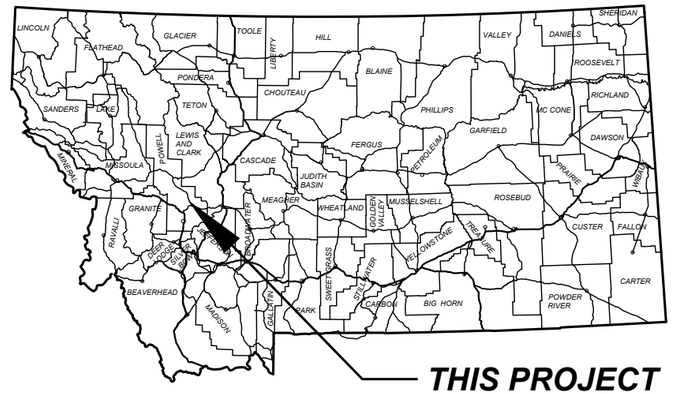
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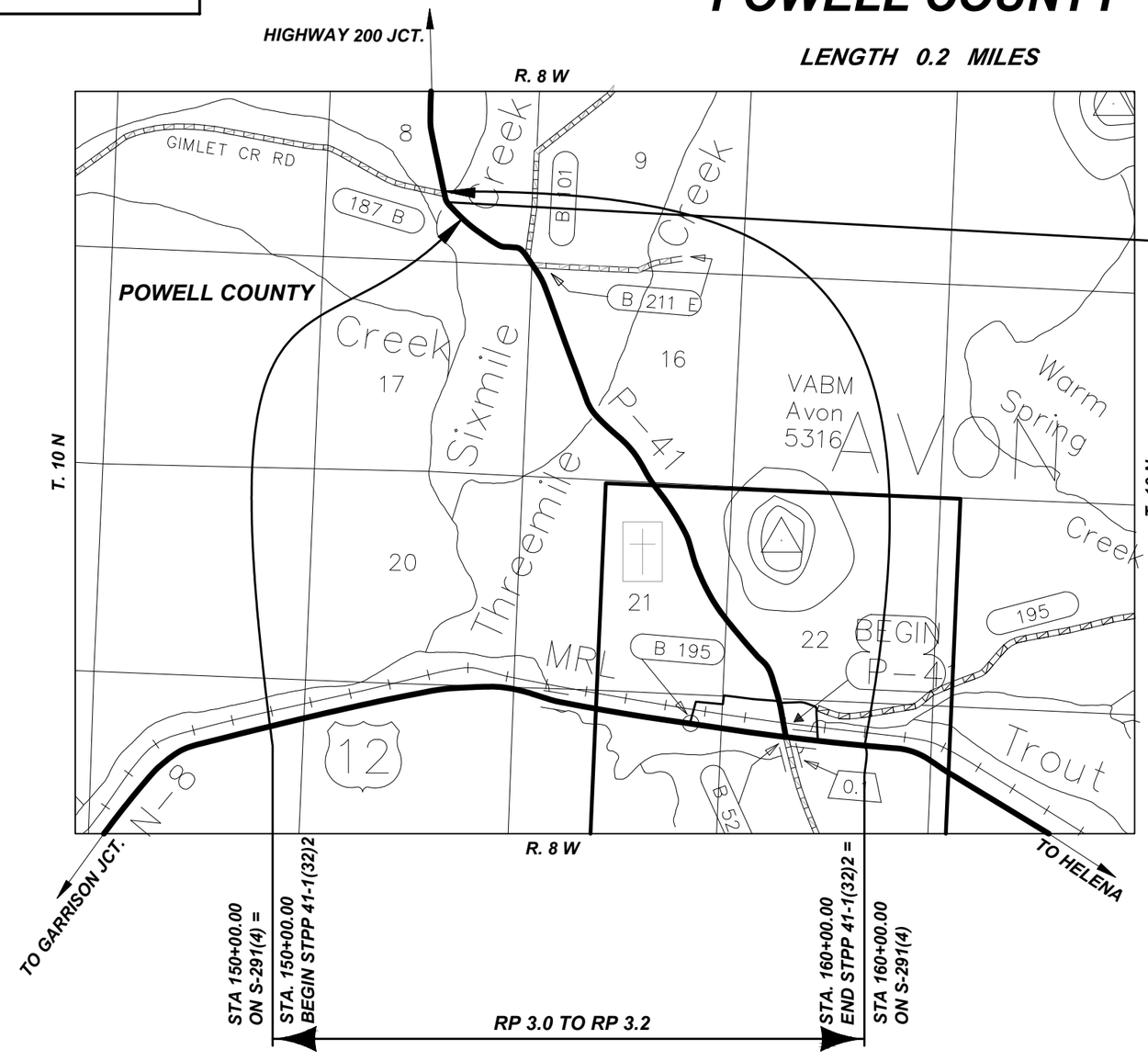
MONTANA DEPARTMENT OF TRANSPORTATION

FEDERAL AID PROJECT STPP 41-1(32)2
REMOVE AND REPLACE CULVERTS
MT-141 CULVERT - NORTH OF AVON
POWELL COUNTY

PROJECT DESIGN DATA

PRESENT	2022	A.D.T. =	1,370
LETTING	2023	A.D.T. =	1,410
DESIGN	2043	A.D.T. =	2,490
		D.H.V. =	340
		TRUCKS =	9.6%
		V. =	55 MPH
		18 KIP ESAL'S =	78
		GROWTH RATE =	2.9%

ASSOCIATED PROJECT AGREEMENT NUMBERS	
R/W	
I.C.	
P.E.	STPP 41-1(31)2



STA 155+74.00
REMOVE 12'-10" X 8'4" X 92.3' SSPPAC
RP 3.07
MDT ID # 08057
NBI STRUCTURE # 000000202208057
STOCKPASS

STA. 155+41.41
NEW 16' X 10' RCB. DR.
RP 3.07
MDT ID # 08058
STRUCTURE # 000000202208058
SIXMILE CREEK

STA. 155+39.67
REMOVE 12'-10" X 8'4" X 102.4' SSPPAC
RP 3.07
MDT ID # 08058
STRUCTURE # 000000202208058
SIXMILE CREEK

MONTANA
DEPARTMENT OF TRANSPORTATION
MALCOLM "MACK" LONG
DIRECTOR OF TRANSPORTATION
APPROVED BY:
HIGHWAYS ENGINEER
DocuSigned by:
Damian Krings
1C71361CE866454...
MONTANA DAMIAN KRINGS 12113PE LICENSED PROFESSIONAL ENGINEER
7/5/2023
DATE

SHEET NO. 1

TITLE SHEET

PROJECT NAME	MT-141 CULVERT - NORTH OF AVON
COUNTY	POWELL
PROJECT ID	STPP 41-1(32)2
UPN	10334000
CHECKED BY	####
REVIEWED BY	T. Johnson 4/27/2023
DESIGNED BY	J. McKinney 4/5/2023

10334000RDPLN001.DWG

MONTANA Department of Transportation

ROAD PLANS

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NOTES

BASIS OF PLAN QUANTITIES

(QUANTITIES FOR ESTIMATING PURPOSES ONLY)

COMP. AGGREGATE WEIGHT	= 3700 LBS. PER CUBIC YARD
COMP. WEIGHT OF PL. MIX BIT. SURF.	= 3855 LBS. PER CUBIC YARD
BITUMINOUS MATERIAL	= 8.5 LBS. PER GAL.
EMULSIFIED ASPHALT - TACK (ALL OTHER SURFACES)	= 0.05 GAL. PER SQ.YARD (UNDILUTED)

AS-BUILTS

FOR ORIGINAL HORIZONTAL ALIGNMENT AND STATIONING REFER TO THE FOLLOWING "AS-BUILT" PROJECT(S):

RTF 41-1(6)0 - 1990 OVERLAY

S-291(4) - 1961 ORIGINAL CONSTRUCTION

UTILITIES

CALL THE UTILITIES UNDERGROUND LOCATION CENTER (811) OR OTHER NOTIFICATION SYSTEM FOR THE MARKING AND LOCATION OF ALL LINES AND SERVICES BEFORE EXCAVATING. ALL CLEARANCES OR DEPTHS PROVIDED FOR UTILITIES ARE FROM EXISTING GROUND LINE.

SOILS INFORMATION

SEE SPECIAL PROVISIONS FOR ADDITIONAL INFORMATION. THE LOCATION OF GEOTECHNICAL BORINGS IS SHOWN ON THE PLAN VIEW WITH THE FOLLOWING SYMBOL:

BORING NUMBER

(GEOTECHNICAL BORING)

CLEARING AND GRUBBING

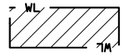
CLEAR AND GRUB TO CONSTRUCTION LIMITS. INCLUDE THE COST OF CLEARING AND GRUBBING IN THE UNIT PRICE BID FOR UNCLASSIFIED EXCAVATION.

APPARENT R/W

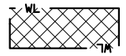
EXISTING R/W LINES SHOWN AS APPARENT ARE APPROXIMATE AND HAVE NOT BEEN RETRACED.

WETLANDS

WETLANDS EXIST ADJACENT TO THE ROADWAY AND MAY EXIST BEYOND THE PROJECT LIMITS. WETLAND AREAS AND PERMANENT WETLAND IMPACT AREAS WITHIN THE PROJECT LIMITS HAVE BEEN DELINEATED AND ARE SHOWN ON THE PLANS. ANY ACTION IMPACTING WETLAND AREAS OUTSIDE OF THE PERMANENT IMPACT AREAS SHOWN IS THE RESPONSIBILITY OF THE CONTRACTOR.



DELINEATED WETLAND AREAS



PERMANENT WETLAND IMPACTED AREAS

WETLAND DELINEATION TABLE

WETLAND DESIGNATION	STATION FROM	STATION TO	WETLAND AREA (acres) DELINEATED AREA #	WETLAND AREA (acres) PERMANENT IMPACTED AREA	REMARKS
WL1-D	149+42	150+16	0.016		RT.
WL1-E	150+31	152+02	0.078		RT.
WL1-C	150+54	153+13	0.284		LT.
WL1-B	152+52	156+05	1.105		LT.
WL1-F	152+64	155+46	0.546	0.003	RT.
WL1-A	155+43	160+96	0.317		LT.
WL1-G	155+44	155+99	0.086	0.003	RT.
TOTAL			2.43	0.01	

AREA OF EXISTING WETLAND EXTENDS BEYOND PLAN LIMITS

APPROACHES (FOR INFORMATION ONLY)

STATION	TYPE	linear feet WIDTH	linear feet RADIUS # LEFT	linear feet RADIUS # RIGHT	linear feet LENGTH	EXISTING SURFACING	feet PMS THK.	feet CAC THK.	PROPOSED SURFACE	tons COMMERCIAL PLANT MIX - MISC.	cu. yards CRUSHED AGG. COURSE	sq. yards AGG. TREAT.	gallons EMULS. ASPHALT TACK	REMARKS
151+98	FARM FIELD	12	25	25	55.6	GRAVEL	0.35	0.65	12' ASPHALT, 43.6' GRAVEL	5	27	178	3	LT.
152+30	FARM FIELD	10	40	40	46.4	GRAVEL	0.35	0.65	12' ASPHALT, 34.4' GRAVEL	10	34	197	5	RT.
SUBTOTAL	FARM FIELD									15	61	374	8	
157+83	PRIVATE	15	45	40	47.7	GRAVEL	0.35	0.65	ASPHALT	20	43	229	9	RT.
SUBTOTAL	PRIVATE									20	43	229	9	

ALL RADII MEASURED TO EDGE OF SHOULDER

SHEET NO. 2

TABLE OF CONTENTS
NOTES

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

	CHECKED BY	REVIEWED BY	DESIGNED BY
	#####	#####	J. McKinney
	#####	#####	4/5/2023

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LINEAR AND LEVEL DATA

LENGTH OF ROADWAY	***2 LANE RURAL***	***1,000.00 ft***
TOTAL LENGTH OF STPP 41-1(32)2	***2 LANE RURAL***	***1,000.00 ft***

BEARING SOURCE

GRID -- MONTANA STATE PLANE COORDINATE SYSTEM NAD 83-2011

LEVEL DATUM SOURCE

ELEVATIONS ARE BASED ON THE GNSS DERIVED ELEVATIONS

Mainline				
STATION	DESCRIPTION	NORTHING OR Y COORDINATE	EASTING OR X COORDINATE	REMARKS
148+25.30	BP	883446.690	1183870.429	BEGINNING OF ALIGNMENT
150+00.00	POT	883530.371	1183717.074	BEGINNING OF PROJECT
151+91.60	PC	883622.146	1183548.884	
157+39.03	PROJECT PI	883897.918	1183043.499	
160+00.00	POC	884184.108	1182982.720	END OF PROJECT
162+37.39	EP	884400.223	1182885.144	END OF ALIGNMENT

NOTE: ALIGNMENT CONTAINED IN PLAN AND PROFILE SHEETS IS ONLY WITHIN THE PROJECT LIMITS. SEE AS-BUILTS FOR COMPLETE CURVE INFORMATION.
AS BUILT: S-291(4)

DESIGN ALIGNMENT WILL BE PROVIDED ELECTRONICALLY.
ALIGNMENT: MAINLINE
PROFILE: DESIGN_PROF_2

SHEET NO. 3

LINEAR & LEVEL DATA

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	####	
REVIEWED BY	####	
DESIGNED BY	J. McKinney	4/5/2023

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CONTROL DIAGRAM

SCALE: N/A

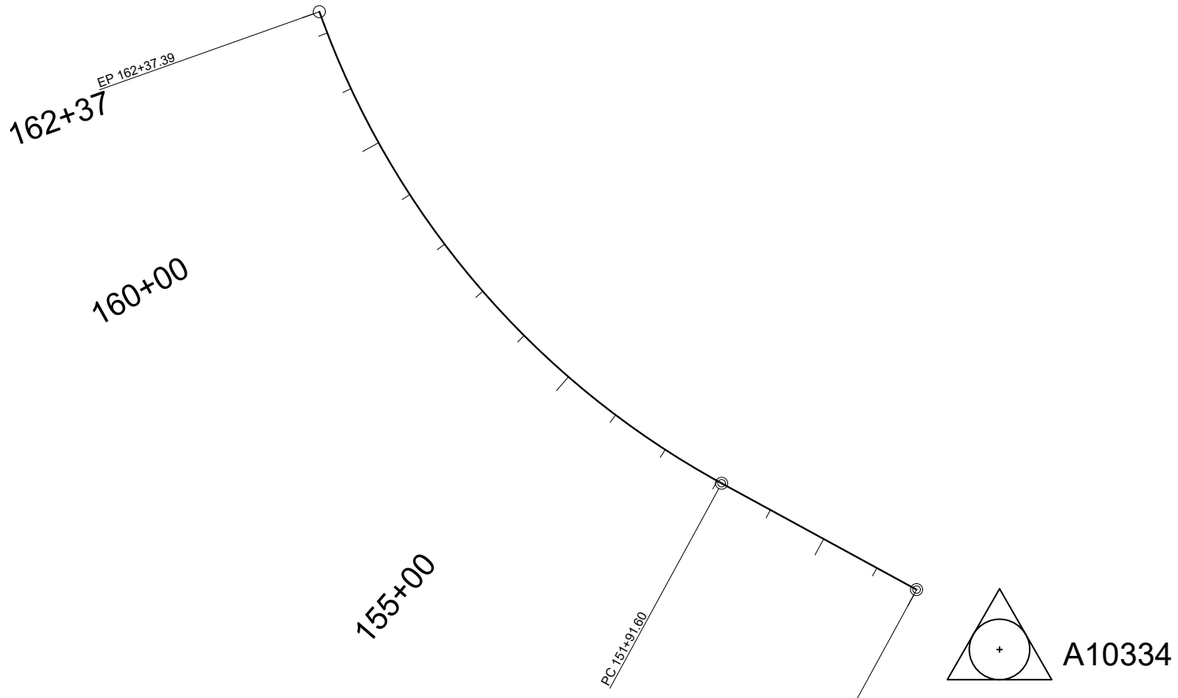
B10334

NOTE:
THIS PROJECT IS ON THE MONTANA COORDINATE SYSTEM NAD83-2011.
NORTHING AND EASTING COORDINATES ARE EXPRESSED IN UNITS OF
INTERNATIONAL FEET AND ELEVATIONS ARE IN UNITS OF U.S. SURVEY FEET.

DIMENSIONS SHOWN ON THE PLANS ARE GRID. ALL SURVEY AND STAKING REQUIRE
THE USE OF A COMBINATION SCALE FACTOR (CSF) TO CONVERT GRID DIMENSIONS
TO GROUND DIMENSIONS (GRID DISTANCE / CSF = GROUND DISTANCE).
THE CSF FOR THIS PROJECT IS 0.999186059.

N

CONTROL ABSTRACT			
POINT NAME\NUMBER	N OR Y COORDINATE	E OR X COORDINATE	POINT ELEVATION
A10334	883348.0590	1184007.3080	4807.201
B10334	885036.3490	1180936.1870	4850.813



SHEET NO.
4

CONTROL DIAGRAM

PROJECT NAME
MT 141 CULVERT - NORTH OF AVON
COUNTY
POWELL
PROJECT ID
STPP 41-1(32)2
UPN
10334000

CHECKED BY	#####	#####
REVIEWED BY	#####	#####
DESIGNED BY	J. McKinney	4/5/2023

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MONTANA
Department of Transportation

ROAD PLANS

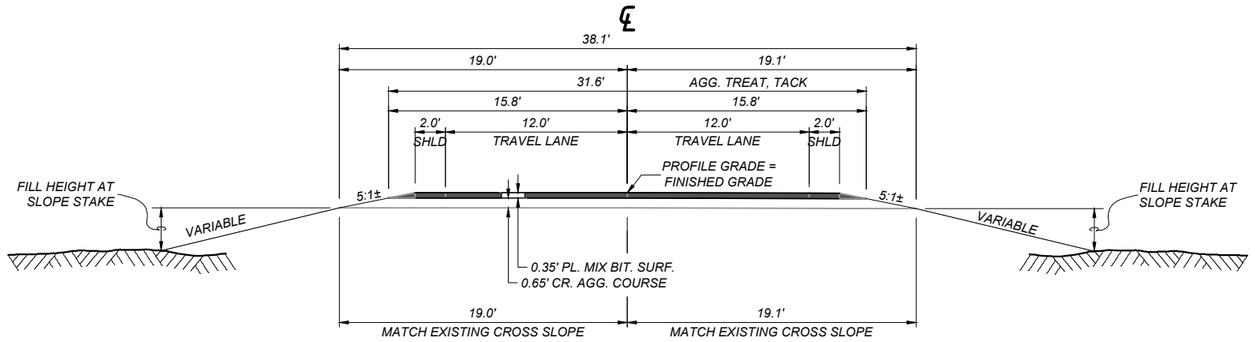
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150+00.00 ONLY
150+00.00 TO 152+60.92 TRANS. TYP. SECT. NO. 1 TO NO. 2

TYPICAL SECTION NO. 1

MAINLINE



QUANTITIES					
UNIT	AGGREGATE		UNIT	BITUMINOUS MATERIAL	
	PLANT MIX	CR. AGG. COURSE		AGG. TREATMENT	EMULSIFIED ASPHALT TACK*
AREA square feet	10.43	22.65	square yards PER STATION	351	702
cubic yards PER STATION	38.6	83.9	tons PER STATION		
tons PER STATION	74.4		gals. PER STATION		35
square yards PER STATION					

* BASED ON 2 APPLICATIONS

*FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

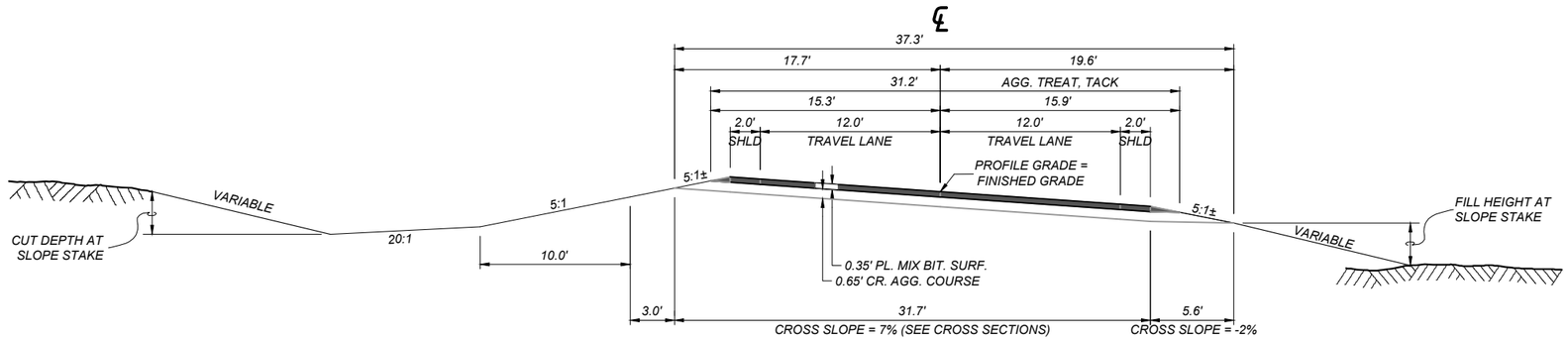
*BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
OVER 20'	2:1

*SEE CROSS SECTIONS FOR DEVIATIONS

152+60.92 TO 159+74.00 (7% RT.)
159+74.00 TO 160+00.00 TRANS. TYP. SECT. NO. 2 TO NO. 3

TYPICAL SECTION NO. 2

MAINLINE



QUANTITIES					
UNIT	AGGREGATE		UNIT	BITUMINOUS MATERIAL	
	PLANT MIX	CR. AGG. COURSE		AGG. TREATMENT	EMULSIFIED ASPHALT TACK*
AREA square feet	10.36	22.26	square yards PER STATION	347	694
cubic yards PER STATION	38.4	82.4	tons PER STATION		
tons PER STATION	74.0		gals. PER STATION		35
square yards PER STATION					

* BASED ON 2 APPLICATIONS

SHEET NO. 5

TYPICAL SECTIONS

PROJECT NAME MT 141 CULVERT - NORTH OF AVON
COUNTY POWELL
PROJECT ID STPP 41-1(32)2
UPN 10334000

	CHECKED BY	####	####
	REVIEWED BY	####	####
	DESIGNED BY	J. McKinney	4/5/2023

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MONTANA Department of Transportation

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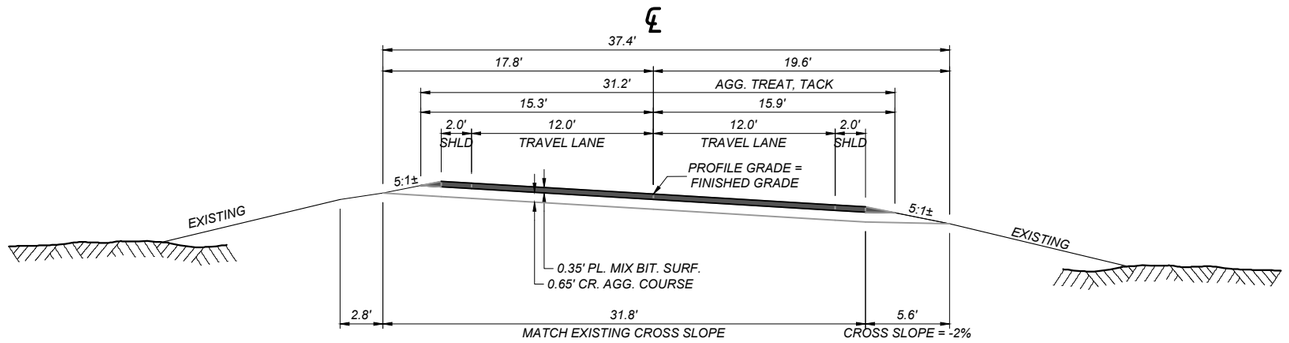
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TYPICAL SECTION NO. 3

MAINLINE



QUANTITIES					
UNIT	AGGREGATE		UNIT	BITUMINOUS MATERIAL	
	PLANT MIX	CR. AGG. COURSE		AGG. TREATMENT	EMULSIFIED ASPHALT TACK*
AREA square feet	10.36	22.30	square yards PER STATION	347	694
cubic yards PER STATION	38.4	82.6	tons PER STATION		
tons PER STATION	74.0		gals. PER STATION		35
square yards PER STATION					

* BASED ON 2 APPLICATIONS

*FILL SLOPES	
0' - 10'	6:1
10' - 20'	4:1
20' - 30'	3:1
OVER 30'	2:1

*BACK SLOPES	
0' - 5'	5:1
5' - 10'	4:1
10' - 15'	3:1
OVER 20'	2:1

*SEE CROSS SECTIONS FOR DEVIATIONS

SHEET NO. 6

TYPICAL SECTIONS

PROJECT NAME MT 141 CULVERT - NORTH OF AVON

COUNTY POWELL

PROJECT ID STPP 41-1(32)2

UPN 10334000

CHECKED BY	####	
REVIEWED BY	####	
DESIGNED BY	J. McKinney	4/5/2023

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MONTANA Department of Transportation

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SURFACING

STATION FROM	STATION TO	linear feet GROSS	linear feet NET	linear feet +	linear feet -	FOR	AGGREGATE tons: COMMERCIAL PLANT MIX BIT. SURF. GR S - 3/8" PG 58V-34	AGGREGATE tons: COMMERCIAL PLANT MIX - MISC.	AGGREGATE cu. yards: CRUSHED AGG. COURSE	AGGREGATE cu. yards: SPECIAL BACKFILL	AGGREGATE cu. yards: TRAFFIC GRAVEL	BITUMINOUS MATERIAL gals.: EMULSIFIED ASPHALT TACK	BITUMINOUS MATERIAL sq. yards: AGG. TREAT.	REMARKS
150+00.00	152+60.92	260.92	260.92				194		217			91	911	TRANS. TYP. SECT. NO. 1 TO TYP. NO. 2
152+60.92	159+74.00	713.08	713.08				528		588			250	2,474	TYP. NO. 2
159+74.00	160+00.00	26.00	26.00				19		21			9	90	TRANS. TYP. SECT. NO. 2 TO TYP. NO. 3
						ADDITIONAL SURFACING	~	35	104	1,590	730	17	5,005	DETOUR AND APPROACH SURFACING
TOTAL		1,000.00	1,000.00	~	~		741	35	930	1,590	730	367	8,480	

ADDITIONAL SURFACING (INCLUDED IN SURFACING FRAME)

STATION FROM	STATION TO	linear feet GROSS	linear feet NET	linear feet +	linear feet -	FOR	AGGREGATE tons: COMMERCIAL PLANT MIX BIT. SURF. GR S - 3/8" PG 58V-34	AGGREGATE tons: COMMERCIAL PLANT MIX - MISC.	AGGREGATE cu. yards: CRUSHED AGG. COURSE	AGGREGATE cu. yards: SPECIAL BACKFILL	AGGREGATE cu. yards: TRAFFIC GRAVEL	BITUMINOUS MATERIAL gals.: EMULSIFIED ASPHALT TACK	BITUMINOUS MATERIAL sq. yards: AGG. TREAT.	REMARKS
150+00.00	160+00.00	1,000.00	1,000.00			DETOUR SURFACING				1,590	730		4,402	
						2 - FARM FIELD APPROACHES		15	61			8	374	
						1 - PRIVATE APPROACH		20	43			9	229	
SUBTOTAL		~	~	~	~		~	35	104	1,590	730	17	5,005	

GRADING

STATION	cu. yards UNCL. EXC.	cu. yards EXCESS EXC.	cu. yards EMB.+	REMARKS
150+00.00				
	11,251	10,245	1,006	DOES NOT INCLUDE CULVERT EXC.
160+00.00				
TOTAL	11,251	# 10,245	# 1,006	

FOR INFORMATION ONLY

ADDITIONAL GRADING

STATION FROM	STATION TO	cu. yards INCL. IN ROADWAY UNCL. EXC.	cu. yards INCL. IN ROADWAY EMB.+	cu. yards ADD. UNCL. EXC.	REMARKS
150+00.00	160+00.00	9,042	38		DETOUR GRADING
151+98		105	21		FARM FIELD APPROACH LT.
152+30		157	0		FARM FIELD APPROACH RT.
157+83		157	0		PRIVATE APPROACH RT.
150+00.00	160+00.00		803		TOPSOIL REPLACEMENT
TOTAL		~	~	~	

SHEET NO. 7

SUMMARIES

PROJECT NAME MT 141 CULVERT - NORTH OF AVON
COUNTY POWELL
PROJECT ID STPP 41-1(32)2
UPN 10334000

	CHECKED BY	REVIEWED BY	DESIGNED BY
	####	####	J. McKinney
	####	####	4/5/2023

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SUMMARIES

CULVERTS

STATION	linear feet		lump sum	END SECTIONS		each		cu. yards					sq. yards	linear feet	SKEW ANGLE	CULVERT IN PL. in x ft	REMARKS
	RCB *	MISC. ITEMS - INSTALL**	REMOVE STRUCTURE	LEFT	RIGHT	CUTOFF WALLS * LEFT	CUTOFF WALLS * RIGHT	FOUNDATION MATERIAL	GRANULAR BEDDING MATERIAL	SPECIAL BACKFILL	CULVERT INFILL	CONCRETE - CLASS GENERAL	GEOTEXT. STAB.	HEIGHT OF COVER			
	16' X 10'																
150+39																24" x 132' RCP IRR	USE IN PLACE - DO NOT DISTURB
155+39			0.5													12'-10" x 8'-4" x 102.4 SSPPAC	SIXMILE CREEK
155+41	108	108		2:1 Sloped End Section *	2:1 Sloped End Section *	1	1	176	88	3,238	32	8.6	560	8.3			SIXMILE CREEK
155+74			0.5							1,011						12'-10" x 8'-4" x 92.3' SSPPAC	STOCKPASS
160+25																24" x 194' RCP IRR	USE IN PLACE - DO NOT DISTURB
TOTAL	~	**108**	**1**	~	~	~	~	**176**	**88**	**4,249**	**32**	**8.6**	**560**	~	~	~	

* FURNISHED BY MDT
** SEE SPECIAL PROVISION

TEMPORARY DETOUR QUANTITIES *

STATION		cubic yards				square yards	REMARKS
		UNCL. EXC.	EMB+	SPECIAL BACKFILL / DETOUR SURFACING	TRAFFIC GRAVEL	AGG. TREATMENT	
FROM	TO						
150+00	160+00	9,042	38	1,590	730	4,402	PHASED DETOUR CONSTRUCTION
TOTAL		**# 9,042**	**# 38**	**## 1,590**	**## 730**	**## 4,402**	

INCLUDED IN ROADWAY GRADING
INCLUDED IN ROADWAY SURFACING
* SEE DETAILS AND SPECIAL PROVISION

TEMPORARY SHORING

STATION	lump sum	REMARKS
	TEMPORARY SHORING	
155+39.67	1	FOR CULVERT STRUCTURAL SUPPORT
TOTAL	**1**	

SEE SPECIAL PROVISION

TEMPORARY BARRIER RAIL

STATION		linear feet				each				REMARKS
		TEMPORARY BARRIER RAIL		RESET TEMPORARY BARRIER RAIL		TEMPORARY IMPACT ATTENUATOR		RESET TEMPORARY IMPACT ATTENUATOR		
FROM	TO	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT	
150+00.00	160+00.00		1,000.0	2,000.0	1,000.0		2	4	2	DETOUR PHASING (3 RESETS)
SUBTOTAL		~	**1,000.0**	**2,000.0**	**1,000.0**	~	**2**	**4**	**2**	
TOTAL		**1,000.0**		**3,000.0**		**2**		**6**		

PAVEMENT MARKINGS

ITEM	UNIT	INTERIM APPLICATION #	FINAL APPLICATION	TOTAL
STRIPING - WHITE PAINT	gallon	10		10
STRIPING - YELLOW PAINT	gallon	11		11
STRIPING - WHITE EPOXY	gallon		13	13
STRIPING - YELLOW EPOXY	gallon		14	14
TEMPORARY STRIPING	linear feet			**2,000**

BASED ON 1 APPLICATION

REVEGETATION *

STATION		lump sum	cu. yards	acres			sq. yards	REMARKS
		REVEGE-TATION	TOPSOIL SALVAGING & PLACING	SEED	FERTILIZER	CONDITION SEEDBED	LONG TERM EROSION CONTROL BLANKET	
FROM	TO							
150+00	160+00	1	669	1.2	1.2	0.7	2,614	LT. & RT.
TOTAL		**1**	**# 669**	**# 1.2**	**# 1.2**	**# 0.7**	**# 2,614**	

FOR INFORMATION ONLY
* SEE SPECIAL PROVISION

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY: #### #### ####
REVIEWED BY: #### #### ####
DESIGNED BY: J. McKinney 4/5/2023 10334000RDPLN001.DWG

MONTANA Department of Transportation

ROAD PLANS

5/9/2023 4:20 PM

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HYDRAULIC DATA SUMMARY *

STATION	STREAM NAME (IF NAMED)	DRAINAGE AREA (mi.²)	SIZE / TYPE STRUCTURE (1) (1A) (4)	DESIGN FLOOD MAGNITUDE (cfs)	DESIGN FLOOD FREQUENCY (%)	DESIGN FLOOD H.W. ELEV. (ft.)	BASE FLOOD (1%) MAGNITUDE (cfs)	BASE FLOOD (1%) H.W. ELEV. (ft.)	OVERTOPPING FLOOD (2) (3) MAGNITUDE (cfs)	OVERTOPPING FLOOD (2) (3) APPROX. FREQUENCY (%)	OVERTOPPING FLOOD (2) (3) H.W. ELEV. (ft.)	REMARKS (FLOOD OF RECORD, Qp(max), etc.) (5)
155+41	Sixmile Creek	21.2	16' x 10' RCB	550	2.0	4762.33	682	4762.92	2717.19	0.2	4776.66	Qp(max)

NOTES :

* H.W. ELEVATIONS SHOWN ARE BASED UPON PEAK FLOW ANALYSIS UNLESS NOTED IN REMARKS COLUMN.

(1) STRUCTURE SIZE OR TYPE AND RELATED HYDRAULIC DATA MAY NOT REFLECT CHANGES MADE DUE TO R/W OR OTHER CONSIDERATIONS (I.E., STOCKPASS ADDED, STRUCTURE SIZE OR TYPE CHANGED, ROAD GRADE CHANGED DURING CONSTRUCTION, ETC.)

(1A) BRIDGE LENGTH SHOWN EQUALS THE WATER SURFACE WIDTH IN THE OPENING AT THE DESIGN H.W. ELEVATION MEASURED NORMAL TO FLOW.

(2) OVERTOPPING IS DEFINED AS FLOW OVER THE ROAD, FLOW THROUGH A SIGNIFICANT RELIEF STRUCTURE OR FLOW OVER THE BASIN DIVIDE WHICHEVER IS LOWER.

(3) FOR THOSE CROSSINGS NOTED BY Qp(max) IN THE REMARKS COLUMN OVERTOPPING DOES NOT OCCUR AND THE FLOOD MAGNITUDE LISTED CORRESPONDS TO THE FLOOD OF SECTION 650.115 (a) (1) (ii) OF FEDERAL-AID POLICY GUIDE; SUBCHAPTER G, PART 650, SUBPART A (DEC. 1991)
THE FLOOD SPECIFIED IS SUBJECT TO STATE-OF-THE-ART CAPABILITY TO ESTIMATE THE EXCEEDANCE PROBABILITY.
(PIPES 0.5%; BRIDGE .2%)

(4) HIGH WATER ELEVATIONS MAY VARY SLIGHTLY DEPENDING UPON THE PIPE OPTION SELECTED.

(5) PROCEDURE MEMORANDUM NO.10, HYDRAULICS MANUAL CHAPTER 9 APPENDIX H.

EXCEEDANCE PROBABILITIES

25 YEAR	4 % CHANCE
50 YEAR	2 % CHANCE
100 YEAR	1 % CHANCE
200 YEAR	.5% CHANCE
500 YEAR	.2% CHANCE

SHEET NO. 9

HYDRAULIC DATA SUMMARY

PROJECT NAME MT 141 CULVERT - NORTH OF AVON
COUNTY POWELL
PROJECT ID STPP 41-1(32)2
UPN 10334000

DESIGNED BY	J. McKinney	4/5/2023
REVIEWED BY	#####	#####
CHECKED BY	#####	#####

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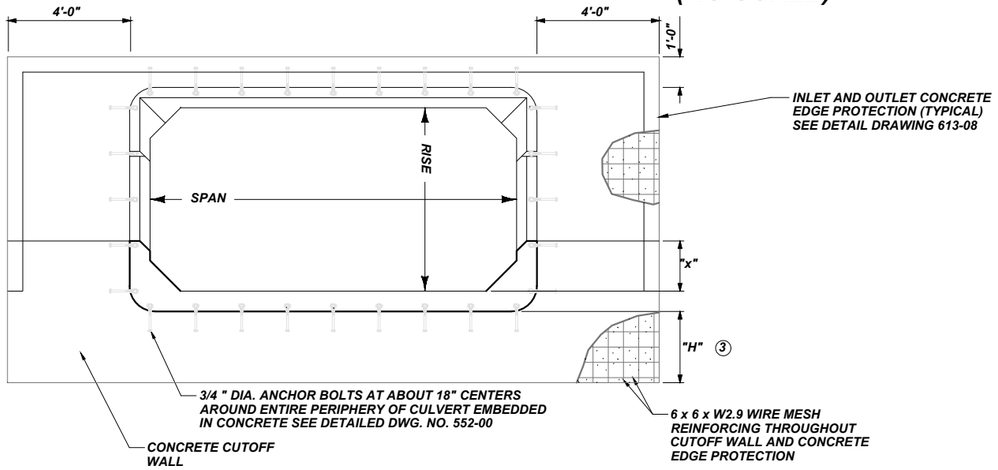
MONTANA Department of Transportation

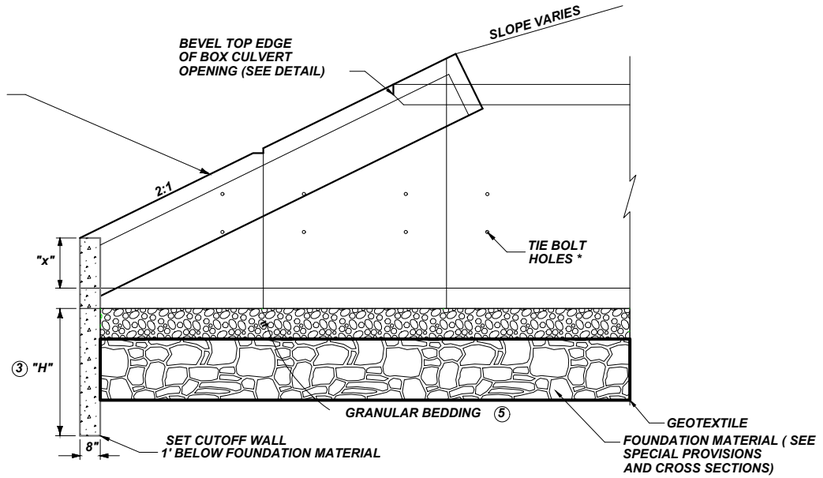
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DETAIL
(NO SCALE)

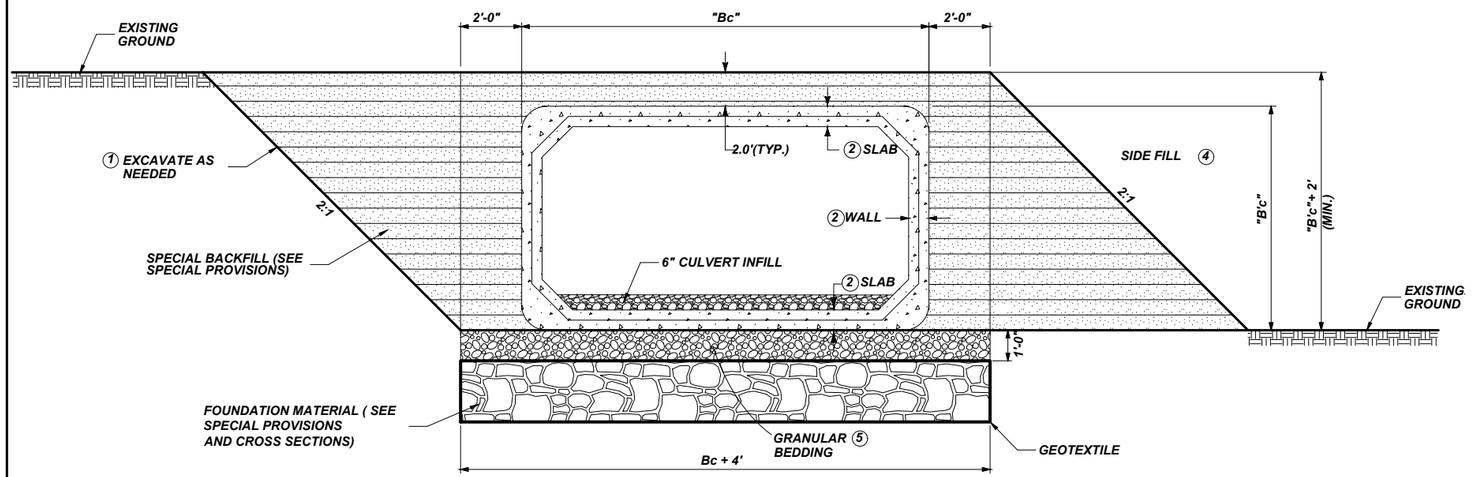




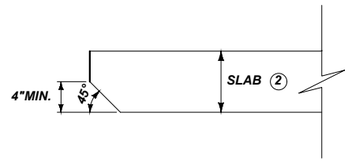
* TIE BOLTS, LOCATE PER MANUFACTURER'S RECOMMENDATION

SIDE ELEVATION

FRONT ELEVATION



EXCAVATION TYPICAL **BEDDING DETAIL** **FILL TYPICAL**



TOP BEVEL DETAIL

NOTES:

(1) EXCAVATE A SUFFICIENT AMOUNT TO PROVIDE A SAFE WORKING ENVIRONMENT AND TO ALLOW ACHIEVEMENT OF ALL CULVERT INSTALLATION AND COMPACTION REQUIREMENTS. SLOPE, BENCH OR PROVIDE SHORING FOR ALL EXCAVATIONS IN ACCORDANCE WITH THE U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION.

(2) FOR ESTIMATING QUANTITIES ONLY. ACTUAL DIMENSIONS TO BE DETERMINED BY PRECAST MANUFACTURER.

(3) 3'-0" MIN. OR 1'-0" BELOW BOTTOM OF FOUNDATION MATERIAL IF SPECIFIED.

(4) COMPACT AND PLACE SIDE FILL PER SECTION 603 AND 203.

(5) SEE SECTION 701 OF THE STANDARD SPECIFICATIONS FOR GRANULAR BEDDING REQUIREMENTS. THE CONTRACTOR HAS THE OPTION OF USING A SAND CUSHION ABOVE THE GRANULAR BEDDING TO FACILITATE JOINING OF THE BOX CULVERT SECTIONS.

DIMENSIONS										
STATION	SPAN (ft.)	RISE (ft.)	LENGTH (ft.)	WALL (in.)	SLAB (in.)	"Bc" (ft.)	"x" (ft.)	"B'c" (ft.)	"H" (ft.)	COVER (ft.)
155+41	16	10	108	12	12	18	5.67	12	4.0	8.3

• NOTE: INCLUDE REINFORCING MATERIAL, AND CONCRETE EDGE PROTECTION IN THE UNIT PRICE BID PER CUBIC YARD OF CLASS GENERAL CONCRETE. REINFORCED CONCRETE BOX CULVERT, CONCRETE CUTOFF WALLS, ANCHOR BOLTS, AND ALL INSTALLATION APPURTENANCES ARE FURNISHED BY MDT.

SHEET NO. 10

SLOPED END RCB DETAIL

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	####	
REVIEWED BY	####	
DESIGNED BY	J. McKinney	4/5/2023

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MONTANA Department of Transportation

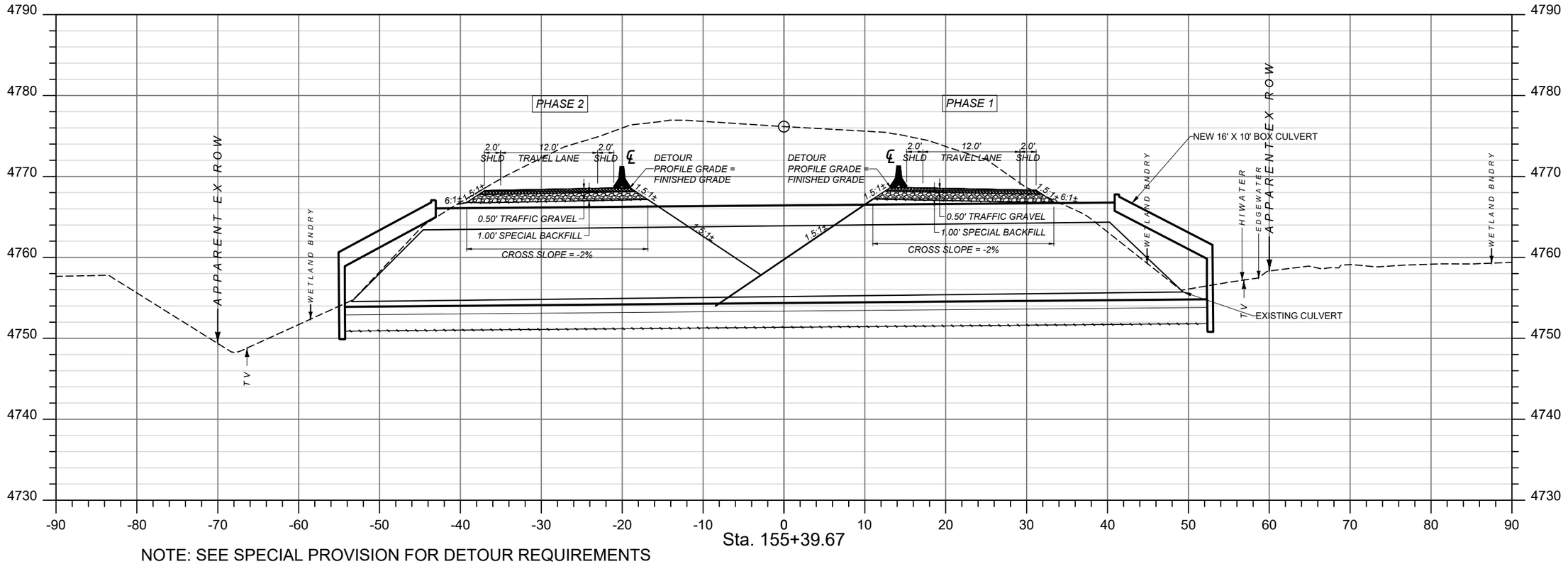
ROAD PLANS

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DETAIL



NOTE: SEE SPECIAL PROVISION FOR DETOUR REQUIREMENTS

SECTION B-B
STA. 155+39.67 Mainline
STA. 5+43.21 Detour Left
STA. 5+37.40 Detour Right

Detour Left (PHASE 2)				
STATION	DESCRIPTION	NORTHING OR Y COORDINATE	EASTING OR X COORDINATE	REMARKS
0+00.00	BP	883530.371	1183717.074	
1+70.69	PC	883612.130	1183567.240	
1+91.60	PI	883622.146	1183548.884	
2+12.49	PT	883630.656	1183529.784	
2+17.55	PC	883632.718	1183525.156	
5+66.58	PI	883774.759	1183206.340	
8+90.13	PT	884082.341	1183041.377	
9+13.88	PC	884103.275	1183030.150	
9+25.01	PI	884113.082	1183024.890	
9+36.14	PT	884122.655	1183019.216	
10+07.59	EP	884184.123	1182982.780	

Detour Right (PHASE 1)				
STATION	DESCRIPTION	NORTHING OR Y COORDINATE	EASTING OR X COORDINATE	REMARKS
0+00.00	BP	883530.371	1183717.074	
1+42.60	PC	883598.675	1183591.899	
1+91.60	PI	883622.146	1183548.884	
2+40.31	PT	883653.240	1183511.012	
2+66.45	PC	883669.827	1183490.809	
2+78.55	PI	883677.501	1183481.462	
2+90.63	PT	883684.732	1183471.769	
4+90.10	PC	883803.997	1183311.889	
5+51.02	PI	883840.422	1183263.060	
6+11.38	PT	883887.146	1183223.972	
6+70.29	PC	883932.332	1183186.172	
6+93.54	PI	883950.162	1183171.255	
7+16.76	PT	883966.591	1183154.807	
7+70.89	PC	884004.843	1183116.509	
8+76.36	PI	884079.381	1183041.882	
9+80.53	PT	884171.242	1182990.049	
9+95.32	EP	884184.123	1182982.780	

SHEET NO.
11

DETOUR DETAIL

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	####	
REVIEWED BY	####	
DESIGNED BY	J. McKinney	4/5/2023

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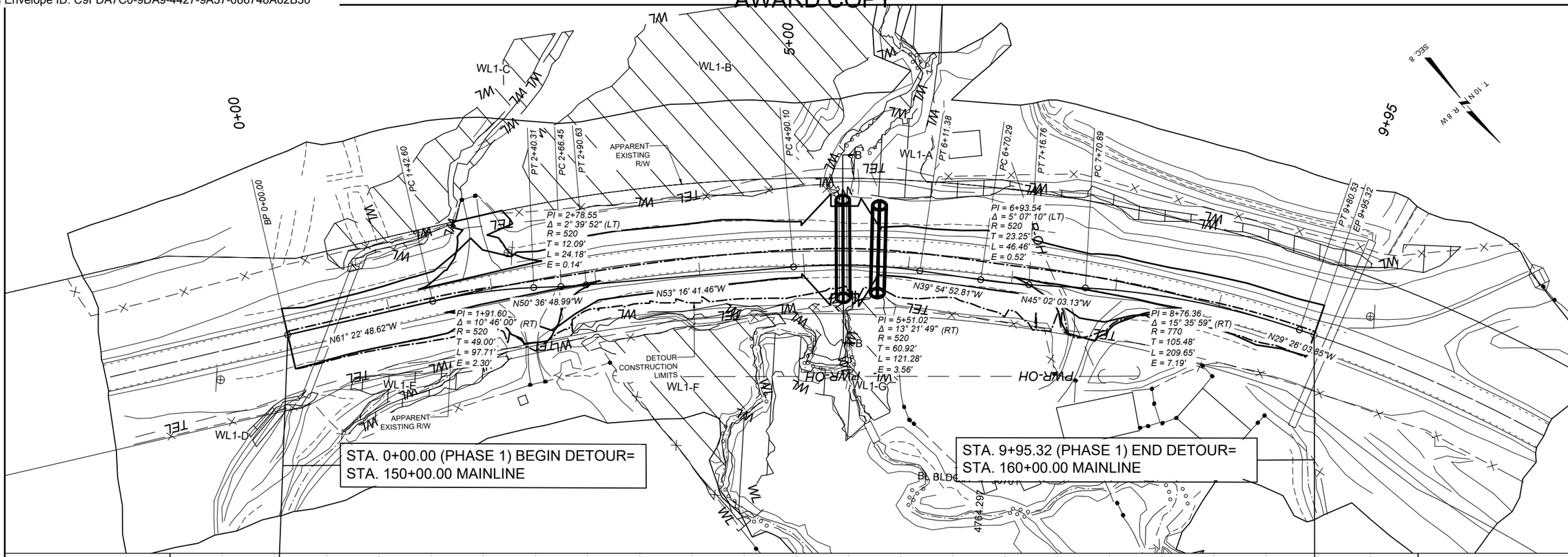
MONTANA Department of Transportation

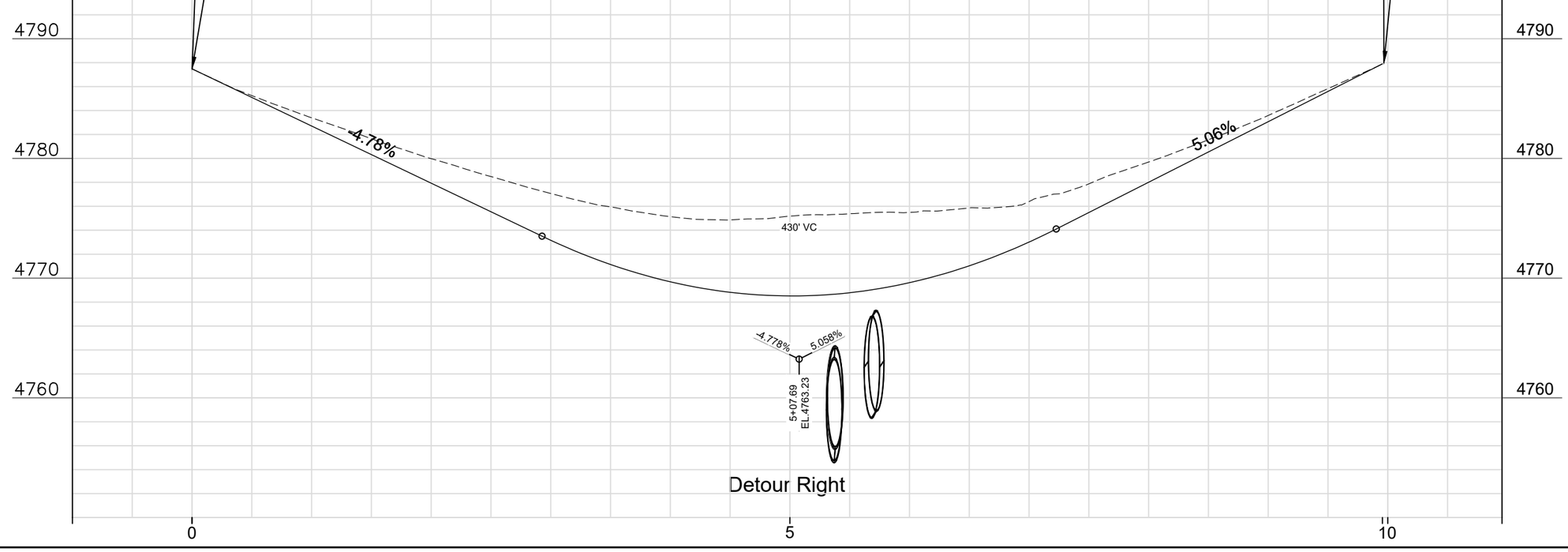
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Detour Right

SHEET NO.	12
	DETOUR RIGHT (PHASE 1) PLAN & PROFILE
PROJECT NAME	MT 141 CULVERT - NORTH OF AVON
COUNTY	POWELL
PROJECT ID	STPP 41-1(32)2
UPN	10334000
DESIGNED BY	J. McKinney 4/5/2023
REVIEWED BY	#### ####
CHECKED BY	#### ####

MONTANA Department of Transportation

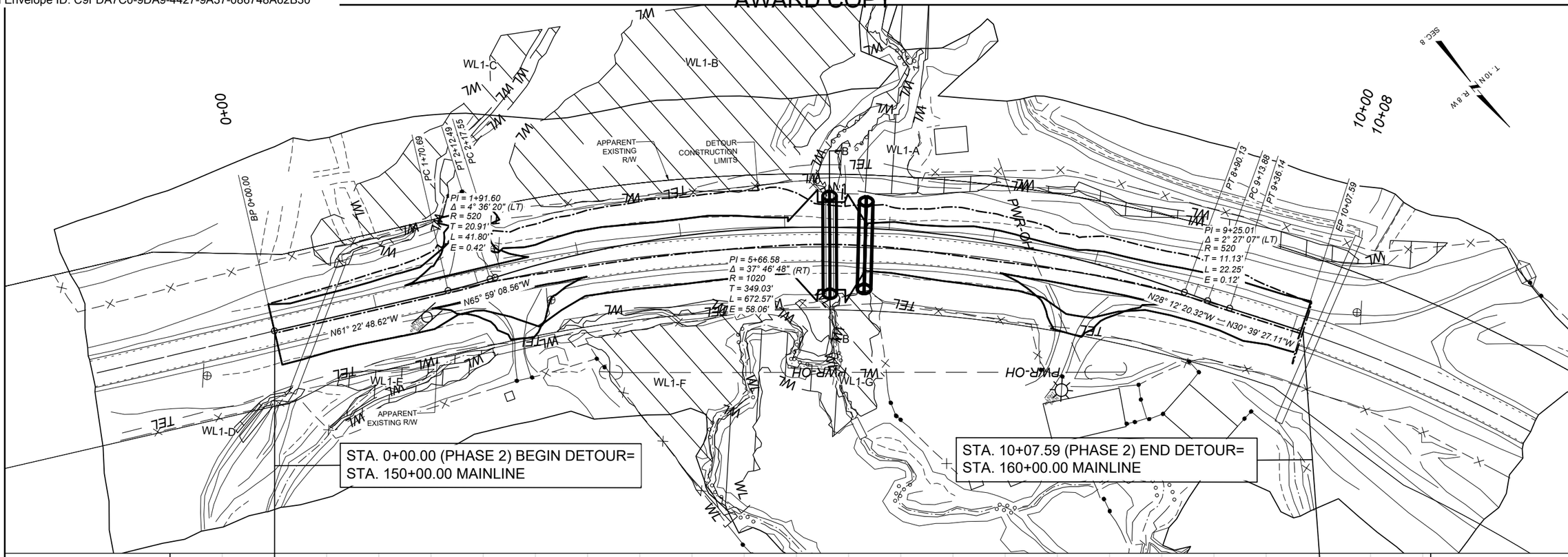
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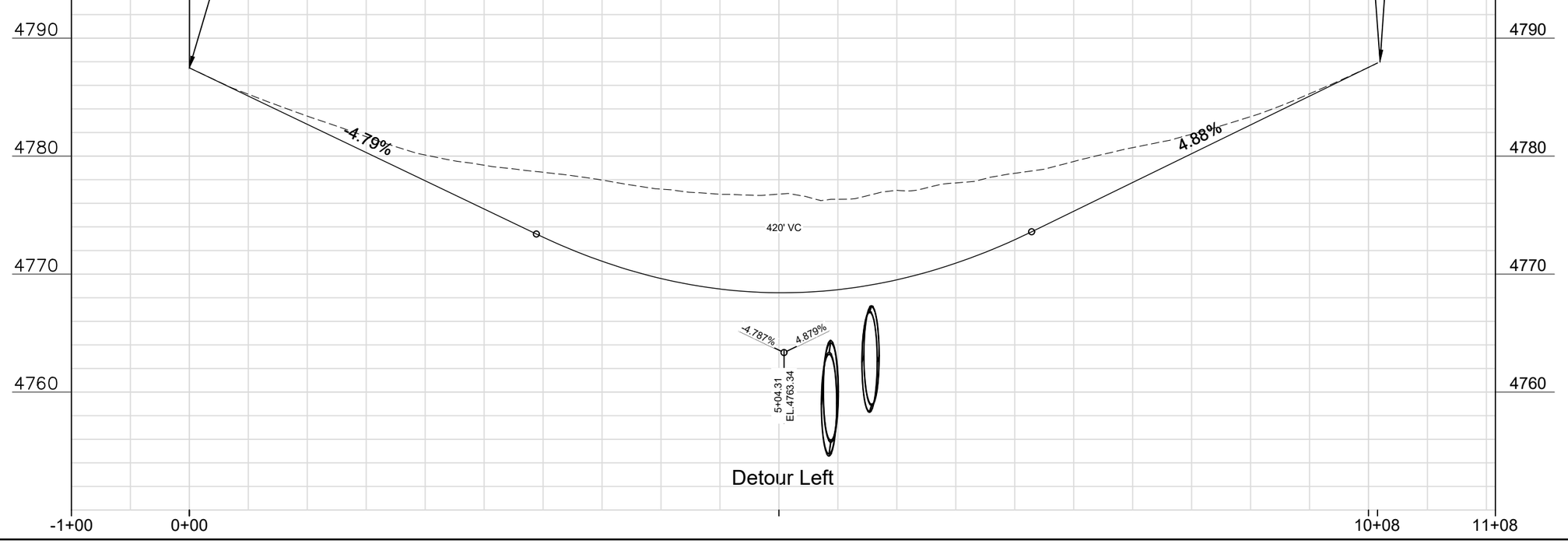
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SHEET NO. 13

DETOUR LEFT (PHASE 2)
PLAN & PROFILE

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	####	####
REVIEWED BY	####	####
DESIGNED BY	J. McKinney	4/5/2023

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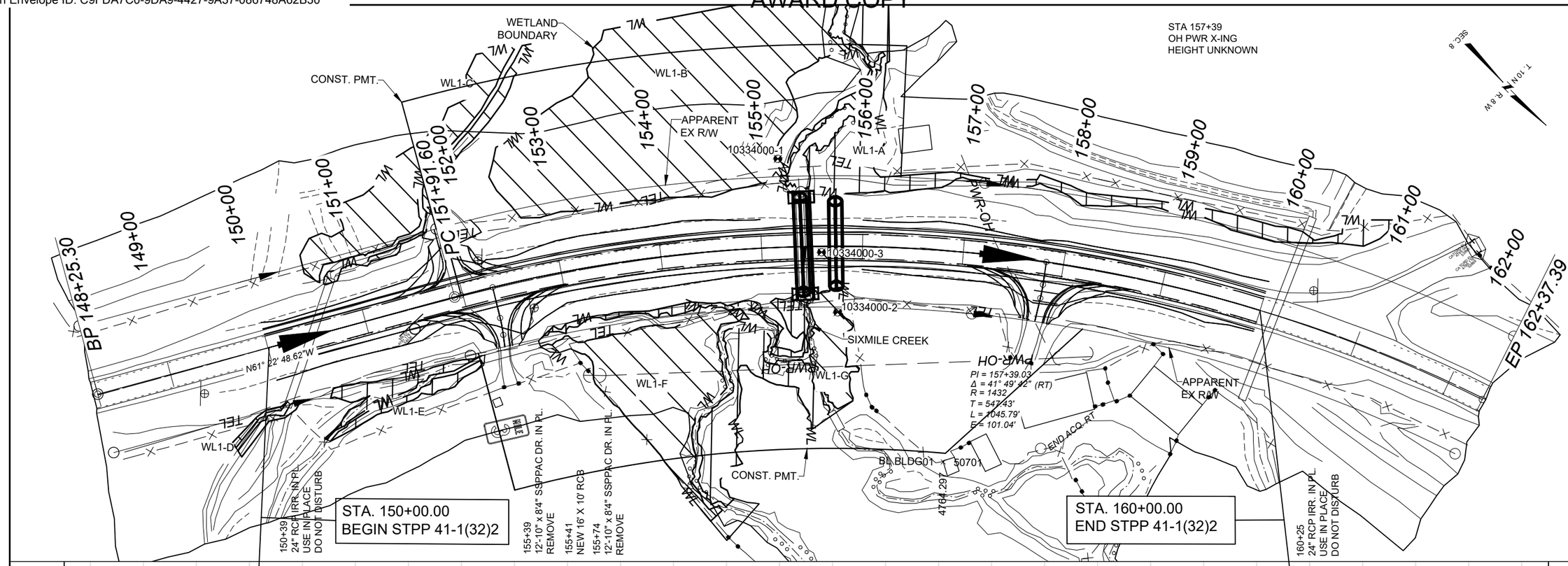
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Department of Transportation

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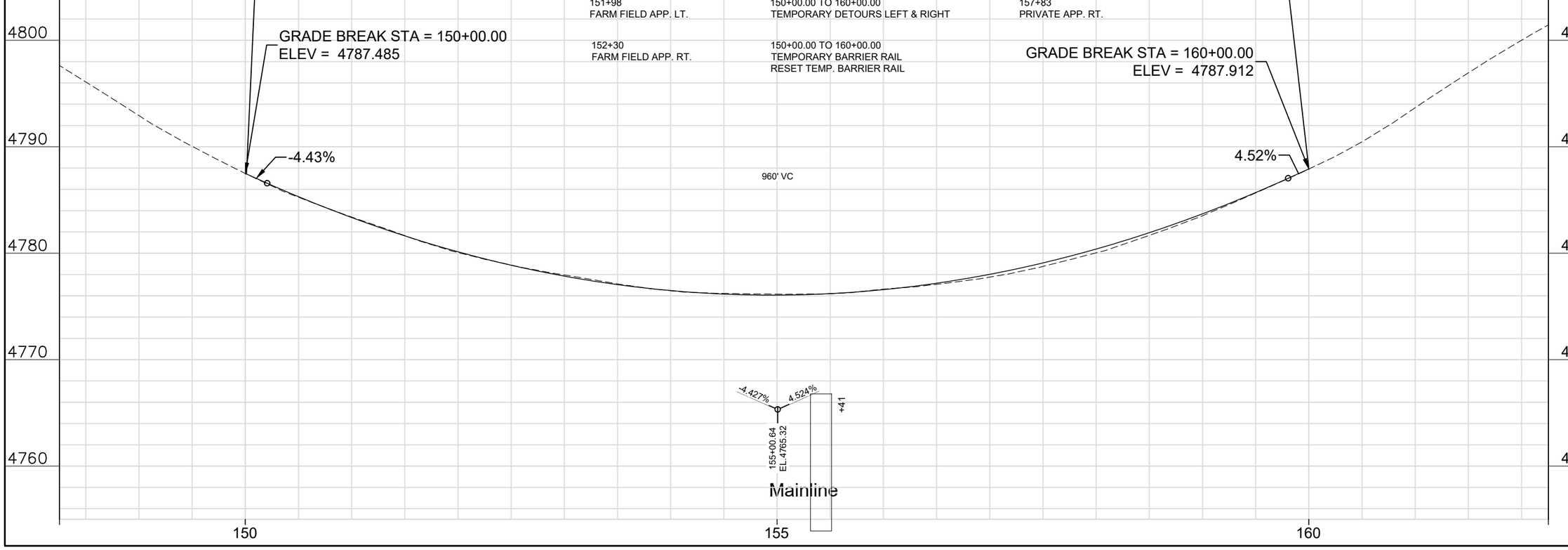
151+98
FARM FIELD APP. LT.

152+30
FARM FIELD APP. RT.

150+00.00 TO 160+00.00
TEMPORARY DETOURS LEFT & RIGHT

150+00.00 TO 160+00.00
TEMPORARY BARRIER RAIL
RESET TEMP. BARRIER RAIL

157+83
PRIVATE APP. RT.



SHEET NO. 14

MAINLINE PLAN & PROFILE

PROJECT NAME: MT-141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	####	####
REVIEWED BY	####	####
DESIGNED BY	J. McKinney	4/5/2023

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MONTANA Department of Transportation

ROAD PLANS

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SUMMARY
SIGNING & DELINEATION QUANTITIES

MATERIAL	TOTALS	UNIT
SIGNS-ALUM REFL SHEET XI	30.4	SQFT
RESET SIGNS	1	EACH
REMOVE SIGN	5	EACH
POSTS-STEEL U SIGN	38	LB
POLES-TREATED WOOD 4 IN	42	LNFT
PANEL DELINEATOR DESIGN F	17	EACH
DELINEATOR DES D	2	EACH

SHEET NO.
S1

SUMMARY

PROJECT NAME MT141 CULVERT NORTH of AVON
COUNTY POWELL COUNTY
PROJECT ID STPP 41-1(32)2
UPN 10334000

CHECKED BY	S.D.R	4/19/2023
REVIEWED BY		
DESIGNED BY	S.S.M	4/19/2023

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MONTANA Department of Transportation

SIGNING PLANS

5/10/2023 2:02 PM

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As Builts | Plans Production | Show All

Lt.	STATION / M.P.	Rt.	RAMP NO./ DIRECTION	SIGN NO.	PANEL SIZE	REFL SHTG TYPE: BACK- GRND	REFL SHTG TYPE: LEGEND	FEET: CLEARANCE	FEET: SIGN SUPPORT SPACING	TYPE OF SUPPORT	CANTILEVER	FEET: MOUNTING HEIGHT	FEET: SUMMED SIGN HEIGHT + GAPS	FEET: FOUNDATION DEPTH	FEET: SUPPORT LENGTH (ESTIMATED)	PANEL (SQ: SHEET ALUMINUM XI	TIMBER POLE (LINEAR FT.) (INSTALLED): 4" TOP DIA.	TIMBER POLE (LINEAR FT.) (INSTALLED): 5" TOP DIA.	TIMBER POLE (LINEAR FT.) (INSTALLED): 6" TOP DIA.	STEEL POST (LBS.) (INSTALLED): ROUND TUBULAR	STEEL POST (LBS.) (INSTALLED): SQUARE TUBULAR	STEEL POST (LBS.) (INSTALLED): STRUCTURAL STEEL	STEEL POST (LBS.) (INSTALLED): "U" POST	BREAKAWAY	SIGNS: REMOVE	SIGNS: RESET	GUIDE: REMOVE	GUIDE: RESET	Back Bracing Required Replace Sign Face Only	Double Face Sign Mount Back to Back	Behind Guardrail FY or FYG	2 1/2" x 2 1/2" x 3/8" x 6'-4" ANGLE IRON REQUIRED (37 lbs.)	REMARKS	SIGN IMAGE
	149+29.62																																	
		Rt.		W1-2R	30x30	FY		10.00		4in Treated Wood Pole		5.00		3.0	13.40	6.30	14.00								1									REPLACE= W1-2R	
	151+82.40																																	
Lt.				N7-1	RESET	RSFO									--											1								RESET REF. = N7-1 FROM 152+25.08	
				N7-1P	24x18			20.00				5.00		3.0	--	3.00																		RSFO = N7-1p LITTLE BLACKFOOT 4-H	
				--											--																				
	151+80.45																																	
		Rt.		D10-1	10x18			4.00		2.0lb Steel U Post		4.00		3.0	9.60	1.30								19.00		1								REPLACE= REF. POST (3)	
	151+80.45																																	
Lt.				D10-1	10x18			4.00		2.0lb Steel U Post		4.00		3.0	9.60	1.30								19.00										NEW= REF. POST (3)	
				--											--																				
	152+73.21																																	
		Rt.		S3-1	30X30	FYG		10.00		4in Treated Wood Pole		5.00		3.0	13.40	6.30	14.00								1									REPLACE= S3-1 [School Bus Turn Around]	
				--											--																				
	160+49.15																																	
Lt.				D3-1	(2) 54x12			6.00		4in Treated Wood Pole		5.00		3.0	13.40	7.00	14.00																	(2) NEW= D3-1 GIMLET CREEK Rd	
				R1-1	30x30										--	5.20										1								REPLACE= R1-1	
	161+59.27																																	
Lt.				D3-1	REMOVE										--											1								(1) REMOVE= D3-1 GIMLET CREEK Rd	
															TOTAL		30.40	42.00					38.00		5	1								

FY = FLUORESCENT YELLOW SHEETING REQUIRED.

FYG = FLUORESCENT YELLOW-GREEN SHEETING REQUIRED.

BBR = BACKBRACING REQUIRED:
-FOR WOOD POST
2" X 4 " REQ'D.
- FOR STRUCTURAL STEEL
2" X 2" X 1/4" ANGLE IRON REQ'D.

DELINEATION QUANTITIES

MATERIAL	UNIT	
PANEL DELINEATOR DESIGN F	17	EACH
DELINEATOR DES D	2	EACH

SHEET NO.
S2

SPECIFICATIONS

PROJECT NAME: MT141 CULVERT NORTH of AVON
COUNTY: POWELL COUNTY
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	S.D.R	4/19/2023	
REVIEWED BY	S.S.M	4/19/2023	10334000SIPLN001.DWG
DESIGNED BY			

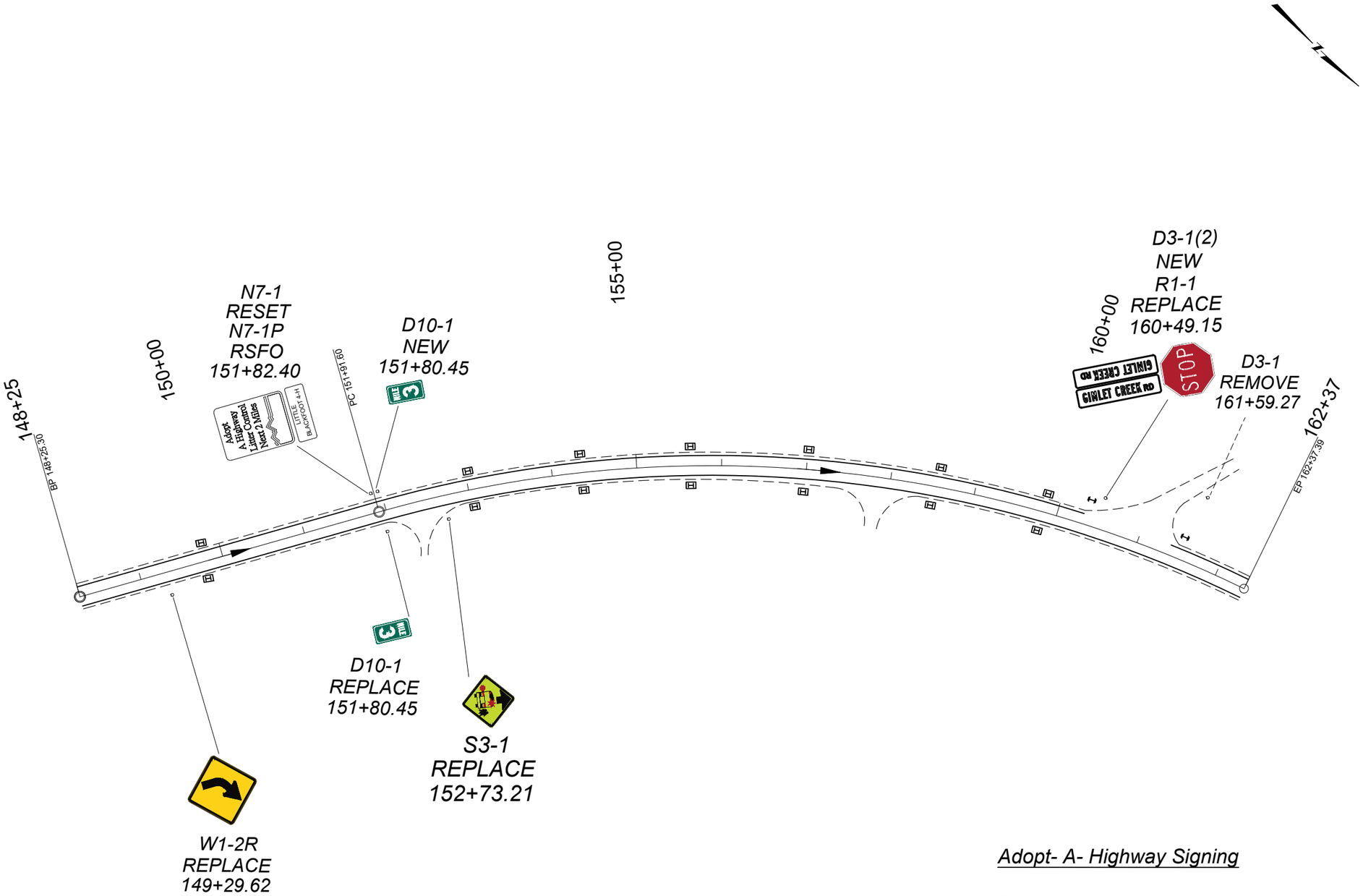
MONTANA Department of Transportation

SIGNING PLANS

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Adopt- A- Highway Signing

Contractor will confirm that the group name on the sign(s) currently existing at the time of construction corresponds to the group name on the sign(s) shown on the plans. If the name is different, Field Project Manager will contact Traffic & Safety Bureau Signing Section with correct name and a new sign design will be provided.

SHEET NO.
S3

PLANS

PROJECT NAME: **MT- 141 CULVERT NORTH OF AVON**
COUNTY: **POWELL COUNTY**
PROJECT ID: **STPP 41-1(32)2**
UPN: **10334000**

	CHECKED BY	DESIGNED BY
	S.D.R	S.S.M
	4/19/2023	4/19/2023

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MONTANA
Department of Transportation

SIGNING PLANS

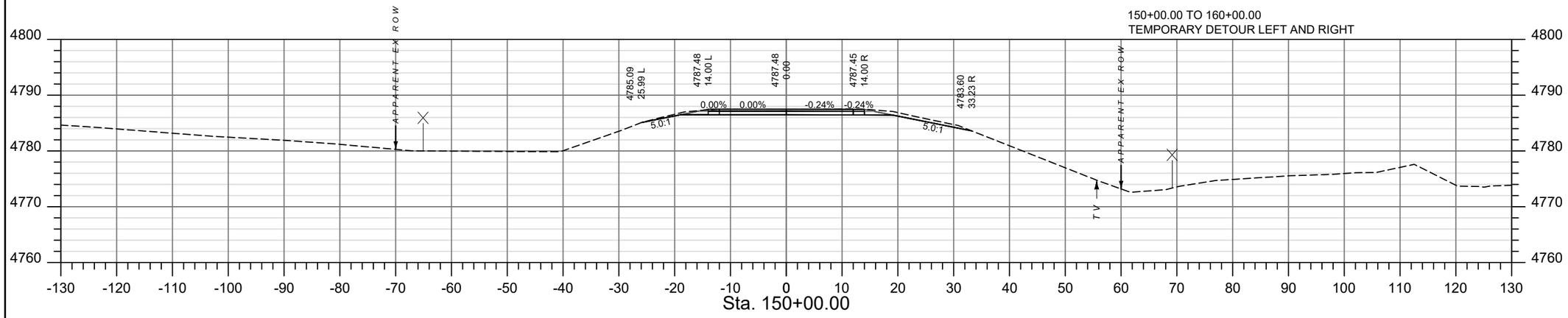
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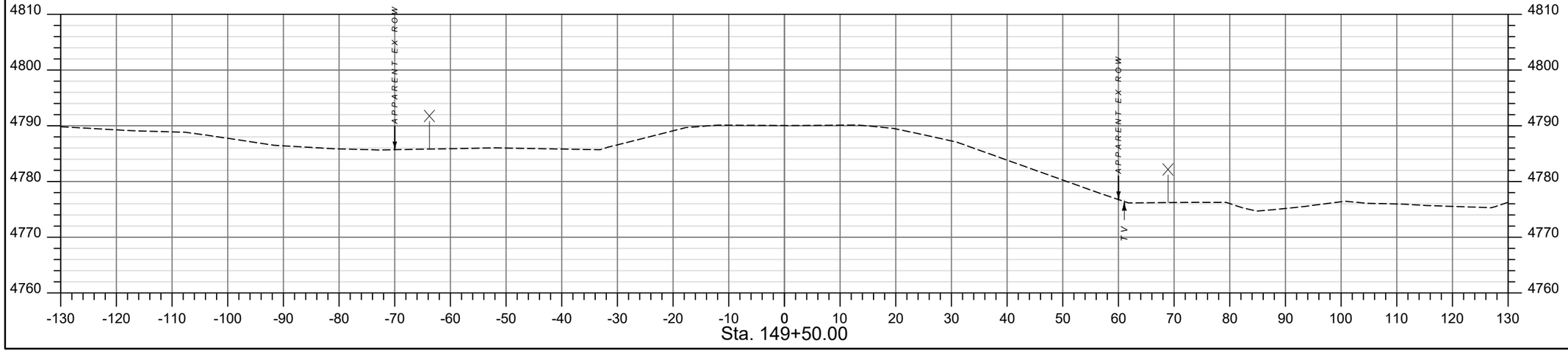
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150+00.00
BEGIN PROJECT
STPP 41-1(32)2

150+00.00 TO 160+00.00
TEMPORARY DETOUR LEFT AND RIGHT





SHEET NO.
SHEET 1

CROSS SECTIONS

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	####	####
REVIEWED BY	####	####
DESIGNED BY	J. McKinney	4/5/2023

MONTANA
Department of Transportation

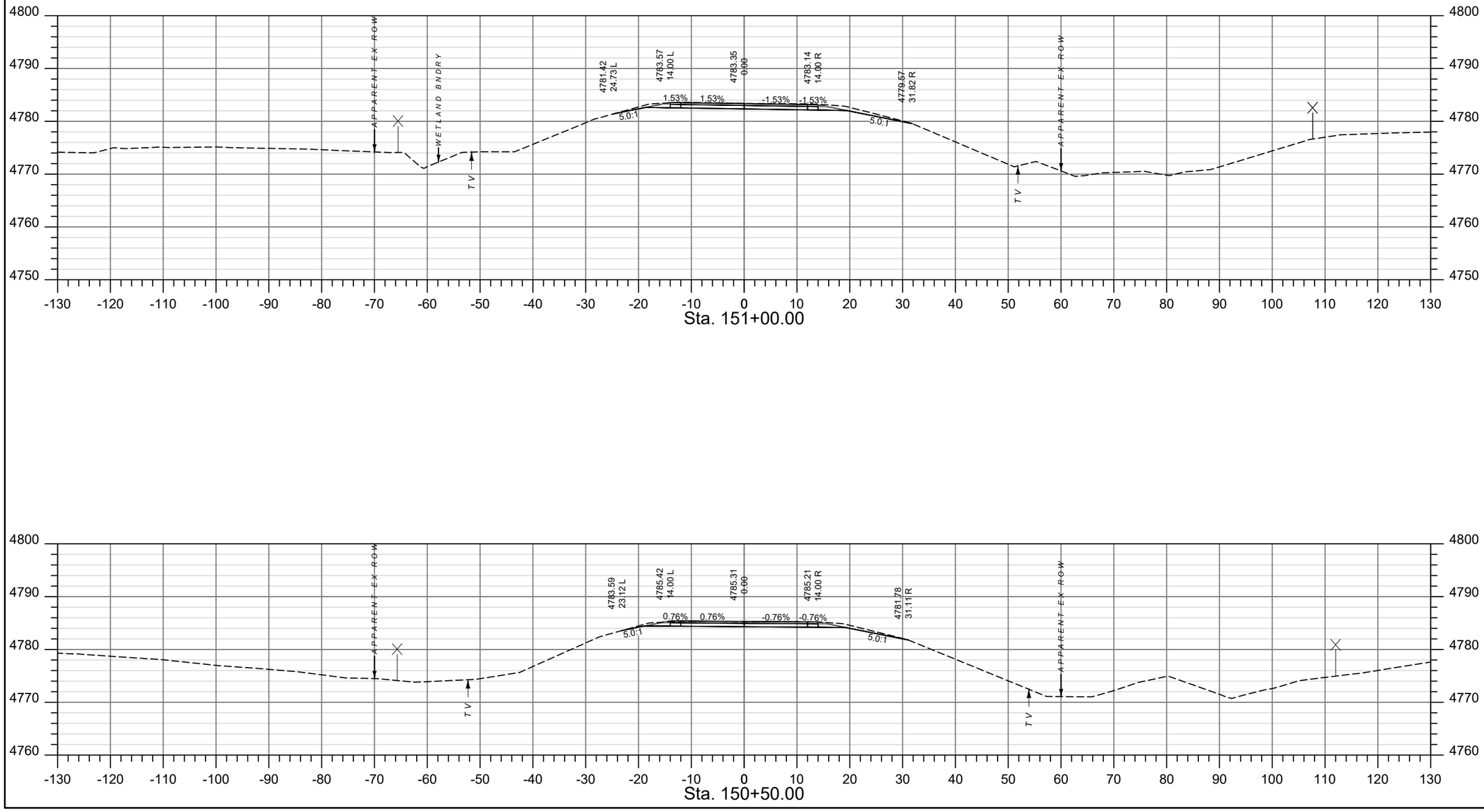
CROSS SECTIONS

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SHEET NO.
SHEET 2

CROSS SECTIONS

PROJECT NAME: **MT 141 CULVERT - NORTH OF AVON**
COUNTY: **POWELL**
PROJECT ID: **STPP 41-1(32)2**
UPN: **10334000**

CHECKED BY	####	
REVIEWED BY	####	
DESIGNED BY	J. McKinney	4/5/2023

MONTANA
Department of Transportation

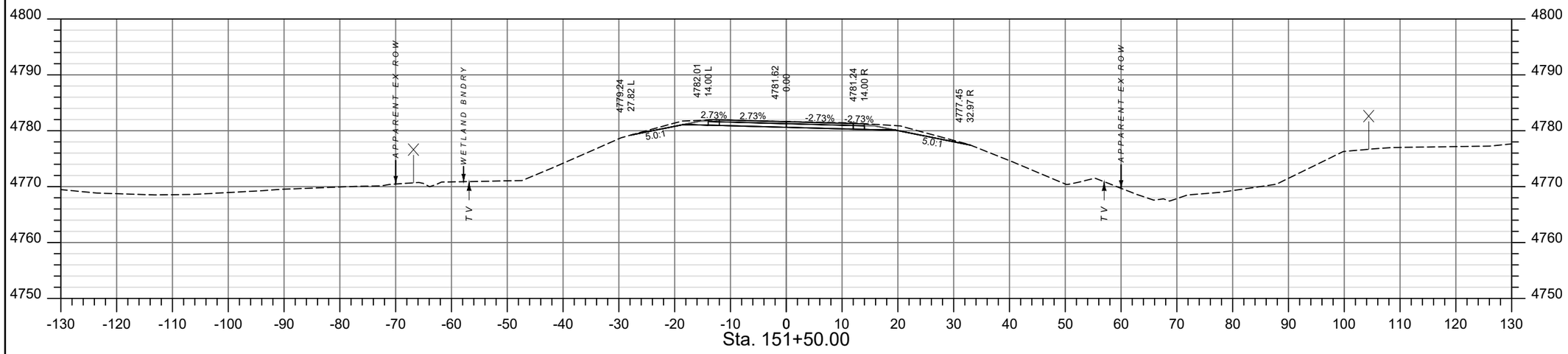
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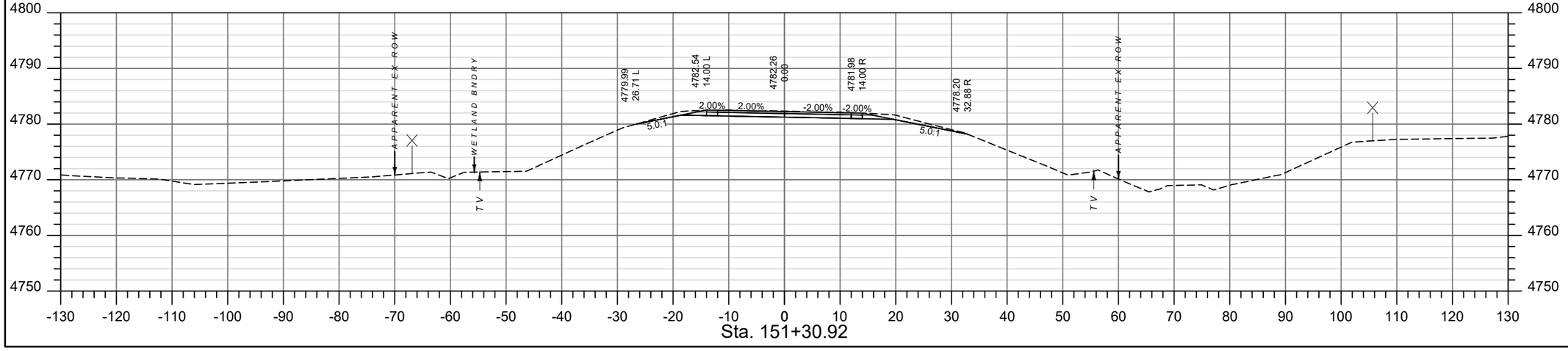
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SHEET NO.
SHEET 3

CROSS SECTIONS

PROJECT NAME **MT 141 CULVERT - NORTH OF AVON**
COUNTY **POWELL**
PROJECT ID **STPP 41-1(32)2**
UPN **10334000**

CHECKED BY	#####	#####
REVIEWED BY	#####	#####
DESIGNED BY	J. McKinney	4/5/2023

10334000RDXS002-SURVEYLINES.DWG

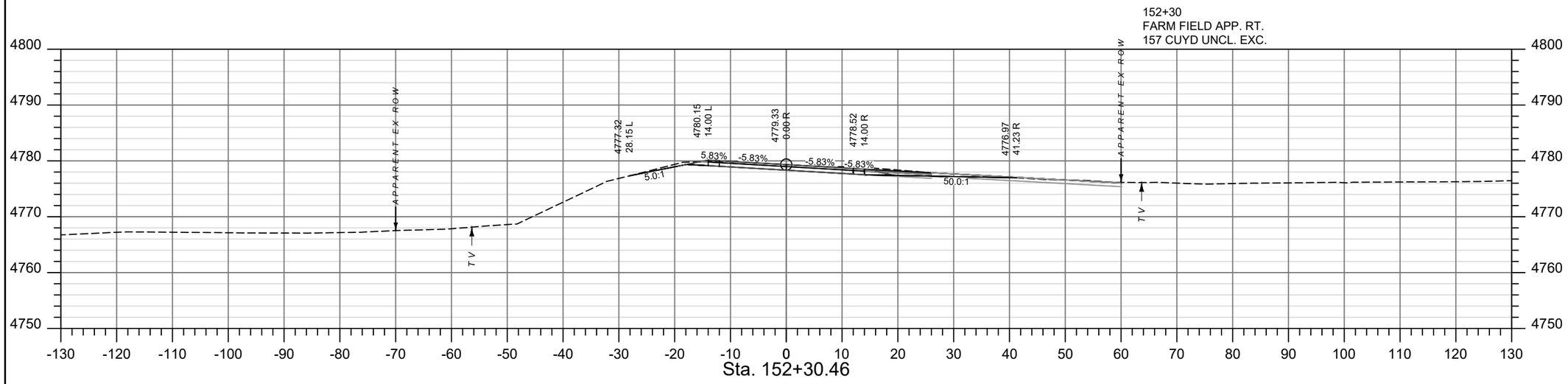
MONTANA
Department of Transportation

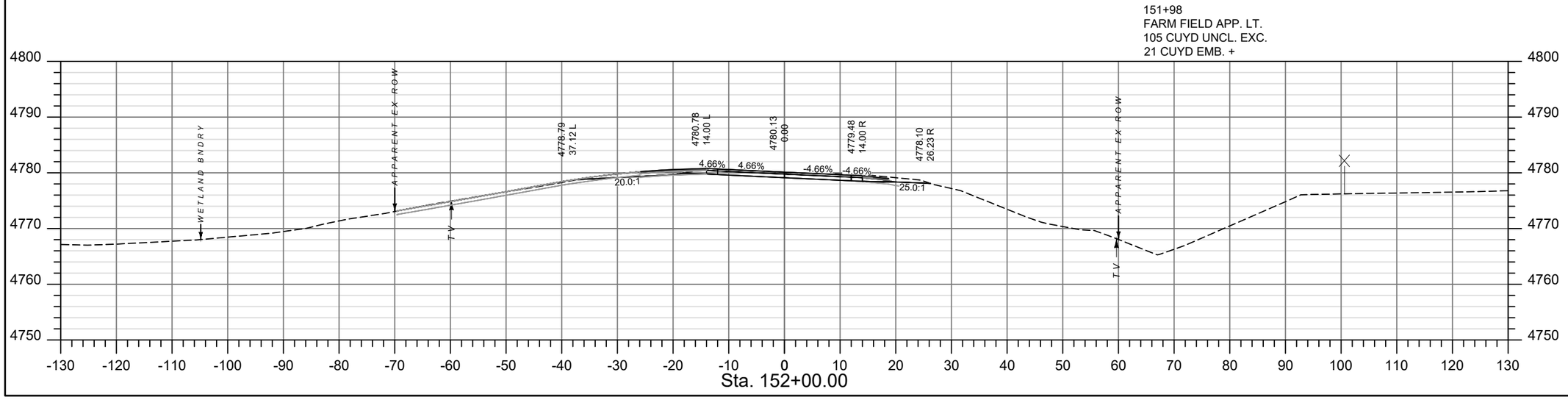
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SHEET NO.
SHEET 4

CROSS SECTIONS

PROJECT NAME: **MT 141 CULVERT - NORTH OF AVON**
COUNTY: **POWELL**
PROJECT ID: **STPP 41-1(32)2**
UPN: **10334000**

CHECKED BY	####	####
REVIEWED BY	####	####
DESIGNED BY	J. McKinney	4/3/2023

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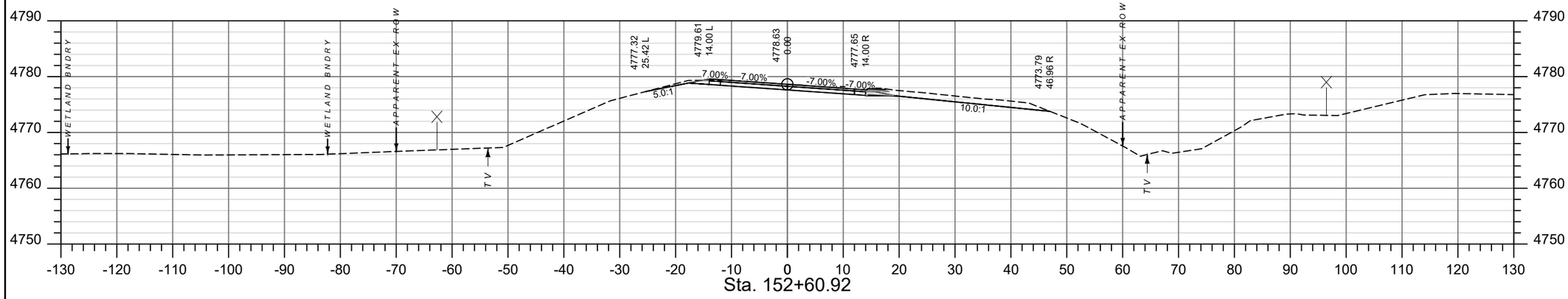
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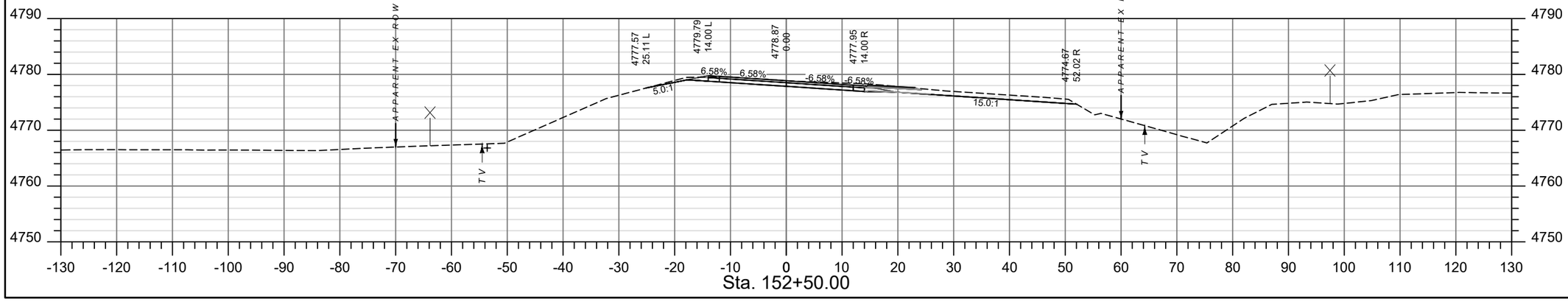
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SHEET NO.
SHEET 5

CROSS SECTIONS

PROJECT NAME: **MT 141 CULVERT - NORTH OF AVON**
COUNTY: **POWELL**
PROJECT ID: **STPP 41-1(32)2**
UPN: **10334000**

CHECKED BY	####	
REVIEWED BY	####	
DESIGNED BY	J. McKinney	4/5/2023

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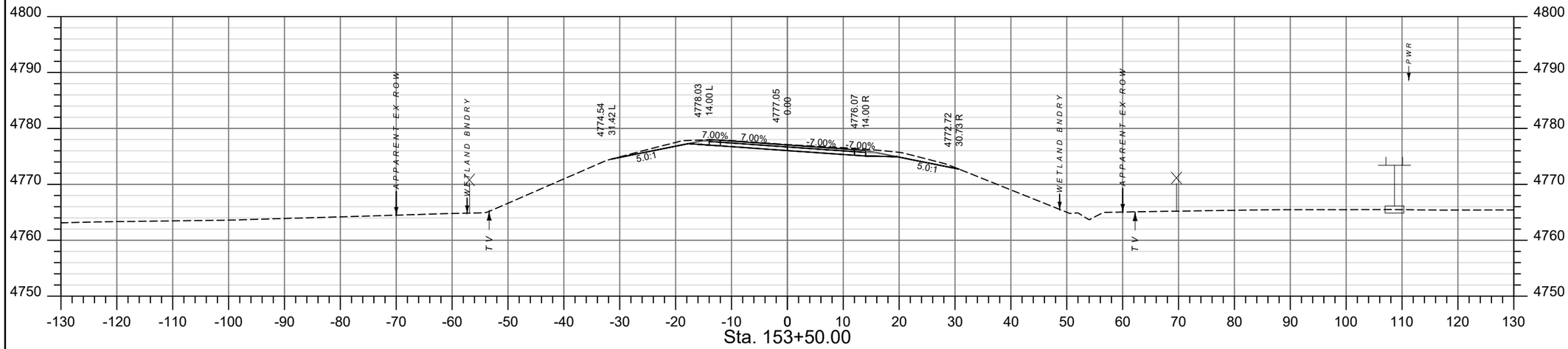
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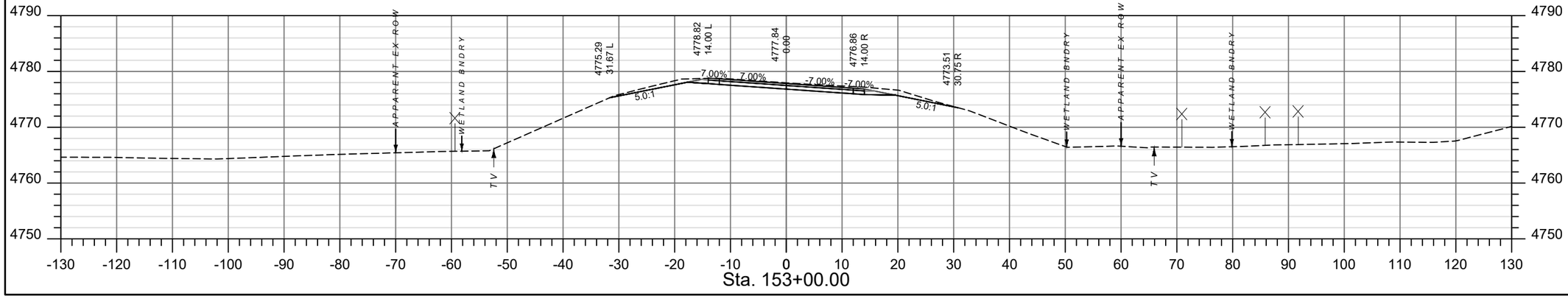
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SHEET NO.
SHEET 6

CROSS SECTIONS

PROJECT NAME: **MT 141 CULVERT - NORTH OF AVON**
COUNTY: **POWELL**
PROJECT ID: **STPP 41-1(32)2**
UPN: **10334000**

CHECKED BY	####	
REVIEWED BY	####	
DESIGNED BY	J. McKinney	4/5/2023

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Department of Transportation

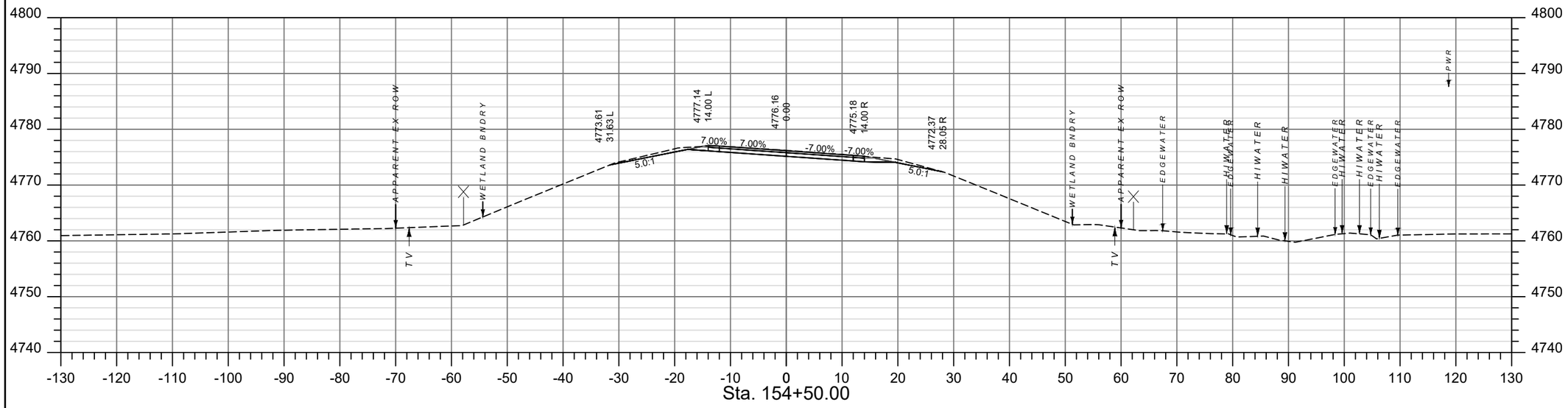
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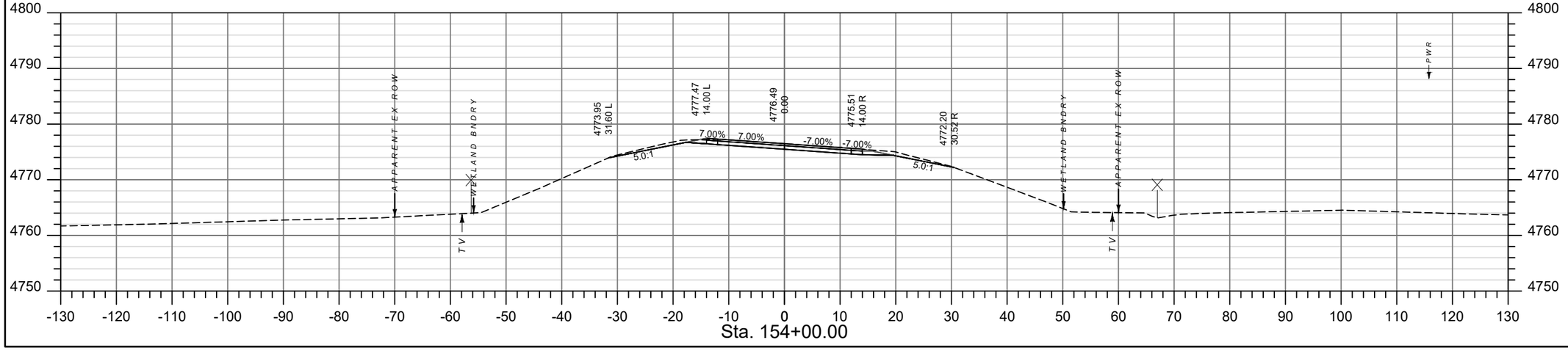
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SHEET NO.
SHEET 7

CROSS SECTIONS

PROJECT NAME: **MT 141 CULVERT - NORTH OF AVON**
COUNTY: **POWELL**
PROJECT ID: **STPP 41-1(32)2**
UPN: **10334000**

CHECKED BY	####	
REVIEWED BY	####	
DESIGNED BY	J. McKinney	4/5/2023

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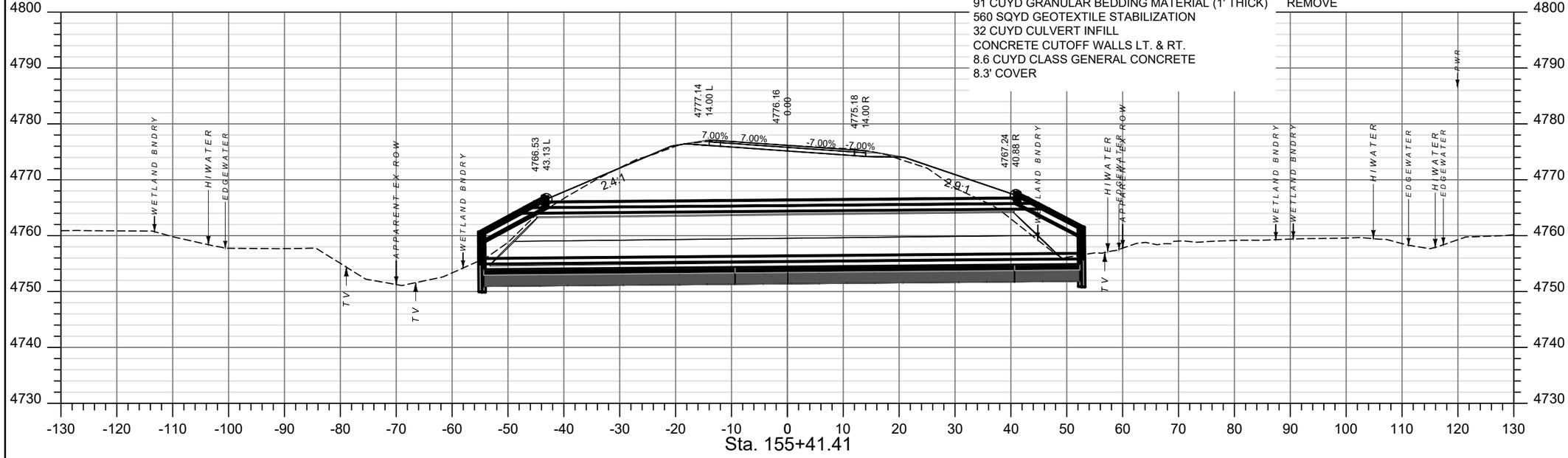
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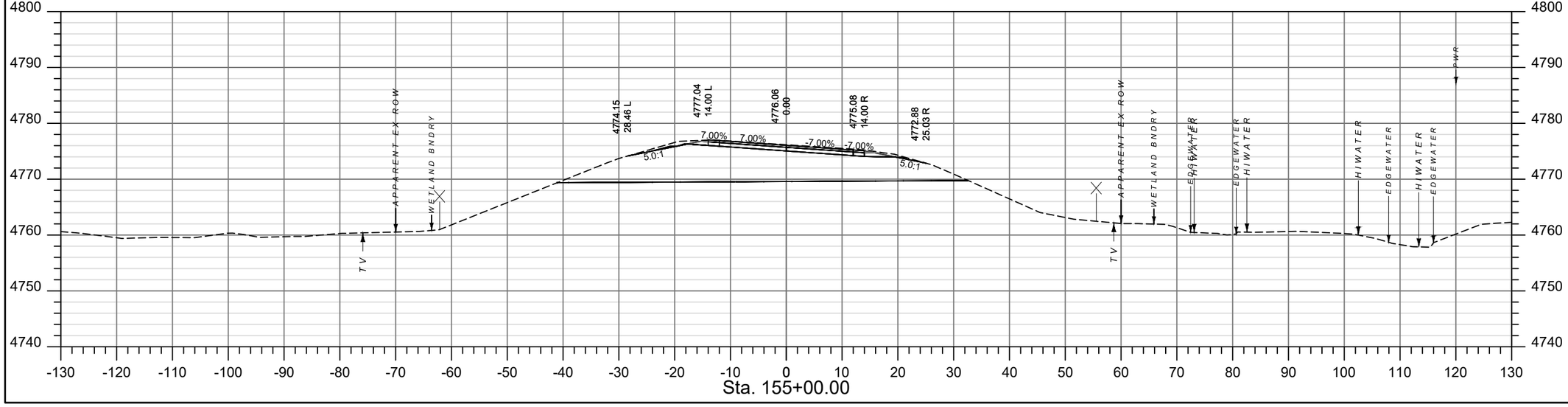
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155+41.41
NEW 16' X 10' RCB. DR.
SIXMILE CREEK
2:1 SLOPED END SECTIONS LT. & RT.
3,238 CUYD SPECIAL BACKFILL
182 CUYD FOUNDATION MATERIAL (2' THICK)
91 CUYD GRANULAR BEDDING MATERIAL (1' THICK)
560 SQYD GEOTEXTILE STABILIZATION
32 CUYD CULVERT INFILL
CONCRETE CUTOFF WALLS LT. & RT.
8.6 CUYD CLASS GENERAL CONCRETE
8.3' COVER

155+39
12'-10" X 8'4" X 102.4' SSPPAC DR. IN PL.
SIXMILE CREEK
REMOVE





SHEET NO.
SHEET 8

CROSS SECTIONS

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	####	####
REVIEWED BY	####	####
DESIGNED BY	J. McKinney	4/5/2023

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Department of Transportation

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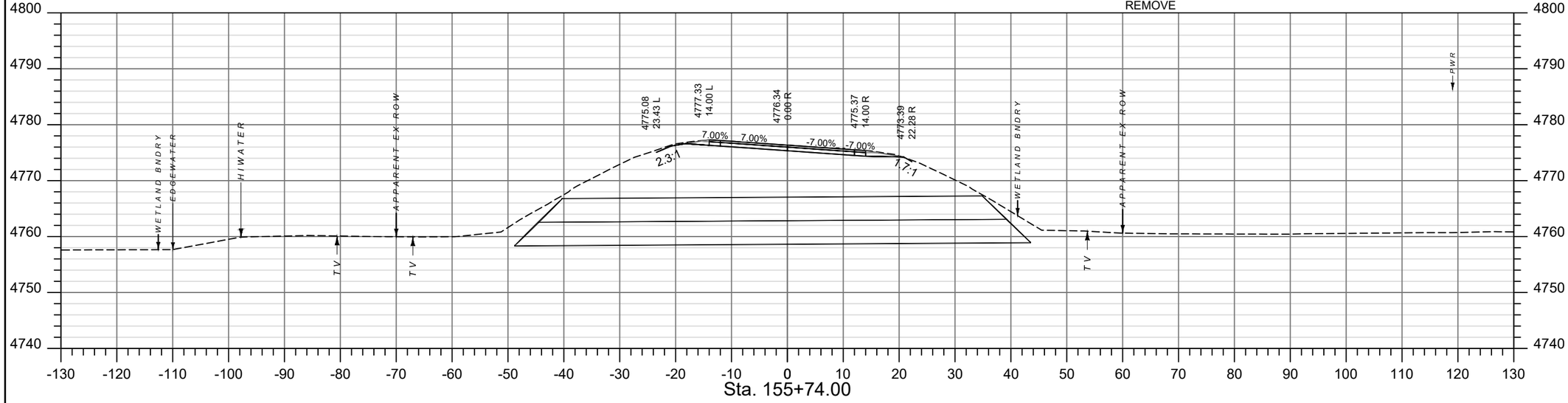
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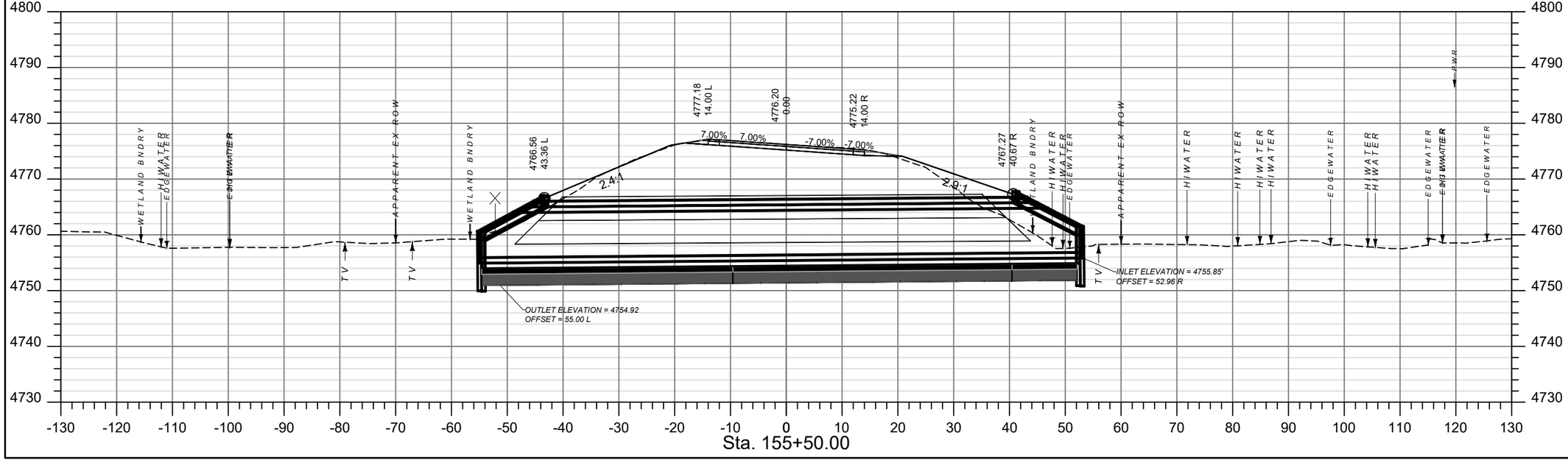
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155+74
12'10" x 8'4" X 92.3' SSPPAC DR. IN PL.
STOCKPASS
REMOVE





SHEET NO.
SHEET 9

CROSS SECTIONS

PROJECT NAME: **MT 141 CULVERT - NORTH OF AVON**
COUNTY: **POWELL**
PROJECT ID: **STPP 41-1(32)2**
UPN: **10334000**

CHECKED BY	#####	#####
REVIEWED BY	#####	#####
DESIGNED BY	J. McKinney	4/5/2023

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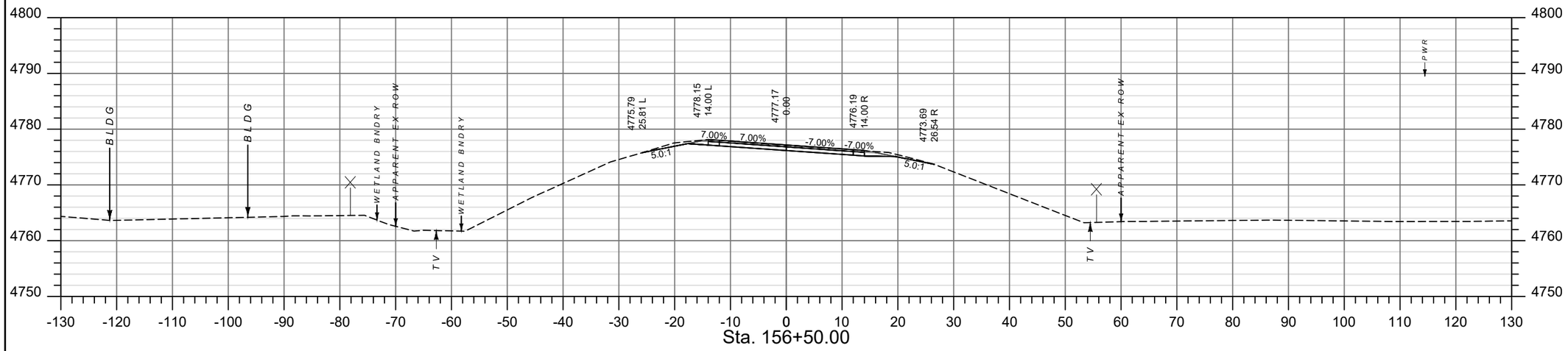
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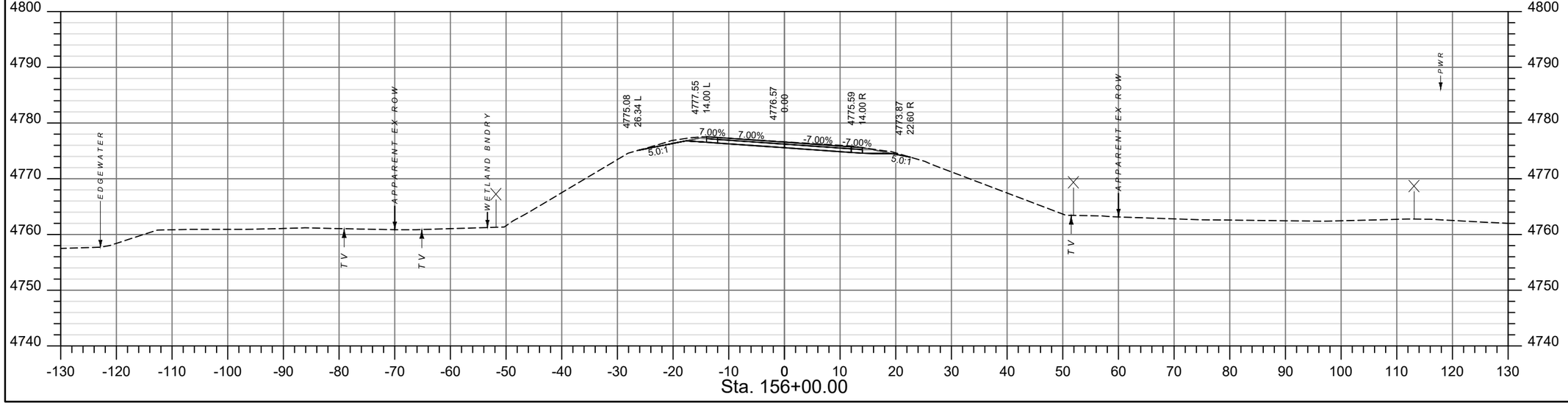
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SHEET NO.
SHEET 10

CROSS SECTIONS

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	####	####
REVIEWED BY	####	####
DESIGNED BY	J. McKinney	4/5/2023

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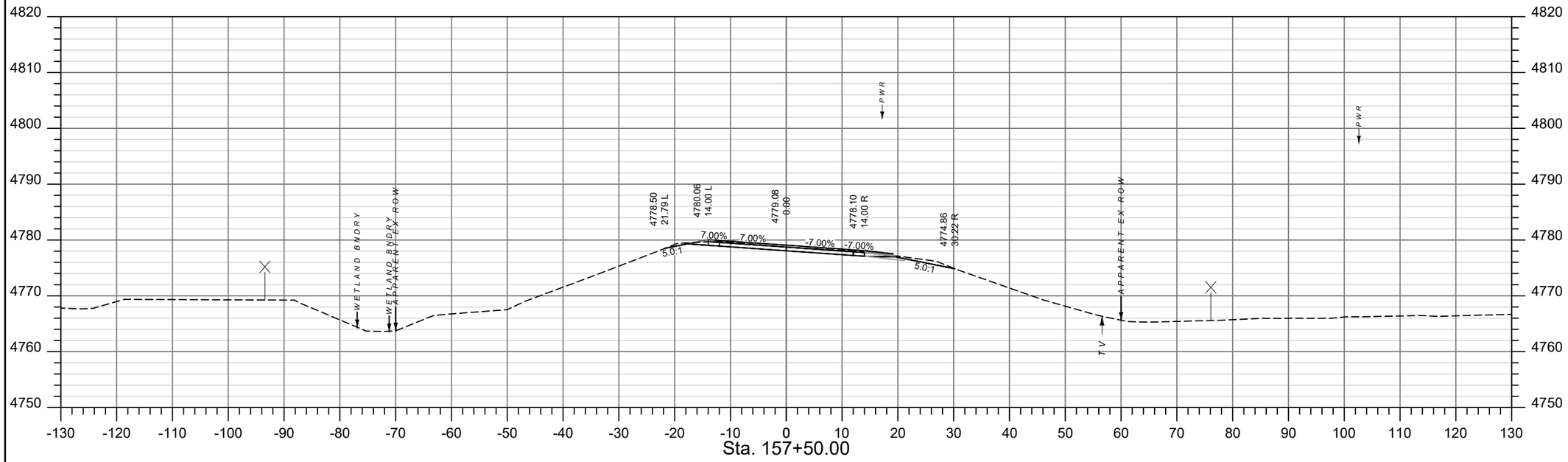
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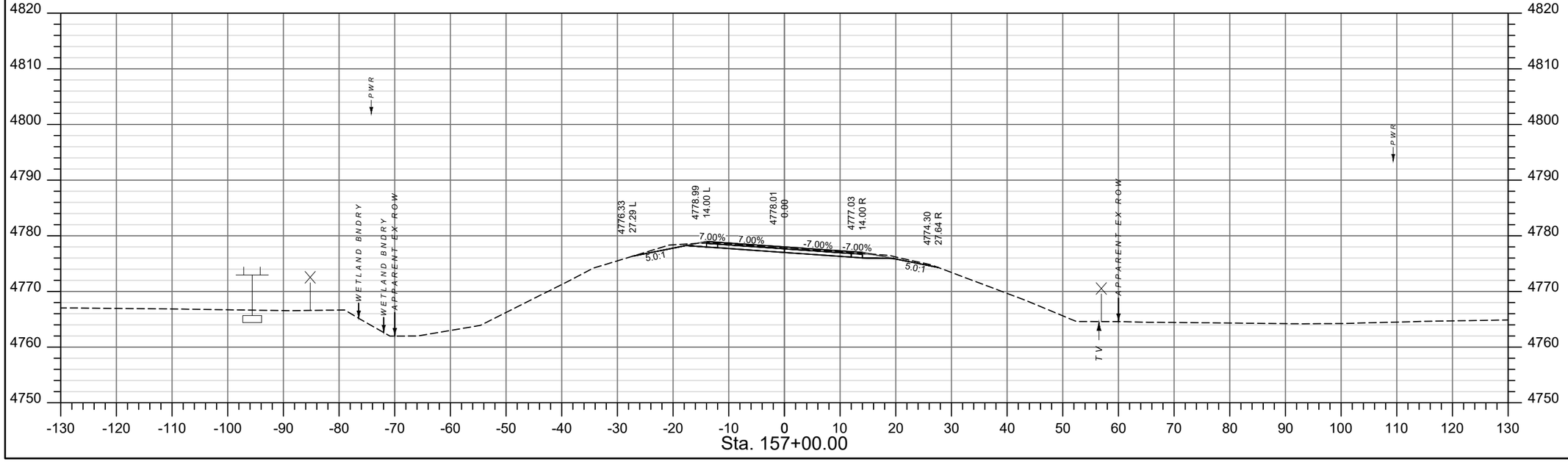
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SHEET NO.
SHEET 11

CROSS SECTIONS

PROJECT NAME
MT 141 CULVERT - NORTH OF AVON

COUNTY
POWELL

PROJECT ID
STPP 41-1(32)2

UPN
10334000

CHECKED BY	#####	#####
REVIEWED BY	#####	#####
DESIGNED BY	J. McKinney	4/5/2023

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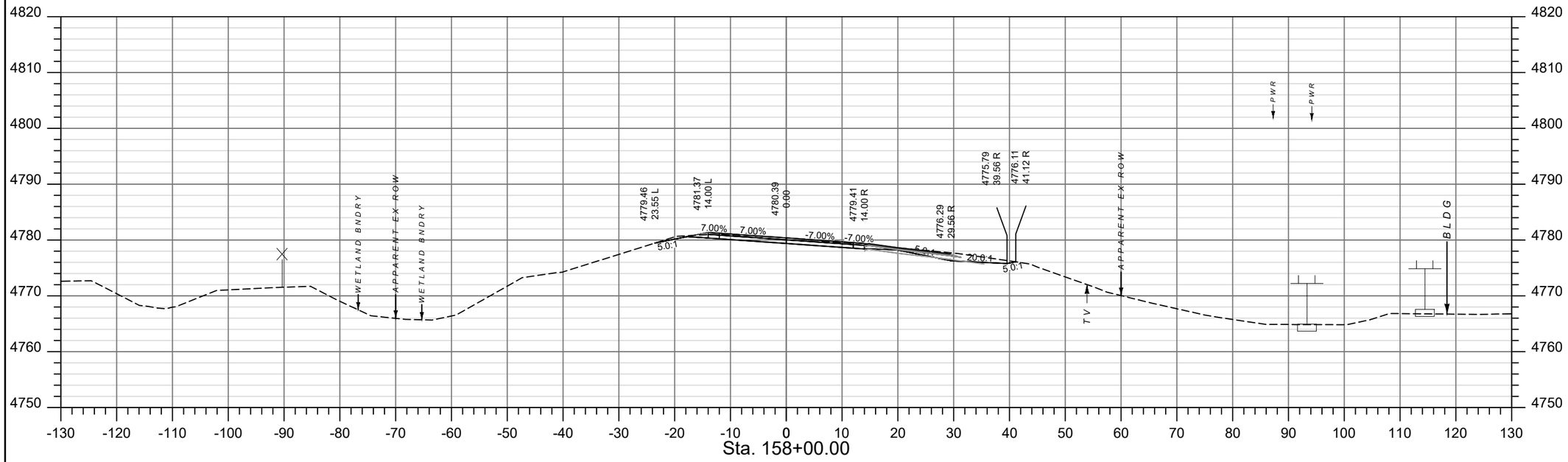
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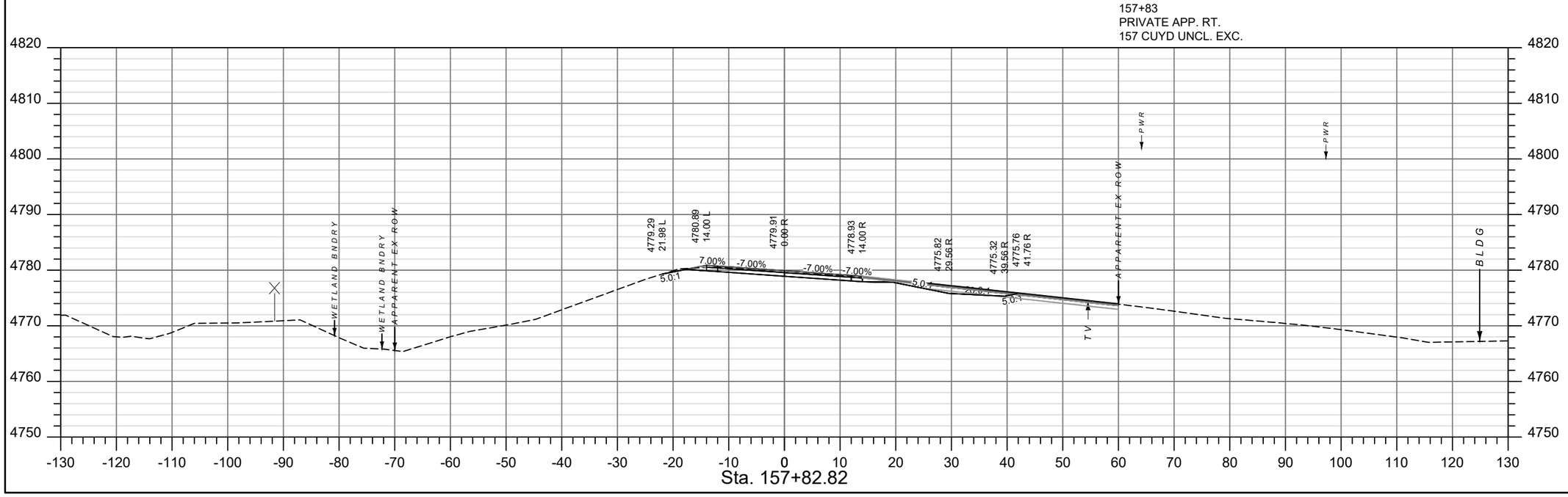
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SHEET NO.
SHEET 12

CROSS SECTIONS

PROJECT NAME: **MT 141 CULVERT - NORTH OF AVON**
COUNTY: **POWELL**
PROJECT ID: **STPP 41-1(32)2**
UPN: **10334000**

CHECKED BY	#####	#####
REVIEWED BY	#####	#####
DESIGNED BY	L. McKinney	4/5/2023

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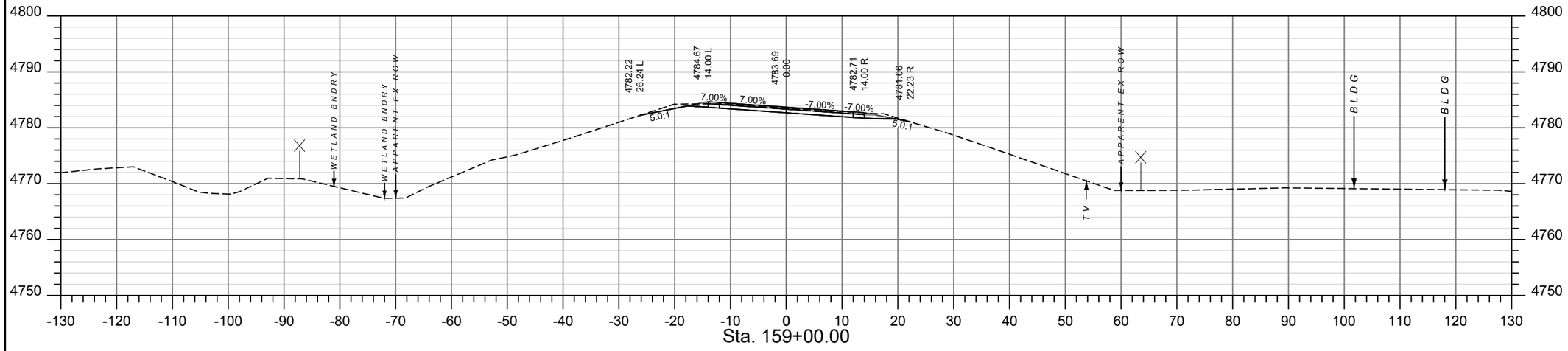
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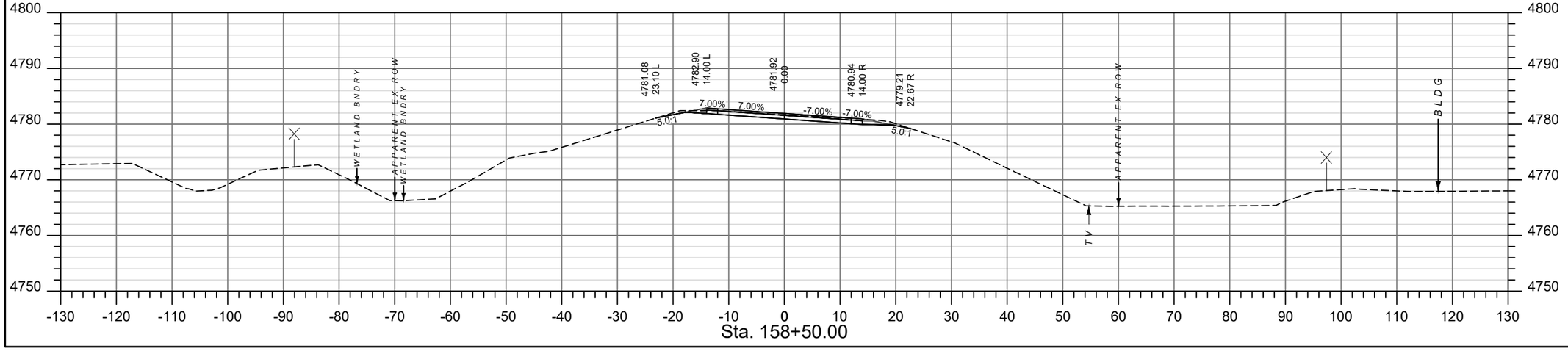
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Sta. 159+00.00



Sta. 158+50.00

SHEET NO.
SHEET 13

CROSS SECTIONS

PROJECT NAME **MT 141 CULVERT - NORTH OF AVON**
COUNTY **POWELL**
PROJECT ID **STPP 41-1(32)2**
UPN **10334000**

CHECKED BY	####	
REVIEWED BY	####	
DESIGNED BY	J. McKinney	4/5/2023

10334000RDXS002-SURVEYLINES.DWG

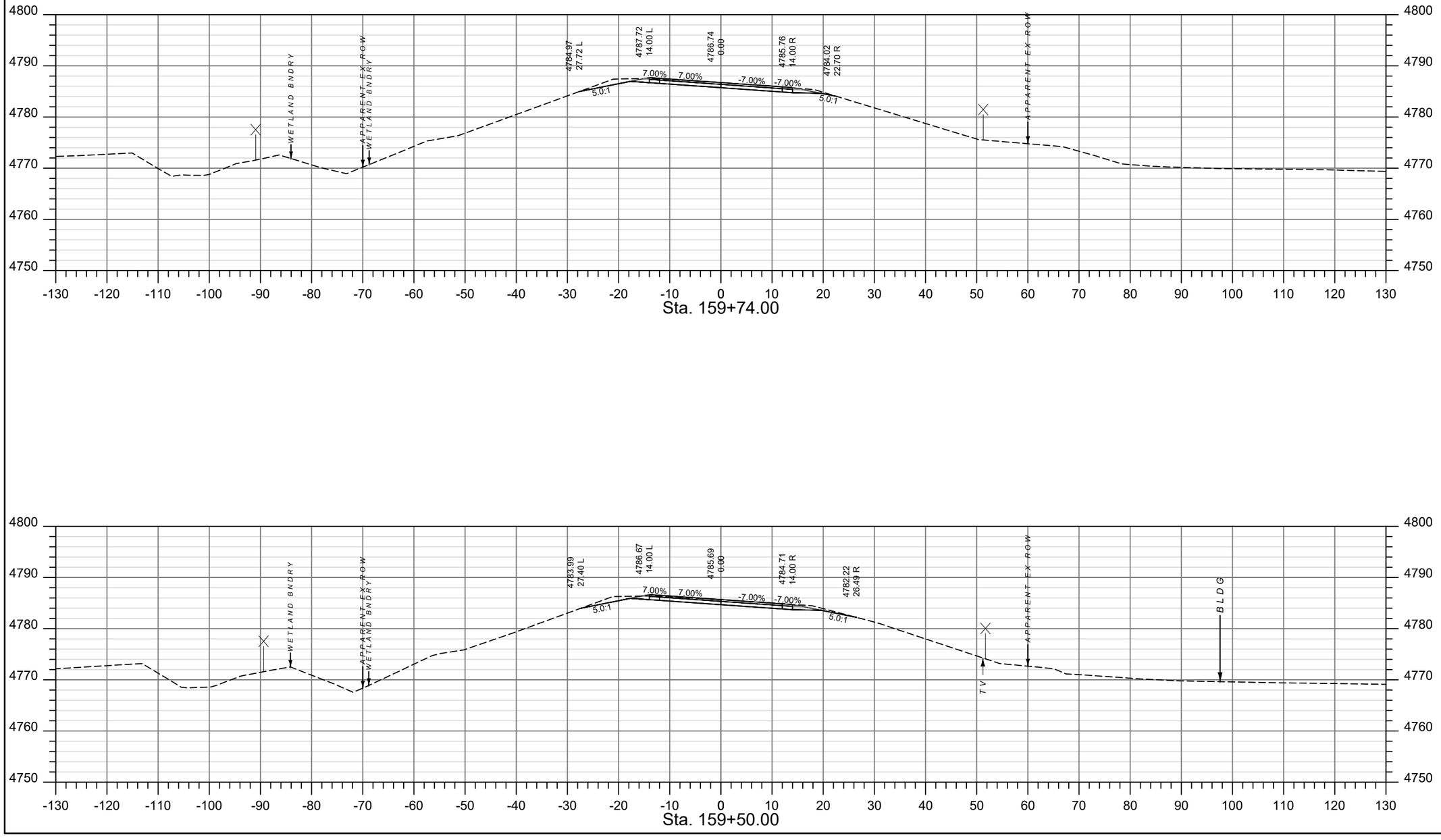
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SHEET NO.
SHEET 14

CROSS SECTIONS

PROJECT NAME: MT 141 CULVERT - NORTH OF AVON
COUNTY: POWELL
PROJECT ID: STPP 41-1(32)2
UPN: 10334000

CHECKED BY	####	####
REVIEWED BY	####	####
DESIGNED BY	J. McKinney	4/5/2023

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Department of Transportation

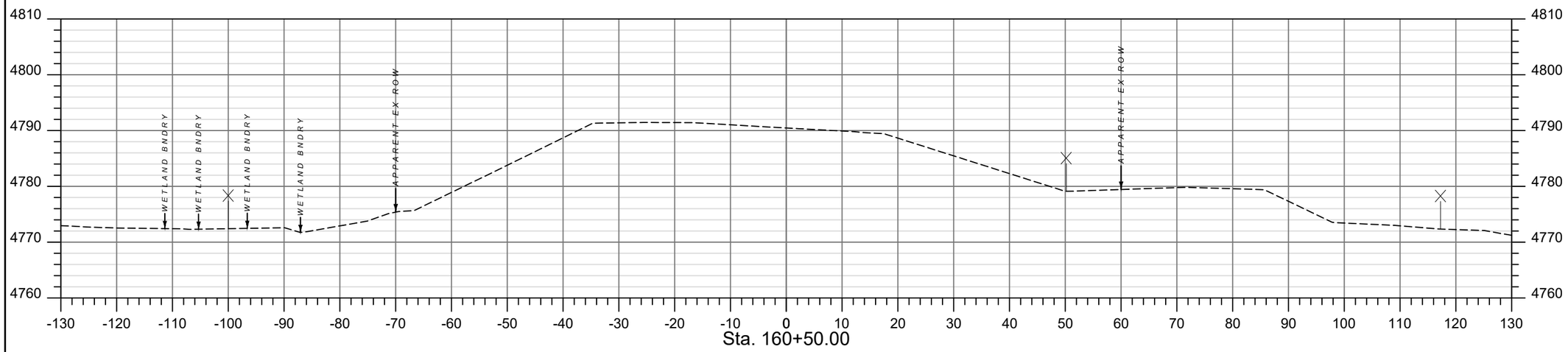
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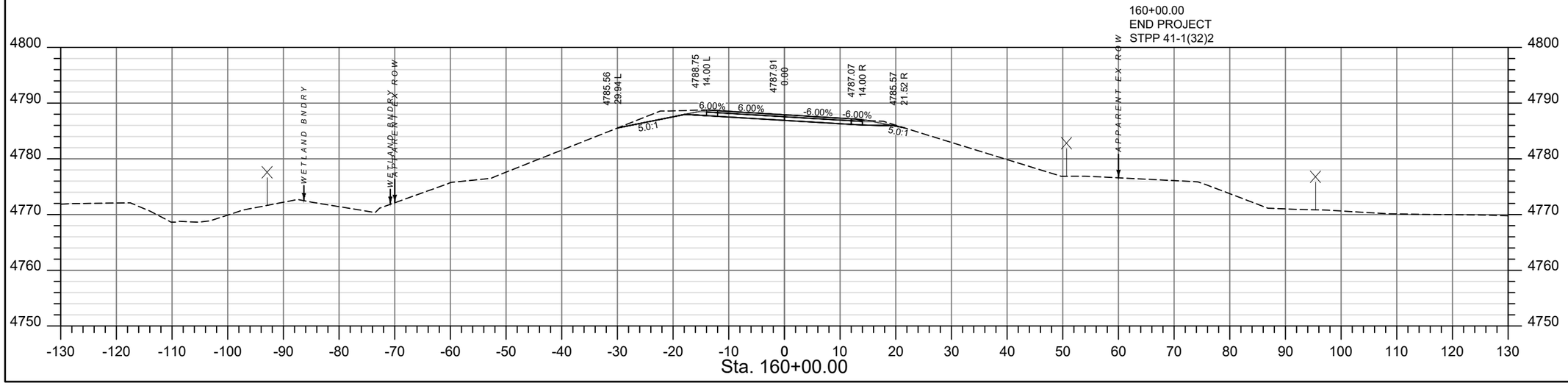
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SHEET NO.
SHEET 15

CROSS SECTIONS

PROJECT NAME **MT 141 CULVERT - NORTH OF AVON**
COUNTY **POWELL**
PROJECT ID **STPP 41-1(32)2**
UPN **10334000**

CHECKED BY	####	####
REVIEWED BY	####	####
DESIGNED BY	J. McKinney	4/5/2023

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