

S:\DEL\98141\DEL-23-42\Design\Roadway\Sheets\98141_G001.dgn Sheet 2 2/24/2020 2:57:50 PM Josh_Rognon

SHEET NUM.										PART.				ITEM	ITEM EXT	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.	CALCULATED	JUR	CHECKED	ALL
7	54	55	56	57	58	83	105	106	109	01/NHS/BR	02/NHS/PV	03/NHS/PV	04/S>2/BR										
PAVEMENT																							
					906					168	738			252	01500	906	FT	FULL DEPTH PAVEMENT SAWING					
	2,367										2,367			254	01000	2,367	SY	PAVEMENT PLANING, ASPHALT CONCRETE					
	102										102			254	01010	102	SY	PAVEMENT PLANING, PORTLAND CEMENT CONCRETE					
200											200			255	10010	200	SY	FULL DEPTH PAVEMENT REMOVAL AND RIGID REPLACEMENT, CLASS QC1					
	93										93			301	46000	93	CY	ASPHALT CONCRETE BASE, PG64-22					
	2				109					2			109	304	20000	111	CY	AGGREGATE BASE					
		205											205	305	13011	205	SY	9" CONCRETE BASE, CLASS QC1, AS PER PLAN				7	
9	254	105									261		107	407	20000	368	GAL	NON-TRACKING TACK COAT					
		52											52	442	10000	52	CY	ASPHALT CONCRETE SURFACE COURSE, 12.5 MM, TYPE A (446)					
	110												110	442	10001	110	CY	ASPHALT CONCRETE SURFACE COURSE, 12.5 MM, TYPE A (446), AS PER PLAN, PG-76-22M				7	
	18												18	442	10100	18	CY	ASPHALT CONCRETE INTERMEDIATE COURSE, 19 MM, TYPE A (446)					
	26									26				SPECIAL	45132000	26	FT	PRESSURE RELIEF JOINT, TYPE C					
	6									6				452	13010	6	SY	9" NON-REINFORCED CONCRETE PAVEMENT, CLASS QC1					
	18									18				609	24000	18	FT	CURB, TYPE 4-A					
4										4				609	26001	4	FT	CURB, TYPE 6, AS PER PLAN				7	
	204										204			SPECIAL	69098300	204	SY	PAVEMENT OVERLAY FABRIC COMPOSITE				9	
TRAFFIC CONTROL																							
				8			10				10		8	626	00102	18	EACH	BARRIER REFLECTOR, TYPE 1					
			9	4						9			4	626	00116	13	EACH	BARRIER REFLECTOR, TYPE 5					
							0.37	0.22			0.37		0.22	644	00104	0.59	MILE	EDGE LINE, 6"					
								0.15					0.15	644	00300	0.15	MILE	CENTER LINE					
							0.37			0.37				646	10010	0.37	MILE	EDGE LINE, 6"					
							0.14			0.14				646	10110	0.14	MILE	LANE LINE, 6"					
							110			110				646	10300	110	FT	CHANNELIZING LINE, 8"					
							49			49				646	10400	49	FT	STOP LINE					
							72			72				646	10500	72	FT	CROSSWALK LINE					
							4			4				646	20300	4	EACH	LANE ARROW					
RETAINING WALLS (RAMP B)																							
						245				245				202	32800	245	SY	CONCRETE SLOPE PROTECTION REMOVED					
						92				92				503	21101	92	CY	UNCLASSIFIED EXCAVATION, AS PER PLAN				82	
						63,810				63,810				509	10000	63,810	LB	EPOXY COATED REINFORCING STEEL					
						170				170				511	46012	170	CY	CLASS QC1 CONCRETE WITH QC/QA, RETAINING/WINGWALL NOT INCLUDING FOOTING					
						89				89				511	46510	89	CY	CLASS QC1 CONCRETE, FOOTING					
						250				250				511	71100	250	CY	CONCRETE, MISC.: PERMANENT SOIL NAIL WALL CIP FACING				82	
						5,728				5,728				SPECIAL	53013000	5,728	SF	FORM LINER				82	
						758				758				601	38501	758	FT	PAVED GUTTER, TYPE 3, AS PER PLAN				82	
						41				41				613	41200	41	CY	LOW STRENGTH MORTAR BACKFILL					
						50				50				622	10161	50	FT	CONCRETE BARRIER, SINGLE SLOPE, TYPE D, AS PER PLAN B				91	
						11				11				SPECIAL	69098000	11	EACH	SPECIAL - MISC: PROOF TEST NAILS				83	
						206				206				SPECIAL	69098000	206	EACH	SPECIAL - MISC: SOIL NAILS, 15 KIPS MAX. TEST LOAD				81	
						3				3				SPECIAL	69098000	3	EACH	SPECIAL MISC: VERIFICATION TEST NAILS				81	
						875				875				SPECIAL	69098300	875	SY	SPECIAL MISC: SHOTCRETE FACING TO FILL EXISTING BIN WALL CORRUGATION, INCLUSIVE				PN	
STRUCTURE 20 FOOT SPAN AND UNDER (U.S. 42 - 09.44C)																							
									66				66	SPECIAL	20270130	66	FT	PIPE CLEANOUT OVER 48"				108	
									2				2	202	98100	2	EACH	REMOVAL MISC.: TREE ROOTS					
									LS				LS	503	11100	LS		COFFERDAMS AND EXCAVATION BRACING					
									73				73	512	10600	73	FT	CONCRETE REPAIR BY EPOXY INJECTION					
									129				129	601	32000	129	CY	ROCK CHANNEL PROTECTION, TYPE A WITH FILTER					
									13				13	601	34400	13	CY	ROCK CHANNEL PROTECTION, WITH GROUT					
									3				3	602	20000	3	CY	CONCRETE MASONRY					
									66				66	611	96550	66	FT	FIELD PAVING OF EXISTING PIPE, 120" CONDUIT, TYPE A					

GENERAL SUMMARY

DEL-23-11.71
DEL-42-9.60

PROPOSED WORK

THE PROPOSED WORK CONSISTS OF BUILDING A SYSTEM OF CAST-IN-PLACE RETAINING WALLS (WALL A, WALL B AND WALL D) AND INSTALLING SOIL NAILS AND A STRUCTURAL FACING (WALL C) ALONG THE EXISTING BIN WALL.

FROM STA (FEET)	TO STA (FEET)	WALL LENGTH (FEET)	WALL ID	NOTES
11+61.17	11+74.79	13.62	N/A	BARRIER TRANSITION
11+74.79 BEGIN WALL	12+25.00	50.21	N/A	TYPE D BARRIER
12+25.00	14+86.00	261.00	WALL 'A'	GRAVITY WALL (WALL "A") -4.25' X 1.5' FOOTING -NO SHEAR KEY
14+86.00	15+36.00	50.00	WALL 'B'	GRAVITY WALL (WALL "B") -4.25' X 1.5' FOOTING, PLUS -2' X 1.5' SHEAR KEY
15+36.00	18+98.00	362.00	WALL 'C'	SOIL NAIL WALL (WALL "C") -2 ROWS FROM STA 15+35 TO STA 15+87.5 -3 ROWS FROM STA 15+87.5 TO STA 18+98
18+98.00	19+17.34 END WALL	19.34	WALL 'D'	GRAVITY WALL (WALL "D") -5' X 1.5' FOOTING, PLUS -2' X 1.5' SHEAR KEY

DESIGN SPECIFICATIONS:

THIS STRUCTURE CONFORMS TO AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION, 2017, AND THE ODOT BRIDGE DESIGN MANUAL, 2007, INCLUDING REVISIONS THROUGH JANUARY 2018, AND SPECIAL PROVISIONS FOR THE DEL-23-11.71 PID 98141 PROJECT, SECTION 900 FOR PERMANENT SOIL NAILS AND SECTION 1000 FOR SHOTCRETE FACING.

CAST IN PLACE GRAVITY WALLS GENERAL NOTES

THE FOLLOWING NOTES PERTAIN TO THE THE CAST IN PLACE GRAVITY WALLS IDENTIFIED AS WALL 'A', WALL 'B' AND WALL 'D'.

THE WORK CONSISTS OF FURNISHING AND INSTALLING PERMANENT CAST IN PLACE GRAVITY WALLS AS SHOWN IN THE PLANS.

UTILITIES THAT MAY BE AFFECTED ARE TO BE FIELD LOCATED AND MOVED IF NECESSARY PRIOR TO BEGINNING OF GRAVITY WALLS CONSTRUCTION.

OVERALL CONSTRUCTION SEQUENCE IN SHEET 10/128 SHALL BE FOLLOWED FOR THE CONSTRUCTION OF THE PROPOSED GRAVITY WALLS.

THE DEPARTMENT WILL PAY FOR GRAVITY WALLS AT THE CONTRACT UNIT PRICE FOR EACH OF THE FOLLOWING PAY ITEMS.

ITEM	UNIT	DESCRIPTION
509	LB	EPOXY COATED REINFORCING STEEL
511	CY	CLASS QC1 CONCRETE WITH QC/QA RETAINING/WINGWALL NOT INCLUDING FOOTING
511	CY	CLASS QC1 CONCRETE, FOOTING

DESIGN PARAMETERS:

FOUNDATION SOIL	
UNIT WEIGHT OF SOIL	125 PCF
ANGLE OF FRICTION	0 DEG
EFFECTIVE ANGLE OF FRICTION	26 DEG
EFFECTIVE COHESION	250 PSF
UNDRAINED SHEAR STRENGTH	3000 PSF

SURCHARGE SOIL	
UNIT WEIGHT OF SOIL	120 PCF
ANGLE OF FRICTION	0 DEG
EFFECTIVE ANGLE OF FRICTION	24 DEG
EFFECTIVE COHESION	125 PSF
UNDRAINED SHEAR STRENGTH	1250 PSF

DESIGN DATA:

CONCRETE CLASS QC1 COMPRESSIVE STRENGTH 4000 PSI

REINFORCING STEEL ASTM A615 OR A996 GRADE 60, MINIMUM YIELD STRENGTH 60 KSI

FOUNDATION BEARING PRESSURE GRAVITY WALL FOOTINGS, AS DESIGNED, PRODUCE THE FOLLOWING BEARING PRESSURE:

FOUNDATION BEARING PRESSURE GRAVITY WALL FOOTINGS, AS DESIGNED, PRODUCE THE FOLLOWING BEARING PRESSURE:

Wall ID	SERVICE BEARING PRESSURE (KSF)	STRENGTH BEARING PRESSURE (KSF)	BEARING RESISTANCE (KSF)
WALL "A", GRAVITY	0.86	1.35	5.95
WALL "B", GRAVITY	1.05	1.59	6.05
WALL "D", GRAVITY	1.28	1.39	6.41

CAST IN PLACE FOOTINGS

THE CONTRACTOR SHOULD CUT THE FOOTING AND FOOTING KEYWAY TO NEAT EXCAVATION LINES WITHOUT FORMING PRIOR TO PLACING THE FOOTING CONCRETE AND REINFORCING STEEL. FORM THE FOOTING ONLY WHEN THE EXCAVATION WALLS ARE UNSTABLE.

EXISTING BIN WALL SURFACE PREPARATION:

THE WORK SHALL INCLUDE ANY PREPARATORY TRIMMING AND CLEANING OF SOIL ROCK AND CLEANING THE SHOTCRETE RECEIVING SURFACES FOR THE SOIL NAIL RETAINING WALL.

CLEAN THE FACE OF THE EXISTING BIN WALL AND OTHER SURFACES TO BE SHOTCRETED OF LOOSE MATERIALS, MUD, REBOUND, OVERSPRAY, OR OTHER FOREIGN MATTER THAT COULD PREVENT OR REDUCE SHOTCRETE BOND. PROTECT ADJACENT SURFACES FROM OVERSPRAY DURING SHOOTING. AVOID LOOSENING, CRACKING, OR SHATTERING THE GROUND DURING EXCAVATION AND CLEANING. REMOVE ANY SURFACE MATERIAL WHICH IS SO LOOSENED OR DAMAGED, TO A SUFFICIENT DEPTH TO PROVIDE A BASE THAT IS SUITABLE TO RECEIVE THE SHOTCRETE. REMOVE MATERIAL THAT LOOSENS AS THE SHOTCRETE IS APPLIED. ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO COMPLETE THE ABOVE DETAILED WORK SHALL BE INCIDENTAL TO "ITEM 690 - SPECIAL - MISC.: SHOTCRETE FACING TO FILL EXISTING BIN WALL CORRUGATION, INCLUSIVE."

SOIL NAIL WALL GENERAL NOTES:

ITEM 690 SOIL NAIL, 15 KIP DESIGN TEST LOAD
ITEM 690 PROOF TEST ON SOIL NAILS
ITEM 690 VERIFICATION TEST ON SOIL NAILS

THE WORK CONSISTS OF FURNISHING, AND INSTALLING, AND PROOF AND VERIFICATION TESTING SOIL NAILS FOR PERMANENT SOIL NAIL WALLS AS SHOWN IN THE PLANS IN ACCORDANCE WITH THE SPECIAL PROVISION "900 PERMANENT SOIL NAILING".

THE DEPARTMENT WILL PAY FOR SOIL NAILS AT THE CONTRACT UNIT PRICE PER EACH PRODUCTION SOIL NAIL WITH 15 KIP MAXIMUM TEST LOAD.

HOLLOW BAR SOIL NAILS (HBSN) ARE ALLOWED. FOR HBSN, MAKE MODIFICATIONS TO THE INSTALLATION PROCEDURE, MATERIALS, AND GROUTING PER FHWA-NHI-14-007 GEC 7 - SOIL NAIL WALLS REFERENCE MANUAL (2015) CHAPTER 10, SUBJECT TO ACCEPTANCE BY THE ENGINEER. HBSN SHALL HAVE THE SAME OR GREATER INITIAL CROSS-SECTIONAL AREA TO A #8 THREADED BAR.

A MINIMUM OF 3 SOIL NAILS SHALL BE SUBJECTED TO VERIFICATION TESTS AS PER SECTION 900 FOR PERMANENT SOIL NAILS. AFTER TESTING, VERIFICATION TEST NAILS SHALL BE CUT OFF AT THE EXISTING WALL FACE AND ABANDONED.

A MINIMUM OF 11 SOIL NAILS SHALL BE SUBJECTED TO PROOF TESTS AS PER SECTION 900 FOR PERMANENT SOIL NAILS.

ANY SOIL NAIL SHALL ONLY BE SUBJECTED TO EITHER VERIFICATION TEST OR PROOF TESTS BUT NOT BOTH.

THE DEPARTMENT WILL PAY FOR EACH SOIL NAIL VERIFICATION TESTED AT THE CONTRACT UNIT PRICE OF "ITEM 690 SPECIAL MISC.: VERIFICATION TEST NAILS" AND WILL PAY FOR EACH SOIL NAIL PROOF TESTED AT THE CONTRACT UNIT PRICE OF "ITEM 690 SPECIAL MISC.: PROOF TEST NAILS"

UTILITIES THAT MAY BE AFFECTED BY SOIL NAIL SYSTEM ARE TO BE FIELD LOCATED AND MOVED IF NECESSARY PRIOR TO BEGINNING OF SOIL NAIL CONSTRUCTION.

MINIMUM SOIL NAIL DRILLED LENGTHS (L) SHALL BE 20 FEET INSTALLED INCLINED AT 15 DEGREES FROM THE HORIZONTAL.

OVERALL CONSTRUCTION SEQUENCE IN SHEET 12/128 SHALL BE FOLLOWED FOR THE CONSTRUCTION OF THE PROPOSED SOIL NAIL WALLS.

DUE TO THE PRESENCE OF EXISTING PILES FROM STRUCTURE DEL-23-11.89 (US23 OVER US36 & DELAWARE RUN), THE SPACING OR DRILLING ANGLE OF THE SOIL NAILS MAY NEED TO BE ADJUSTED IN THE FIELD TO AVOID DRILLING THROUGH THE EXISTING PILES. THE APPROXIMATE LOCATIONS OF THE TOP OF THE EXISTING PILES ARE

1. STATION *18+89, 31' LT.
2. STATION *18+96, 33' LT.
3. STATION *18+99, 31' LT.

THESE PILES WERE LOCATED USING THE 1964 ORIGINAL CONSTRUCTION PLANS DEL-23-10.23. THE CONTRACTOR SHALL USE THE AS BUILT LOCATIONS OF THE TOP OF THE EXISTING PILES TO DEVELOP OR ADJUST THE SHOP DRAWINGS FOR THE SOIL NAILS.

SOIL NAIL WALL GENERAL NOTES (CONTINUED):

IN THE CASE THAT DRILLING FOR A SOIL NAIL HOLE HITS AN EXISTING PILE, THE DRILLED HOLE SHALL BE ABANDONED. THE HOLE SHALL BE FILLED WITH GROUT AND THE SOIL NAIL HOLE SHALL BE RELOCATED WITHIN 1 FOOT OF THE ORIGINAL SOIL NAIL LOCATION. THE DEPARTMENT WILL PAY FOR EACH ABANDONED SOIL NAIL AT 25 PERCENT OF THE PRODUCTION SOIL NAIL UNIT PRICE. THE PAYMENT FOR THE ABANDONED SOIL NAILS INCLUDES THE COST OF DRILLING, ABANDONING THE HOLE, AND GROUTING INCLUDING: TIME, MATERIAL, AND LABOR. FOR ESTIMATING PURPOSES THE CONTRACTOR SHALL ASSUME THAT THE WALL WILL HAVE 2 EXCAVATED SOIL NAILS THAT WILL NEED TO BE ABANDONED AND RELOCATED.

DESIGN DATA

PARAMETER	SPECIFICATION
DRILL HOLE DIAMETER	6 INCHES
MINIMUM NAIL LENGTH	20 FEET
DESIGN TEST LOAD (DTL)	15 KIPS
MAXIMUM NAIL SPACING	
HORIZONTAL	5 FEET
VERTICAL *	5 FEET
NAIL INCLINATION	15° FROM HORIZONTAL
NAIL BAR	
MINIMUM SIZE	#8 THREADED BAR
MINIMUM GRADE	75 KSI
NAIL GROUT COMPRESSIVE STRENGTH	3,000 PSI 28-DAY 1,500 PSI 3-DAY
REINFORCING STEEL	WELDED WIRE FABRIC COATED GRADE 60 MIN. YIELD (EPOXY COATED) STRENGTH 60 OR 75 KSI, ODO CMS 509.00

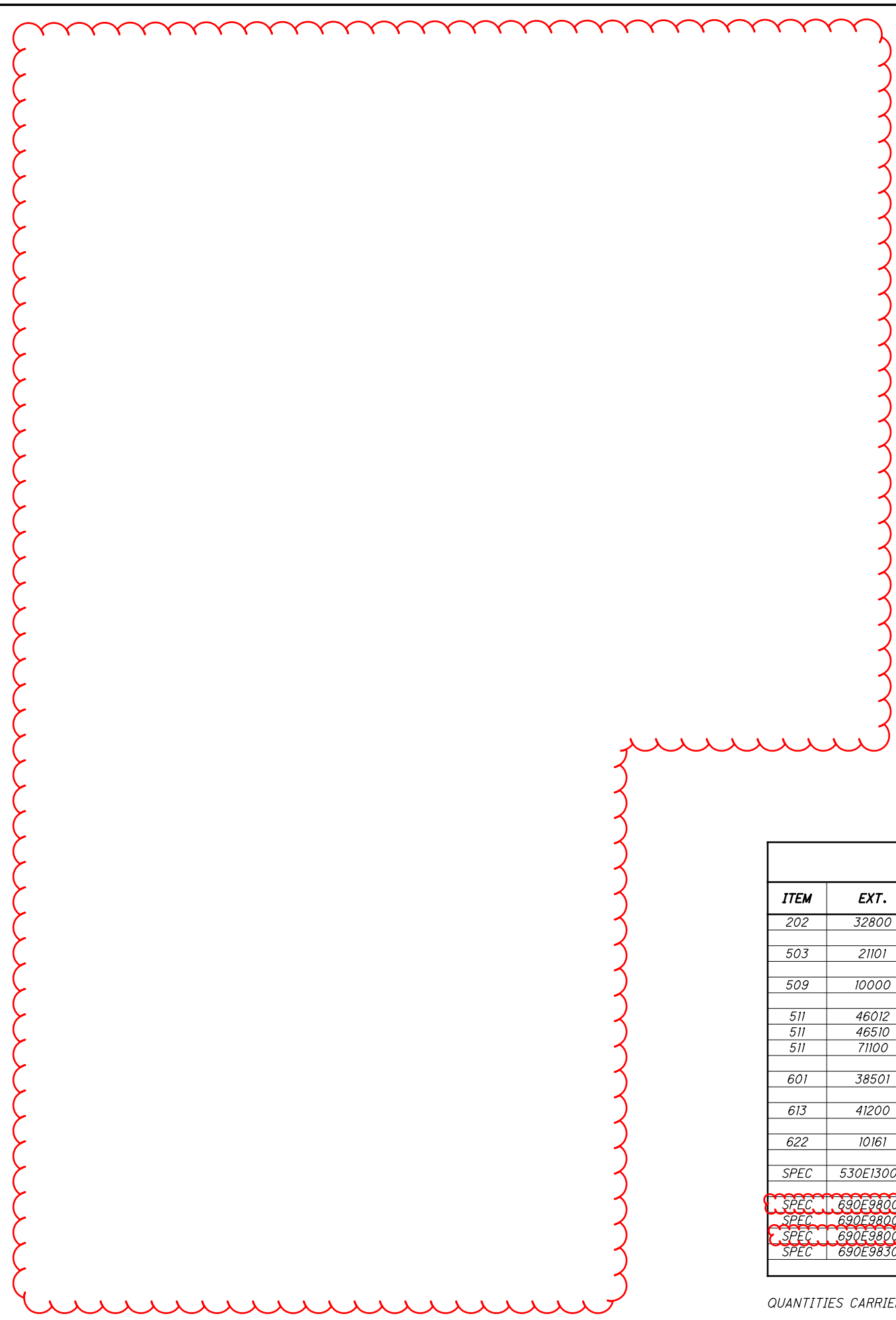
* FROM STA. 15+87 TO STA. 16+87 BOTTOM ROW VERTICAL NAIL SPACING (SV) IS 4 FEET.

STRUCTURE DRAINAGE. 4" DIAMETER PVC PIPE WEEPHOLE

THE WORK CONSISTS OF FURNISHING AND INSTALLING 4 INCH DIAMETER PVC PIPE WEEPHOLE AS DETAILED IN SHEETS 91-91 FOR THE GRAVITY AND SOIL NAIL RETAINING WALLS. THE DRAIN PIPE WILL OUTLET DIRECTLY TO ITEM 518 - POROUS BACKFILL UNDERLAIN BY ITEM 512 - TYPE 3 WATERPROOFING MEMBRANE. THE TYPE 3 WATERPROOFING SHALL BE APPLIED TO THE ENTIRE TOP SURFACE OF THE FOOTING AND SHALL EXTEND VERTICALLY DOWN THE ENTIRE FOOTING SIDES. ITEM 518 - POROUS BACKFILL WILL OUTLET TO THE EXISTING UNDERDRAIN EXCEPT AT WALL "D" (GRAVITY WALL), LOCATION WHERE THE EXISTING UNDERDRAIN IS TO BE REPLACED WITH A NEW UNDERDRAIN AT WALL "C" (SOIL NAIL WALL) AS SOON AS PRACTICAL. THE APPROXIMATE LOCATION OF THE EXISTING UNDERDRAIN IS SHOWN IN THE DETAIL.

CARE SHALL BE TAKEN DURING THE PLACEMENT OF THE PVC PIPE NOT TO ENTRAP DIRT OR EXCESSIVE DUST THAT COULD CAUSE CLOGGING OF THE DRAINAGE SYSTEM. PVC DRAINAGE PIPE SHALL BE IN ACCORDANCE WITH ITME 707.45 AND TYPE 3 WATERPROOFING SHALL BE IN ACCORDANCE WITH ITEM 711.29.

ALL MATERIALS, LABOR AND INCIDENTALS NECESSARY TO CONSTRUCT THE 4" DIA. PVC PIPE WEEPHOLE INCLUDING ITEM 518 - POROUS BACKFILL AND ITEM 512 - TYPE 3 WATERPROOFING SHALL BE INCIDENTAL TO THE SHOTCRETE FACING PAY ITEM 690 - SPECIAL - MISC.: SHOTCRETE FACING TO FILL EXISTING BIN WALL CORRUGATION, INCLUSIVE.



ESTIMATED QUANTITIES						
ITEM	EXT.	QUANTITY		UNIT	DESCRIPTION	SEE SHT.
		02/NHS/PV	03/NHS/PV			
202	32800	245		SY	CONCRETE SLOPE PROTECTION REMOVED	
503	21101	92		CY	UNCLASSIFIED EXCAVATION, AS PER PLAN	82
509	10000	63,810		LB	EPOXY COATED REINFORCING SEEL	
511	46012	170		CY	CLASS QC1 CONCRETE WITH QC/QA, RETAINING/WINGWALL NOT INCLUDING FOOTING	
511	46510	89		CY	CLASS QC1 CONCRETE, FOOTING	
511	71100	250		CY	CONCRETE, MISC.: PERMANENT SOIL NAIL WALL CIP FACING	82
601	38501	758		FT	PAVED GUTTER, TYPE 3, AS PER PLAN	82
613	41200	41		CY	LOW STRENGTH MORTAR BACKFILL	
622	10161	50		FT	CONCRETE BARRIER, SINGLE SLOPE, TYPE D, AS PER PLAN B	91
SPEC	530E13000		5,728	SF	FORM LINER	82
SPEC	690E98000	206		EACH	SPECIAL - MISC.: SOIL NAILS, 15 KIPS MAX. TEST LOAD	81
SPEC	690E98000	11		EACH	SPECIAL - MISC.: PROOF TEST NAILS	83
SPEC	690E98000	3		EACH	SPECIAL - MISC.: VERIFICATION TEST NAILS	81
SPEC	690E98300	875		SY	SPECIAL - MISC.: SHOTCRETE FACING TO FILL EXISTING BIN WALL CORRUGATION, INCLUSIVE	*

* SEE SPECIAL PROVISIONS

QUANTITIES CARRIED TO GENERAL SUMMARY

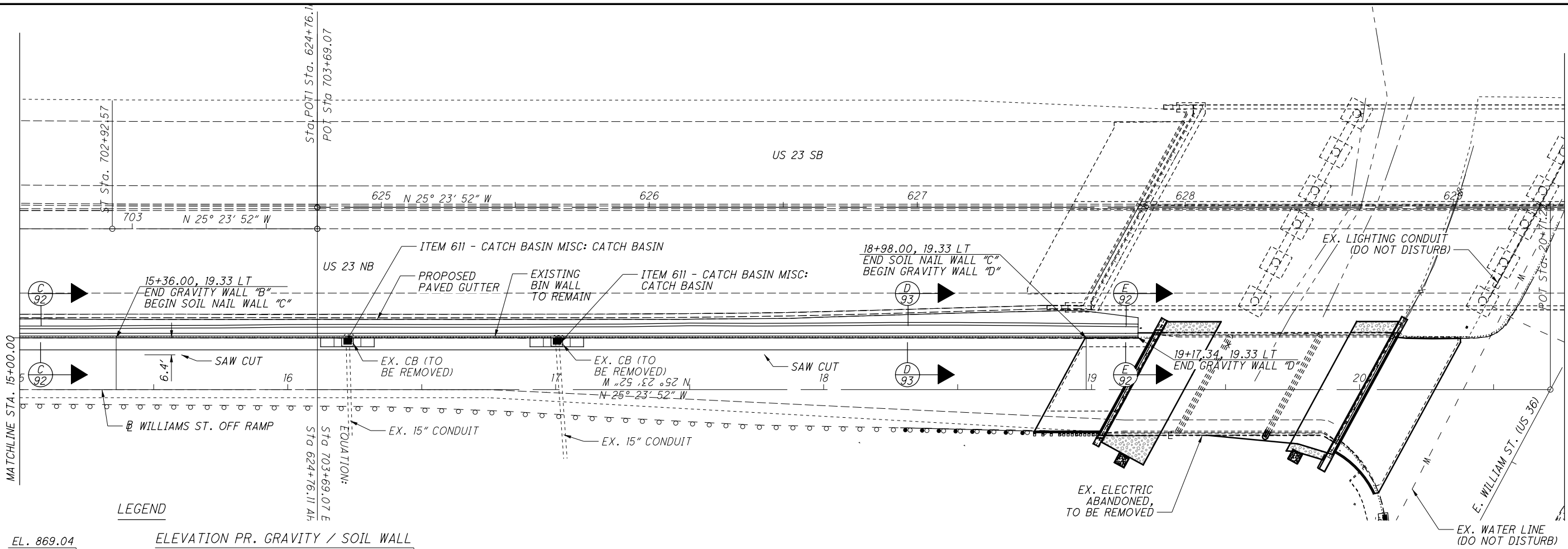


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WALL PLAN AND PROFILE
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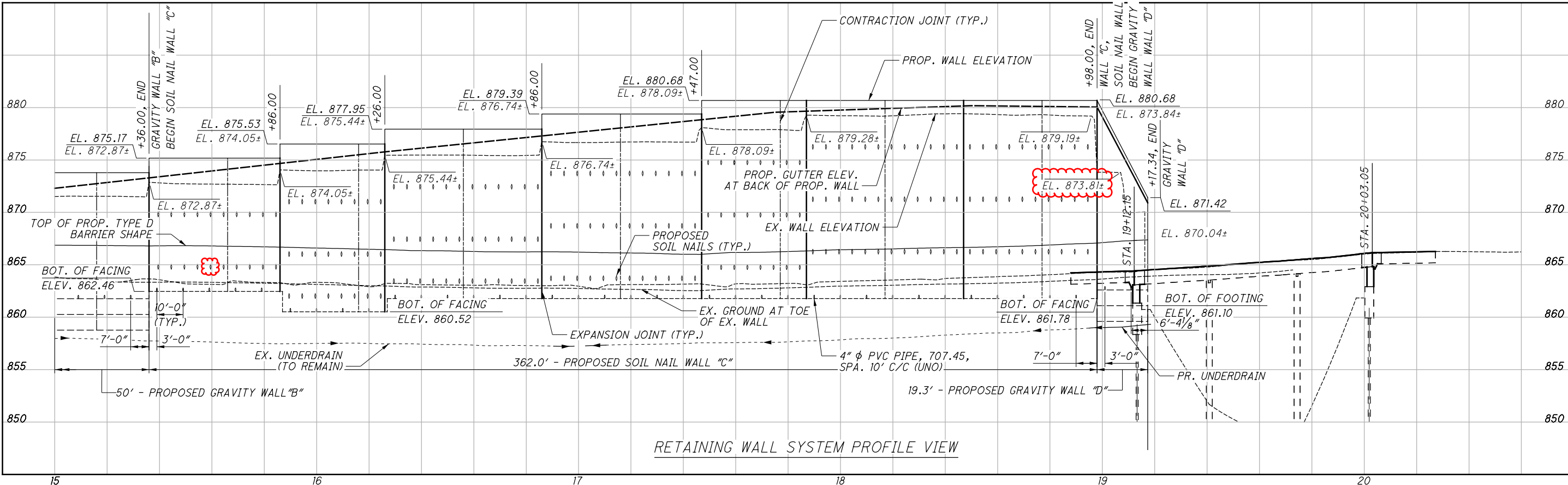
DEL-23-11.71
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85
140



RETAINING WALL SYSTEM PLAN VIEW

NOTES:
1. SEE SHEET 91-93 FOR RETAINING WALL SECTIONS.
2. SEE RETAINING WALL ELEVATION SHEETS FOR ADDITIONAL INFORMATION.



RETAINING WALL SYSTEM PROFILE VIEW

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