

PROJECT ID: 1400-01-70

COUNTY: COLUMBIA

ORDER OF SHEETS

Section No.	1	Title
Section No.	2	Typical Sections and Details
Section No.	3	Estimate of Quantities
Section No.	3	Miscellaneous Quantities
Section No.	4	Right of Way Plat
Section No.	5	Plan and Profile
Section No.	6	Standard Detail Drawings
Section No.	7	Sign Plates
Section No.	8	Structure Plans
Section No.	9	Computer Earthwork Data
Section No.	9	Cross Sections

TOTAL SHEETS =



BEGIN PROJECT 1400-01-70
STA 561+35
X = 596,544.27
Y = 358,716.93

DESIGN DESIGNATION	WEST OF STH 146	EAST OF STH 146
A.A.D.T. 2022	= 4,100	11,700
A.A.D.T. 2042	= 4,600	14,100
D.H.V.	= 535	1,385
D.D.	= 65/35	60/40
T.	= 12.1%	15.0%
DESIGN SPEED	= 60 MPH	60 MPH
ESALS	= 1,200,000	3,700,000

CONVENTIONAL SYMBOLS

PLAN	
CORPORATE LIMITS	
PROPERTY LINE	
LOT LINE	
LIMITED HIGHWAY EASEMENT	
EXISTING RIGHT OF WAY	
PROPOSED OR NEW R/W LINE	
SLOPE INTERCEPT	
REFERENCE LINE	
EXISTING CULVERT	
PROPOSED CULVERT (Box or Pipe)	
COMBUSTIBLE FLUIDS	
MARSH AREA	
WOODED OR SHRUB AREA	

PROFILE	
GRADE LINE	
ORIGINAL GROUND	
MARSH OR ROCK PROFILE (To be noted as such)	
SPECIAL DITCH	
GRADE ELEVATION	
CULVERT (Profile View)	
UTILITIES	
ELECTRIC	
FIBER OPTIC	
GAS	
SANITARY SEWER	
STORM SEWER	
TELEPHONE	
WATER	
UTILITY PEDESTAL	
POWER POLE	
TELEPHONE POLE	

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

PLAN OF PROPOSED IMPROVEMENT

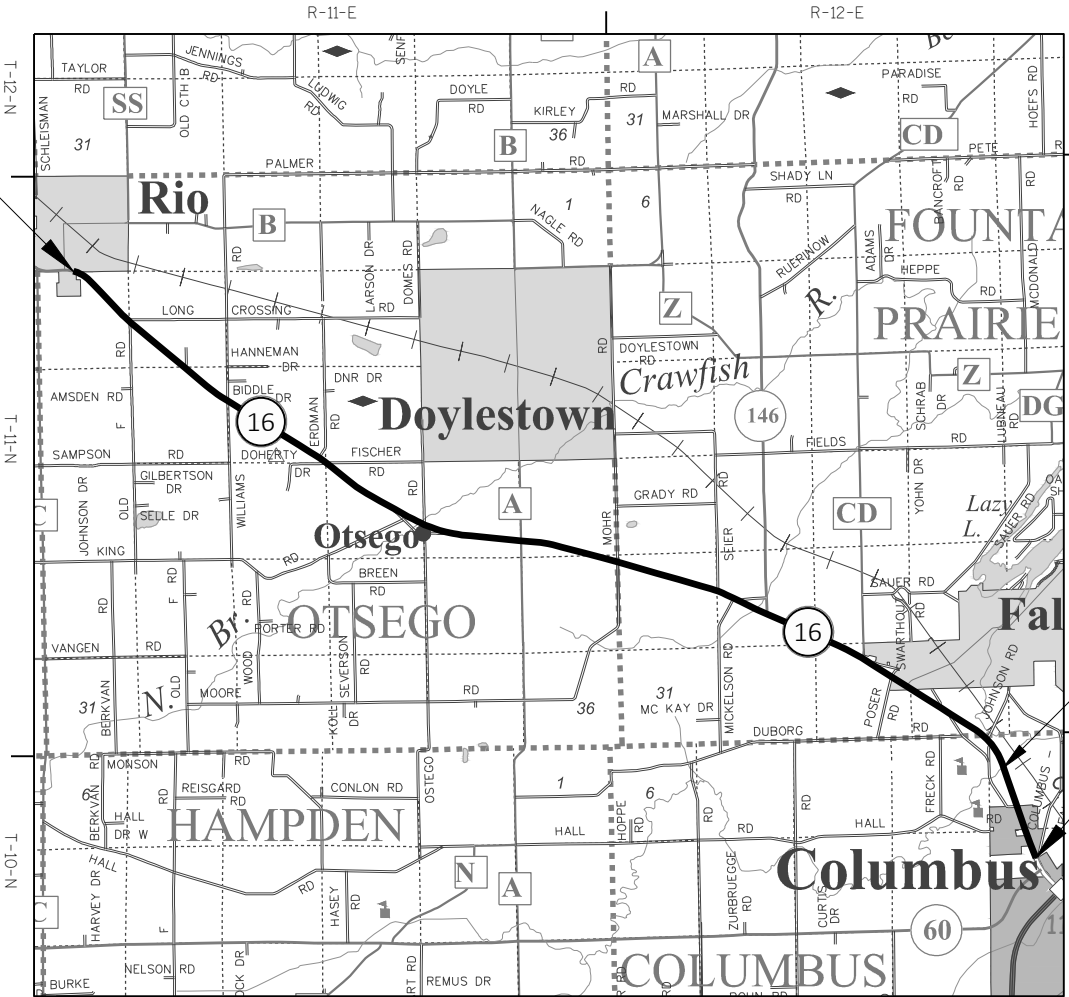
PORTAGE - COLUMBUS

LINCOLN TO FALL RIVER-COLUMBUS RD

STH 16

COLUMBIA COUNTY

STATE PROJECT NUMBER
1400-01-70



LAYOUT

SCALE 0 2 MI

TOTAL NET LENGTH OF CENTERLINE = 12.171 MI

HORIZONTAL POSITIONS SHOWN ON THIS PLAN ARE WISCONSIN COUNTY COORDINATES, COLUMBIA COUNTY, NAD83 (2011), IN U.S. SURVEY FEET. VALUES ARE GRID COORDINATES, GRID BEARINGS, AND GRID DISTANCES. GRID DISTANCES MAY BE USED AS GROUND DISTANCES.

ELEVATION SHOWN ON THIS PLAN ARE IN REFERENCE TO THE NORTH AMERICAN VERTICAL DATUM OF 1988, NAVD88 (2012).

1078 UTILITY PLANS
11/2/2020

STRUCTURE B-11-172 OVER CRAWFISH RIVER
STA 1156+36.42 - STA 1157+15.58

END PROJECT 1400-01-70
STA 1204+00

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

PREPARED BY	
Surveyor	SURVEYOR
Designer	JAMES RINZEL
Project Manager	LALITHA BALACHANDRAN, P.E.
Regional Examiner	REGIONAL EXAMINER
Regional Supervisor	WILLIAM STROBEL, P.E.

APPROVED FOR THE DEPARTMENT
DATE: _____ (Signature)

E

GENERAL NOTES

THE LOCATIONS OF EXISTING AND PROPOSED UTILITY INSTALLATIONS AS SHOWN ON THE PLANS ARE APPROXIMATE. THERE MAY BE OTHER UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN. THE CONTRACTOR SHALL COORDINATE THEIR CONSTRUCTION ACTIVITIES WITH A CALL TO DIGGERS HOTLINE AND/OR A DIRECT CALL TO THE UTILITIES THAT HAVE FACILITIES IN THE AREAS. NOT ALL UTILITIES ARE MEMBERS OF DIGGERS HOTLINE.

UTILITY LINES IN THE CROSS SECTIONS ARE FOR HORIZONTAL REFERENCE ONLY.

CONTRACTOR TO VERIFY ELEVATIONS OF THE EXISTING PAVEMENT TO REMAIN IN PLACE, PRIOR TO STAKING.

D.O.T. BRIDGE BENCHMARK MONUMENT TO BE FURNISHED BY THE STATE AND PLACED BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER.

EXCAVATION FOR STRUCTURE LIMITS ARE BETWEEN STA XXXX+XX TO STA XXXX+XX AND STA XXXX+XX TO STA XXXX+XX, APPROXIMATELY.

CONTRACTORS SHALL MAINTAIN ACCESS TO ALL DRIVEWAYS AT ALL TIMES. ACCESS SHALL BE PROVIDED DURING ALL NON-WORKING HOURS.

PRIOR TO THE PLACEMENT OF MGS GUARDRAILS, THE SHOULDERS SHALL BE IN PLACE, SHAPED AND COMPACTED UNLESS SHOWN OTHERWISE.

THE CONTRACTOR'S PAVING OPERATIONS SHALL BE CONSISTENT WITH THE PLAN TYPICAL SECTIONS AND CONSTRUCTED TO PREVENT HMA LONGITUDINAL JOINTS FROM BEING LOCATED WITHIN DRIVING, TURNING, BIKE OR PARKING LANE.

HMA PAVEMENT WEIGHT CALCULATIONS ARE BASED ON 112 LB/SY/IN.

APPLY TACK COAT BETWEEN LAYERS OF ASPHALT PAVEMENT AND TO MILLED SURFACES. THE APPLICATION RATE IS 0.05 GAL/SY BETWEEN LAYERS OF NEW HMA PAVEMENT AND 0.07 GAL/SY PLACED ON EXISTING ASPHALT, MILLED SURFACES AND CONCRETE PAVEMENT OR AS DIRECTED BY THE ENGINEER..

SAWCUTS, AS SHOWN ON THE PLANS, ARE SUGGESTED LOCATIONS AND MAY BE ADJUSTED AT THE DISCRETION OF THE ENGINEER TO BETTER SUIT FIELD CONDITIONS.

CONTRACTOR WILL BE RESPONSIBLE FOR RESHAPING AND SEEDING ANY PREVIOUSLY GRASSED AREAS WHICH ARE DISTURBED BY HIS OPERATION OUTSIDE OF THE NORMAL CONSTRUCTION LIMITS.

THE QUALITY OF THE ITEMS FOR EROSION PROTECTION INCLUDES AN UNDISTURBED AMOUNT FOR PROTECTION, CONTROL AND ABATEMENT OF WATER POLLUTION RESULTING FROM SOIL EROSION. THE DISTRIBUTION AND LOCATION OF THESE MATERIALS ARE TO BE DETERMINED BY THE ENGINEER.

DISTURBED AREAS WITHIN THE RIGHT OF WAY ARE TO BE TOPSOILED (SALVAGED), FERTILIZED, SEEDED, AND MULCHED AS DIRECTED BY THE ENGINEER.

THE EROSION CONTROL DEVICES AS SHOWN ON THE EROSION CONTROL SHEETS ARE AT SUGGESTED LOCATIONS. EXACT LOCATIONS WILL BE DETERMINED BY THE ENGINEER. EROSION CONTROL DEVICES SHALL BE PLACED IN SEQUENCE WITH CONSTRUCTION OPERATIONS OR AS DETERMINED BY THE ENGINEER.

NO TREES OR SHRUBS ARE TO BE REMOVED WITHOUT APPROVAL OF THE ENGINEER.

NUMBER, LOCATION, AND SPACING OF SIGNS AND DEVICES, AS SHOWN IN THE PLANS SHALL BE ADJUSTED TO FIT FIELD CONDITIONS.

EXISTING RIGHT OF WAY LINES SHOWN IN THE PLANS AND CROSS SECTIONS ARE APPROXIMATE.

DRIVEWAY AND ENTRANCE STATIONS AND OFFSETS IN THE PLANS REFER TO THE MATCH-IN LOCATION OF THE EXISTING DRIVEWAY/ENTRANCE.

MILL AND PAVE ADJACENT TO EXISTING SECTION AND ALUMINUM TIE MONUMENTS WITHOUT DAMAGING THE MONUMENTS. SEE ALIGNMENT DIAGRAM FOR LOCATIONS.

CONTRACTOR TO PROTECT DH5548 GPS AND KEEP CONSTRUCTION EQUIPMENT AT LEAST 10 FEET AWAY FROM DH5548 GPS. SEE ALIGNMENT DIAGRAM FOR LOCATION.

ENSURE THAT DH5548 GPS IS/ARE NOT DISTURBED, BUMPED OR MOVED DURING THE DURATION OF THE PROJECT. NOTIFY JACOB ROCKWEILER IMMEDIATELY IF DH5548 GPS IS/ARE DISTURBED, BUMPED OR MOVED DURING CONSTRUCTION OPERATIONS. CONTACT INFO:

JACOB ROCKWEILER, P.E.
WISCONSIN HEIGHT MODERNIZATION PROGRAM MANAGER WITH THE
WISCONSIN DEPARTMENT OF TRANSPORTATION
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EMAIL: JACOB.ROCKWEILER@DOT.WI.GOV



SECTION 2 ORDER OF SHEETS

GENERAL NOTES	
PROJECT OVERVIEW	
TYPICAL SECTIONS	
CONSTRUCTION DETAILS	
PLAN	
PAVING GRADES	
CROSS SECTION MATCHLINES	
EROSION CONTROL DETAILS	
EROSION CONTROL PLAN	
MOVING SIGNS	
PAVEMENT MARKINGS	
DETOUR PLAN OVERVIEW	
DETOUR PLAN	
ALIGNMENT DIAGRAM	
SUPERELEVATION TABLES	

UTILITY CONTACTS

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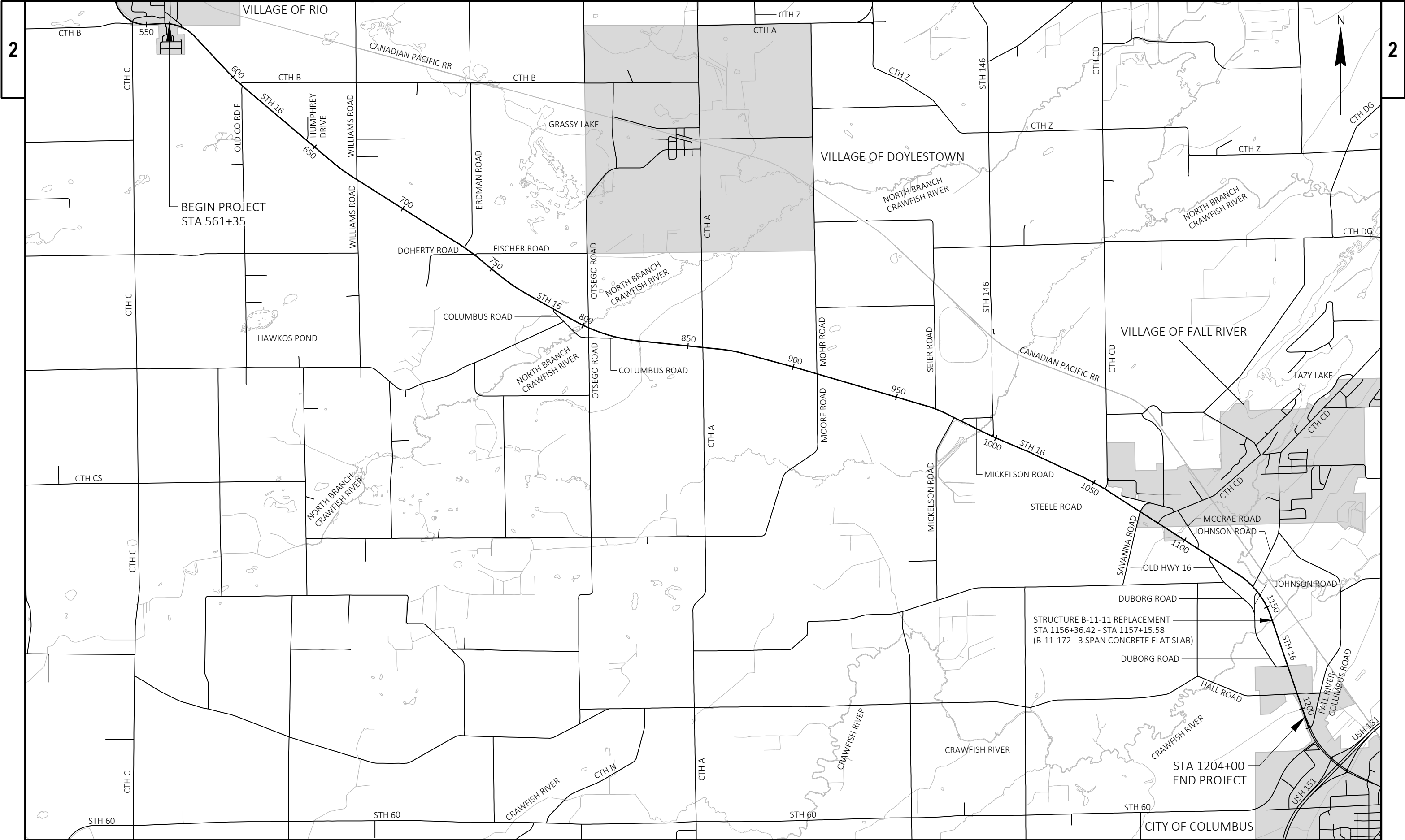
ABBREVIATIONS	
AC	ACRE
AGG	AGGREGATE
<	ANGLE
AE, AEW	APRON ENDWALL
ASPH	ASPHALTIC
ADT	AVERAGE DAILY TRAFFIC
AADT	ANNUAL AVERAGE DAILY TRAFFIC
BAD	BASE AGGREGATE DENSE
BF	BACK FACE
BM	BENCHMARK
BTWN	BETWEEN
CTR	CENTER
C/L	CENTERLINE
Δ	CENTRAL ANGLE OR DELTA
CE	COMMERCIAL ENTRANCE
CONST	CONSTRUCTION
CMCP	CORRUGATED METAL CULVERT PIPE
CMP	CORRUGATED METAL PIPE
CO	COUNTY
CTH	COUNTY TRUNK HIGHWAYS
CY	CUBIC YARD
CP	CONTROL POINT OR CULVERT PIPE
C&G	CURB AND GUTTER
D	DEGREE OF CURVE
DHV	DESIGN HOUR VOLUME
DIA	DIAMETER
DD	DIRECTIONAL DISTRIBUTION
DISCH	DISCHARGE
DMS	DYNAMIC MESSAGE SIGN
EA	EACH
E	EAST
EB	EASTBOUND
ELEC	ELECTRIC(AL), ELEC. CABLE
EL, ELEV	ELEVATION
ESALS	EQUIVALENT SINGLE AXLE LOADS
EXC	EXCAVATION
EXIST	EXISTING
FF	FACE TO FACE
FERT	FERTILIZER
FE	FIELD ENTRANCE
F/L, FL	FLOW LINE
GALV	GALVANIZE
HS	HIGH STRENGTH
CWT	HUNDRED WEIGHT
INL	INLET
INTER	INTERSECTION
JT	JOINT
LT	LEFT
L	LENGTH OF CURVE
LF	LINEAR FOOT (FEET)
LC	LONG CHORD
LS	LUMP SUM
MP	MARKER POST
MGAL	1000 GALLONS
NC	NORMAL CROWN
N	NORTH
NB	NORTH BOUND
NOR	NORMAL
NO	NUMBER
PAV'T	PAVEMENT
PLE	PERMANENT LIMITED EASEMENT
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
PT	POINT OF TANGENCY

ABBREVIATIONS CONT'D	
PCC	PORTLAND CEMENT CONCRETE
PE	PRIVATE ENTRANCE
PGL	PROFILE GRADE LINE
PL	PROPERTY LINE
R	RADIUS OR RANGE
R/L	REFERENCE LINE
RCCP	REINFORCED CONCRETE CULVERT PIPE
REQ'DREQUIRED	
RT	RIGHT
R/W	RIGHT OF WAY
RD	ROAD
SHLD	SHOULDER(S)
S	SOUTH
SB	SOUTHBOUND
SF	SQUARE FOOT (FEET)
SDD	STANDARD DETAIL DRAWING(S)
STH	STATE TRUNK HIGHWAYS
SS	STORM SEWER
SSD	STOPPING SIGHT DISTANCE
STA	STATION
SE	SUPERELEVATION
S/L	SURVEY LINE
SYM	SYMMETRICAL
T	TRUCKS (PERCENT OF)
TEL	TELEPHONE
TEMP	TEMPORARY
TLE	TEMPORARY LIMITED EASEMENT
TOC	TOP OF CURB
TYP	TYPICAL
UNCL	UNCLASSIFIED
UG	UNDERGROUND
VAR	VARIABLE
VC	VERTICAL CURVE
VPC	VERTICAL POINT OF CURVATURE
VPI	VERTICAL POINT OF INTERSECTION
VPT	VERTICAL POINT OF TANGENCY
WT	WEIGHT
W	WEST
WB	WEST BOUND

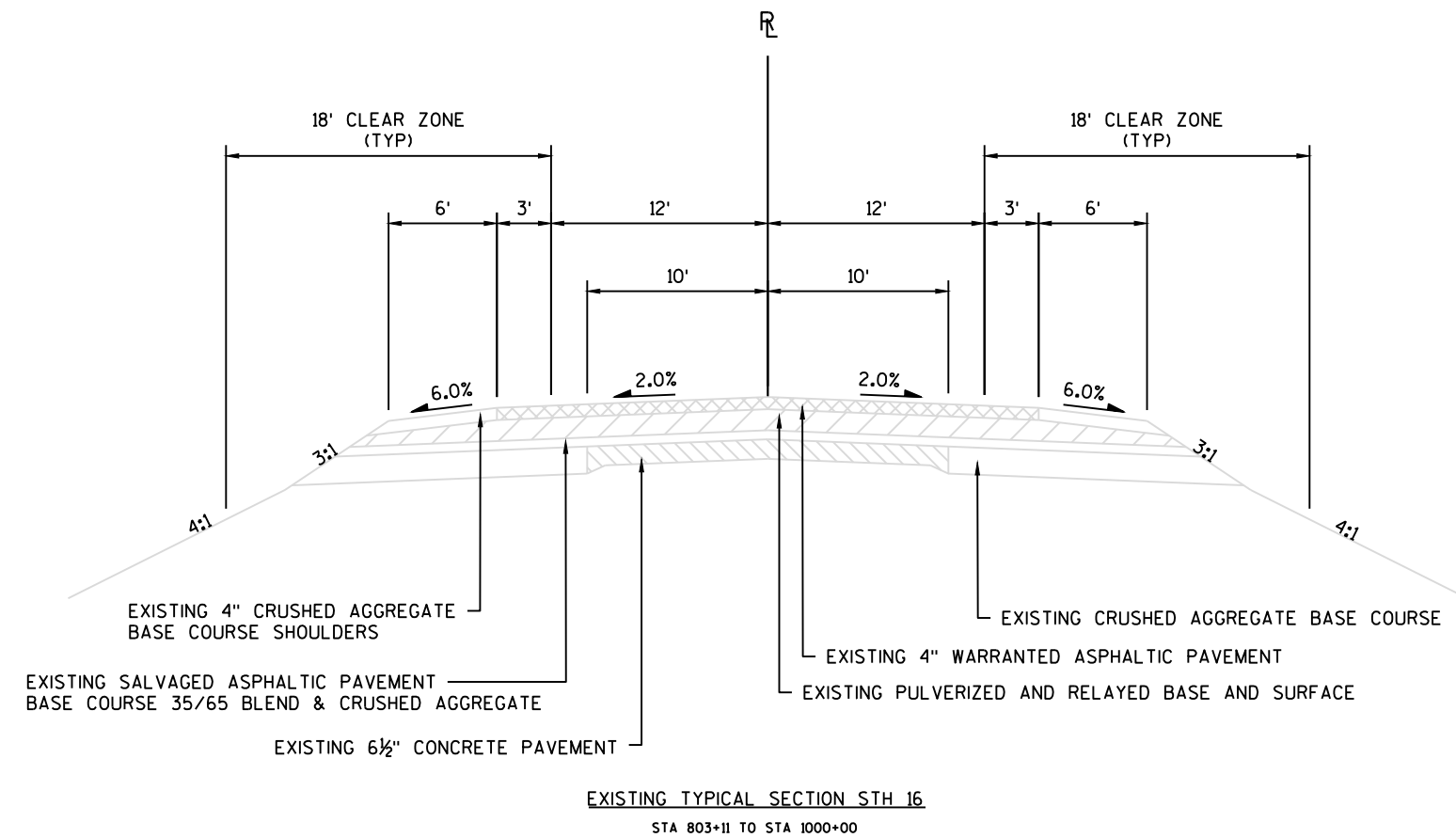
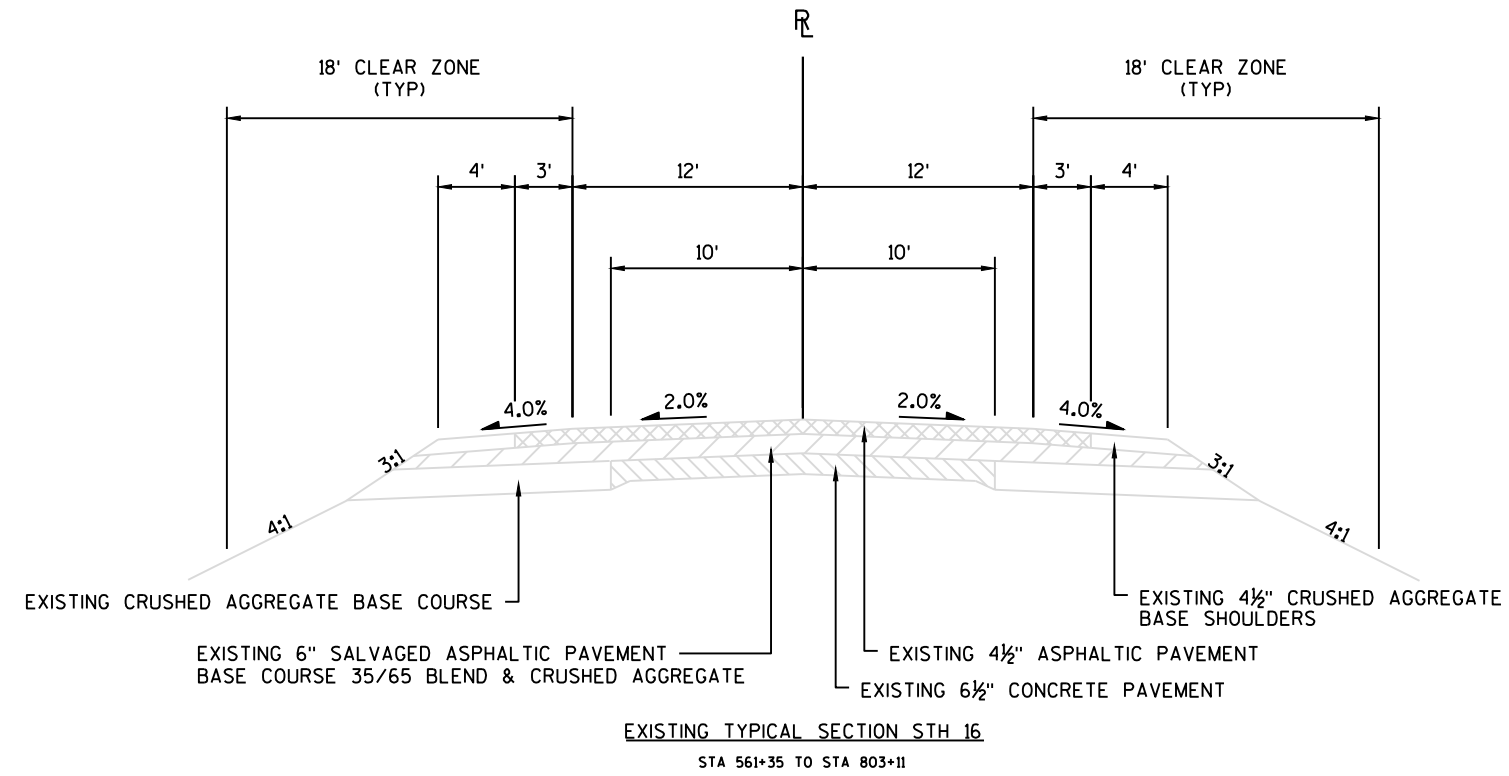
RUNOFF COEFFICIENT TABLE

	HYDROLOGIC SOIL GROUP											
	A			B			C			D		
	SLOPE RANGE (PERCENT)			SLOPE RANGE (PERCENT)			SLOPE RANGE (PERCENT)			SLOPE RANGE (PERCENT)		
LAND USE:	0-2	2-6	6 & OVER	0-2	2-6	6 & OVER	0-2	2-6	6 & OVER	0-2	2-6	6 & OVER
ROW CROPS	.08 .22	.16 .30	.22 .38	.12 .26	.20 .34	.27 .44	.15 .30	.24 .37	.33 .50	.19 .34	.28 .41	.38 .56
MEDIAN STRIP- TURF	.19 .24	.20 .26	.24 .30	.19 .25	.22 .28	.26 .33	.20 .26	.23 .30	.30 .37	.20 .27	.25 .32	.30 .40
SIDE SLOPE: TURF			.25 .32			.27 .34			.28 .36			.30 .38
PAVEMENT:												
ASPHALT							.70 - .95					
CONCRETE							.80 - .95					
BRICK							.70 - .80					
DRIVES, WALKS							.75 - .85					
ROOFS							.75 - .95					
GRAVEL ROADS, SHOULDERS							.40 - .60					

TOTAL PROJECT AREA = 0.0 ACRES
TOTAL AREA EXPECTED TO BE DISTURBED BY CONSTRUCTION ACTIVITIES = 0.0 ACRES

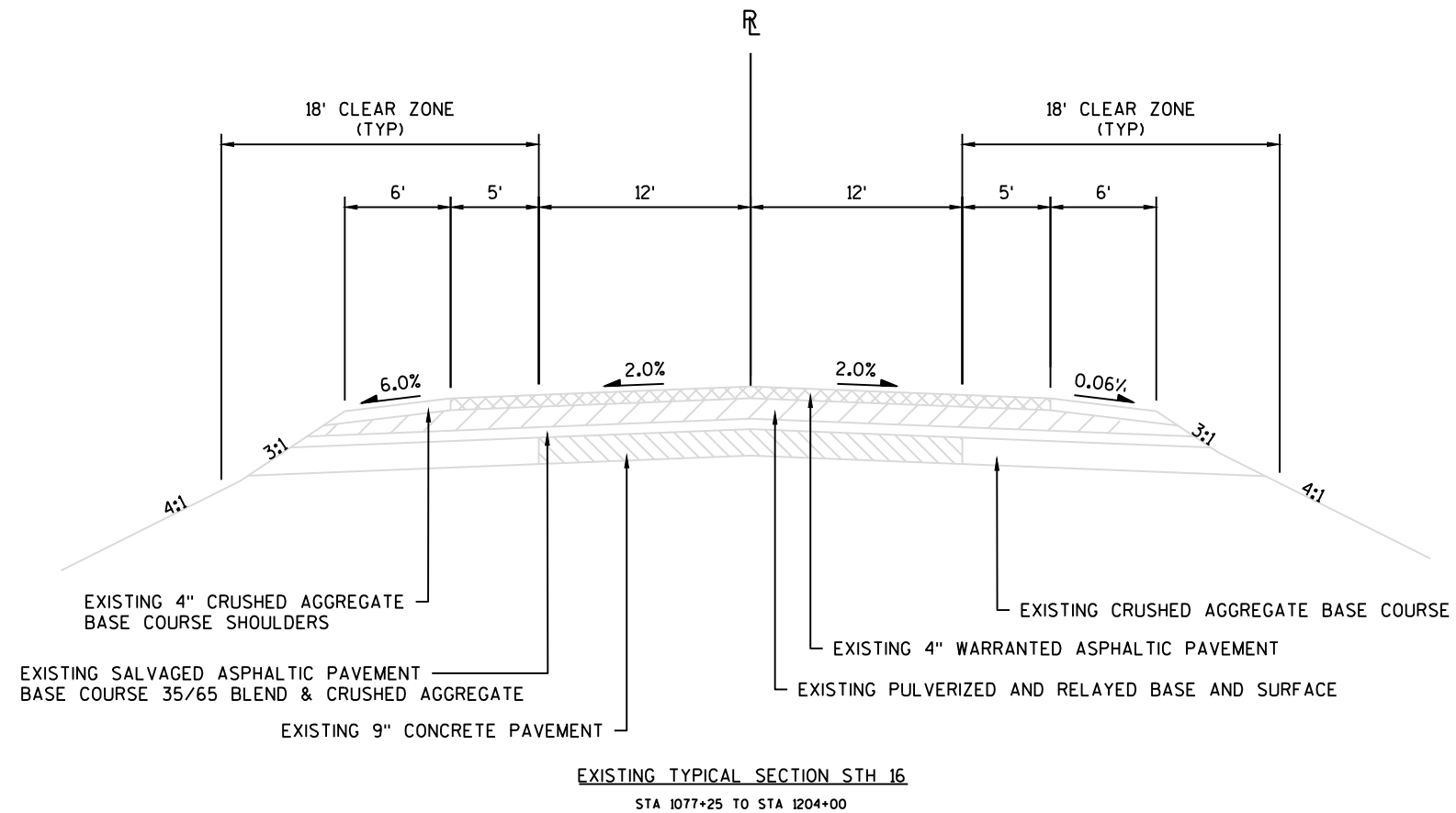
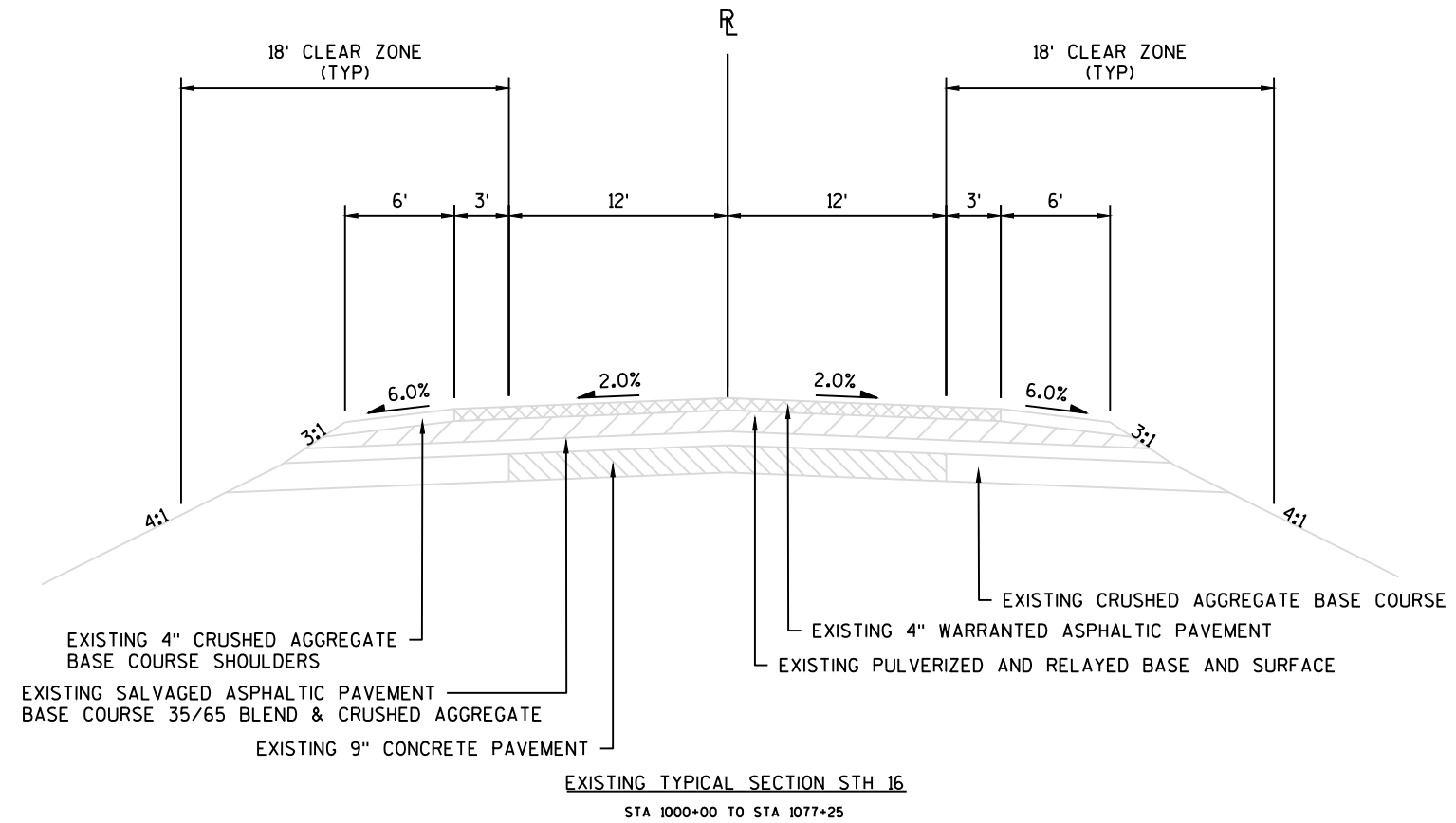


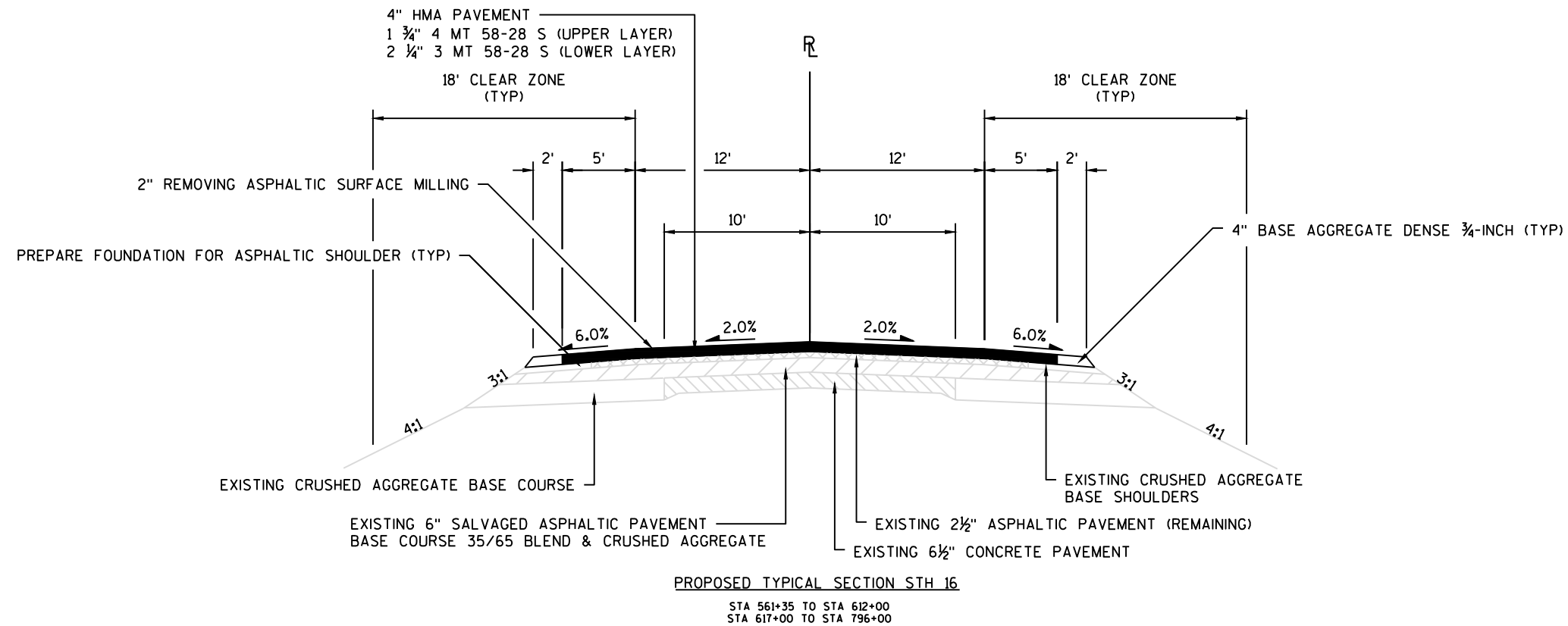
PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PROJECT OVERVIEW	SHEET E
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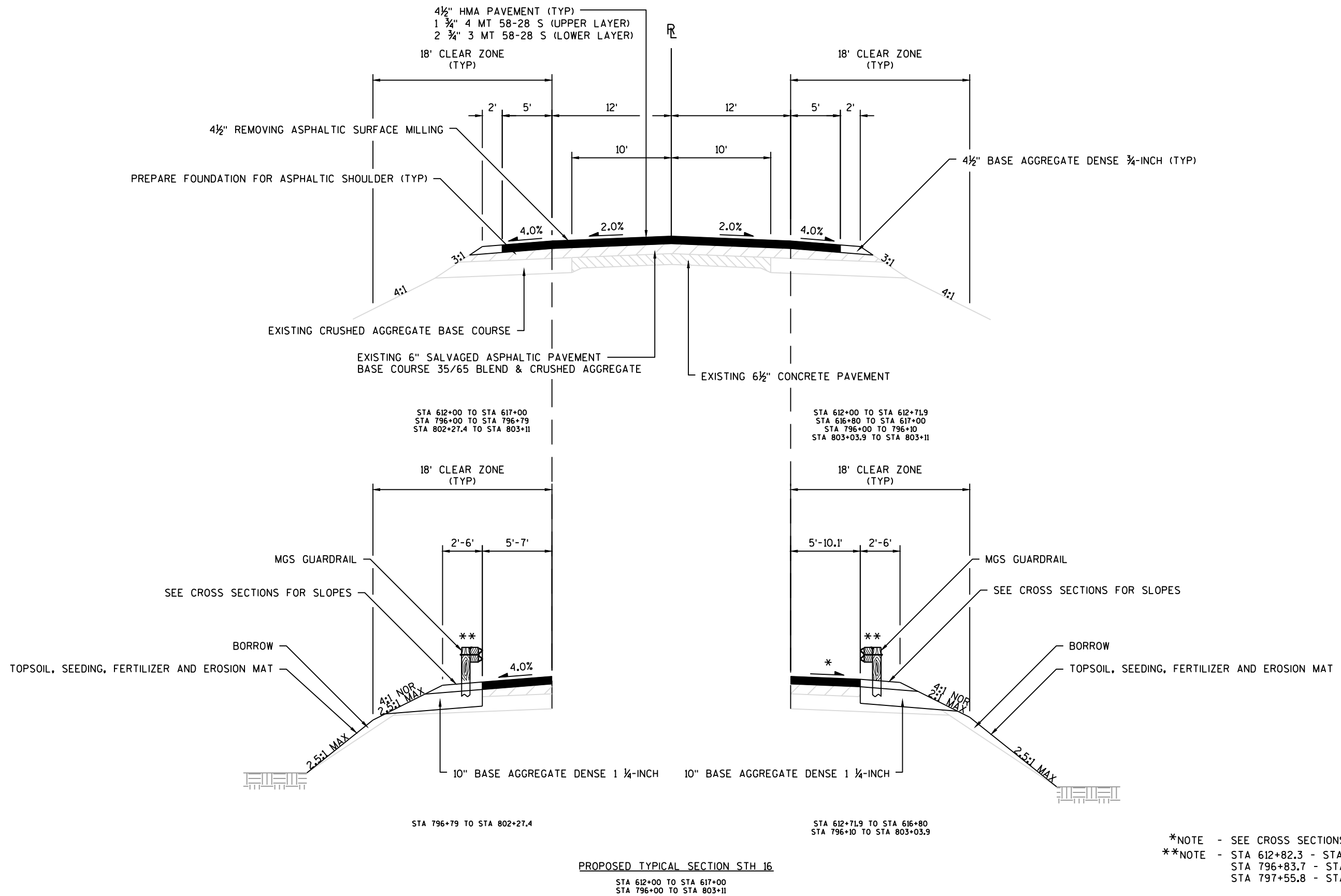


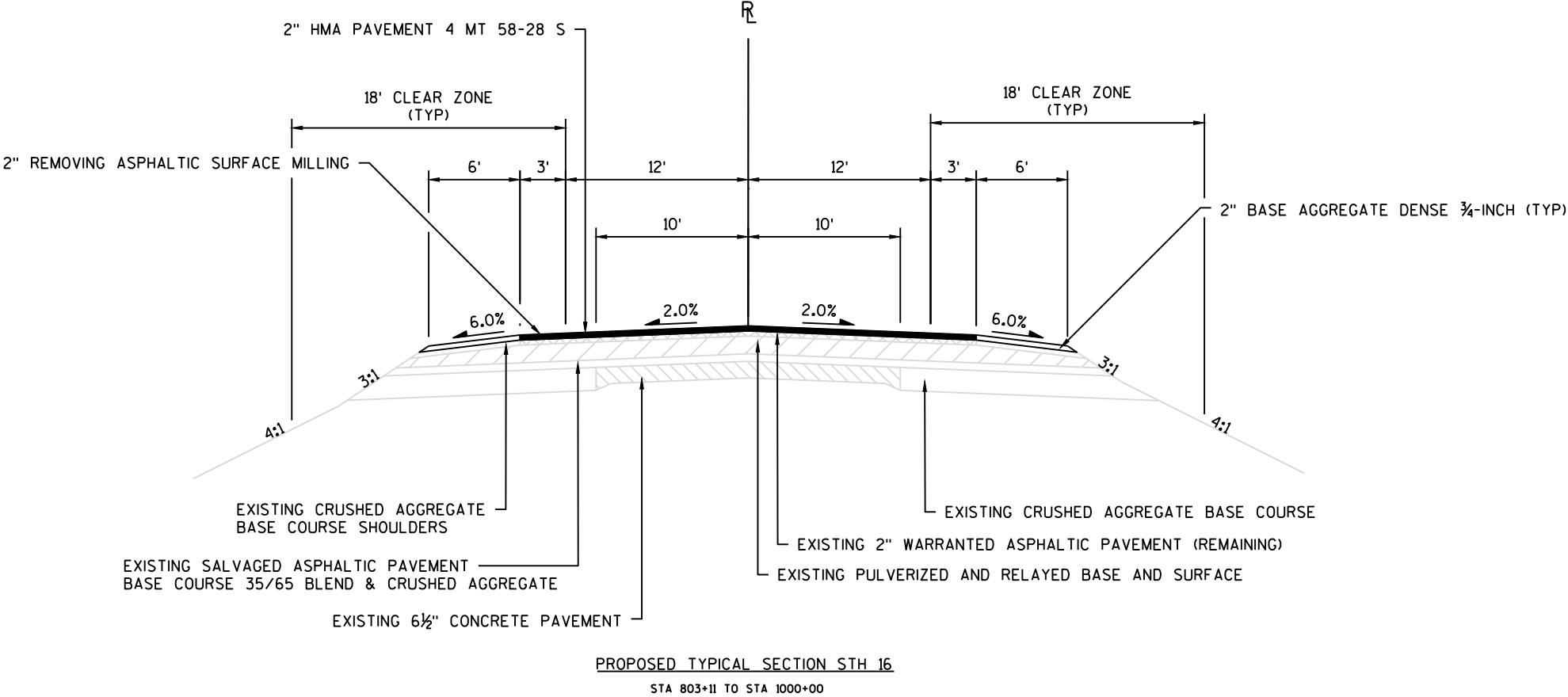
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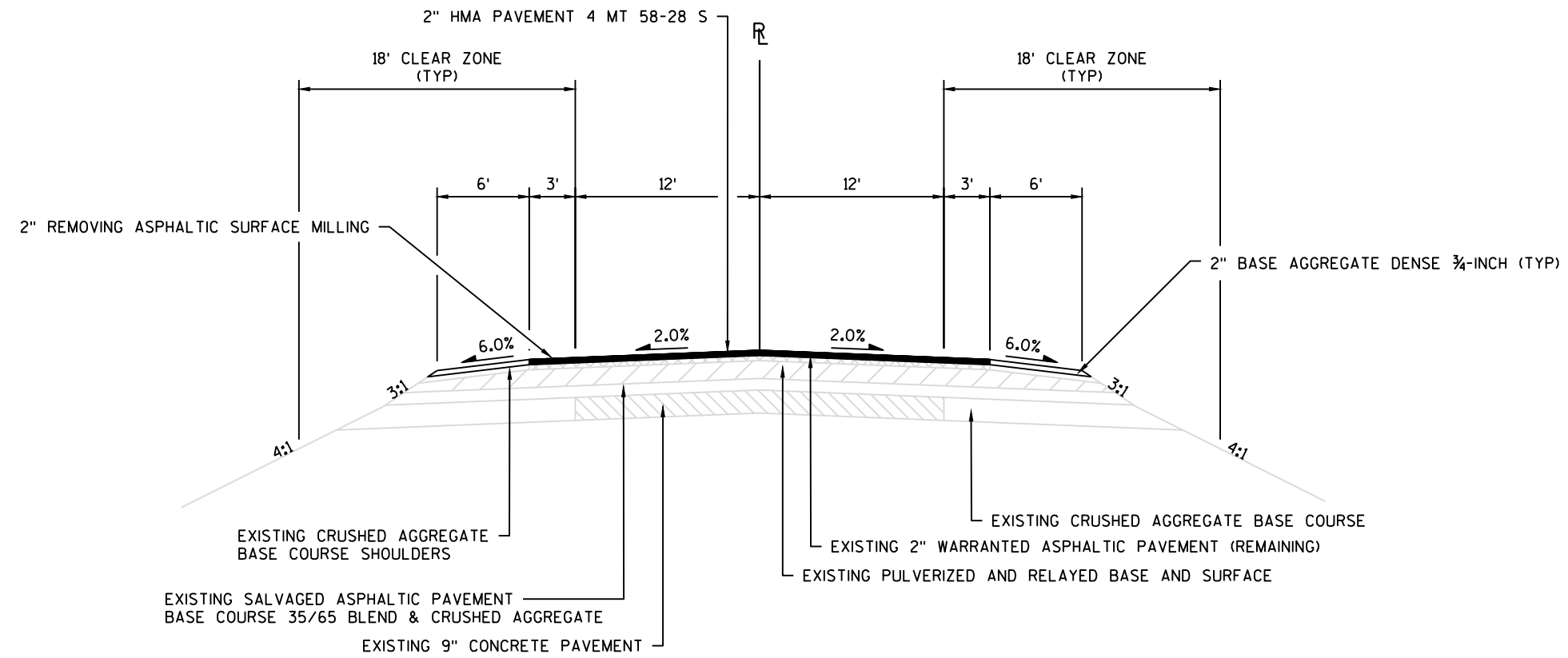
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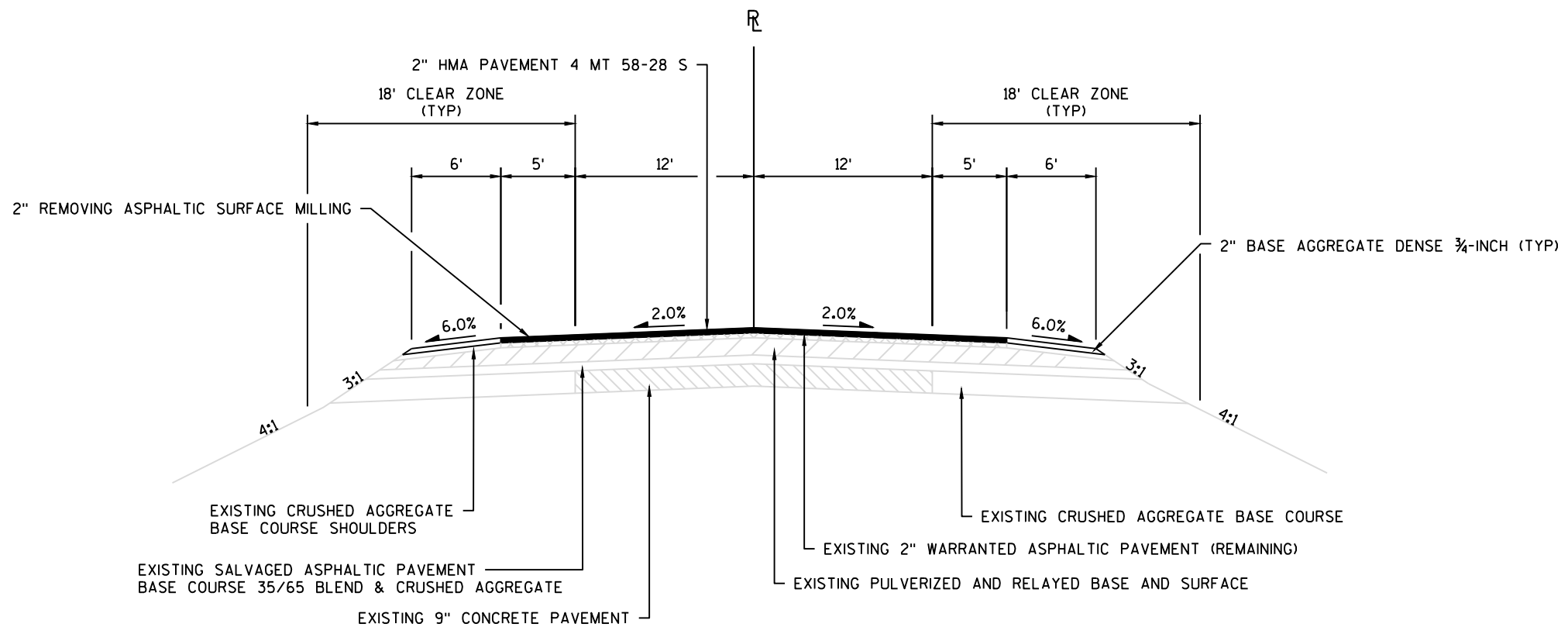






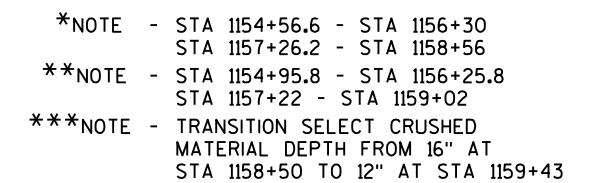
PROPOSED TYPICAL SECTION STH 16

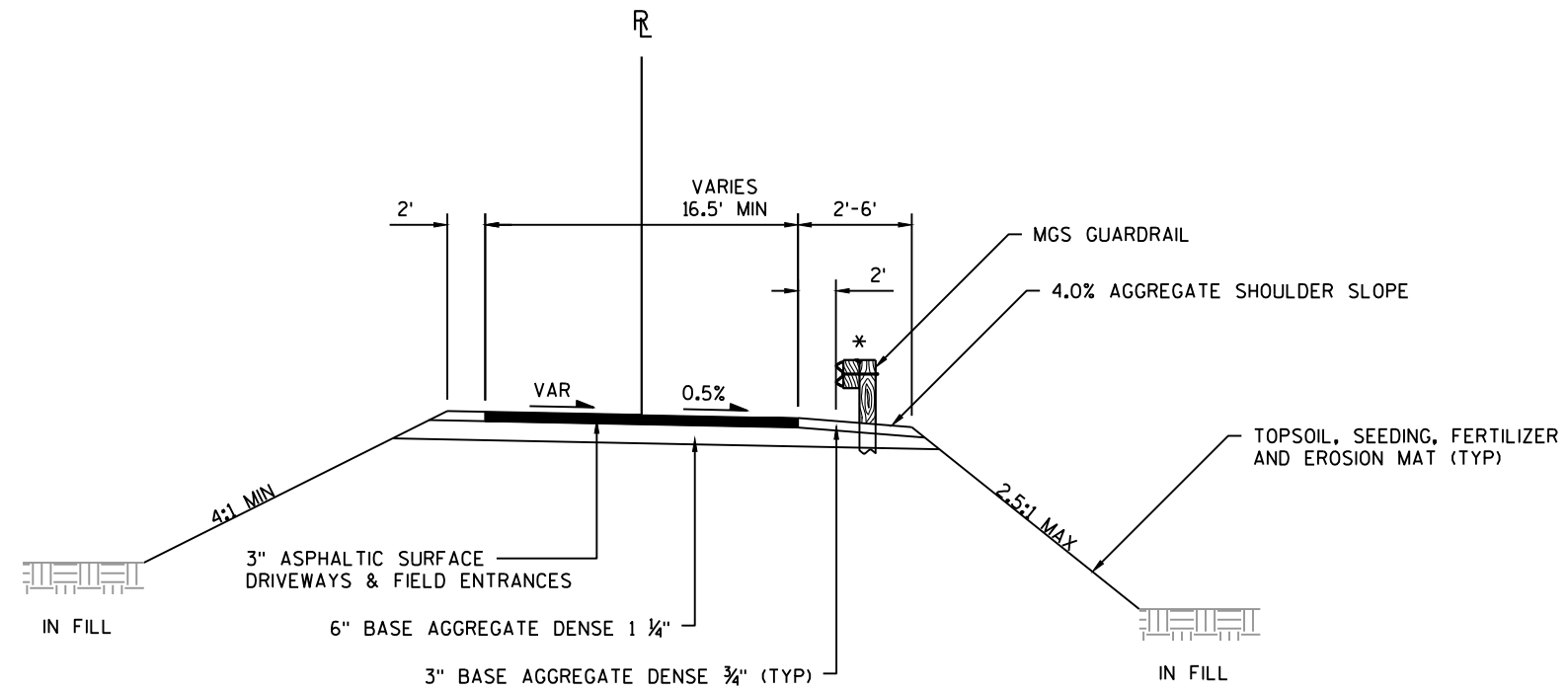
STA 1000+00 TO STA 1077+25



PROPOSED TYPICAL SECTION STH 16

STA 1077+25 TO STA 1150+50
STA 1159+43 TO STA 1204+00





PROPOSED TYPICAL SECTION DRIVEWAY

STA 1150+50 TO STA 1156+50
STA 1157+43 TO STA 1159+43

*NOTE - SEE CONSTRUCTION DETAILS FOR MGS
GUARDRAIL TYPE(S) AND LOCATIONS

PROJECT NO: 1400-01-70

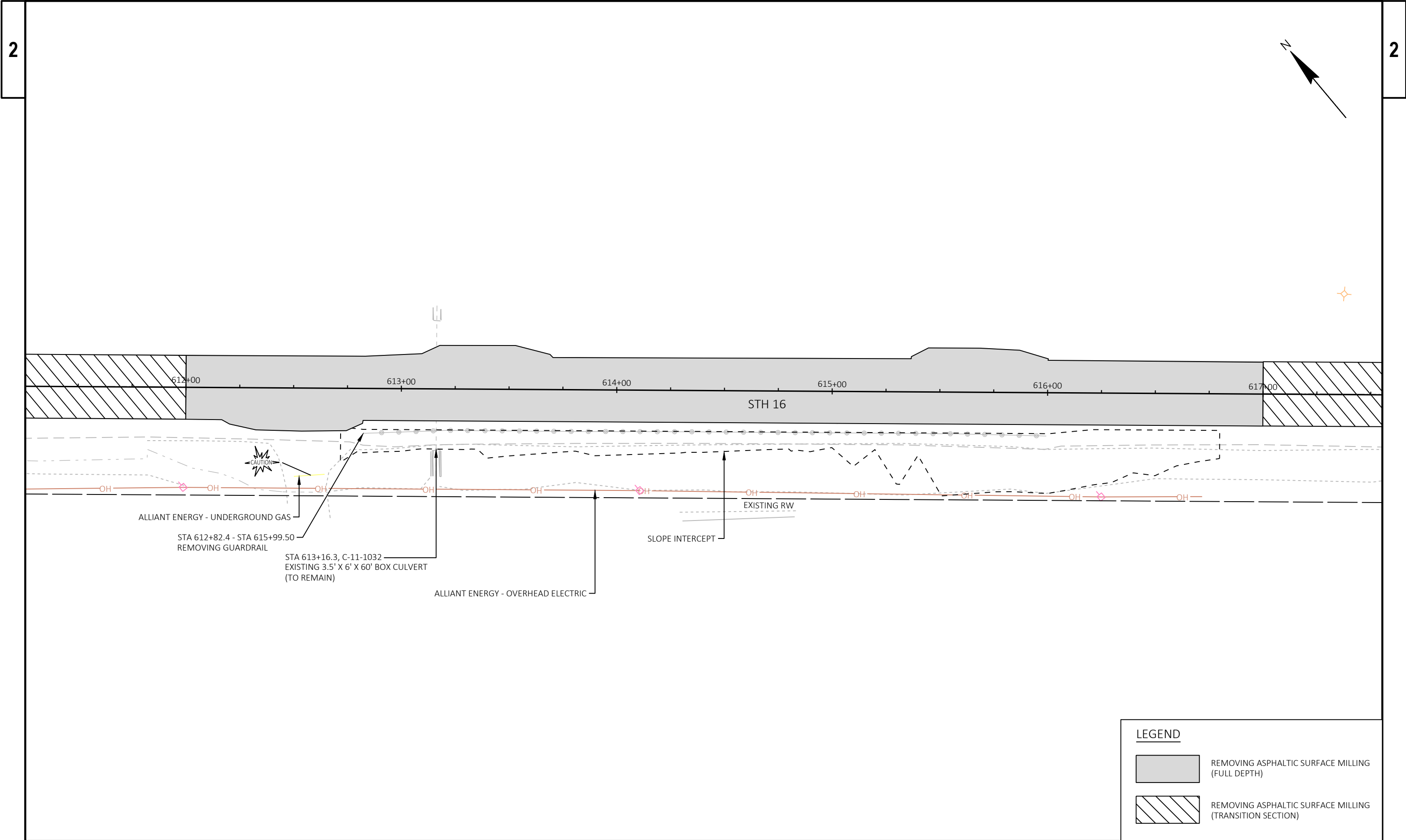
HWY: STH 16

COUNTY: COLUMBIA

PROPOSED TYPICAL SECTIONS

SHEET

E



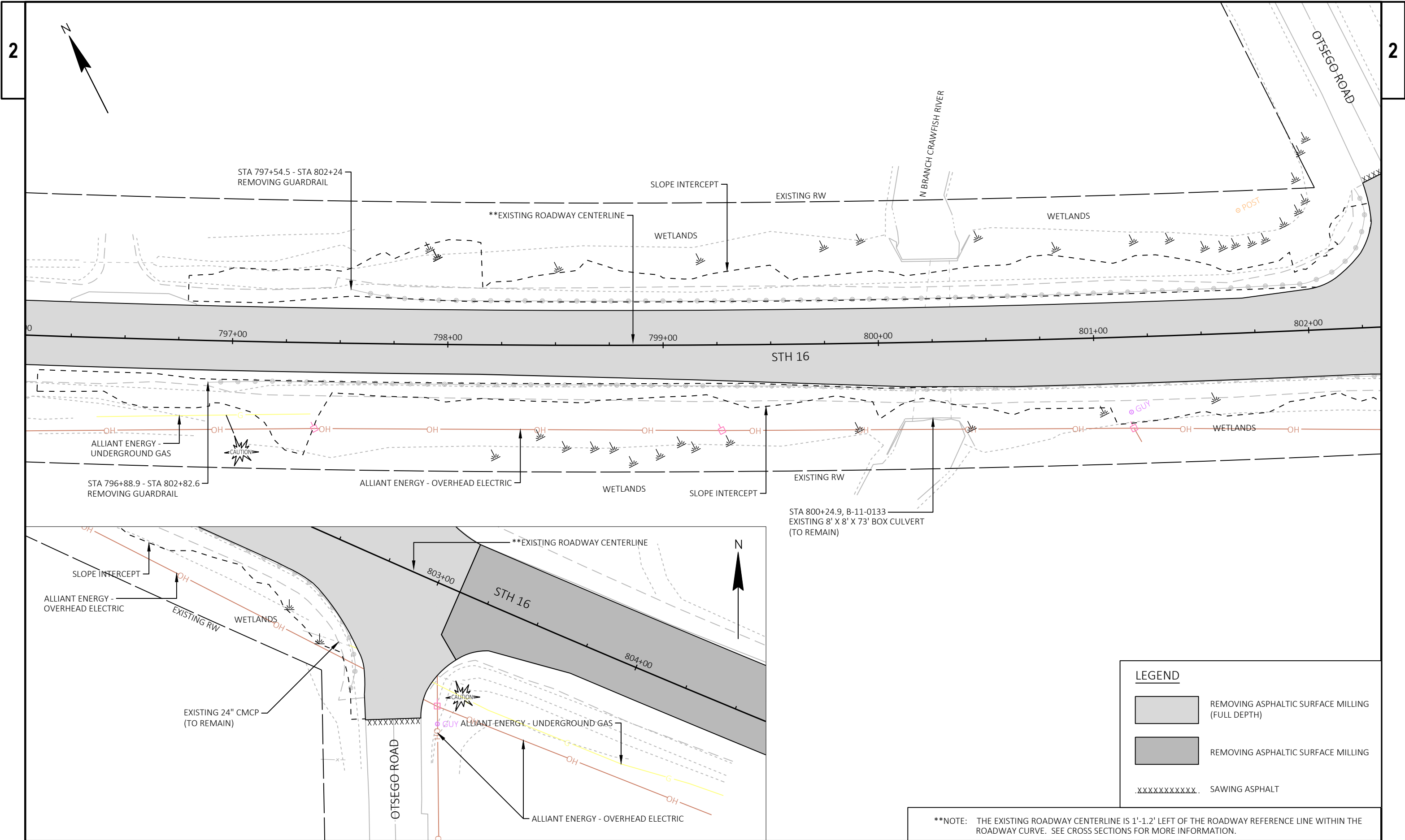
LEGEND

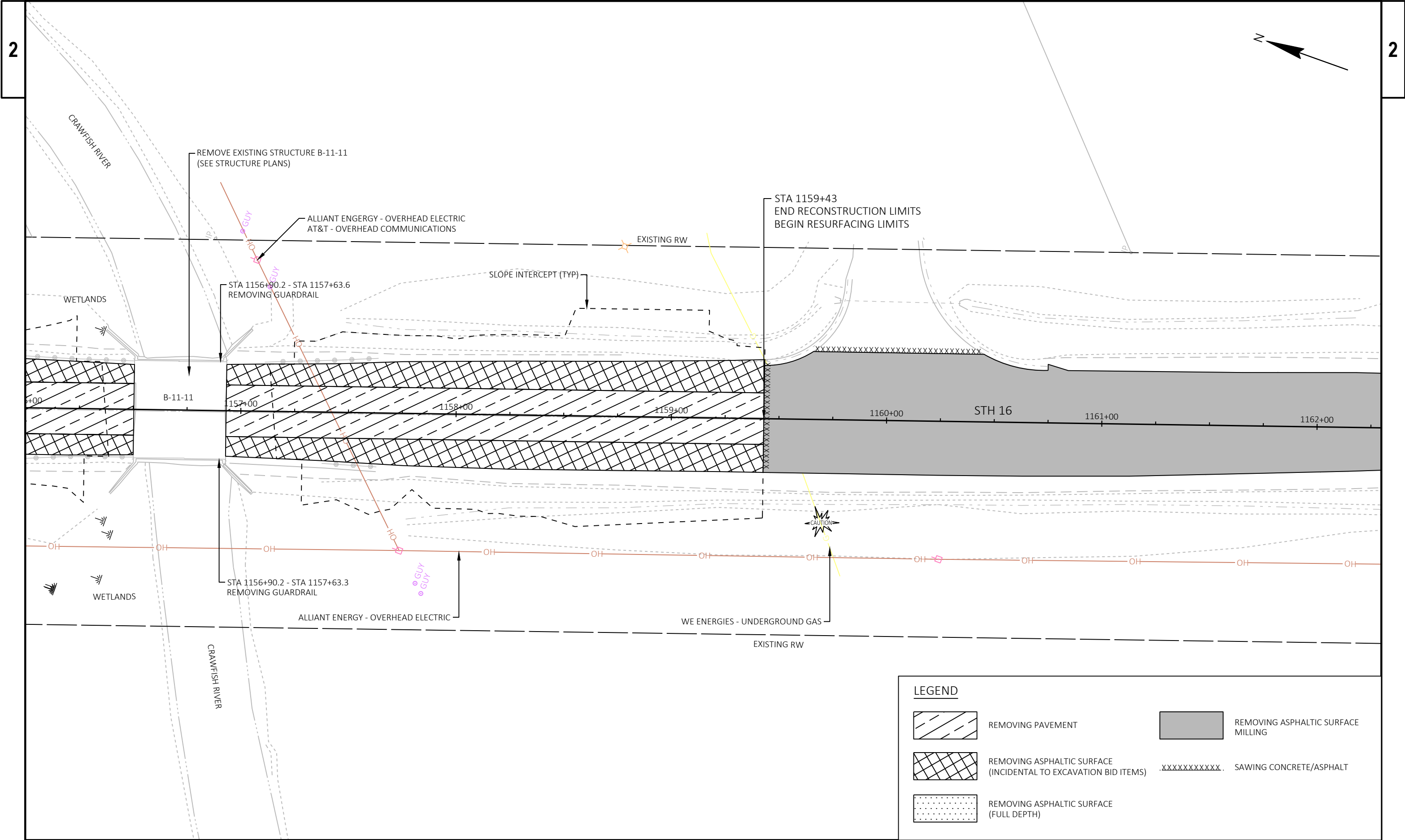


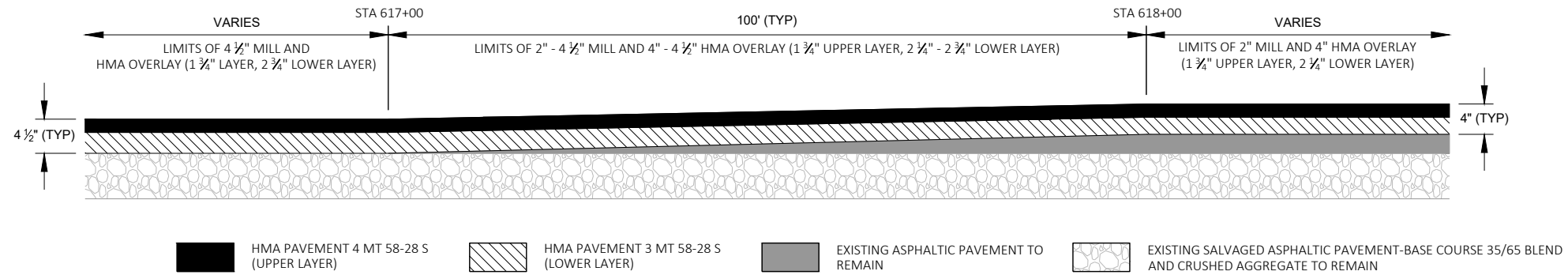
REMOVING ASPHALTIC SURFACE MILLING
(FULL DEPTH)



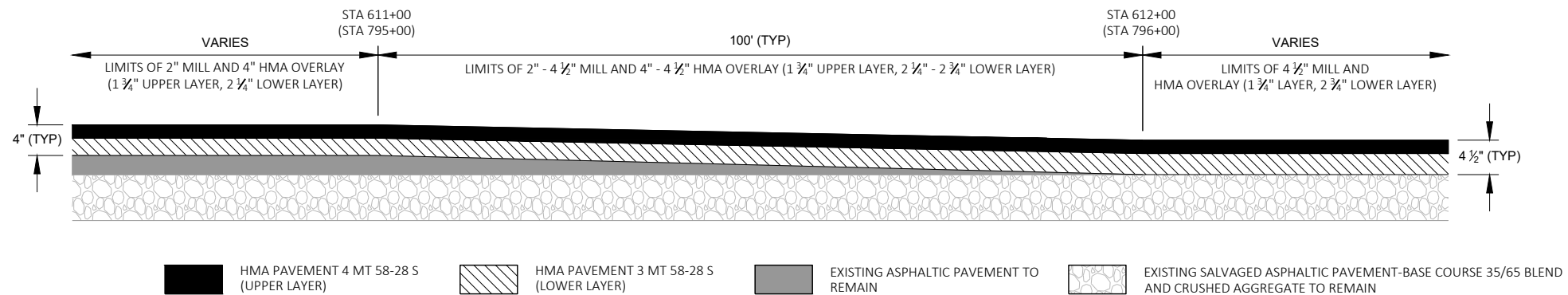
REMOVING ASPHALTIC SURFACE MILLING
(TRANSITION SECTION)



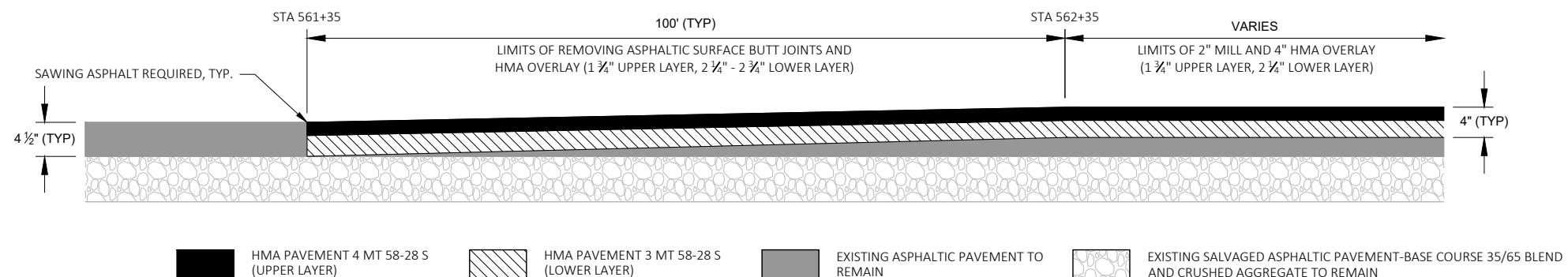




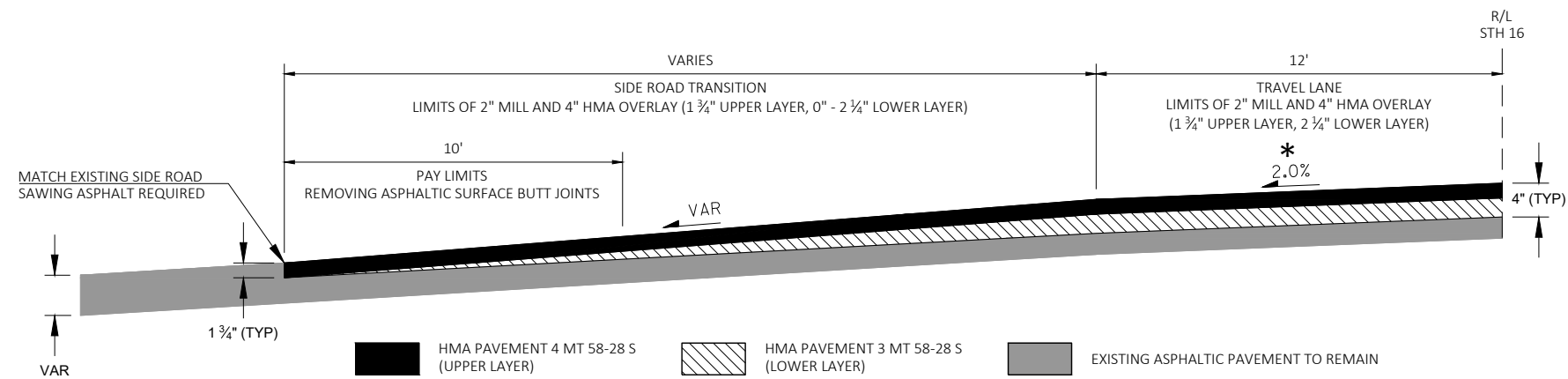
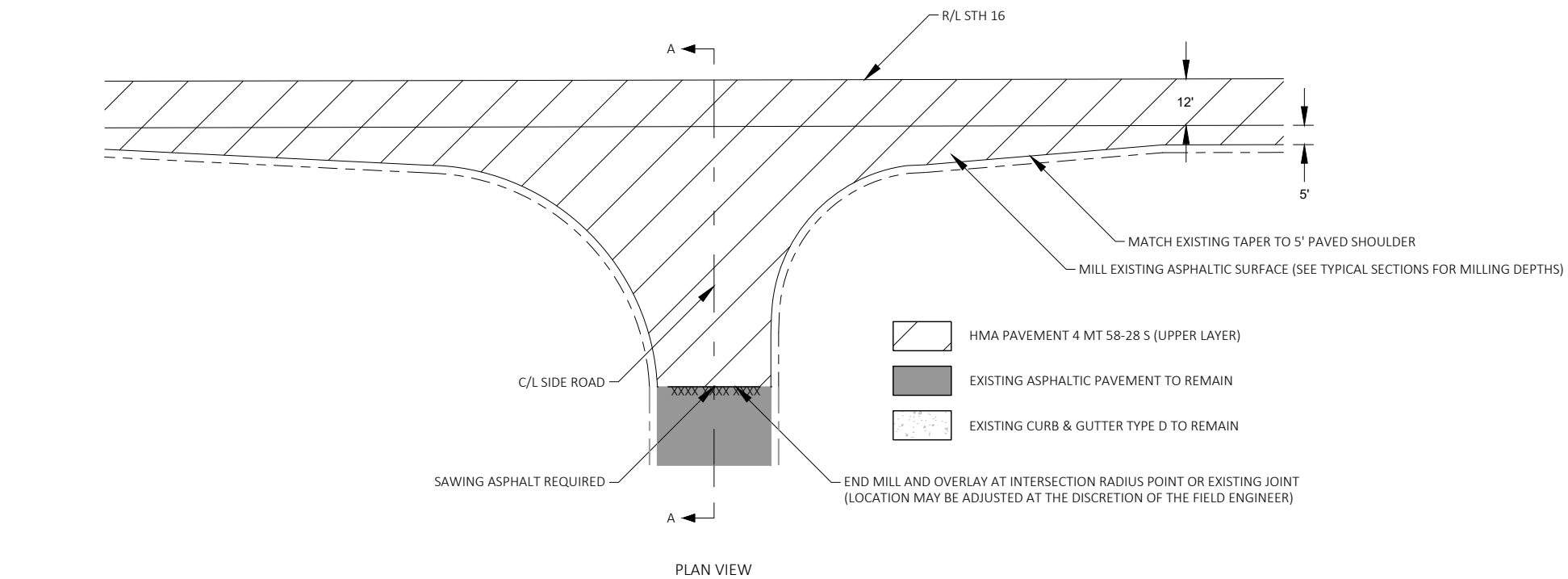
HMA OVERLAY DEPTH TRANSITION DETAIL
ELEVATION VIEW
STA 617+00 - STA 618+00



HMA OVERLAY DEPTH TRANSITION DETAIL
ELEVATION VIEW
STA 611+00 - STA 612+00
(STA 795+00 - STA 796+00)



WEST END JOINT DETAIL
ELEVATION VIEW
STA 561+35 - STA 562+35



SIDE ROAD TRANSITION DETAIL

*2.0% TYPICAL; MATCH EXISTING PAVEMENT CROSS SLOPE ALONG SUPERELEVATED CURVES

CHURCH STREET

CTH B/LONG CROSSING ROAD

OLD COUNTY ROAD F

HUMPHREY DRIVE

WILLIAMS ROAD

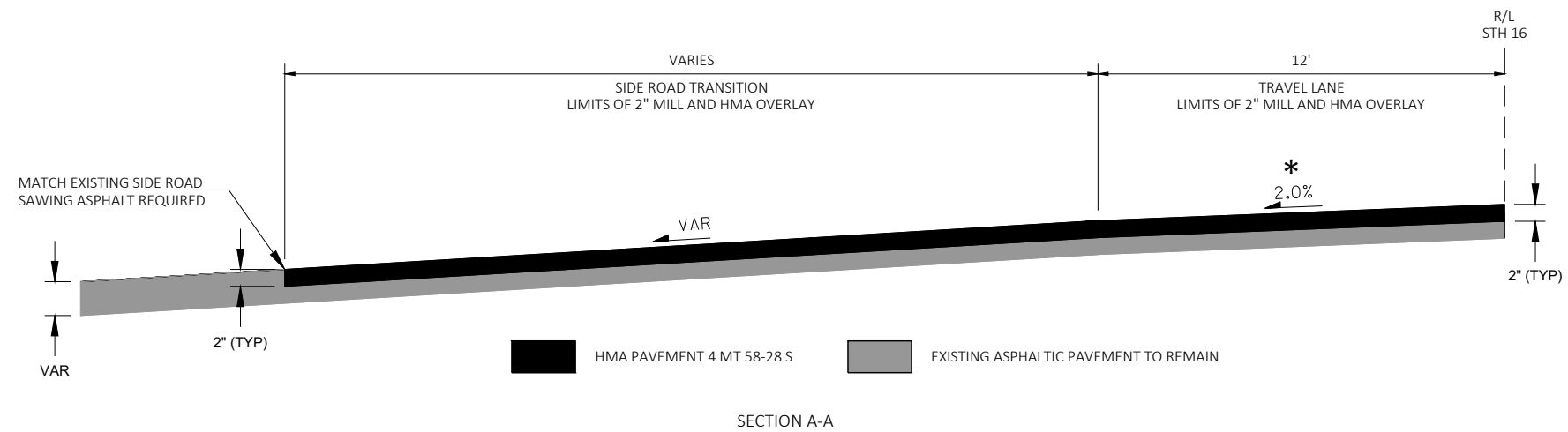
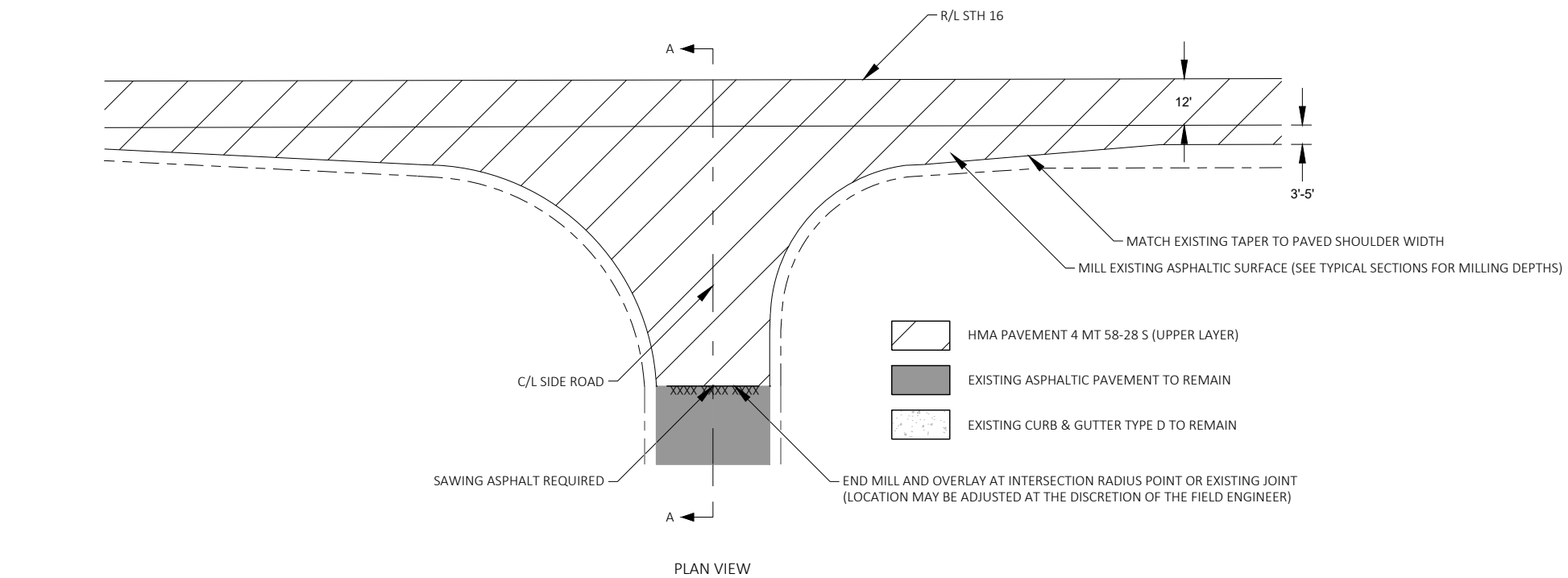
ERDMAN ROAD

DOHERTY ROAD

FISCHER ROAD

COLUMBUS ROAD

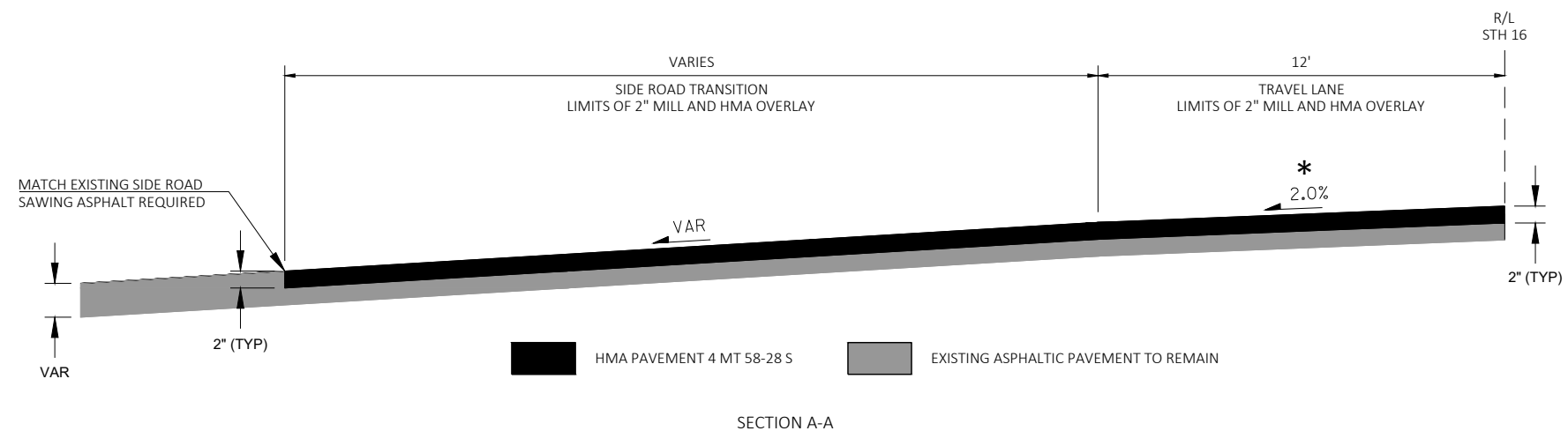
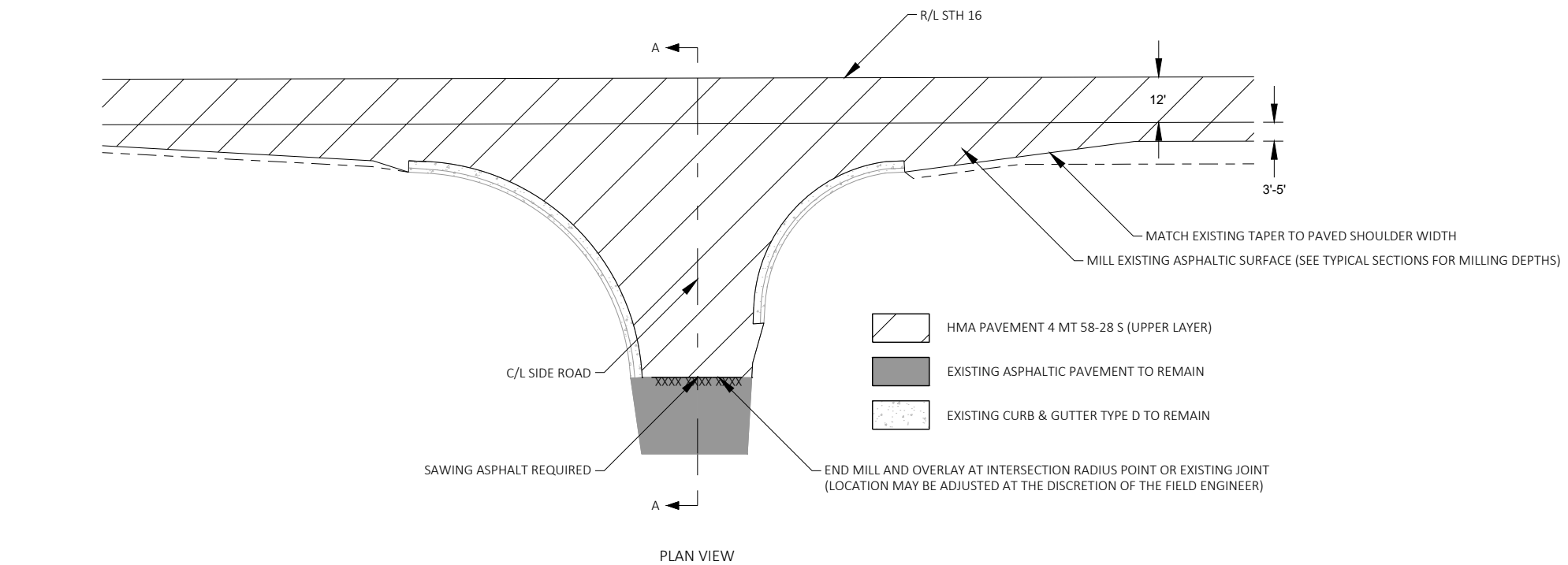
OTSEGO ROAD



SIDE ROAD TRANSITION DETAIL

*2.0% TYPICAL; MATCH EXISTING PAVEMENT CROSS SLOPE ALONG SUPERELEVATED CURVES

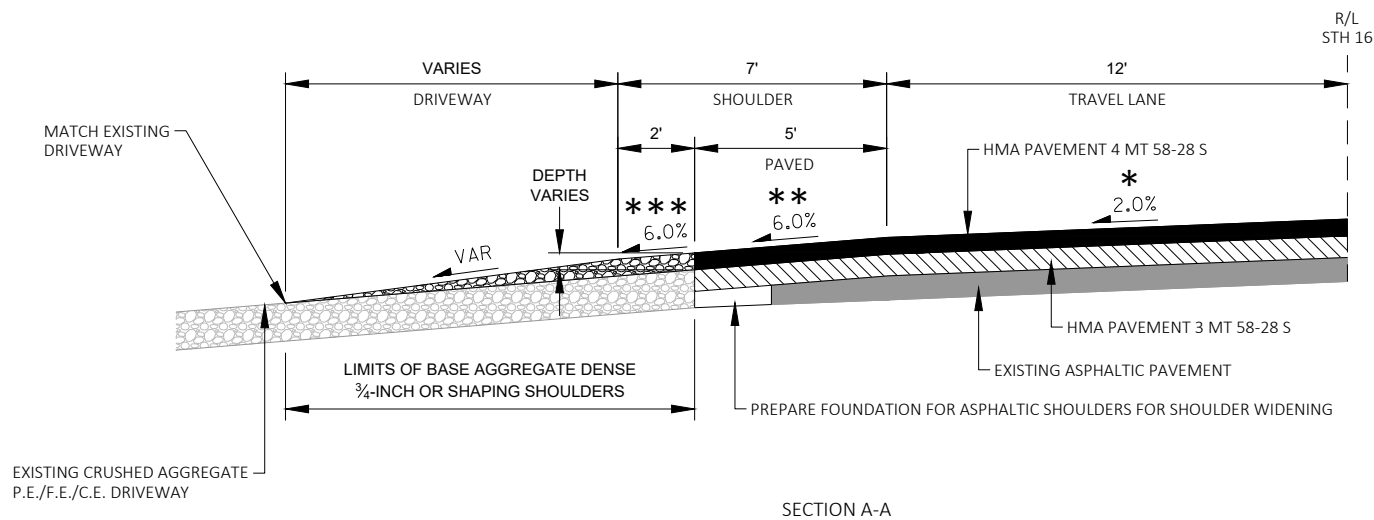
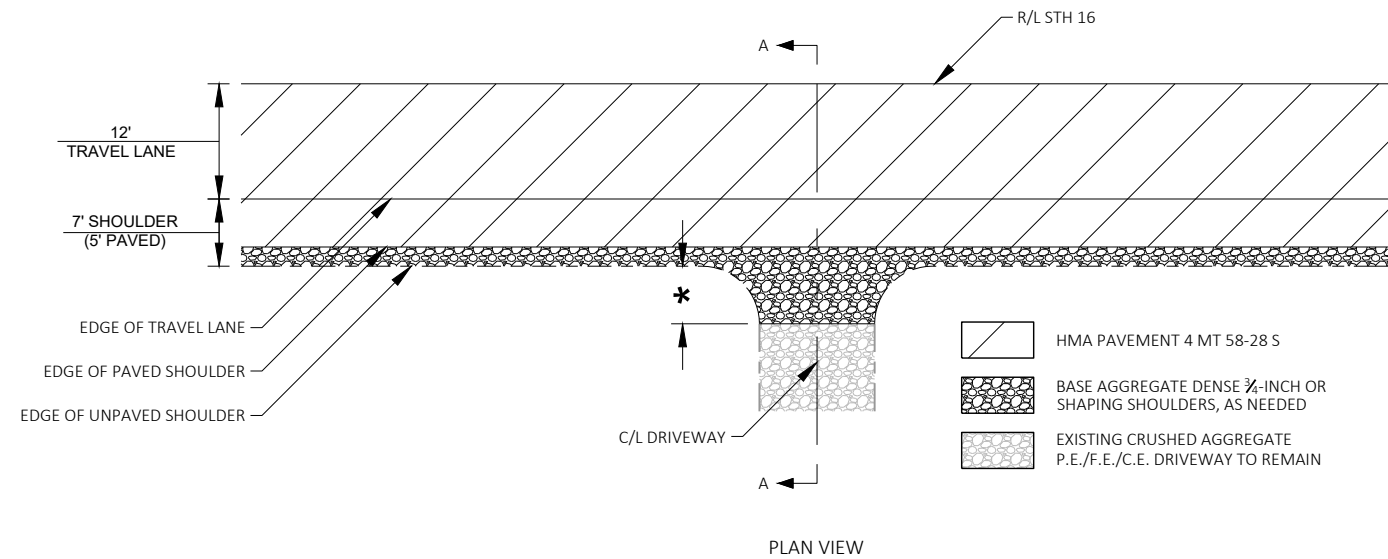
COLUMBUS ROAD
MICKELSON ROAD
JOHNSON ROAD



SIDE ROAD WITH CURB AND GUTTER TRANSITION DETAIL (STA 803+11 - STA 1204+00)

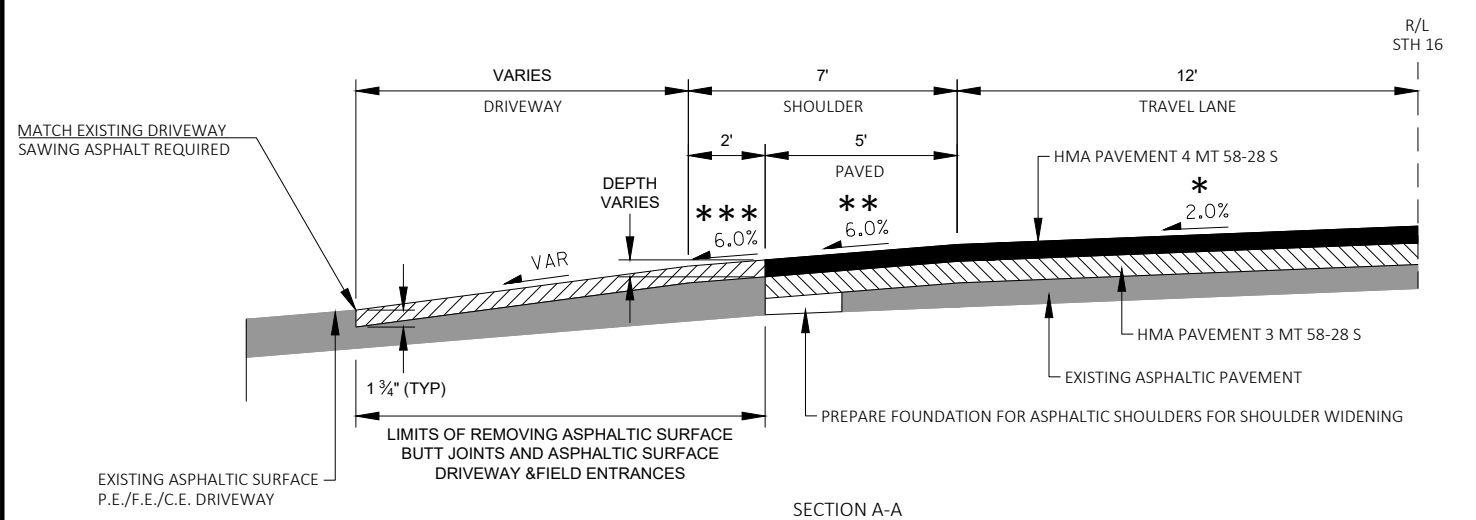
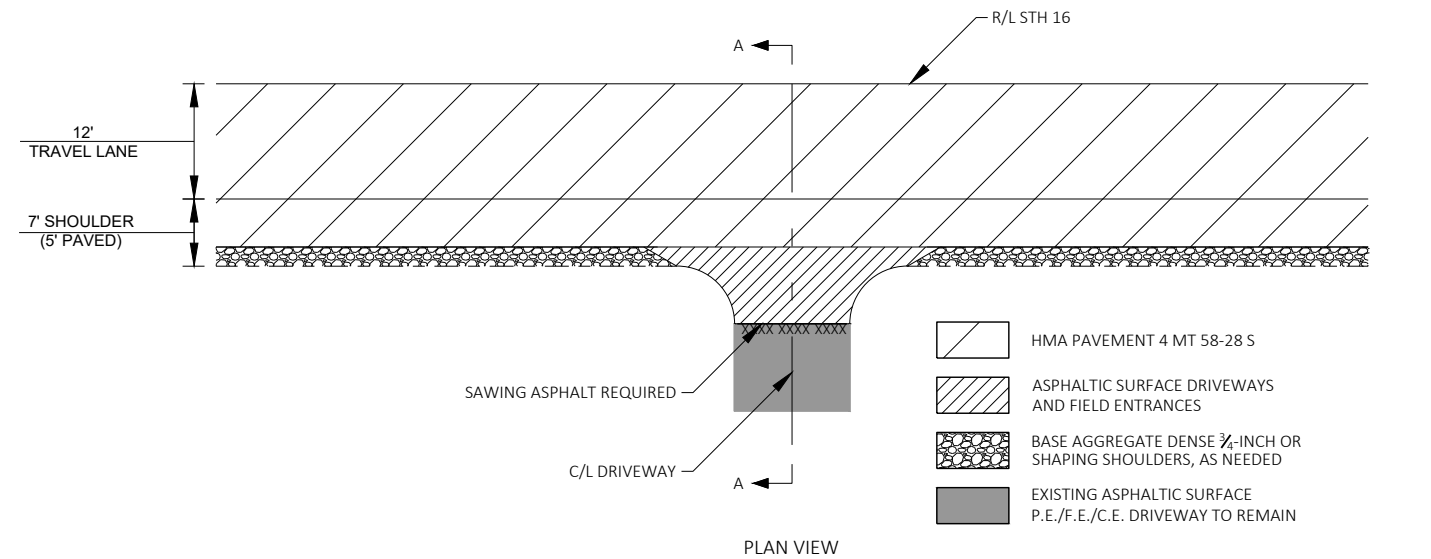
*2.0% TYPICAL; MATCH EXISTING PAVEMENT CROSS SLOPE ALONG SUPERELEVATED CURVES

CTH A (WITH RIGHT TURN LANES)	JOHNSON ROAD (WITH RIGHT TURN LANE)
MOORE ROAD/MOHR ROAD	RHODES BAKE-N-SERV ENTRANCE
SEIER ROAD (WITH RIGHT TURN LANE AND ACCELERATION LANE)	HALL ROAD
STH 146 (WITH SPLITTER ISLAND AND RIGHT TURN LANE)	
CTH CD (WITH RIGHT TURN LANE)	
SAVANNA ROAD/STEELE ROAD	
CTH D (WITH RIGHT TURN LANE)	
MCCRAE ROAD (WITH RIGHT TURN LANE)	
DUBORG ROAD	



P.E./F.E./C.E. DRIVEWAY DETAIL - EXISTING CRUSHED AGGREGATE (STA 561+35 - STA 803+11)

*REPLACE TO THE DRIVEWAY RADIUS POINTS OR AS DIRECTED BY THE FIELD ENGINEER
**2.0% TYPICAL ON DRIVING LANE; 6.0% TYPICAL ON PAVED SHOULDER; MATCH EXISTING PAVEMENT CROSS SLOPE ALONG SUPERELEVATED CURVES
***6% TYPICAL; MATCH S.E. SLOPE AT LOW END OF S.E. CURVE; 8% MAX. ROLLOVER RATE AT HIGH END OF S.E. CURVE



P.E./F.E./C.E. DRIVEWAY DETAIL - EXISTING ASPHALT (STA 561+35 - STA 803+11)

*REPLACE TO THE EXISTING PAVEMENT JOINT OR AS DIRECTED BY THE FIELD ENGINEER
**MATCH EXISTING PAVEMENT CROSS SLOPE
***6% TYPICAL; MATCH S.E. SLOPE AT LOW END OF S.E. CURVE; 8% MAX. ROLLOVER RATE AT HIGH END OF S.E. CURVE

2" REMOVING ASPHALTIC SURFACE MILLING
PAVE 1 ¾" HMA PAVEMENT 4 MT 58-28 S (UPPER LAYER)
PAVE 2 ¾" HMA PAVEMENT 3 MT 58-28 S (LOWER LAYER)

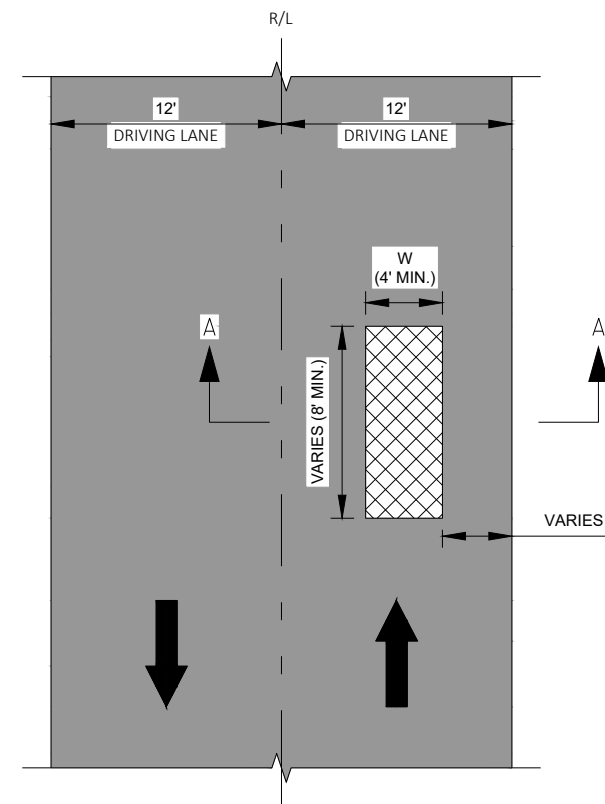
EXISTING ASPHALTIC PAVEMENT

2 ½" REMOVING DISTRESSED PAVEMENT MILLING
PAVE 2 ½" ASPHALTIC SURFACE

EXISTING SALVAGED ASPHALTIC PAVEMENT-BASE COURSE 35/65 BLEND AND CRUSHED AGGREGATE

APPLY TACK COAT

SECTION A-A



PLAN VIEW - MILLED SURFACE

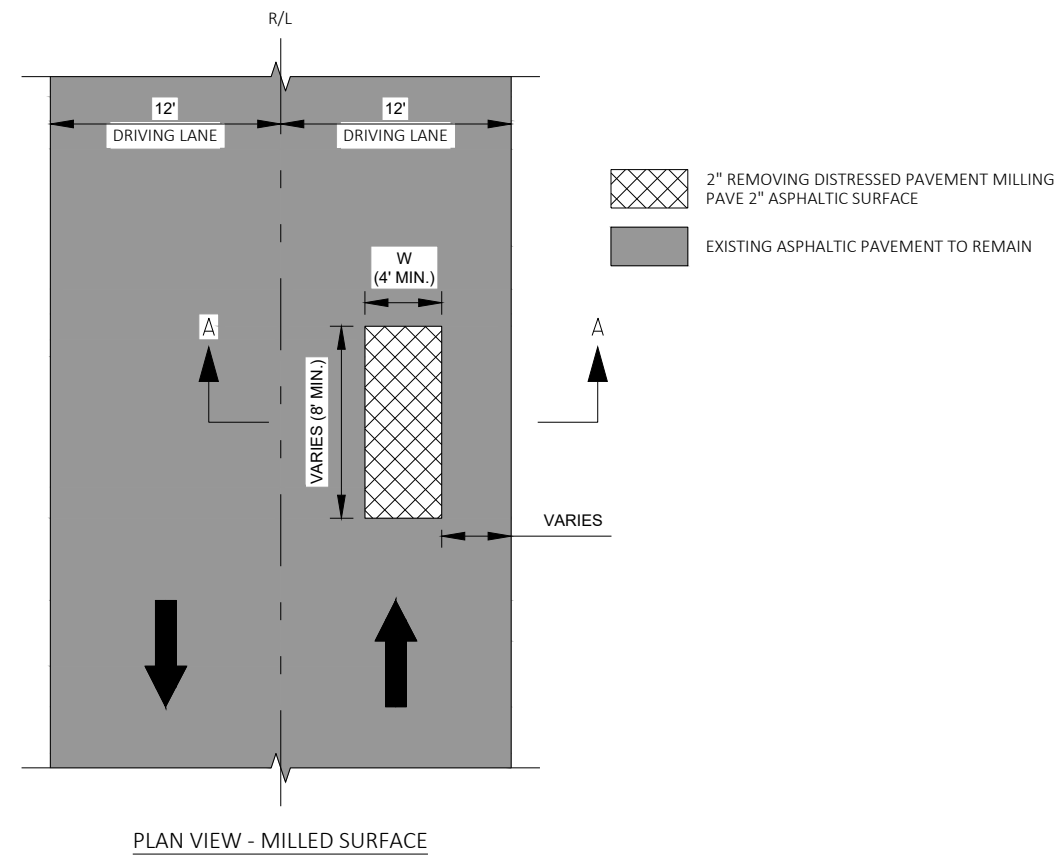
HMA PAVEMENT 4 MT 58-28 S (UPPER LAYER)
 HMA PAVEMENT 3 MT 58-28 S (LOWER LAYER)

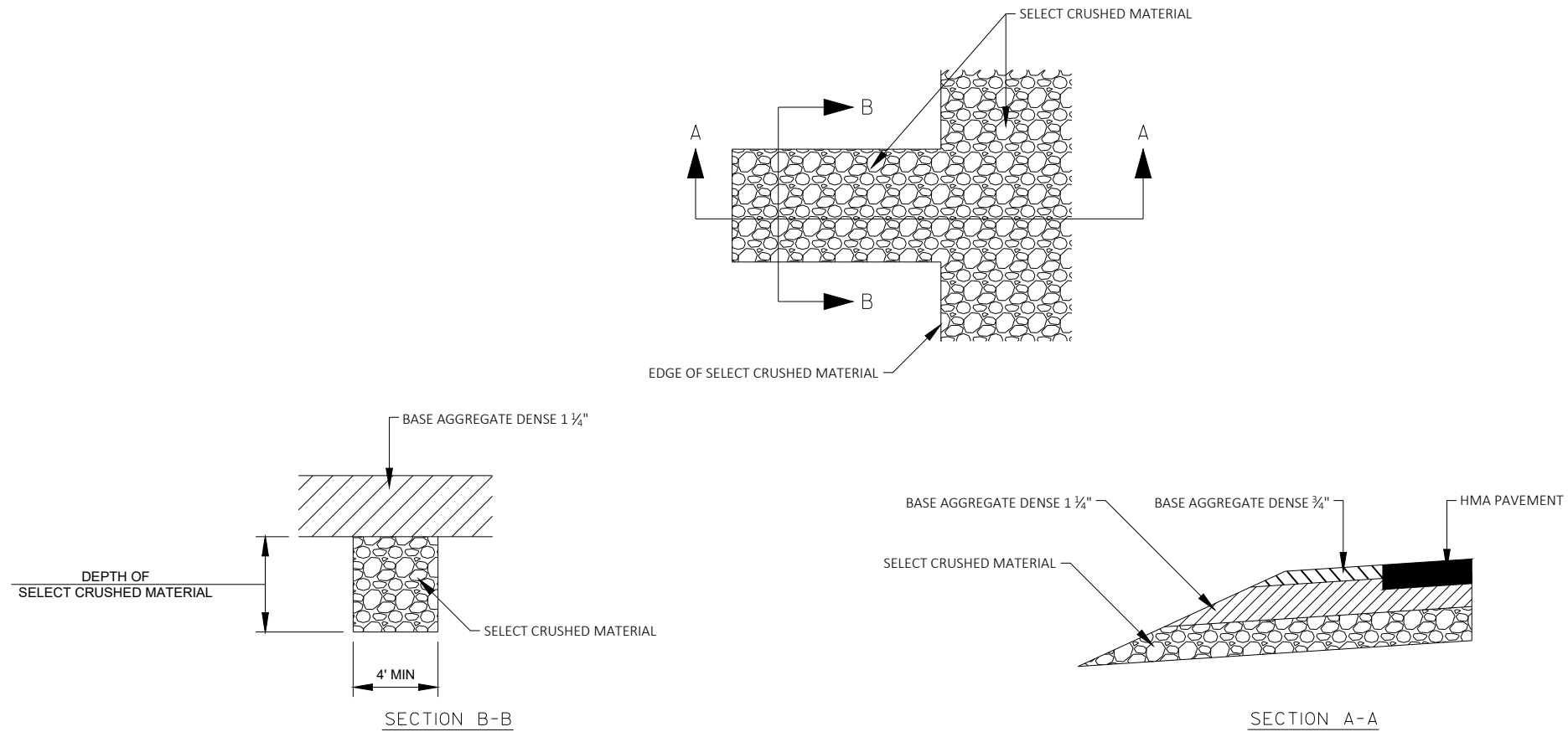
2 ½" REMOVING DISTRESSED PAVEMENT MILLING
PAVE 2 ½" ASPHALTIC SURFACE
 EXISTING ASPHALTIC PAVEMENT TO REMAIN

REMOVING DISTRESSED PAVEMENT MILLING DETAIL
SEE TABLES (RIGHT) FOR APPROXIMATE LOCATIONS AND WIDTHS.
EXACT LOCATIONS AND WIDTHS TO BE DETERMINED BY THE FIELD ENGINEER.

STATION	TO	STATION	OFFSET	W (FT)
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	
-	-	-	LT	

STATION	TO	STATION	OFFSET	W (FT)
-	-	-	RT	
-	-	-	RT	
-	-	-	RT	
-	-	-	RT	
-	-	-	RT	
-	-	-	RT	
-	-	-	RT	
-	-	-	RT	
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-	-	-	RT	
-	-	-	RT	
-	-	-	RT	

[illegible][illegible]



DETAIL FOR FRENCH DRAINS/WEEP

DRAINS ARE TO BE CONSTRUCTED AT LEAST EVERY 250'
OR AT ANY LOW POINT TO SUFFICIENTLY DRAIN SELECT CRUSHED MATERIAL
(OR AS OTHERWISE DIRECTED BY THE FIELD ENGINEER)

EXCAVATION REQUIRED TO CONSTRUCT FRENCH DRAINS/WEEPS SHALL
BE CONSIDERED INCIDENTAL TO THE ITEM, SELECT CRUSHED MATERIAL.

DO NOT COVER FORESLOPE SELECT CRUSHED MATERIAL WITH TOPSOIL

APPROXIMATE FRENCH DRAIN/WEEP LOCATIONS:

STA 1153+00 LT & RT
STA 1155+50 LT & RT
STA 1158+50 LT & RT

GENERAL NOTES

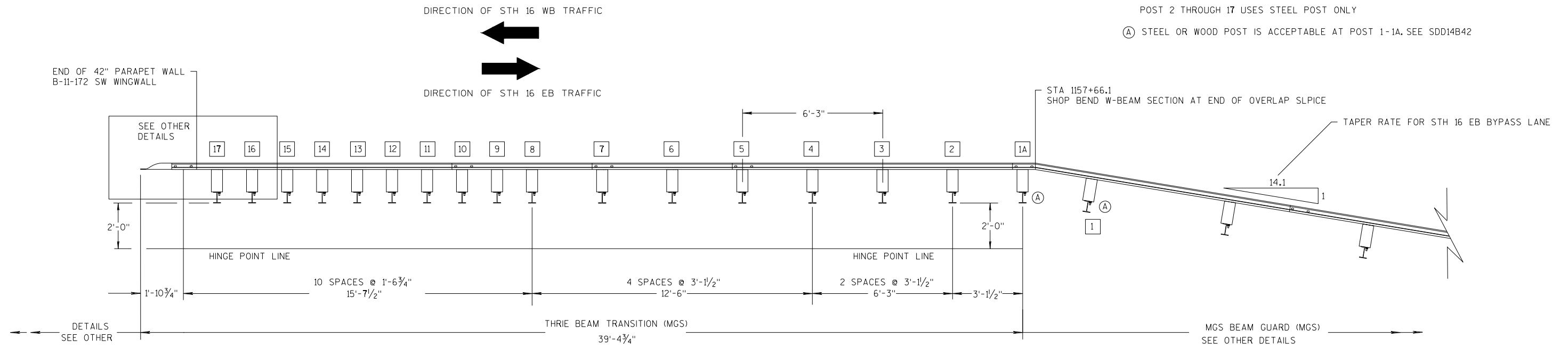
IF ROCK IS ENCOUNTERED, REMOVE ROCK TO FULL DEPTH OF POST PLUS $2\frac{1}{2}$ ", AND 12" DIAMETER AROUND POST. SEE 14B42 FOR MORE DETAILS.

TRANSITION USES STEEL POSTS ONLY.

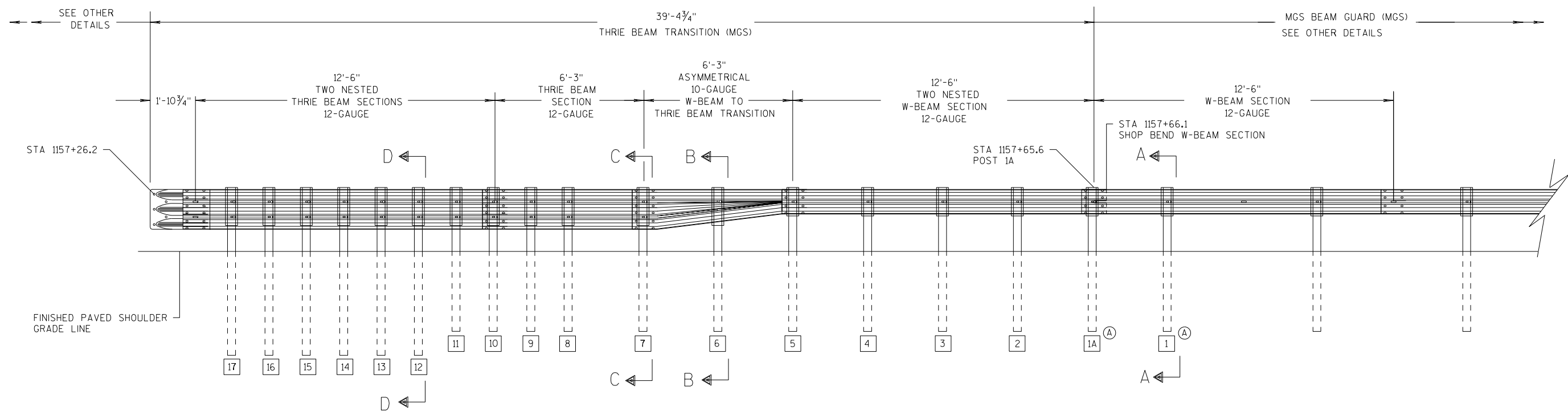
SEE STANDARD DETAIL DRAWING 14 B 42 FOR MORE INFORMATION.

POST 2 THROUGH 17 USES STEEL POST ONLY

(A) STEEL OR WOOD POST IS ACCEPTABLE AT POST 1-1A. SEE SDD14B42



PLAN VIEW



ELEVATION VIEW

MIDWEST GUARDRAIL SYSTEM THRIE BEAM TRANSITION WITH FLARE

PROJECT NO: 1400-01-70

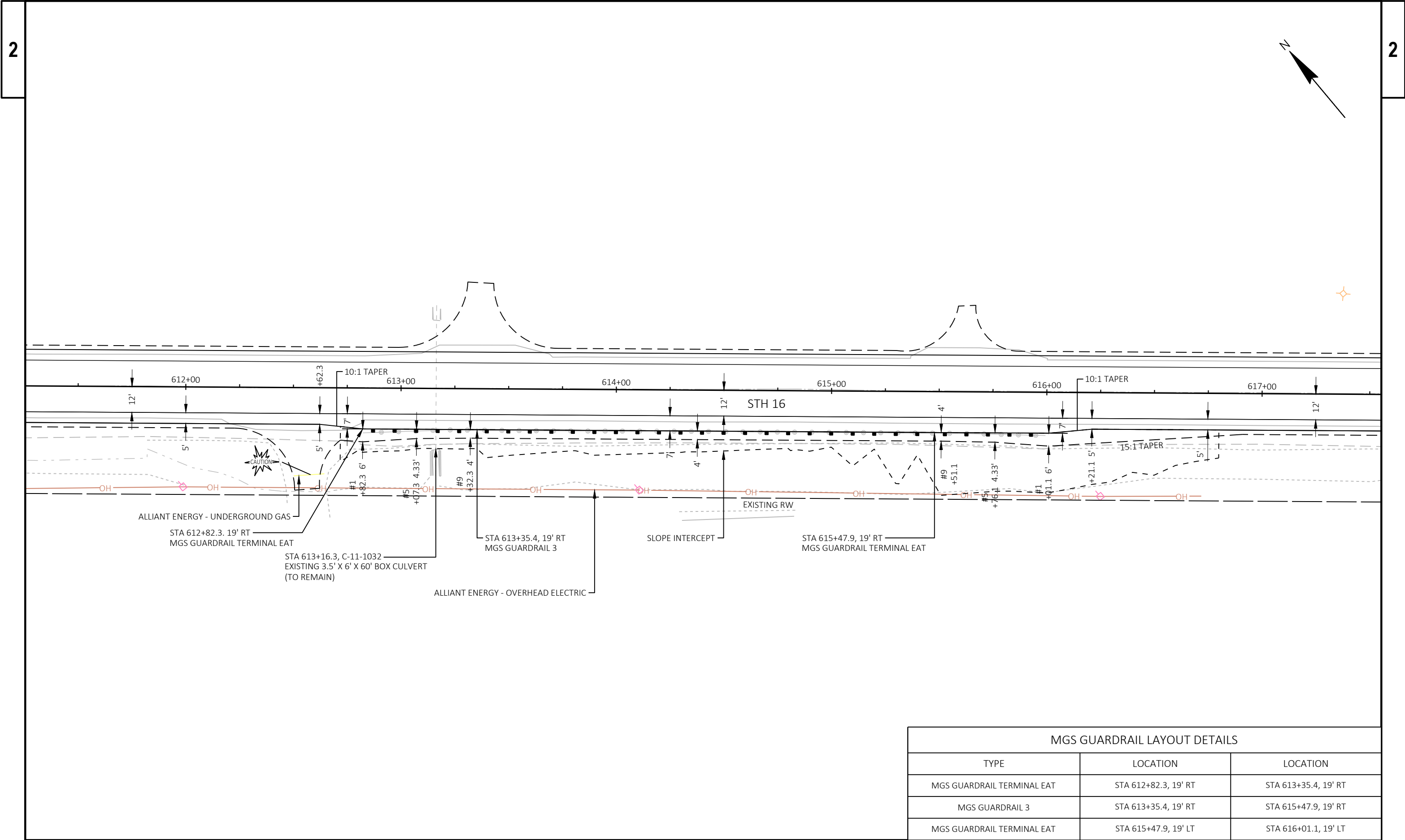
HWY: STH 16

COUNTY: COLUMBIA

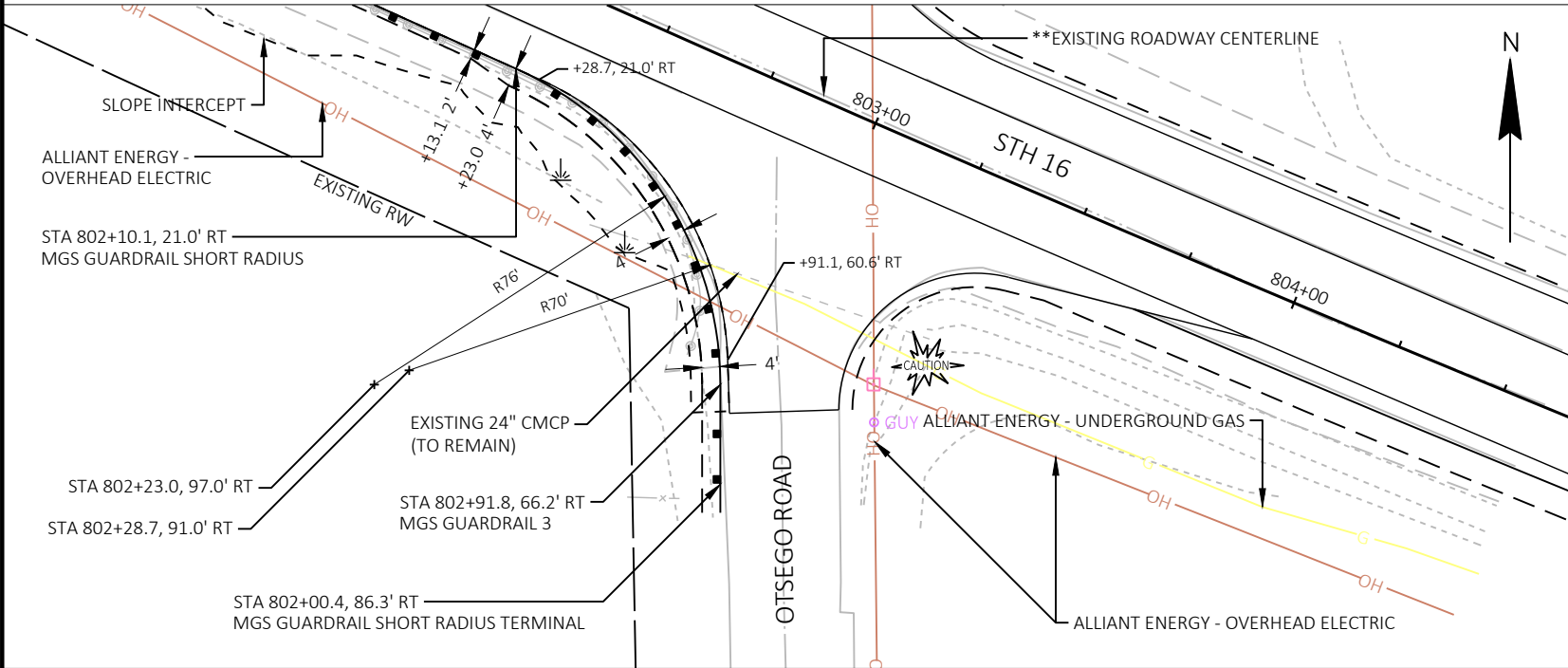
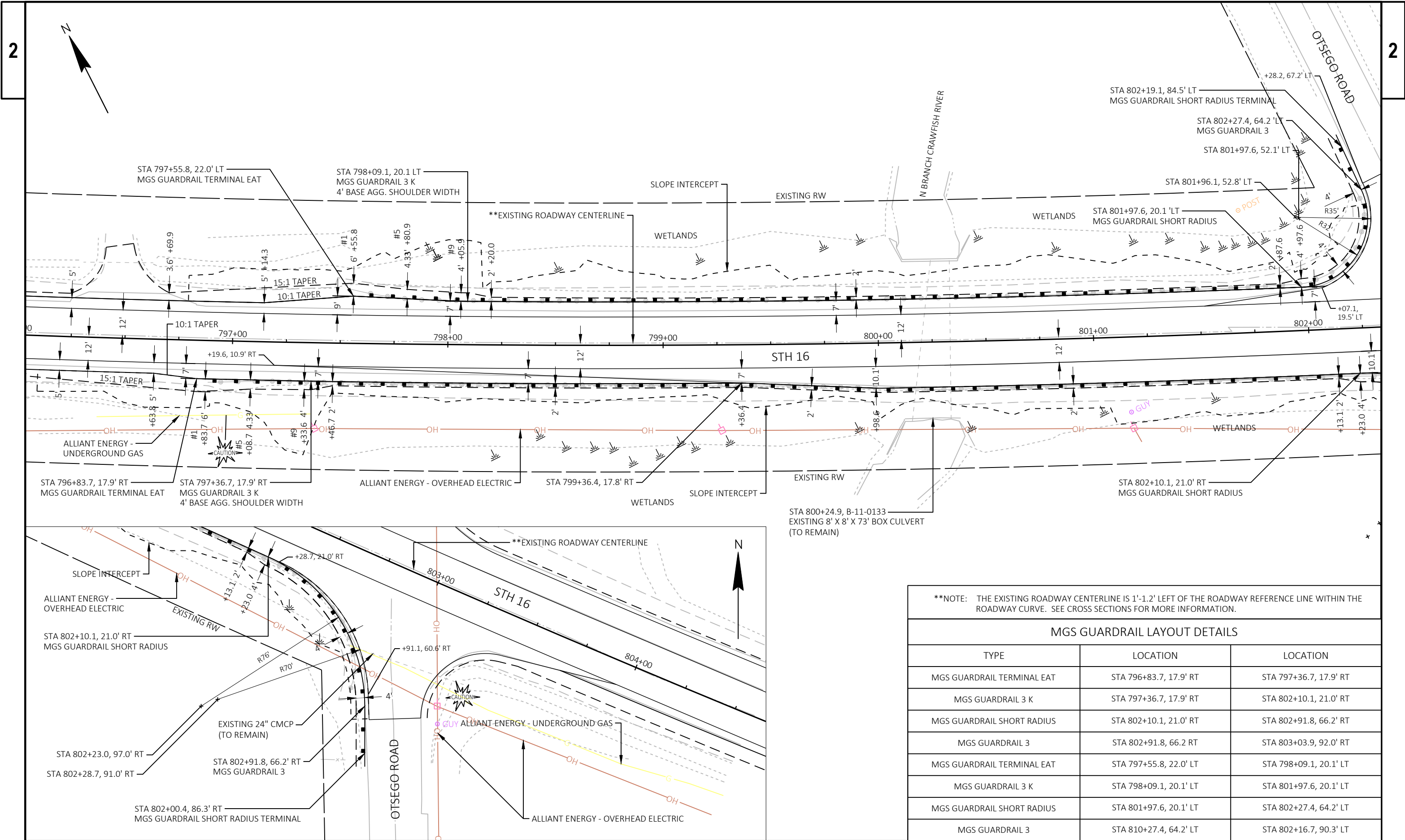
CONSTRUCTION DETAILS - MGS THRIE BEAM TRANSITION WITH FLARE DETAILS

SHEET

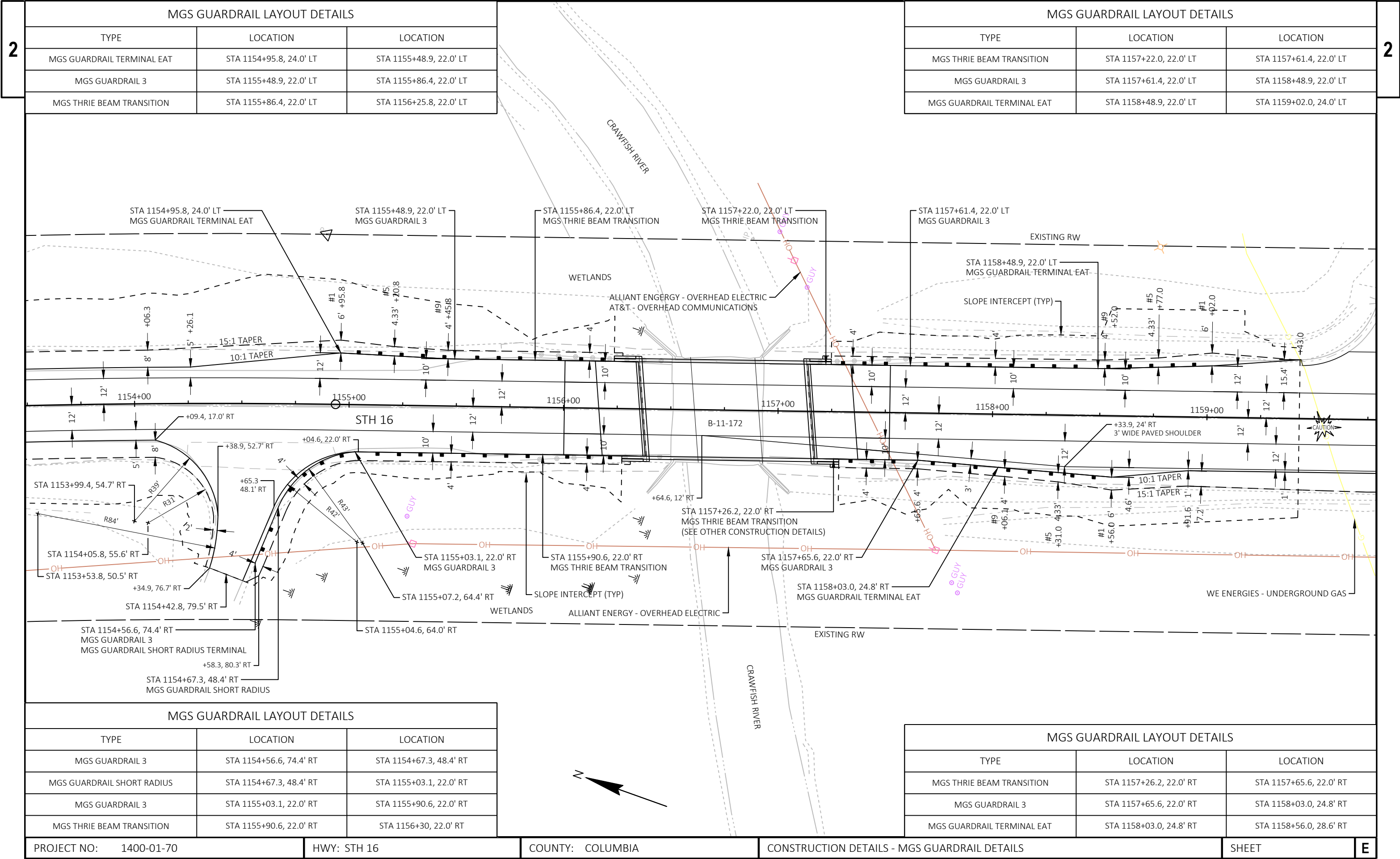
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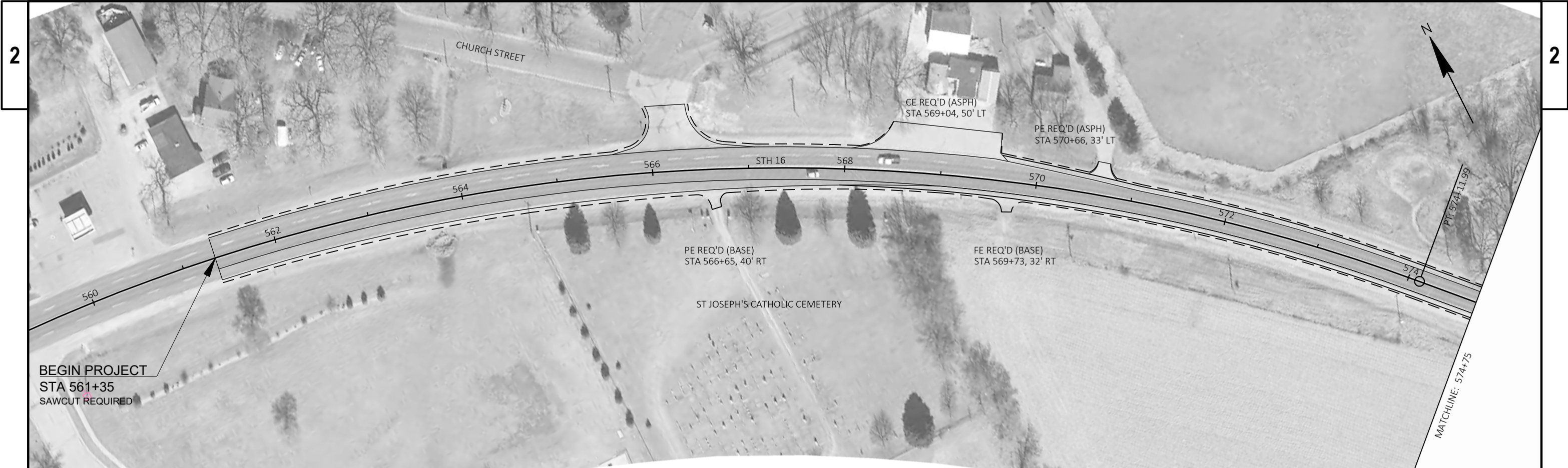


MGS GUARDRAIL LAYOUT DETAILS		
TYPE	LOCATION	LOCATION
MGS GUARDRAIL TERMINAL EAT	STA 612+82.3, 19' RT	STA 613+35.4, 19' RT
MGS GUARDRAIL 3	STA 613+35.4, 19' RT	STA 615+47.9, 19' RT
MGS GUARDRAIL TERMINAL EAT	STA 615+47.9, 19' LT	STA 616+01.1, 19' LT



**NOTE: THE EXISTING ROADWAY CENTERLINE IS 1'-1.2' LEFT OF THE ROADWAY REFERENCE LINE WITHIN THE ROADWAY CURVE. SEE CROSS SECTIONS FOR MORE INFORMATION.		
MGS GUARDRAIL LAYOUT DETAILS		
TYPE	LOCATION	LOCATION
MGS GUARDRAIL TERMINAL EAT	STA 796+83.7, 17.9' RT	STA 797+36.7, 17.9' RT
MGS GUARDRAIL 3 K	STA 797+36.7, 17.9' RT	STA 802+10.1, 21.0' RT
MGS GUARDRAIL SHORT RADIUS	STA 802+10.1, 21.0' RT	STA 802+91.8, 66.2' RT
MGS GUARDRAIL 3	STA 802+91.8, 66.2' RT	STA 803+03.9, 92.0' RT
MGS GUARDRAIL TERMINAL EAT	STA 797+55.8, 22.0' LT	STA 798+09.1, 20.1' LT
MGS GUARDRAIL 3 K	STA 798+09.1, 20.1' LT	STA 801+97.6, 20.1' LT
MGS GUARDRAIL SHORT RADIUS	STA 801+97.6, 20.1' LT	STA 802+27.4, 64.2' LT
MGS GUARDRAIL 3	STA 810+27.4, 64.2' LT	STA 802+16.7, 90.3' LT





PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO:	1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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2

2

PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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2

2

MATCHLINE: 914+00

MATCHLINE: 928+75

MATCHLINE: 928+75

MATCHLINE: 943+50

PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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2

2

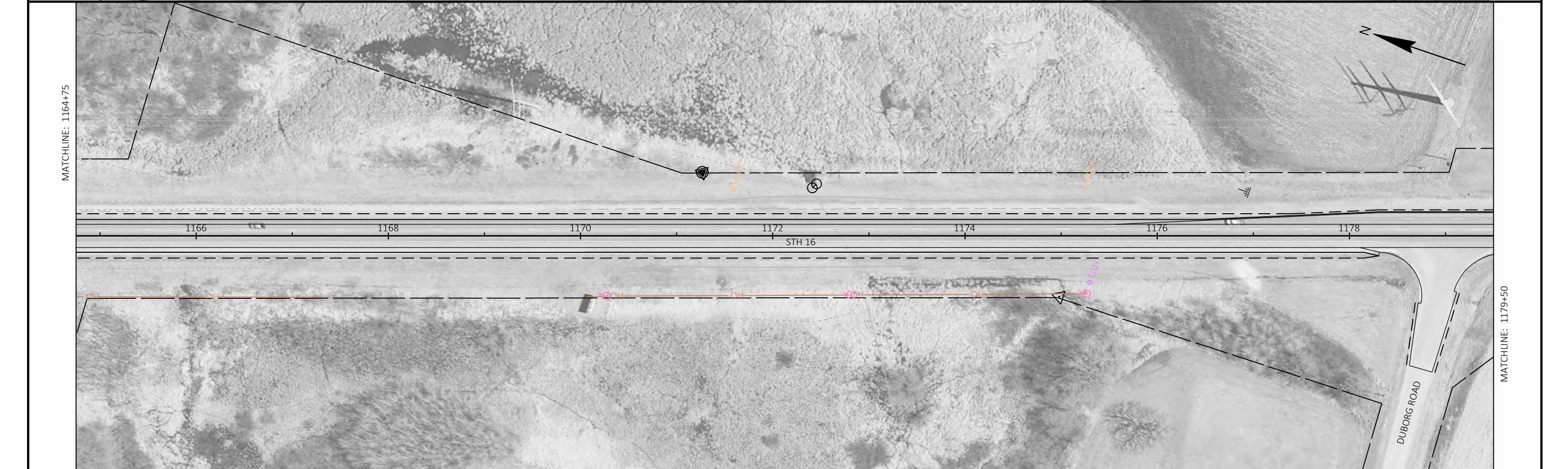
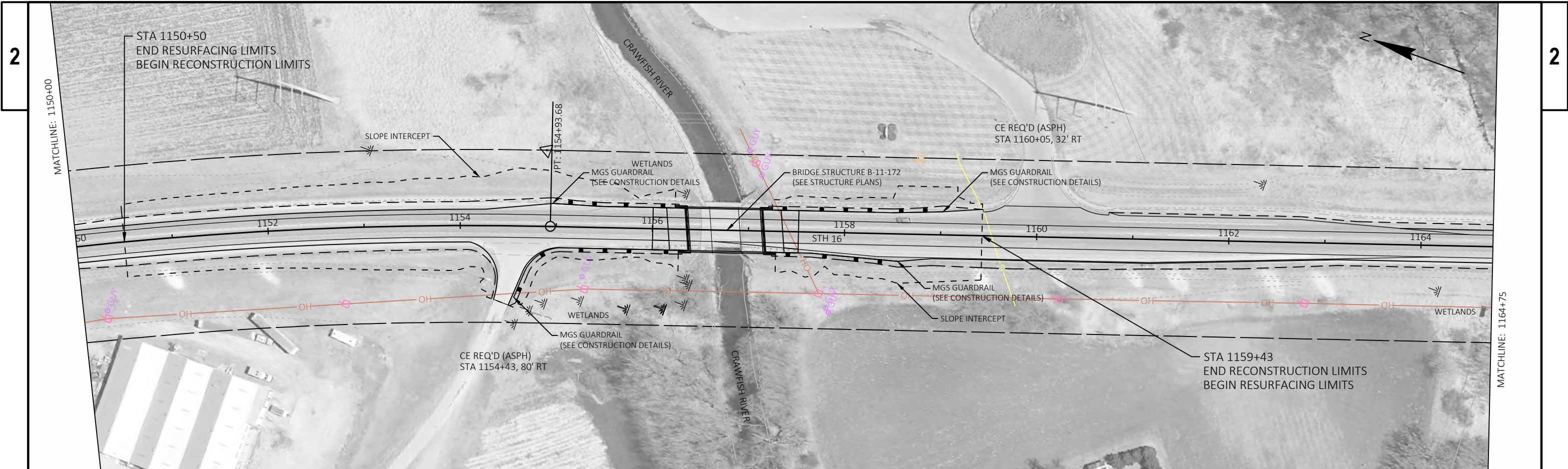
MATCHLINE: 1120+50

MATCHLINE: 1135+25

MATCHLINE: 1135+25

MATCHLINE: 1150+00

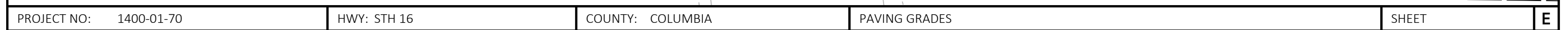
PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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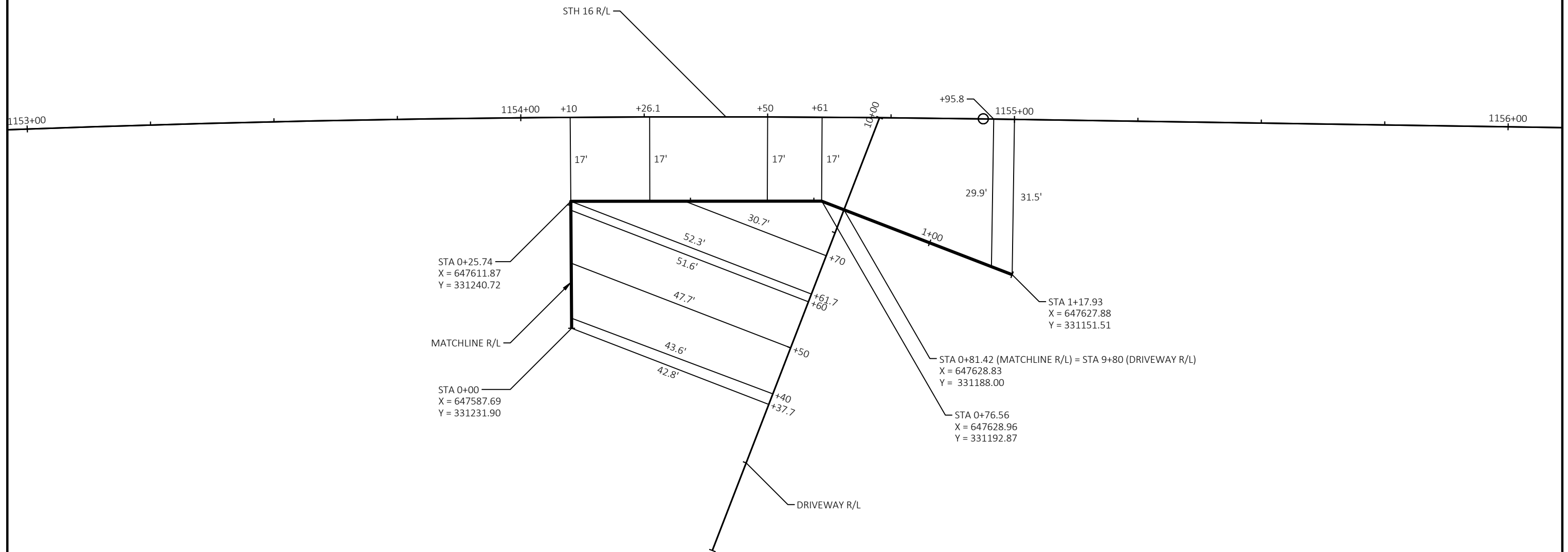


PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	PLAN	SHEET	E
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GENERAL NOTES

THE SILT FENCE RELIEF DETAIL IS A SUPPLEMENTAL DETAIL TO THE SILT FENCE STANDARD DETAILS AND SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND APPLICABLE SPECIAL PROVISIONS.

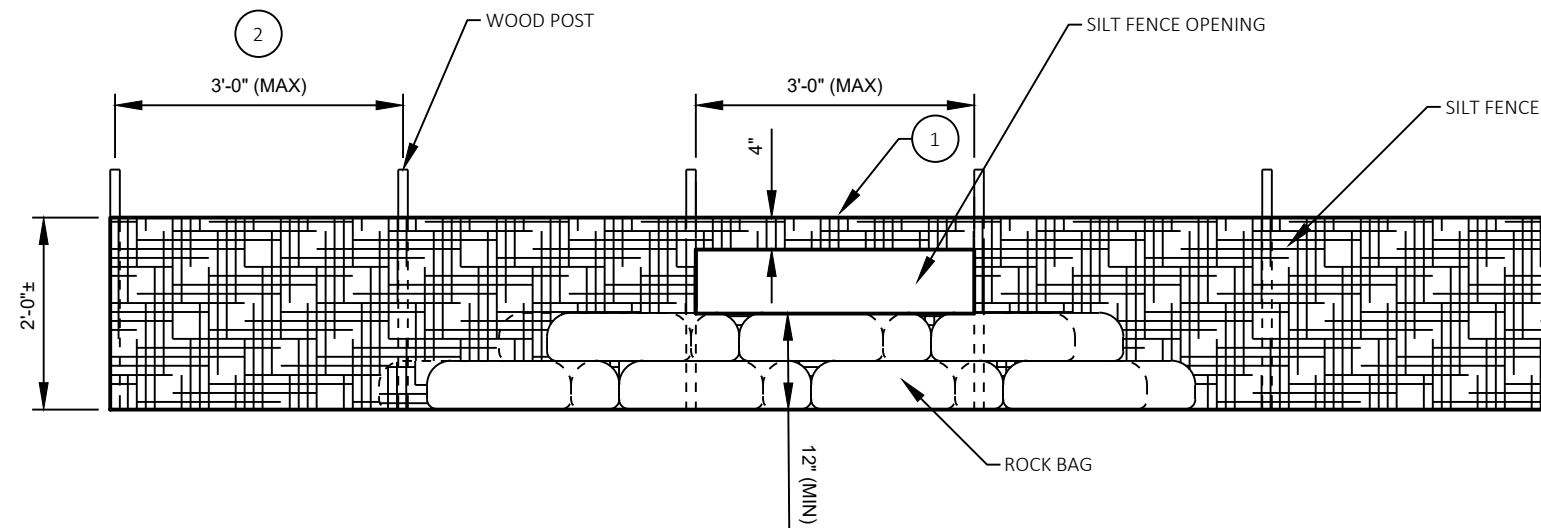
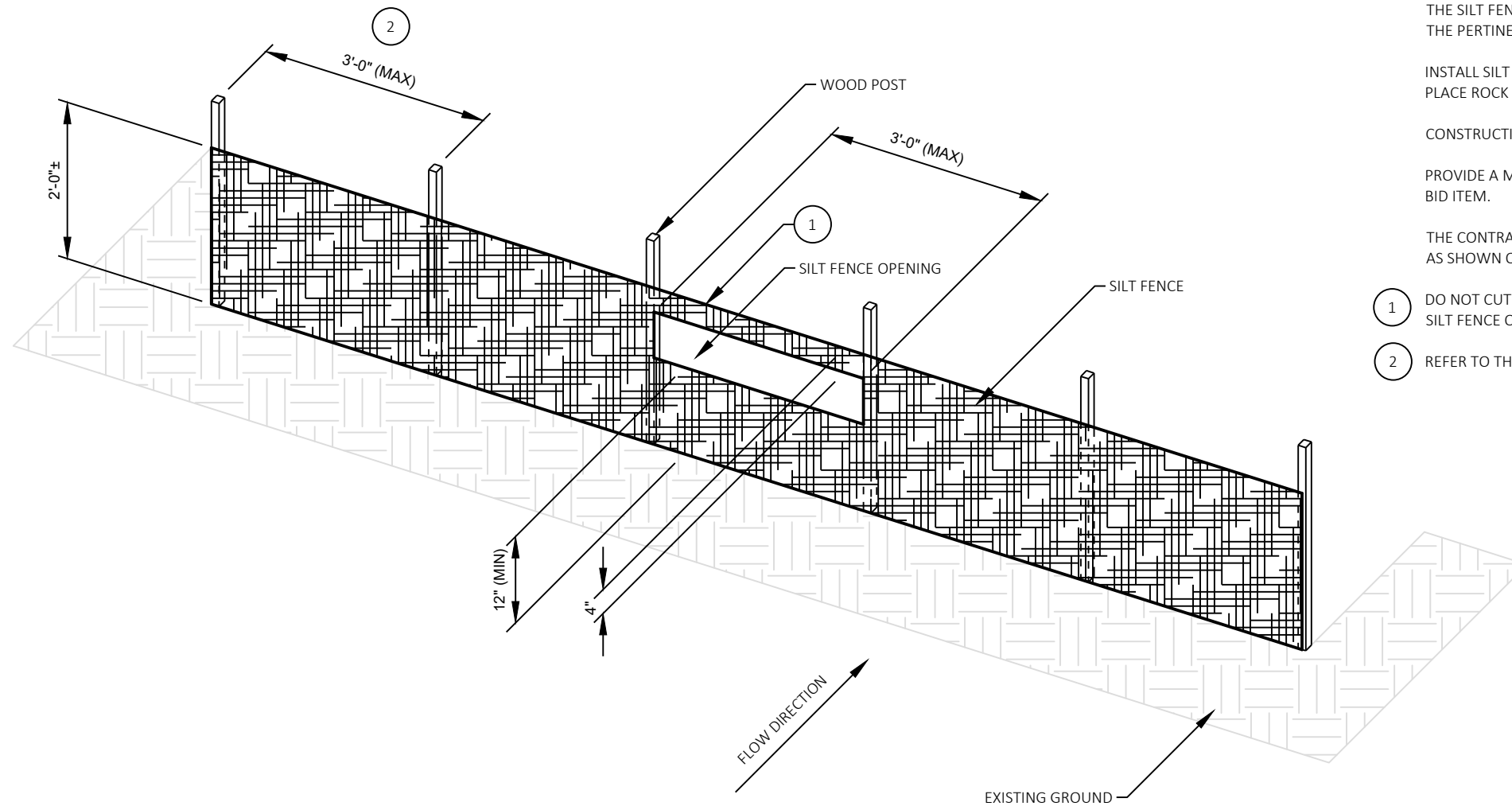
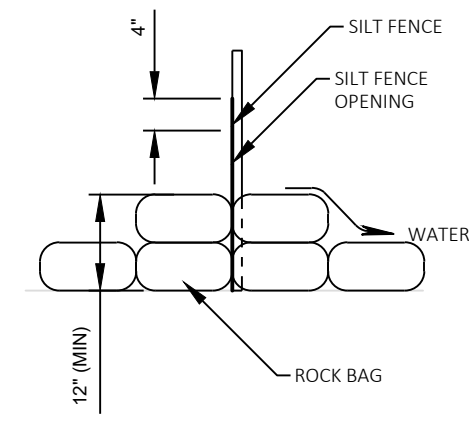
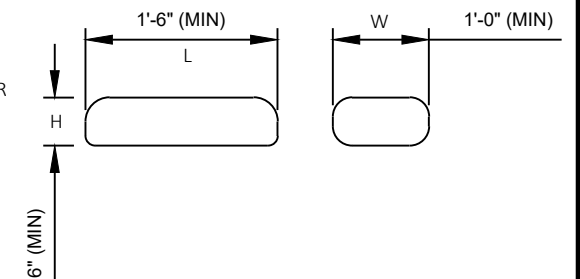
INSTALL SILT FENCE PRIOR TO CONSTRUCTING THE SILT FENCE OPENING. PRIOR TO CONSTRUCTING THE SILT FENCE OPENING, PLACE ROCK BAGS AT THE SILT FENCE OPENING AS SHOWN IN THIS DETAIL.

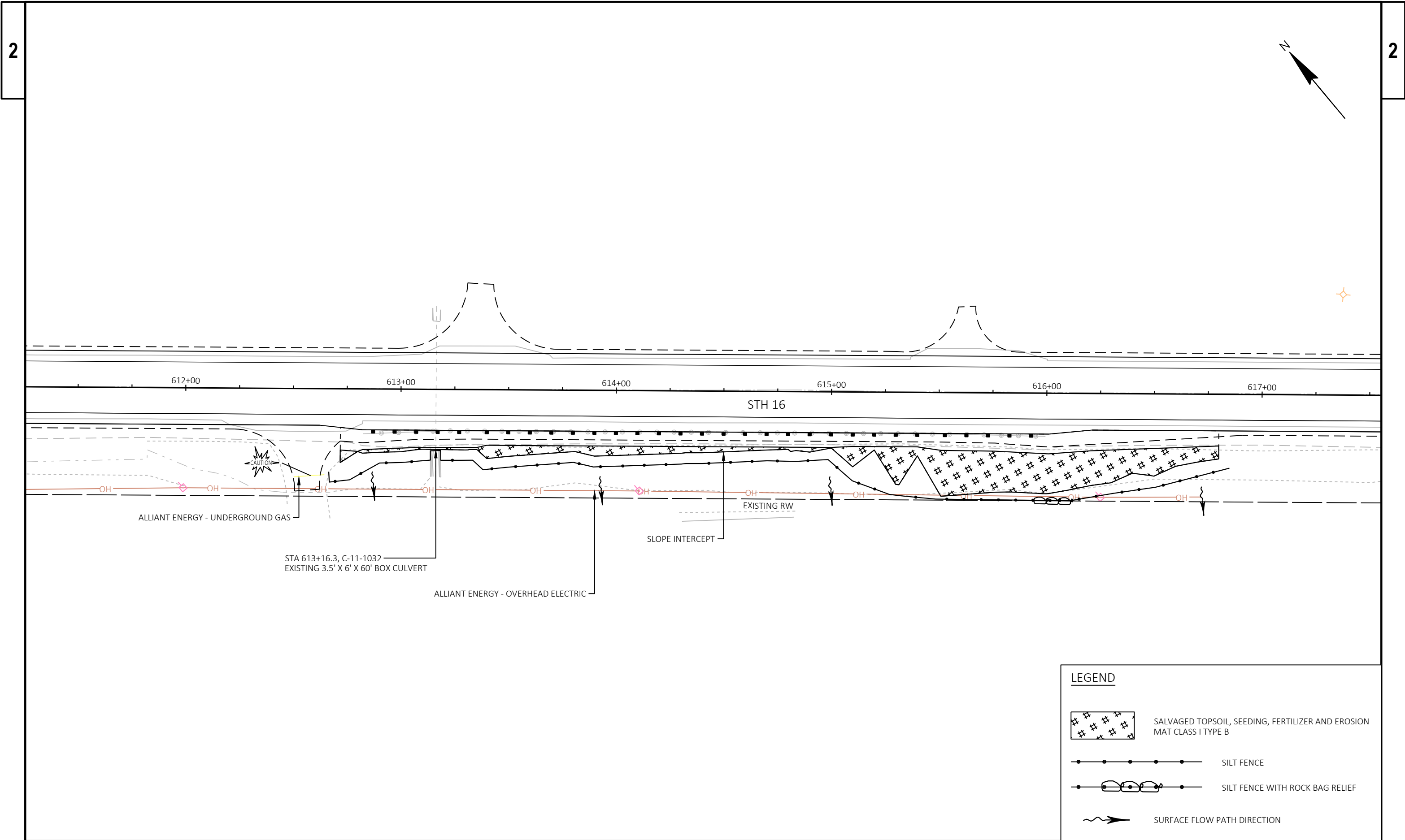
CONSTRUCTION OF THE SILT FENCE OPENING SHALL BE INCIDENTAL TO THE COST OF THE SILT FENCE BID ITEM.

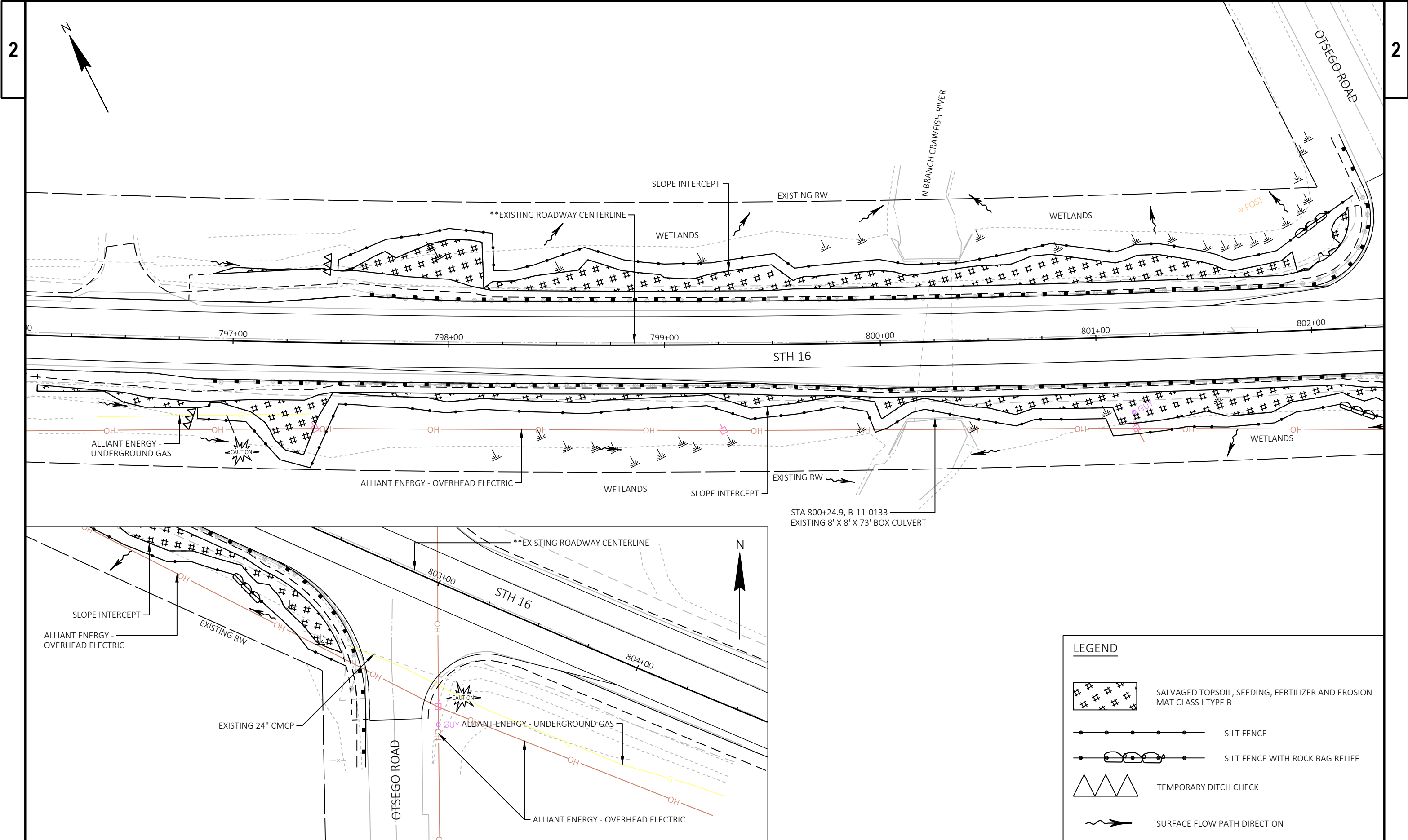
PROVIDE A MINIMUM OF 22 ROCK BAGS MINIMUM PER 3 FOOT OPENING. ROCK BAGS SHALL BE PAID UNDER THE ROCK BAGS BID ITEM.

THE CONTRACTOR SHALL ADJUST THE SILT FENCE RELIEF OPENINGS WITHIN THE SILT FENCE AS NECESSARY TO PROVIDE RELIEF: AS SHOWN ON THE PLANS, TO FIT FIELD CONDITIONS AND AS DIRECTED BY THE FIELD ENGINEER.

- 1 DO NOT CUT THE SUPPORT CORD OR TENSION TAPE WHEN CONSTRUCTING THE SILT FENCE OPENING. KEEP THE TOP OF THE SILT FENCE OPENING 1"± BELOW THE 3" FOLD AT THE SUPPORT CORD OR TENSION TAPE.
- 2 REFER TO THE SILT FENCE STANDARD DETAILS FOR ALLOWABLE ADJUSTMENTS TO POST SPACING.

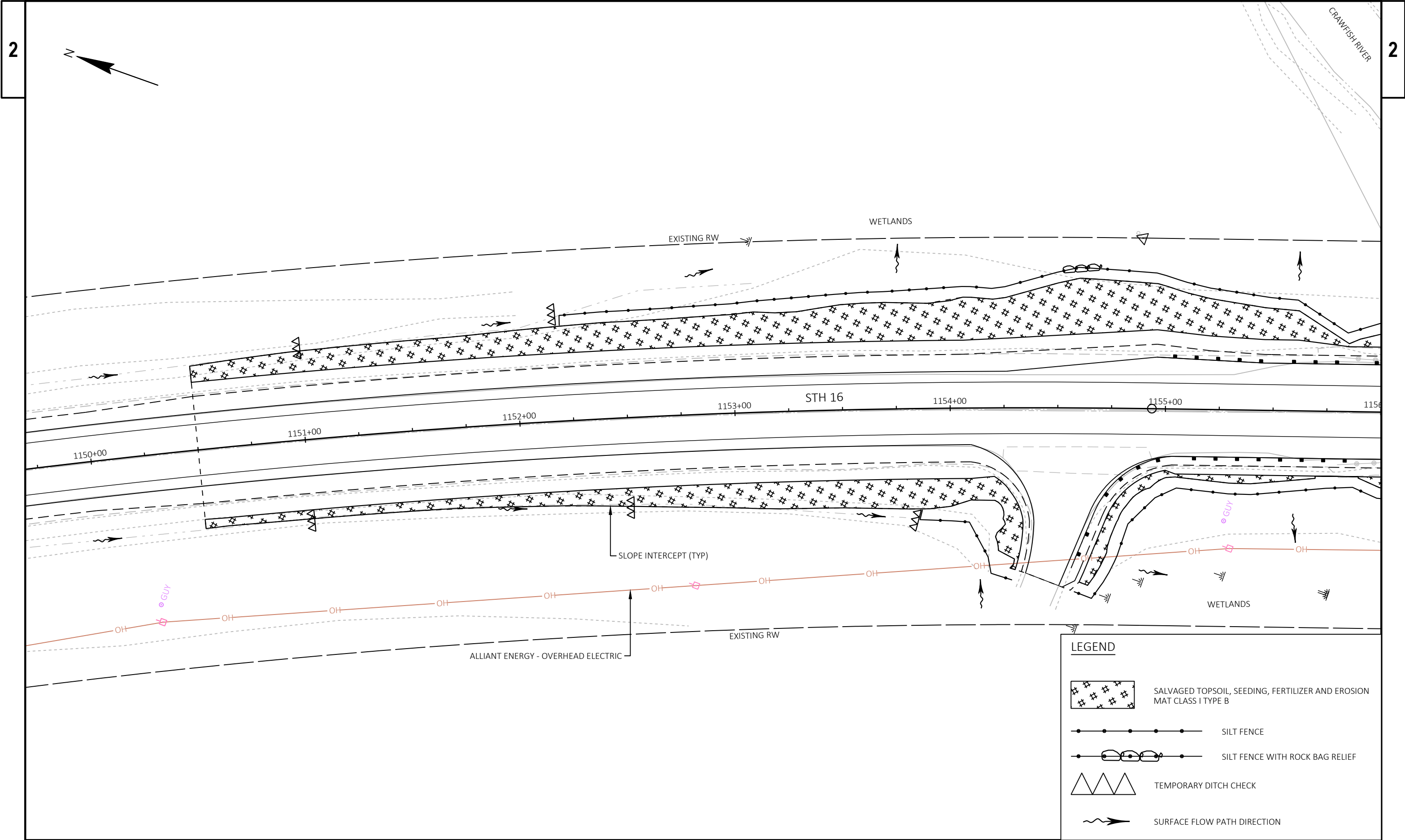
SILT FENCE RELIEF DETAILSECTION VIEWROCK BAG DETAIL

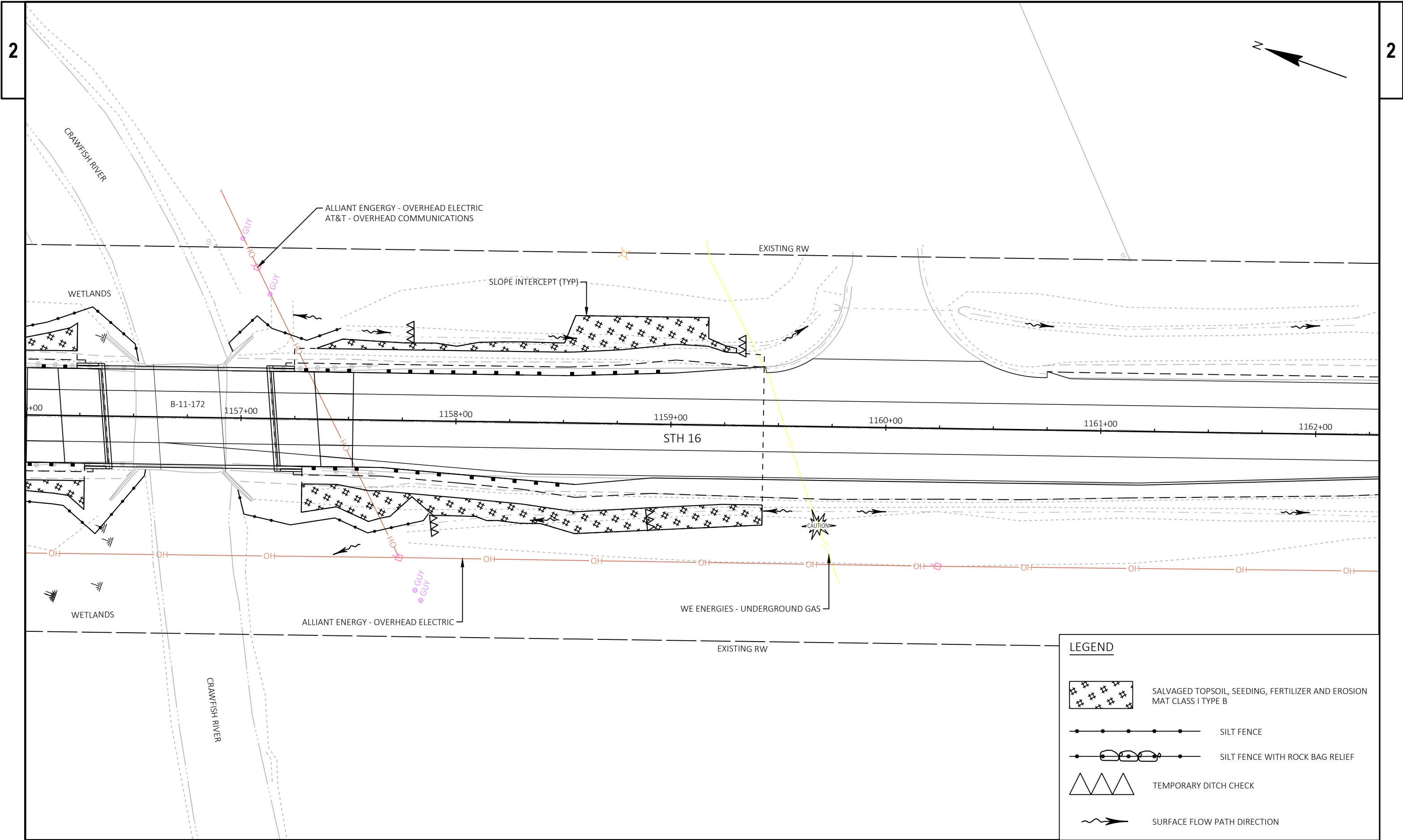


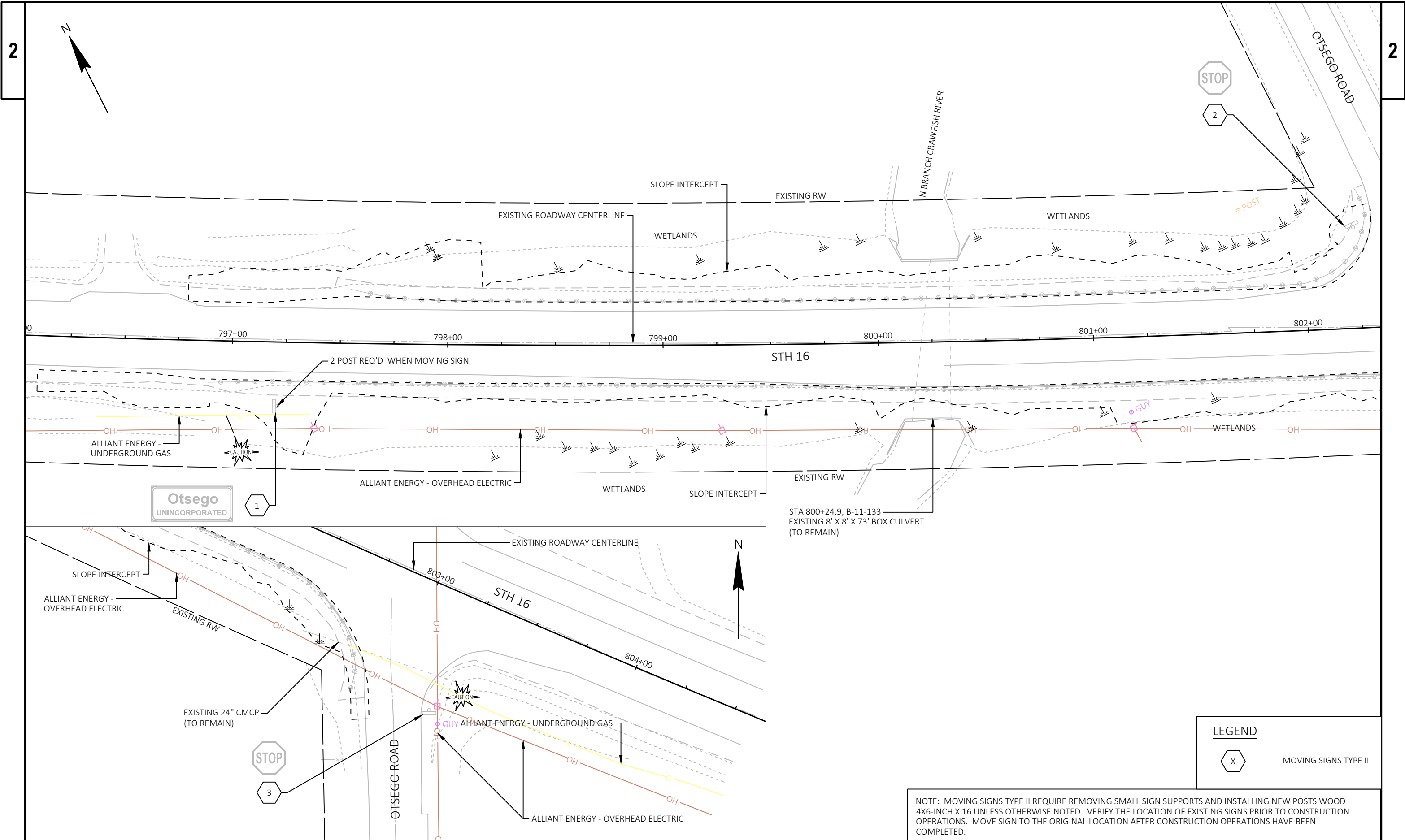


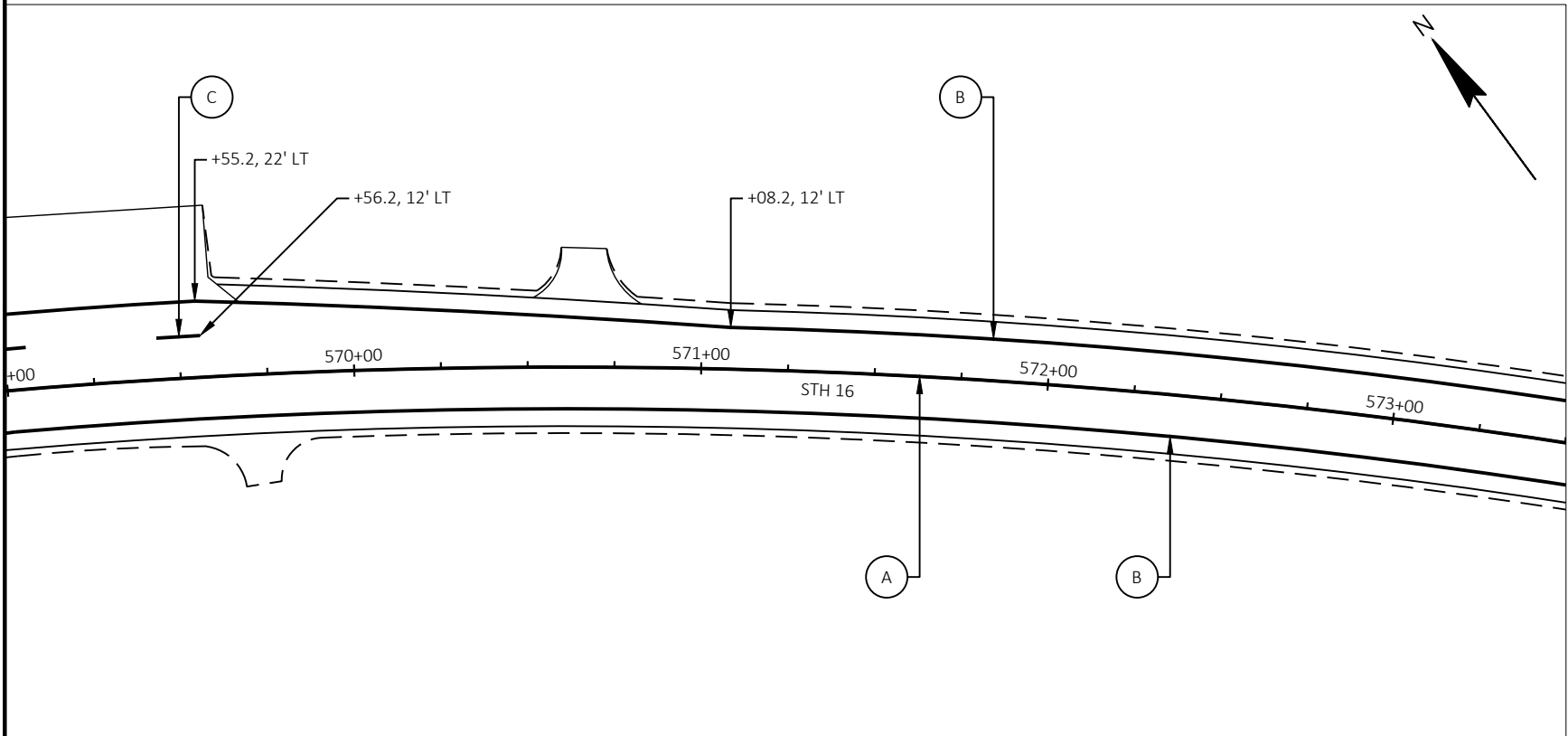
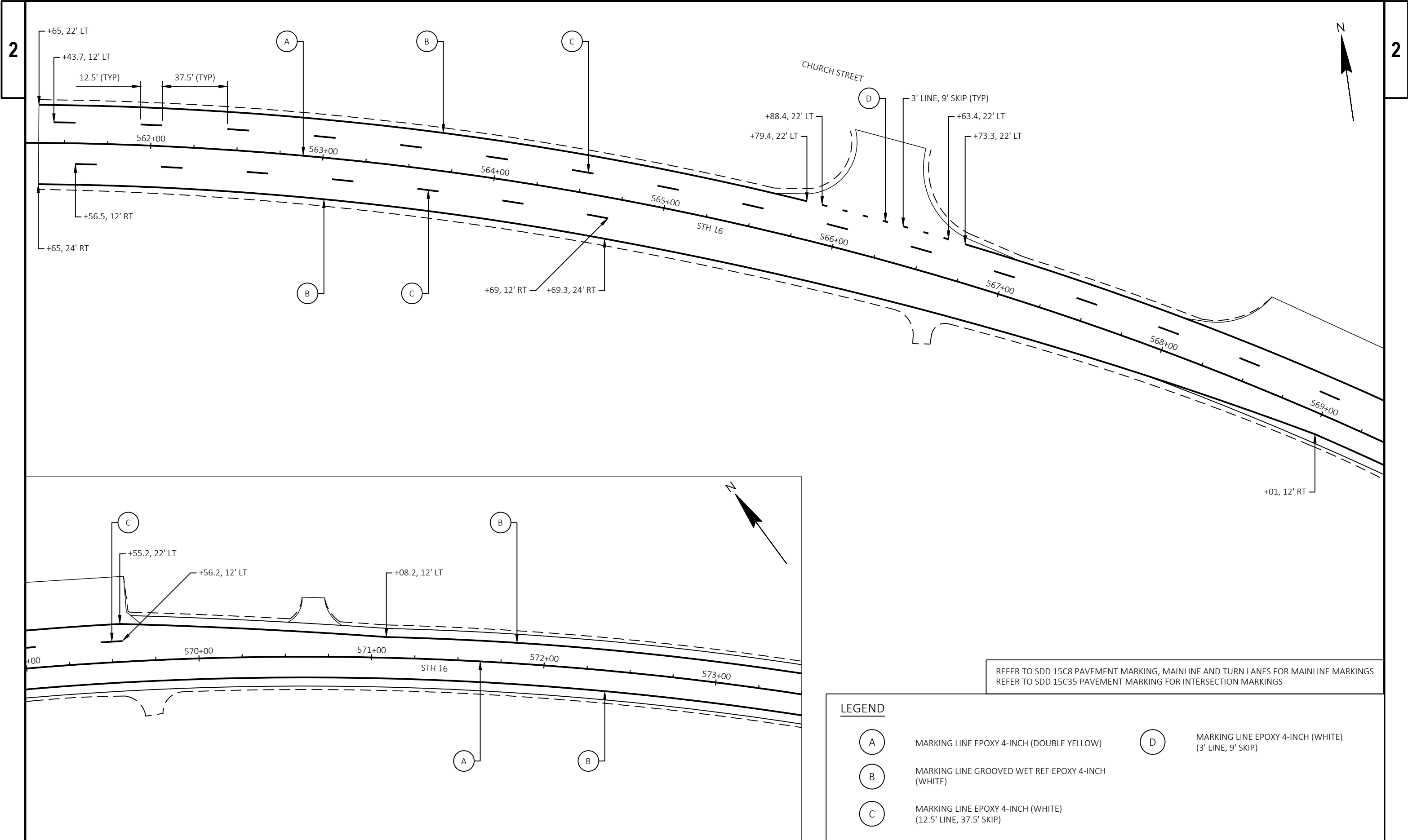
LEGEND

	SALVAGED TOPSOIL, SEEDING, FERTILIZER AND EROSION MAT CLASS I TYPE B
	SILT FENCE
	SILT FENCE WITH ROCK BAG RELIEF
	TEMPORARY DITCH CHECK
	SURFACE FLOW PATH DIRECTION



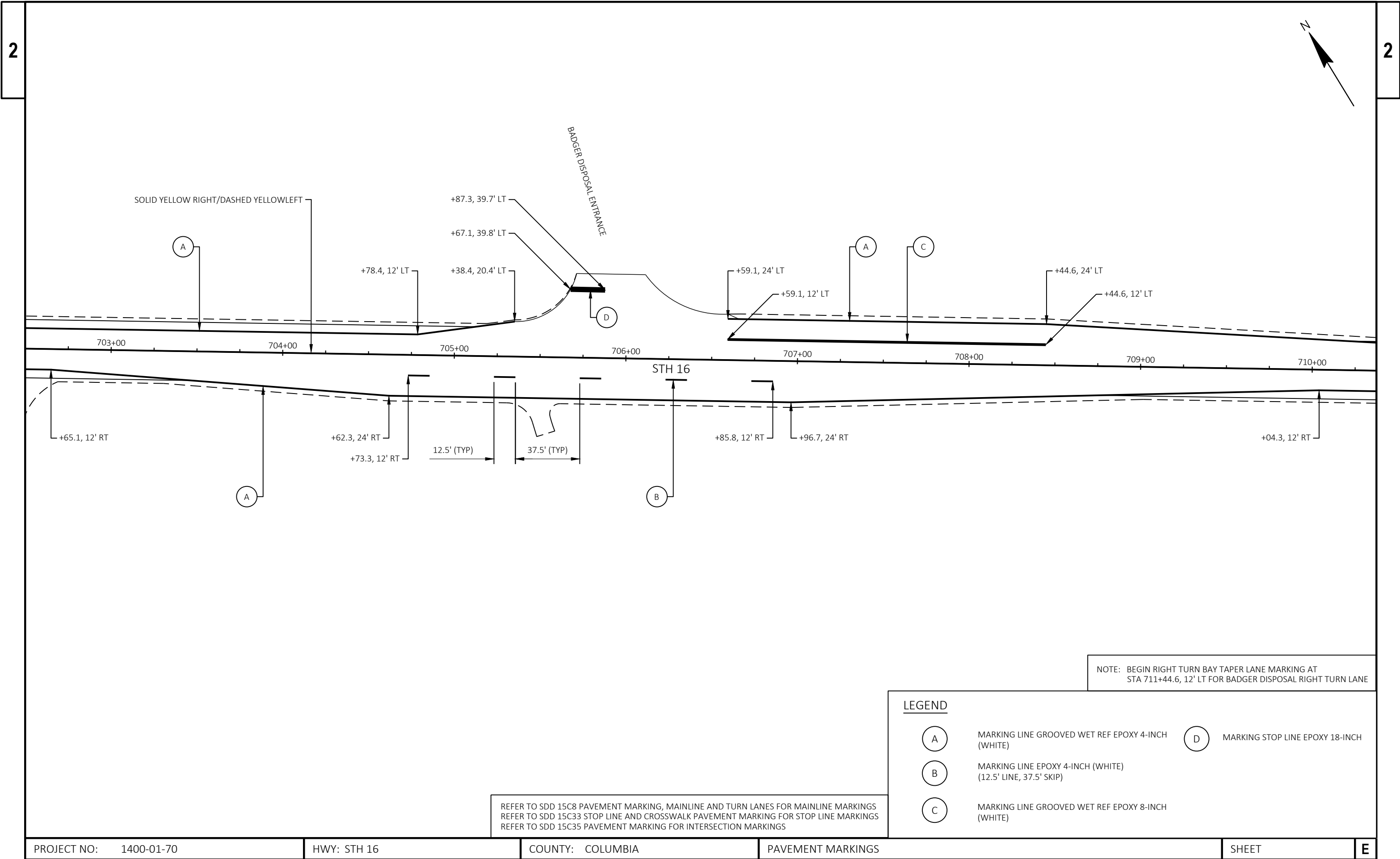


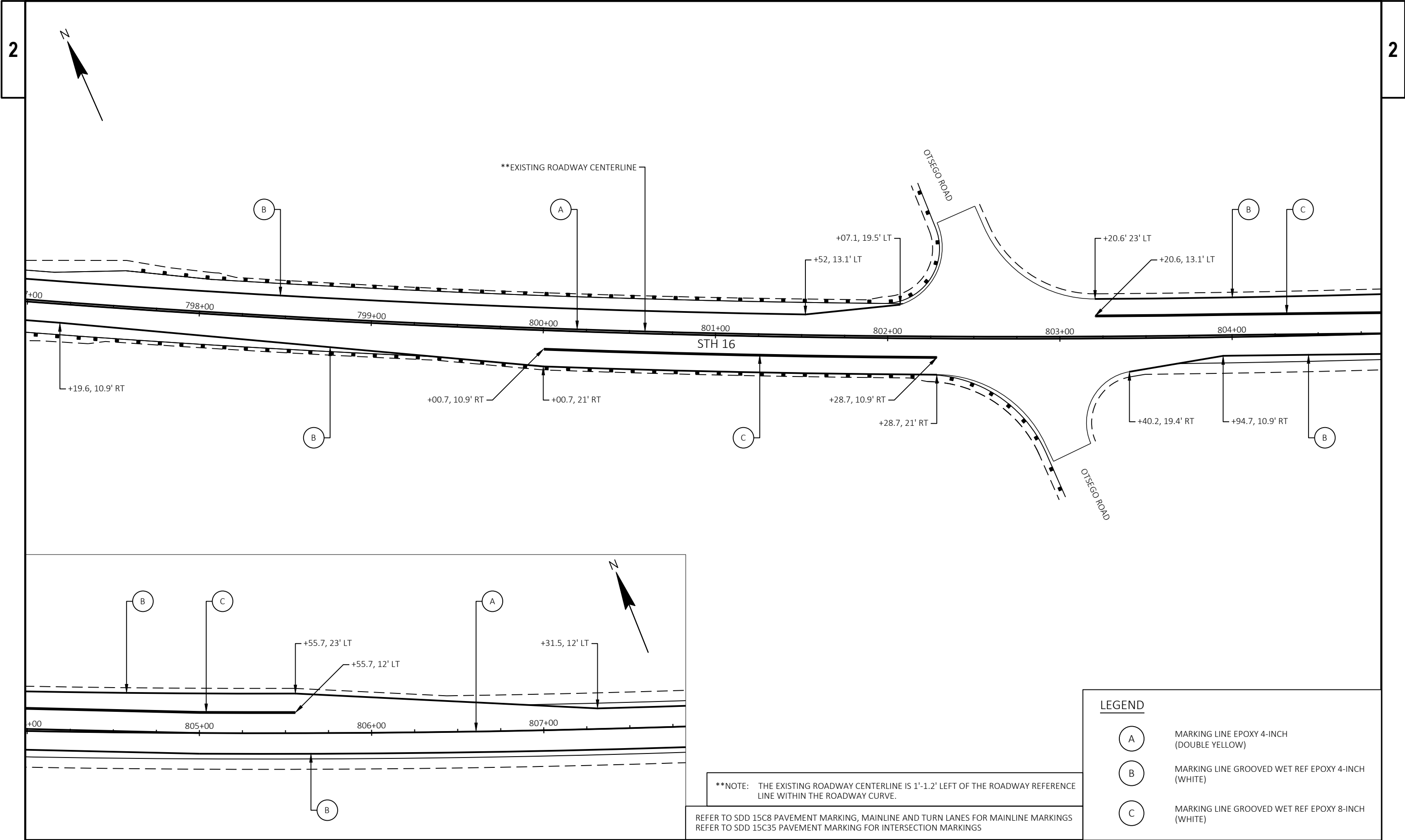


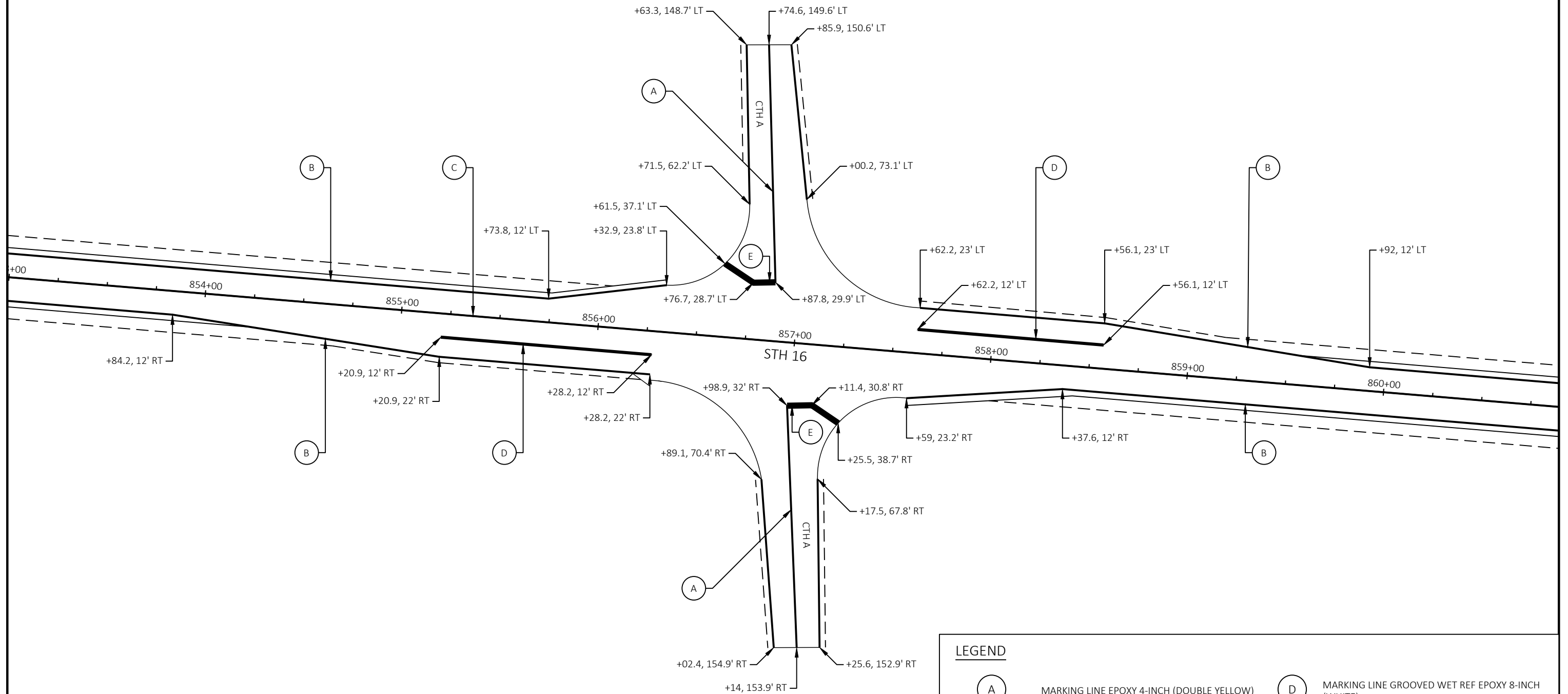


REFER TO SDD 15C8 PAVEMENT MARKING, MAINLINE AND TURN LANES FOR MAINLINE MARKINGS
REFER TO SDD 15C35 PAVEMENT MARKING FOR INTERSECTION MARKINGS

LEGEND			
A	MARKING LINE EPOXY 4-INCH (DOUBLE YELLOW)	D	MARKING LINE EPOXY 4-INCH (WHITE) (3' LINE, 9' SKIP)
B	MARKING LINE GROOVED WET REF EPOXY 4-INCH (WHITE)		
C	MARKING LINE EPOXY 4-INCH (WHITE) (12.5' LINE, 37.5' SKIP)		

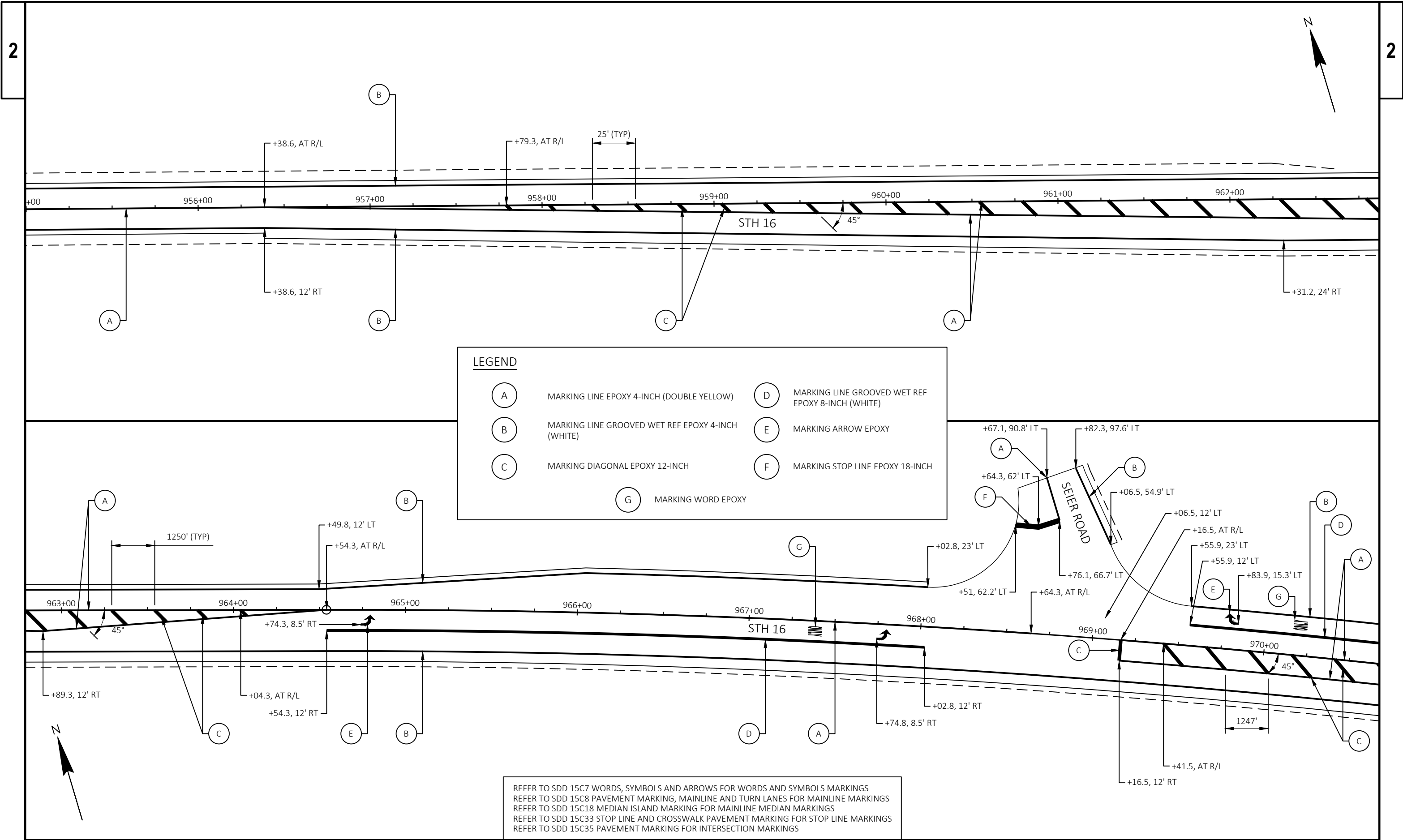


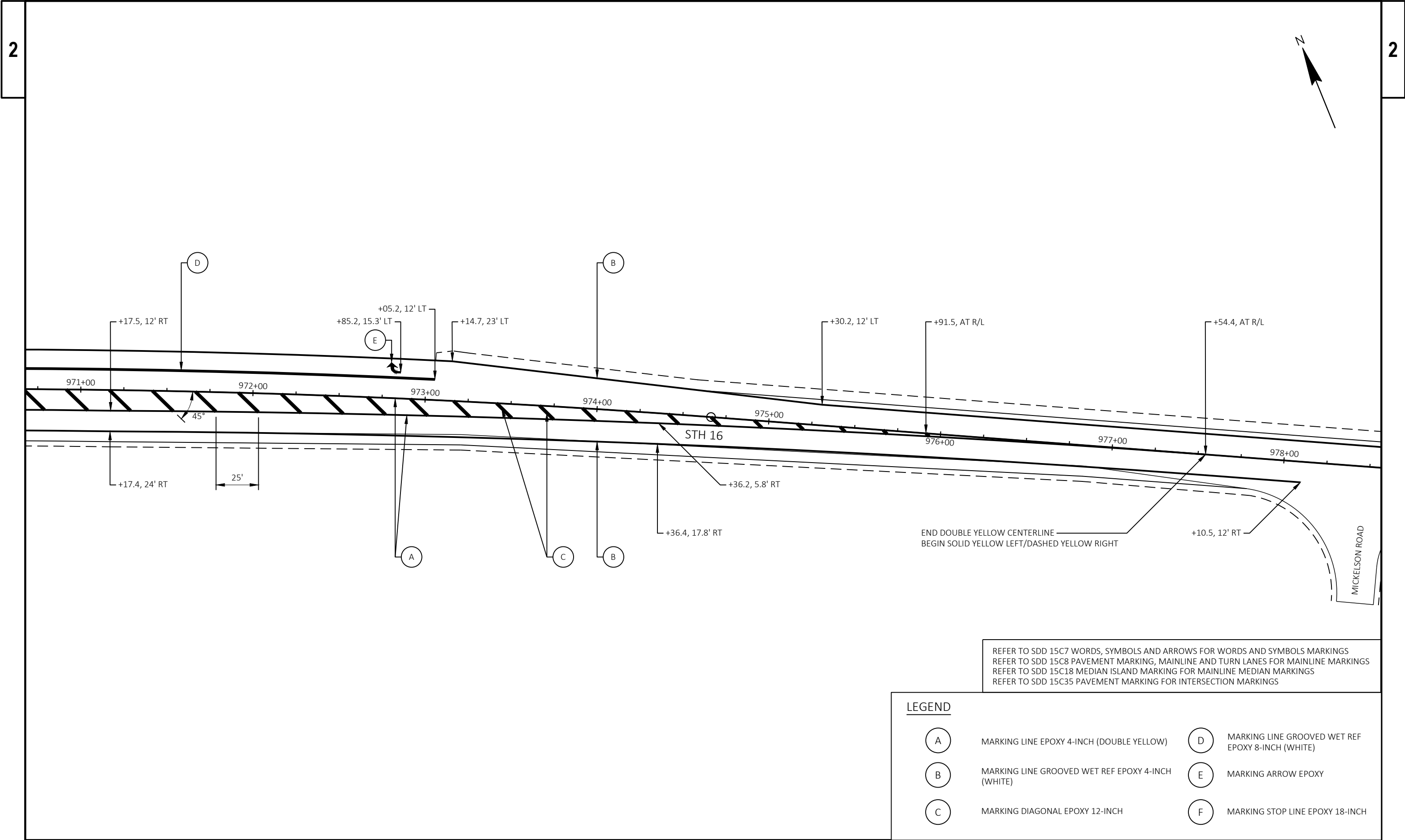




REFER TO SDD 15C8 PAVEMENT MARKING, MAINLINE AND TURN LANES FOR MAINLINE MARKINGS
REFER TO SDD 15C33 STOP LINE AND CROSSWALK PAVEMENT MARKING FOR STOP LINE MARKINGS
REFER TO SDD 15C35 PAVEMENT MARKING FOR INTERSECTION MARKINGS

LEGEND			
(A)	MARKING LINE EPOXY 4-INCH (DOUBLE YELLOW)	(D)	MARKING LINE GROOVED WET REF EPOXY 8-INCH (WHITE)
(B)	MARKING LINE GROOVED WET REF EPOXY 4-INCH (WHITE)	(E)	MARKING STOP LINE EPOXY 18-INCH
(C)	MARKING LINE EPOXY 4-INCH (YELLOW) (12.5' LINE, 37.5' SKIP)		

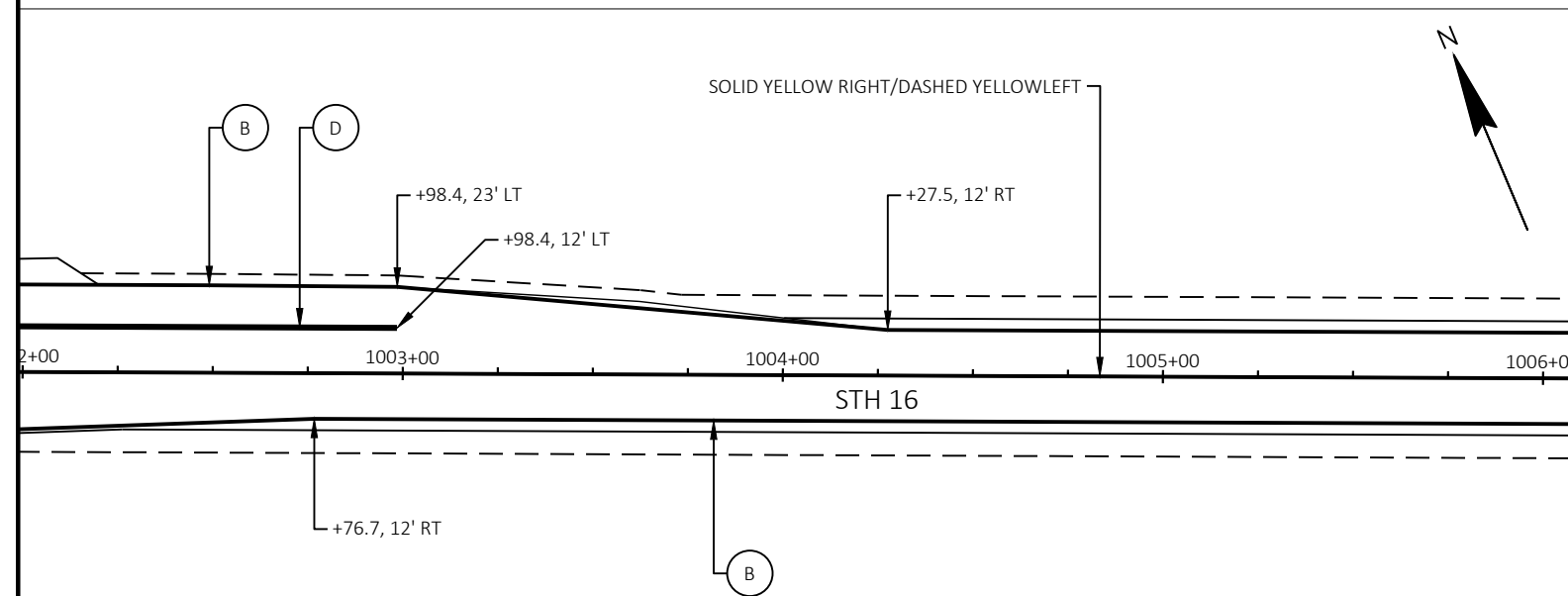




REFER TO SDD 15C7 WORDS, SYMBOLS AND ARROWS FOR WORDS AND SYMBOLS MARKINGS
REFER TO SDD 15C8 PAVEMENT MARKING, MAINLINE AND TURN LANES FOR MAINLINE MARKINGS
REFER TO SDD 15C18 MEDIAN ISLAND MARKING FOR MAINLINE MEDIAN MARKINGS
REFER TO SDD 15C35 PAVEMENT MARKING FOR INTERSECTION MARKINGS

LEGEND

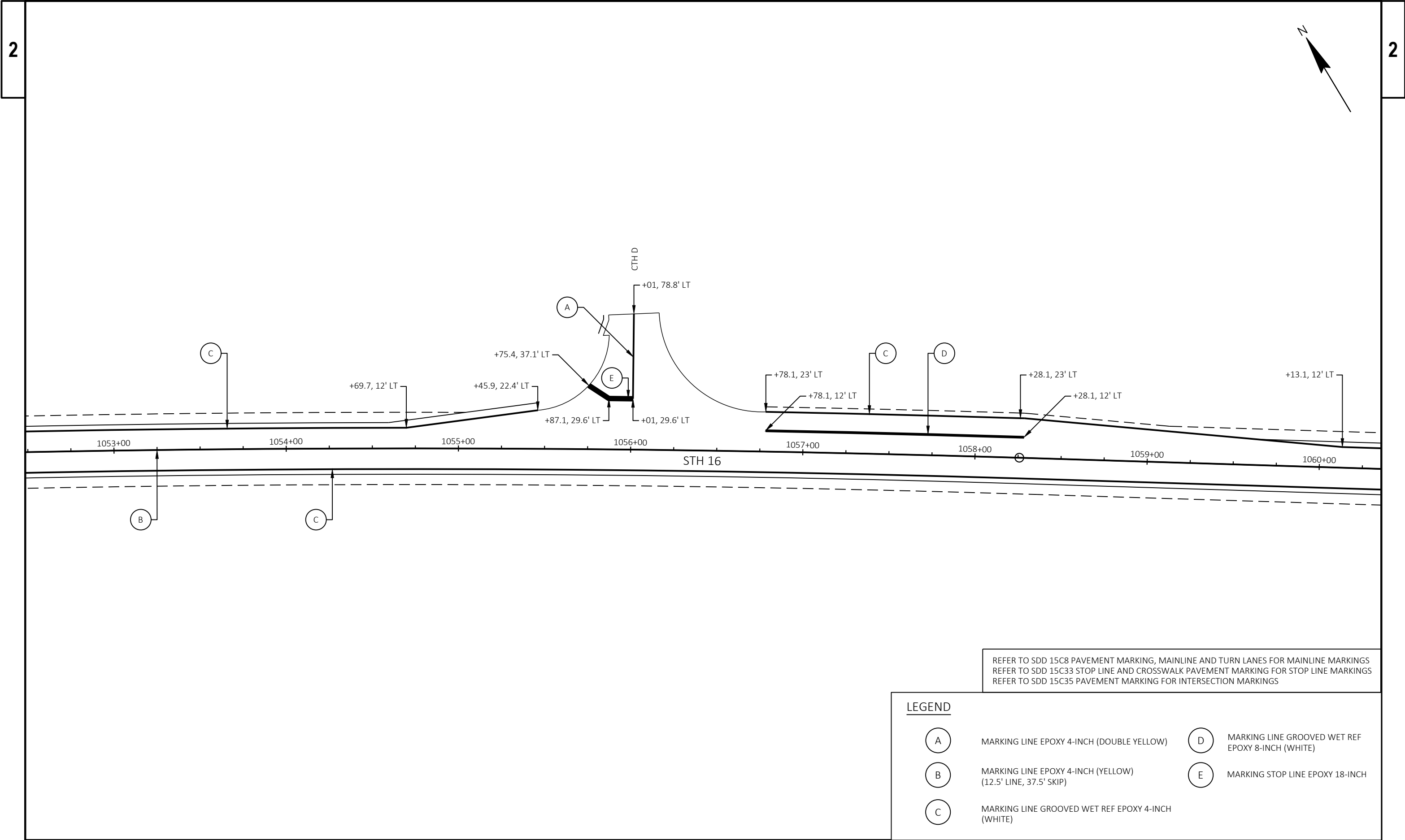
- | | | | |
|-----|---|-----|---|
| (A) | MARKING LINE EPOXY 4-INCH (DOUBLE YELLOW) | (D) | MARKING LINE GROOVED WET REF EPOXY 8-INCH (WHITE) |
| (B) | MARKING LINE GROOVED WET REF EPOXY 4-INCH (WHITE) | (E) | MARKING ARROW EPOXY |
| (C) | MARKING DIAGONAL EPOXY 12-INCH | (F) | MARKING STOP LINE EPOXY 18-INCH |

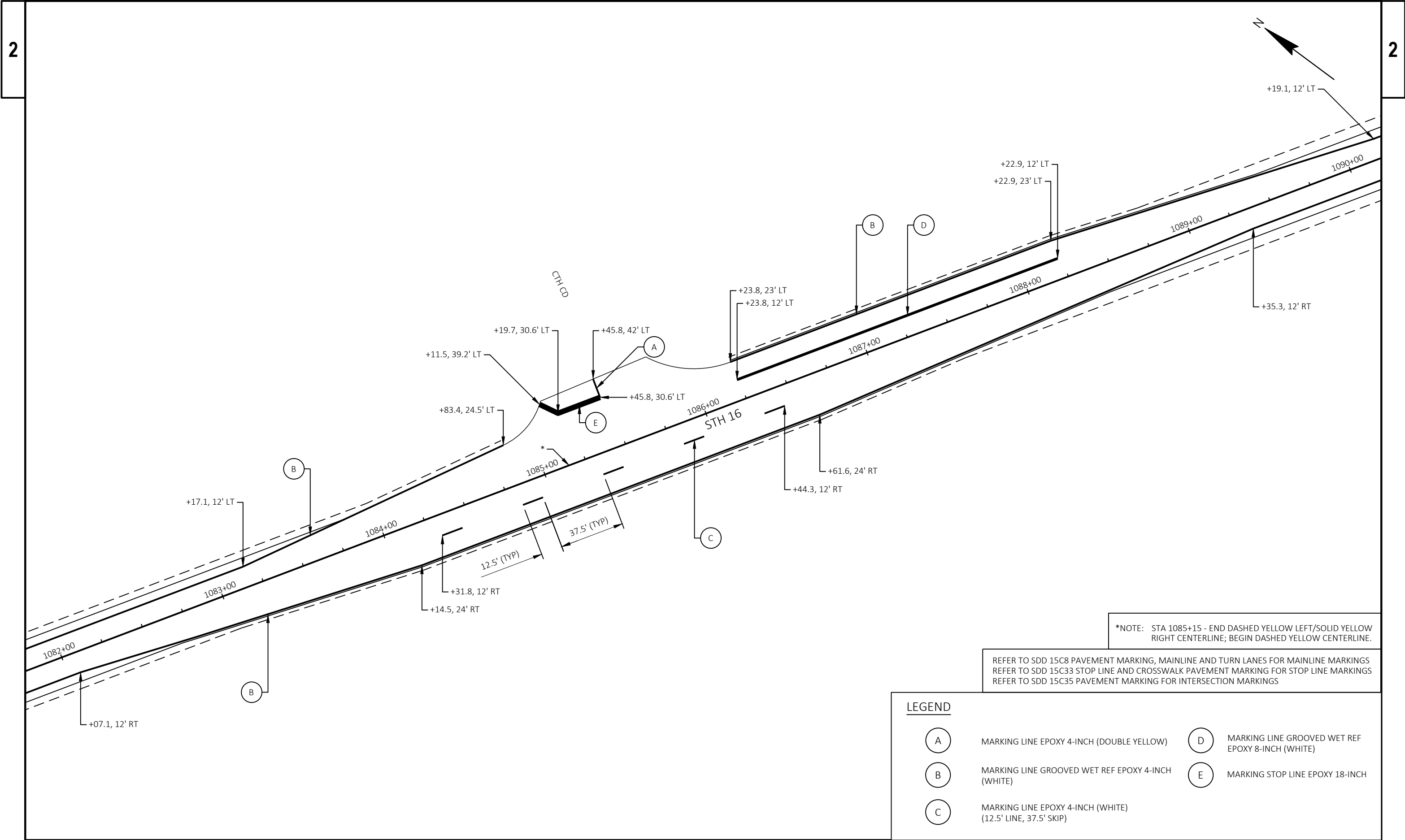


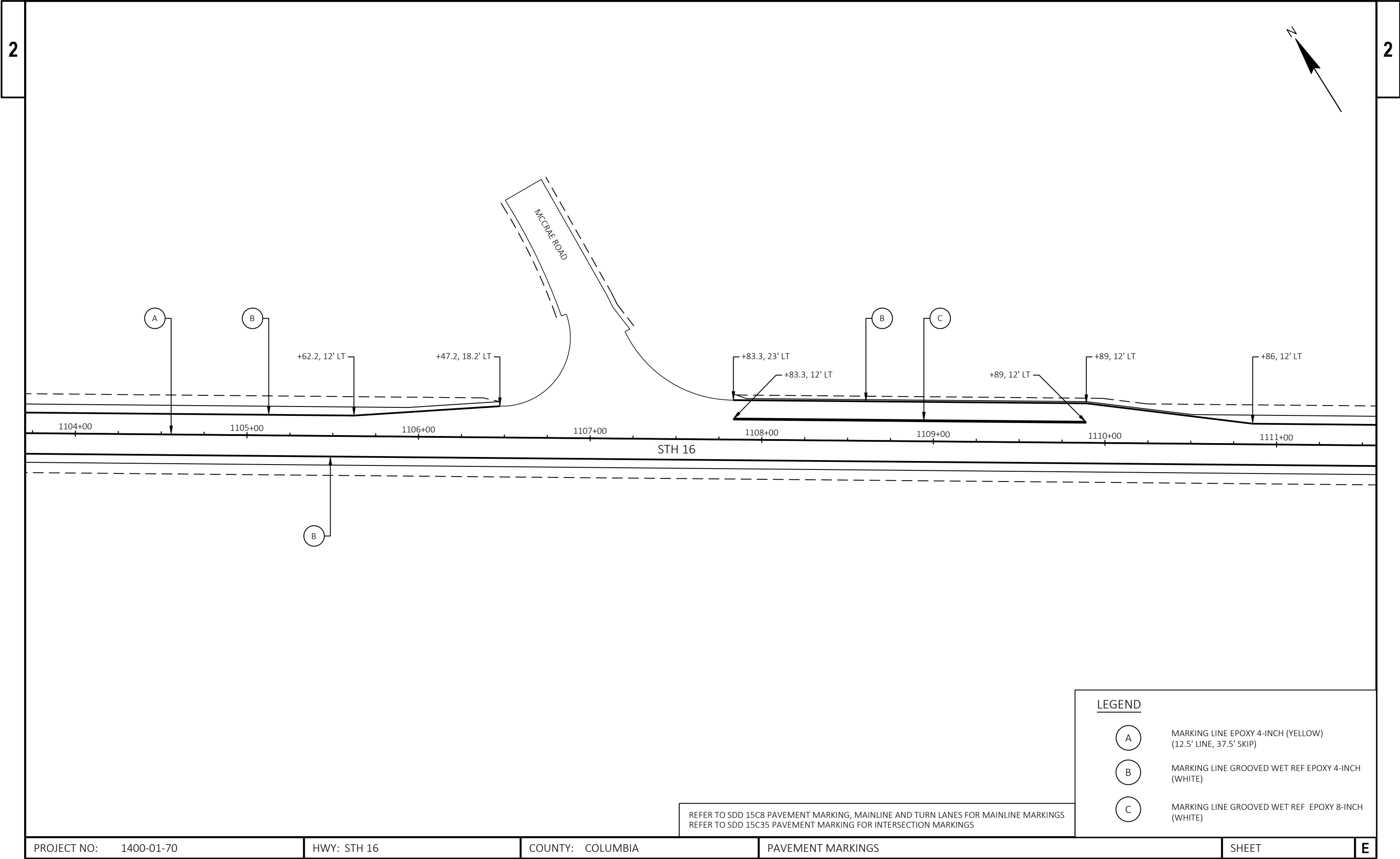
REFER TO SDD 15C8 PAVEMENT MARKING, MAINLINE AND TURN LANES FOR MAINLINE MARKINGS
REFER TO SDD 15C33 STOP LINE AND CROSSWALK PAVEMENT MARKING FOR STOP LINE MARKINGS
REFER TO SDD 15C35 PAVEMENT MARKING FOR INTERSECTION MARKINGS

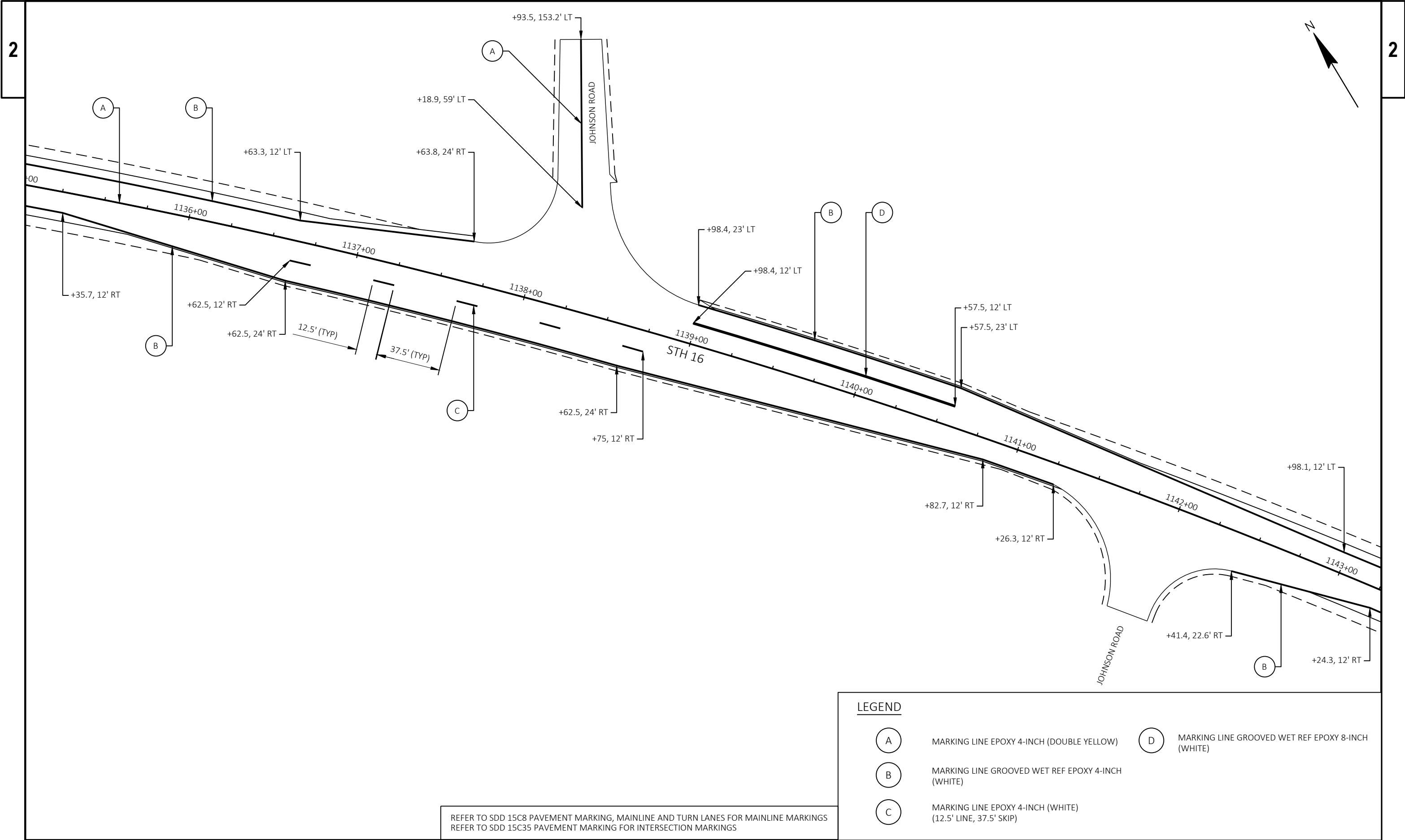
MARKING STOP LINE EPOXY 18-INCH

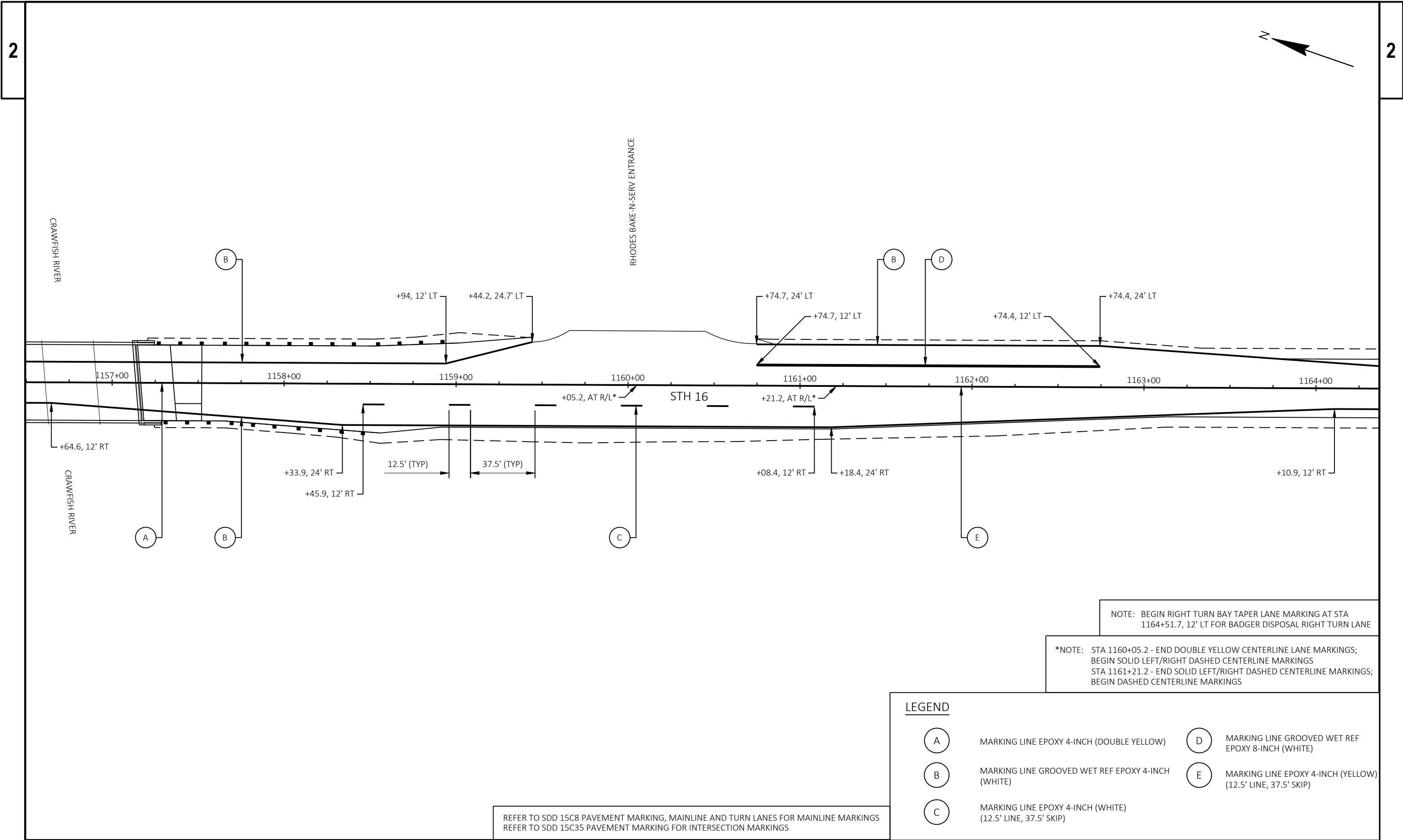
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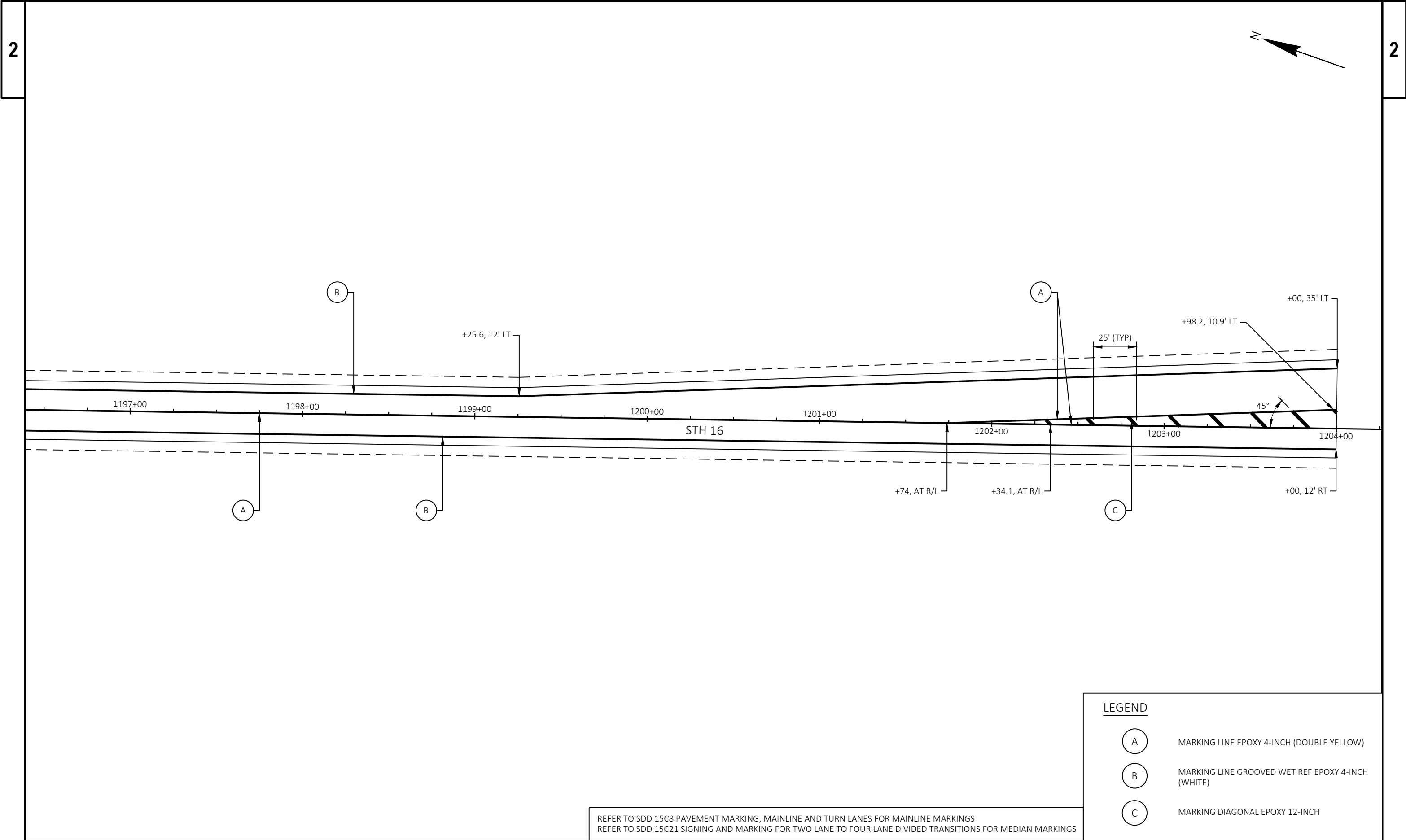








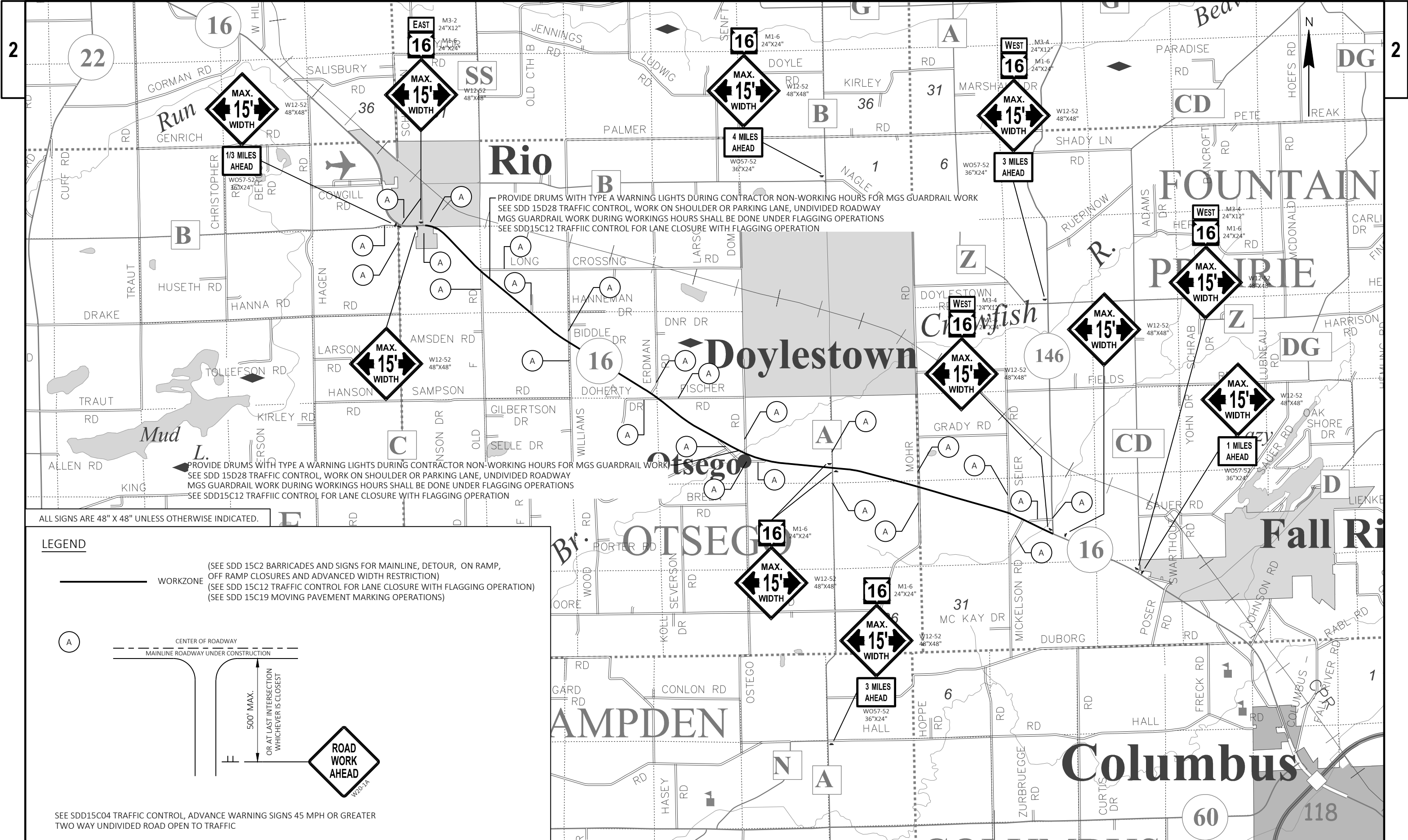




LEGEND

- A MARKING LINE EPOXY 4-INCH (DOUBLE YELLOW)
- B MARKING LINE GROOVED WET REF EPOXY 4-INCH (WHITE)
- C MARKING DIAGONAL EPOXY 12-INCH

REFER TO SDD 15C8 PAVEMENT MARKING, MAINLINE AND TURN LANES FOR MAINLINE MARKINGS
REFER TO SDD 15C21 SIGNING AND MARKING FOR TWO LANE TO FOUR LANE DIVIDED TRANSITIONS FOR MEDIAN MARKINGS



ALL SIGNS ARE 48" X 48" UNLESS OTHERWISE INDICATED.

LEGEND

(SEE SDD 15C2 BARRICADES AND SIGNS FOR MAINLINE, DETOUR, ON RAMP, OFF RAMP CLOSURES AND ADVANCED WIDTH RESTRICTION)
(SEE SDD 15C12 TRAFFIC CONTROL FOR LANE CLOSURE WITH FLAGGING OPERATION)
(SEE SDD 15C19 MOVING PAVEMENT MARKING OPERATIONS)

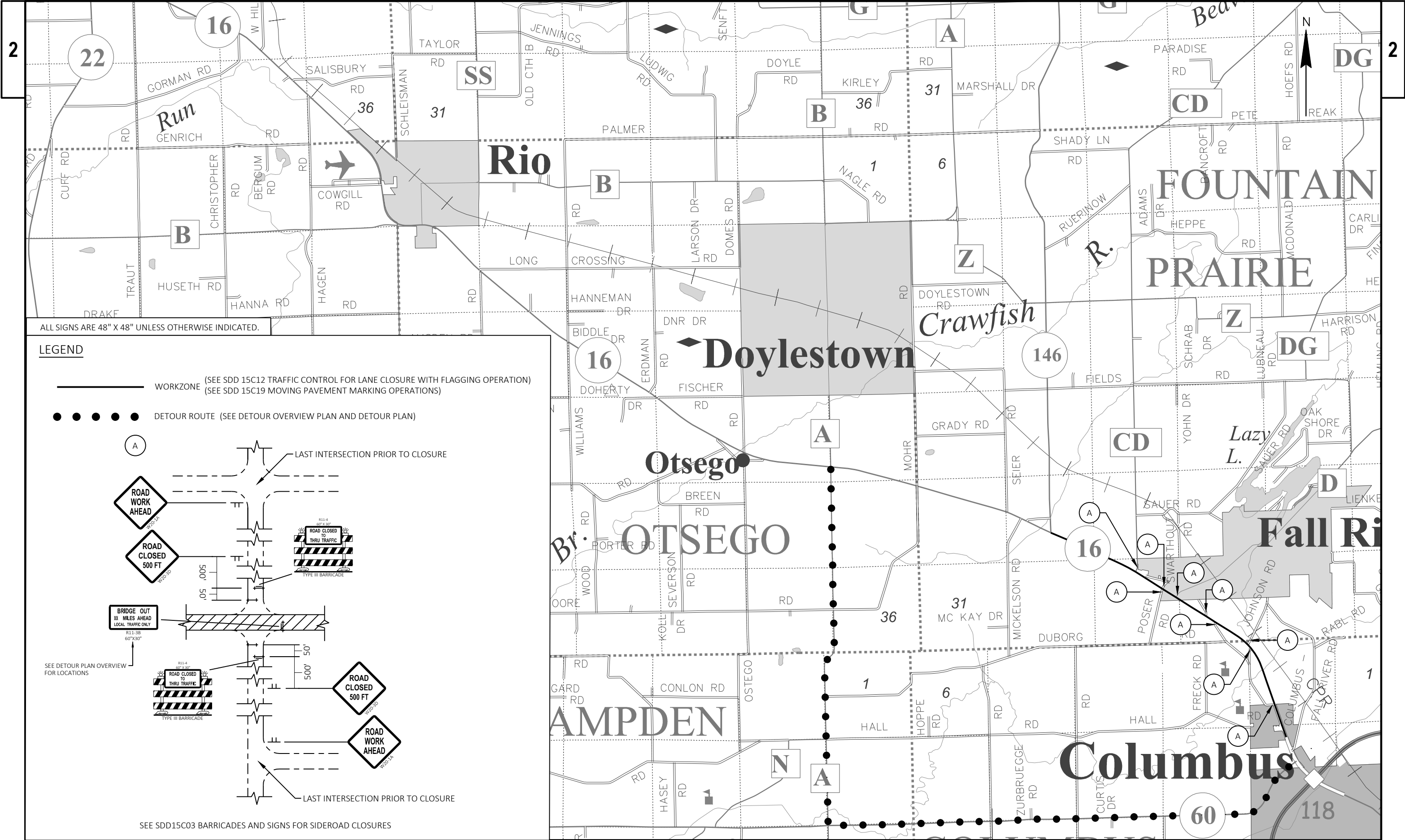
WORKZONE

(A) CENTER OF ROADWAY
MAINLINE ROADWAY UNDER CONSTRUCTION

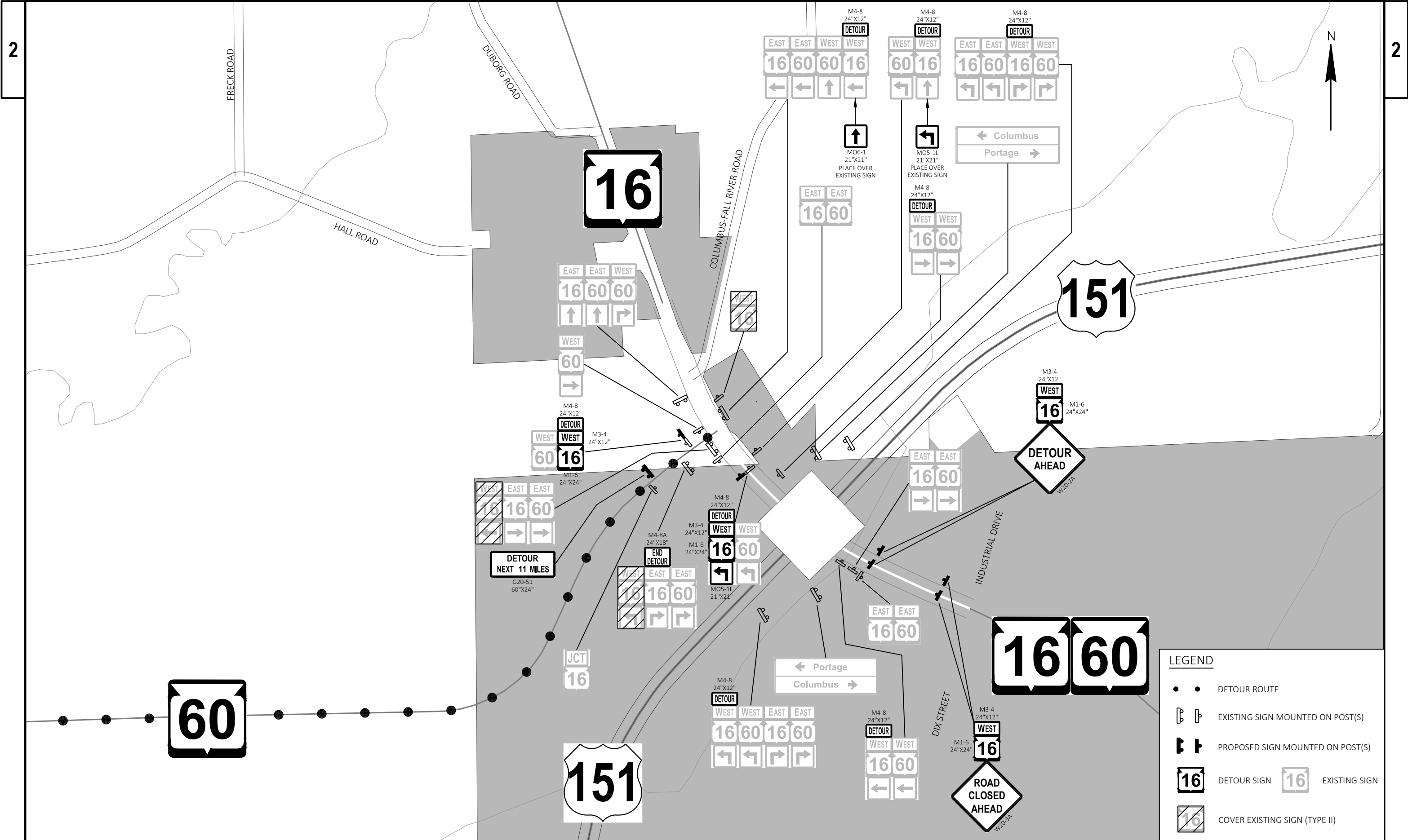
500' MAX.
OR AT LAST INTERSECTION
WHICHEVER IS CLOSEST

ROAD WORK AHEAD

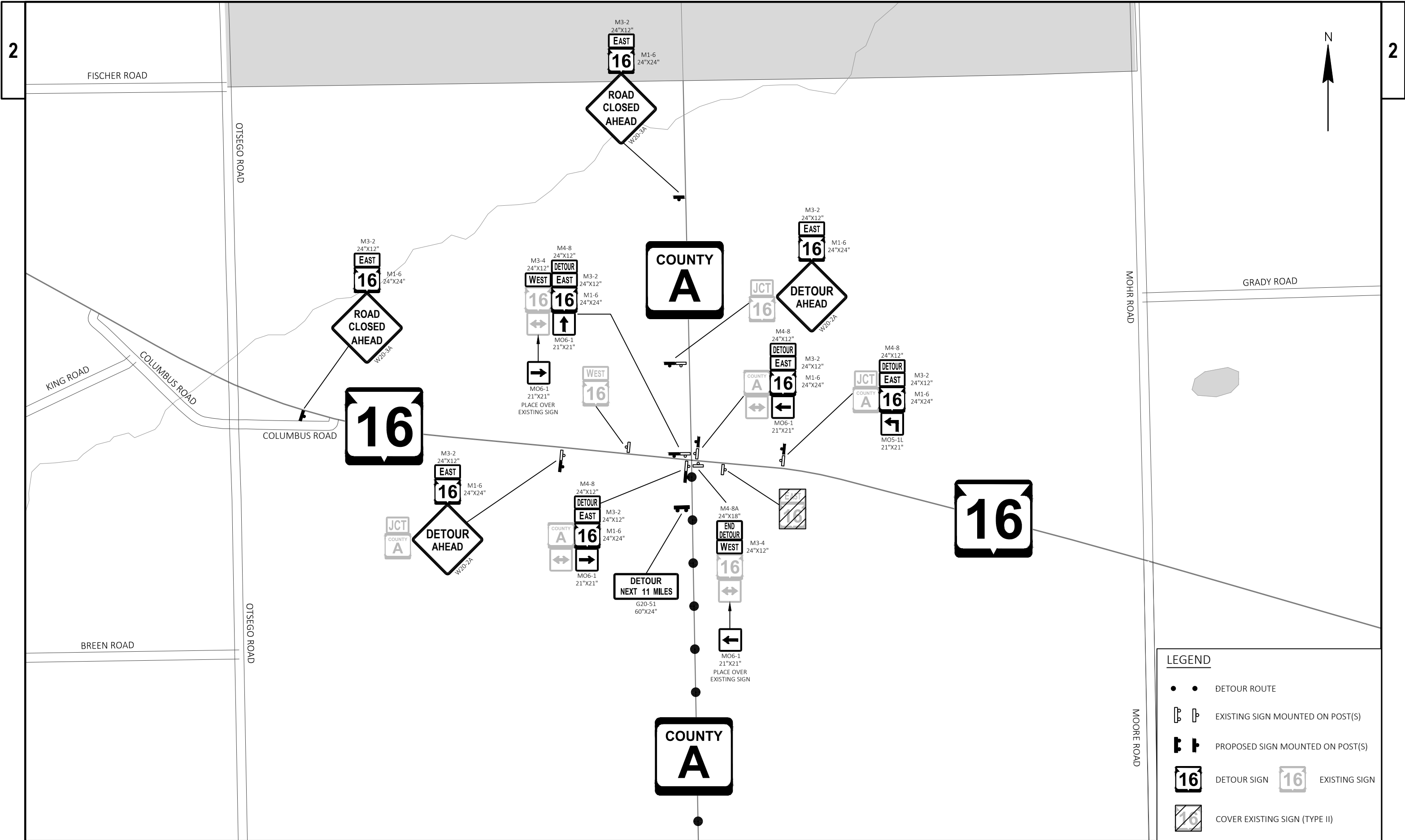
SEE SDD15C04 TRAFFIC CONTROL, ADVANCE WARNING SIGNS 45 MPH OR GREATER
TWO WAY UNDIVIDED ROAD OPEN TO TRAFFIC

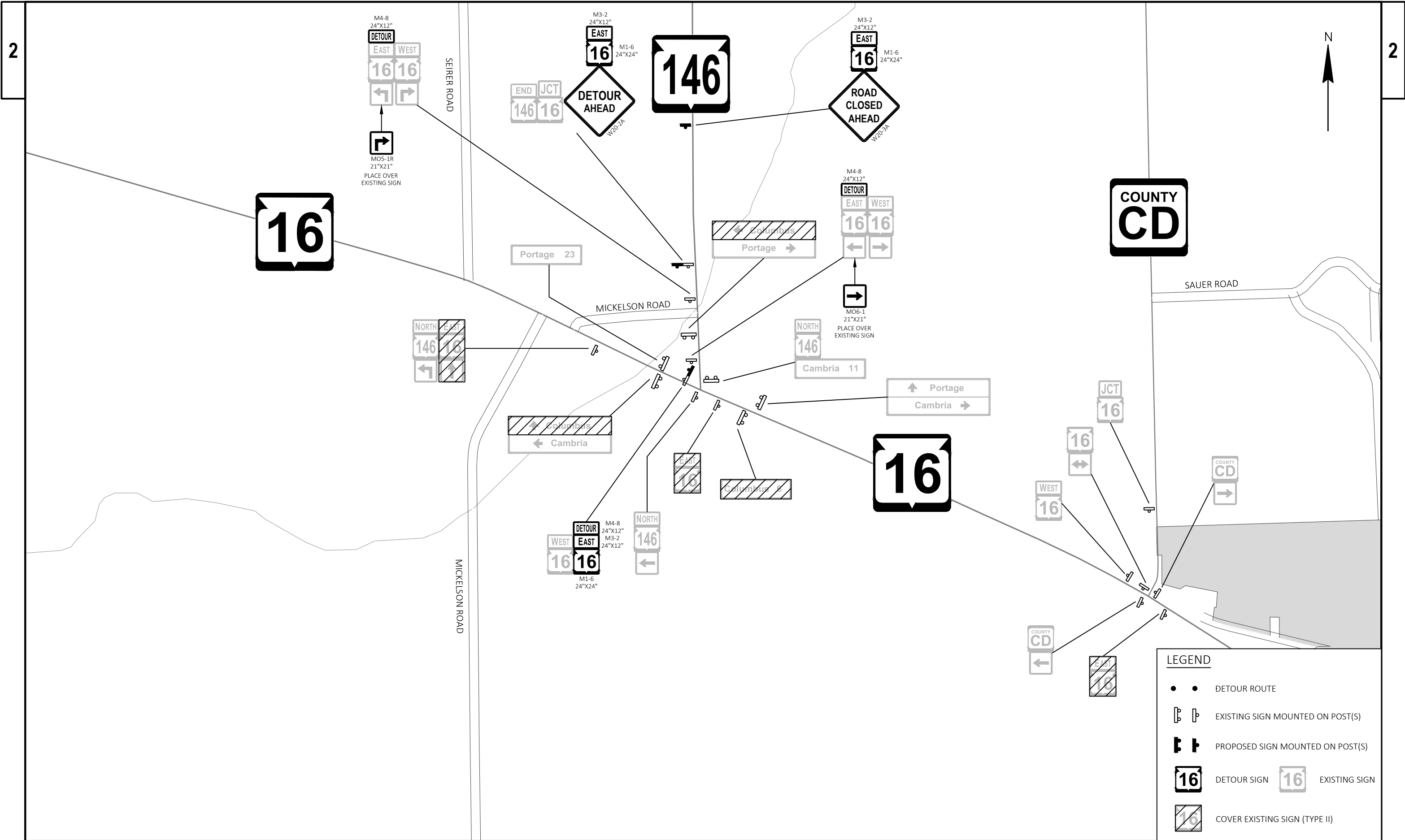


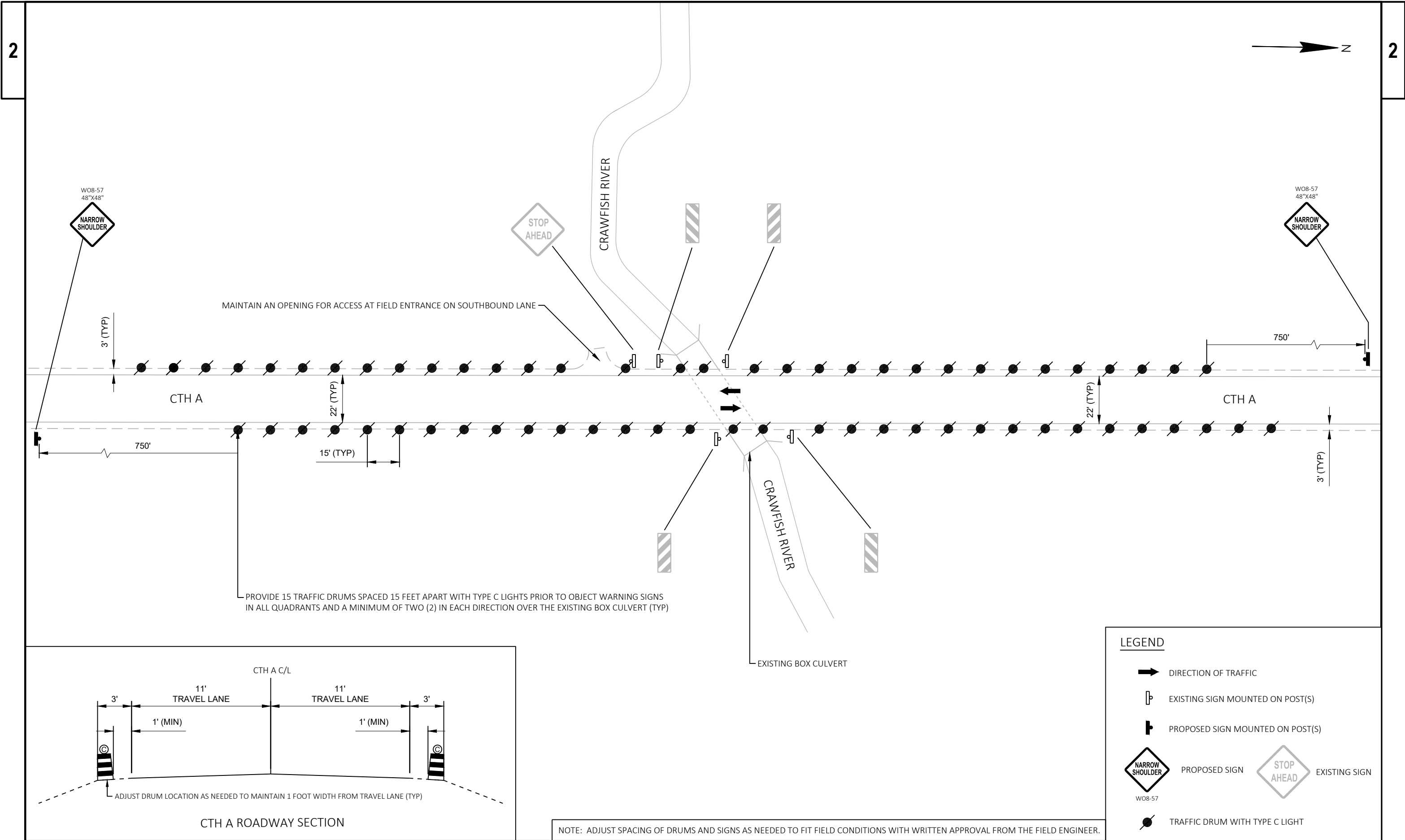
PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	TRAFFIC CONTROL - STAGE 2	SHEET	E
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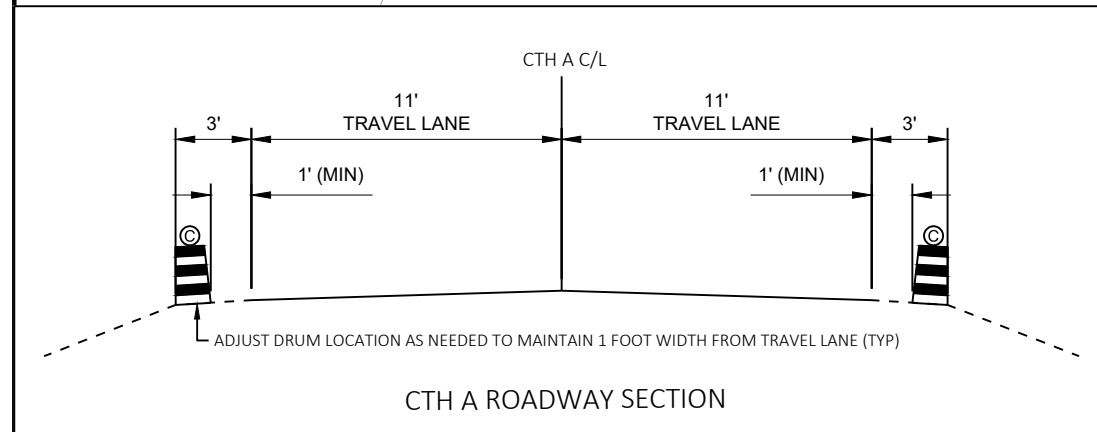
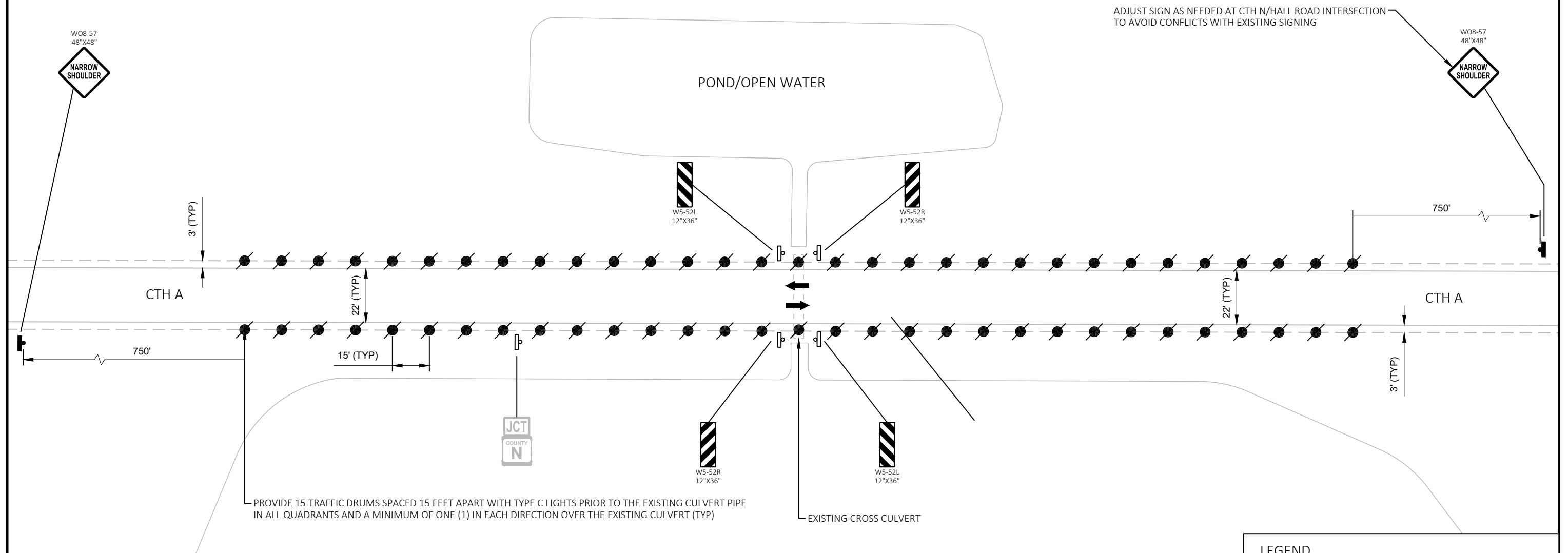












NOTE: ADJUST SPACING OF DRUMS AND SIGNS AS NEEDED TO FIT FIELD CONDITIONS WITH WRITTEN APPROVAL FROM THE FIELD ENGINEER.
INSTALL W5-52R/L SIGNS PRIOR TO ESTABLISHING THE DETOUR ROUTE AND REMOVE SIGNS AFTER DETOUR IS NO LONGER IN USE.
W5-52R/L SIGNS PAID AS TRAFFIC CONTROL SIGNS.

LEGEND

- ➔ DIRECTION OF TRAFFIC
- Ⓟ EXISTING SIGN MOUNTED ON POST(S)
- Ⓢ PROPOSED SIGN MOUNTED ON POST(S)
- WO8-57
NARROW SHOULDER
PROPOSED SIGN
- COUNTY
N
EXISTING SIGN
- TRAFFIC DRUM WITH TYPE C LIGHT

PROJECT NO: 1400-01-70

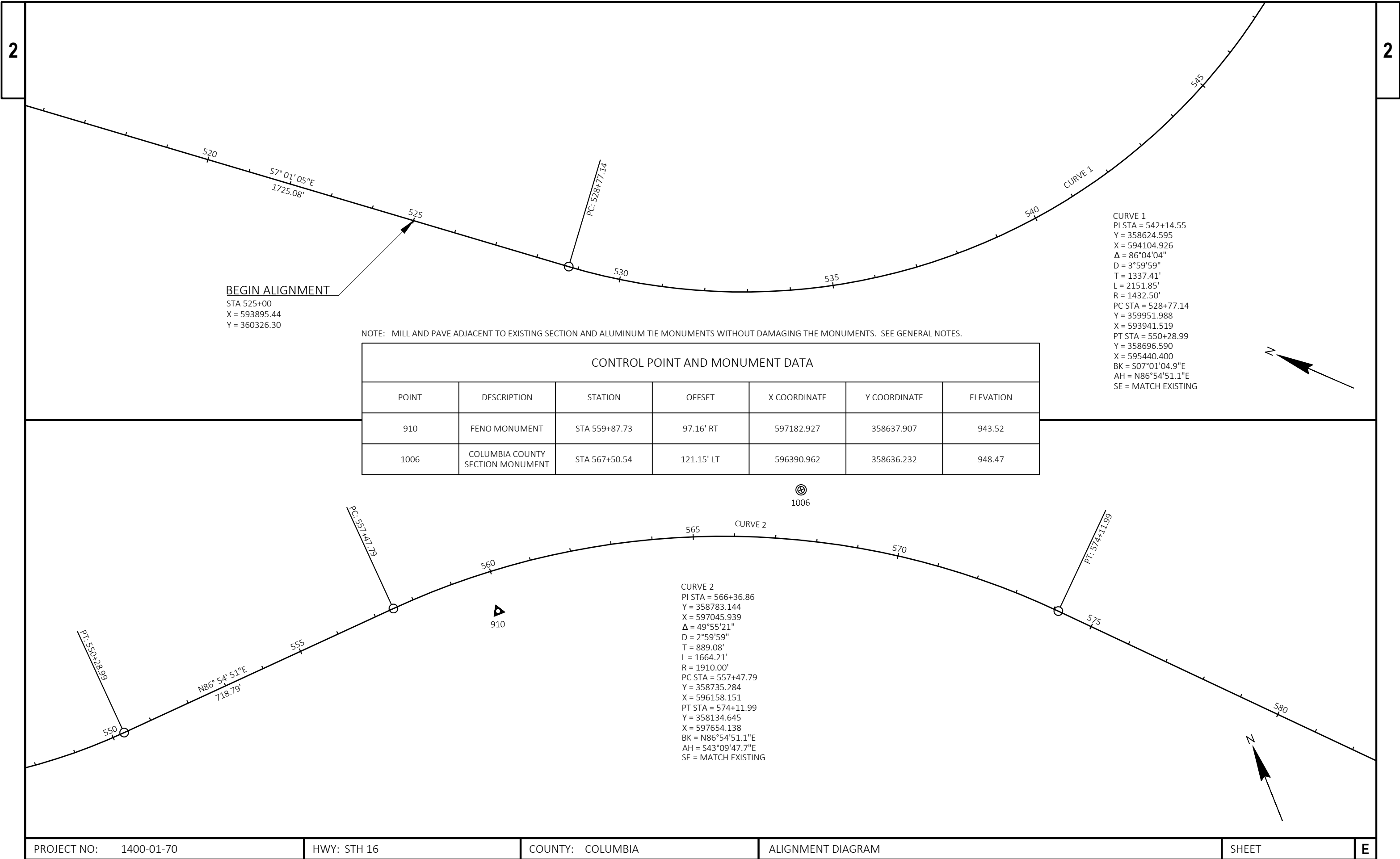
HWY: STH 16

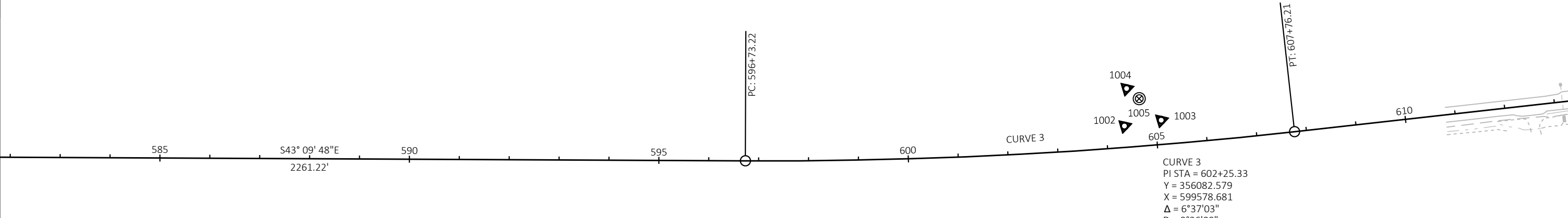
COUNTY: COLUMBIA

DETOUR PLAN - CTH A SOUTH OF CTH N/HALL ROAD INTERSECTION

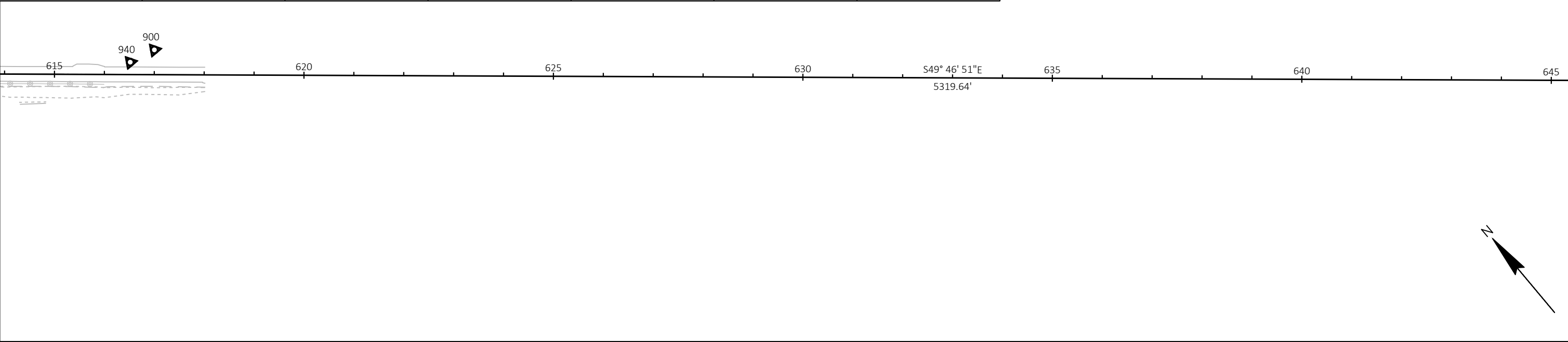
SHEET

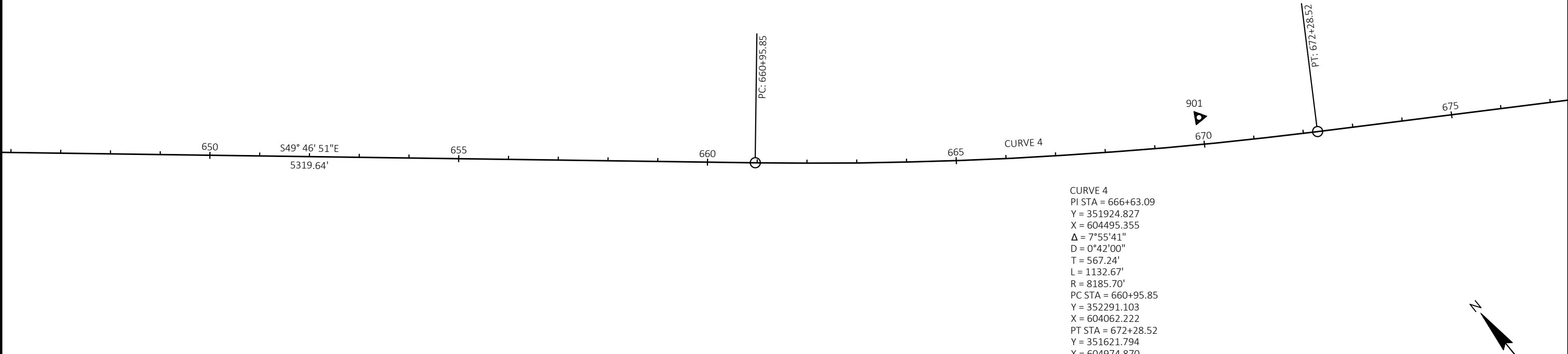
E



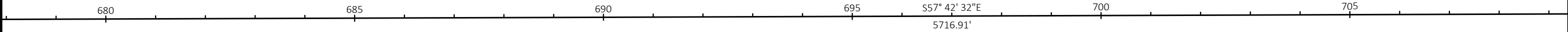


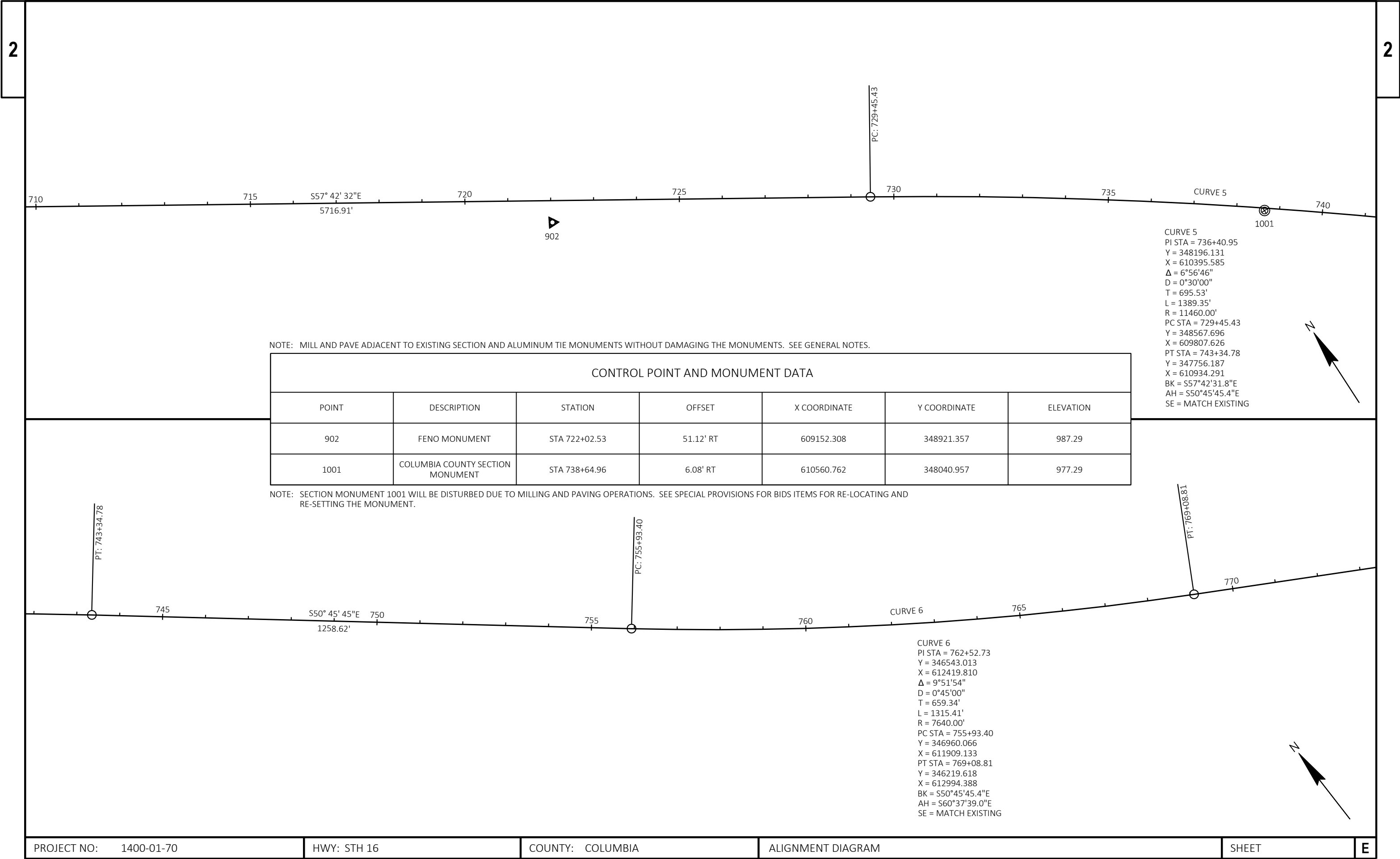
CONTROL POINT AND MONUMENT DATA						
POINT	DESCRIPTION	STATION	OFFSET	X COORDINATE	Y COORDINATE	ELEVATION
1002	COLUMBIA COUNTY ALUMINUM TIE MONUMENT	STA 604+36.19	42.73' LT	599773.326	355981.823	1014.27
1003	COLUMBIA COUNTY ALUMINUM TIE MONUMENT	STA 605+10.70	48.36' LT	599832.173	355936.356	1013.39
1004	COLUMBIA COUNTY ALUMINUM TIE MONUMENT	STA 604+46.11	117.10' LT	599830.592	356030.285	1011.67
1005	COLUMBIA COUNTY SECTION MONUMENT	STA 604+70.76	95.22' LT	599834.001	355997.709	1012.17
900	FENO MONUMENT	STA 616+98.81	49.27' LT	600736.551	355167.958	973.76
940	IRON ROD CAP	STA 616+50.59	24.32' LT	600683.619	355180.039	979.13

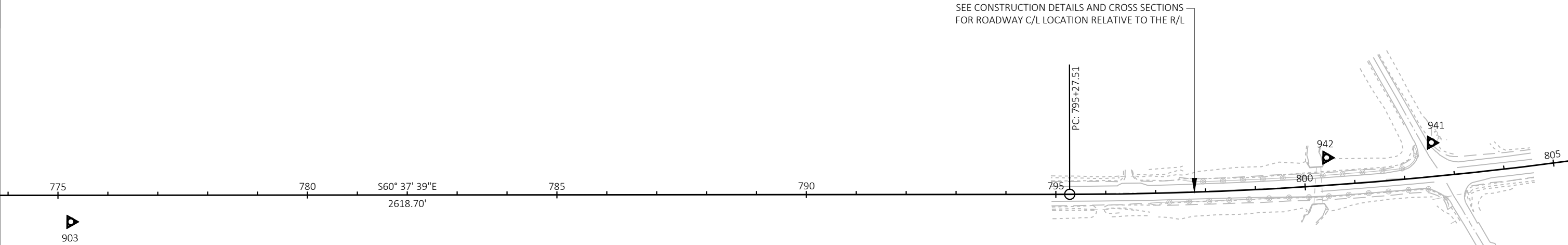




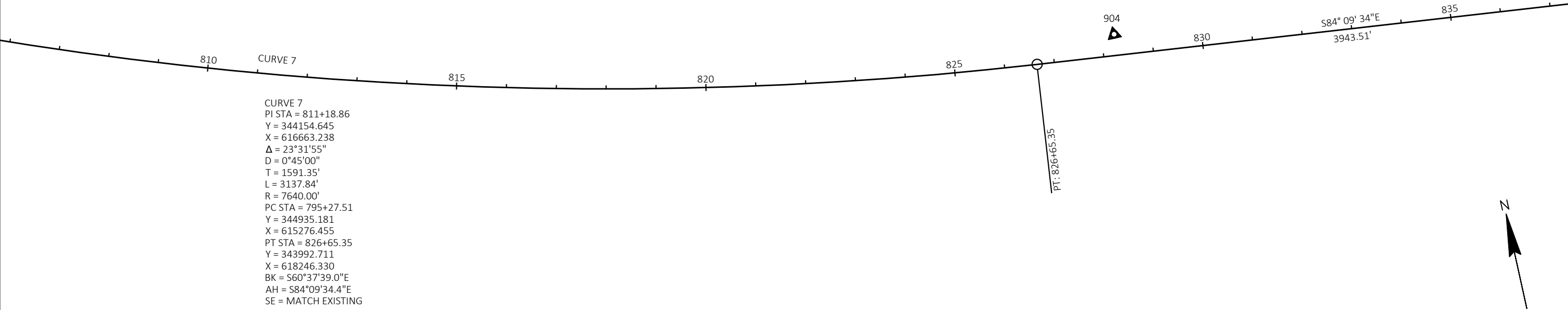
CONTROL POINT AND MONUMENT DATA						
POINT	DESCRIPTION	STATION	OFFSET	X COORDINATE	Y COORDINATE	ELEVATION
901	FENO MONUMENT	STA 669+93.05	54.21' LT	604807.919	351795.411	1009.94



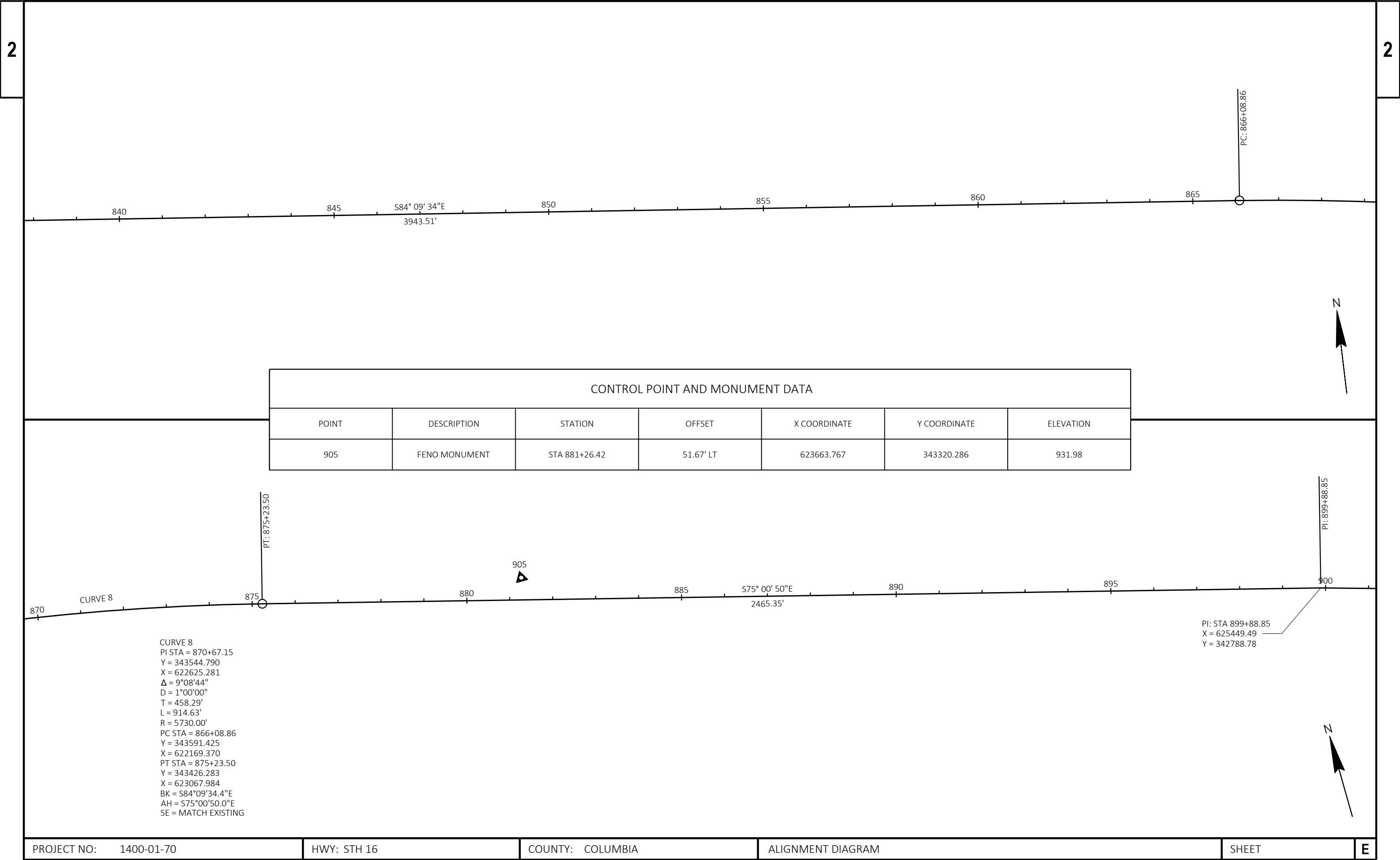




CONTROL POINT AND MONUMENT DATA						
POINT	DESCRIPTION	STATION	OFFSET	X COORDINATE	Y COORDINATE	ELEVATION
903	FENO MONUMENT	STA 775+24.52	53.42' RT	613504.753	345871.068	964.40
941	IRON ROD CAP	STA 802+59.22	68.03' LT	615957.842	344669.549	936.38
942	SPIKE NAIL	STA 800+45.89	55.30' LT	615760.268	344746.359	928.15
904	FENO MONUMENT	STA 828+24.58	42.73' LT	618409.076	344019.017	930.70



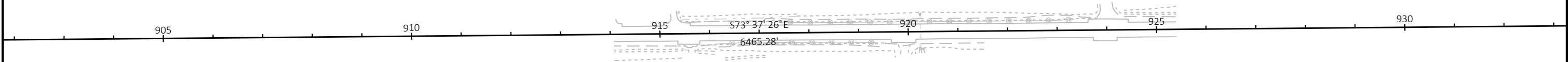
CURVE 7
PI STA = 811+18.86
Y = 344154.645
X = 616663.238
Δ = 23°31'55"
D = 0°45'00"
T = 1591.35'
L = 3137.84'
R = 7640.00'
PC STA = 795+27.51
Y = 344935.181
X = 615276.455
PT STA = 826+65.35
Y = 343992.711
X = 618246.330
BK = S60°37'39.0"E
AH = S84°09'34.4"E
SE = MATCH EXISTING



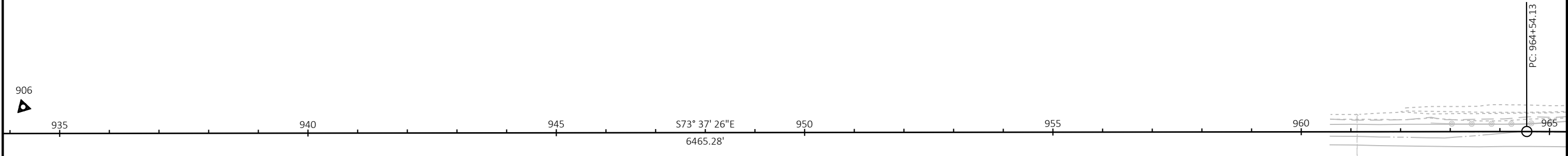
CONTROL POINT AND MONUMENT DATA						
POINT	DESCRIPTION	STATION	OFFSET	X COORDINATE	Y COORDINATE	ELEVATION
905	FENO MONUMENT	STA 881+26.42	51.67' LT	623663.767	343320.286	931.98

CURVE 8
PI STA = 870+67.15
Y = 343544.790
X = 622625.281
Δ = 9°08'44"
D = 1°00'00"
T = 458.29'
L = 914.63'
R = 5730.00'
PC STA = 866+08.86
Y = 343591.425
X = 622169.370
PT STA = 875+23.50
Y = 343426.283
X = 623067.984
BK = S84°09'34.4"E
AH = S75°00'50.0"E
SE = MATCH EXISTING

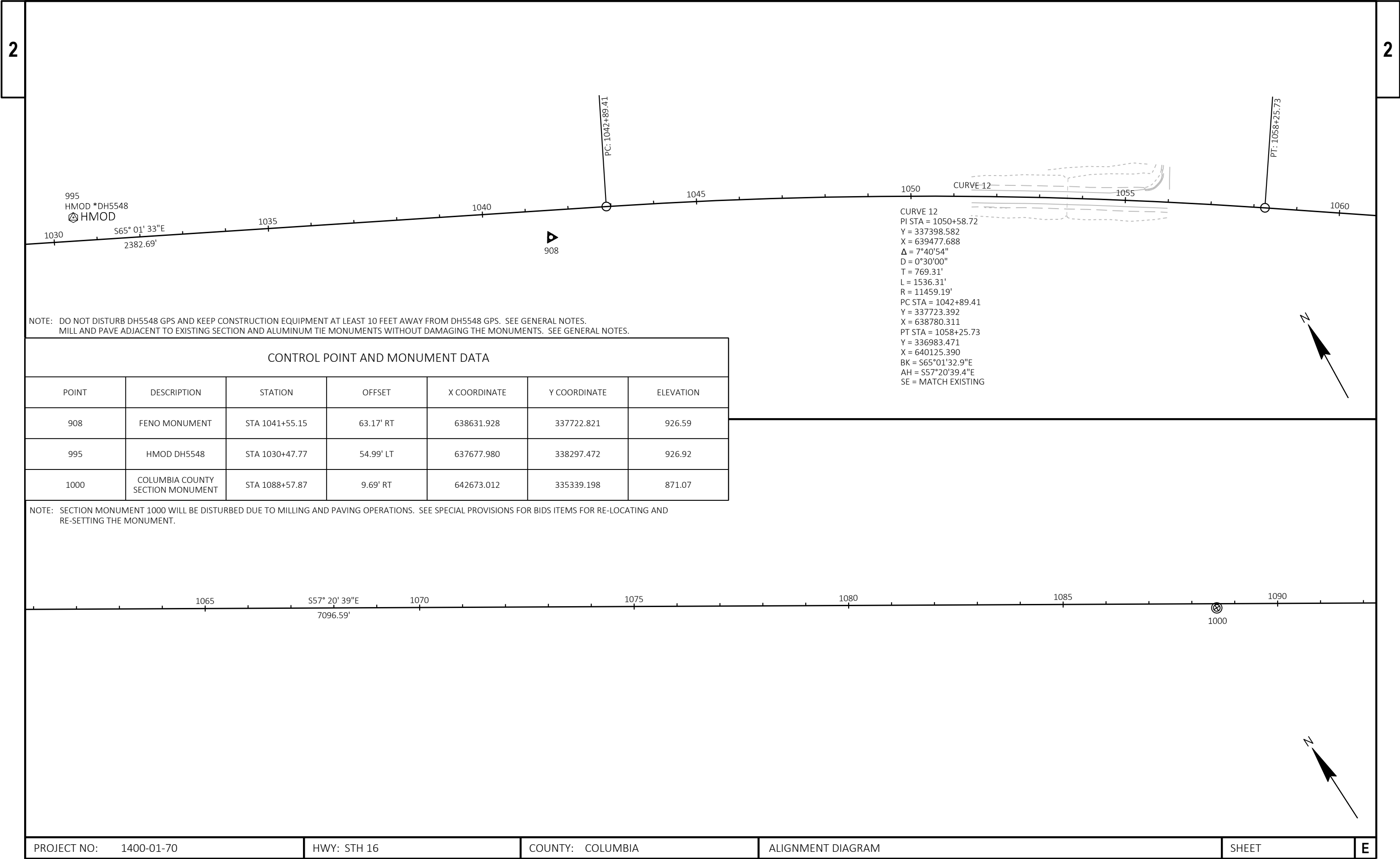
PI: STA 899+88.85
X = 625449.49
Y = 342788.78



CONTROL POINT AND MONUMENT DATA						
POINT	DESCRIPTION	STATION	OFFSET	X COORDINATE	Y COORDINATE	ELEVATION
906	FENO MONUMENT	STA 934+25.72	53.20' LT	628761.928	341870.834	933.76







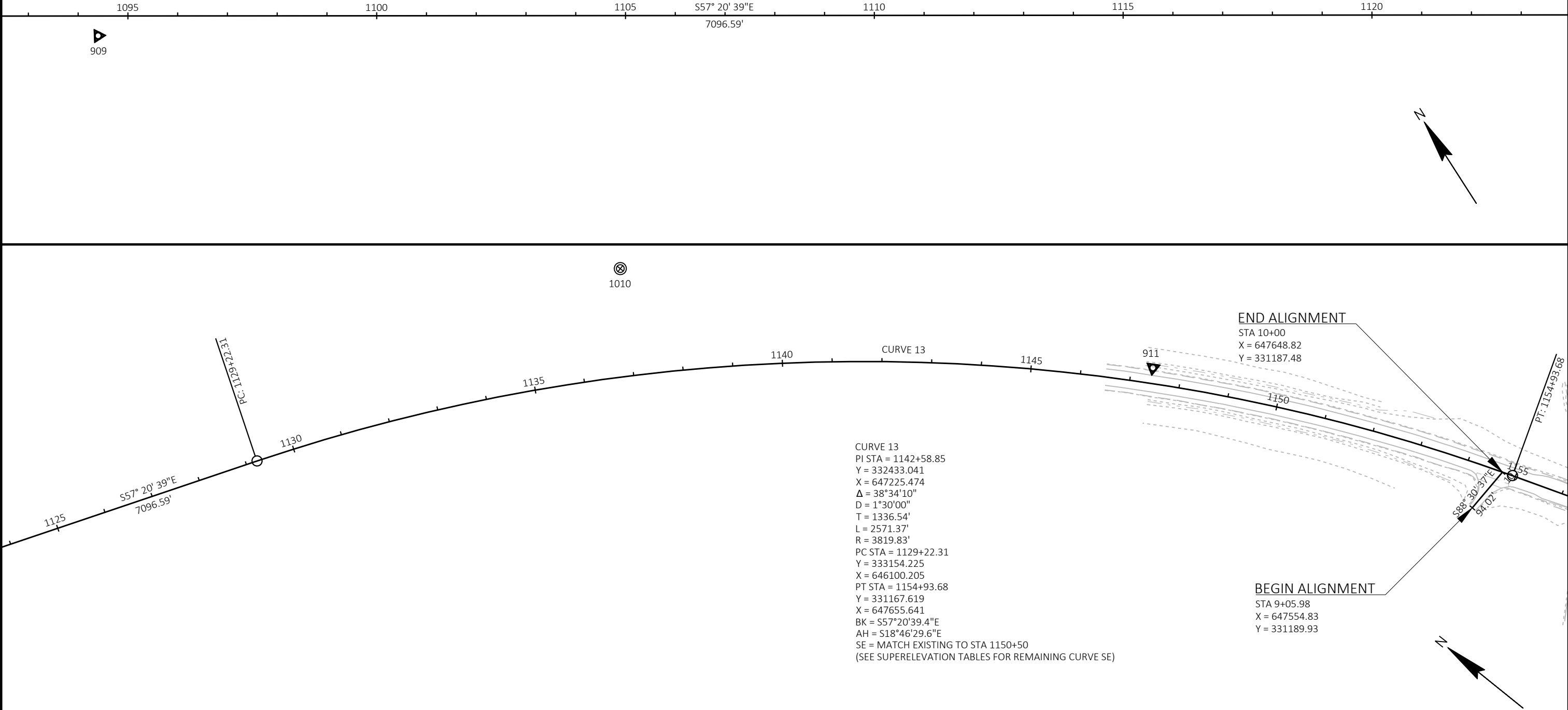
NOTE: DO NOT DISTURB DH5548 GPS AND KEEP CONSTRUCTION EQUIPMENT AT LEAST 10 FEET AWAY FROM DH5548 GPS. SEE GENERAL NOTES.
MILL AND PAVE ADJACENT TO EXISTING SECTION AND ALUMINUM TIE MONUMENTS WITHOUT DAMAGING THE MONUMENTS. SEE GENERAL NOTES.

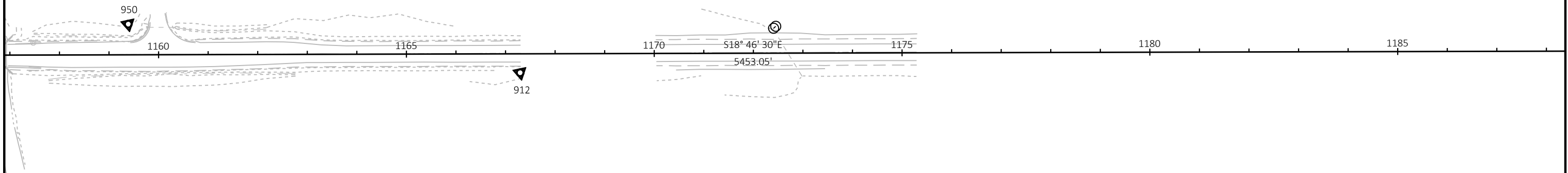
CONTROL POINT AND MONUMENT DATA						
POINT	DESCRIPTION	STATION	OFFSET	X COORDINATE	Y COORDINATE	ELEVATION
908	FENO MONUMENT	STA 1041+55.15	63.17' RT	638631.928	337722.821	926.59
995	HMOD DH5548	STA 1030+47.77	54.99' LT	637677.980	338297.472	926.92
1000	COLUMBIA COUNTY SECTION MONUMENT	STA 1088+57.87	9.69' RT	642673.012	335339.198	871.07

NOTE: SECTION MONUMENT 1000 WILL BE DISTURBED DUE TO MILLING AND PAVING OPERATIONS. SEE SPECIAL PROVISIONS FOR BIDS ITEMS FOR RE-LOCATING AND RE-SETTING THE MONUMENT.

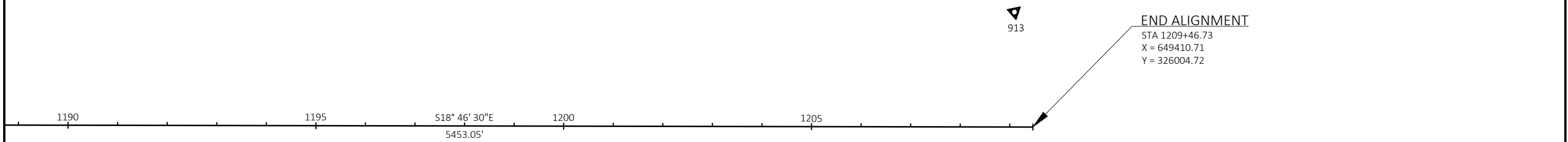
CONTROL POINT AND MONUMENT DATA						
POINT	DESCRIPTION	STATION	OFFSET	X COORDINATE	Y COORDINATE	ELEVATION
909	FENO MONUMENT	STA 1094+39.08	40.00' RT	643145.991	335000.066	867.53
1010	COLUMBIA COUNTY SECTION MONUMENT	STA 1136+99.30	216.18' LT	646858.386	332826.241	840.14
911	FENO MONUMENT	STA 1147+41.27	30.83' LT	647371.787	331867.066	849.37

NOTE: MILL AND PAVE ADJACENT TO EXISTING SECTION AND ALUMINUM TIE MONUMENTS WITHOUT DAMAGING THE MONUMENTS. SEE GENERAL NOTES.



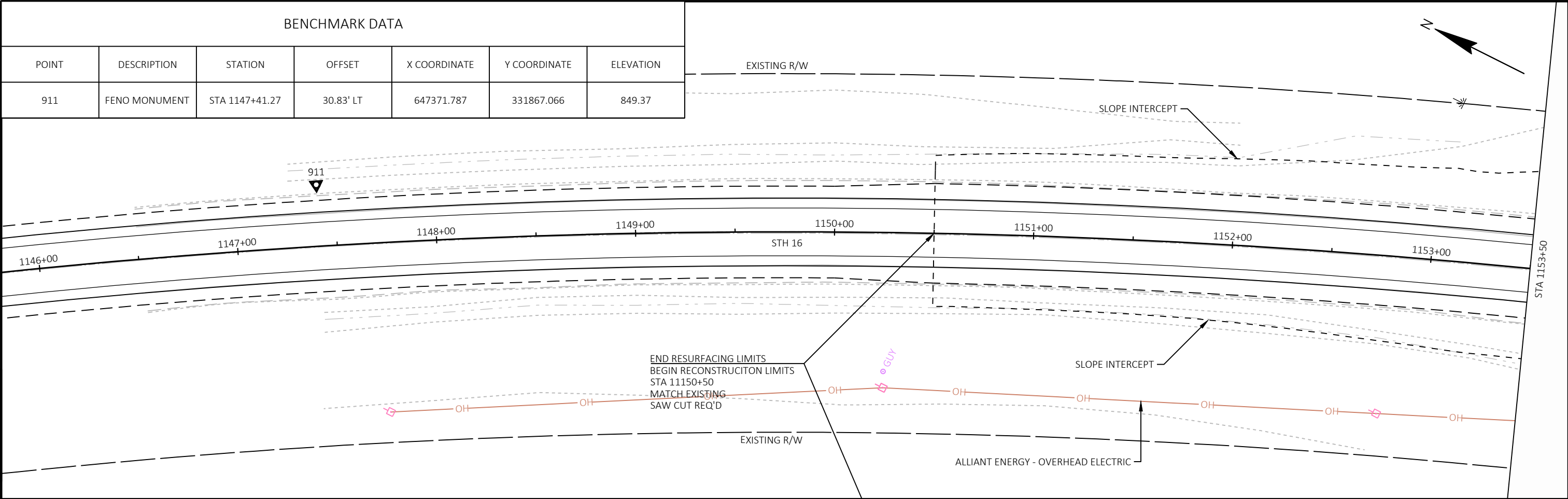


CONTROL POINT AND MONUMENT DATA						
POINT	DESCRIPTION	STATION	OFFSET	X COORDINATE	Y COORDINATE	ELEVATION
912	FENO MONUMENT	STA 1167+28.73	38.80' LT	648016.404	329985.794	844.37
950	IRON ROD	STA 1159+38.18	61.11' LT	647856.559	330766.433	850.05
911	FENO MONUMENT	STA 1209+08.45	231.95' LT	649618.000	326115.620	850.20

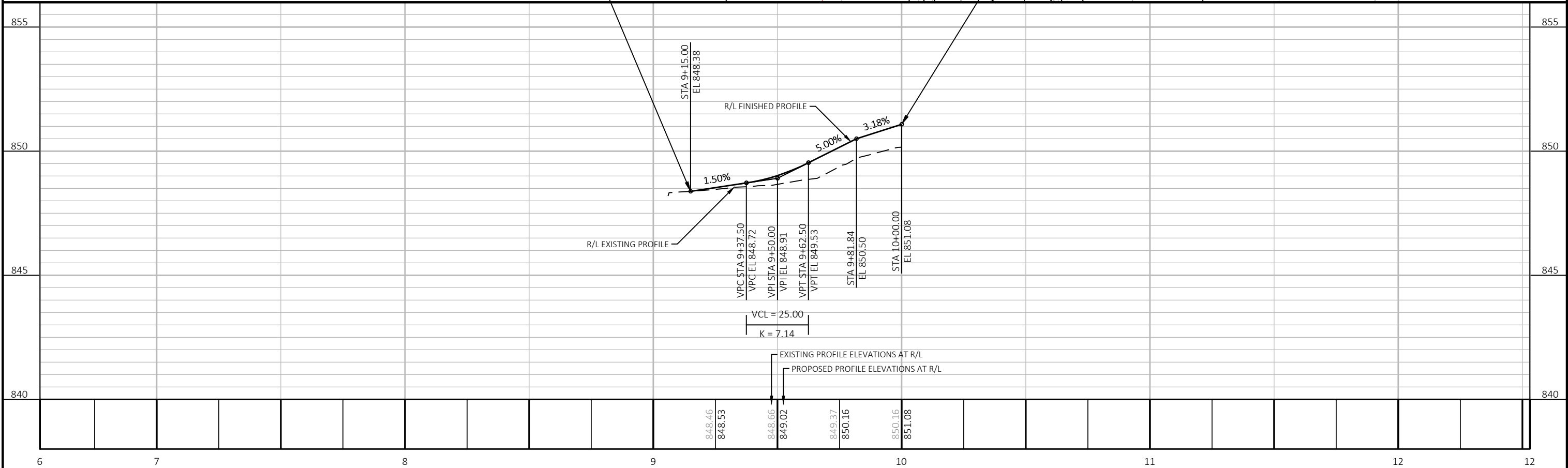
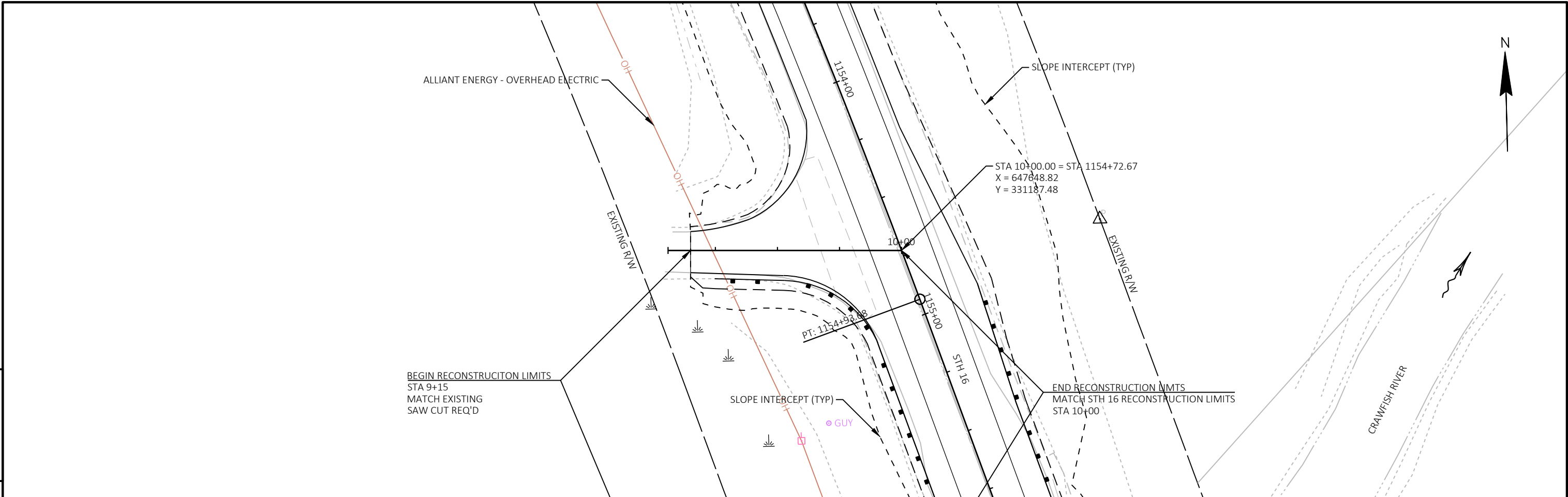


STH 16 SUPERELEVATION TABLE (CURVE 13 & STA 1154+93.68 - STA 1159+43)								
STATION	LT AGG SHOULDER	LT PAVED SHOULDER	LEFT LANE	RIGHT LANE	RIGHT BYPASS LANE	RT PAVED SHOULDER	RT AGG SHOULDER	REMARKS
1150+50	-4.0%	2.2%	2.2%	-3.4%	---	-3.4%	-4.0%	MATCH EXISTING LANES AND PAVED SHOULDERS SUPERELEVATION
1150+60.5	-4.0%	2.5%	2.5%	-3.7%	---	-3.7%	-4.0%	RIGHT LANE AND PAVED SHOULDER AT FULL SUPERELEVATION
1154+60.68	-4.0%	3.7%	3.7%	-3.7%	---	-3.7%	-4.0%	LANES AND PAVED SHOULDERS AT FULL SUPERELEVATION
1155+06.17	-4.0%	2.0%	2.0%	-2.0%	---	-2.0%	-4.0%	REVERSE CROWN
1155+59.68	-4.0%	0.0%	0.0%	-2.0%	---	-2.0%	-4.0%	ZERO CROWN
1156+13.20	-4.0%	-2.0%	-2.0%	-2.0%	---	-2.0%	-4.0%	NORMAL CROWN
1158+55	-4.0%	-2.0%	-2.0%	-2.0%	-2.0%	-2.0%	-4.0%	BEGIN LEFT PAVED SHOULDER TRANSITION
1159+43	-4.0%	-4.0%	-2.0%	-2.0%	-2.0%	-2.0%	-4.0%	END LEFT PAVED SHOULDER TRANSITION

BENCHMARK DATA						
POINT	DESCRIPTION	STATION	OFFSET	X COORDINATE	Y COORDINATE	ELEVATION
911	FENO MONUMENT	STA 1147+41.27	30.83' LT	647371.787	331867.066	849.37

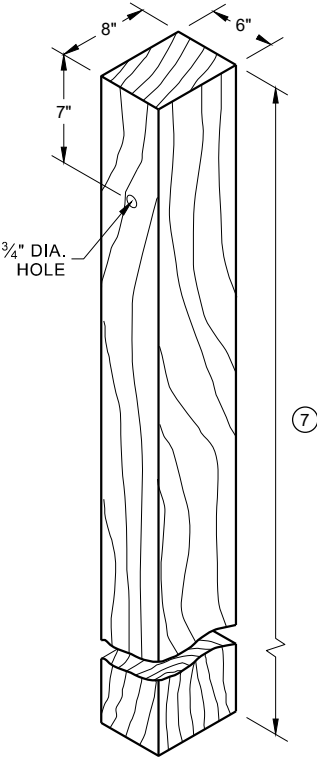


PROJECT NO:	1400-01-70	HWY:	STH 16	COUNTY:	COLUMBIA	PLAN AND PROFILE:	STH 16	SHEET	E
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- Diagram illustrating the end view of a steel or wood post set in rock. The post is 12" wide and 2" thick. The rock is 2" thick. The post is embedded 20" minimum in solid rock. The post is surrounded by foundation backfill. The height of the post above the rock is "A" inches. The height of the post below the rock is 44 1/2" MIN. WHERE "A" IS $\geq 22"$. The post is surrounded by foundation backfill.
- END VIEW**
- SETTING STEEL OR WOOD POST IN ROCK**
- ③



**WOOD POST
(6" X 8") NOMINAL**

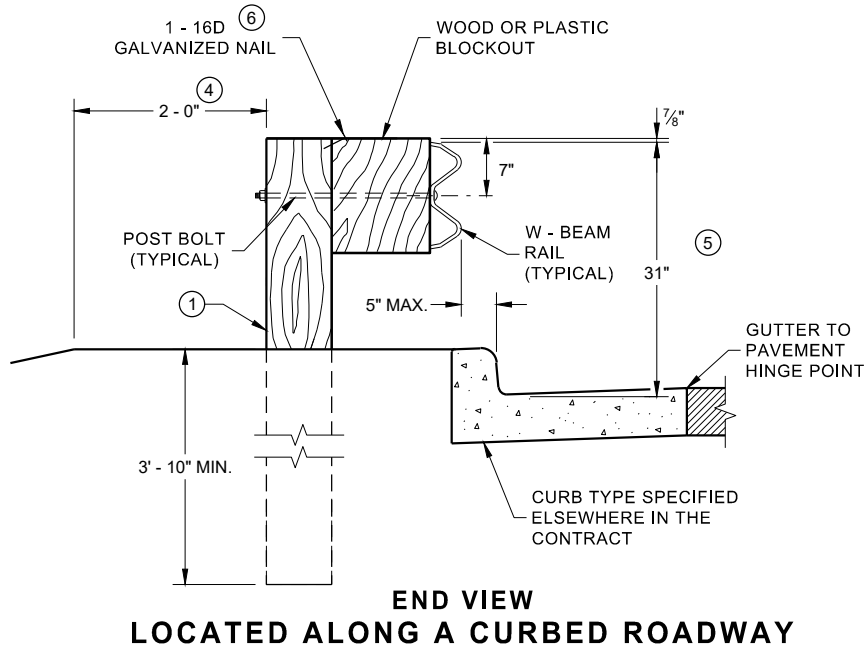
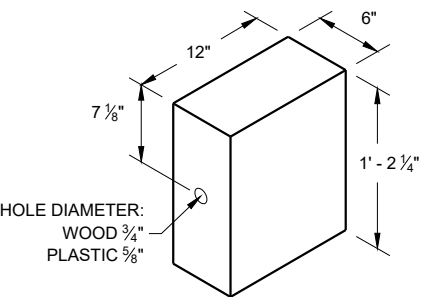


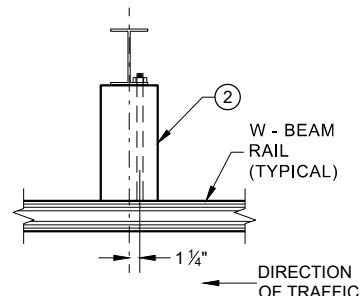
Diagram illustrating the Plan View of a Wood Post, Lockout, and Beam. The diagram shows a vertical wood post (labeled 6) secured by a horizontal W-beam rail (labeled 2). The rail is labeled "W - BEAM RAIL (TYPICAL)". An arrow indicates the "DIRECTION OF TRAFFIC" moving from right to left.

PLAN VIEW
WOOD POST,
LOCKOUT & BEAM

PLAN VIEW
WOOD POST,
BLOCKOUT & BEAM



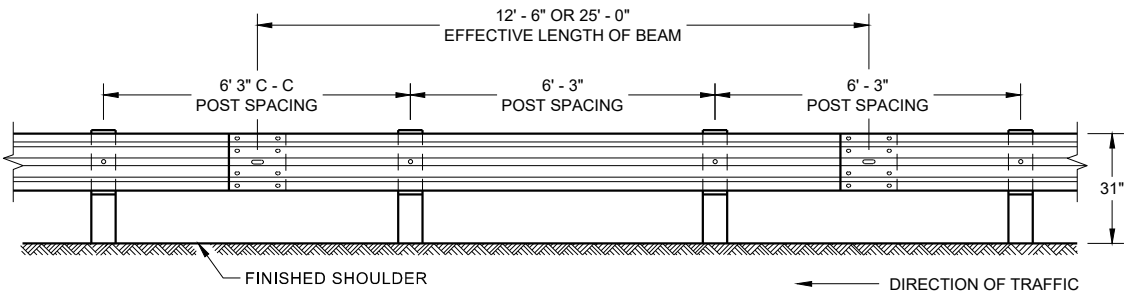
**WOOD OR PLASTIC
BLOCKOUT**



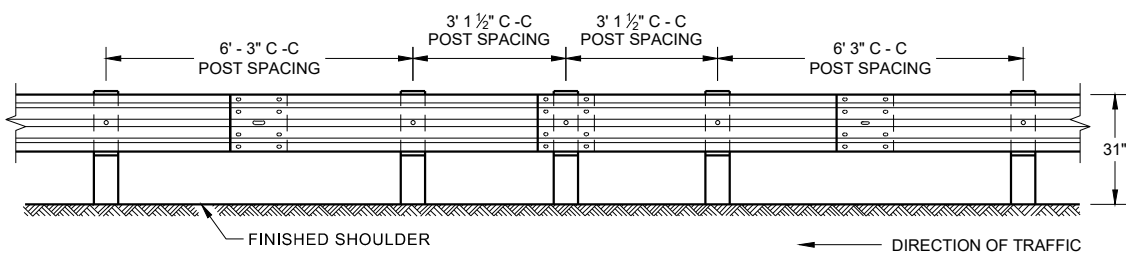
**PLAN VIEW
STEEL POST,
PLASTIC BLOCKOUT & BEAM**



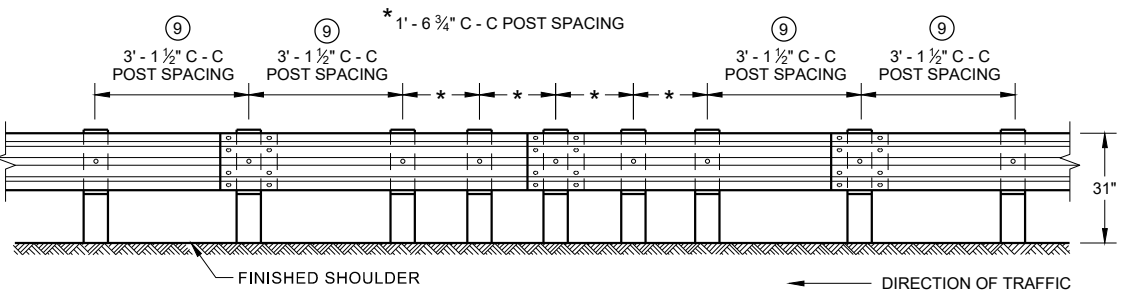
SDD 14B42-b Midwest Guardrail System (MGS) Guardrail



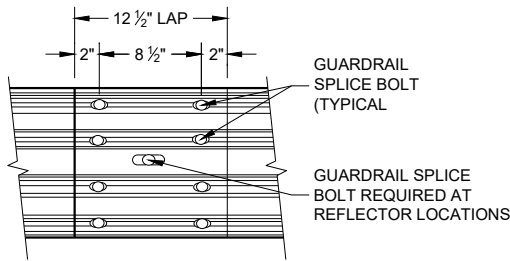
FRONT VIEW
POST SPACING STANDARD INSTALLATION



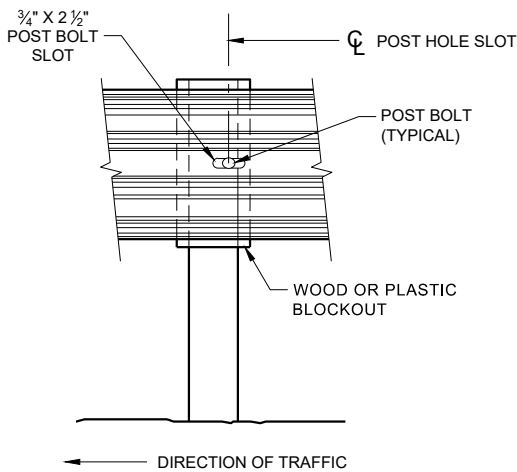
FRONT VIEW
HALF POST SPACING (HS) AND
HALF POST SPACING WITH LONGER POSTS (K)



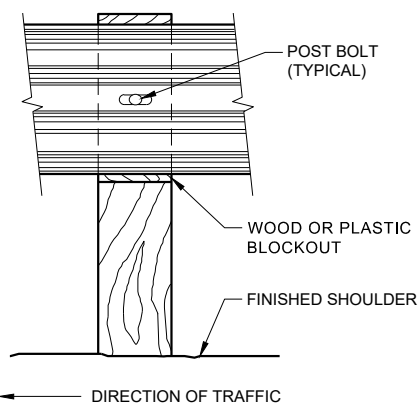
FRONT VIEW
QUARTER POST SPACING (QS)



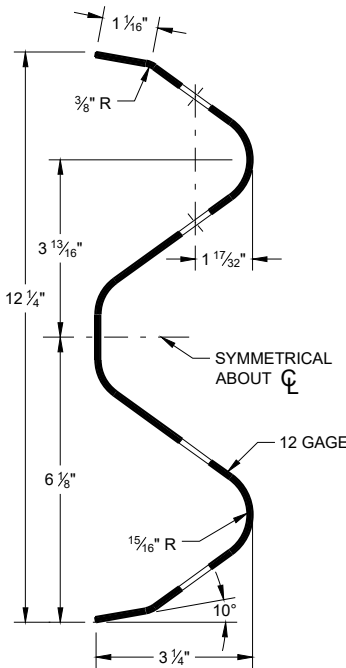
FRONT VIEW
MID-SPAN BEAM SPLICE



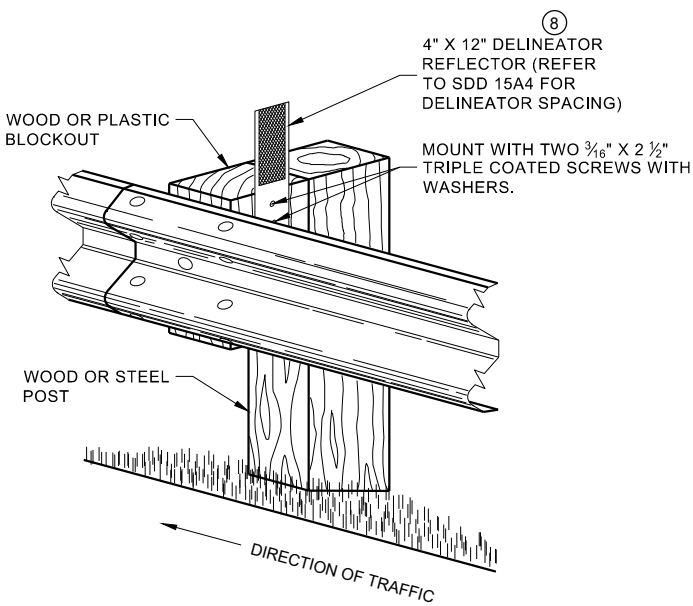
FRONT VIEW AT STEEL POST



FRONT VIEW AT WOOD POST



SECTION THRU W-BEAM RAIL



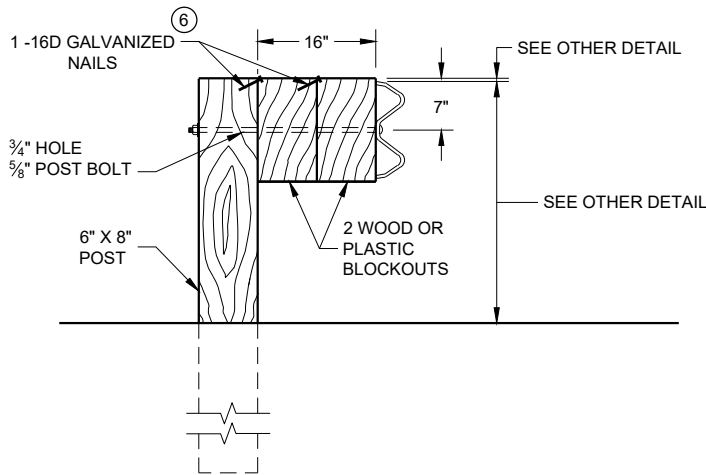
ONE SIDED REFLECTOR DETAIL
AND TYPICAL INSTALLATION

GENERAL NOTES

- 8 DO NOT INSTALL REFLECTORS ON THE FIRST 50 FEET OF THE APPROACH END OF THE ENERGY ABSORBING TERMINAL.
- 9 25 FEET OF HALF POST SPACING IS REQUIRED ON APPROACH AND DEPARTURE ENDS OF QUARTER POST SPACING.
- POST BOLTS ARE A 3/8" DIAMETER ASTM A307 GUARDRAIL BOLT. A POST BOLT REQUIRES 3/8" DIAMETER A563A DOUBLE RECESSED (DR) HEAVY HEX NUT AND 3/8" DIAMETER F844 FLAT WASHER. POST BOLTS MAY BE LONGER IF MULTIPLE BLOCKOUTS ARE BEING USED.
- GUARD RAIL SPLICE BOLTS ARE A 3/8" DIAMETER ASTM A307 GUARDRAIL HEAD BOLT. A GUARDRAIL SPLICE BOLT REQUIRES 3/8" DIAMETER A563A DOUBLE RECESSED (DR) HEAVY HEX NUT.



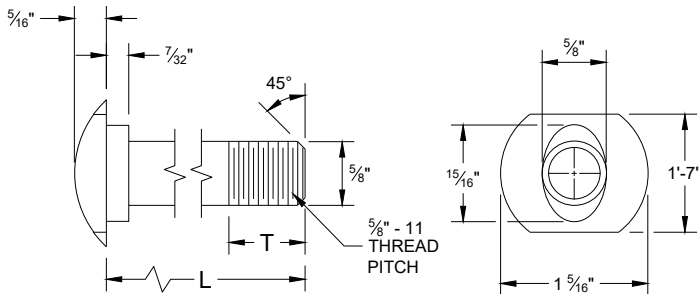
SDD 14B42-c Midwest Guardrail System (MGS) Guardrail



DETAIL FOR 16" BLOCKOUT DEPTH

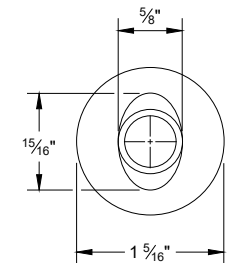
IT IS ACCEPTABLE TO USE BLOCKOUTS UP TO 16" DEEP TO INCREASE THE POST OFFSET TO AVOID UNDERGROUND OBSTACLES. THERE IS NO LIMIT TO THE NUMBER OF POSTS THAT CAN HAVE ADDITIONAL BLOCKOUTS UP TO 16" DEEP.

- NOTE:
1. ALL FILLETS SHALL HAVE A MINIMUM RADIUS OF $\frac{3}{16}$ ".
 2. IF THE BOLT EXTENDS MORE THAN $\frac{1}{4}$ " FROM THE NUT THE BOLT SHOULD BE TRIMMED BACK.

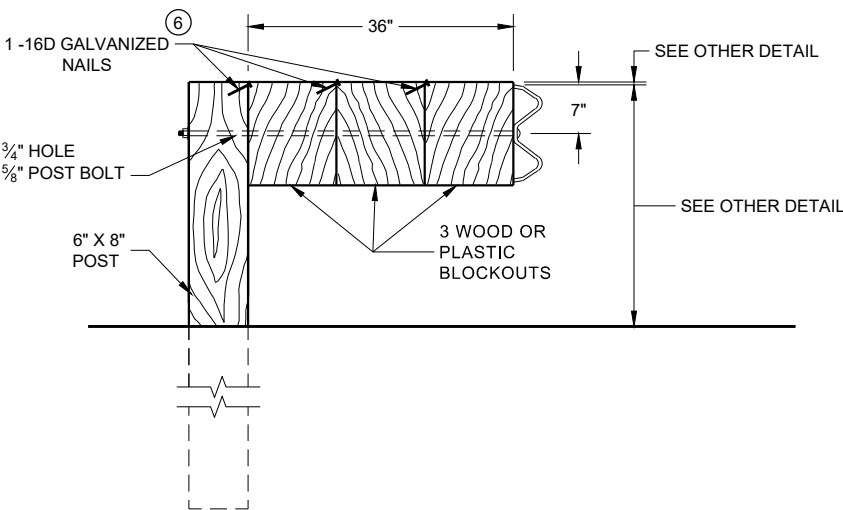


POST BOLT TABLE

L	T (MIN.)
1 1/4"	1 1/8"
2"	1 3/4"
10"	4"
14"	4 1/16"
18"	4"
21"	4 1/16"
25"	4"



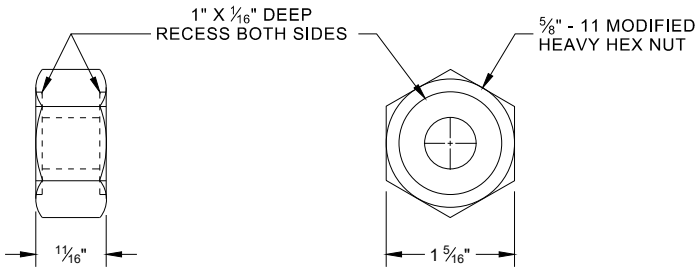
ALTERNATE BOLT HEAD



DETAIL FOR 36" BLOCKOUT DEPTH

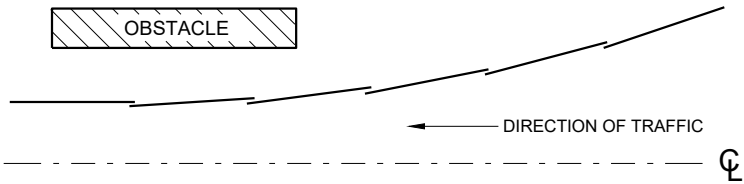
NOTES: UNDER SPECIAL CIRCUMSTANCES, SUCH AS AVOIDING OBSTACLES THAT ARE NOT RELOCATED, IT IS ACCEPTABLE TO INSTALL ADDITIONAL BLOCKOUTS TO OBTAIN UP TO 36" DEPTH FOR ONE OR TWO POSTS IN A SECTION OF GUARDRAIL.

DO NOT USE 16" OR 36" BLOCKOUTS IF IT CAUSES THE POST TO BE DRIVEN BEYOND SHOULDER HINGE POINT OR CAUSES A FIXED OBJECT TO BE WITHIN THE DEFLECTION DISTANCE OF THE BARRIER.

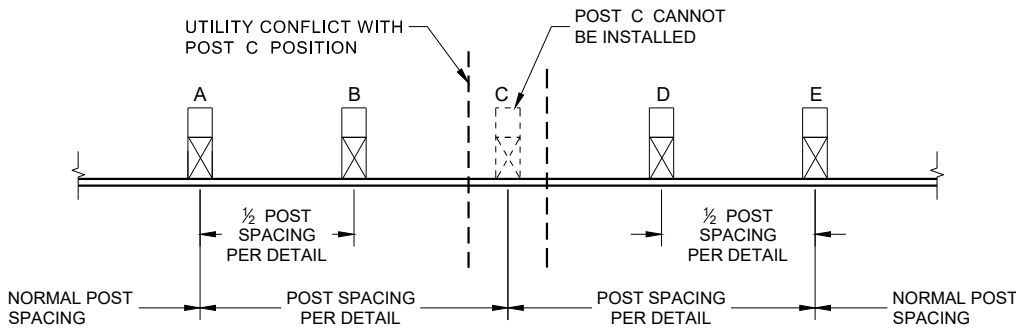


POST BOLT, SPLICE BOLT AND RECESS NUT

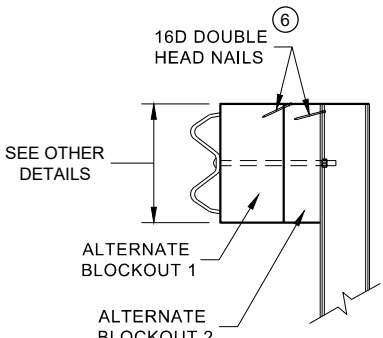
- 6 WHEN USING STEEL POST AD WOOD BLOCKOUTS, INSTALL FOUR 16D GALVANIZED NAILS. INSTALL NAILS AT THE BACK CORNERS OF THE BLOCK AND BEND THE NAILS OVER THE FLANGE OF THE STEEL POST.



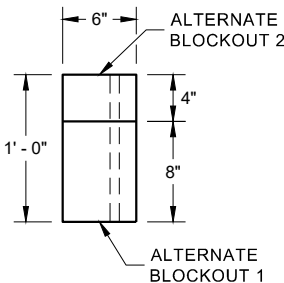
PLAN VIEW BEAM LAPPING DETAIL



POST DRIVING FOR CONTINUOUS UNDERGROUND OBSTRUCTION



SIDE VIEW



PLAN VIEW

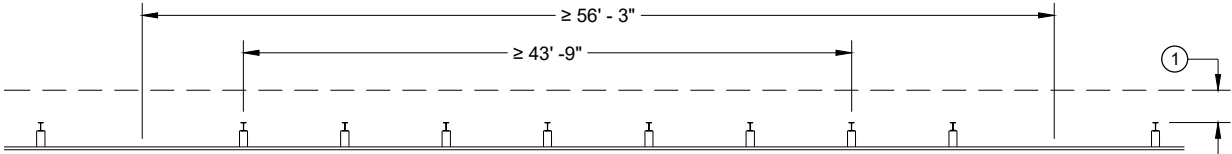
ALTERNATE WOOD BLOCKOUT DETAIL

**MIDWEST GUARDRAIL SYSTEM
(MGS) GUARDRAIL**

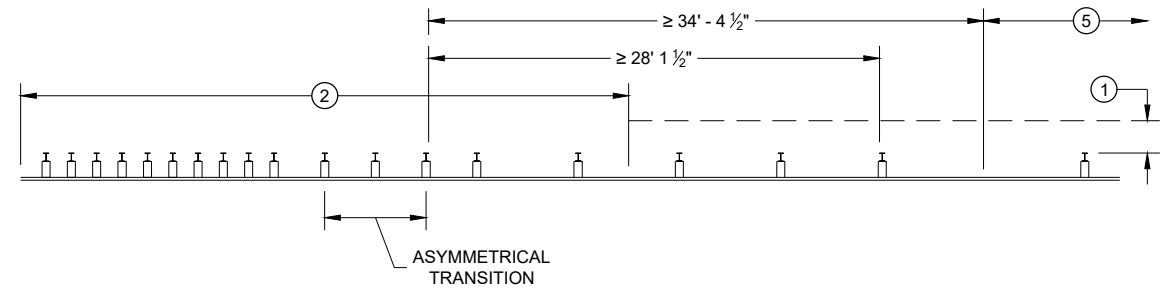
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



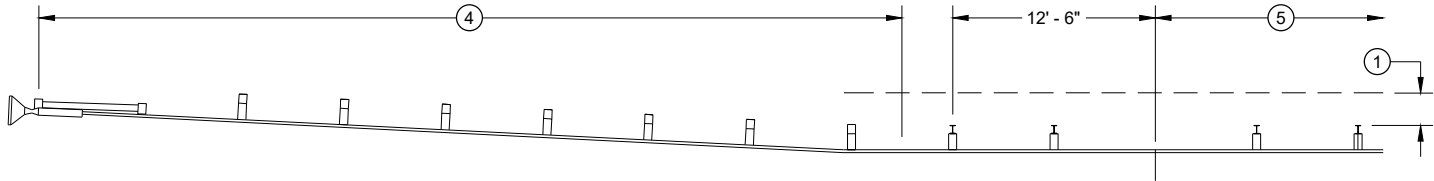
SDD 14B42-d Midwest Guardrail System (MGS) Guardrail



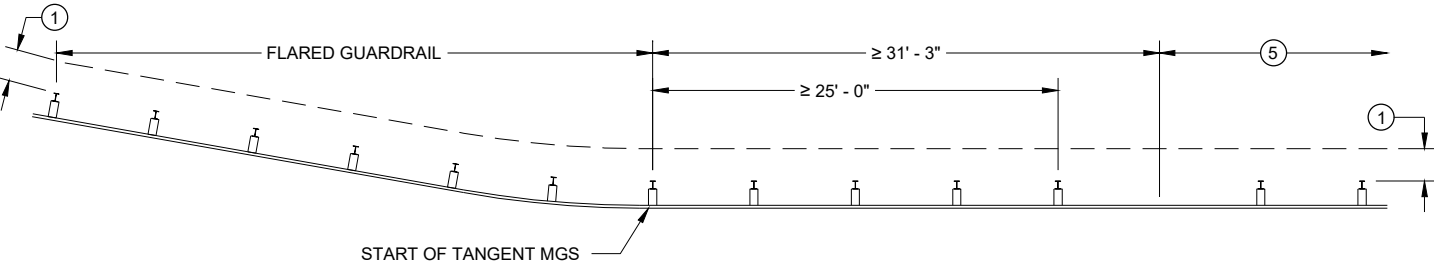
MISSING POST IN NORMAL BEAM GUARD RUN



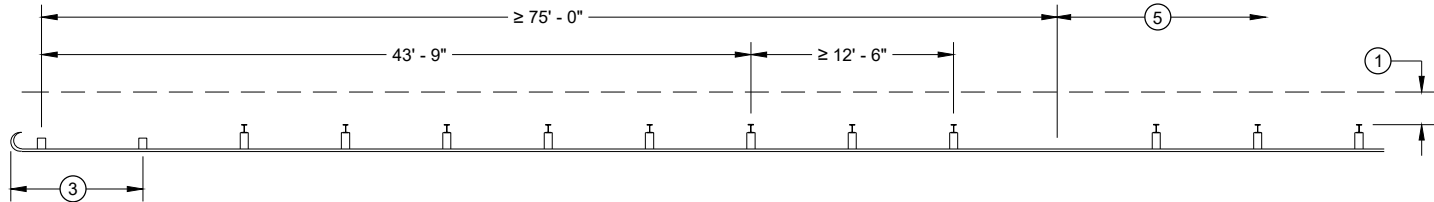
MISSING POST NEAR APPROACH THRIE BEAM TRANSITION



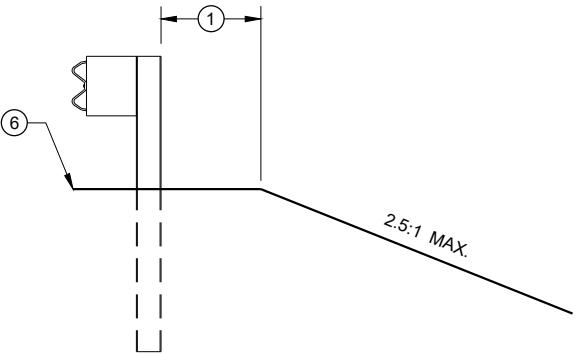
MISSING POST IN NORMAL BEAM GUARD RUN NEAR EAT



MISSING POST IN NORMAL BEAM GUARD RUN
NEAR FLARED BEAM GUARD



MISSING POST IN NORMAL BEAM GUARD RUN
NEAR TYPE 2 TERMINAL



CROSS SECTION VIEW

- (1) MINIMUM OF 2 FEET OF GRADING BEHIND POST.
- (2) SEE SDD 14B45 FOR MORE DETAILS.
- (3) SEE SDD 14B47 FOR MORE DETAILS.
- (4) SEE SDD 14B44 FOR MORE DETAILS.
- (5) SEE MISSING POST IN NORMAL BEAM GUARD RUN FOR DISTANCE TO NEXT MISSING POST AND AREA FOR WELL DRAINED, COMPACTED SOILS.
- (6) SEE PLAN FOR SHOULDER DESIGN.

MIDWEST GUARDRAIL SYSTEM (MGS) GUARDRAIL

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
7/2018
DATE
/S/ Rodney Taylor
ROADWAY STANDARDS DEVELOPMENT
UNIT SUPERVISOR
FHWA



SDD 14B44-a Midwest Guardrail System (MGS) Energy Absorbing Terminal

GENERAL NOTES

- (A) THE SLOPE IN THE AREA BOUNDED BY THE GRADELINE, THE HINGE POINT LINE (HPL) AND THE CLEAR ZONE LIMITS (CZL) SHALL BE 4:1 OR FLATTER.
- (B) AFTER FINAL ASSEMBLY, RECHECK CABLE TO BE SURE IT IS TAUT AND HAS NOT RELAXED
- (C) DIFFERENT MANUFACTURERS REQUIRE DIFFERENT PERFORATED W - BEAM RAIL END PANELS. SEE MANUFACTURER'S INFORMATION.
- (D) ATTACH ALUMINUM SHEET TO E.A.T. HEAD USING 4 STAINLESS STEEL SELF - TAPPING SCREWS. ONE SCREW PER CORNER.
- (E) HARDWARE MAY VARY BETWEEN MANUFACTURER. SEE MANUFACTURER'S DRAWING FOR INFORMATION.
- (F) DIMENSIONS MAY VARY, MANUFACTURER'S INFORMATION.

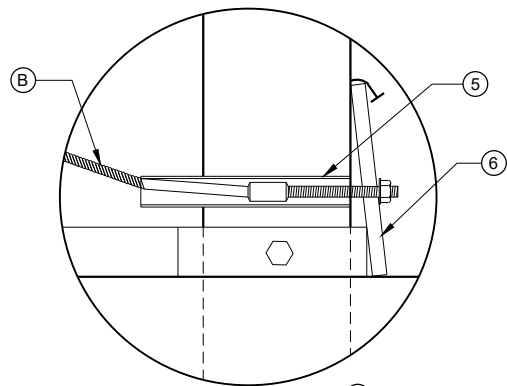
SEE SDD 14B42 FOR MORE INFORMATION.

* DO NOT ATTACH BLOCKOUTS TO POST 1 AND 2.

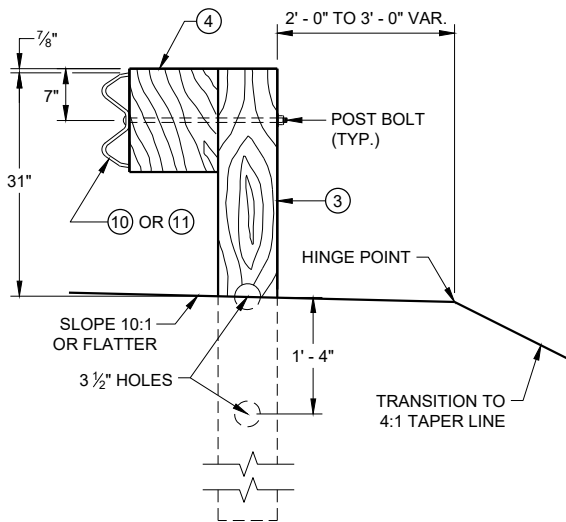
DO NOT INSTALL REFLECTORS ON THE FIRST 50 FEET OF THE APPROACH END OF THE ENERGY ABSORBING TERMINAL.

SEE MANUFACTURER'S DRAWING FOR SPLICE LOCATION, HARDWARE DIMENSIONS AND INSTALLATION INSTRUCTIONS.

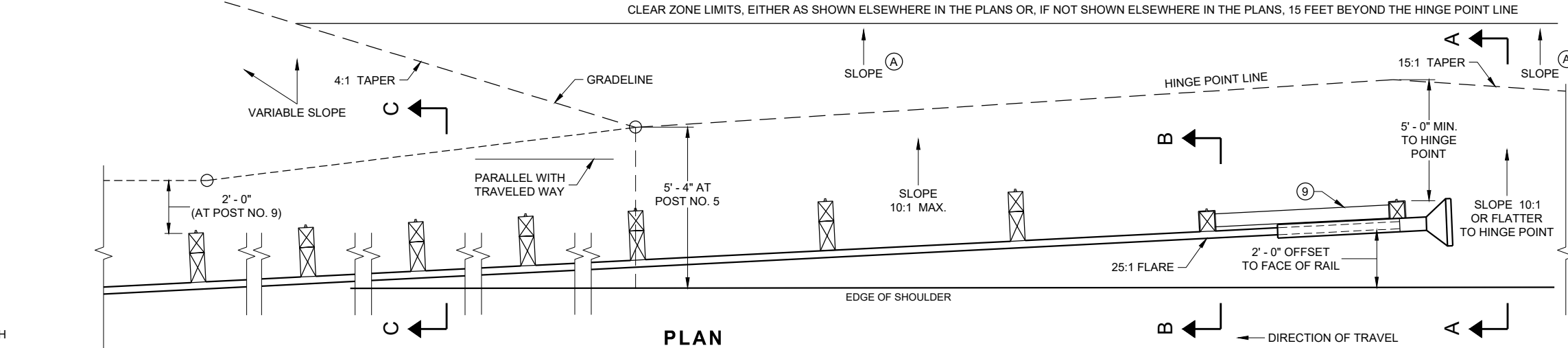
THE CENTER OF THE UPPER 3 1/2" DIAMETER HOLE ON POST NUMBER 3 THROUGH POST 9 IS TO BE FLUSH WITH THE GROUND LINE UP TO A MAXIMUM OF 2" ABOVE GROUND LINE. WOOD BLOCKS ON POSTS NUMBERED 3 THROUGH 9 MAY BE ADJUSTED UP TO 3" ABOVE THE TOP OF POST.



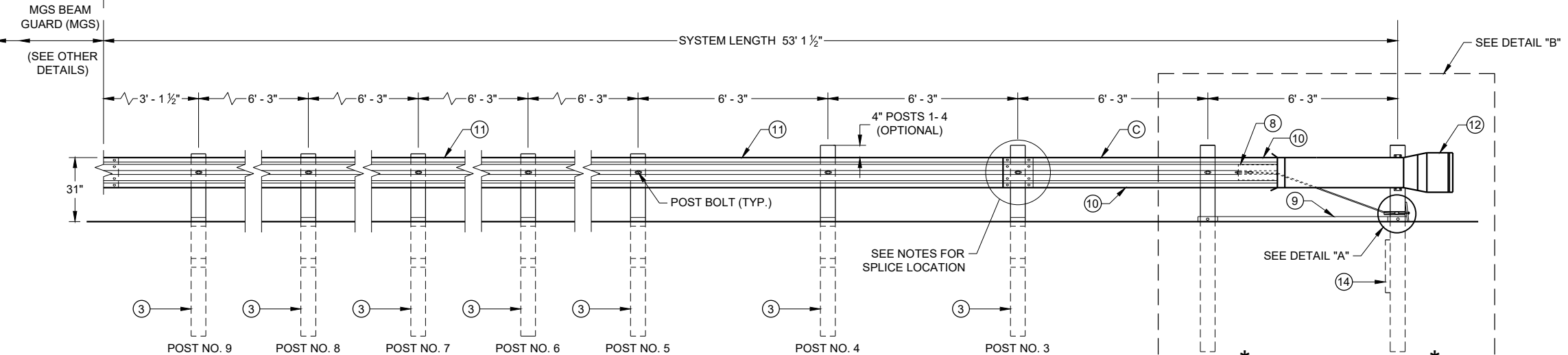
DETAIL "A"



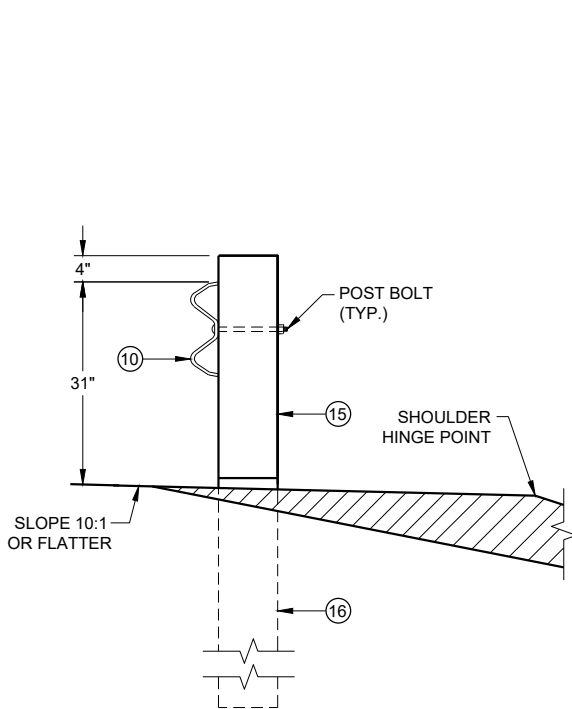
SECTION C - C
TYPICAL AT POST NOS. 3 - 9



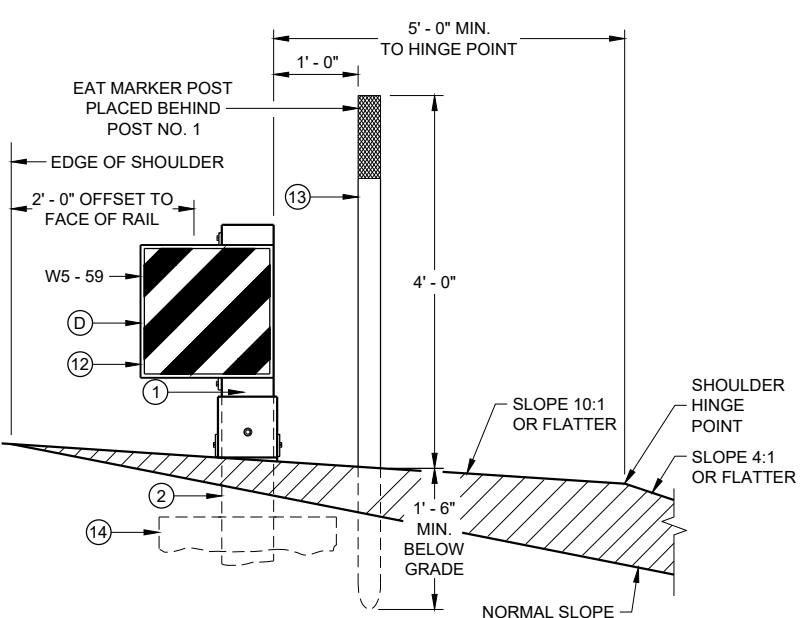
PLAN



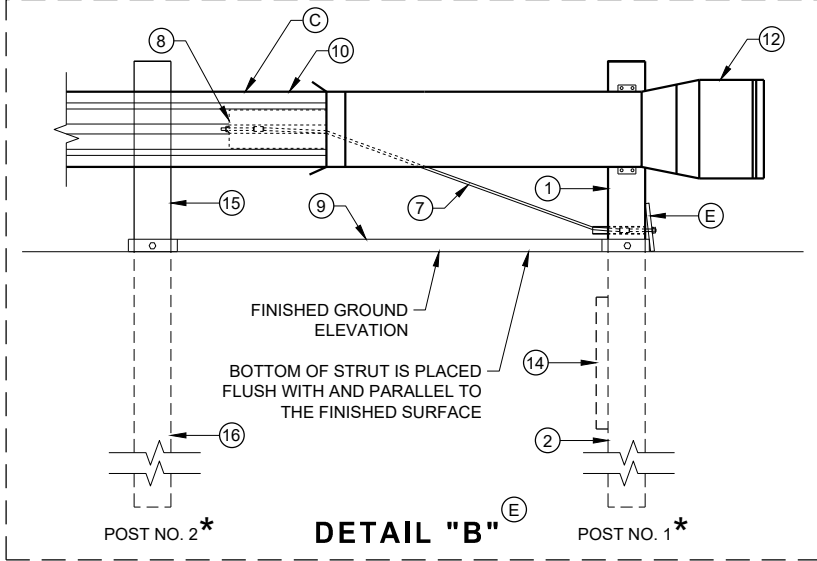
ELEVATION



SECTION B - B
TYPICAL AT POST NO. 2*



SECTION A - A
TYPICAL AT POST NO. 1*



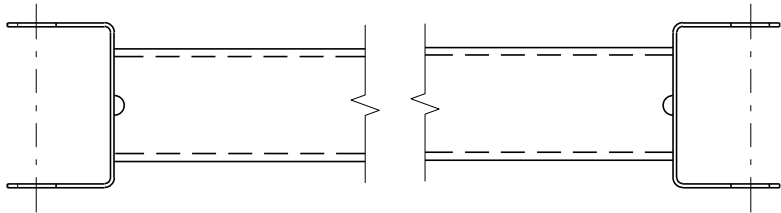
DETAIL "B"

**MIDWEST GUARDRAIL SYSTEM
ENERGY ABSORBING TERMINAL
(MGS)**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



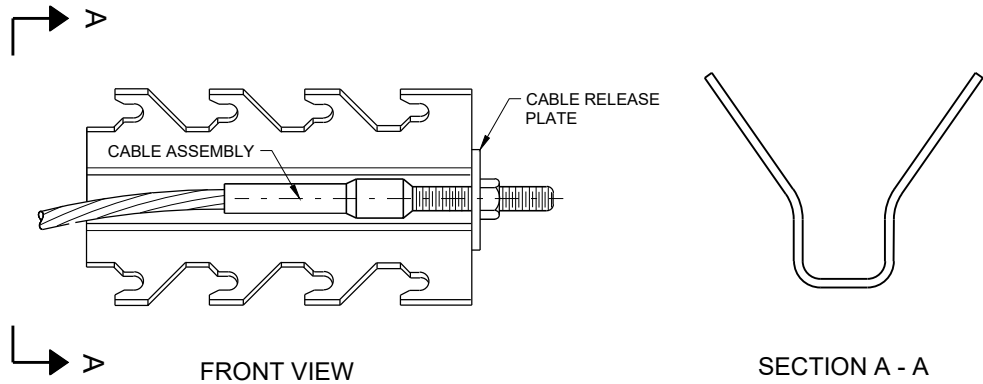
SDD 14B44-b Midwest Guardrail System (MGS) Energy Absorbing Terminal



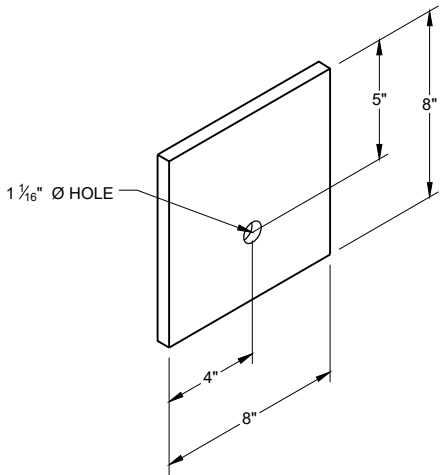
GENERIC GROUND STRUT ⁹ (E)

BILL OF MATERIALS

PART NO.	DESCRIPTION MATERIALS PROVIDED BY MGS EAT MANUFACTURER. SEE MANUFACTURER'S DETAILS FOR MORE INFORMATION.
①	UPPER POST NO. 1 6" X 6" TUBE
②	LOWER POST NO. 1
③	WOOD CRT
④	WOOD BLOCKOUT
⑤	PIPE SLEEVE
⑥	BEARING PLATE
⑦	BCT CABLE ASSEMBLY
⑧	ANCHOR CABLE BOX
⑨	GROUND STRUT
⑩	PERFORATED W-BEAM RAIL END PANEL, 12'-6" LONG.
⑪	STANDARD W-BEAM RAIL. MULTIPLE SECTIONS REQUIRED. SECTIONS VARY IN LENGTH.
⑫	IMPACT HEAD
⑬	EAT MARKER POST - YELLOW (SEE APPROVED PRODUCTS LIST)
⑭	SOIL PLATE
⑮	UPPER POST NO. 2
⑯	LOWER POST NO. 2



GENERIC ANCHOR CABLE BOX ⁹ (E)



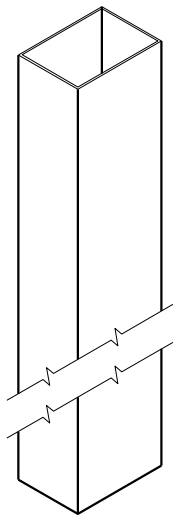
BEARING PLATE ⁶ (E)

MIDWEST GUARDRAIL SYSTEM
ENERGY ABSORBING TERMINAL
(MGS)

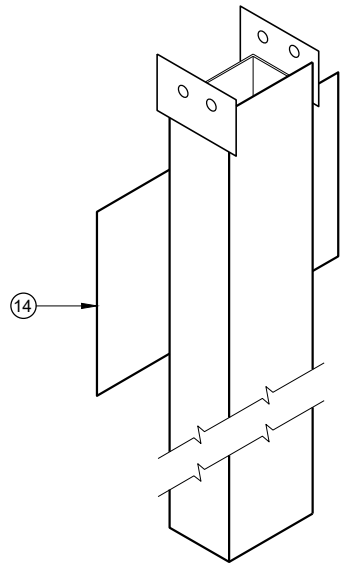
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



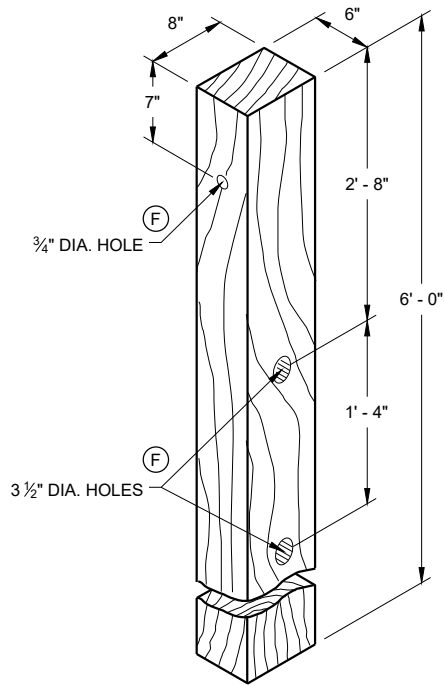
SDD 14B44-c Midwest Guardrail System (MGS) Energy Absorbing Terminal



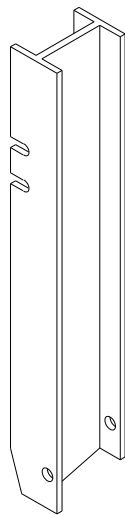
UPPER POST NO. 1^{(1) (E)}



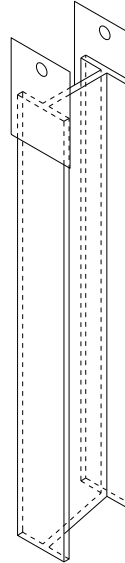
LOWER POST NO. 1^{(2) (E)}



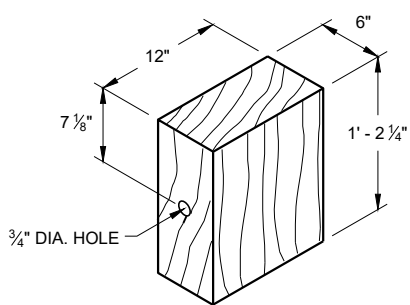
WOOD CRT POST^{(3) (E)}
POSTS NUMBER 3-9



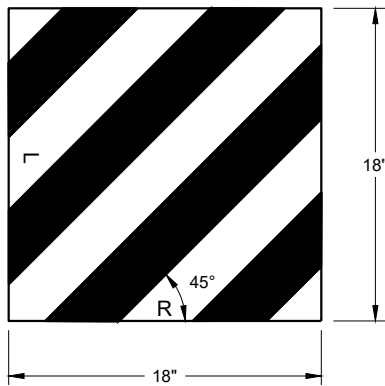
UPPER POST NO. 2^{(15) (E)}



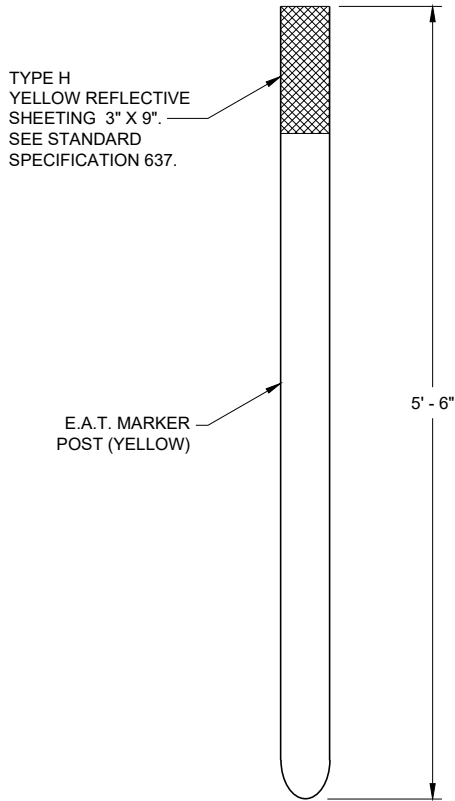
LOWER POST NO. 2^{(16) (E)}



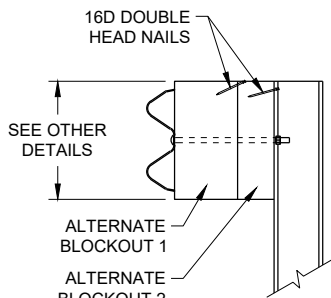
WOOD BLOCKOUT⁽⁴⁾
REQ'D. AT ALL POSTS EXCEPT POST NO'S 1 & 2



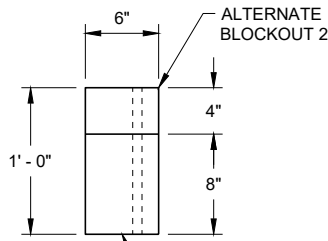
REFLECTIVE SHEETING DETAIL^(E)



E.A.T. MARKER POST⁽¹³⁾



SIDE VIEW



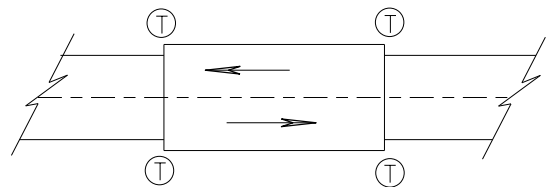
TOP VIEW

ALTERNATE WOOD
BLOCKOUT DETAIL

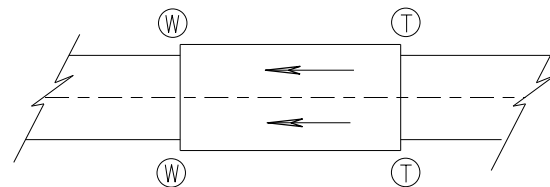
**MIDWEST GUARDRAIL SYSTEM
ENERGY ABSORBING TERMINAL
(MGS)**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
7/2018 DATE /S/ Rodney Taylor
ROADWAY STANDARDS DEVELOPMENT
UNIT SUPERVISOR
FHWA



TWO WAY TRAFFIC



ONE WAY TRAFFIC

(T) THRIE BEAM CONNECTION

(W) W-BEAM CONNECTION WHEN REQUIRED

TYPICAL LOCATIONS OF THRIE BEAM AND W-BEAM CONNECTIONS TO BRIDGE

GENERAL NOTES

IF ROCK IS ENCOUNTERED, REMOVE ROCK TO FULL DEPTH OF POST PLUS 2 1/2", AND 12" DIAMETER AROUND POST. SEE 14B42 FOR MORE DETAILS.

TRANSITION USES STEEL POSTS ONLY.

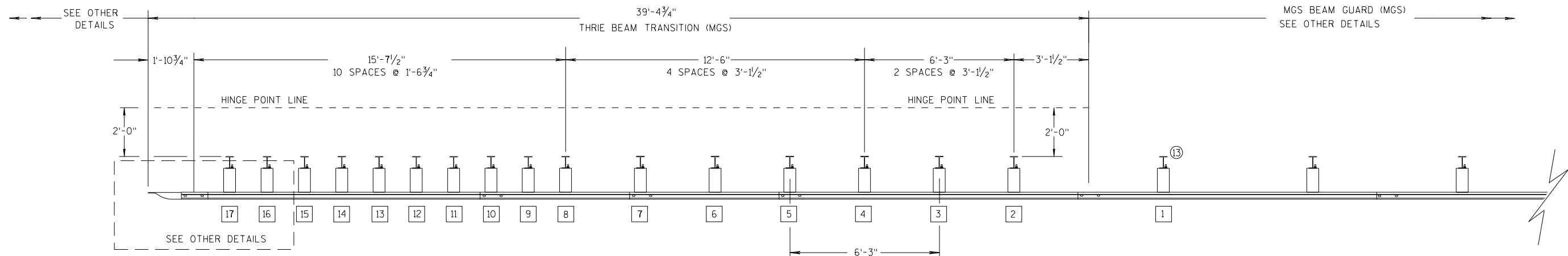
SEE STANDARD DETAIL DRAWING 14 B 42 FOR MORE INFORMATION.

POST 2 THROUGH 17 USES STEEL POST ONLY

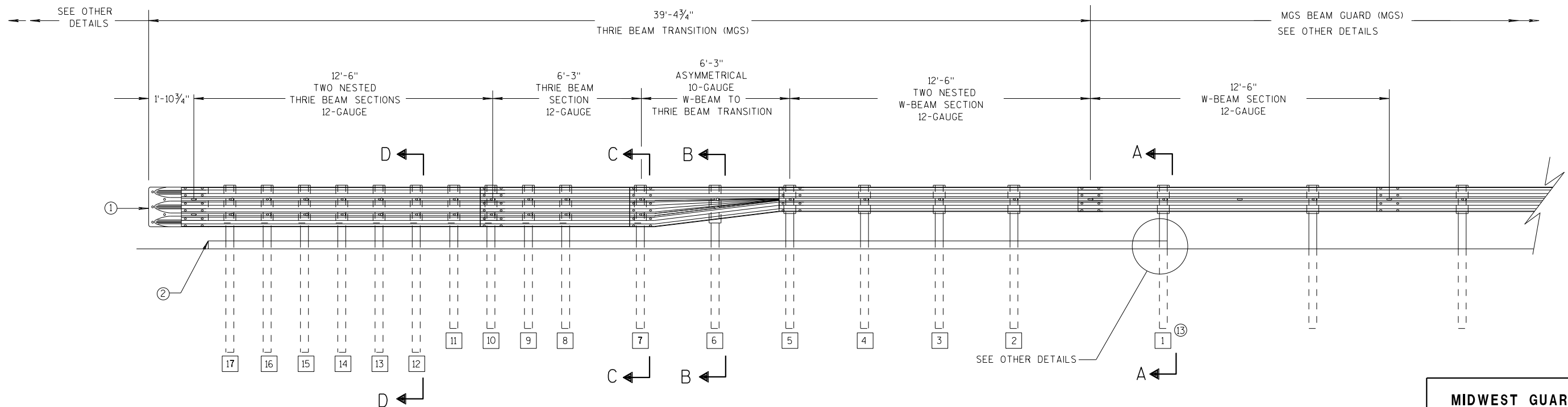
① BRIDGE RAILING TYPE "W" DOES NOT REQUIRE A TERMINAL CONNECTOR.

② OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.

⑬ STEEL OR WOOD POST IS ACCEPTABLE AT POST 1. SEE SDD14B42



PLAN VIEW



ELEVATION VIEW

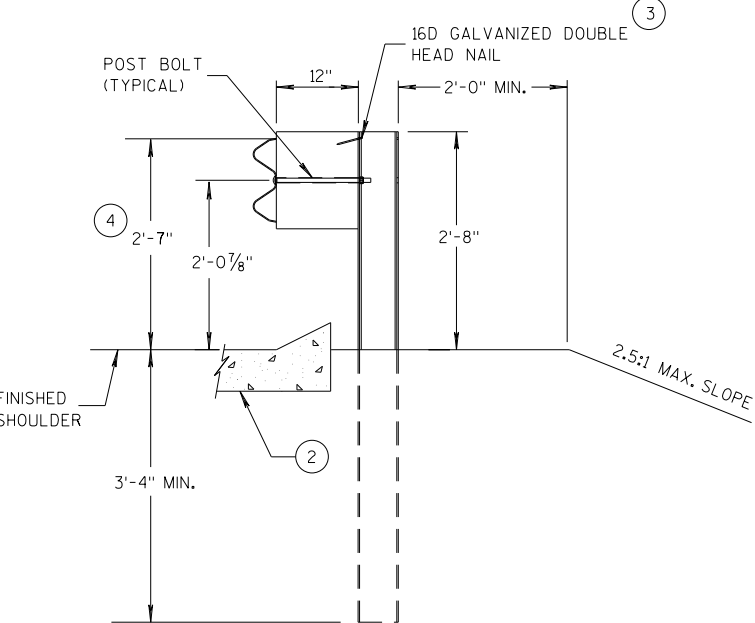
MIDWEST GUARDRAIL SYSTEM THRIE BEAM TRANSITION

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

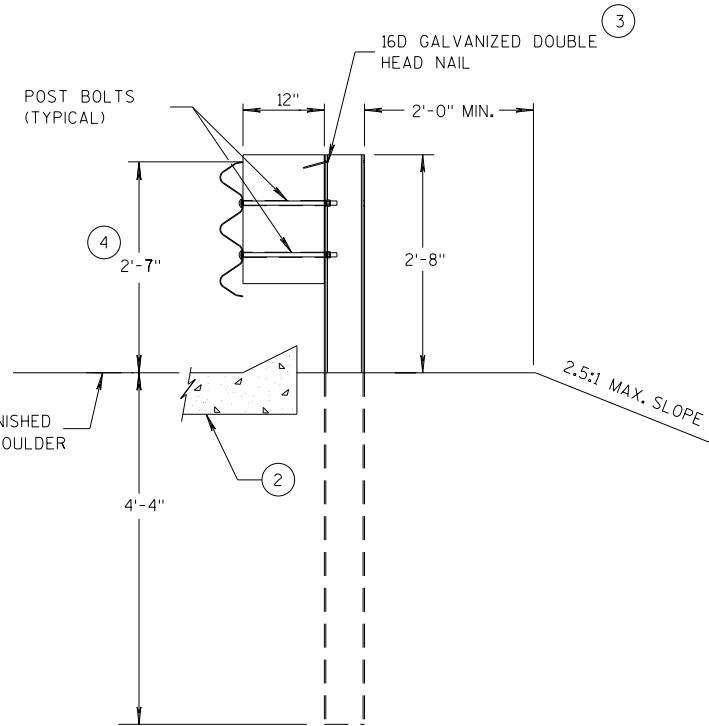
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

GENERAL NOTES

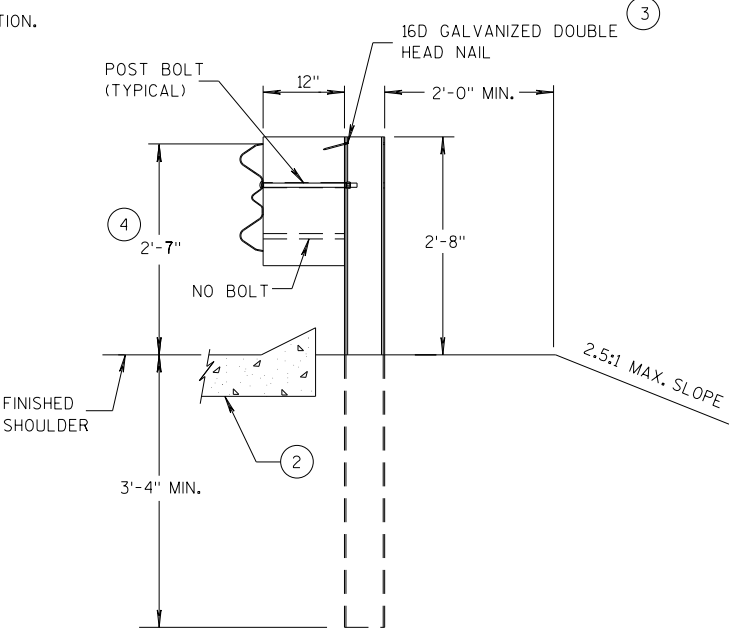
- 2 OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.
- 3 WHEN USING STEEL POSTS AND WOOD BLOCKOUTS INSTALL FOUR 10D GALVANIZED NAILS. INSTALL NAILS AT THE BACK CORNERS OF THE BLOCK AND BEND THE NAILS OVER THE FLANGE OF THE STEEL POST.
- 4 TOLERANCE FOR TOP OF W-BEAM RAIL IS $\pm 1"$.
- 13 STEEL OR WOOD POST IS ACCEPTABLE AT POST 1. SEE SDD 14B42



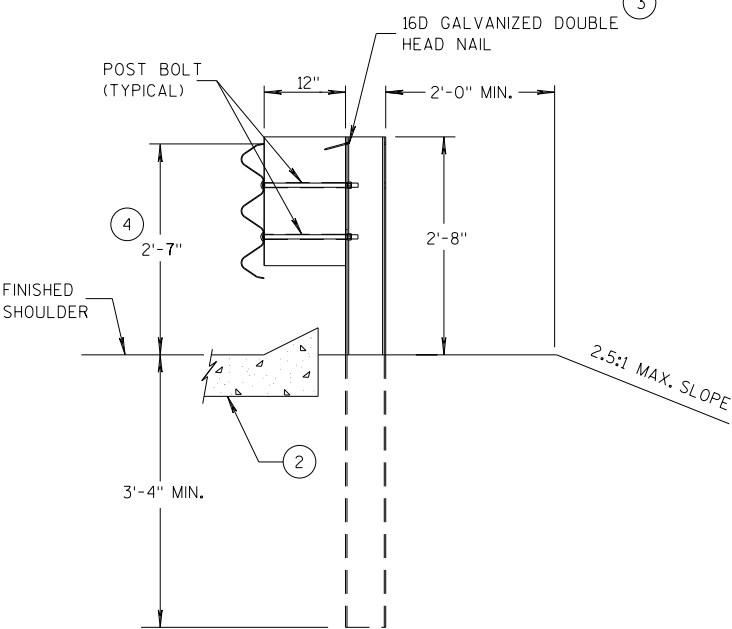
SECTION A-A
POSTS 1-5



SECTION D-D
POSTS 12-17



SECTION B-B
POST 6



SECTION C-C
POSTS 7-11

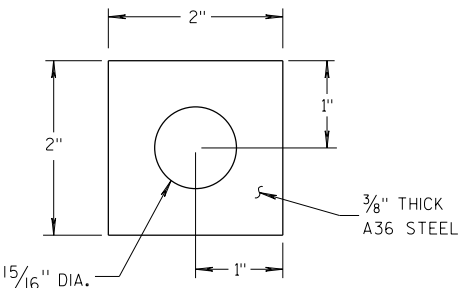
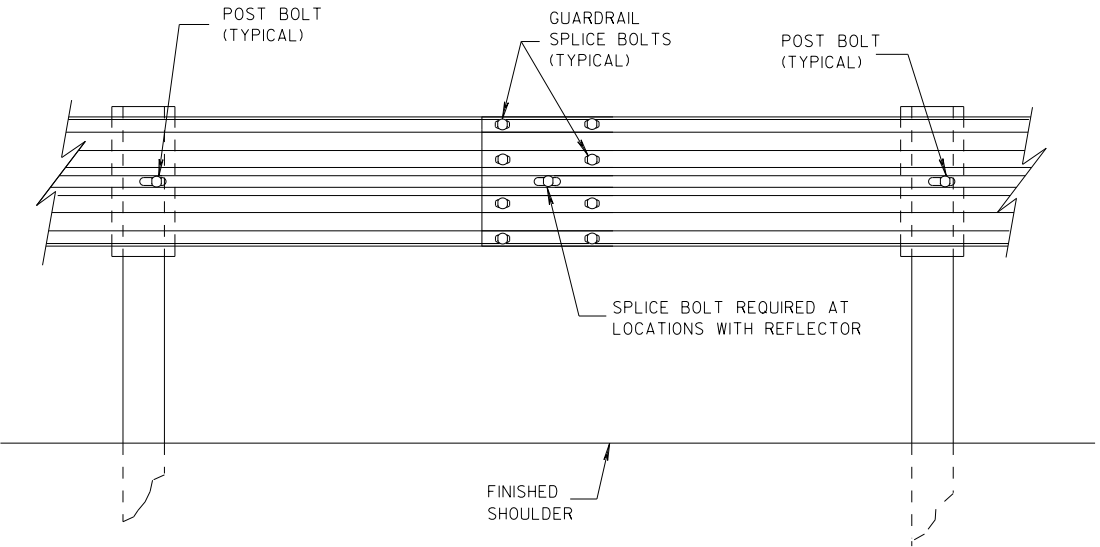
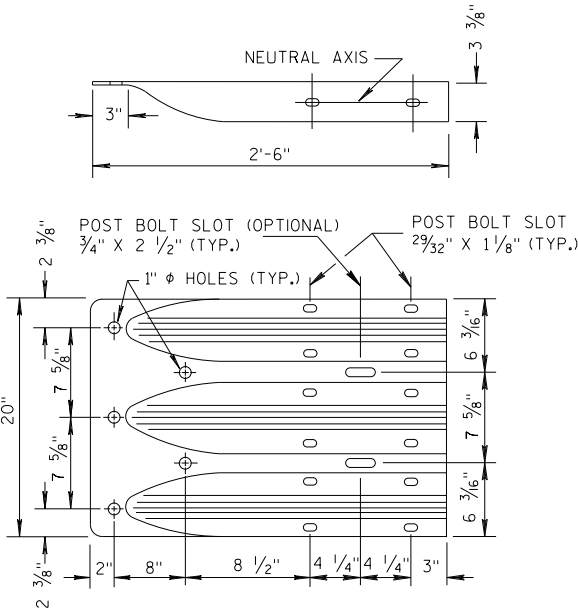


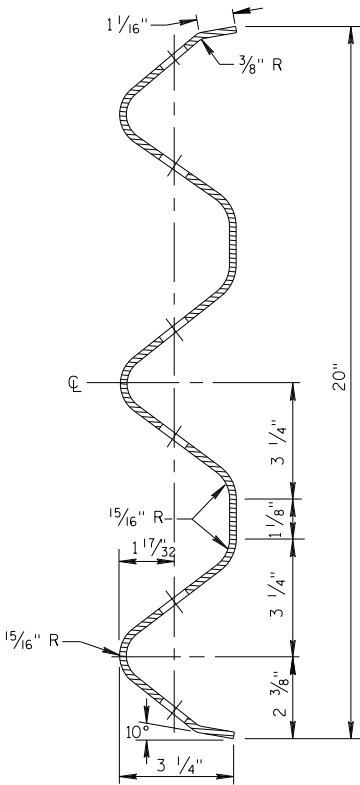
PLATE WASHER DETAIL



SPlice DETAIL



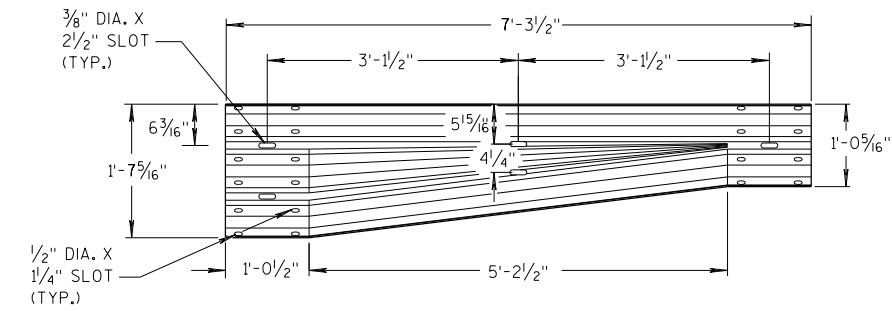
THRIE BEAM
TERMINAL CONNECTOR



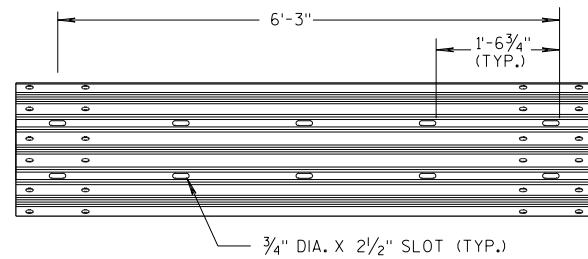
SECTION THRU THRIE
BEAM RAIL ELEMENT

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

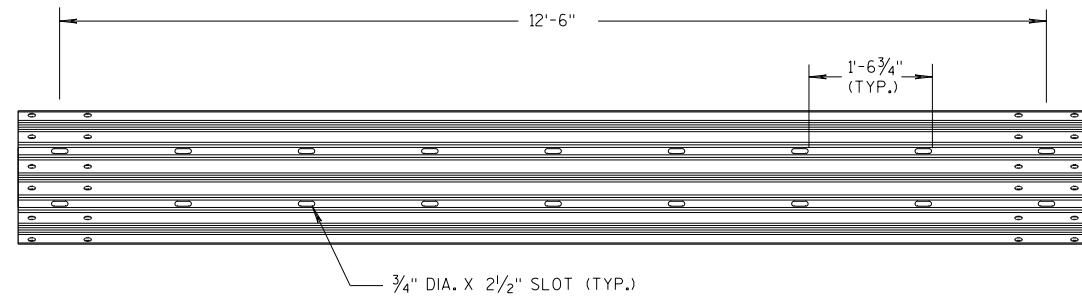
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



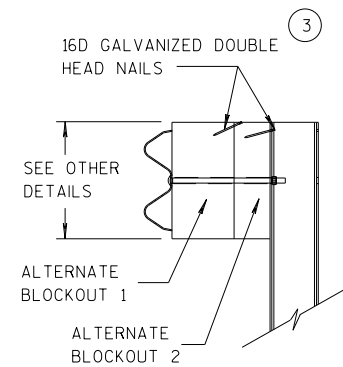
W-BEAM TO THRIE BEAM TRANSITION SECTION



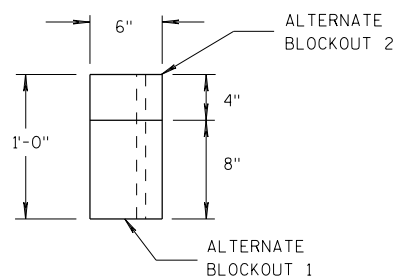
6'-3" THRIE BEAM SECTION



12'-6" THRIE BEAM SECTION

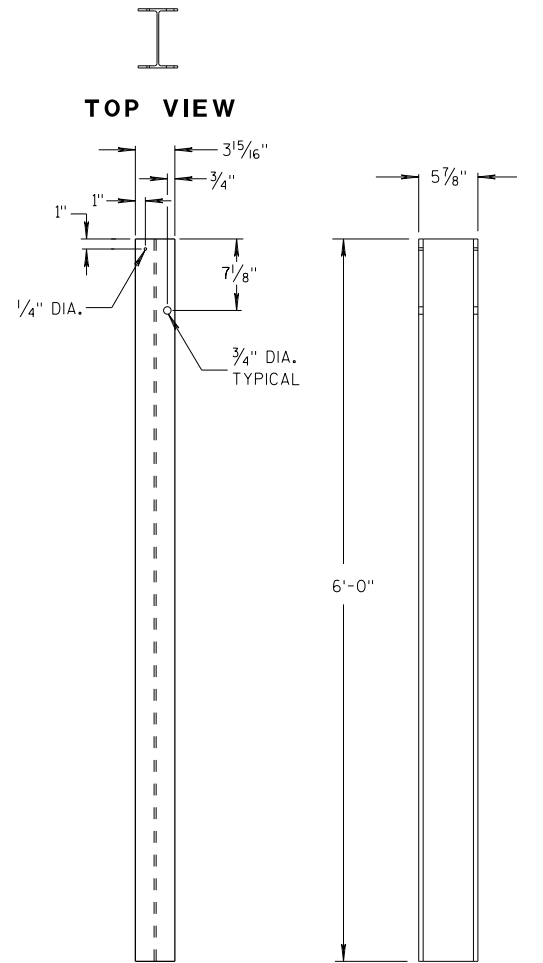


SIDE VIEW



TOP VIEW

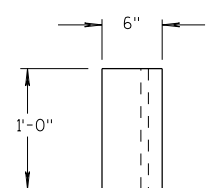
ALTERNATE WOOD BLOCKOUT DETAIL



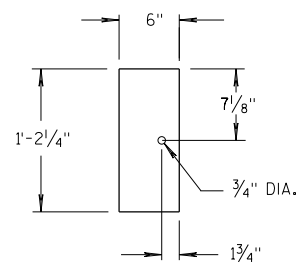
FRONT VIEW

SIDE VIEW

STEEL POSTS 1-5

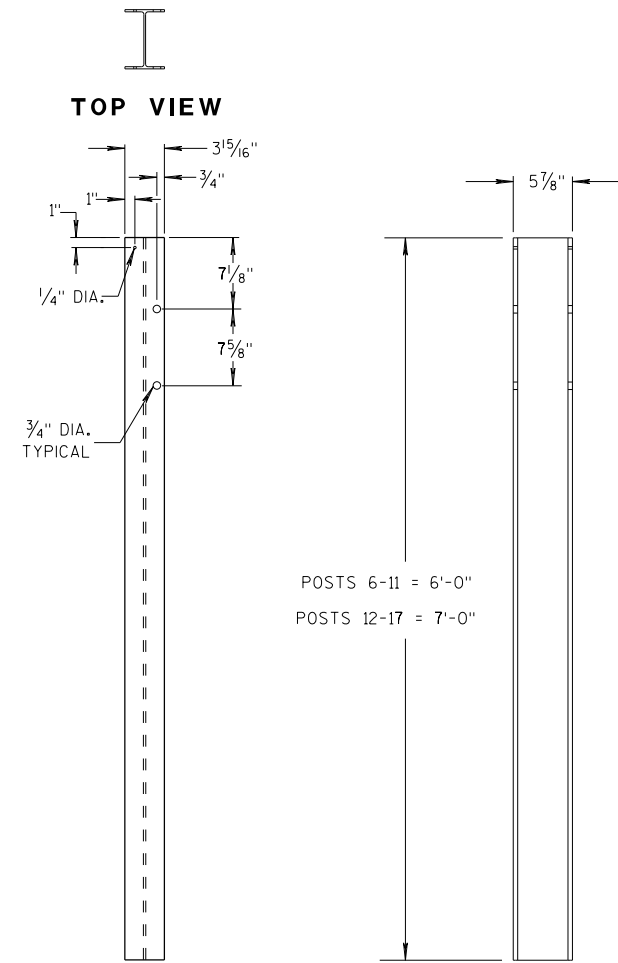


TOP VIEW



FRONT VIEW

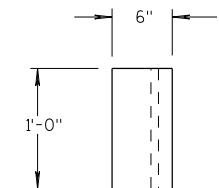
**BLOCKOUT
POSTS 1-5**



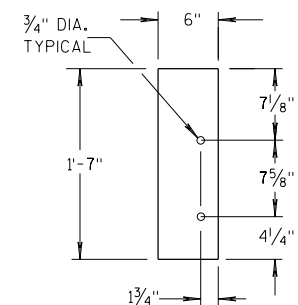
FRONT VIEW

SIDE VIEW

STEEL POSTS 6-17



TOP VIEW



FRONT VIEW

**BLOCKOUT
POSTS 6-17**

GENERAL NOTES

STEEL POSTS ARE W6X9 OR W6X8.5.

BOLT HOLES FOR POST ARE ON FRONT AND OF SIDE OF POST.

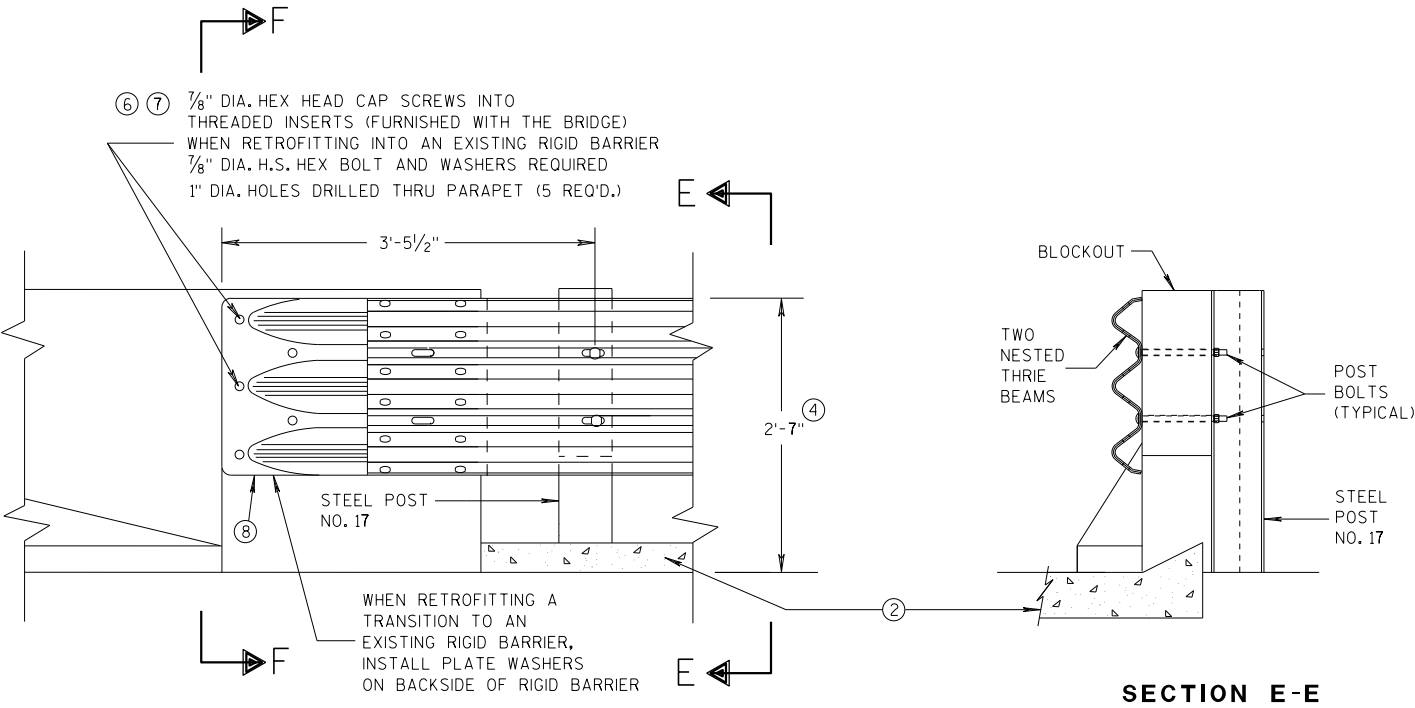
③ WHEN USING STEEL POSTS AND WOOD BLOCKOUTS INSTALL FOUR 16D GALVANIZED NAILS. INSTALL NAILS AT THE BACK CORNERS OF THE BLOCK AND BEND THE NAILS OVER THE FLANGE OF THE STEEL POST.

⑤ WOOD BLOCKS MAY BE CONSTRUCTED OUT OF 2 WOOD BLOCKS. SEE ALTERNATE WOOD BLOCK DETAIL.

⑬ STEEL OR WOOD POST IS ACCEPTABLE AT POST 1. SEE SDD 14B42.

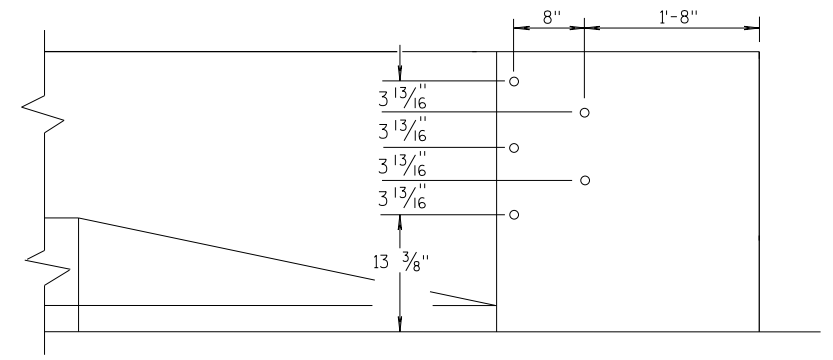
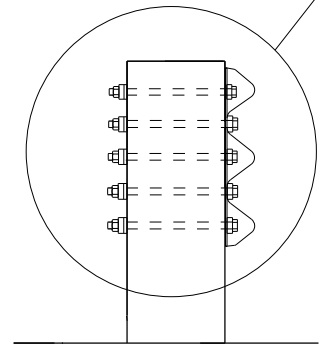
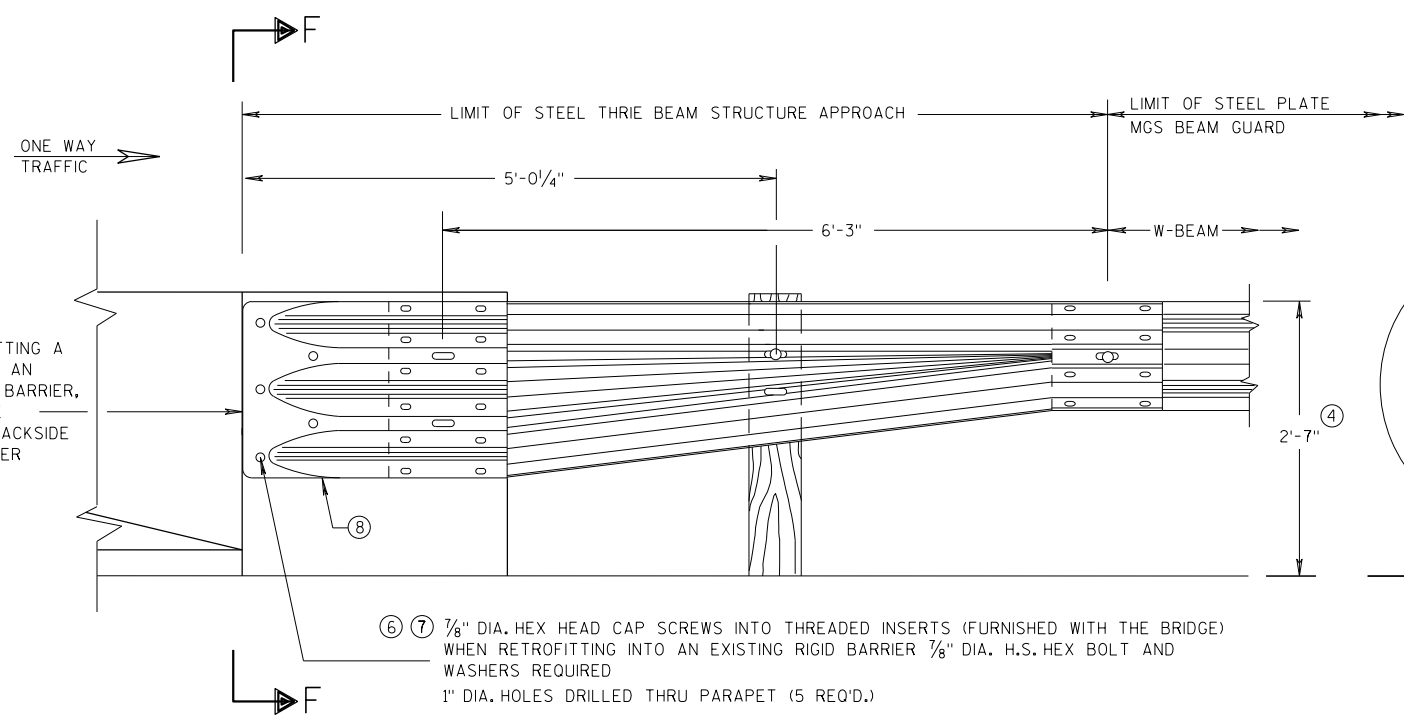
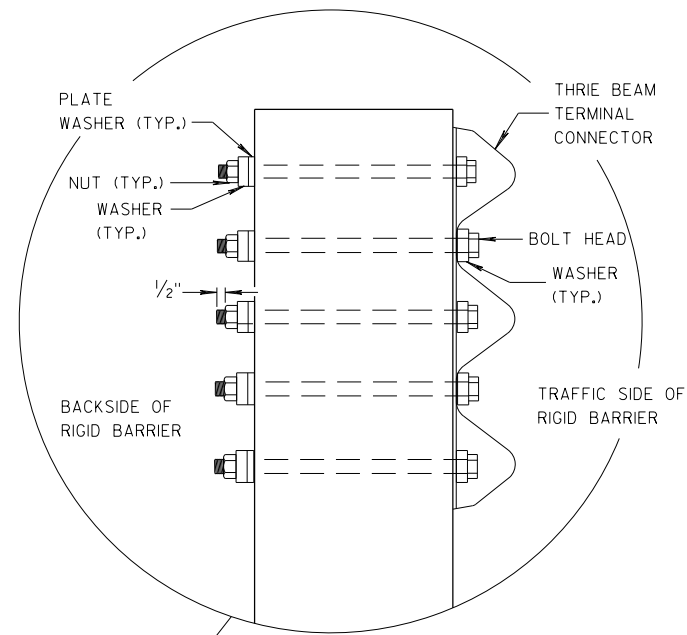
**MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



GENERAL NOTES

- THESE ARE TYPICAL CONNECTION DETAILS. ADJUST THE POSTION OF CONNECTIONS TO EXISTING BRIDGES TO FIT THE ACTUAL BRIDGE AND SITE DIMENSIONS.
- ② OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.
- ④ TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- ⑥ DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
- ⑦ BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM CONNECTOR PLATE. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X 5/32" THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.
- ⑧ THE RECESS FOR A W-BEAM CONNECTION, WHICH EXISTS ON SOME PARAPETS OF THIS TYPE, SHALL BE FILLED WITH A TREATED TIMBER BLOCKOUT. BLOCKOUT SIZE IS 1'-6" X 2'-0" X 3 1/2".

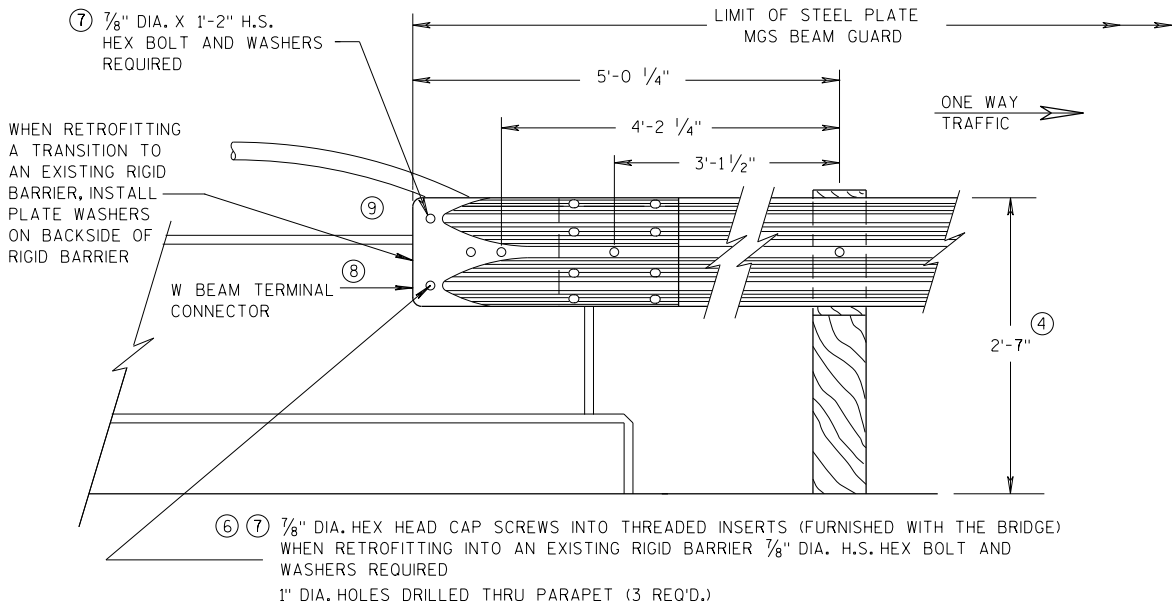


MIDWEST GUARDRAIL SYSTEM THRIE BEAM TRANSITION (MGS)	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
APPROVED 07/2018 DATE	/S/ Rodney Taylor ROADWAY STANDARDS DEVELOPMENT UNIT SUPERVISOR
FHWA	

GENERAL NOTES

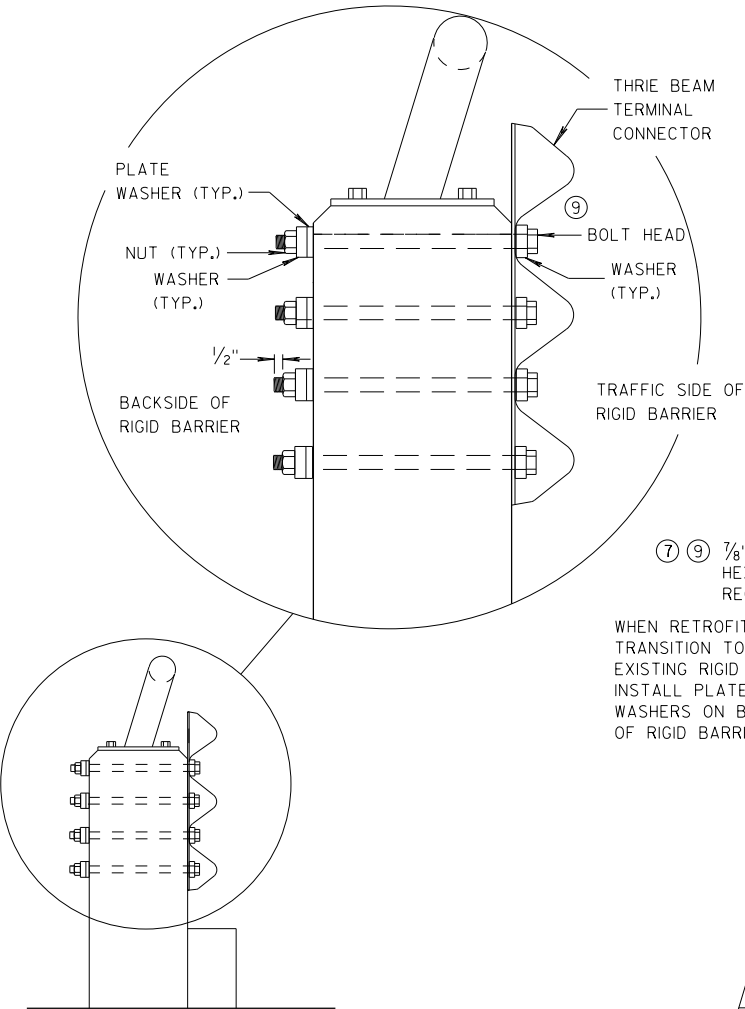
THESE ARE TYPICAL CONNECTION DETAILS. ADJUST THE POSTION OF CONNECTIONS TO EXISTING BRIDGES TO FIT THE ACTUAL BRIDGE AND SITE DIMENSIONS.

- ②
- OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.
- ④
- TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- ⑥
- DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
- ⑦
- BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM CONNECTOR PLATE. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X 5/32" THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.
- ⑧
- THE RECESS FOR A W-BEAM CONNECTION, WHICH EXISTS ON SOME PARAPETS OF THIS TYPE, SHALL BE FILLED WITH A TREATED TIMBER BLOCKOUT. BLOCKOUT SIZE IS 1'-6" X 2'-0" X 3 1/2".
- ⑨
- BOLT, NUT AND WASHERS NOT REQUIRED FOR THIS LOCATION WHEN RETROFITTING AN EXISTING PAPAPET AND THE HOLE IS EITHER ABOVE PARAPET OR WITHIN 4 INCHES OF THE EDGE OF PARAPET.

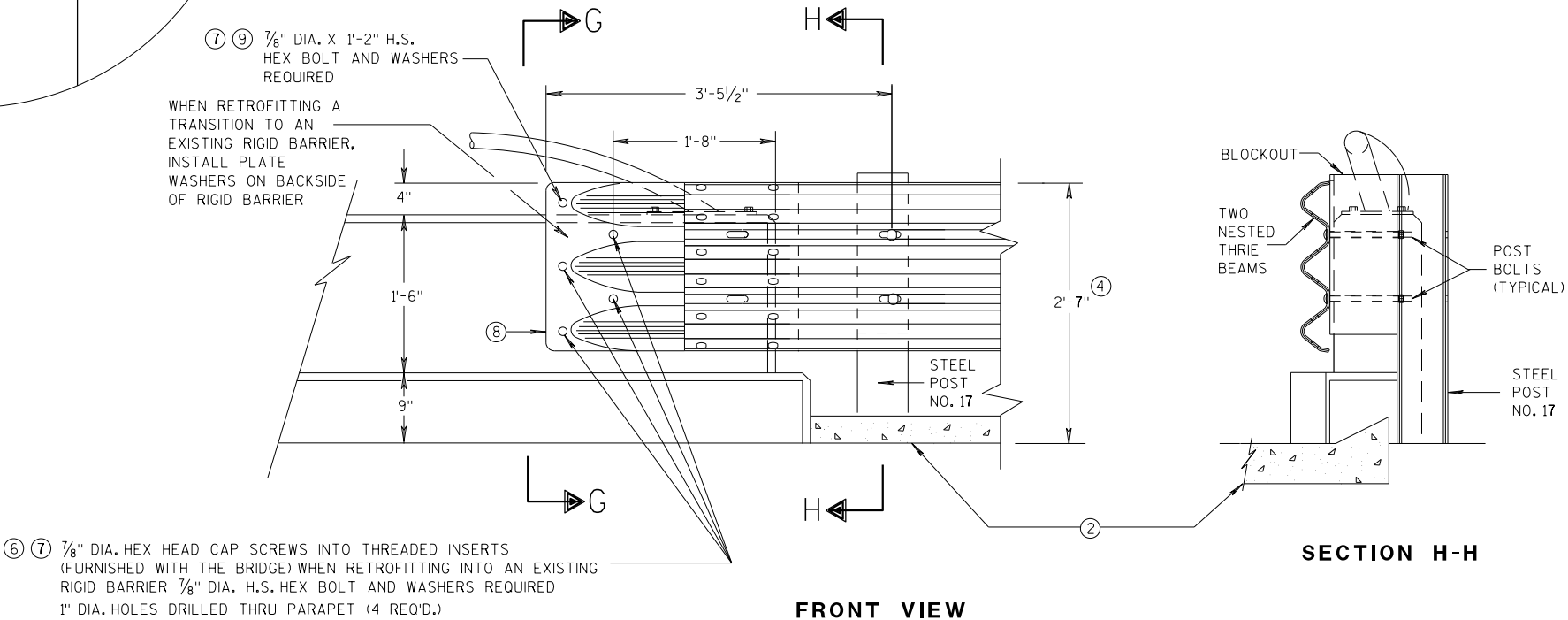


FRONT VIEW

W BEAM CONNECTION TO VERTICAL FACE PARAPET
(USE ONLY ON THE TRAFFIC EXIT END OF ONE WAY BRIDGES)

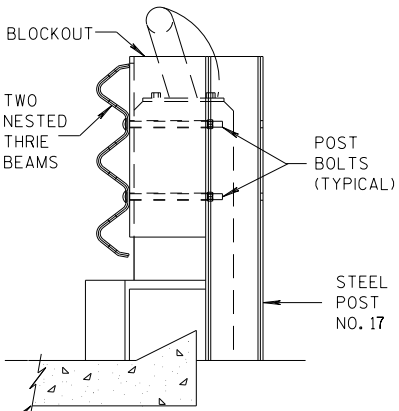


SECTION G-G



FRONT VIEW

THRIE BEAM CONNECTION TO VERTICAL FACED PARAPETS

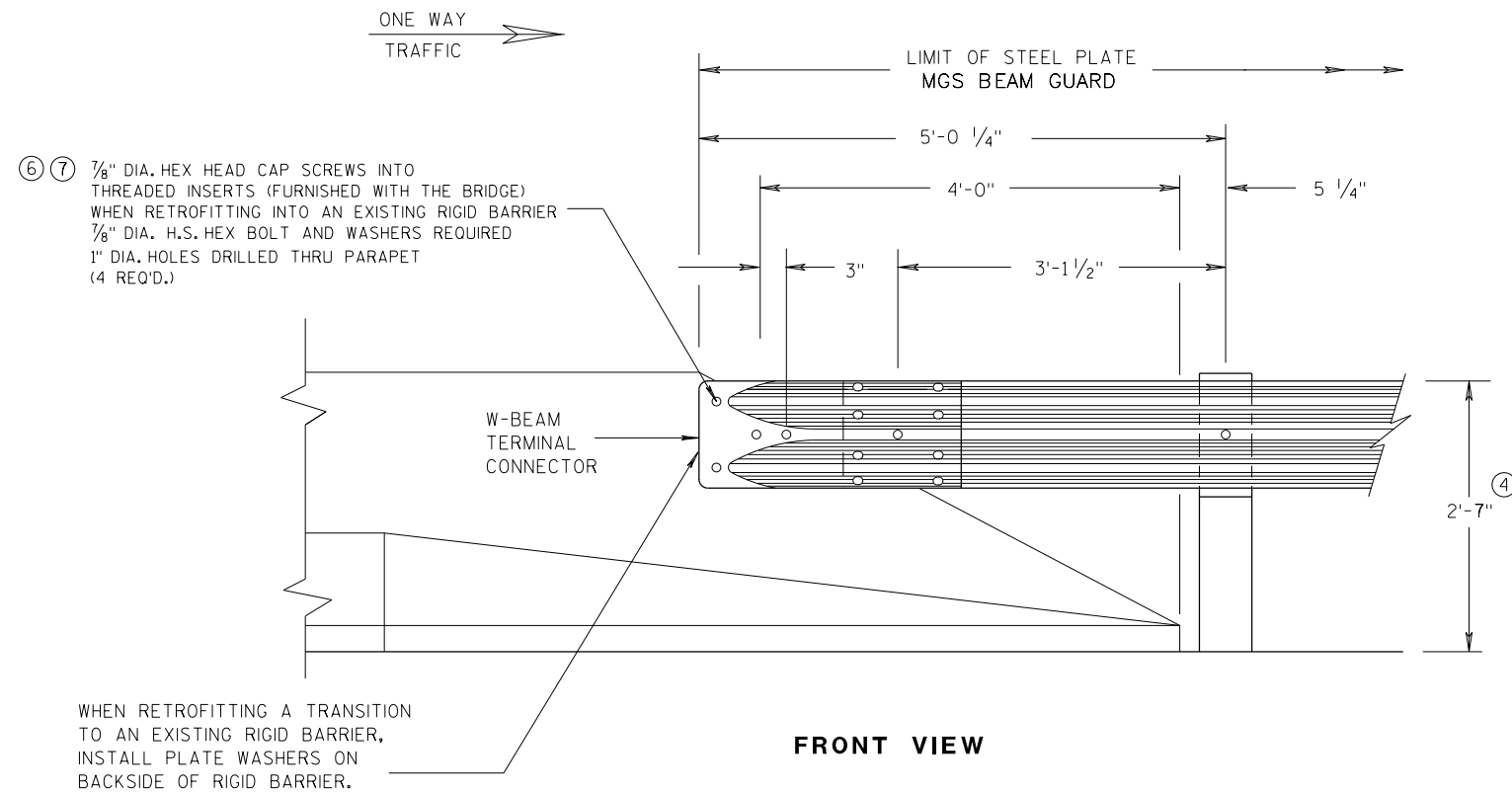


SECTION H-H

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

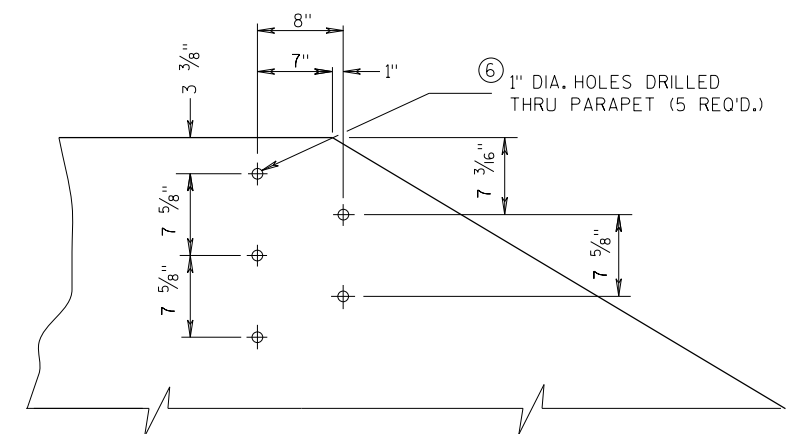
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UNIT SUPERVISOR



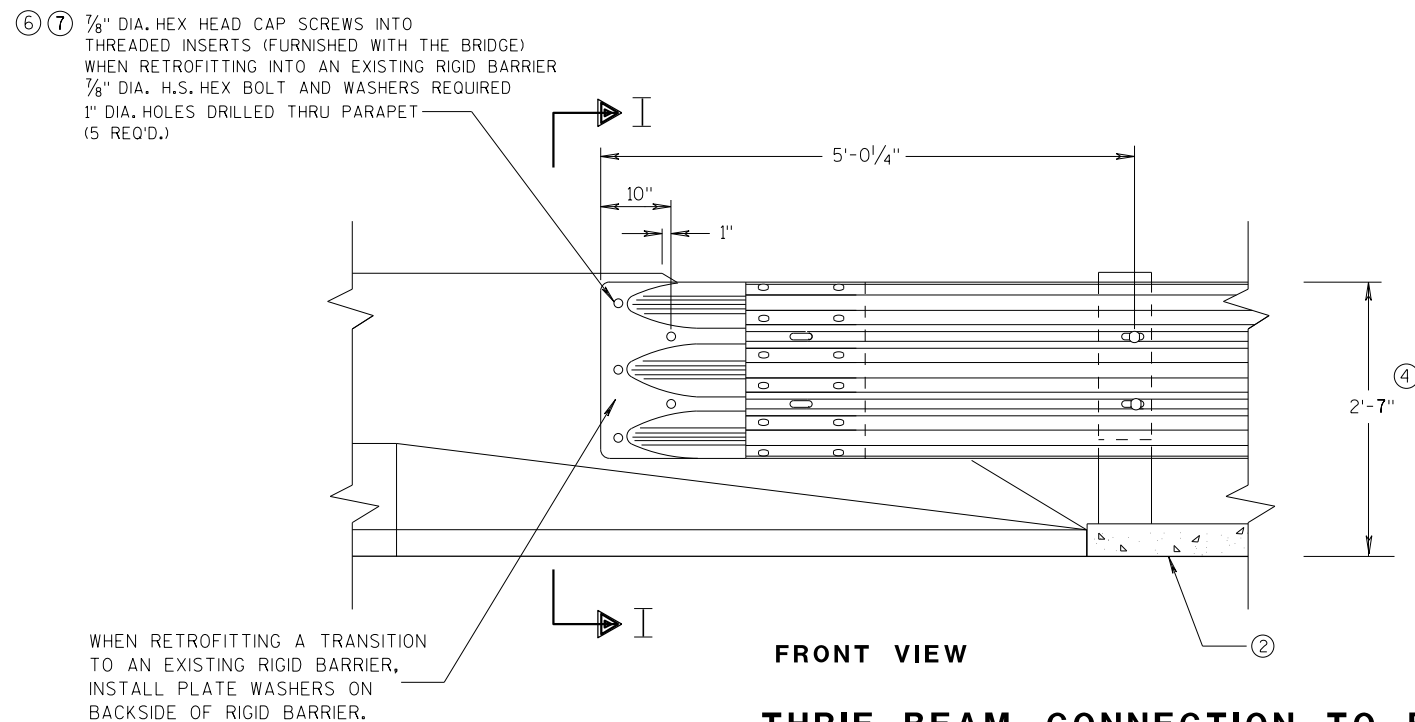
**W BEAM CONNECTION TO
PARAPETS WITH SLOPED ENDS**
(USE ONLY AT TRAFFIC EXIT END OF ONE WAY BRIDGE)

GENERAL NOTES

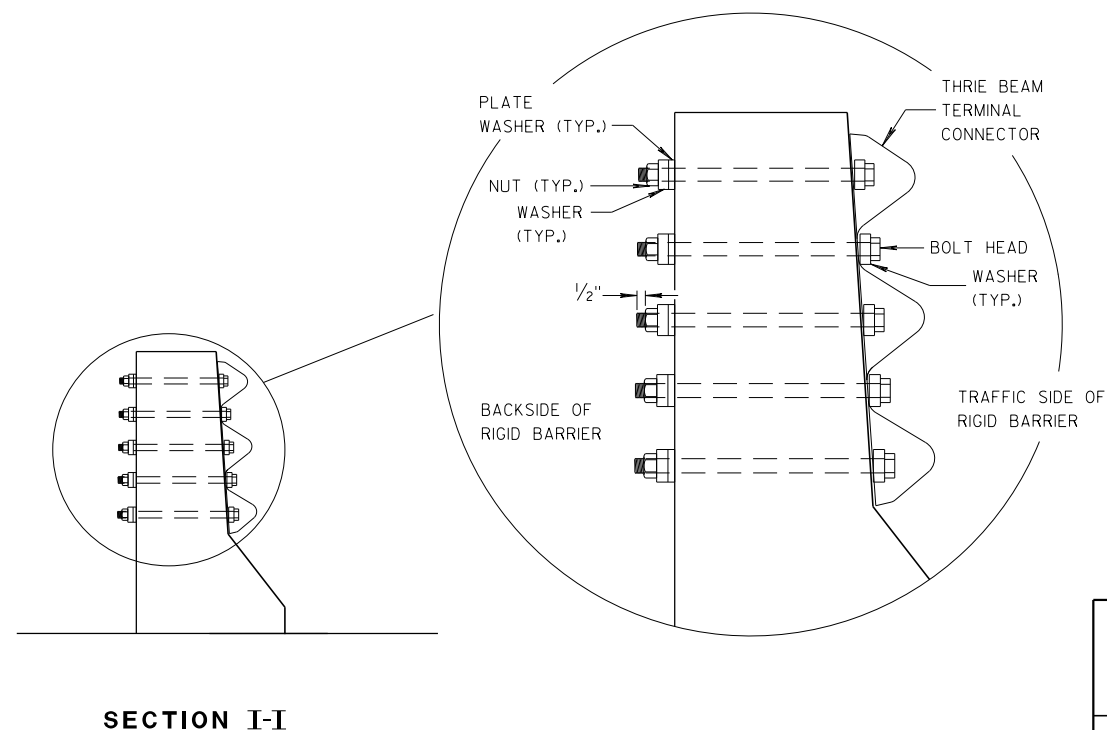
- ② OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.
- ④ TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- ⑥ DRILLING BOLT HOLES THROUGH THE PARAPET, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.
- ⑦ BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM CONNECTOR PLATE. BOLTS THAT EXTEND THROUGH THE PARAPET AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X 5/32" THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.



**DRILL HOLE LOCATION AND PATTERN
FOR THRIE BEAM CONNECTION**



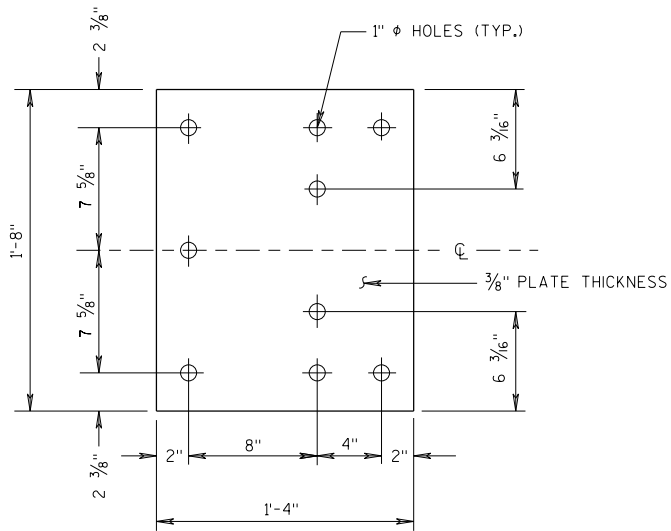
**THRIE BEAM CONNECTION TO BRIDGE
PARAPETS WITH SLOPED ENDS**



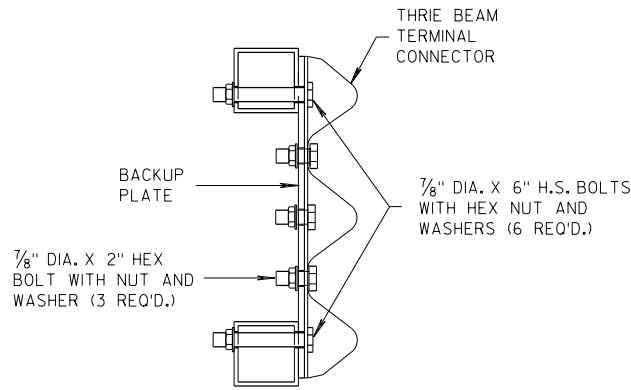
**MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)**

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

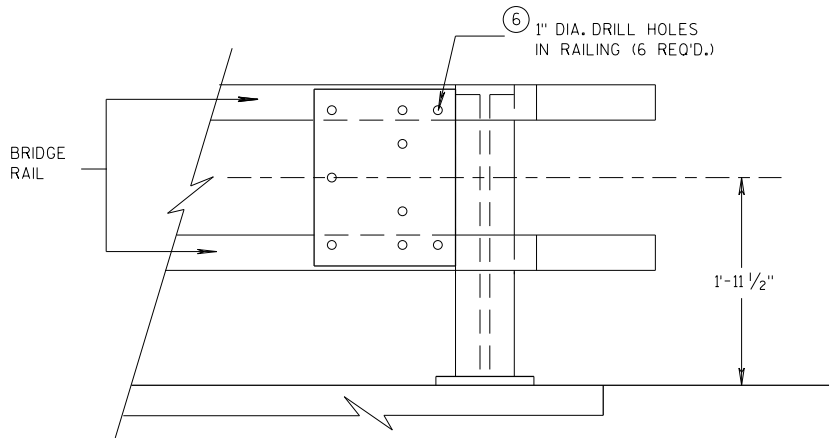
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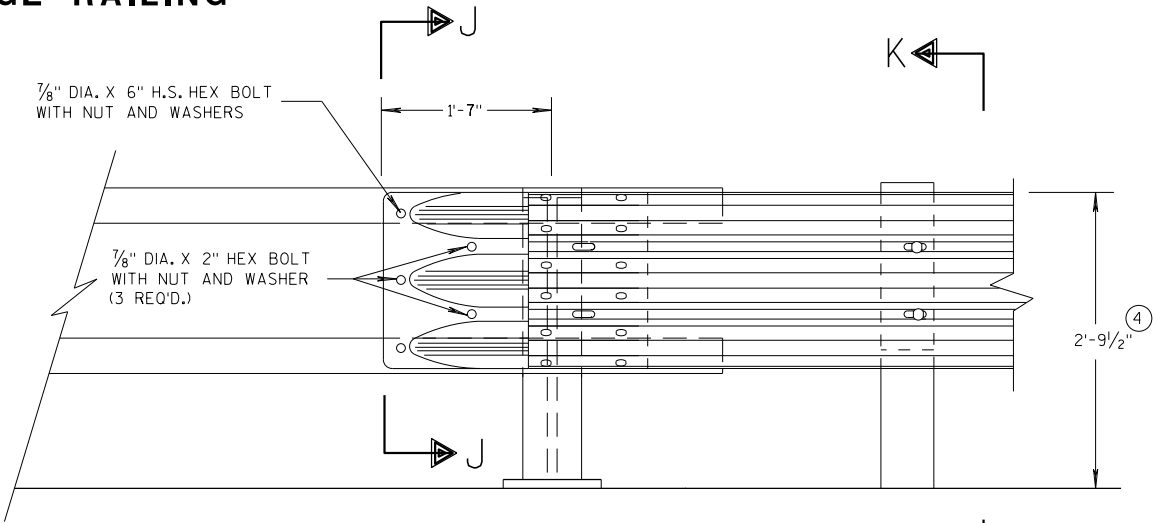
BACK-UP PLATE DETAIL



SECTION J-J

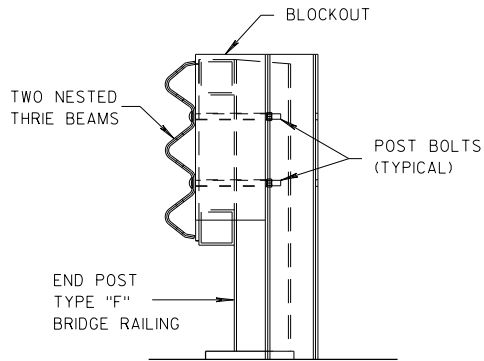


BACK-UP PLATE MOUNTING ONTO BRIDGE RAILING



FRONT VIEW

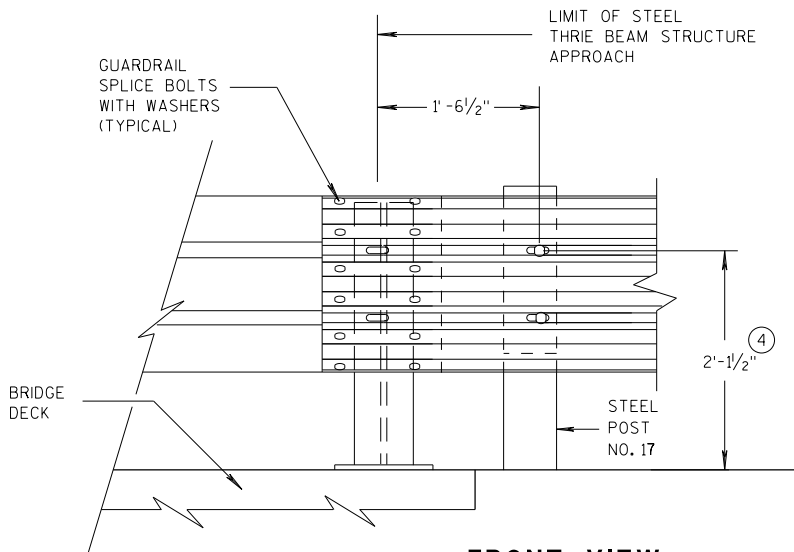
THRIE BEAM CONNECTION TO TUBULAR RAILING TYPE "F"



SECTION K-K

GENERAL NOTES

- ④ TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- ⑥ DRILLING HOLES THROUGH THE PAPER, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.



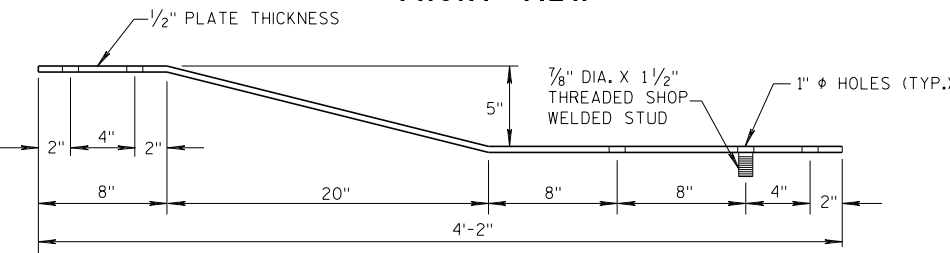
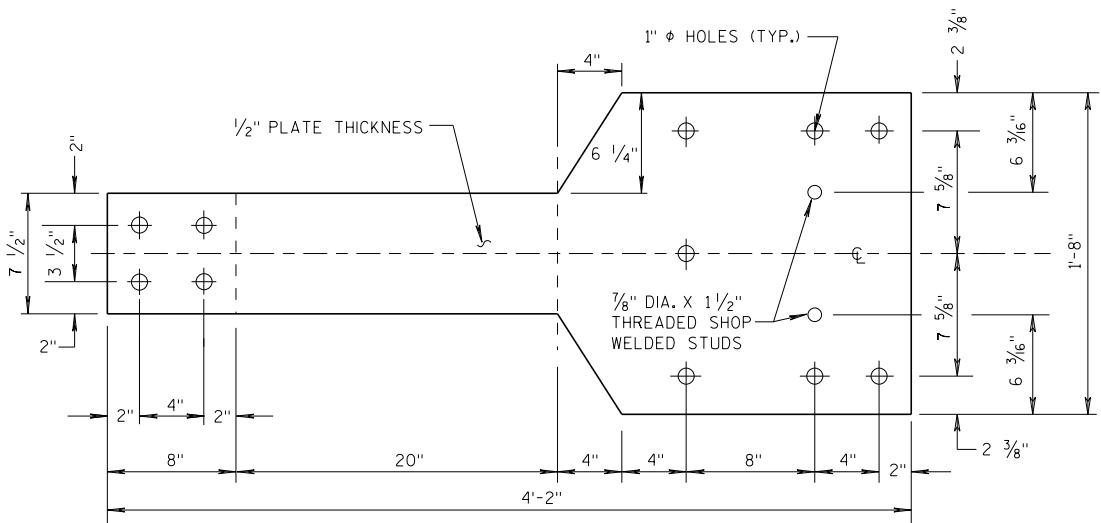
FRONT VIEW

THRIE BEAM CONNECTION TO STEEL RAILING TYPE "W"

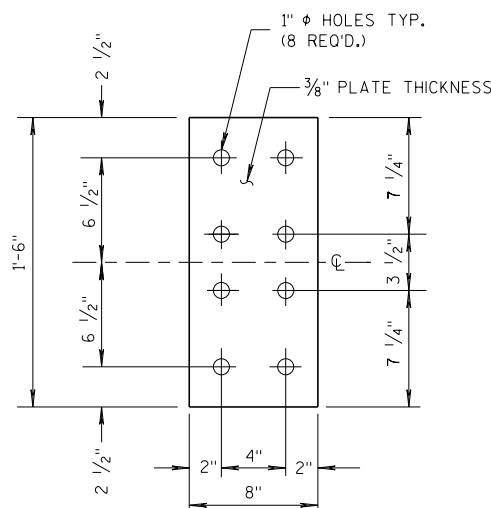
MIDWEST GUARDRAIL SYSTEM THRIE BEAM TRANSITION (MGS)	
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION	
APPROVED 07/2018 DATE	/S/ Rodney Taylor ROADWAY STANDARDS DEVELOPMENT UNIT SUPERVISOR
FHWA	

GENERAL NOTES

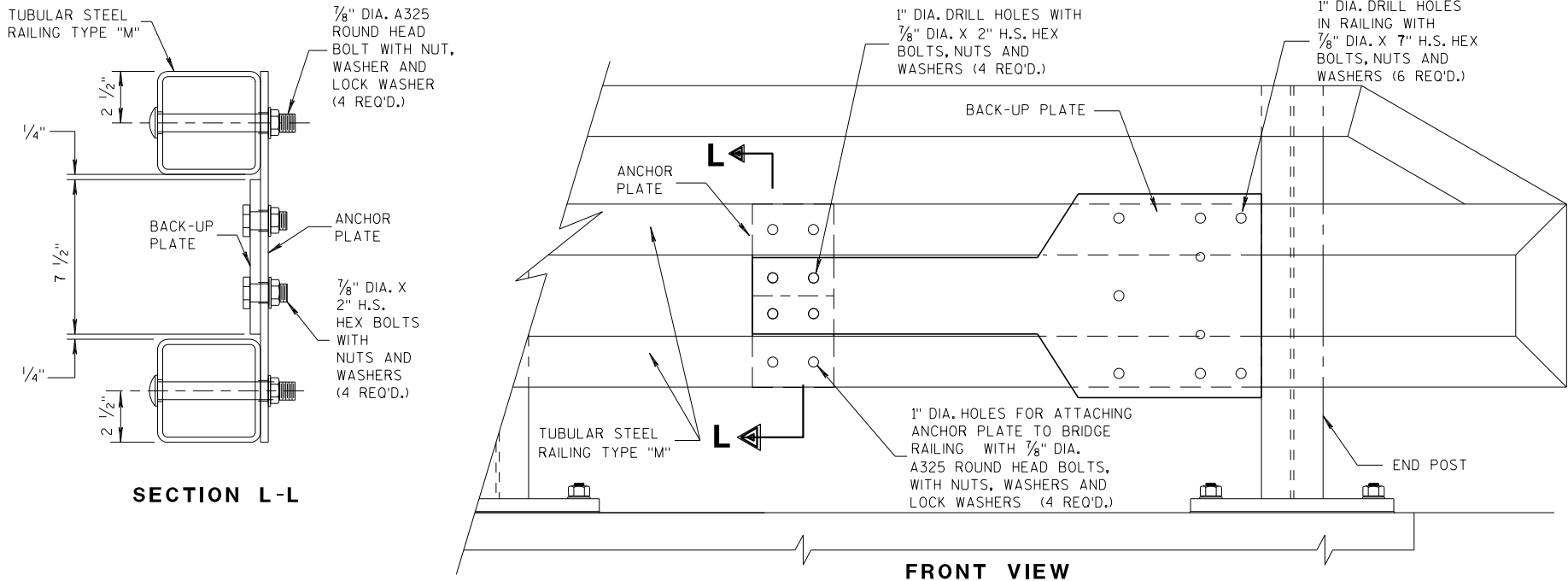
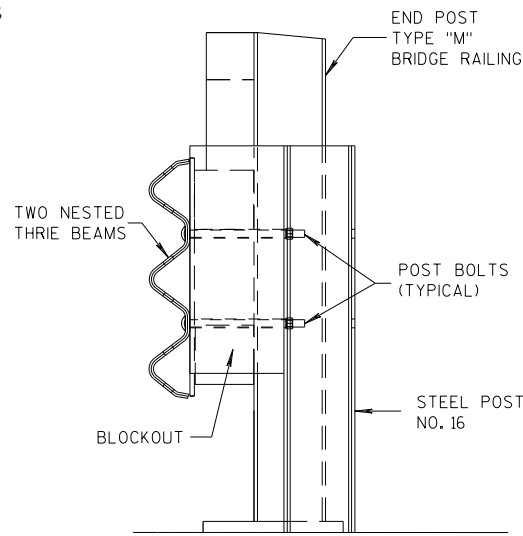
④ TOLERANCE FOR TOP OF W-BEAM RAIL IS $\pm 1"$.



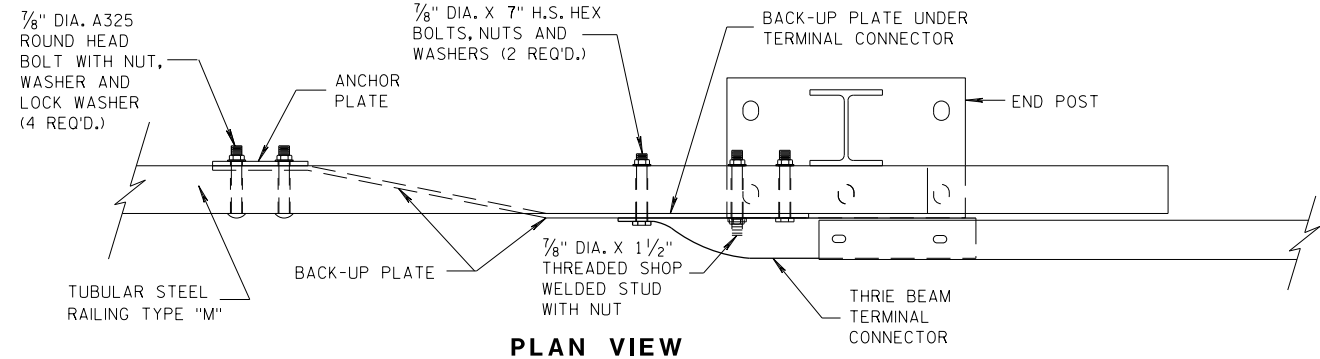
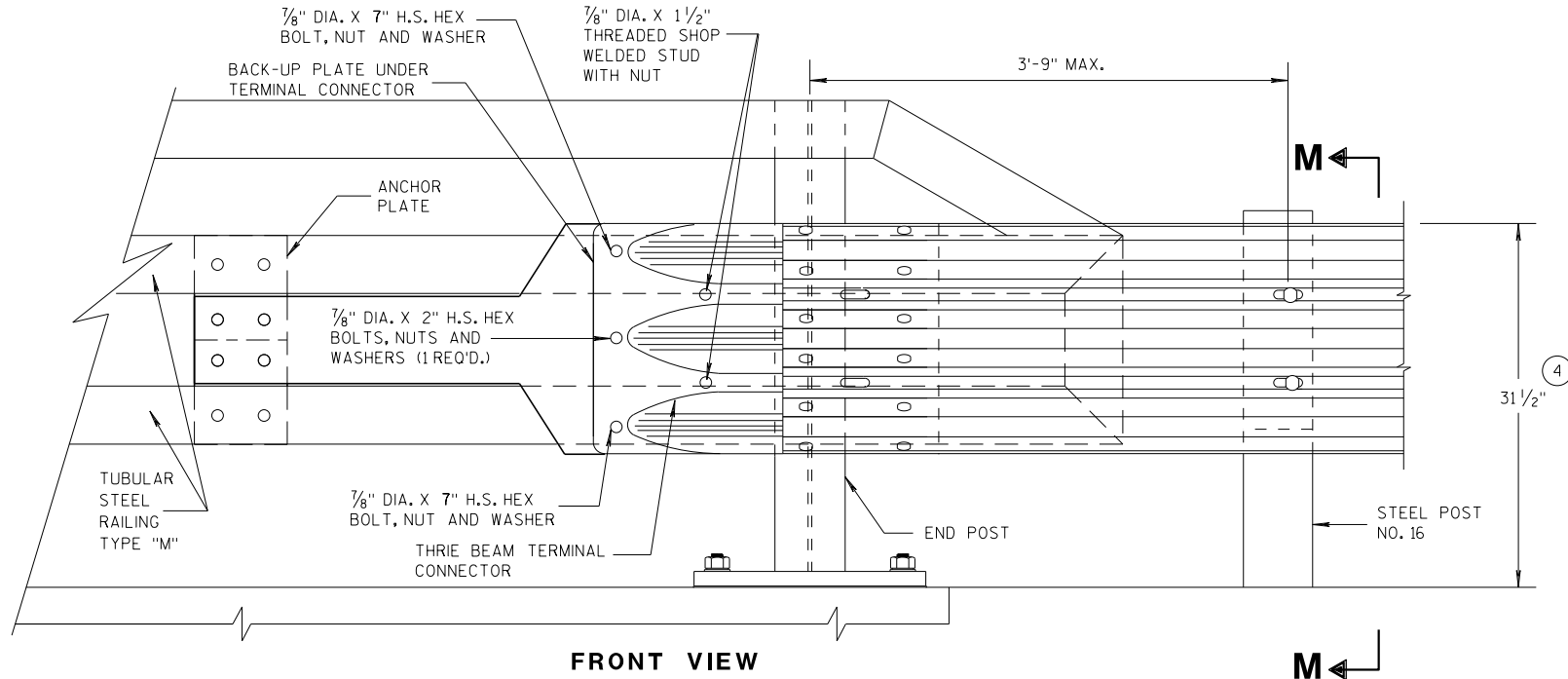
BACK-UP PLATE DETAIL, TYPE "M"



ANCHOR PLATE DETAIL, TYPE "M"



ANCHOR AND BACK-UP PLATE MOUNTING TO BRIDGE RAILING, TYPE "M"

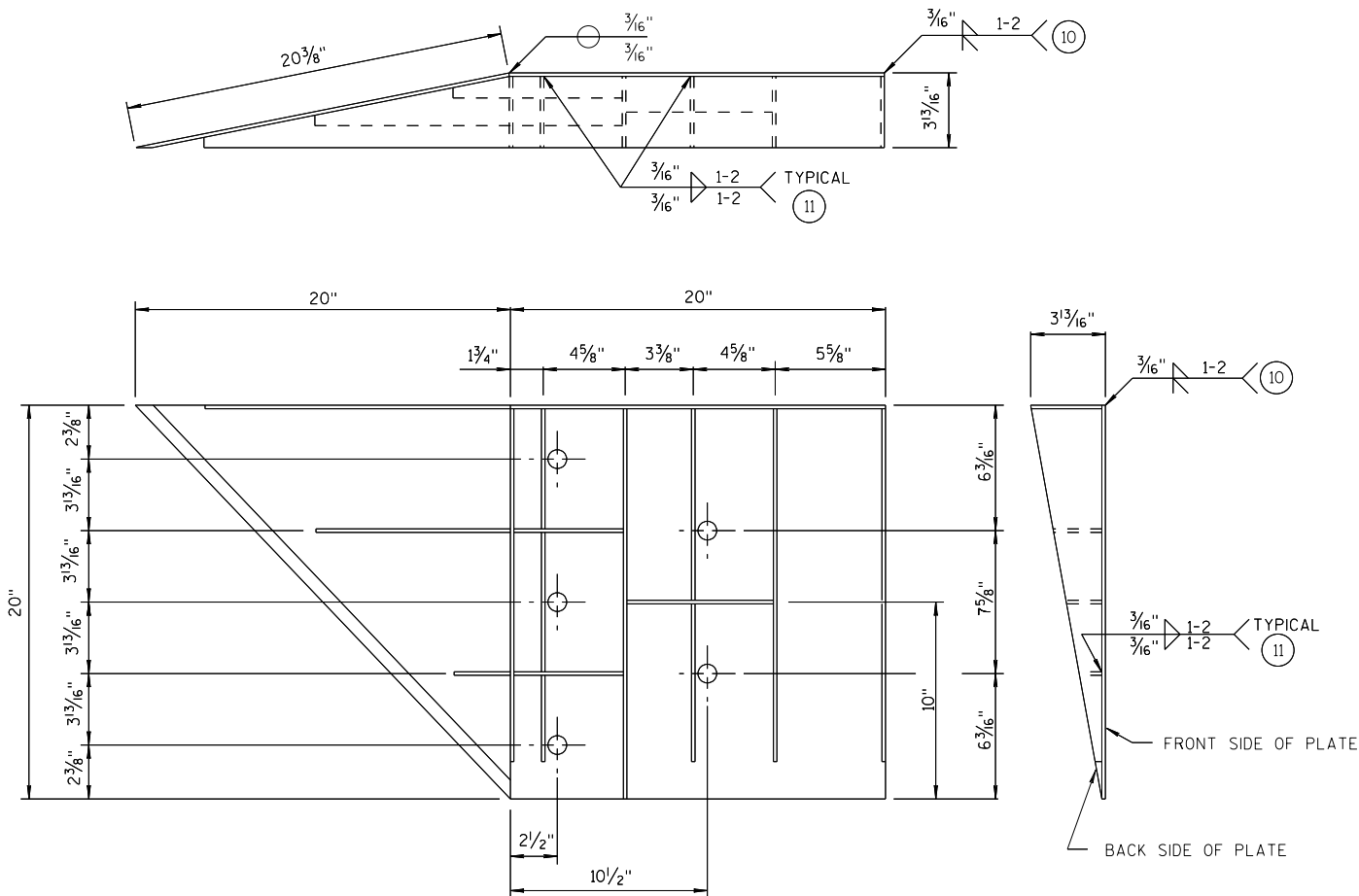


THRIE BEAM CONNECTION TO TUBULAR RAILING, TYPE "M"

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

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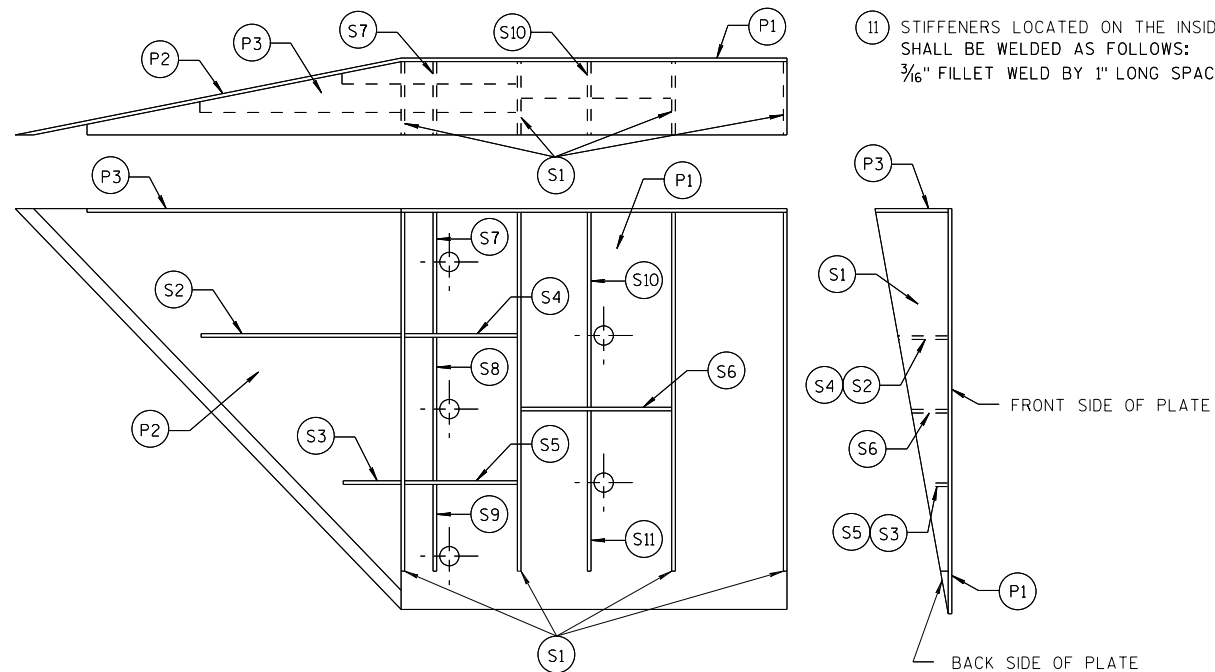


WELDING INSTRUCTION
(VIEWED FROM BACK SIDE OF PLATE)

SINGLE SLOPE CONNECTION PLATE

CONNECTOR PLATE DIMENSION (PER ASSEMBLY)				
PLATE	QUANTITY	SHAPE	SIZE (A x B x C x D)	THICKNESS
P1	1		20" x 20"	3/16"
P2	1		20" x 20" x 28 3/16"	3/16"
P3	1		39" x 3 5/8" x 20" x 19 5/16"	3/16"
S1	4		18 7/16" x 3 5/8" x 18 3/4"	1/4"
S2	1		10 1/4" x 2 1/16" x 10 3/8" x 1/2"	1/4"
S3	1		3" x 1 1/16" x 3 1/8" x 1/2"	1/4"
S4	1		6 1/8" x 2 7/16"	1/4"
S5	1		6 1/8" x 1 1/16"	1/4"
S6	1		7 3/4" x 1 3/4"	1/4"
S7	1		2 3/16" x 6" x 3 5/8" x 5 7/8"	1/4"
S8	1		1 5/32" x 7 1/2" x 2 1/2" x 7 3/8"	1/4"
S9	1		6 1/16" x 6 3/16" x 1 3/32"	1/4"
S10	1		1 7/8" x 9 7/8" x 3 5/8" x 9 11/16"	1/4"
S11	1		8 1/2" x 8 3/4" x 1 3/16"	1/4"

PLATE AND STIFFENER IDENTIFICATION
(VIEWED FROM BACK SIDE OF PLATE)



GENERAL NOTES

- COVER PLATE PANELS ARE 3/16" THICK.
- ALL STIFFENERS ARE 1/4" THICK.
- CONNECTOR PLATE SHALL BE FABRICATED FROM ASTM GRADE A36 STEEL AND GALVANIZED.
- FOR GALVANIZED REQUIREMENTS, SEE SECTION 614 OF THE STANDARD SPECIFICATIONS.
- ALL HOLE DIAMETERS SHALL BE 1".
- FOR OPPOSITE SIDE INSTALLATION MIRROR DRAWINGS.

- 10 STIFFENERS LOCATED AT THE OUTSIDE EDGES OF THE COVER PLATES SHALL BE WELDED AS FOLLOWS:
SINGLE BEVEL GROOVE WELD ON EXTERNAL SIDES AND 3/16" FILLET WELD BY 1" LONG SPACED AT 2" ON INTERNAL SIDES.
- 11 STIFFENERS LOCATED ON THE INSIDE OF THE COVER PLATE SHALL BE WELDED AS FOLLOWS:
3/16" FILLET WELD BY 1" LONG SPACED AT 2".

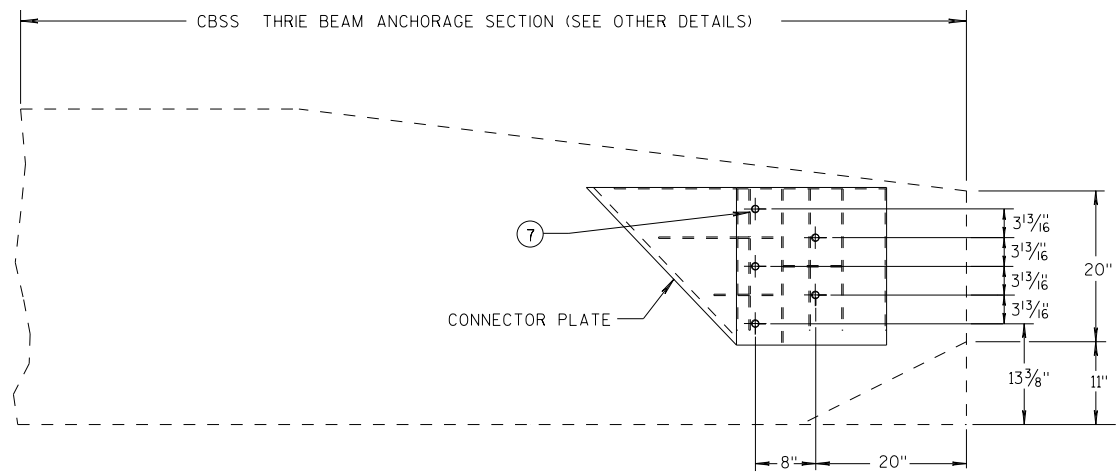
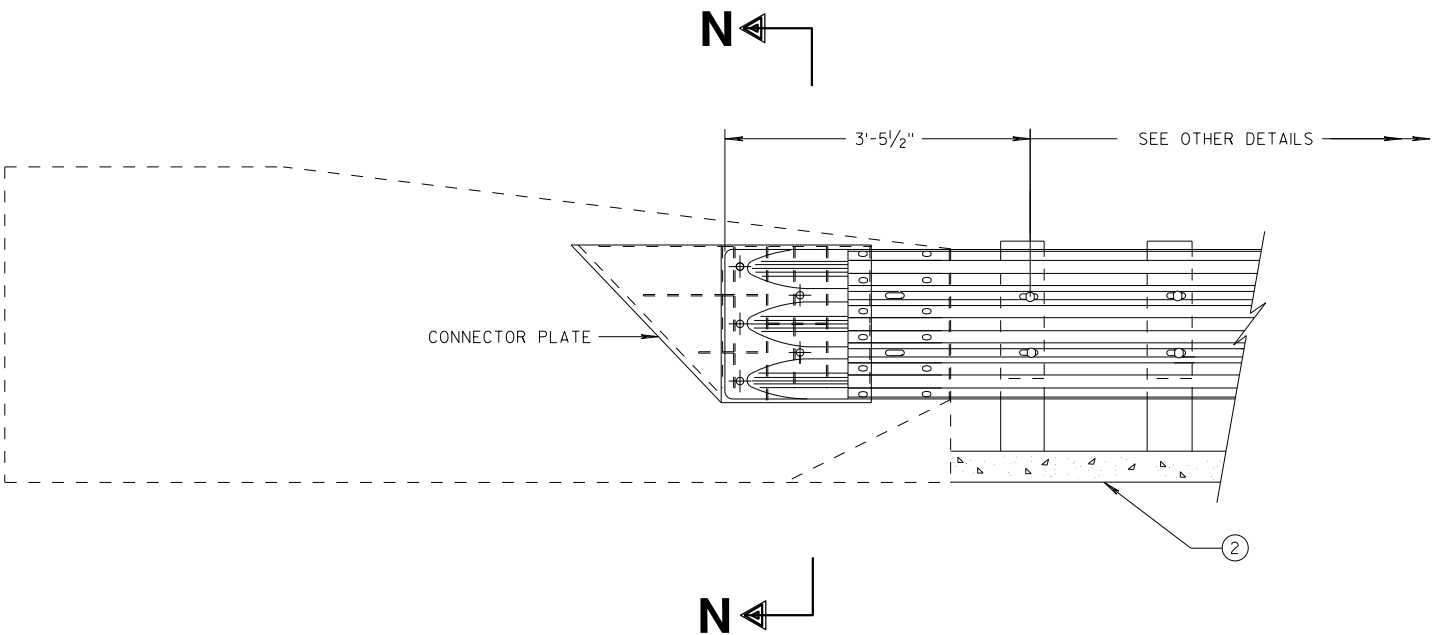
MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

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7/2018
DATE
FHWA

/S/ Rodney Taylor
ROADWAY STANDARDS DEVELOPMENT
UNIT SUPERVISOR

THRIE BEAM CONNECTION TO SINGLE SLOPE BARRIER



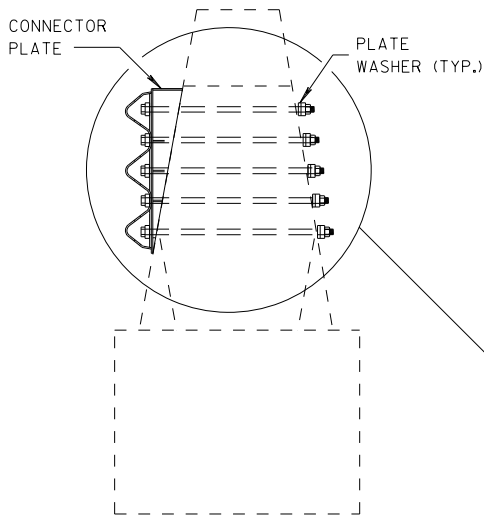
SINGLE SLOPE CONNECTION PLATE PLACEMENT

GENERAL NOTES

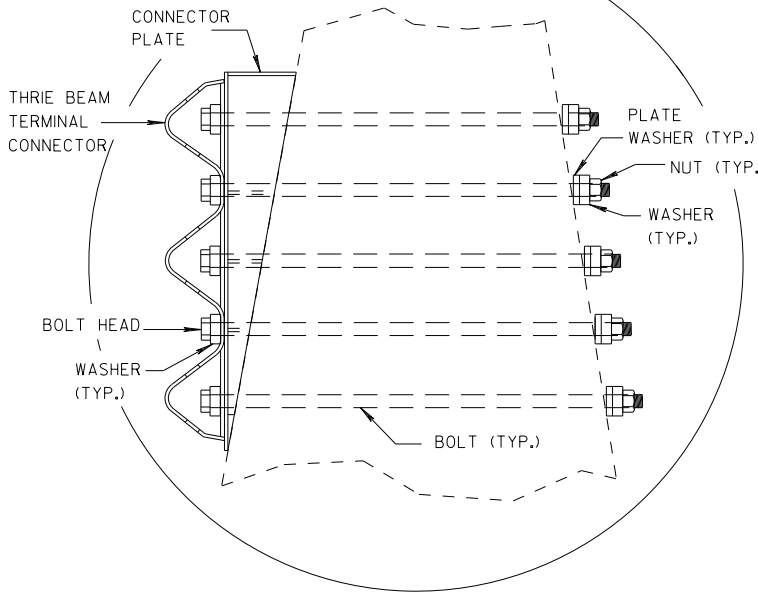
CONNECTOR PLATE, DRILLING BOLT HOLES THROUGH THE BARRIER, BOLTS, NUTS, WASHERS AND REPAIRING DAMAGED CONCRETE ARE INCIDENTAL TO THE CONTRACT.

② OPTIONAL CURB AND GUTTER OR DRAINAGE FEATURE SEE PLAN FOR INFORMATION.

⑦ BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM CONNECTION PLATE. BOLTS THAT EXTEND THROUGH THE BARRIER AND OUT THE BACK FACE REQUIRE A HARDENED ROUND STEEL WASHER THAT IS 2" O.D. X 5/32" THICK AND ONE PLATE WASHER. REPAIR ANY DAMAGED CONCRETE FROM BOLT INSTALLATION.



SECTION N-N



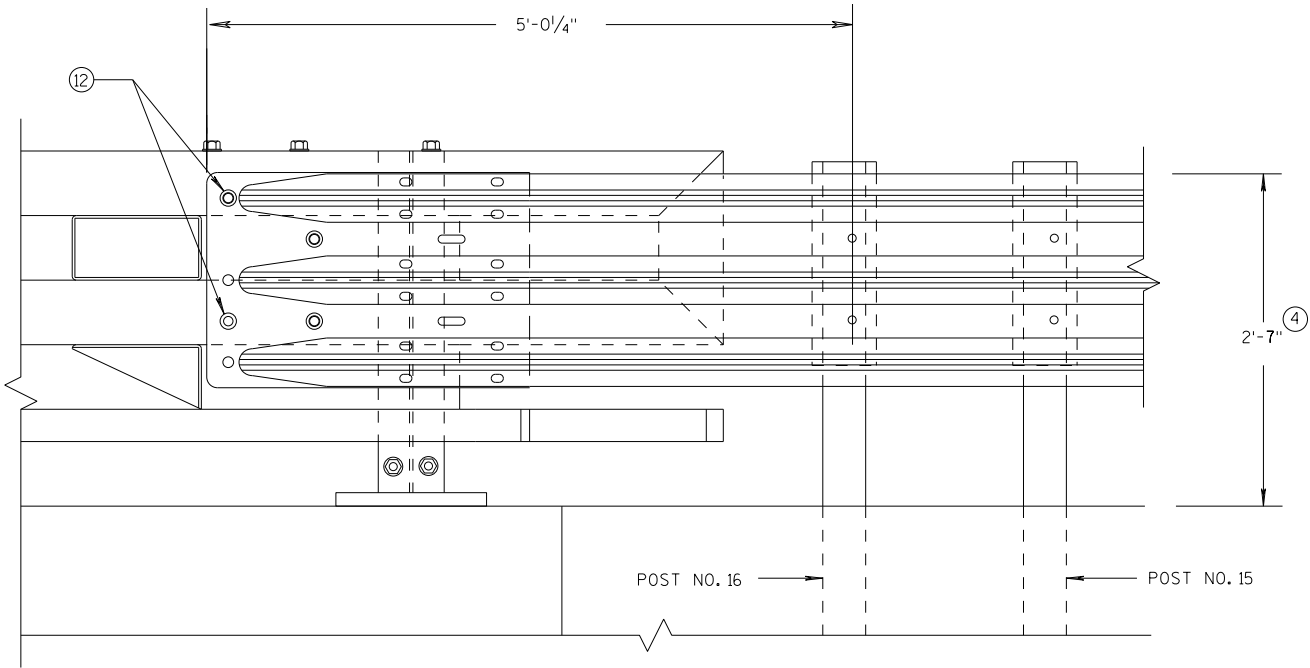
MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
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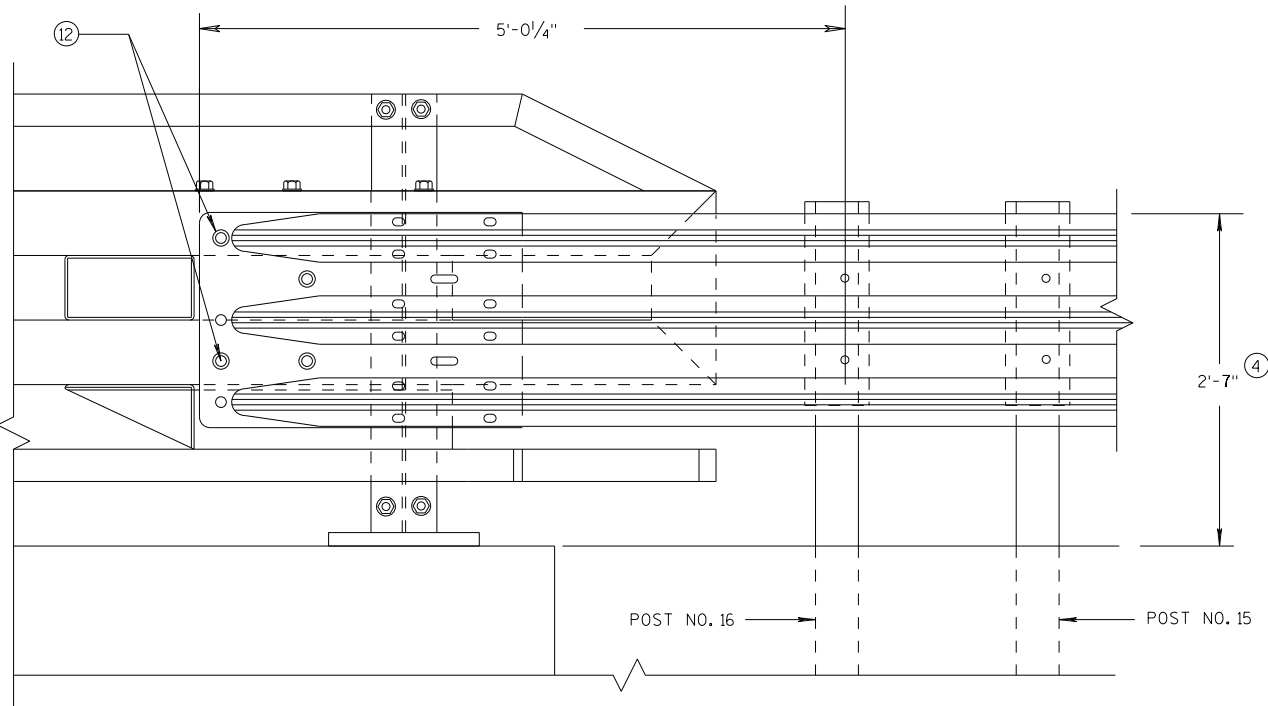
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GENERAL NOTES

- ④ TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- ⑫ BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM CONNECTOR PLATE. ON BACKSIDE OF PARAPET ONE ROUND WASHER, AND NUT REQUIRED. BOLT THREAD IS TO EXTEND $\frac{1}{2}$ -INCH BEYOND NUT.



ELEVATION OF DETAIL AT NY3 END POST
THRIE BEAM RAIL ATTACHMENT

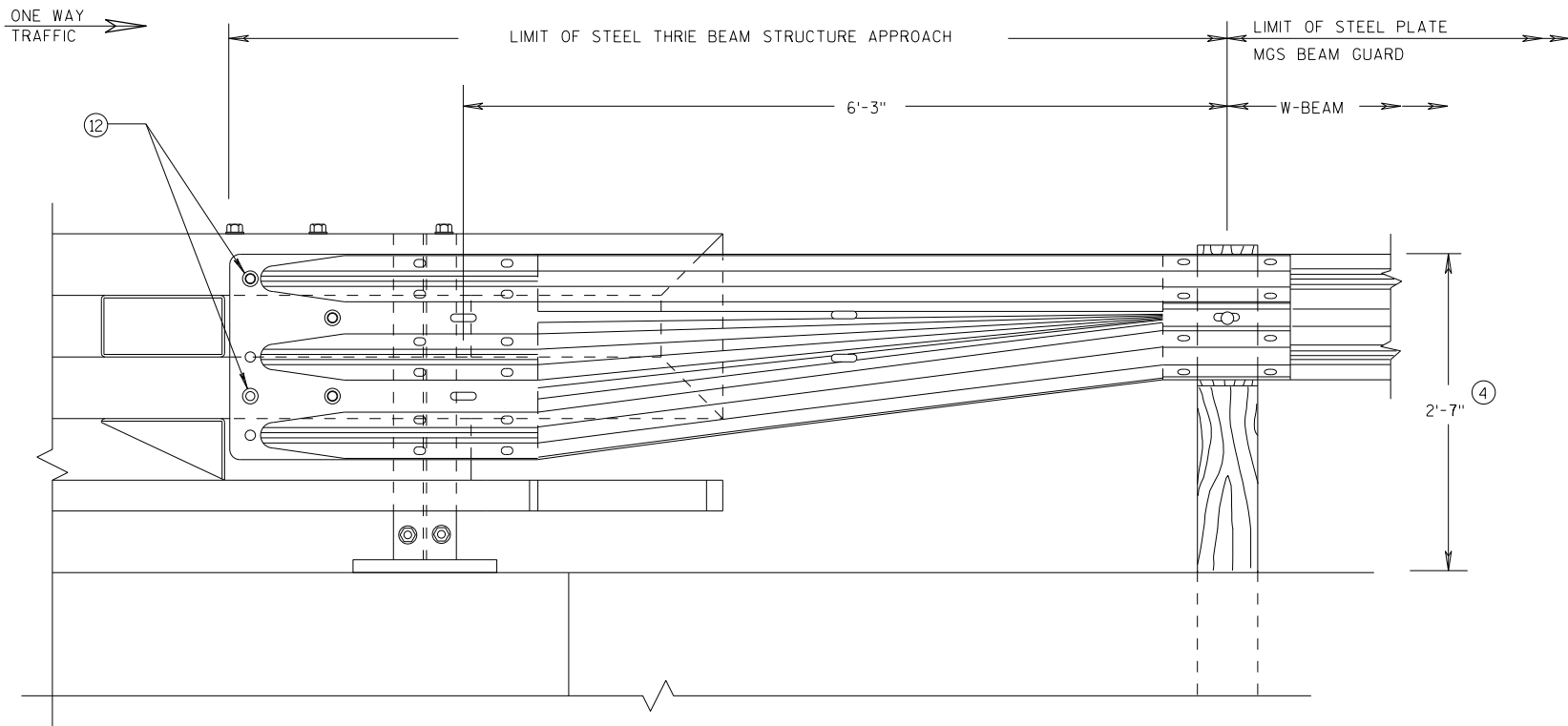


ELEVATION OF DETAIL AT NY4 END POST
THRIE BEAM RAIL ATTACHMENT

MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

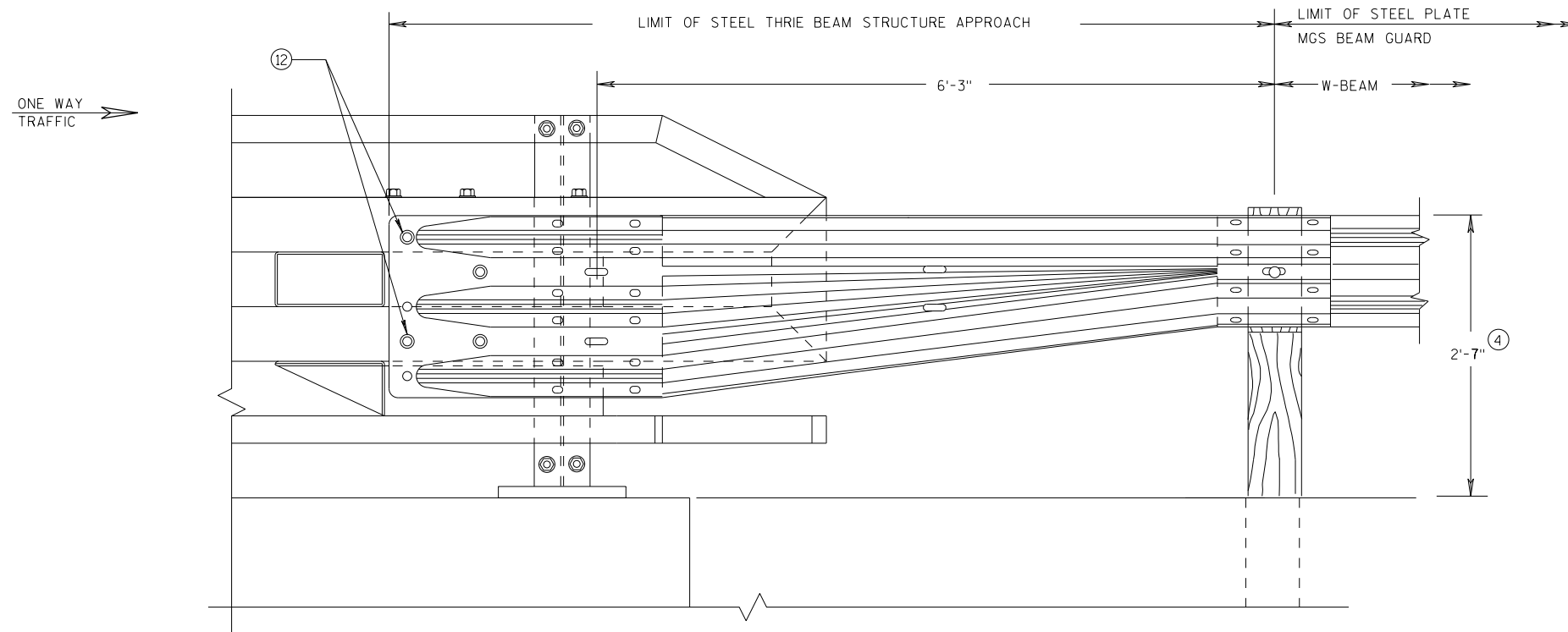
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DATE	UNIT SUPERVISOR
FHWA	



FRONT VIEW
W BEAM TRANSITION AND
CONNECTION TO BRIDGE RAILING TYPE "NY3"
 (USE ONLY ON THE TRAFFIC EXIT END OF ONE WAY BRIDGES)

GENERAL NOTES

- (4) TOLERANCE FOR TOP OF BEAM IS $\pm 1"$.
- (12) BOLTS MAY BE A325 BOLTS OR A449 BOLTS. BOLT LENGTH AND THREADING LENGTH ARE TO ALLOW FOR A TIGHT CONNECTION BETWEEN RIGID BARRIER AND THRIE BEAM CONNECTION PLATE. CONTRACTOR IS TO FIELD VERIFY BOLT LENGTH AND THREAD LENGTH. ONE ROUND WASHER REQUIRED BETWEEN BOLT HEAD AND THRIE BEAM CONNECTOR PLATE. ON BACKSIDE OF PARAPET ONE ROUND WASHER, AND NUT REQUIRED. BOLT THREAD IS TO EXTEND $\frac{1}{2}$ -INCH BEYOND NUT.



FRONT VIEW
W BEAM TRANSITION AND
CONNECTION TO BRIDGE RAILING TYPE "NY4"
 (USE ONLY ON THE TRAFFIC EXIT END OF ONE WAY BRIDGES)

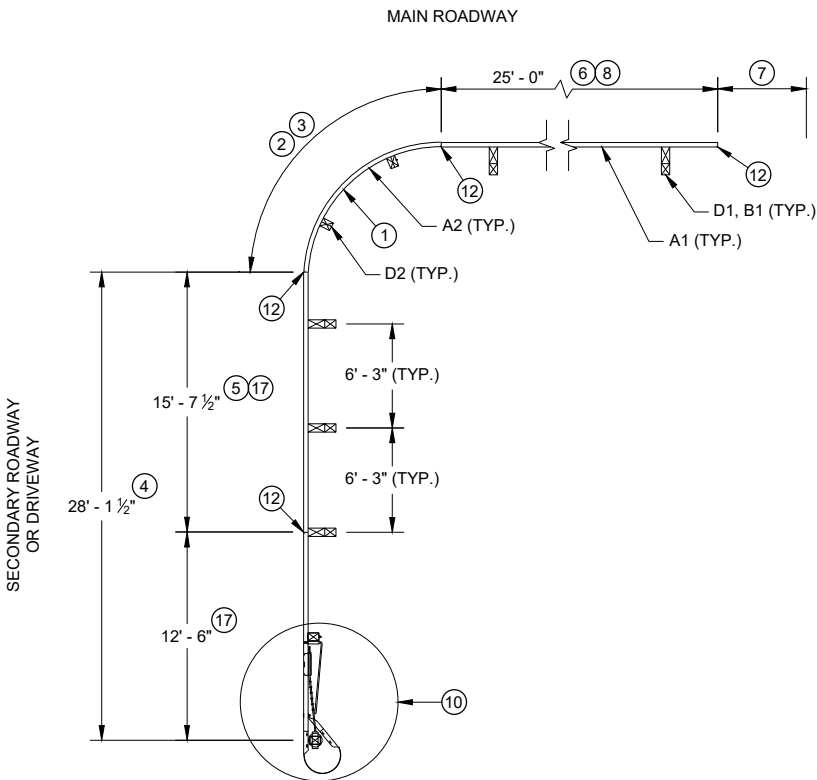
MIDWEST GUARDRAIL SYSTEM
THRIE BEAM TRANSITION (MGS)

STATE OF WISCONSIN
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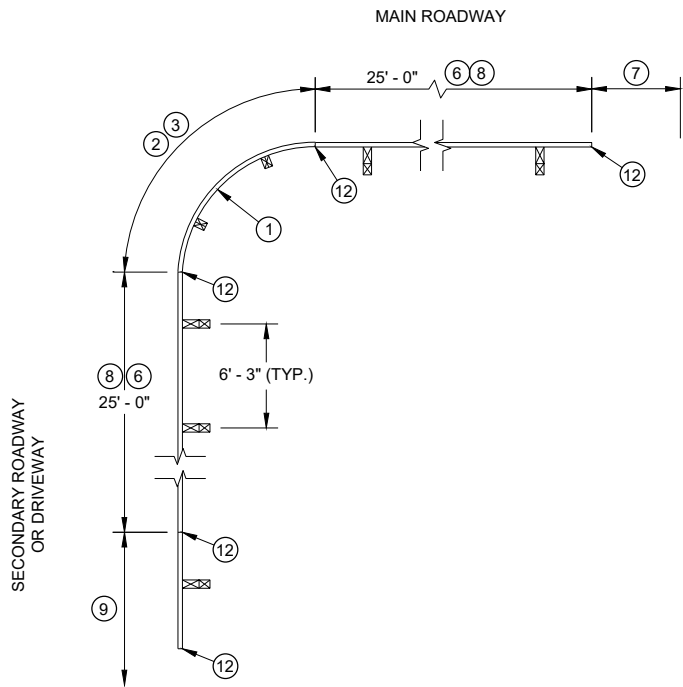
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SDD 14B53-a Short Radius Beam Guard and Terminal (MGS) - Layout



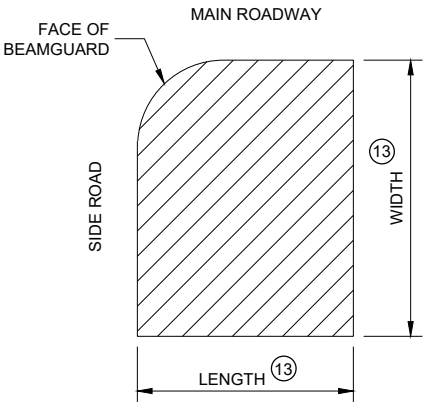
PLAN VIEW
SHORT RADIUS BEAM GUARD WITH
SHORT RADIUS TERMINAL ON
SECONDARY ROAD OR DRIVEWAY



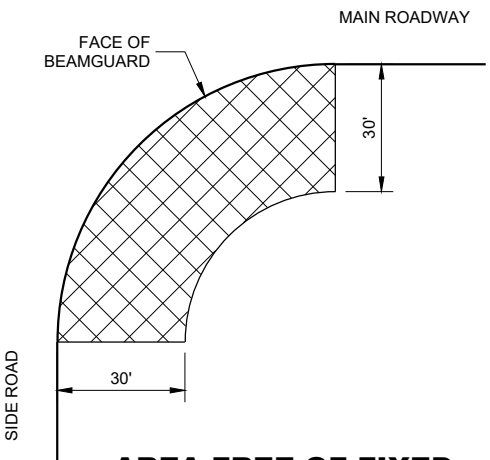
PLAN VIEW
SHORT RADIUS BEAM GUARD WITH
EAT, ADDITIONAL BEAM GUARD
OR
TRANSITION TO RIGID BARRIER ON
SECONDARY ROAD OR DRIVEWAY

TABLE FOR RADIUS OF 32' AND LESS

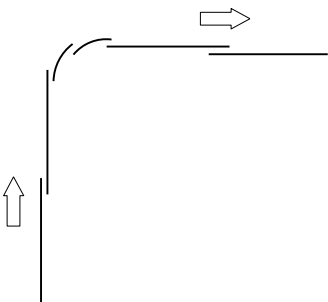
RADIUS (FT)	LENGTH (FT)	WIDTH (FT)
8	25	15
16	30	15
24	40	20
32	50	30



AREA FREE OF FIXED
OBJECTS FOR RADIUS
32' AND LESS



AREA FREE OF FIXED
OBJECTS FOR RADIUS
GREATER THAN 32'



LAP SPLICE DETAIL

GENERAL NOTES

SEE PLANS FOR OTHER BARRIER SYSTEM AND LOCATION SPECIFICS.

SEE SDD 14B42 FOR MORE INFORMATION ON BEAM GUARD INSTALLATION, PARTS, MATERIALS, AND INSTALLATION INFORMATION.

GALVANIZE PARTS AFTER FABRICATION.

WELDING TO FOLLOW CURRENT REQUIREMENTS OF THE AMERICAN WELDING SOCIETY STRUCTURAL WELDING CODE ANSI / AWS D1.1.

UNLESS NOTED OTHERWISE, ALL PLATES ARE FLAT AND FREE OF WARP.

UNLESS NOTED OTHERWISE, ALL EDGES ARE SMOOTH, STRAIGHT AND VERTICAL.

ALL CUTS AND HOLES, EXCEPT IN BEAM GUARD RAIL ARE TO BE MACHINED OR MACHINE FLAME CUT.

UNLESS NOTED OTHERWISE, CUT OR PROVIDE BOLTS THAT ARE 1/4" TO 1/2" BEYOND THE NUT.

DRAWINGS ARE NOT TO SCALE.

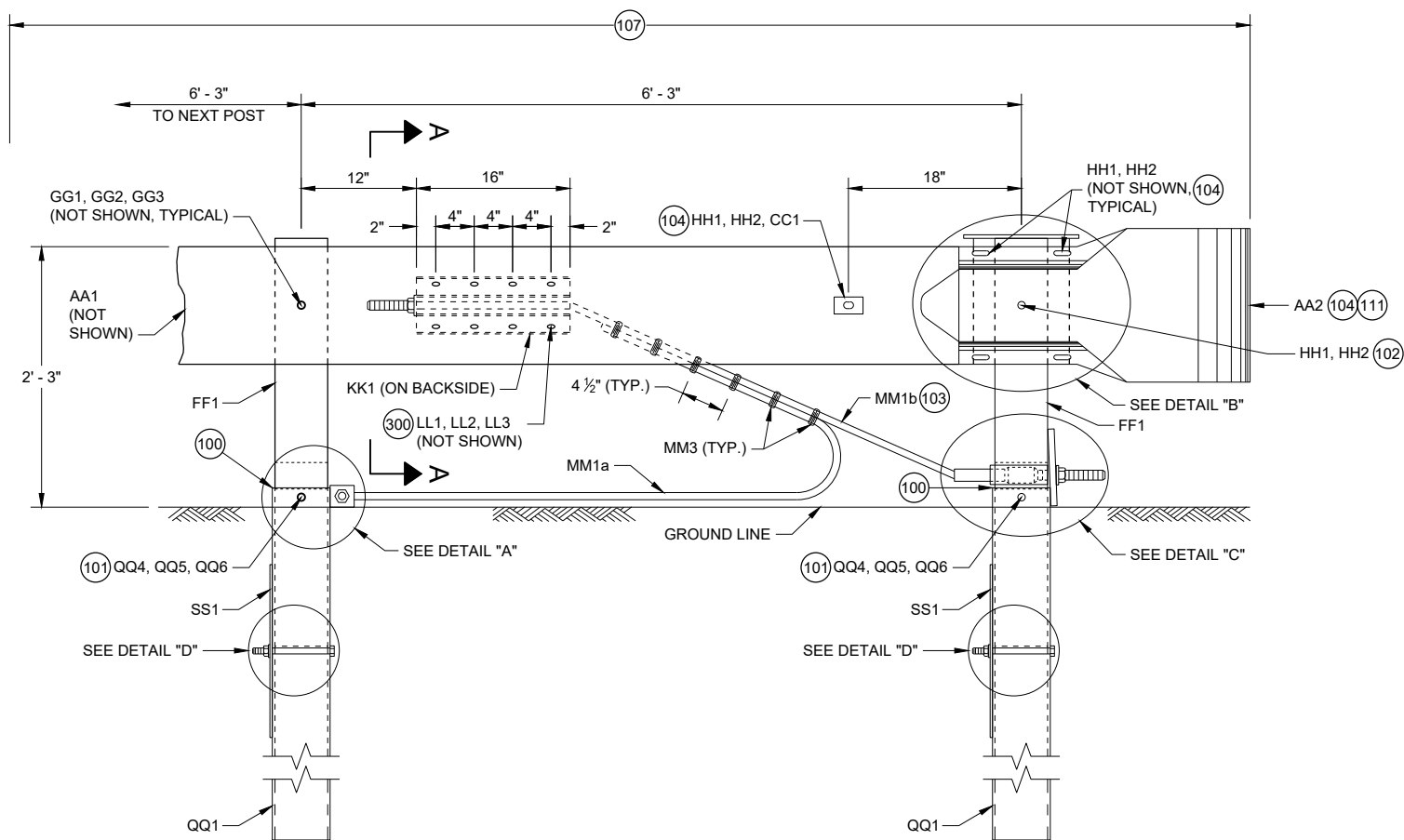
- 1 RADIUS MEASURE FROM INSIDE OF RAIL. LENGTH OF BEAM GUARD SHORT RADIUS GUARD MEASURED ALONG TRAFFIC SIDE OF RAIL. RADIUS BETWEEN 8 FEET TO 150 FEET. SEE PLAN FOR REQUIRED RADIUS. BEAM GUARD RAIL IN RADIUS IS SHOP BENT. ODD RAIL LENGTH OR FIELD CUTS MAY BE REQUIRED.
- 2 CONTROLLED RELEASE TERMINAL (CRT) POSTS ARE USED IN THE RADIUS. CONTROLLED RELEASE TERMINAL (CRT) POSTS ARE SPACED 6' - 3". SEE PLAN FOR NUMBER OF CONTROLLED RELEASE (CRT) POSTS.
- 3 WITHIN RADIUS BEAM GUARD RAILS ARE NOT BOLTED TO POSTS. BEAM GUARD RAIL IS RESTED ON TOP OF LAG SCREW.
- 4 MINIMUM LENGTH OF BEAM GUARD ALONG SIDE ROAD OR DRIVEWAY TO INSTALL SHORT RADIUS TERMINAL. BEAM GUARD IS PAID WITH BEAM GUARD ITEM.
- 5 ODD LENGTH OF BEAM GUARD REQUIRED TO INSTALL SHORT RADIUS TERMINAL.
- 6 MINIMUM AMOUNT OF BEAM GUARD TO BE INSTALLED PRIOR TO TRANSITION TO RIGID BARRIER. ADDITIONAL BEAM GUARD, OR EAT. BEAM GUARD PAID FOR WITH BEAM GUARD ITEM. SEE PLANS FOR MORE DETAIL.
- 7 BEAM GUARD, EAT, OR TRANSITION TO RIGID BARRIER. SEE PLAN.
- 8 TOP OF BEAM GUARD BY THE RADIUS IS 27". HEIGHT OF BEAM GUARD IS 31" BY TRANSITION TO RIGID BARRIER, ADDITIONAL BEAM GUARD OR EAT.
- 9 ADDITIONAL BEAM GUARD, EAT OR TRANSITION TO RIGID BARRIER. BEAM GUARD SHOWN. SEE PLAN FOR DETAILS.
- 10 SHORT RADIUS TERMINAL (SEE OTHER DETAILS).
- 11 HEIGHT VARIES. SEE NOTE (8) AND (8).
- 12 BEAM GUARD RAIL SPLICE LOCATION. SPLICE LOCATION REQUIRES PART F1 AND F2. SEE SDD 14B42 FOR DETAILS.
- 13 SEE TABLE FOR VALUES.
- 14 MAXIMUM HEIGHT FOR CENTER OF HOLE IS 3/4" ABOVE FINISHED GROUND ±1".
- 15 DRILL POST 1 5/8" DIA. PILOT HOLE. DO NOT HAMMER LAG SCREW INTO POST.
- 16 SMALL SIGNS ON BREAKAWAY HARDWARE ARE ACCEPTABLE.
- 17 TOP OF RAIL HEIGHT IS 27" WHEN USING A SHORT RADIUS TERMINAL (CRT).

SHORT RADIUS BEAM
GUARD (MGS) SHORT
RADIUS TERMINAL (MGS)

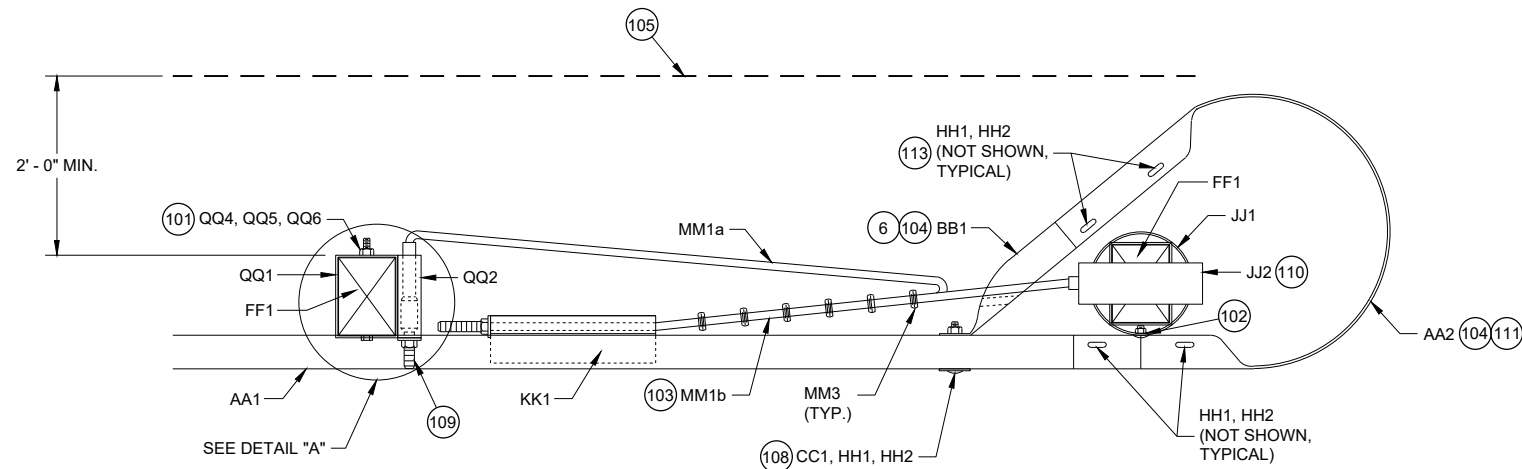
STATE OF WISCONSIN
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SDD 14B53-b Short Radius Beam Guard and Terminal (MGS) - Short Radius Terminal View, Detail A



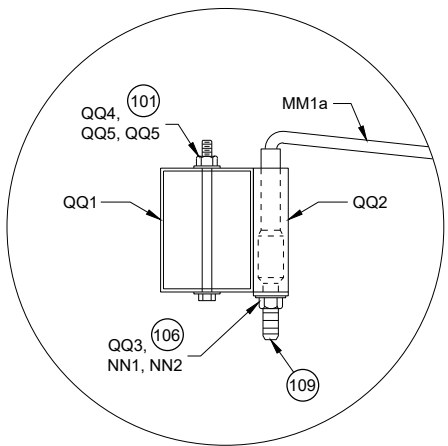
PROFILE VIEW
SHORT RADIUS TERMINAL



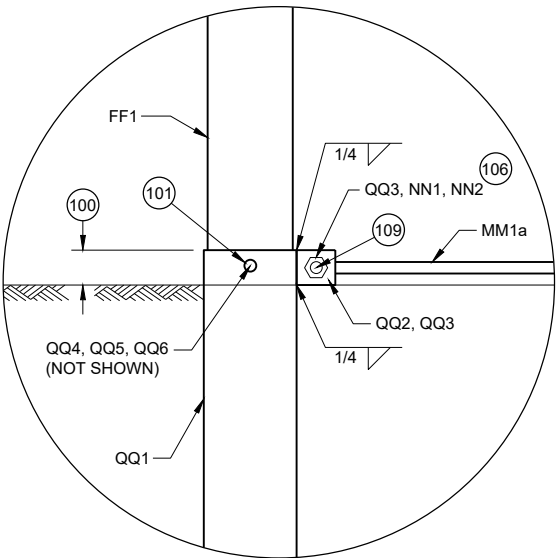
TOP VIEW
SHORT RADIUS TERMINAL

GENERAL NOTES

- 100 TOP OF FOUNDATION TUBE 2 INCHES MAXIMUM ABOVE FINISHED GROUND.
- 101 WASHERS REQUIRED BETWEEN BOLT HEAD AND FOUNDATION TUBE AND BETWEEN NUT AND FOUNDATION TUBE.
- 102 SPLICE BOLT AND NUT CONNECTS BEAM GUARD RAIL, W-BEAM SECTION BUFFER, AND STEEL PIPE ASSEMBLY. NO WASHER REQUIRED. SEE DETAIL "B".
- 103 CABLE IS TAUT.
- 104 ADJUST AA2 AND BB1 TO FIT.
- 105 BREAK POINT OF SHOULDER.
- 106 TACK WELD CABLE CONNECTOR TUBE PLATE TO CABLE CONNECTION TUBE. SEE DETAIL "A" PROFILE VIEW.
- 107 PAY LIMIT FOR BEAM GUARD.
- 108 SQUARE WASHER BETWEEN HEAD OF BOLT AND TRAFFIC FACE OF BEAM GUARD. ROUND WASHER REQUIRED BETWEEN NUT AND BB1.
- 109 CUT OR PROVIDE THREADED STUD THAT IS FLUSH WITH FACE OF BEAM GUARD RAIL KK1 (PLUS OR MINUS 1/2" TOLERANCE). DEBURR AFTER CUTTING.
- 110 SEE STEEL PIPE ASSEMBLY DETAILS.
- 111 ATTACH UU2 WITH UU3. SHOP APPLY UU1 TO UU2.
- 112 FOUR (4) HH1 AND HH2 REQUIRED TO ATTACH AA1 TO AA2.
- 113 FOUR (4) HH1 AND HH2 REQUIRED TO ATTACH AA2 TO BB1.



TOP VIEW
DETAIL "A"
(WOOD BREAKAWAY AND BEAM
GUARD RAIL POSTS NOT SHOWN)



PROFILE VIEW
DETAIL "A"

SHORT RADIUS BEAM
GUARD (MGS) SHORT
RADIUS TERMINAL (MGS)

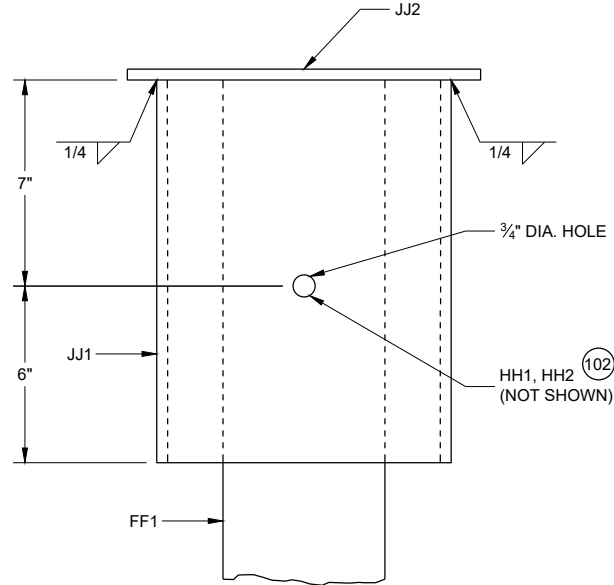
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



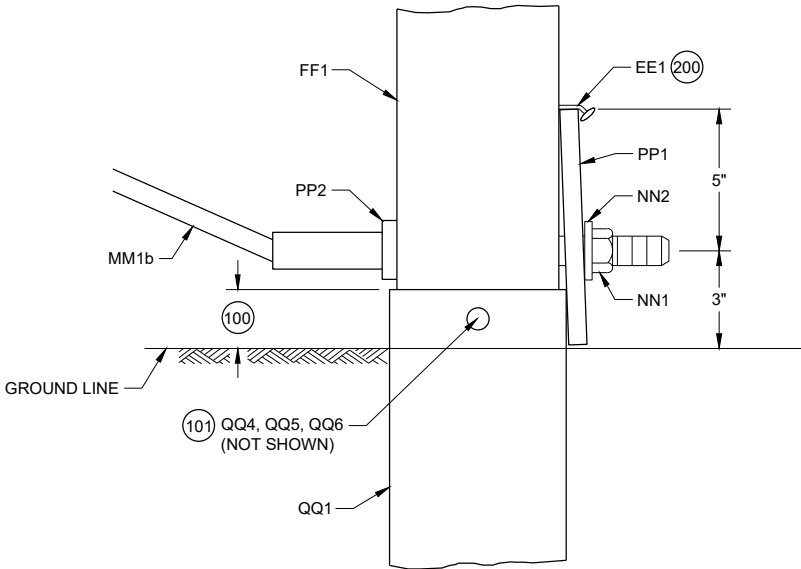
SDD 14B53-c Short Radius Beam Guard and Terminal (MGS) - Terminal Details B, C and D

GENERAL NOTES

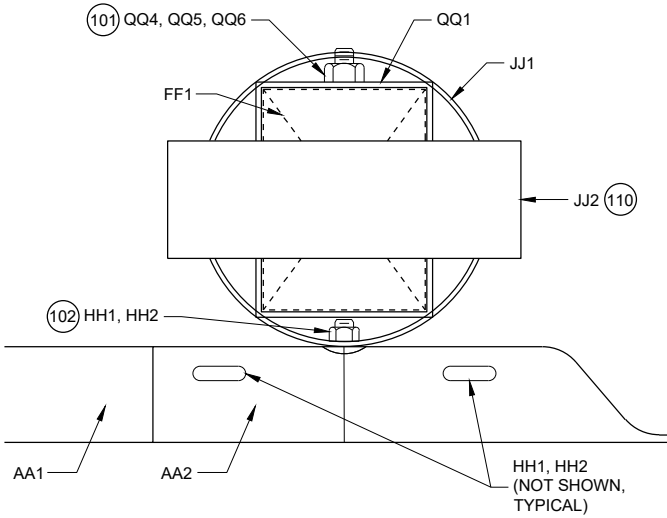
(200) TWO (2) NAILS SPACED 4 INCHES CENTER TO CENTER.



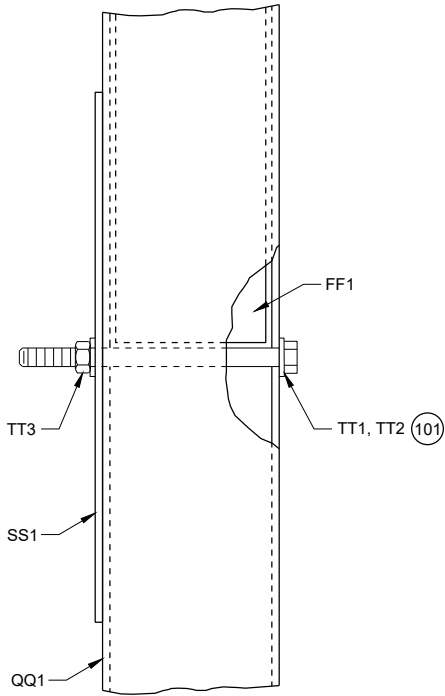
PROFILE VIEW
DETAIL "B"
STEEL PIPE ASSEMBLY
(BEAM GUARD AND W BEAM
END SECTION NOT SHOWN)



PROFILE VIEW
DETAIL "C"



PLAN VIEW
DETAIL "B"
STEEL PIPE ASSEMBLY



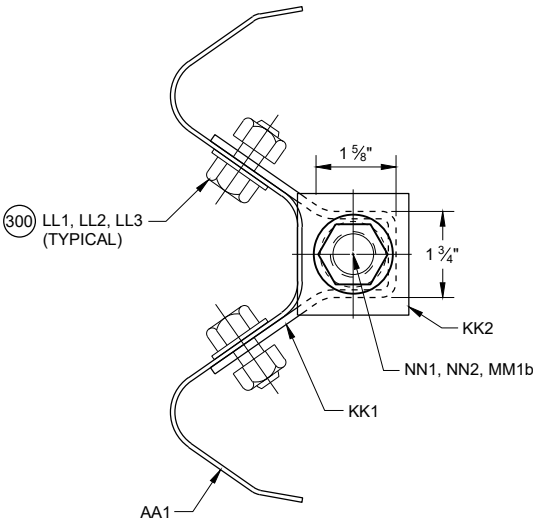
PROFILE VIEW
DETAIL "D"

SHORT RADIUS BEAM
GUARD (MGS) SHORT
RADIUS TERMINAL (MGS)

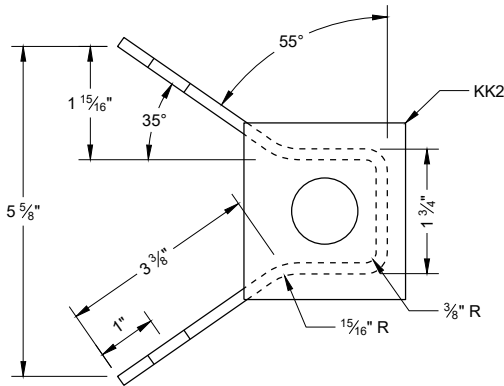
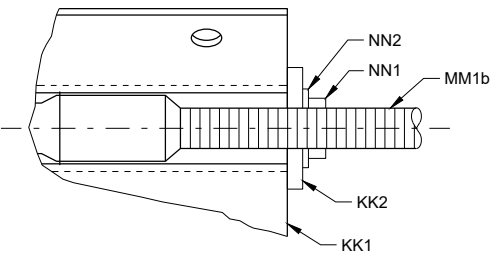
STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



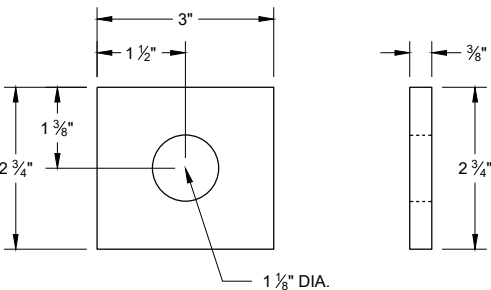
300 WASHERS REQUIRED BETWEEN BOLT HEAD AND BEAM GUARD RAIL AND BETWEEN NUT AND ANCHOR BRACKET. EIGHT (8) LL1 AND LL3 REQUIRED. SIXTEEN (16) LL2 REQUIRED.



SECTION A - A



ANCHOR BRACKET BEARING PLATE (KK2)



ANCHOR BRACKET (KK1, KK2)

SHORT RADIUS BEAM GUARD (MGS) SHORT RADIUS TERMINAL (MGS)

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6

SDD 14B53 - 01d

6

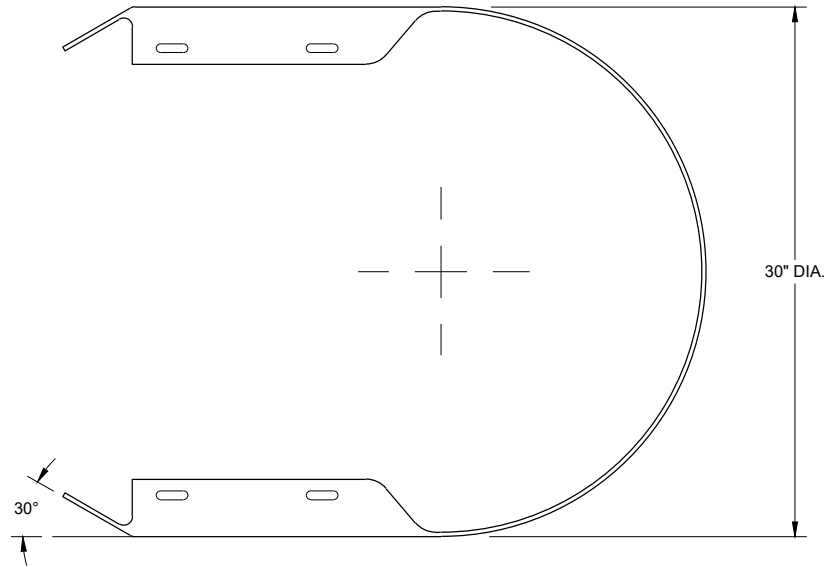
SDD14B53 - 01d



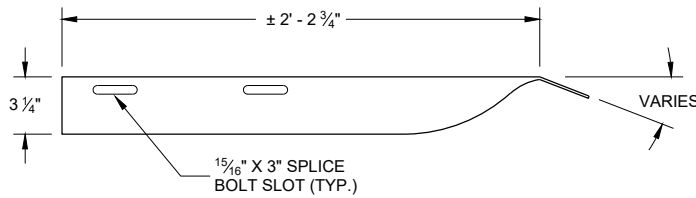
SDD 14B53-e Short Radius Beam Guard and Terminal (MGS)-End Section Buffer,Terminal Connector, Reflector Sheeting

GENERAL NOTES

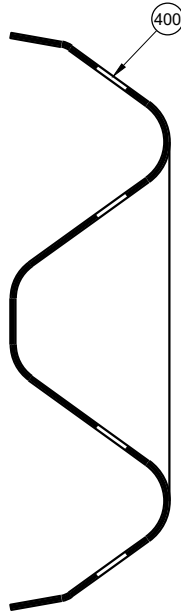
- (400) CROSS SECTION OF PART IS TO FIT OVER AA1 .
(401) CROSS SECTION OF PART IS TO FIT OVER OR UNDER AA1 .



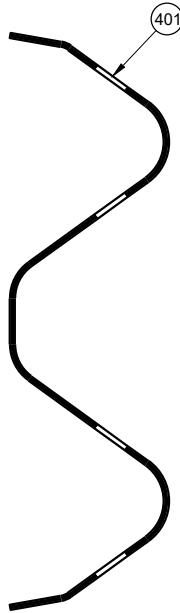
TOP VIEW



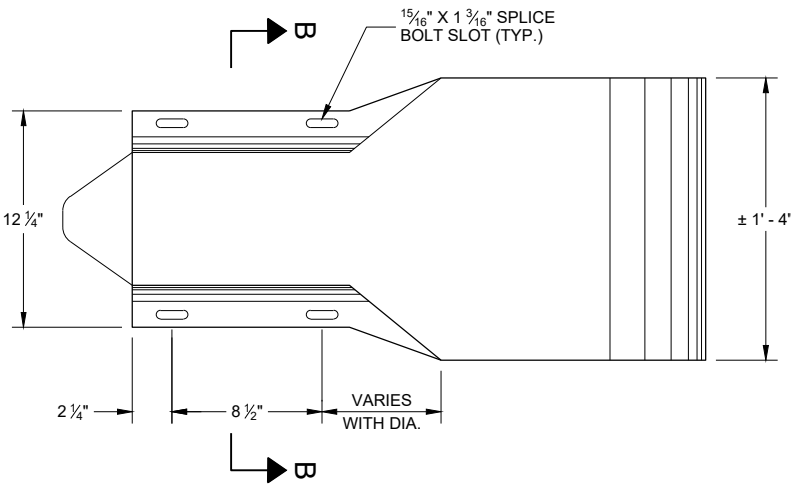
TOP VIEW



SECTION B -B

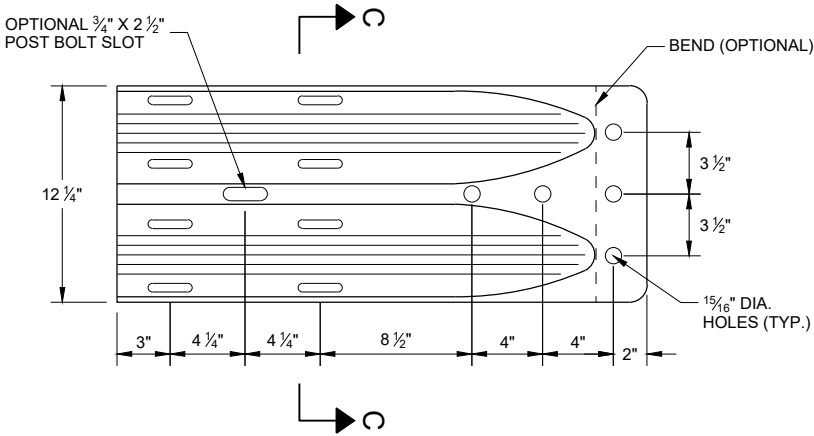


SECTION C -C



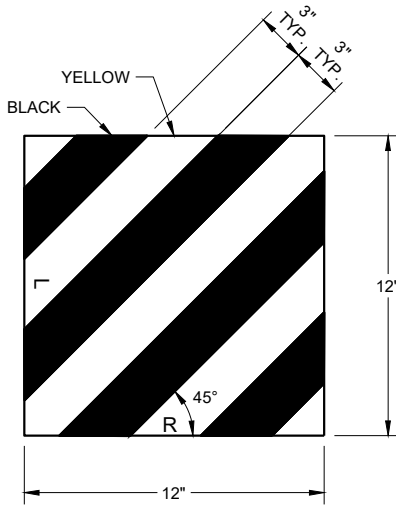
PROFILE VIEW

W BEAM
END SECTION BUFFER (AA2)



PROFILE VIEW

W BEAM
TERMINAL CONNECTOR (BB1)



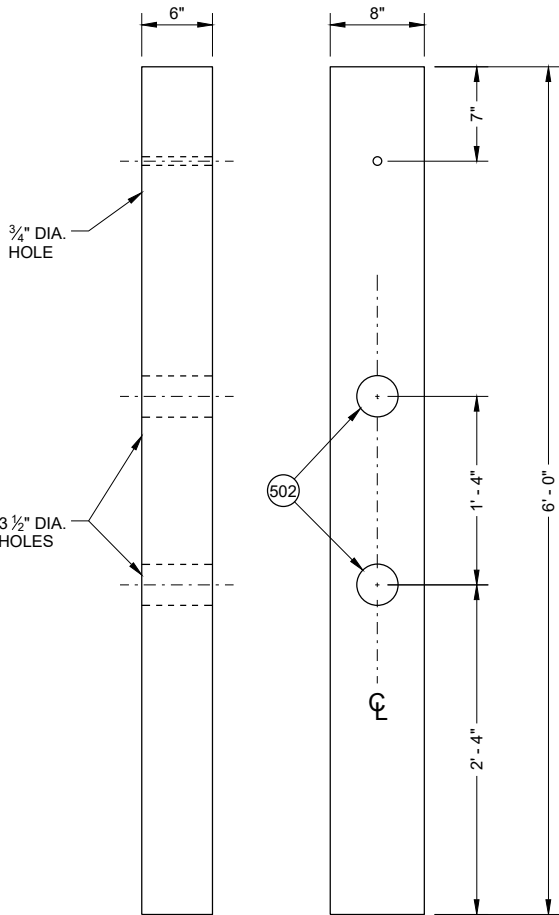
REFLECTIVE SHEETING (UU1, UU2)

SHORT RADIUS BEAM
GUARD (MGS) SHORT
RADIUS TERMINAL (MGS)

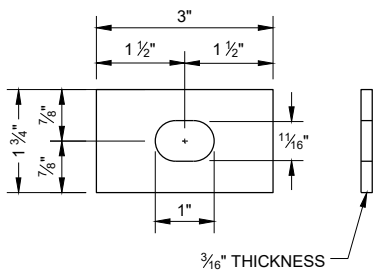
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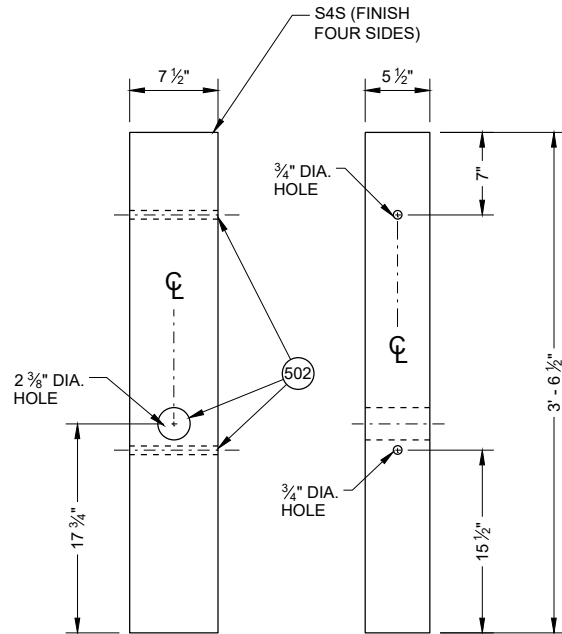
SDD 14B53-f Short Radius Beam Guard and Terminal (MGS)-Cable Assembly, Terminal Post Details, Tube, Plate, Washer



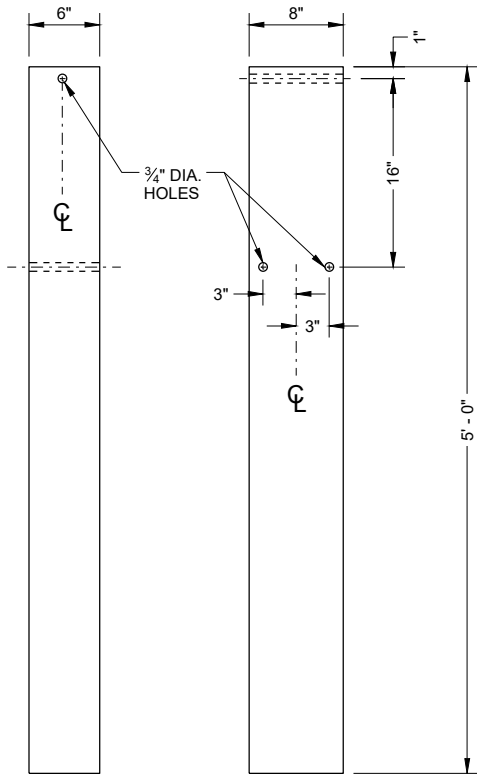
FRONT VIEW SIDE VIEW
CONTROLLED RELEASE
POST (CRT) (DD2)



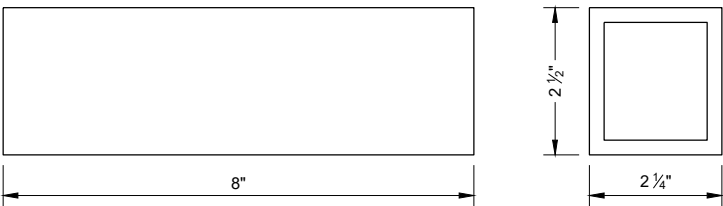
RECTANGULAR PLATE
WASHER (CC1)



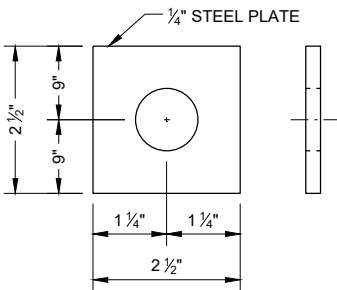
FRONT VIEW SIDE VIEW
WOOD BREAKAWAY POST (FF1)



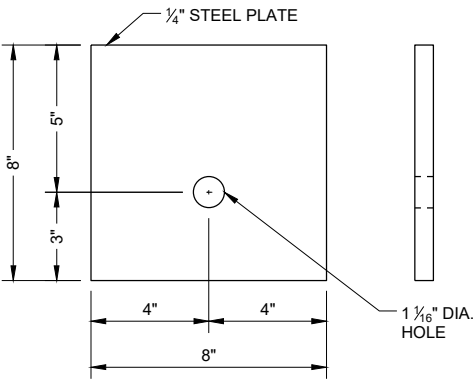
FRONT VIEW SIDE VIEW
FOUNDATION TUBE (QQ1)



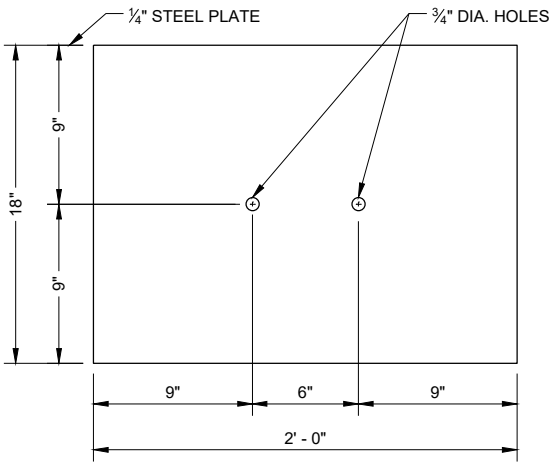
FOUNDATION TUBE -
ANCHOR CABLE TUBE (QQ2)



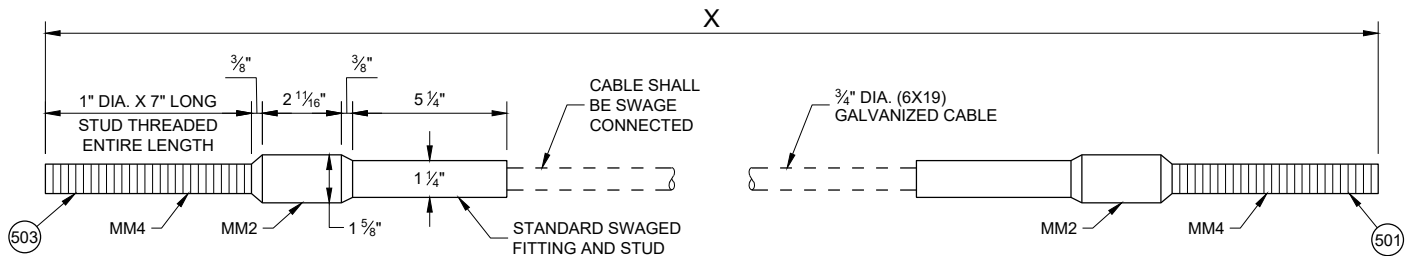
ANCHOR CABLE TUBE
END PLATE (QQ3)



BEARING PLATE (PP1)



SOIL PLATE (SS1)



CABLE ASSEMBLY (MM1a, MM1b)

"X" LENGTH

MM1b	9' - 0"
MM1b	6' - 8"

GENERAL NOTES

- (500) SEE DETAIL "D" FOR LOCATION AND ATTACHMENT OF SS1.
- (501) FOR MM1a THREADED STUD ONLY REQUIRED ON ONE END. SWAGED FITTING REQUIRED.
- (502) LOCATE HOLES ON THE CENTERLINE OF THE SIDE OF THE POST.
- (503) MM1a MAY HAVE ONE THREADED STUD 4 INCHES LONG. SEE NOTE (109).

SHORT RADIUS BEAM
GUARD (MGS) SHORT
RADIUS TERMINAL (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



SDD 14B53-g Short Radius Beam Guard and Terminal (MGS) - Part List

BILL OF MATERIALS - SHORT RADIUS BEAM GUARD (MGS)

PART	DESCRIPTION	MATERIALS SPECIFICATIONS	NOTES
A1	BEAM GUARD RAIL	AASHTO M180, CLASS A, TYPE 2	
		APPROVED PRODUCER	
A2	BEAM GUARD RAIL - SHOP BENT	INDICATE ON BACK OF RAIL THE RADIUS THAT RAIL WAS BENT TO. SHOP BEND RADIUS IS TO THE NEAREST FOOT. FOLLOW AASHTO M180 ON HOW TO MARK RADIUS INFORMATION.	
		AASHTO M180, CLASS A, TYPE 2	
		APPROVED PRODUCER	
B1	BLOCK - WOOD	WISDOT SPEC. 614	SEE SDD 14B42
C1	NAIL	ASTM A153 HOT DIP CLASS D	
		ASTM F1667 TYPE 1 STYLE 12 (16 DOUBLE HEAD)	
D1	POST-STRONG POST-WOOD	WISDOT SPEC. 614	SEE SDD 14B42
D2	POST-CRT-WOOD	WISDOT SPEC. 614	
E1	POST BOLT	ASTM A307 GRADE A OR SAE J429 GRADE 2	5/8" DIA. SEE SDD 14B42 FOR BOLT GEOMETRY
		AASHTO M180	
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	
		UNC	
E2	POST BOLT - WASHER	ASTM F436 TYPE 1 (HARDEN TYPICALLY USED WITH STEEL) OR ASTM F844 (UNHARDENED TYPICALLY WITH WOOD)	5/8" DIA.
		GALV. AASHTO M111 / ASTM A 123 OR GALV. HOT DIP. TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329	
E3	POST BOLT - NUT	AASHTO M180 DOUBLE RECESSED HEAVY HEX HEAD	5/8" DIA. SEE SDD 14B42 FOR BOLT GEOMETRY
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	
		UNC	
		OVER TAPPED NUTS OVER-SIZE AS SPECIFIED IN AASHTO 291 / ASTM A 563	
		ASTM A563 GRADE A HEAVY HEX HEAD	
F1	SPLICE BOLT	GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	5/8" DIA. SEE SDD 14B42 FOR BOLT GEOMETRY
		ASTM A307 GRADE A OR SAE J429 GRADE 2	
		UNC	
		AASHTO M180	

PART	DESCRIPTION	MATERIALS SPECIFICATIONS	NOTES
F2	SPLICE BOLT - NUT	ASTM A563 GRADE A	5/8" DIA. SEE SDD 14B42 FOR BOLT GEOMETRY
		AASHTO M180 DOUBLE RECESSED HEAVY HEX HEAD	
		GALV. HOT DIP TO AASHTO M232 CLASS C/ASTM A153 CLASS C/ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1/ASTM B695 CLASS 50, TYPE 1	
		OVER TAPPED NUTS OVER-SIZE AS SPECIFIED IN AASHTO 291 / ASTM A 563	
		UNC	
G1	LAG SCREW	ASTM A308 GRADE A ASTM A153 CLASS D	1/2" DIA. 6" LONG
H1	DELINEATOR - BEAM GUARD		SEE SDD 14B42 FOR MORE INFORMATION
H2	DELINEATION - SHEETING	YELLOW OR WHITE	
		WISDOT SPEC 637 TYPE SH	
		APPROVED PRODUCT LIST	
J1	FOUNDATION BACKFILL	STANDARD SPEC. 614	
AA1	BEAM GUARD RAIL - PUNCHED	AASHTO M180, CLASS A, TYPE 2	
		APPROVED PRODUCER	
AA2	BEAM GUARD RAIL - END SECTION BUFFER	AASHTO M180, CLASS A, TYPE 2	
		APPROVED PRODUCER	
BB1	BEAM GUARD RAIL - TERMINAL CONNECTOR MODIFIED	AASHTO M180, CLASS A, TYPE 2	
		APPROVED PRODUCER	
CC1	SHORT RADIUS - SQUARE WASHER	AASHTO M180	
		GALV. AASHTO M111 / ASTM A123	
EE1	NAIL	ASTM A153 HOT DIP CLASS D	
		ASTM F1667 TYPE 1 STYLE 12 (16 DOUBLE HEADED)	
FF1	POST - BCT - WOOD	S4S FINISH ON 4 SIDES	
		WISDOT SPEC. 614	
GG1	POST BOLT	ASTM A307 GRADE A OR SAE J429 GRADE 2	3/8" DIA. SEE SDD 14B42 FOR BOLT GEOMETRY
		AASHTO M180	
		GALV. HOT DIP TO AASHTO M232 CLASS C/ASTM A153 CLASS C/ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1/ASTM B695 CLASS 50, TYPE 1	
		UNC	
GG2	POST BOLT - WASHER	ASTM F436 TYPE 1 (HARDEN TYPICALLY USED WITH STEEL) OR ASTM F844 (UNHARDENED TYPICALLY WITH WOOD)	3/8" DIA.
		GALV. AASHTO M111 / ASTM A 123 OR GALV. HOT DIP. TO AASHTO M232 CLASS C/ASTM A153 CLASS C / ASTM F2329	

SHORT RADIUS BEAM
GUARD (MGS) SHORT
RADIUS TERMINAL (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION



SDD 14B53-h Short Radius Beam Guard and Terminal (MGS) - Part List

BILL OF MATERIALS - SHORT RADIUS BEAM GUARD (MGS)

PART	DESCRIPTION	MATERIALS SPECIFICATIONS	NOTES
GG3	POST BOLT - NUT	ASTM A563 GRADE A	$\frac{3}{8}$ " DIA. SEE 14B42 FOR GEOMETRY
		AASHTO M180 DOUBLE RECESSED HEAVY HEX HEAD	
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	
		UNC	
		OVER TAPPED NUTS OVER-SIZE AS SPECIFIED IN AASHTO 291 / ASTM A 563	
		ASTM A563 GRADE A HEAVY HEX HEAD	
HH1	SPLICE BOLT	GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	$\frac{3}{8}$ " DIA. SEE SDD 14B42 FOR BOLT GEOMETRY
		ASTM A307 GRADE A OR SAE J429 GRADE 2	
		UNC	
		AASHTO M180 HEAD GEOMETRY	
HH2	SPLICE BOLT - NUT	ASTM A563 GRADE A	$\frac{3}{8}$ " DIA. SEE SDD 14B42 FOR BOLT GEOMETRY
		AASHTO M180 DOUBLE RECESSED HEAVY HEX HEAD	
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	
		OVER TAPPED NUTS OVER-SIZE AS SPECIFIED IN AASHTO 291 / ASTM A 563	
		UNC	
JJ1	PIPE - STEEL	ASTM A53 GALVANIZED GRADE B SCHEDULE 40	10" O.D.
JJ2	TOP PLATE	ASTM A36 MIN. STRENGTH 36 KSI, OR ASTM A529 MAX. STRENGTH 50 KSI, OR ASTM A572 MAX STRENGTH 50 KSI OR ASTM A709 MAX STRENGTH 50 KSI OR ASTM A992 MAX STRENGTH 50 KSI	DIMENSIONS $\frac{3}{8}$ " X 4" X 1' - 0"
		GALV. AASHTO M111 / ASTM A123	
KK1	ANCHOR BRACKET	ASTM A36 MIN. STRENGTH 36 KSI, OR ASTM A529 MAX. STRENGTH 50 KSI, OR ASTM A572 MAX STRENGTH 50 KSI OR ASTM A709 MAX STRENGTH 50 KSI OR ASTM A992 MAX STRENGTH 50 KSI	
		GALV. AASHTO M111 / ASTM A123	
KK2	ANCHOR BRACKET - BEARING PLATE	ASTM A36 MIN. STRENGTH 36 KSI, OR ASTM A529 MAX. STRENGTH 50 KSI, OR ASTM A572 MAX STRENGTH 50 KSI OR ASTM A709 MAX STRENGTH 50 KSI OR ASTM A992 MAX STRENGTH 50 KSI	
		GALV. AASHTO M111 / ASTM A123	
LL1	ANCHOR BRACKET - BOLT	ASTM A307 GRADE B HEAVY HEX HEAD OR SAE J429 GRADE 2 HEAVY HEX HEAD	$\frac{3}{8}$ " DIA.
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	
		UNC	

PART	DESCRIPTION	MATERIALS SPECIFICATIONS	NOTES
LL2	ANCHOR BRACKET - WASHER	ASTM F436 TYPE 1 (HARDEN WASHER ONLY)	$\frac{3}{8}$ " DIA.
		GALV. AASHTO M111 / ASTM A123 OR GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329	
LL3	ANCHOR BRACKET - NUT	ASTM A563 GRADE A	$\frac{3}{8}$ " DIA.
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	
		OVER TAPPED NUTS OVER-SIZE AS SPECIFIED IN AASHTO 291 / ASTM A 563	
		UNC	
MM1a	ANCHOR CABLE	AASHTO M30 / ASTM A741 INDEPENDENT WIRE CORE (IWRC) OR WIRE STRAND CORE (WCS), IMPROVED PLOW STEEL (IPS), 6X19, TYPE II OR IIc CLASS C ZINC COATED	
MM1b	ANCHOR CABLE	AASHTO M30 / ASTM A741 INDEPENDENT WIRE CORE (IWRC) OR WIRE STRAND CORE (WCS), IMPROVED PLOW STEEL (IPS), 6X19, TYPE II OR IIc CLASS C ZINC COATED	
MM2	ANCHOR CABLE - SWAGE FITTING	ASTM A576 GRADE 1035	
		SWAGE FITTINGS ARE TO BE FACTORY SWEDGED. WITH A BREAKING STRENGTH 40,000 LBS.	
		GALV. AASHTO M111 / ASTM A123	
		ASME B30.26 FORGED, CAST, OR DIE STAMPED WITH THE FOLLOWING INTO CONNECTION: NAME OF MANUFACTURER OR TRADEMARK OF CONNECTION'S MANUFACTURER, SIZE OR RATED LOAD, GRADE.	
MM3	WIRE ROPE CABLE CLAMPS	FF-C-450D TYPE 1 CLASS 1	$\frac{3}{4}$ "
		ASTM A153 HOT DIP CLASS D	
MM4	ANCHOR CABLE - SWAGE FITTING - STUD	ASTM F3125 GRADE A325 TYPE 1 OR SAE GRADE 5 OR ASTM A449 TYPE 1 HEAVY HEX HEAD	
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	
		UNC	
NN1	ANCHOR CABLE - NUT	ASTM A563 GRADE A	1" DIA.
		AASHTO M180 DOUBLE RECESSED HEAVY HEX HEAD	
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	
		OVER TAPPED NUTS OVER-SIZE AS SPECIFIED IN AASHTO 291 / ASTM A 563	
NN2	ANCHOR CABLE - NUT - WASHER	UNC	1" DIA.
		ASTM F436 TYPE 1 (HARDEN WASHER ONLY)	
		GALV. AASHTO M111 / ASTM A123 OR GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329	

SHORT RADIUS BEAM
GUARD (MGS) SHORT
RADIUS TERMINAL (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

BILL OF MATERIALS - SHORT RADIUS BEAM GUARD (MGS)

PART	DESCRIPTION	MATERIALS SPECIFICATIONS	NOTES
PP1	BEARING PLATE AT POST	ASTM A36 MIN. STRENGTH 36 KSI, OR ASTM A529 MAX. STRENGTH 50 KSI, OR ASTM A572 MAX STRENGTH 50 KSI OR ASTM A709 MAX STRENGTH 50 KSI OR ASTM A992 MAX STRENGTH 50 KSI	
		GALV. AASHTO M111 / ASTM A123	
PP2	PIPE - STEEL	ASTM A53 GALVANIZED GRADE B SCHEDULE 40	2" DIA. x 6" LONG
QQ1	FOUNDATION TUBE	ASTM A500 GRADE B	8" X 6" X $\frac{3}{16}$ "
		GALV. AASHTO M111 / ASTM A123	
QQ2	SHORT RADIUS - FOUNDATION TUBE - ANCHOR CABLE - TUBE	ASTM A500 GRADE B	DIMENSIONS 2 $\frac{1}{2}$ " X 2 $\frac{1}{4}$ " X $\frac{1}{4}$ " X 8"
		GALV. AASHTO M111 / ASTM A123	
QQ3	SHORT RADIUS - SOIL TUBE - ANCHOR CABLE - TUBE - END PLATE	ASTM A36 MIN. STRENGTH 36 KSI, OR ASTM A529 MAX. STRENGTH 50 KSI, OR ASTM A572 MAX STRENGTH 50 KSI OR ASTM A709 MAX STRENGTH 50 KSI OR ASTM A992 MAX STRENGTH 50 KSI	DIMENSIONS 2 $\frac{1}{2}$ " X 2 $\frac{1}{2}$ " X $\frac{1}{4}$ "
		GALV. AASHTO M111 / ASTM A123	
QQ4	GROUND STRUT AND YOKE - BOLT	GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	$\frac{5}{8}$ DIA.
		ASTM A307 GRADE B HEAVY HEX HEAD OR SAE J429 GRADE 2 HEAVY HEX HEAD	
		UNC	
QQ5	GROUND PLATE AND YOKE - WASHER	ASTM F436 TYPE 1 (HARDEN WASHER ONLY)	$\frac{5}{8}$ DIA.
		GALV. AASHTO M111 / ASTM A123 OR GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329	
QQ6	GROUND STRUT AND YOKE - NUT	HEAVY HEX	$\frac{5}{8}$ DIA.
		UNC	
		ASTM A563 GRADE A	
		OVER TAPPED NUTS AS SPECIFIED IN AASHTO 291 / ASTM A 563	
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	

PART	DESCRIPTION	MATERIALS SPECIFICATIONS	NOTES
SS1	SOIL PLATE	ASTM A36 MIN. STRENGTH 36 KSI, OR ASTM A529 MAX. STRENGTH 50 KSI, OR ASTM A572 MAX STRENGTH 50 KSI OR ASTM A709 MAX STRENGTH 50 KSI OR ASTM A992 MAX STRENGTH 50 KSI	
		GALV. AASHTO M111 / A123	
TT1	SOIL PLATE - BOLT	ASTM A307 GRADE B HEAVY HEX HEAD OR SAE J429 GRADE 2 HEAVY HEX HEAD	$\frac{5}{8}$ DIA.
		GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	
		UNC	
TT2	SOIL PLATE - WASHER	ASTM F436 TYPE 1 (HARDEN WASHER ONLY)	$\frac{5}{8}$ DIA.
		GALV. AASHTO M111 / ASTM A123 OR GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329	
TT3	SOIL PLATE - NUT	GALV. HOT DIP TO AASHTO M232 CLASS C / ASTM A153 CLASS C / ASTM F2329 OR GALV. MECHANICALLY TO AASHTO M298 CLASS 50, TYPE 1 / ASTM B695 CLASS 50, TYPE 1	$\frac{5}{8}$ DIA.
UU1	OBJECT MARKER - SHEETING	MUTCD / WISDOT OBJECT MARKER TYPE 3	PATTERN AND COLOR FOR SHEETING. SHEETING TYPE FOR MARKER.
		WISDOT SPEC 637 TYPE F	
		APPROVED PRODUCT LIST	
UU2	OBJECT MARKER - ALUMINUM PLATE	WISDOT SPEC 637 ALUMINUM PLATE	MATERIAL AND THICKNESS OF MATERIALS
UU3	OBJECT MARKER - SCREWS	STAINLESS SELF-TAPPING SCREWS	
VV1	FOUNDATION BACKFILL	WISDOT SPEC 614	

SHORT RADIUS BEAM
GUARD (MGS) SHORT
RADIUS TERMINAL (MGS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
June 2017 /S/ Rodney Taylor
DATE ROADWAY STANDARDS DEVELOPMENT
ENGINEER
FHWA

DESIGN DATA

LIVE LOAD:
DESIGN LOADING: HL-93
INVENTORY RATING FACTOR: RF =
OPERATING RATING FACTOR: RF =
WISCONSIN STANDARD PERMIT VEHICLE (WIS.-SPV): (KIPS)

STRUCTURE IS DESIGNED FOR A FUTURE WEARING SURFACE OF 20 POUNDS PER SQUARE FOOT.

MATERIAL PROPERTIES:

CONCRETE MASONRY:
SUPERSTRUCTURE & STRUCTURAL APPROACH SLAB — $f'_c = 4,000$ P.S.I.
ALL OTHER — $f'_c = 3,500$ P.S.I.

BAR STEEL REINFORCEMENT:
GRADE 60 — $f_y = 60,000$ P.S.I.
STAINLESS, GRADE 60 — $f_y = 60,000$ P.S.I.

FOUNDATION DATA

ABUTMENTS TO BE SUPPORTED ON PILING DRIVEN TO A REQUIRED DRIVING RESISTANCE OF TONS ** PER PILE AS DETERMINED BY THE MODIFIED GATES DYNAMIC FORMULA. ESTIMATED LONG.

PIER TO BE SUPPORTED ON PILING DRIVEN TO A REQUIRED DRIVING RESISTANCE OF TONS ** PER PILE AS DETERMINED BY THE MODIFIED GATES DYNAMIC FORMULA. ESTIMATED LONG.

** THE FACTORED AXIAL RESISTANCE OF PILES IN COMPRESSION USED FOR DESIGN IS THE REQUIRED DRIVING RESISTANCE MULTIPLIED BY A RESISTANCE FACTOR OF 0.5 USING MODIFIED GATES TO DETERMINE DRIVEN PILE CAPACITY.

HYDRAULIC DATA

100 YEAR FREQUENCY
 $Q_{100} = 2370$ C.F.S.
 $VEL_{100} = 4.82$ F.P.S.
 $HW_{100} = EL. 844.51$
WATERWAY AREA = 491.70 SQ. FT.
DRAINAGE AREA = 55.6 SQ. MI.
ROADWAY OVERTOPPING = N/A
SCOUR CRITICAL CODE = 5

2 YEAR FREQUENCY

$Q_2 = 560$ C.F.S.
 $VEL_2 = 2.1$ F.P.S.
 $HW_2 = EL. 840.30$

TRAFFIC VOLUME

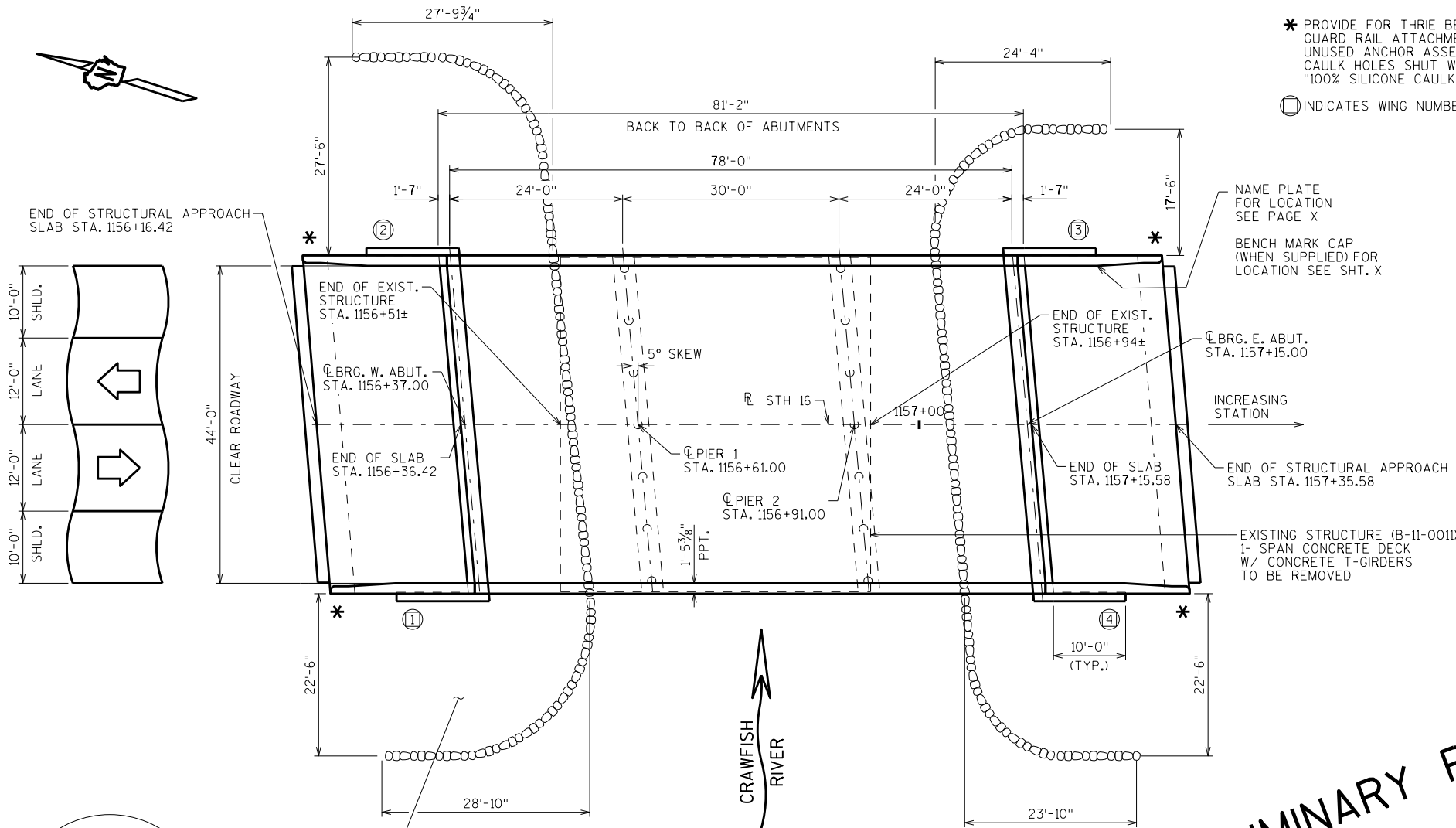
FEATURE ON
ADT = 14,400 (2024)
R.D.S. = 60 M.P.H.

FEATURE UNDER
ADT = ()
R.D.S. = M.P.H.

STRUCTURE DESIGN CONTACTS:

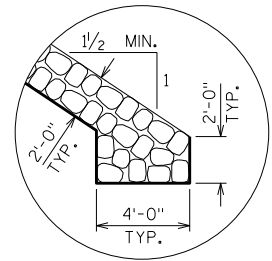
CARLA PRINCIPE (608) 261-6110
AARON BONK (608) 261-0261

NO.	DATE	REVISION	BY
 BUREAU OF STRUCTURES			
ACCEPTED CHIEF STRUCTURES DESIGN ENGINEER _____ DATE _____			
STRUCTURE B-11-172			
STH 16 OVER CRAWFISH RIVER			
COUNTY	COLUMBIA	TOWN	COLUMBUS
DESIGN SPEC. AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS			
DESIGNED BY	DESIGNED CK'D.	DRAWN BY	PLANS CK'D.
CSP	CSP	SCL	CSP
GENERAL PLAN			SHEET 1 OF 2

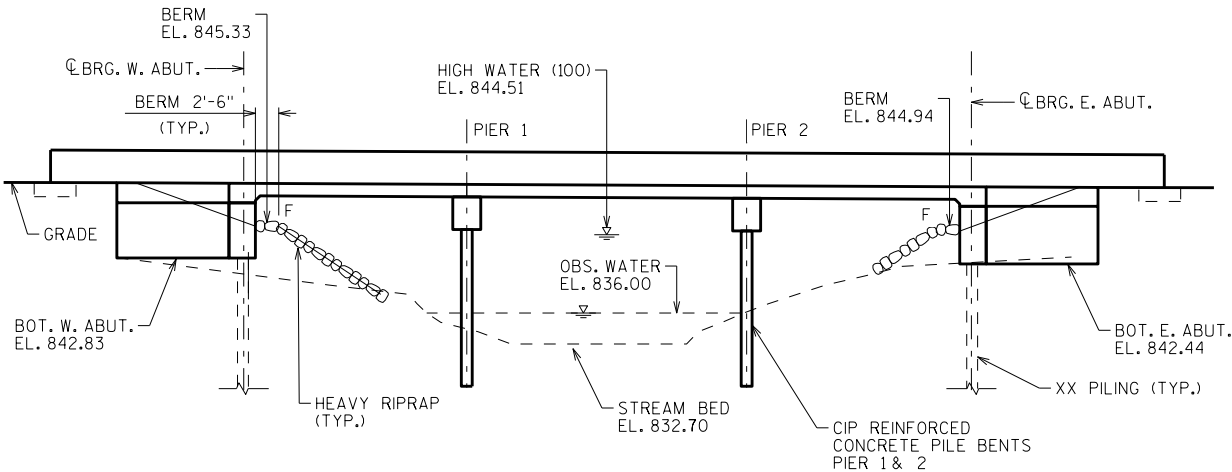


PLAN

3-SPAN FLAT SLAB

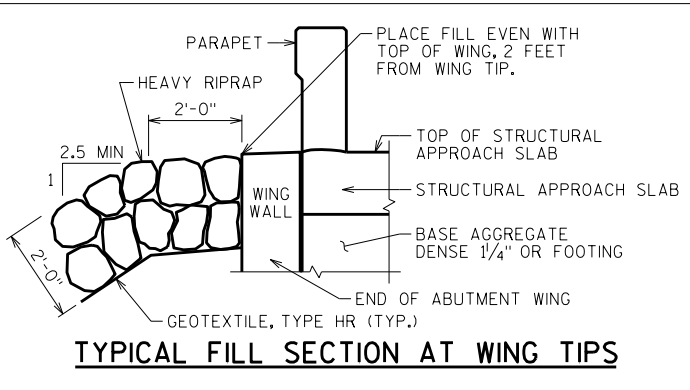


RIPRAP TOE DETAIL



ELEVATION

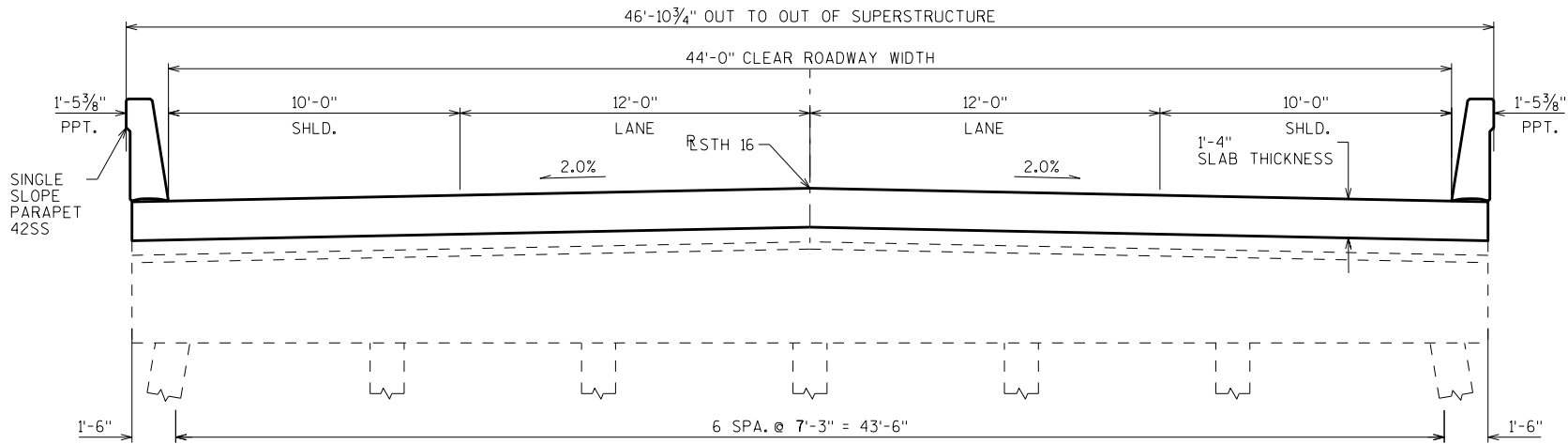
LOOKING DOWNSTREAM



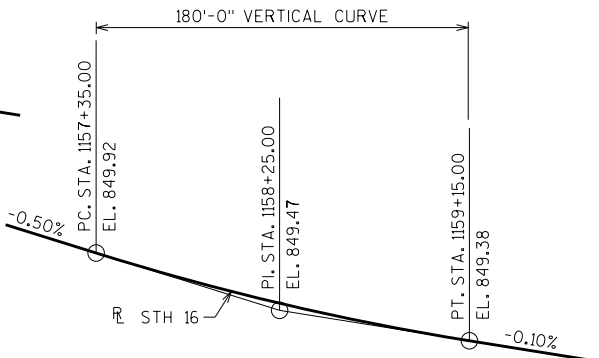
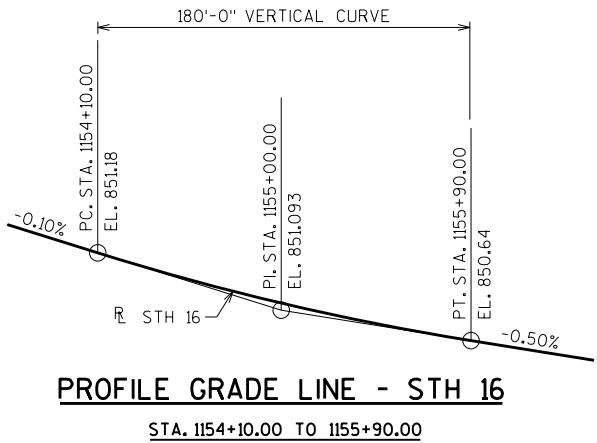
TYPICAL FILL SECTION AT WING TIPS

LIST OF DRAWINGS

1. GENERAL PLAN
2. CROSS SECTION & QUANTITIES



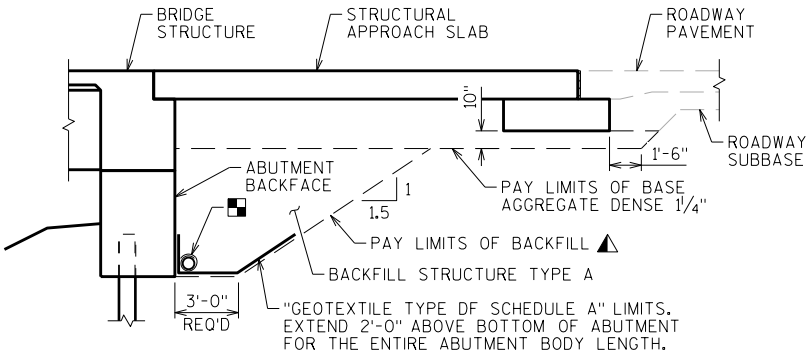
CROSS SECTION THRU ROADWAY



PROFILE GRADE LINE - STH 16
STA. 1154+10.00 TO 1155+90.00
STA. 1157+35.00 TO STA. 1159+15.00

TOTAL ESTIMATED QUANTITIES

BID ITEM NUMBER	BID ITEMS	UNIT	SUPER.	W. STRUCT. APP. SLAB	WEST ABUT.	PIER 1	PIER 2	EAST ABUT.	E. STRUCT. APP. SLAB	TOTALS
203.0600.S	REMOVING OLD STRUCTURE OVER WATERWAY WITH MINIMAL DEBRIS STA.	LS	—	—	—	—	—	—	—	1
206.1000	EXCAVATION FOR STRUCTURES BRIDGES B-11-172	LS	—	—	—	—	—	—	—	1
210.1500	BACKFILL STRUCTURE TYPE A	TON								
502.0100	CONCRETE MASONRY BRIDGES	CY								
502.3200	PROTECTIVE SURFACE TREATMENT	SY								
502.3210	PIGMENTED SURFACE SEALER	SY								
505.0400	BAR STEEL REINFORCEMENT HS STRUCTURES	LB								
505.0600	BAR STEEL REINFORCEMENT HS COATED STRUCTURES	LB								
505.0800.S	BAR STEEL REINFORCEMENT HS STAINLESS STRUCTURES	LB								
516.0500	RUBBERIZED MEMBRANE WATERPROOFING	SY								
550.1100	PILING STEEL HP 10-INCH X 42 LB	LF								
550.2144	PILING CIP CONCRETE 14 X 0.25-INCH	LF								
606.0300	RIPRAP HEAVY	CY								
612.0406	PIPE UNDERDRAIN WRAPPED 6-INCH	LF								
645.0120	GEOTEXTILE TYPE HR	SY								
	NON-BID ITEMS									
	FILLER	SIZE	—	—	—	—	—	—	—	1/2", 3/4", 1/2"



TYPICAL SECTION THRU ABUTMENT

- ▲ BACKFILL PAY LIMITS. BACKFILL BEYOND BACKFILL PAY LIMITS SHALL BE INCIDENTAL TO EXCAVATION FOR STRUCTURES. LIMITS OF EXCAVATION SHALL BE DETERMINED BY THE CONTRACTOR.
- PIPE UNDERDRAIN WRAPPED (6 INCH). SLOPE 0.5% MIN. TO SUITABLE DRAINAGE. ATTACH RODENT SHIELD AT ENDS OF PIPE UNDERDRAIN.

GENERAL NOTES

DRAWINGS SHALL NOT BE SCALED.

BAR STEEL REINFORCEMENT SHALL BE EMBEDDED 2" CLEAR UNLESS OTHERWISE SHOWN OR NOTED.

THE FIRST OR FIRST TWO DIGITS OF THE BAR MARK SIGNIFIES THE BAR SIZE.

BEVEL EXPOSED EDGES OF CONCRETE 3/4" UNLESS OTHERWISE NOTED.

THE UPPER LIMITS OF "EXCAVATION FOR STRUCTURES B-11-172" SHALL BE THE EXISTING GROUNDLINE.

AT THE BACK FACE OF ABUTMENT ALL VOLUME WHICH CANNOT BE PLACED BEFORE ABUTMENT CONSTRUCTION AND IS NOT OCCUPIED BY THE NEW STRUCTURE SHALL BE BACKFILLED WITH STRUCTURE BACKFILL TYPE A. ALSO EXCLUDED IS THE "BASE AGGREGATE DENSE 1 1/4-INCH" AS DETAILED ON THE STRUCTURAL APPROACH SLAB SHEETS.

EXCAVATION BELOW THE ABUTMENT AND ABUTMENT BEDDING MATERIALS REQUIRES ENGINEER APPROVAL. GEOTEXTILE SHALL BE SET AT THE BOTTOM OF EXCAVATION AND EXTEND 2'-0" ABOVE BOTTOM OF ABUTMENT.

THE QUANTITY FOR BACKFILL STRUCTURE IS CALCULATED BASED ON THE DETAIL SHOWN IN THE PLANS.

PROTECTIVE SURFACE TREATMENT TO BE APPLIED TO THE ENTIRE EXPOSED TOP OF DECK AND APPROACH SLAB SURFACES AND TO THE VERTICAL AND HORIZONTAL SURFACES OF THE PAVING NOTCHES AT ABUTMENT DIAPHRAGMS.

PIGMENTED SURFACE SEALER TO BE APPLIED TO THE FRONT FACE AND THE TOP OF THE PARAPETS, INCLUDING PARAPETS ON APPROACH SLABS.

THE SLOPE OF THE FILL IN FRONT OF THE ABUTMENTS SHALL BE COVERED WITH HEAVY RIPRAP AND GEOTEXTILE TYPE "HR" TO THE EXTENT SHOWN ON SHEET 1 AND THE ABUTMENT DETAILS.

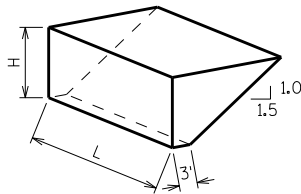
AT ABUTMENTS, HP 12X53 STEEL PILING MAY BE USED IN LIEU OF HP 10X42 STEEL PILING. PAYMENT SHALL BE BASED ON BID PRICE FOR HP 10X42 STEEL PILING.

SLAB FALSEWORK SHALL BE SUPPORTED ON PILES OR THE SUBSTRUCTURE, UNLESS AN ALTERNATE METHOD IS APPROVED BY THE ENGINEER.

THE EXISTING STREAM BED SHALL BE USED AS THE UPPER LIMITS OF EXCAVATION AT THE PIERS.

AT ABUTMENTS AND PIER(S), CONCRETE POURED UNDER WATER WILL BE ALLOWED AND SHALL BE DONE IN ACCORDANCE WITH SECTION 502.3.5.3 OF THE STANDARD SPECIFICATIONS.

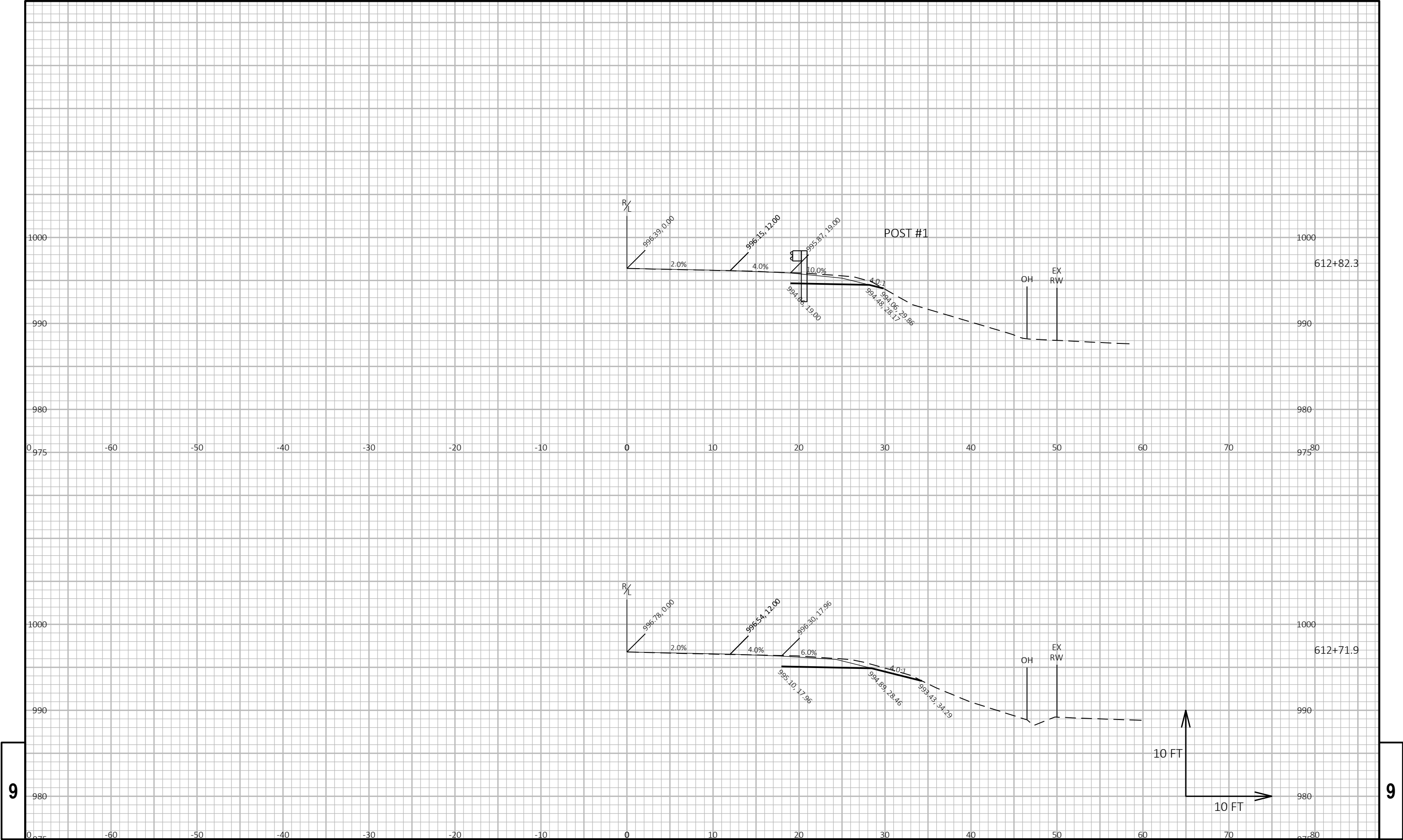
THE CONTRACTOR SHALL SUPPLY A NEW NAME PLATE IN ACCORDANCE WITH SECTION 502.3.11 OF THE STANDARD SPECIFICATIONS AND THE STANDARD DETAIL DRAWINGS. NAME PLATE TO SHOW ORIGINAL CONSTRUCTION YEAR.



ABUTMENT BACKFILL DIAGRAM
FOR WINGS PARALLEL TO ROADWAY

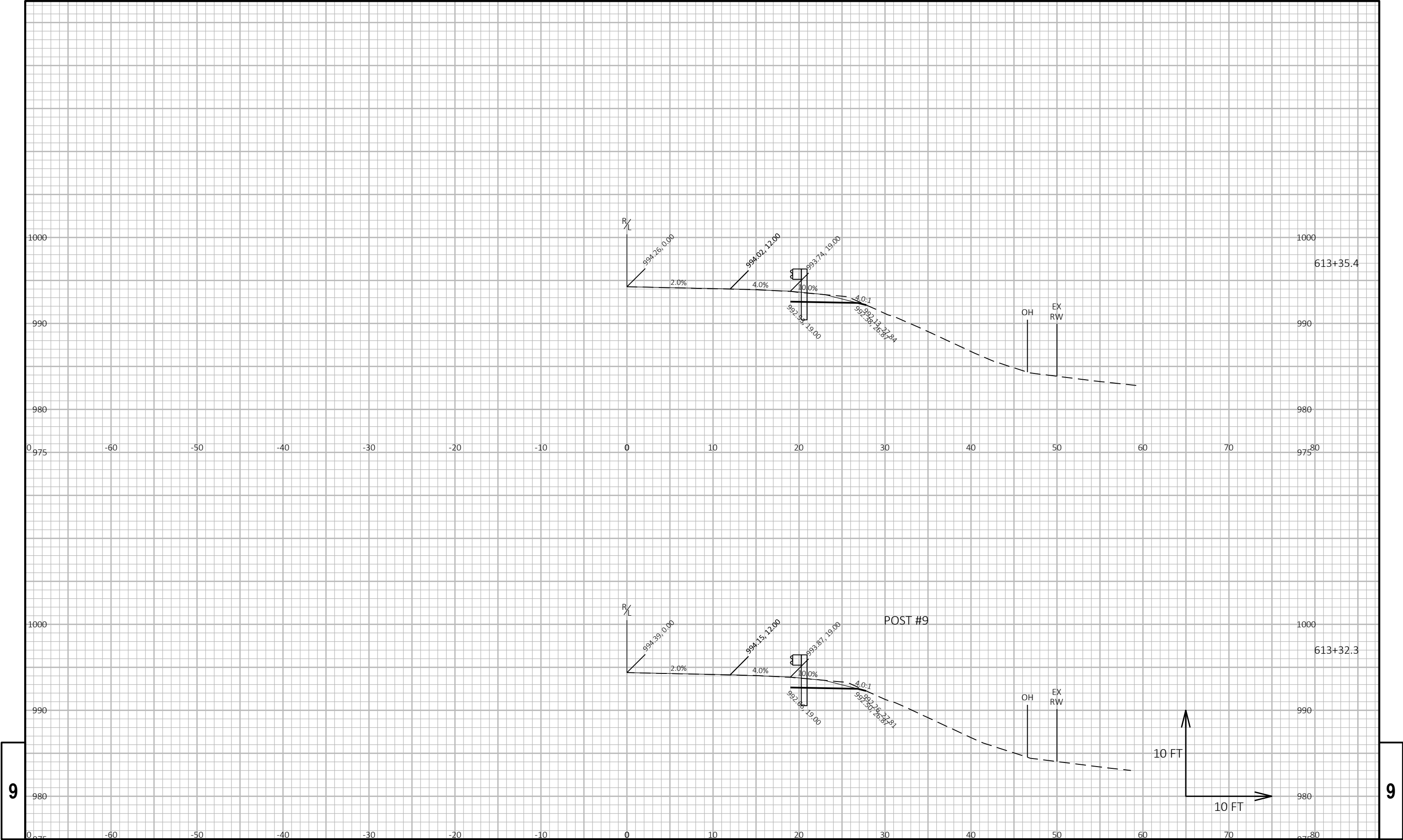
L = OUT TO OUT OF ABUTMENT, INCLUDING WINGS (FT)
H = AVERAGE ABUTMENT FILL HEIGHT (FT)
EF = EXPANSION FACTOR (1.20 FOR CY BID ITEMS AND 1.00 FOR TON BID ITEMS)
 $V_{CF} = (L)(3.0')(H) + (L)(0.5)(1.5H)(H)$
 $V_{CY} = V_{CF}(EF)/27$
 $V_{TON} = V_{CY}(2.0)$

NO.	DATE	REVISION	BY
STATE OF WISCONSIN DEPARTMENT OF TRANSPORTATION STRUCTURES DESIGN SECTION			
STRUCTURE B-11-172			
DRAWN BY		CSP	PLANS CK'D. SCL
CROSS SECTION & QUANTITIES		SHEET 2	



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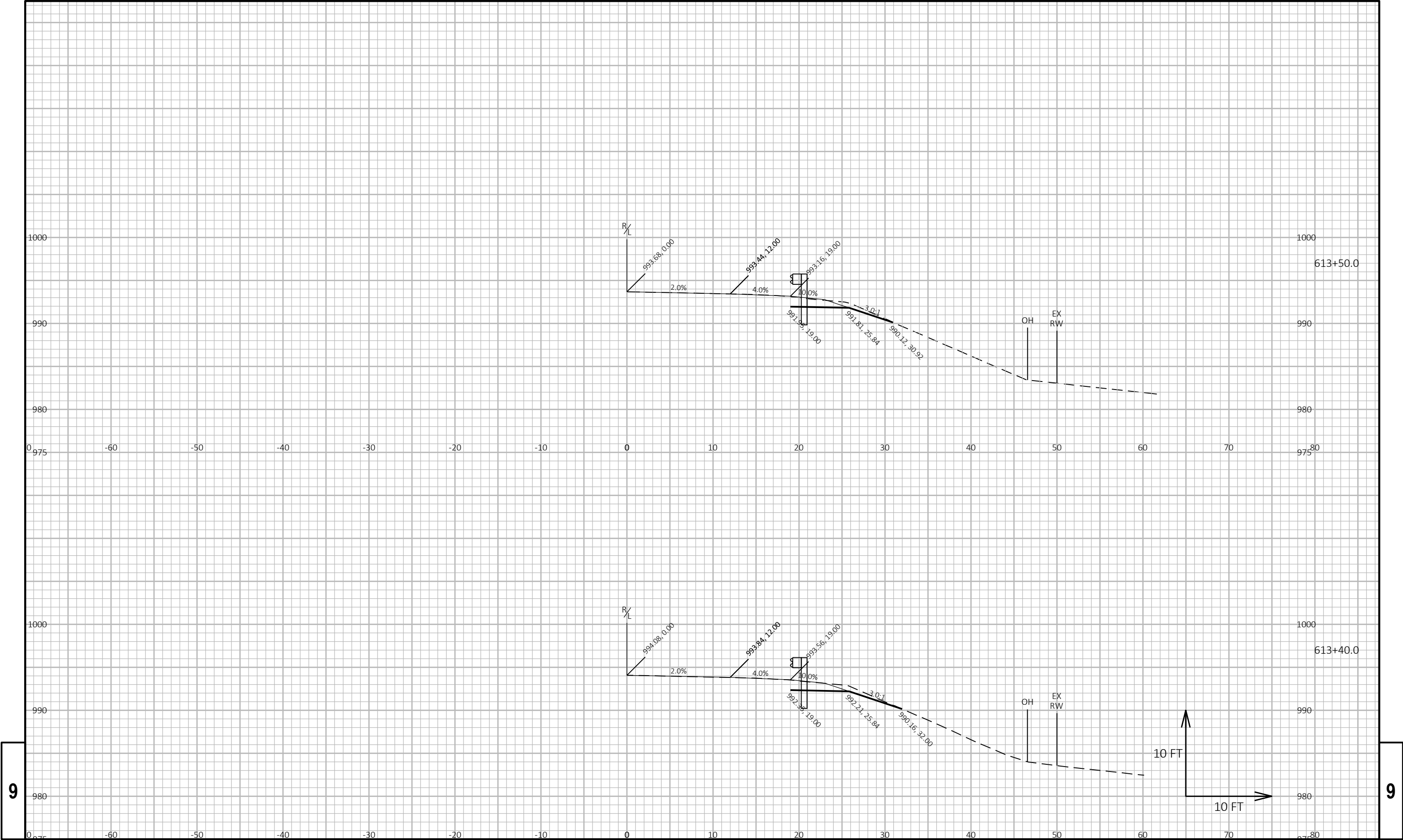
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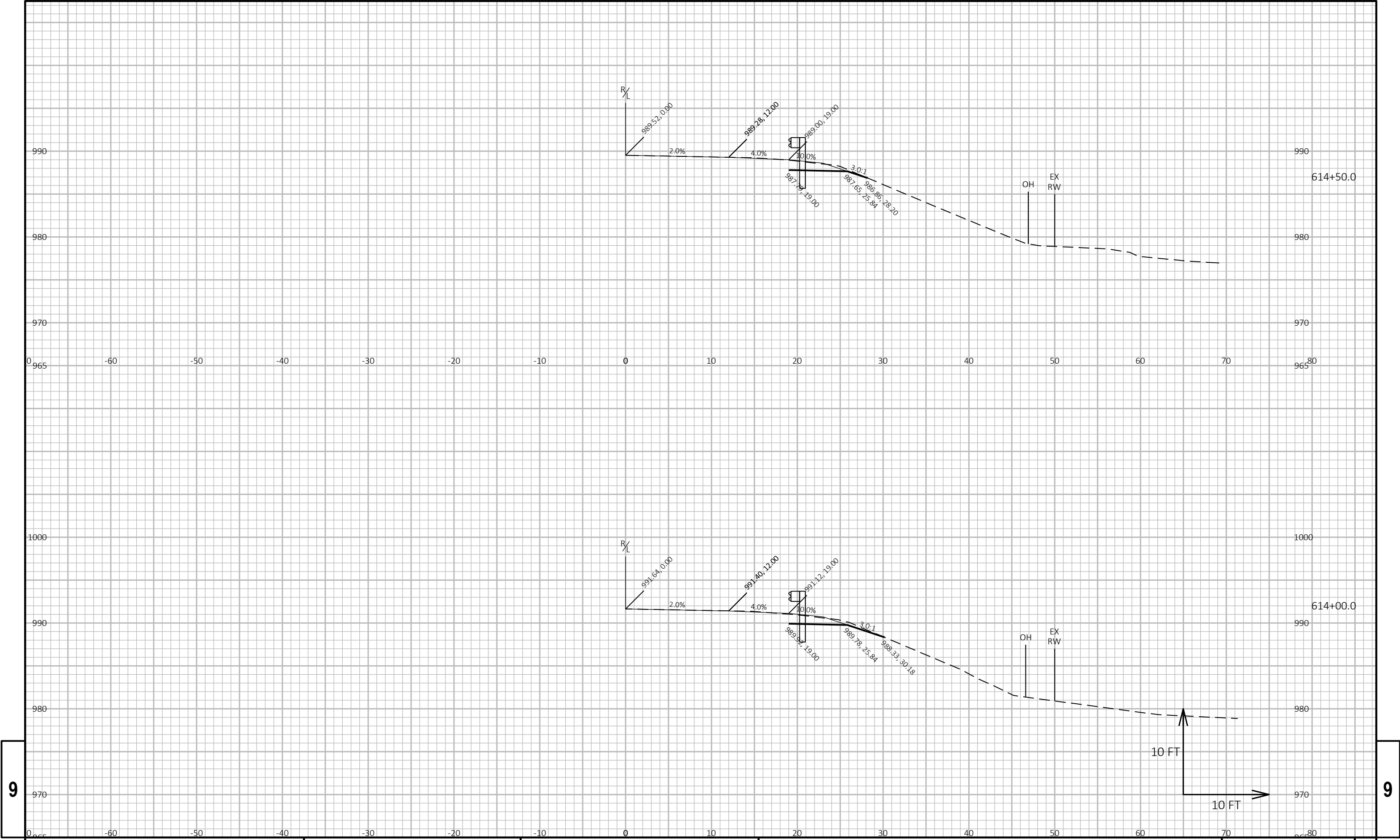
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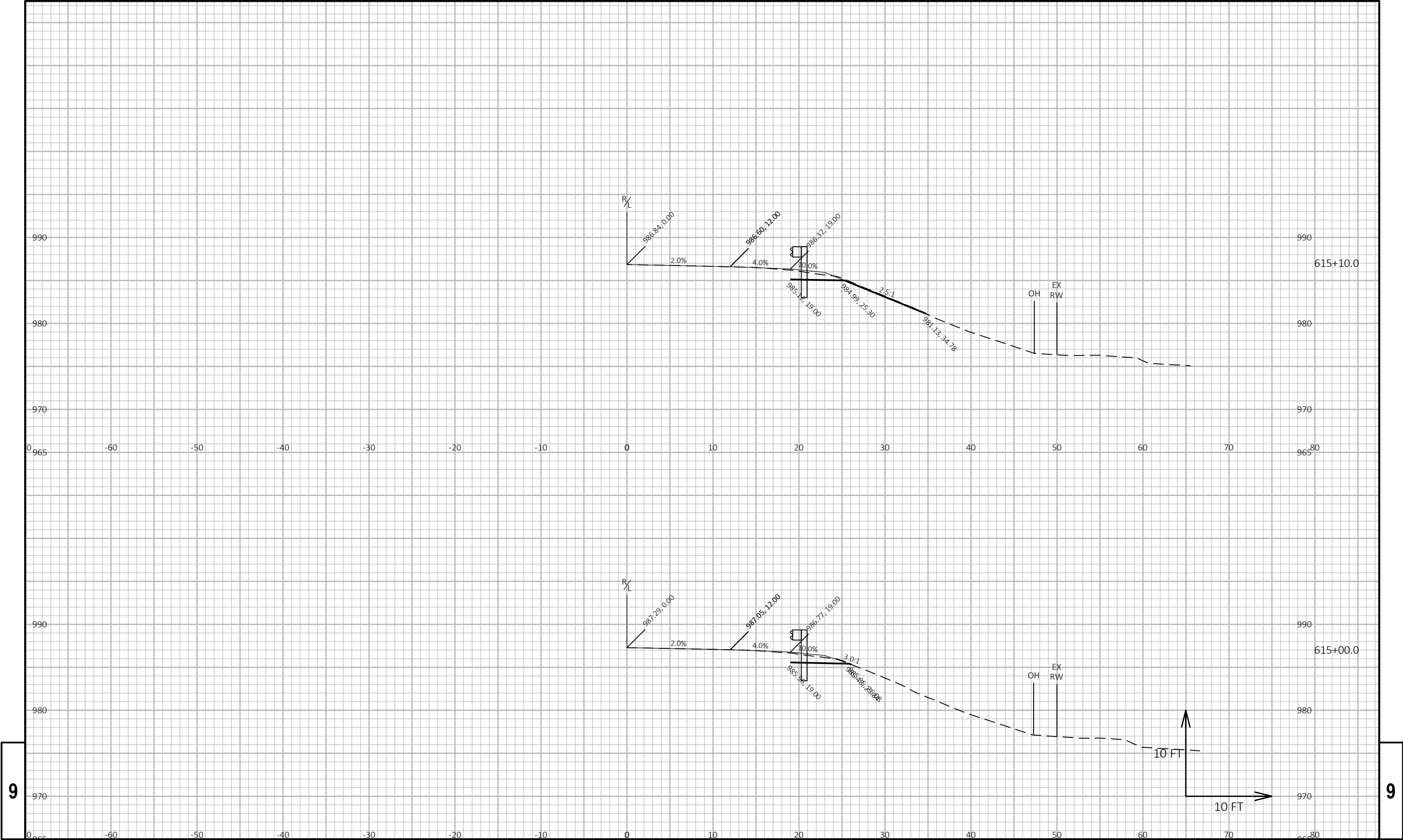
PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	CROSS SECTIONS: STH 16	SHEET	E
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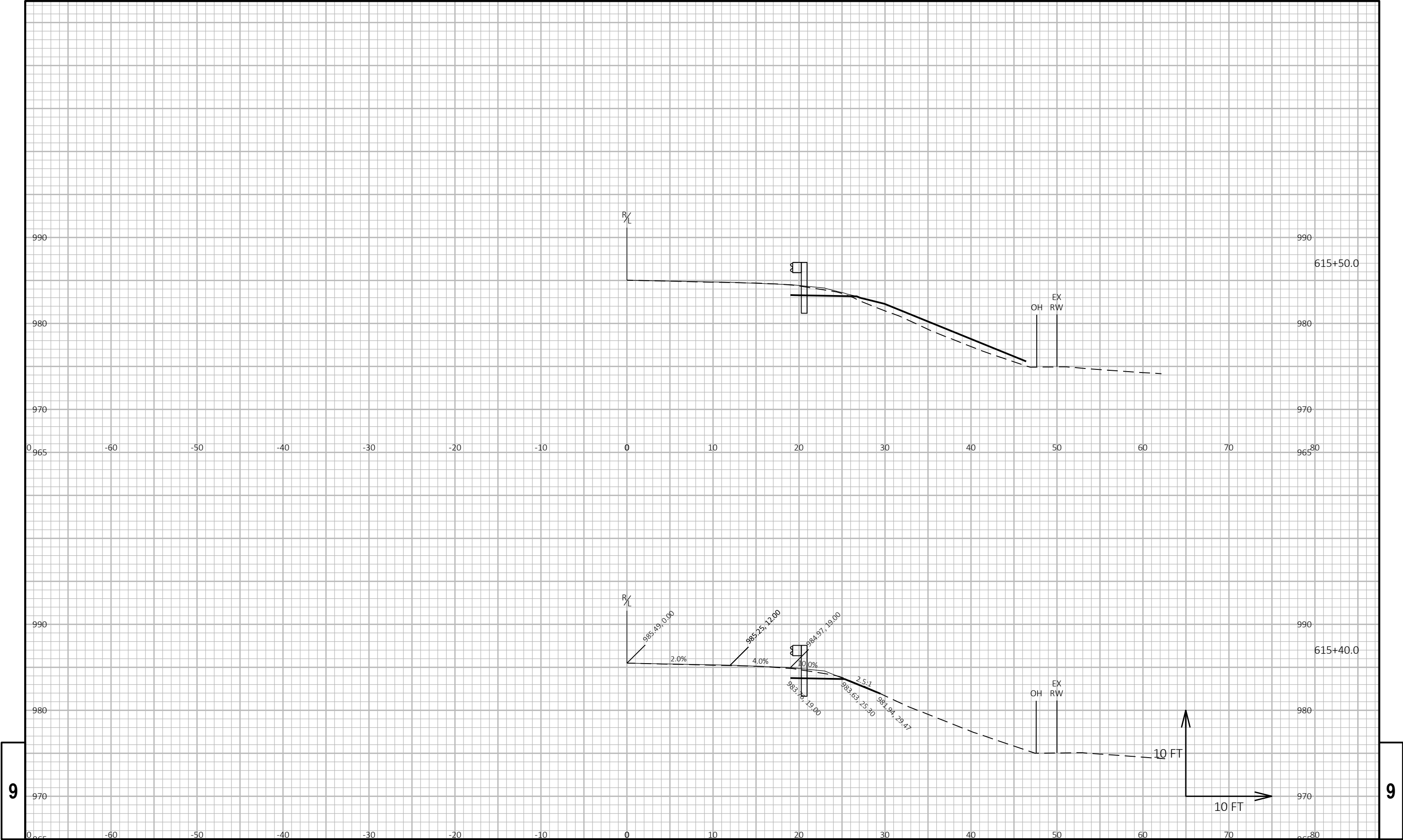
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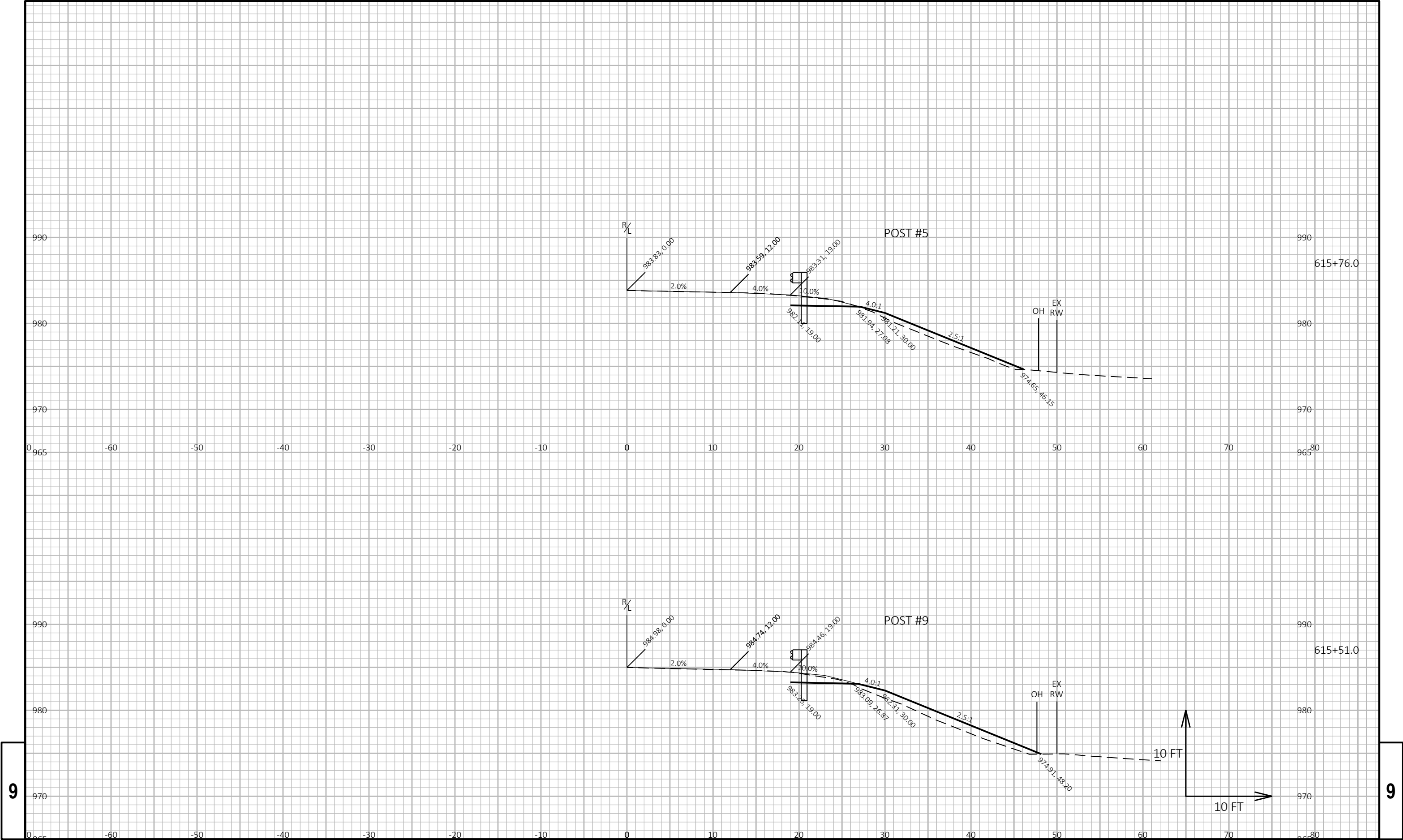
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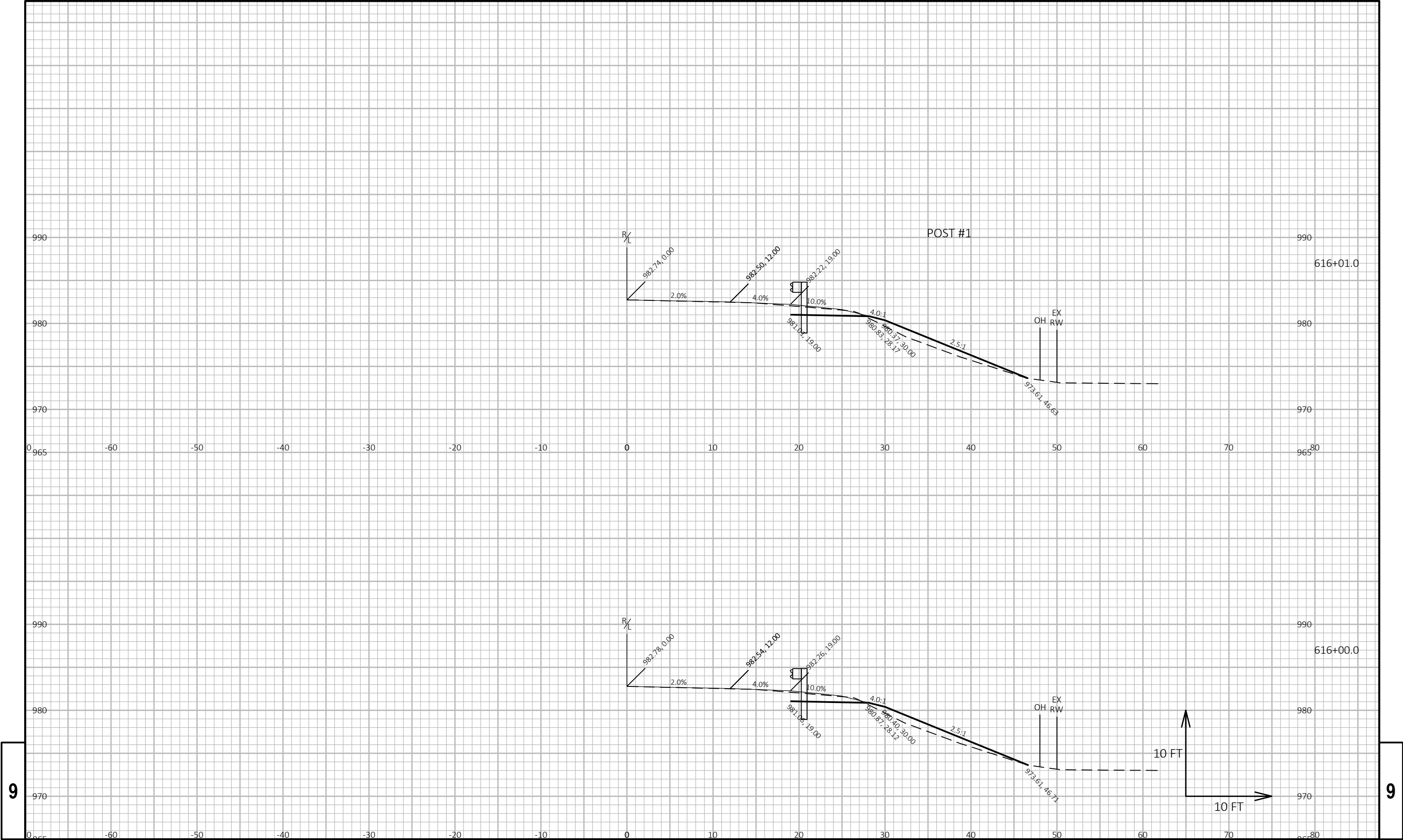
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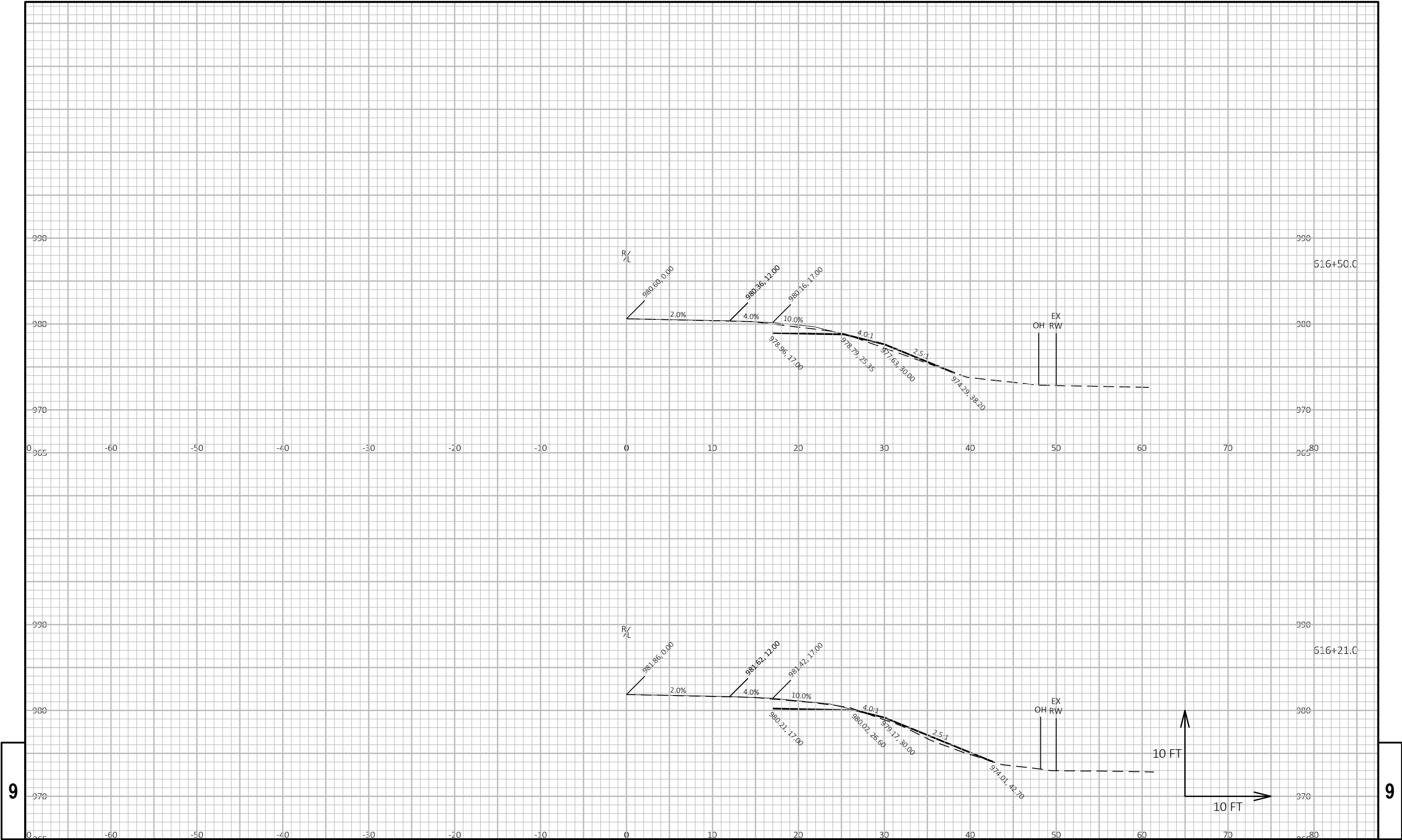
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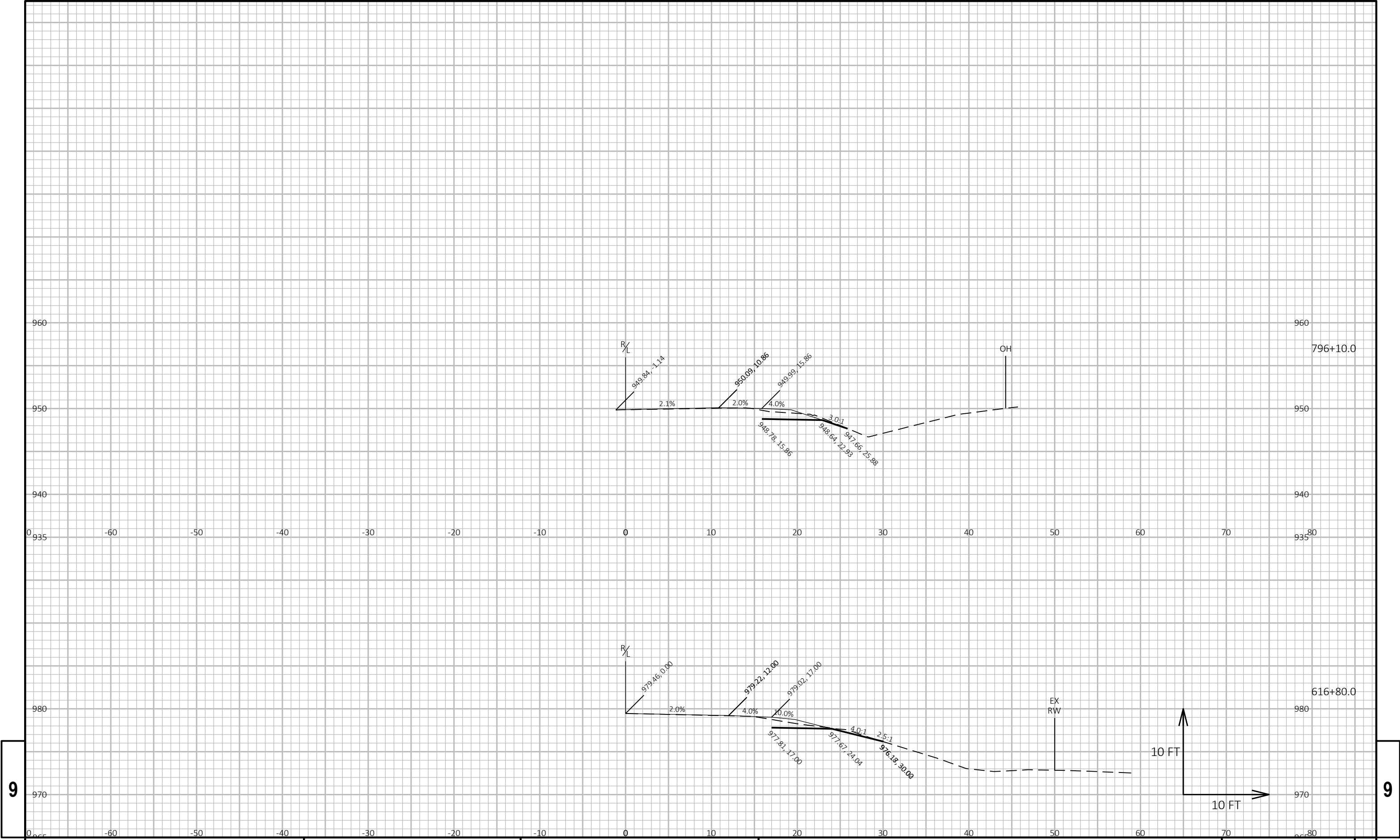
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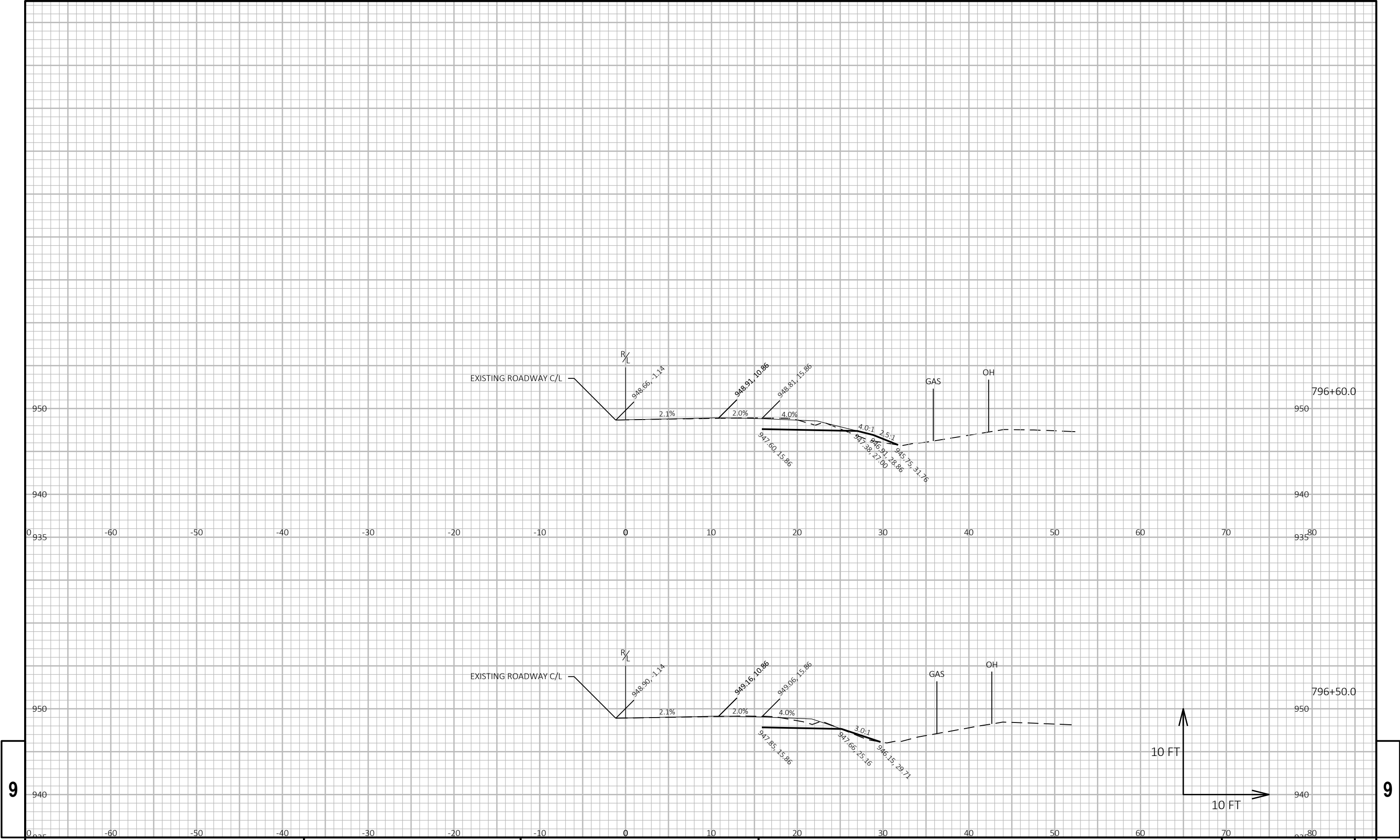
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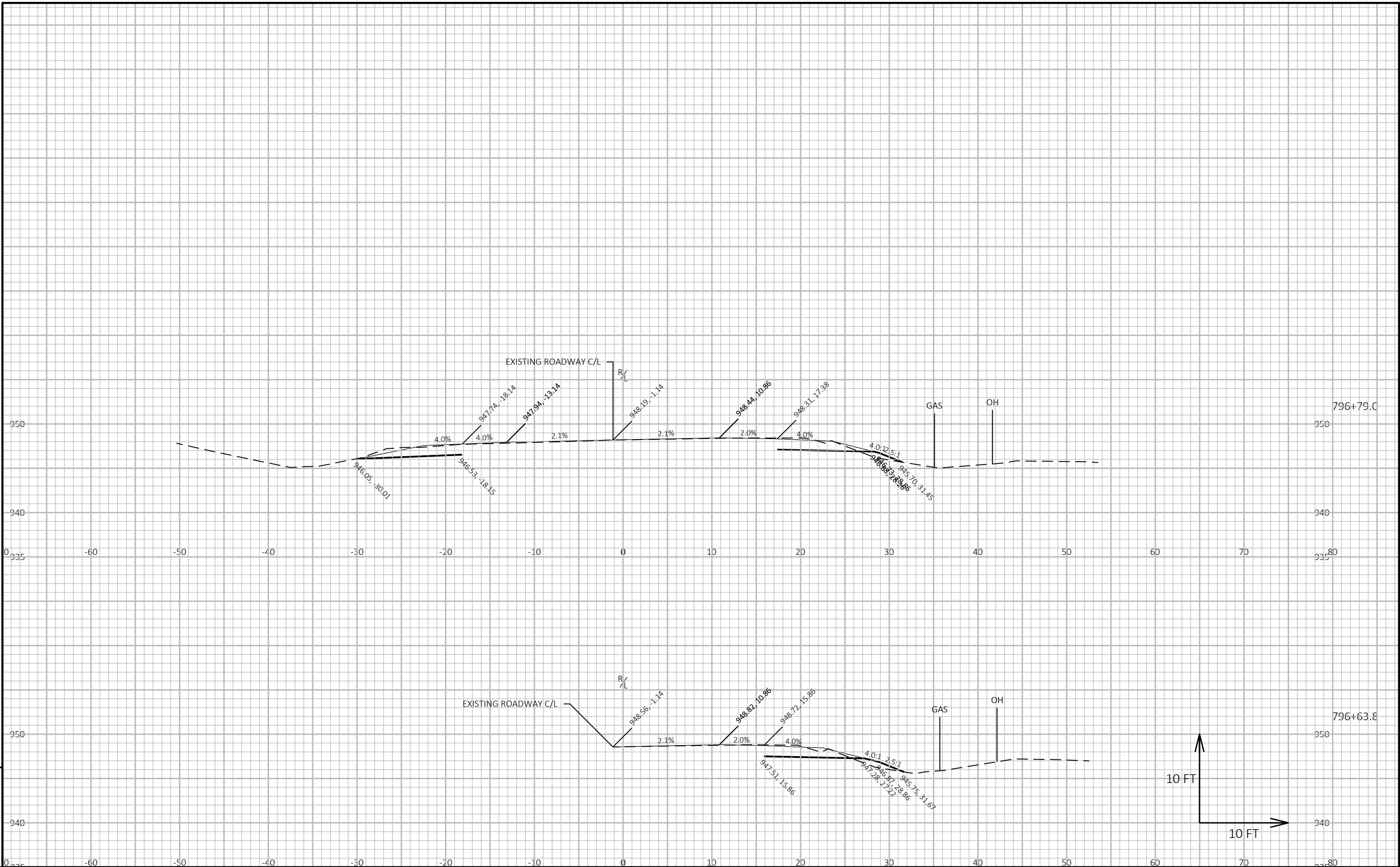
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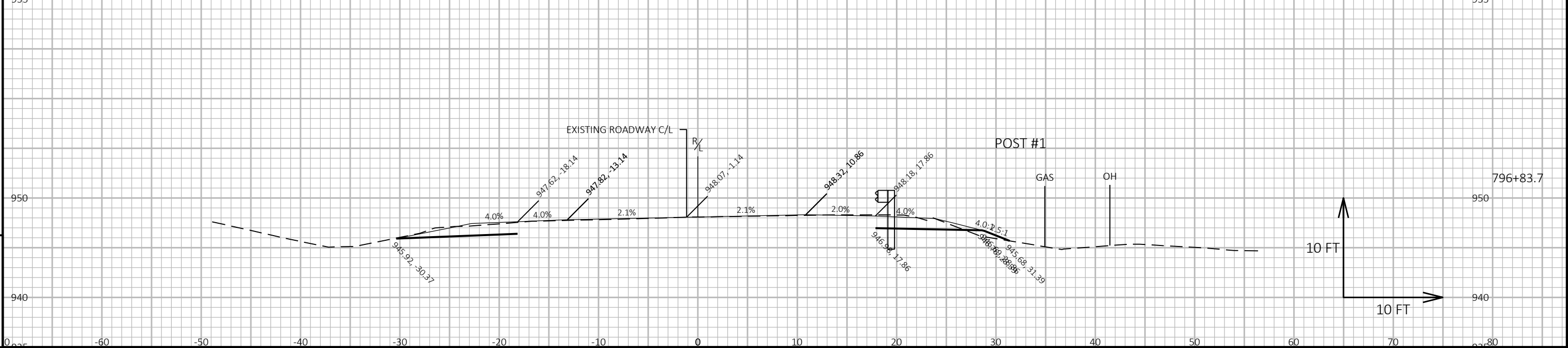
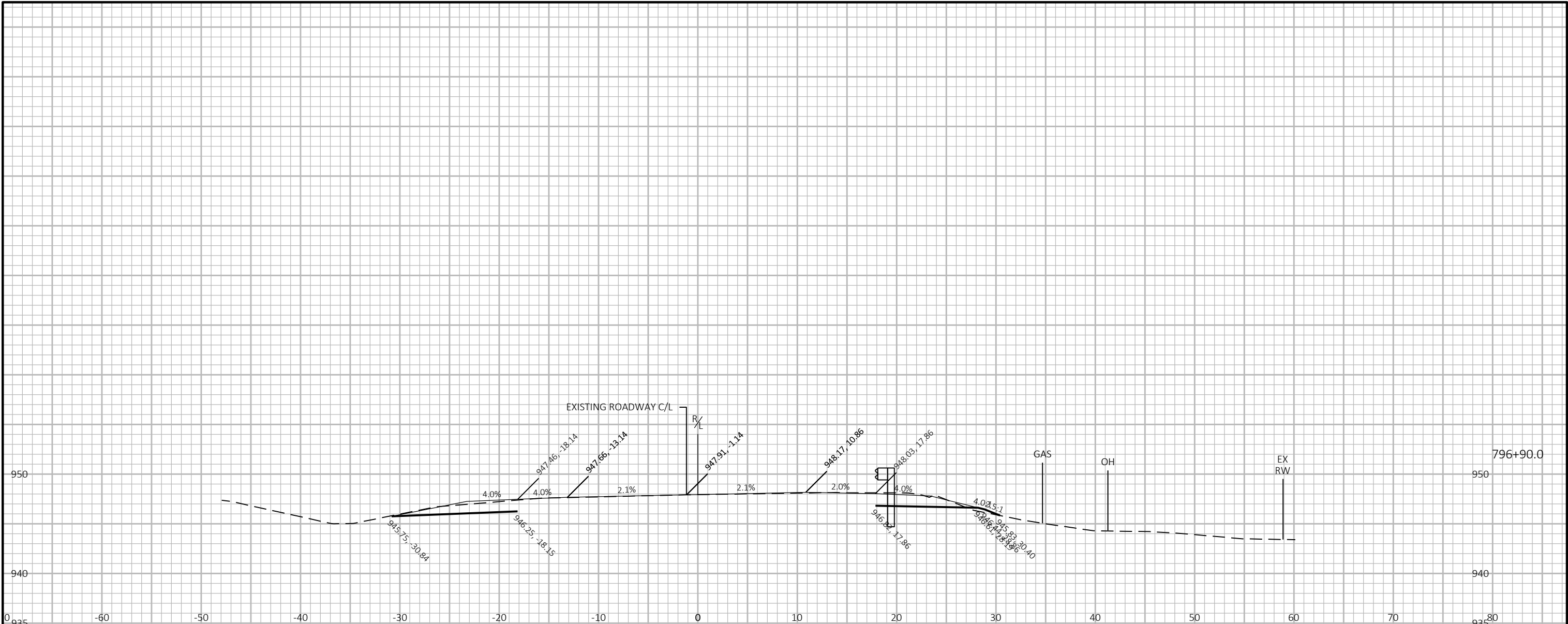


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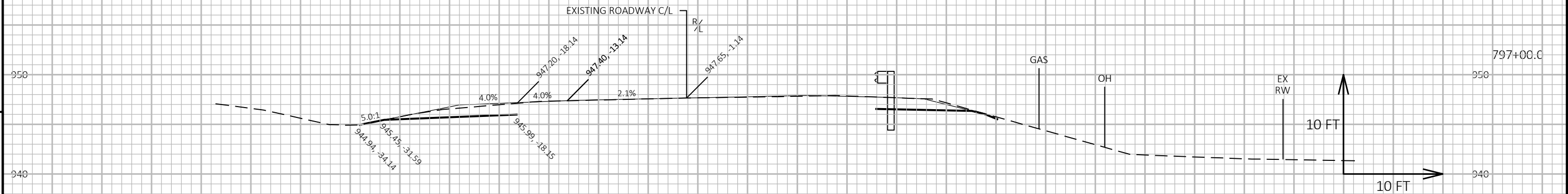
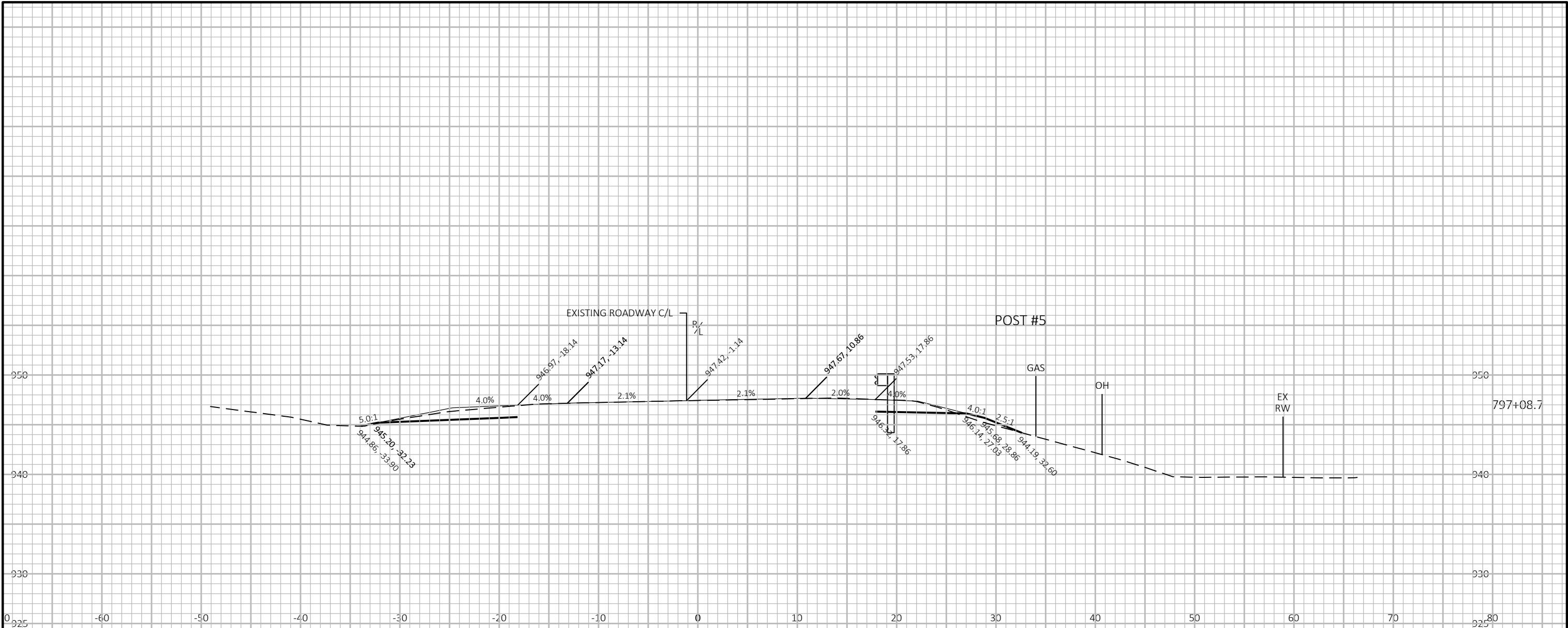
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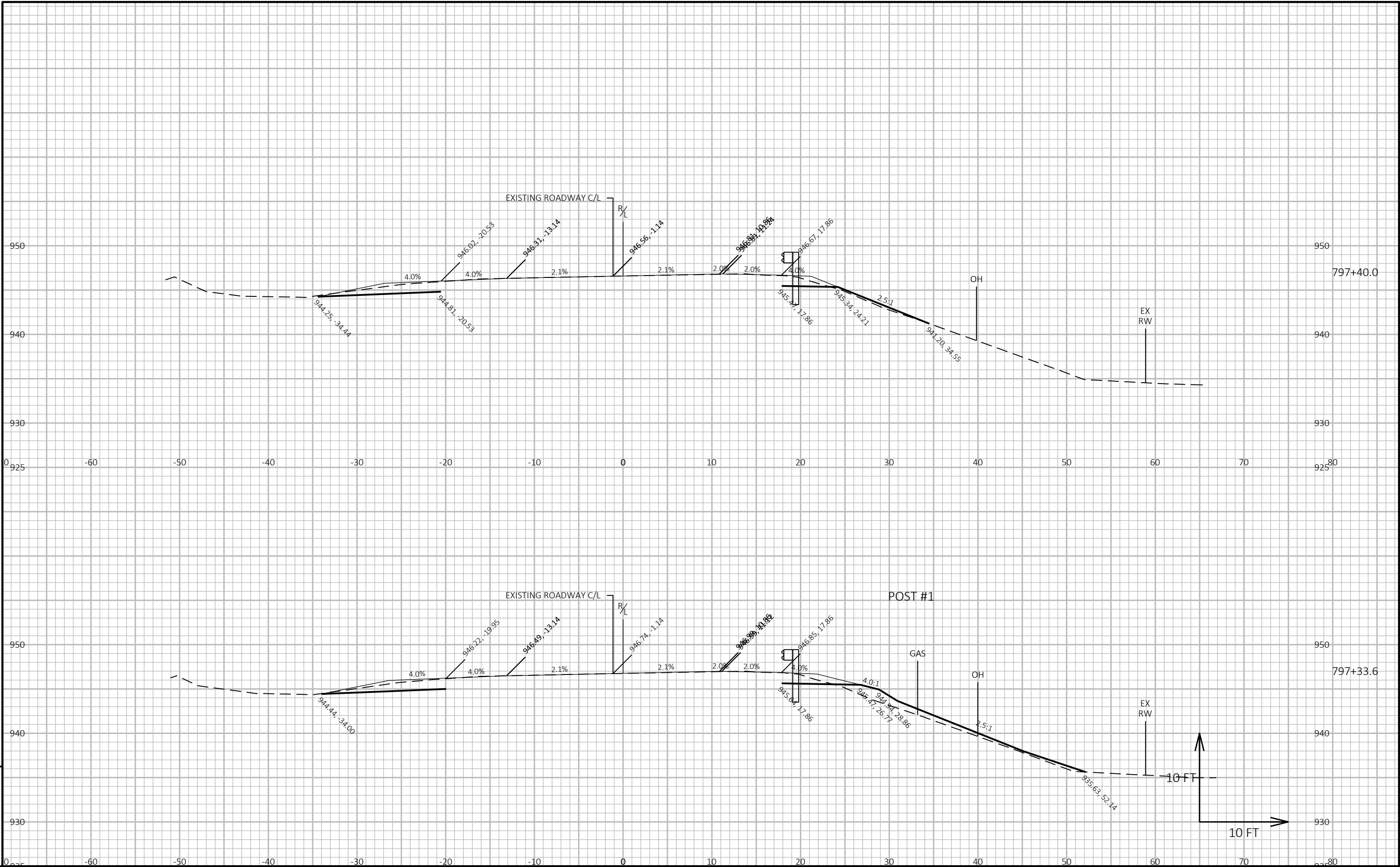
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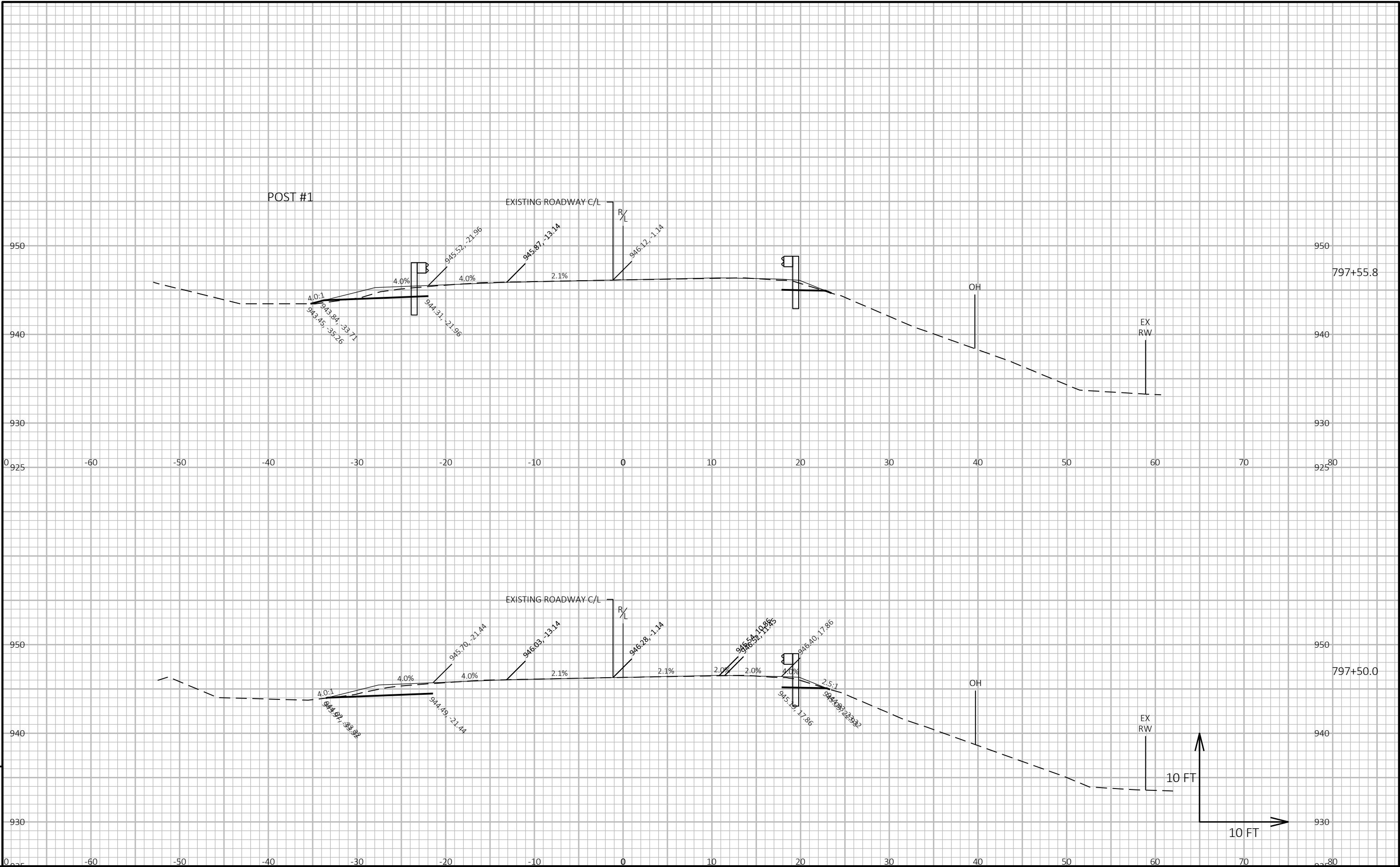


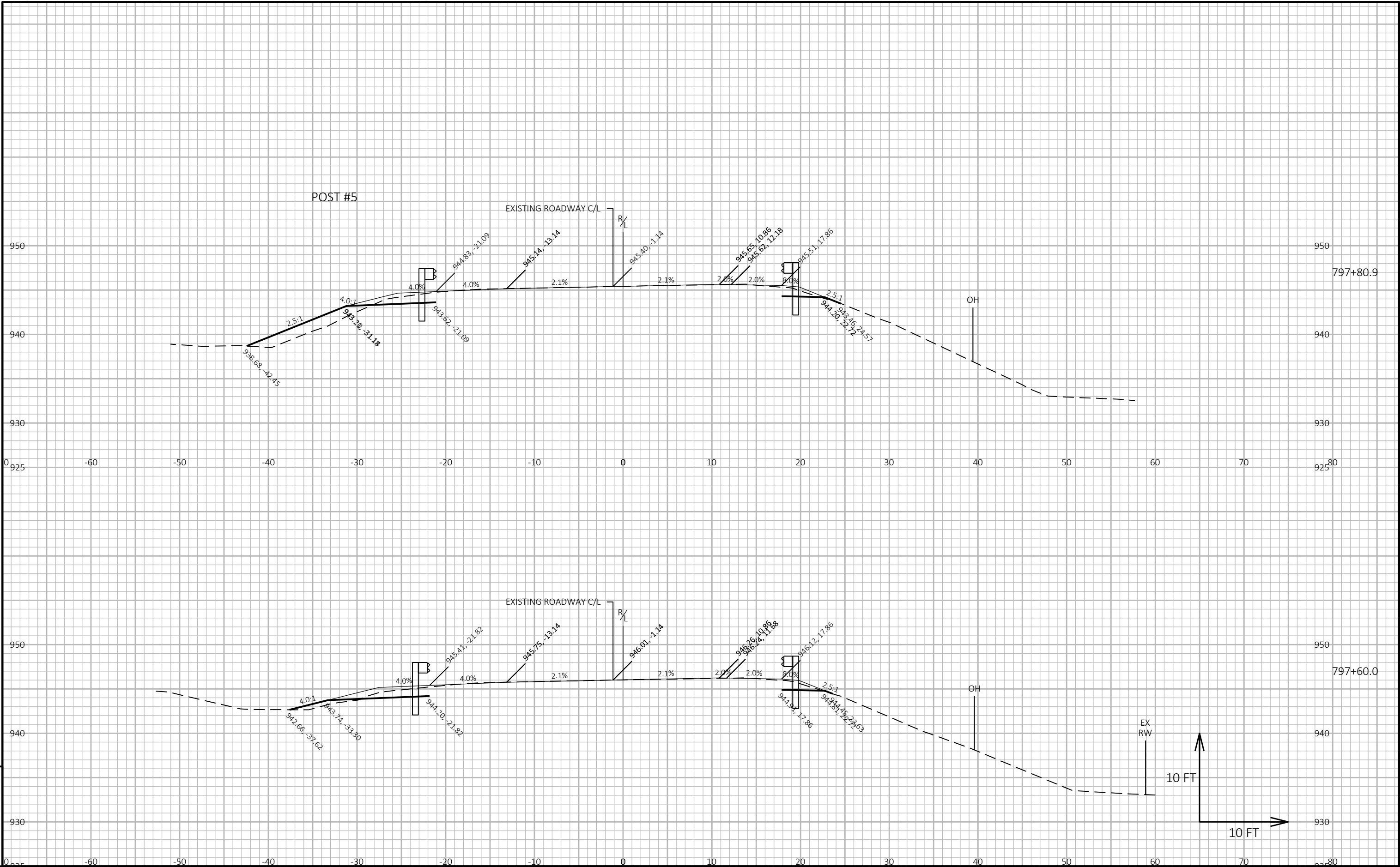


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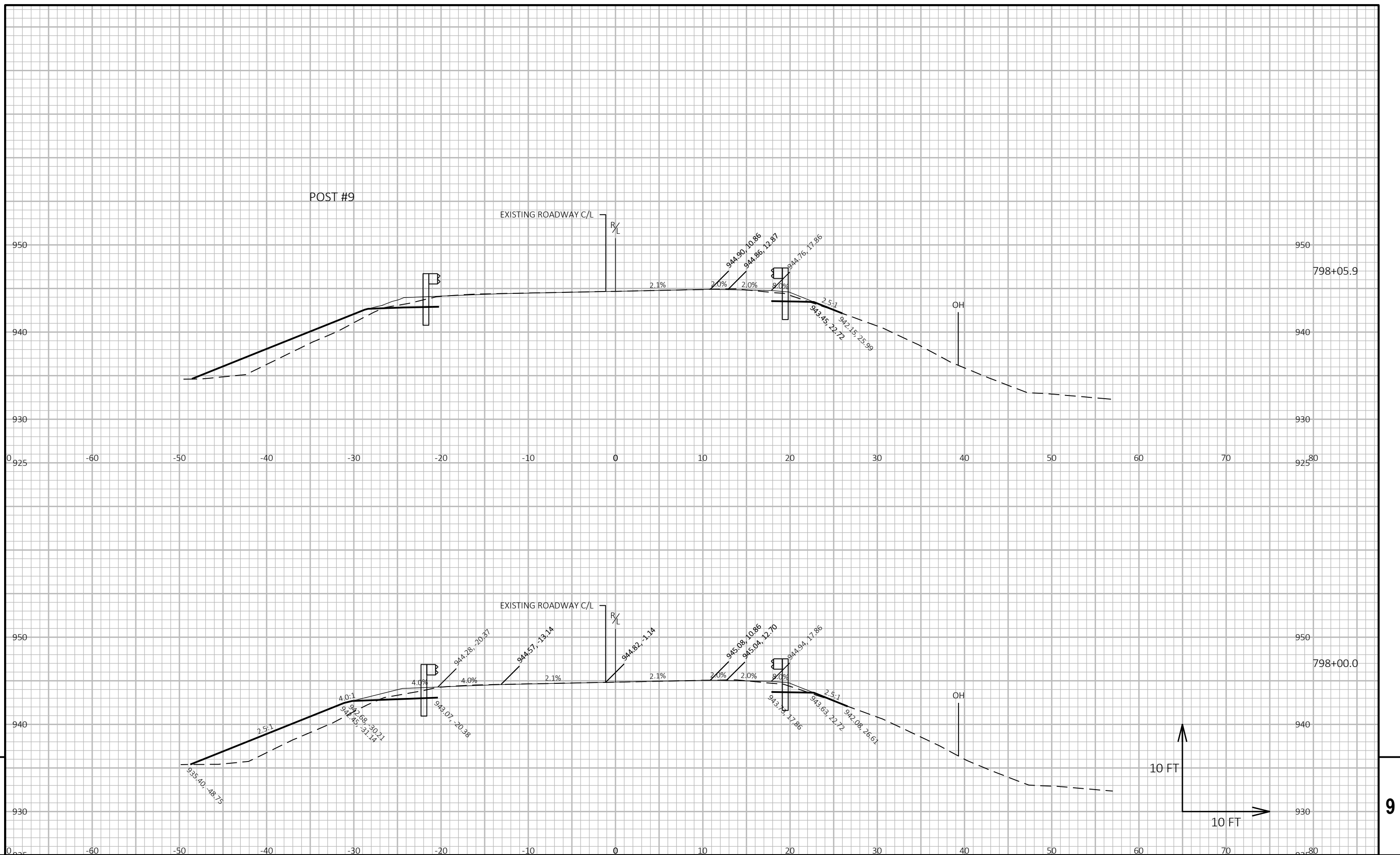
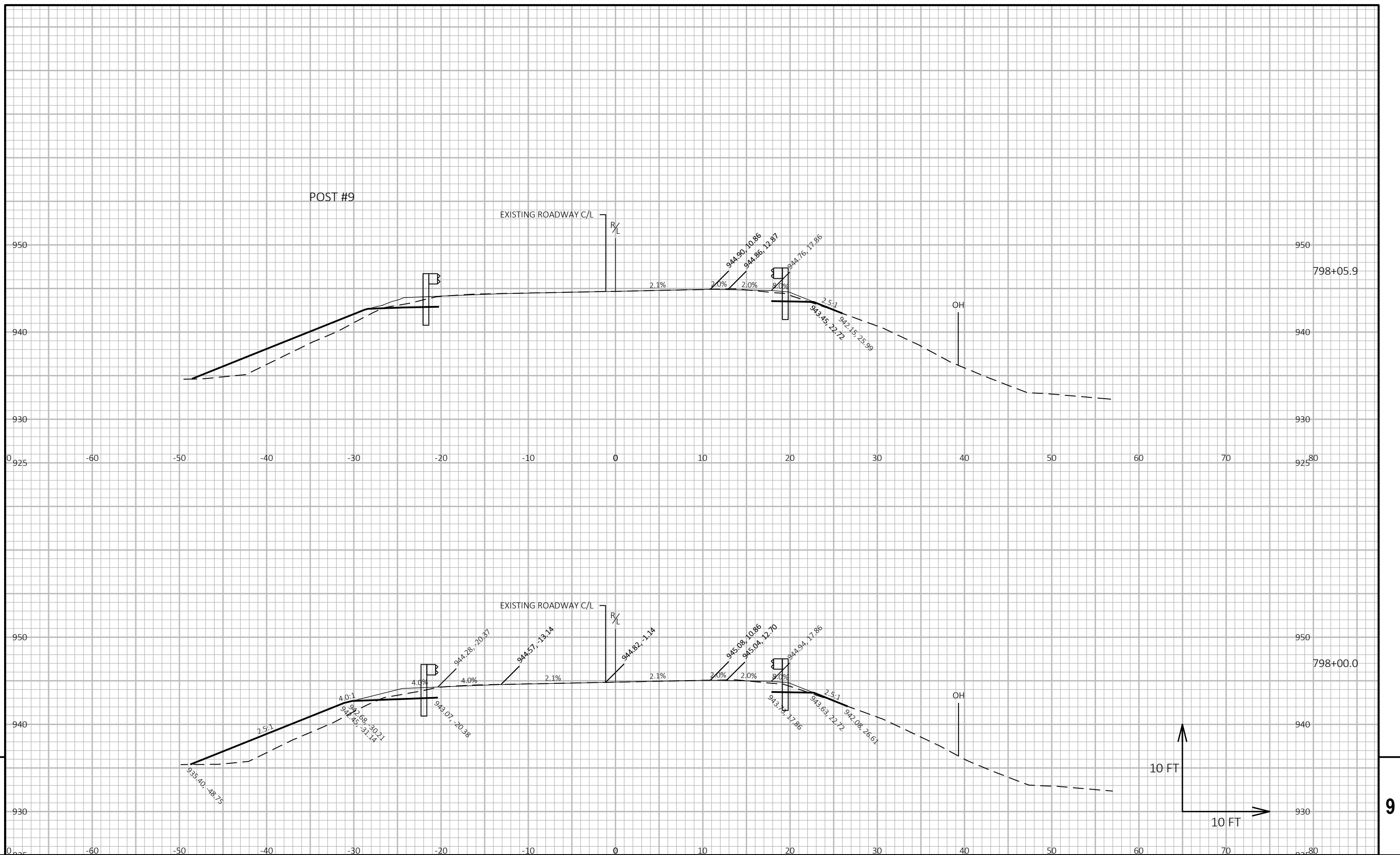




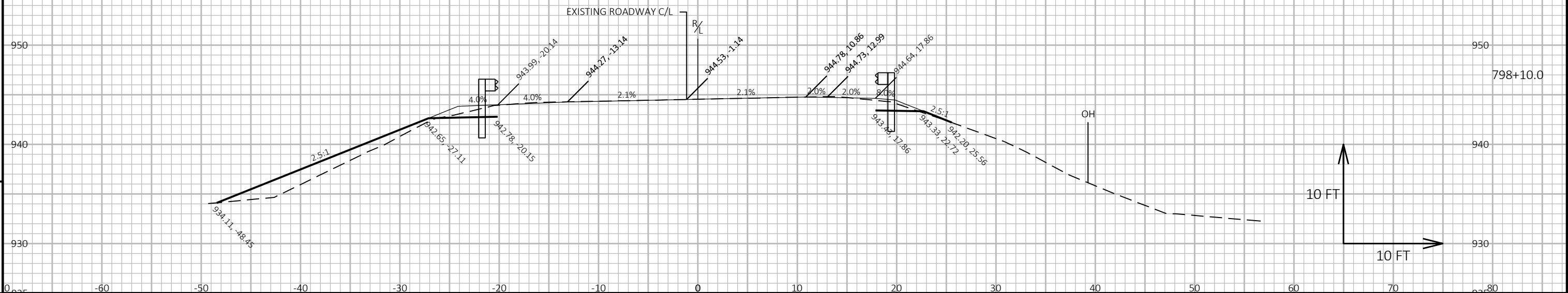
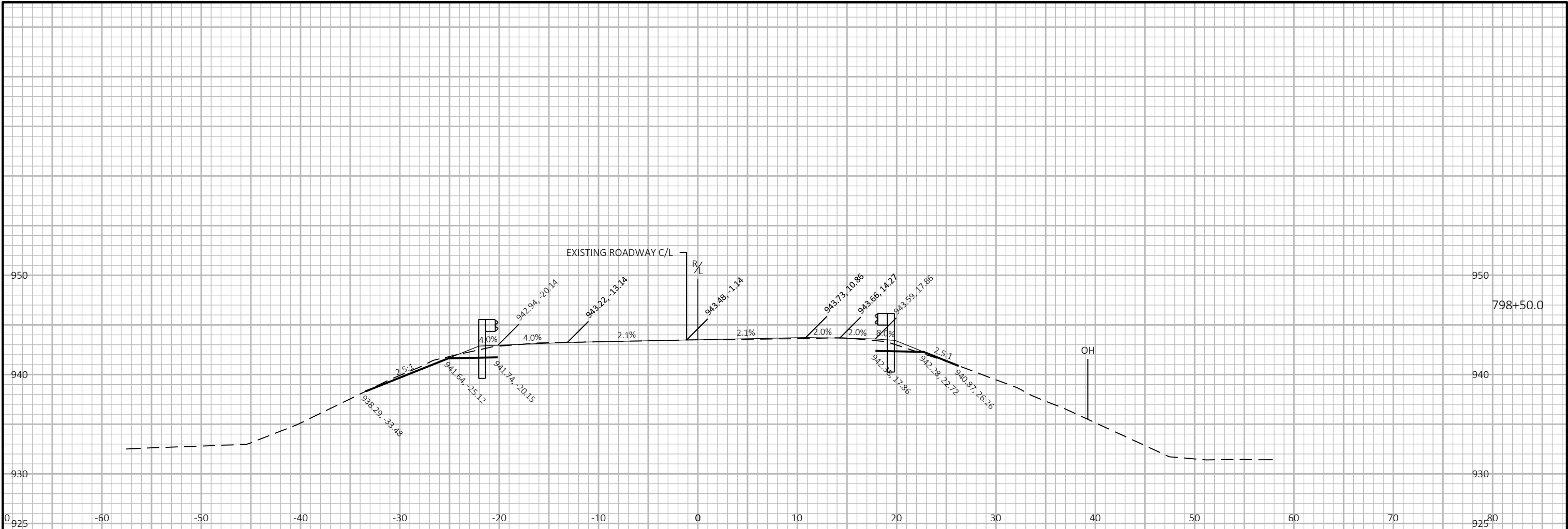


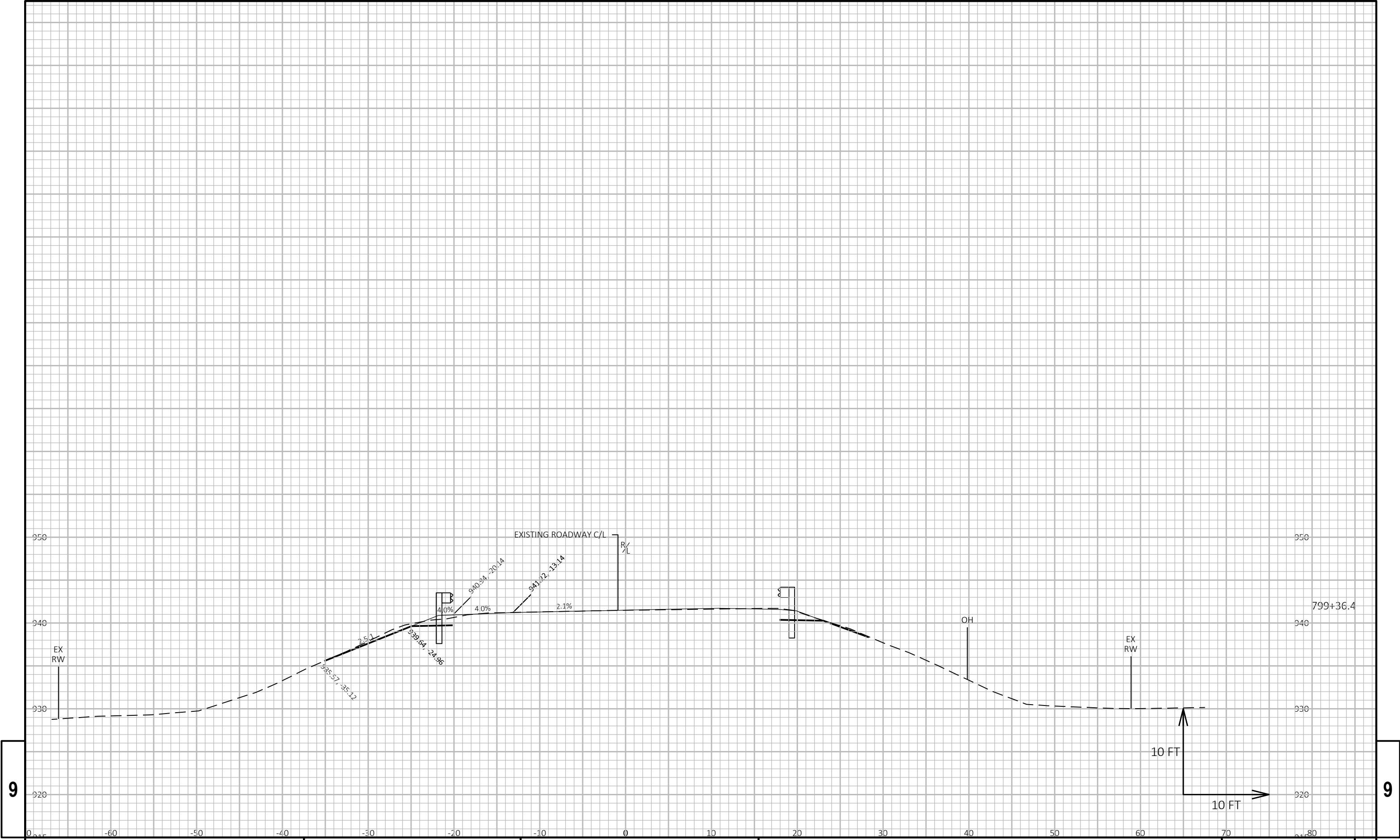


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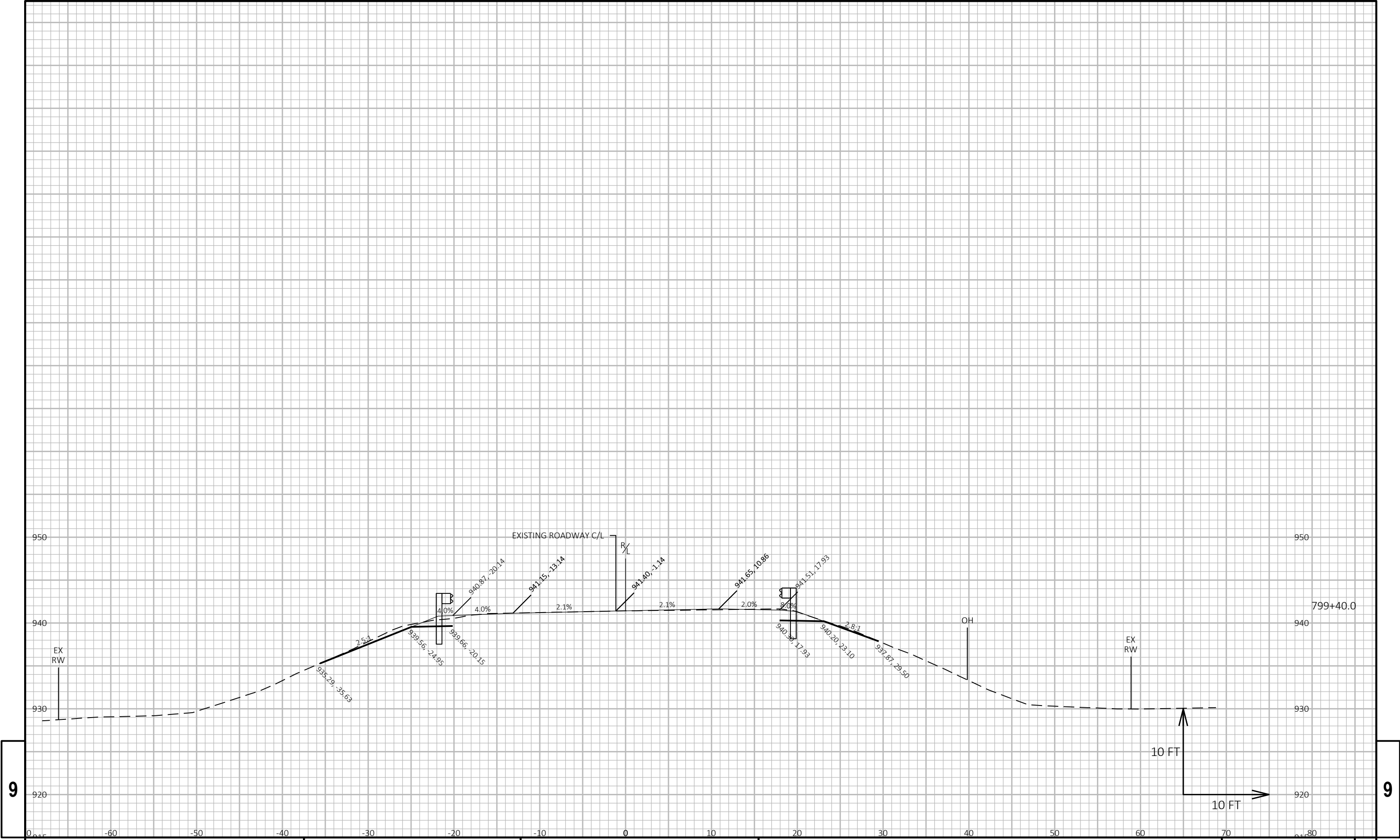




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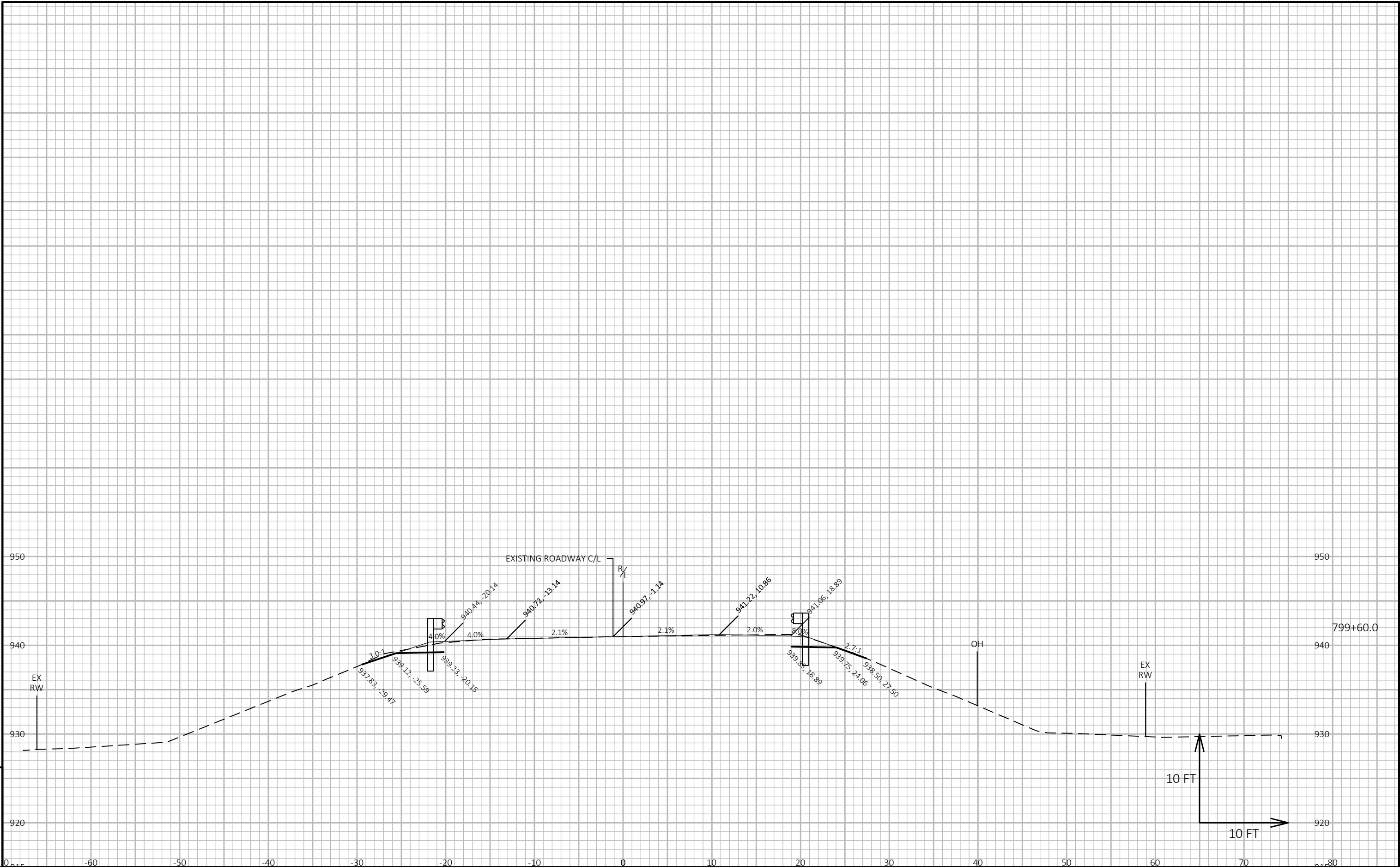
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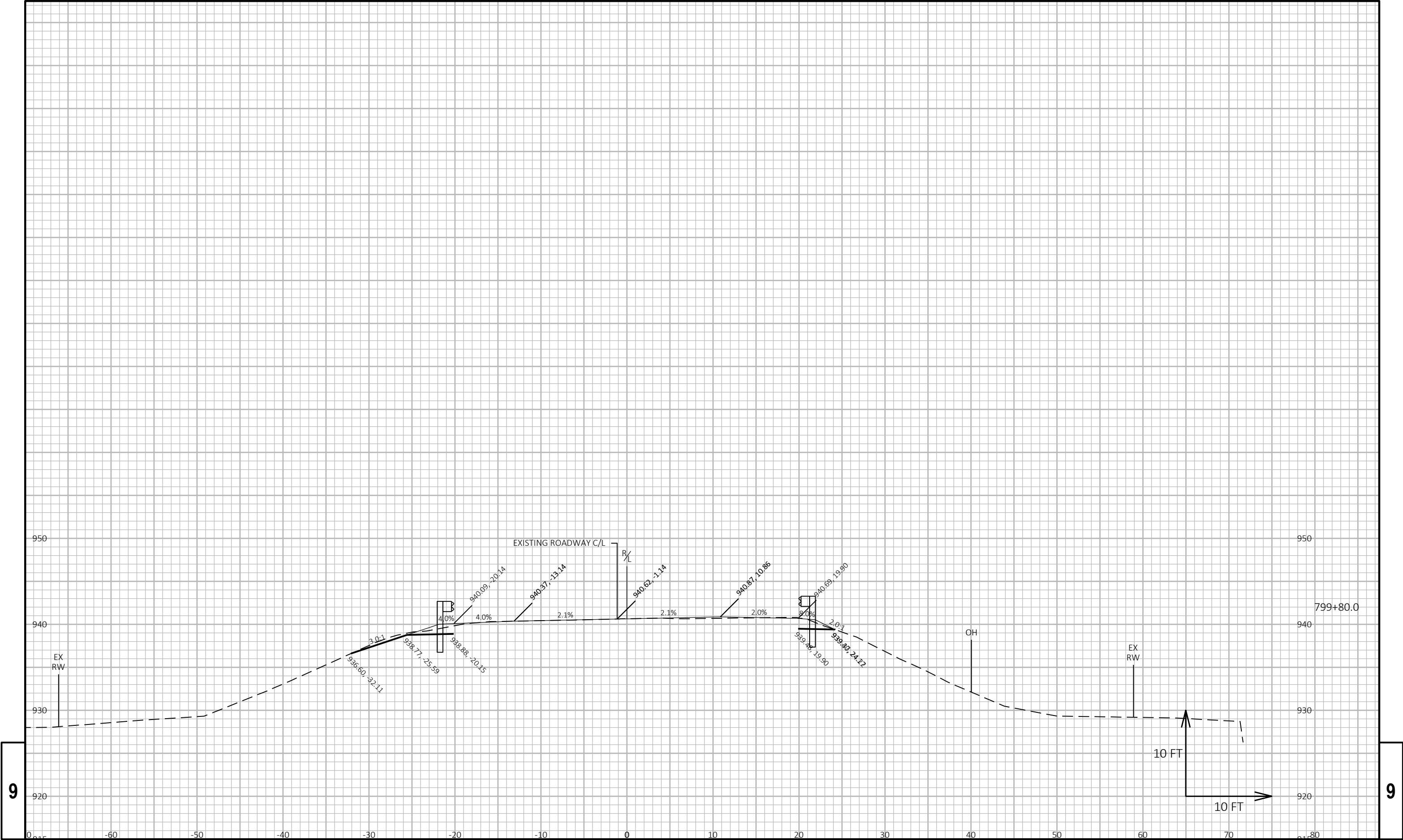
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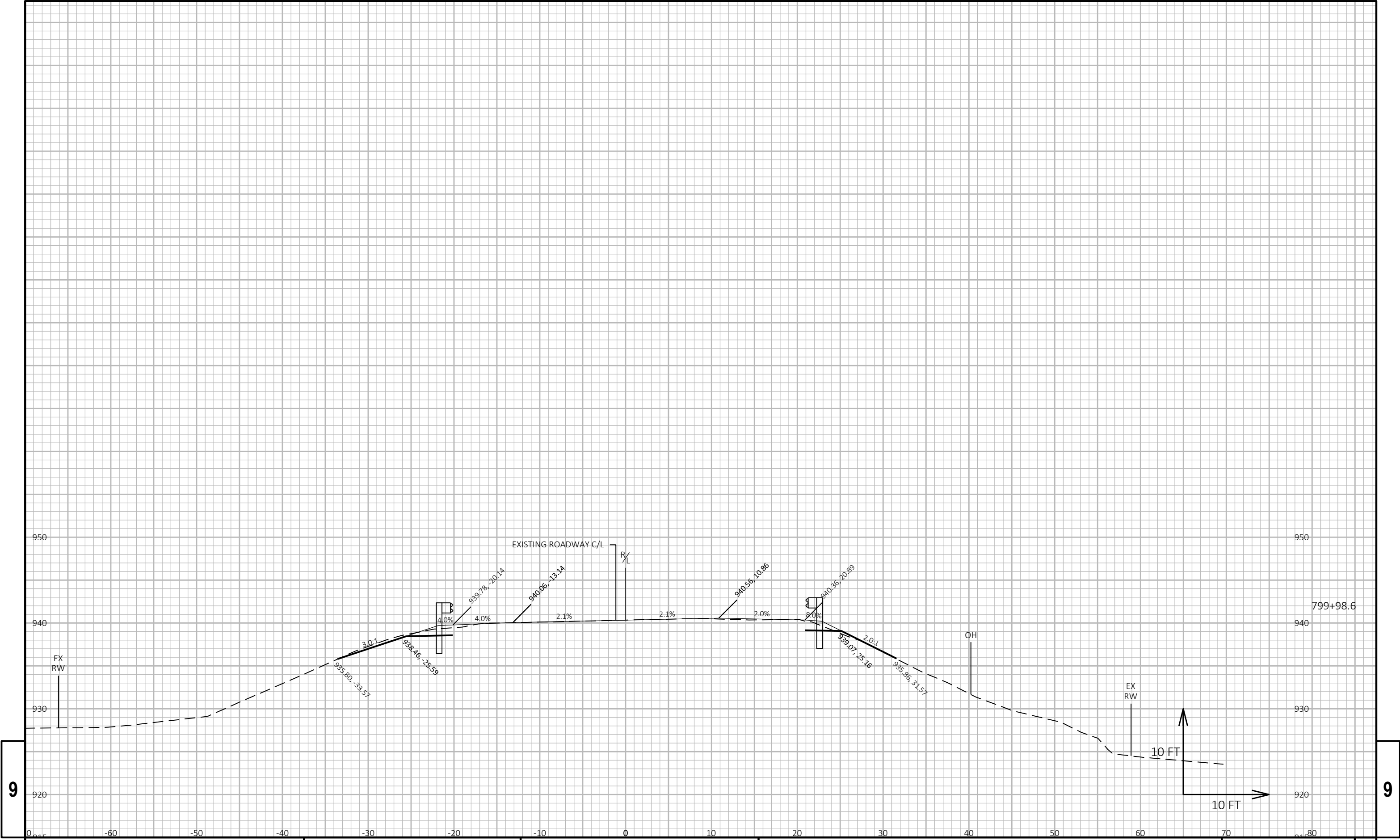




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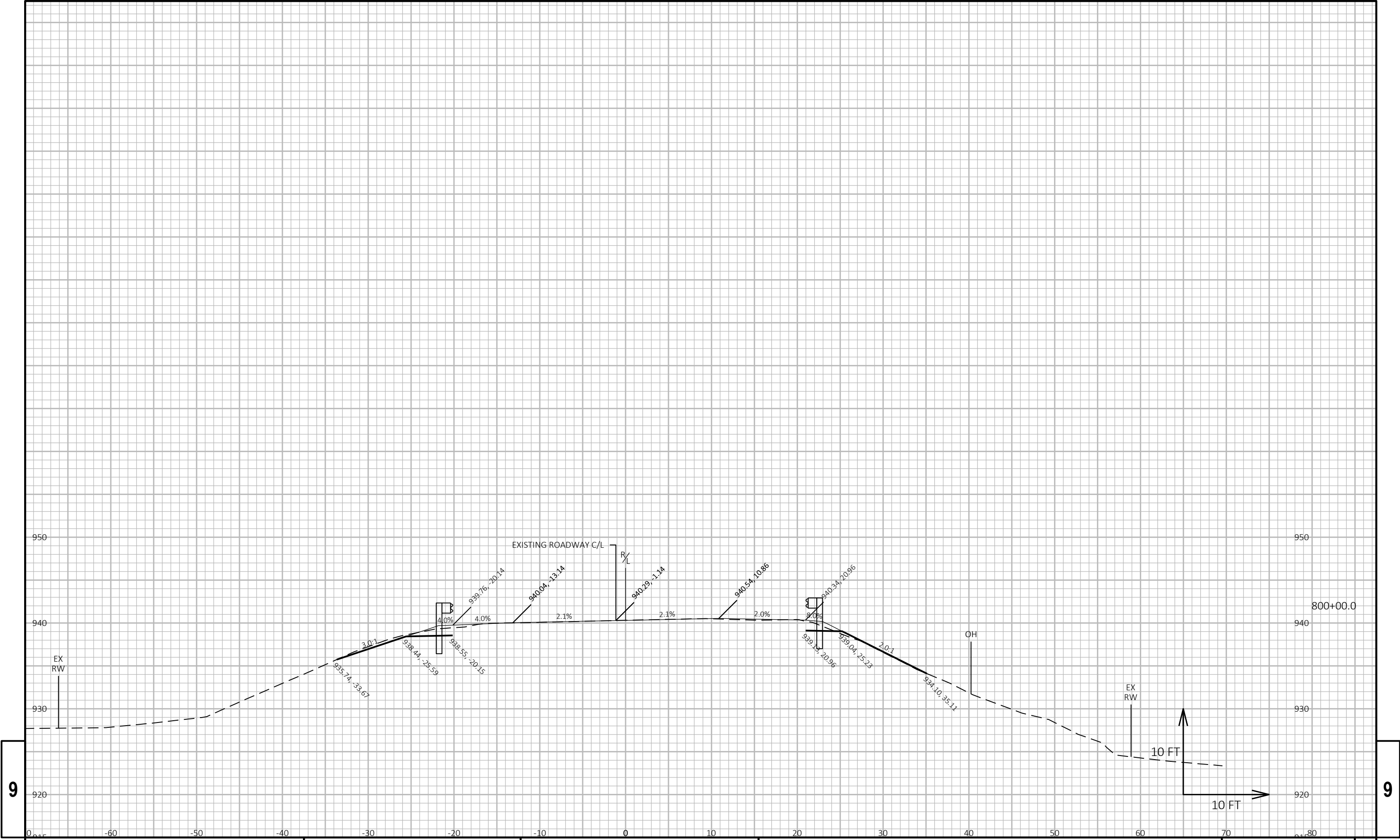
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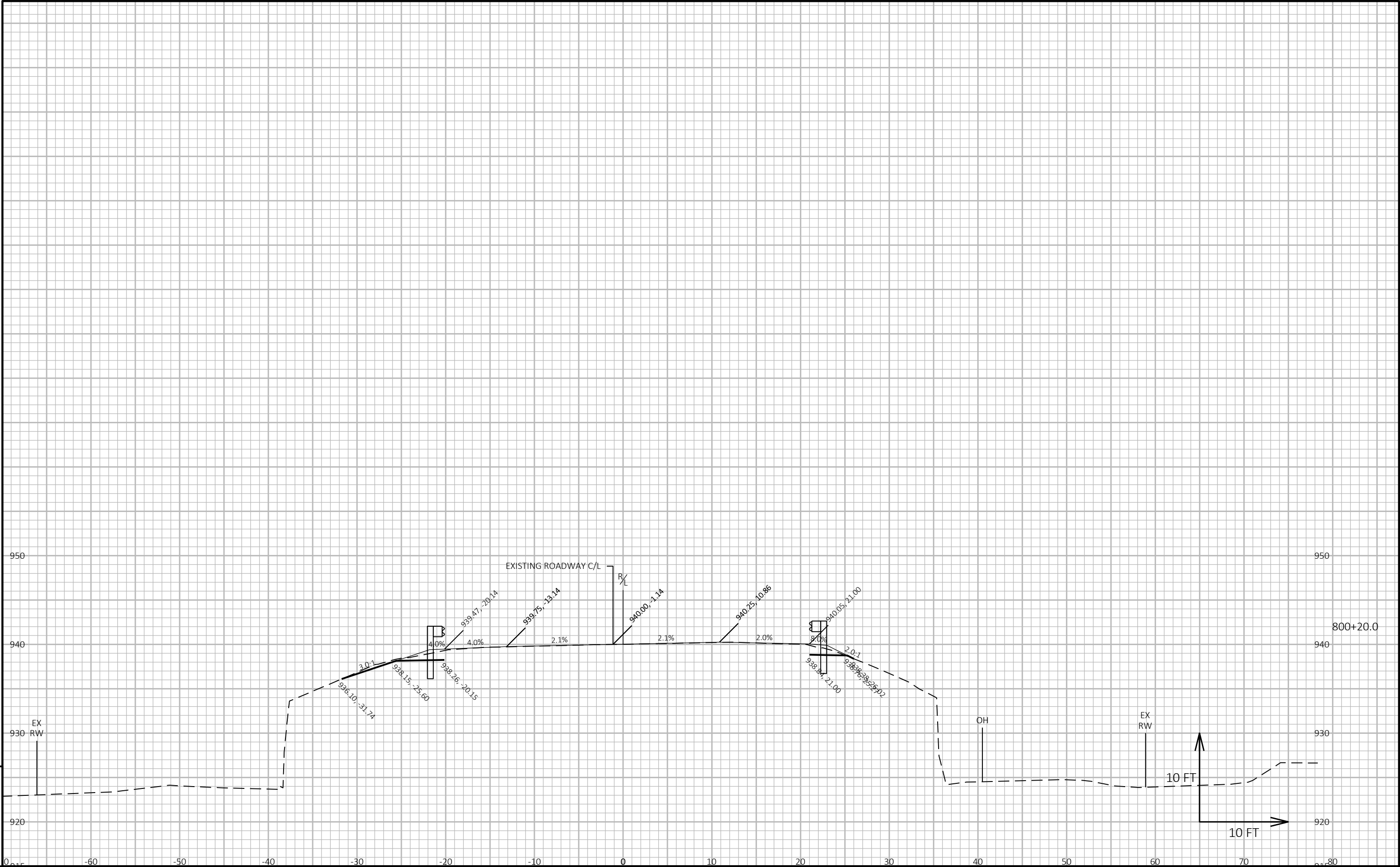
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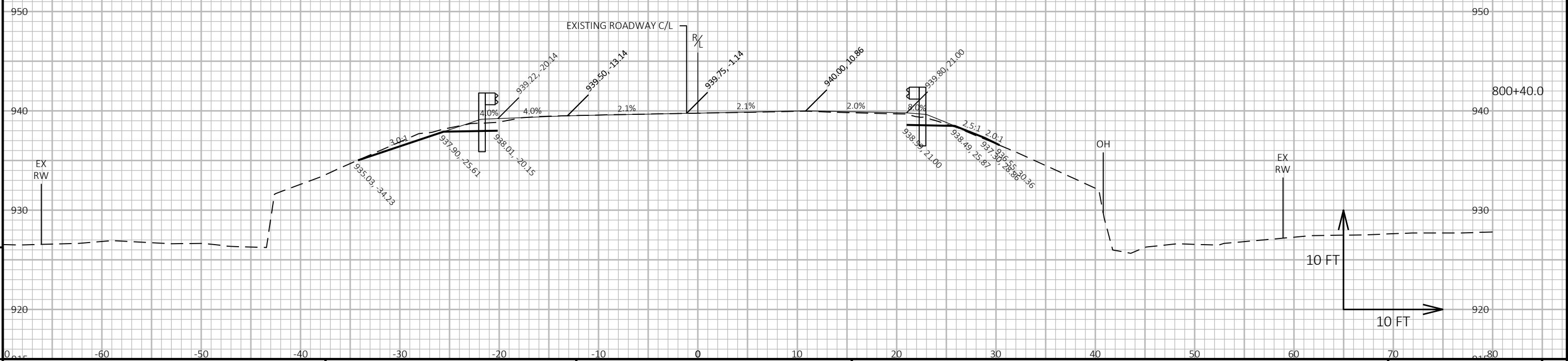
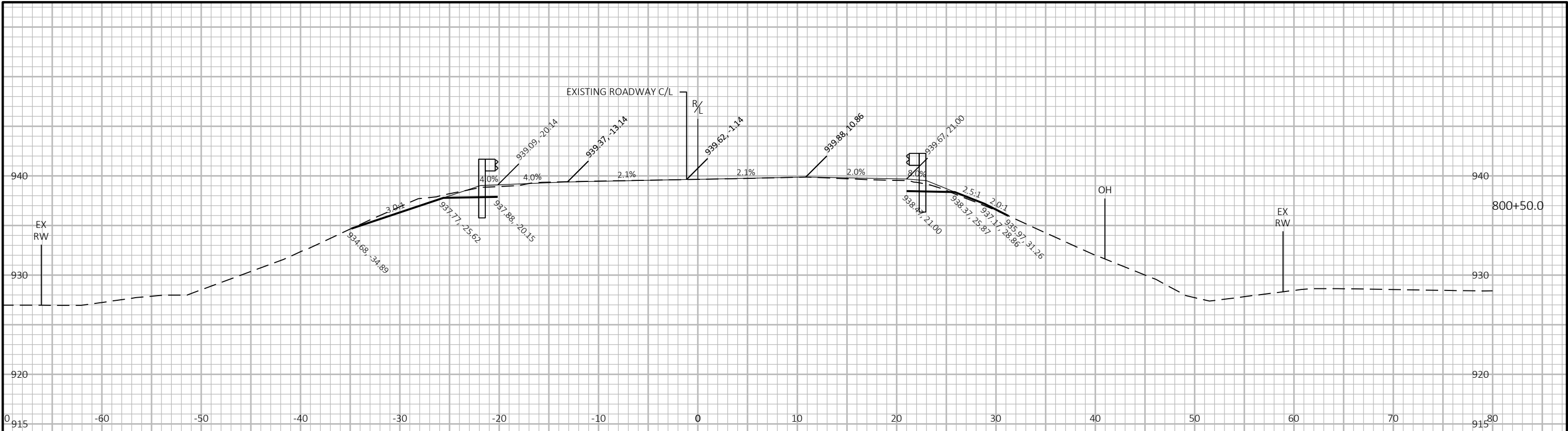


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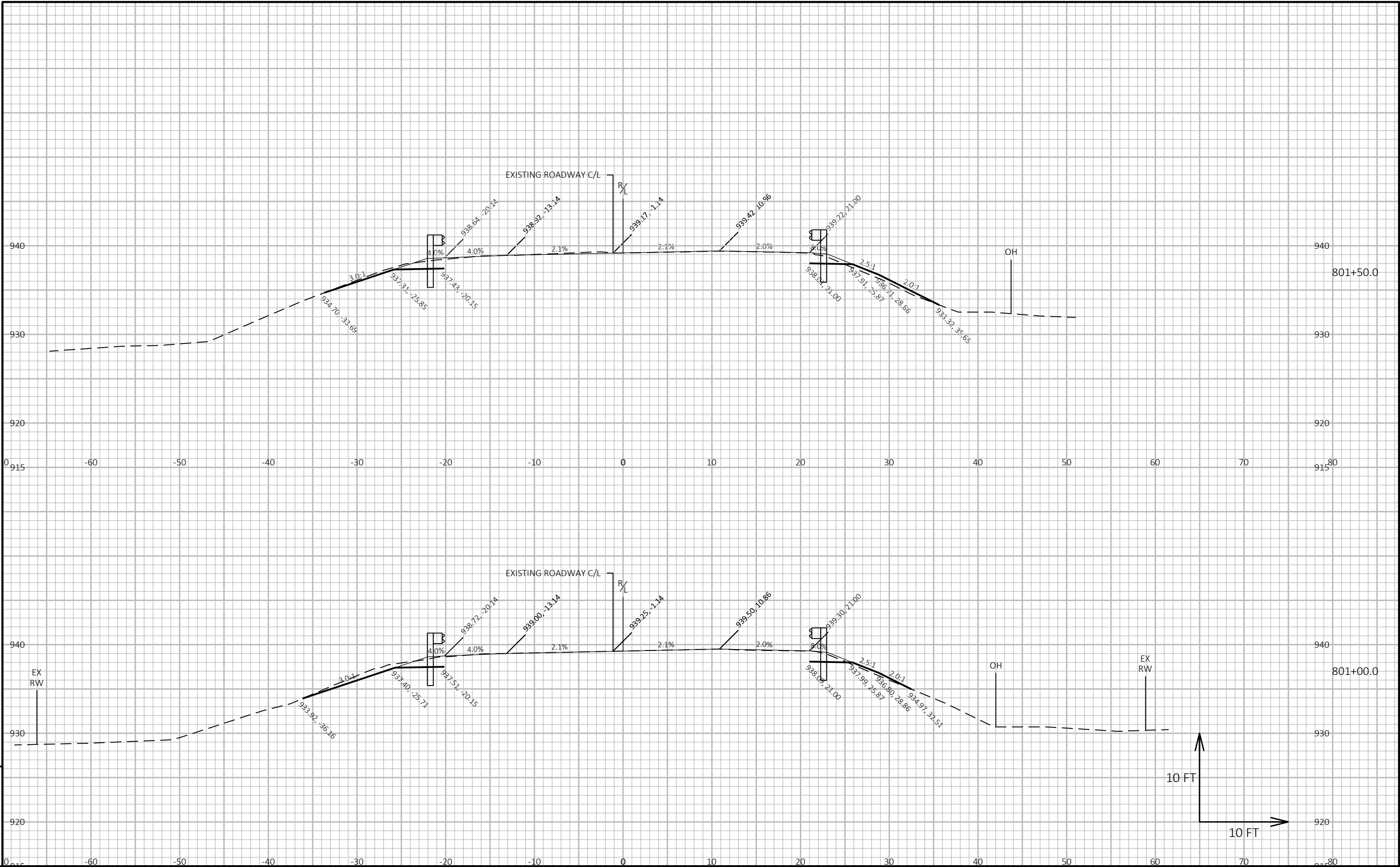
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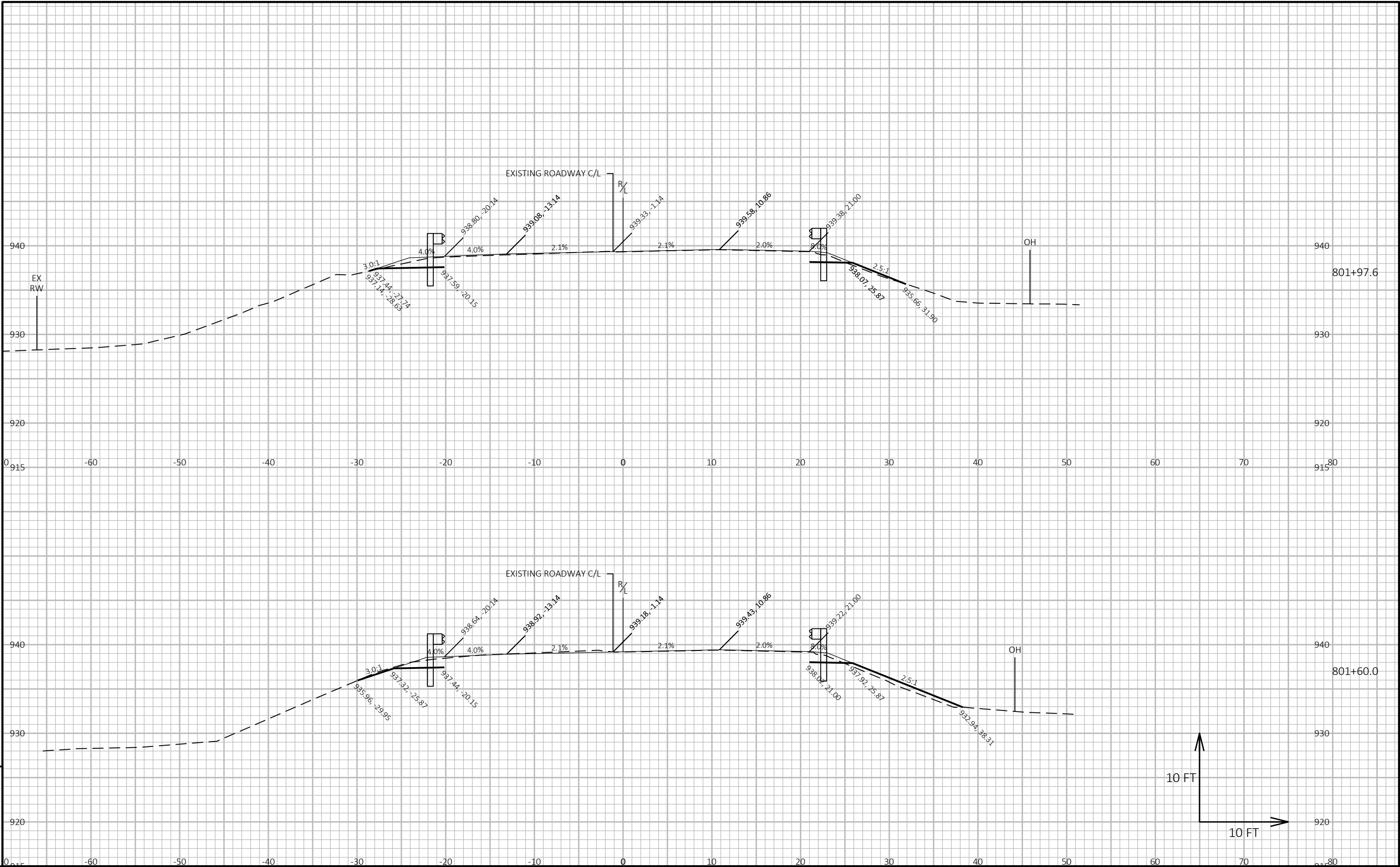


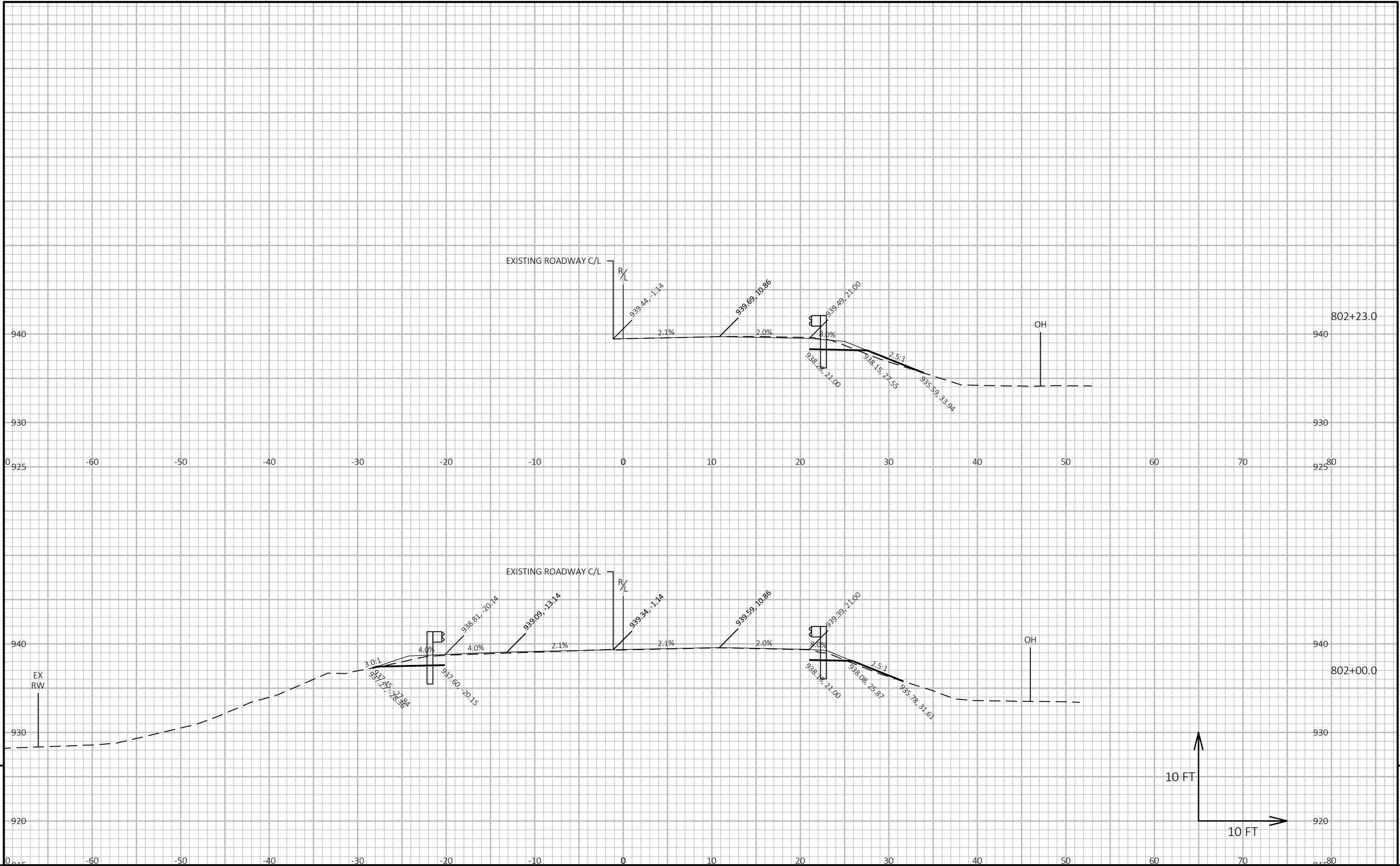
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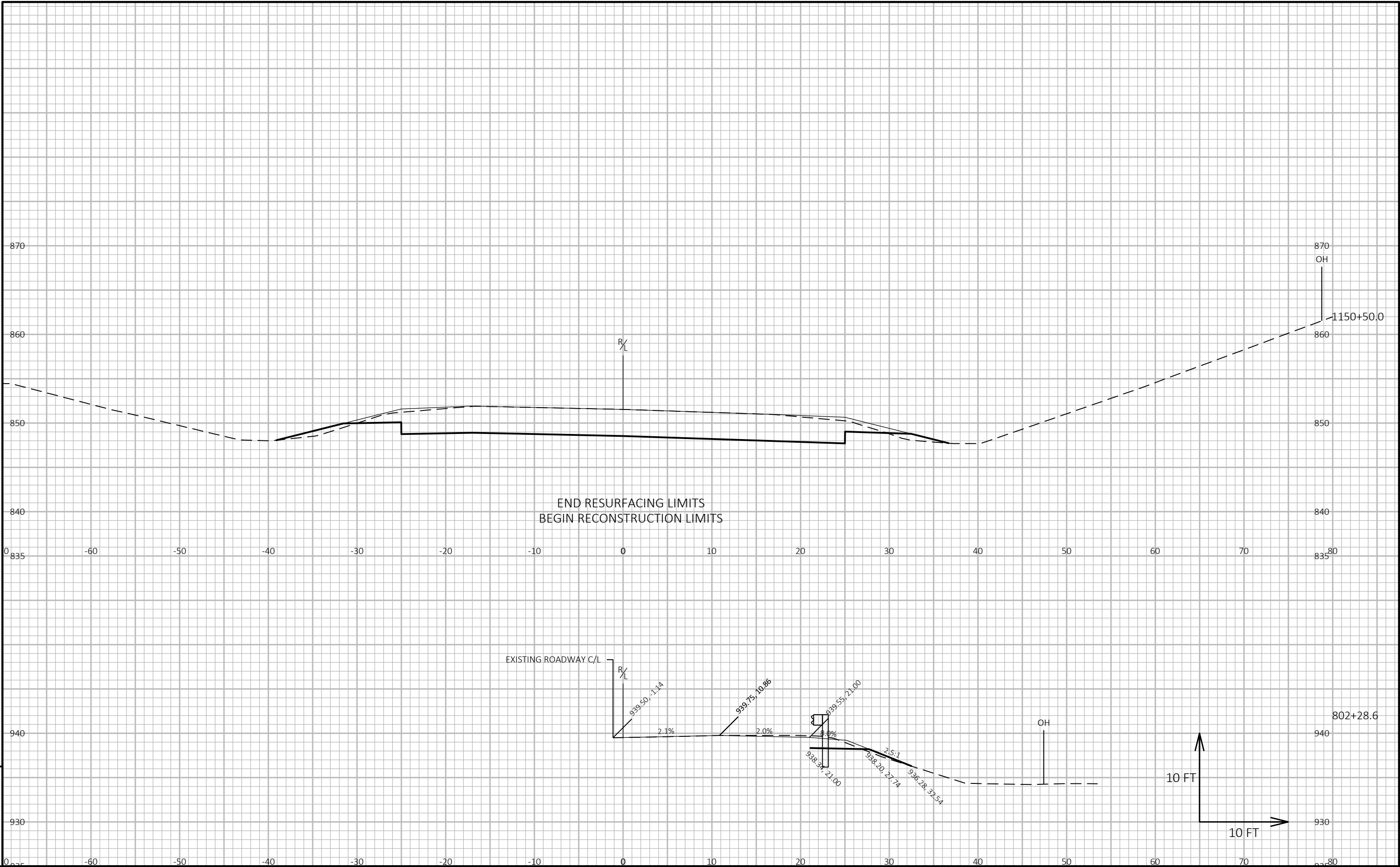




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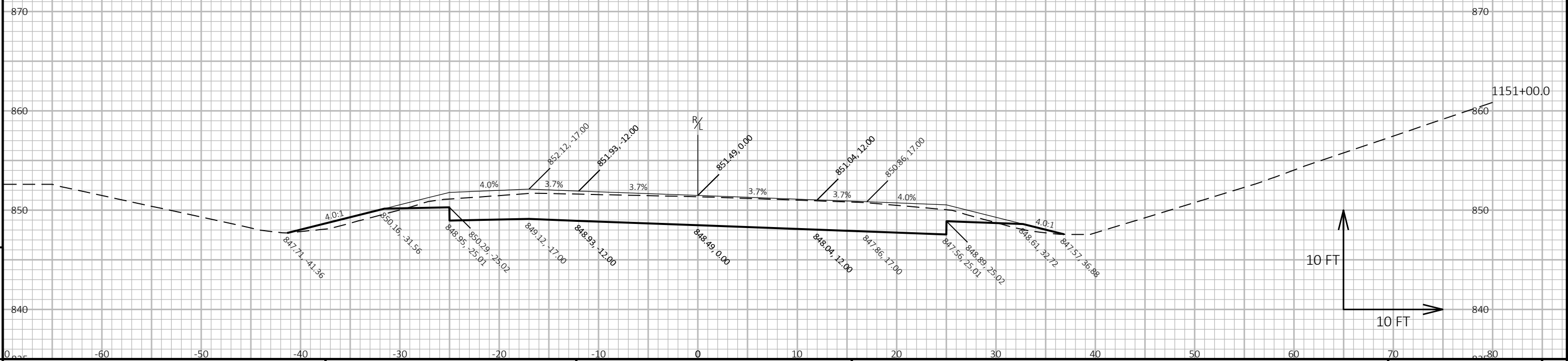
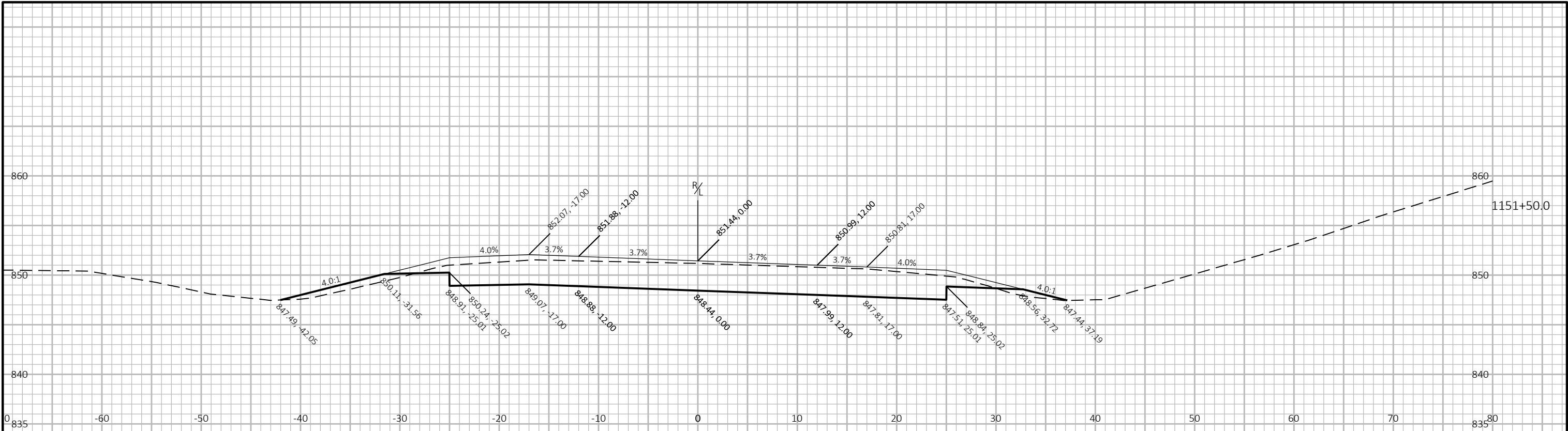
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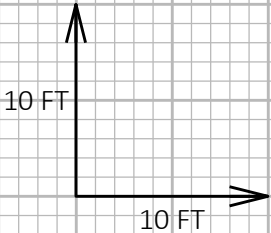
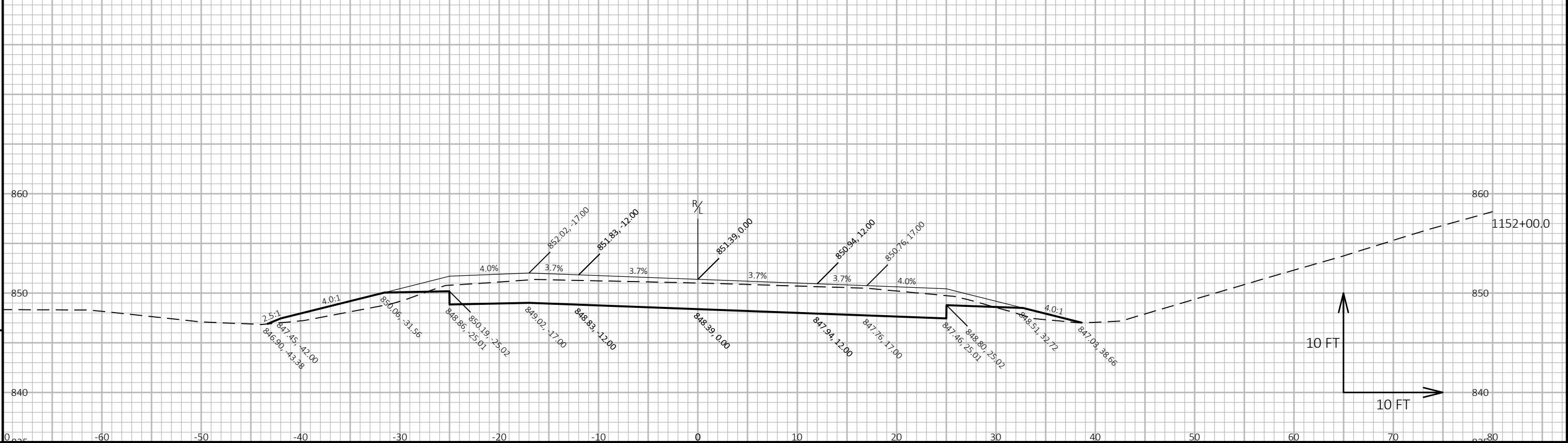
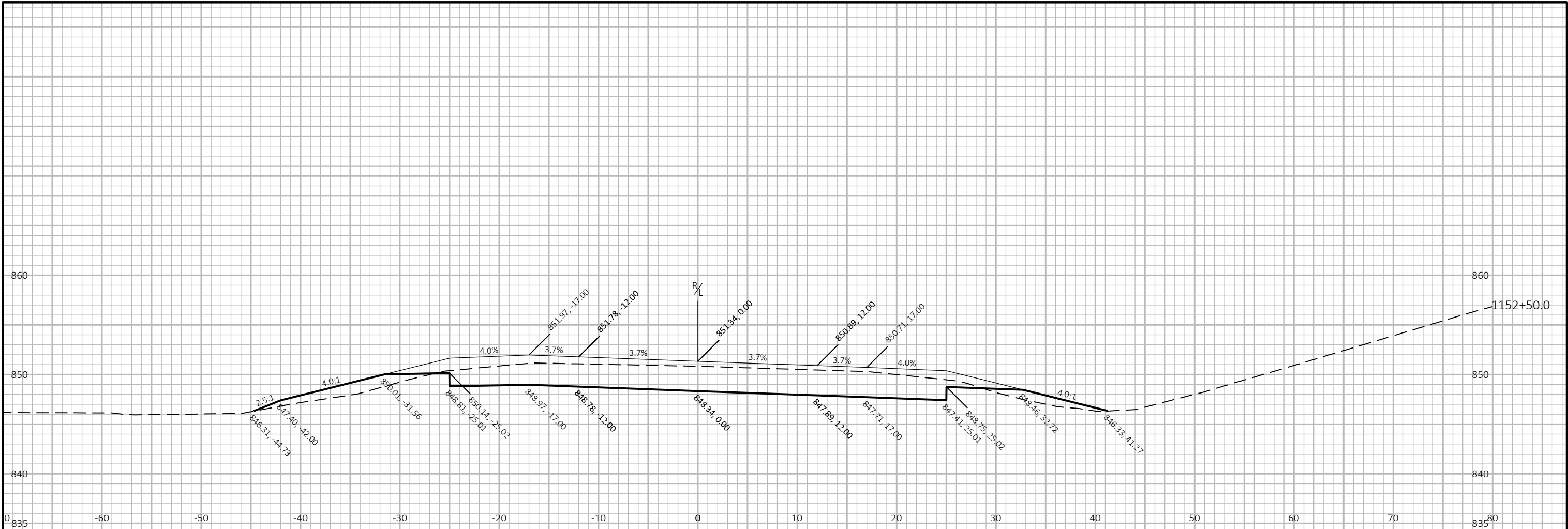
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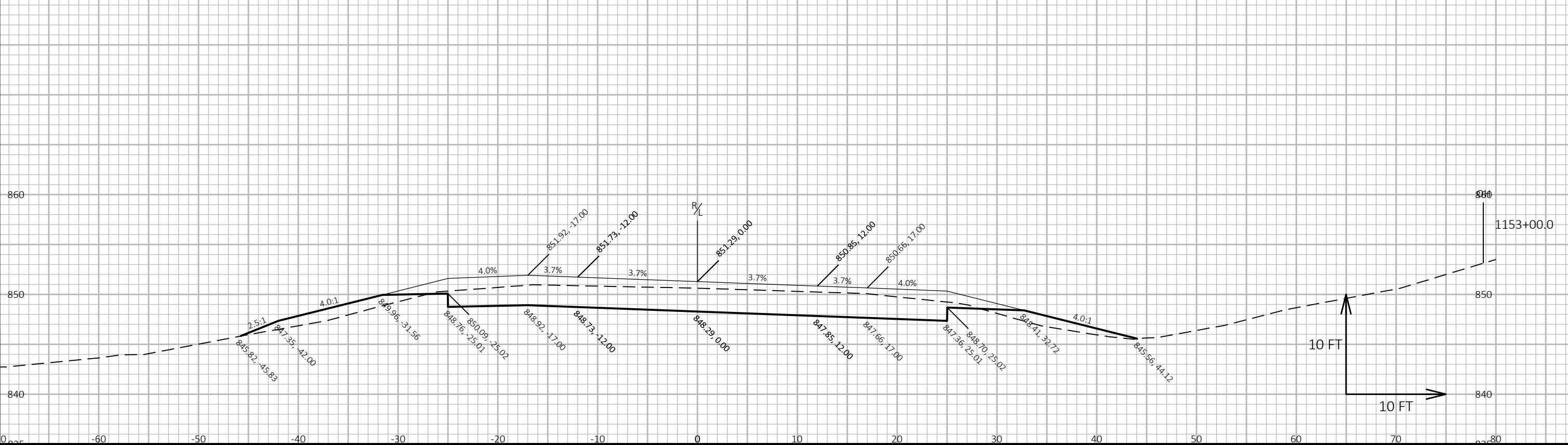
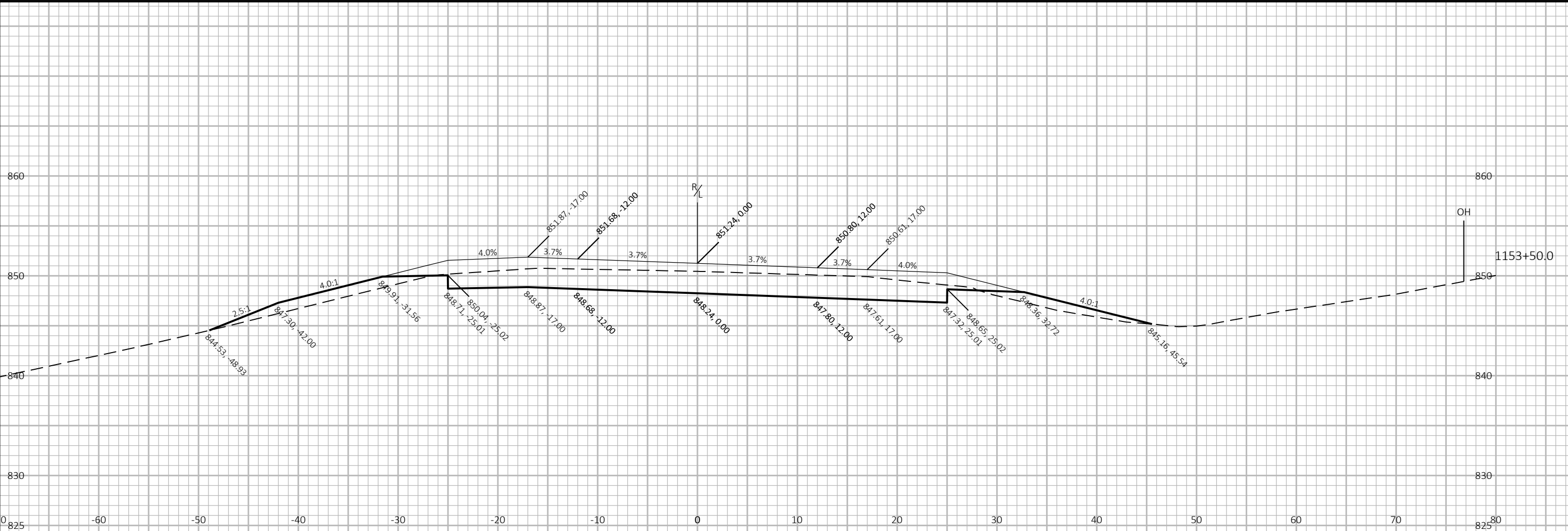
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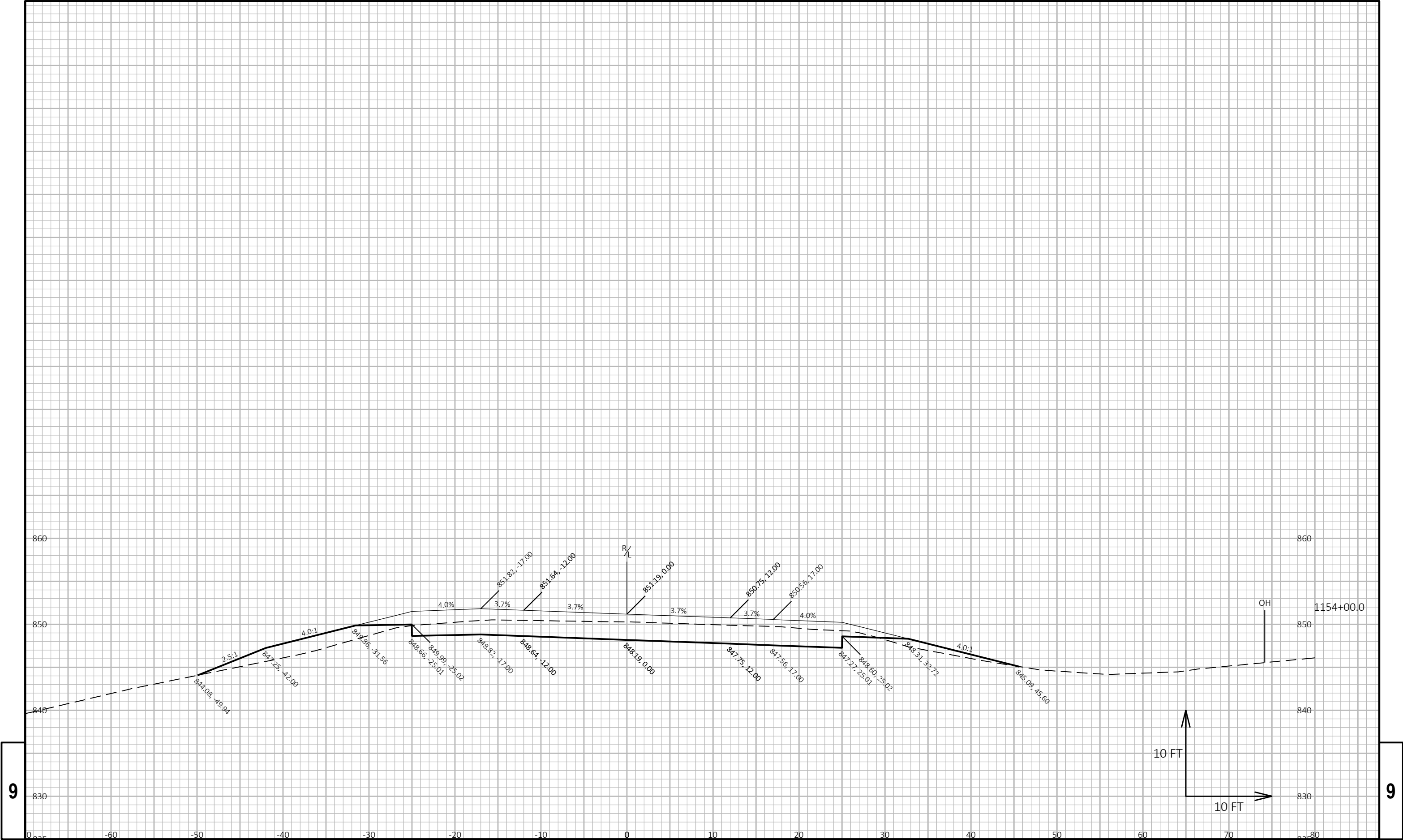
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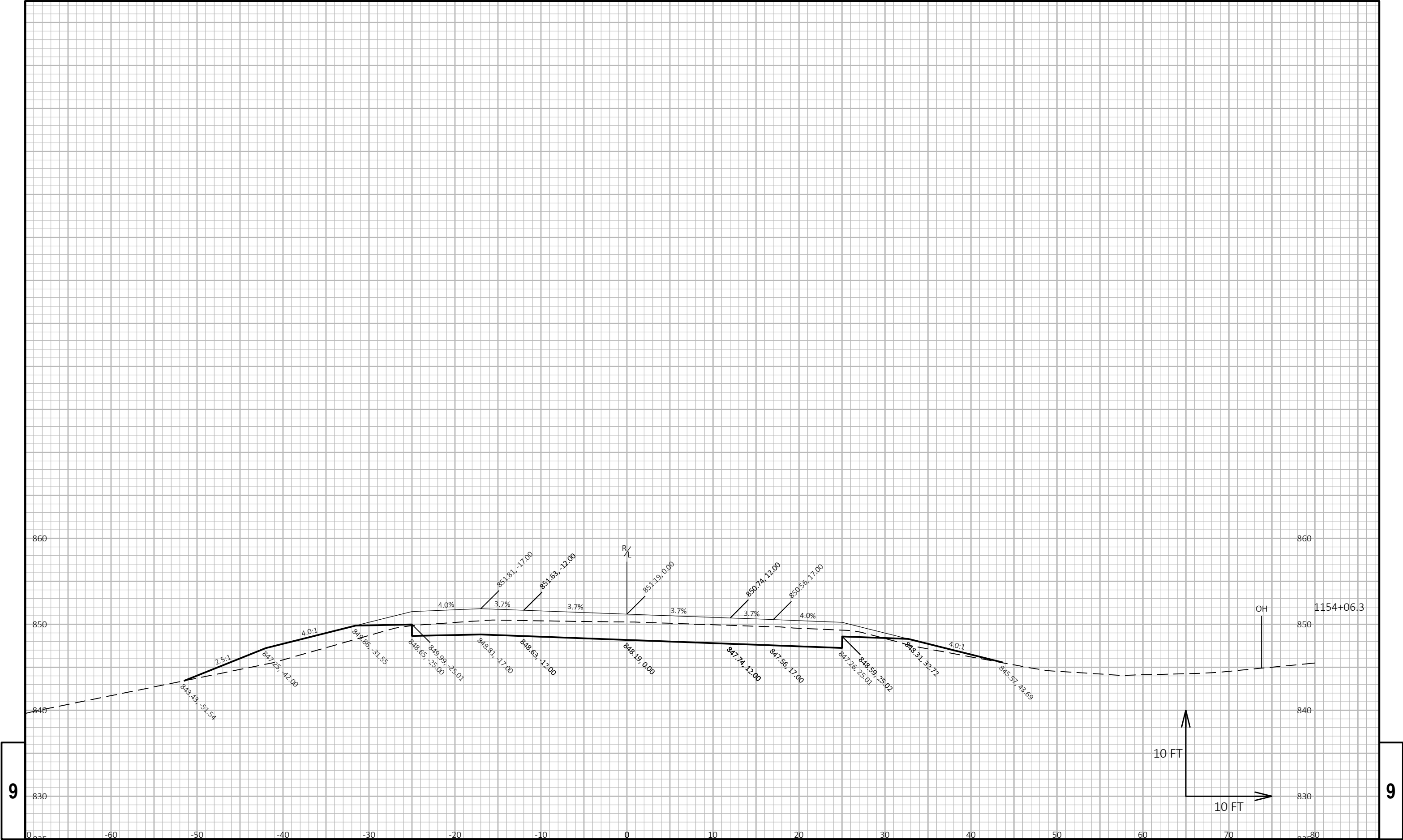
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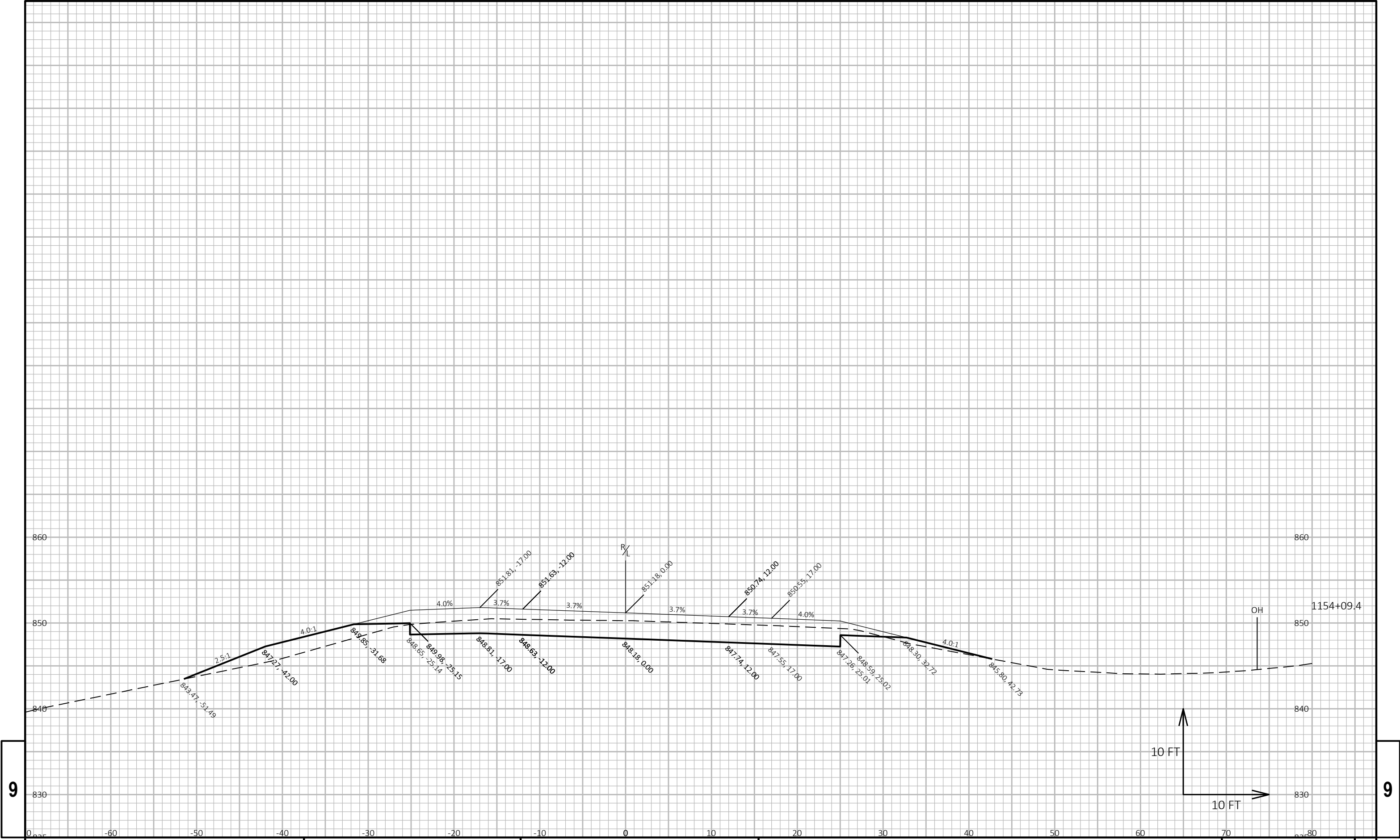
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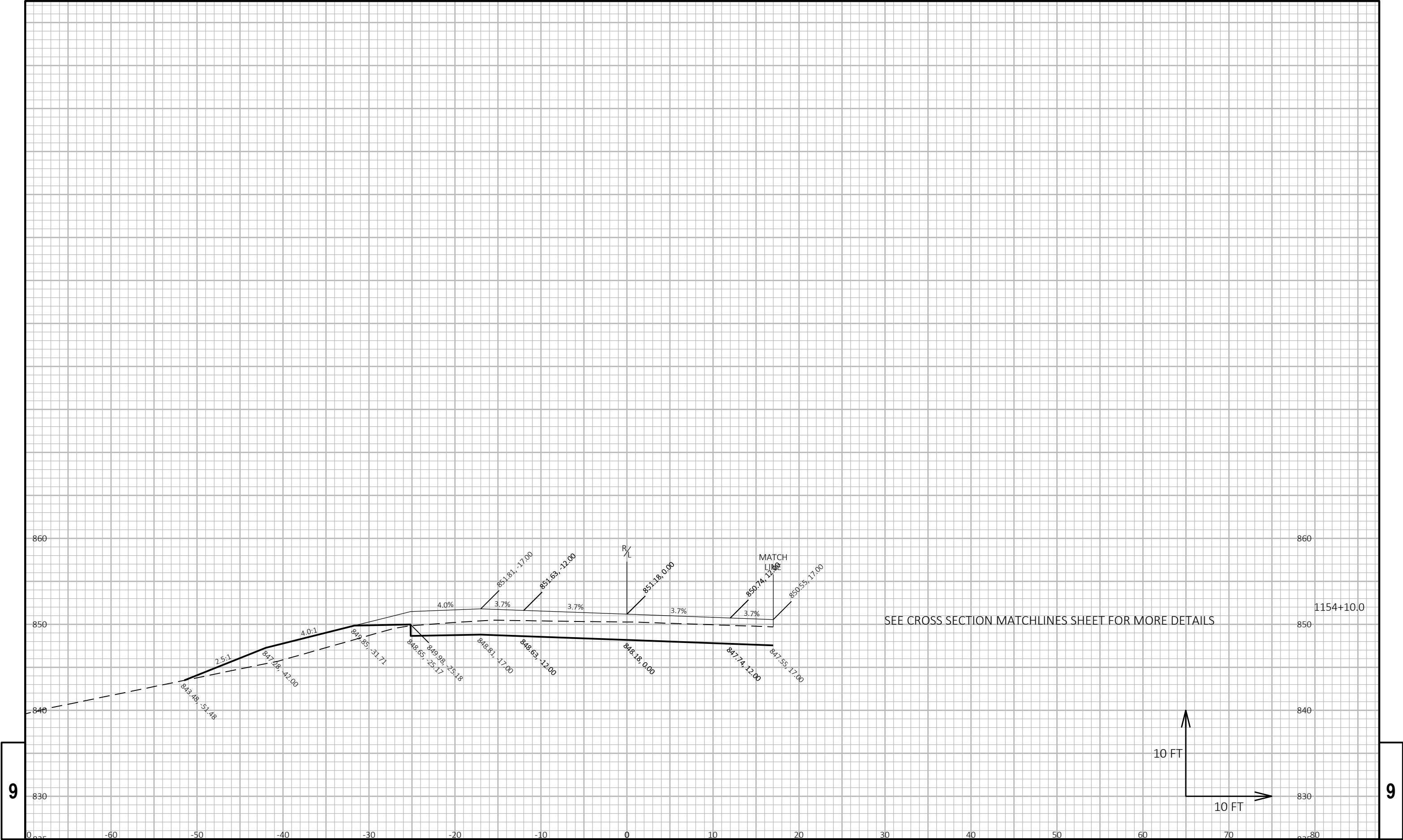
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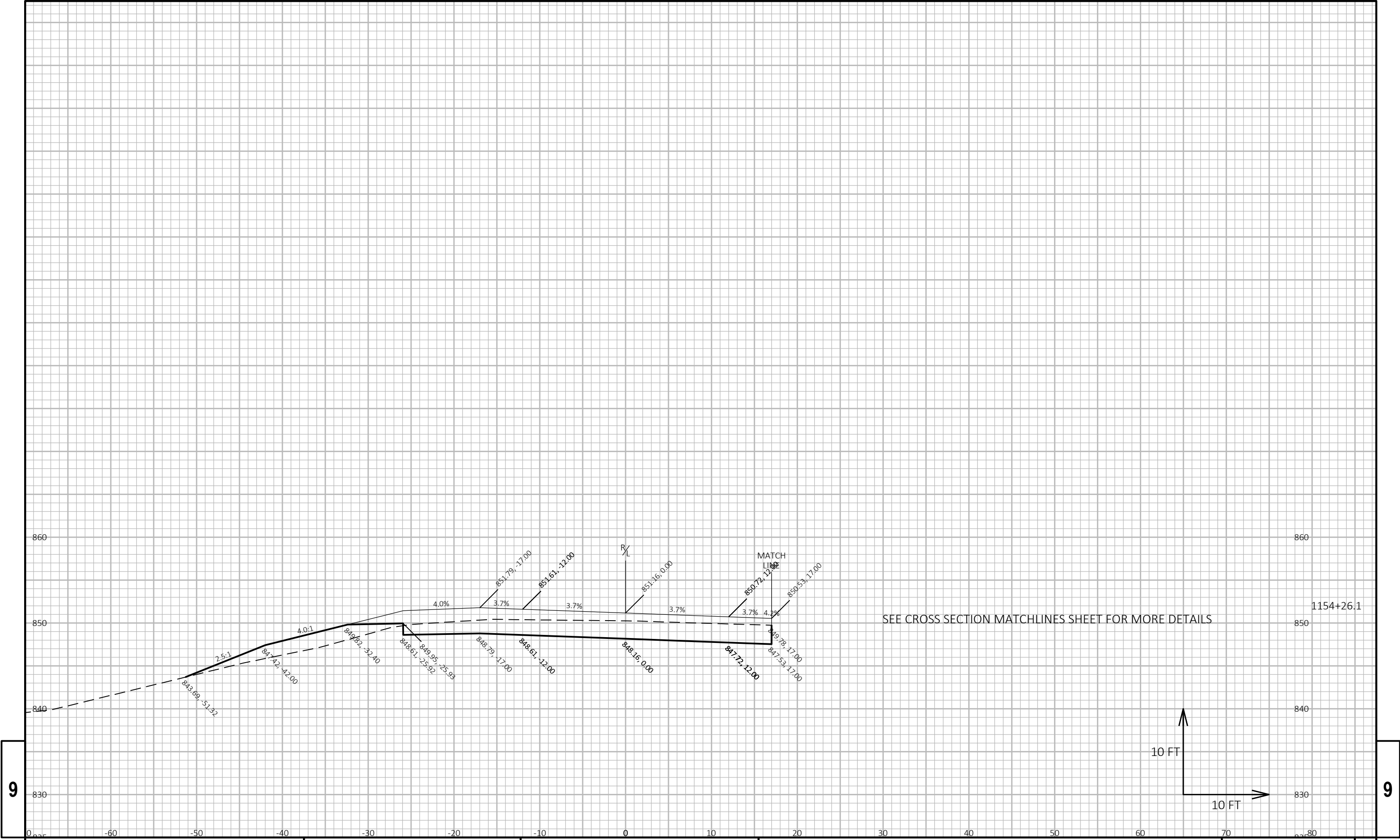


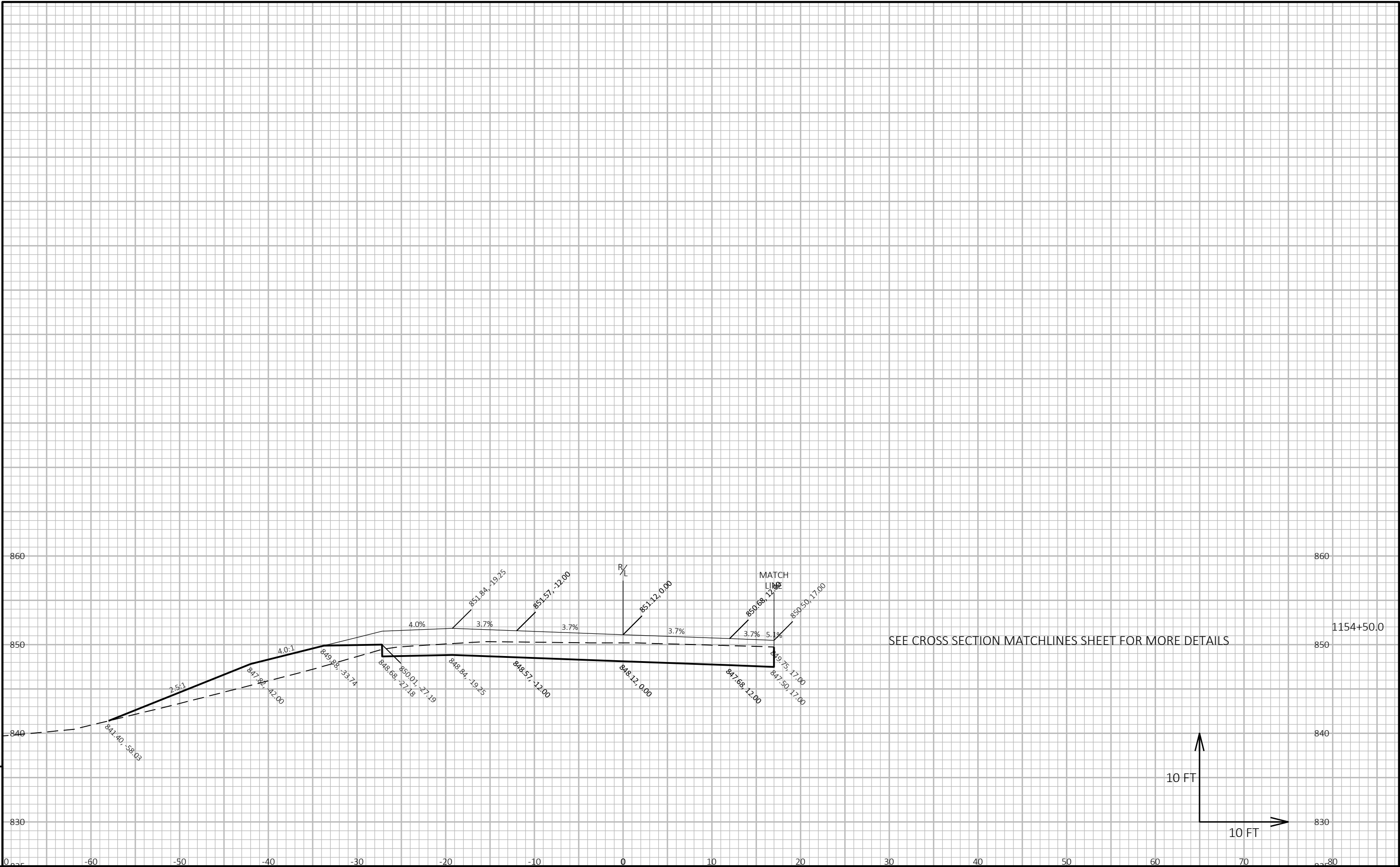
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PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	CROSS SECTIONS: STH 16	SHEET	E
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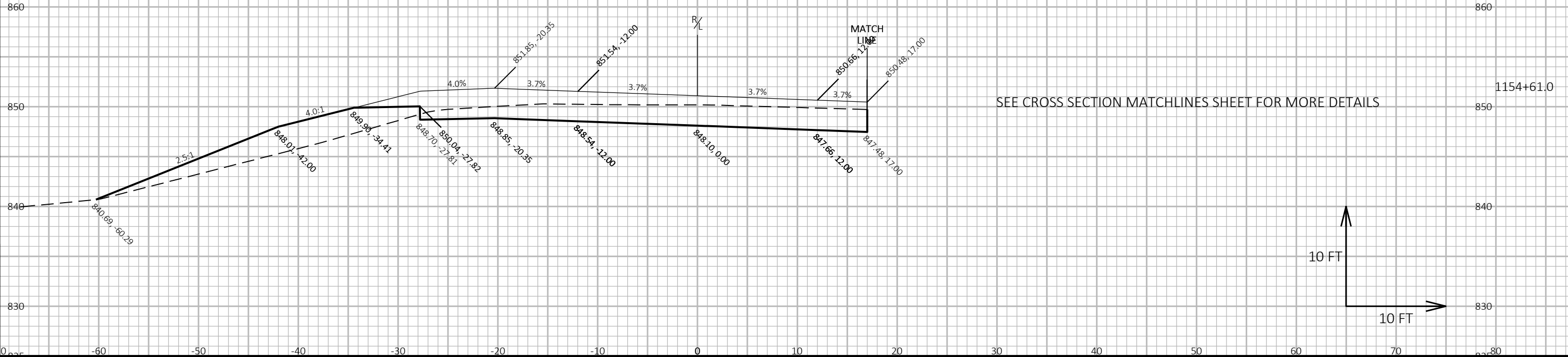
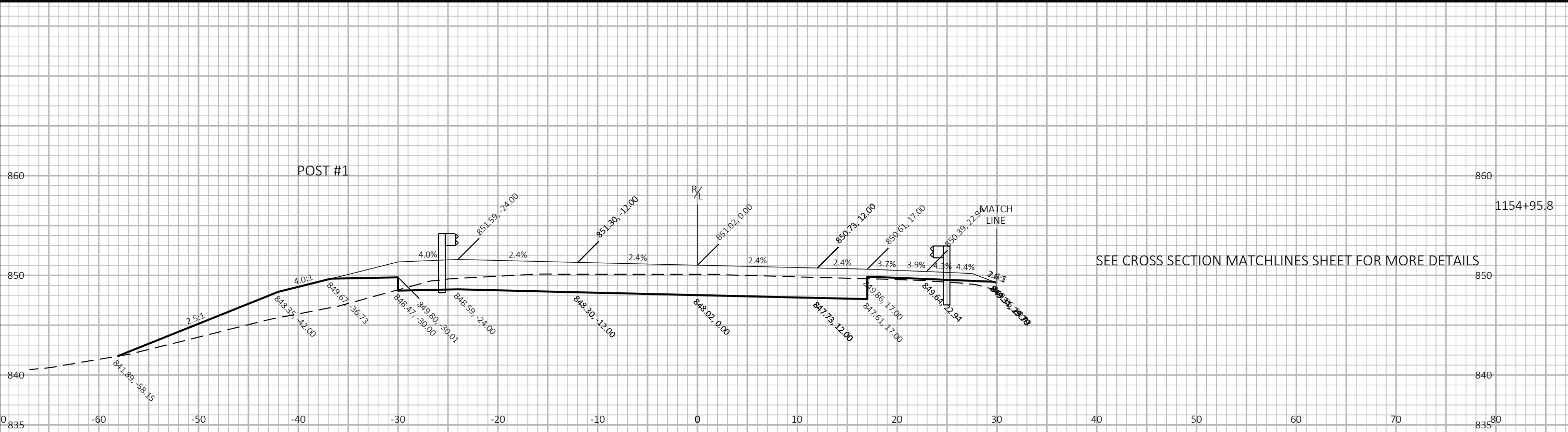




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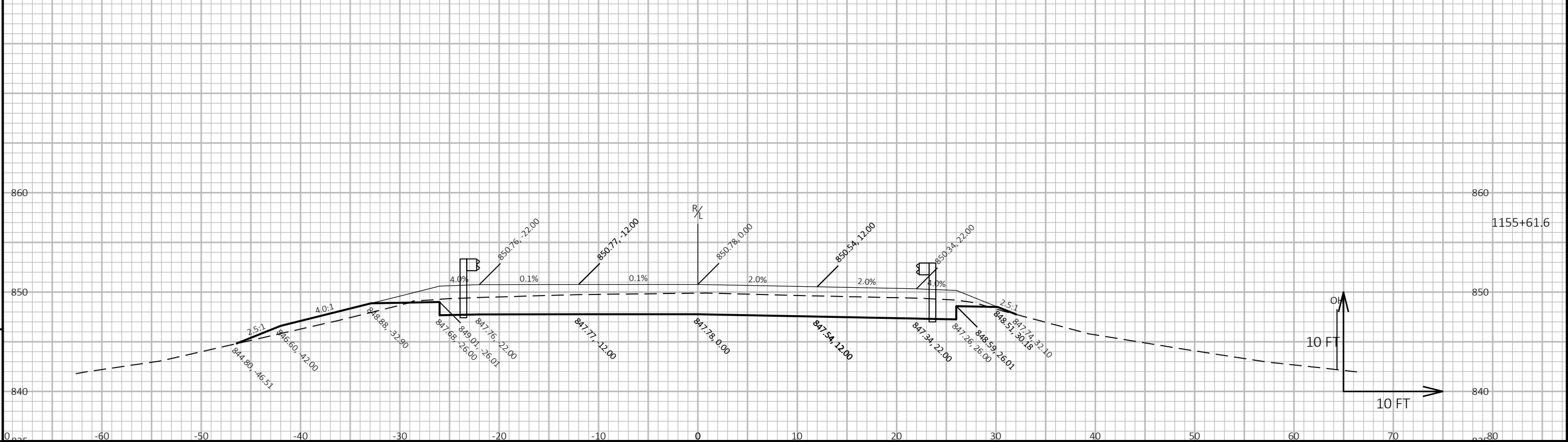
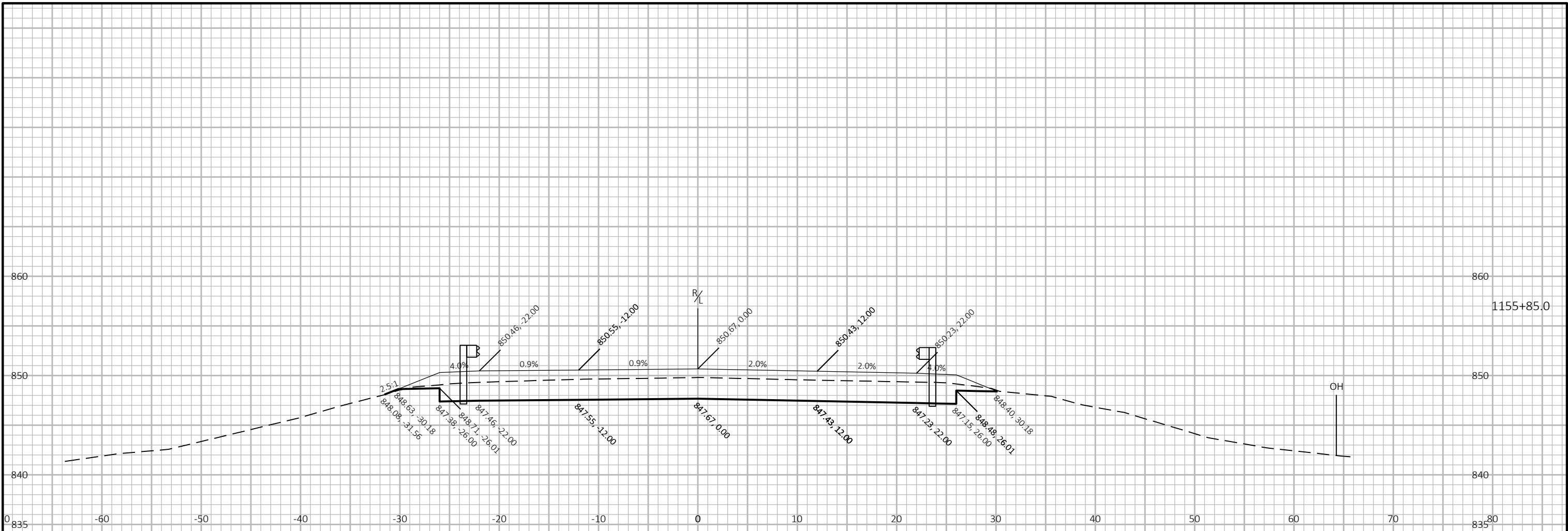
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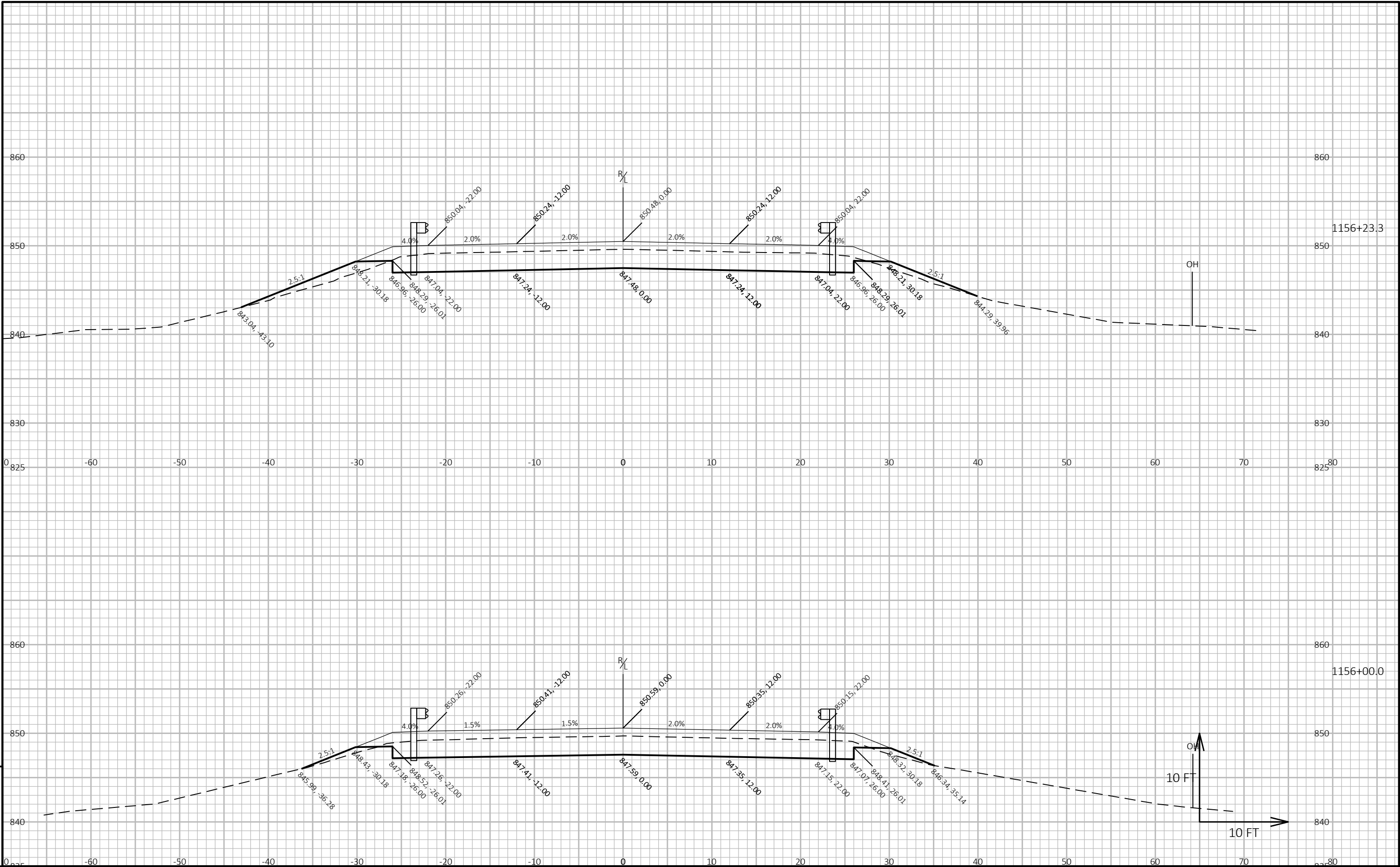
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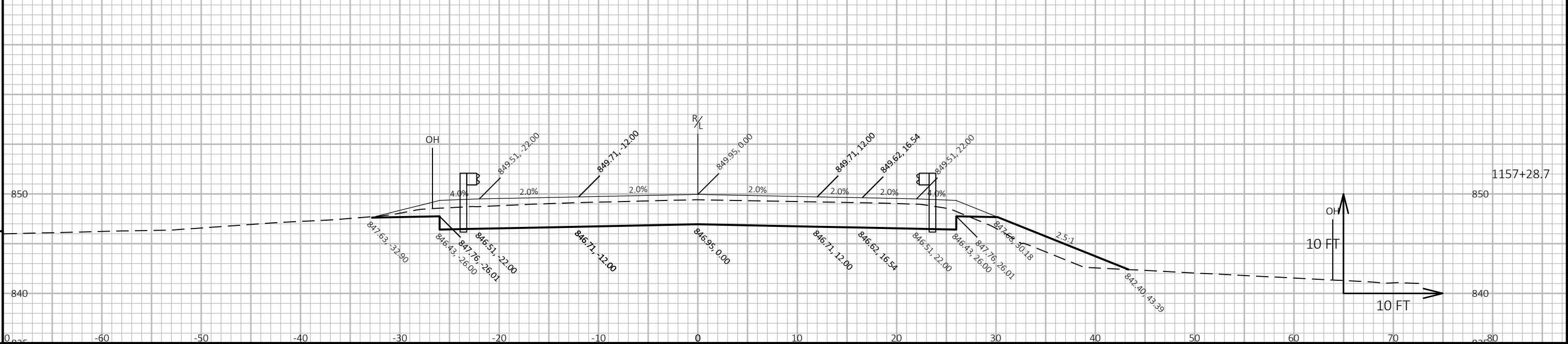
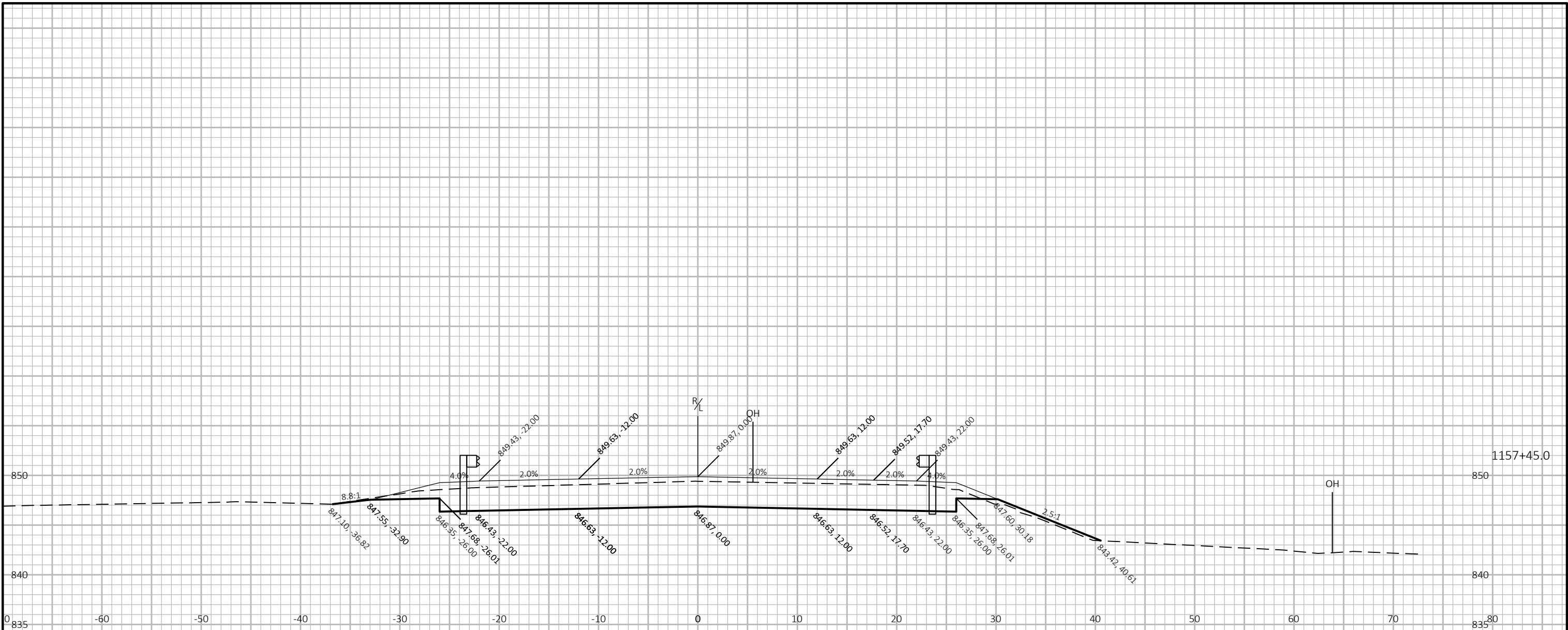
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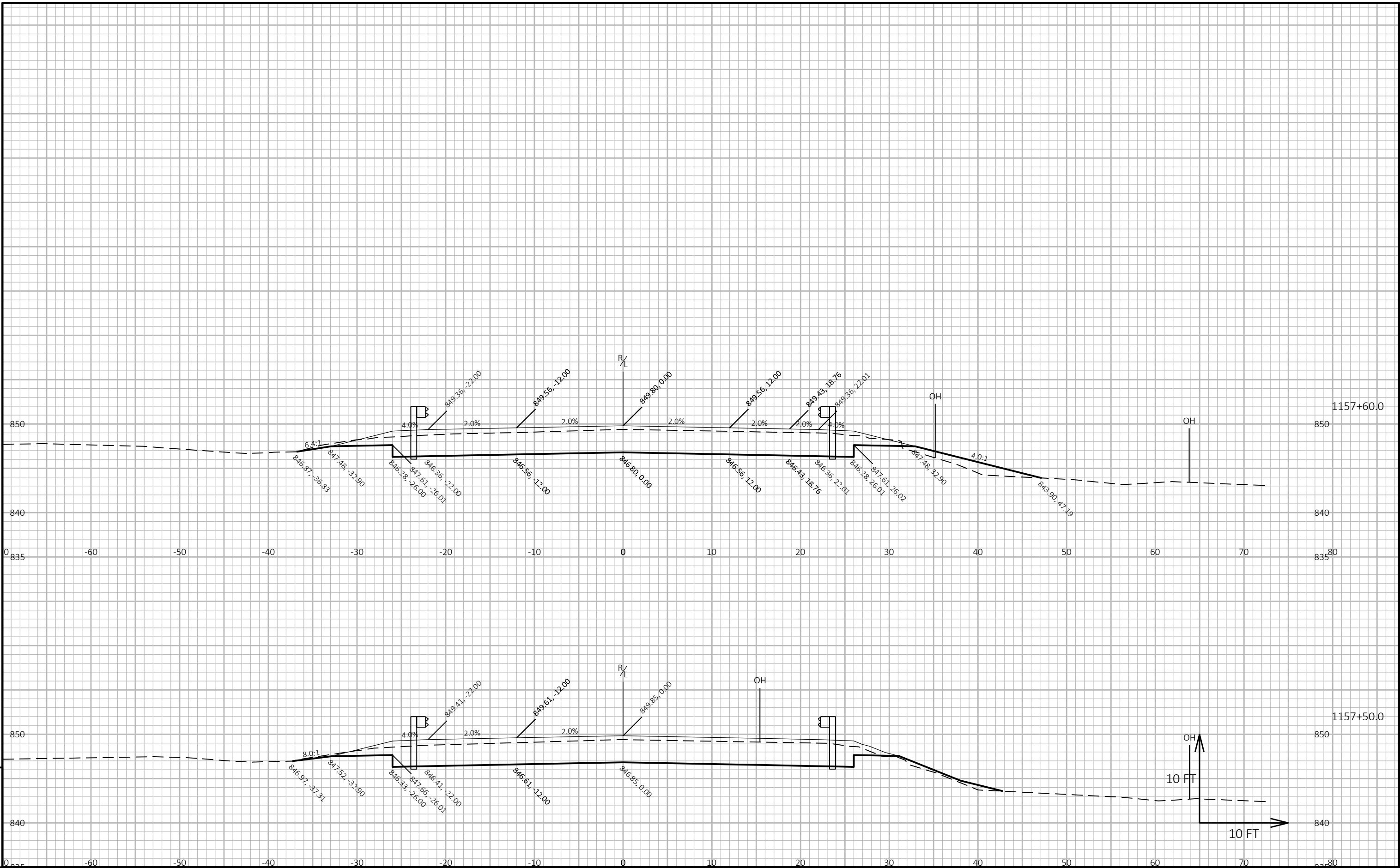
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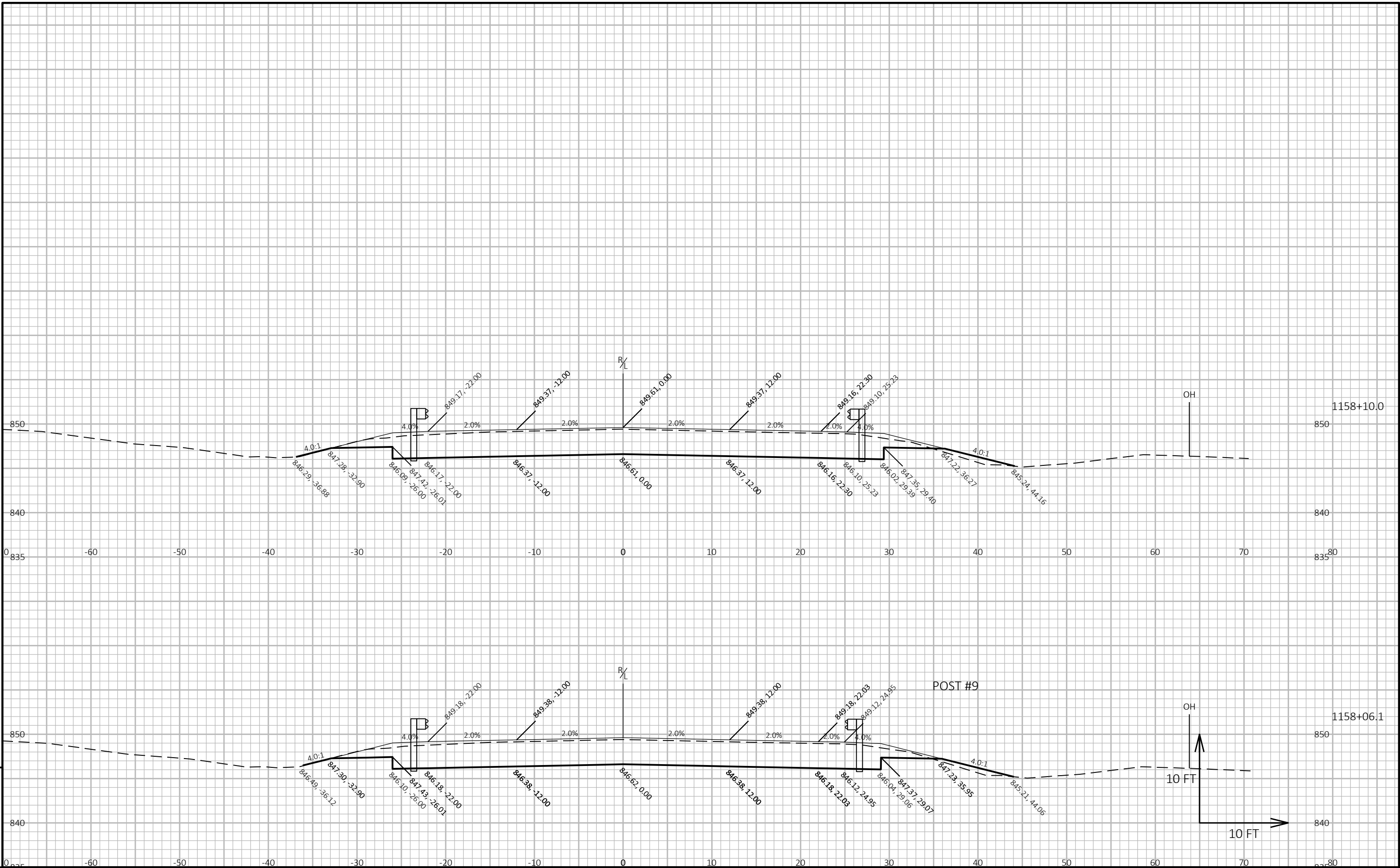


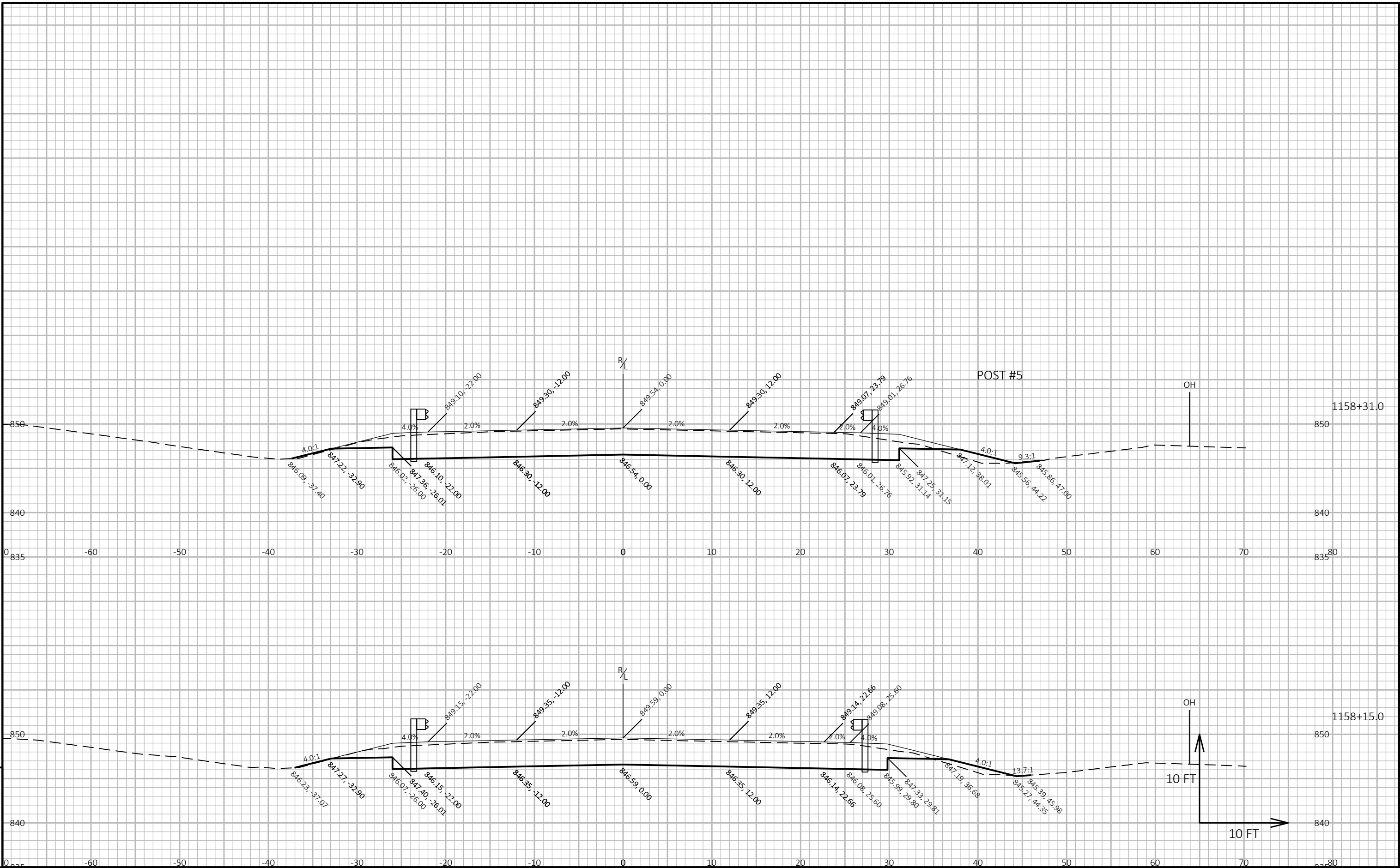
PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	CROSS SECTIONS: STH 16	SHEET	E
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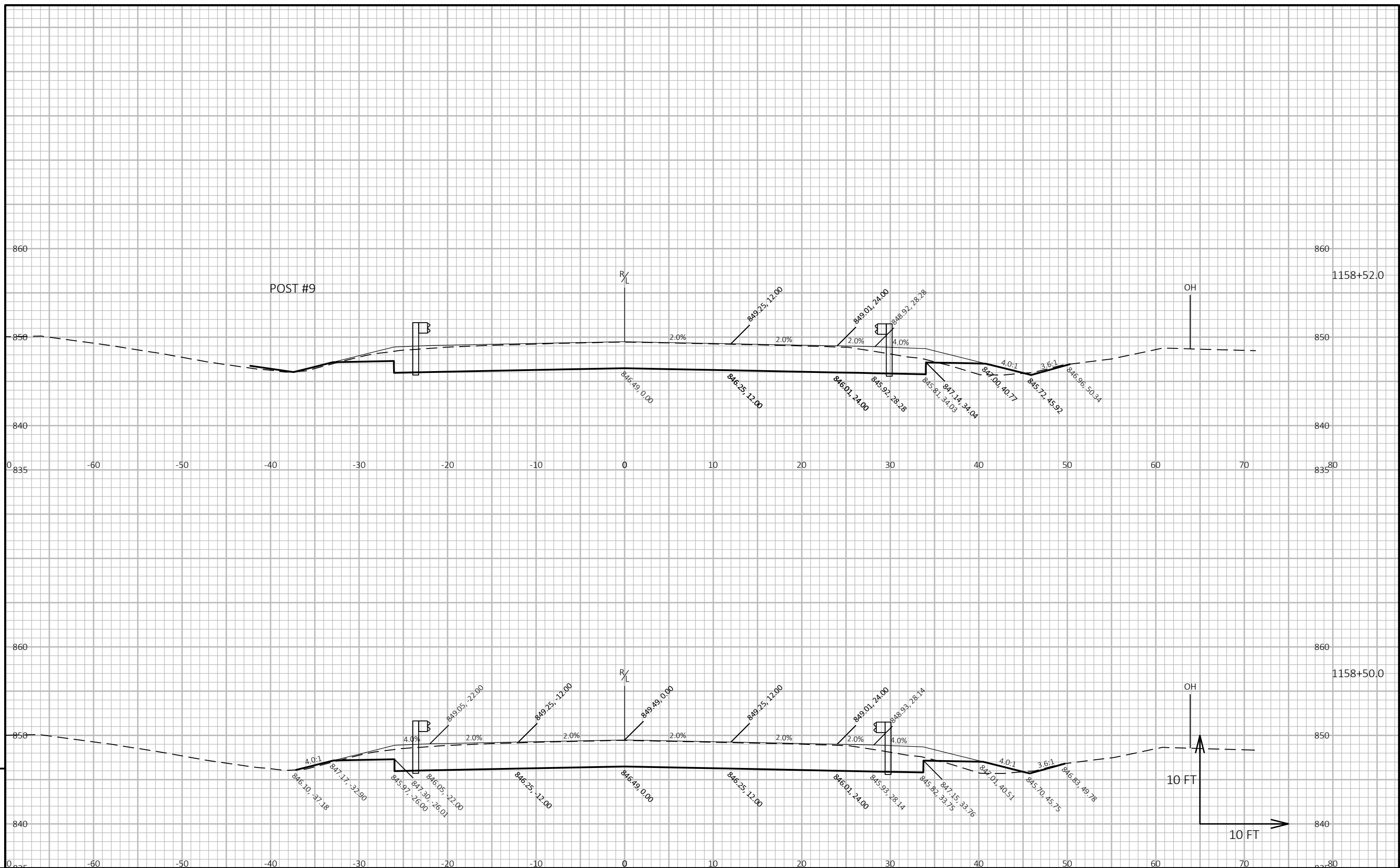
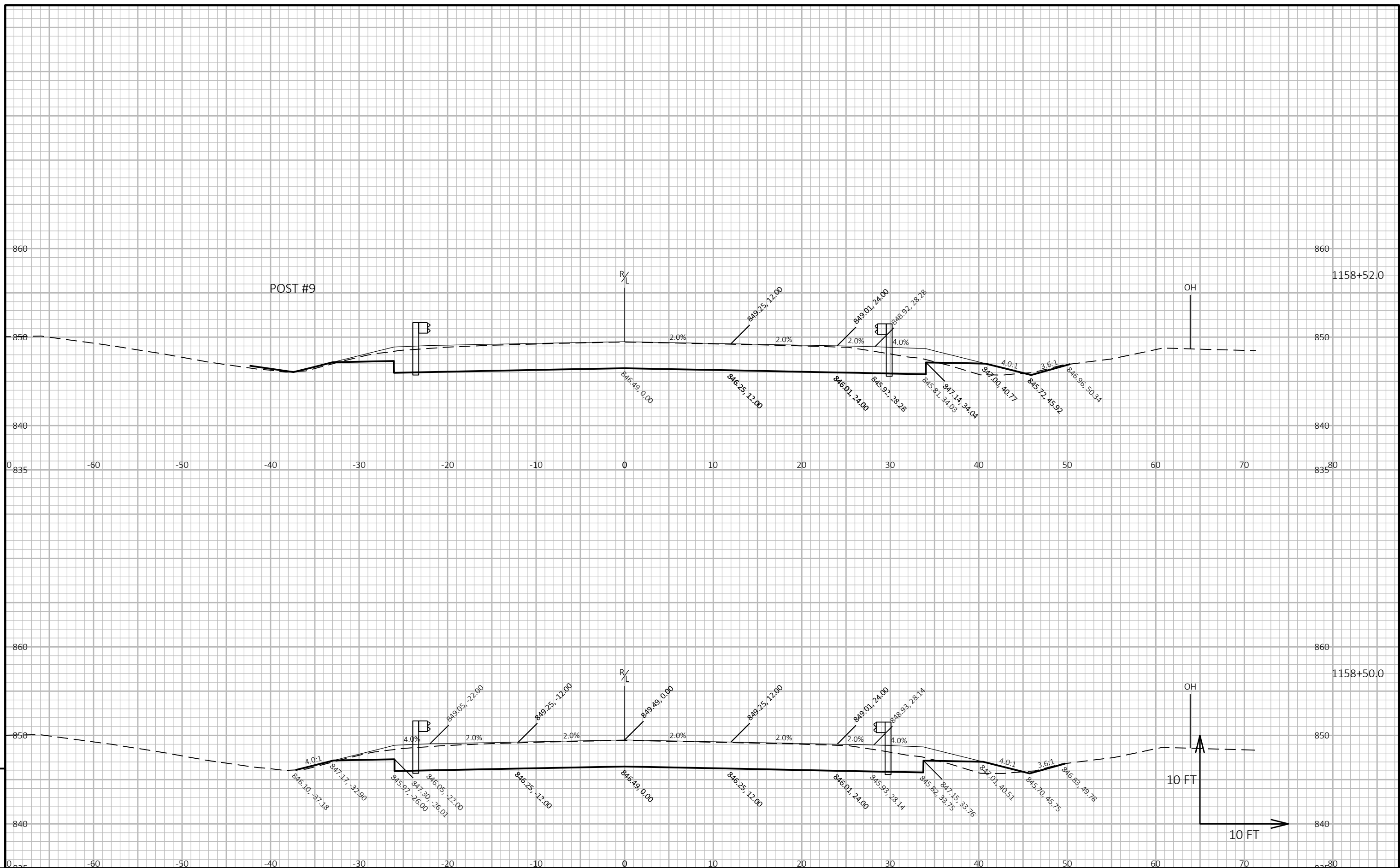




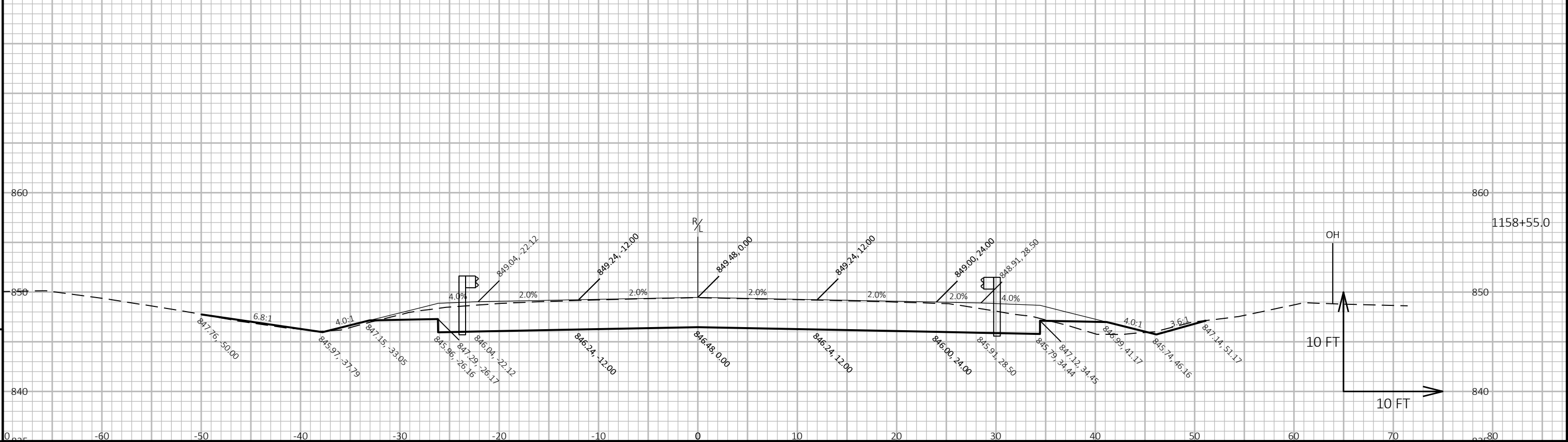
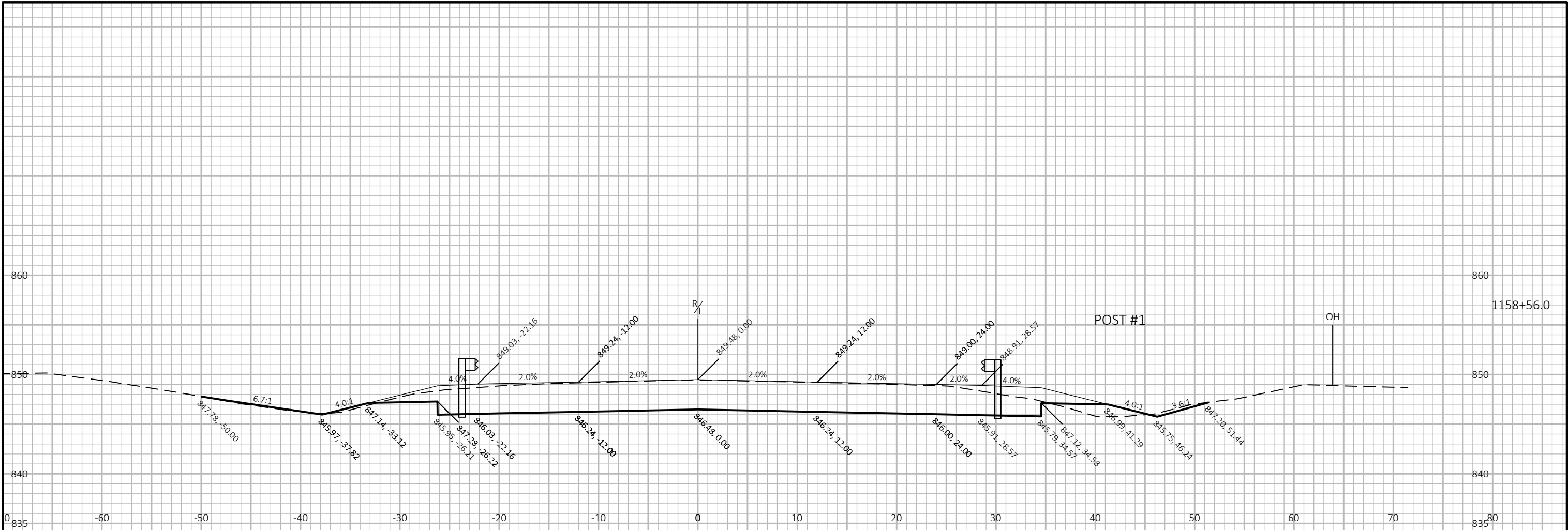




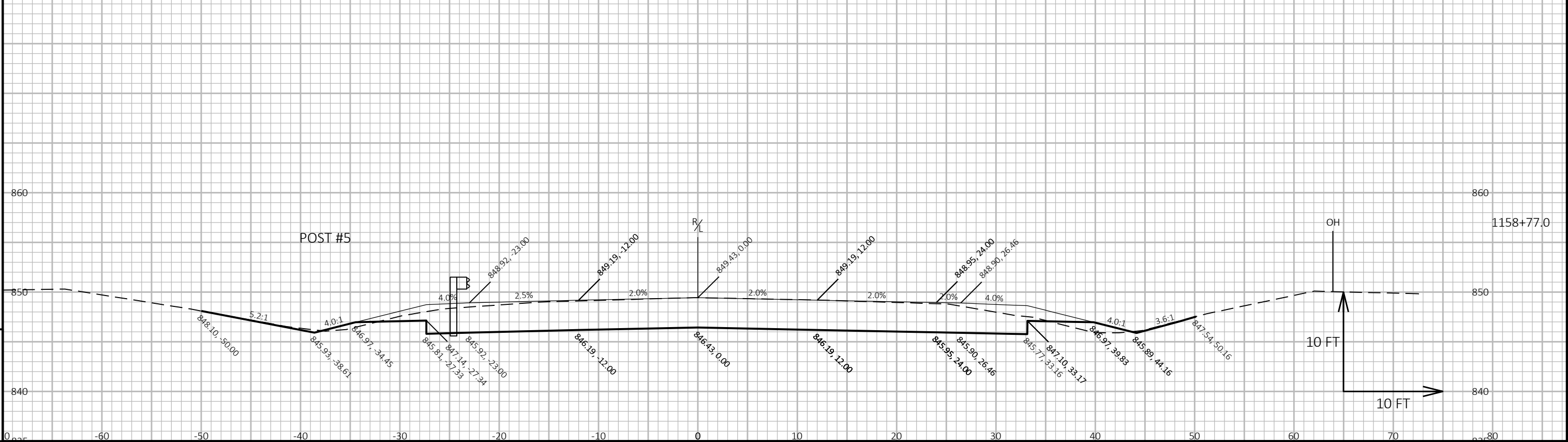
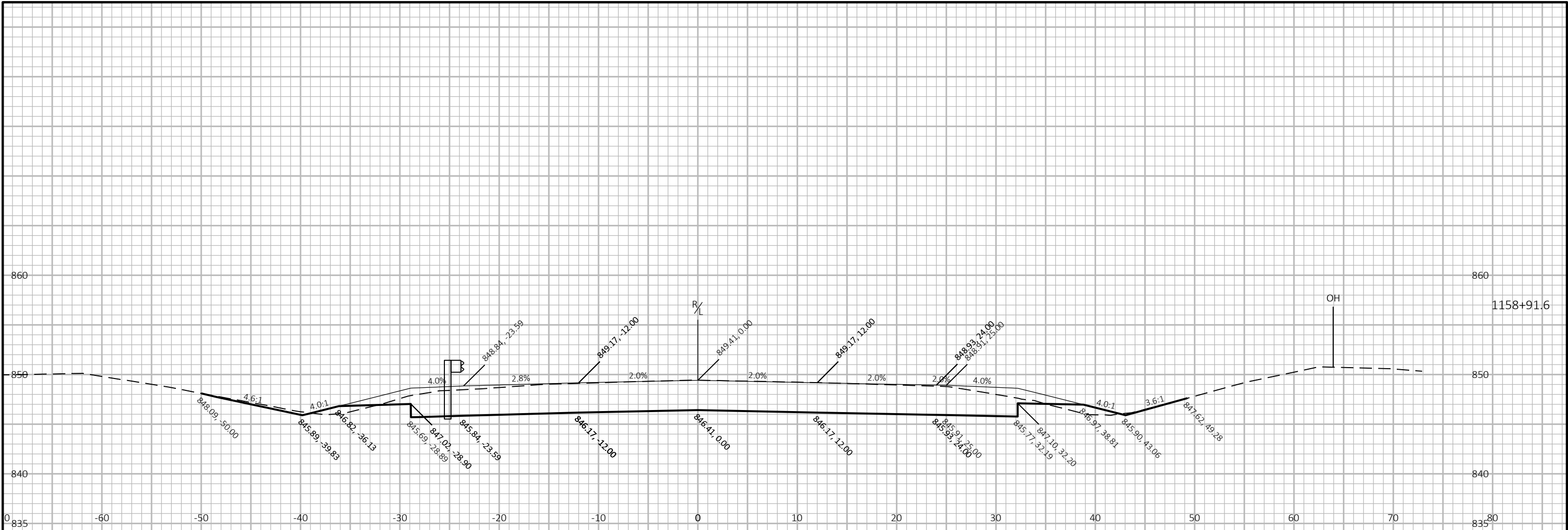




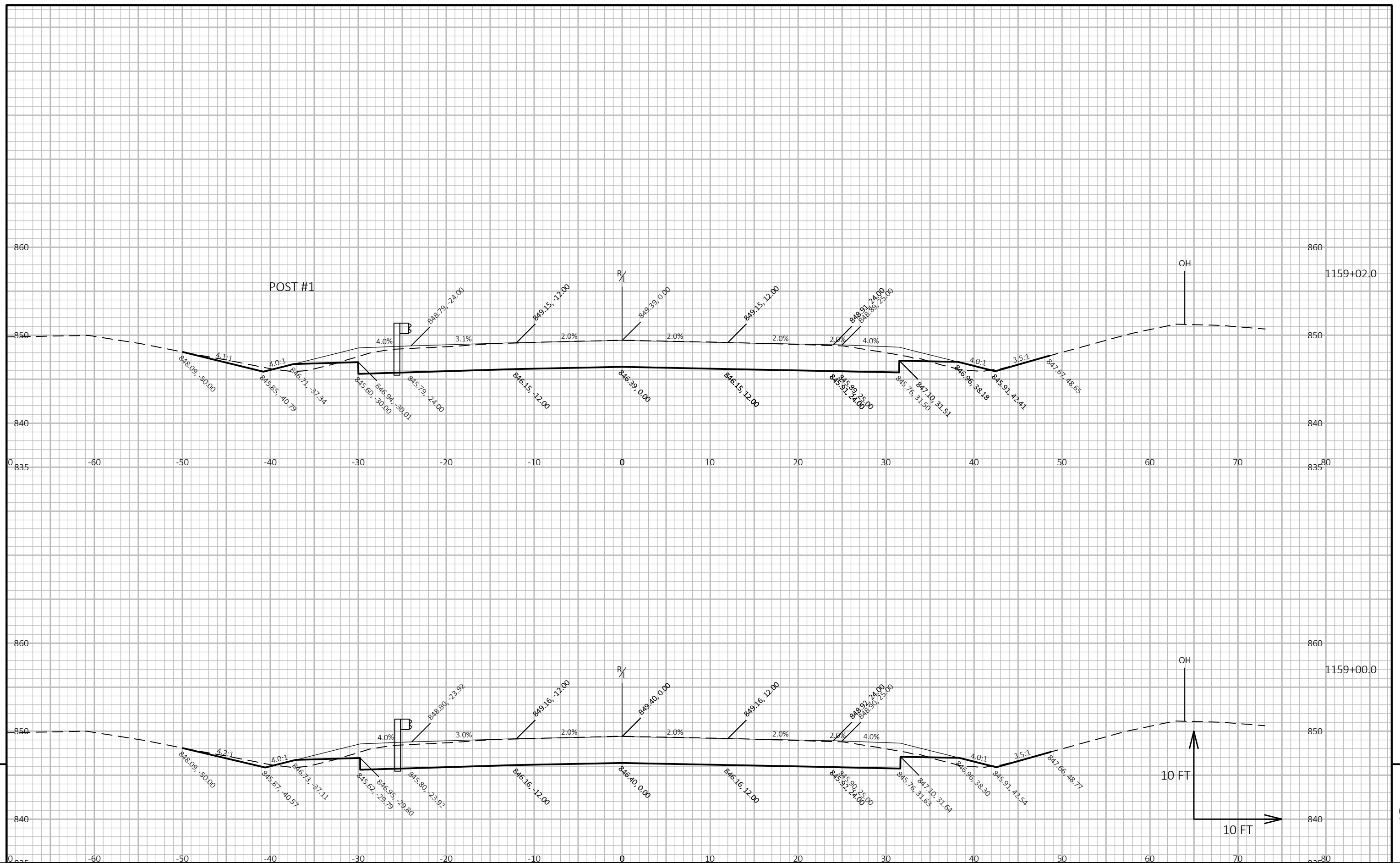
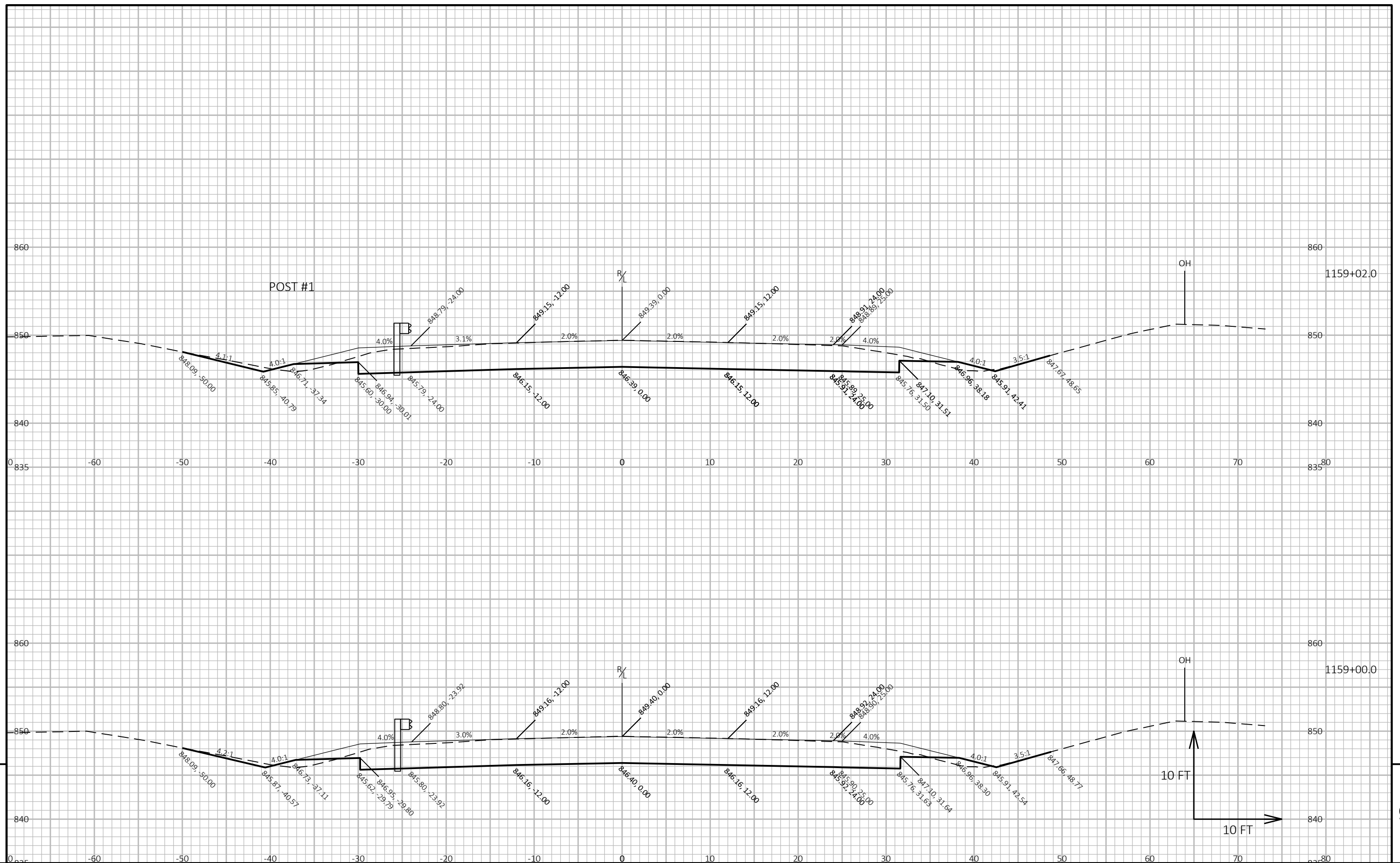
PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	CROSS SECTIONS: STH 16	SHEET	E
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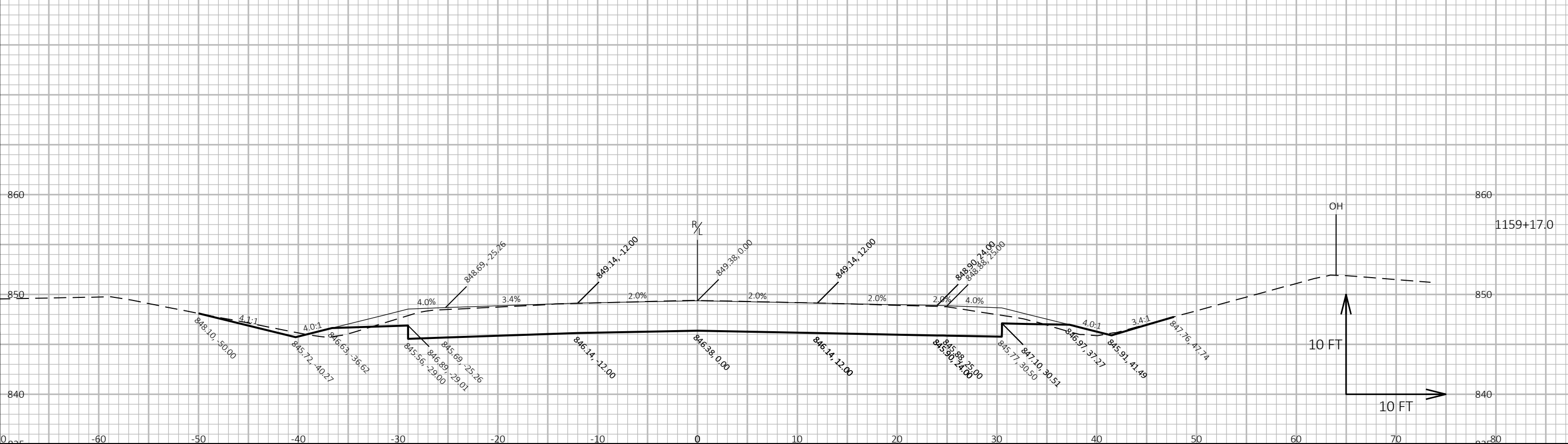
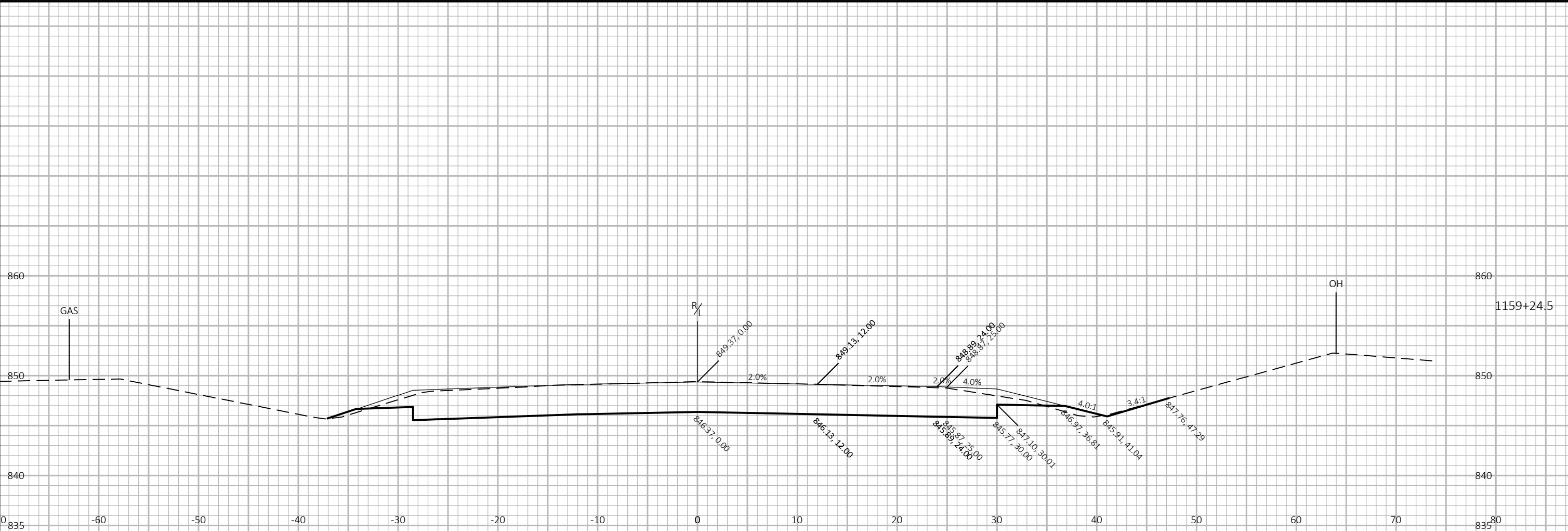
PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	CROSS SECTIONS: STH 16	SHEET	E
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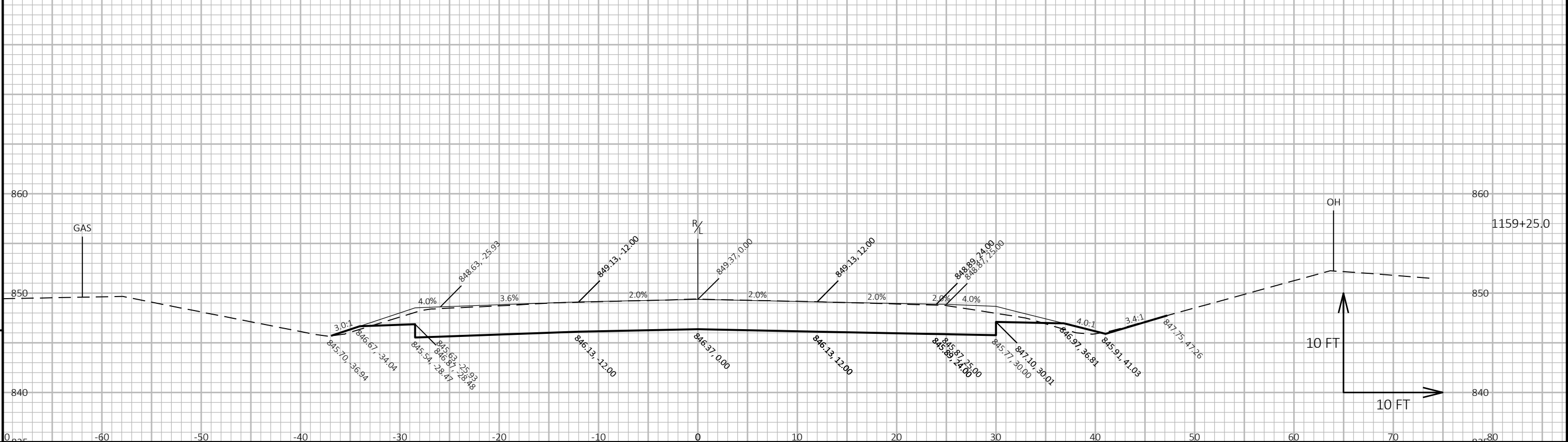
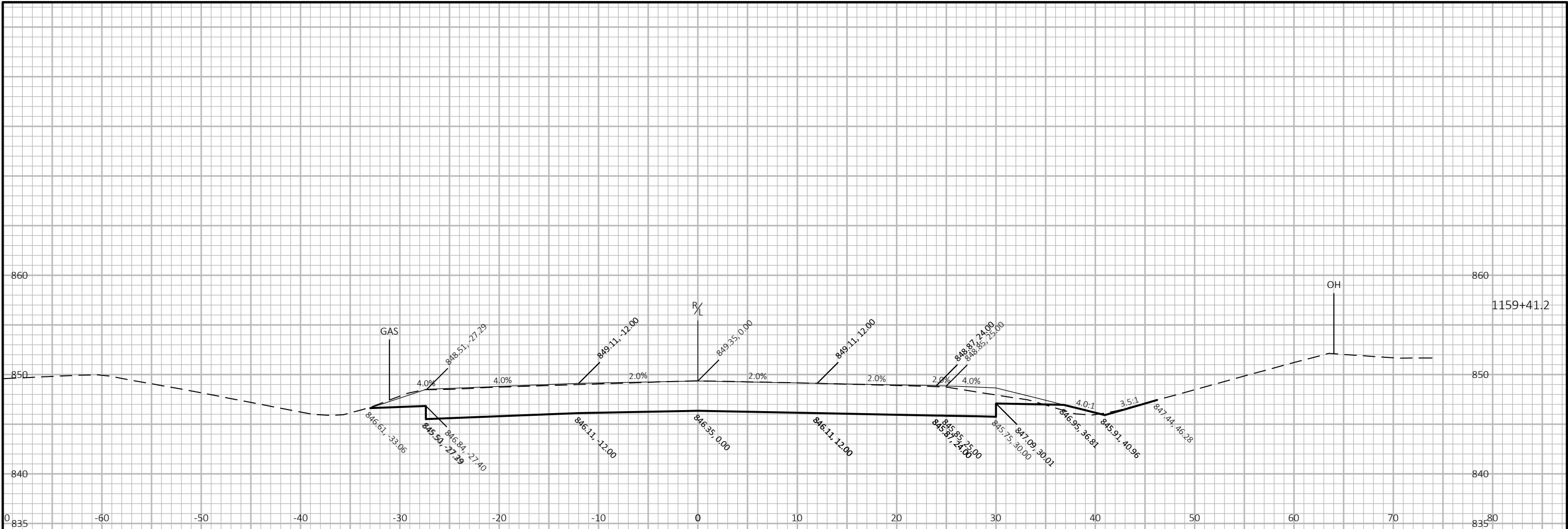


PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	CROSS SECTIONS: STH 16	SHEET E
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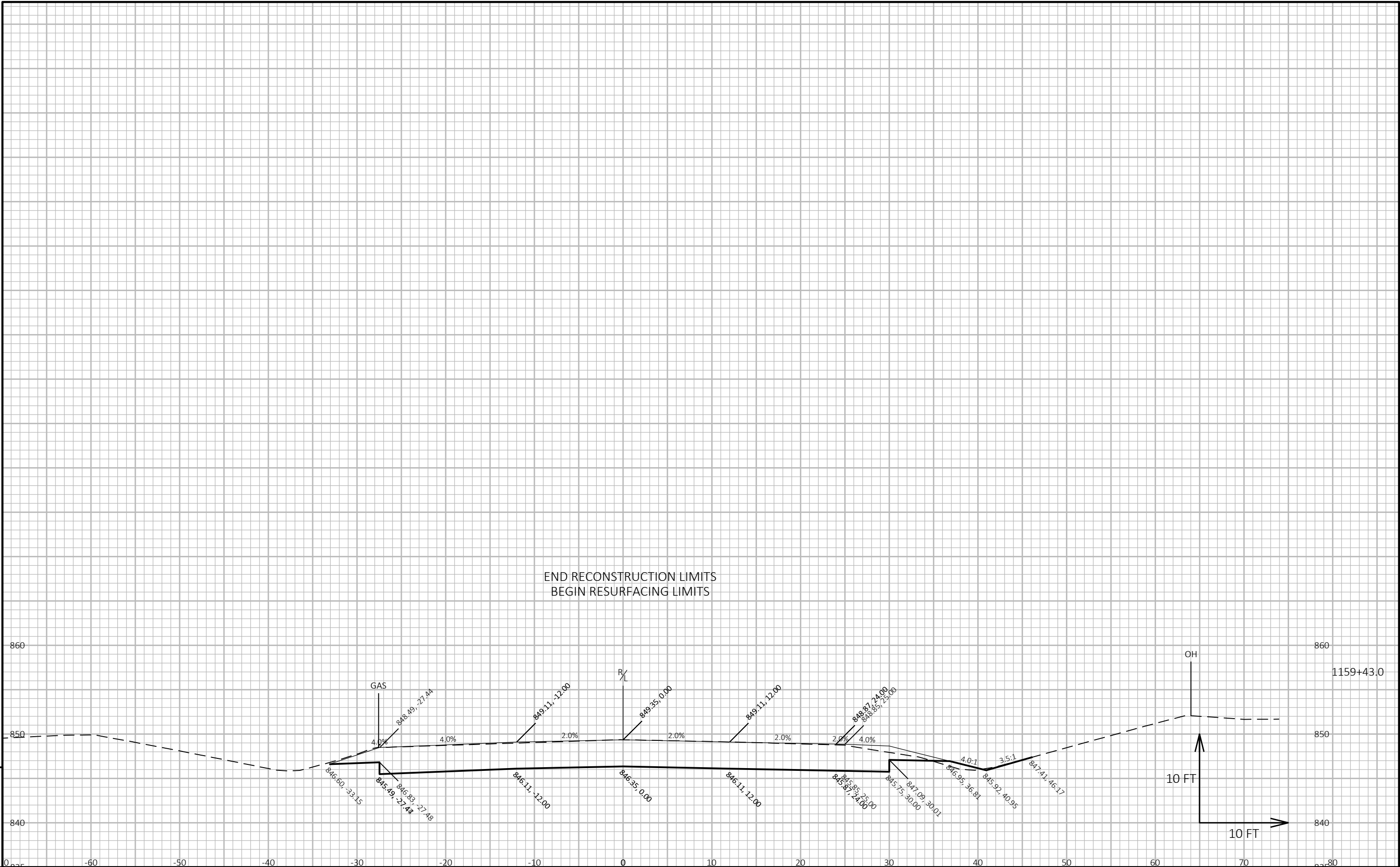
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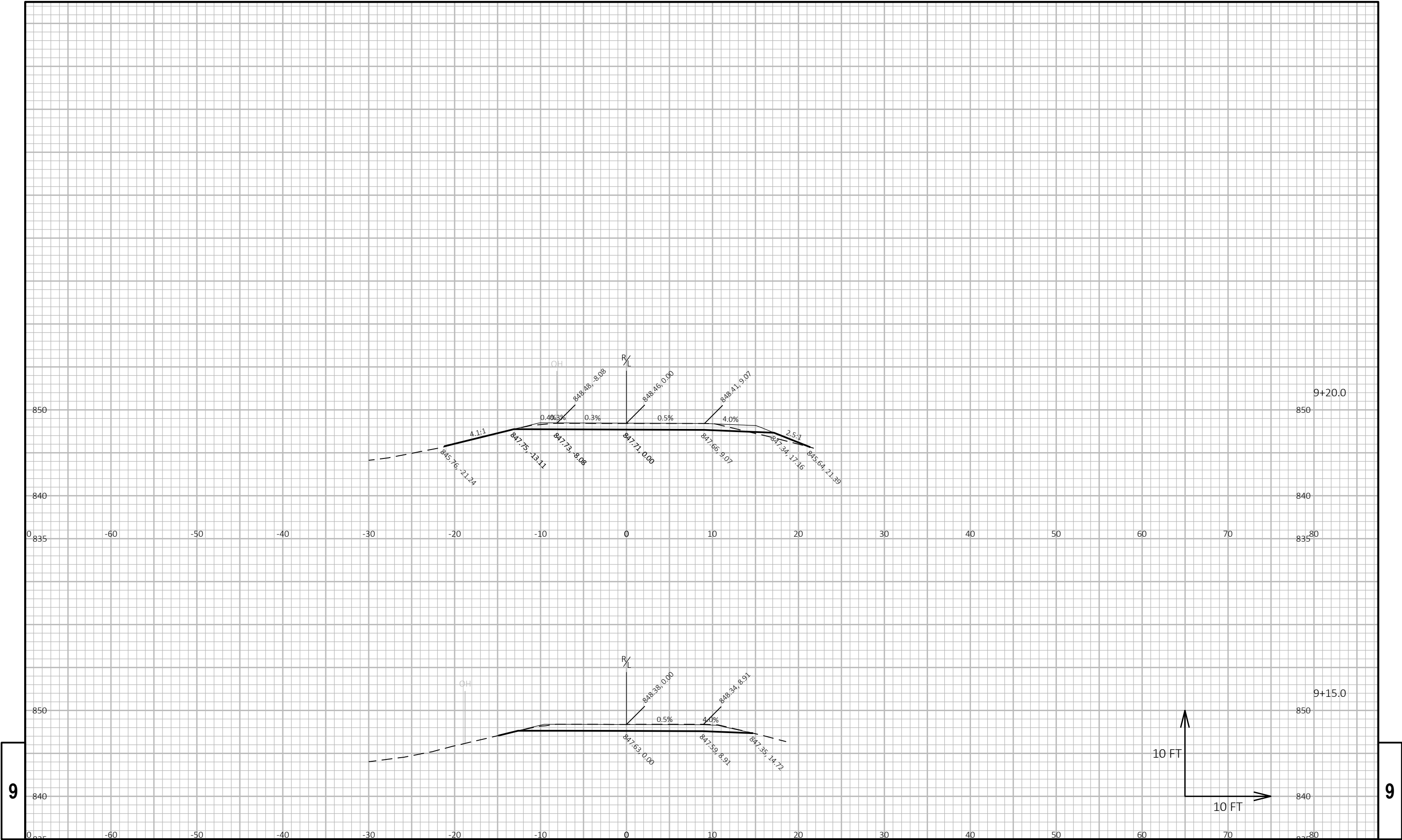


PROJECT NO: 1400-01-70	HWY: STH 16	COUNTY: COLUMBIA	CROSS SECTIONS: STH 16	SHEET	E
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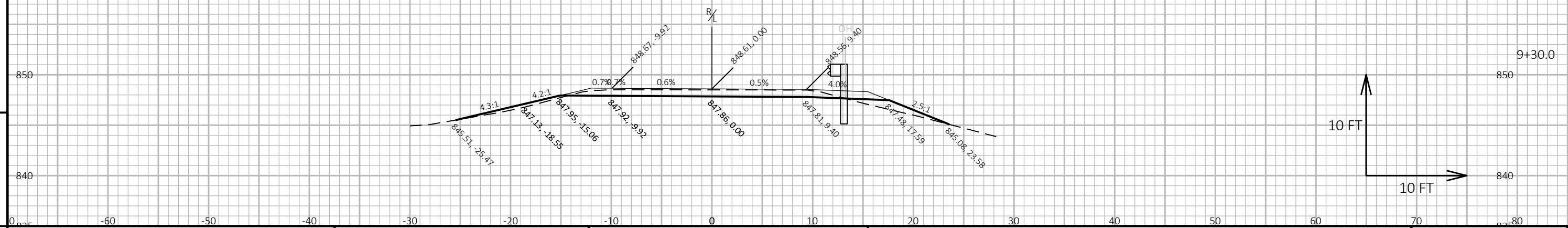
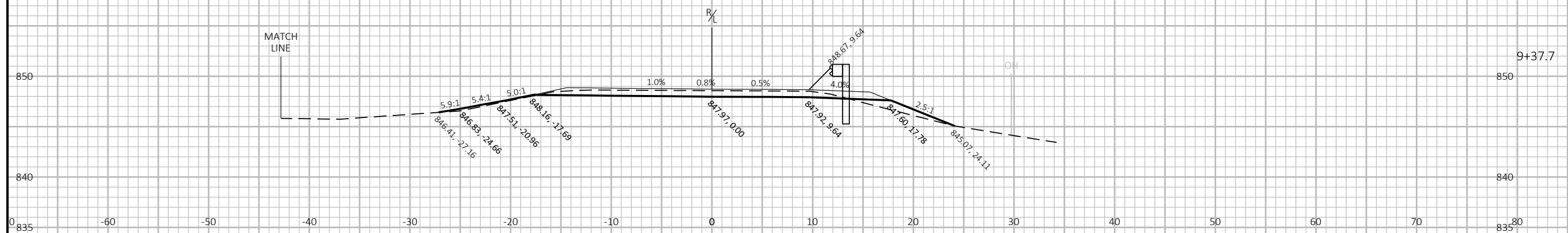
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SEE CROSS SECTION MATCHLINES SHEET FOR MORE DETAILS



PROJECT NO:	1400-01-70
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HWY: STH 16

COUNTY: COLUMBIA

CROSS SECTIONS: DRIVEWAY STA 1154+72.67 RT

SHEET

1

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LAYOUT NAME - 63

PLOT DATE : 10/12/2020 2:29 PM

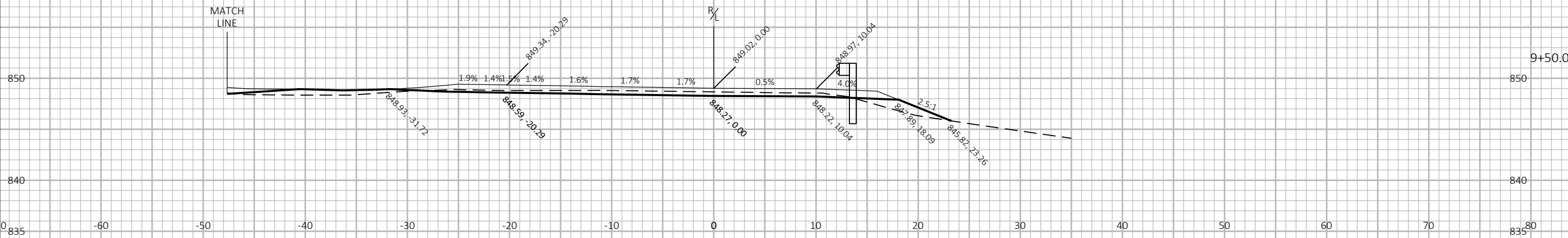
PLOT BY : RINZEL, JAMES M

PLOT NAME :

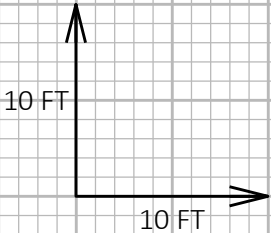
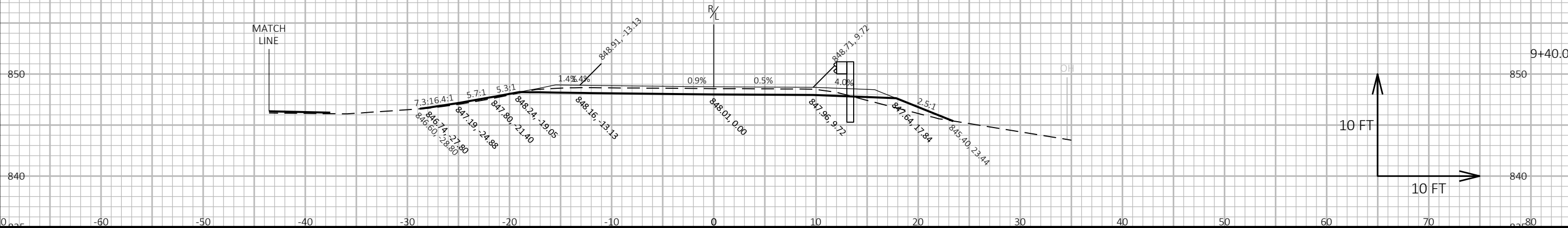
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WISDOT/CADDS SHEET 49

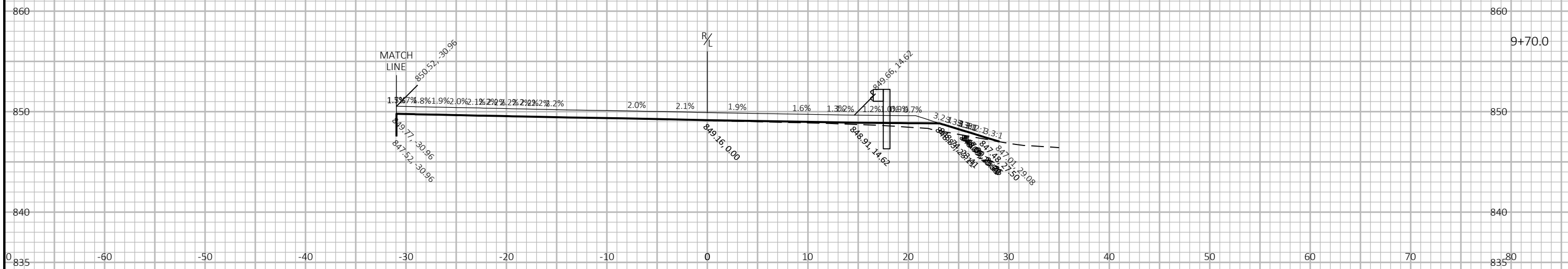
SEE CROSS SECTION MATCHLINES SHEET FOR MORE DETAILS



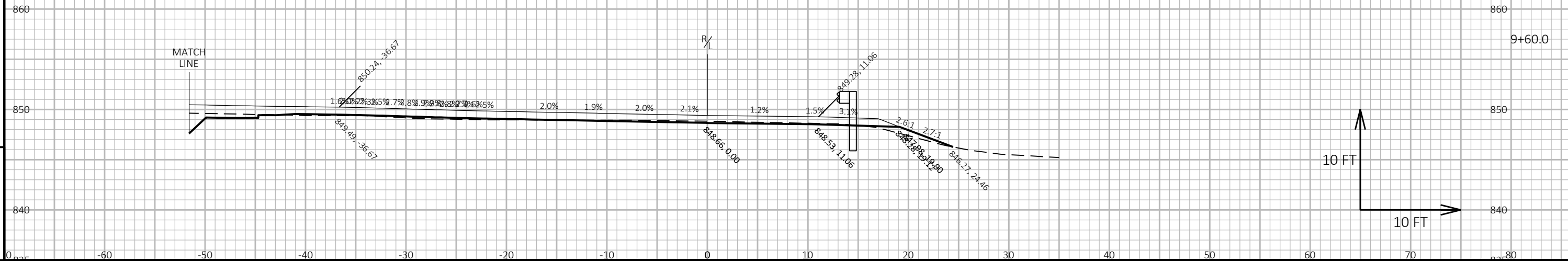
SEE CROSS SECTION MATCHLINES SHEET FOR MORE DETAILS



SEE CROSS SECTION MATCHLINES SHEET FOR MORE DETAILS



SEE CROSS SECTION MATCHLINES SHEET FOR MORE DETAILS



PROJECT NO:	1400-01-70
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HWY: STH 16

COUNTY: COLUMBIA

CROSS SECTIONS: DRIVEWAY STA 1154+72.67 RT

SHEET

1

