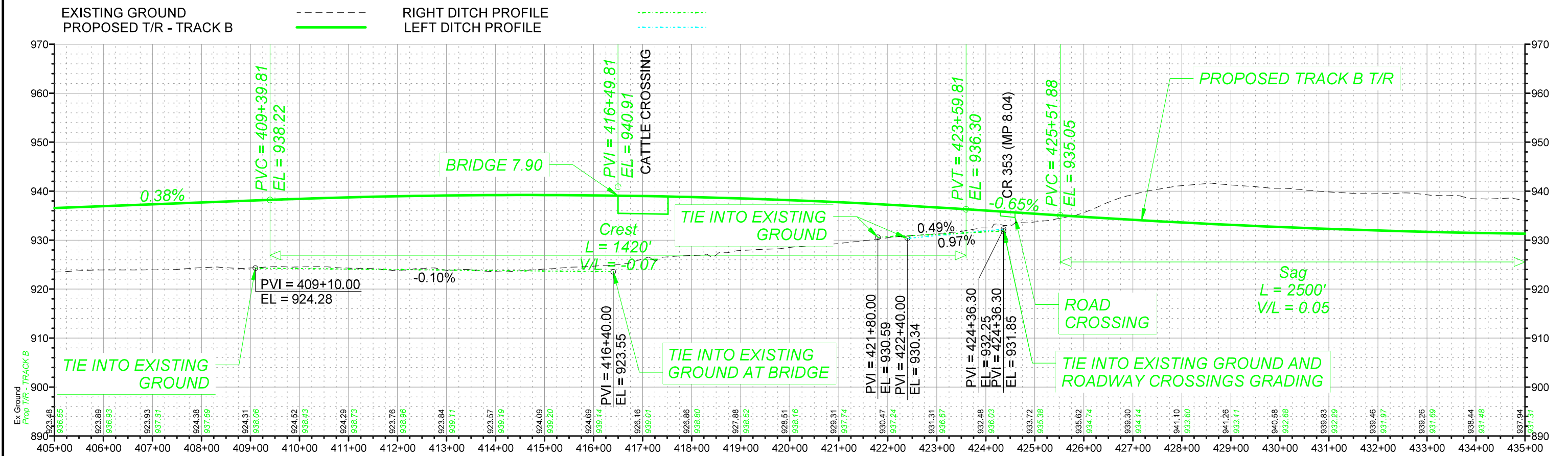
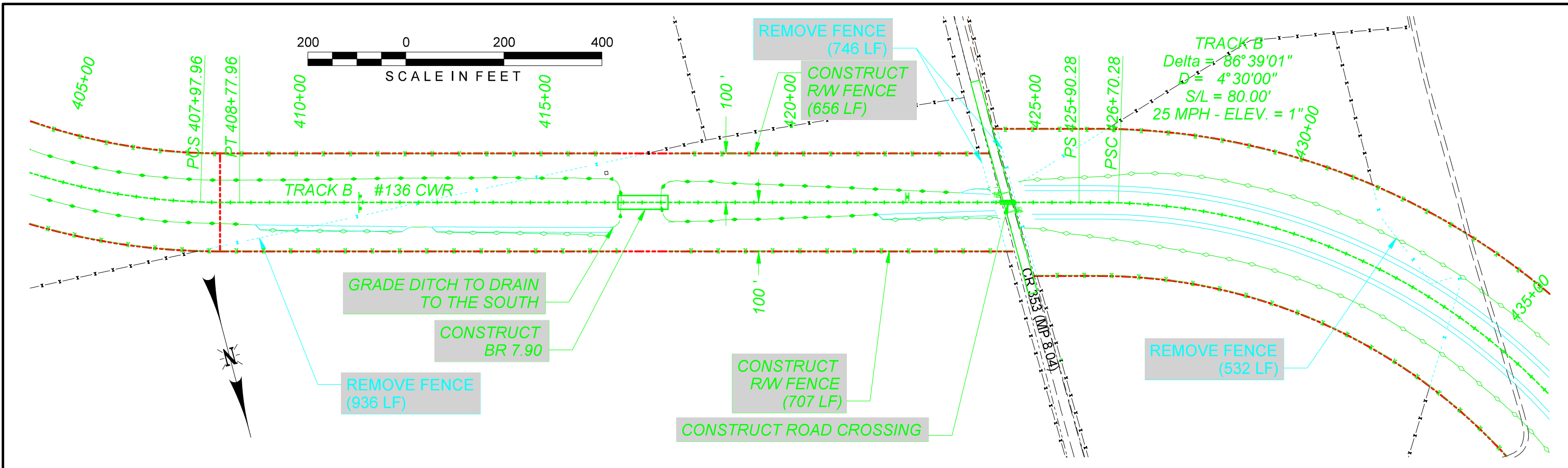
LEGEND:	
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Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	— F/O —
Railroad Right Of Way	— X — X — X — X — X
Fence	— X — X — X — X — X

For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK B PLAN & PROFILE

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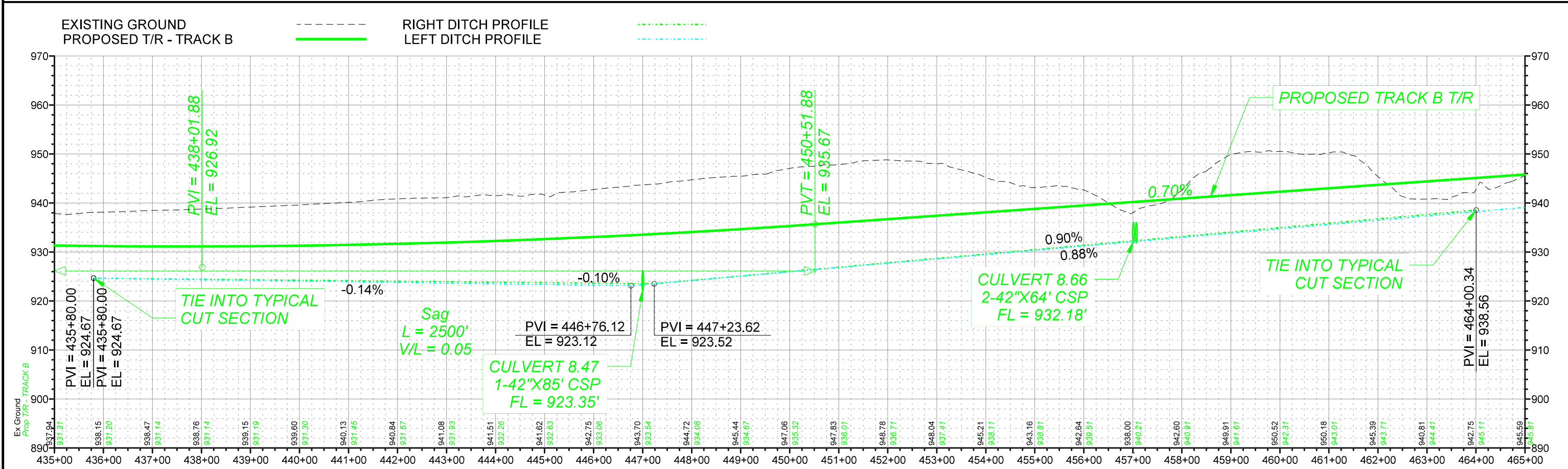
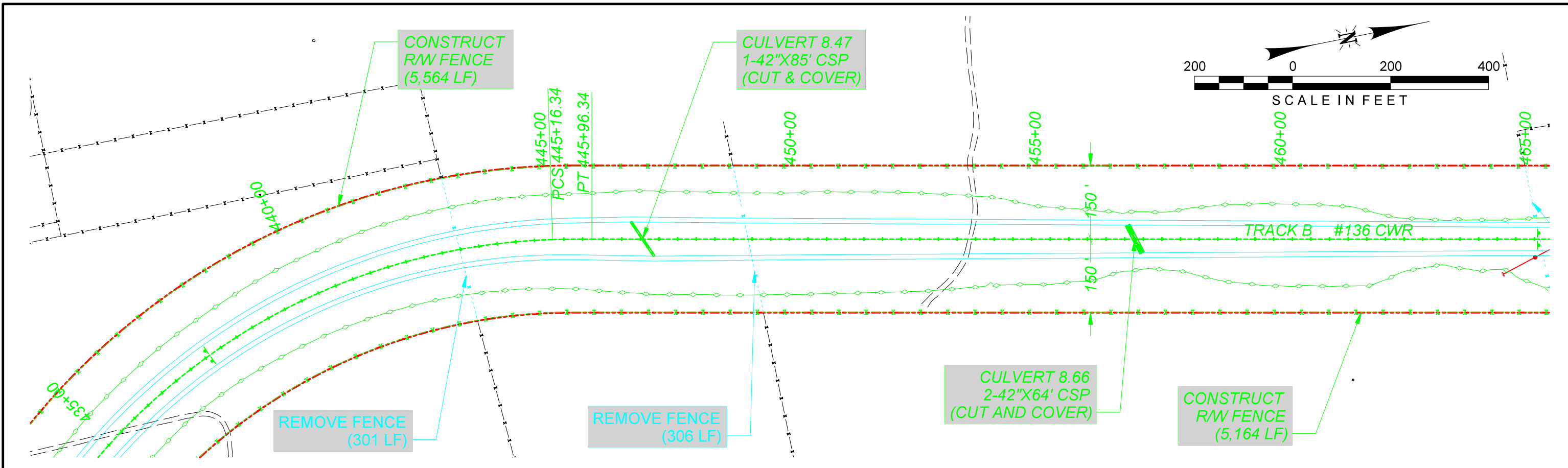


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DATE: 3 MARCH 2017
SHEET NUMBER: P015 of P024

LEGEND:
Existing Railroad Owned Trackage
Proposed Railroad Owned Trackage
Existing Industry Owned Trackage
Proposed Industry Owned Trackage
Future Industry Owned Trackage
Fiber Optic Cable
Railroad Right Of Way
Fence

UNION PACIFIC RAILROAD
And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK B PLAN & PROFILE

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CHECKED BY: MAM
DATE: 3 MARCH 2017
SHEET NUMBER: P016 of P024

LEGEND:

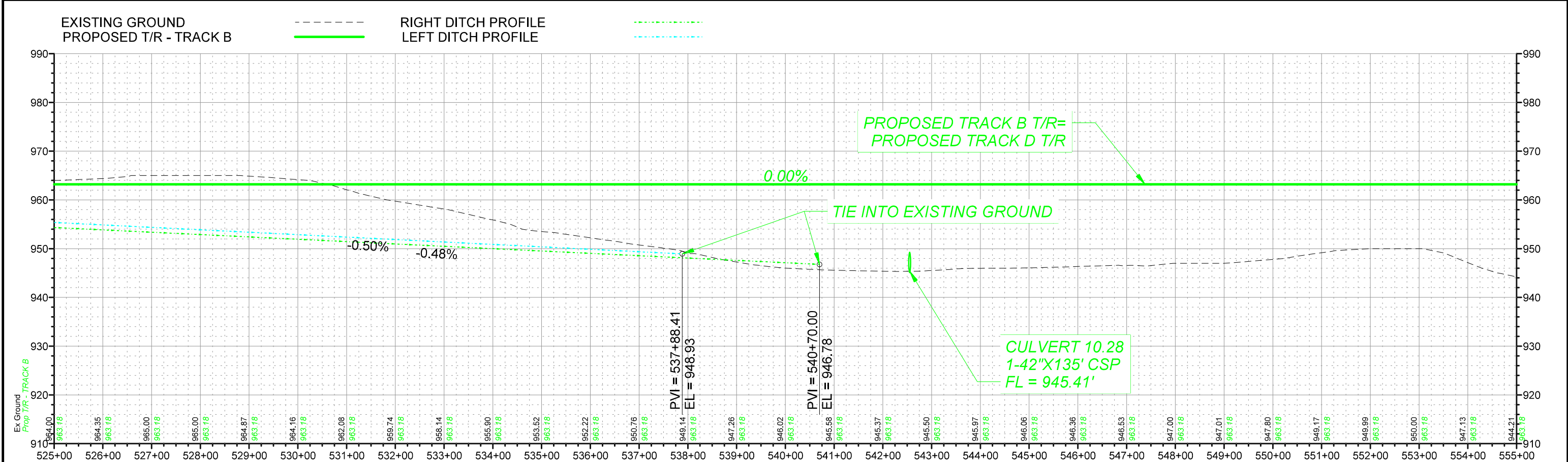
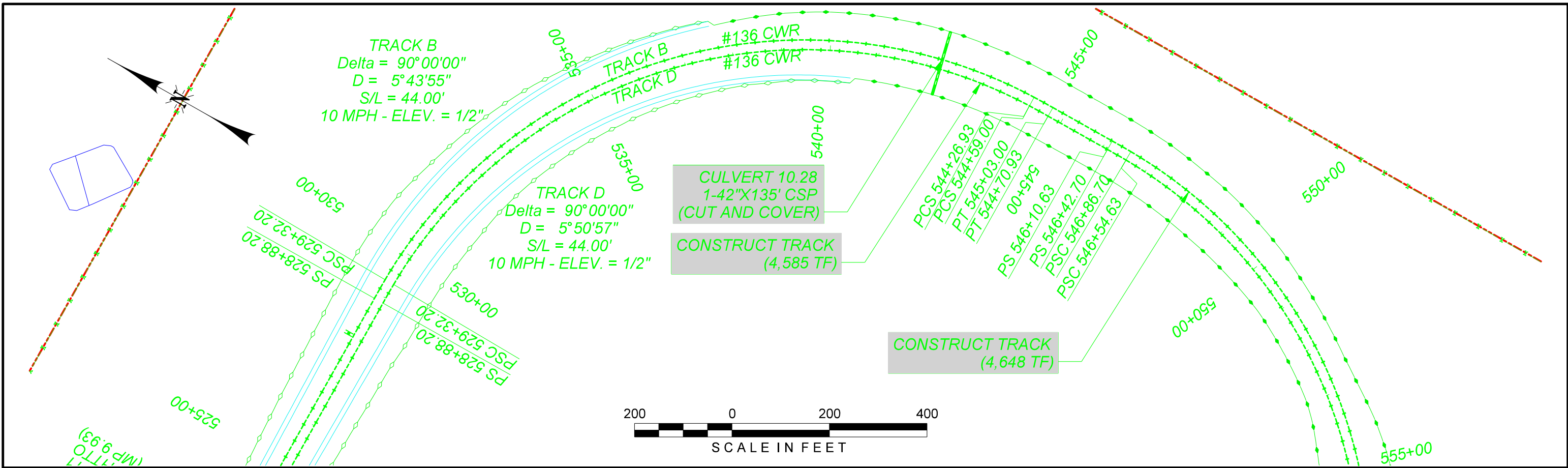
- Existing Railroad Owned Trackage
- Proposed Railroad Owned Trackage
- Existing Industry Owned Trackage
- Proposed Industry Owned Trackage
- Future Industry Owned Trackage
- Fiber Optic Cable
- Railroad Right Of Way
- Fence

For Use in Agreement with: UNION PACIFIC RAILROAD And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION: MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX

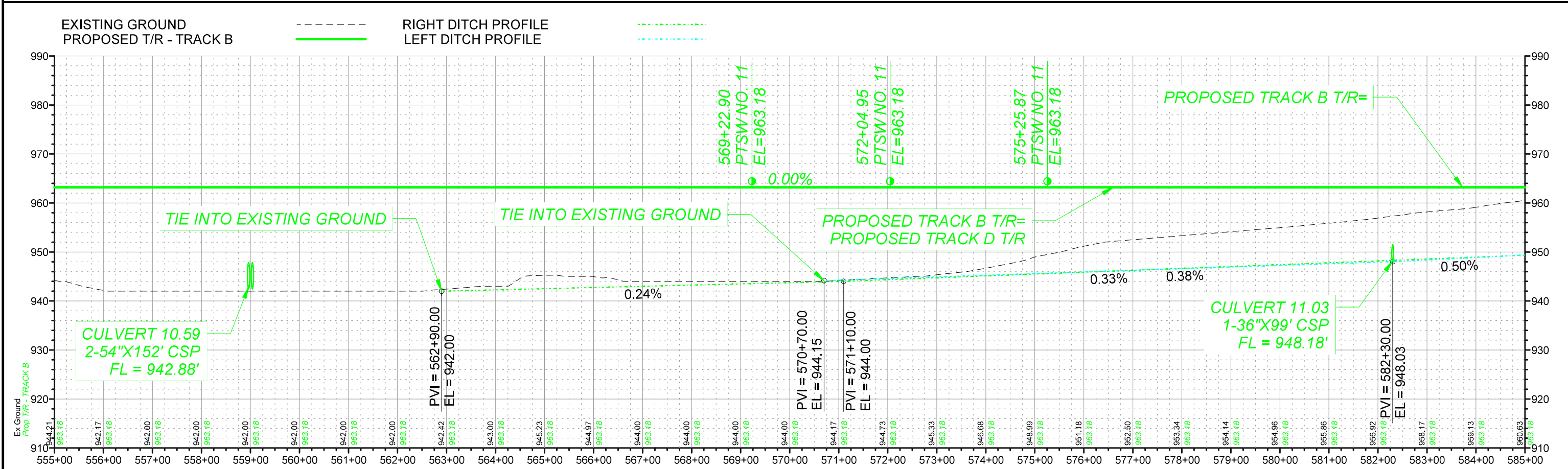
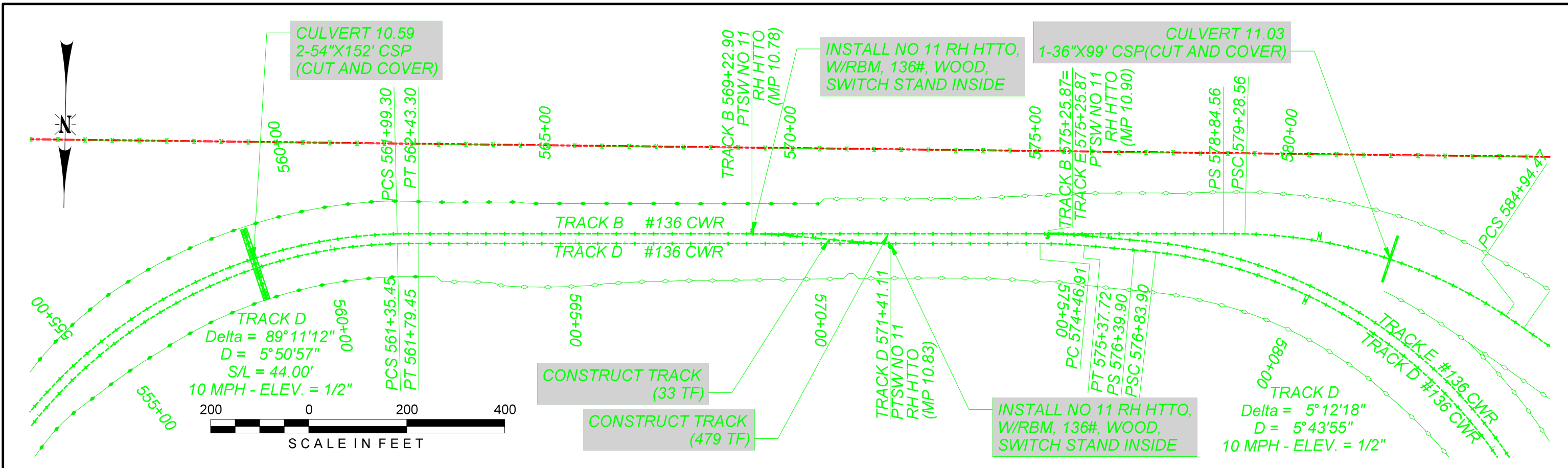
FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR TRACK B PLAN & PROFILE

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 HDR Engineering, Inc. Firm No. 754	 CALL BEFORE YOU DIG 1-800-336-9193		DRAWN BY: LBB	LEGEND: Existing Railroad Owned Trackage Proposed Railroad Owned Trackage Existing Industry Owned Trackage Proposed Industry Owned Trackage Future Industry Owned Trackage Fiber Optic Cable Railroad Right Of Way Fence	UNION PACIFIC RAILROAD And SOUTHWEST GULF RAILROAD LOCATION & DESCRIPTION: MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR TRACK B PLAN & PROFILE
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			DATE: 3 MARCH 2017		
			SHEET NUMBER P019 of P024		

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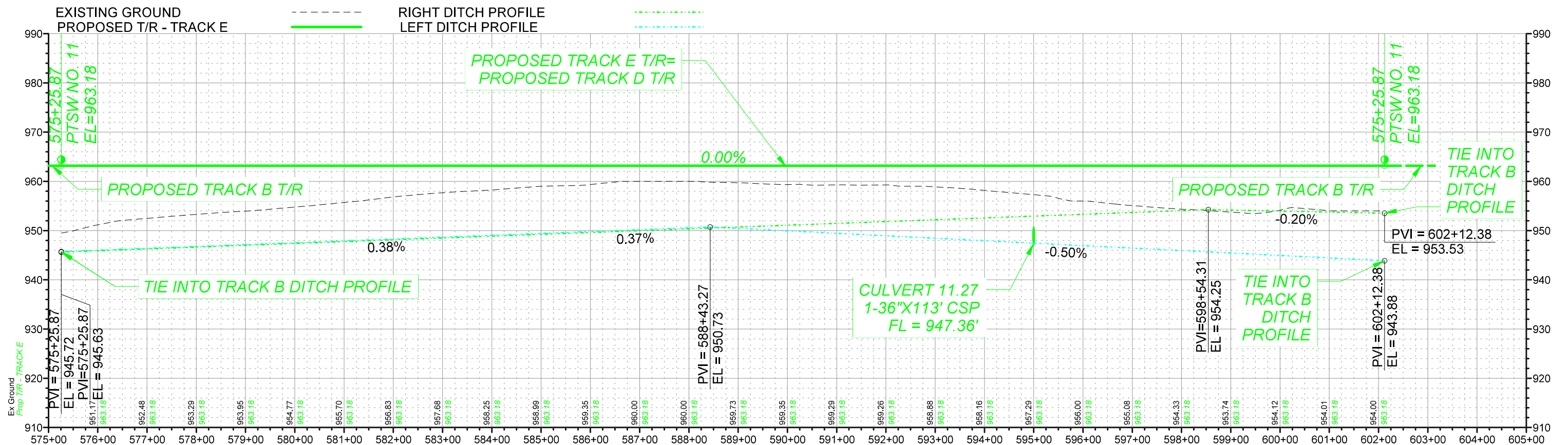
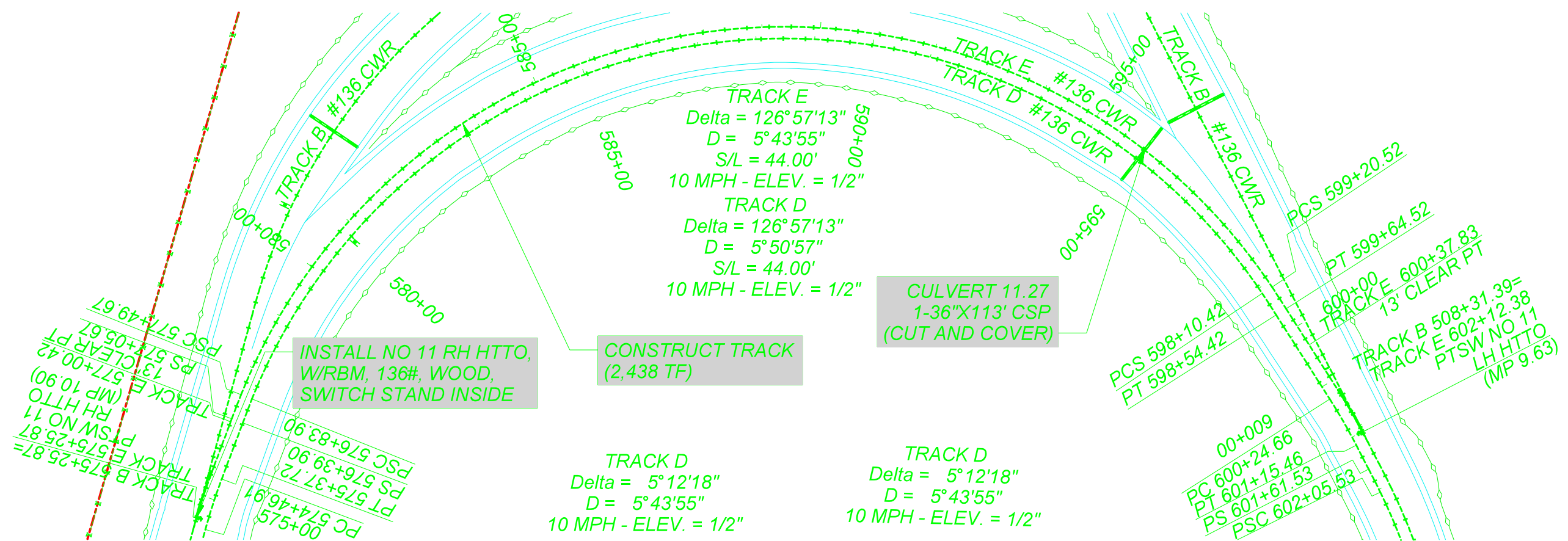
FIBER OPTIC CABLE!
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1-800-336-9193



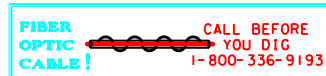
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DATE: 3 MARCH 2017
SHEET NUMBER: P020 of P024

LEGEND:
Existing Railroad Owned Trackage
Proposed Railroad Owned Trackage
Existing Industry Owned Trackage
Proposed Industry Owned Trackage
Future Industry Owned Trackage
Fiber Optic Cable
Railroad Right Of Way
Fence

UNION PACIFIC RAILROAD
And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK B PLAN & PROFILE



HDR Engineering, Inc.
Firm No. 754



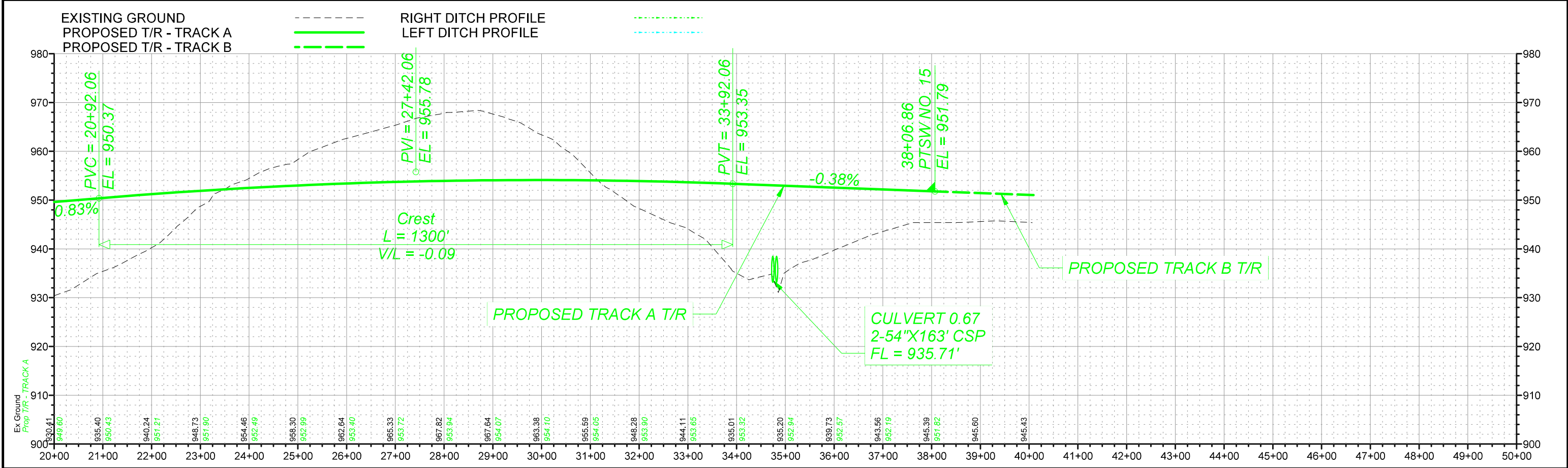
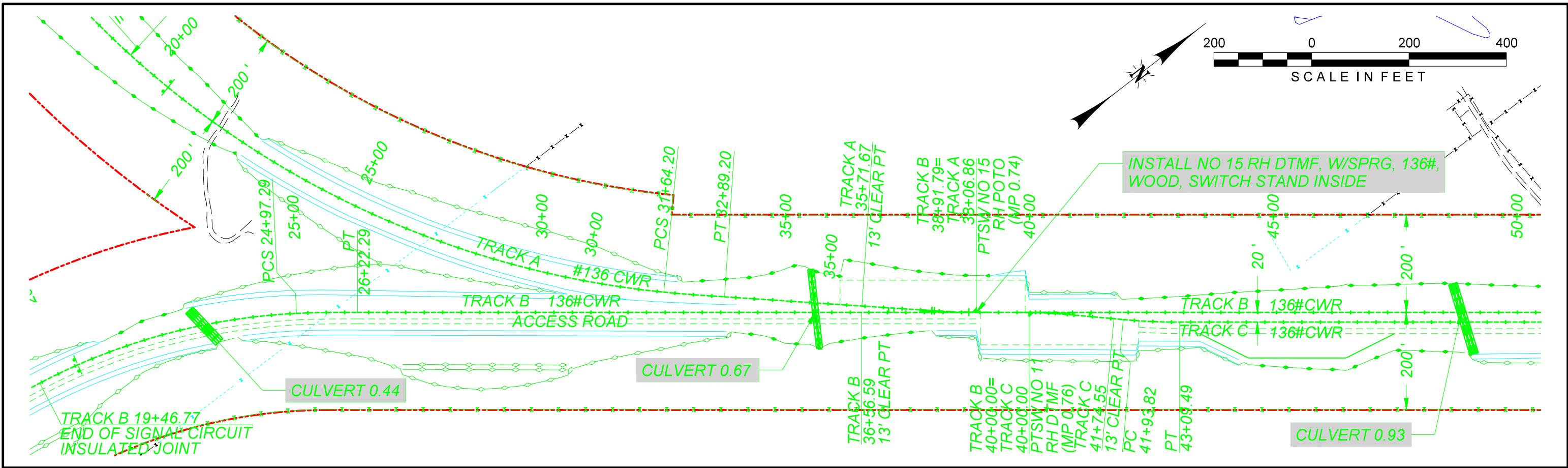
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SHEET NUMBER	P022 of P024

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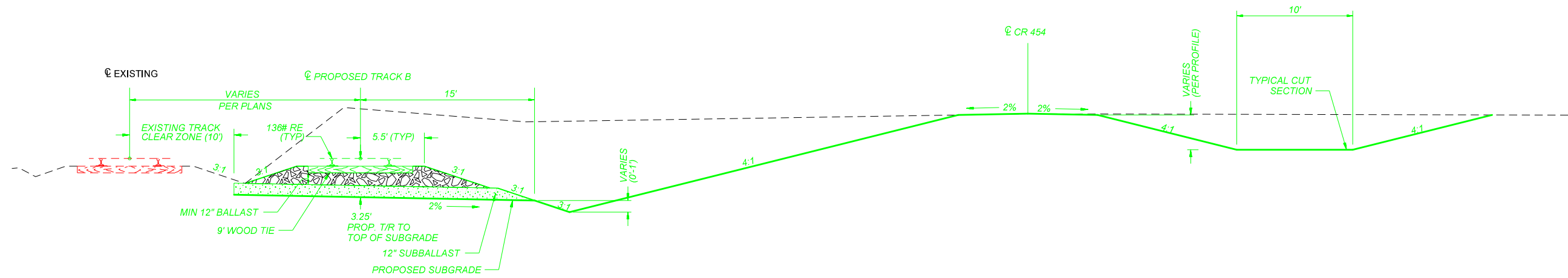
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- Proposed Railroad Owned Trackage
- Existing Industry Owned Trackage 
- Proposed Industry Owned Trackage 
- Future Industry Owned Trackage
- Fiber Optic Cable  F/O
- Railroad Right Of Way 
- Fence X

UNION PACIFIC RAILROAD For Use in Agreement with: And SOUTHWEST GULF RAILROAD	
LOCATION & DESCRIPTION: MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX	
FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR TRACK PLAN & PROFILE	

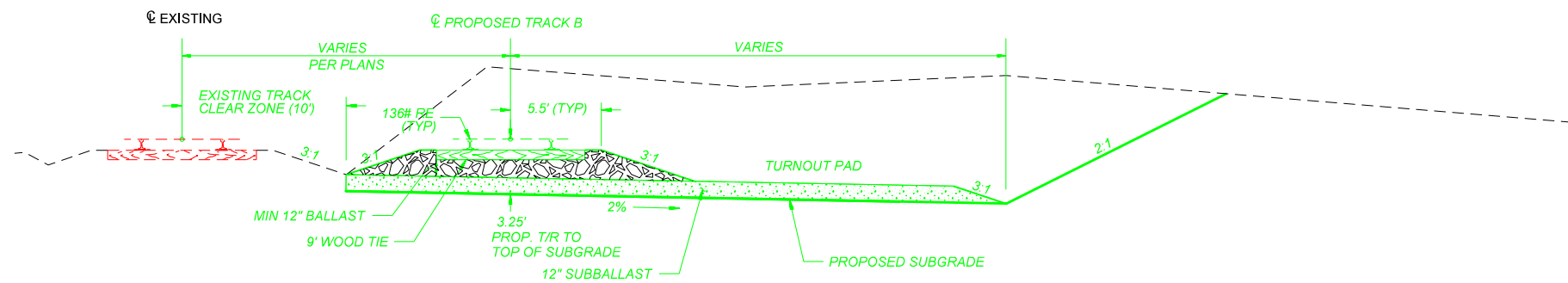
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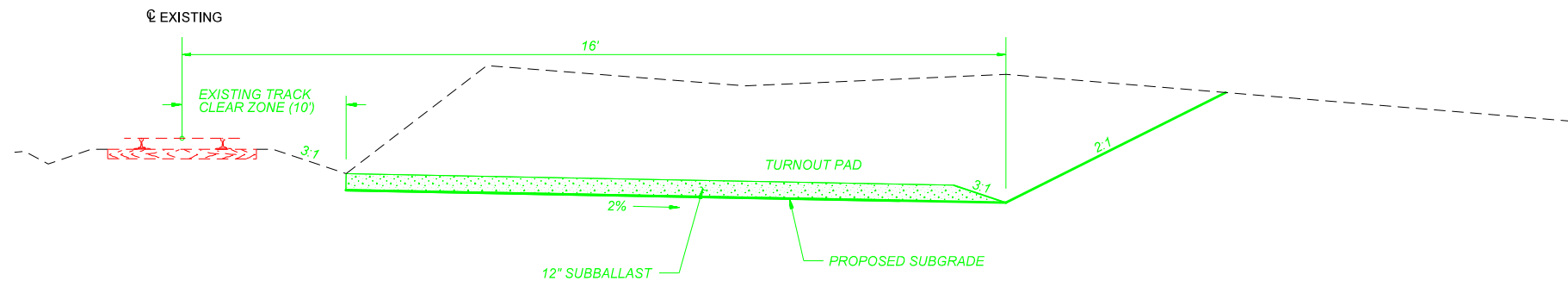
 HDR Engineering, Inc. Firm No. 754	 CALL BEFORE YOU DIG 1-800-336-9193		DRAWN BY: LBB	LEGEND: Existing Railroad Owned Trackage Proposed Railroad Owned Trackage Existing Industry Owned Trackage Proposed Industry Owned Trackage Future Industry Owned Trackage Fiber Optic Cable Railroad Right Of Way Fence	UNION PACIFIC RAILROAD And SOUTHWEST GULF RAILROAD LOCATION & DESCRIPTION: MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR TRACK A PLAN & PROFILE
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PROPOSED SINGLE TRACK B - DIVERGING TYPICAL SECTION
(STA 2+83.65 TO STA 4+49.67)



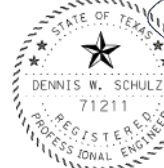
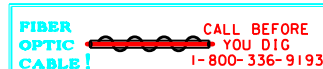
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(STA 0+00.00 TO STA 2+83.65)



EXISTING TRACK B - DIVERGING TYPICAL SECTION WITH TURNOUT PAD
(STA -1+00.00 TO STA 0+00.00)



HDR Engineering, Inc.
Firm No. 754



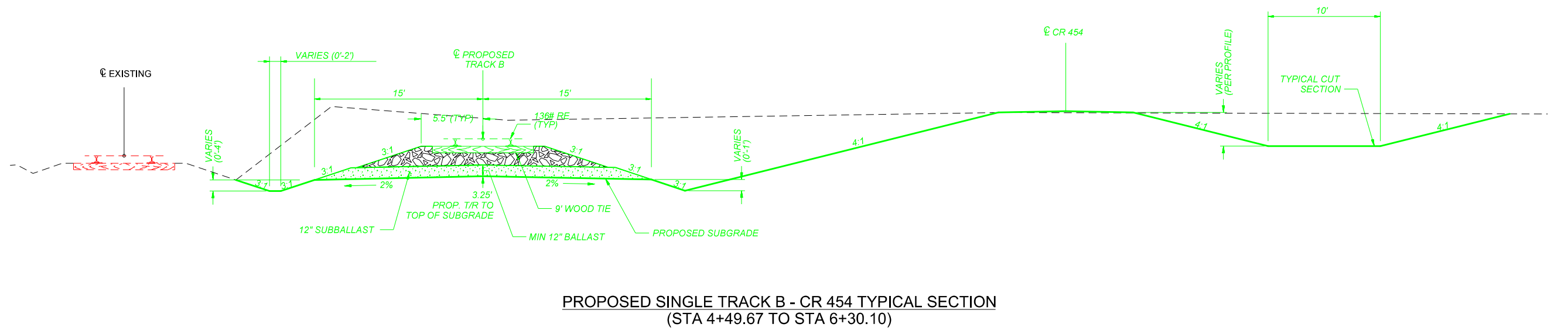
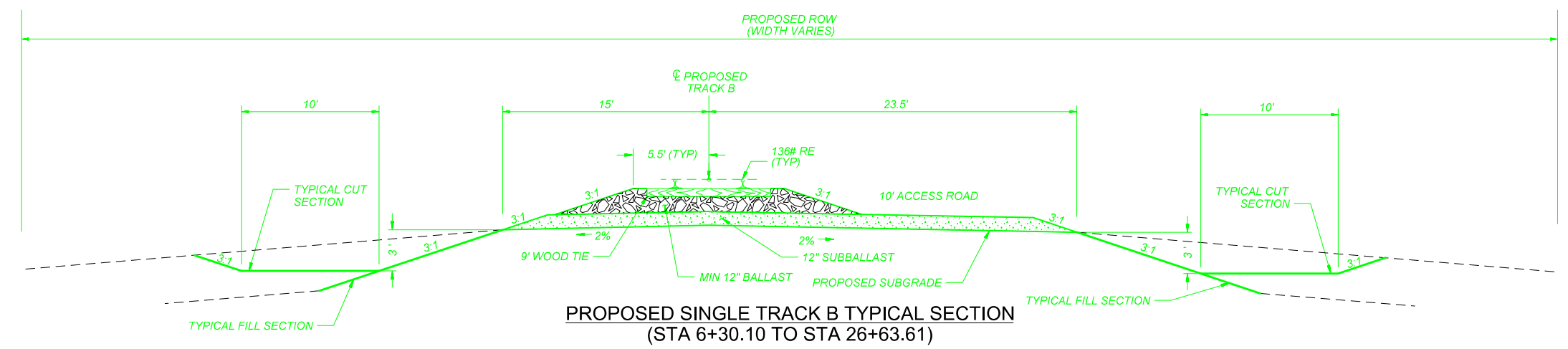
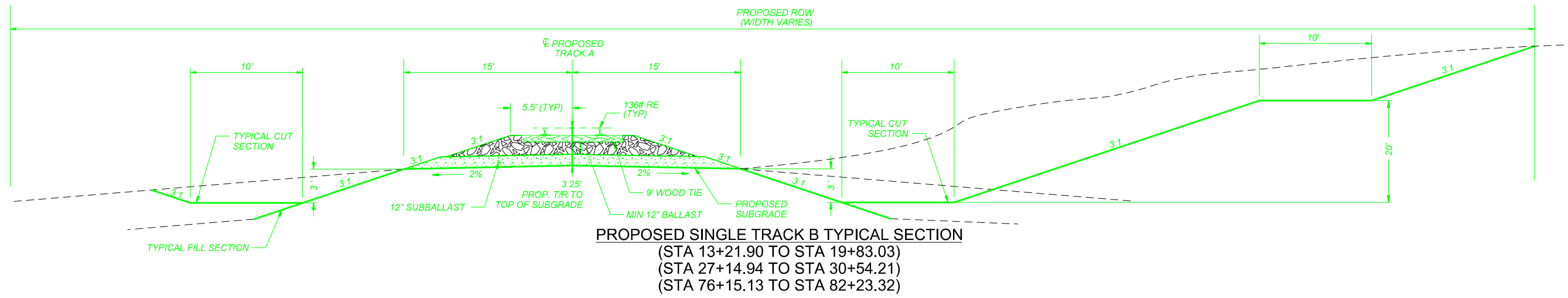
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DATE: 3 MARCH 2017
SHEET NUMBER: T001 of T009

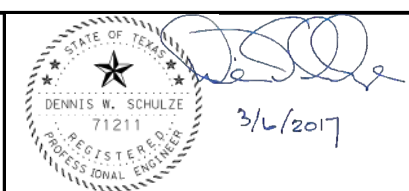
LEGEND:	
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Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	— F/O —
Railroad Right Of Way	— X — X — X — X — X
Fence	— X — X — X — X — X

UNION PACIFIC RAILROAD	
And SOUTHWEST GULF RAILROAD	
LOCATION & DESCRIPTION:	
MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX	
FES #31985	
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR TRACK TYPICAL SECTIONS	

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DATE: 3 MARCH 2017
SHEET NUMBER: T002 of T009

LEGEND:	
Existing Railroad Owned Trackage	
Proposed Railroad Owned Trackage	
Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
Future Industry Owned Trackage	
Fiber Optic Cable	
Railroad Right Of Way	
Fence	

UNION PACIFIC RAILROAD
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK TYPICAL SECTIONS

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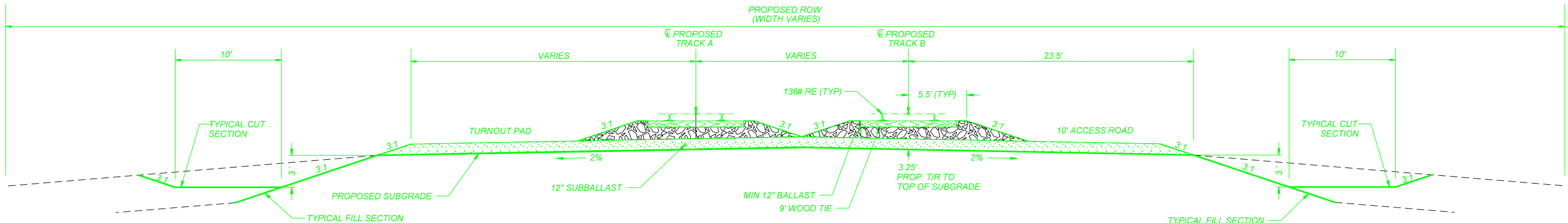
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1-800-336-9193



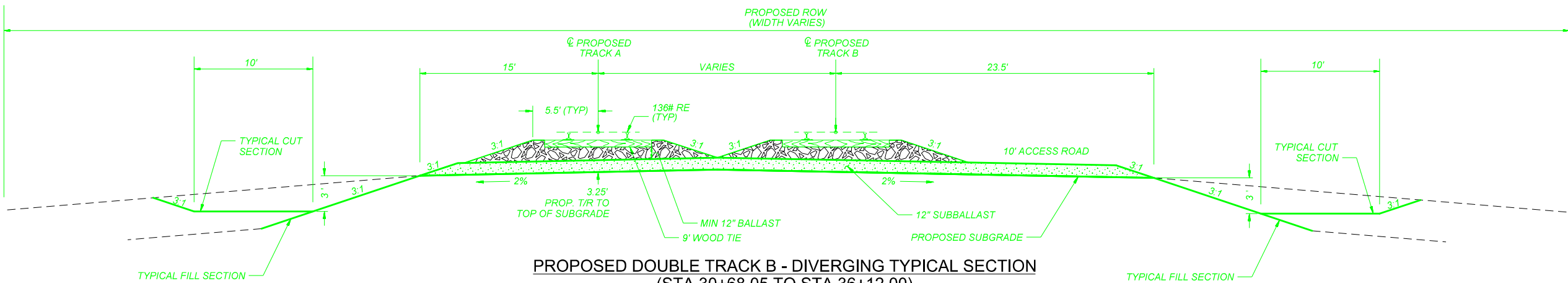
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CHECKED BY: LBB
DATE: 3 MARCH 2017
SHEET NUMBER: T003 of T009

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Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
Future Industry Owned Trackage	
Fiber Optic Cable	
Railroad Right Of Way	
Fence	

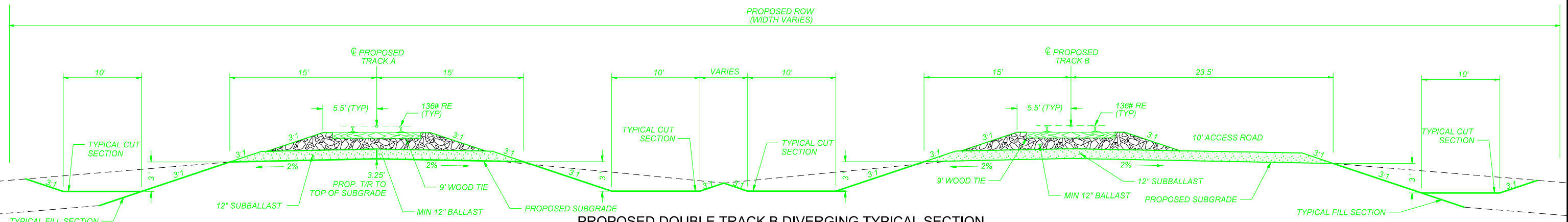
For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK TYPICAL SECTIONS



PROPOSED DOUBLE TRACK B TYPICAL SECTION WITH TURNOUT PAD
(STA 36+12.00 TO STA 38+91.79)

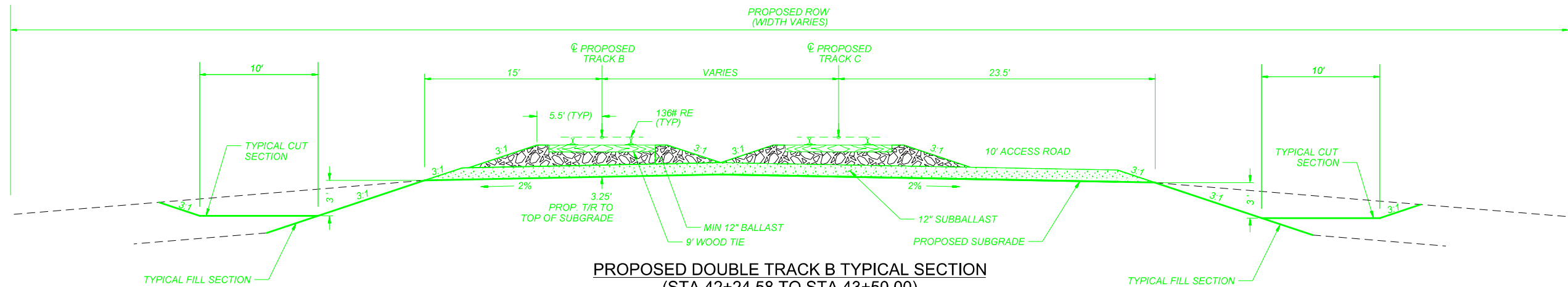


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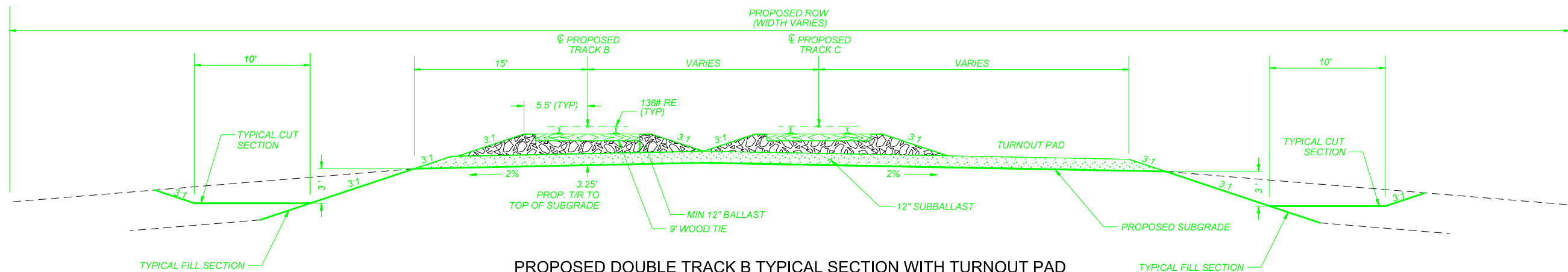


PROPOSED DOUBLE TRACK B DIVERGING TYPICAL SECTION
(STA 26+63.61 TO STA 30+68.05)

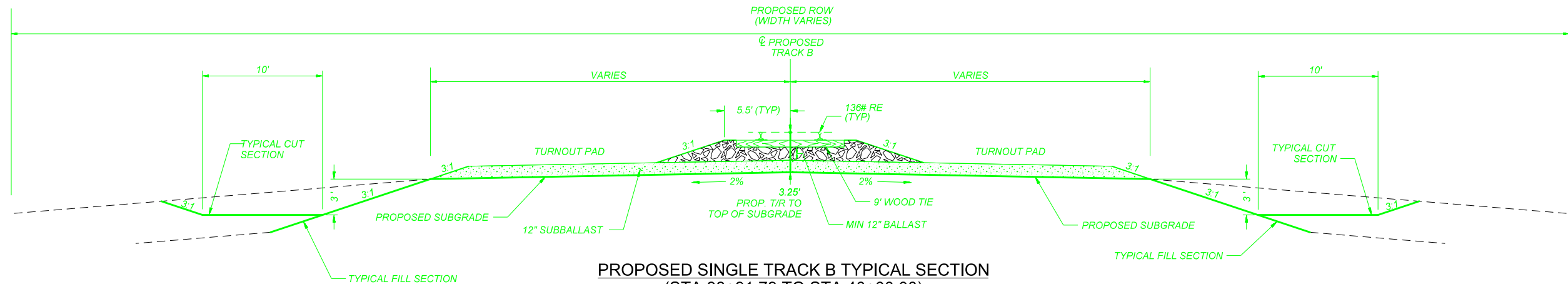
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PROPOSED DOUBLE TRACK B TYPICAL SECTION
(STA 42+24.58 TO STA 43+50.00)
(STA 47+50.00 TO STA 121+50.00)
(STA 125+50.00 TO STA 127+25.42)



PROPOSED DOUBLE TRACK B TYPICAL SECTION WITH TURNOUT PAD
(STA 40+00.00 TO STA 42+24.58)
(STA 127+25.42 TO STA 129+50.00)



PROPOSED SINGLE TRACK B TYPICAL SECTION
(STA 38+91.79 TO STA 40+00.00)



FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193

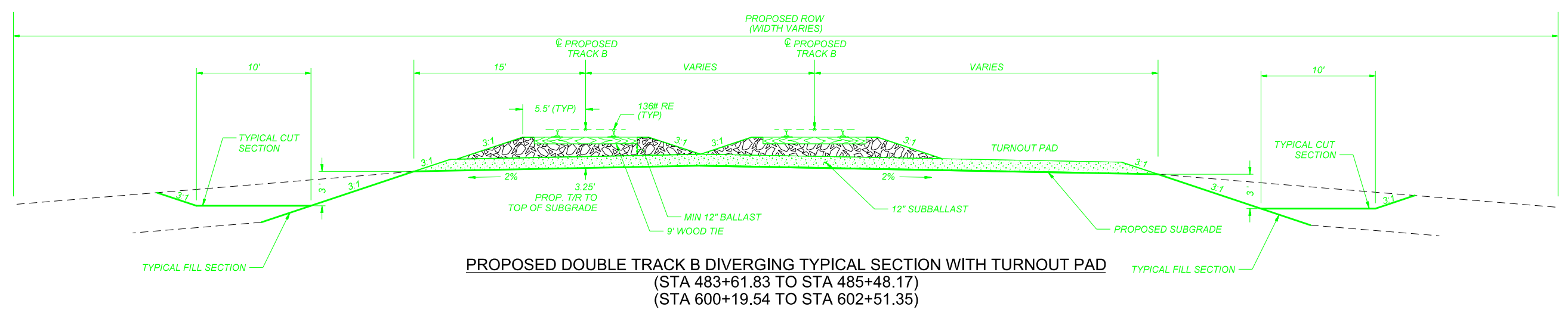
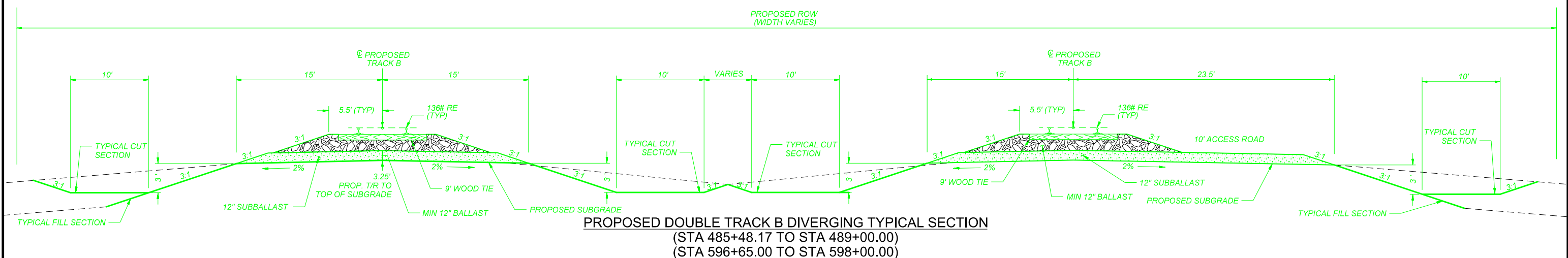
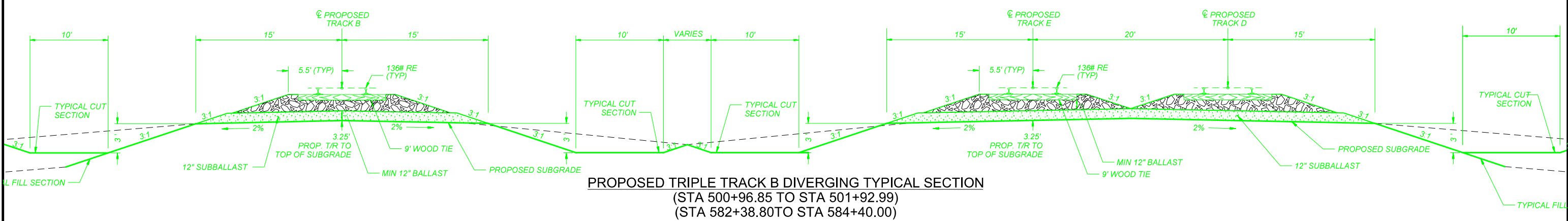


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DATE: 3 MARCH 2017
SHEET NUMBER T004 of T009

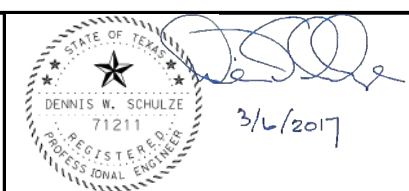
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Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	— F/O —
Railroad Right Of Way	— X — X — X — X — X
Fence	— X — X — X — X — X

UNION PACIFIC RAILROAD	
And SOUTHWEST GULF RAILROAD	
LOCATION & DESCRIPTION:	
MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX	
FES #31985	
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR TRACK TYPICAL SECTIONS	

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DATE: 3 MARCH 2017
SHEET NUMBER: T006 of T009

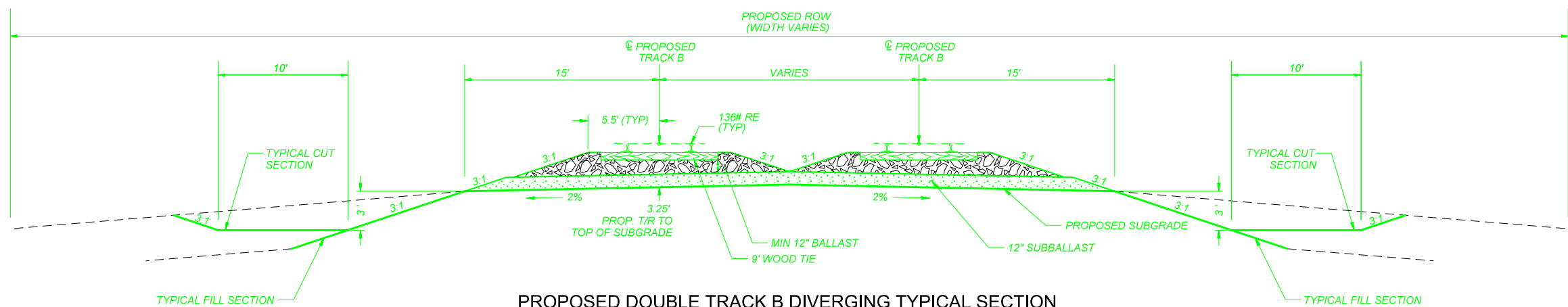
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Proposed Railroad Owned Trackage	
Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
Future Industry Owned Trackage	
Fiber Optic Cable	
Railroad Right Of Way	
Fence	

UNION PACIFIC RAILROAD
And SOUTHWEST GULF RAILROAD

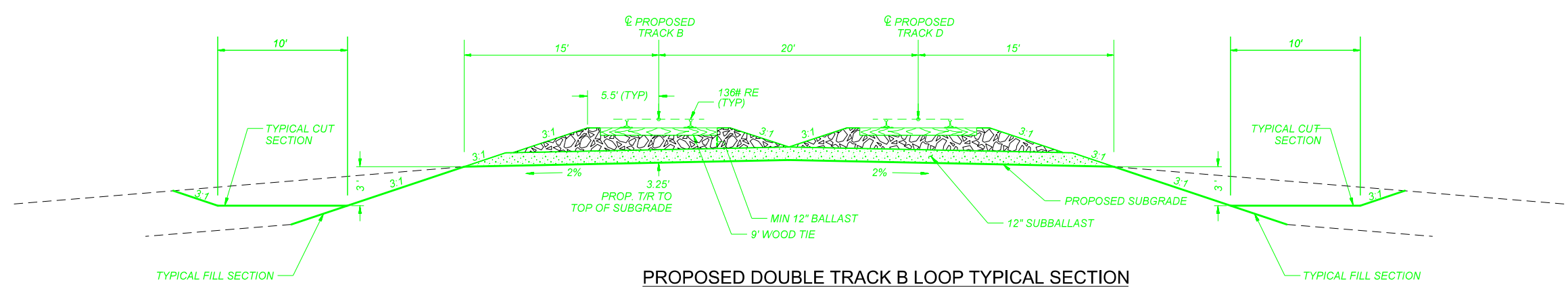
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MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK TYPICAL SECTIONS

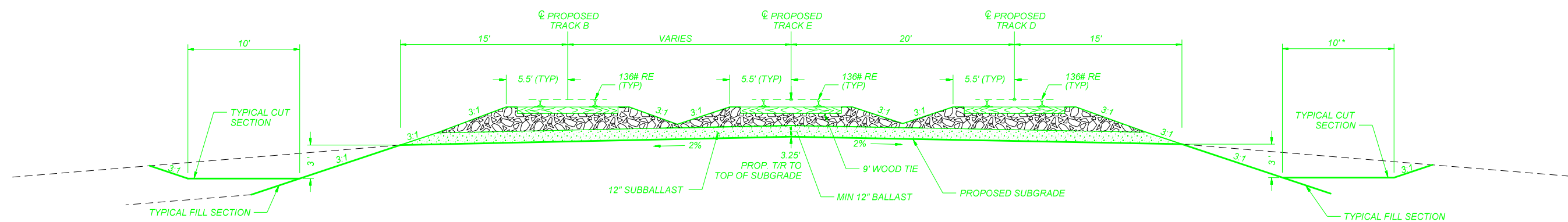
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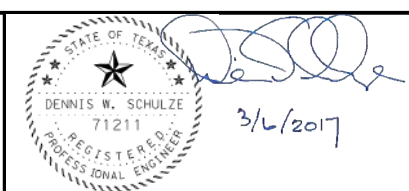
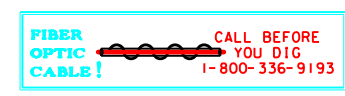
PROPOSED DOUBLE TRACK B DIVERGING TYPICAL SECTION
(STA 598+00.00 TO STA 600+19.54)



PROPOSED DOUBLE TRACK B LOOP TYPICAL SECTION
(STA 508+31.39 TO STA 575+25.87)



PROPOSED TRIPLE TRACK B - DIVERGING TYPICAL SECTION
(STA 504+90.00 TO STA 508+31.69)
(STA 575+25.87 TO STA 578+28.38)



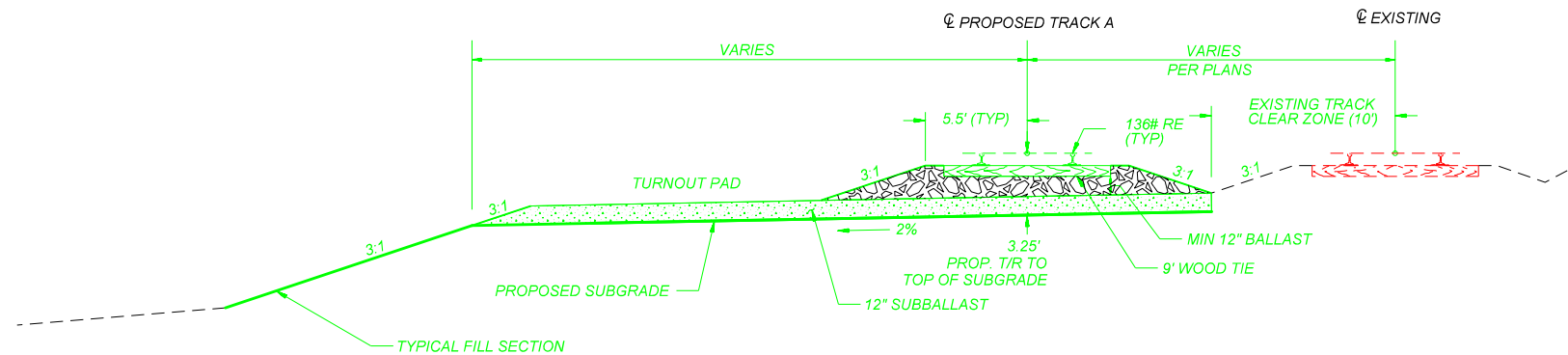
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CHECKED BY:	LBB
DATE:	3 MARCH 2017
SHEET NUMBER	T007 of T009

LEGEND:	
Existing Railroad Owned Trackage	
Proposed Railroad Owned Trackage	
Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
Future Industry Owned Trackage	
Fiber Optic Cable	
Railroad Right Of Way	
Fence	

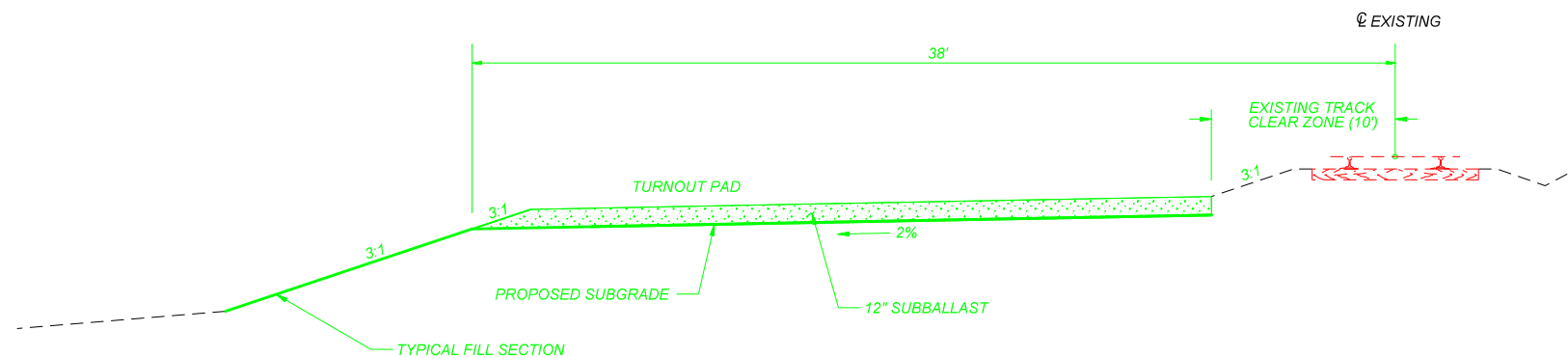
For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

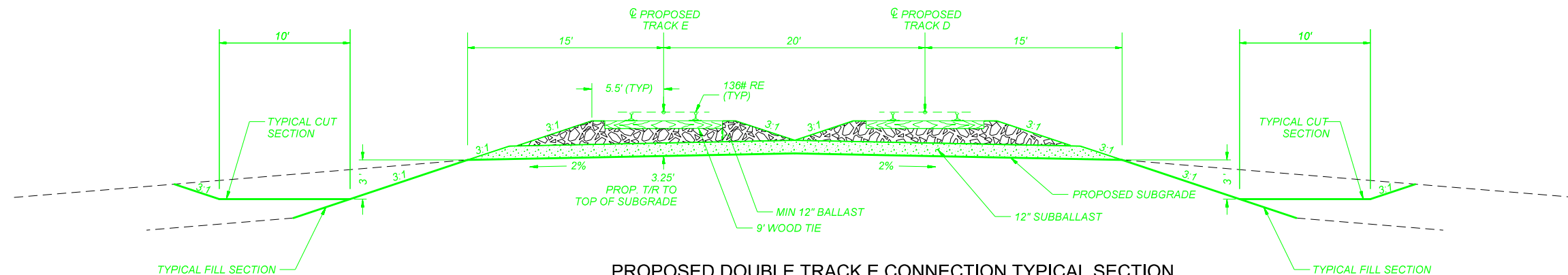
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK TYPICAL SECTIONS



PROPOSED SINGLE TRACK A - DIVERGING TYPICAL SECTION WITH TURNOUT PAD
(STA 0+00.00 TO STA 2+90.00)



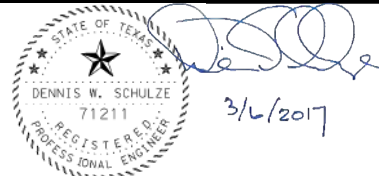
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(STA -1+00.00 TO STA 0+00.00)



PROPOSED DOUBLE TRACK E CONNECTION TYPICAL SECTION
(STA 575+25.87 TO STA 602+12.38)



HDR Engineering, Inc.
Firm No. 754

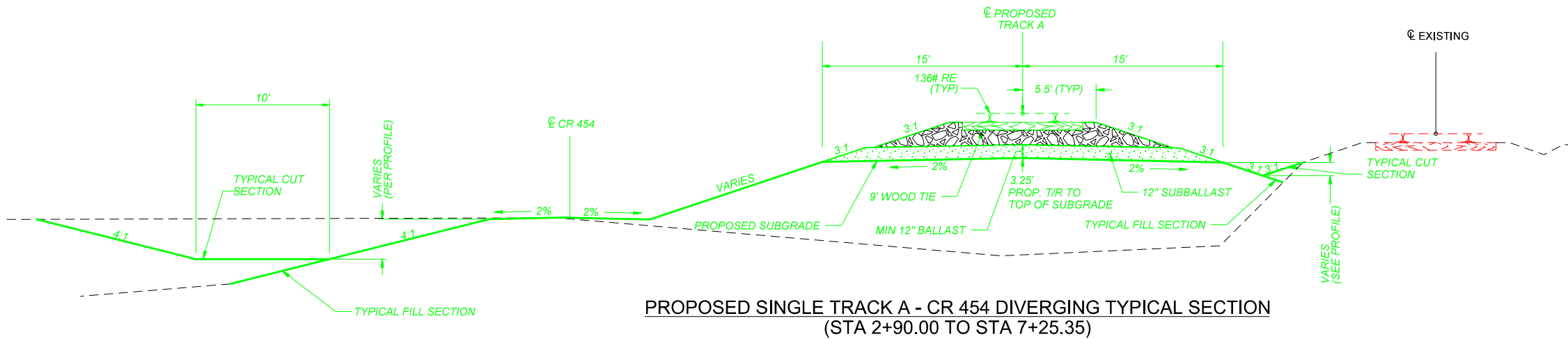
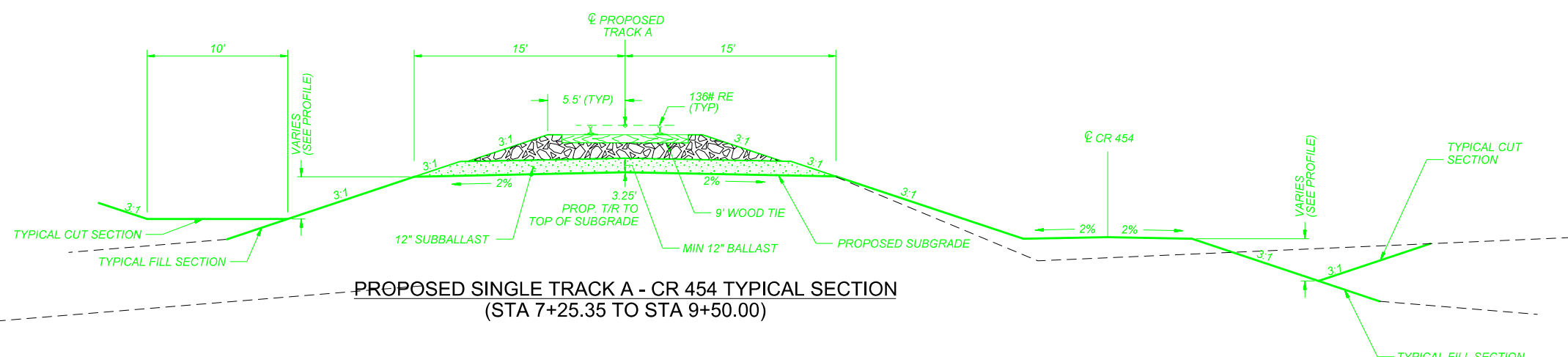
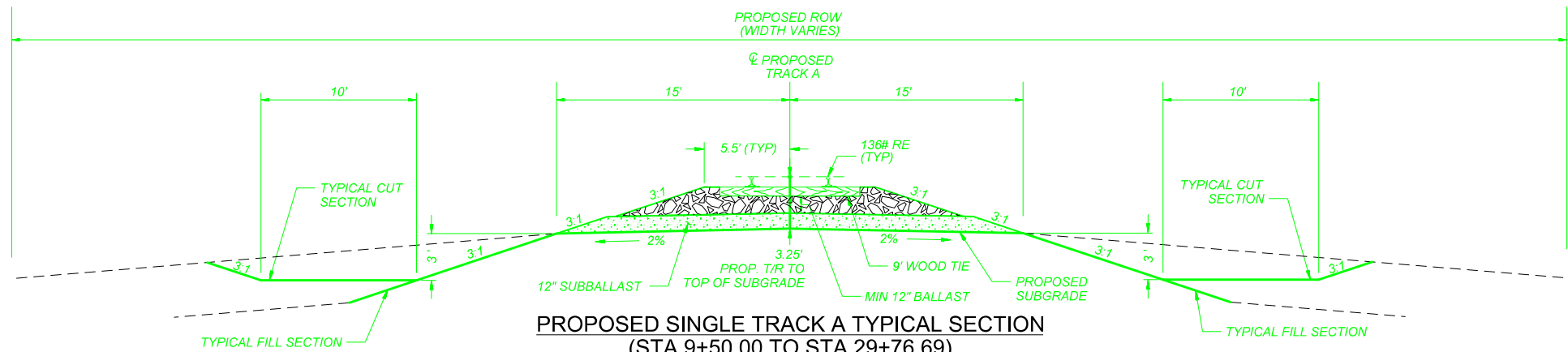


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CHECKED BY: LBB
DATE: 3 MARCH 2017
SHEET NUMBER: T008 of T009

LEGEND:	
Existing Railroad Owned Trackage	—
Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	— F/O —
Railroad Right Of Way	— X — X — X — X — X —
Fence	— X — X — X — X — X —

For Use in Agreement with: UNION PACIFIC RAILROAD And SOUTHWEST GULF RAILROAD	
LOCATION & DESCRIPTION: MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX	
FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR TRACK TYPICAL SECTIONS	

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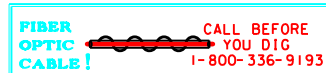
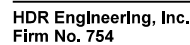
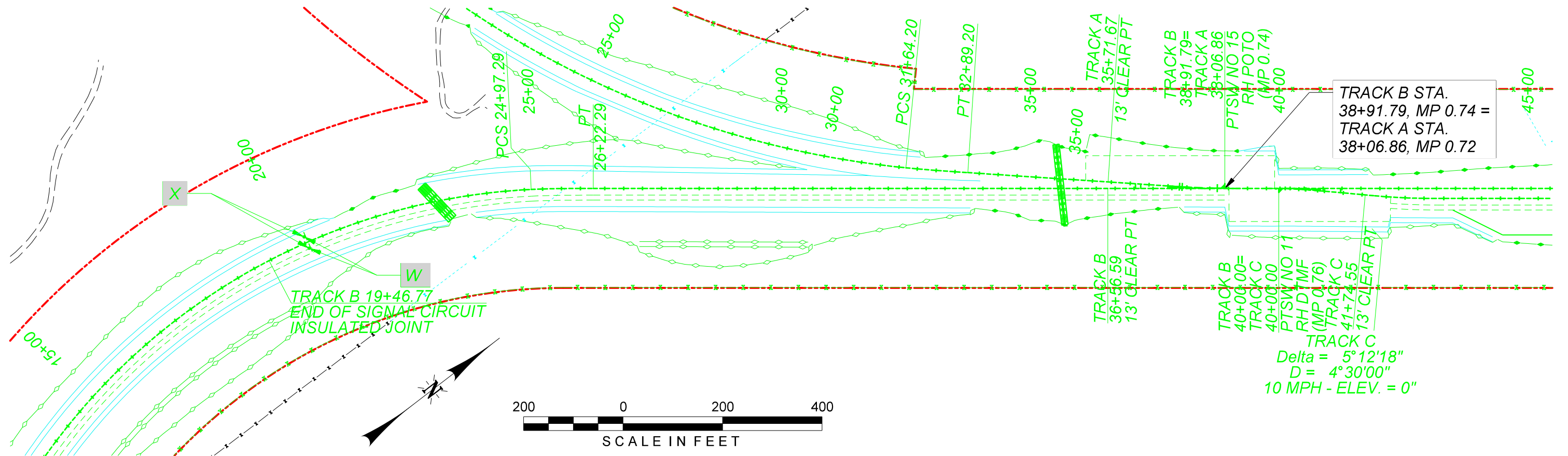
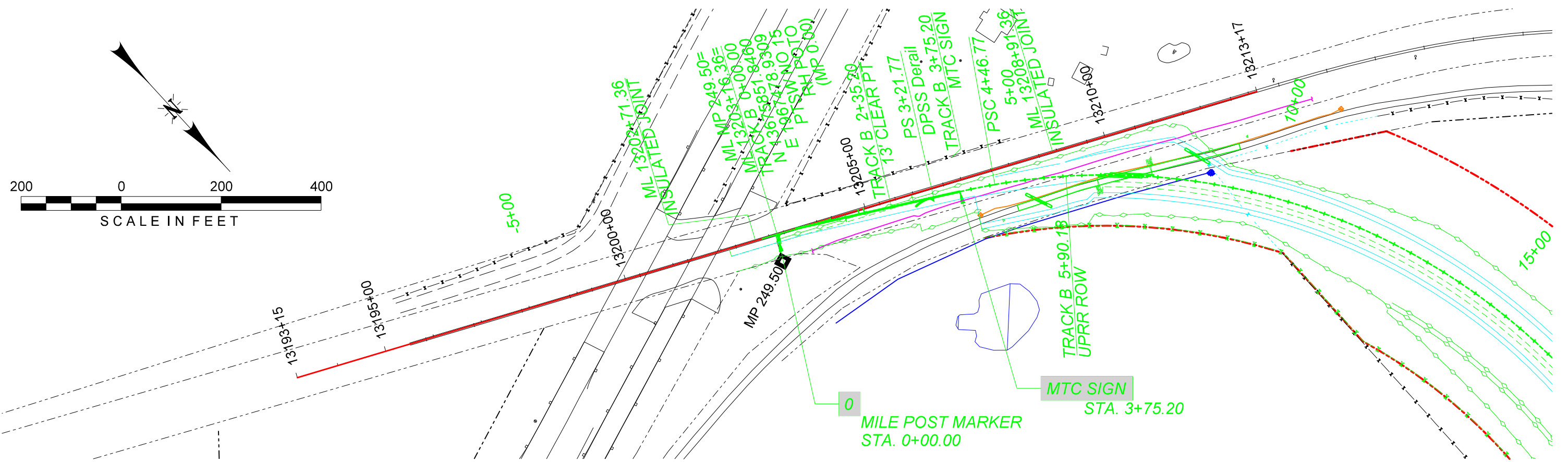
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CHECKED BY: LBB
DATE: 3 MARCH 2017
SHEET NUMBER: T009 of T009

LEGEND:	
Existing Railroad Owned Trackage	—
Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	F/O
Railroad Right Of Way	—
Fence	— X — X — X — X — X —

For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TRACK TYPICAL SECTIONS



3/6/2017

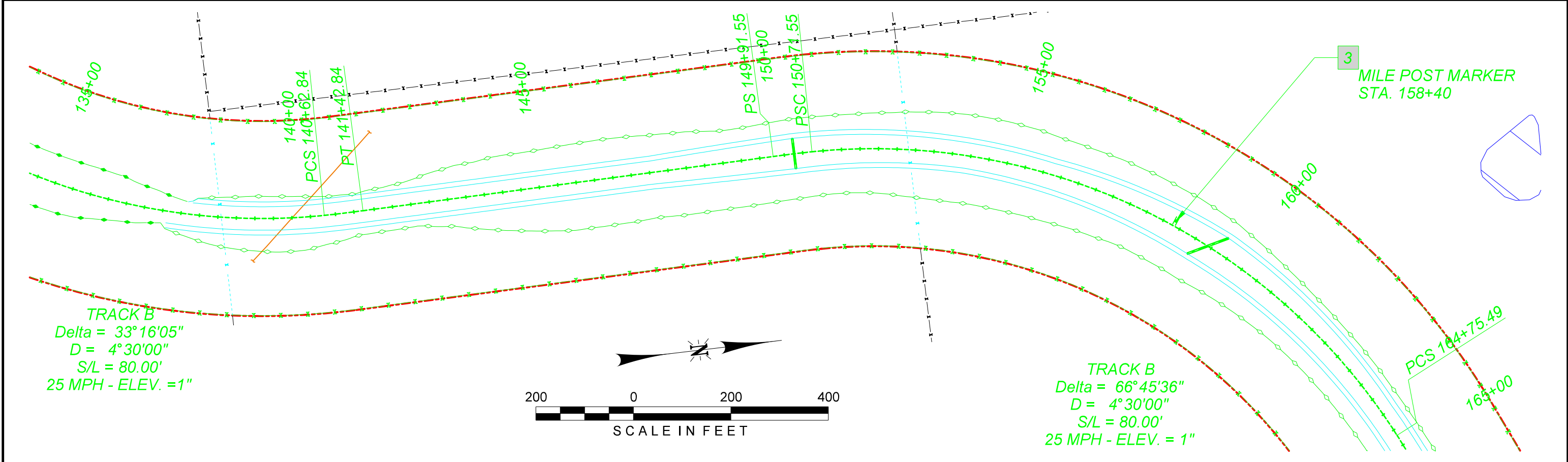
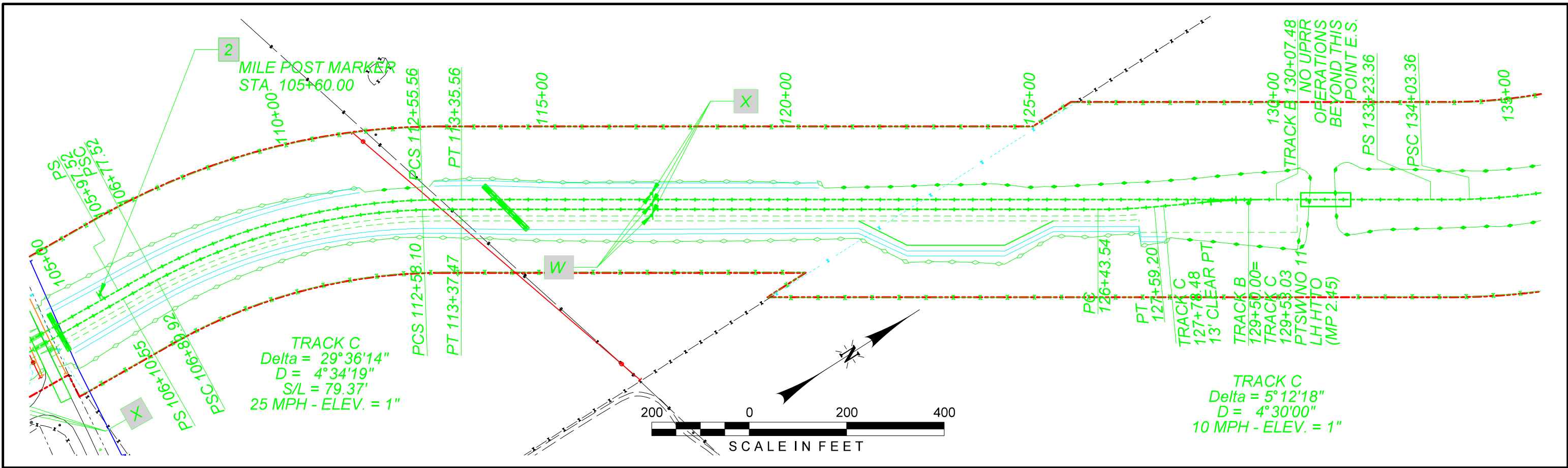
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DATE:	3 MARCH 2017
SHEET NUMBER	S001 of S012

LEGEND:

- Existing Railroad Owned Trackage
- Proposed Railroad Owned Trackage
- Existing Industry Owned Trackage
- Proposed Industry Owned Trackage
- Future Industry Owned Trackage
- Fiber Optic Cable
- F / O
- Railroad Right Of Way
- Fence

For Use in Agreement with: UNION PACIFIC RAILROAD And SOUTHWEST GULF RAILROAD	
LOCATION & DESCRIPTION: MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX	
FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR SIGN LAYOUT PLAN	

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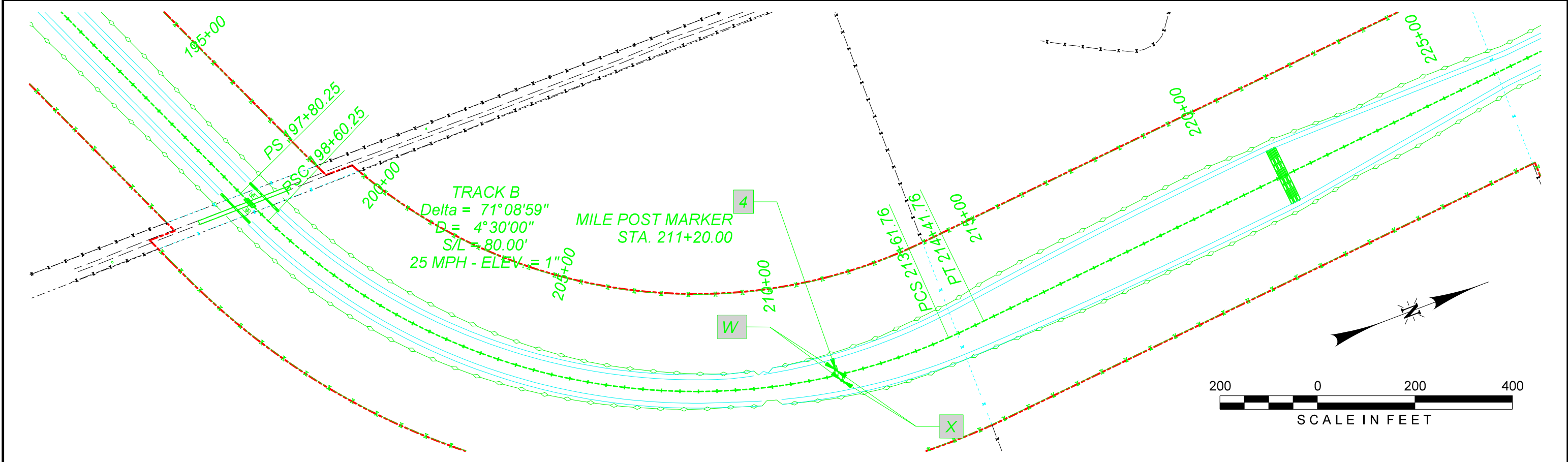
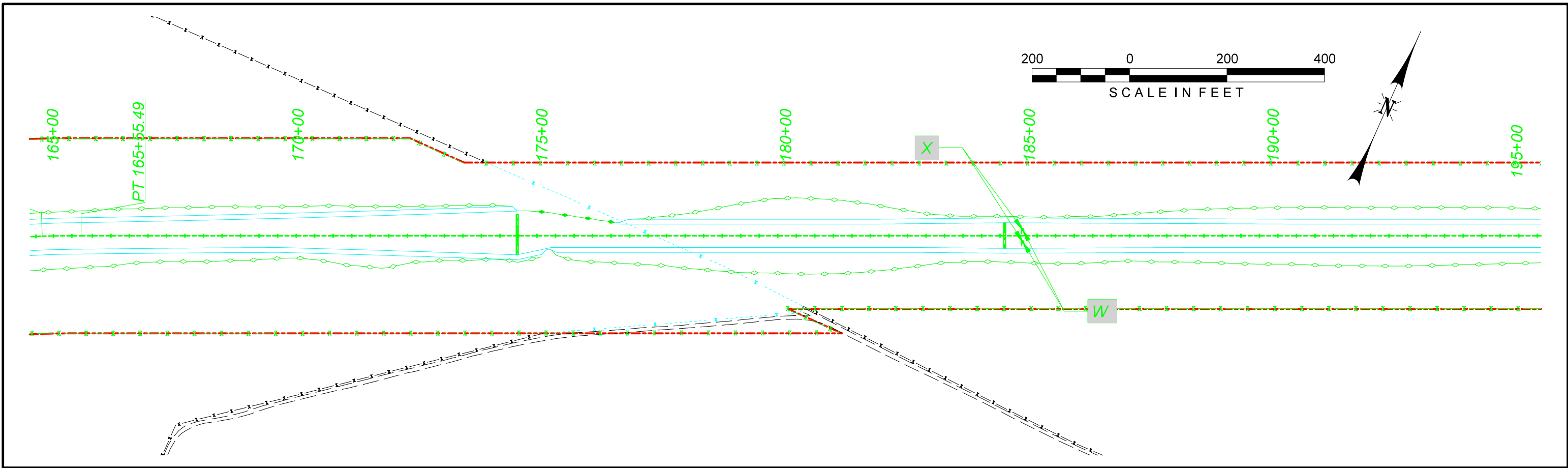


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CHECKED BY: MAM
DATE: 3 MARCH 2017
SHEET NUMBER: S003 of S012

LEGEND:	
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Proposed Railroad Owned Trackage	
Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
Future Industry Owned Trackage	
Fiber Optic Cable	
Railroad Right Of Way	
Fence	

For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
SIGN LAYOUT PLAN

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DATE: 3 MARCH 2017
SHEET NUMBER: S004 of S012

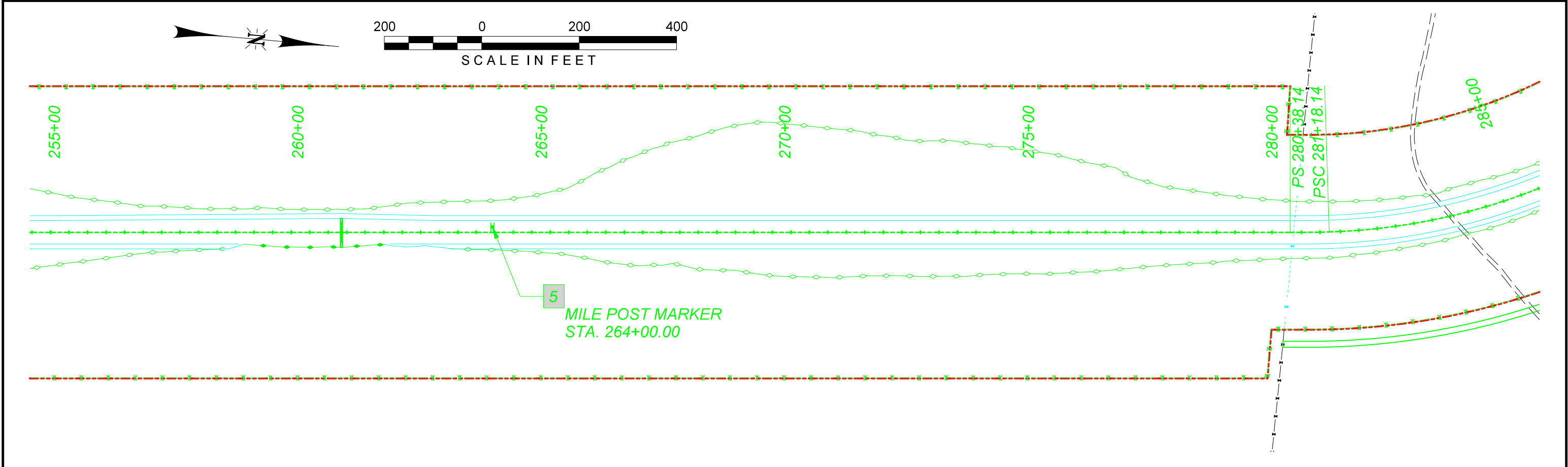
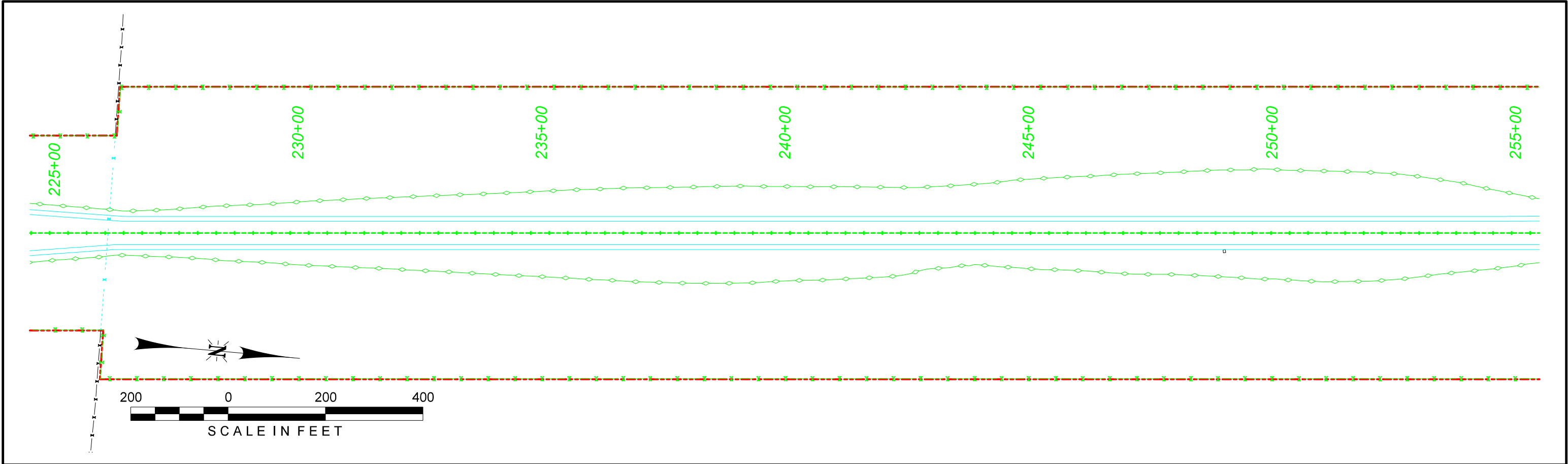
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Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	F/O
Railroad Right Of Way	— X — X — X — X — X
Fence	— X — X — X — X — X

For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
SIGN LAYOUT PLAN

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DATE: 3 MARCH 2017
SHEET NUMBER: S005 of S012

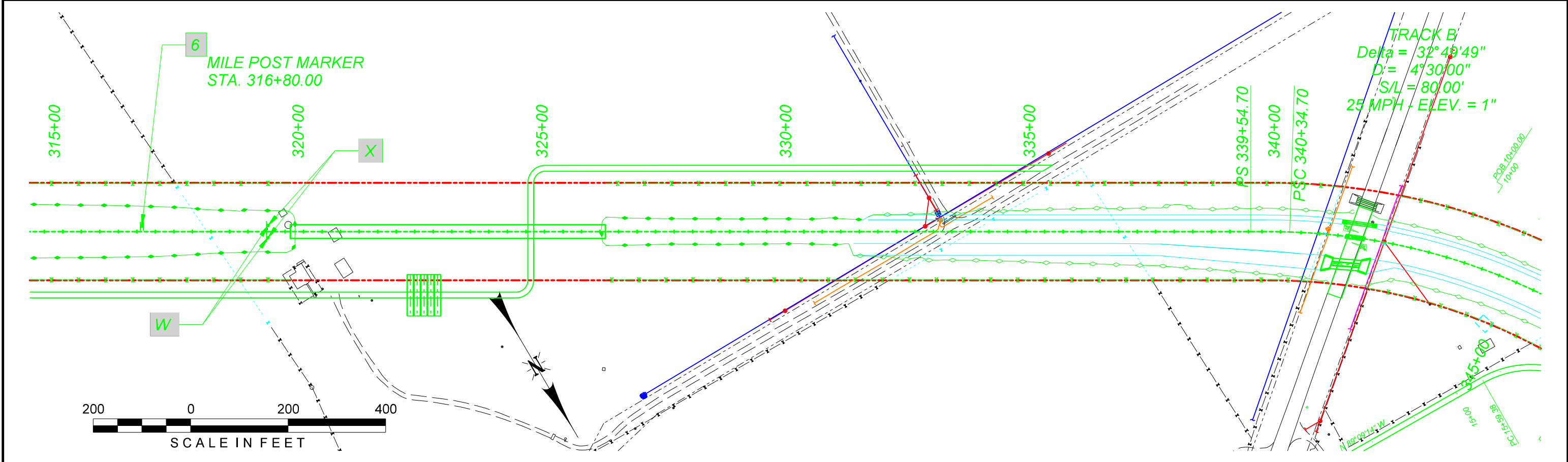
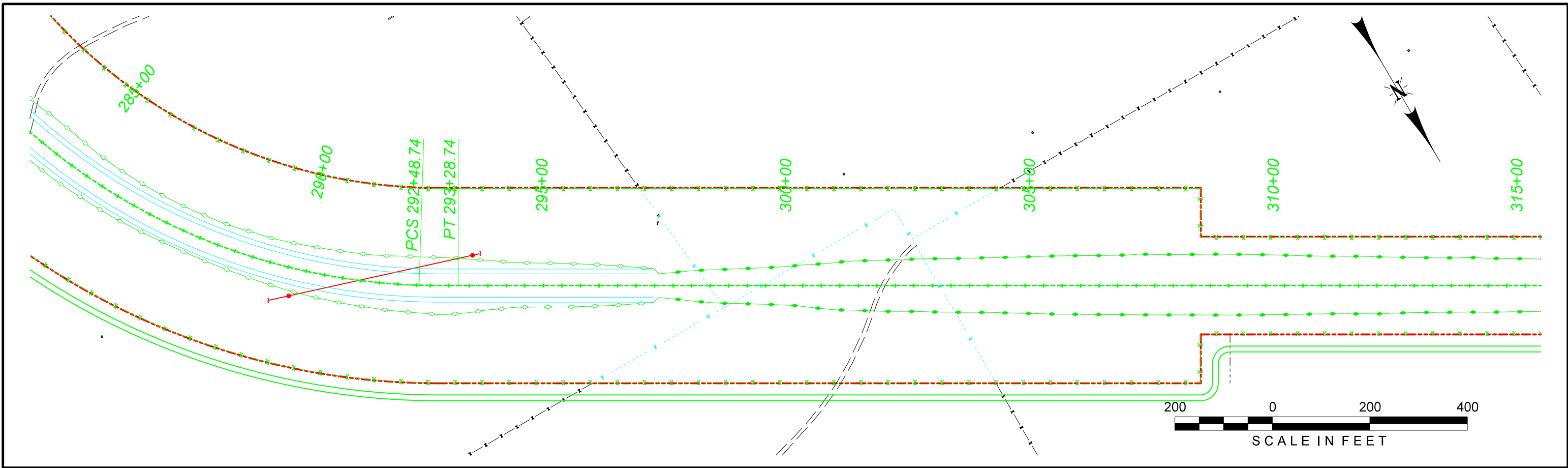
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Proposed Railroad Owned Trackage	
Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
Future Industry Owned Trackage	
Fiber Optic Cable	
Railroad Right Of Way	
Fence	

For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
SIGN LAYOUT PLAN

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DATE: 3 MARCH 2017
SHEET NUMBER: S006 of S012

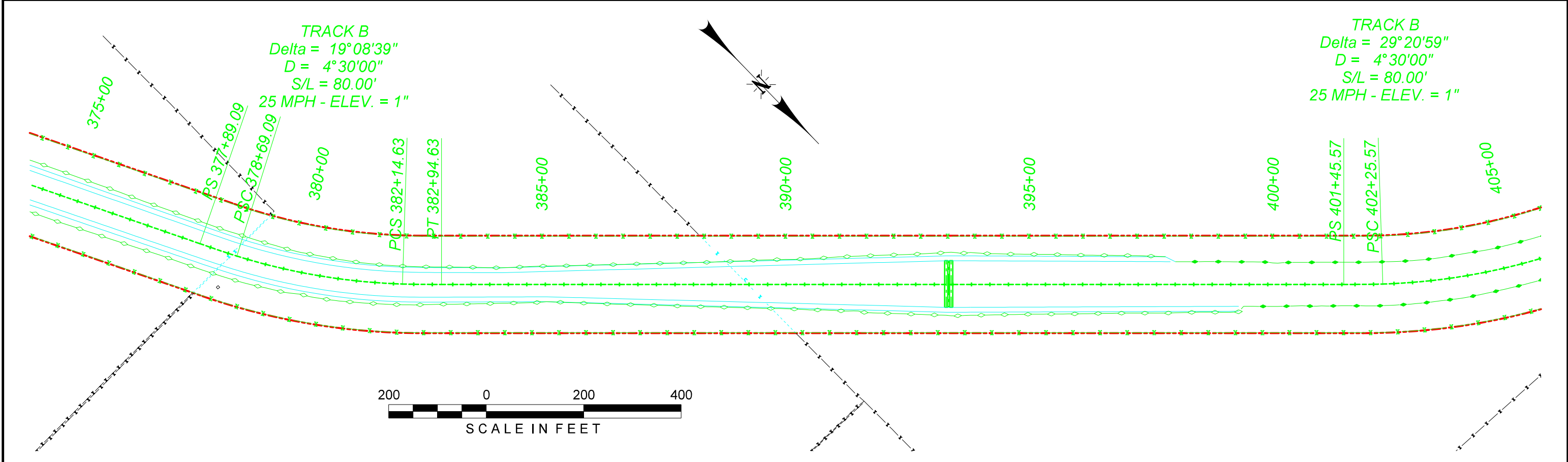
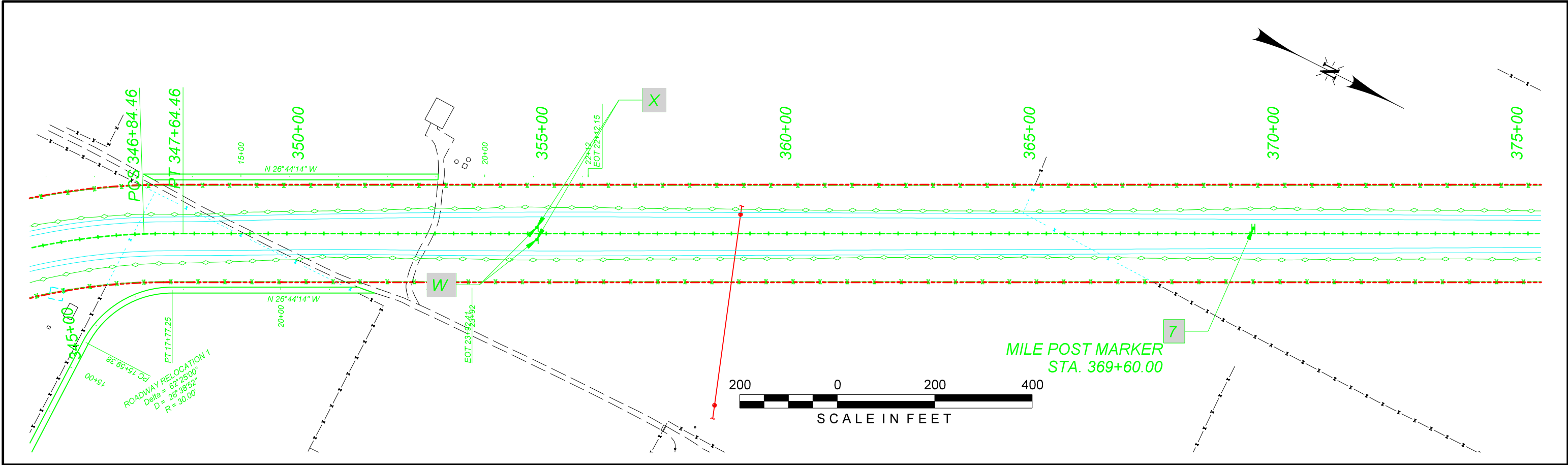
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Proposed Railroad Owned Trackage	
Existing Industry Owned Trackage	
Proposed Industry Owned Trackage	
Future Industry Owned Trackage	
Fiber Optic Cable	
Railroad Right Of Way	
Fence	

For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
SIGN LAYOUT PLAN

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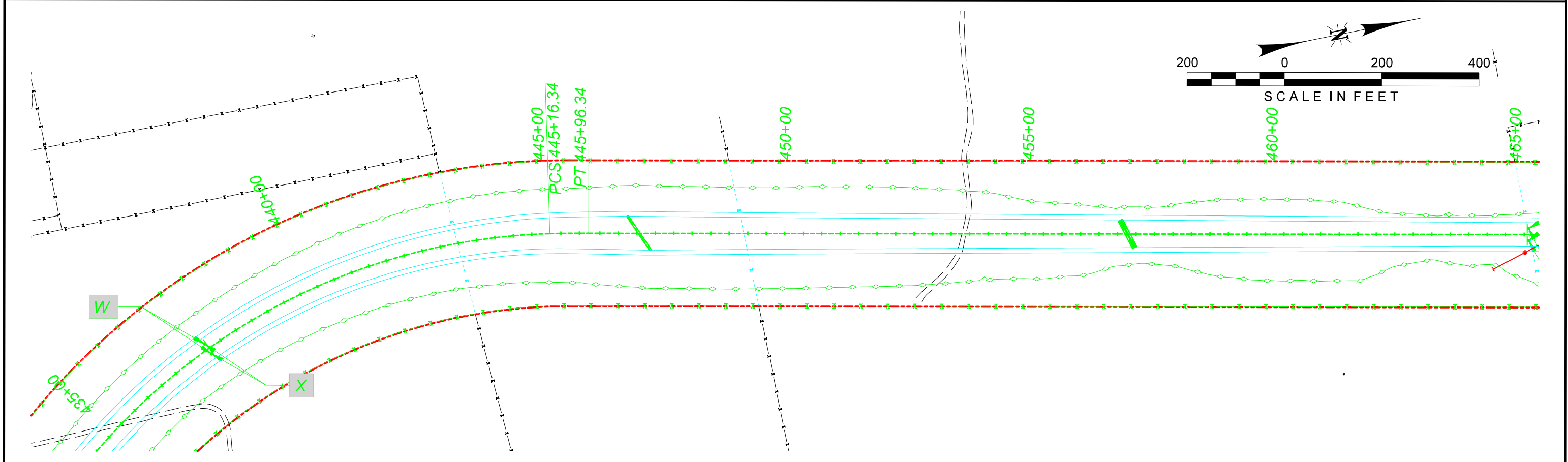
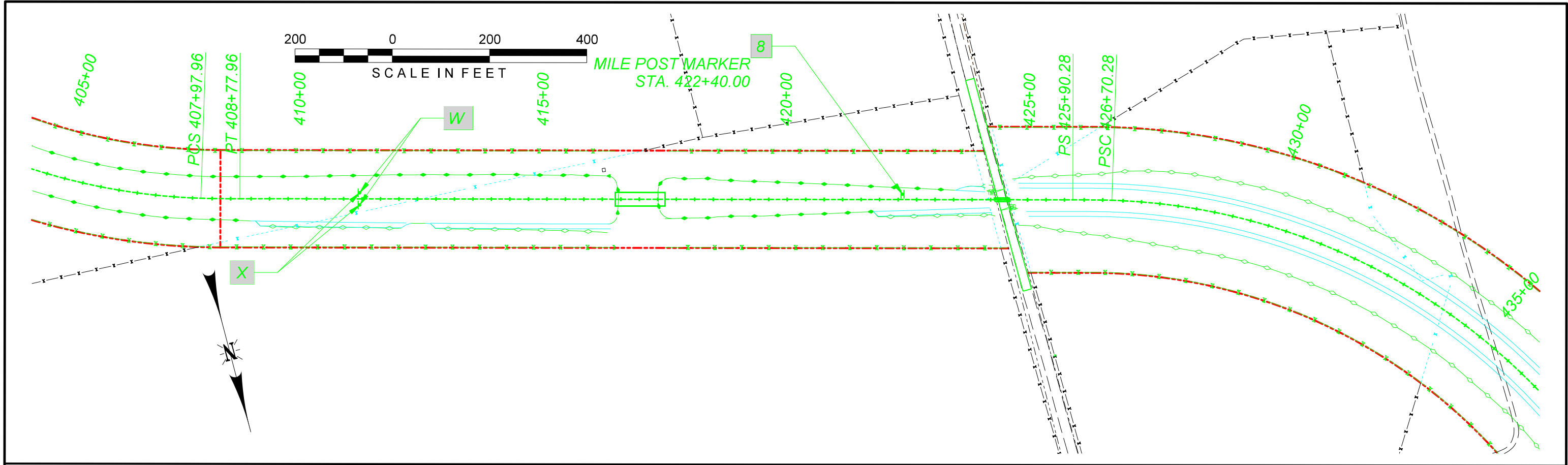


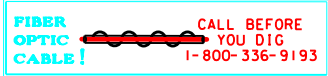
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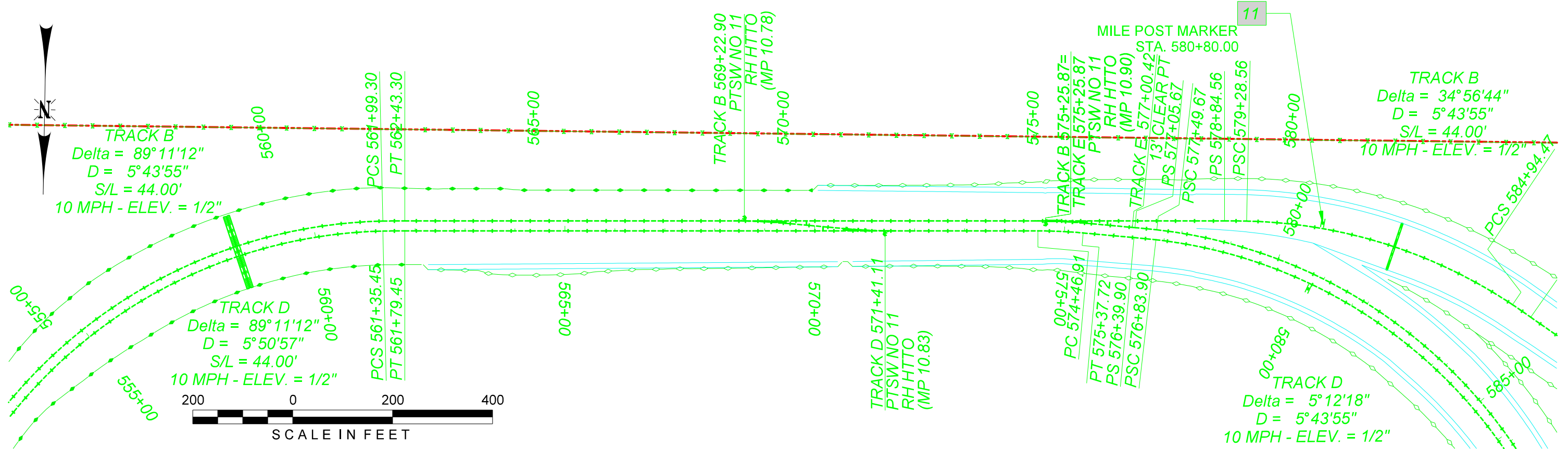
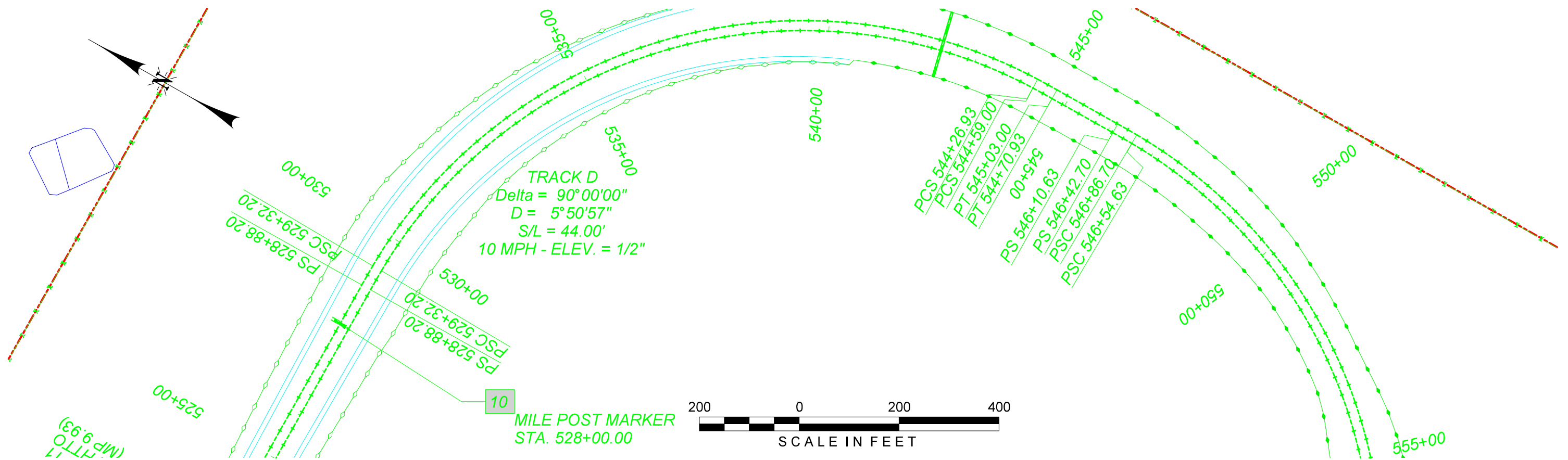
LEGEND:	
Existing Railroad Owned Trackage	—
Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	F/O
Railroad Right Of Way	— X — X — X — X — X
Fence	— X — X — X — X — X

For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
SIGN LAYOUT PLAN

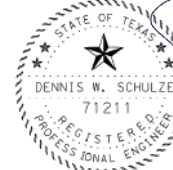
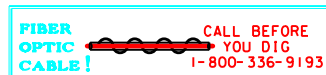
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 HDR Engineering, Inc. Firm No. 754		 3/6/2017	DRAWN BY: LBB	LEGEND: Existing Railroad Owned Trackage Proposed Railroad Owned Trackage Existing Industry Owned Trackage Proposed Industry Owned Trackage Future Industry Owned Trackage Fiber Optic Cable Railroad Right Of Way Fence	For Use in Agreement with: UNION PACIFIC RAILROAD And SOUTHWEST GULF RAILROAD
			CHECKED BY: MAM		



HDR
HDR Engineering, Inc.
Firm No. 754



3/6/2017

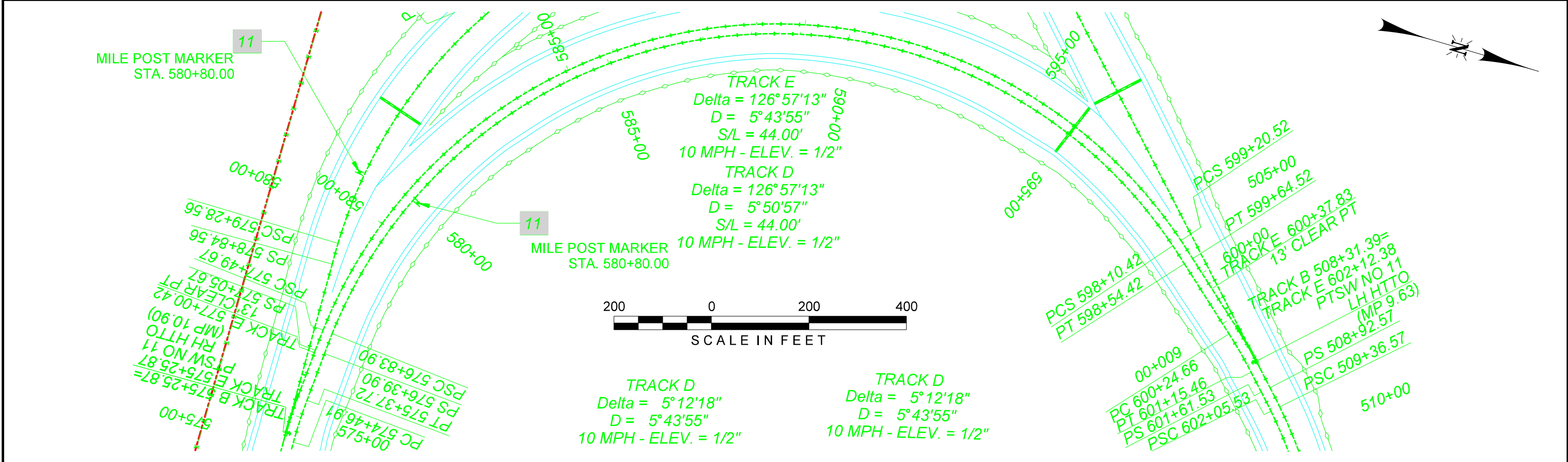
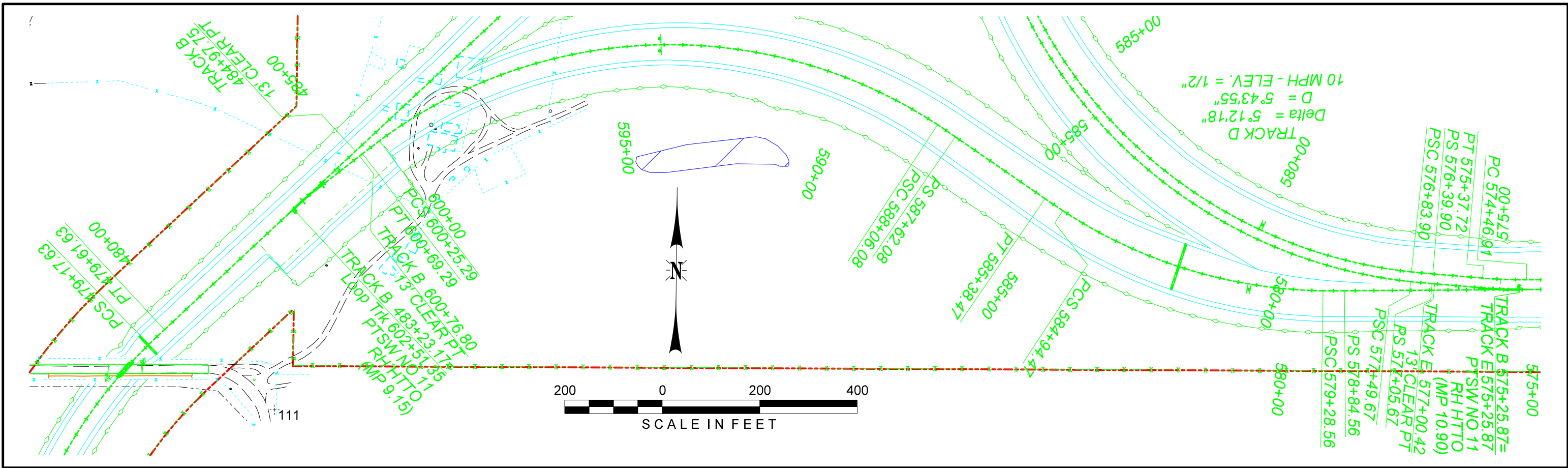
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CHECKED BY:	MAM
DATE:	3 MARCH 2017
SHEET NUMBER	S010 of S012

LEGEND:

- Existing Railroad Owned Trackage
- Proposed Railroad Owned Trackage
- Existing Industry Owned Trackage
- Proposed Industry Owned Trackage
- Future Industry Owned Trackage
- Fiber Optic Cable
- F / O
- Railroad Right of Way
- Fence

	UNION PACIFIC RAILROAD
	For Use in Agreement with: And SOUTHWEST GULF RAILROAD
	LOCATION & DESCRIPTION: MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR SIGN LAYOUT PLAN

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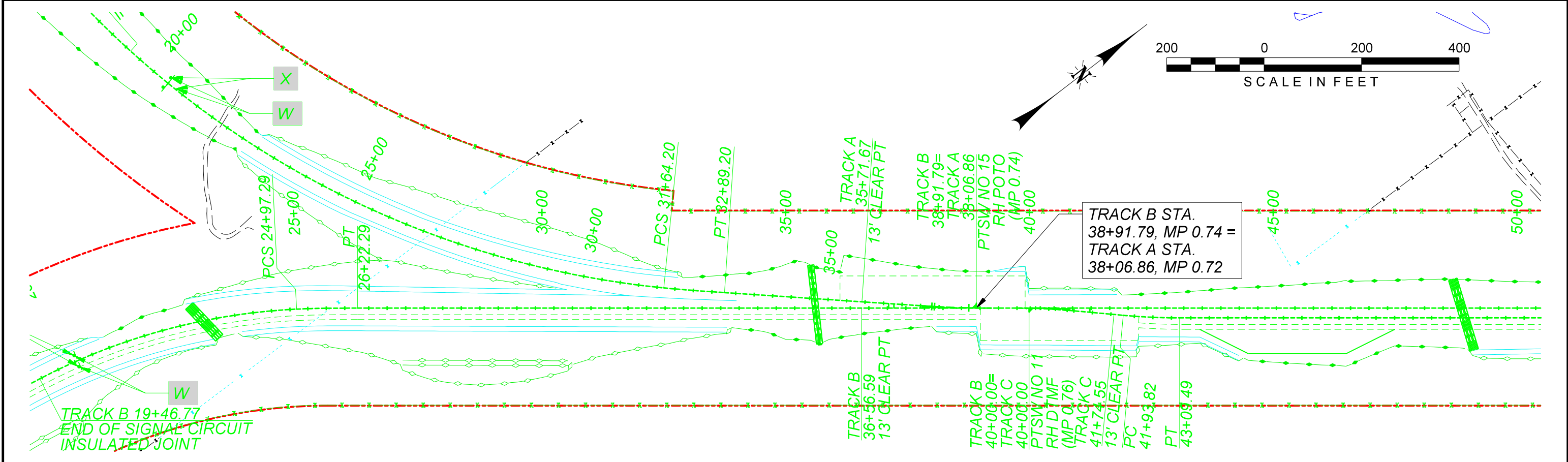
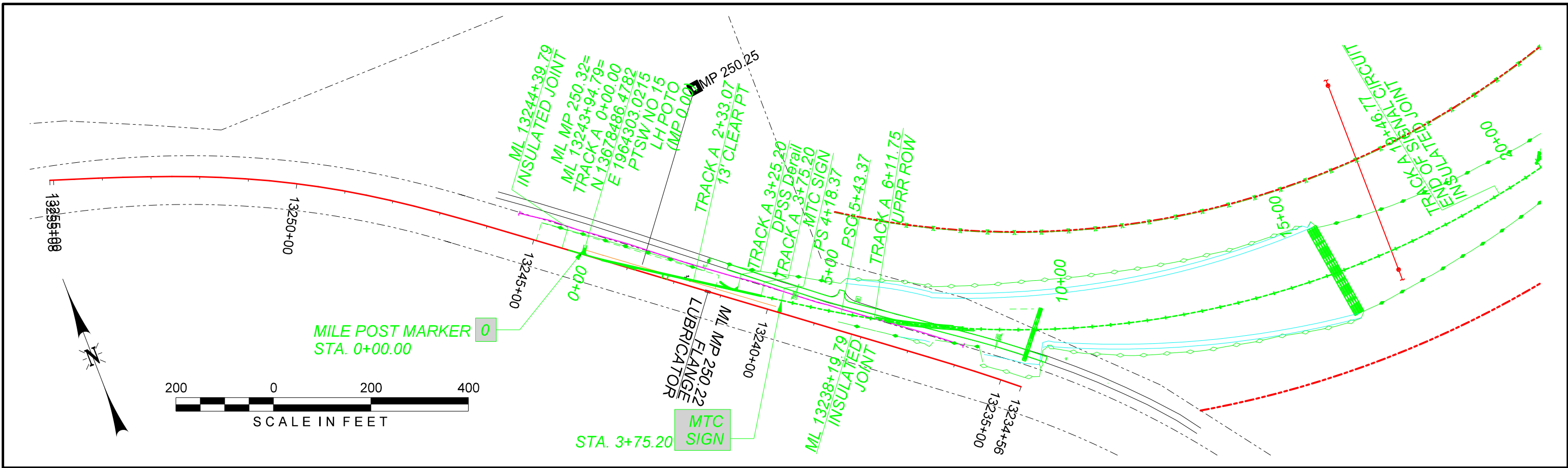


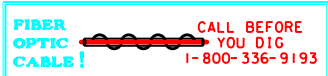
DRAWN BY: LBB
CHECKED BY: MAM
DATE: 3 MARCH 2017
SHEET NUMBER: S011 of S012

LEGEND:	
Existing Railroad Owned Trackage	—
Proposed Railroad Owned Trackage	—
Existing Industry Owned Trackage	—
Proposed Industry Owned Trackage	—
Future Industry Owned Trackage	—
Fiber Optic Cable	— F/O —
Railroad Right Of Way	— X — X — X — X — X —
Fence	— X — X — X — X — X —

For Use in Agreement with: **UNION PACIFIC RAILROAD**
And SOUTHWEST GULF RAILROAD
LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX
FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
SIGN LAYOUT PLAN

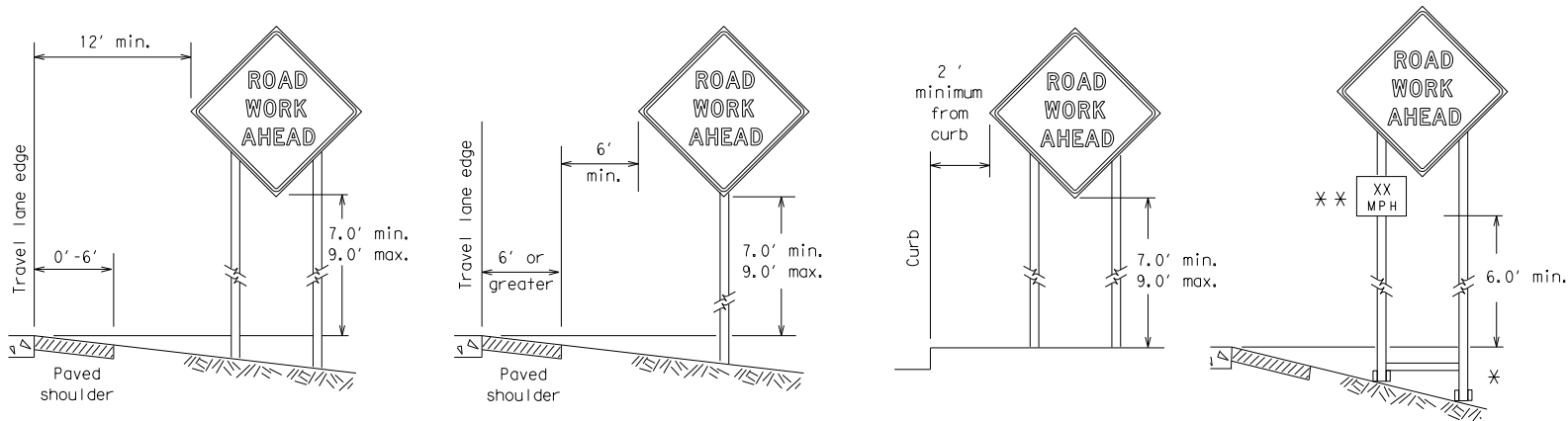
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 HDR Engineering, Inc. Firm No. 754	 CALL BEFORE YOU DIG 1-800-336-9193	 3/6/2017	DRAWN BY: LBB	LEGEND: Existing Railroad Owned Trackage Proposed Railroad Owned Trackage Existing Industry Owned Trackage Proposed Industry Owned Trackage Future Industry Owned Trackage Fiber Optic Cable Railroad Right Of Way Fence	For Use in Agreement with: UNION PACIFIC RAILROAD And SOUTHWEST GULF RAILROAD LOCATION & DESCRIPTION: MILEPOST 249.50, DEL RIO SUBDIVISION DUNLAY, TX FES #31985 SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR SIGN LAYOUT PLAN
			CHECKED BY: MAM		

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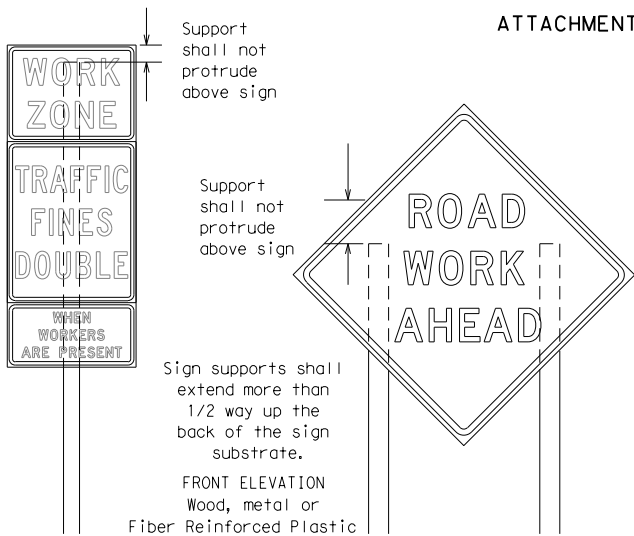
TYPICAL MINIMUM CLEARANCES FOR LONG TERM AND INTERMEDIATE TERM SIGNS



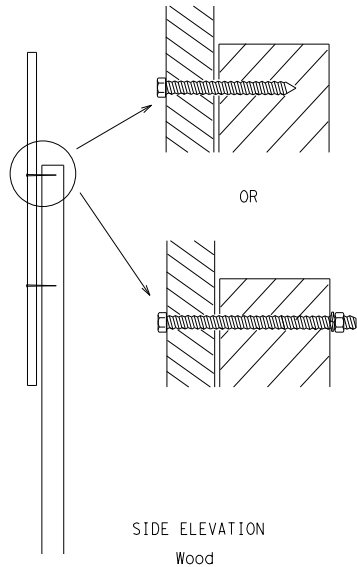
✱ When placing skid supports on unlevel ground, the leg post lengths must be adjusted so the sign appears straight and plumb. Objects shall NOT be placed under skids as a means of leveling.

✱✱ When plaques are placed on dual-leg supports, they should be attached to the upright nearest the travel lane. Supplemental plaques (advisory or distance) should not cover the surface of the parent sign.

ATTACHMENT FOR SIGN SUPPORTS



Splicing embedded perforated square metal tubing in order to extend post height will only be allowed when the splice is made using four bolts, two above and two below the splice point. Splice must be located entirely behind the sign substrate, not near the base of the support. Splice insert lengths should be at least 5 times nominal post size, centered on the splice and of at least the same gauge material.

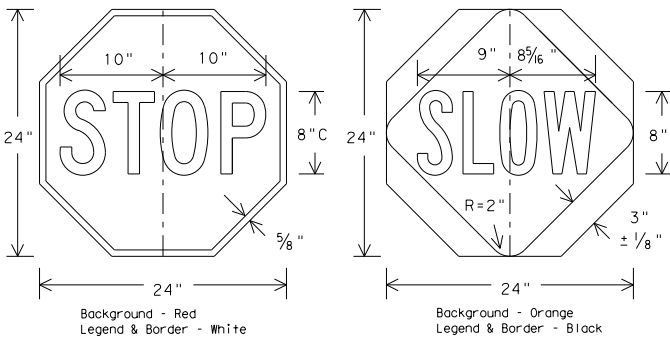


Attachment to wooden supports will be by bolts and nuts or screws. Use TxDOT's or manufacturer's recommended procedures for attaching sign substrates to other types of sign supports

Nails shall NOT be allowed. Each sign shall be attached directly to the sign support. Multiple signs shall not be joined or spliced by any means. Wood supports shall not be extended or repaired by splicing or other means.

STOP/SLOW PADDLES

- STOP/SLOW paddles are the primary method to control traffic by flaggers. The STOP/SLOW paddle size should be 24" x 24" as detailed below.
- When used at night, the STOP/SLOW paddle shall be retroreflectORIZED.
- STOP/SLOW paddles may be attached to a staff with a minimum length of 6' to the bottom of the sign.
- Any lights incorporated into the STOP or SLOW paddle faces shall only be as specifically described in Section 6E.03 Hand Signaling Devices in the TMUTCD.



CONTRACTOR REQUIREMENTS FOR MAINTAINING PERMANENT SIGNS WITHIN THE PROJECT LIMITS

- Permanent signs are used to give notice of traffic laws or regulations, call attention to conditions that are potentially hazardous to traffic operations, show route designations, destinations, directions, distances, services, points of interest, and other geographical, recreational, or cultural information. Drivers proceeding through a work zone need the same, if not better route guidance as normally installed on a roadway without construction.
- When permanent regulatory or warning signs conflict with work zone conditions, remove or cover the permanent signs until the permanent sign message matches the roadway condition.
- When existing permanent signs are moved and relocated due to construction purposes, they shall be visible to motorists at all times.
- If existing signs are to be relocated on their original supports, they shall be installed on crashworthy bases as shown on the SMD Standard sheets. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards. This work should be paid for under the appropriate pay item for relocating existing signs.
- If permanent signs are to be removed and relocated using temporary supports, the Contractor shall use crashworthy supports as shown on the BC sheets or the CWZTCD. The signs shall meet the required mounting heights shown on the BC Sheets or the SMD Standards during construction. This work should be paid for under the appropriate pay item for relocating existing signs.
- Any sign or traffic control device that is struck or damaged by the Contractor or his/her construction equipment shall be replaced as soon as possible by the Contractor to ensure proper guidance for the motorists. This will be subsidiary to Item 502.

GENERAL NOTES FOR WORK ZONE SIGNS

- Contractor shall install and maintain signs in a straight and plumb condition and/or as directed by the Engineer.
- Wooden sign posts shall be painted white.
- Barricades shall NOT be used as sign supports.
- All signs shall be installed in accordance with the plans or as directed by the Engineer. Signs shall be used to regulate, warn, and guide the traveling public safely through the work zone.
- The Contractor may furnish either the sign design shown in the plans or in the "Standard Highway Sign Designs for Texas" (SHSD). The Engineer/Inspector may require the Contractor to furnish other work zone signs that are shown in the TMUTCD but may have been omitted from the plans. Any variation in the plans shall be documented by written agreement between the Engineer and the Contractor's Responsible Person. All changes must be documented in writing before being implemented. This can include documenting the changes in the Inspector's TxDOT diary and having both the Inspector and Contractor initial and date the agreed upon changes.
- The Contractor shall furnish sign supports listed in the "Compliant Work Zone Traffic Control Device List" (CWZTCD). The Contractor shall install the sign support in accordance with the manufacturer's recommendations. If there is a question regarding installation procedures, the Contractor shall furnish the Engineer a copy of the manufacturer's installation recommendations so the Engineer can verify the correct procedures are being followed.
- The Contractor is responsible for installing signs on approved supports and replacing signs with damaged or cracked substrates and/or damaged or marred reflective sheeting as directed by the Engineer/Inspector.
- Identification markings may be shown only on the back of the sign substrate. The maximum height of letters and/or company logos used for identification shall be 1 inch.
- The Contractor shall replace damaged wood posts. New or damaged wood sign posts shall not be spliced.

DURATION OF WORK (as defined by the "Texas Manual on Uniform Traffic Control Devices" Part 6)

- The types of sign supports, sign mounting height, the size of signs, and the type of sign substrates can vary based on the type of work being performed. The Engineer is responsible for selecting the appropriate size sign for the type of work being performed. The Contractor is responsible for ensuring the sign support, sign mounting height and substrate meets manufacturer's recommendations in regard to crashworthiness and duration of work requirements.
 - Long-term stationary - work that occupies a location more than 3 days.
 - Intermediate-term stationary - work that occupies a location more than one daylight period up to 3 days, or nighttime work lasting more than one hour.
 - Short-term stationary - daytime work that occupies a location for more than 1 hour in a single daylight period.
 - Short, duration - work that occupies a location up to 1 hour.
 - Mobile - work that moves continuously or intermittently (stopping for up to approximately 15 minutes.)

SIGN MOUNTING HEIGHT

- The bottom of Long-term/Intermediate-term signs shall be at least 7 feet, but not more than 9 feet, above the paved surface, except as shown for supplemental plaques mounted below other signs.
- The bottom of Short-term/Short Duration signs shall be a minimum of 1 foot above the pavement surface but no more than 2 feet above the ground.
- Long-term/Intermediate-term Signs may be used in lieu of Short-term/Short Duration signing.
- Short-term/Short Duration signs shall be used only during daylight and shall be removed at the end of the workday or raised to appropriate Long-term/Intermediate sign height.
- Regulatory signs shall be mounted at least 7 feet, but not more than 9 feet, above the paved surface regardless of work duration.

SIZE OF SIGNS

- The Contractor shall furnish the sign sizes shown on BC (2) unless otherwise shown in the plans or as directed by the Engineer.

SIGN SUBSTRATES

- The Contractor shall ensure the sign substrate is installed in accordance with the manufacturer's recommendations for the type of sign support that is being used. The CWZTCD lists each substrate that can be used on the different types and models of sign supports.
- "Mesh" type materials are NOT an approved sign substrate, regardless of the tightness of the weave.
- All wooden individual sign panels fabricated from 2 or more pieces shall have one or more plywood cleat, 1/2" thick by 6" wide, fastened to the back of the sign and extending fully across the sign. The cleat shall be attached to the back of the sign using wood screws that do not penetrate the face of the sign panel. The screws shall be placed on both sides of the splice and spaced at 6" centers. The Engineer may approve other methods of splicing the sign face.

REFLECTIVE SHEETING

- All signs shall be retroreflective and constructed of sheeting meeting the color and retro-reflectivity requirements of DMS-8300 for rigid signs or DMS-8310 for roll-up signs. The web address for DMS specifications is shown on BC(1).
- White sheeting, meeting the requirements of DMS-8300 Type A, shall be used for signs with a white background.
- Orange sheeting, meeting the requirements of DMS-8300 Type B_{FL} or Type C_{FL}, shall be used for rigid signs with orange backgrounds.

SIGN LETTERS

- All sign letters and numbers shall be clear, and open rounded type uppercase alphabet letters as approved by the Federal Highway Administration (FHWA) and as published in the "Standard Highway Sign Design for Texas" manual. Signs, letters and numbers shall be of first class workmanship in accordance with Department Standards and Specifications.

REMOVING OR COVERING

- When sign messages may be confusing or do not apply, the signs shall be removed or completely covered.
- Long-term stationary or intermediate stationary signs installed on square metal tubing may be turned away from traffic 90 degrees when the sign message is not applicable. This technique may not be used for signs installed in the median of divided highways or near any intersections where the sign may be seen from approaching traffic.
- Signs installed on wooden skids shall not be turned at 90 degree angles to the roadway. These signs should be removed or completely covered when not required.
- When signs are covered, the material used shall be opaque, such as heavy mil black plastic, or other materials which will cover the entire sign face and maintain their opaque properties under automobile headlights at night, without damaging the sign sheeting.
- Burlap shall NOT be used to cover signs.
- Duct tape or other adhesive material shall NOT be affixed to a sign face.
- Signs and anchor stubs shall be removed and holes backfilled upon completion of work.

SIGN SUPPORT WEIGHTS

- Where sign supports require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand should be used.
- The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight.
- Rock, concrete, iron, steel or other solid objects shall not be permitted for use as sign support weights.
- Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs.
- Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall NOT be used.
- Rubber ballasts designed for channelizing devices should not be used for ballast on portable sign supports. Sign supports designed and manufactured with rubber bases may be used when shown on the CWZTCD list.
- Sandbags shall only be placed along or laid over the base supports of the traffic control device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners. Sandbags shall be placed along the length of the skids to weigh down the sign support.
- Sandbags shall NOT be placed under the skid and shall not be used to level sign supports placed on slopes.

FLAGS ON SIGNS

- Flags may be used to draw attention to warning signs. When used the flag shall be 16 inches square or larger and shall be orange or fluorescent red-orange in color. Flags shall not be allowed to cover any portion of the sign face.

SHEET 4 OF 12



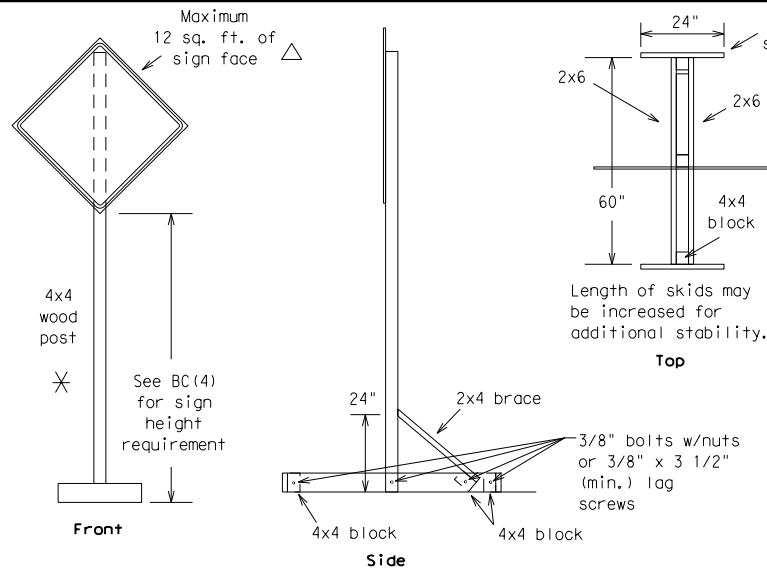
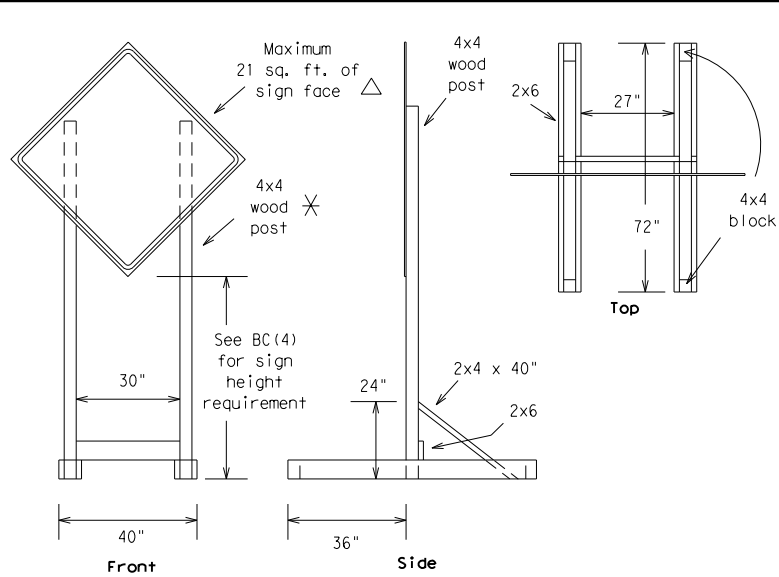
BARRICADE AND CONSTRUCTION TEMPORARY SIGN NOTES

BC (4) - 14

FILE:	bc-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB			HIGHWAY		
REVISIONS									
9-07	8-14	DIST	COUNTY				SHEET NO.		
7-13							RD004		

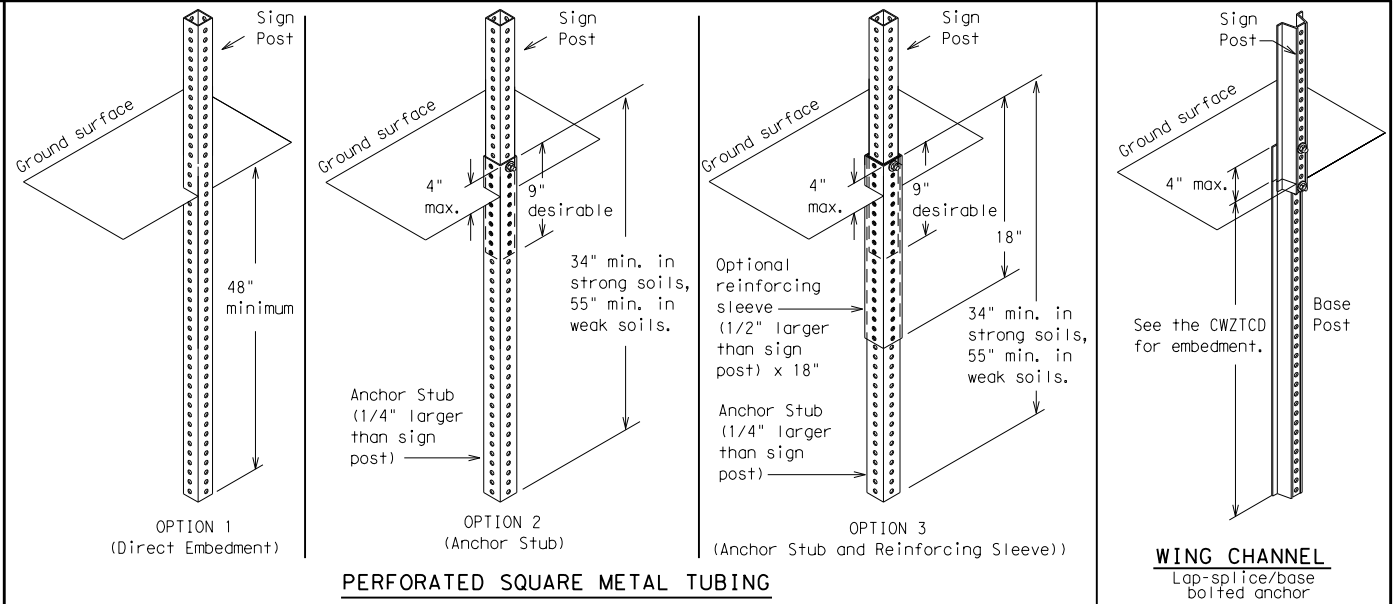
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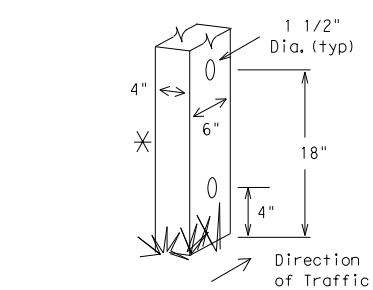
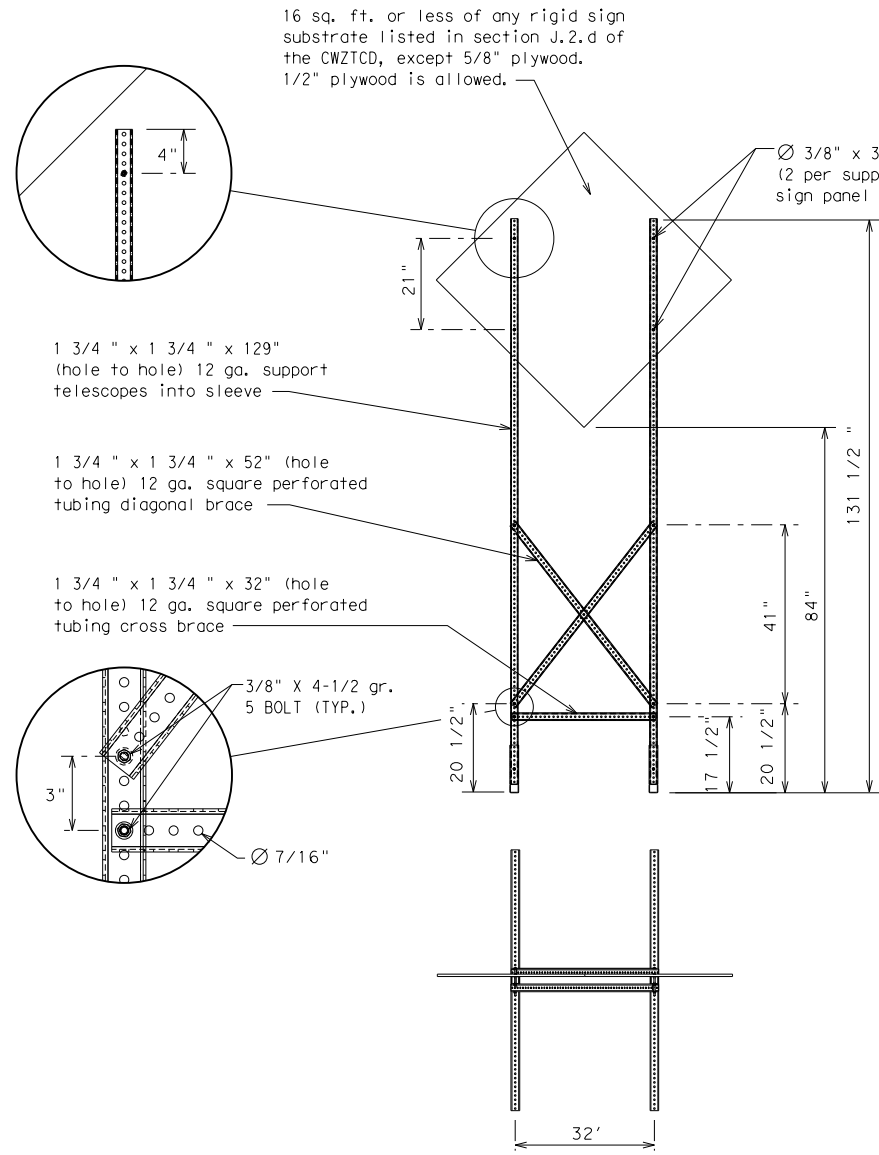
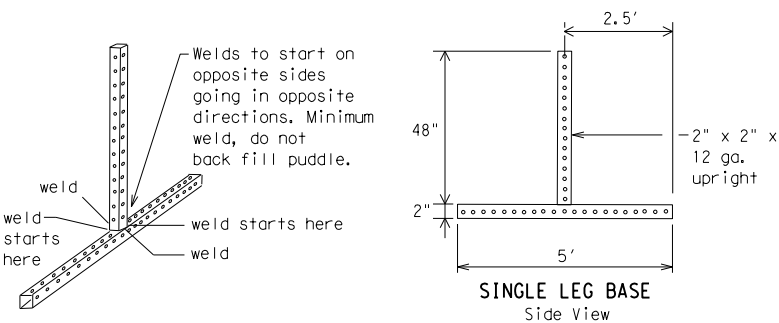
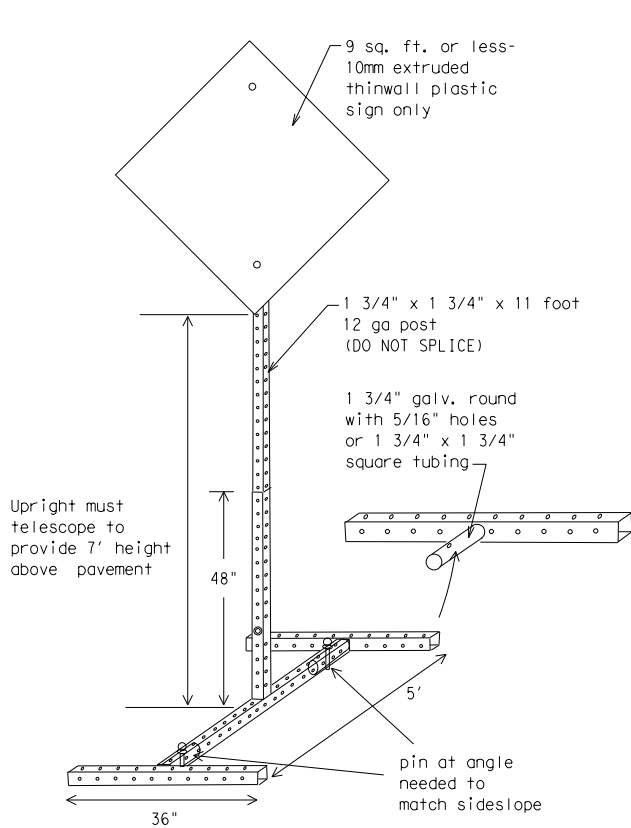
SKID MOUNTED WOOD SIGN SUPPORTS

LONG/INTERMEDIATE TERM STATIONARY - PORTABLE SKID MOUNTED SIGN SUPPORTS $\square$



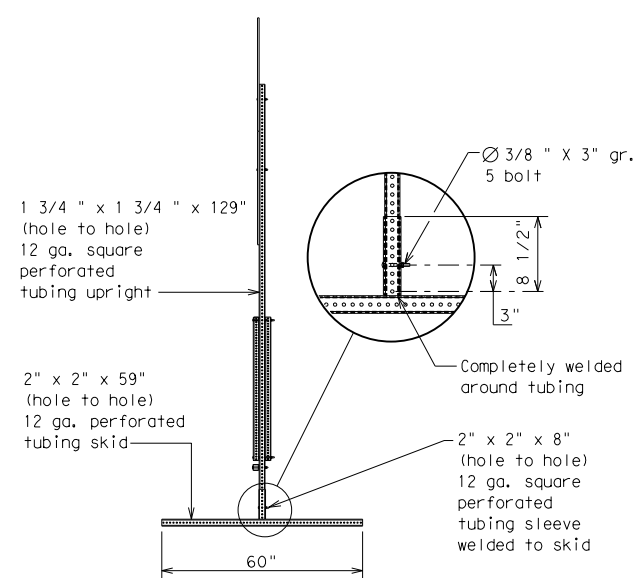
GROUND MOUNTED SIGN SUPPORTS

Refer to the CWZTCD and the manufacturer's installation procedure for each type sign support.
The maximum sign square footage shall adhere to the manufacturer's recommendation.
Two post installations can be used for larger signs.



Nominal Post Size	Number of Posts	Maximum Sq. feet of Sign Face	Minimum Soil Embedment	Drilled Hole(s) Required
4 x 4	1	12	36"	NO
4 x 4	2	21	36"	NO
4 x 6	1	21	36"	YES
4 x 6	2	36	36"	YES

WOOD POST SYSTEM FOR GROUND MOUNTED SIGN SUPPORTS



WEDGE ANCHORS

Both steel and plastic Wedge Anchor Systems as shown on the SMD Standard Sheets may be used as temporary sign supports for signs up to 10 square feet of sign face. They may be set in concrete or in sturdy soils if approved by the Engineer. (See web address for "Traffic Engineering Standard Sheets" on BC(1)).

OTHER DESIGNS

MORE DETAILS OF APPROVED LONG/INTERMEDIATE AND SHORT TERM SUPPORTS CAN BE FOUND ON THE CWZTCD LIST. SEE BC(1) FOR WEBSITE LOCATION.

GENERAL NOTES

- Nails may be used in the assembly of wooden sign supports, but 3/8" bolts with nuts or 3/8" x 3 1/2" lag screws must be used on every joint for final connection.
- No more than 2 sign posts shall be placed within a 7 ft. circle, except for specific materials noted on the CWZTCD List.
- When project is completed, all sign supports and foundations shall be removed from the project site. This will be considered subsidiary to Item 502.

- ☐ See BC(4) for definition of "Work Duration."
- $\times$ Wood sign posts MUST be one piece. Splicing will NOT be allowed. Posts shall be painted white.
- $\triangle$ See the CWZTCD for the type of sign substrate that can be used for each approved sign support.

SHEET 5 OF 12



BARRICADE AND CONSTRUCTION TYPICAL SIGN SUPPORT

BC(5) - 14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
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9-07 8-14	DIST		COUNTY	SHEET NO.
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DATE:
FILE:

WHEN NOT IN USE, REMOVE THE PCMS FROM THE RIGHT-OF-WAY OR PLACE THE PCMS BEHIND BARRIER OR GUARDRAIL WITH SIGN PANEL TURNED PARALLEL TO TRAFFIC

PORTABLE CHANGEABLE MESSAGE SIGNS

1. The Engineer/Inspector shall approve all messages used on portable changeable message signs (PCMS).
2. Messages on PCMS should contain no more than 8 words (about four to eight characters per word), not including simple words such as "TO," "FOR," "AT," etc.
3. Messages should consist of a single phase, or two phases that alternate. Three-phase messages are not allowed. Each phase of the message should convey a single thought, and must be understood by itself.
4. Use the word "EXIT" to refer to an exit ramp on a freeway; i.e., "EXIT CLOSED." Do not use the term "RAMP."
5. Always use the route or interstate designation (IH, US, SH, FM) along with the number when referring to a roadway.
6. When in use the bottom of a stationary PCMS message panel should be a minimum 7 feet above the roadway, where possible.
7. The message term "WEEKEND" should be used only if the work is to start on Saturday morning and end by Sunday evening at midnight. Actual days and hours of work should be displayed on the PCMS if work is to begin on Friday evening and/or continue into Monday morning.
8. The Engineer/Inspector may select one of two options which are available for displaying a two-phase message on a PCMS. Each phase may be displayed for either four seconds each or for three seconds each.
9. Do not "flash" messages or words included in a message. The message should be steady burn or continuous while displayed.
10. Do not present redundant information on a two-phase message; i.e., keeping two lines of the message the same and changing the third line.
11. Do not use the word "Danger" in message.
12. Do not display the message "LANES SHIFT LEFT" or "LANES SHIFT RIGHT" on a PCMS. Drivers do not understand the message.
13. Do not display messages that scroll horizontally or vertically across the face of the sign.
14. The following table lists abbreviated words and two-word phrases that are acceptable for use on a PCMS. Both words in a phrase must be displayed together. Words or phrases not on this list should not be abbreviated, unless shown in the TMUTCD.
15. PCMS character height should be at least 18 inches for trailer mounted units. They should be visible from at least 1/2 (.5) mile and the text should be legible from at least 600 feet at night and 800 feet in daylight. Truck mounted units must have a character height of 10 inches and must be legible from at least 400 feet.
16. Each line of text should be centered on the message board rather than left or right justified.
17. If disabled, the PCMS should default to an illegible display that will not alarm motorists and will only be used to alert workers that the PCMS has malfunctioned. A pattern such as a series of horizontal solid bars is appropriate.

WORD OR PHRASE	ABBREVIATION
Access Road	ACCS RD
Alternate	ALT
Avenue	AVE
Best Route	BEST RTE
Boulevard	BLVD
Bridge	BRDG
Cannot	CANT
Center	CTR
Construction Ahead	CONST AHD
CROSSING	XING
Detour Route	DETOUR RTE
Do Not	DONT
East	E
Eastbound	(route) E
Emergency	EMER
Emergency Vehicle	EMER VEH
Entrance, Enter	ENT
Express Lane	EXP LN
Expressway	EXPWY
XXXX Feet	XXXX FT
Fog Ahead	FOG AHD
Freeway	FRWY, FWY
Freeway Blocked	FWY BLKD
Friday	FRI
Hazardous Driving	HAZ DRIVING
Hazardous Material	HAZMAT
High-Occupancy	HOV
Vehicle Highway	HWY
Hour(s)	HR, HRS
Information	INFO
It Is	ITS
Junction	JCT
Left	LFT
Left Lane	LFT LN
Lane Closed	LN CLOSED
Lower Level	LWR LEVEL
Maintenance	MAINT

Roadway designation # IH-number, US-number, SH-number, FM-number

RECOMMENDED PHASES AND FORMATS FOR PCMS MESSAGES DURING ROADWORK ACTIVITIES

(The Engineer may approve other messages not specifically covered here.)

Phase 1: Condition Lists

Road/Lane/Ramp Closure List

FREEWAY
CLOSED
X MILE

ROAD
CLOSED
AT SH XXX

ROAD
CLSD AT
FM XXXX

RIGHT X
LANES
CLOSED

CENTER
LANE
CLOSED

NIGHT
LANE
CLOSURES

VARIOUS
LANES
CLOSED

EXIT
CLOSED

MALL
DRIVEWAY
CLOSED

XXXXXXXX
BLVD
CLOSED

Other Condition List

FRONTAGE
ROAD
CLOSED

SHOULDER
CLOSED
XXX FT

RIGHT LN
CLOSED
XXX FT

RIGHT X
LANES
OPEN

DAYTIME
LANE
CLOSURES

I-XX SOUTH
EXIT
CLOSED

EXIT XXX
CLOSED
X MILE

RIGHT LN
TO BE
CLOSED

X LANES
CLOSED
TUE - FRI

ROADWORK
XXX FT

FLAGGER
XXXX FT

RIGHT LN
NARROWS
XXXX FT

MERGING
TRAFFIC
XXXX FT

LOOSE
GRAVEL
XXXX FT

DETOUR
X MILE

ROADWORK
PAST
SH XXXX

BUMP
XXXX FT

TRAFFIC
SIGNAL
XXXX FT

ROAD
REPAIRS
XXXX FT

LANE
NARROWS
XXXX FT

TWO-WAY
TRAFFIC
XX MILE

CONST
TRAFFIC
XXX FT

UNEVEN
LANES
XXXX FT

ROUGH
ROAD
XXXX FT

ROADWORK
NEXT
FRI-SUN

US XXX
EXIT
X MILES

LANES
SHIFT

* LANES SHIFT in Phase 1 must be used with STAY IN LANE in Phase 2.

Phase 2: Possible Component Lists

Action to Take/Effect on Travel List

MERGE
RIGHT

DETOUR
NEXT
X EXITS

USE
EXIT XXX

STAY ON
US XXX
SOUTH

TRUCKS
USE
US XXX N

WATCH
FOR
TRUCKS

EXPECT
DELAYS

REDUCE
SPEED
XXX FT

USE
OTHER
ROUTES

STAY
IN
LANE

FORM
X LINES
RIGHT

USE
XXXXX
RD EXIT

USE EXIT
I-XX
NORTH

USE
I-XX E
TO I-XX N

WATCH
FOR
TRUCKS

EXPECT
DELAYS

END
SHOULDER
USE

WATCH
FOR
WORKERS

*

Location List

AT
FM XXXX

BEFORE
RAILROAD
CROSSING

NEXT
X
MILES

PAST
US XXX
EXIT

XXXXXXX
TO
XXXXXXX

US XXX
TO
FM XXXX

Warning List

SPEED
LIMIT
XX MPH

MAXIMUM
SPEED
XX MPH

MINIMUM
SPEED
XX MPH

ADVISORY
SPEED
XX MPH

RIGHT
LANE
EXIT

USE
CAUTION

DRIVE
SAFELY

DRIVE
WITH
CARE

** Advance Notice List

TUE-FRI
XX AM-
X PM

APR XX-
XX
X PM-X AM

BEGINS
MONDAY

BEGINS
MAY XX

MAY X-X
XX PM -
XX AM

NEXT
FRI-SUN

XX AM
TO
XX PM

NEXT
TUE
AUG XX

TONIGHT
XX PM-
XX AM

** See Application Guidelines Note 6.

APPLICATION GUIDELINES

1. Only 1 or 2 phases are to be used on a PCMS.
2. The 1st phase (or both) should be selected from the "Road/Lane/Ramp Closure List" and the "Other Condition List".
3. A 2nd phase can be selected from the "Action to Take/Effect on Travel, Location, General Warning, or Advance Notice Phase Lists".
4. A Location Phase is necessary only if a distance or location is not included in the first phase selected.
5. If two PCMS are used in sequence, they must be separated by a minimum of 1000 ft. Each PCMS shall be limited to two phases, and should be understandable by themselves.
6. For advance notice, when the current date is within seven days of the actual work date, calendar days should be replaced with days of the week. Advance notification should typically be for no more than one week prior to the work.

PCMS SIGNS WITHIN THE R.O.W. SHALL BE BEHIND GUARDRAIL OR CONCRETE BARRIER OR SHALL HAVE A MINIMUM OF FOUR (4) PLASTIC DRUMS PLACED PERPENDICULAR TO TRAFFIC ON THE UPSTREAM SIDE OF THE PCMS, WHEN EXPOSED TO ONE DIRECTION OF TRAFFIC. WHEN EXPOSED TO TWO WAY TRAFFIC, THE FOUR DRUMS SHOULD BE PLACED WITH ONE DRUM AT EACH OF THE FOUR CORNERS OF THE UNIT.

FULL MATRIX PCMS SIGNS

1. When Full Matrix PCMS signs are used, the character height and legibility/visibility requirements shall be maintained as listed in Note 15 under "PORTABLE CHANGEABLE MESSAGE SIGNS" above.
2. When symbol signs, such as the "Flagger Symbol" (CW20-7) are represented graphically on the Full Matrix PCMS sign and, with the approval of the Engineer, it shall maintain the legibility/visibility requirement listed above.
3. When symbol signs are represented graphically on the Full Matrix PCMS, they shall only supplement the use of the static sign represented, and shall not substitute for, or replace that sign.
4. A full matrix PCMS may be used to simulate a flashing arrow board provided it meets the visibility, flash rate and dimming requirements on BC(7), for the same size arrow.

WORDING ALTERNATIVES

1. The words RIGHT, LEFT and ALL can be interchanged as appropriate.
2. Roadway designations IH, US, SH, FM and LP can be interchanged as appropriate.
3. EAST, WEST, NORTH and SOUTH (or abbreviations E, W, N and S) can be interchanged as appropriate.
4. Highway names and numbers replaced as appropriate.
5. ROAD, HIGHWAY and FREEWAY can be interchanged as needed.
6. AHEAD may be used instead of distances if necessary.
7. FT and MI, MILE and MILES interchanged as appropriate.
8. AT, BEFORE and PAST interchanged as needed.
9. Distances or AHEAD can be eliminated from the message if a location phase is used.

SHEET 6 OF 12



Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PORTABLE CHANGEABLE MESSAGE SIGN (PCMS)

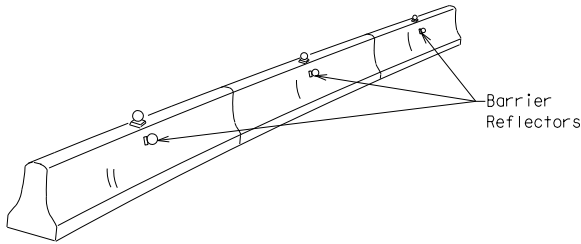
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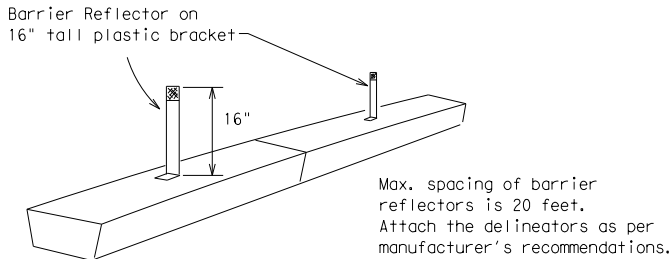
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- Barrier Reflectors shall be pre-qualified, and conform to the color and reflectivity requirements of DMS-8600. A list of prequalified Barrier Reflectors can be found at the Material Producer List web address shown on BC(1).
- Color of Barrier Reflectors shall be as specified in the TMUTCD. The cost of the reflectors shall be considered subsidiary to Item 512.

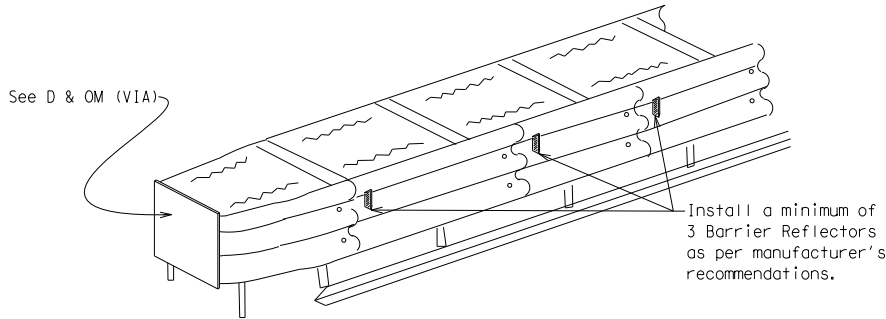


CONCRETE TRAFFIC BARRIER (CTB)

- Where traffic is on one side of the CTB, two (2) Barrier Reflectors shall be mounted in approximately the midsection of each section of CTB. An alternate mounting location is uniformly spaced at one end of each CTB. This will allow for attachment of a barrier grapple without damaging the reflector. The Barrier Reflector mounted on the side of the CTB shall be located directly below the reflector mounted on top of the barrier, as shown in the detail above.
- Where CTB separates two-way traffic, three barrier reflectors shall be mounted on each section of CTB. The reflector unit on top shall have two yellow reflective faces (Bi-Directional) while the reflectors on each side of the barrier shall have one yellow reflective face, as shown in the detail above.
- When CTB separates traffic traveling in the same direction, no barrier reflectors will be required on top of the CTB.
- Barrier Reflector units shall be yellow or white in color to match the edgeline being supplemented.
- Maximum spacing of Barrier Reflectors is forty (40) feet.
- Pavement markers or temporary flexible-reflective roadway marker tabs shall NOT be used as CTB delineation.
- Attachment of Barrier Reflectors to CTB shall be per manufacturer's recommendations.
- Missing or damaged Barrier Reflectors shall be replaced as directed by the Engineer.
- Single slope barriers shall be delineated as shown on the above detail.



LOW PROFILE CONCRETE BARRIER (LPCB)

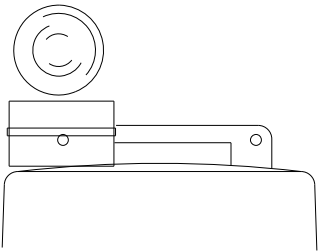


DELINEATION OF END TREATMENTS

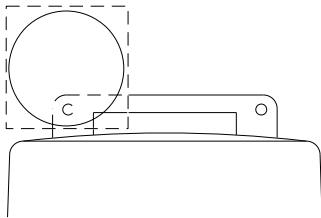
END TREATMENTS FOR
CTB'S USED
IN WORK ZONES

End treatments used on CTB's in work zones shall meet crashworthy standards as defined in the National Cooperative Highway Research Report 350. Refer to the CWZTCD List for approved end treatments and manufacturers.

BARRIER REFLECTORS FOR CONCRETE TRAFFIC BARRIER AND ATTENUATORS



Type C Warning Light or approved substitute mounted on a drum adjacent to the travel way.



Warning reflector may be round or square. Must have a yellow reflective surface area of at least 30 square inches

WARNING LIGHTS

- Warning lights shall meet the requirements of the TMUTCD.
- Warning lights shall NOT be installed on barricades.
- Type A-Low Intensity Flashing Warning Lights are commonly used with drums. They are intended to warn of or mark a potentially hazardous area. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "FL". The Type A Warning Lights shall not be used with signs manufactured with Type B_{FL} or C_{FL} Sheeting meeting the requirements of Departmental Material Specification DMS-8300.
- Type-C and Type D 360 degree Steady Burn Lights are intended to be used in a series for delineation to supplement other traffic control devices. Their use shall be as indicated on this sheet and/or other sheets of the plans by the designation "SB".
- The Engineer/Inspector or the plans shall specify the location and type of warning lights to be installed on the traffic control devices.
- When required by the Engineer, the Contractor shall furnish a copy of the warning lights certification. The warning light manufacturer will certify the warning lights meet the requirements of the latest ITE Purchase Specifications for Flashing and Steady-Burn Warning Lights.
- When used to delineate curves, Type-C and Type D Steady Burn Lights should only be placed on the outside of the curve, not the inside.
- The location of warning lights and warning reflectors on drums shall be as shown elsewhere in the plans.

WARNING LIGHTS MOUNTED ON PLASTIC DRUMS

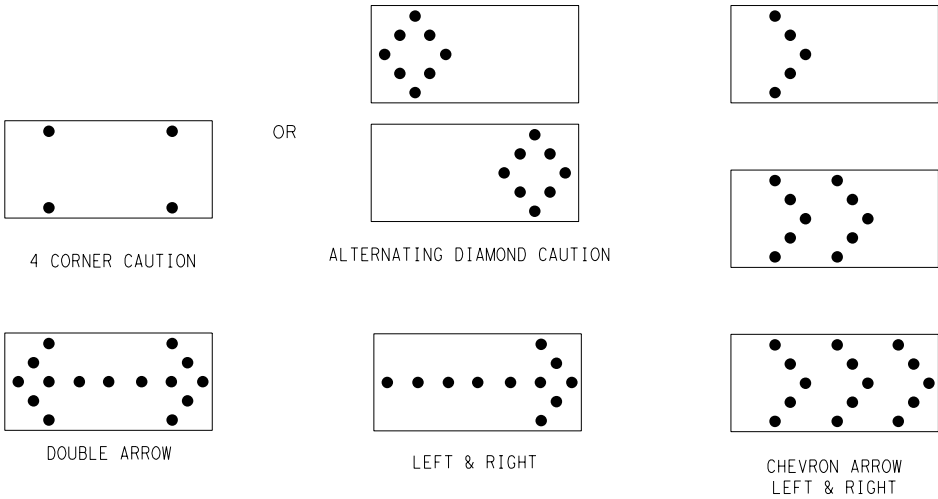
- Type A flashing warning lights are intended to warn drivers that they are approaching or are in a potentially hazardous area.
- Type A random flashing warning lights are not intended for delineation and shall not be used in a series.
- A series of sequential flashing warning lights placed on channelizing devices to form a merging taper may be used for delineation. If used, the successive flashing of the sequential warning lights should occur from the beginning of the taper to the end of the merging taper in order to identify the desired vehicle path. The rate of flashing for each light shall be 65 flashes per minute, plus or minus 10 flashes.
- Type C and D steady-burn warning lights are intended to be used in a series to delineate the edge of the travel lane on detours, on lane changes, on lane closures, and on other similar conditions.
- Type A, Type C and Type D warning lights shall be installed at locations as detailed on other sheets in the plans.
- Warning lights shall not be installed on a drum that has a sign, chevron or vertical panel.
- The maximum spacing for warning lights on drums should be identical to the channelizing device spacing.

WARNING REFLECTORS MOUNTED ON PLASTIC DRUMS AS A SUBSTITUTE FOR TYPE C (STEADY BURN) WARNING LIGHTS

- A warning reflector or approved substitute may be mounted on a plastic drum as a substitute for a Type C, steady burn warning light at the discretion of the Contractor unless otherwise noted in the plans.
- The warning reflector shall be yellow in color and shall be manufactured using a sign substrate approved for use with plastic drums listed on the CWZTCD.
- The warning reflector shall have a minimum retroreflective surface area (one-side) of 30 square inches.
- Round reflectors shall be fully reflectorized, including the area where attached to the drum.
- Square substrates must have a minimum of 30 square inches of reflectorized sheeting. They do not have to be reflectorized where it attaches to the drum.
- The side of the warning reflector facing approaching traffic shall have sheeting meeting the color and retroreflectivity requirements for DMS 8300-Type B or Type C.
- When used near two-way traffic, both sides of the warning reflector shall be reflectorized.
- The warning reflector should be mounted on the side of the handle nearest approaching traffic.
- The maximum spacing for warning reflectors should be identical to the channelizing device spacing requirements.

Arrow Boards may be located behind channelizing devices in place for a shoulder taper or merging taper, otherwise they shall be delineated with four (4) channelizing devices placed perpendicular to traffic on the upstream side of traffic.

- The Flashing Arrow Board should be used for all lane closures on multi-lane roadways, or slow moving maintenance or construction activities on the travel lanes.
- Flashing Arrow Boards should not be used on two-lane, two-way roadways, detours, diversions or work on shoulders unless the "CAUTION" display (see detail below) is used.
- The Engineer/Inspector shall choose all appropriate signs, barricades and/or other traffic control devices that should be used in conjunction with the Flashing Arrow Board.
- The Flashing Arrow Board should be able to display the following symbols:



- The "CAUTION" display consists of four corner lamps flashing simultaneously, or the Alternating Diamond Caution mode as shown.
- The straight line caution display is NOT ALLOWED.
- The Flashing Arrow Board shall be capable of minimum 50 percent dimming from rated lamp voltage. The flashing rate of the lamps shall not be less than 25 nor more than 40 flashes per minute.
- Minimum lamp "on time" shall be approximately 50 percent for the flashing arrow and equal intervals of 25 percent for each sequential phase of the flashing chevron.
- The sequential arrow display is NOT ALLOWED.
- The flashing arrow display is the TxDOT standard; however, the sequential Chevron display may be used during daylight operations.
- The Flashing Arrow Board shall be mounted on a vehicle, trailer or other suitable support.
- A Flashing Arrow Board SHALL NOT BE USED to laterally shift traffic.
- A full matrix PCMS may be used to simulate a Flashing Arrow Board provided it meets visibility, flash rate and dimming requirements on this sheet for the same size arrow.
- Minimum mounting height of trailer mounted Arrow Boards should be 7 feet from roadway to bottom of panel.

REQUIREMENTS			
TYPE	MINIMUM SIZE	MINIMUM NUMBER OF PANEL LAMPS	MINIMUM VISIBILITY DISTANCE
B	30 x 60	13	3/4 mile
C	48 x 96	15	1 mile

ATTENTION
Flashing Arrow Boards shall be equipped with automatic dimming devices.

WHEN NOT IN USE, REMOVE THE ARROW BOARD FROM THE RIGHT-OF-WAY OR PLACE THE ARROW BOARD BEHIND CONCRETE TRAFFIC BARRIER OR GUARDRAIL.

FLASHING ARROW BOARDS

SHEET 7 OF 12

TRUCK-MOUNTED ATTENUATORS

- Truck-mounted attenuators (TMA) used on TxDOT facilities must meet the requirements outlined in the National Cooperative Highway Research Report No. 350 (NCHRP 350) or the Manual for Assessing Safety Hardware (MASH).
- Refer to the CWZTCD for the requirements of Level 2 or Level 3 TMAs.
- Refer to the CWZTCD for a list of approved TMAs.
- TMAs are required on freeways unless otherwise noted in the plans.
- A TMA should be used anytime that it can be positioned 30 to 100 feet in advance of the area of crew exposure without adversely affecting the work performance.
- The only reason a TMA should not be required is when a work area is spread down the roadway and the work crew is an extended distance from the TMA.



Traffic
Operations
Division
Standard

BARRICADE AND CONSTRUCTION
ARROW PANEL, REFLECTORS,
WARNING LIGHTS & ATTENUATOR

BC(7)-14

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GENERAL DESIGN REQUIREMENTS

1. For long term stationary work zones on freeways, drums shall be used as the primary channelizing device.
2. For intermediate term stationary work zones on freeways, drums should be used as the primary channelizing device but may be replaced in tangent sections by vertical panels, or 42" two-piece cones. In tangent sections one-piece cones may be used with the approval of the Engineer but only if personnel are present on the project at all times to maintain the cones in proper position and location.
3. For short term stationary work zones on freeways, drums are the preferred channelizing device but may be replaced in tapers, transitions and tangent sections by vertical panels, two-piece cones or one-piece cones as approved by the Engineer.
4. Drums and all related items shall comply with the requirements of the current version of the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD) and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
5. Drums, bases, and related materials shall exhibit good workmanship and shall be free from objectionable marks or defects that would adversely affect their appearance or serviceability.
6. The Contractor shall have a maximum of 24 hours to replace any plastic drums identified for replacement by the Engineer/Inspector. The replacement device must be an approved device.

GENERAL DESIGN REQUIREMENTS

Pre-qualified plastic drums shall meet the following requirements:

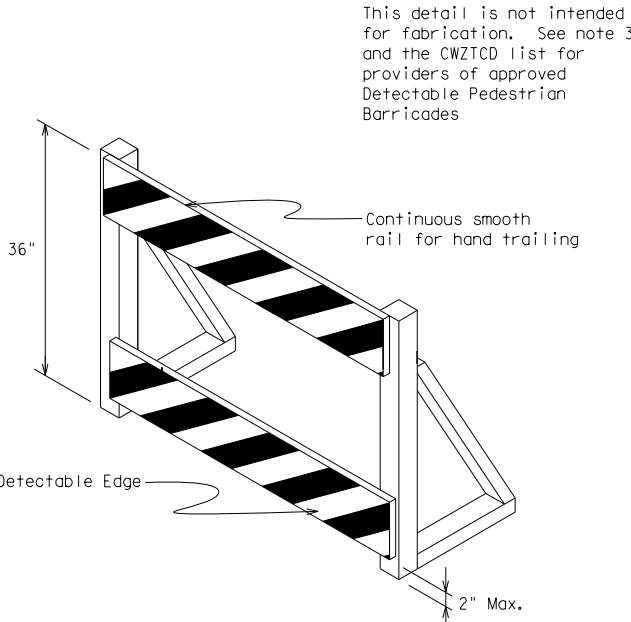
1. Plastic drums shall be a two-piece design; the "body" of the drum shall be the top portion and the "base" shall be the bottom.
2. The body and base shall lock together in such a manner that the body separates from the base when impacted by a vehicle traveling at a speed of 20 MPH or greater but prevents accidental separation due to normal handling and/or air turbulence created by passing vehicles.
3. Plastic drums shall be constructed of lightweight flexible, and deformable materials. The Contractor shall NOT use metal drums or single piece plastic drums as channelization devices or sign supports.
4. Drums shall present a profile that is a minimum of 18 inches in width at the 36 inch height when viewed from any direction. The height of drum unit (body installed on base) shall be a minimum of 36 inches and a maximum of 42 inches.
5. The top of the drum shall have a built-in handle for easy pickup and shall be designed to drain water and not collect debris. The handle shall have a minimum of two widely spaced 9/16 inch diameter holes to allow attachment of a warning light, warning reflector unit or approved compliant sign.
6. The exterior of the drum body shall have a minimum of four alternating orange and white retroreflective circumferential stripes not less than 4 inches nor greater than 8 inches in width. Any non-reflectORIZED space between any two adjacent stripes shall not exceed 2 inches in width.
7. Bases shall have a maximum width of 36 inches, a maximum height of 4 inches, and a minimum of two footholds of sufficient size to allow base to be held down while separating the drum body from the base.
8. Plastic drums shall be constructed of ultra-violet stabilized, orange, high-density polyethylene (HDPE) or other approved material.
9. Drum body shall have a maximum unballasted weight of 11 lbs.
10. Drum and base shall be marked with manufacturer's name and model number.

RETROREFLECTIVE SHEETING

1. The stripes used in drums shall be constructed of sheeting meeting the color and retroreflectivity requirements of Departmental Materials Specification DMS-8300, "Sign Face Materials." Type A reflective sheeting shall be supplied unless otherwise specified in the plans.
2. The sheeting shall be suitable for use on and shall adhere to the drum surface such that, upon vehicular impact, the sheeting shall remain adhered in-place and exhibit no delaminating, cracking, or loss of retroreflectivity other than that loss due to abrasion of the sheeting surface.

BALLAST

1. Unballasted bases shall be large enough to hold up to 50 lbs. of sand. This base, when filled with the ballast material, should weigh between 35 lbs (minimum) and 50 lbs (maximum). The ballast may be sand in one to three sandbags separate from the base, sand in a sand-filled plastic base, or other ballasting devices as approved by the Engineer. Stacking of sandbags will be allowed, however height of sandbags above pavement surface may not exceed 12 inches.
2. Bases with built-in ballast shall weigh between 40 lbs. and 50 lbs. Built-in ballast can be constructed of an integral crumb rubber base or a solid rubber base.
3. Recycled truck tire sidewalls may be used for ballast on drums approved for this type of ballast on the CWZTCD list.
4. The ballast shall not be heavy objects, water, or any material that would become hazardous to motorists, pedestrians, or workers when the drum is struck by a vehicle.
5. When used in regions susceptible to freezing, drums shall have drainage holes in the bottoms so that water will not collect and freeze becoming a hazard when struck by a vehicle.
6. Ballast shall not be placed on top of drums.
7. Adhesives may be used to secure base of drums to pavement.

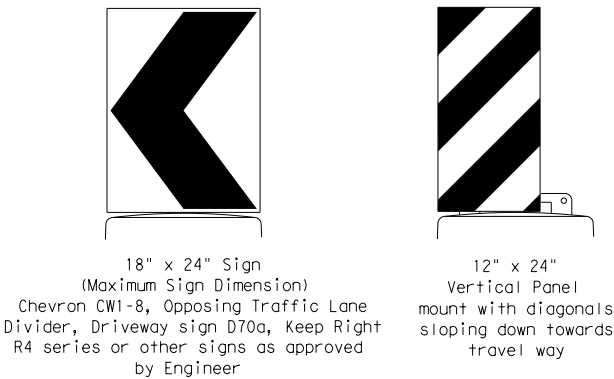


DIRECTION INDICATOR BARRICADE

1. The Direction Indicator Barricade may be used in tapers, transitions, and other areas where specific directional guidance to drivers is necessary.
2. If used, the Direction Indicator Barricade should be used in series to direct the driver through the transition and into the intended travel lane.
3. The Direction Indicator Barricade shall consist of One-Direction Large Arrow (CW1-6) sign in the size shown with a black arrow on a background of Type B_{FL} or Type C_{FL} Orange retroreflective sheeting above a rail with Type A retroreflective sheeting in alternating 4" white and orange stripes sloping downward at an angle of 45 degrees in the direction road users are to pass. Sheeting types shall be as per DMS 8300.
4. Double arrows on the Direction Indicator Barricade will not be allowed.
5. Approved manufacturers are shown on the CWZTCD List. Ballast shall be as approved by the manufacturers instructions.

DETECTABLE PEDESTRIAN BARRICADES

1. When existing pedestrian facilities are disrupted, closed, or relocated in a TTC zone, the temporary facilities shall be detectable and include accessibility features consistent with the features present in the existing pedestrian facility.
2. Where pedestrians with visual disabilities normally use the closed sidewalk, a device that is detectable by a person with a visual disability traveling with the aid of a long cane shall be placed across the full width of the closed sidewalk.
3. Detectable pedestrian barricades similar to the one pictured above, longitudinal channelizing devices, some concrete barriers, and wood or chain link fencing with a continuous detectable edging can satisfactorily delineate a pedestrian path.
4. Tape, rope, or plastic chain strung between devices are not detectable, do not comply with the design standards in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" and should not be used as a control for pedestrian movements.
5. Warning lights shall not be attached to detectable pedestrian barricades.
6. Detectable pedestrian barricades may use 8" nominal barricade rails as shown on BC(10) provided that the top rail provides a smooth continuous rail suitable for hand trailing with no splinters, burrs, or sharp edges.



Plywood, Aluminum or Metal sign
substrates shall NOT be used on
plastic drums

SIGNS, CHEVRONS, AND VERTICAL PANELS MOUNTED
ON PLASTIC DRUMS

1. Signs used on plastic drums shall be manufactured using substrates listed on the CWZTCD.
2. Chevrons and other work zone signs with an orange background shall be manufactured with Type B_{FL} or Type C_{FL} Orange sheeting meeting the color and retroreflectivity requirements of DMS-8300, "Sign Face Material," unless otherwise specified in the plans.
3. Vertical Panels shall be manufactured with orange and white sheeting meeting the requirements of DMS-8300 Type A Diagonal stripes on Vertical Panels shall slope down toward the intended traveled lane.
4. Other sign messages (text or symbolic) may be used as approved by the Engineer. Sign dimensions shall not exceed 18 inches in width or 24 inches in height, except for the R9 series signs discussed in note 8 below.
5. Signs shall be installed using a 1/2 inch bolt (nominal) and nut, two washers, and one locking washer for each connection.
6. Mounting bolts and nuts shall be fully engaged and adequately torqued. Bolts should not extend more than 1/2 inch beyond nuts.
7. Chevrons may be placed on drums on the outside of curves, on merging tapers or on shifting tapers. When used in these locations they may be placed on every drum or spaced not more than on every third drum. A minimum of three (3) should be used at each location called for in the plans.
8. R9-9, R9-10, R9-11 and R9-11a Sidewalk Closed signs which are 24 inches wide may be mounted on plastic drums, with approval of the Engineer.

SHEET 8 OF 12



**Traffic
Operations
Division
Standard**

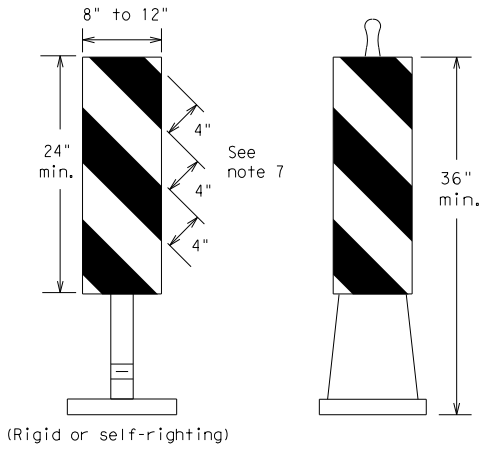
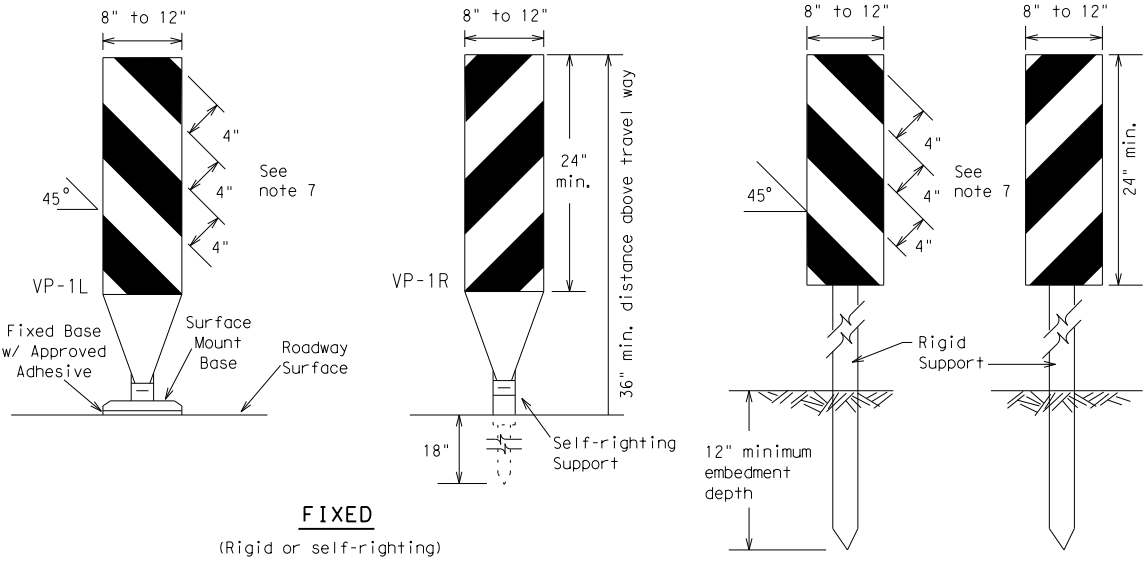
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (8) - 14

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9-07	8-14						RD008		

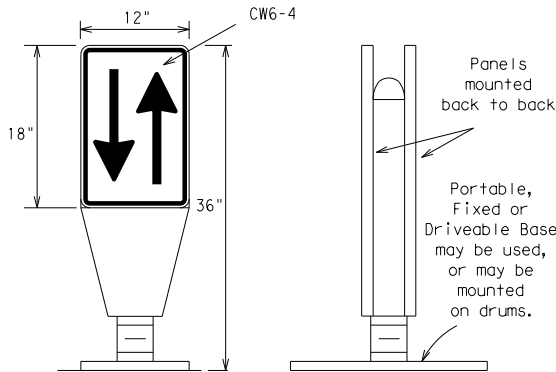
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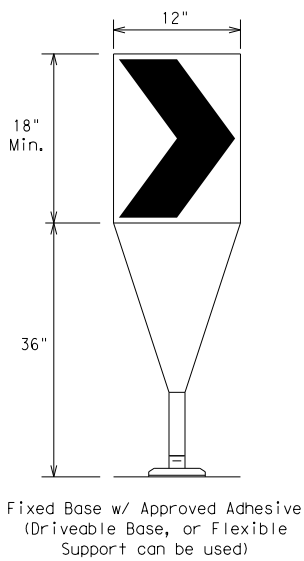
- Vertical Panels (VP's) are normally used to channelize traffic or divide opposing lanes of traffic.
- VP's may be used in daytime or nighttime situations. They may be used at the edge of shoulder drop-offs and other areas such as lane transitions where positive daytime and nighttime delineation is required. The Engineer/Inspector shall refer to the Roadway Design Manual Appendix B "Treatment of Pavement Drop-offs in Work Zones" for additional guidelines on the use of VP's for drop-offs.
- VP's should be mounted back to back if used at the edge of cuts adjacent to two-way two lane roadways. Stripes are to be reflective orange and reflective white and should always slope downward toward the travel lane.
- VP's used on expressways and freeways or other high speed roadways, may have more than 270 square inches of retroreflective area facing traffic.
- Self-righting supports are available with portable base. See "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- Sheeting for the VP's shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless noted otherwise.
- Where the height of reflective material on the vertical panel is 36 inches or greater, a panel stripe of 6 inches shall be used.

VERTICAL PANELS (VPs)



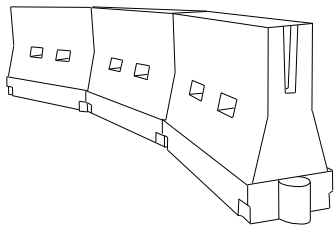
- Opposing Traffic Lane Dividers (OTLD) are delineation devices designed to convert a normal one-way roadway section to two-way operation. OTLD's are used on temporary centerlines. The upward and downward arrows on the sign's face indicate the direction of traffic on either side of the divider. The base is secured to the pavement with an adhesive or rubber weight to minimize movement caused by a vehicle impact or wind gust.
- The OTLD may be used in combination with 42" cones or VPs.
- Spacing between the OTLD shall not exceed 500 feet. 42" cones or VPs placed between the OTLD's should not exceed 100 foot spacing.
- The OTLD shall be orange with a black non-reflective legend. Sheeting for the OTLD shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.

OPPOSING TRAFFIC LANE DIVIDERS (OTLD)



- The chevron shall be a vertical rectangle with a minimum size of 12 by 18 inches.
- Chevrons are intended to give notice of a sharp change of alignment with the direction of travel and provide additional emphasis and guidance for vehicle operators with regard to changes in horizontal alignment of the roadway.
- Chevrons, when used, shall be erected on the outside of a sharp curve or turn, or on the far side of an intersection. They shall be in line with and at right angles to approaching traffic. Spacing should be such that the motorist always has three in view, until the change in alignment eliminates its need.
- To be effective, the chevron should be visible for at least 500 feet.
- Chevrons shall be orange with a black nonreflective legend. Sheeting for the chevron shall be retroreflective Type B_{FL} or Type C_{FL} conforming to Departmental Material Specification DMS-8300, unless noted otherwise. The legend shall meet the requirements of DMS-8300.
- For Long Term Stationary use on tapers or transitions on freeways and divided highways self-righting chevrons may be used to supplement plastic drums but not to replace plastic drums.

CHEVRONS



LONGITUDINAL CHANNELIZING DEVICES (LCD)

- LCDs are crashworthy, lightweight, deformable devices that are highly visible, have good target value and can be connected together. They are not designed to contain or redirect a vehicle on impact.
- LCDs may be used instead of a line of cones or drums.
- LCDs shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- LCDs should not be used to provide positive protection for obstacles, pedestrians or workers.
- LCDs shall be supplemented with retroreflective delineation as required for temporary barriers on BC(7) when placed roughly parallel to the travel lanes.
- LCDs used as barricades placed perpendicular to traffic should have at least one row of reflective sheeting meeting the requirements for barricade rails as shown on BC(10) placed near the top of the LCD along the full length of the device.

WATER BALLASTED SYSTEMS USED AS BARRIERS

- Water ballasted systems used as barriers shall not be used solely to channelize road users, but also to protect the work space per the appropriate NCHRP 350 crashworthiness requirements based on roadway speed and barrier application.
- Water ballasted systems used to channelize vehicular traffic shall be supplemented with retroreflective delineation or channelizing devices to improve daytime/nighttime visibility. They may also be supplemented with pavement markings.
- Water ballasted systems used as barriers shall be placed in accordance to application and installation requirements specific to the device, and used only when shown on the CWZTCD list.
- Water ballasted systems used as barriers should not be used for a merging taper except in low speed (less than 45 MPH) urban areas. When used on a taper in a low speed urban area, the taper shall be delineated and the taper length should be designed to optimize road user operations considering the available geometric conditions.
- When water ballasted systems used as barriers have blunt ends exposed to traffic, they should be attenuated as per manufacturer recommendations or flared to a point outside the clear zone.

If used to channelize pedestrians, longitudinal channelizing devices or water ballasted systems must have a continuous detectable bottom for users of long canes and the top of the unit shall not be less than 32 inches in height.

HOLLOW OR WATER BALLASTED SYSTEMS USED AS LONGITUDINAL CHANNELIZING DEVICES OR BARRIERS

GENERAL NOTES

- Work Zone channelizing devices illustrated on this sheet may be installed in close proximity to traffic and are suitable for use on high or low speed roadways. The Engineer/Inspector shall ensure that spacing and placement is uniform and in accordance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
- Channelizing devices shown on this sheet may have a driveable, fixed or portable base. The requirement for self-righting channelizing devices must be specified in the General Notes or other plan sheets.
- Channelizing devices on self-righting supports should be used in work zone areas where channelizing devices are frequently impacted by errant vehicles or vehicle related wind gusts making alignment of the channelizing devices difficult to maintain. Locations of these devices shall be detailed elsewhere in the plans. These devices shall conform to the TMUTCD and the "Compliant Work Zone Traffic Control Devices List" (CWZTCD).
- The Contractor shall maintain devices in a clean condition and replace damaged, nonreflective, faded, or broken devices and bases as required by the Engineer/Inspector. The Contractor shall be required to maintain proper device spacing and alignment.
- Portable bases shall be fabricated from virgin and/or recycled rubber. The portable bases shall weigh a minimum of 30 lbs.
- Pavement surfaces shall be prepared in a manner that ensures proper bonding between the adhesives, the fixed mount bases and the pavement surface. Adhesives shall be prepared and applied according to the manufacturer's recommendations.
- The installation and removal of channelizing devices shall not cause detrimental effects to the final pavement surfaces, including pavement surface discoloration or surface integrity. Driveable bases shall not be permitted on final pavement surfaces. The Engineer/Inspector shall approve all application and removal procedures of fixed bases.

Posted Speed X	Formula	Minimum Desirable Taper Lengths X X			Suggested Maximum Spacing of Channelizing Devices	
		10' Offset	11' Offset	12' Offset	On a Taper	On a Tangent
30	$L = \frac{WS^2}{60}$	150'	165'	180'	30'	60'
35		205'	225'	245'	35'	70'
40		265'	295'	320'	40'	80'
45	L = WS	450'	495'	540'	45'	90'
50		500'	550'	600'	50'	100'
55		550'	605'	660'	55'	110'
60		600'	660'	720'	60'	120'
65		650'	715'	780'	65'	130'
70		700'	770'	840'	70'	140'
75		750'	825'	900'	75'	150'
80		800'	880'	960'	80'	160'

XX Taper lengths have been rounded off.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

SUGGESTED MAXIMUM SPACING OF CHANNELIZING DEVICES AND MINIMUM DESIRABLE TAPER LENGTHS

SHEET 9 OF 12



BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES

BC (9) - 14

FILE:	bc-14.dgn	DN:	TxDOT	CK:	TxDOT	DW:	TxDOT	CK:	TxDOT
© TxDOT	November 2002	CONT	SECT	JOB			HIGHWAY		
REVISIONS									
9-07	8-14	DIST	COUNTY				SHEET NO.		
7-13							RD009		

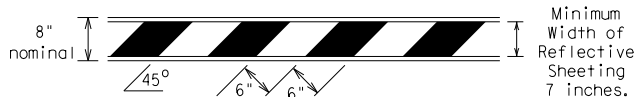
DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by TxDOT for any purpose whatsoever. TxDOT assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

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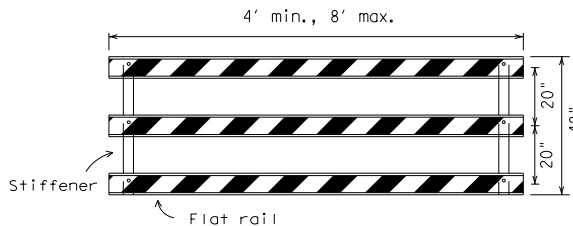
TYPE 3 BARRICADES

1. Refer to the Compliant Work Zone Traffic Control Devices List (CWZTCD) for details of the Type 3 Barricades and a list of all materials used in the construction of Type 3 Barricades.
2. Type 3 Barricades shall be used at each end of construction projects closed to all traffic.
3. Barricades extending across a roadway should have stripes that slope downward in the direction toward which traffic must turn in detouring. When both right and left turns are provided, the chevron striping may slope downward in both directions from the center of the barricade. Where no turns are provided at a closed road striping should slope downward in both directions toward the center of roadway.
4. Striping of rails, for the right side of the roadway, should slope downward to the left. For the left side of the roadway, striping should slope downward to the right.
5. Identification markings may be shown only on the back of the barricade rails. The maximum height of letters and/or company logos used for identification shall be 1".
6. Barricades shall not be placed parallel to traffic unless an adequate clear zone is provided.
7. Warning lights shall NOT be installed on barricades.
8. Where barricades require the use of weights to keep from turning over, the use of sandbags with dry, cohesionless sand is recommended. The sandbags will be tied shut to keep the sand from spilling and to maintain a constant weight. Sand bags shall not be stacked in a manner that covers any portion of a barricade rails reflective sheeting. Rock, concrete, iron, steel or other solid objects will NOT be permitted. Sandbags should weigh a minimum of 35 lbs and a maximum of 50 lbs. Sandbags shall be made of a durable material that tears upon vehicular impact. Rubber (such as tire inner tubes) shall not be used for sandbags. Sandbags shall only be placed along or upon the base supports of the device and shall not be suspended above ground level or hung with rope, wire, chains or other fasteners.
9. Sheeting for barricades shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300 unless otherwise noted.

Barricades shall NOT be used as a sign support.

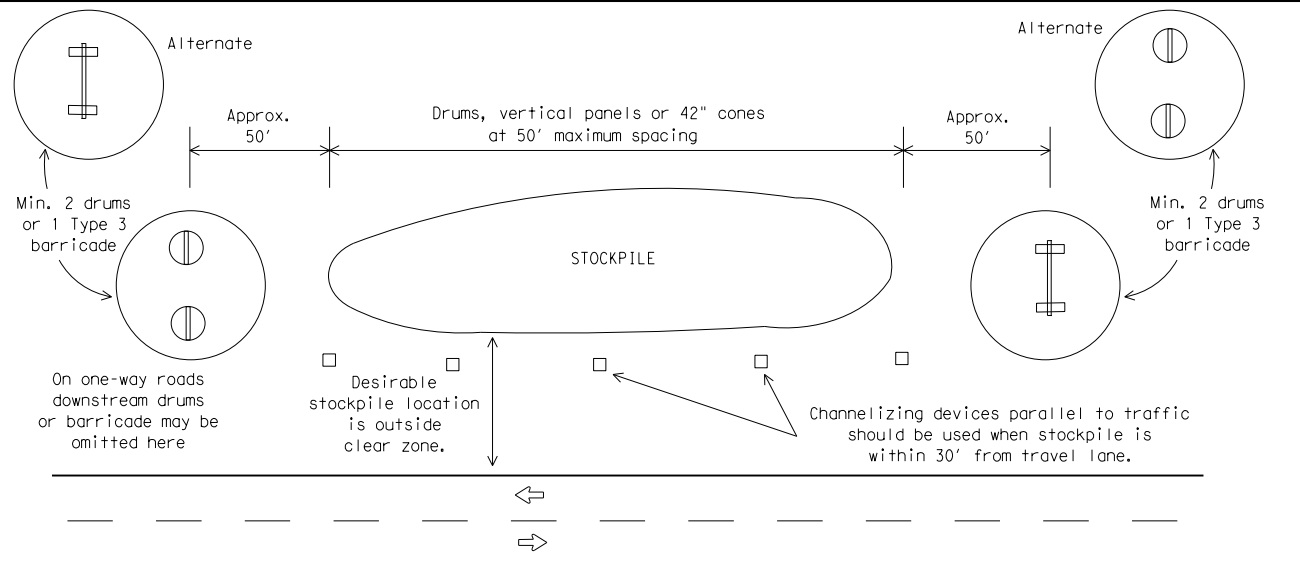


TYPICAL STRIPING DETAIL FOR BARRICADE RAIL



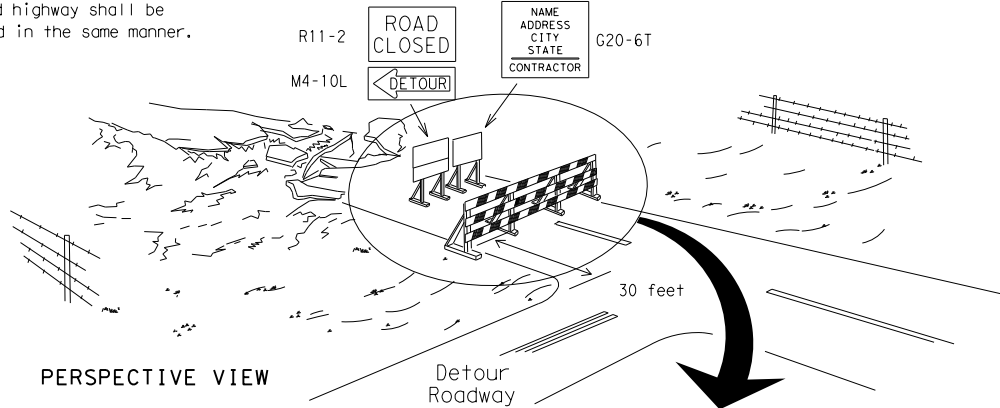
Stiffener may be inside or outside of support, but no more than 2 stiffeners shall be allowed on one barricade.

TYPICAL PANEL DETAIL FOR SKID OR POST TYPE BARRICADES



TRAFFIC CONTROL FOR MATERIAL STOCKPILES

Each roadway of a divided highway shall be barricaded in the same manner.

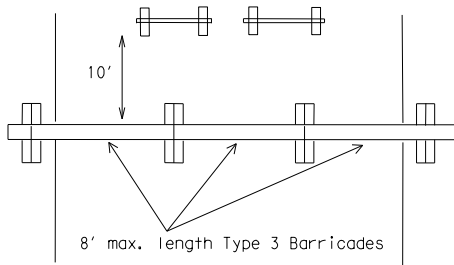


PERSPECTIVE VIEW

The three rails on Type 3 barricades shall be reflectorized orange and reflective white stripes on one side facing one-way traffic and both sides for two-way traffic.

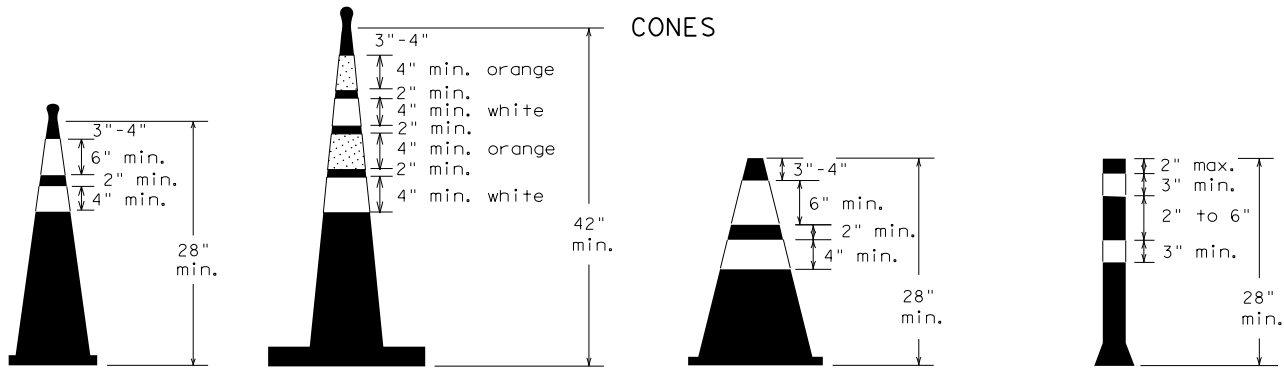
Barricade striping should slant downward in the direction of detour.

1. Signs should be mounted on independent supports at a 7 foot mounting height in center of roadway. The signs should be a minimum of 10 feet behind Type 3 Barricades.
2. Advance signing shall be as specified elsewhere in the plans.



PLAN VIEW

TYPE 3 BARRICADE (POST AND SKID) TYPICAL APPLICATION



Two-Piece cones

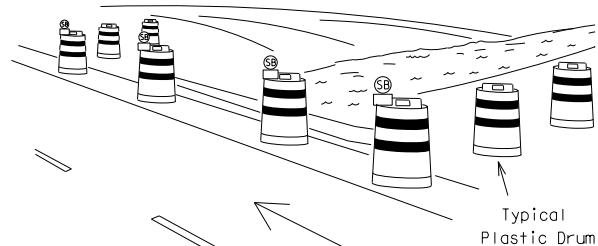
One-Piece cones

Tubular Marker

28" Cones shall have a minimum weight of 9 1/2 lbs.

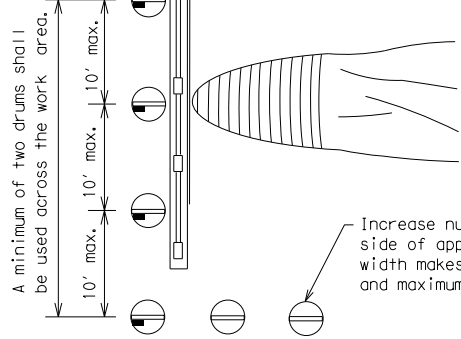
42" 2-piece cones shall have a minimum weight of 30 lbs. including base.

1. Traffic cones and tubular markers shall be predominantly orange, and meet the height and weight requirements shown above.
2. One-piece cones have the body and base of the cone molded in one consolidated unit. Two-piece cones have a cone shaped body and a separate rubber base, or ballast, that is added to keep the device upright and in place.
3. Two-piece cones may have a handle or loop extending up to 8" above the minimum height shown, in order to aid in retrieving the device.
4. Cones or tubular markers used at night shall have white or white and orange reflective bands as shown above. The reflective bands shall have a smooth, sealed outer surface and meet the requirements of Departmental Material Specification DMS-8300 Type A.
5. 28" cones and tubular markers are generally suitable for short duration and short-term stationary work as defined on BC(4). These should not be used for intermediate-term or long-term stationary work unless personnel is on-site to maintain them in their proper upright position.
6. 42" two-piece cones, vertical panels or drums are suitable for all work zone durations.
7. Cones or tubular markers used on each project should be of the same size and shape.



PERSPECTIVE VIEW

These drums are not required on one-way roadway



PLAN VIEW

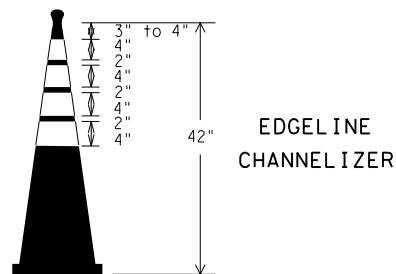
CULVERT WIDENING OR OTHER ISOLATED WORK WITHIN THE PROJECT LIMITS

1. Where positive redirection capability is provided, drums may be omitted.
2. Plastic construction fencing may be used with drums for safety as required in the plans.
3. Vertical Panels on flexible support may be substituted for drums when the shoulder width is less than 4 feet.
4. When the shoulder width is greater than 12 feet, steady-burn lights may be omitted if drums are used.
5. Drums must extend the length of the culvert widening.

LEGEND

	Plastic drum
	Plastic drum with steady burn light or yellow warning reflector
	Steady burn warning light or yellow warning reflector

THIS DEVICE SHALL NOT BE USED ON PROJECTS LET AFTER MARCH 2014.



EDGELINE CHANNELIZER

1. This device is intended only for use in place of a vertical panel to channelize traffic by indicating the edge of the travel lane. It is not intended to be used in transitions or tapers.
2. This device shall not be used to separate lanes of traffic (opposing or otherwise) or warn of objects.
3. This device is based on a 42 inch, two-piece cone with an alternate striping pattern: four 4 inch retroreflective bands, with an approximate 2 inch gap between bands. The color of the band should correspond to the color of the edgeline (yellow for left edgeline, white for right edgeline) for which the device is substituted or for which it supplements. The reflectorized bands shall be retroreflective Type A conforming to Departmental Material Specification DMS-8300, unless otherwise noted.
4. The base must weigh a minimum of 30 lbs.

SHEET 10 OF 12

 Texas Department of Transportation				Traffic Operations Division Standard			
BARRICADE AND CONSTRUCTION CHANNELIZING DEVICES							
BC (10) - 14							
FILE: bc-14.dgn		DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT		
© TxDOT November 2002		CONT	SECT	JOB		HIGHWAY	
REVISIONS							
9-07	8-14	DIST	COUNTY			SHEET NO.	
7-13						RD010	

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WORK ZONE PAVEMENT MARKINGS

GENERAL

1. The Contractor shall be responsible for maintaining work zone and existing pavement markings, in accordance with the standard specifications and special provisions, on all roadways open to traffic within the CSJ limits unless otherwise stated in the plans.
2. Color, patterns and dimensions shall be in conformance with the "Texas Manual on Uniform Traffic Control Devices" (TMUTCD).
3. Additional supplemental pavement marking details may be found in the plans or specifications.
4. Pavement markings shall be installed in accordance with the TMUTCD and as shown on the plans.
5. When short term markings are required on the plans, short term markings shall conform with the TMUTCD, the plans and details as shown on the Standard Plan Sheet WZ(STPM).
6. When standard pavement markings are not in place and the roadway is opened to traffic, DO NOT PASS signs shall be erected to mark the beginning of the sections where passing is prohibited and PASS WITH CARE signs at the beginning of sections where passing is permitted.
7. All work zone pavement markings shall be installed in accordance with Item 662, "Work Zone Pavement Markings."

RAISED PAVEMENT MARKERS

1. Raised pavement markers are to be placed according to the patterns on BC(12).
2. All raised pavement markers used for work zone markings shall meet the requirements of Item 672, "RAISED PAVEMENT MARKERS" and Departmental Material Specification DMS-4200 or DMS-4300.

PREFABRICATED PAVEMENT MARKINGS

1. Removable prefabricated pavement markings shall meet the requirements of DMS-8241.
2. Non-removable prefabricated pavement markings (foil back) shall meet the requirements of DMS-8240.

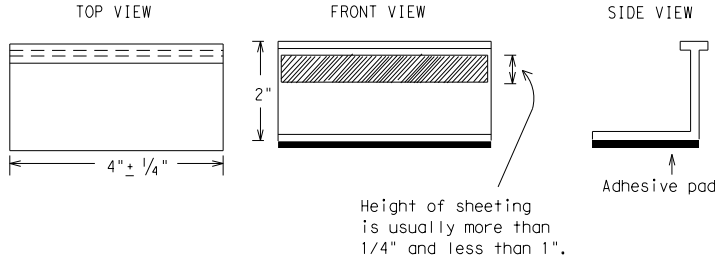
MAINTAINING WORK ZONE PAVEMENT MARKINGS

1. The Contractor will be responsible for maintaining work zone pavement markings within the work limits.
2. Work zone pavement markings shall be inspected in accordance with the frequency and reporting requirements of work zone traffic control device inspections as required by Form 599.
3. The markings should provide a visible reference for a minimum distance of 300 feet during normal daylight hours and 160 feet when illuminated by automobile low-beam headlights at night, unless sight distance is restricted by roadway geometrics.
4. Markings failing to meet this criteria within the first 30 days after placement shall be replaced at the expense of the Contractor as per Specification Item 662.

REMOVAL OF PAVEMENT MARKINGS

1. Pavement markings that are no longer applicable, could create confusion or direct a motorist toward or into the closed portion of the roadway shall be removed or obliterated before the roadway is opened to traffic.
2. The above shall not apply to detours in place for less than three days, where flaggers and/or sufficient channelizing devices are used in lieu of markings to outline the detour route.
3. Pavement markings shall be removed to the fullest extent possible, so as not to leave a discernable marking. This shall be by any method approved by TxDOT Specification Item 677 for "Eliminating Existing Pavement Markings and Markers".
4. The removal of pavement markings may require resurfacing or seal coating portions of the roadway as described in Item 677.
5. Subject to the approval of the Engineer, any method that proves to be successful on a particular type pavement may be used.
6. Blast cleaning may be used but will not be required unless specifically shown in the plans.
7. Over-painting of the markings SHALL NOT BE permitted.
8. Removal of raised pavement markers shall be as directed by the Engineer.
9. Removal of existing pavement markings and markers will be paid for directly in accordance with Item 677, "ELIMINATING EXISTING PAVEMENT MARKINGS AND MARKERS," unless otherwise stated in the plans.
- 10.Black-out marking tape may be used to cover conflicting existing markings for periods less than two weeks when approved by the Engineer.

Temporary Flexible-Reflective
Roadway Marker Tabs



STAPLES OR NAILS SHALL NOT BE USED TO SECURE
TEMPORARY FLEXIBLE-REFLECTIVE ROADWAY MARKER
TABS TO THE PAVEMENT SURFACE

1. Temporary flexible-reflective roadway marker tabs used as guidemarks shall meet the requirements of DMS-8242.
2. Tabs detailed on this sheet are to be inspected and accepted by the Engineer or designated representative. Sampling and testing is not normally required, however at the option of the Engineer, either "A" or "B" below may be imposed to assure quality before placement on the roadway.
 - A. Select five (5) or more tabs at random from each lot or shipment and submit to the Construction Division, Materials and Pavement Section to determine specification compliance.
 - B. Select five (5) tabs and perform the following test. Affix five (5) tabs at 24 inch intervals on an asphaltic pavement in a straight line. Using a medium size passenger vehicle or pickup, run over the markers with the front and rear tires at a speed of 35 to 40 miles per hour, four (4) times in each direction. No more than one (1) out of the five (5) reflective surfaces shall be lost or displaced as a result of this test.
3. Small design variances may be noted between tab manufacturers.
4. See Standard Sheet WZ(STPM) for tab placement on new pavements. See Standard Sheet TCP(7-1) for tab placement on seal coat work.

RAISED PAVEMENT MARKERS USED AS GUIDEMARKS

1. Raised pavement markers used as guidemarks shall be from the approved product list, and meet the requirements of DMS-4200.
2. All temporary construction raised pavement markers provided on a project shall be of the same manufacturer.
3. Adhesive for guidemarks shall be bituminous material hot applied or butyl rubber pad for all surfaces, or thermoplastic for concrete surfaces.

Guidemarks shall be designated as:
YELLOW - (two amber reflective surfaces with yellow body).
WHITE - (one silver reflective surface with white body).

DEPARTMENTAL MATERIAL SPECIFICATIONS	
PAVEMENT MARKERS (REFLECTORIZED)	DMS-4200
TRAFFIC BUTTONS	DMS-4300
EPOXY AND ADHESIVES	DMS-6100
BITUMINOUS ADHESIVE FOR PAVEMENT MARKERS	DMS-6130
PERMANENT PREFABRICATED PAVEMENT MARKINGS	DMS-8240
TEMPORARY REMOVABLE, PREFABRICATED PAVEMENT MARKINGS	DMS-8241
TEMPORARY FLEXIBLE, REFLECTIVE ROADWAY MARKER TABS	DMS-8242

A list of prequalified reflective raised pavement markers, non-reflective traffic buttons, roadway marker tabs and other pavement markings can be found at the Material Producer List web address shown on BC(1).

SHEET 11 OF 12



Texas Department of Transportation

Traffic Operations Division Standard

BARRICADE AND CONSTRUCTION PAVEMENT MARKINGS

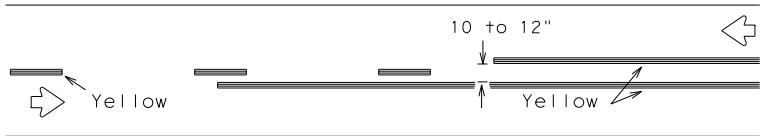
BC (11) - 14

FILE: bc-14.dgn	DN: TxDOT	CK: TxDOT	DW: TxDOT	CK: TxDOT
© TxDOT February 1998	CONT	SECT	JOB	HIGHWAY
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2-98 9-07	DIST			
1-02 7-13		COUNTY		
11-02 8-14		SHEET NO.		
105				RD011

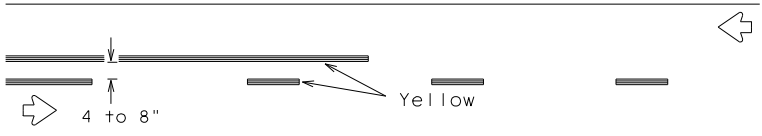
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PAVEMENT MARKING PATTERNS



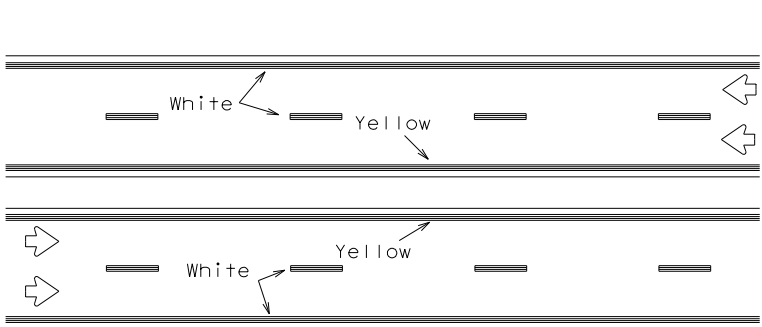
REFLECTORIZED PAVEMENT MARKINGS - PATTERN A



REFLECTORIZED PAVEMENT MARKINGS - PATTERN B

Pattern A is the TxDOT Standard, however Pattern B may be used if approved by the Engineer.
Prefabricated markings may be substituted for reflectORIZED pavement markings.

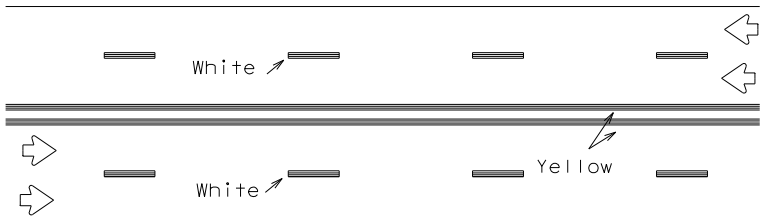
CENTER LINE & NO-PASSING ZONE BARRIER LINES FOR TWO-LANE, TWO-WAY HIGHWAYS



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.

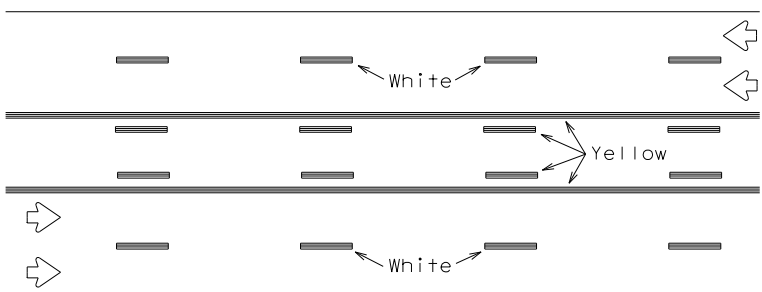
EDGE & LANE LINES FOR DIVIDED HIGHWAY



REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.

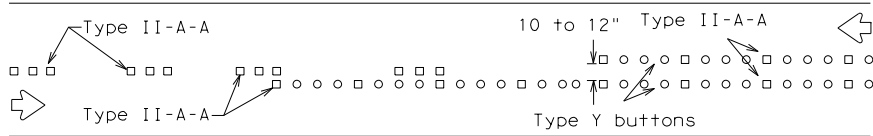
LANE & CENTER LINES FOR MULTILANE UNDIVIDED HIGHWAYS



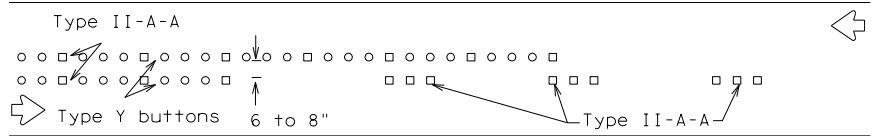
REFLECTORIZED PAVEMENT MARKINGS

Prefabricated markings may be substituted for reflectORIZED pavement markings.

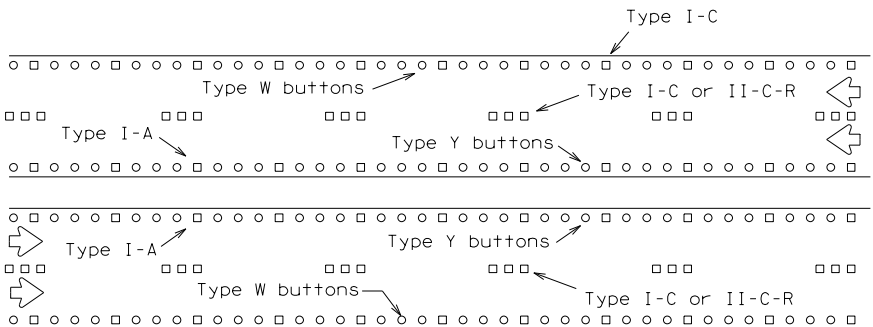
TWO-WAY LEFT TURN LANE



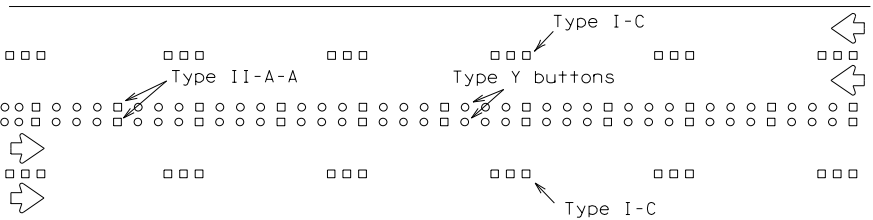
RAISED PAVEMENT MARKERS - PATTERN A



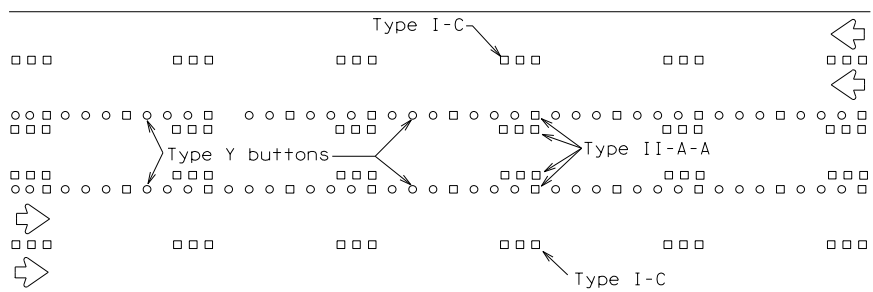
RAISED PAVEMENT MARKERS - PATTERN B



RAISED PAVEMENT MARKERS

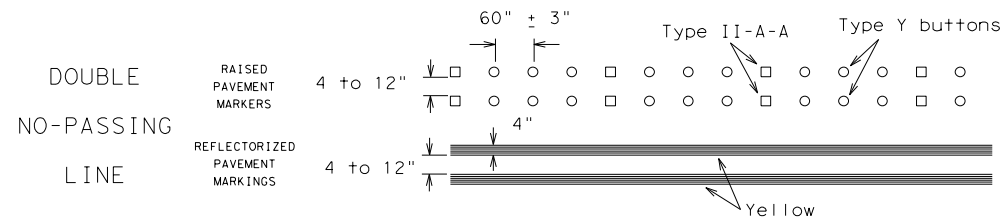


RAISED PAVEMENT MARKERS

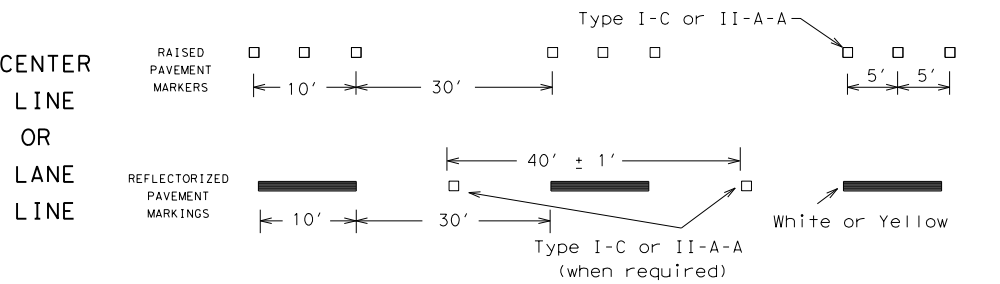
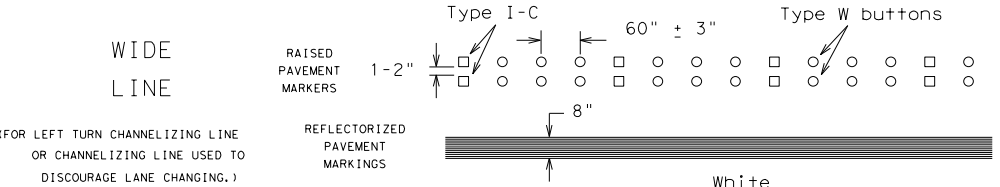
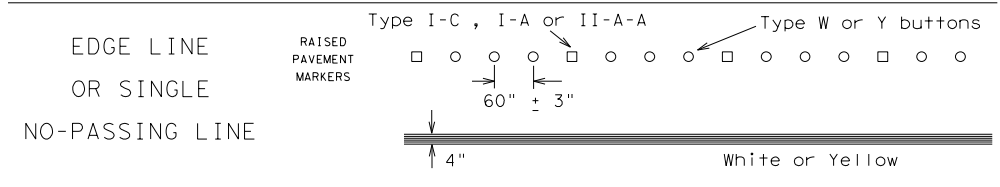


RAISED PAVEMENT MARKERS

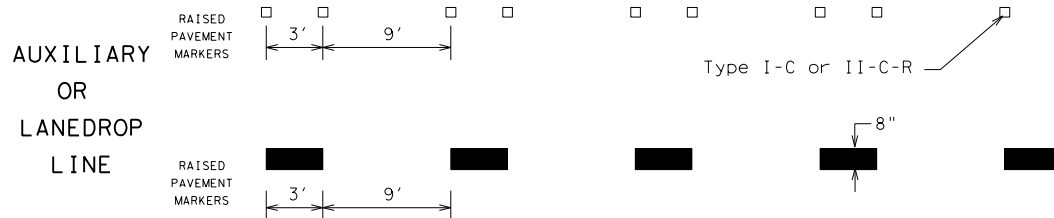
STANDARD WORK ZONE PAVEMENT MARKINGS DETAILS



SOLID LINES

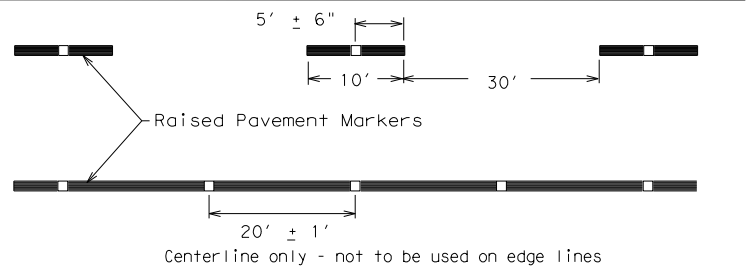


BROKEN LINES



REMOVABLE MARKINGS WITH RAISED PAVEMENT MARKERS

If raised pavement markers are used to supplement REMOVABLE markings, the markers shall be applied to the top of the tape at the approximate mid length of tape used for broken lines or at 20 foot spacing for solid lines. This allows an easier removal of raised pavement markers and tape.



SHEET 12 OF 12

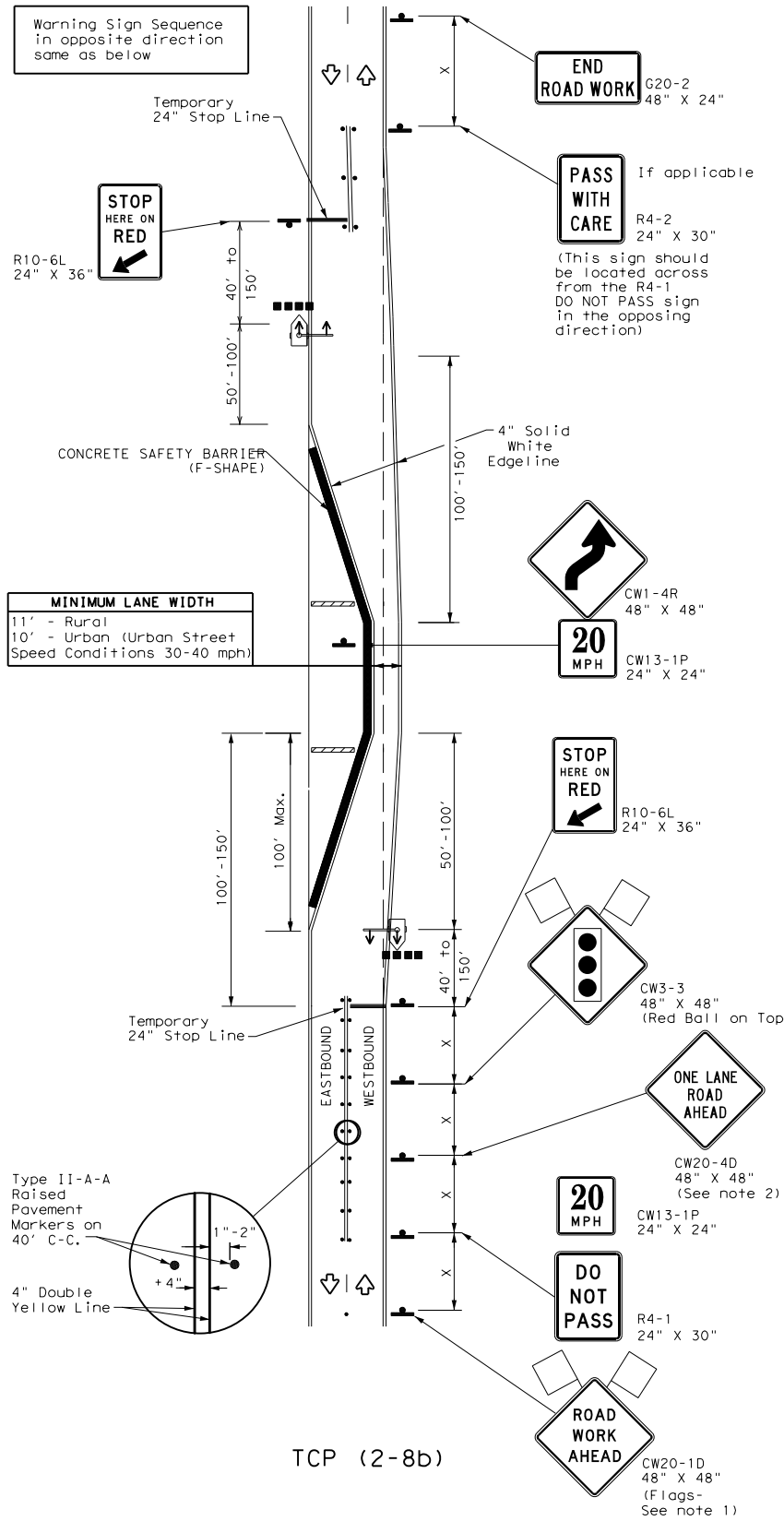


BARRICADE AND CONSTRUCTION PAVEMENT MARKING PATTERNS

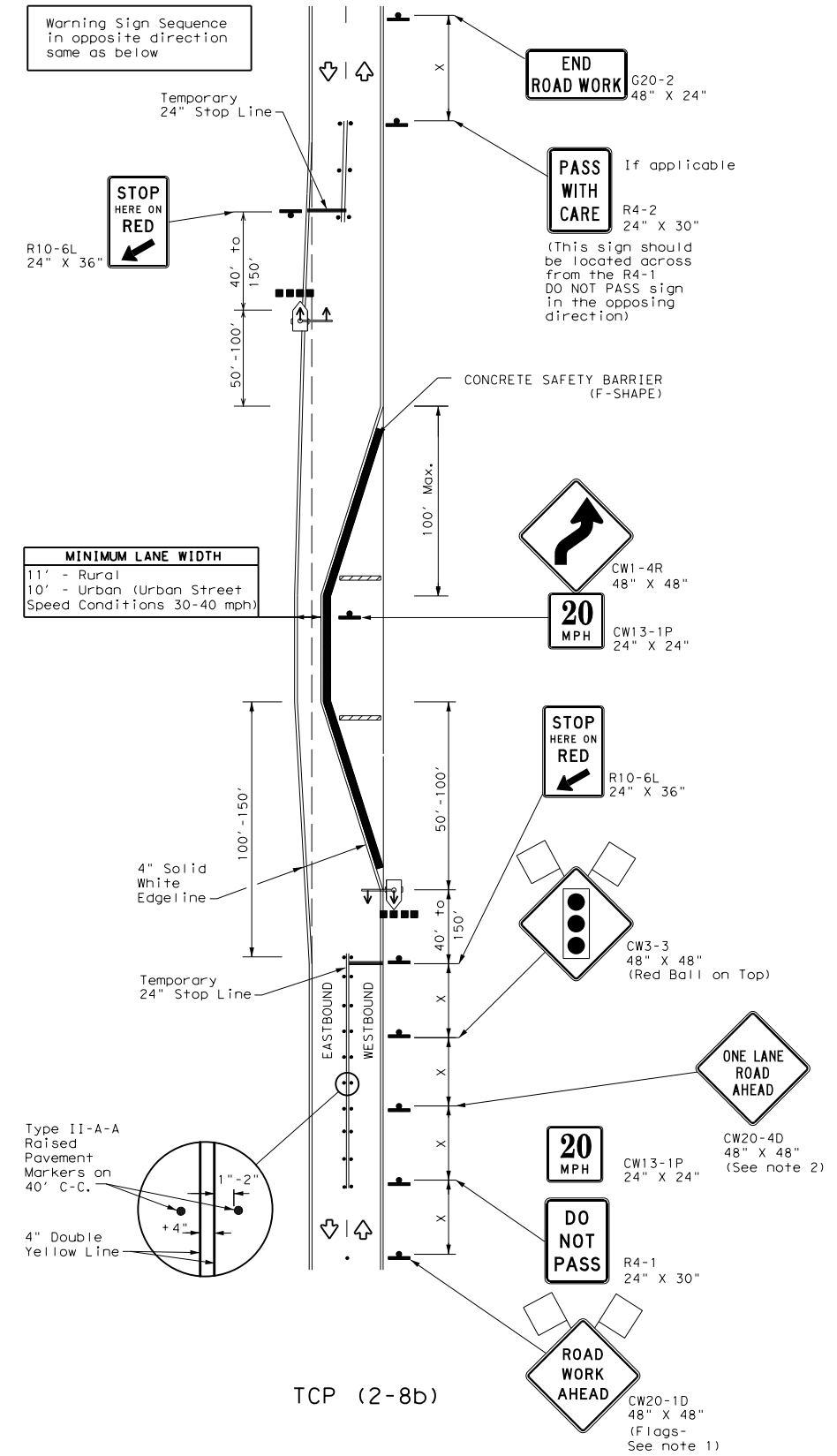
BC(12)-14

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©TxDOT	February 1998	CONT	SECT	JOB	HIGHWAY				
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2-98	7-13								
11-02	8-14								
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ONE LANE TWO-WAY TCP-PHASE 1
TRAFFIC CONTROL WITH TRAFFIC SIGNAL
(Less Than 2000 ADT-See Note 5)



ONE LANE TWO-WAY TCP-PHASE 2
TRAFFIC CONTROL WITH TRAFFIC SIGNAL
(Less Than 2000 ADT-See Note 5)

LEGEND			
	Type 3 Barricade		Channelizing Devices
	Sign		Traffic Flow
	Flag		Flagger
	Raised Pavement Markers by II-AA		Temporary or Portable Traffic Signal

Posted Speed X	Formula	Minimum Desirable Taper Lengths X X	Suggested Maximum Spacing of Channelizing Devices	Minimum Sign Spacing "X" Distance	Suggested Longitudinal Buffer Space "B"	Stopping Sight Distance
30	$L = \frac{WS^2}{60}$	10' Offset	10' On a Taper	120'	90'	200'
35		11' Offset	11' On a Taper	160'	120'	250'
40		12' Offset	12' On a Taper	240'	155'	305'
45	L = WS	450'	45'	320'	195'	360'
50		500'	50'	400'	240'	425'
55		550'	55'	500'	295'	495'
60		600'	60'	600'	350'	570'
65		650'	65'	700'	410'	645'
70		700'	70'	800'	475'	730'
75		750'	75'	900'	540'	820'

X Conventional Roads Only
XX Taper lengths have been rounded off.
L=Length of Taper (FT) W=Width of Offset (FT) S=Posted Speed (MPH)

TYPICAL USAGE				
MOBILE	SHORT DURATION	SHORT TERM STATIONARY	INTERMEDIATE TERM STATIONARY	LONG TERM STATIONARY
			✓	✓

- GENERAL NOTES**
- Flags attached to signs where shown are REQUIRED.
 - When this TCP is used at a location which does not involve a bridge, a 48" x 48" CW20-4D "ONE LANE ROAD AHEAD" signs should be used in lieu of the CW5-3 "ONE LANE BRIDGE" signs. The CW13-1P Advisory Speed Plaque is required with either warning sign.
 - Raised pavement markers shall be placed 40 feet c-c on centerline between DO NOT PASS signs and stop or yield lines.
 - For intermediate term situations, when it is not feasible to remove and restore pavement markings, the channelization must be made dominant by using a very close spacing. This is especially important in locations of conflicting information, such as where traffic is directed over a double yellow centerline. In such locations a maximum channelizing device spacing of 20 feet is recommended. The 20 foot channelizing device spacing recommendation is intended for the area of conflicting information and not the entire work zone.
- TCP (2-8a)**
- Traffic control by CW3-2 "YIELD AHEAD" symbol signs for one lane two-way traffic control operations should be limited to work spaces less than 400 feet long and roadways with less than 2000 ADT. Otherwise, portable traffic signals should be used.
 - If power is available, a flashing beacon should be attached to the CW3-2 "YIELD AHEAD" symbol sign for emphasis.
 - The R1-2 "YIELD" and R1-2aP "TO ONCOMING TRAFFIC" signs and other regulatory signs shall be installed at 7 foot minimum mounting height.
- TCP (2-8b)**
- A list of approved Portable Traffic Signals can be found in the "Compliant Work Zone Traffic Control Devices" list.
 - Portable traffic signals should be located to provide adequate stopping sight distance for approaching motorist (See table above).

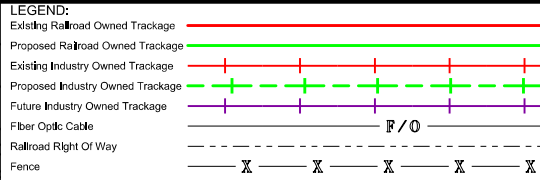
For construction or maintenance contract work, specific project requirements for shadow vehicles can be found in the project GENERAL NOTES for Item 502, Barricades, Signs and Traffic Handling.



FIBER OPTIC CABLE! CALL BEFORE YOU DIG 1-800-336-9193



DRAWN BY: CJB
CHECKED BY: MAM
DATE: 3 MARCH 2017
SHEET NUMBER: RD013

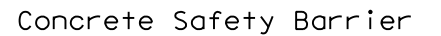
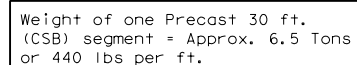
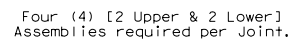
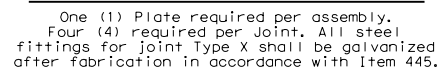
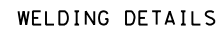
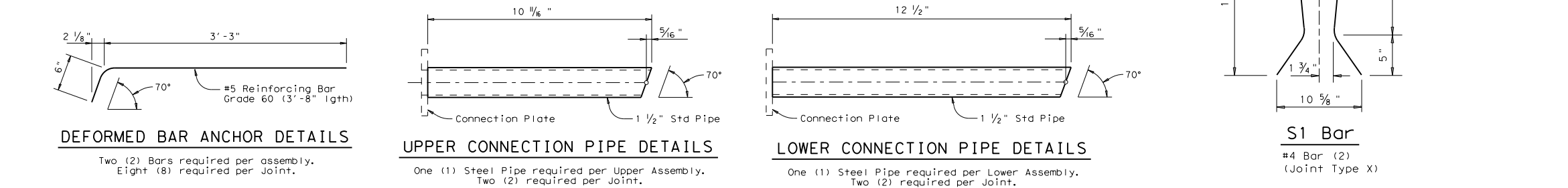


UNION PACIFIC RAILROAD
And SOUTHWEST GULF RAILROAD

LOCATION & DESCRIPTION:
MILEPOST 249.50, DEL RIO SUBDIVISION
DUNLAY, TX

FES #31985
SOUTHWEST GULF RAILROAD INDUSTRIAL SPUR
TCP-LONG TERM ONE-LANE TWO-WAY CONTROL

DATE:
FILE:



* When 1" ACP is "not" used as lateral support for permanent barrier placement. A permissible method of attaining the equivalent lateral support may be used, See CSB(6) sheet.

GENERAL NOTES

1. Concrete shall be Class H with a minimum compressive strength of 3,600 psi.
2. Where used, rebar reinforcement shall be Grade 60 and conform to ASTM A615.
3. Precast barrier length shall be 30 ft. unless otherwise specified on the plans.
4. All precast barrier edges shall have a $\frac{3}{4}$ " chamfer or tooled radius.
5. All concrete, reinforcement, joint connection systems, grout etc. as shown, are considered as part of the barrier payment.
6. All steel assemblies for joint shall be galvanized after fabrication in accordance with Item 445, "Galvanizing."
7. Regardless of the method of handling, barrier lifting points shall be approx. 7.5 feet from the ends of the barrier. Lifting devices and attachments to barrier sections shall be approved by the Engineer.
8. Surface finishing and grouting (where required) shall be two parts sand one part cement with enough water to make the mixture plastic. Grouting shall be done in a manner that will assure a smooth surface. Surface finishing shall be considered subsidiary to the various bid items involved.
9. Conduit trough when required shall be shown elsewhere on the plans, or as directed by the Engineer.

SHEET 1 OF 2



**Design
Division
Standard**

CONCRETE SAFETY
BARRIER (F-SHAPE)

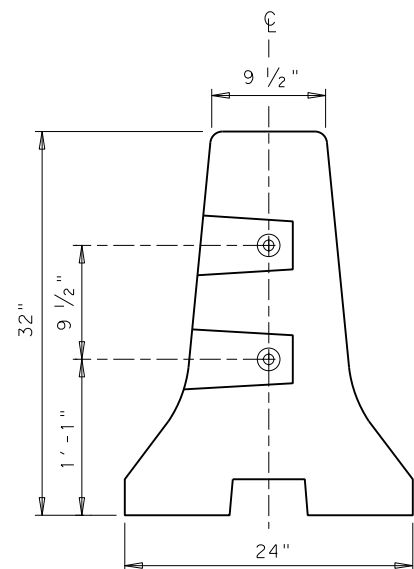
PRECAST BARRIER
(TYPE 1)

CSB (1) - 10

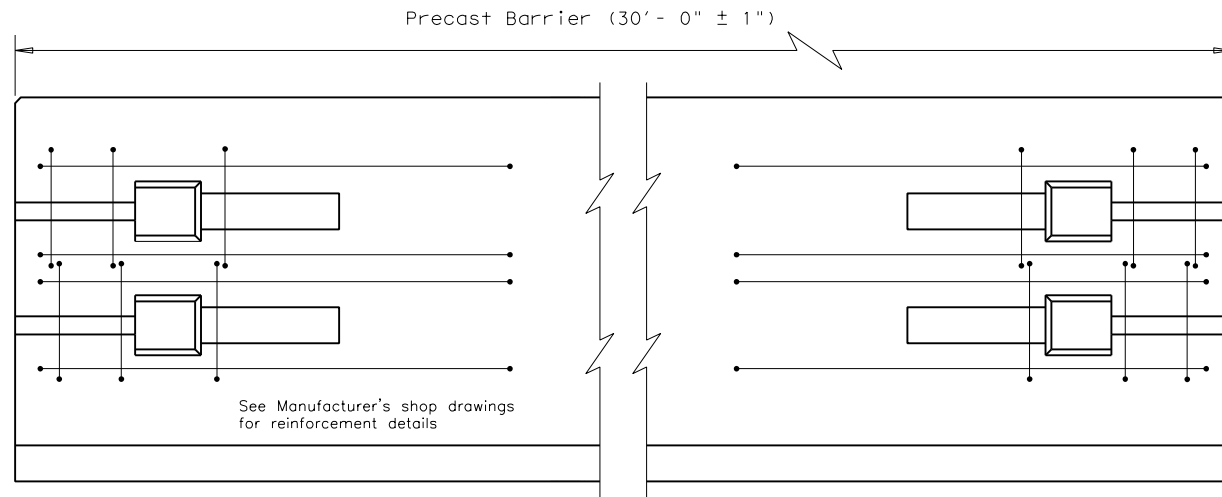
FILE:	csb110.dgn		DN: TxDOT	CK: AM	DN: BD	CK: VP
© TxDOT	December 2010		CONT	SECT	JOB	HIGHWAY
REVISONS			DIST	COUNTY		SHEET NO.
						TD014

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FILE:

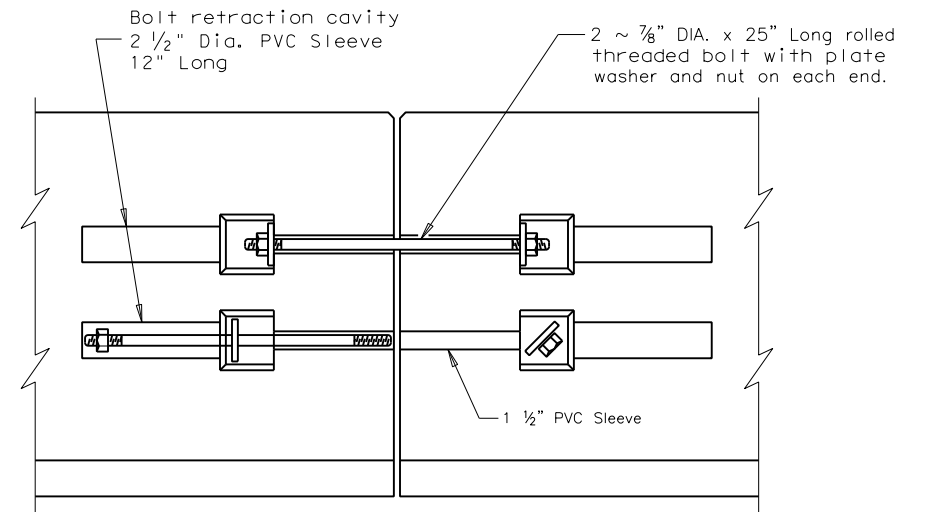


END VIEW (CSB) QUICK-BOLT
QUICK-BOLT POCKET LOCATIONS

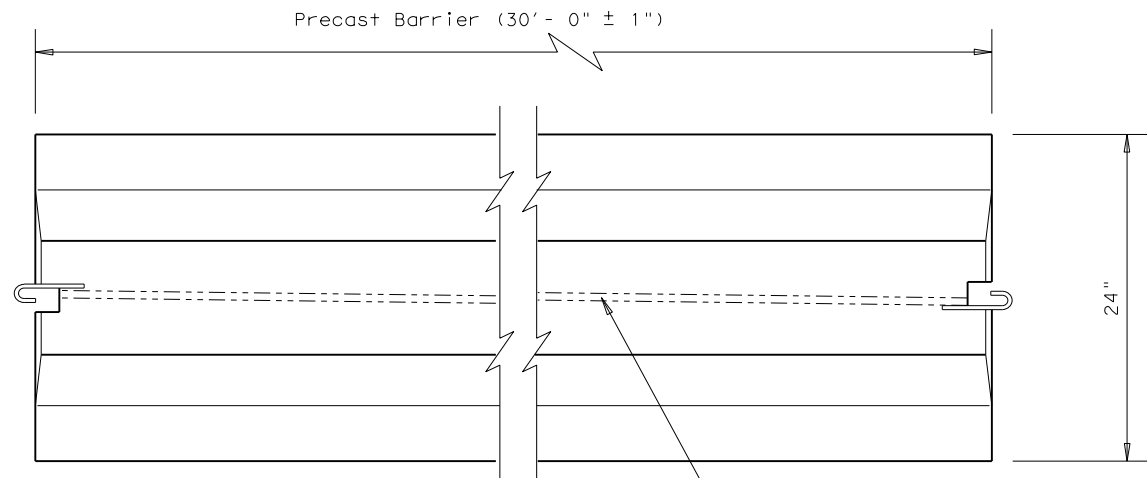


ELEVATION (CSB) QUICK-BOLT
See Manufacturer's shop drawing for additional details

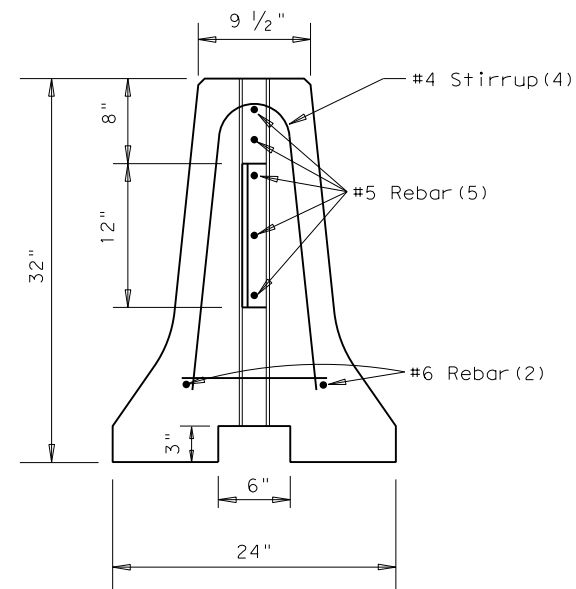
Joint Connection (Type Q)



ELEVATION VIEW SHOWING JOINT CONNECTION
"QUICK-BOLT"

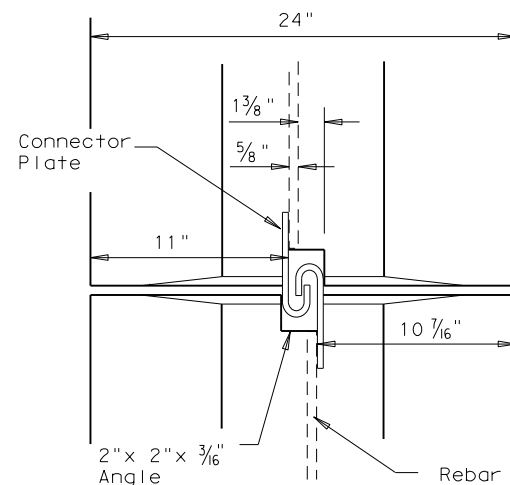


TOP VIEW
PRECAST (CSB) WITH J-J HOOKS
See Manufacturer's shop drawing for additional details



END VIEW
J-J HOOK CONNECTION

Joint Connection (Type J)



VIEW FROM ABOVE
J-J HOOK CONNECTION

Proprietary Joint Connections (CSB)

Two proprietary joint connections are acceptable as alternates to the (Type X) connection shown, here on. These joint connections types are:

J-J Hooks by Easi-Set Industries, (800)547-4045
Quick-Bolt by Bexar Concrete, (210)497-3773

If one of these connection systems are exclusively specified in the plans, prior approval for sole source use must be obtained. Details of the connection components and barrier reinforcement for these systems, will be shown on the manufacturer's shop drawing(s) furnished to the Engineer.

SHEET 2 OF 2

				Design Division Standard	
CONCRETE SAFETY BARRIER (F-SHAPE) PRECAST BARRIER (TYPE 1)					
CSB(1)-10					
FILE: csb110.dgn	DN: TxDOT	CK: AM	DW: BD	CK: VP	
© TxDOT December 2010	CONT	SECT	JOB	HIGHWAY	
REVISIONS		DIST		COUNTY	SHEET NO.
					TD015