

SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS

STERLING RANCH DEVELOPMENT

EL PASO COUNTY, COLORADO

EPC STORMWATER REVIEW COMMENTS ARE SHOWN IN ORANGE BOXES WITH BLACK TEXT

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 Public Services Department. All other 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 SOUTH 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.

SUMMARY OF EXISTING CONDITION DESIGN FLOWS (cfs)

Design Point	EPC FIS	STERLING RANCH MDDP		
		5yr	10yr	100yr
A	NR	1200	2600	380 618 1638
B	NR	1200	2600	430 713 1912
C	NR	1200	2600	

ABBREVIATIONS

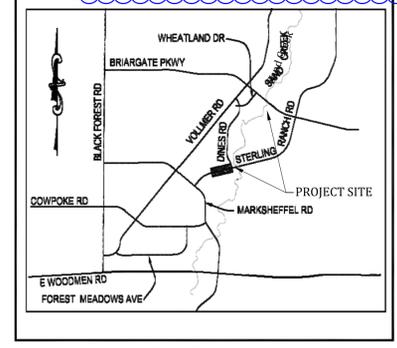
ASSY = ASSEMBLY	MIN. = MINIMUM
BNRY = BOUNDARY	NTS = NOT TO SCALE
BOP = BOTTOM OF PIPE	OD = OUTSIDE DIAMETER
CL = CENTERLINE	PC = POINT OF HORIZONTAL CURVATURE
CRA = CONCRETE REVERSE ANCHOR	PP = PROPOSED
CTRB = CONCRETE THRUST BLOCK	PT = POINT OF HORIZONTAL TANGENCY
CR = POINT OF CURB RETURN	PVC = POLY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



Kiowa Project No. 19032

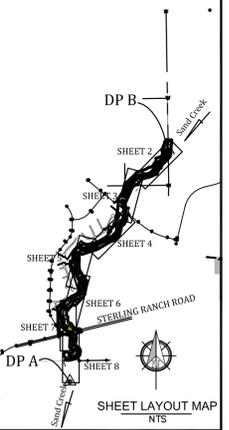
July 9, 2020

PCD-ENGINEERING REVIEW COMMENTS IN BLUE BOXES WITH BLUE TEXT



VICINITY MAP
SCALE: N.T.S.

Engineering Review
11/19/2020 11:49:23 AM
ddrice
JeffRice@elpaso.com
(719) 520-7877
EPC Planning & Community Development Department
See comment letter.
Cursory comments.



SHEET LAYOUT MAP
NTS

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 (UNC).
- 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
 - CDOT M & S Standards
- 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

- Cover Sheet
 - PLAN & PROFILE STA 97+00 TO STA 86+00
 - PLAN & PROFILE STA 86+00 TO STA 73+00
 - PLAN & PROFILE STA 73+00 TO STA 58+00
 - PLAN & PROFILE STA 58+00 TO STA 45+00
 - PLAN & PROFILE STA 45+00 TO STA 32+00
 - PLAN & PROFILE STA 32+00 TO STA 19+00
 - PLAN & PROFILE STA 19+00 TO STA 9+00
 - TYPICAL DRAINAGEWAY SECTIONS & DETAILS
 - TYPICAL DROP STRUCTURE PLAN & DETAILS
 - CROSS-SECTIONS
 - CROSS-SECTIONS
 - CROSS-SECTIONS
-
- | | |
|-------|------------------------|
| GEC 1 | STA 97+00 TO STA 73+00 |
| GEC 2 | STA 73+00 TO STA 45+00 |
| GEC 3 | STA 45+00 TO STA 19+00 |
| GEC 4 | STA 19+00 TO STA 9+00 |
| GEC 5 | DETAILS |
| GEC 6 | DETAILS |
| GEC 7 | DETAILS |
-
- C201 BRIARGATE BOULEVARD BRIDGE PLAN & PROFILE
C202 BRIARGATE BOULEVARD BRIDGE STRUCTURE LAYOUT
C203 BRIARGATE BOULEVARD BRIDGE FOUNDATION PLAN
C204 BRIARGATE BOULEVARD BRIDGE ROADWAY & GUARDRAIL LAYOUT
C211 STERLING RANCH ROAD BRIDGE PLAN & PROFILE
C212 STERLING RANCH ROAD BRIDGE STRUCTURE LAYOUT
C213 STERLING RANCH ROAD BRIDGE FOUNDATION PLAN
C214 STERLING RANCH ROAD BRIDGE ROADWAY & GUARDRAIL LAYOUT
C221 BRIARGATE BOULEVARD & STERLING RANCH ROAD ROADWAY DETAILS
C222 BRIARGATE BOULEVARD & STERLING RANCH ROAD GUARDRAIL DETAILS
C223 BRIARGATE BOULEVARD & STERLING RANCH ROAD HANDRAIL DETAILS

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.

Richard N. Wray, P.E. #19310 _____ Date _____
For and on behalf of Kiowa Engineering Corp.

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 _____ Date _____
Sterling Ranch Metropolitan District

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, 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.

Jennifer Irvine, P.E., _____ Date _____
County Engineer / ECM Administrator

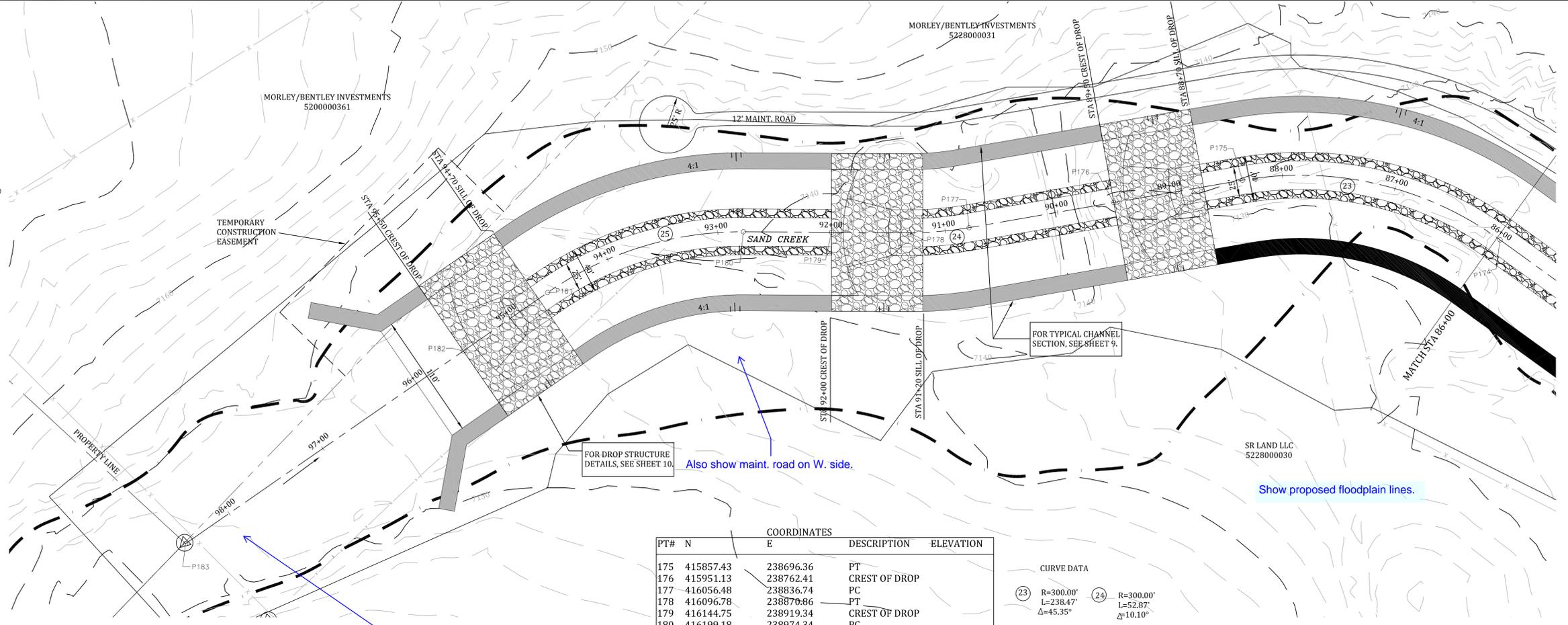
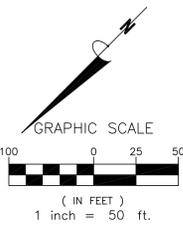
EPC FILE NO. CDR 204



SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
COVER SHEET
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/9/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

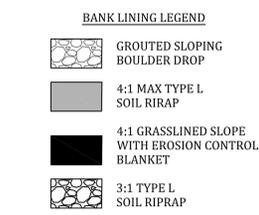
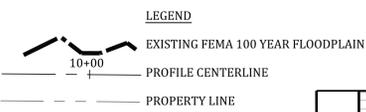
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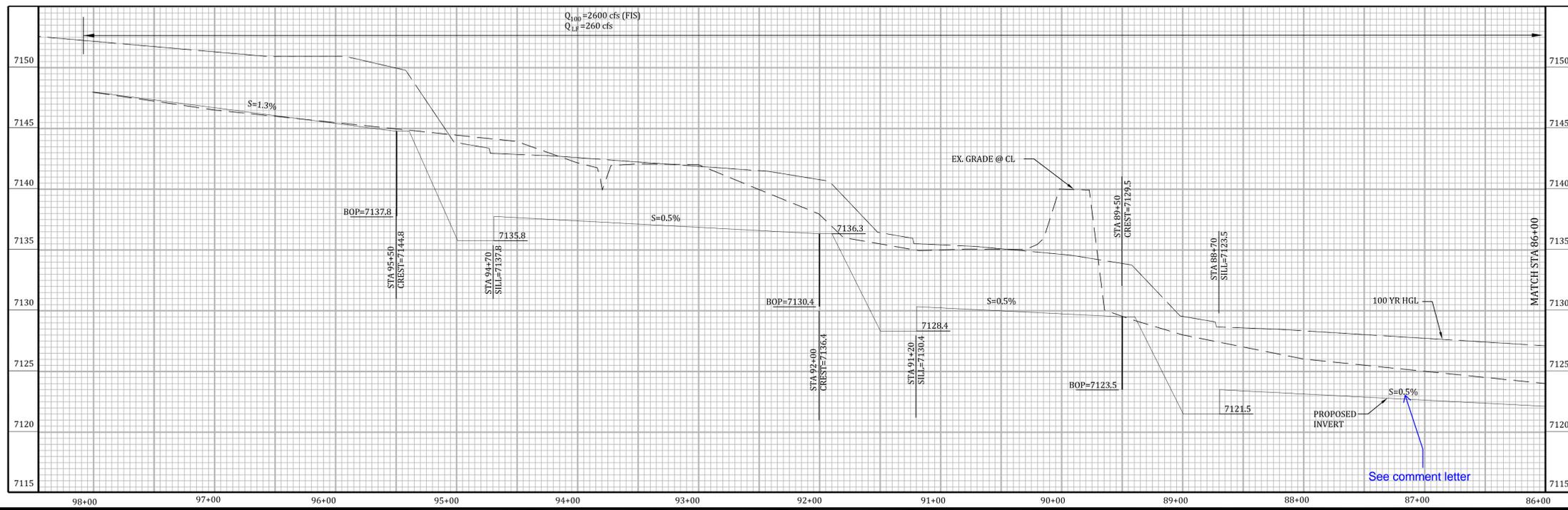
PT#	COORDINATES		DESCRIPTION	ELEVATION
	N	E		
175	415857.43	238696.36	PT	
176	415951.13	238762.41	CREST OF DROP	
177	416056.48	238836.74	PC	
178	416096.78	238870.86	PT	
179	416144.75	238919.34	CREST OF DROP	
180	416199.18	238974.34	PC	
181	416356.80	239057.04	PT	
182	416446.72	238074.71	CREST OF DROP	
183	416738.26	239128.13	PL	

CURVE DATA	
23	R=300.00' L=238.47' Δ=45.35°
24	R=300.00' L=52.87' Δ=10.10°
25	R=300.00' L=182.75' Δ=34.80°

FOR GRADING & EROSION CONTROL PLAN, SEE SHEETS GEC1-GEC7.

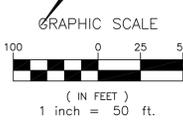
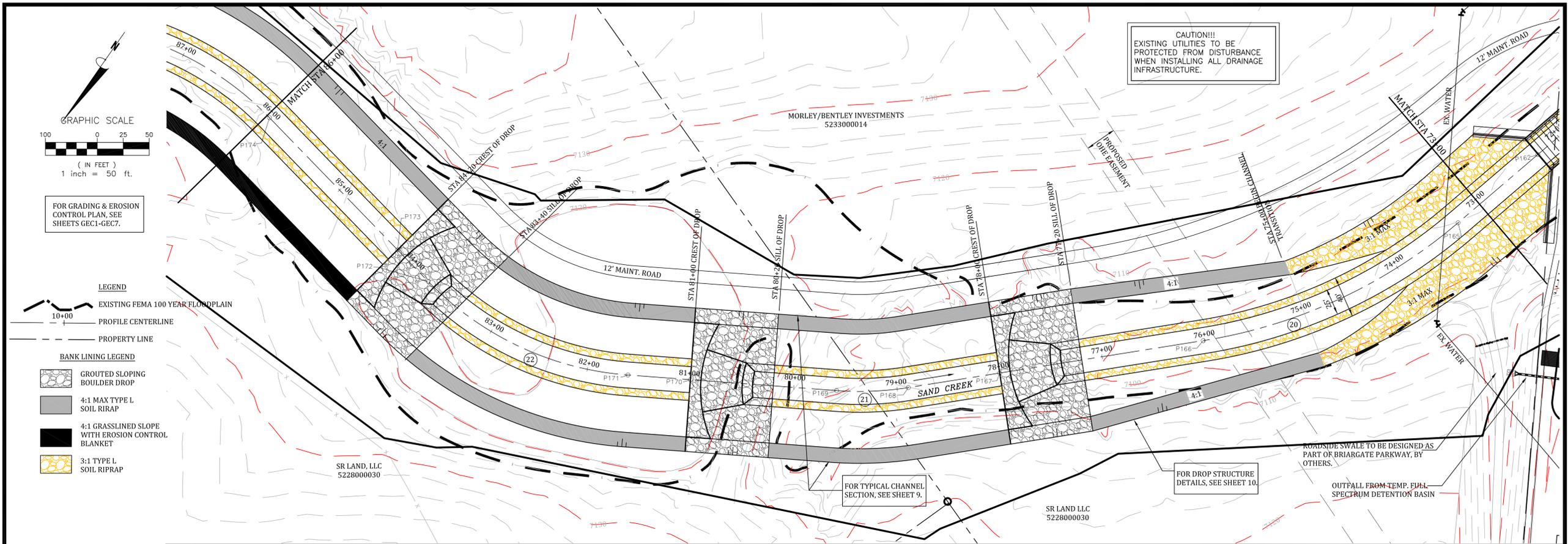


CAUTION!!!
EXISTING UTILITIES TO BE PROTECTED FROM DISTURBANCE WHEN INSTALLING ALL DRAINAGE INFRASTRUCTURE.



SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
STA 97+00 TO STA 86+00
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/9/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	



FOR GRADING & EROSION CONTROL PLAN, SEE SHEETS GEC1-GEC7.

- LEGEND**
- 10+00 EXISTING FEMA 100 YEAR FLOODPLAIN
 - PROFILE CENTERLINE
 - - - PROPERTY LINE
- BANK LINING LEGEND**
- GROUDED SLOPING BOULDER DROP
 - 4:1 MAX TYPE L SOIL RIPRAP
 - 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
 - 3:1 TYPE L SOIL RIPRAP

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

MORLEY/BENTLEY INVESTMENTS
5233000014

PROPOSED
DRAINAGE

TEMPORARY
DRAINAGE

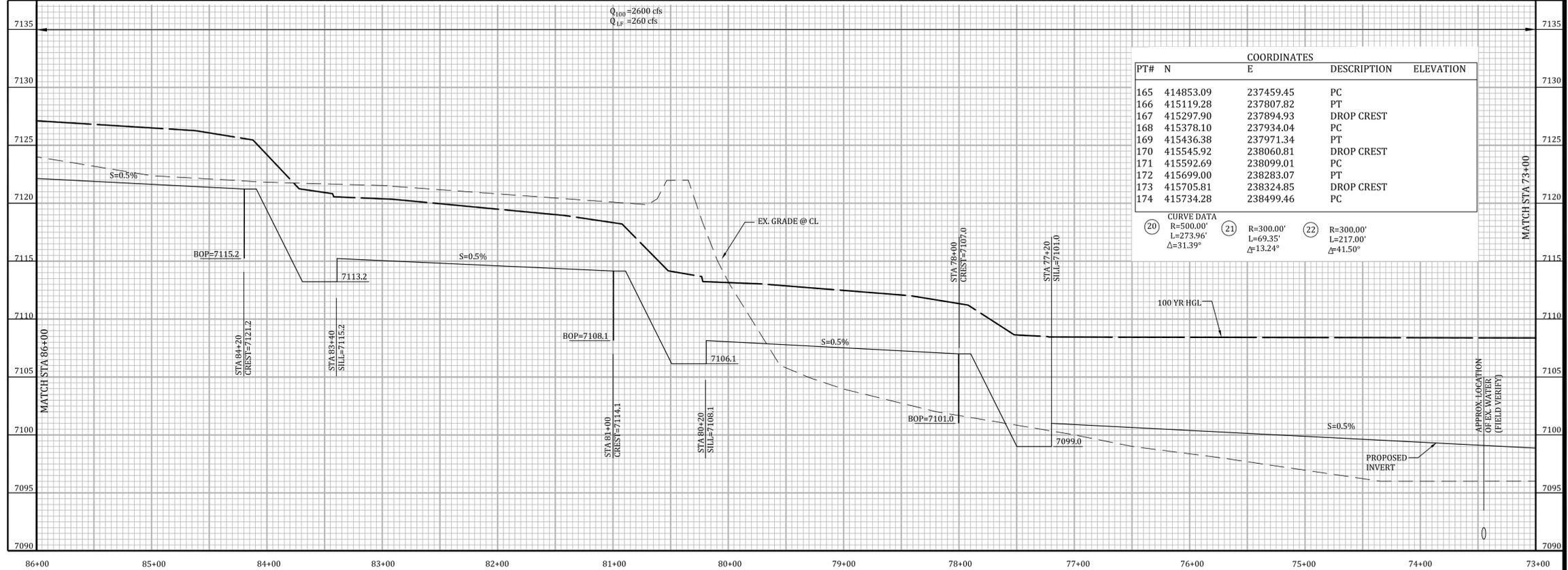
ROADSIDE SWALE TO BE DESIGNED AS PART OF BRIARGATE PARKWAY, BY OTHERS.
OUTFALL FROM TEMP. FULL SPECTRUM DETENTION BASIN

FOR DROP STRUCTURE DETAILS, SEE SHEET 10.

FOR TYPICAL CHANNEL SECTION, SEE SHEET 9.

SR LAND, LLC
5228000030

SR LAND LLC
5228000030

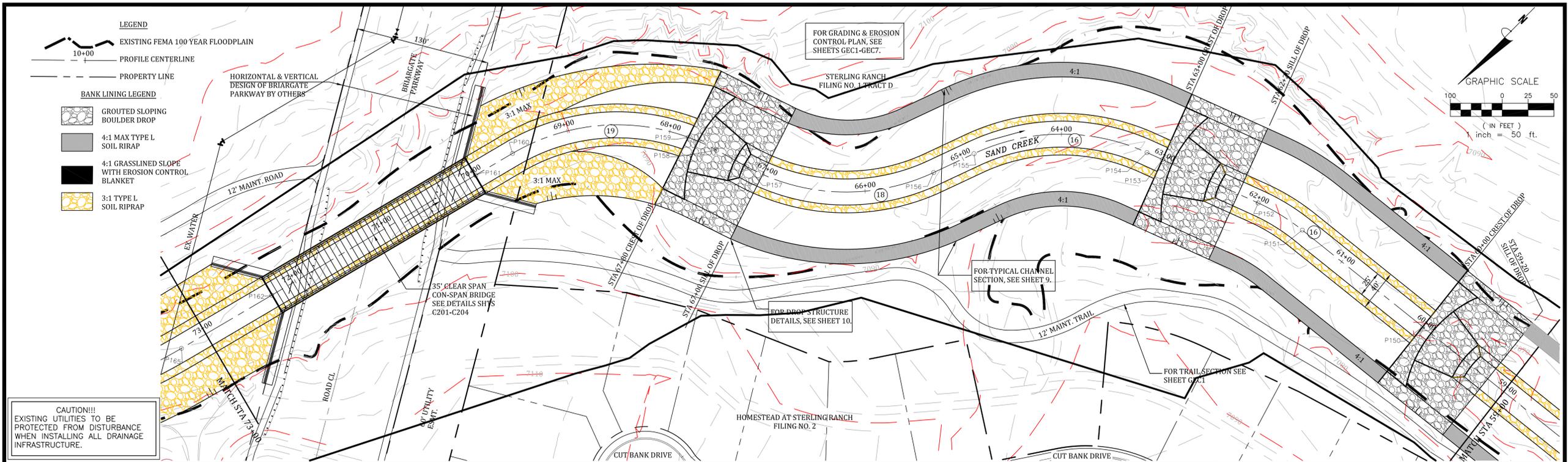


Kiowa
Engineering Corporation
1604 South 21st Street
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(719) 630-7342

SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
STA 86 +00 TO STA 73+00
EL PASO COUNTY, COLORADO

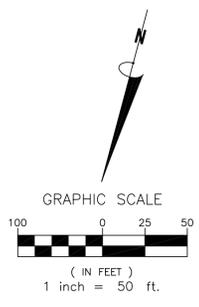
Project No.:	19032
Date:	7/9/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

3



SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
STA 73+00 TO STA 59+00
EL PASO COUNTY, COLORADO

Project No.: 19032
Date: 7/9/2020
Design: RNW
Drawn: EAK
Check: RNW
Revisions:



- LEGEND**
- EXISTING FEMA 100 YEAR FLOODPLAIN
 - PROFILE CENTERLINE
 - PROPERTY LINE
- BANK LINING LEGEND**
- GROUTED SLOPING BOULDER DROP
 - 4:1 MAX TYPE L SOIL RIRAP
 - 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
 - 3:1 TYPE L SOIL RIRAP

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

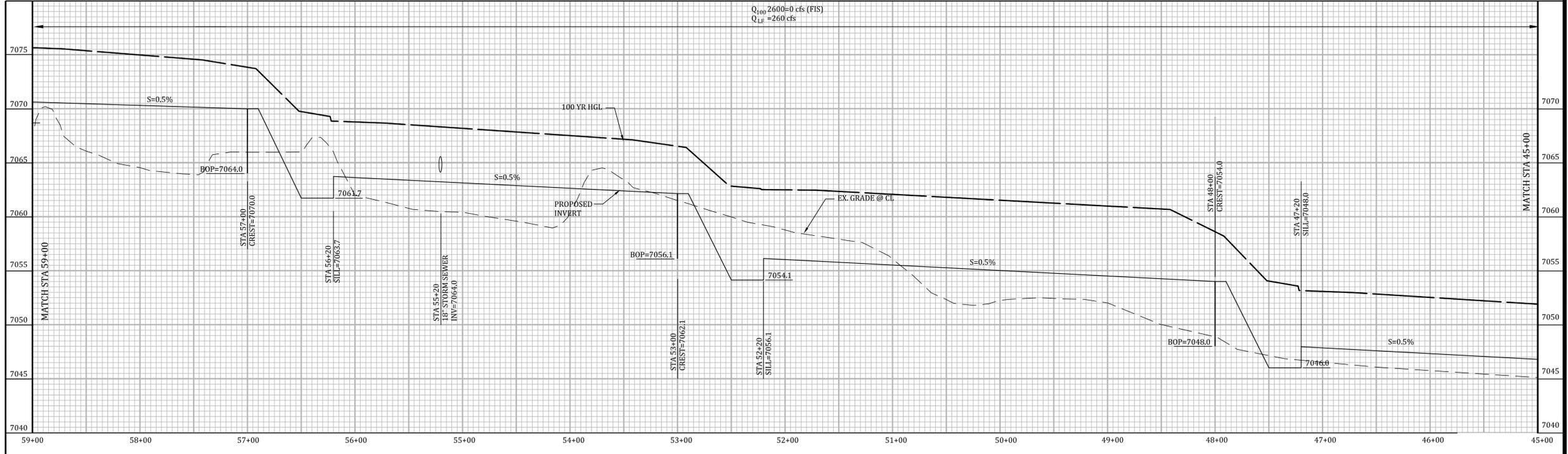
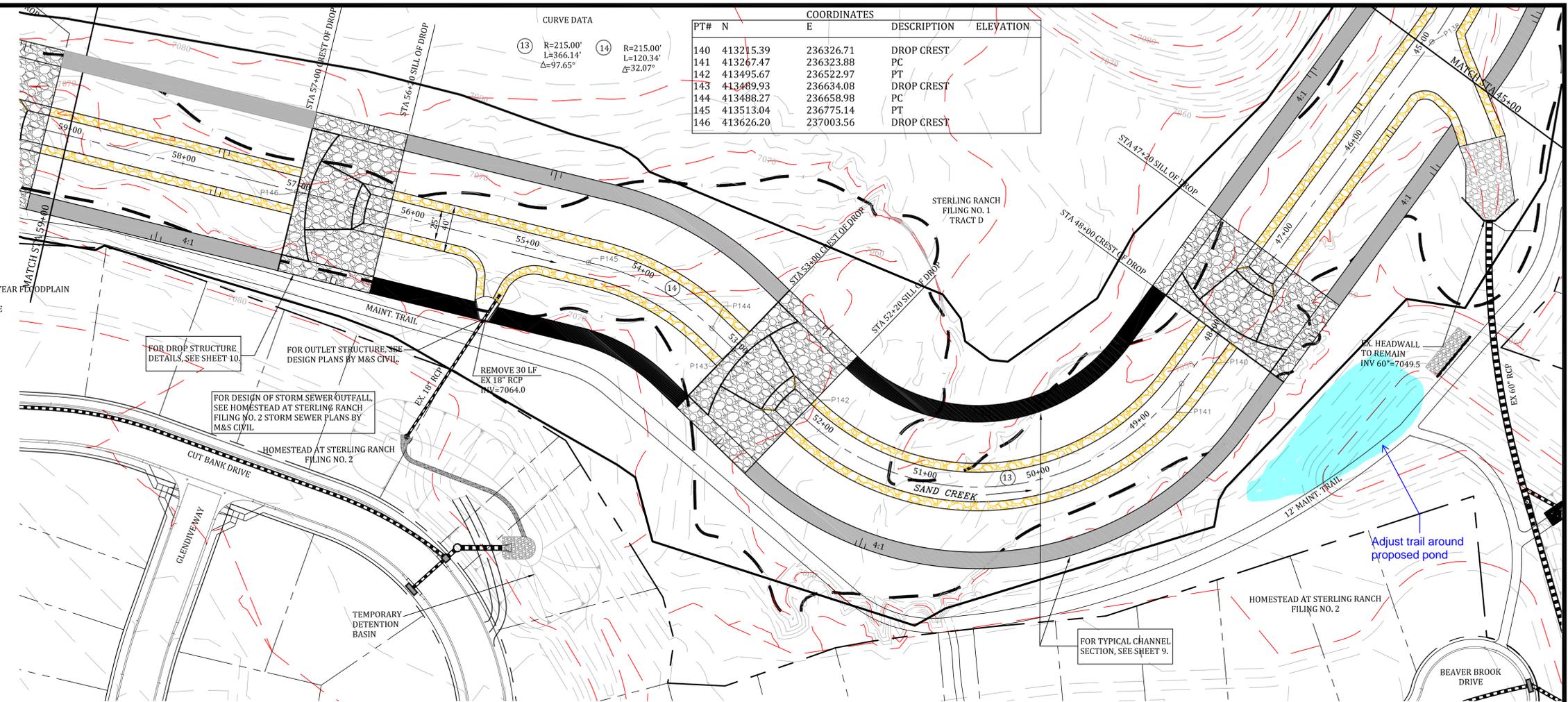
FOR GRADING & EROSION CONTROL PLAN, SEE SHEETS GEC1-GEC7.

CURVE DATA

13	R=215.00'	L=366.14'	$\Delta=97.65^\circ$
14	R=215.00'	L=120.34'	$\Delta=32.07^\circ$

COORDINATES

PT#	N	E	DESCRIPTION	ELEVATION
140	413215.39	236326.71	DROP CREST	
141	413267.47	236323.88	PC	
142	413495.67	236522.97	PT	
143	413489.93	236634.08	DROP CREST	
144	413488.27	236658.98	PC	
145	413513.04	236775.14	PT	
146	413626.20	237003.56	DROP CREST	



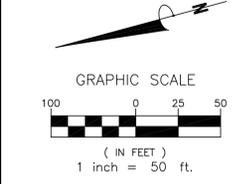
SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
STA 59 +00 TO STA 45+00
EL PASO COUNTY, COLORADO

Project No.: 19032
Date: 7/9/2020
Design: RNW
Drawn: EAK
Check: RNW
Revisions:

PT#	N	E	DESCRIPTION	ELEVATION
128	411962.56	236256.62	DROP CREST	
129	411970.66	236267.45	PC	
130	411975.50	236274.57	PT	
131	411066.82	236422.06	PC	
132	412080.90	236411.97	DROP CREST	
133	412201.48	236513.62	PT	
134	412563.18	236524.71	PC	
135	412688.42	236442.28	PT	
136	412731.49	236415.23	DROP CREST	
137	412769.12	236391.60	PC	
138	412909.53	236346.26	PT	

CURVE DATA

⑩	R=100.00'	L=8.61'	Δ=4.94°
⑪	R=200.00'	L=167.71'	Δ=48.05°
⑬	R=600.00'	L=443.16'	Δ=43.32°
⑭	R=300.00'	L=149.67'	Δ=28.47°

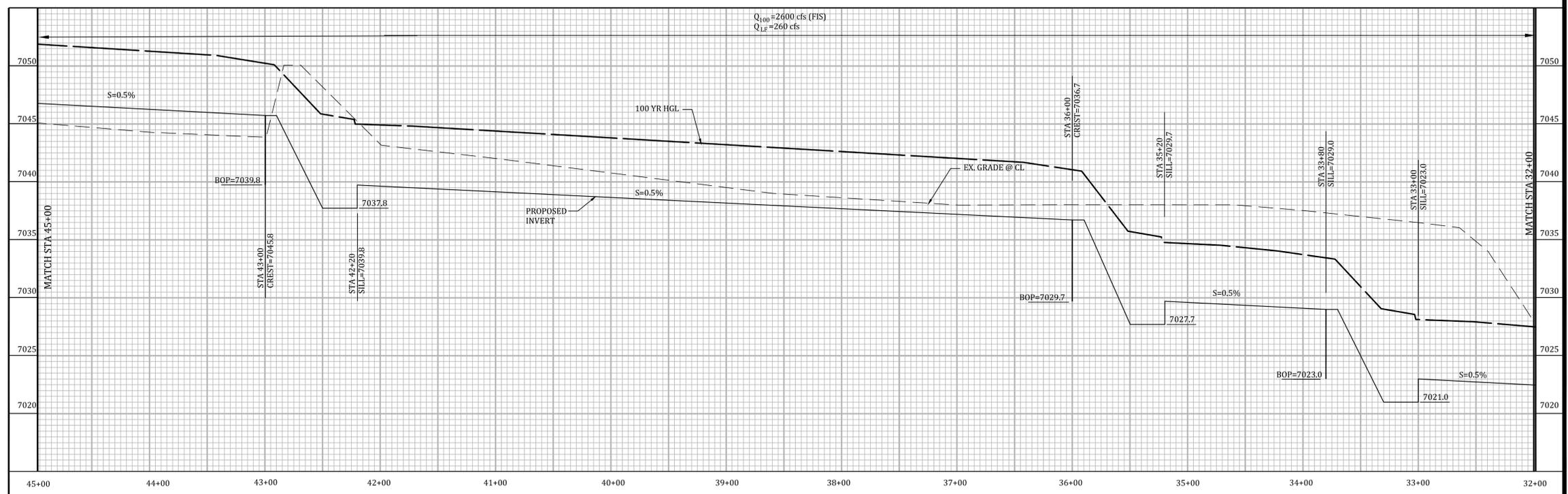
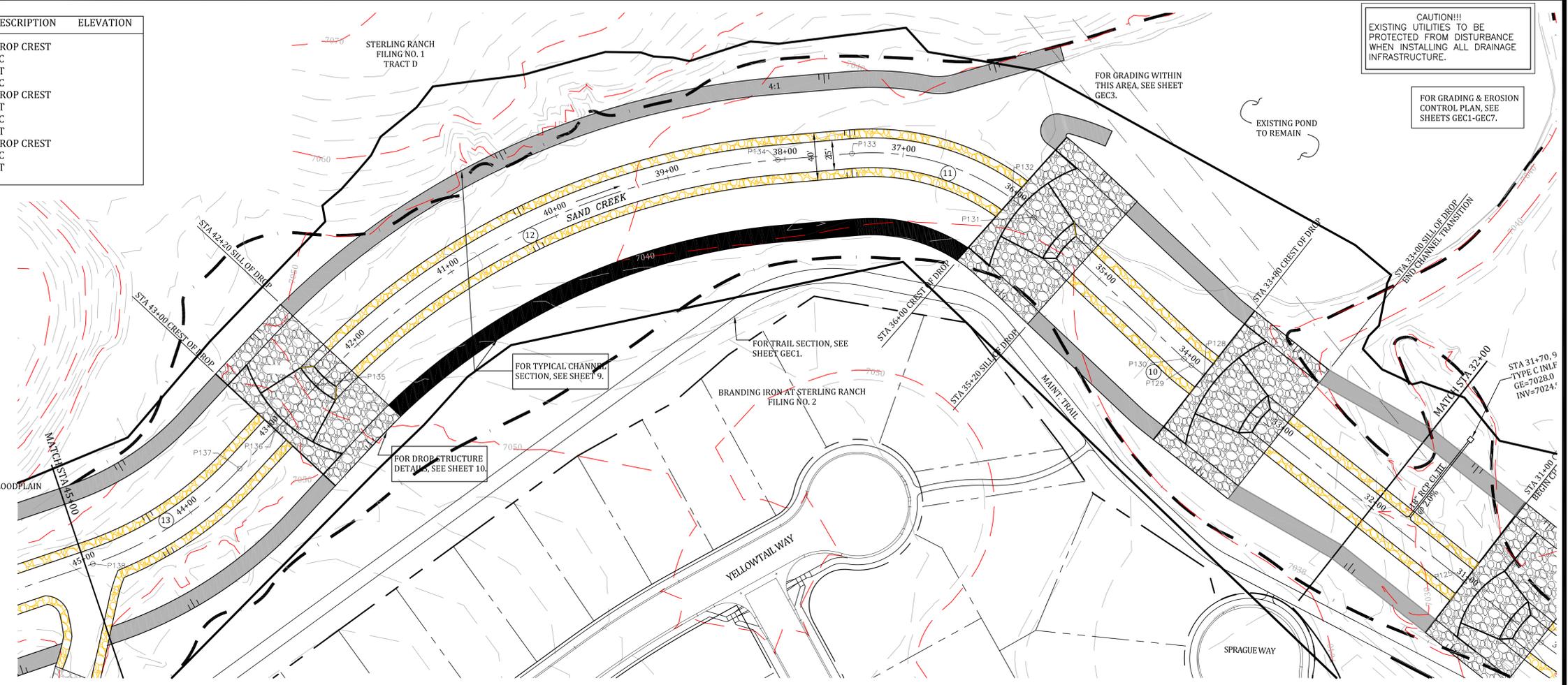


LEGEND

- EXISTING FEMA 100 YEAR FLOODPLAIN
- PROFILE CENTERLINE
- PROPERTY LINE

BANK LINING LEGEND

- GROUTED SLOPING BOULDER DROP
- 4:1 MAX TYPE L SOIL RIPRAP
- 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
- 3:1 TYPE L SOIL RIPRAP

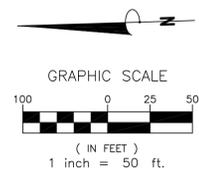


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STERLING RANCH DEVELOPMENT
STA 45+00 TO STA 32+00
EL PASO COUNTY, COLORADO

Project No.:	19032
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Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

6



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

FOR GRADING & EROSION
CONTROL PLAN, SEE
SHEETS GEC1-GEC7.

- LEGEND**
- EXISTING FEMA 100 YEAR FLOODPLAIN
 - PROFILE CENTERLINE
 - PROPERTY LINE

BANK LINING LEGEND

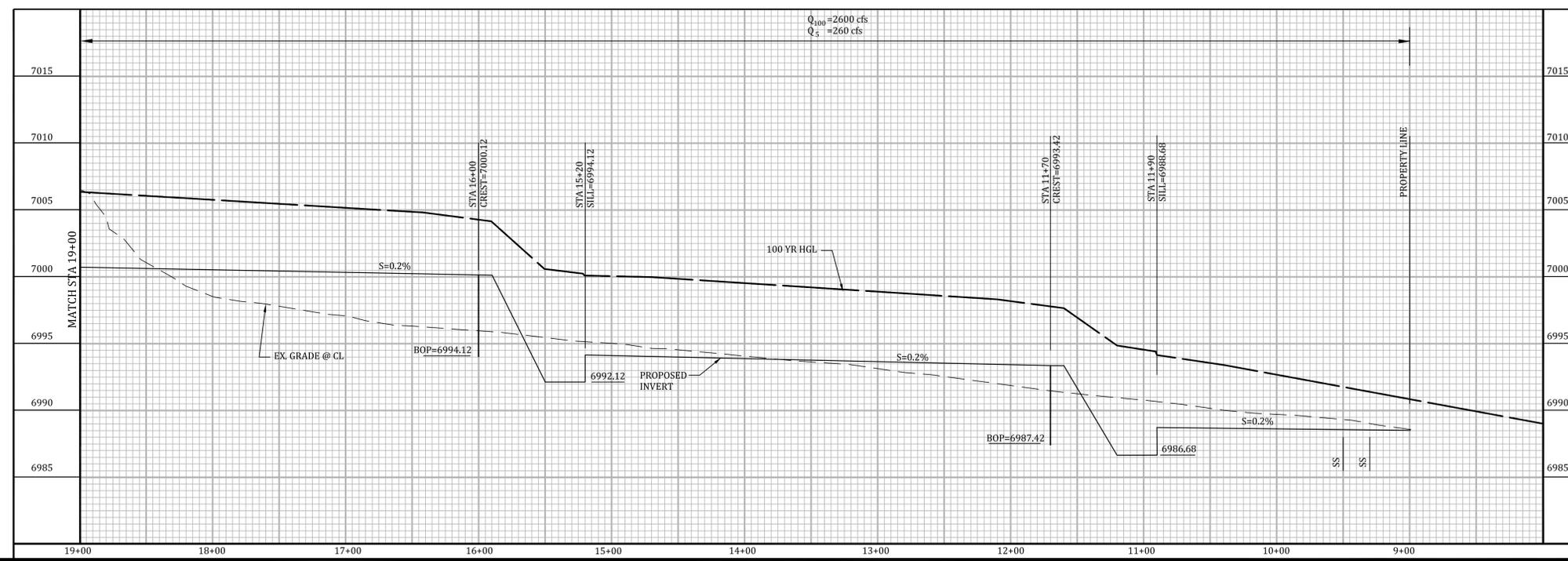
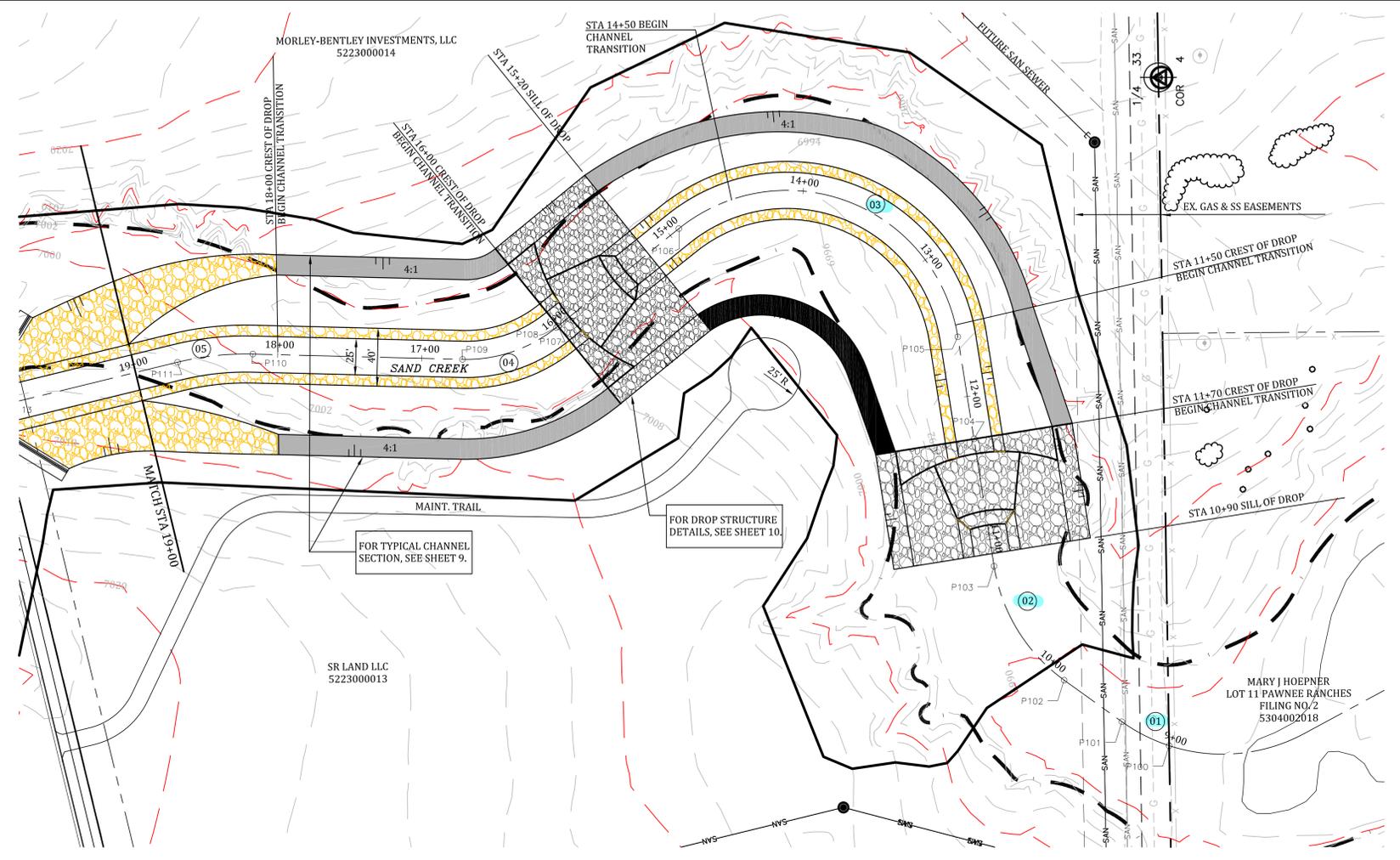
- GROUTED SLOPING BOULDER DROP
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PT#	N	COORDINATES		DESCRIPTION	ELEVATION
		E			
100	410109.60	235969.79		PL	
101	410142.41	235986.35		PT	
102	410182.50	236015.05		PC	
103	410231.15	236093.77		PT	
104	410245.15	236183.74		DROP CREST	
105	410256.37	236252.26		PC	
106	410450.02	236326.96		PT	
107	410533.88	236259.61		DROP CREST	
108	410535.05	236258.67		PC	
109	410600.17	236236.67		PT	
110	410745.75	236240.32		PC	
111	410798.05	236234.72		PT	

CURVE DATA

01	R=120.00'	L=36.89'	Δ=17.62°
02	R=120.00'	L=95.00'	Δ=45.36°
03	R=120.00'	L=250.76'	Δ=119.73°
04	R=100.00'	L=70.17'	Δ=40.21°
05	R=200.00'	L=52.76'	Δ=115.11°

Most of these radii
don't meet DCM
Section 3.3.3.E.2?

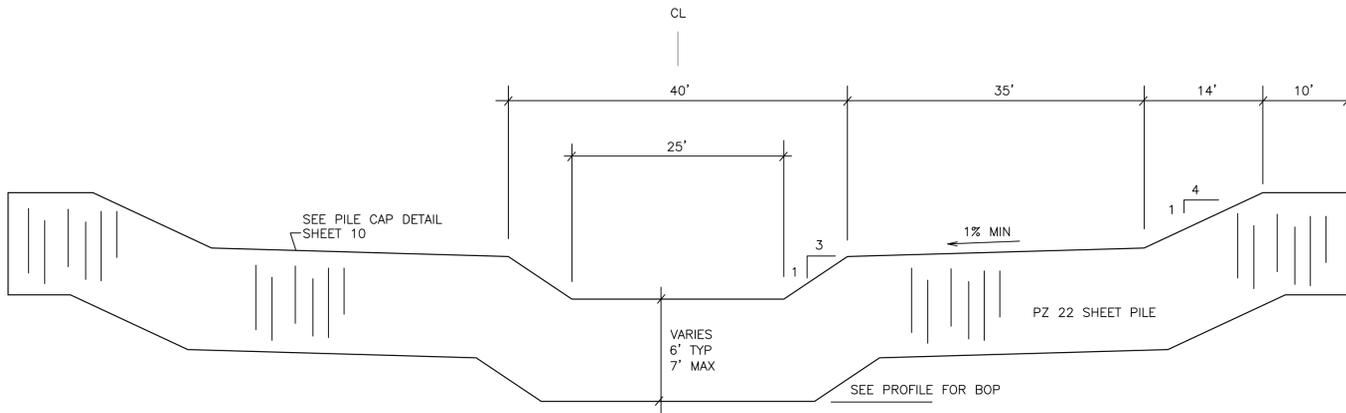


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**SAND CREEK STABILIZATION, BRIARGATE BOULEVARD &
STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
STA 19+00 TO STA 9+00
EL PASO COUNTY, COLORADO**

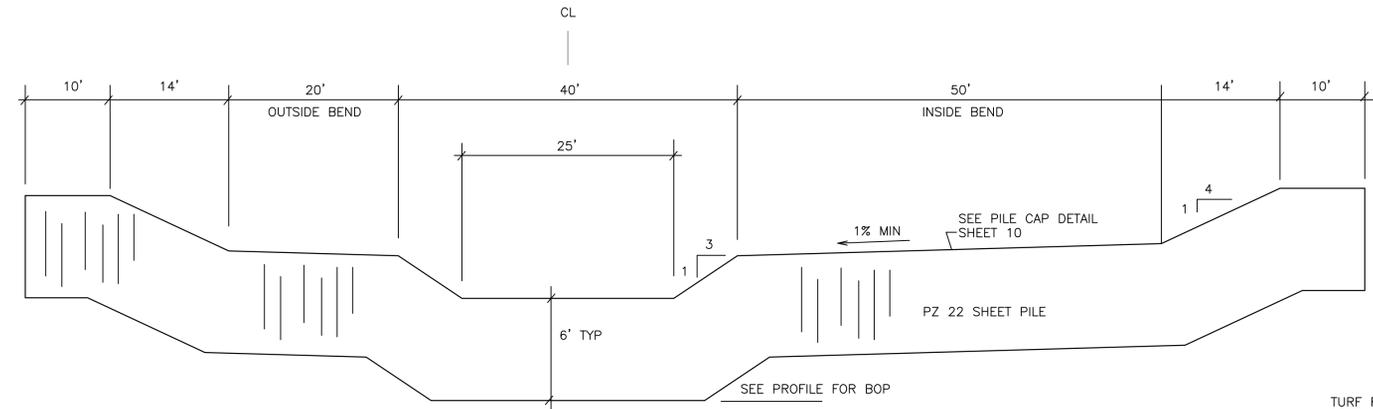
Project No.:	19032
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Check:	RNW
Revisions:	

8



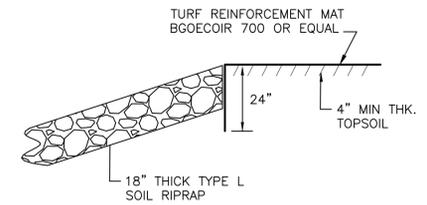
TYPICAL SHEET PILE CUTOFF WALL

H: 1"=10'
V: 1"=5'



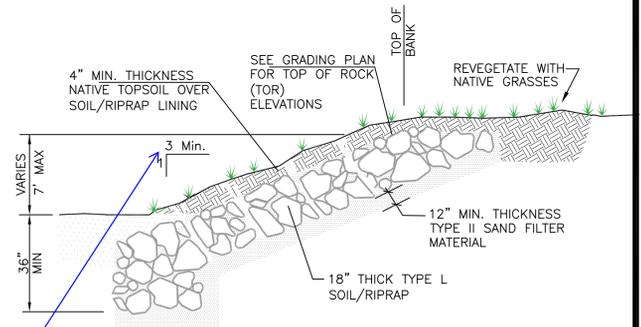
TYPICAL SHEET PILE DROP STATIONS 27+00 & 31+00

H: 1"=10'
V: 1"=5'



TRM DETAIL

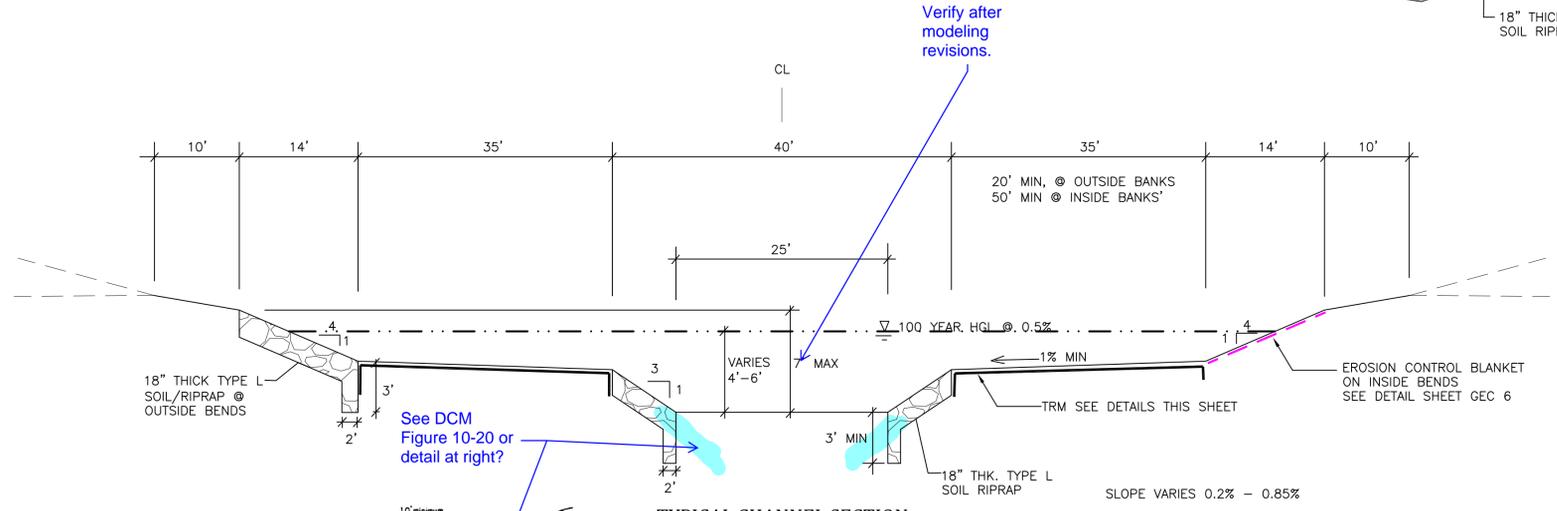
SCALE : N.T.S.



TYPICAL SOIL/RIPRAP BANK LINING

SCALE : N.T.S.

steeper than 4:1 requires fencing



TYPICAL CHANNEL SECTION

H: 1"=10'
V: 1"=5'

CLASSIFICATION OF BOULDERS		
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 [22-26]	2.00 [44"-52" MAX.]
B30	30 [28-32]	2.00 [56"-64" MAX.]
B36	36 [34-38]	1.75 [60"-67" MAX.]
B42	42 [40-44]	1.65 [66"-73" MAX.]
B48	48 [45-51+]	1.50 [68"-77" MAX.]

(TABLE MD-8: CLASSIFICATION OF BOULDERS. UDFCD, DRAINAGE CRITERIA MANUAL, VOL. 1)

CLASSIFICATION AND GRADATION OF RIPRAP			
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	100	30	18
	50-70	24	
	35-50	18	
	2-10	6	
TYPE VH	100	42	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 MD-7: CLASSIFICATION AND GRADATION OF ORDINARY RIPRAP. UDFCD, DRAINAGE CRITERIA MANUAL, VOL. 1)

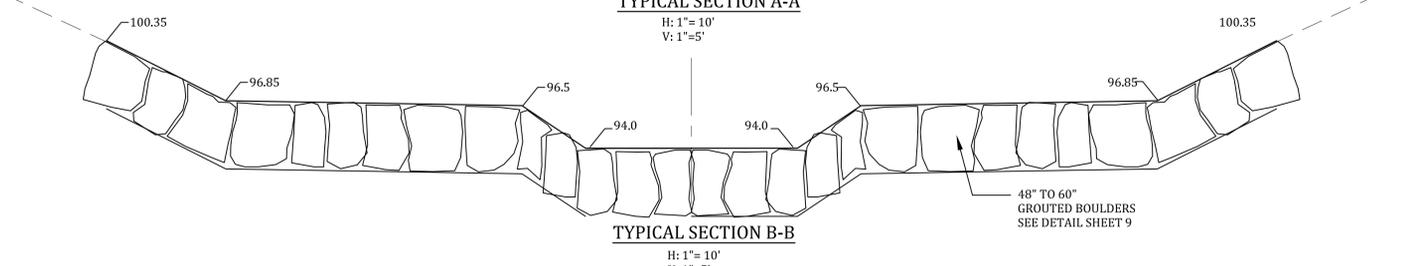
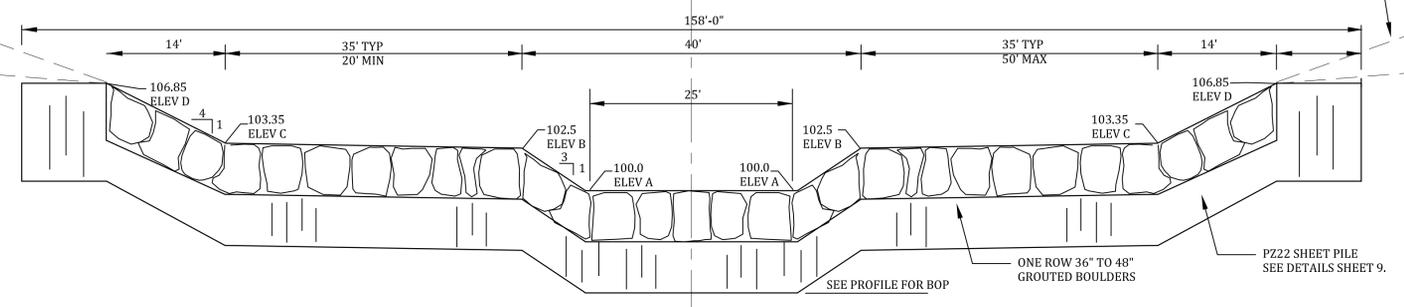
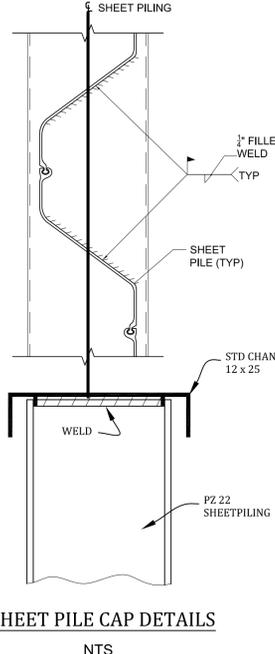
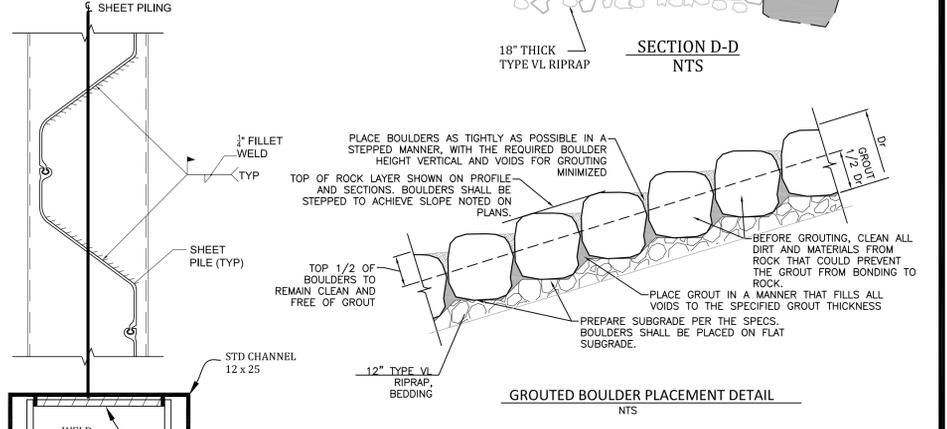
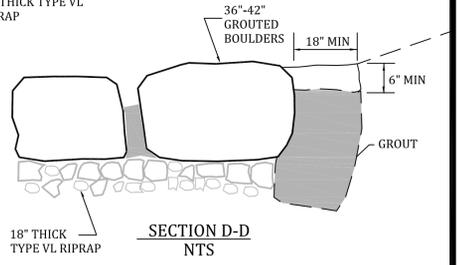
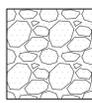
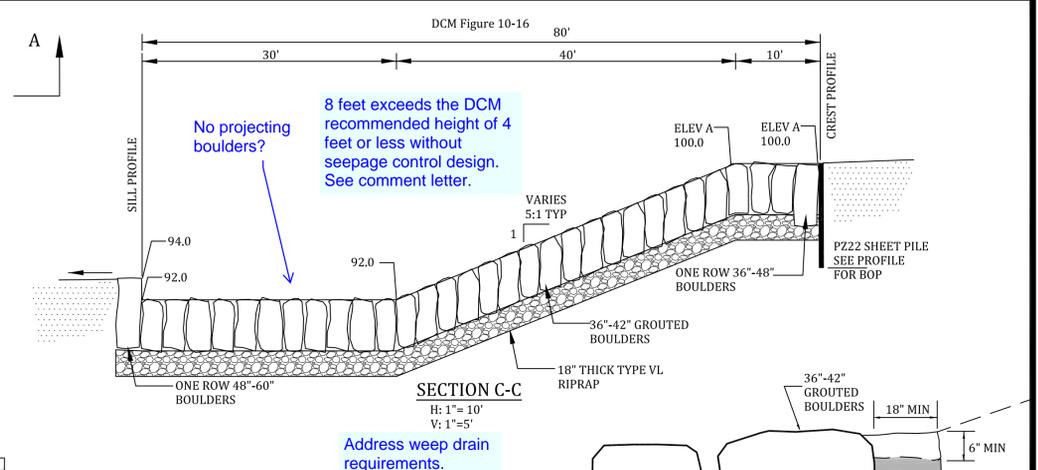
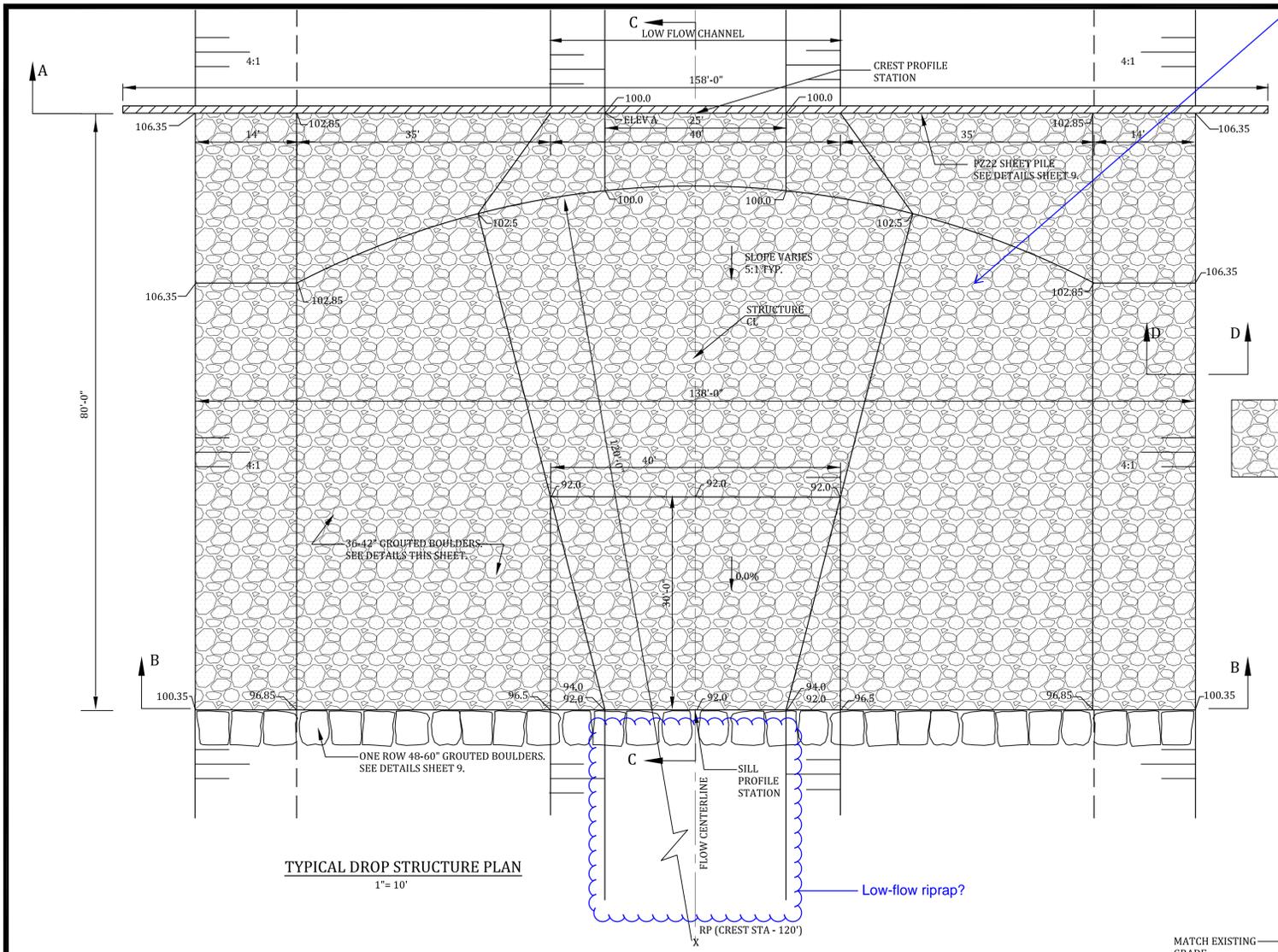
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STERLING RANCH DEVELOPMENT
 DETAILS
 EL PASO COUNTY, COLORADO

Project No.:	19032
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Lighten the hatching so that details and text are legible

Ref. DCM Figure 10-16.



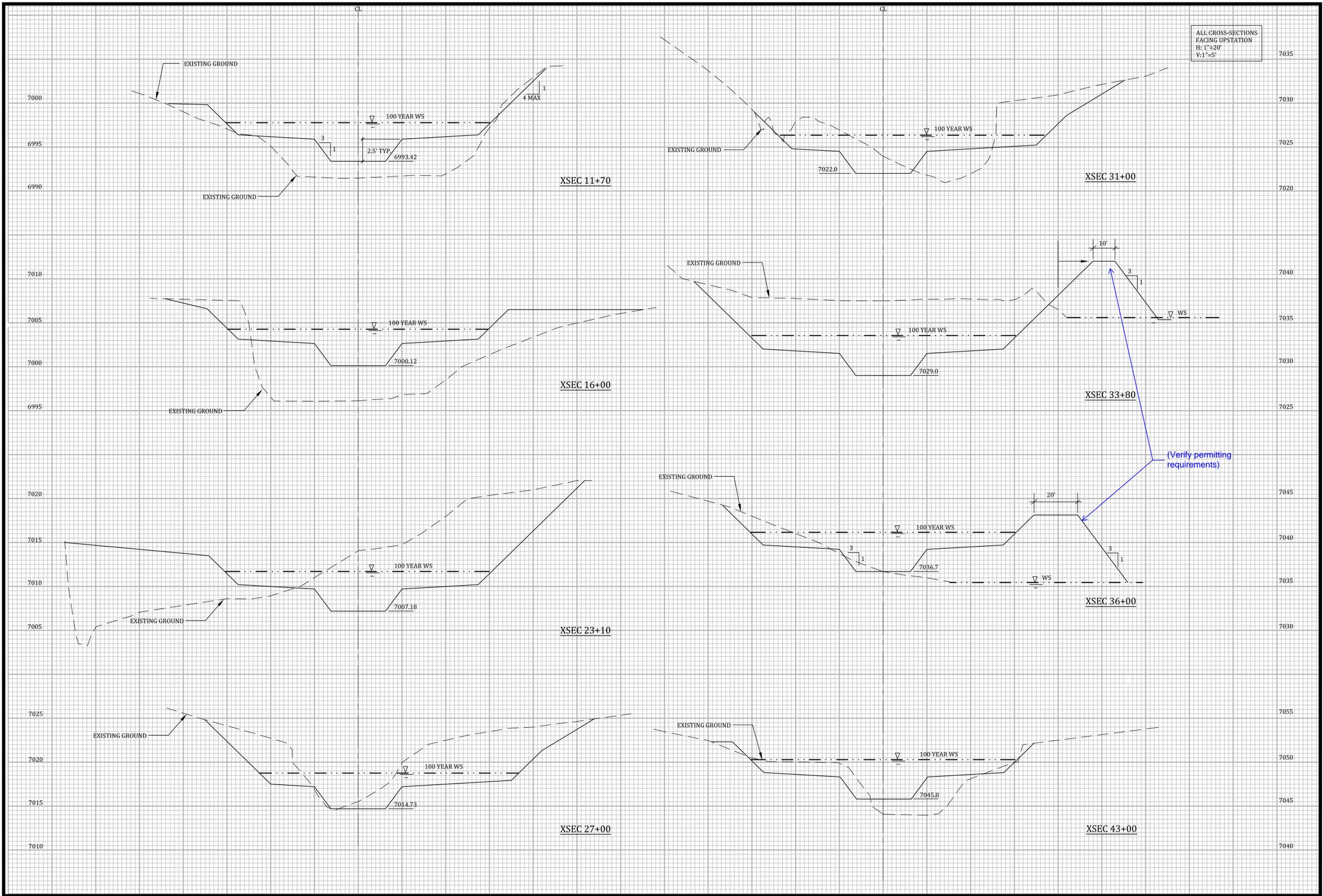
DROP STRUCTURE SCHEDULE

Crest Station	Crest Elevation	Top of Low Flow Channel	Bench Left (ft)	Bench Right (ft)	Toe Elevation Left	Toe Elevation Right	Top of Overbank Left	Top of Overbank Right
A	B	C	C	D	D			
11+70	6993.42	6995.92	35.00	35.00	6996.27	6996.27	6999.77	6999.77
16+00	7000.12	7002.62	35.00	35.00	7002.97	7002.97	7006.47	7006.47
23+10	7007.18	7009.68	35.00	35.00	7010.03	7010.03	7013.53	7013.53
27+00	7014.70	7017.20	20.00	50.00	7017.40	7017.40	7020.90	7021.20
31+00	7022.00	7024.50	20.00	50.00	7024.70	7024.70	7028.20	7028.50
33+80	7029.00	7031.50	35.00	35.00	7031.85	7031.85	7035.35	7035.35
38+00	7036.70	7039.20	35.00	35.00	7039.55	7039.55	7043.05	7043.05
43+00	7045.80	7048.30	35.00	35.00	7048.65	7048.65	7052.15	7052.15
48+00	7054.00	7056.50	35.00	35.00	7056.85	7056.85	7060.35	7060.35
53+00	7062.10	7064.60	35.00	35.00	7064.95	7064.95	7068.45	7068.45
57+00	7070.00	7072.50	35.00	35.00	7072.85	7072.85	7076.35	7076.35
60+00	7077.80	7080.10	35.00	35.00	7080.45	7080.45	7083.95	7083.95
63+00	7085.70	7088.20	35.00	35.00	7088.55	7088.55	7092.05	7092.05
67+80	7094.70	7097.20	35.00	35.00	7097.55	7097.55	7101.05	7101.05
78+00	7107.00	7109.50	35.00	35.00	7109.85	7109.85	7113.35	7113.35
81+00	7114.10	7116.60	35.00	35.00	7116.95	7116.95	7120.45	7120.45
84+20	7121.20	7123.70	35.00	35.00	7124.05	7124.05	7127.55	7127.55
89+50	7129.50	7132.00	35.00	35.00	7132.35	7132.35	7135.85	7135.85
92+00	7136.40	7138.90	35.00	35.00	7139.25	7139.25	7142.75	7142.75
95+50	7144.80	7147.30	35.00	35.00	7147.65	7147.65	7151.15	7151.15



SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
DROP STRUCTURE DETAILS
EL PASO COUNTY, COLORADO

Project No.: 19032
Date: 5/20/2020
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Drawn: EAK
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Revisions:



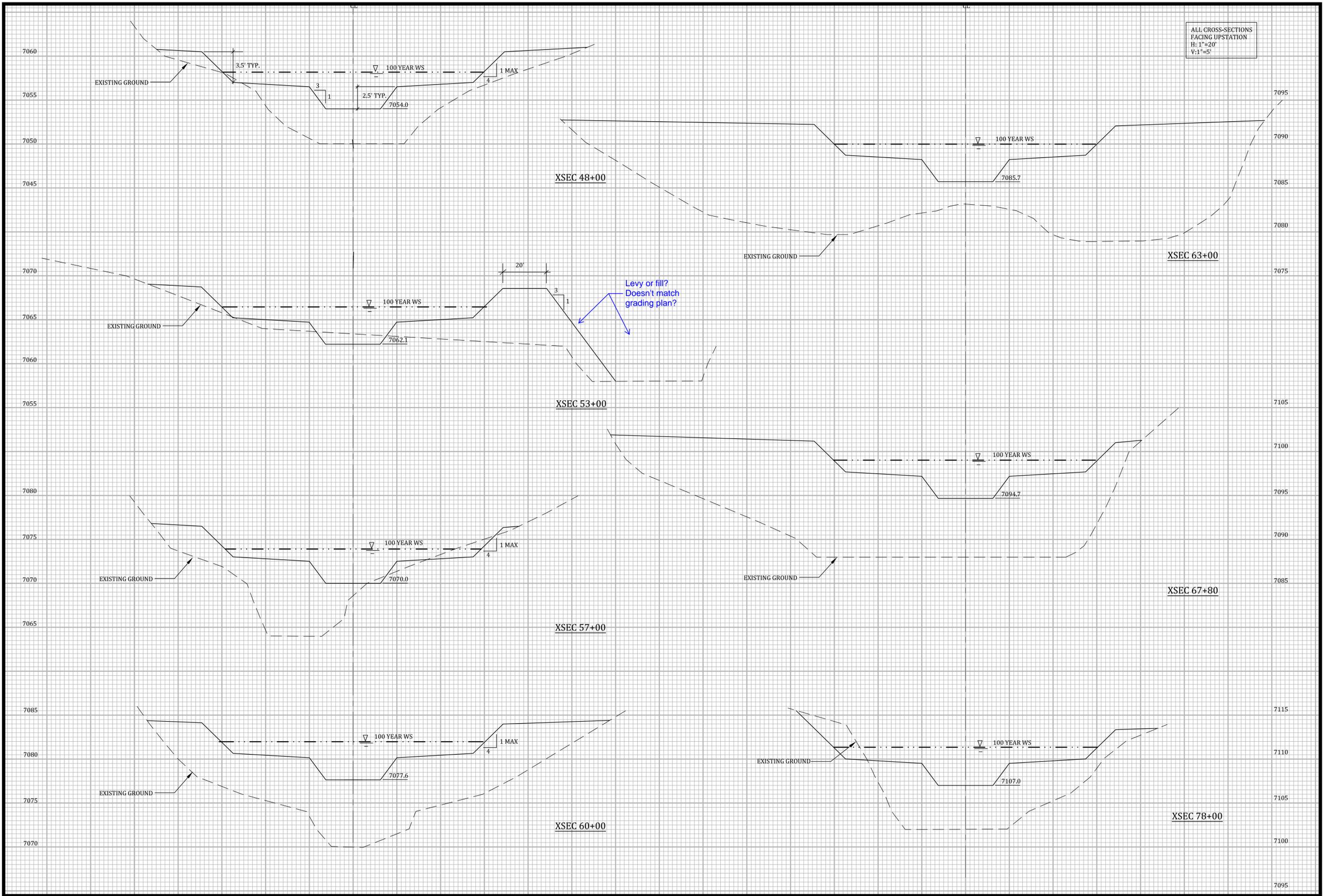
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Engineering Corporation

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(719) 530-7342

**SAND CREEK STABILIZATION, BRIARGATE BOULEVARD &
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STERLING RANCH DEVELOPMENT
CROSS-SECTIONS
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	5/20/2020
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19032 10-13 XSECTIONS.dwg/0ct 29, 2020/5:36pm



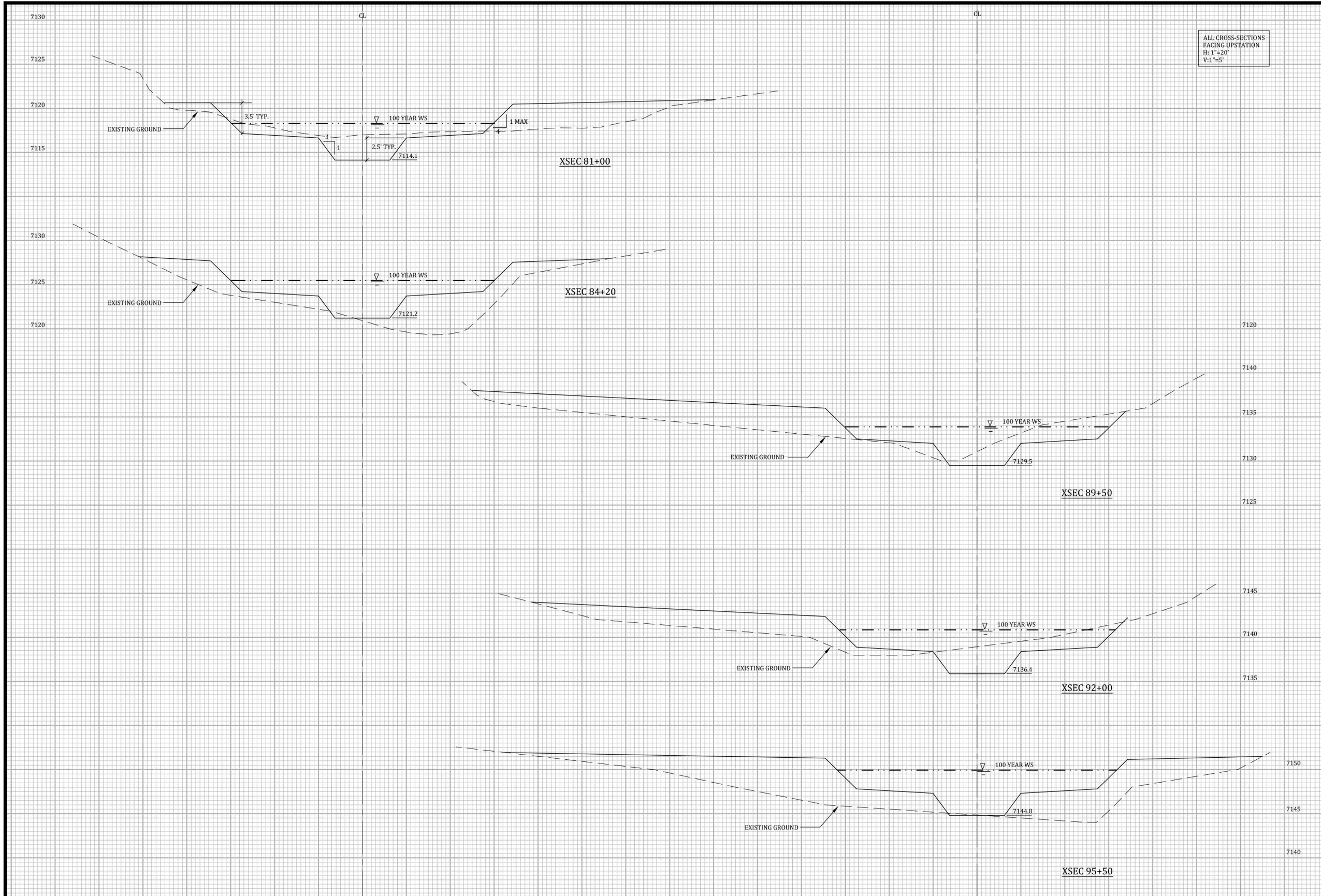
ALL CROSS-SECTIONS
FACING UPSTATION
H: 1"=20'
V: 1"=5'

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**SAND CREEK STABILIZATION, BRIARGATE BOULEVARD &
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CROSS-SECTIONS
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Revisions:	

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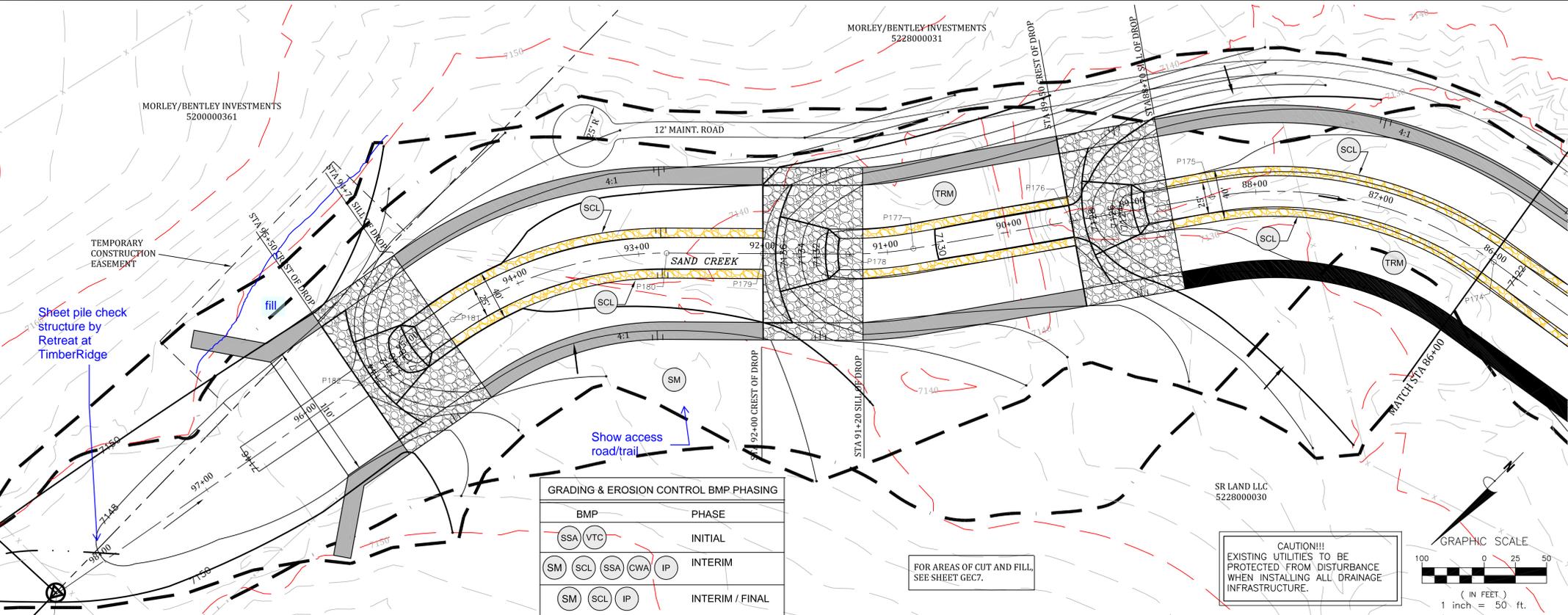


**SAND CREEK STABILIZATION, BRIARGATE BOULEVARD &
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 STERLING RANCH DEVELOPMENT
 CROSS-SECTIONS
 EL PASO COUNTY, COLORADO**

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Revisions:	

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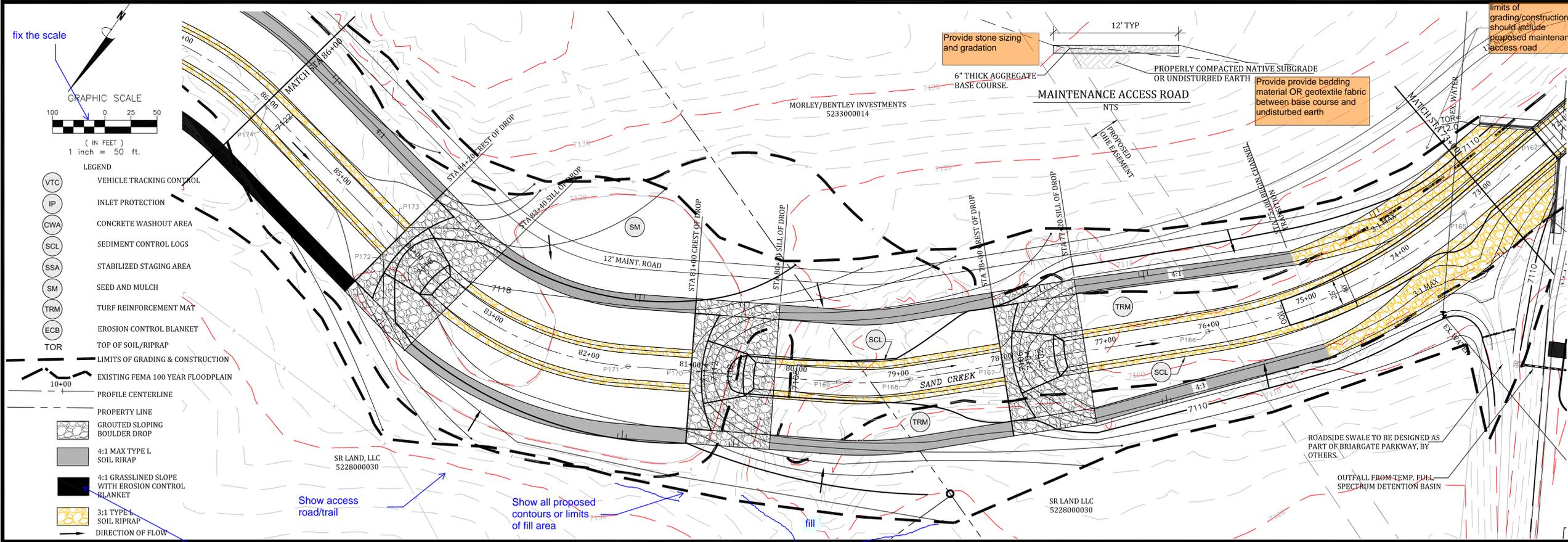
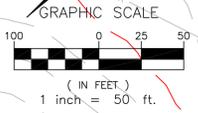
- NOTES:
1. CONTRACTOR TO IDENTIFY MATERIAL AND SOIL STOCKPILES AREA ON THE SWMP PRIOR TO THE COMMENCEMENT OF MOBILIZATION AND PROVIDE PERIMETER CONTROL CONSTRUCTION FENCE. CONTRACTOR SHALL IDENTIFY STABILIZED STAGING AREA ON THE PLAN, THE LOCATION OF VEHICLE AND EQUIPMENT STORAGE AND MAINTENANCE, STORAGE AREAS FOR FERTILIZERS AND PESTICIDES, ON SITE WASTE MANAGEMENT MEASURES SUCH AS PORTOLETS, TRASH ROLL-OFF AND CONCRETE TRUCK AND EQUIPMENT WASHING AREA PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITIES.
 2. CONTRACTOR TO IDENTIFY STABILIZED STAGING AREA PRIOR TO THE COMMENCEMENT OF MOBILIZATION.
 3. CONSTRUCTION FENCING SHALL BE PROVIDED AT LIMITS OF GRADING/CONSTRUCTION AS PART OF THE INSTALLATION OF THE INITIAL BMPs.
 4. CONTRACTOR SHALL PROVIDE CONSTRUCTION FENCING AROUND AREAS TO REMAIN UNDISTURBED BUT WITHIN LIMITS OF GRADING.
 5. VEHICLE TRACKING BMPs FOR THIS PROJECT WILL BE LOCATED OFFSITE FROM THE WORK SHOWN ON THESE PLANS. VEHICLE TRACKING OFFSITE FROM THE PROJECT SHALL BE MAINTAINED CONTINUOUSLY THROUGHOUT THE PERIOD OF CONSTRUCTION.
 6. THERE WILL BE NO DEDICATED ASPHALT OR CONCRETE BATCH PLANS REQUIRED FOR THIS PROJECT.
 7. EXISTING VEGETATION IS MAINLY GRASSES AND HERBS WITH SMALLER AMOUNTS OF SHRUBS. EXISTING VEGETATION IS ESTIMATED AT 80%, BUT CONTRACTOR SHALL FIELD VERIFY PRIOR TO CONSTRUCTION.



GRADING & EROSION CONTROL BMP PHASING	
BMP	PHASE
(SSA) (VTC)	INITIAL
(SM) (SCL) (SSA) (CWA) (IP)	INTERIM
(SM) (SCL) (IP)	INTERIM / FINAL

FOR AREAS OF CUT AND FILL, SEE SHEET GEC7.

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

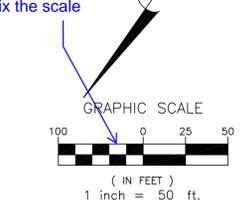


Provide stone sizing and gradation

PROPERLY COMPACTED NATIVE SUBGRADE OR UNDISTURBED EARTH

Provide bedding material OR geotextile fabric between base course and undisturbed earth

limits of grading/construction should include proposed maintenance access road



- fix the scale
- LEGEND
- (VTC) VEHICLE TRACKING CONTROL
 - (IP) INLET PROTECTION
 - (CWA) CONCRETE WASHOUT AREA
 - (SCL) SEDIMENT CONTROL LOGS
 - (SSA) STABILIZED STAGING AREA
 - (SM) SEED AND MULCH
 - (TRM) TURF REINFORCEMENT MAT
 - (ECB) EROSION CONTROL BLANKET
 - (TOR) TOP OF SOIL/RIPRAP
 - LIMITS OF GRADING & CONSTRUCTION
 - EXISTING FEMA 100 YEAR FLOODPLAIN
 - PROFILE CENTERLINE
 - PROPERTY LINE
 - GROUTED SLOPING BOULDER DROP
 - 4:1 MAX TYPE L SOIL RIPRAP
 - 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
 - 3:1 TYPE L SOIL RIPRAP
 - DIRECTION OF FLOW

Show access road/trail

Show all proposed contours or limits of fill area

Show all linetypes and features in the legend (contours, fencing, etc)

use a different hatch so that this does not obstruct other features

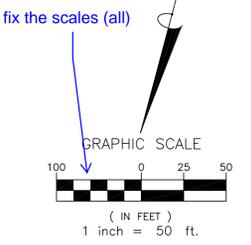
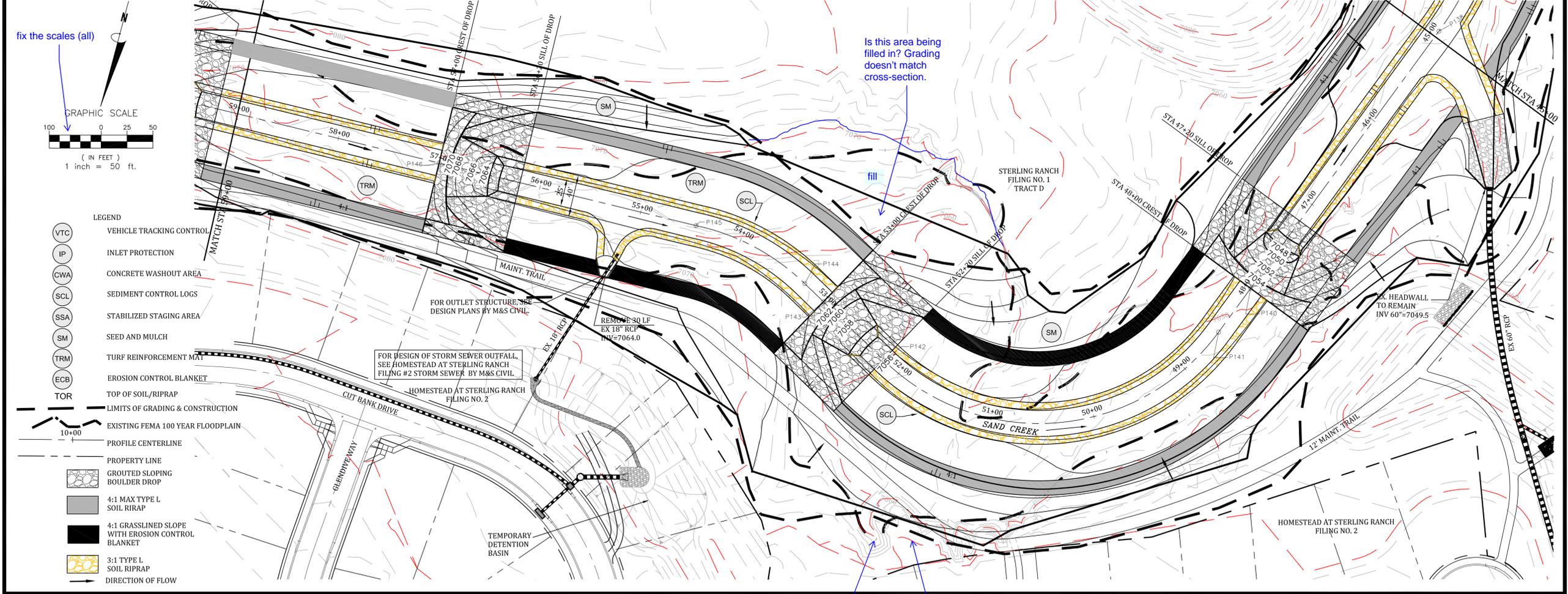
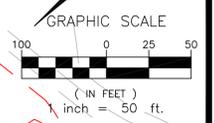
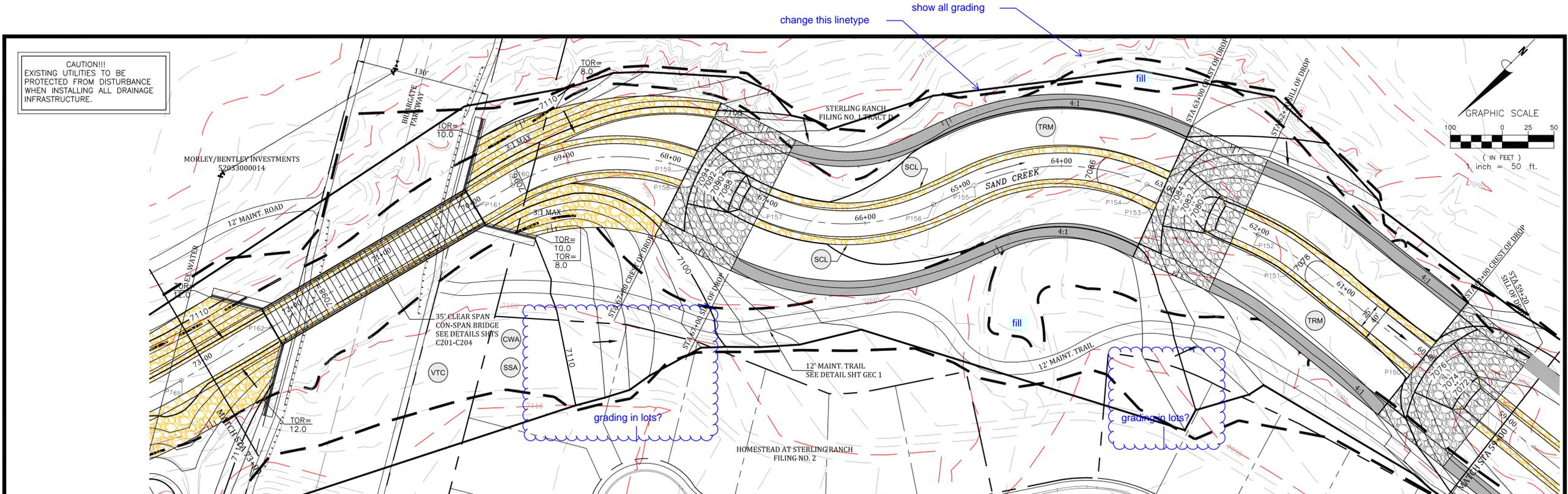
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 Celebrating 30 years
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 Colorado Springs, Colorado 80904
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SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
 STERLING RANCH DEVELOPMENT
 STA 97+00 TO STA 73+00
 EL PASO COUNTY, COLORADO

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GEC1

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



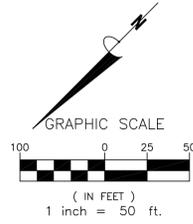
- LEGEND
- (VTC) VEHICLE TRACKING CONTROL
 - (IP) INLET PROTECTION
 - (CWA) CONCRETE WASHOUT AREA
 - (SCL) SEDIMENT CONTROL LOGS
 - (SSA) STABILIZED STAGING AREA
 - (SM) SEED AND MULCH
 - (TRM) TURF REINFORCEMENT MAT
 - (ECB) EROSION CONTROL BLANKET
 - TOR TOP OF SOIL/RIPRAP
 - LIMITS OF GRADING & CONSTRUCTION
 - - - EXISTING FEMA 100 YEAR FLOODPLAIN
 - PROFILE CENTERLINE
 - PROPERTY LINE
 - [Pattern] GROUTED SLOPING BOULDER DROP
 - [Pattern] 4:1 MAX TYPE L SOIL RIPRAP
 - [Pattern] 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
 - [Pattern] 3:1 TYPE L SOIL RIPRAP
 - DIRECTION OF FLOW

Celebrating 30 years
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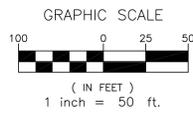
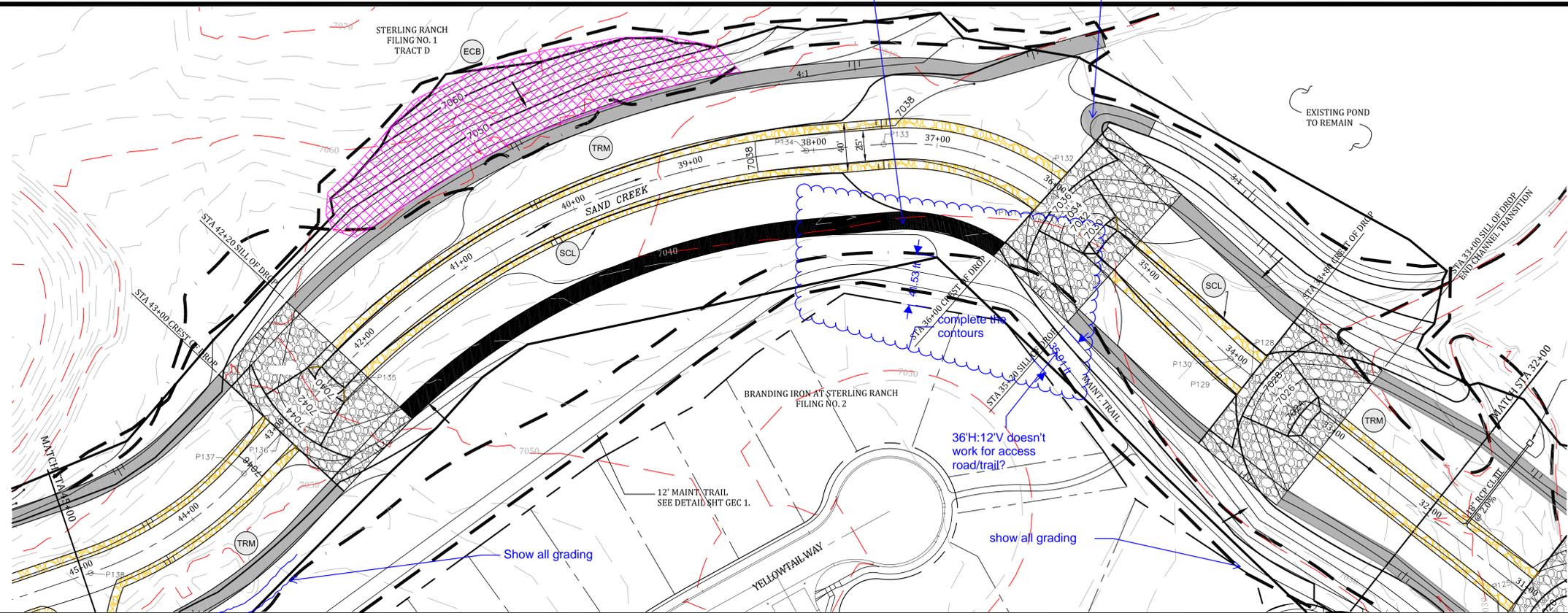
**SAND CREEK STABILIZATION, BRIARGATE BOULEVARD &
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STERLING RANCH DEVELOPMENT
STA 73+00 TO STA 45+00
EL PASO COUNTY, COLORADO**

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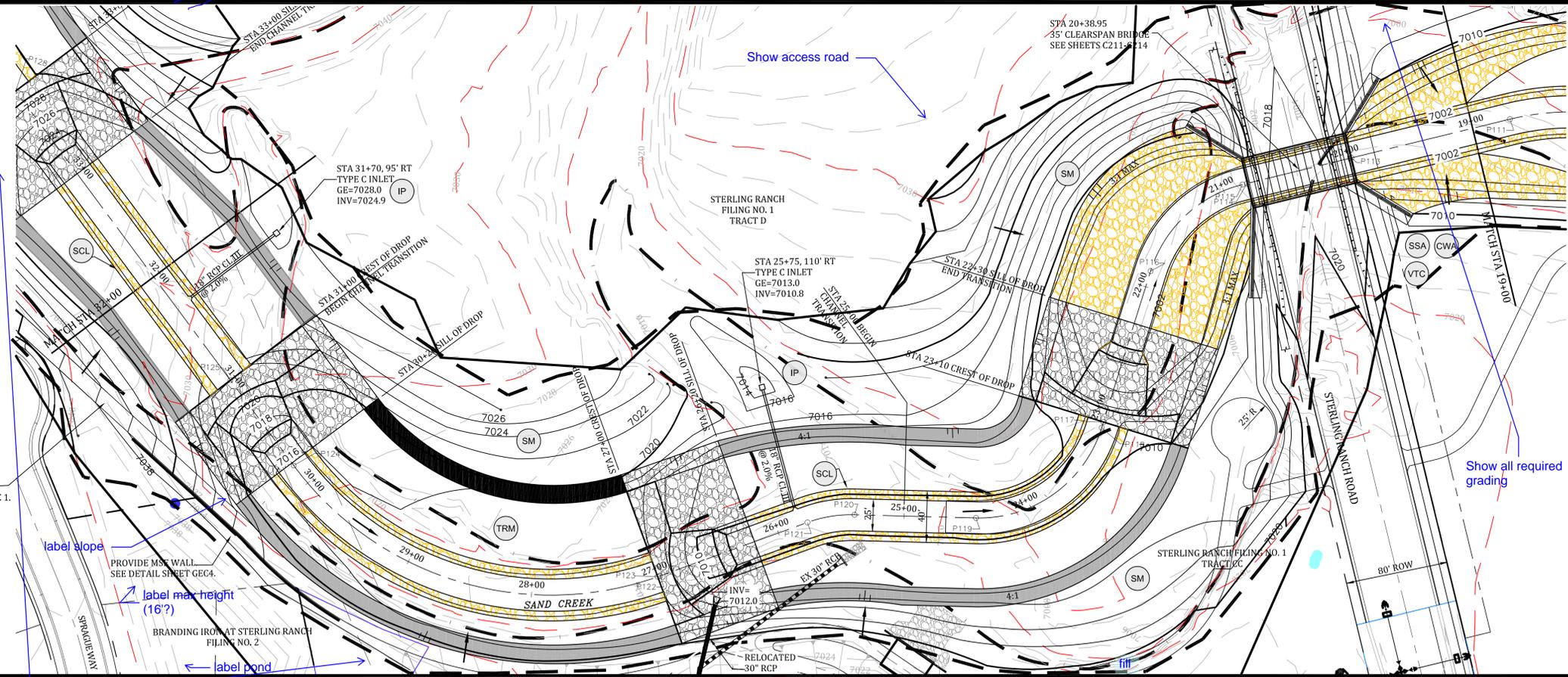
GEC2



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



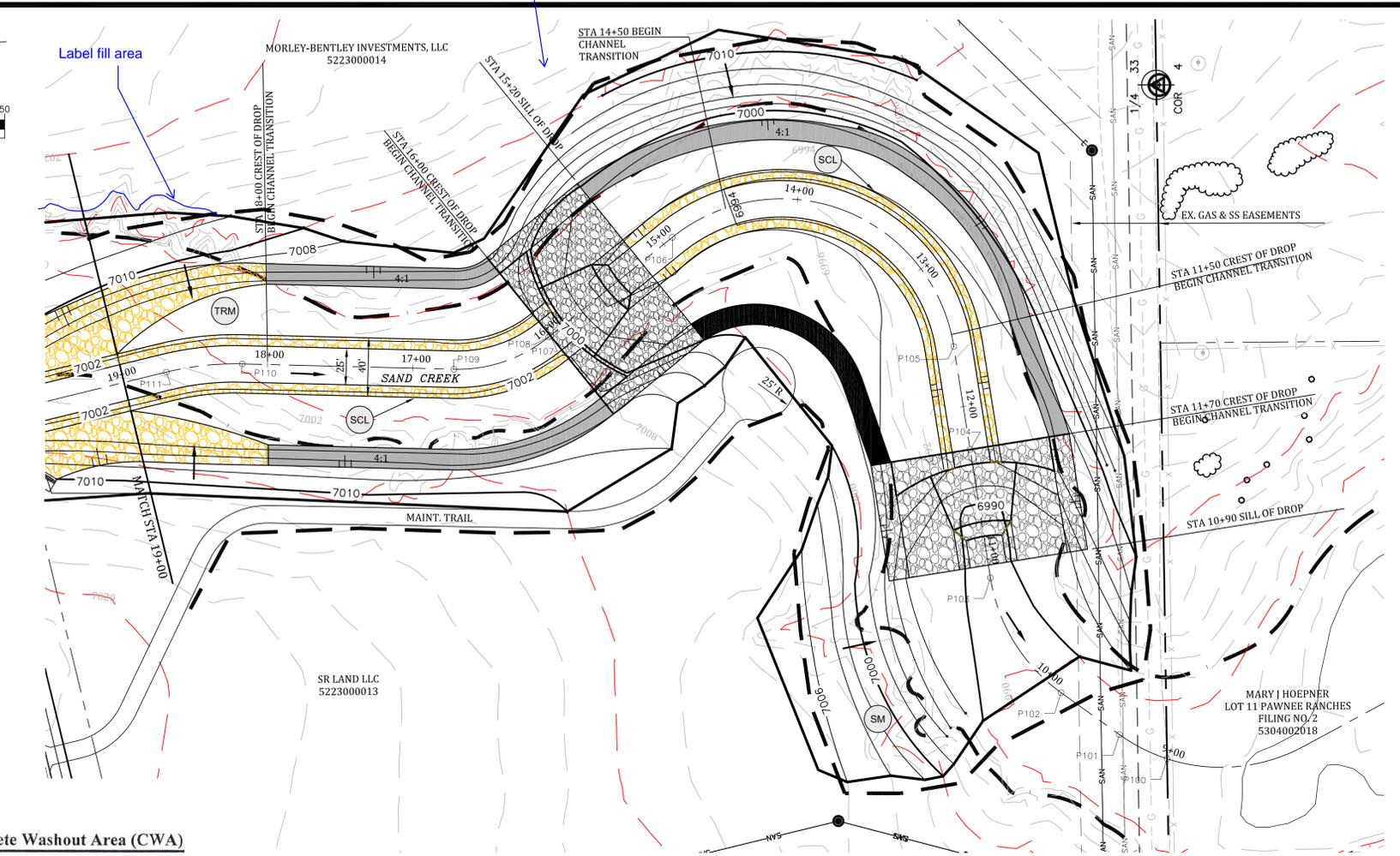
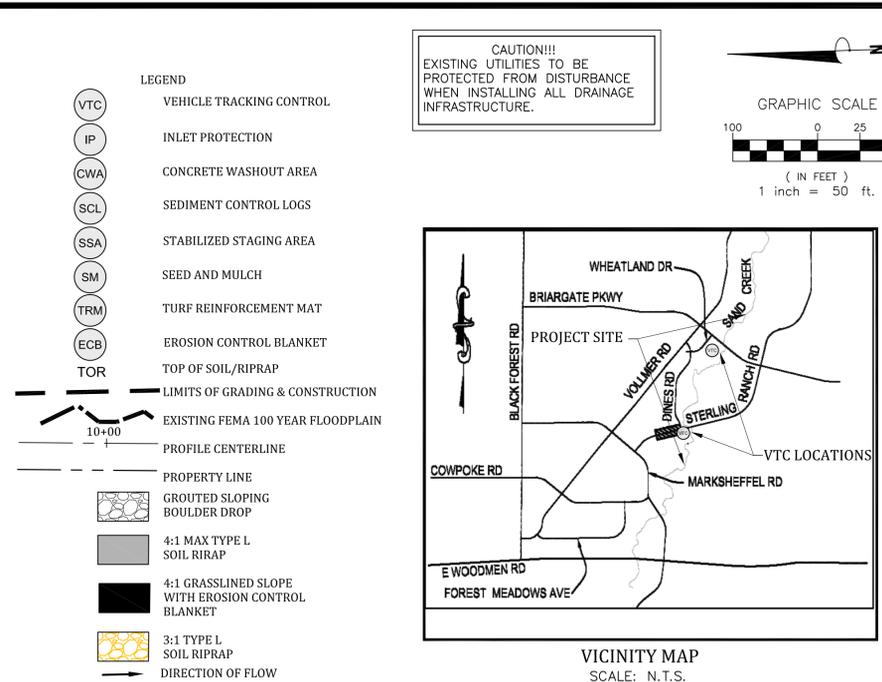
- LEGEND
- (VTC) VEHICLE TRACKING CONTROL
 - (IP) INLET PROTECTION
 - (CWA) CONCRETE WASHOUT AREA
 - (SCL) SEDIMENT CONTROL LOGS
 - (SSA) STABILIZED STAGING AREA
 - (SM) SEED AND MULCH
 - (TRM) TURF REINFORCEMENT MAT
 - (ECB) EROSION CONTROL BLANKET
 - (TOR) TOP OF SOIL/RIPRAP
 - LIMITS OF GRADING & CONSTRUCTION
 - EXISTING FEMA 100 YEAR FLOODPLAIN
 - PROFILE CENTERLINE
 - PROPERTY LINE
 - GROUDED SLOPING BOULDER DROP
 - 4:1 MAX TYPE I SOIL RIPRAP
 - 4:1 GRASSLINED SLOPE WITH EROSION CONTROL BLANKET
 - 3:1 TYPE I SOIL RIPRAP
 - DIRECTION OF FLOW
 - 12' MAINT. TRAIL SEE DETAIL SHT GEC 1
 - PROVIDE MS WALL SEE DETAIL SHT GEC 4
 - BRANDING IRON AT STERLING RANCH FILING NO. 2
 - label slope
 - label max height (16'?)
 - label pond



**SAND CREEK STABILIZATION, BIRGATE BOULEVARD &
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STERLING RANCH DEVELOPMENT
STA 45+00 TO STA 19+00
EL PASO COUNTY, COLORADO**

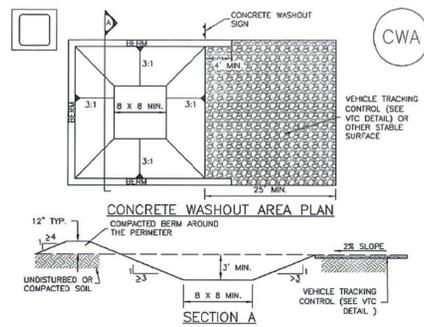
Project No:	19032
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Revisions:	

GEC3



Concrete Washout Area (CWA) MM-1

Concrete Washout Area (CWA) MM-1

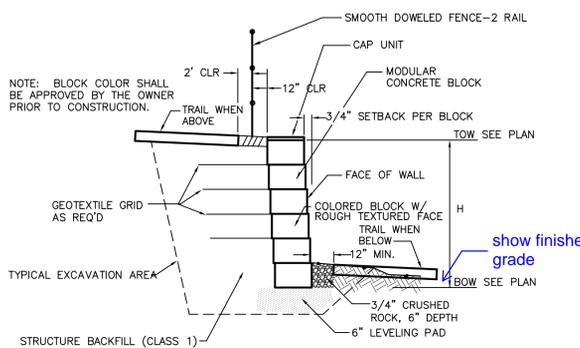


CWA-1 CONCRETE WASHOUT AREA

- CWA INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
 - CWA INSTALLATION LOCATION.
 - DO NOT LOCATE AN UNLINED CWA WITHIN 400' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODY. DO NOT LOCATE WITHIN 1,000' OF ANY WELLS OR DRINKING WATER SOURCES. IF SITE CONSTRAINTS MAKE THIS INFEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE, THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (16 MIL MIN. THICKNESS) OR SURFACE STORAGE ALTERNATIVES USING PREFABRICATED CONCRETE WASHOUT DEVICES OR A UNLINED ABOVE GROUND STORAGE ARE SHOULD BE USED.
 - THE CWA SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT ON SITE.
 - CWA SHALL INCLUDE A FLAT SUBSURFACE PIT THAT IS AT LEAST 8" BY 8" SLOPES LEADING OUT OF THE SUBSURFACE PIT SHALL BE 3:1 OR FLATTER. THE PIT SHALL BE AT LEAST 3' DEEP.
 - BERM SURROUNDING SIDES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 1'.
 - VEHICLE TRACKING PAD SHALL BE SLOPED 2% TOWARDS THE CWA.
 - SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE CWA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CWA TO OPERATORS OF CONCRETE TRUCKS AND PUMP TRUCKS.
 - USE EXCAVATED MATERIAL FOR PERIMETER BERM CONSTRUCTION.

CWA MAINTENANCE NOTES

- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - THE CWA SHALL BE REPAIRED, CLEANED, OR ENLARGED AS NECESSARY TO MAINTAIN CAPACITY FOR CONCRETE WASTE, CONCRETE MATERIALS, ACCUMULATED IN PIT, SHALL BE REMOVED ONCE THE MATERIALS HAVE REACHED A DEPTH OF 2'.
 - CONCRETE WASHOUT WATER, WASTED PIECES OF CONCRETE AND ALL OTHER DEBRIS IN THE SUBSURFACE PIT SHALL BE TRANSPORTED FROM THE JOB SITE IN A WATER-TIGHT CONTAINER AND DISPOSED OF PROPERLY.
 - THE CWA SHALL REMAIN IN PLACE UNTIL ALL CONCRETE FOR THE PROJECT IS PLACED.
 - WHEN THE CWA IS REMOVED, COVER THE DISTURBED AREA WITH TOP SOIL, SEED AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE LOCAL JURISDICTION.
- (DETAIL ADAPTED FROM SOULS GAS, COLORADO AND THE CITY OF PARKER, COLORADO, NOT AVAILABLE IN AUTOCAD)
- NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM UDFCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.



CONCRETE BLOCK FACING MSE WALL CROSS SECTION

- NOTES:**
- SHOP DRAWINGS DEPICTING THE DESIGN OF BLOCK WALL SHALL BE SUBMITTED TO ENGINEER PRIOR TO CONSTRUCTION PER THE PROJECT SPECIFICATIONS. DESIGN SHALL BE COMPLETED UNDER THE SUPERVISION OF A PROPERLY REGISTERED PROFESSIONAL ENGINEER WITH THE STATE OF COLORADO. FINAL CONSTRUCTION DRAWINGS SHALL BEAR HIS/HER SEAL AND SIGNATURE.
 - BUILDING PERMIT FOR THE INSTALLATION OF THE MSE WALL MAY BE REQUIRED THROUGH THE PIKES PEAK REGIONAL BUILDING DEPARTMENT.

PROJECT SPECIFIC GRADING AND EROSION CONTROL NOTES

- All earthwork required of this construction shall be completed in accordance with all applicable sections of the Project Specifications and Soil Investigation Report (Geotechnical Report).
- Rubbish including timber, concrete rubble, trees, brush, and asphalt shall not be backfilled adjacent to any of the structures or be in the placement of any undisturbed fill. The Contractor shall be responsible for the removal and hauling of such materials to a suitable spoil area. Costs associated with the removal of such materials shall be paid for as documented in the Project Specifications.
- Excess excavation shall become the property of the Contractor and shall be disposed of at the Contractor's expense. The cost of hauling and spilling of excess excavated materials shall be paid for as documented in the Project Specifications.
- Water shall be used as a dust palliative as required and shall be included in the cost for earthwork item(s). No separate payment will be made for dust control associated with the site construction.
- The road grades shall be cleared of vegetation and the topsoil stockpiled for later use.
- All grading shall be in conformance with the Geotechnical Report for the area.
- Placement of fill for roadway embankments shall be completed in conformance with the Geotechnical Report.
- Grading contours shown on this plan are to final grade.
- Compaction under filled areas, including roadway and detention basin embankments, shall be 95 percent of the maximum Standard Proctor Density (ASTM D698) at two (2) percent of optimum moisture content.
- No rubble or debris shall be placed in the backfill under any of the proposed buildings, streets, curb & gutter, sidewalk and drainage structures or within five (5) feet of a building footprint. Properly graded rubble may be used in some locations as specified and verified by the Geotechnical Engineer.
- Contractor is responsible for reviewing the site prior to bidding to verify site conditions.
- Contractor is responsible for providing erosion control measures as approved by the El Paso County PCD Engineering Division and as may be required by the El Paso County Inspector.
- All slopes equal to or greater than 3:1 shall require anchored soil retention blanket (SRB), Geocel 700 or equal.
- The Developer is responsible for maintaining erosion control measures until a mature stage of vegetation is established.
- All soils used for fill must be approved by a representative of the Geotechnical Engineer.
- All natural ground to receive fill must be properly scarified, watered and compacted prior to placing fill.
- The Contractor is solely responsible for the design, maintenance and operation of any required dewatering system. The Contractor shall perform such independent investigation as he deems necessary to satisfy himself as to the subsurface groundwater conditions and unstable soil conditions to be encountered throughout the construction. Contractor shall coordinate the dewatering system with El Paso County when associated with public facilities.
- No fill shall be placed, spread or rolled while it is frozen, thawing or during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until a representative of the Geotechnical Engineer indicates that the moisture content and density of the previously placed fill are as specified. Fill surfaces may be scarified and recompact after rainfall if necessary, to obtain proper moisture density relation.
- Additional erosion control structures and/or grading may be required at the time of construction.
- Sediment removal for erosion control facilities shall be performed continuously for proper function.
- Base mapping was provided by MS Civil Engineers The date of the last survey update was 2019.
- Proposed Construction Schedule:
 - Begin Construction: pending
 - End Construction: pending
 - Total Site Area = 60 Acres
 - Area to be disturbed = 47.3 Acres (est.)
 - Existing 100-year runoff coefficient = 0.25
 - Proposed 100-year runoff coefficient = 0.25
 - Existing Hydrologic Soil Groups: HSG A & B
 - Site is currently undeveloped and covered with native grasses on mild to moderate to steep slopes (1%-4%).
 - Site is located in the Sand Creek Drainage Basin.

SEEDING AND MULCHING INSTALLATION NOTES

- SEE PLAN VIEW FOR:
 - AREA OF SEEDING AND MULCHING.
 - TYPE OF SEED MIX.
- ALL BRANDS FURNISHED SHALL BE FREE FROM SUCH NOXIOUS SEEDS AS RUSSIAN OR CANADIAN THISTLE, COARSE FESCUE, EUROPEAN BINDWEED, JOHNSON GRASS, KNAP WEED AND LEAFY SPURGE.
- THE SEEDER SHALL FURNISH TO THE CONTRACTOR A SIGNED STATEMENT CERTIFYING THAT THE SEED FURNISHED IS FROM A LOT THAT HAS BEEN TESTED BY A RECOGNIZED LABORATORY, SEED WHICH HAS BECOME WET, MOLDY OR OTHERWISE DAMAGED IN TRANSIT OR IN STORAGE WILL NOT BE ACCEPTABLE. SEED TICKETS SHALL BE PROVIDED TO REGULATING AGENCY UPON REQUEST.
- DRILL SEEDING MIX SHALL CONFORM TO THE TABLE ON THE RIGHT.
- IF THE SEED AVAILABLE ON THE MARKET DOES NOT MEET THE MINIMUM PURITY AND GERMINATION PERCENTAGES SPECIFIED, THE SUBCONTRACTOR MUST COMPENSATE FOR A LESSER PERCENTAGE OF PURITY OR GERMINATION BY FURNISHING SUFFICIENT ADDITIONAL SEED TO EQUAL THE SPECIFIED PRODUCT. THE TAGS FROM THE SEED MIXES MUST BE SUPPLIED TO CONTRACTOR AND FORWARDED TO THE REGULATING AGENCY'S GESC INSPECTOR.
- THE FORMULA USED FOR DETERMINING THE QUANTITY OF PURE LIVE SEED (PLS) SHALL BE (POUNDS OF SEED) X (PURITY) X (GERMINATION) = POUNDS OF PURE LIVE SEED (PLS).
- PERMANENT SEED MIX SHALL BE USED UNLESS OTHERWISE APPROVED BY THE REGULATING AGENCY.
- ALL AREAS TO BE SEEDED AND MULCHED SHALL HAVE NATIVE TOPSOIL OR APPROVED SOIL AMENDMENTS SPREAD TO A DEPTH OF AT LEAST 6 INCHES (LOOSE DEPTH), HAUL ROADS AND OTHER COMPACTED AREAS SHALL BE LOOSENEED TO A DEPTH OF 6 INCHES PRIOR TO SPREADING TOPSOIL.
- SOIL IS TO BE THOROUGHLY LOOSENEED (TILED) TO A DEPTH OF AT LEAST 6 INCHES PRIOR TO SEEDING. THE TOP 6 INCHES OF THE SEED BED SHALL BE FREE OF ROCKS GREATER THAN 4 INCHES AND SOIL CLODS GREATER THAN 2 INCHES. SEEDING OVER ANY COMPACTED AREAS THAT HAVEN'T BEEN THOROUGHLY LOOSENEED SHALL BE REJECTED.
- SEED IS TO BE APPLIED USING A MECHANICAL DRILL TO A DEPTH OF 1/4 INCH. ROW SPACING SHALL BE NO MORE THAN 6 INCHES. MATERIAL USED FOR MULCH SHALL CONSIST OF LONG-STEMMED STRAW, AT LEAST 50 PERCENT OF THE MULCH, BY WEIGHT, SHALL BE 10 INCHES OR MORE IN LENGTH. MULCH SHALL BE APPLIED AND MECHANICALLY ANCHORED TO A DEPTH OF AT LEAST 2 INCHES. MULCH SHALL BE APPLIED AT A RATE OF 4000 LB. OF STRAW PER ACRE.
- IF THE PERMITTEE DEMONSTRATES TO THE REGULATING AGENCY THAT IT IS NOT POSSIBLE TO DRILL SEED, SEED IS TO BE UNIFORMLY BROADCAST AT TWO TIMES THE DRILLED RATE, THEN LIGHTLY HARROWED TO PROVIDE A SEED DEPTH OF APPROXIMATELY 1/4 INCH, THEN ROLLED TO COMPACT, THEN MULCHED AS SPECIFIED ABOVE.
- SEEDING AND MULCHING SHALL BE COMPLETED WITHIN 30 DAYS OF INITIAL EXPOSURE OR 7 DAYS AFTER GRADING IS SUBSTANTIALLY COMPLETE IN A GIVEN AREA (AS DEFINED BY THE REGULATING AGENCY). THIS MAY REQUIRE MULTIPLE MOBILIZATIONS FOR SEEDING AND MULCHING.
- MULCH SHALL BE APPLIED WITHIN 24 HOURS OF SEEDING.
- TACKIFIER SHOULD BE UTILIZED TO HELP WITH STRAW DISPLACEMENT.

SEEDING AND MULCHING MAINTENANCE NOTES

- SEEDED AND MULCHED AREAS SHALL BE INSPECTED FOR REQUIRED COVERAGE MONTHLY FOR A PERIOD OF TWO YEARS FOLLOWING INITIAL SEEDING. REPAIRS AND RE-SEEDING AND MULCHING SHALL BE UNDERTAKEN AFTER THE FIRST GROWING SEASON FOR ANY AREAS FAILING TO MEET THE REQUIRED COVERAGE.
- REQUIRED COVERAGE FOR STANDARD, OPEN SPACE AND LOW GROWTH SEED MIXES SHALL BE DEFINED AS FOLLOWS:
 - THREE (3) PLANTS PER SQUARE FOOT WITH A MINIMUM HEIGHT OF 3 INCHES. THE 3 PLANTS PER SQUARE FOOT SHALL BE OF THE VARIETY AND SPECIES FOUND IN THE DOUGLAS COUNTY-APPROVED MIX.
 - NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO-FOOT BY TWO-FOOT OR EQUIVALENT).
 - FREE OF ERODED AREAS.
 - FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC CRITERIA MANUAL.
- REQUIRED COVERAGE FOR TURF GRASS AREAS SHALL BE DEFINED AS FOLLOWS:
 - AT LEAST 80% VEGETATIVE COVER OR GRASS SPECIES PLANTED.
 - NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO-FOOT BY TWO-FOOT OR EQUIVALENT).
 - FREE OF ERODED AREAS.
 - FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC CRITERIA MANUAL.
- RILL AND GULLY EROSION SHALL BE FILLED WITH TOPSOIL PRIOR TO RESEEDING. THE RESEEDING METHOD SHALL BE APPROVED BY THE COUNTY.

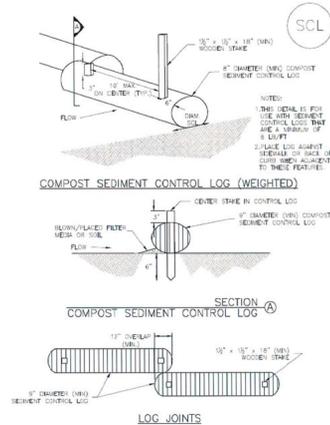
SEED MIX	
AREAS DISTURBED BY THE EARTHWORK SHALL BE PERMANENTLY REVEGETATED WITH NATIVE GRASSES. NATIVE SEED MIX FOR THIS PROJECT SHALL BE AS FOLLOWS:	
SPECIES	PLS/ACRE
WESTERN WHEAT GRASS	<i>Paspalum smithii</i> 3.0
SIDEWATS GRAMA	<i>Bouteloua curtipendula</i> 2.0
SLENDER WHEAT GRASS	<i>Elymus trachycaulus</i> 2.0
LITTLE BLUESTEM	<i>Schizachyrium scoparium</i> 2.0
BLUE GRAMA	<i>Bouteloua gracilis</i> 0.5
SWITCH GRASS	<i>Panicum virgatum</i> 2.0
JUNE GRASS	<i>Koeleria cristata</i> 0.5
SAND DROPSEED	<i>Sporobolus cryptandrus</i> 0.5
	12.5 lbs

SEEDING APPLICATION: DRILL SEED 1/4" TO 1/2" INTO TOPSOIL IN AREAS INACCESSIBLE TO A DRILL, HAND BROADCAST AT DOUBLE THE RATE AND RAKE 1/4" TO 1/2" INTO THE TOPSOIL.
 MULCHING APPLICATION: 1-1/2 TONS NATIVE HAY PER ACRE, MECHANICALLY CRIMPED INTO THE TOPSOIL OR HYDROMULCH.

SEEDING AND MULCHING NOTES



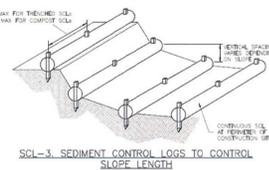
SC-2 Sediment Control Log (SCL)



SCL-2, COMPOST SEDIMENT CONTROL LOG (WEIGHTED)

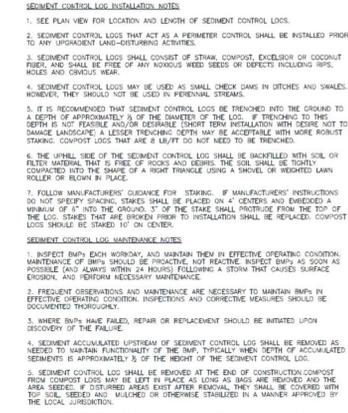
SC-4 Urban Drainage and Flood Control District November 2015
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Sediment Control Log (SCL)



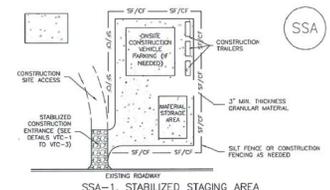
SC-5 Urban Drainage and Flood Control District November 2015
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SC-2 Sediment Control Log (SCL)



SC-6 Urban Drainage and Flood Control District November 2015
Urban Storm Drainage Criteria Manual Volume 3

Stabilized Staging Area (SSA)

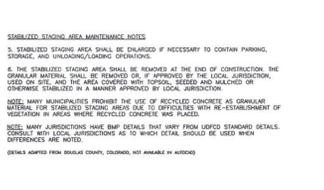


SSA-1, STABILIZED STAGING AREA

- STABILIZED STAGING AREA INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
 - LOCATION OF STAGING AREAS.
 - LOCATION, TYPE, AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION.
 - STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSEEING RESULTS IN A LARGER AREA TO STABILIZE PAVING CONSTRUCTION.
 - STAGING AREA SHALL BE STABILIZED PRIOR TO OTHER OPERATIONS ON THE SITE.
 - THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM 3" THICK GRANULAR MATERIAL.
 - UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DO# 57, FILL, SAND# 33 COURSE AGGREGATE, OR 4" (MIN) ROCK.
 - ADDITIONAL PERIMETER BMPs MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO Silt Fence and CONSTRUCTION FENCING.
- STABILIZED STAGING AREA MAINTENANCE NOTES**
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - ROCK SHALL BE REPLACED OR REGRASSED AS NECESSARY IF RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.

SSA-4 Urban Drainage and Flood Control District November 2010
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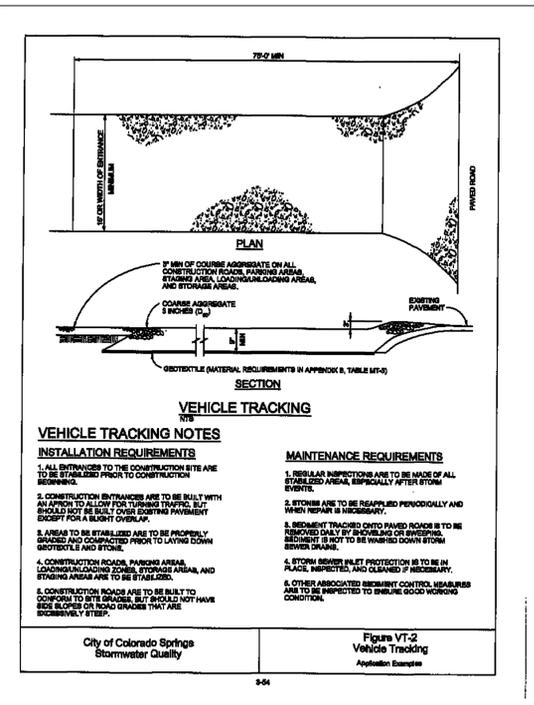
Stabilized Staging Area (SSA)



SSA-1, STABILIZED STAGING AREA

- STABILIZED STAGING AREA INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
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 - LOCATION, TYPE, AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION.
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Urban Storm Drainage Criteria Manual Volume 3



- Revised 7/02/19
- Standard Notes for El Paso County Grading and Erosion Control Plans**
- Stormwater discharges from construction sites shall not cause or threaten to cause pollution, contamination, or degradation of State Waters. All work and earth disturbance shall be done in a manner that minimizes pollution of any on-site or off-site waters, including wetlands.
 - 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.
 - A separate Stormwater Management Plan (SWMP) for this project shall be completed and an Erosion and Stormwater Quality Control Permit (ESQCP) issued prior to commencing construction. Management of the SWMP during construction is the responsibility of the designated Qualified Stormwater Manager or Certified Erosion Control Inspector. The SWMP shall be located on site at all times during construction and shall be kept up to date with work progress and changes in the field.
 - Once the ESQCP is approved and a "Notice to Proceed" has been issued, the contractor may install the initial stage erosion and sediment control measures as indicated on the approved GEC. A Preconstruction Meeting between the contractor, engineer, and El Paso County will be held prior to any construction. It is the responsibility of the applicant to coordinate the meeting time and place with County staff.
 - Control measures must be installed prior to commencement of activities that could contribute pollutants to stormwater. Control measures for all slopes, channels, ditches, and disturbed land areas shall be installed immediately upon completion of the disturbance.
 - All temporary sediment and erosion control measures shall be maintained and remain in effective operating condition until permanent soil erosion control measures are implemented and final stabilization is established. All persons engaged in land disturbance activities shall assess the adequacy of control measures at the site and identify if changes to those control measures are needed to ensure the continued effective performance of the control measures. All changes to temporary sediment and erosion control measures must be incorporated into the Stormwater Management Plan.
 - Temporary stabilization shall be implemented on disturbed areas and stockpiles where ground disturbing construction activity has permanently ceased or temporarily ceased for longer than 14 days.
 - Final stabilization must be implemented at all applicable construction sites. Final stabilization is achieved when all ground disturbing activities are complete and all disturbed areas either have a uniform vegetative cover with individual plant density of 70 percent of pre-disturbance levels established or equivalent permanent alternative stabilization method is implemented. All temporary sediment and erosion control measures shall be removed upon final stabilization and before permit closure.
 - All permanent stormwater management facilities shall be installed as designed in the approved plans. Any proposed changes that affect the design or function of permanent stormwater management structures must be approved by the ECM Administrator prior to implementation.
 - Earth disturbances shall be conducted in such a manner so as to effectively minimize accelerated soil erosion and resulting sedimentation. All disturbances shall be designed, constructed, and completed so that the exposed area of any disturbed land shall be limited to the shortest practical period of time. Pre-existing vegetation shall be protected and maintained within 50 horizontal feet of a waters of the state unless shown to be infeasible and specifically requested and approved.
 - Compaction of soil must be prevented in areas designated for infiltration control measures or where final stabilization will be achieved by vegetative cover. Areas designated for infiltration control measures shall also be protected from sedimentation during construction until final stabilization is achieved. If compaction prevention is not feasible due to site constraints, all areas designated for infiltration and vegetation control measures must be loosened prior to installation of the control measure(s).
 - Any temporary or permanent facility designed and constructed for the conveyance of stormwater around, through, or from the earth disturbance area shall be a stabilized conveyance designed to minimize erosion and the discharge of sediment off-site.
 - Concrete wash water shall be contained and disposed of in accordance with the SWMP. No wash water shall be discharged to or allowed to enter State Waters, including any surface or subsurface storm drainage system or facilities. Concrete washwater shall not be located in an area where shallow groundwater may be present, or within 50 feet of a surface water body, creek or stream.
 - During dewatering operations of uncontaminated ground water may be discharged on site, but shall not leave the site in the form of surface runoff unless an approved State dewatering permit is in place.
 - Erosion control blanketing or other protective covering shall be used on slopes steeper than 3:1.
 - Contractor shall be responsible for the removal of all wastes from the construction site for disposal in accordance with local and State regulatory requirements. No construction debris, tree slash, building material wastes or unused building materials shall be buried, dumped, or discharged at the site.
 - Waste materials shall not be temporarily placed or stored in the street, alley, or other public way, unless in accordance with an approved Traffic Control Plan. Control measures may be required by El Paso County Engineering if deemed necessary, based on specific conditions and circumstances.
 - Tracking of soils and construction debris off-site shall be minimized. Materials tracked off-site shall be cleaned up and properly disposed of immediately.
 - The owner/developer shall be responsible for the removal of all construction debris, dirt, trash, rock, sediment, soil, and sand that may accumulate in roads, storm drains and other drainage conveyance systems and stormwater appurtenances as a result of site development.
 - The quantity of materials stored on the project site shall be limited, as much as practical, to that quantity required to perform the work in an orderly sequence. All materials stored on-site shall be stored in a neat, orderly manner, in their original containers, with original manufacturer's labels.
 - No chemical(s) having the potential to be released in stormwater are to be stored or used onsite unless permission for the use of such chemical(s) is granted in writing by the ECM Administrator. In granting approval for the use of such chemical(s), special conditions and monitoring may be required.
 - Bulk storage of allowed petroleum products or other allowed liquid chemicals in excess of 55 gallons shall require adequate secondary containment protection to contain all spills onsite and to prevent any spilled materials from entering State Waters, any surface or subsurface storm drainage system or other facilities.
 - No person shall cause the impediment of stormwater flow in the curb and gutter or ditch except with approved sediment control measures.
 - Owner/developer and their agents shall comply with the "Colorado Water Quality Control Act" (Title 25, Article 8, CRS), and the "Clean Water Act" (33 USC 1344), in addition to the requirements of the Land Development Code, DCM Volume II and the ECM Appendix L. All appropriate permits must be obtained by the contractor prior to construction (1041, NPDES, Floodplain, 404, fugitive dust, etc.). In the event of conflicts between these requirements and other laws, rules, or regulations of other Federal, State, local, or County agencies, the most restrictive laws, rules, or regulations shall apply.
 - All construction traffic must enter/exit the site only at approved construction access points.
 - Prior to construction the permittee shall verify the location of existing utilities.
 - A water source shall be available on site during earthwork operations and shall be utilized as required to minimize dust from earthwork equipment and stirring.
 - The Sub-Surface Soil Investigation, Sterling Ranch Bridges prepared by Entech Engineering shall be considered a part of these plans.
 - At least ten (10) days prior to the anticipated start of construction, for projects that will disturb one (1) acre or more, the owner or operator of construction activity shall submit a permit application for stormwater discharge to the Colorado Department of Public Health and Environment, Water Quality Division. The application contains certification of completion of a stormwater management plan (SWMP), of which this Grading and Erosion Control Plan may be a part. For information or application materials contact:

- Colorado Department of Public Health and Environment
Water Quality Control Division
WQCD - Permits
4300 Cherry Creek Drive South
Denver, CO 80246-1530
Attn: Permits Unit

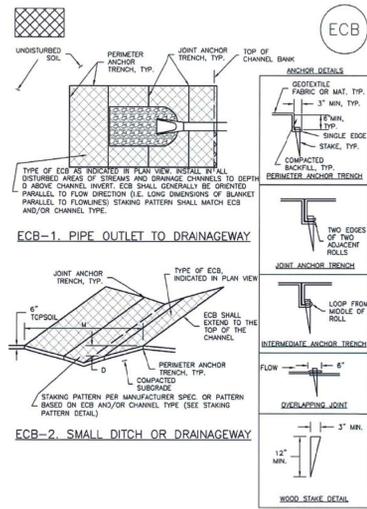
Kiowa
Engineering Corporation
1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 637-7342

SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH DEVELOPMENT
EROSION CONTROL DETAILS
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/9/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

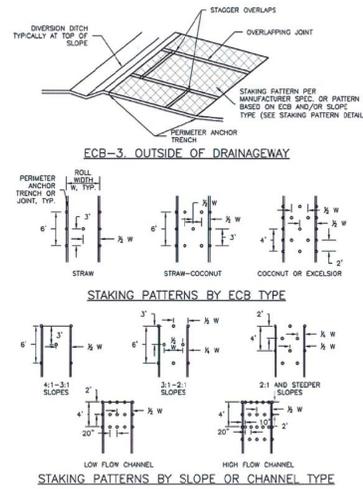
GEC5

EC-6 Rolled Erosion Control Products (RECP)



RECP-6 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Rolled Erosion Control Products (RECP) EC-6



RECP-7 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

EC-6 Rolled Erosion Control Products (RECP)

- EROSION CONTROL BLANKET INSTALLATION NOTES**
- SEE PLAN VIEW FOR:
 - LOCATION OF ECB.
 - TYPE OF ECB (STRAW, STRAW-COCOANUT, COCONUT OR EXCELSIOR).
 - AREA, A, IN SQUARE YARDS OF EACH TYPE OF ECB.
 - 100% NATURAL AND BIODEGRADABLE MATERIALS ARE PREFERRED FOR RECP, ALTHOUGH SOME JURISDICTIONS MAY ALLOW OTHER MATERIALS IN SOME APPLICATIONS.
 - IN AREAS WHERE ECB ARE SHOWN ON THE PLANS THE PERIMETER SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING AND MULCHING. SURFACE SHALL BE SMOOTH AND MOIST PRIOR TO ECB INSTALLATION AND THE ECB SHALL BE IN FULL CONTACT WITH SUBGRADE. NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
 - PERIMETER ANCHOR TRENCH SHALL BE USED ALONG THE OUTSIDE PERIMETER OF ALL BLANKET AREAS.
 - JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF ECB TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL ECB EXCEPT STRAW WHICH MAY USE AN OVERLAPPING JOINT.
 - INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF ROLL LENGTH FOR COCONUT AND EXCELSIOR ECB.
 - OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF ECB TOGETHER FOR ECB ON SLOPES.
 - MATERIAL SPECIFICATIONS OF ECB SHALL CONFORM TO TABLE EC6-1.
 - ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING ECB SHALL BE RESEEDED AND MULCHED.
 - DETAILS ON DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION WILL GOVERN IF DIFFERENT FROM THOSE SHOWN HERE.

TABLE EC6-1. ECB MATERIAL SPECIFICATIONS

TYPE	COCONUT CONTENT	STRAW CONTENT	EXCELSIOR CONTENT	RECOMMENDED NETTING*
STRAW	-	100%	-	DOUBLE/NATURAL
STRAW-COCOANUT	30% MIN	70% MAX	-	DOUBLE/NATURAL
COCONUT	100%	-	-	DOUBLE/NATURAL
EXCELSIOR	-	-	100%	DOUBLE/NATURAL

*NETTING SHALL BE ONLY IN THOSE SIZES OF 1/2" TO 3/4" OPENING. *NETTING SHALL BE AS SPECIFIED IN THE MANUFACTURER'S SPECIFICATIONS.

RECP-8 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Rolled Erosion Control Products (RECP) EC-6

- EROSION CONTROL BLANKET MAINTENANCE NOTES**
- INSPECT BMPs EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BMPs SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BMPs AS SOON AS POSSIBLE (AND ALWAYS WITHIN 24 HOURS) FOLLOWING A STORM THAT CAUSES SURFACE EROSION, AND PERFORM NECESSARY MAINTENANCE.
 - FREQUENT OBSERVATIONS AND MAINTENANCE ARE NECESSARY TO MAINTAIN BMPs IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
 - WHERE BMPs HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
 - ECB SHALL BE LEFT IN PLACE TO EVENTUALLY BIODEGRADE, UNLESS REQUESTED TO BE REMOVED BY THE LOCAL JURISDICTION.
 - ANY ECB PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE REPAIRED OR REPLANTED. ANY SUBGRADE AREAS BELOW THE GEOTEXTILE THAT HAVE EXPOSED TO CREATED A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDED AND MULCHED AND THE ECB REPLANTED.
- NOTE: MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM USDCD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.
- (DETAILS ADAPTED FROM DOUGLAS COUNTY, COLORADO AND TOWN OF PARKER COLORADO, MAY AVAILABLE IN ALCAD6)

RECP-9 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 November 2010

Inlet Protection (IP) SC-6

Description

Inlet protection consists of permeable barriers installed around an inlet to filter runoff and remove sediment prior to entering a storm drain inlet. Inlet protection can be constructed from rock socks, sediment control logs, silt fence, block and rock socks, or other materials approved by the local jurisdiction. Area inlets can also be protected by over-excavating around the inlet to form a sediment trap.



Photograph IP-1. Inlet protection for a curb opening inlet.

Appropriate Uses

Install protection at storm sewer inlets that are operable during construction. Consider the potential for tracked-out sediment or temporary stockpile areas to contribute sediment to inlets when determining which inlets must be protected. This may include inlets in the general proximity of the construction area, not limited to downgradient inlets. Inlet protection is not a stand-alone BMP and should be used in conjunction with other upgradient BMPs.

Design and Installation

To function effectively, inlet protection measures must be installed to ensure that flows do not bypass the inlet protection and enter the storm drain without treatment. However, designs must also enable the inlet to function without completely blocking flows into the inlet in a manner that causes localized flooding. When selecting the type of inlet protection, consider factors such as type of inlet (e.g., curb or area, sump or on-grade conditions), traffic, anticipated flows, ability to secure the BMP properly, safety and other site-specific conditions. For example, block and rock socks will be better suited to a curb and gutter along a roadway, as opposed to silt fence or sediment control logs, which cannot be properly secured in a curb and gutter setting, but are effective area inlet protection measures.

Several inlet protection designs are provided in the Design Details. Additionally, a variety of proprietary products are available for inlet protection that may be approved for use by local governments. If proprietary products are used, design details and installation procedures from the manufacturer must be followed. Regardless of the type of inlet protection selected, inlet protection is most effective when combined with other BMPs such as curb socks and check dams. Inlet protection is often the last barrier before runoff enters the storm sewer or receiving water.

Design details with notes are provided for these forms of inlet protection:

Inlet Protection (various forms)	
Functions:	
Erosion Control	No
Sediment Control	Yes
Site/Material Management	No

- IP-1. Block and Rock Sock Inlet Protection for Sump or On-grade Inlets
- IP-2. Curb (Rock) Socks Upstream of Inlet Protection, On-grade Inlets

IP-1 August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 IP-1

SC-6 Inlet Protection (IP)

- IP-3. Rock Sock Inlet Protection for Sump/Area Inlet
- IP-4. Silt Fence Inlet Protection for Sump/Area Inlet
- IP-5. Over-excavation Inlet Protection
- IP-6. Straw Bale Inlet Protection for Sump/Area Inlet
- CIP-1. Culvert Inlet Protection

Proprietary inlet protection devices should be installed in accordance with manufacturer specifications. More information is provided below on selecting inlet protection for sump and on-grade locations.

Inlets Located in a Sump

When applying inlet protection in sump conditions, it is important that the inlet continue to function during larger runoff events. For curb inlets, the maximum height of the protective barrier should be lower than the top of the curb opening to allow overflow into the inlet during larger storms without excessive localized flooding. If the inlet protection height is greater than the curb elevation, particularly if the filter becomes clogged with sediment, runoff will not enter the inlet and may bypass it, possibly causing localized flooding, public safety issues, and downstream erosion and damage from bypassed flows.

Area inlets located in a sump setting can be protected through the use of silt fence, concrete block and rock socks (on paved surfaces), sediment control log/straw wattles embedded in the adjacent soil and stacked around the area inlet (on pervious surfaces), over-excavation around the inlet, and proprietary products providing equivalent functions.

Inlets Located on a Slope

For curb and gutter inlets on paved sloping streets, block and rock sock inlet protection is recommended in conjunction with curb socks in the gutter leading to the inlet. For inlets located along unpaved roads, also see the Check Dam Fact Sheet.

Maintenance and Removal

- Inspect inlet protection frequently. Inspection and maintenance guidance includes:
- Inspect for tears that can result in sediment directly entering the inlet, as well as result in the contents of the BMP (e.g., gravel) washing into the inlet.
 - Check for improper installation resulting in untreated flows bypassing the BMP and directly entering the inlet or bypassing to an unprotected downstream inlet. For example, silt fence that has not been properly trenched around the inlet can result in flows under the silt fence and directly into the inlet.
 - Look for displaced BMPs that are no longer protecting the inlet. Displacement may occur following larger storm events that wash away or reposition the inlet protection. Traffic or equipment may also crush or displace the BMP.
 - Monitor sediment accumulation upgradient of the inlet protection.

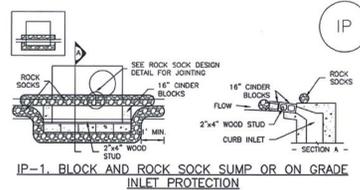
IP-2 August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3

Inlet Protection (IP) SC-6

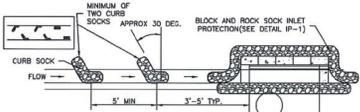
- Remove sediment accumulation from the area upstream of the inlet protection, as needed to maintain BMP effectiveness, typically when it reaches no more than half the storage capacity of the inlet protection. For silt fence, remove sediment when it accumulates to a depth of 30 more than 6 inches. Remove sediment accumulation from the area upstream of the inlet protection as needed to maintain the functionality of the BMP.
 - Proprietary inlet protection devices should be inspected and maintained in accordance with manufacturer specifications. If proprietary inlet insert devices are used, sediment should be removed in a timely manner to prevent devices from breaking and spilling sediment into the storm drain.
- Inlet protection must be removed and properly disposed of when the drainage area for the inlet has reached final stabilization.

IP-3 August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3

SC-6 Inlet Protection (IP)



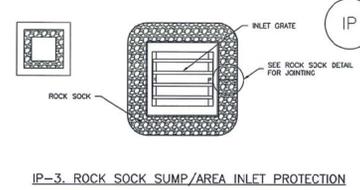
- IP-1. ROCK SOCK SUMP OR ON-GRADE INLET PROTECTION**
- BLOCK AND CURB SOCK INLET PROTECTION INSTALLATION NOTES**
- SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - CONCRETE "TOWER" BLOCKS SHALL BE LAD ON THEIR SIDES AROUND THE INLET IN A SINGLE ROW, ADJUTING ONE ANOTHER WITH THE OPEN END FACING AWAY FROM THE CURB.
 - GRAVEL BAGS SHALL BE PLACED AROUND CONCRETE BLOCKS, CLOSELY ADJUTING ONE ANOTHER AND JOINTED TOGETHER IN ACCORDANCE WITH ROCK SOCK DESIGN DETAIL.



- IP-2. CURB ROCK SOCKS UPSTREAM OF INLET PROTECTION**
- CURB ROCK SOCK INLET PROTECTION INSTALLATION NOTES**
- SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - PLACEMENT OF THE SOCK SHALL BE APPROXIMATELY 30 DEGREES FROM PERPENDICULAR IN THE OPPOSITE DIRECTION OF FLOW.
 - SOCKS ARE TO BE FLUSH WITH THE CURB AND SPACED A MINIMUM OF 5 FEET APART.
 - AT LEAST TWO CURB SOCKS IN SERIES ARE REQUIRED UPSTREAM OF ON-GRADE INLETS.

IP-4 August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3

Inlet Protection (IP) SC-6



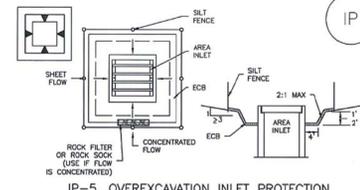
- IP-3. ROCK SOCK SUMP/AREA INLET PROTECTION**
- ROCK SOCK SUMP/AREA INLET PROTECTION INSTALLATION NOTES**
- SEE ROCK SOCK DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - STRAW WATTLE/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF ROCK SOCKS FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.



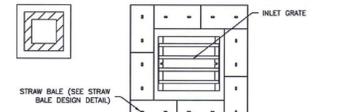
- IP-4. SILT FENCE FOR SUMP INLET PROTECTION**
- SILT FENCE INLET PROTECTION INSTALLATION NOTES**
- SEE SILT FENCE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - POSTS SHALL BE PLACED AT EACH CORNER OF THE INLET AND AROUND THE EDGES AT A MAXIMUM SPACING OF 3 FEET.
 - STRAW WATTLE/SEDIMENT CONTROL LOGS MAY BE USED IN PLACE OF SILT FENCE FOR INLETS IN PERVIOUS AREAS. INSTALL PER SEDIMENT CONTROL LOG DETAIL.

IP-5 August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3

SC-6 Inlet Protection (IP)



- IP-5. OVEREXCAVATION INLET PROTECTION**
- OVEREXCAVATION INLET PROTECTION INSTALLATION NOTES**
- THIS FORM OF INLET PROTECTION IS PRIMARILY APPLICABLE FOR SITES THAT HAVE NOT YET REACHED FINAL GRADE AND SHOULD BE USED ONLY FOR INLETS WITH A RELATIVELY SMALL CONTRIBUTING DRAINAGE AREA.
 - WHEN USING FOR CONCENTRATED FLOWS, SHAPE BASIN IN 2:1 RATIO WITH LENGTH ORIENTED TOWARDS DIRECTION OF FLOW.
 - SEDIMENT MUST BE PERIODICALLY REMOVED FROM THE OVEREXCAVATED AREA.



- IP-6. STRAW BALE FOR SUMP INLET PROTECTION**
- STRAW BALE BARRIER INLET PROTECTION INSTALLATION NOTES**
- SEE STRAW BALE DESIGN DETAIL FOR INSTALLATION REQUIREMENTS.
 - BALES SHALL BE PLACED IN A SINGLE ROW AROUND THE INLET WITH ENDS OF BALES TIGHTLY ADJUTING ONE ANOTHER.

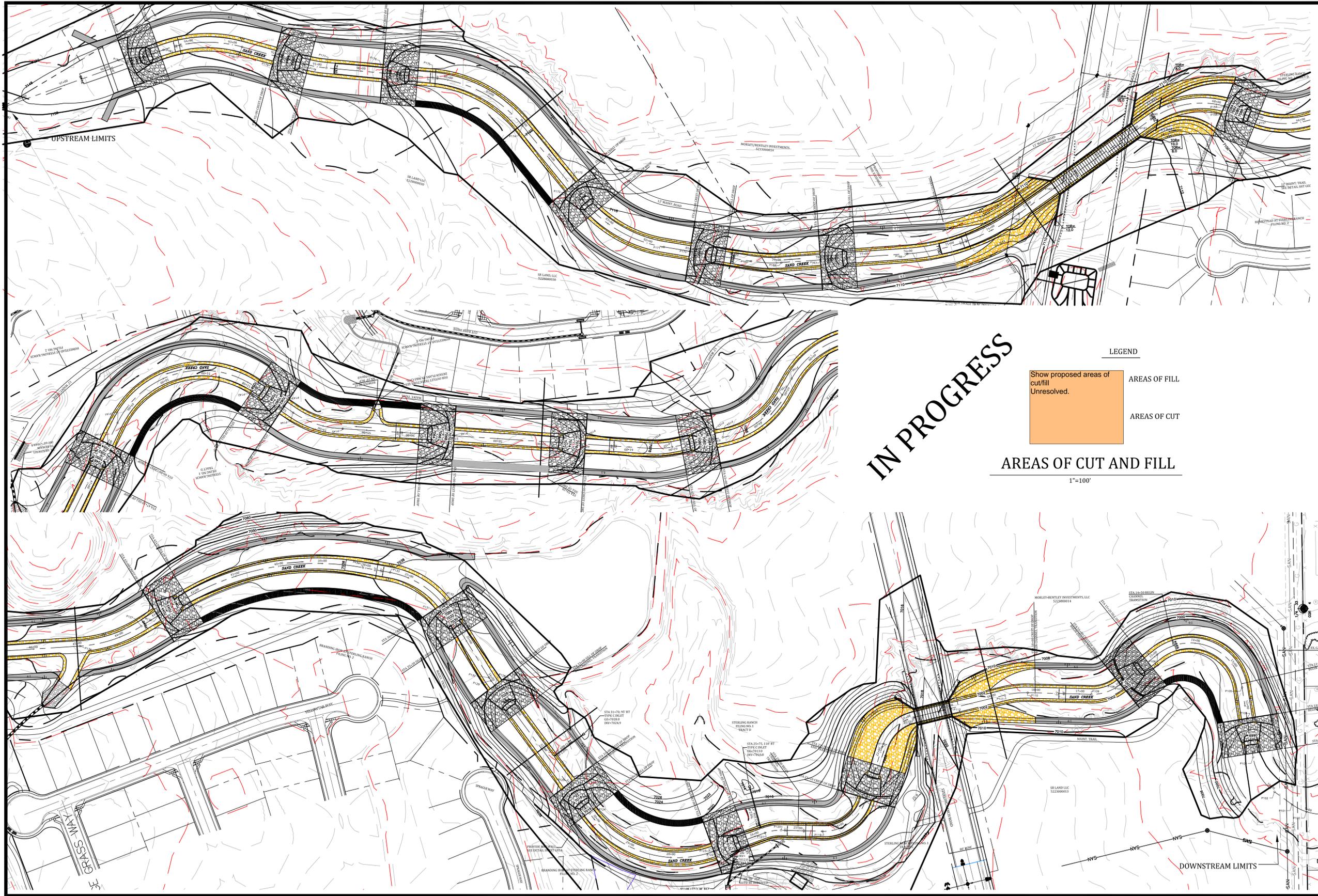
IP-6 August 2013 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3

Kiowa
Engineering Corporation
1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 637-7342

SAND CREEK STABILIZATION, BRIARGATE BOULEVARD & STERLING RANCH ROAD BRIDGE DESIGN PLANS
STERLING RANCH ROAD DEVELOPMENT
EROSION CONTROL DETAILS
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/9/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

GEC6



IN PROGRESS

AREAS OF CUT AND FILL

1"=100'

LEGEND	
	Show proposed areas of cut/fill Unresolved.
	AREAS OF FILL
	AREAS OF CUT

Celebrating 30 years
Kiowa
 Engineering Corporation

1604 South 21st Street
 Colorado Springs, Colorado 80904
 (719) 530-7342

**SAND CREEK STABILIZATION, BRIARGATE BOULEVARD &
 STERLING RANCH ROAD BRIDGE DESIGN PLANS**
 STERLING RANCH DEVELOPMENT
 AREAS OF CUT AND FILL
 EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	7/9/2020
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

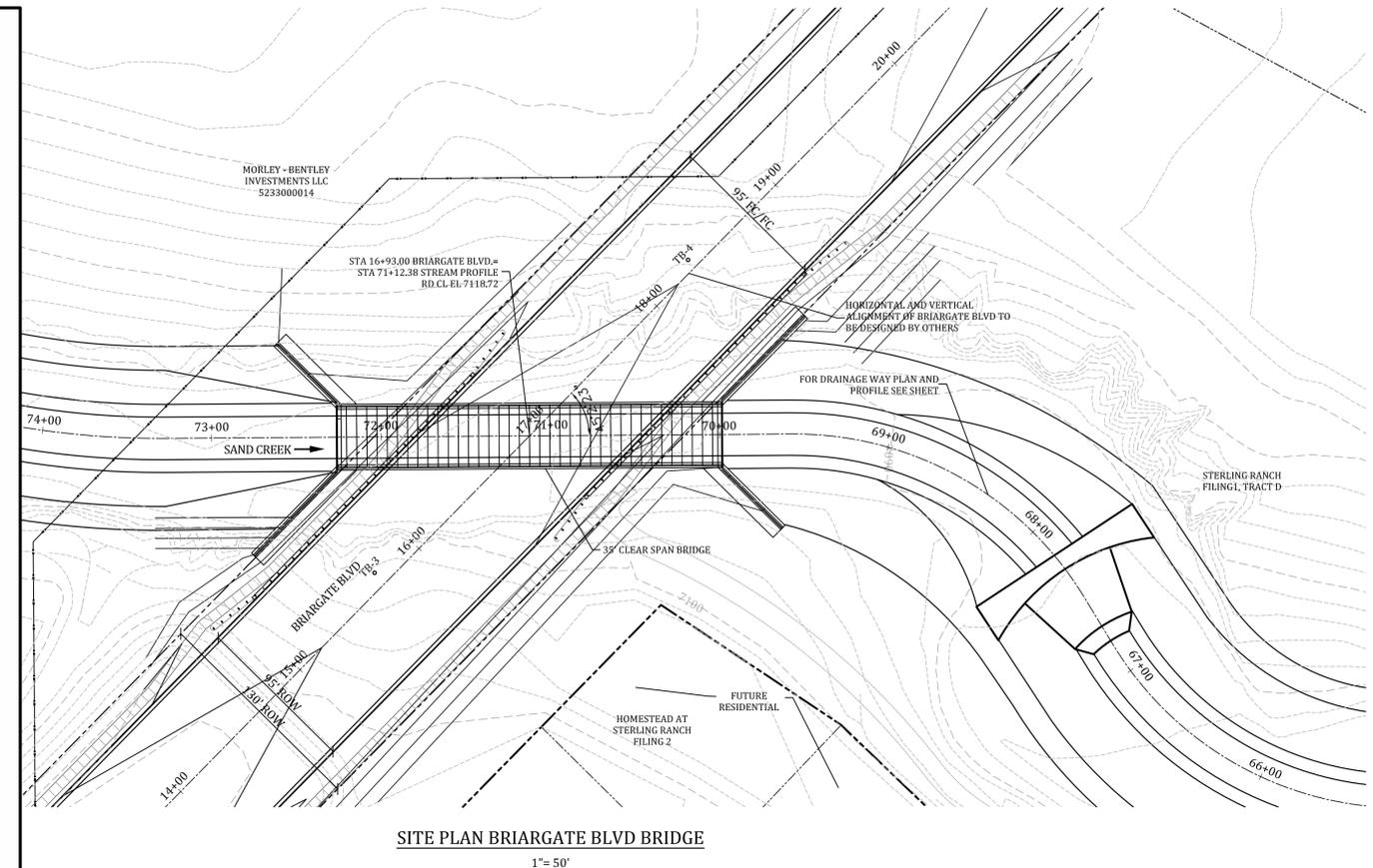
GEC7

TEST BORING NO.	3	TEST BORING NO.	4																																												
DATE DRILLED	1/23/2020	DATE DRILLED	1/23/2020																																												
Job #	200045	CLIENT	C&C LAND																																												
REMARKS		LOCATION	STERLING RANCH BRIDGES																																												
APPROX EL 7102 WATER @ 16.5', 1/28/20 SAND, SILTY TO VERY SILTY, FINE TO COARSE GRAINED, TAN TO BROWN, MEDIUM DENSE TO LOOSE, MOIST	<table border="1"> <tr><th>Depth (ft)</th><th>Symbol</th><th>Blows per foot</th><th>Watercontent %</th></tr> <tr><td>5</td><td></td><td>7</td><td>19.7</td></tr> <tr><td>10</td><td></td><td>24</td><td>15.1</td></tr> <tr><td>15</td><td></td><td>50</td><td>12.7</td></tr> <tr><td>20</td><td></td><td>50</td><td>17.3</td></tr> </table>	Depth (ft)	Symbol	Blows per foot	Watercontent %	5		7	19.7	10		24	15.1	15		50	12.7	20		50	17.3	APPROX EL 7106 WATER @ 13', 1/28/20 SAND, SILTY, TAN SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	<table border="1"> <tr><th>Depth (ft)</th><th>Symbol</th><th>Blows per foot</th><th>Watercontent %</th></tr> <tr><td>5</td><td></td><td>10</td><td>7.1</td></tr> <tr><td>10</td><td></td><td>11</td><td>9.2</td></tr> <tr><td>15</td><td></td><td>10</td><td>10.3</td></tr> <tr><td>20</td><td></td><td>10</td><td>16.4</td></tr> <tr><td>25</td><td></td><td>10</td><td>14.9</td></tr> </table>	Depth (ft)	Symbol	Blows per foot	Watercontent %	5		10	7.1	10		11	9.2	15		10	10.3	20		10	16.4	25		10	14.9
Depth (ft)	Symbol	Blows per foot	Watercontent %																																												
5		7	19.7																																												
10		24	15.1																																												
15		50	12.7																																												
20		50	17.3																																												
Depth (ft)	Symbol	Blows per foot	Watercontent %																																												
5		10	7.1																																												
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15		10	10.3																																												
20		10	16.4																																												
25		10	14.9																																												
SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST TO VERY MOIST		SANDSTONE, VERY SILTY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST TO VERY MOIST																																													
		COARSE GRAINED LENSES																																													

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

TEST BORING LOG

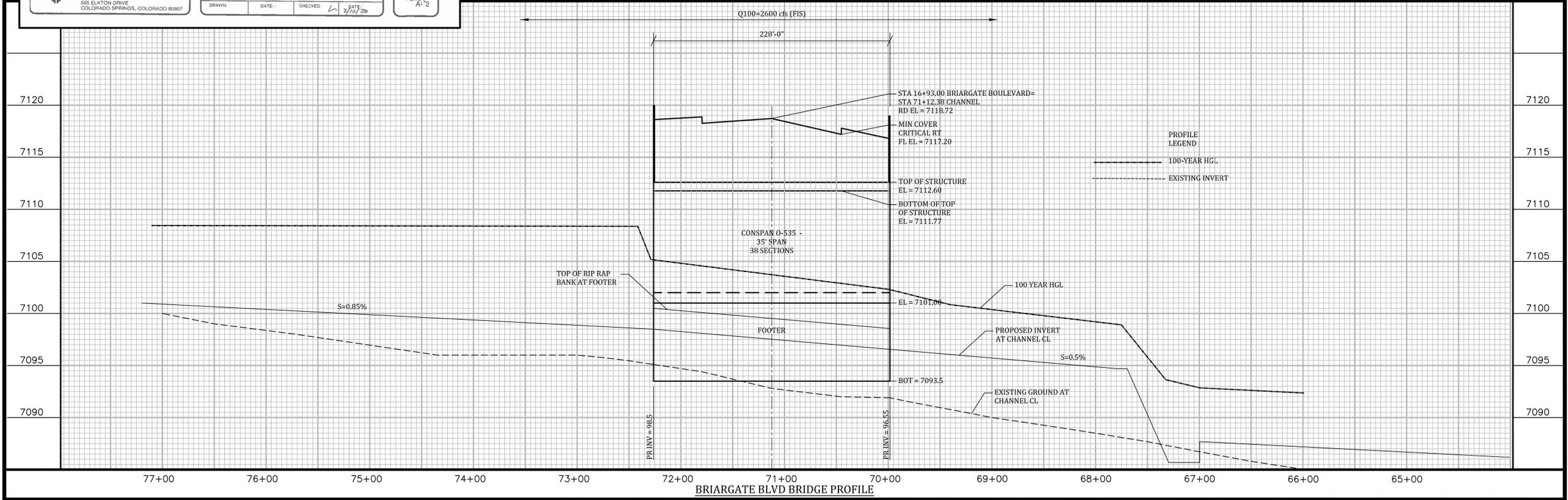
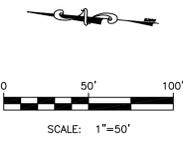
JOB NO. 200045
DATE 2/17/20
FIG NO. A-2



CAUTION!!!
EXISTING UTILITIES TO BE PROTECTED FROM DISTURBANCE WHEN INSTALLING BRIDGE AND INFRASTRUCTURE.



Know what's below.
Call before you dig.



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STERLING RANCH
BRIARGATE BOULEVARD BRIDGE
PLAN & PROFILE
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	8/24/20
Design:	TAC
Drawn:	CAD
Check:	RNW
Revisions:	

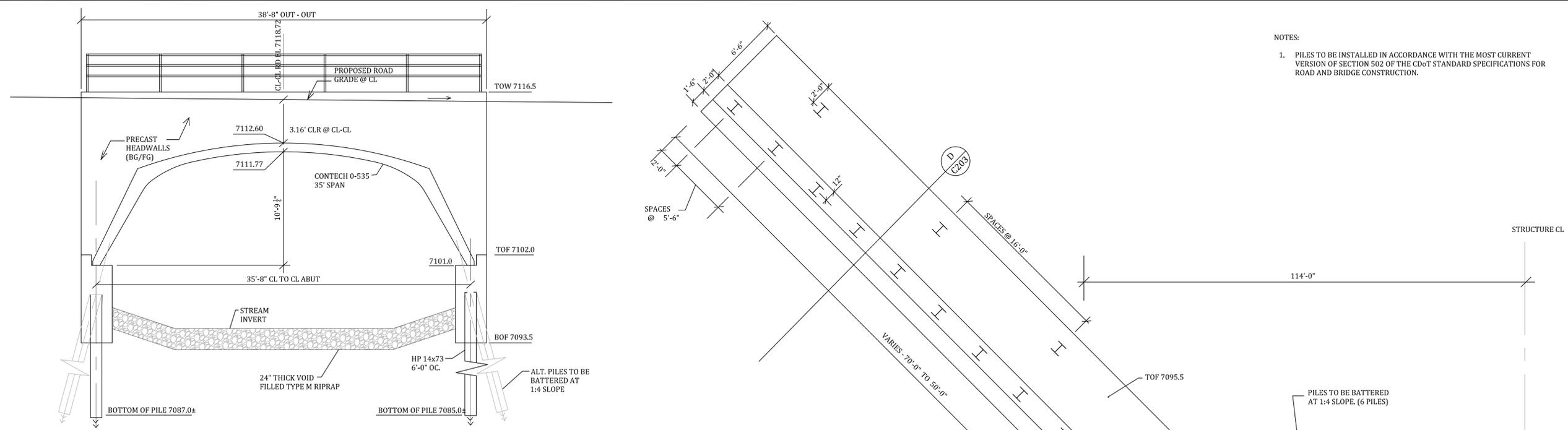
C201

**STERLING RANCH
BRIARGATE BOULEVARD BRIDGE
FOUNDATION PLAN & SECTIONS
EL PASO COUNTY, COLORADO**

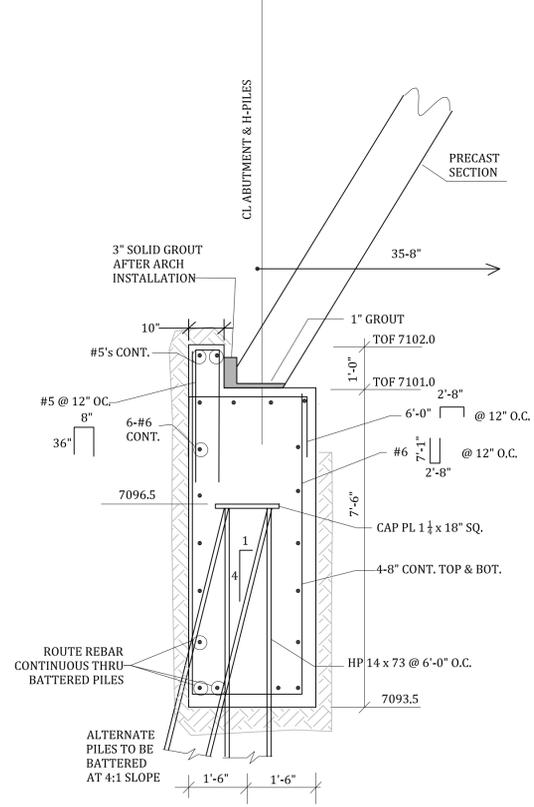
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Date:	08/24/20
Design:	TAC
Drawn:	CAD
Check:	RNW
Revisions:	

C203

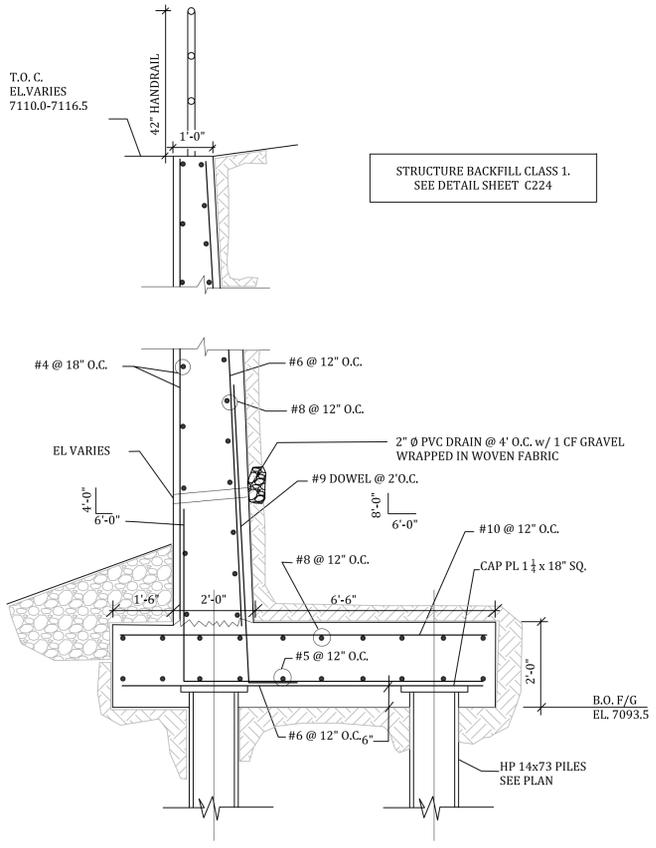
NOTES:
1. PILES TO BE INSTALLED IN ACCORDANCE WITH THE MOST CURRENT VERSION OF SECTION 502 OF THE CDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.



BRIDGE SECTION B
1" = 5'
C203



BRIDGE FOOTER SECTION C
1" = 2'
C203



WINGWALL SECTION D
1" = 2'
C203

FOUNDATION PLAN
1" = 5'

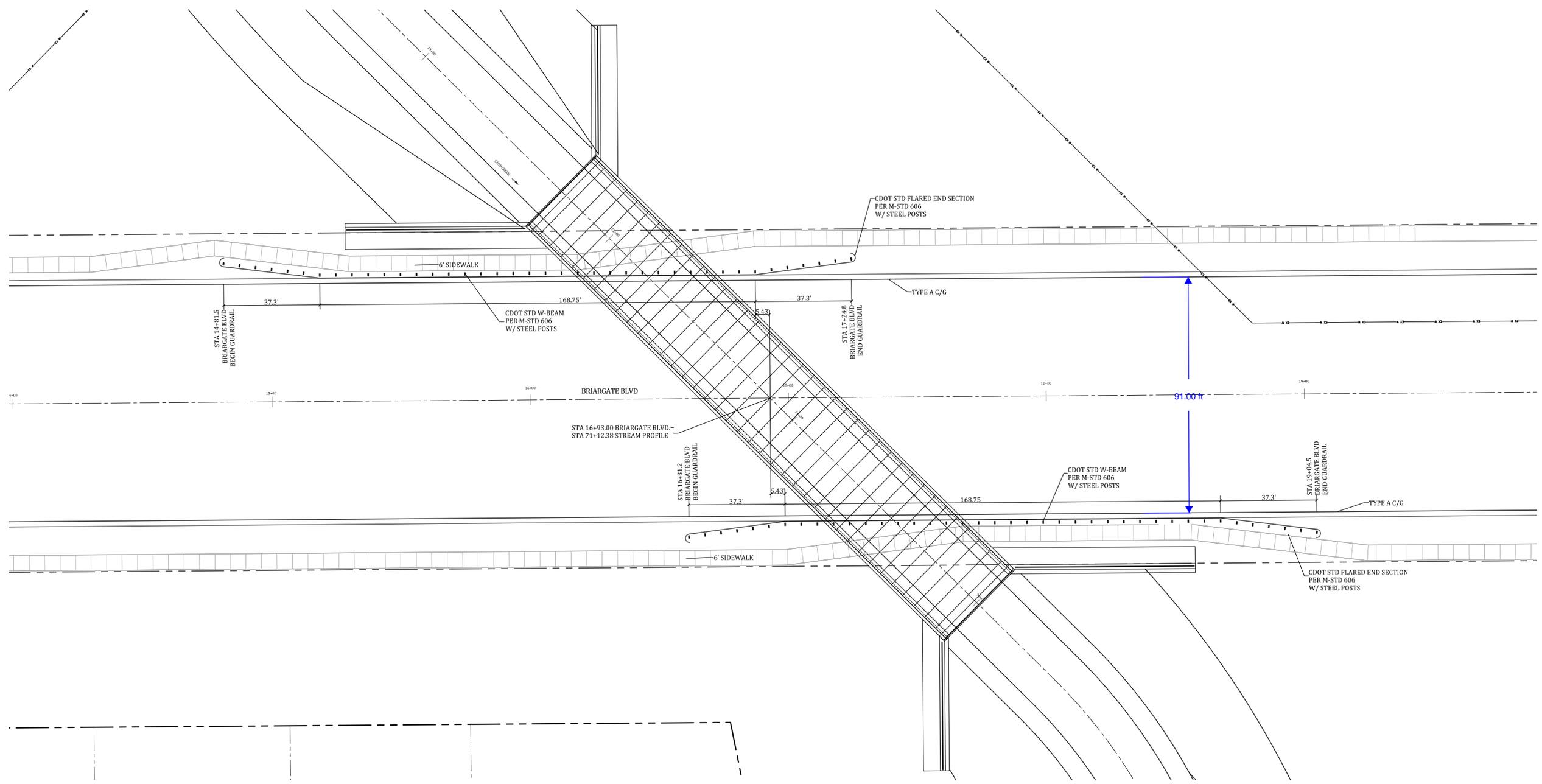


**STERLING RANCH
BRIARGATE BOULEVARD BRIDGE
GUARDRAIL LAYOUT**
EL PASO COUNTY, COLORADO

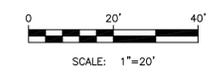
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Date:	08/24/20
Design:	TAC
Drawn:	CAD
Check:	RNW
Revisions:	

C204

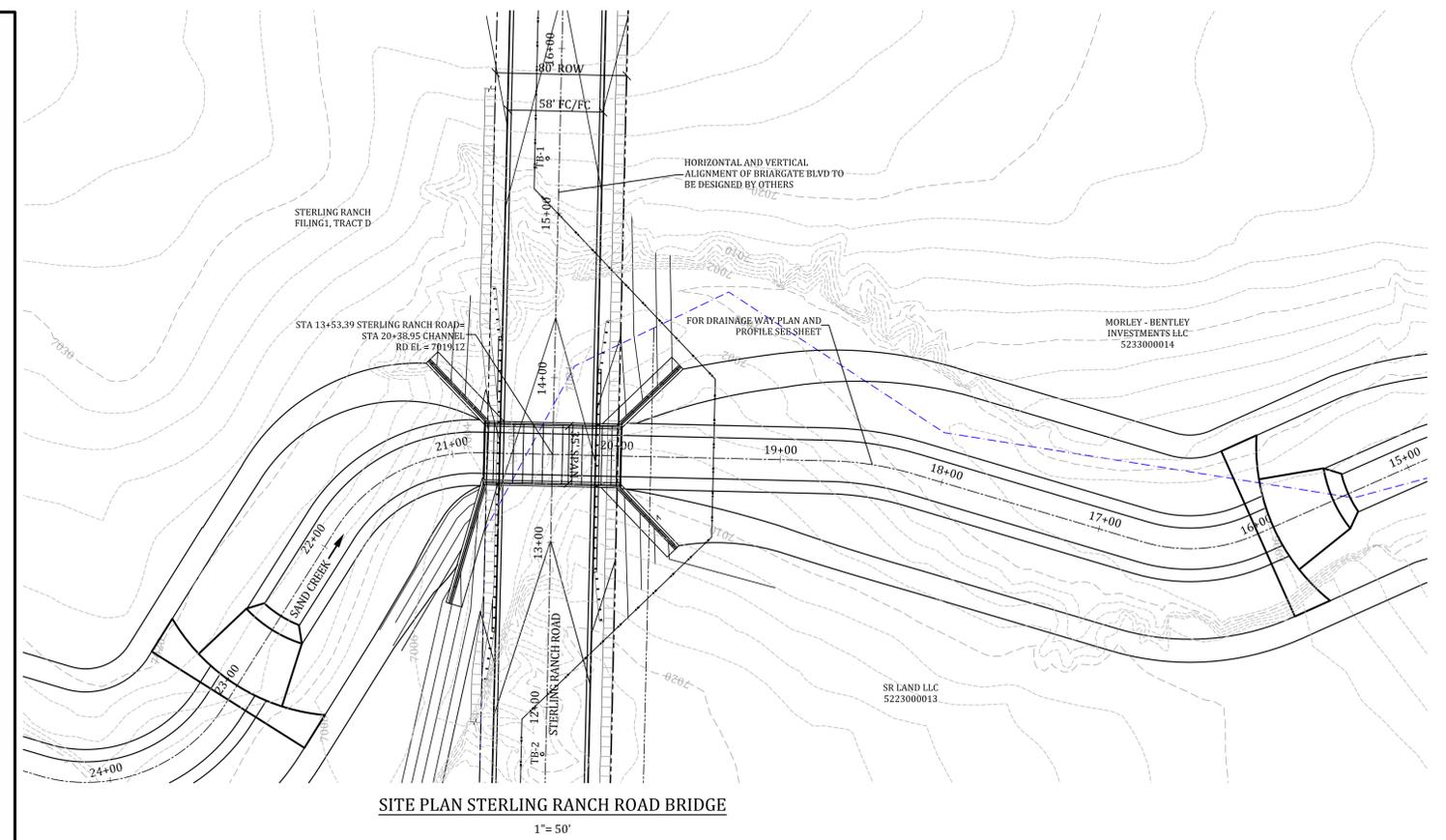
NOTES:
1. FOR GUARDRAIL DETAILS SEE SHEET C223



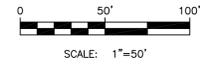
GUARDRAIL LAYOUT
1" = 20'



TEST BORING NO. 1 DATE DRILLED 1/23/2020 JOB # 200045				TEST BORING NO. 2 DATE DRILLED 1/23/2020 CLIENT C&C LAND LOCATION STERLING RANCH BRIDGES							
REMARKS	Depth (ft)	Symbol	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Blows per foot	Watercontent %	Soil Type
APPROX EL 7028 DRY TO 18', 1/28/20 FILL OF SAND, SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE, MOIST	6		7.7		1	APPROX EL 7022 DRY TO 18', 1/28/20 SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST	26		5.2		2
	5		4	6.9	1	SANDSTONE, SILTY, FINE GRAINED, TAN, VERY DENSE, MOIST	50		13.5		3
SANDSTONE, SILTY, FINE GRAINED, TAN, VERY DENSE, MOIST	10		50	14.6	3	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN TO GRAY BROWN, VERY DENSE, MOIST	10		10.0		3
	15		50	15.3	4		15		11.2		3
CLAYSTONE, SANDY TO VERY SANDY, GRAY BROWN, HARD, MOIST	20		50	15.9	4		20		12.2		3



CAUTION!!!
EXISTING UTILITIES TO BE PROTECTED FROM DISTURBANCE WHEN INSTALLING BRIDGE AND INFRASTRUCTURE.

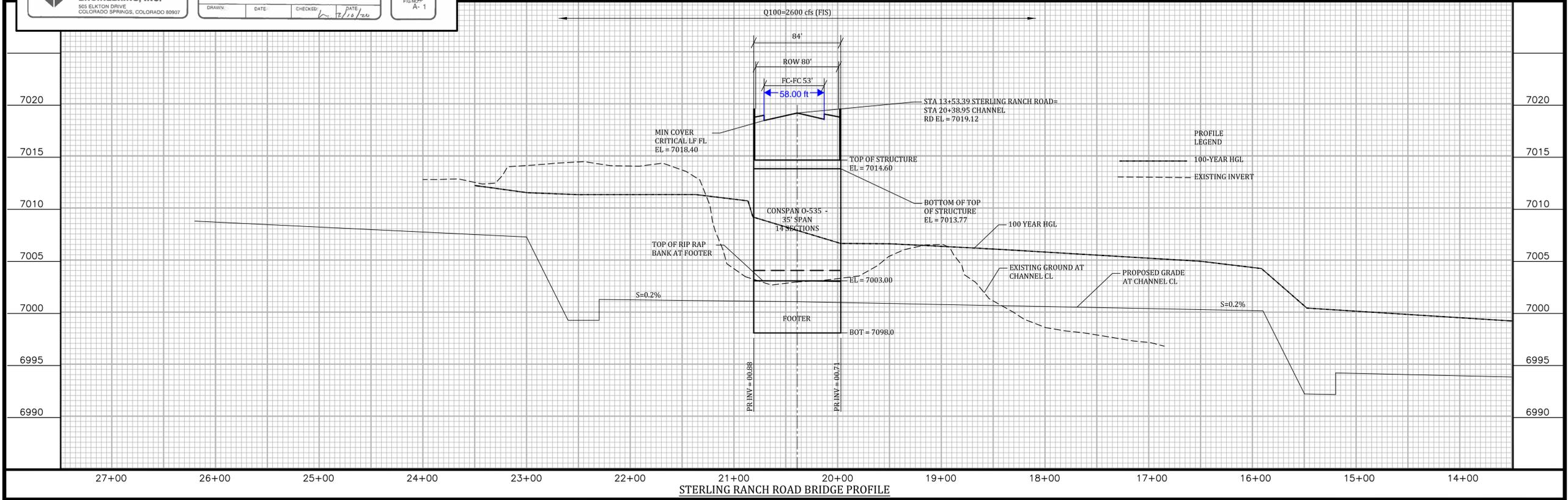


ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

JOB NO. 200045
FIG. NO. A-1

DRAWN: _____ DATE: _____ CHECKED: _____ DATE: 12/18/20



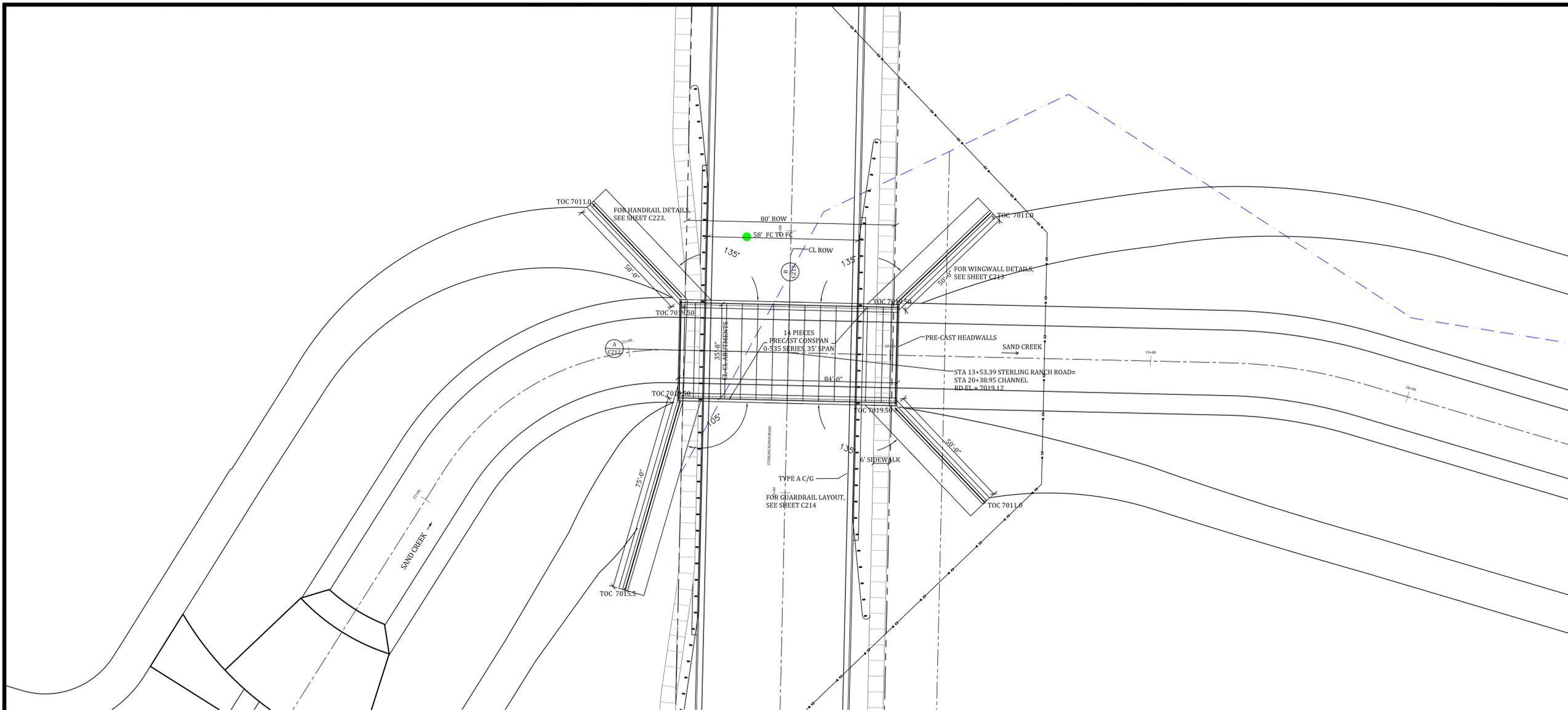
Kiowa
Engineering Corporation
1604 South 21st Street
Colorado Springs, Colorado 80904
(719) 630-7342

**STERLING RANCH
STERLING RANCH ROAD BRIDGE
PLAN & PROFILE**
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	08/24/20
Design:	TAC
Drawn:	CAD
Check:	RNW
Revisions:	

C211

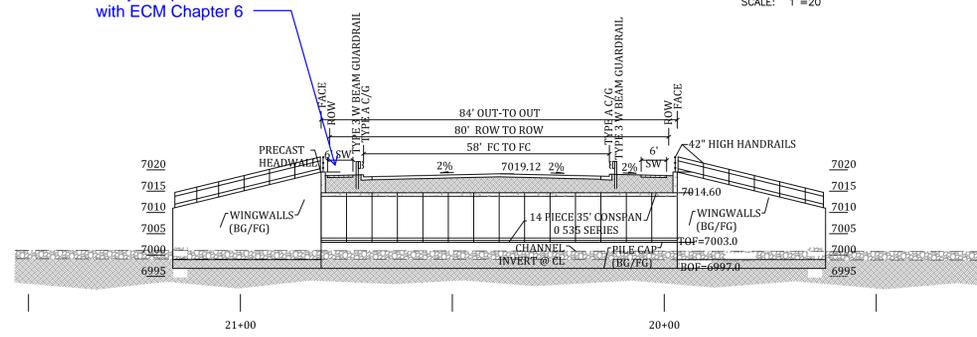
**STERLING RANCH
STERLING RANCH ROAD BRIDGE
BRIDGE STRUCTURE LAYOUT**
EL PASO COUNTY, COLORADO



STRUCTURE LAYOUT
1" = 20'

- NOTES:
- 1. PRECAST BRIDGE SECTIONS SHALL BE DESIGNED TO MEET HL-93 HIGHWAY LOADING AND MANUFACTURED IN CONFORMANCE WITH CDOT STANDARD SPECIFICATIONS.

verify compliance with ECM Chapter 6



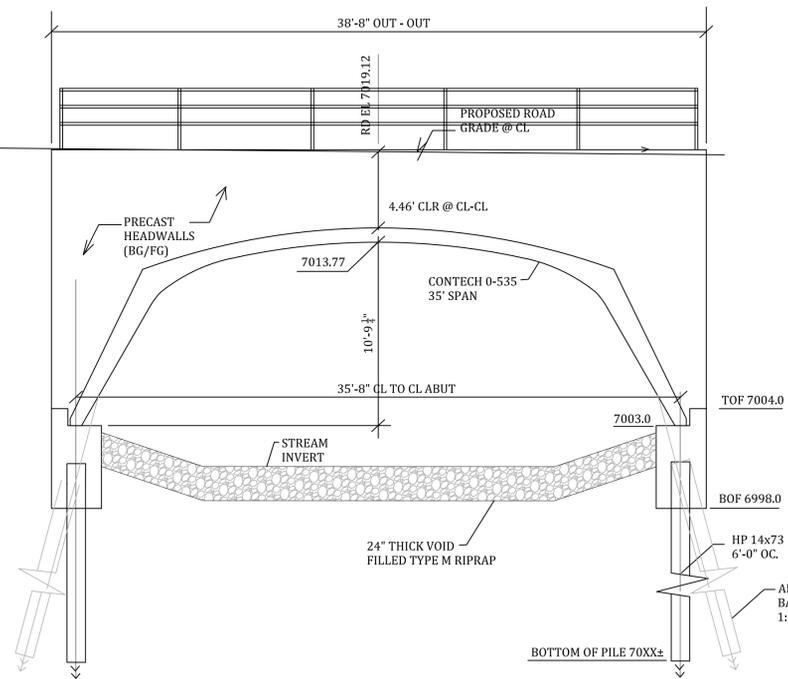
STRUCTURE SECTION A
1" = 20'
C212



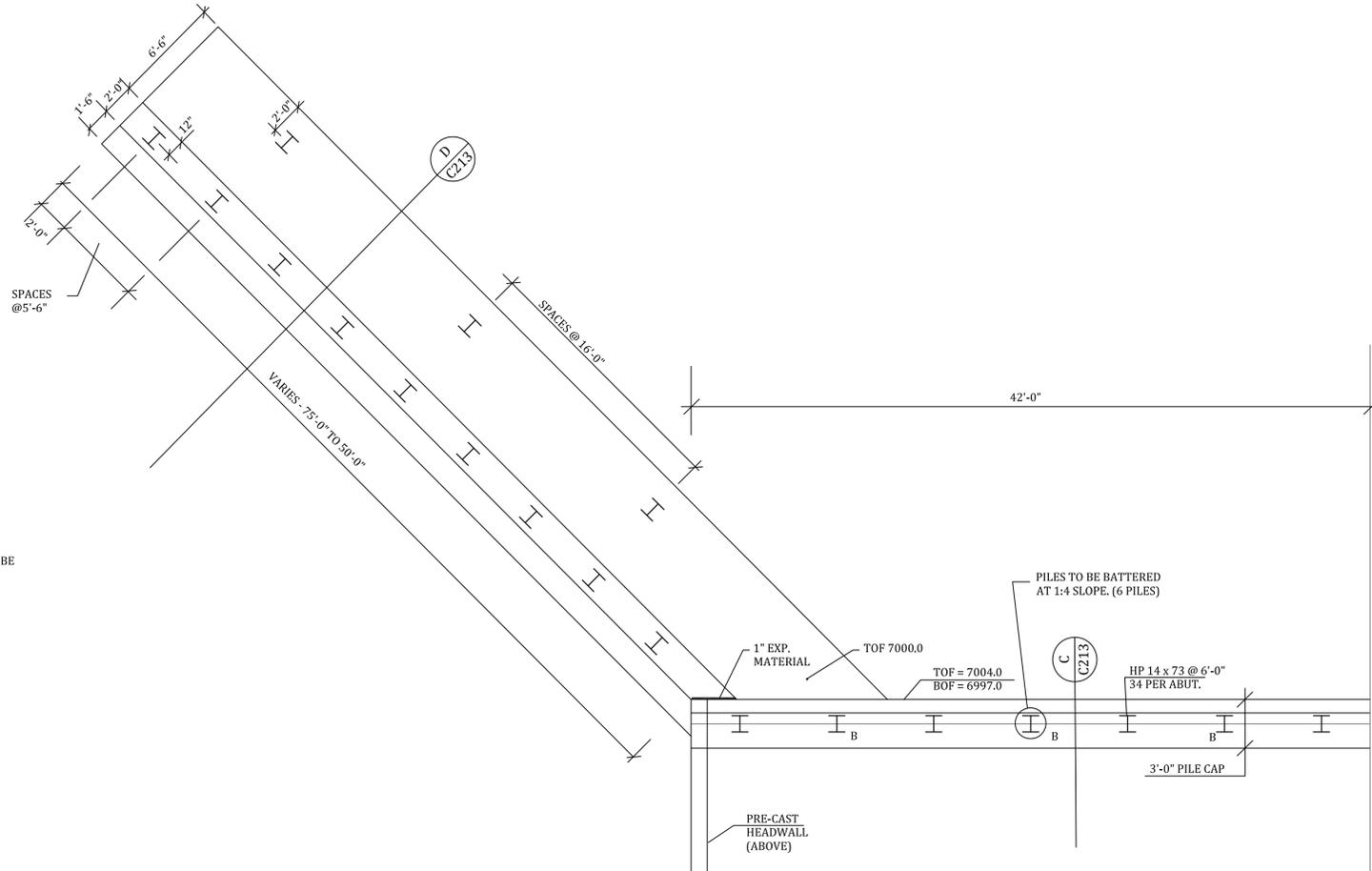
Know what's below.
Call before you dig.

Project No.:	19032
Date:	08/24/20
Design:	TAC
Drawn:	CAD
Check:	RNW
Revisions:	

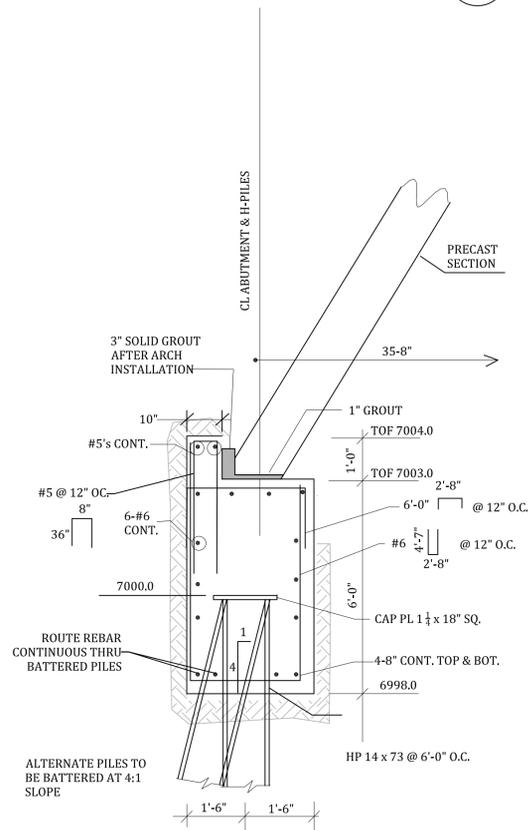
C212



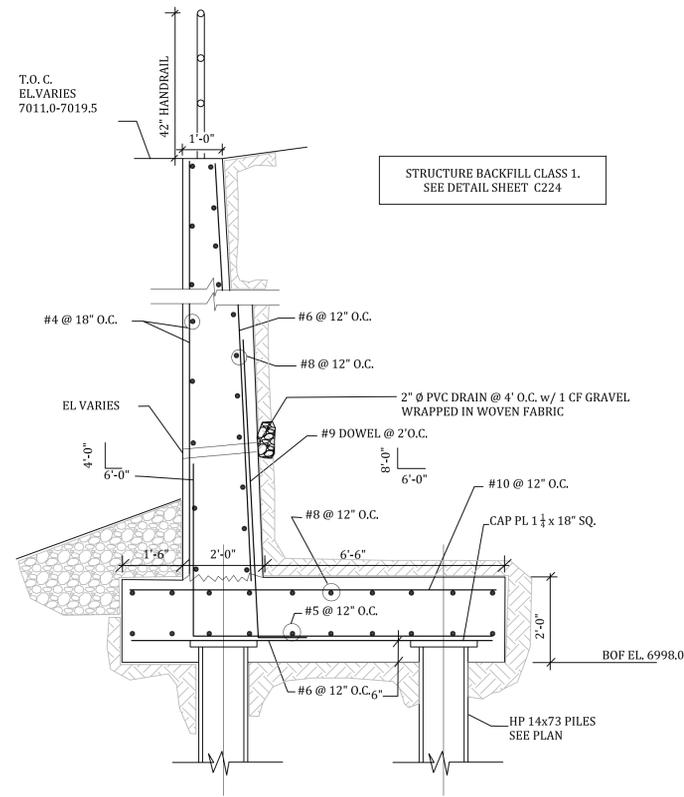
BRIDGE SECTION B
1" = 5'



FOUNDATION PLAN
1" = 5'



BRIDGE FOOTER SECTION C
1" = 2'



WINGWALL SECTION D
1" = 2'

NOTES:

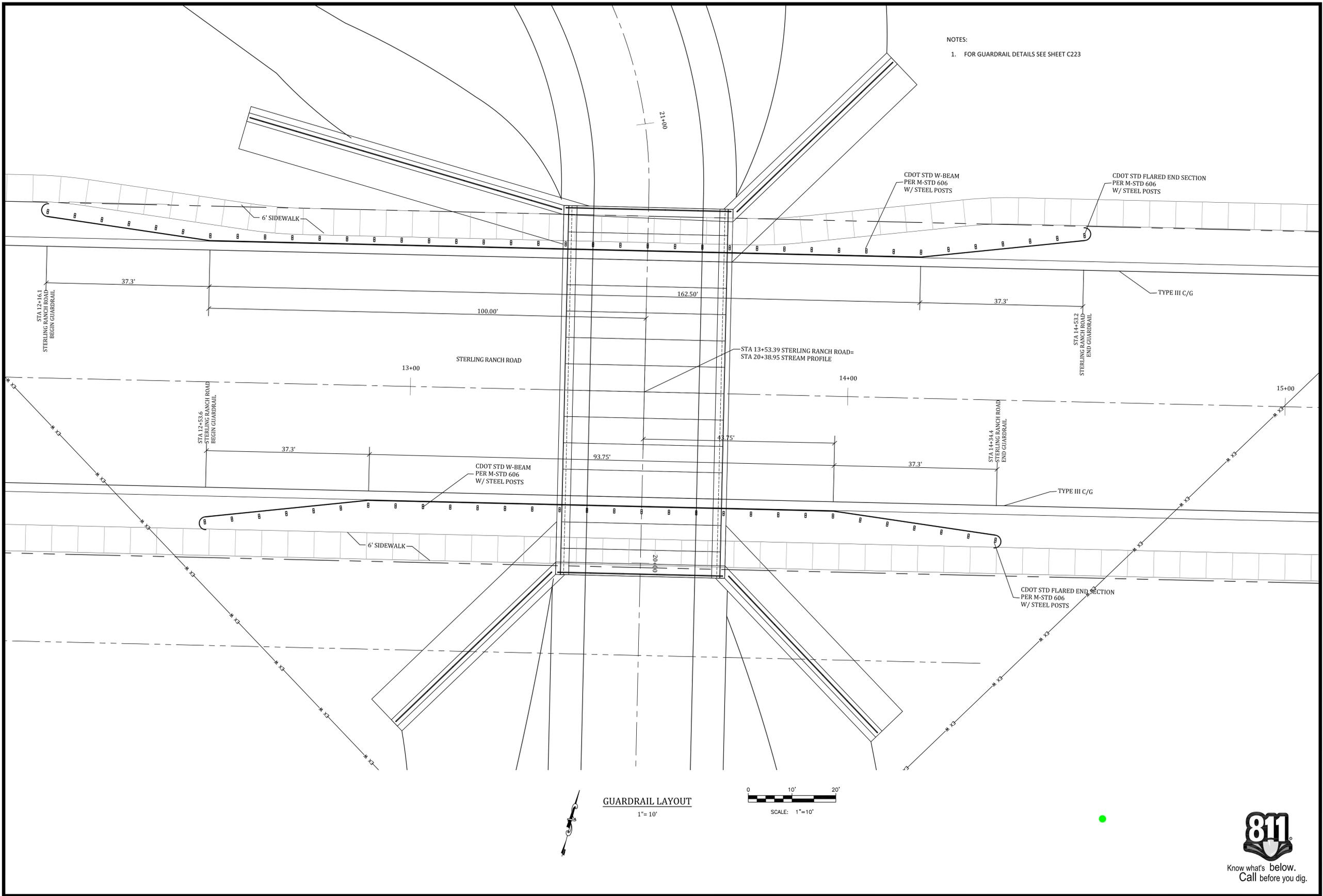
1. PILES TO BE INSTALLED IN ACCORDANCE WITH THE MOST CURRENT VERSION OF SECTION 502 OF THE CDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

STERLING RANCH
STERLING RANCH ROAD BRIDGE
FOUNDATION PLAN & SECTIONS
EL PASO COUNTY, COLORADO

Project No.:	19032
Date:	08/24/20
Design:	TAC
Drawn:	CAD
Check:	RNW
Revisions:	



C213



NOTES:
1. FOR GUARDRAIL DETAILS SEE SHEET C223

GUARDRAIL LAYOUT
1"=10'



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

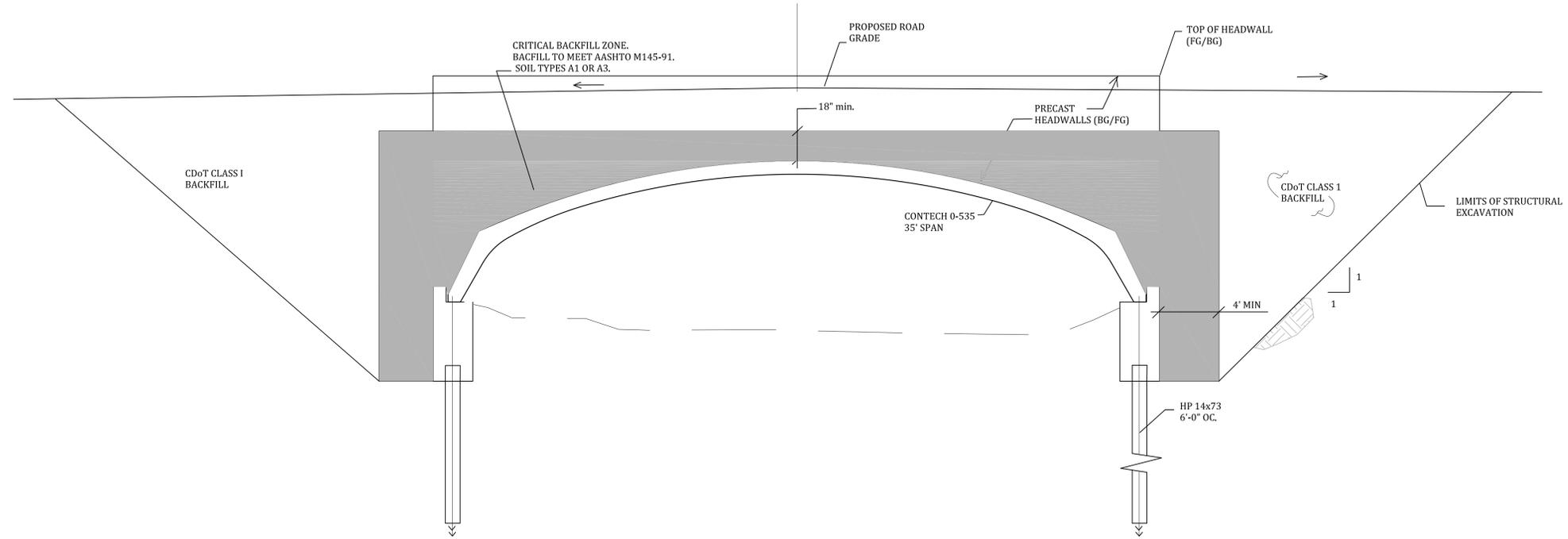
**STERLING RANCH
STERLING RANCH ROAD BRIDGE
GUARDRAIL LAYOUT
EL PASO COUNTY, COLORADO**

Project No.:	19032
Date:	08/24/20
Design:	TAC
Drawn:	CAD
Check:	RNW
Revisions:	



Know what's below.
Call before you dig.

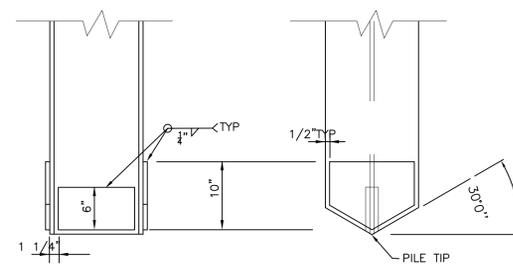
C214



BRIDGE BACKFILL SECTION

NTS

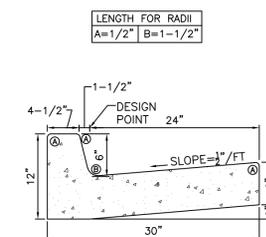
BACKFILL DESCRIPTION (AASHTO M 145-91)								
GROUP CLASSIFICATION	A-1		A-3	A-2		A-2-7		A-4
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7	
SIEVE ANALYSIS (100% PASSING 3" SIEVE)								
NO. 10	50 max		51 max	35 max	35 max	35 max	35 max	35 min
NO. 40	30 max	50 max	10 max					
NO. 200	15 max	25 max						
CHARACTERISTICS OF FRACTION PASSING NO. 40								
LIQUID LIMIT				40 max	41 max	11 min	11 min	10 max
USUAL TYPES OF SIGNIFICANT CONSTITUENT MATERIALS								
	GRAVEL & SAND		SAND					
GENERAL RATING AS SUB-GRADE			EXCELLENT TO GOOD				FAIR TO POOR	



PILE TIP DETAIL

NTS

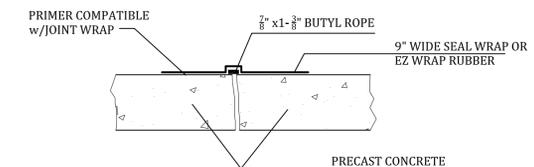
AN APPROVED COMMERCIAL PILE MAY BE USED



EPC TYPE A VERTICAL CURB AND GUTTER

NTS

EPC STD. SD_2-20



TYPICAL JOINT SEAL

NTS

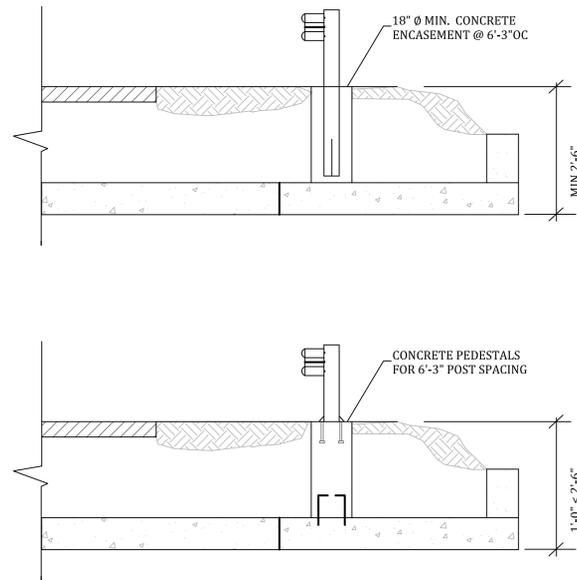


Know what's below.
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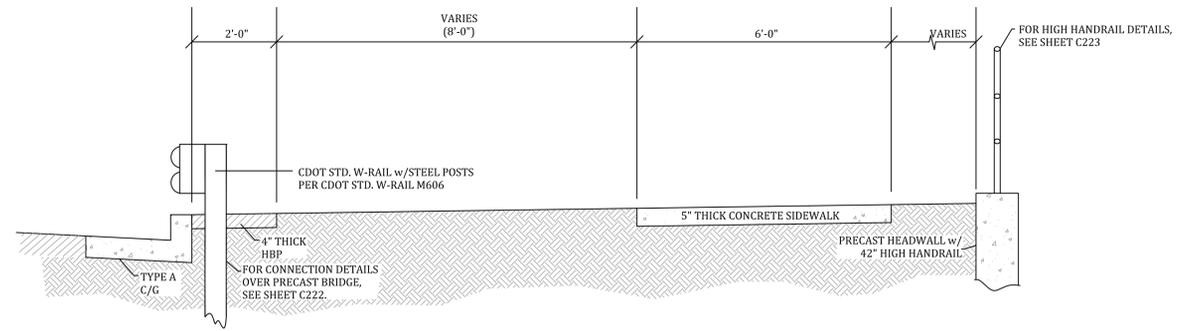
Project No.:	19032
Date:	5/20/20
Design:	TAC
Drawn:	CAD
Check:	RNW
Revisions:	

C221

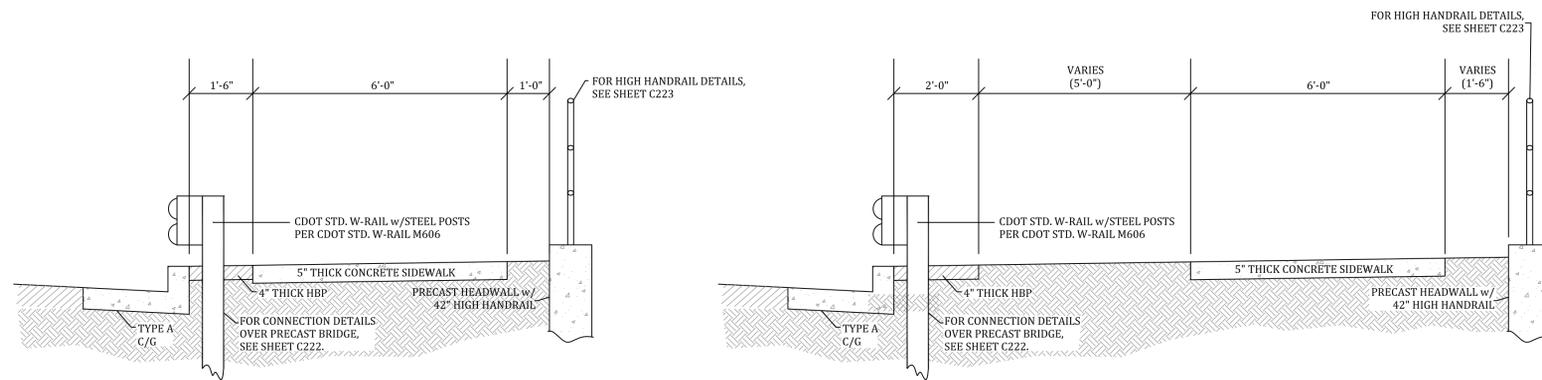
**STERLING RANCH
BRIARGATE BLVD AND STERLING RANCH ROAD BRIDGE
GUARD RAIL DETAILS
EL PASO COUNTY, COLORADO**



GUARDRAIL MOUNTING DETAILS
NTS



TYPICAL GUARDRAIL LAYOUT BRIARGATE BLVD
1"= 2"



NORTH SIDE

SOUTH SIDE

TYPICAL GUARDRAIL LAYOUT STERLING RANCH ROAD
1"= 2"

NOTES:

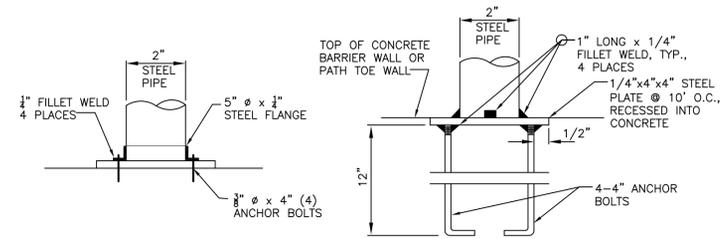
1. GUARDRAIL POST SPACING OVER THE PRECAST SECTIONS SHALL BE IN CONFORMANCE WITH CDOT M-606.



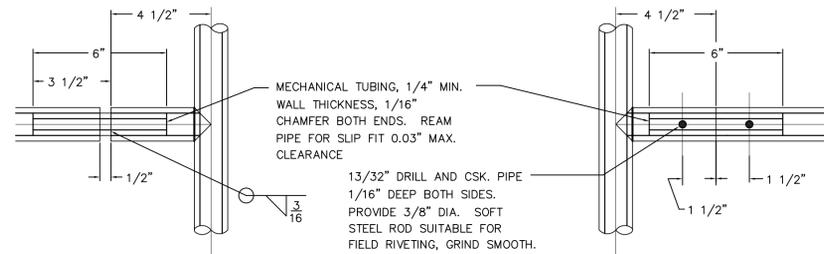
Know what's below.
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Project No.:	19032
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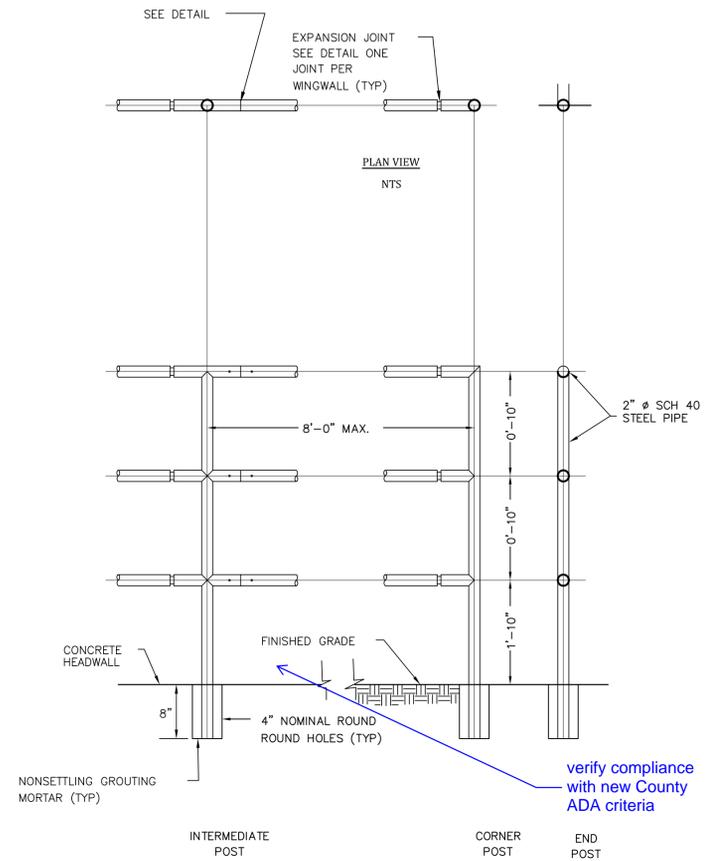
C222



ALTERNATE HANDRAIL POST CONNECTION DETAIL
NTS



HANDRAIL DETAIL
NTS



ELEVATION
NTS

HANDRAIL PAINT NOTE:

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	OZ	32	64	128
844 COLORANT	2	16	-	-
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	-

Project No.:	19032
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C223