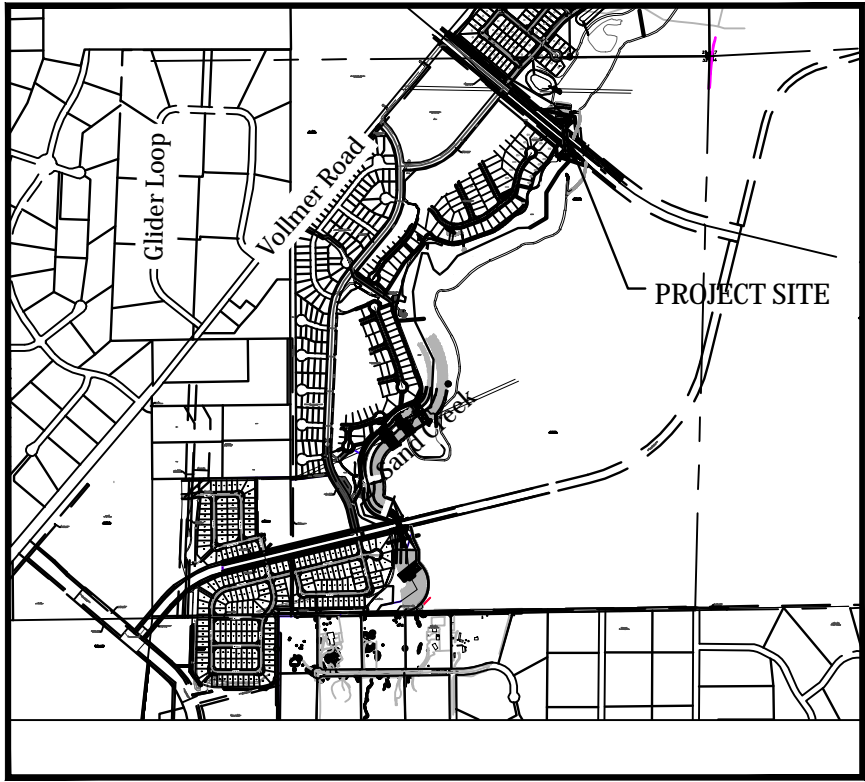


STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE
CONSTRUCTION DRAWINGS
EL PASO COUNTY, COLORADO

Kiowa Project No. 19032
7/14/2022



VICINITY MAP
SCALE: N.T.S.



STATEMENTS

Design Engineer's Statement:

These detailed plans and specifications were prepared under my direction and supervision. Said plans and specifications have been prepared according to the criteria established by the County for detailed roadway, drainage, grading and erosion control plans and specifications, and said plans and specifications are in conformity with applicable master drainage plans and master transportation plans. Said plans and specifications meet the purposes for which the particular roadway and drainage facilities are designed and are correct to the best of my knowledge and belief. I accept responsibility for any liability caused by any negligent acts, errors or omissions on my part in preparation of these detailed plans and specifications.

Todd Cartwright, P.E. #33365
For and on behalf of Kiowa Engineering Corp.

Date



Owner/Developer's Statement:

I, the owner/developer have read and will comply with of the requirements of the Grading and Erosion Control Plans and all of the requirements specified in these detailed plans and specifications.


James Morley
Sterling Ranch Metropolitan District SR LAND, LLC

06/30/2022
Date

El Paso County:

County plan review is provided only for general conformance with County Design Criteria. The County is not responsible for the accuracy and adequacy of the design, dimensions, and/or elevations which shall be confirmed at the job site. The County through the approval of this document assumes no responsibility for completeness and/or accuracy of this document.

Filed in accordance with the requirements of the El Paso County Land Development Code, Drainage Criteria Manual Volumes 1 and 2, and Engineering Criteria Manual as amended.

In accordance with ECM Section 1.12, these construction documents will be valid for construction for a period of 2 years from the date signed by the El Paso County Engineer. If construction has not started within those 2 years the plans will need to be resubmitted for approval, including payment of review fees at the Planning and Community Development Directors discretion.

APPROVED
Engineering Department
EPC Planning & Community Development
County Engineer / ECM Administrator

Date



Know what's below.
Call before you dig.



As-Built

Note: As-built survey and drawing prepared by JR Engineering, LLC.

EL PASO COUNTY STANDARD NOTES

- All drainage and roadway construction shall meet the standards and specifications of the City of Colorado Springs/El Paso County Drainage Criteria Manual, Volumes 1 and 2, and the El Paso County Engineering Criteria Manual.
- Contractor shall be responsible for the notification and field notification of all existing utilities, whether shown on the plans or not, before beginning construction. Location of existing utilities shall be verified by the contractor prior to construction. Call 811 to contact the Utility Notification Center of Colorado (UNCC).
- Contractor shall keep a copy of these approved plans, the Grading and Erosion Control Plan, the Stormwater Management Plan (SWMP), the soils and geotechnical report, and the appropriate design and construction standards and specifications at the job site at all times, including the following:
 - El Paso County Engineering Criteria Manual (ECM)
 - City of Colorado Springs/El Paso County Drainage Criteria Manual, Volumes 1 and 2
 - Colorado Department of Transportation (CDOT) Standard Specifications for Road and Bridge Construction 2021
 - CDOT M & S Standards 2019
- Notwithstanding anything depicted in these plans in words or graphic representation, all design and construction related to roads, storm drainage and erosion control shall conform to the standards and requirements of the most recent version of the relevant adopted El Paso County standards, including the Land Development Code, the Engineering Criteria Manual, the Drainage Criteria Manual, and the Drainage Criteria Manual Volume 2. Any deviations from regulations and standards must be requested, and approved, in writing. Any modifications necessary to meet criteria after-the-fact will be entirely the developer's responsibility to rectify.
- It is the design engineer's responsibility to accurately show existing conditions, both onsite and offsite, on the construction plans. Any modifications necessary due to conflicts, omissions, or changed conditions will be entirely the developer's responsibility to rectify.
- Contractor shall schedule a pre-construction meeting with El Paso County Planning and Community Development (PCD) - Inspections, prior to starting construction.
- It is the contractor's responsibility to understand the requirements of all jurisdictional agencies and to obtain all required permits, including but not limited to El Paso County Erosion and Stormwater Quality Control Permit (ESQCP), Regional Building Floodplain Development Permit, U.S. Army Corps of Engineers-issued 401 and/or 404 permits, and county and state fugitive dust permits.
- Contractor shall not deviate from the plans without first obtaining written approval from the design engineer and PCD. Contractor shall notify the design engineer immediately upon discovery of any errors or inconsistencies.
- All storm drain pipe shall be Class III RCP unless otherwise noted and approved by PCD.
- Contractor shall coordinate geotechnical testing per ECM standards. Pavement design shall be approved by El Paso County PCD prior to placement of curb and gutter and pavement.
- All construction traffic must enter/exit the site at approved construction access points.
- Sight visibility triangles as identified in the plans shall be provided at all intersections. Obstructions greater than 18 inches above flowline are not allowed within sight triangles.
- Signing and striping shall comply with El Paso County Department of Public Works and MUTCD criteria. [If applicable, additional signing and striping notes will be provided.]
- Contractor shall obtain any permits required by El Paso County Department of Public Works, including Work Within the Right-of-Way and Special Transport permits.
- The limits of construction shall remain within the property line unless otherwise noted. The owner/developer shall obtain written permission and easements, where required, from adjoining property owner(s) prior to any off-site disturbance, grading, or construction.

INDEX OF SHEETS

C001	COVER SHEET
C101	SITE PLAN
C201	BRIARGATE BOULEVARD BRIDGE PLAN & PROFILE
C202	BRIARGATE BOULEVARD BRIDGE STRUCTURE LAYOUT
C203	BRIARGATE BOULEVARD BRIDGE DETAILS
C204	BRIARGATE BOULEVARD BRIDGE GUARDRAIL PLAN
C211	BRIARGATE BOULEVARD BRIDGE GUARDRAIL DETAILS
C212	BRIARGATE BOULEVARD BRIDGE HANDRAIL DETAILS
C221	WINGWALL PROFILES
C222	WINGWALL PROFILES
C223	WINGWALL PROFILES
C224	WINGWALL DETAILS
C225	WINGWALL TABLES
C226	WINGWALL TABLES
C227	WINGWALL TABLES
C231	BRIDGE FOOTER PROFILE
C301	DROP STRUCTURE A DETAILS
C302	DROP STRUCTURE B DETAILS
C303	DROP STRUCTURE DETAILS
C311	GRADE CONTROL STRUCTURE DETAILS
HW1	HEADWALL GENERAL INFORMATION
HW2	HEADWALL PLAN AND ELEVATION
HW3	HEADWALL TOP PLAN & SHORING REQ'S
HW4	BACK FACE REINFORCING ELEVATION
HW5	FRONT FACE REINFORCING ELEVATION
HW6	HEADWALL REINFORCING DETAILS
HW7	HEADWALL REINFORCING DETAILS
HW8	HEADWALL REINFORCING DETAILS
HW9	MISCELLANEOUS HEADWALL DETAILS
1	BRIDGECOR SINGLE RADIUS ARCH
2	BRIDGECOR SINGLE RADIUS ARCH
3	BRIDGECOR SINGLE RADIUS ARCH
4	BRIDGECOR SINGLE RADIUS ARCH
5	BRIDGECOR SINGLE RADIUS ARCH
6	BRIDGECOR SINGLE RADIUS ARCH
7	BRIDGECOR SINGLE RADIUS ARCH

(38 sheets total)

GENERAL NOTES

- Profile design lines are based on centerline, as shown, unless otherwise noted.
- All new construction to conform to the specifications of El Paso County Department of Public Works. Any asphalt removed is to be replaced to meet the specifications of the El Paso County Public Works Department.
- For pavement design, curb and gutter, and sidewalks see individual plan and profile sheets. Pavement design to be based on Resistance Value 'R' derived from Hveem tests and are to be approved by the Engineering Division of the El Paso County Planning and Community Development prior to work above subgrade.
- At intersections, all curb returns will have 20-foot radius unless otherwise noted.
- All existing utilities have been shown according to the best available information. The contractor is responsible for field location and verification prior to beginning work. If it appears that there could be a conflict with any utilities, whether indicated on the plans or not, the contractor is to notify the engineer and owner immediately. The contractor is responsible for the protection and repair (if necessary) of all utilities.
- A Pre-Construction meeting shall be held with the El Paso County Planning and Community Development prior to any construction.
- Approved plans, Engineering Criteria Manual, etc. is required to be on-site at all times during construction.
- All necessary permits, such as SWMP, ESQCP, Fugitive Dust, Access, C.O.E. 404, etc. shall be obtained prior to construction.
- All handicap ramps to be per El Paso County Standard SD 2-40.
- The contractor shall coordinate locations and layout with the El Paso County Planning and Community Development on the placement of any pedestrian ramps prior to construction of the curb.
- Where appropriate, neatly saw cut all existing concrete and asphalt. Repair/replace all disturbed existing items with like materials and thicknesses.
- All disturbed areas shall be revegetated with native grasses within 21 days of excavation per Erosion Control Plan.
- The prepared Erosion/Sediment Control Plan is to be considered a part of these plans and its requirements adhered to during the construction of this project.
- All storm and sanitary sewer pipe lengths and slopes are figured from center of manhole or bend. Pipe lengths are given as a horizontal length.
- All storm sewer bedding to be per CDoT Standards.
- All storm sewer pipe shall be Class III B Wall unless otherwise shown on the storm sewer plan and profile sheets.
- All wyes and bends used in construction of storm sewer facilities shall be factory fabricated, unless approved by the El Paso County Planning and Community Development.
- Construction and materials used in all storm and sanitary sewer manholes shall be per specifications. Storm sewer radial deflections to be grouted or installed per manufacturer's recommendations.
- Storm sewer manholes sizes as follows unless otherwise shown:
18" thru 36" use 48" I.D. manhole
42" thru 48" use 60" I.D. manhole
54" thru 60" use 72" I.D. manhole
NOTE: Manhole sizes tabulated here shall be increased, if necessary, to accommodate incoming laterals.
- All horizontal stationing is based on the 'Face of Curb', unless otherwise shown.
- All vertical design and top of curb are based on the design point shown in the typical cross section.
- The curb line design point is located at the intersection of the face and top of curb for the Type III Standard 6-inch vertical curb. See typical street section for design point locations.
- Vertical curb to be used between curb returns (CR) and at curb inlets. Transitions from ramp to vertical curb shall be 10-feet unless otherwise approved by the El Paso County Department of Public Works. All outer curb & gutter to be ramp curb & gutter.
- Cross pans to be per El Paso County Standard Detail SD 2-26.
- Curb returns shall be straight graded from CR to CR unless otherwise noted.
- Inlets are Type 'R' inlets (CDOT STD M-604-12) unless otherwise noted.

BENCHMARK:
THE TOP OF AN ALUMINUM SURVEYORS CAP, STAMPED "8953"
NORTHING = 411416.273
EASTING = 235167.071
ELEVATION = 7023.42

THE TOP OF RED PLASTIC SURVEYORS CAP, ILLEGIBLE
NORTHING = 410095.404
EASTING = 235052.131
ELEVATION = 7000.40

THE TOP OF RED PLASTIC SURVEYORS CAP, STAMPED "38141"
NORTHING = 411399.962
EASTING = 233849.817
ELEVATION = 7030.82

BASIS OF BEARING
THE SOUTHWEST LINE OF THE SOUTHWEST QUARTER (SW $\frac{1}{4}$) OF SECTION 34, TOWNSHIP 12 SOUTH, RANGE 65 WEST OF THE 6TH P.M. AS MONUMENTED AT THE SOUTHWEST CORNER OF SAID SOUTHWEST QUARTER (SW $\frac{1}{4}$) BY A 2-1/2" ALUMINUM CAP STAMPED "LS 11624" AND AT THE SOUTHEAST CORNER OF SAID SOUTHWEST QUARTER (SW $\frac{1}{4}$) BY A 2-1/2" ALUMINUM CAP STAMPED "LS11624", SAID LINE BEARS N 89°14'14" E, A DISTANCE OF 2,722.56 FEET.

ABBREVIATIONS

ASSY = ASSEMBLY	MIN. = MINIMUM
BNDY = BOUNDARY	NTS = NOT TO SCALE
BOA = BOTTOM OF ARCH	OD = OUTSIDE DIAMETER
BOF = BOTTOM OF FOOTER	PC = POINT OF HORIZONTAL CURVATURE
BOP = BOTTOM OF PIPE	PP = PROPOSED
CL = CENTERLINE	PT = POINT OF HORIZONTAL TANGENCY
CRA = CONCRETE REVERSE ANCHOR	PVC = POLY VINYL CHLORIDE PIPE
CTRB = CONCRETE THRUST BLOCK	PVC = POINT OF VERTICAL CURVATURE
CR = POINT OF CURB RETURN	PVI = POINT OF VERTICAL INTERSECTION
DIP = DUCTILE IRON PIPE	PVT = POINT OF VERTICAL TANGENCY
EL = ELEVATION	RCB = REINFORCED CONCRETE BOX
ESMT = EASEMENT	RCP = REINFORCED CONCRETE PIPE
EX. = EXISTING	ROW = RIGHT OF WAY
FC = FACE OF CURB	RT = RIGHT
FES = FLARED END SECTION	SHT = SHEET
FLG = FLANGE	SS = SANITARY SEWER
FL = FLOWLINE	STA = STATION
GB = GRADE BREAK	STD = STANDARD
HP = HIGH POINT	TA = TOP OF ASPHALT
HORIZ = HORIZONTAL	TC = TOP OF CURB
HYD = HYDRANT	TOP = TOP OF FOOTER
ID. = INSIDE DIAMETER	TOP = TOP OF PIPE
LT = LEFT	TOR = TOP OF ROCK
LF = LINEAR FEET	TYP = TYPICAL
LP = LOW POINT	VC = VERTICAL CURVE
MAX = MAXIMUM	VERT = VERTICAL
MH = MANHOLE	

Kiowa
Engineering Corporation
1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 630-7342

STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION DRAWINGS
COVER SHEET
EL PASO COUNTY, COLORADO

Project No.: 19032

Date: 7/14/2022

Design: TAC

Drawn: PAV

Check:

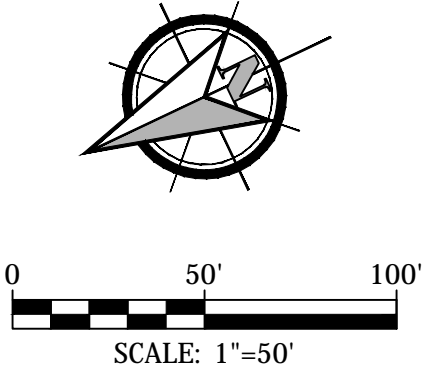
Revisions: AS BUILT

5/12/2025

C001

WETLAND DISTURBANCE AREA: 0.74 AC. (0.74 AC. MAX.)
LENGTH CHANNEL DISTURBANCE: 630 LF. (635 LF MAX.)

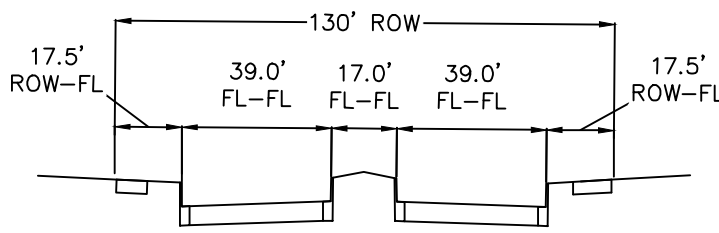
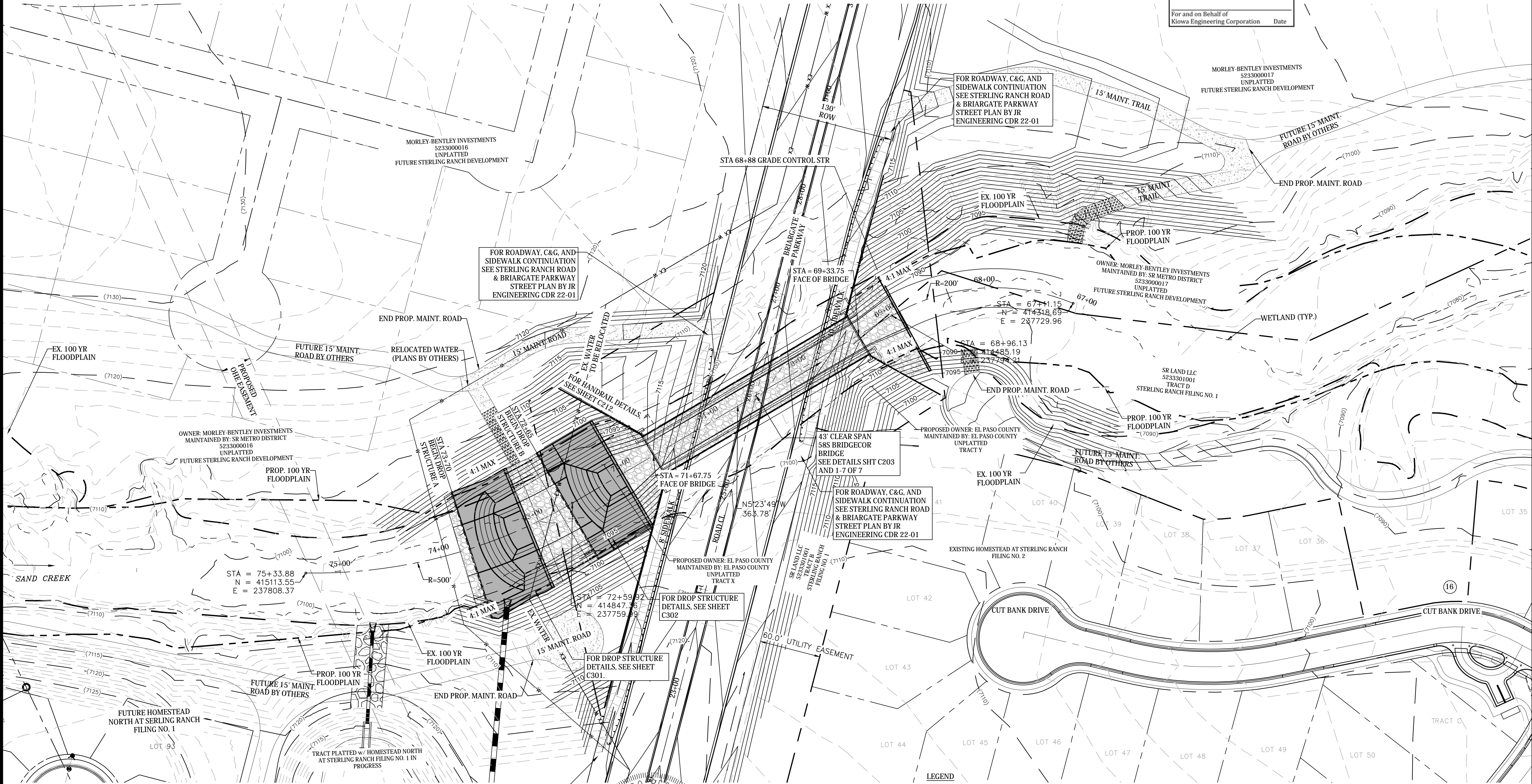
CAUTION!!!
EXISTING UTILITIES TO BE
PROTECTED FROM DISTURBANCE
WHEN INSTALLING ALL DRAINAGE
INFRASTRUCTURE.



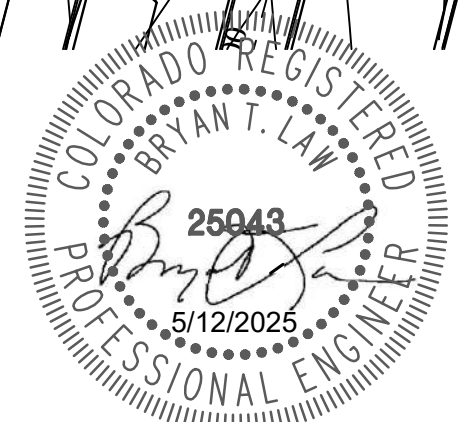
STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION DRAWINGS
SITE PLAN
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/14/2022
Design:	TAC
Drawn:	PAV
Check:	
Revisions:	AS BUILT 5/12/2025

C101



BRIARGATE BLVD TYPICAL SECTION



As-Built

LEGEND

- EXISTING FEMA 100 YEAR FLOODPLAIN
- PROPOSED FEMA 100 YEAR FLOODPLAIN
- PROFILE CENTERLINE
- PROPERTY LINE
- PROPOSED CONTOUR
- EXISTING CONTOUR
- FENCE

HATCH LEGEND

- GRAUTED BOULDER
- TYPE M SOIL RIPRAP D50=12"
- TYPE L SOIL RIPRAP D50=9"
- ACCESS ROAD/TRAIL

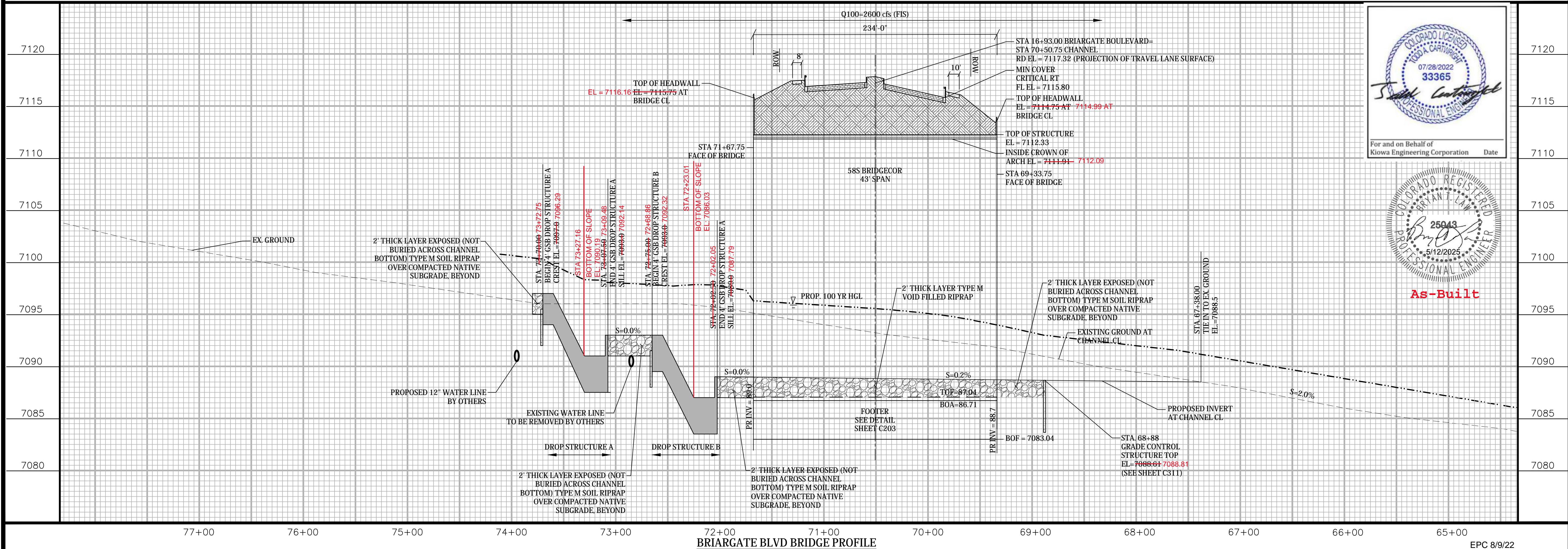
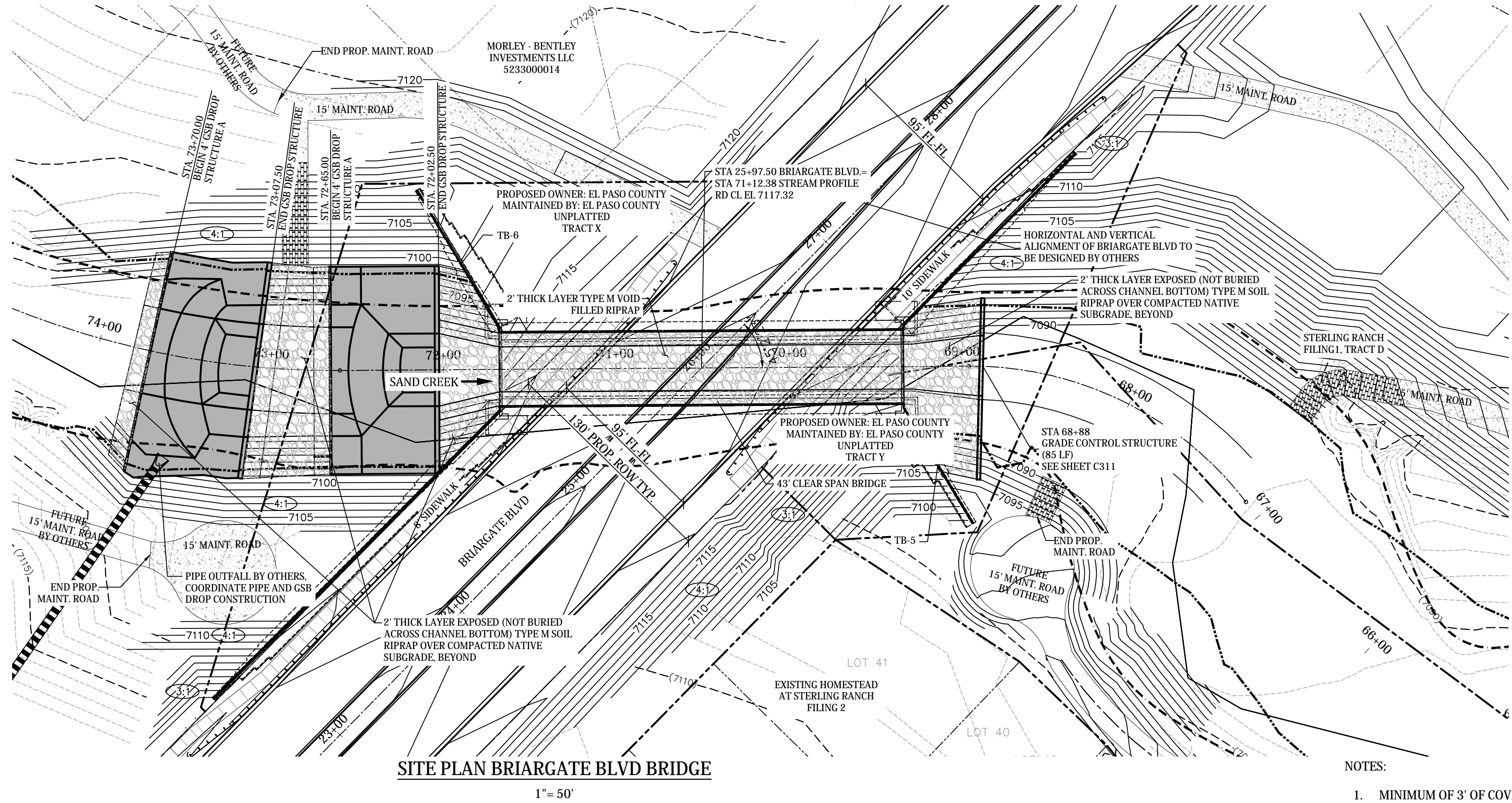
EPC 8/9/22

TEST BORING NO. 5 DATE DRILLED 7/13/2021 JOB # 211647	TEST BORING NO. 6 DATE DRILLED 7/13/2021 CLIENT C&C LAND LOCATION BRIARGATE BRIDGE
REMARKS	REMARKS
SURFACE ELEV. = 7096.5 WATER @ 1.5' 7/20/21 SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, GRAY BROWN, DENSE, VERY MOIST	SURFACE ELEV. = 7105.5 WATER @ 3.5' 7/20/21 SAND, SILTY, BROWN
Depth (ft) 5 10 15 20 Symbol Blows per foot 47 50 50 50 Watercontent % 16.5 11.5 16.0 5.2 Soil Type 1 2 3 2	Depth (ft) 5 10 15 20 Symbol Blows per foot 50 50 50 50 Watercontent % 13.2 14.3 16.6 10.8 Soil Type 2 3 3 2
SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, GRAY BROWN, DENSE TO VERY DENSE, VERY MOIST	SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
SILTSTONE, SANDY, GRAY BROWN, HARD, MOIST	SILTSTONE, SANDY, GRAY BROWN, HARD, MOIST
SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, GRAY BROWN, DENSE, VERY MOIST	SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST

ENTECH
ENGINEERING, INC.
555 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG
DRAWN: DATE: CHECKED: DATE: 7/23/24

JOB NO: 211647
FIG NO: A-1



Kiowa
Engineering Corporation
1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 630-7342

STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION DRAWINGS
PLAN AND PROFILE
EL PASO COUNTY, COLORADO

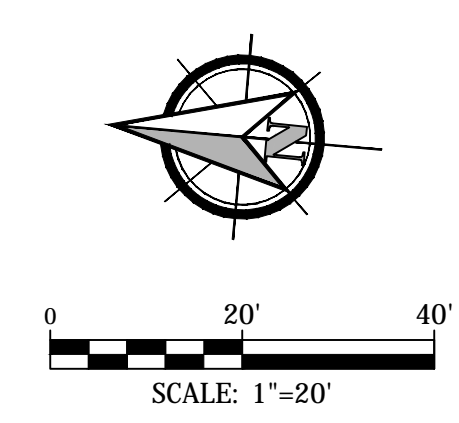
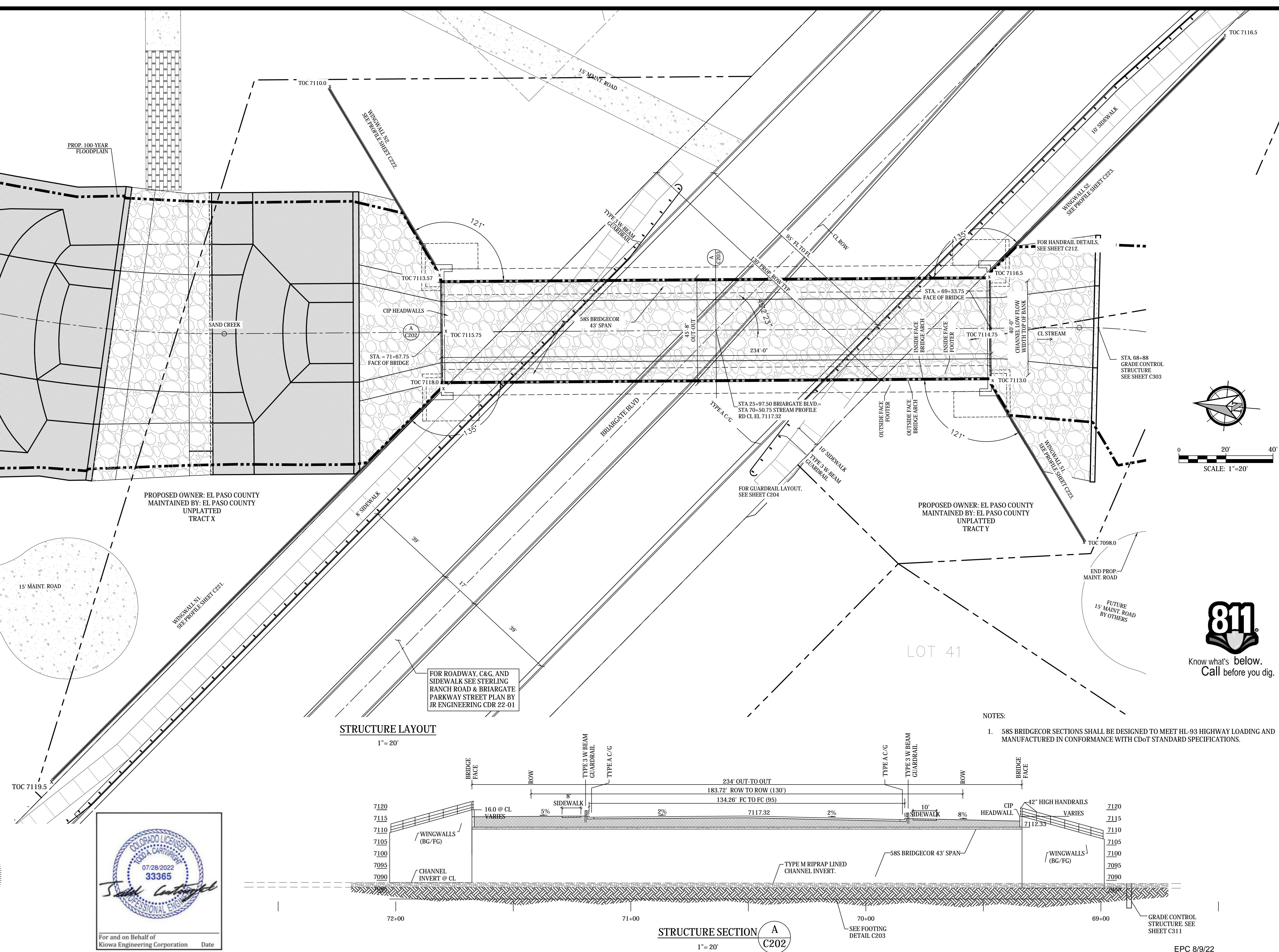
Project No.: 19032
Date: 7/14/22
Design: TAC
Drawn: PAV
Check:
Revisions: AS BUILT
5/12/2025

C201

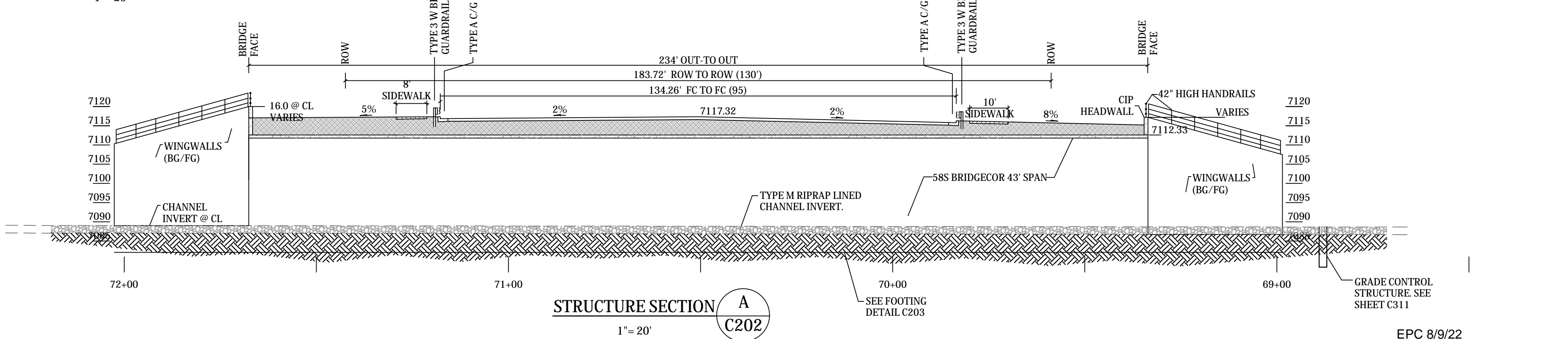
STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION DRAWINGS
STRUCTURE LAYOUT
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/14/22
Design:	TAC
Drawn:	PAV
Check:	
Revisions:	AS BUILT
	5/12/2025

C202



STRUCTURE LAYOUT
1" = 20'



STRUCTURE SECTION
1" = 20'

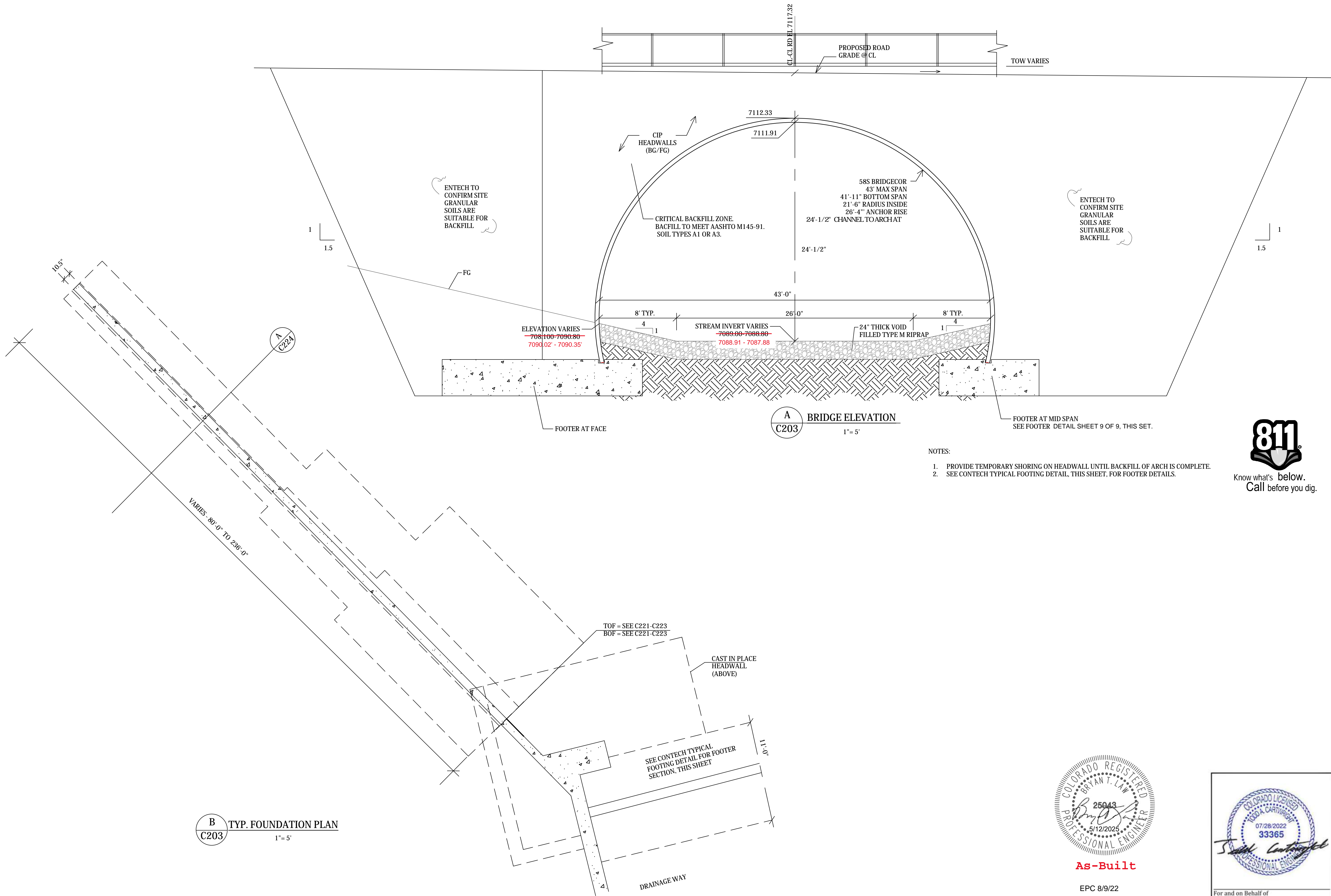
- NOTES:
- 58S BRIDGECOR SECTIONS SHALL BE DESIGNED TO MEET HL-93 HIGHWAY LOADING AND MANUFACTURED IN CONFORMANCE WITH CDOT STANDARD SPECIFICATIONS.



As-Built



For and on Behalf of
Kiowa Engineering Corporation Date



- NOTES:
1. PROVIDE TEMPORARY SHORING ON HEADWALL UNTIL BACKFILL OF ARCH IS COMPLETE.
 2. SEE CONTECH TYPICAL FOOTING DETAIL, THIS SHEET, FOR FOOTER DETAILS.



As-Built

EPC 8/9/22

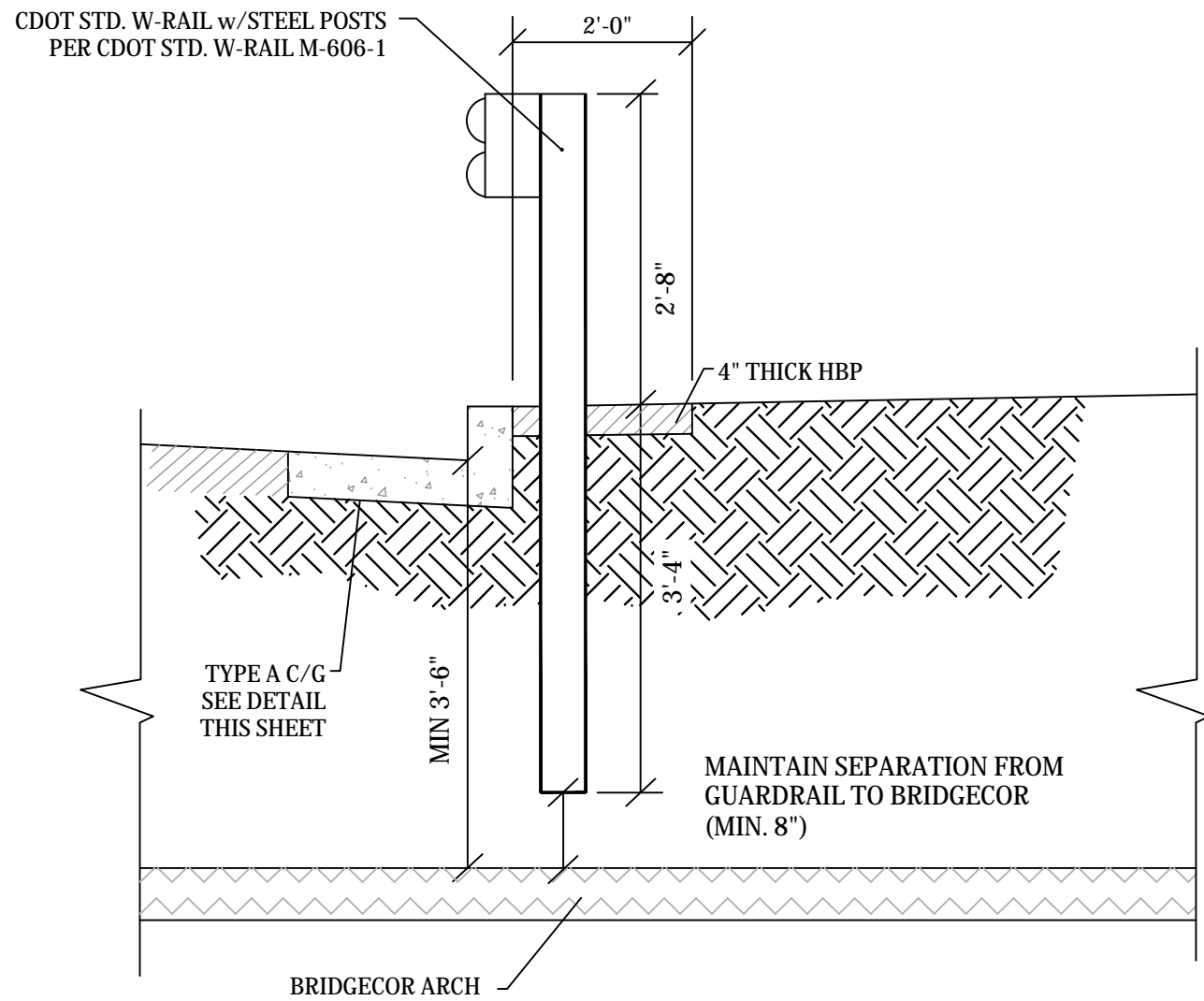


For and on Behalf of
Kiowa Engineering Corporation Date

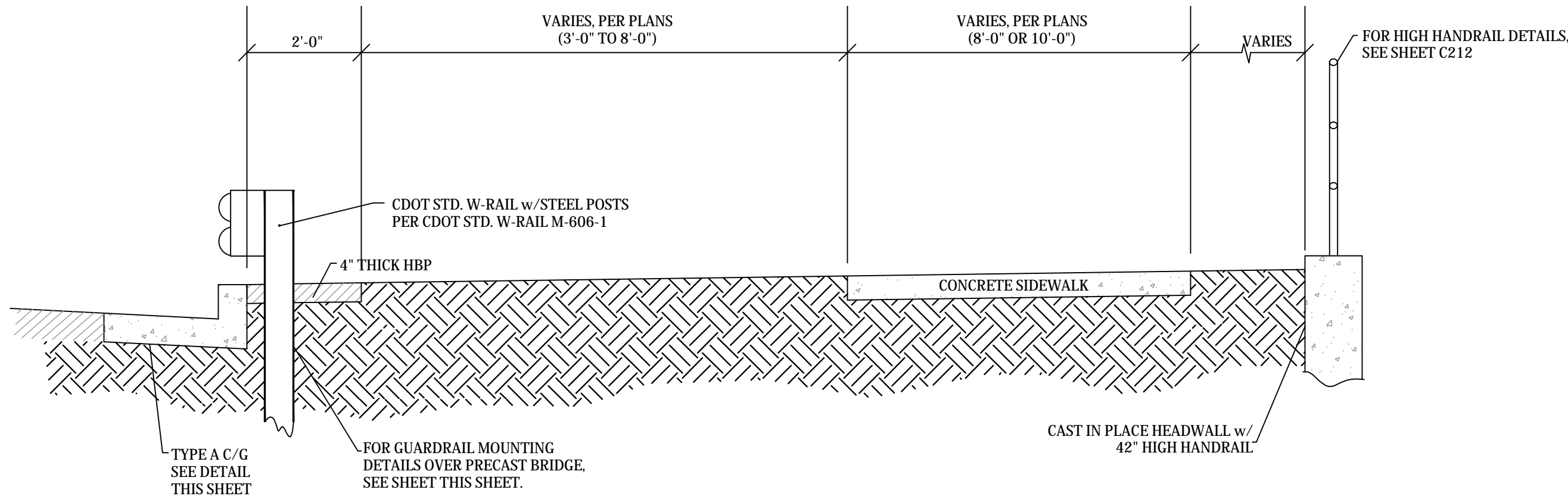
STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION DRAWINGS
BRIDGE DETAILS
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/14/22
Design:	TAC
Drawn:	PAV
Check:	
Revisions:	AS BUILT
	5/12/2025

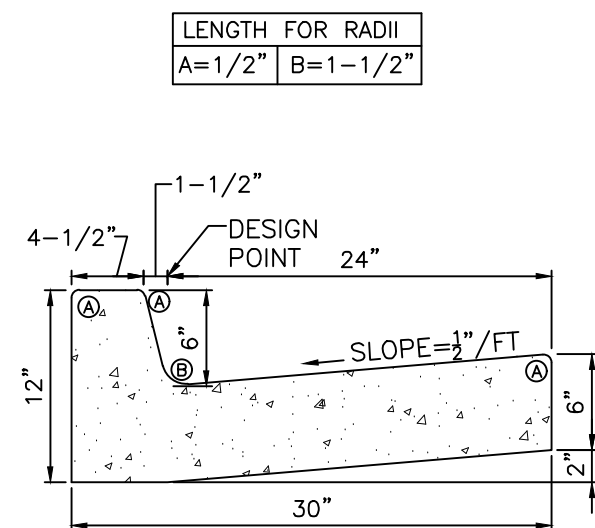
C203



A
C211 **GUARDRAIL MOUNTING DETAILS**
NTS



B
C211 **TYPICAL GUARDRAIL LAYOUT BRIARGATE BLVD**
1" = 2'



C
C211 **EPC TYPE A VERTICAL CURB AND GUTTER**
NTS
EPC STD. SD.2-20

NOTES:

1. GUARDRAIL POST SPACING OVER THE ARCH SECTIONS SHALL BE IN CONFORMANCE WITH CDOT M-606-1.
2. EXPANSION JOINTS SHALL BE PLACED IN THE SIDEWALK AT INTERVALS OF NOT MORE THAN 100 FEET.



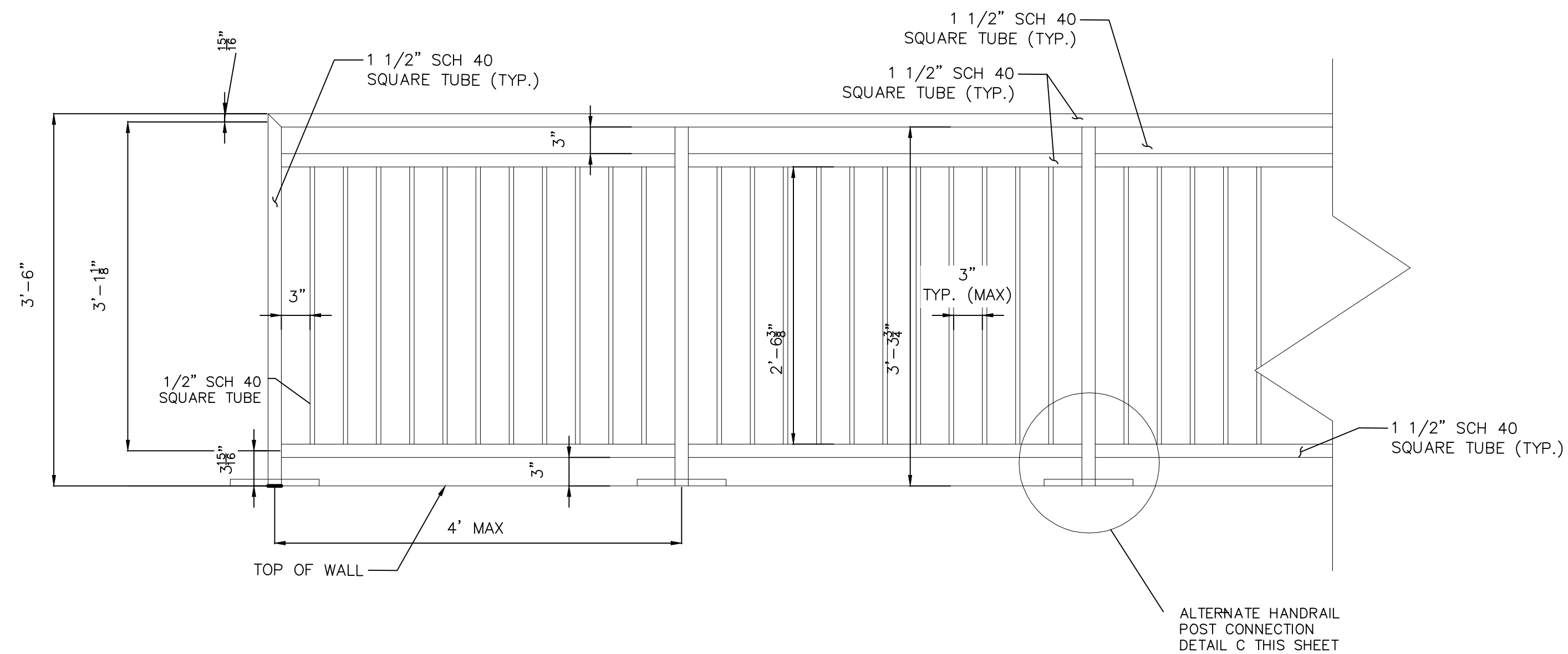
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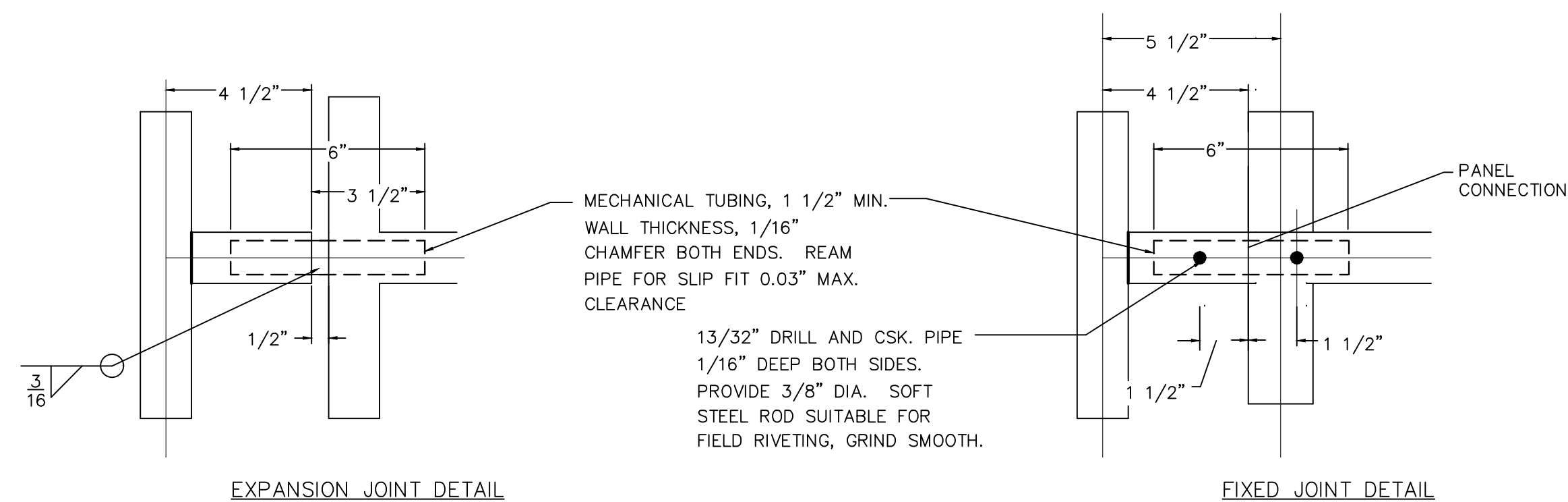
Know what's below.
Call before you dig.

HANDRAIL FINISH SHALL BE ONE COAT METAL PRIMER AND TWO COATS SHERWIN WILLIAMS "BRIDGE GREEN" COLOR, ACROLON 218 HS ACRYLIC POLYURETHANE, SEMI-GLOSS. COLOR SHALL BE VERIFIED BY THE ENGINEER.

BRIDGE GREEN CUSTOM	MANUAL	MATCH
844 COLORANT	OZ 32	64 128
LB-LAMP BLACK	2	16 -
PG-PHTH GREEN	10	- -
TW-WHITE	2	46 -
YO-YELLOW OX	-	50 -
PB-PHTH	-	50 -
4 GALLON KIT	ULTRADEEP	
B65T00654	640335618	

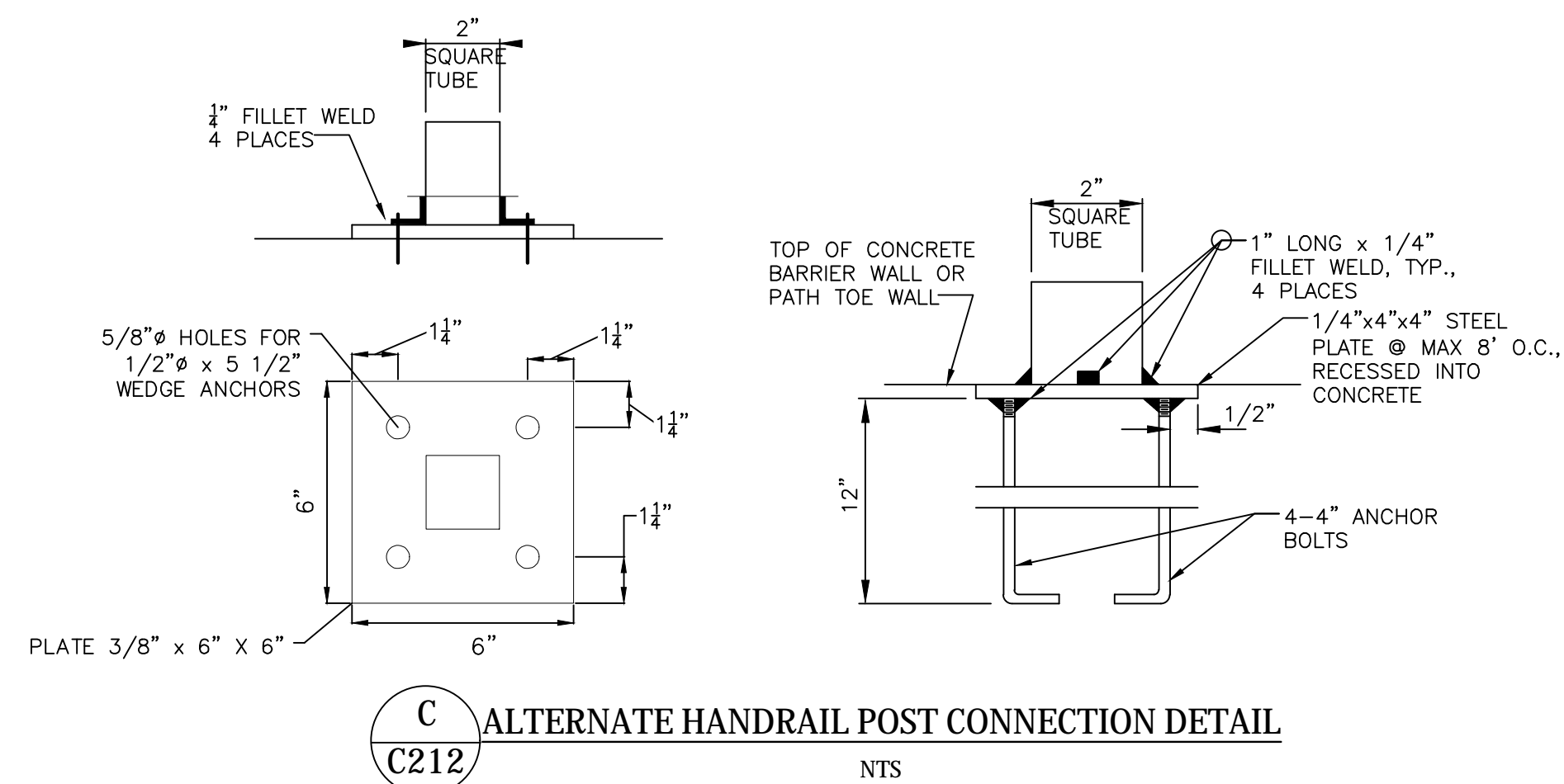


A
C212 **HANDRAIL DETAIL**
NTS



B **HANDRAIL JOINT DETAIL**
C212 NTS

As-Built



Know what's **below**.
Call before you dig.

EPC 8/9/22

19032 Sand Creek at Sterling Ranch/drawings/Const dwg/1-BB/19032 BB 201-223.dwg

EPC FILE NO. CDR 21-013

Kiowa
Engineering Corporation

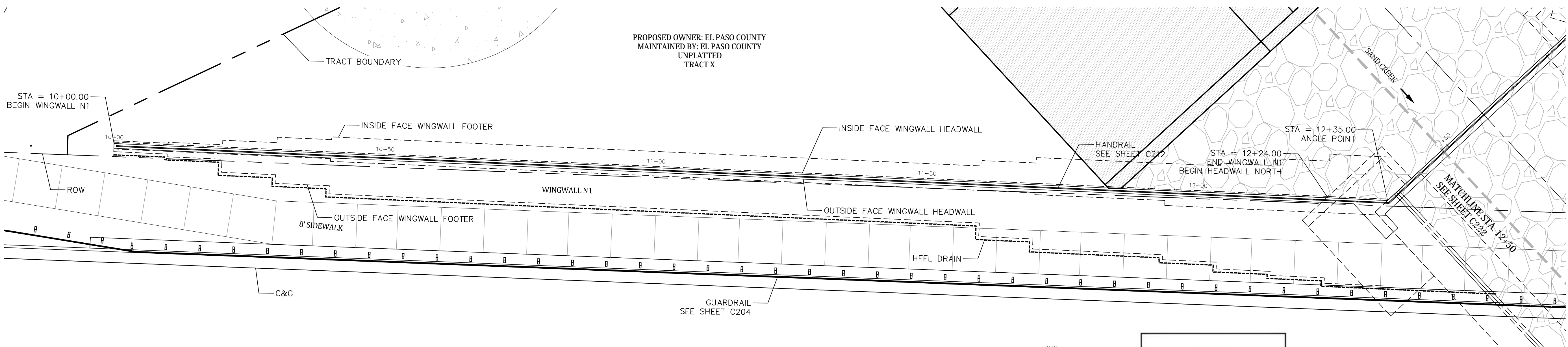
1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 630-7342

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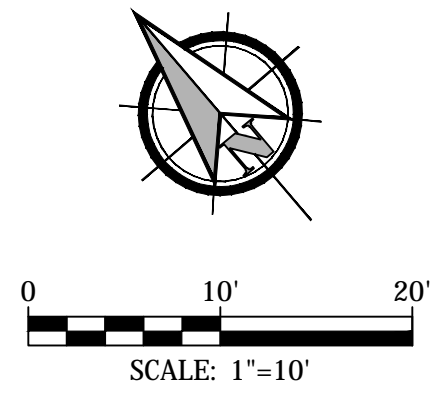
STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION DRAWINGS
HANDRAIL DETAILS
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/14/22
Design:	TAC
Drawn:	PAV
Check:	
Revisions:	AS BUILT
	5/12/2025

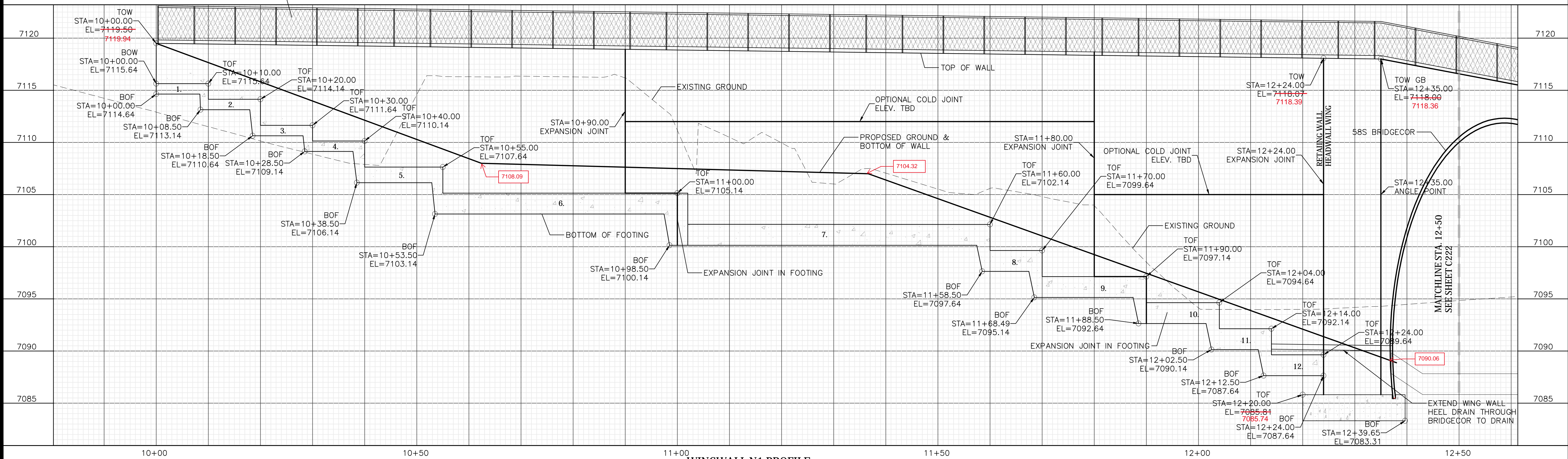
C212



WINGWALL N1 PLAN
1"=10'



- NOTES:
1. MINIMUM OF 3' OF COVER OVER BRIDGE CORE FOR CONSTRUCTION TRAFFIC.
 2. ALL JOINTS ARE EXPANSION JOINTS. HEAD WALL AND RETAINING WALL ARE INDEPENDENT STRUCTURES.

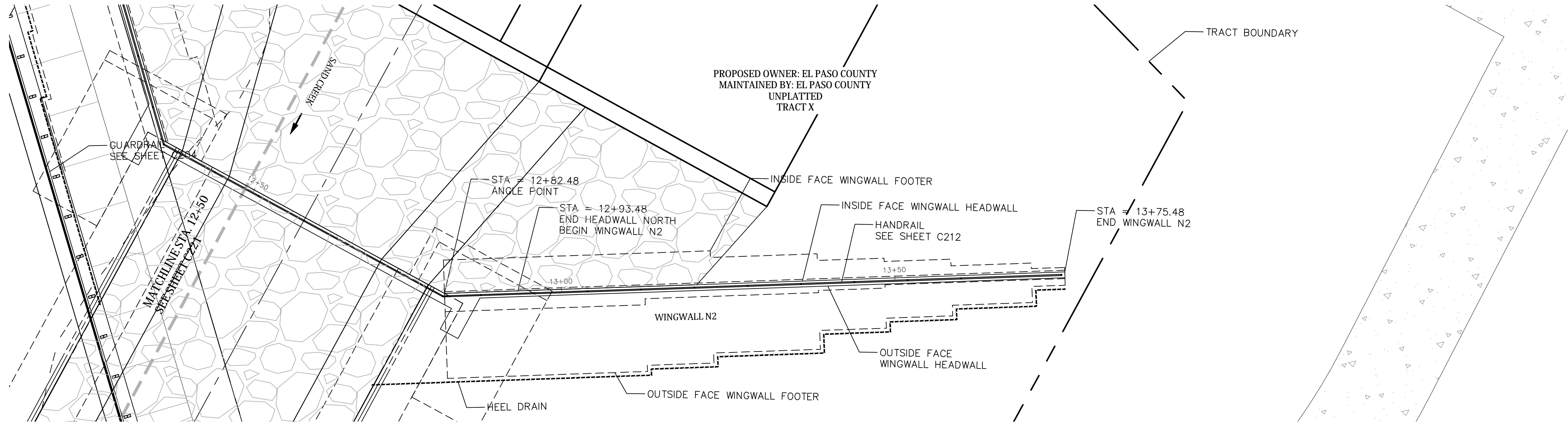


WINGWALL N1 PROFILE

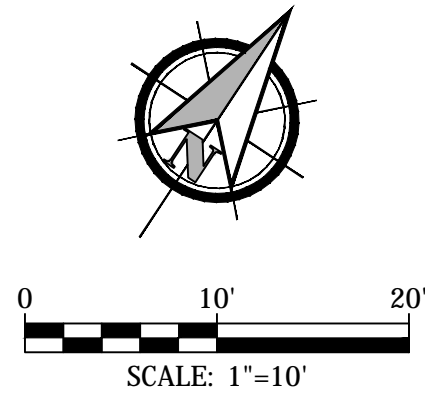
EPC 8/9/22

Project No.:	19032
Date:	7/14/22
Design:	TAC
Drawn:	PAV
Check:	
Revisions:	AS BUILT
	5/12/2025

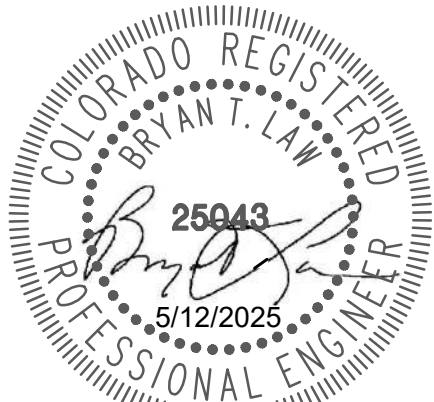
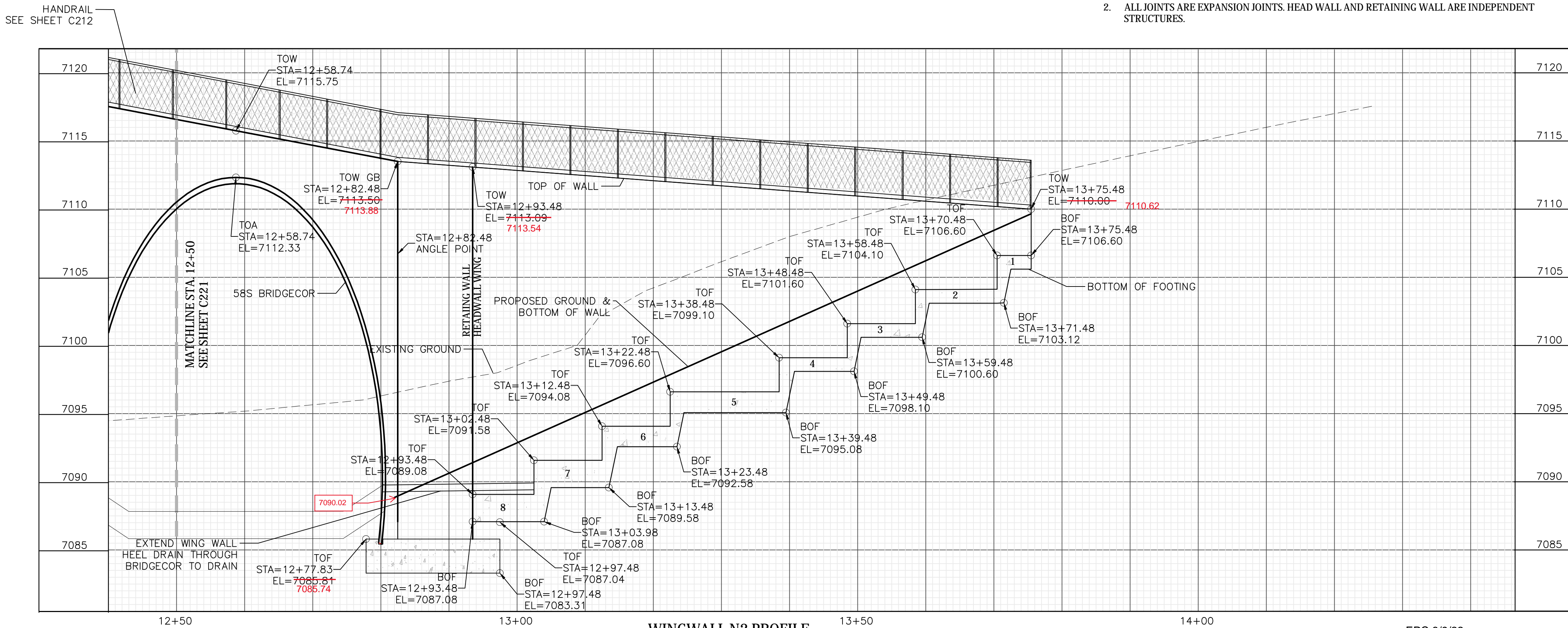
C221



WINGWALL N2 PLAN
1"=10'



- NOTES:
1. MINIMUM OF 3' OF COVER OVER BRIDGE CORE FOR CONSTRUCTION TRAFFIC.
 2. ALL JOINTS ARE EXPANSION JOINTS. HEAD WALL AND RETAINING WALL ARE INDEPENDENT STRUCTURES.

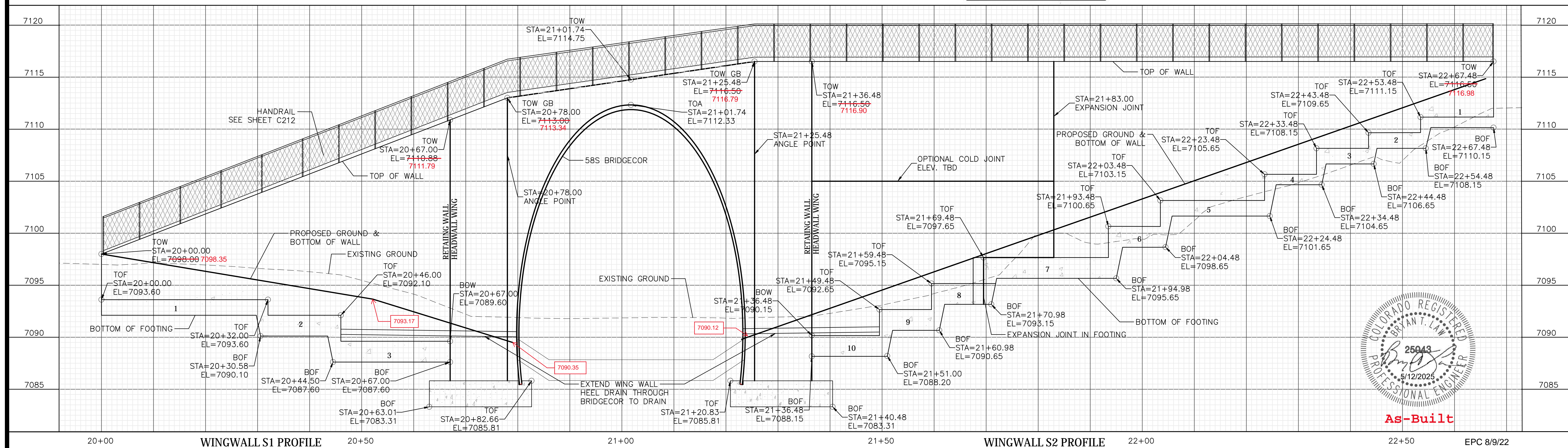
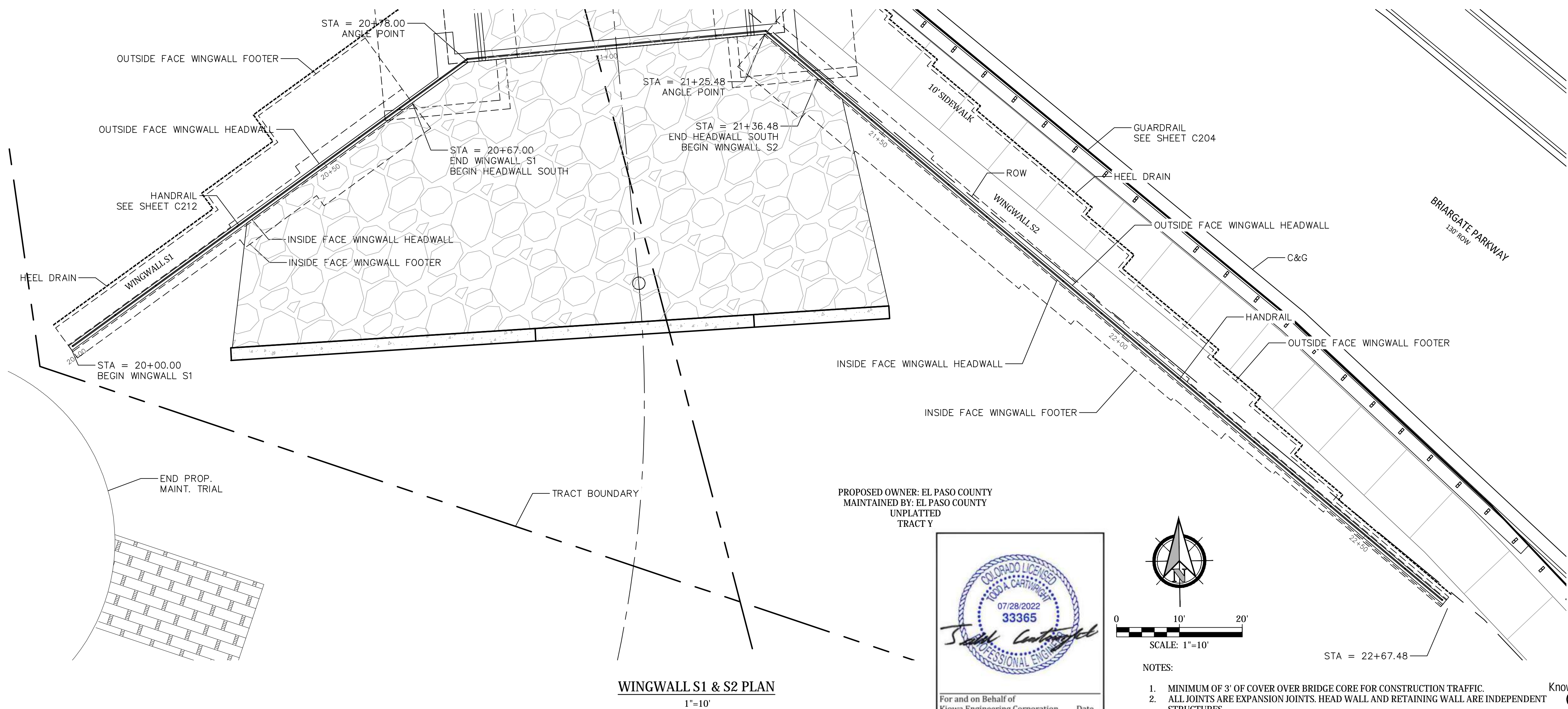


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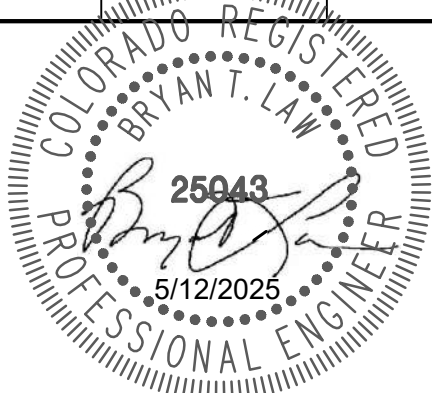
STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION DRAWINGS
WINGWALL PROFILES
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/14/22
Design:	TAC
Drawn:	PAV
Check:	
Revisions:	AS BUILT
	5/12/2025

C222



RETAINING WALL PARAMETERS & REINFORCING SCHEDULE FOR WING WALL N1																							
READ TABLE ALONG w/ DETAIL									SHEAR KEY				FOOTING REINFORCEMENT				WALL REINFORCMENT						
GEOMETRY/ELEVATION AT RETAINING WALL STEPS									DIMENSIONS		REINFORCMENT		CONT. LONG. FT'G REINF'G. (S&T)		TRANSVERSE REINF'G.		VERTICAL DOWELS		VERTICAL REINFORCING		HORIZ. REINFORCING		
TYPE	STATIONS/ TOP OF WALL ELEV.		TOP OF FOOTING ELEV.	AVERAGE HEIGHT, H'	FT'G. SIZE W	FOOTING THICKNESS, D	TOE SIZE A	BASE DIM. B	HEEL SIZE C	WIDTH	DEPTH	LONG.	SHEAR REINF'G	TOP LAYER	BOT. LAYER	TOP LAYER (HEEL)	BOT. LAYER (TOE)	EARTH SIDE	CREEK SIDE	EARTH SIDE	CREEK SIDE	EARTH SIDE	CREEK SIDE
B	STA. 10+00	STA. 10+10	ELEV. =7115.64	3.81'	2'-0"	1'-0"	0'-6"	1'-0"	0'-6"						CONT. 3 - #5's				CONT. #4's @ 18" O.C.			CONT. #4's @ 18" O.C.	
	7119.50	7119.44																					
C	STA. 10+10	STA. 10+20	ELEV. =7114.64	5.21'	3'-6"	1'-0"	1'-2"	1'-0"	1'-6"						CONT. 4 - #5's				CONT. #4's @ 18" O.C.			CONT. #4's @ 18" O.C.	
	7119.44	7119.37																					
D	STA. 10+20	STA. 10+30	ELEV. =7111.64	8.60'	6'-0"	1'-0"	1'-6"	1'-0"	3'-5"					CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.	#5's @ 15" O.C.	#5's @ 15" O.C.		#5's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.	
	7119.37	7119.31																					
E	STA. 10+30	STA. 10+40	ELEV. =7110.14	9.00'	8'-6"	1'-0"	2'-6"	1'-0"	5'-0"					CONT. #4's @ 15" O.C.	CONT. #5's @ 15" O.C.	#5's @ 9" O.C.	#5's @ 12" O.C.		#5's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.	
	7119.31	7119.25																					
F	STA. 10+40	STA. 10+55	ELEV. =7107.64	11.56'	10'-6"	1'-4"	3'-0"	1'-6"	6'-0"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 12" O.C.	CONT. #5's @ 12" O.C.	#6's @ 12" O.C.	#5's @ 12" O.C.		#6's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.	
	7119.25	7119.15																					
G	STA. 10+55	STA. 11+00	ELEV. =7105.14	13.87'	10'-6"	1'-4"	3'-0"	1'-6"	6'-0"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 12" O.C.	CONT. #5's @ 12" O.C.	#6's @ 12" O.C.	#5's @ 12" O.C.		#6's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.	
	7119.15	7118.86																					
H	STA. 11+00	STA. 11+60	ELEV. =7102.14	16.53'	14'-0"	1'-6"	4'-0"	1'-6"	8'-6"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#6's @ 8" O.C.	#6's @ 10" O.C.		#7's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.	
	7118.86	7118.48																					
I	STA. 11+60	STA. 11+70	ELEV. =7099.64	18.13'	16'-10"	1'-6"	5'-0"	1'-10"	10'-0"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#7's @ 8" O.C.	#7's @ 10" O.C.		#9's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.	
	7118.48	7118.42																					
J	STA. 11+70	STA. 11+90	ELEV. =7097.14	20.5'	17'-9"	1'-9"	5'-0"	2'-9"	10'-0"	2'-0"	2'-0"		CONT. 3 - #5 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#8's @ 8" O.C.	#9's @ 10" O.C.		ABOVE SPLICE #8's MATCH BELOW SPLICE EPOXY COATED #9's MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.	
	7118.42	7118.26																					
K	STA. 11+90	STA. 12+04	ELEV. =7094.64	23.61'	19'-6"	2'-0"	5'-6"	2'-9"	11'-3"	2'-0"	2'-0"		CONT. 3 - #5 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#9's @ 8" O.C.	#9's @ 10" O.C.		ABOVE SPLICE #9's @ MATCH BELOW SPLICE EPOXY COATED #9's MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.	
	7118.26	7118.20																					
L	STA. 12+04	STA. 12+14	ELEV. =7092.14	26.04	21'-6"	2'-0"	6'-9"	2'-9"	12'-0"	2'-0"	3'-0"		CONT. 3 - #5 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#9's @ 10" O.C.	#9's @ 10" O.C.		ABOVE SPLICE #10's MATCH BELOW SPLICE EPOXY COATED #11's MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.	
	7118.20	7118.13																					
M	STA. 12+14	STA. 12+24	ELEV. =7089.64	28.44'	23'-9"	2'-9"	8'-0"	2'-9"	13'-0"	2'-0"	3'-0"		CONT. 3 - #5 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#9's @ 8" O.C.	#9's @ 8" O.C.		ABOVE SPLICE #11's MATCH BELOW SPLICE EPOXY COATED #11's MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.	
	7118.13	7118.00																					



As-Built

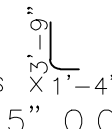
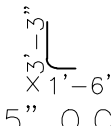
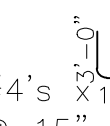
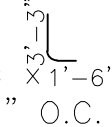
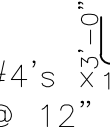
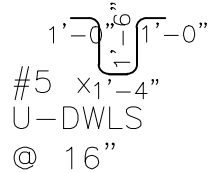
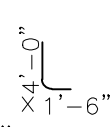
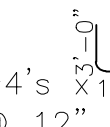
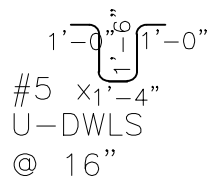
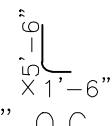
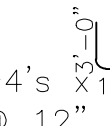
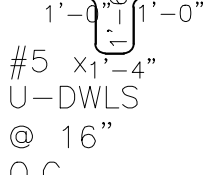
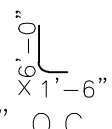
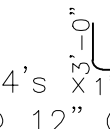
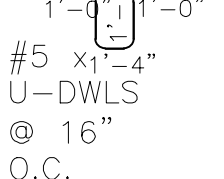
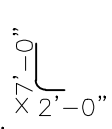
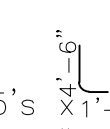
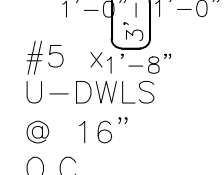
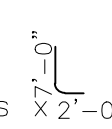
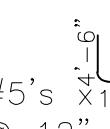


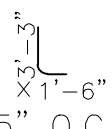
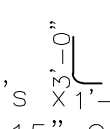
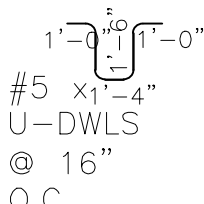
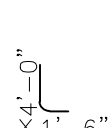
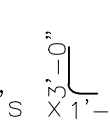
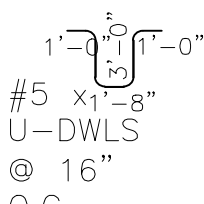
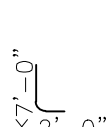
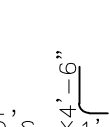
Know what's below.
Call before you dig.

EPC 8/9/22

19032 Sand Creek at Sterling Ranch/drawings/Const dwg/1-BB/19032 BB 201--223.dwg

EPC FILE NO. CDR 21-013

RETAINING WALL PARAMETERS & REINFORCING SCHEDULE FOR WING WALL N2																							
READ TABLE ALONG w/ DETAIL									SHEAR KEY				FOOTING REINFORCEMENT				WALL REINFORCMENT						
GEOMETRY/ELEVATION AT RETAINING WALL STEPS									DIMENSIONS		REINFORCMENT		CONT. LONG. FT'G REINF'G. (S&T)		TRANSVERSE REINF'G.		VERTICAL DOWELS		VERTICAL REINFORCING		HORIZ. REINFORCING		
TYPE	STATIONS/ TOP OF WALL ELEV.		TOP OF FOOTING ELEV.	AVERAGE HEIGHT, H'	FT'G. SIZE W	FOOTING THICKNESS, D	TOE SIZE A	BASE DIM. B	HEEL SIZE C	WIDTH	DEPTH	LONG.	SHEAR REINF'G	TOP LAYER	BOT. LAYER	TOP LAYER (HEEL)	BOT. LAYER (TOE)	EARTH SIDE	CREEK SIDE	EARTH SIDE	CREEK SIDE	EARTH SIDE	CREEK SIDE
A	STA. 13+70.48	STA. 13+75.48	ELEV. =7106.60	3.63'	2'-6"	1'-0"	0'-8"	1'-0"	1'-0"						CONT. 3 - #5's							CONT. #4's @ 18" O.C.	
	7110.19	7110.00																					
B	STA. 13+58.48	STA. 13+70.48	ELEV. =7104.11	6.46'	6'-0"	1'-0"	1'-6"	1'-0"	3'-5"					CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.	#5's @ 15" O.C.	#5's @ 15" O.C.			#5's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.
	7110.64	7110.19																					
C	STA. 13+48.48	STA. 13+58.48	ELEV. =7101.60	9.38'	8'-6"	1'-0"	2'-6"	1'-0"	5'-0"					CONT. #4's @ 15" O.C.	CONT. #5's @ 15" O.C.	#5's @ 9" O.C.	#5's @ 12" O.C.			#5's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.
	7111.00	7110.64																					
D	STA. 13+38.48	STA. 13+48.48	ELEV. =7099.10	12.24'	10'-6"	1'-4"	3'-0"	1'-6"	6'-0"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 12" O.C.	CONT. #5's @ 12" O.C.	#6's @ 12" O.C.	#5's @ 12" O.C.			#6's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.
	7111.39	7111.00																					
E	STA. 13+22.48	STA. 13+38.48	ELEV. =7096.60	15.22'	14'-0"	1'-6"	4'-0"	1'-10"	8'-6"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#6's @ 8" O.C.	#6's @ 10" O.C.			#7's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.
	7111.99	7111.39																					
F	STA. 13+12.48	STA. 13+22.48	ELEV. =7094.08	18.21'	16'-10"	1'-6"	5'-0"	1'-10"	10'-0"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#7's @ 8" O.C.	#7's @ 10" O.C.			#9's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.
	7112.37	7111.99																					
G	STA. 13+02.48	STA. 13+12.48	ELEV. =7091.58	20.98'	17'-9"	1'-9"	5'-0"	2'-9"	10'-0"	2'-0"	2'-0"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#8's @ 8" O.C.	#9's @ 10" O.C.			ABOVE SPLICE #8's MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.
	7112.75	7112.37																					
H	STA. 12+93.48	STA. 13+02.48	ELEV. =7089.08	23.84'	19'-6"	2'-0"	5'-6"	2'-9"	11'-3"	2'-0"	2'-0"		CONT. 3 - #5 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#9's @ 8" O.C.	#9's @ 10" O.C.			ABOVE SPLICE #9's @ MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.
	7113.09	7113.50																					

RETAINING WALL PARAMETERS & REINFORCING SCHEDULE FOR WING WALL S1																							
READ TABLE ALONG w/ DETAIL									SHEAR KEY				FOOTING REINFORCEMENT				WALL REINFORCMENT						
GEOMETRY/ELEVATION AT RETAINING WALL STEPS									DIMENSIONS		REINFORCMENT		CONT. LONG. FT'G REINF'G. (S&T)		TRANSVERSE REINF'G.		VERTICAL DOWELS		VERTICAL REINFORCING		HORIZ. REINFORCING		
TYPE	STATIONS/ TOP OF WALL ELEV.		TOP OF FOOTING ELEV.	AVERAGE HEIGHT, H'	FT'G. SIZE W	FOOTING THICKNESS, D	TOE SIZE A	BASE DIM. B	HEEL SIZE C	WIDTH	DEPTH	LONG.	SHEAR REINF'G	TOP LAYER	BOT. LAYER	TOP LAYER (HEEL)	BOT. LAYER (TOE)	EARTH SIDE	CREEK SIDE	EARTH SIDE	CREEK SIDE	EARTH SIDE	CREEK SIDE
A	STA. 20+00	STA. 20+32	ELEV. =7093.60	6.92'	6'-0"	1'-0"	1'-6"	1'-0"	3'-5"					CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.	#5's @ 15" O.C.	#5's @ 15" O.C.			#5's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.
	7098.00	7104.00																					
B	STA. 20+32	STA. 20+46	ELEV. =7092.10	13.21'	10'-6"	1'-4"	3'-0"	1'-6"	6'-0"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 12" O.C.	CONT. #5's @ 12" O.C.	#6's @ 12" O.C.	#5's @ 12" O.C.			#6's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.
	7104.00	7106.63																					
C	STA. 20+46	STA. 20+67	ELEV. =7089.60	20.21'	17'-9"	1'-9"	5'-0"	2'-9"	10'-0"	2'-0"	2'-0"		CONT. 3 - #5 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#8's @ 8" O.C.	#9's @ 10" O.C.			ABOVE SPLICE #8's MATCH BELOW SPLICE EPOXY COATED #9's MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.
	7106.63	7113.00																					

1

2

3

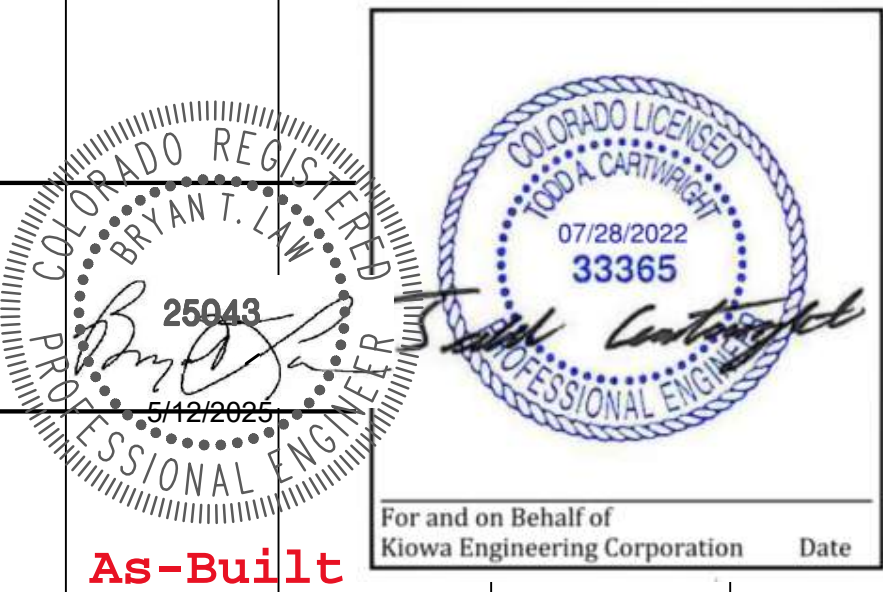
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EPC 8/9/22

Kiowa

Engineering Corporation

1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 630-7342

STERLING RANCH DEVELOPMENT

BRIARGATE BOULEVARD BRIDGE CONSTRUCTION DRAWINGS

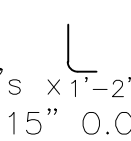
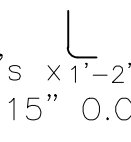
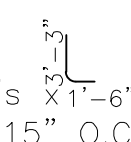
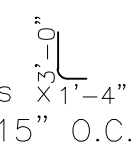
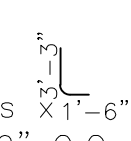
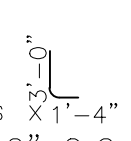
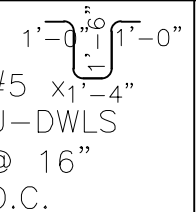
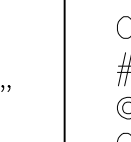
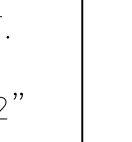
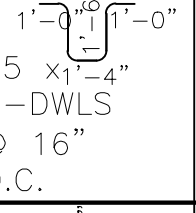
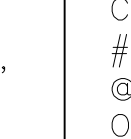
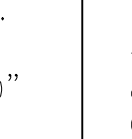
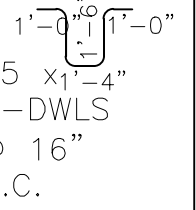
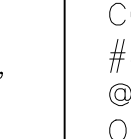
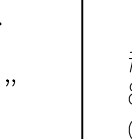
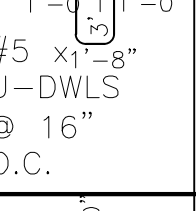

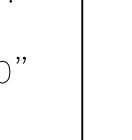
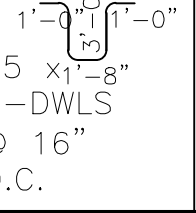
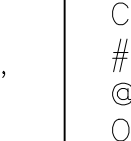
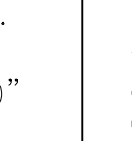
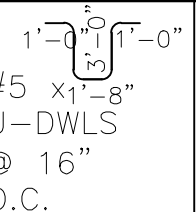

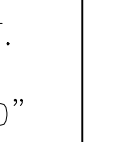
WINGWALL TABLE

EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/14/22
Design:	TAC
Drawn:	PAV
Check:	
Revisions:	AS BUILT
	5/12/2025

C226

As-Built

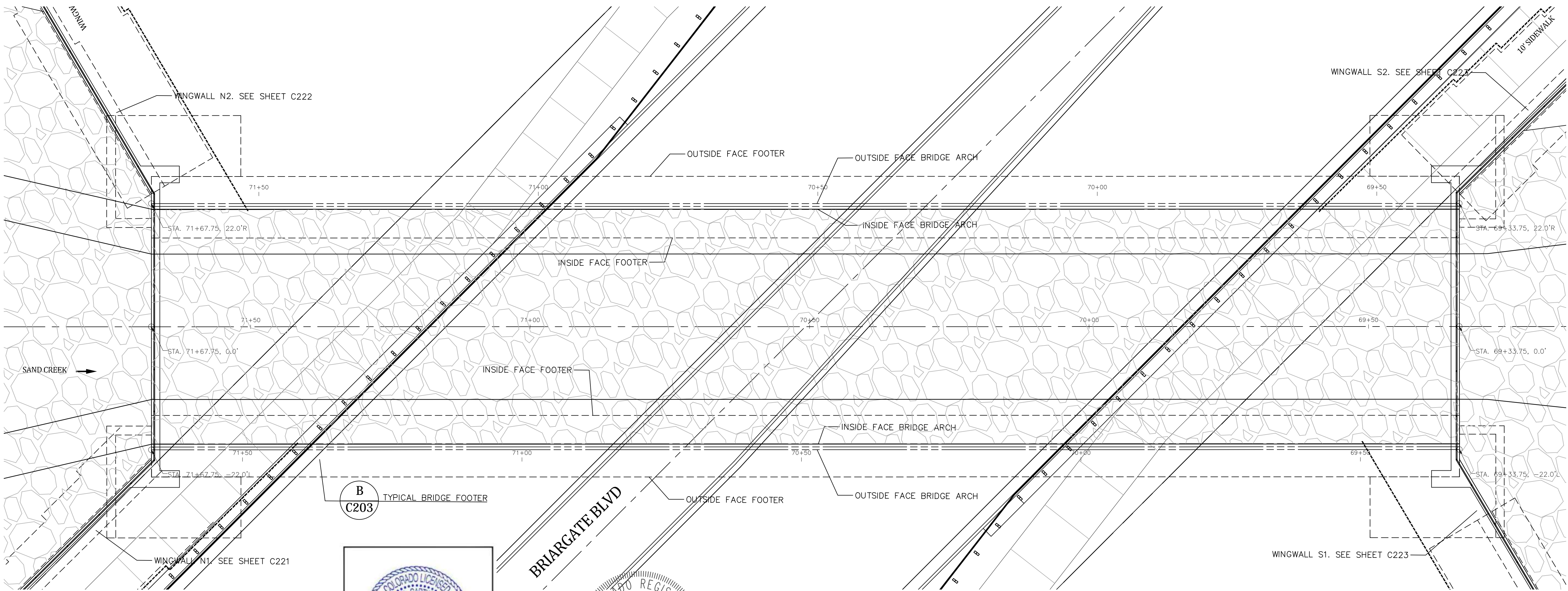
RETAINING WALL PARAMETERS & REINFORCING SCHEDULE FOR WING WALL S2																							
READ TABLE ALONG w/ DETAIL									SHEAR KEY				FOOTING REINFORCEMENT				WALL REINFORCMENT						
GEOMETRY/ELEVATION AT RETAINING WALL STEPS									DIMENSIONS		REINFORCMENT		CONT. LONG. FT'G REINF'G. (S&T)		TRANSVERSE REINF'G.		VERTICAL DOWELS		VERTICAL REINFORCING		HORIZ. REINFORCING		
TYPE	STATIONS/ TOP OF WALL ELEV.		TOP OF FOOTING ELEV.	AVERAGE HEIGHT, H'	FT'G. SIZE W	FOOTING THICKNESS, D	TOE SIZE A	BASE DIM. B	HEEL SIZE C	WIDTH	DEPTH	LONG.	SHEAR REINF'G	TOP LAYER	BOT. LAYER	TOP LAYER (HEEL)	BOT. LAYER (TOE)	EARTH SIDE	CREEK SIDE	EARTH SIDE	CREEK SIDE	EARTH SIDE	CREEK SIDE
A	STA. 22+53.48	STA. 22+67.48	ELEV. =7111.15	4.44'	2'-0"	1'-0"	0'-6"	1'-0"	0'-6"						CONT. 3 - #5's				CONT. #4's @ 18" O.C.			CONT. #4's @ 18" O.C.	
	7116.5	7116.5																					
B	STA. 22+43.48	STA. 22+53.48	ELEV. =7109.65	6.00'	3'-6"	1'-0"	1'-0"	1'-0'	1'-6"						CONT. 3 - #5's				CONT. #4's @ 18" O.C.			CONT. #4's @ 18" O.C.	
	7116.5	7116.5																					
C	STA. 22+33.48	STA. 22+43.48	ELEV. =7108.14	7.61'	6'-0"	1'-0"	1'-6"	1'-0"	3'-5"					CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.	#5's @ 15" O.C.	#5's @ 15" O.C.			#5's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.
	7116.5	7116.5																					
D	STA. 22+23.48	STA. 22+33.48	ELEV. =7105.64	10.21'	8'-6"	1'-0"	2'-6"	1'-0"	5'-0"					CONT. #4's @ 15" O.C.	CONT. #5's @ 15" O.C.	#5's @ 9" O.C.	#5's @ 12" O.C.			#5's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 18" O.C.	CONT. #4's @ 18" O.C.
	7116.5	7116.5																					
E	STA. 22+03.48	STA. 22+23.48	ELEV. =7103.13	12.82'	10'-6"	1'-4"	3'-0"	1'-6"	6'-0"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 12" O.C.	CONT. #5's @ 12" O.C.	#6's @ 12" O.C.	#5's @ 12" O.C.			#6's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.
	7116.5	7116.5																					
F	STA. 21+93.48	STA. 22+03.48	ELEV. =7100.63	15.39'	14'-0"	1'-6"	4'-0"	1'-10"	8'-6"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#6's @ 8" O.C.	#6's @ 10" O.C.			#7's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.
	7116.5	7116.5																					
G	STA. 21+69.48	STA. 21+93.48	ELEV. =7097.64	18.49	16'-10"	1'-6"	5'-0"	1'-10"	10'-0"	1'-6"	1'-6"		CONT. 3 - #4 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#7's @ 8" O.C.	#7's @ 10" O.C.			#9's FULL HT. MATCH DOWEL SPACING	#4's FULL HT. MATCH DOWEL SPACING	CONT. #4's @ 15" O.C.	CONT. #4's @ 15" O.C.
	7116.5	7116.5																					
H	STA. 21+59.48	STA. 21+69.48	ELEV. =7095.14	21.10'	17'-9"	1'-9"	5'-0"	2'-9"	10'-0"	2'-0"	2'-0"		CONT. 3 - #5 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#8's @ 8" O.C.	#9's @ 10" O.C.			ABOVE SPLICE #8's MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.
	7116.5	7116.5																					
J	STA. 21+49.48	STA. 21+59.48	ELEV. =7092.64	23.66'	19'-6"	2'-0"	5'-6"	2'-9"	11'-3"	2'-0"	2'-0"		CONT. 3 - #5 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#9's @ 8" O.C.	#9's @ 10" O.C.			ABOVE SPLICE #9's @ MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.
	7116.5	7116.5																					
K	STA. 21+36.48	STA. 21+49.48	ELEV. =7090.15	26.28	21'-6"	2'-0"	6'-9"	2'-9"	12'-0"	2'-0"	3'-0"		CONT. 3 - #5 TOP & BOT.	CONT. #5's @ 10" O.C.	CONT. #5's @ 10" O.C.	#9's @ 10" O.C.	#9's @ 10" O.C.			ABOVE SPLICE #10's MATCH	FULL HEIGHT #5's @ 12" O.C.	CONT. #5's @ 15" O.C.	CONT. #5's @ 15" O.C.
	7116.5	7116.5																					



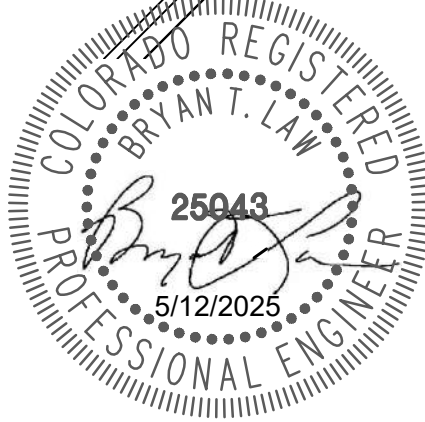
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Call before you dig.
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B
C203
TYPICAL BRIDGE FOOTER

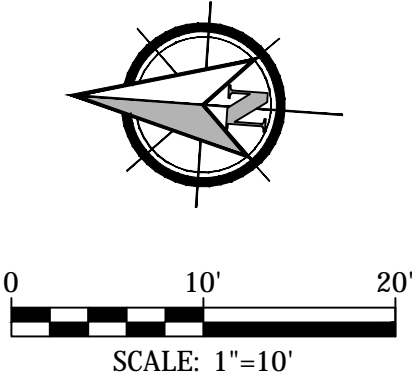


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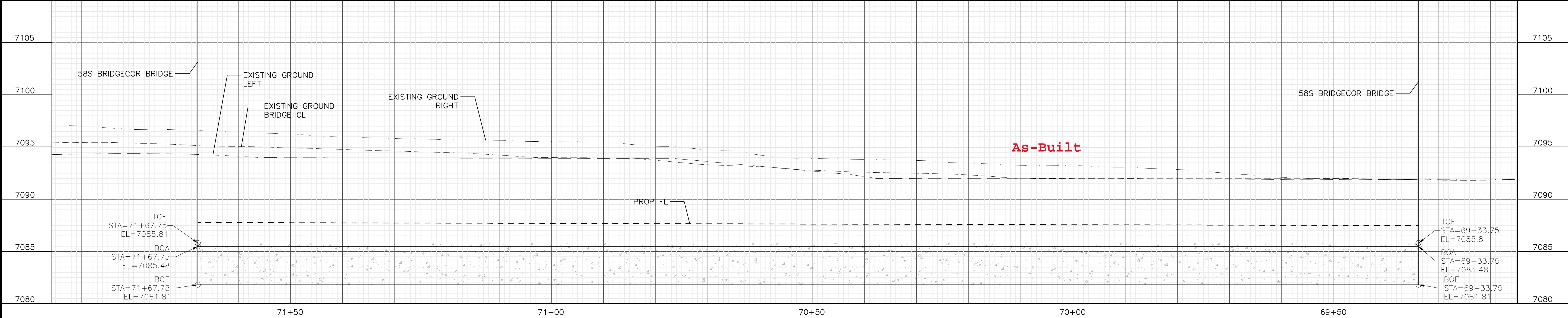
BRIDGE PLAN
1"=10'

NOTES:

1. THE FOOTINGS ARE DESIGNED FOR A FACTORED BEARING RESISTANCE OF 8,700 PSF (ULTIMATE BEARING RESISTANCE OF 14,500 PSF) BASED ON A 0.60 RESISTANCE FACTOR IN ACCORDANCE WITH THE UPDATED RECOMMENDATION BY ENTECH ENGINEERING, INC FOR A MINIMUM PERMANENT FOOTING EMBEDMENT DEPTH OF 5- FEET. A FRICTION FACTOR OF 0.34 HAS ALSO BEEN UTILIZED BASED ON AN ULTIMATE FRICTION COEFFICIENT OF 0.40 AND THE RECOMMENDED SLIDING RESISTANCE FACTOR OF 0.85. THESE SHALL BE VERIFIED IN THE FIELD BEFORE CONSTRUCTION. THE EVALUATION AND DESIGN OF ANY REQUIRED FOUNDATION IMPROVEMENT TO ACHIEVE THE RECOMMENDED FACTORED BEARING RESISTANCE AND FRICTION FACTOR, AND TO PROTECT AGAINST FROST AND SCOUR AND SETTLEMENT, IS THE RESPONSIBILITY OF OTHERS THAN KBW. ALL RECOMMENDATIONS IN THE PROJECT GEOTECHNICAL REPORT SHALL BE FOLLOWED DURING CONSTRUCTION.



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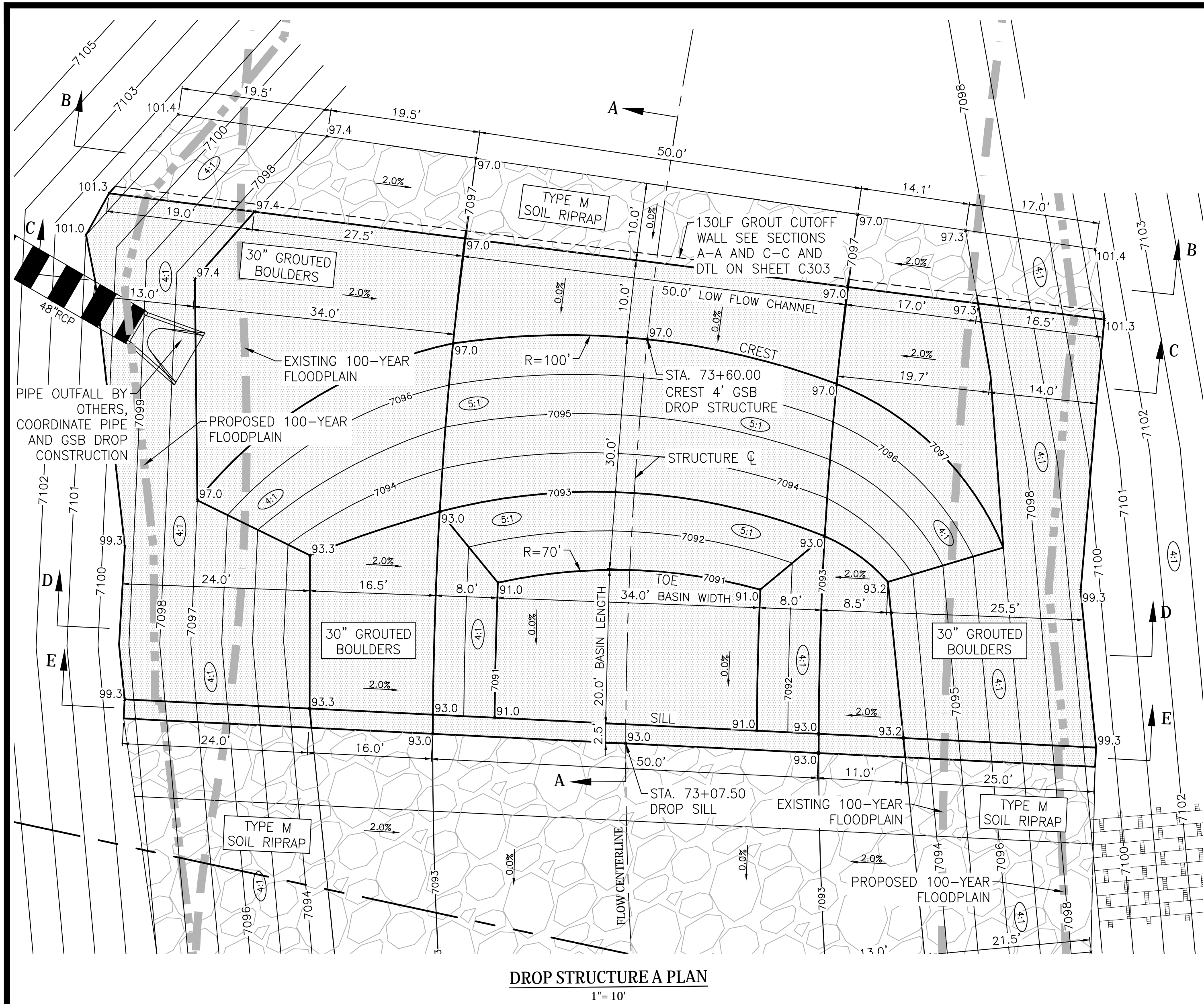
BRIDGE FOOTER PROFILE

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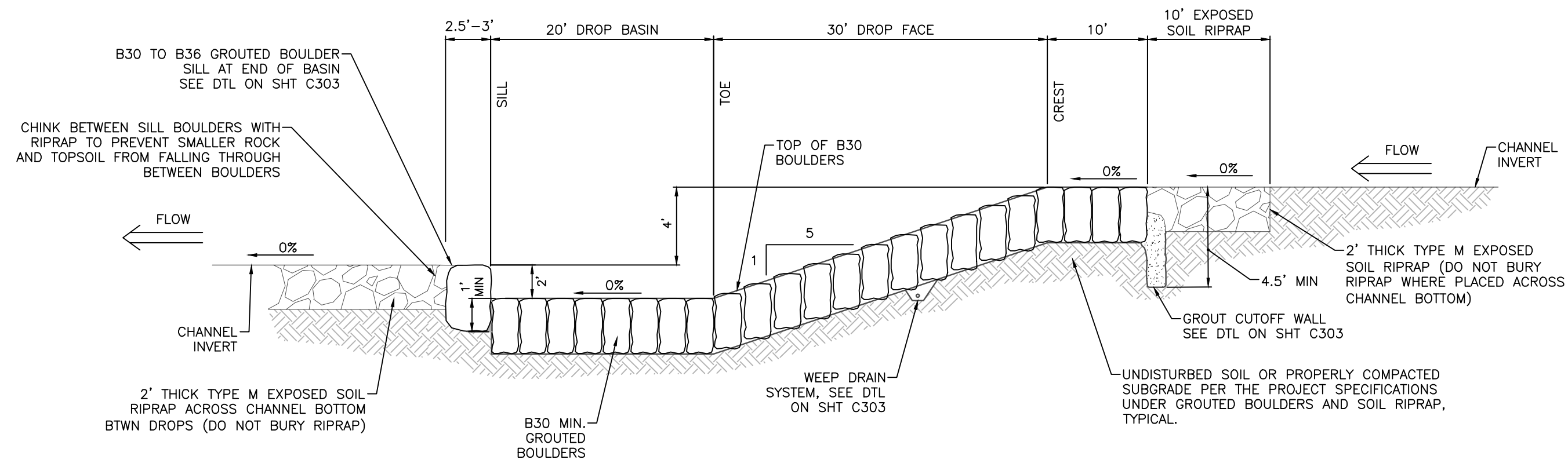
STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION DRAWINGS
BRIDGE FOOTING PROFILE
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/14/22
Design:	TAC
Drawn:	PAV
Check:	
Revisions:	AS BUILT
	5/12/2025

C231

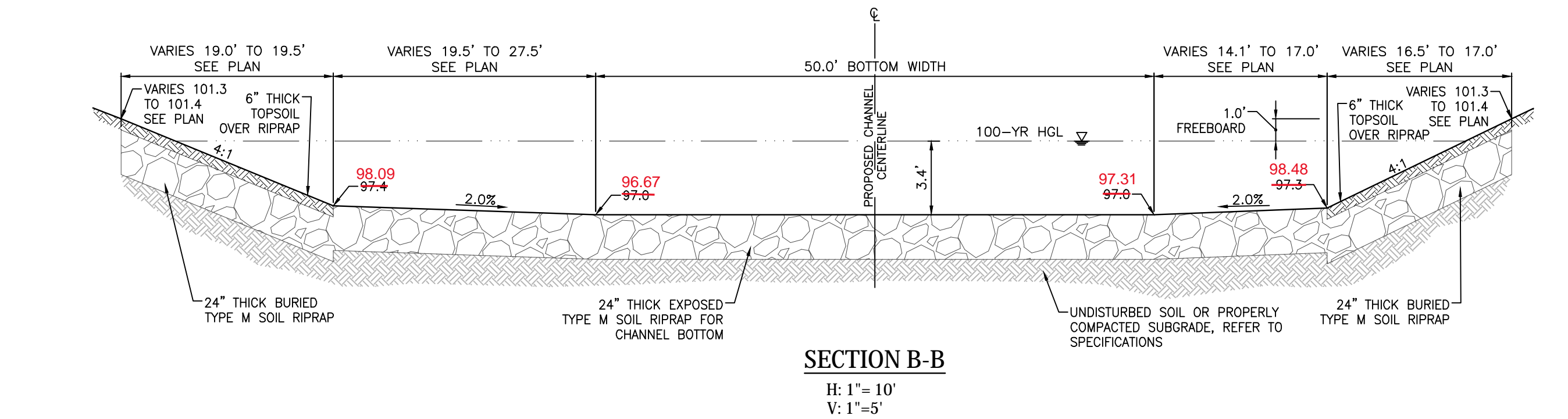


DROP STRUCTURE A PLAN
1"=10'

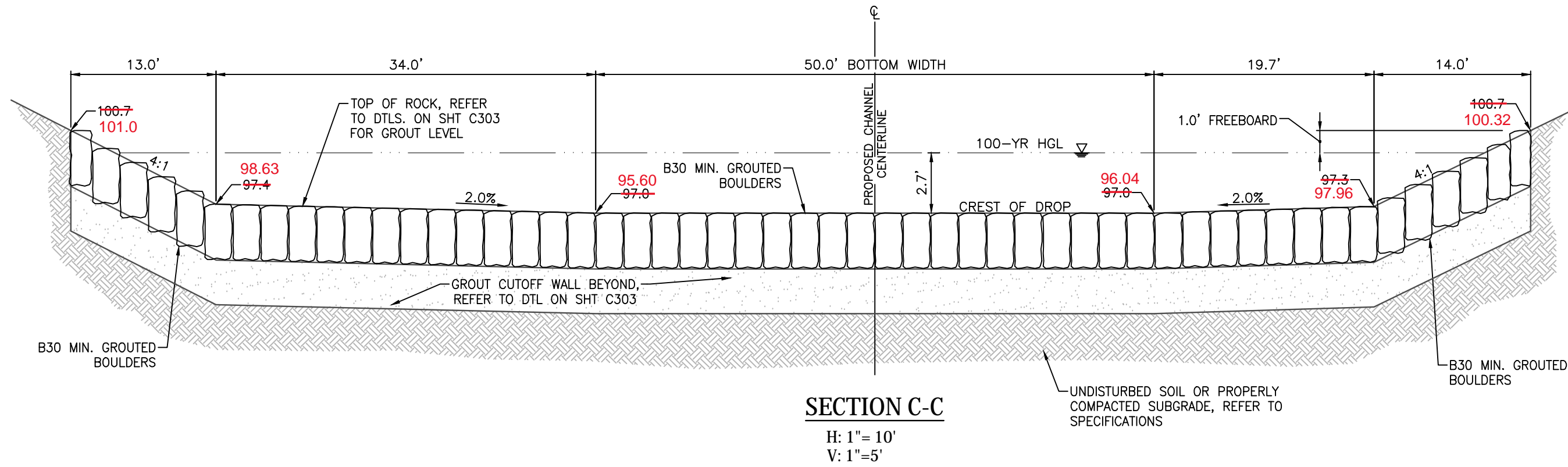


SECTION A-A
H: 1"=10'
V: 1"=5'

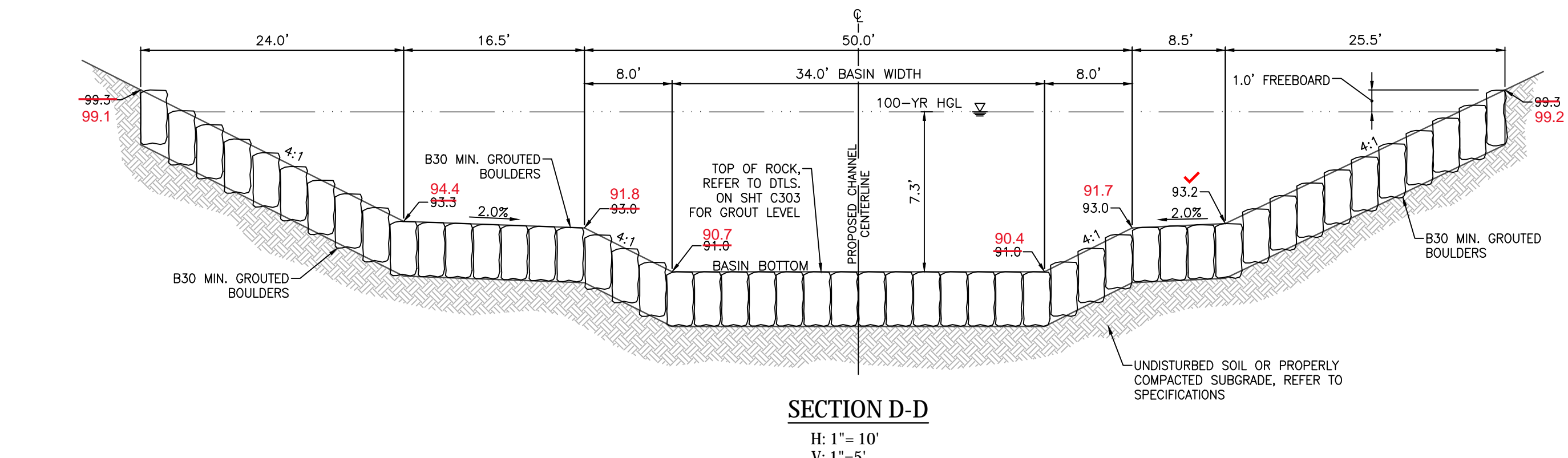
REFER TO OPTIONAL GROUTED BOULDER PLACEMENT DETAIL F ON SHT C303 FOR AREAS WHERE SHALLOW BEDROCK IS ENCOUNTERED.



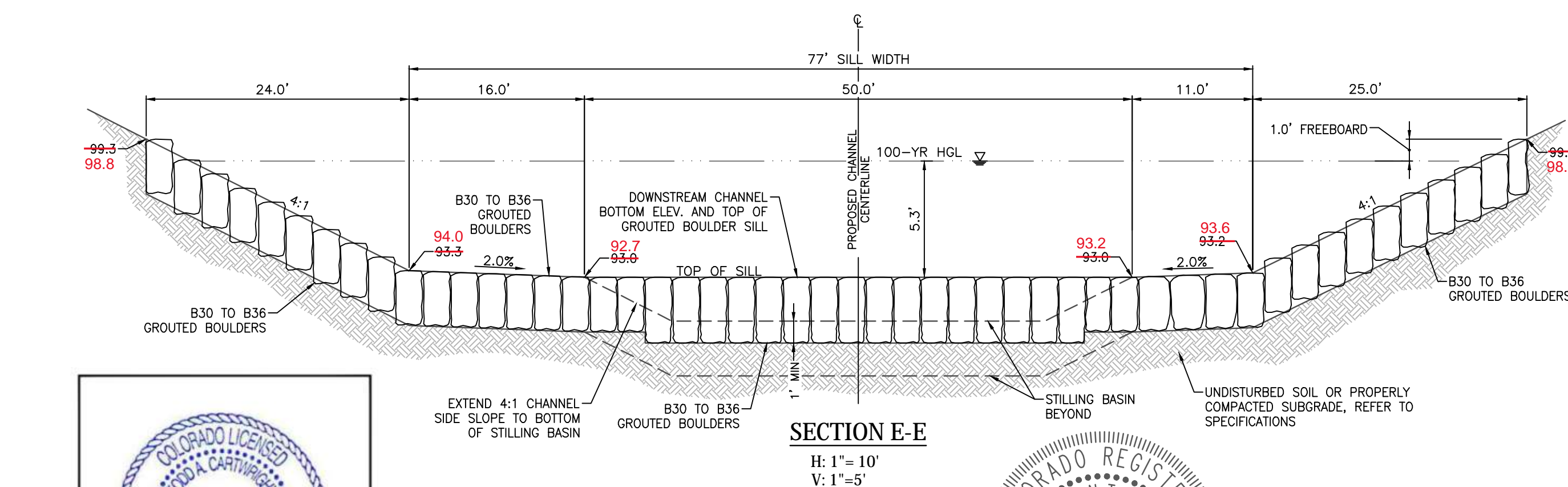
SECTION B-B
H: 1"=10'
V: 1"=5'



SECTION C-C
H: 1"=10'
V: 1"=5'



SECTION D-D
H: 1"=10'
V: 1"=5'



SECTION E-E
H: 1"=10'
V: 1"=5'



As-Built

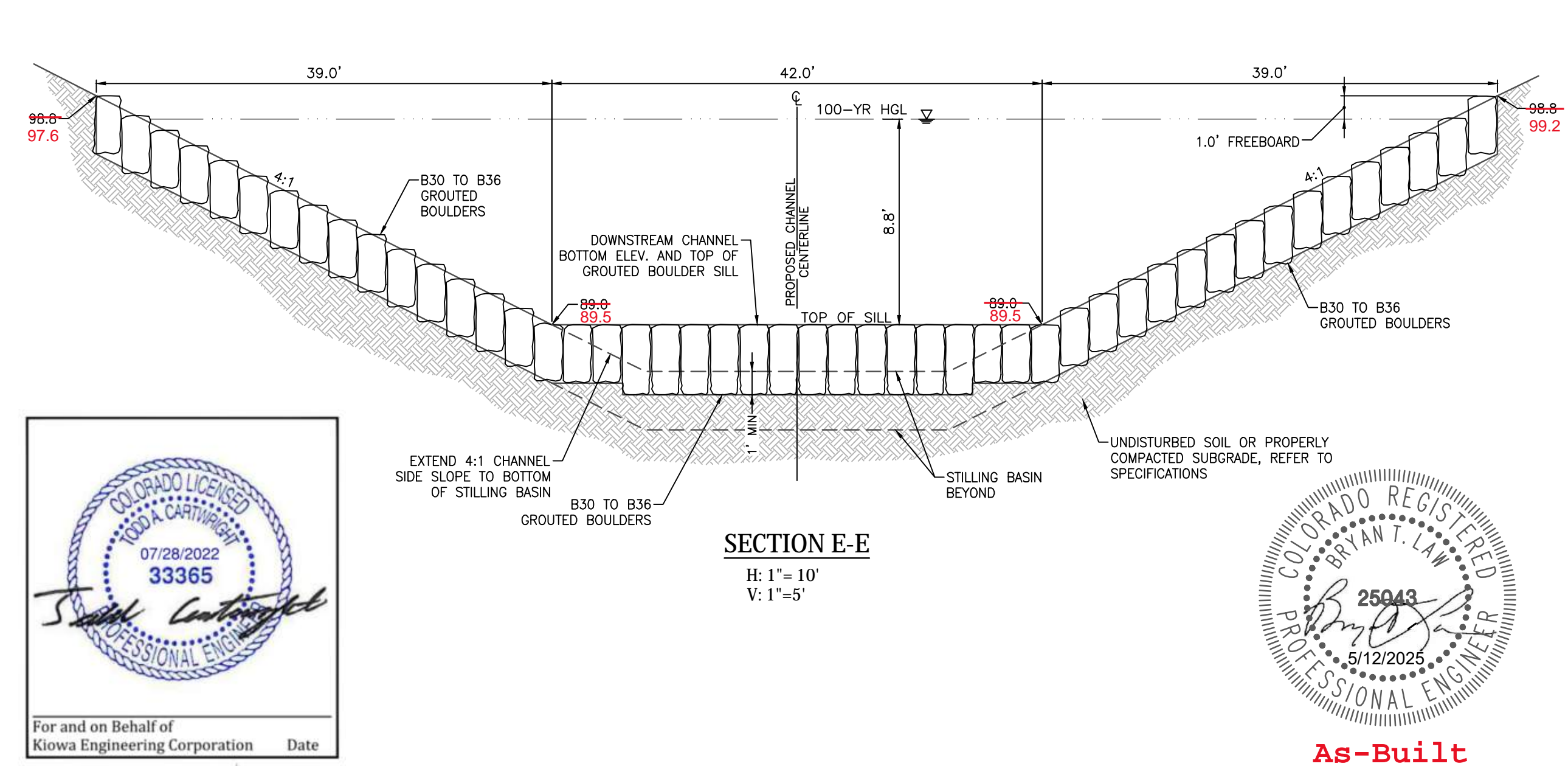
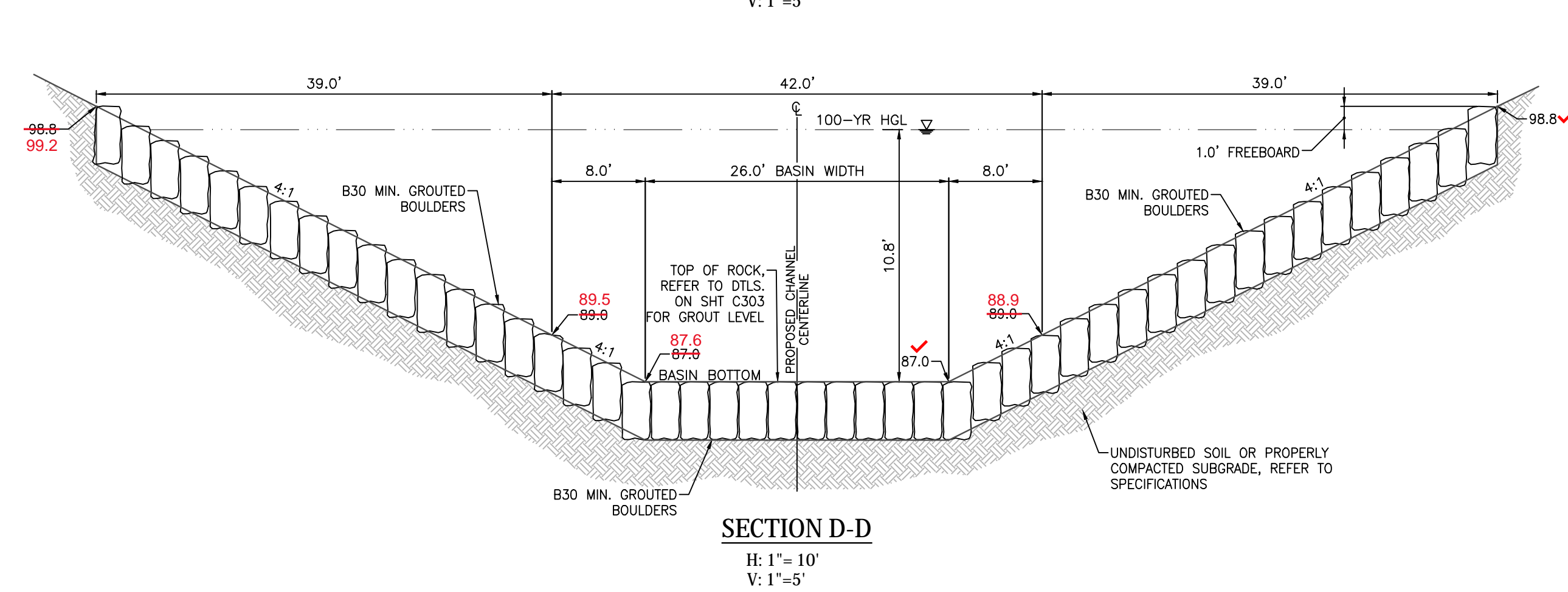
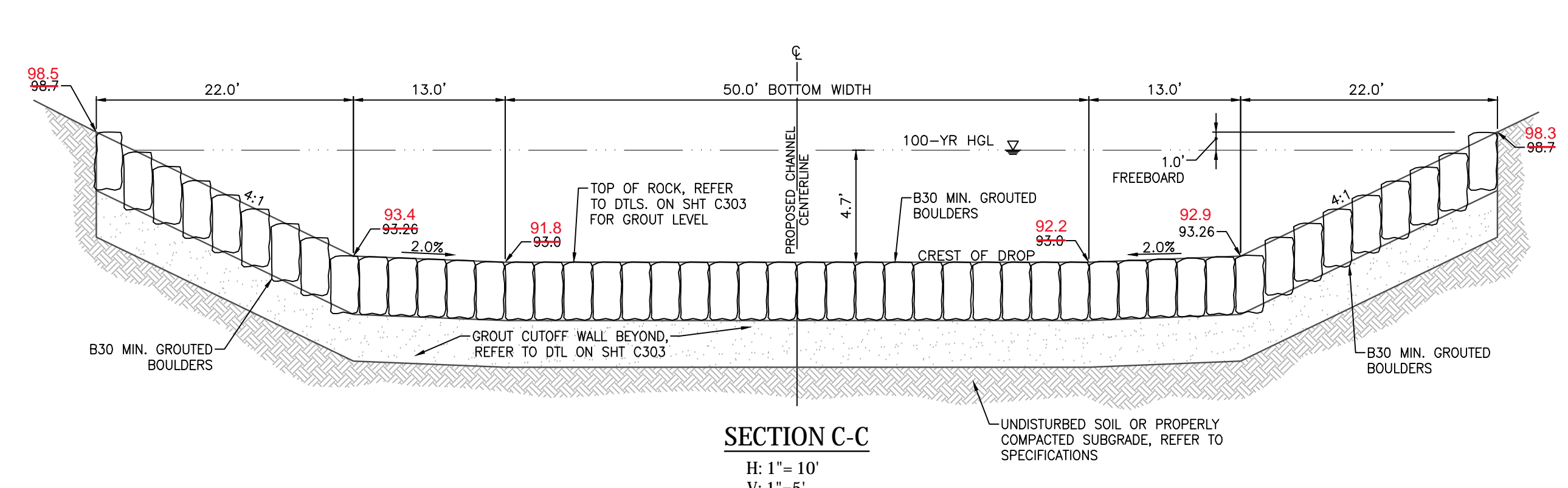
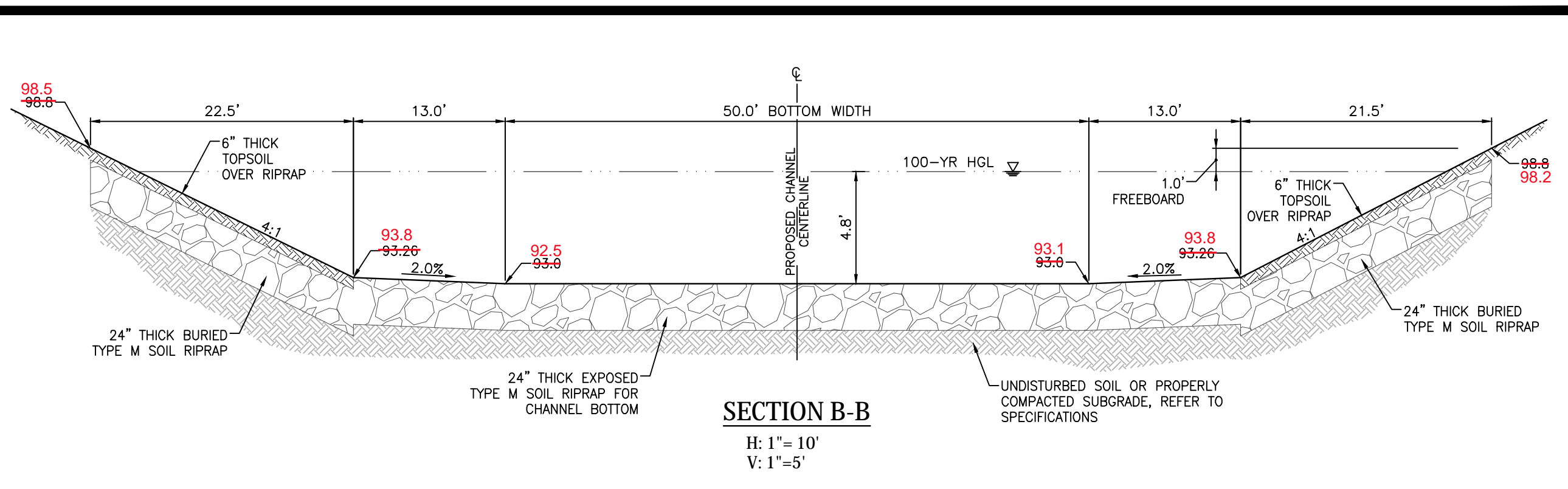
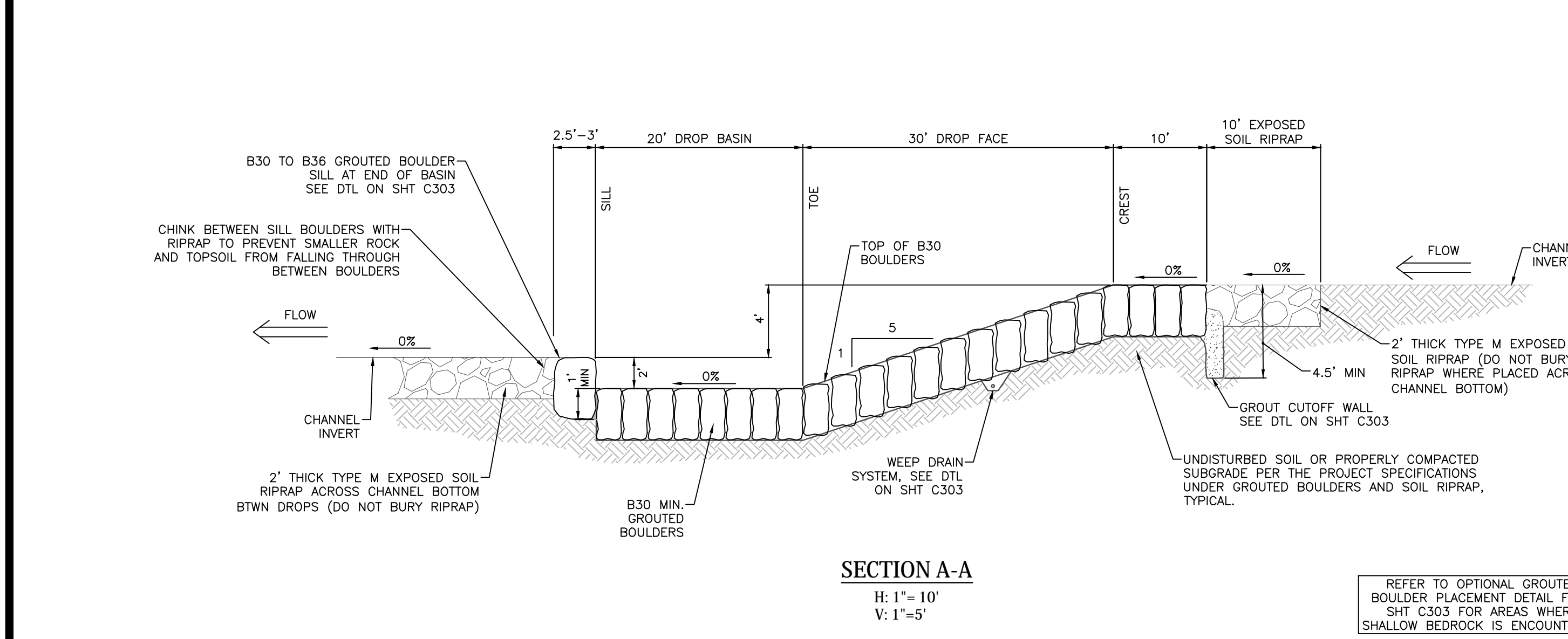
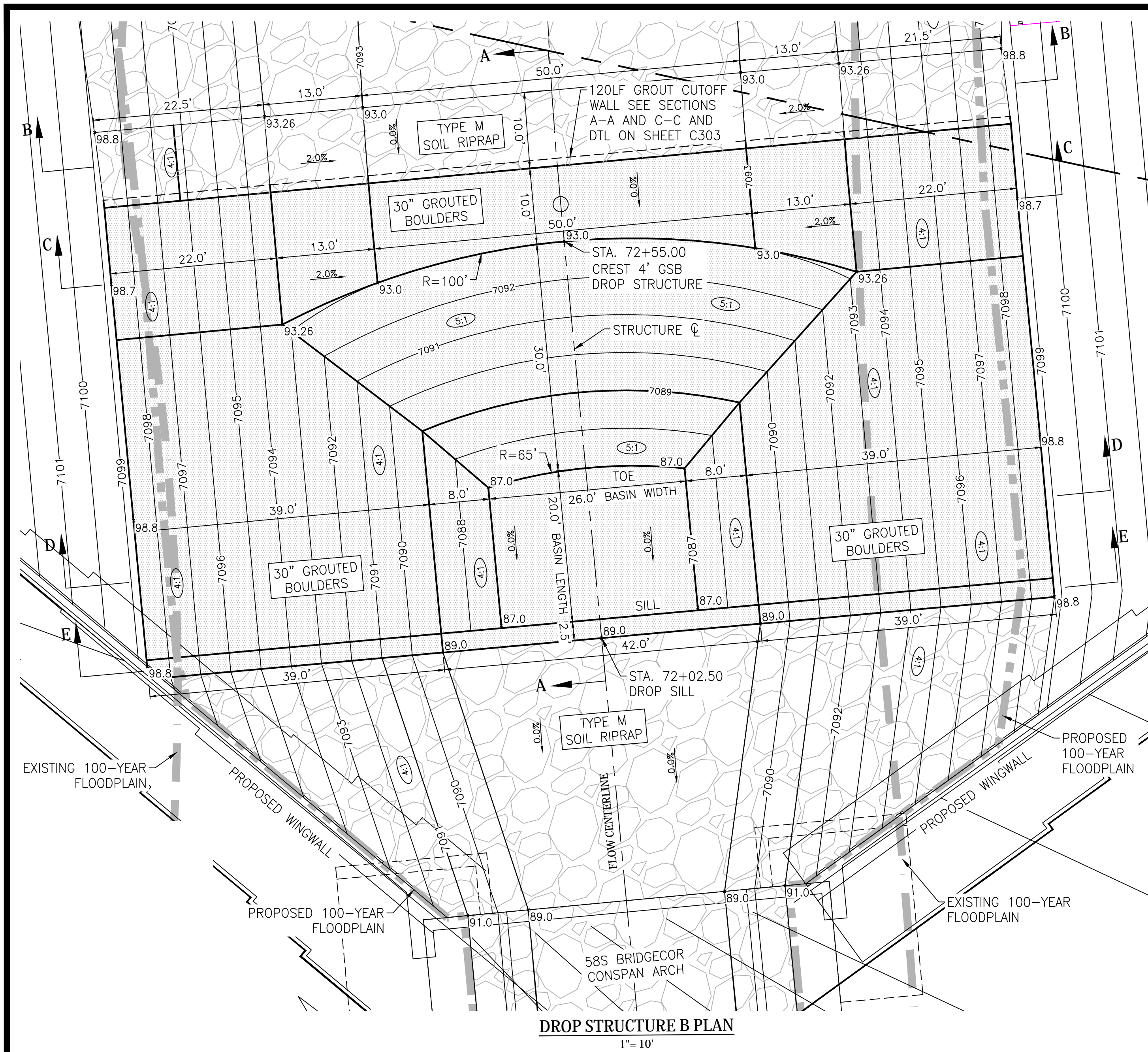
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Kiowa
Engineering Corporation
1404 South 21st Street
Colorado Springs, Colorado 80904
(719) 630-7342

STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION PLANS
DROP STRUCTURE A DETAILS
EL PASO COUNTY, COLORADO

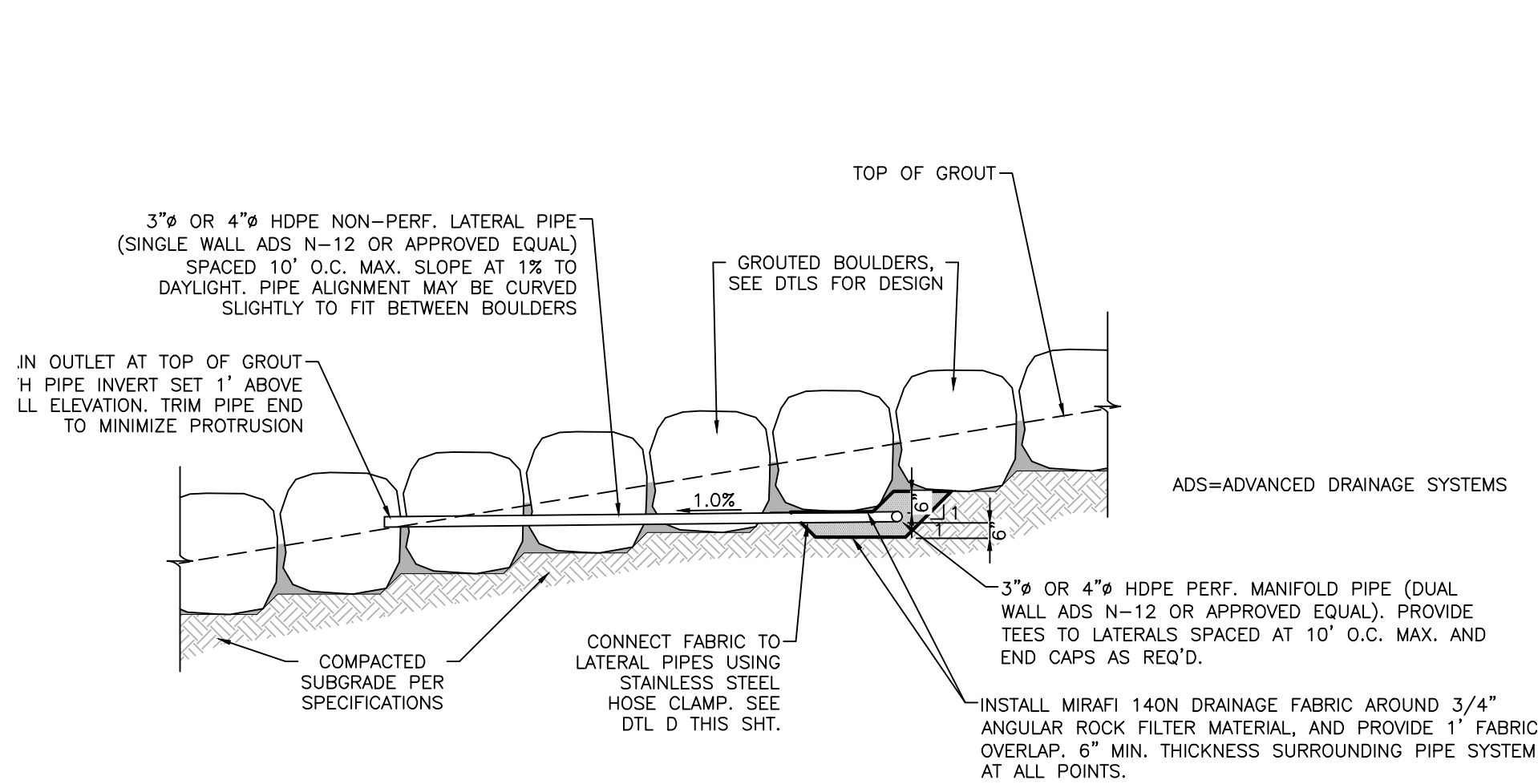
Project No.: 19032
Date: 7/14/22
Design: TAC
Drawn: PAV
Check: **AS BUILT**
Revisions: 5/12/2025

C301

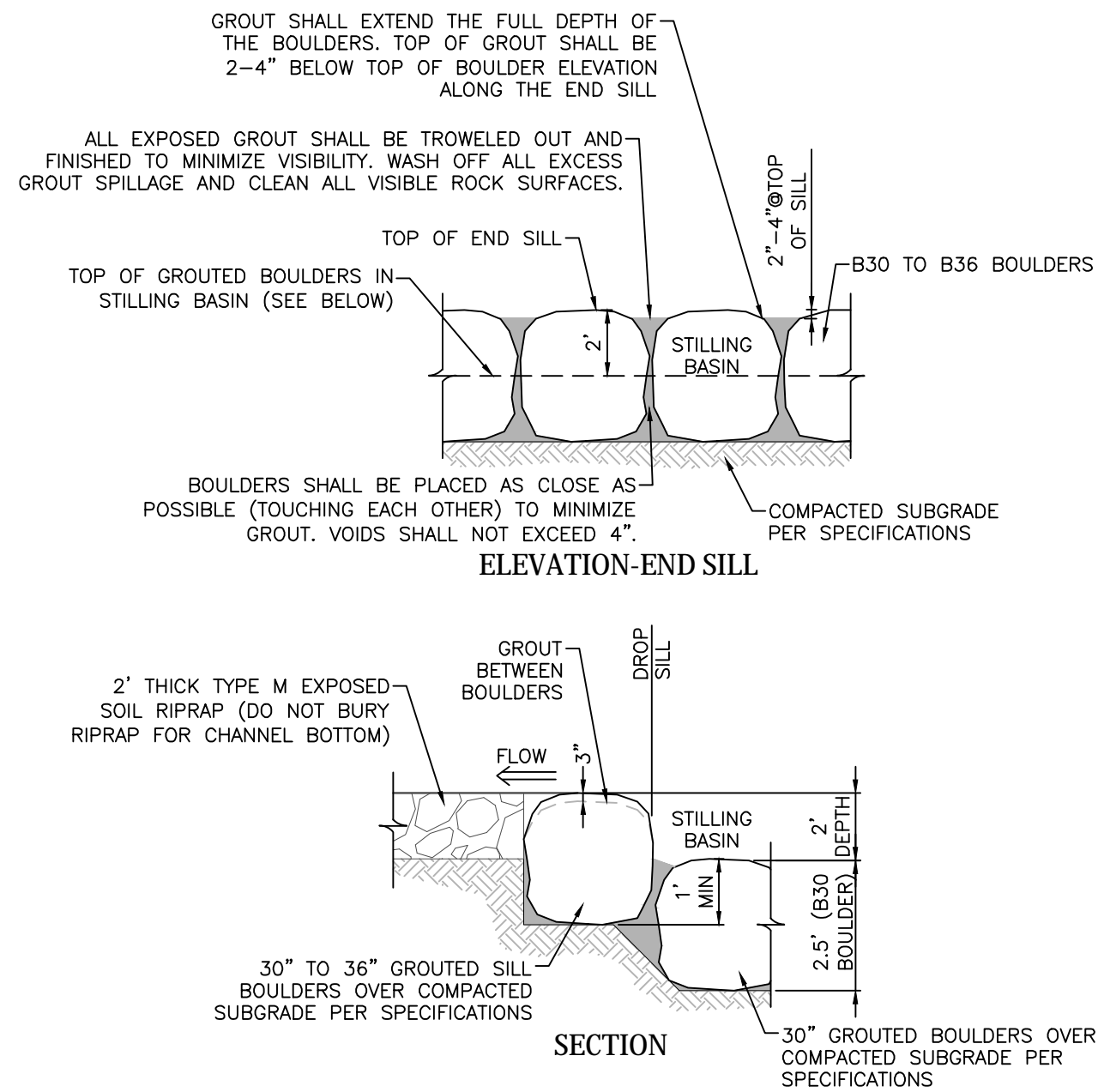


STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION PLANS
DROP STRUCTURE B DETAILS
EL PASO COUNTY, COLORADO

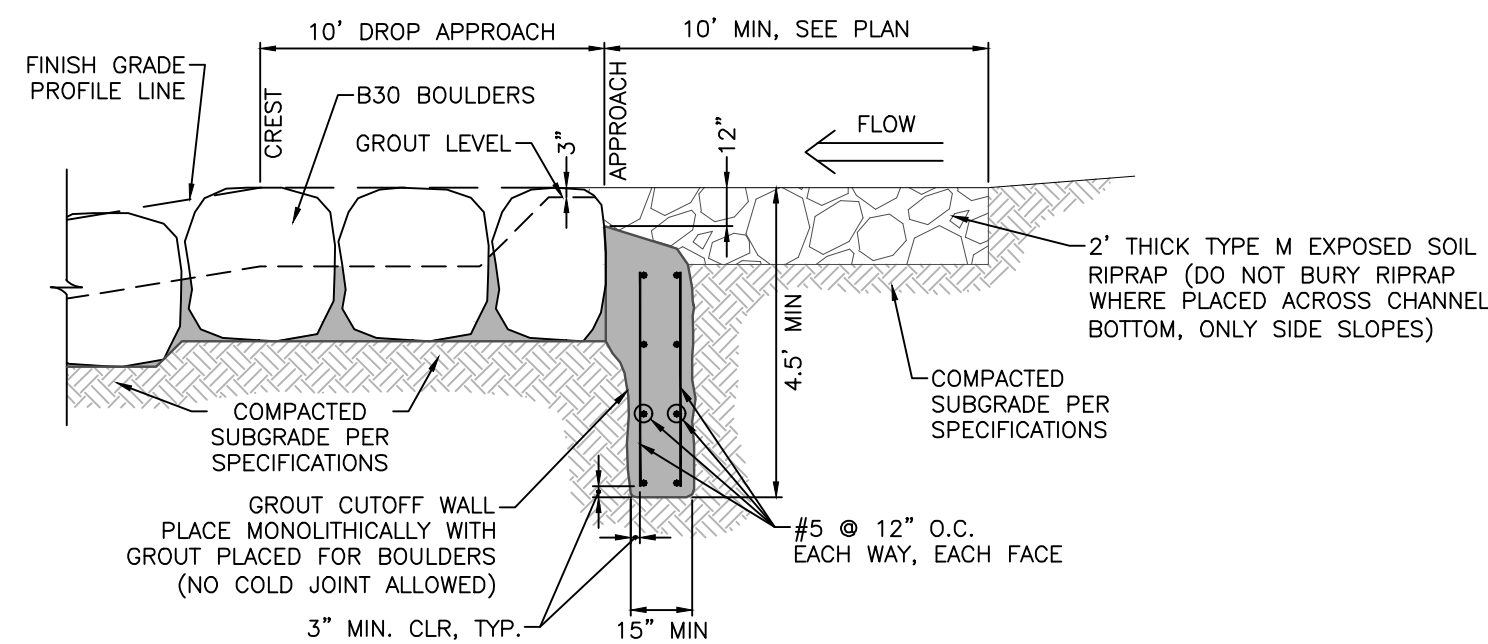
Project No.:	19032
Date:	7/14/22
Design:	TAC
Drawn:	PAV
Check:	AS BUILT
Revisions:	5/12/2025



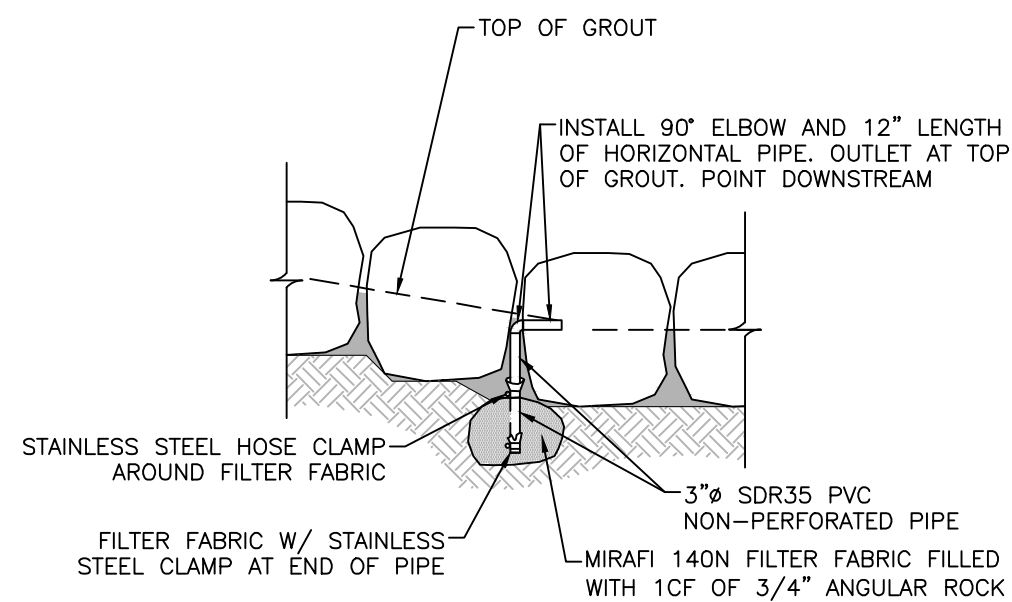
A
303 **WEEP DRAIN SYSTEM DETAIL**
SCALE: NTS



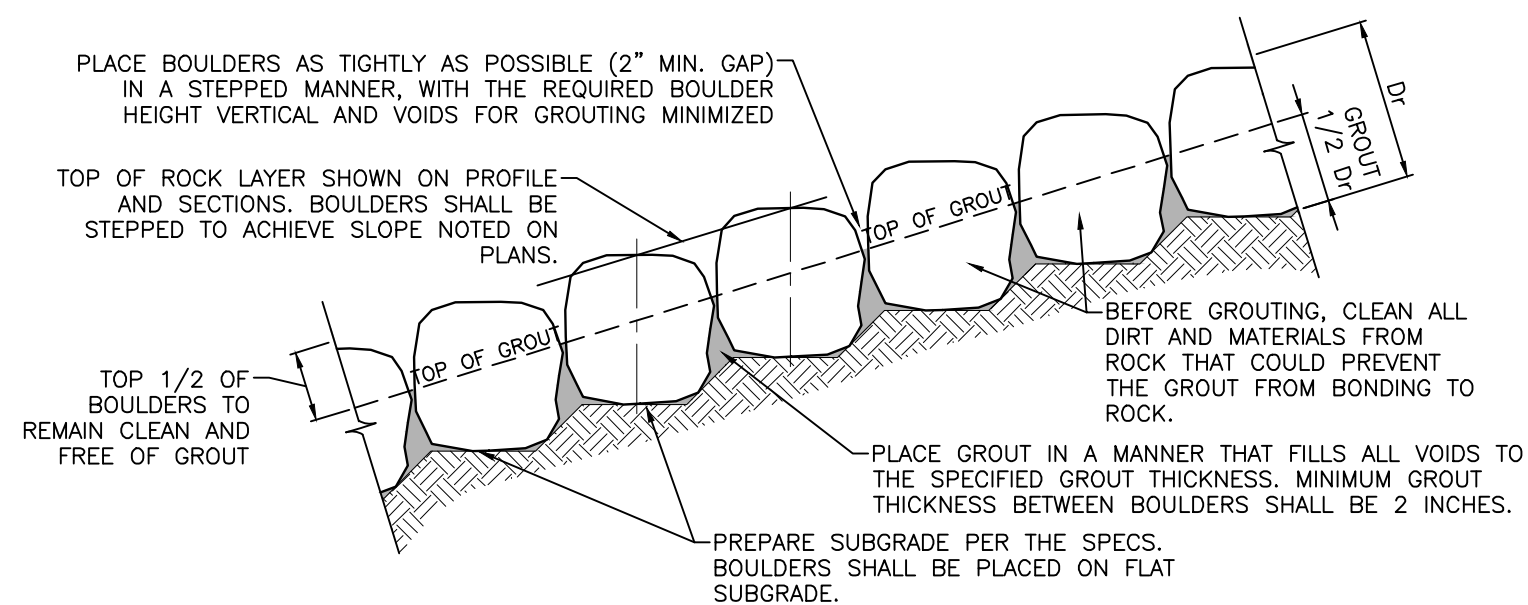
B
303 **GROUTED BOULDER END SILL DETAIL**
SCALE: NTS



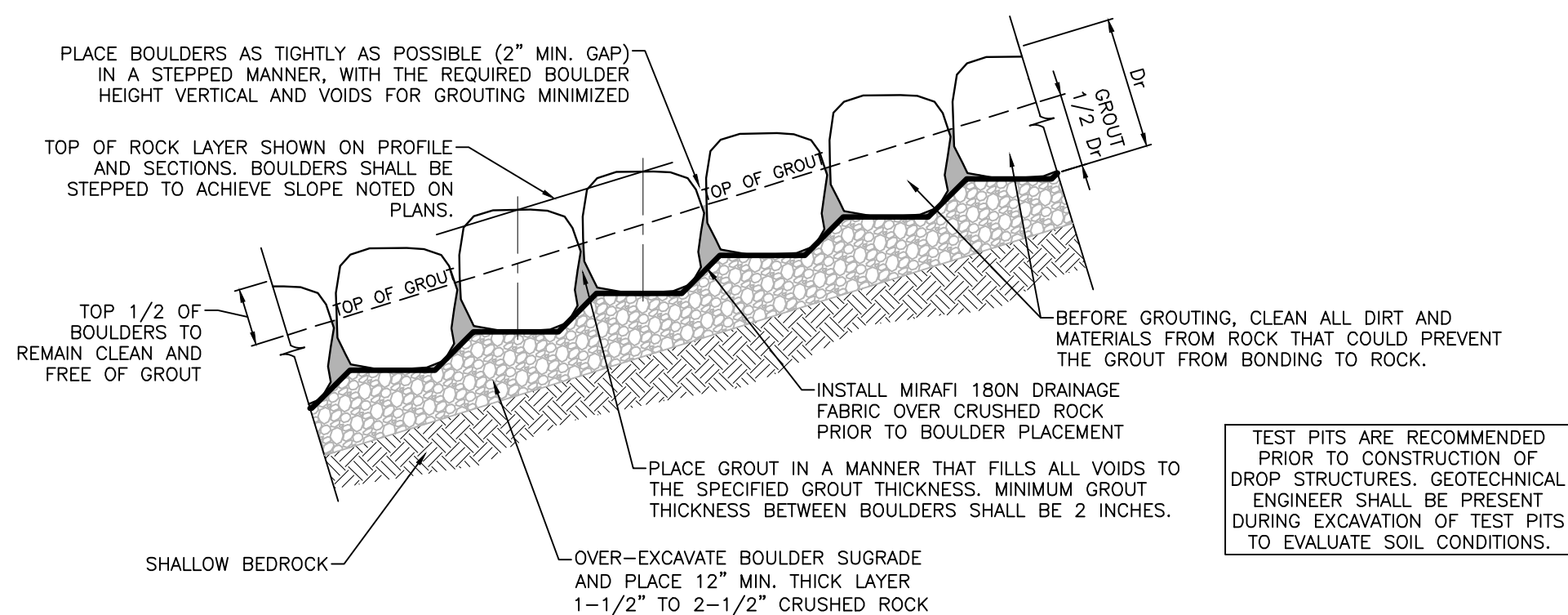
C
303 **SEEPAGE CUTOFF DETAIL**
SCALE: NTS



D
303 **SINGLE WEEP DRAIN DETAIL**
SCALE: NTS



E
303 **GROUTED BOULDER PLACEMENT DETAIL**
SCALE: NTS



F
303 **OPTIONAL GROUTED BOULDER PLACEMENT DETAIL FOR SHALLOW BEDROCK CONDITIONS**
SCALE: NTS

- GENERAL NOTES:**
1. CONTRACTOR TO CONTACT ENGINEER TO REVIEW REPRESENTATIVE BOULDERS AND RIPRAP FOR APPROVAL PRIOR TO DELIVERY TO SITE.
 2. ENGINEER SHALL BE CONTACTED TO OBSERVE SUBGRADE PRIOR TO PLACEMENT OF RIPRAP AND BOULDERS.
 3. ENGINEER SHALL BE CONTACTED TO REVIEW BOULDER PLACEMENT PRIOR TO GROUT PLACEMENT.
 4. ALTHOUGH THE COUNTY OR ENGINEER SHALL PROVIDE FIELD OBSERVATION, CONTRACTOR HAS FULL RESPONSIBILITY OF CONFORMING WITH THE PROJECT DRAWINGS AND SPECIFICATIONS. ANY REWORK COST SHALL BE BORNE BY THE CONTRACTOR.
- GROUT MATERIAL SPECIFICATIONS:**
1. ALL GROUT SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH EQUAL TO 3200 PSI.
 2. ONE CUBIC YARD OF GROUT SHALL HAVE A MINIMUM OF SIX (6) SACKS OF TYPE II PORTLAND CEMENT.
 3. A MAXIMUM OF 25% TYPE F FLY ASH MAY BE SUBSTITUTED FOR THE PORTLAND CEMENT.
 4. THE AGGREGATE SHALL BE COMPRISED OF 70% FINE AGGREGATE (NATURAL SAND) AND 30% COARSE AGGREGATE (3/4-INCH MAXIMUM ROCK).
 5. THE GROUT SLUMP SHALL BE 4-INCHES TO 6-INCHES.
 6. AIR ENTRAINMENT SHALL BE 5.5%-7.5%.
 7. TO CONTROL SHRINKAGE AND CRACKING, 1.5 POUNDS OF FIBERMESH, OR EQUIVALENT, SHALL BE USED PER CUBIC YARD OF GROUT.
 8. COLOR ADDITIVE IN REQUIRED AMOUNTS SHALL BE USED WHEN SPECIFIED BY CONTRACT.
- GROUT PLACEMENT SPECIFICATIONS:**
1. CLEAN BOULDERS BY BRUSHING AND WASHING BEFORE GROUTING TO IMPROVE THE BOND BETWEEN THE GROUT AND BOULDERS.
 2. GROUT SHALL BE DELIVERED BY MEANS OF A LOW PRESSURE (LESS THAN 10 PSI) CONCRETE PUMP USING A 2-INCH DIAMETER NOZZLE.
 3. FULL DEPTH PENETRATION OF THE GROUT INTO THE BOULDER VOIDS SHALL BE ACHIEVED BY INJECTING GROUT STARTING WITH THE NOZZLE NEAR THE BOTTOM AND RAISING IT AS GROUT FILLS, WHILE VIBRATING GROUT INTO PLACE USING A PENCIL VIBRATOR.
 4. AFTER GROUT PLACEMENT, EXPOSED BOULDER FACES SHALL BE CLEANED WITH A WET BROOM.
 - 4.1. REMOVE ALL GROUT SPLATTER FROM EXPOSED FACES OF ROCK IMMEDIATELY DURING OR FOLLOWING GROUTING OPERATIONS.
 - 4.2. NO GROUT WILL BE ALLOWED TO REMAIN ON THE EXPOSED BOULDER FACES. SANDBLASTING MAY BE REQUIRED TO REMOVE GROUT SPLATTER OR SPILLS THAT ARE ALLOWED TO DRY AND HARDEN ON THE BOULDER FACES.
 5. ALL GROUT BETWEEN BOULDERS SHALL BE TREATED WITH A BROOM FINISH.
 6. ALL FINISHED GROUT SURFACES SHALL BE SPRAYED WITH A CLEAR LIQUID MEMBRANE CURING COMPOUND AS SPECIFIED IN ASTM C-309.
 7. SPECIAL PROCEDURES SHALL BE REQUIRED FOR GROUT PLACEMENT WHEN THE AIR TEMPERATURES ARE LESS THAN 40°F OR GREATER THAN 90°F. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE DESIGN ENGINEER OF THE PROCEDURES TO BE USED FOR PROTECTING THE GROUT.

BOULDER PROPERTIES		
BOULDER CLASSIFICATION	NOMINAL SIZE AND RANGE IN SMALLEST DIMENSION OF INDIVIDUAL ROCK BOULDERS (INCHES)	MAXIMUM RATIO OF LARGEST TO SMALLEST ROCK DIMENSION OF INDIVIDUAL BOULDERS
B24	24 [20-28]	1.50 [30"-42" MAX.]
B30	30 [26-34]	1.50 [39"-51" MAX.]
B36	36 [32-40]	1.50 [48"-60" MAX.]
B42	42 [38-46]	1.50 [57"-69" MAX.]
B48	48 [44-52]	1.50 [66"-78" MAX.]

(TABLE 2: BOULDER PROPERTIES. MHFD SPECIFICATION SECTION 31 37 00)

RIPRAP GRADATION			
RIPRAP DESIGNATION	% SMALLER THAN GIVEN SIZE BY WEIGHT	INTERMEDIATE ROCK DIMENSION (INCHES)	d50* (INCHES)
TYPE VL	70-100	12	6**
	50-70	9	
	35-50	6	
	2-10	2	
TYPE L	70-100	15	9**
	50-70	12	
	35-50	9	
	2-10	3	
TYPE M	70-100	21	12**
	50-70	18	
	35-50	12	
	2-10	4	
TYPE H	70-100	30	18
	50-70	24	
	35-50	18	
	2-10	6	
TYPE VH	70-100	41	24
	50-70	33	
	35-50	24	
	2-10	9	

* d50=MEAN PARTICLE SIZE (INTERMEDIATE DIMENSION) BY WEIGHT.
** MIX VL, L AND M RIPRAP WITH 35% TOPSOIL (BY VOLUME) AND BURY WITH 4-6 INCHES OF TOPSOIL, ALL VIBRATION COMPACTED & REVEGETATE.
(TABLE 1: RIPRAP GRADATION. MHFD SPECIFICATION SECTION 31 37 00)



As-Built

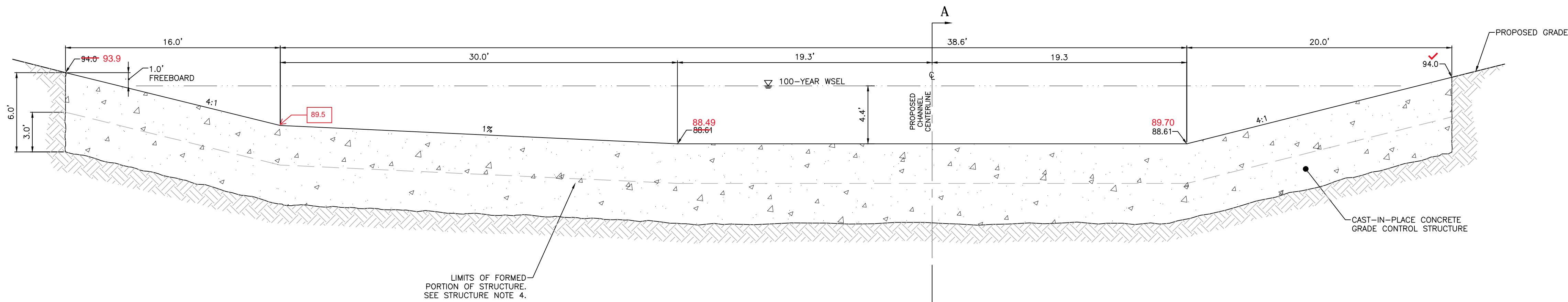


EPC 8/9/22

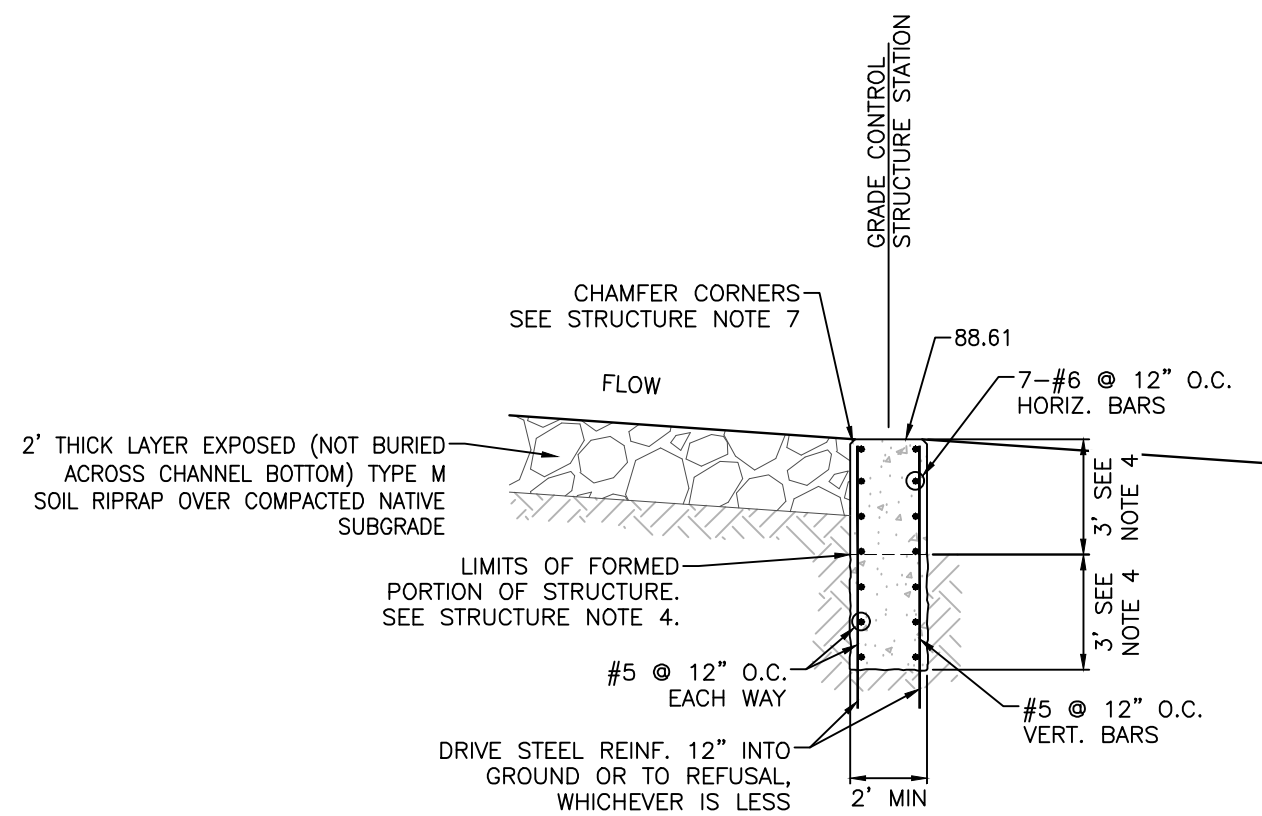
STERLING RANCH DEVELOPMENT
BRIARGATE BOULEVARD BRIDGE CONSTRUCTION PLANS
4' DROP STRUCTURE DETAILS
EL PASO COUNTY, COLORADO

Project No.: 19032
Date: 7/14/22
Design: TAC
Drawn: PAV
Check: **AS BUILT**
Revisions: **5/12/2025**

C303

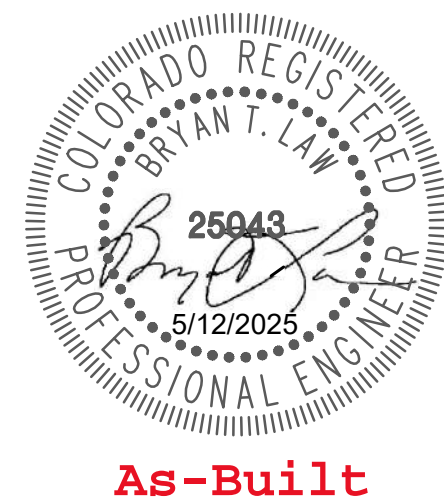


A
C311 GRADE CONTROL STRUCTURE SECTION
H: 1"=5'
V: 1"=5'



B
C311 SECTION A-A
H: 1"=5'
V: 1"=5'

- STRUCTURE NOTES:
- TOP OF STRUCTURE SHALL MATCH PROPOSED GRADE ON THE SIDE SLOPES.
 - BACKFILLING AGAINST WALL SHALL NOT COMMENCE UNTIL CONCRETE HAS OBTAINED ITS FULL SEVEN DAY STRENGTH.
 - BACKFILL MATERIAL SHALL BE COMPACTED TO 95% STANDARD PROCTOR DENSITY PER ASTM M698.
 - THE TOP 3 FEET MINIMUM OF STRUCTURE SHALL BE FORMED CONCRETE, AND THE BOTTOM 3 FEET CAN BE PLACED AGAINST UNDISTURBED SOIL.
 - REINFORCING STEEL SHALL BE GRADE 60 AND EPOXY COATED. SEE TABLE FOR THE MINIMUM LAP SPLICE LENGTH FOR REINFORCING BARS. ALL REINFORCING STEEL SHALL HAVE 2-INCH MINIMUM CLEARANCE FROM EDGE OF CONCRETE AND 3-INCH MIN CLEARANCE TO EDGE OF CONCRETE PLACED AGAINST SOIL, UNLESS OTHERWISE NOTED.
- | BAR SIZE | #4 | #5 | #6 |
|--------------------|-------|-------|-------|
| MIN. SPLICE LENGTH | 1'-3" | 1'-7" | 2'-0" |
- CONCRETE FOR GRADE CONTROL STRUCTURE SHALL BE 4,500 PSI CDOT CLASS D CONCRETE.
 - ALL EXPOSED CONCRETE CORNERS SHALL HAVE A 3/4-INCH CHAMFER UNLESS OTHERWISE NOTED.



As-Built



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ALL WORK SHALL BE DONE IN ACCORDANCE WITH COLORADO DEPARTMENT OF TRANSPORTATION STANDARD CONSTRUCTION SPECIFICATIONS, 2021 EDITION, APPLICABLE TO THIS PROJECT.

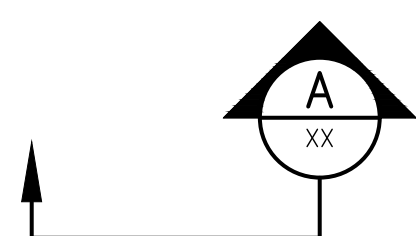
EXPANSION JOINT MATERIAL SHALL MEET AASHTO SPECIFICATION M-213.

GRADE 60 REINFORCING STEEL IS REQUIRED.

E.F. = EACH FACE
F.F. = FAR FACE
N.F. = NEAR FACE
I.F. = INSIDE FACE
O.C. = ON CENTER

O.F. = OUTSIDE FACE
T.&B. = TOP AND BOTTOM
T.F. = TOP FACE
B.F. = BOTTOM FACE

THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATION AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO. THE CONTRACTOR SHALL CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO AT 1-800-922-1987 AT LEAST 2 DAYS (NOT INCLUDING THE DAY OF NOTIFICATION) PRIOR TO ANY EXCAVATION OR OTHER EARTHWORK.



SECTION OR DETAIL
IDENTIFICATION

CROSS-REFERENCE SHEET
NUMBER (-- = SAME SHEET)



Know what's **below**.
Call before you dig.

REINFORCED CONCRETE CANTILEVER HEADWALLS ON SPREAD
FOOTINGS SPANNING Laterally across ARCH CULVERT TO
END PILASTERS. MAX FOOTING-TO-TOP HEIGHT = 31'-2".
PILASTER-TO-PILASTER CLEAR SPAN = 54'-9".

HEADWALLS ARE DESIGNED TO BE STRUCTURALLY ISOLATED FROM WINGWALLS (SEE SEPARATE WINGWALL CONSTRUCTION DRAWINGS).

AASHTO, 9th EDITION LRFD

DESIGN METHOD: LOAD AND RESISTANCE FACTOR DESIGN.

REINFORCED CONCRETE:
CLASS D CONCRETE: $f_c = 4,500$ psi
REINFORCING STEEL: $f_y = 60,000$ psi

DESIGN LOADS (NATIVE SOIL)


INTERNAL FRICTION ANGLE:	34 DEGREES
UNIT WEIGHT:	125 PCF
AT-REST EQUIVALENT FLUID PRESSURE:	60 PCF
PASSIVE EQUIVALENT FLUID PRESSURE:	300 PCF
LIVE LOAD SURCHARGE:	2 FEET OF EARTH

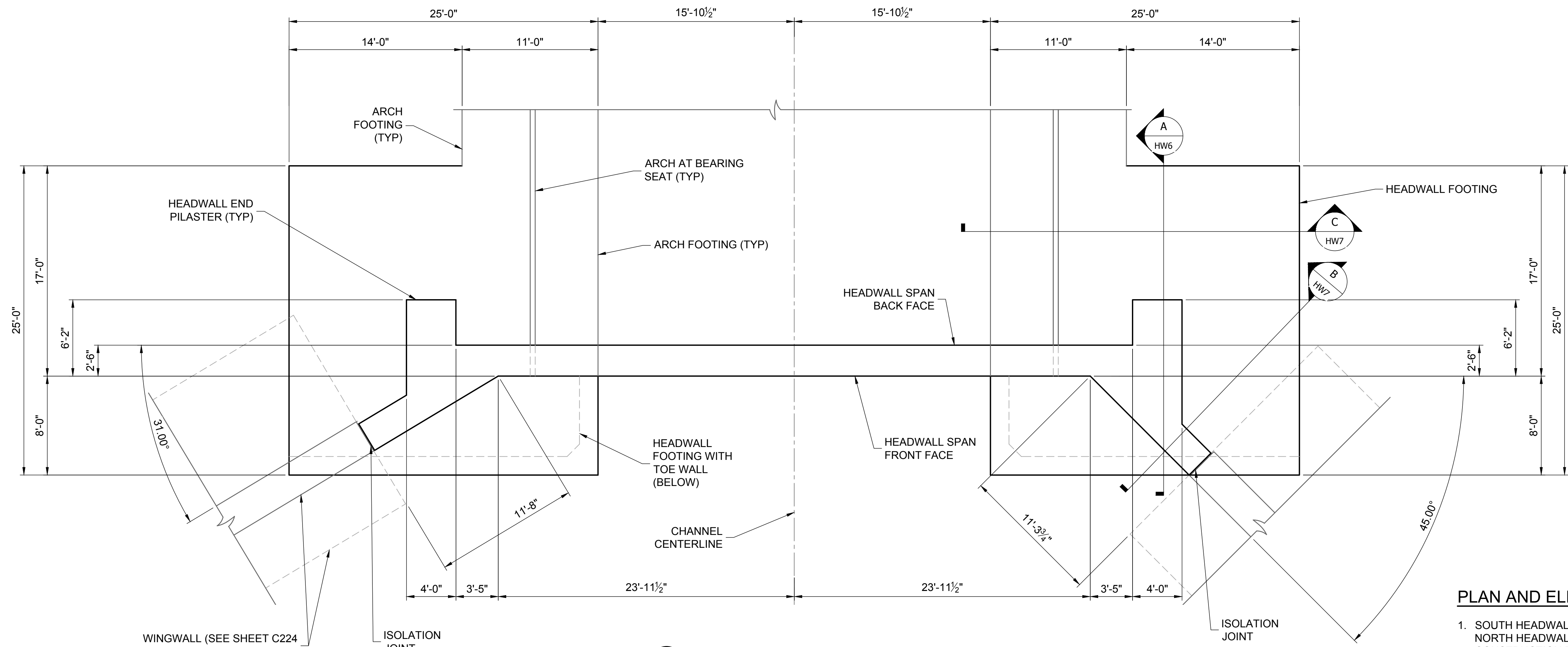
FOUNDATION SOILS:

ULTIMATE BEARING OF SANDSTONE:	14,500 PSF
RESISTING FACTOR	0.6
SLIDING FRICTION FACTOR:	0.35

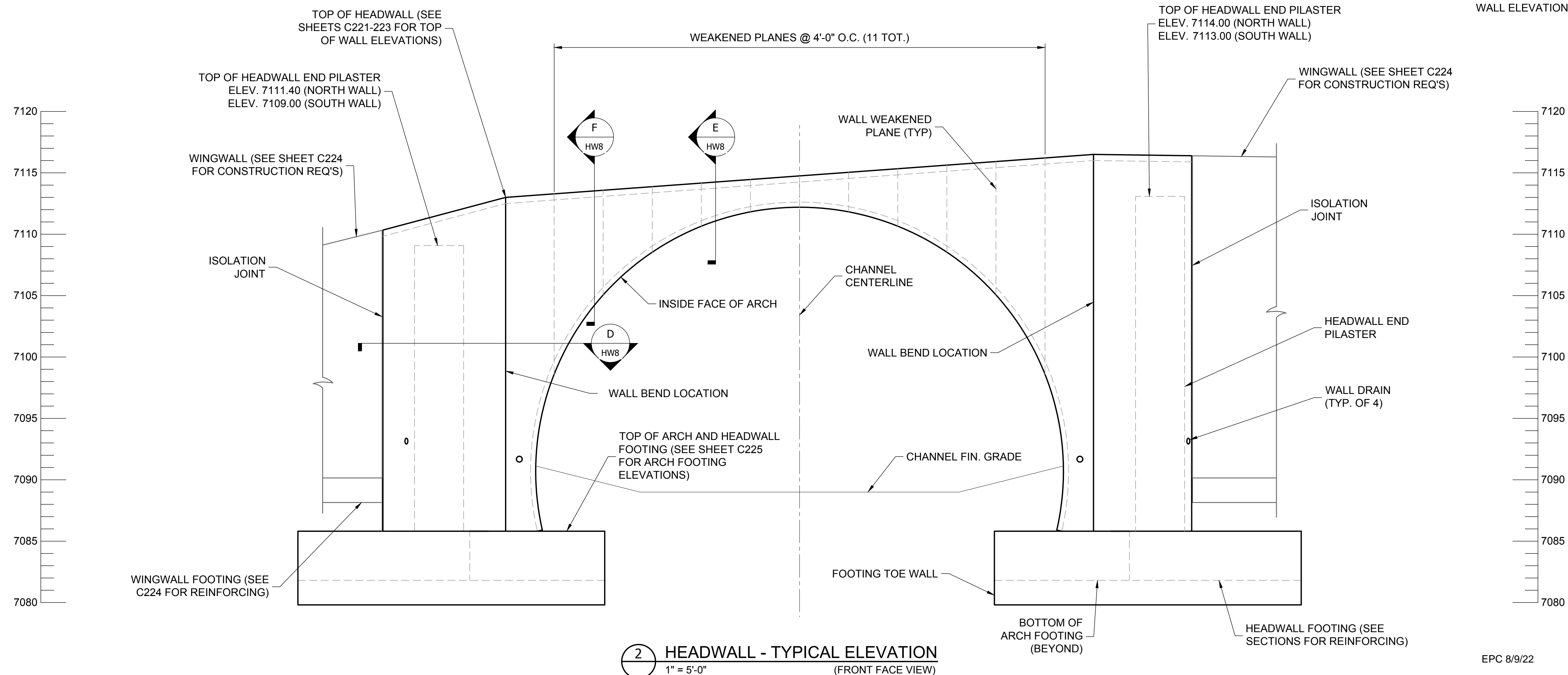
REFER TO THE GEOTECHNICAL REPORT NO 211647 BY ENTECH
ENGINEERING, INC, DATED FEBRUARY 18, 2022, AND ANY ADDENDA
THERE TO, FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

HW1	HEADWALL GENERAL INFORMATION
HW2	HEADWALL PLAN AND ELEVATION
HW3	HEADWALL TOP PLAN & SHORING REQUIREMENTS
HW4	BACK FACE REINFORCING ELEVATION
HW5	FRONT FACE REINFORCING ELEVATION
HW6	HEADWALL REINFORCING DETAILS
HW7	HEADWALL REINFORCING DETAILS
HW8	HEADWALL REINFORCING DETAILS
HW9	MISCELLANEOUS HEADWALL DETAILS

 San Engineering LLC Civil and Structural Engineering		1150 West Littleton Boulevard, Suite 200, Littleton, CO 80120 (303) 953-9014 saneengineeringllc.com	
STERLING RANCH DEVELOPMENT		BY JM DATE 5/12/2025	
BRIARGATE BOULEVARD BRIDGE OVER SAND CREEK HEADWALL STRUCTURES			
HEADWALL GENERAL INFORMATION			
AS SHOWN	NO.	REVISION	
H-SCALE	AS SHOWN	AB AS BUILT	
V-SCALE	DATE		
DESIGNED BY	JJM		
DRAWN BY	JJM		
CHECKED BY	JJM		
SHEET HW1 OF HW9		JOB NO. 19032	

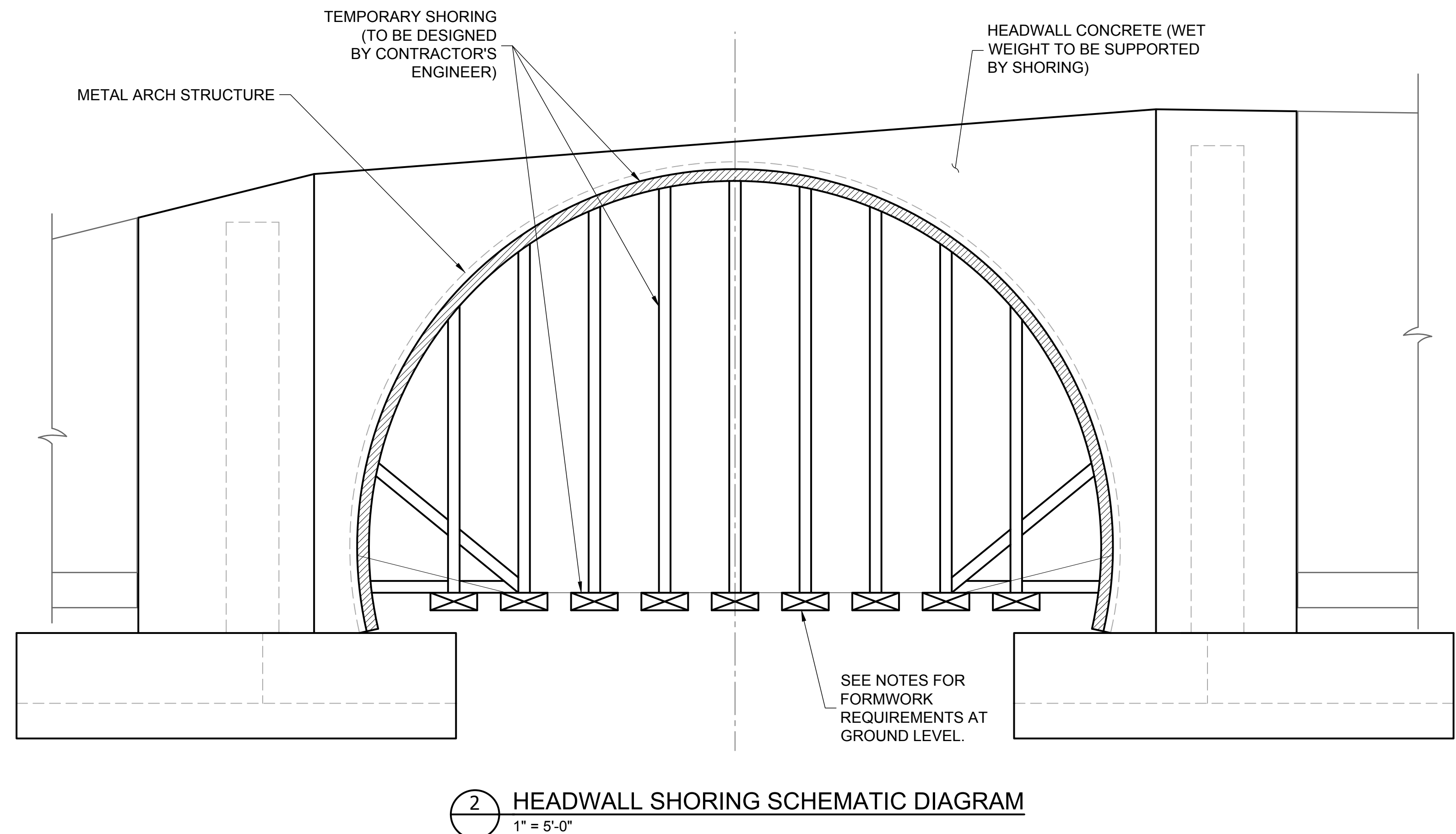
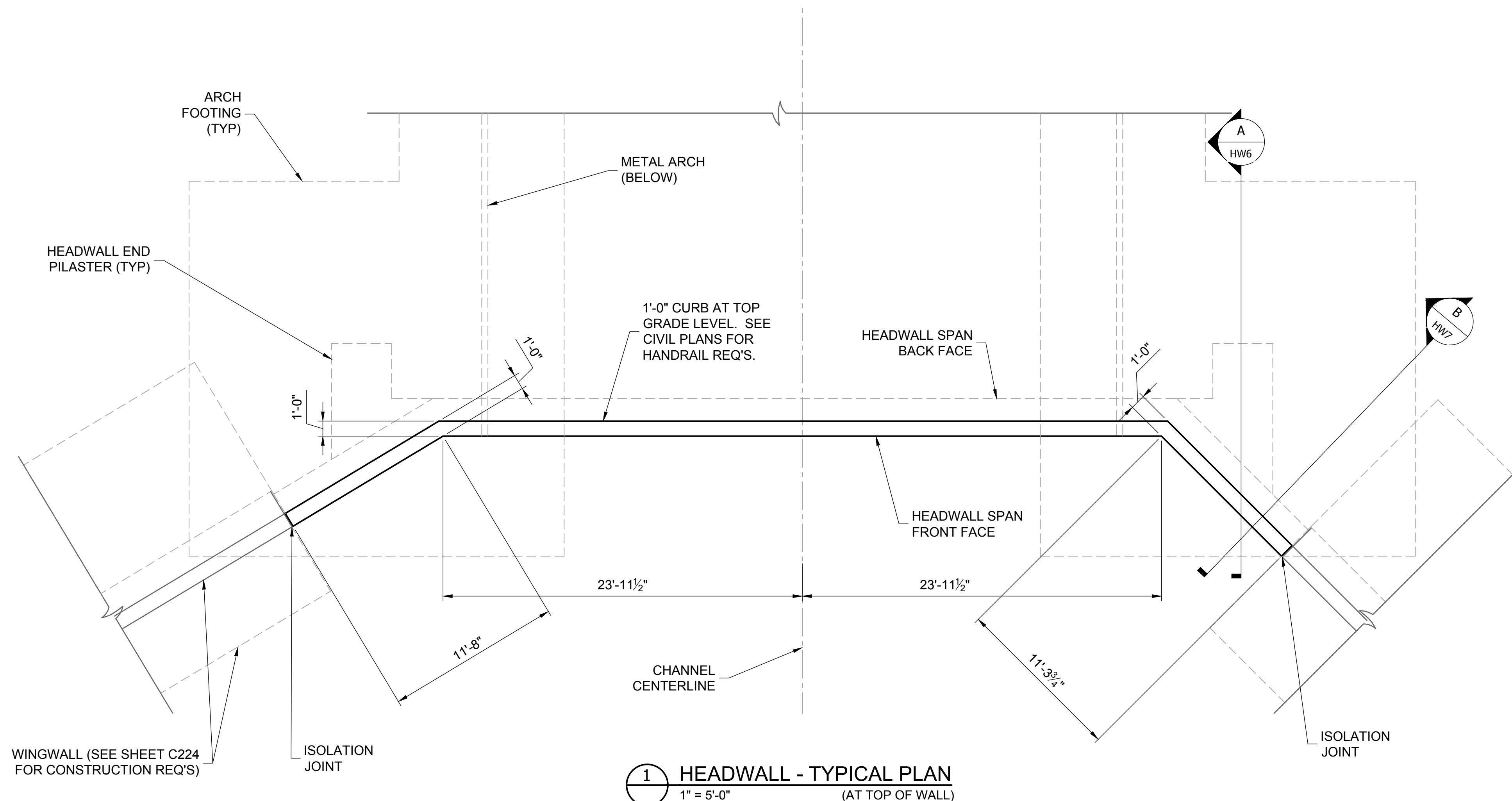
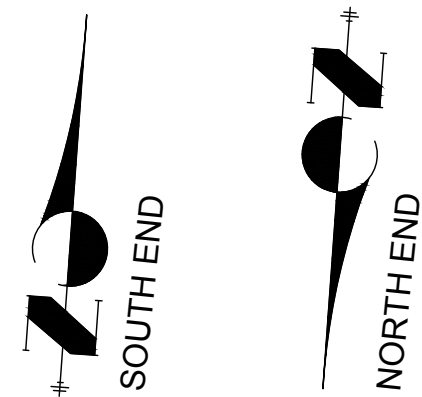


1. SOUTH HEADWALL IS SHOWN IN ELEVATION. NORTH HEADWALL SHALL BE SIMILAR CONSTRUCTION EXCEPT AS NOTED IN CIVIL AND STRUCTURAL CONSTRUCTION PLANS.
2. REFER TO SHEETS C221 TO C223 FOR TOP OF WALL ELEVATIONS.



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TEMPORARY SHORING REQUIREMENTS

- 1. THE METAL ARCH IS NOT DESIGNED TO SUPPORT THE WEIGHT AND HYDROSTATIC PRESSURE OF WET CONCRETE. TEMPORARY SHORING SHALL PROVIDED TO SUPPORT ALL VERTICAL AND LATERAL LOADS OF WET CONCRETE ON THE INTERIOR OF THE ARCH.
- 2. TEMPORARY FOOTINGS OR FOUNDATIONS FOR SHORING AT GROUND LEVEL SHALL BE DESIGNED TO THE POTENTIAL FOR UNINTENDED SETTLEMENT OF UNDERLYING SOILS UNDER THE WEIGHT OF WET CONCRETE.
- 3. SHOP DRAWINGS ACCOMPANIED BY SUPPORTING STRUCTURAL CALCULATIONS FOR THE TEMPORARY SHORING SHALL BE PROVED FOR REVIEW PRIOR TO CONSTRUCTION. CALCULATIONS SHALL BEAR THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF COLORADO.
- 4. PARTIAL-HEIGHT CONSTRUCTION JOINTS IN THE HEADWALL WILL BE CONSIDERED. ANY PROPOSED CONSTRUCTION JOINT LOCATIONS AND DETAILS THEREOF SHALL BE CLEARLY INDICATED IN THE SUBMITTED SHOP DRAWINGS.
- 5. FORMWORK FOR THE HEADWALL, PILASTERS AND FOOTINGS IS ALSO THE RESPONSIBILITY OF THE CONTRACTOR, BUT IS NOT SUBJECT TO THE SUBMITTAL OF SHOP DRAWINGS OR CALCULATIONS.



San Engineering LLC

Civil and Structural Engineering

1150 West Littleton Boulevard, Suite 200,
Littleton, CO 80120 (303) 953-9014
sanengineeringllc.com

STERLING RANCH DEVELOPMENT

BRIARGATE BOULEVARD BRIDGE OVER SAND CREEK

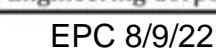
HEADWALL STRUCTURES

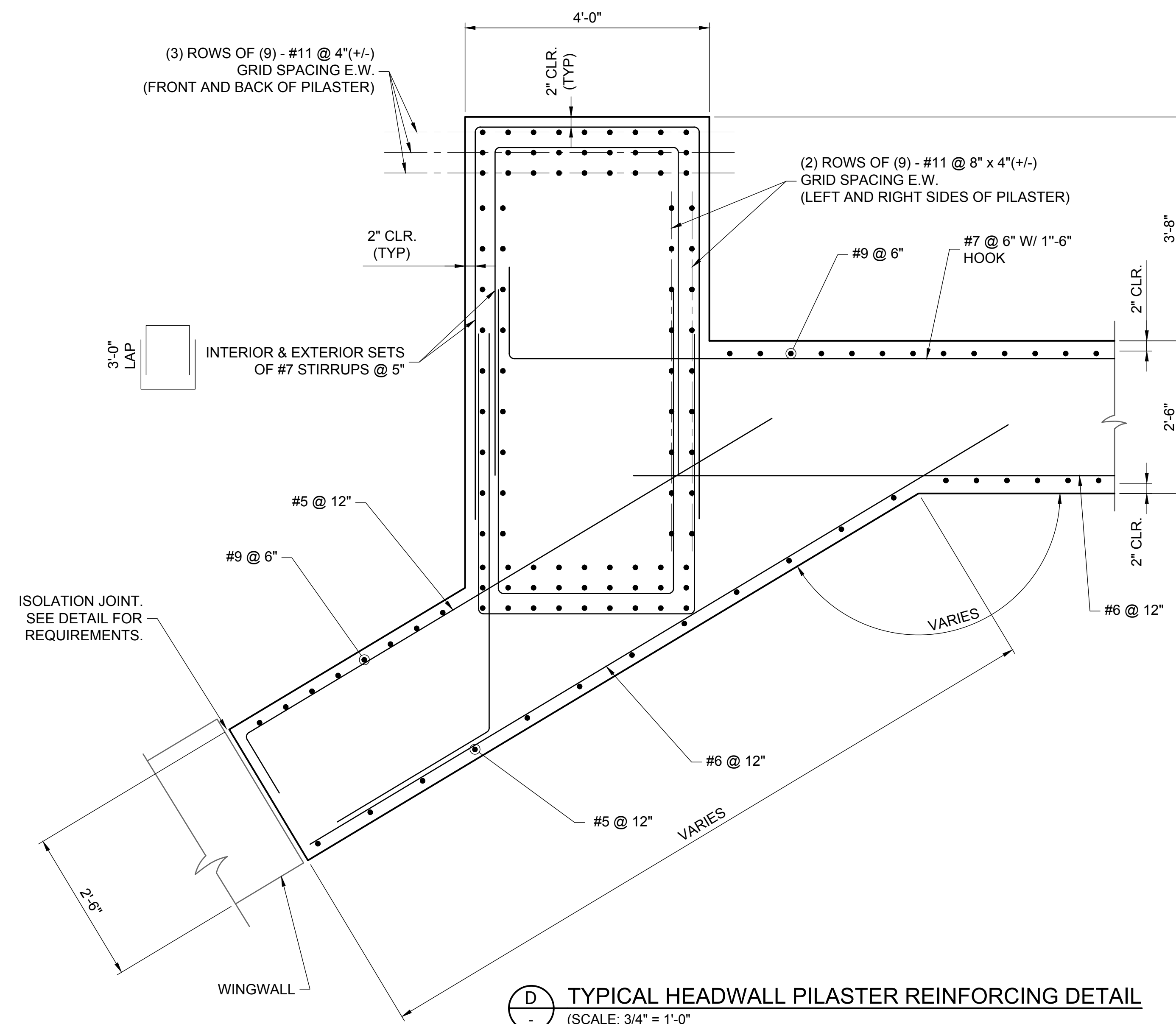
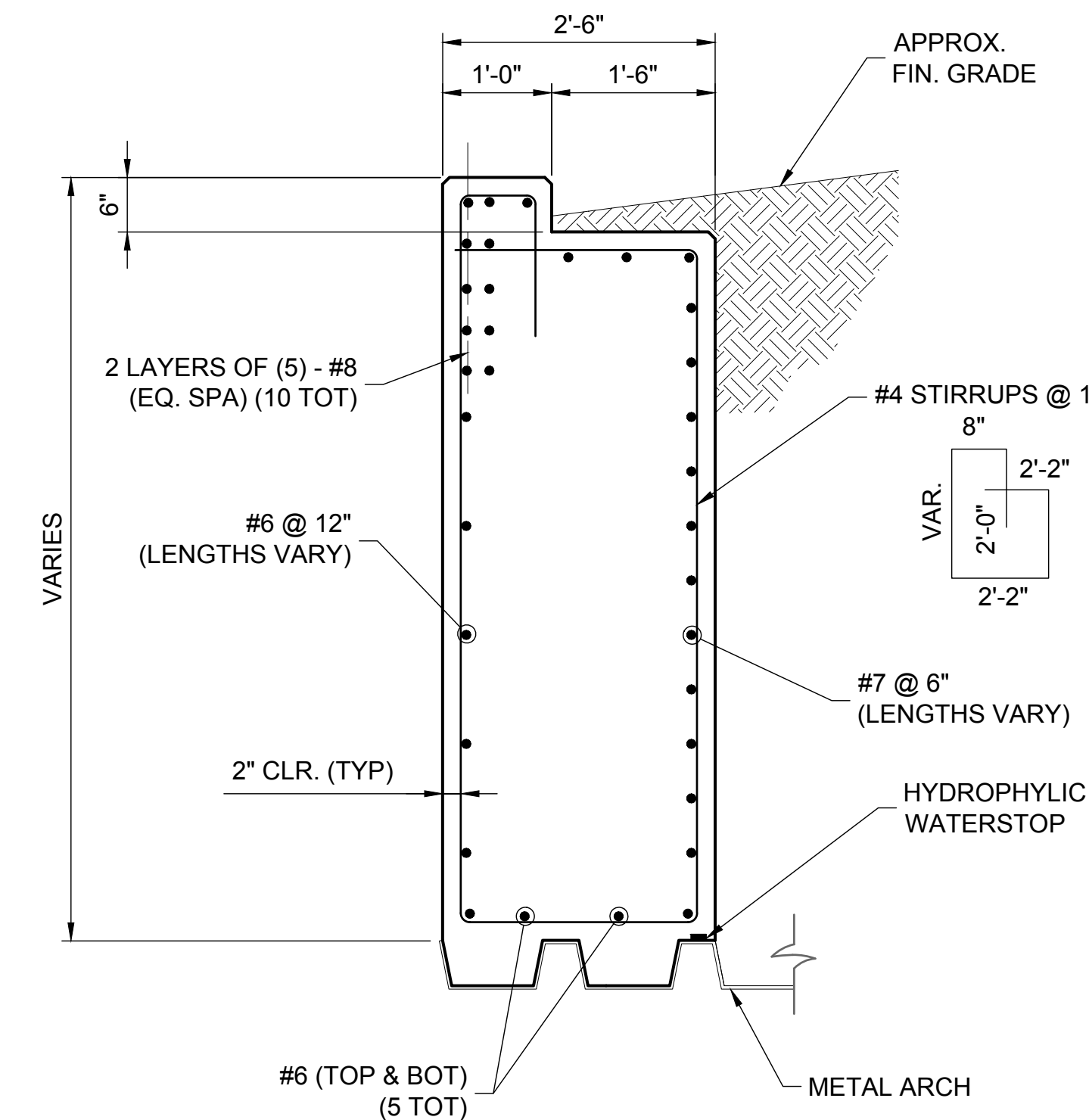
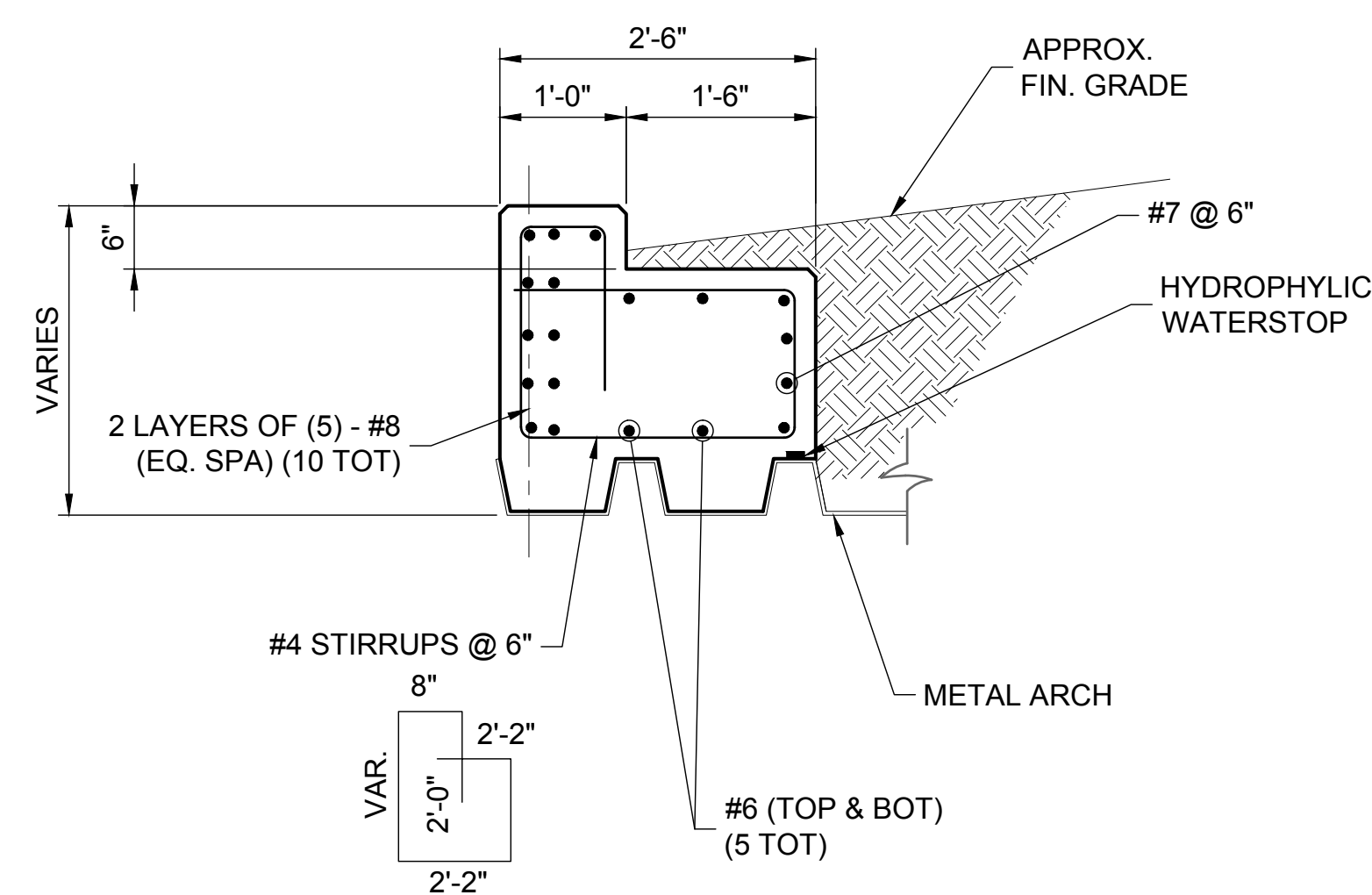
HEADWALL TOP PLAN & SHORING REQ'S.

BY	DATE	REVISION	AS SHOWN	AS SHOWN	DATE	DESIGNED BY	DRAWN BY	CHECKED BY
JM	5/12/2025	AB AS BUILT			03/14/22	JJM	JJM	JJM

SHEET HW3 OF HW9

JOB NO. 19032





EPC 8/9/22

SHEET		H-SCALE		AS SHOWN		REVISION		BY		DATE	
JOB NO.		V-SCALE		AS SHOWN		AB		JM		5/12/2025	
19032		DATE		DESIGNED BY							
		5/14/22		JM							
		8		JUM							
		DRAWN BY		JUM							
		CHECKED BY		JUM							



1. EXPOSED SUBGRADE FOR ALL FOOTINGS AND BOTTOM SLABS SHALL BE OBSERVED BY THE GEOTECHNICAL ENGINEER UPON EXCAVATION.
2. HEADWALL FOOTINGS SHALL BE VERIFIED PRIOR TO CONCRETE AND REINFORCEMENT PLACEMENT, TO BEAR ON SANDSTONE MATERIAL. IF ADDITIONAL DEPTH OF EXCAVATION IS REQUIRED TO REACH SANDSTONE MATERIAL, LEAN CONCRETE SHALL BE USED TO BRING SUBGRADE UP FROM SANDSTONE LEVEL TO SPECIFIED BOTTOM OF FOOTING.
3. FRONT OF FOOTING TOE WALLS SHALL BE PLACED DIRECTLY AGAINST SANDSTONE MATERIAL. LEAN CONCRETE SHALL FILL ANY SPACE BETWEEN ACTUAL EXCAVATION FACE AT SANDSTONE AND THE SPECIFIED FRONT FACE OF TOE WALL.
4. FOLLOW RECOMMENDATIONS IN THE PROJECT GEOTECHNICAL REPORT FOR SUBGRADE PREPARATION AND PROTECTION, AND TEMPORARY EXCAVATION SLOPE STABILITY.



EPC 8/9/22

SHEET	H-SCALE	AS SHOWN	NO. REVISION	BY	DATE
	V-SCALE	AS SHOWN	AB AS BUILT	JM	5/12/2025
	DATE	03/14/22			
	DESIGNED BY	JJM			
	DRAWN BY	JJM			
JOB NO.	CHECKED BY		JJM		
	SHEET		HW9	OF	HW9
JOB NO.		19032			