

# FONTAINE BOULEVARD BRIDGE & EAST FORK JIMMY CAMP CREEK CHANNEL DESIGN

## EL PASO COUNTY, COLORADO

### PREPARED FOR LORSON DEVELOPMENT

#### GENERAL NOTES

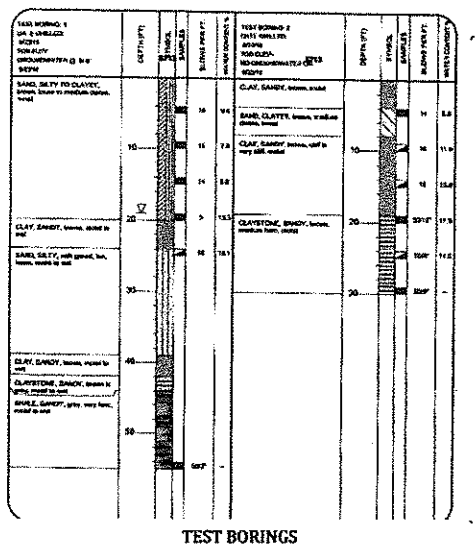
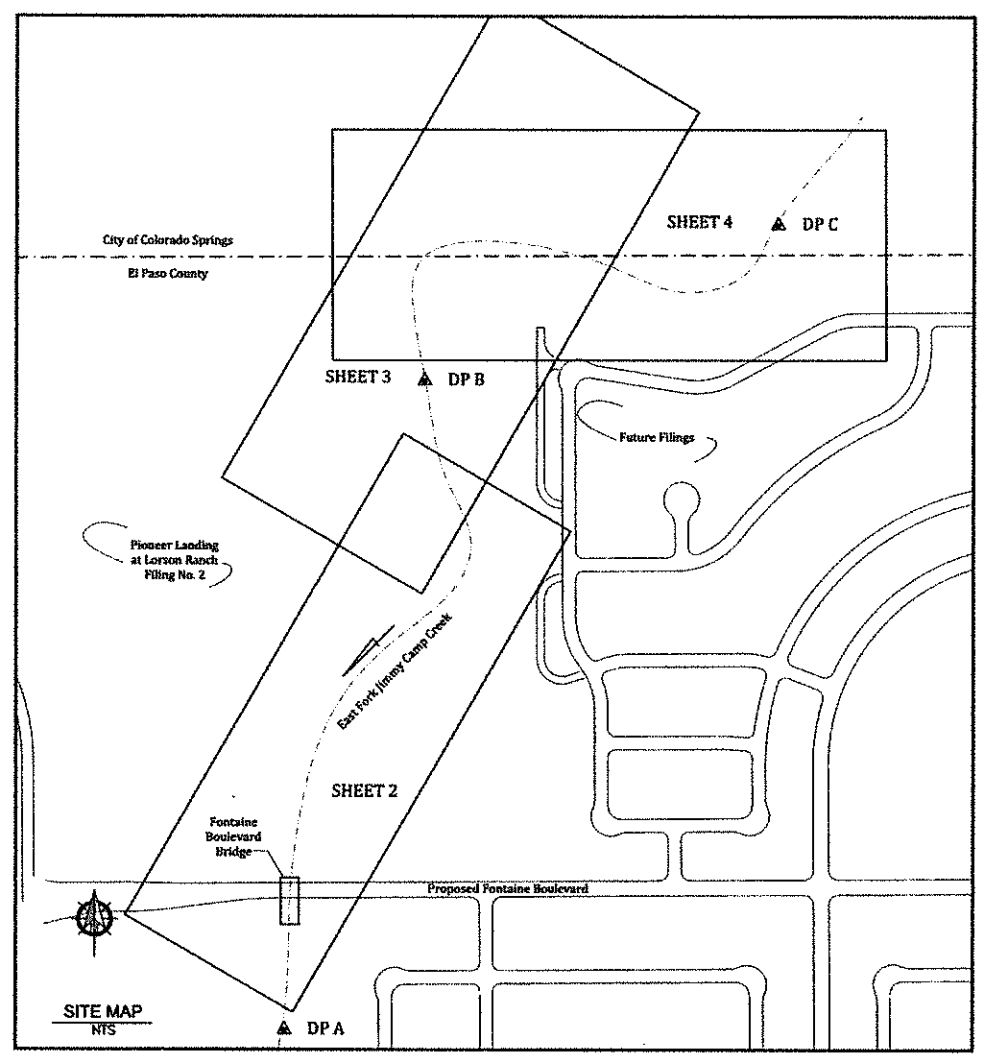
- Profile design lines are based on centerline, as shown, unless otherwise noted.
  - All new construction to conform to the specifications of El Paso County Department of Public Works. Any asphalt removed is to be replaced to meet the specifications of the El Paso County Public Works Department.
  - For pavement design, curb and gutter, and sidewalks are individual plan and profile sheets. Pavement design to be based on Resistance Value "R" derived from heavy tests and are to be approved by the Engineering Division of the El Paso County Planning and Community Development prior to work above subgrade.
  - All 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 and Widefield Water and Sanitation District 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, EQCPT, Fugitive Dust, Access, C.O.E. 404, etc. shall be obtained prior to construction.
  - All landscape ramps to be per El Paso County Standard SD-3-106.
  - 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, newly 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 completion 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 Standard.
  - All storm sewer pipe shall be Class III B Wall unless otherwise shown on the storm sewer plan and profile sheets.
  - All pipe and bends used in construction of storm sewer facilities shall be factory fabricated, unless approved by the El Paso County Development Services Department.
  - Construction and materials used in all storm and sanitary sewer manholes shall be per specifications. Storm sewer radial deflections to be limited or limited per manufacturer's recommendations.
  - Storm sewer manholes shall be 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 points are 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 tees. 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 paths to be per El Paso County Standard Detail SD-2-26.
  - Contractor responsible for meeting all Widefield Water and Sanitation District criteria when connecting to existing lines.
  - Curb returns shall be straight graded from CR to CR unless otherwise noted.
  - Inlets are Type "X" inlets (COOT STD M-604-13) unless otherwise noted.
- BENCHMARK:** Measurement is located at the Northwest corner of the intersection of Powers Boulevard and Fontaine Street. The monument is a 3-inch aluminum cap (FMS ID #206). Located 51.3 feet west of the west edge of asphalt of Powers Blvd and 65.5 feet north of the north edge of asphalt of Fontaine Street. Elevation=5977.89 feet (NGVD 1929, 1960 Ad.)
- Basis of Bearing:** All bearings used herein are based on an assumed bearing of N89°42'02" E, a distance of 1873.45 feet between the westerly corner of Pioneer Landing at Lorson Ranch Filing No. 2 and the easterly corner of the intersection of Powers Blvd and Fontaine Street. The bearing and distance are recorded under Record and Recapture No. 219713813 of the records of the El Paso County Clerk and Recorder, as transmitted by a red and orange surveyors cap stamped "Transport PLS 26965", from which the east one-quarter corner (E. 1/4) of said section 14, as monumented by a 2-1/2" pipe with galvanized cover cap only partially staked.

#### 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 satisfaction and field notification of all existing utilities, whether shown on the plans or not, before beginning construction. Location of existing utilities shall be verified by the contractor prior to construction. Call 811 to contact the Utility Notification Center of Colorado (UNCC).
- Contractor shall keep a copy of these approved plans, the Grading and Erosion Control Plan, the Stormwater Management Plan (SWMP), the soils and geotechnical reports, and the appropriate design and construction standards and specifications at the job site at all times, including the following:  
a. El Paso County Engineering Criteria Manual (ECM)  
b. City of Colorado Springs/El Paso County Drainage Criteria Manual, Volumes 1 and 2  
c. Colorado Department of Transportation (CDOT) Standard Specifications for Road and Bridge Construction  
d. CDOT 14 & 5 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 of the most recent version of the most recent version of the most recent version of the 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 modification 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 (EQCPT), Regional Building Floodplain Development Permit, U.S. Army Corps of Engineers-stated 401 and/or 404 permits, and county and state highway easement 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 SCM 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 Rowline are not allowed within sight triangles.
- Signage and striping shall comply with El Paso County Department of Public Works and MUTCD criteria. (If applicable, additional signage 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 the subject 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.

#### ABBREVIATIONS

ASBY = ASSEMBLY	MBL = MBRUSH
BNBY = BOUNDARY	NIS = NOT TO SCALE
BOP = BOTTOM OF PIPE	OD = OUTSIDE DIAMETER
CL = CENTERLINE	PC = POINT OF HORIZONTAL CURVATURE
CHA = CONCRETE REINFORCE ANCHOR	PO = POINT OF HORIZONTAL TANGENCY
CTRS = CONCRETE THRUST BLOCK	PVT = POINT OF VERTICAL TANGENCY
CR = POINT OF CURB RETURN	PVC = POLY VINYL CHLORIDE PIPE
DP = 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	SH = SHER
GB = GRADE BREAK	SS = SANITARY SEWER
HP = HIGH POINT	STA = STATION
HORIZ = HORIZONTAL	STD = STANDARD
HYD = HYDRAULIC	TA = TOP OF ASPHALT
IL = INSIDE DIAMETER	TC = TOP OF CURB
LI = 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



**SOILS DESCRIPTION**

- CLAYEY SAND
- CLAYSTONE
- RANBY CLAY
- SHALE
- SILTY SAND
- SILTY TO CLAYEY SAND

**SYMBOLS AND NOTES**

- STANDARD PENETRATION TEST - MADE BY DRIVING A SPLIT BARREL SAMPLER INTO THE SOIL BY EMPLOYING A 140 LB. HAMMER 30" IN GENERAL ACCORDANCE WITH ASTM D-1586. NUMBER INDICATES NUMBER OF BLOWN BLOWS PER FOOT (BASES OTHERWISE INDICATED)
- UNSATURATED CALIFORNIA SANDS - MADE BY DRIVING A RING PENETRAMETER INTO THE SOIL BY EMPLOYING A 140 LB. HAMMER 30" IN GENERAL ACCORDANCE WITH ASTM D-1586. NUMBER INDICATES NUMBER OF BLOWN BLOWS PER FOOT (UNLESS OTHERWISE INDICATED)
- FREE WATER TABLE
- DEPTH AT WHICH BORING CANCELED
- DISURBED BULK SAMPLE
- AUGER CUTTING
- WATER CONTENT (%)

Kiowa Project No. 16031  
January 26, 2018

#### INDEX OF SHEETS

- Cover Sheet
- Plan and Profile - Sta 9+33 to Sta 21+00
- Plan and Profile - Sta 21+00 to Sta 34+00
- Plan and Profile - Sta 34+00 to Sta 39+18
- Grade Control Plan and Details
- Drainageway Details
- Bridge Structure Layout
- Bridge Structure Plans
- Grading & Erosion Control Plan
- Grading & Erosion Control Plan
- Erosion Control Details
- Roadway Details
- Drainageway Cross-Sections

#### 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 H. Wray, P.E.*  
Richard H. Wray, P.E. #11811  
For and on behalf of Kiowa Engineering Corp.  
Date: 1/23/18

**Owner/Developer's Statement:**  
I, the owner/developer hereon, certify that I will comply with all of the requirements specified in these detailed plans and specifications.

*Jeff Harty*  
Jeff Harty  
Lorson Development  
212 N. Wahsatch Ave. Suite 301  
Colorado Springs, Colorado 80903  
Date: 1/23/18

**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 approval has not started within those 2 years the plans will need to be re-submitted for approval, including payment of review fees at the Planning and Community Development Director's discretion.

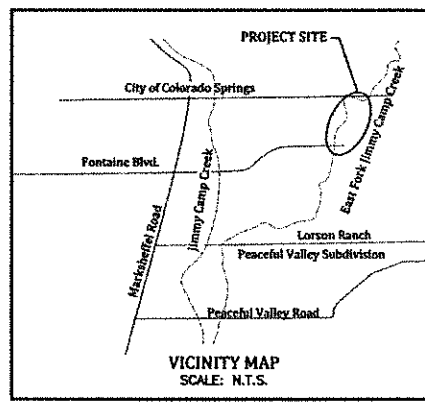
Jennifer Irvine, P.E.  
County Engineer / ECM Administrator  
Date

DP	EPC FIS (1)	2014 DPBS		
		5yr	10yr	100yr
A	NR 2400 4750	100	1850	4260
B	NR 2200 4400	100	1830	4220
C	NR 2200 4400	100	1830	4220

- DESIGN OF MAJOR DRAINAGEWAYS AND FONTAINE BRIDGE BASED ON 100-YEAR FIS DISCHARGES.
- ALL DISCHARGES REPRESENT EXISTING BASIN DEVELOPMENT CONDITIONS.

#### WIDEFIELD WATER AND SANITATION DISTRICT GENERAL NOTES

- All utility construction to be conducted in conformance with the current Widefield Water and Sanitation District specifications. Compaction requirements shall be 95% Standard Proctor as determined by ASTM D698, unless otherwise approved by the Widefield Water and Sanitation District or a higher standard is imposed by another agency having right-of-way jurisdiction.
- All materials and workmanship shall be subject to inspection by the Widefield Water and Sanitation District. The Widefield Water and Sanitation District reserves the right to accept or reject any such materials and workmanship that does not conform to its standards and specifications.
- The Developer or his Engineer has located all fire hydrants and future service stubs. Any required realignment, either horizontal or vertical, shall be at the expense of the Developer.
- All ductile iron pipe, to include fittings, valves and fire hydrants will be wrapped with polyethylene tubing, and electrically isolated.
- All ductile iron pipe and fittings shall be double bonded. Specifications for cathodic protection on both Dip mains and PVC mains is specified in the Standards and Specifications.
- PVC main lines shall be installed with coated No. 12 tracer wire.
- The Contractor is required to notify the Widefield Water and Sanitation District (390-7111) a minimum of 48 hours and a maximum of 96 hours prior to the start of construction. The Contractor shall also notify affected utility companies 48 hours prior to construction adjacent to the known utility lines.
- The location of all utilities as shown on these drawings are approximate only. The location of all utilities shall be verified prior to construction by the Contractor.
- The Contractor shall field excavate and verify the vertical and horizontal location of all tie-ins. Contractor shall notify the Widefield Water and Sanitation District and the Engineer of the field verified information prior to construction.
- All bends shall be field staked prior to construction.
- Any water utility material removed and not reused shall be returned to the Widefield Water and Sanitation District of the District no requests.
- The Contractor shall at his expense support and protect all utility mains so that they will function continuously during construction. Should a utility main fail as a result of the Contractor's operation, it will be replaced immediately by either the Contractor or the Widefield Water and Sanitation District at full cost of labor and materials to the Contractor.
- Any pumping or bypass operations must be reviewed and approved prior to execution by both the Widefield Water and Sanitation District and the Engineer.
- Contractor must replace or repair any damage to all surface improvements, including but not limited to fences, curb and gutter and/or asphalt that may be caused during construction.
- All water lines 6" and larger, and all sewer lines 8" and larger, shall have as "As-Built" plans prepared and approved prior to final acceptance by the Widefield Water and Sanitation District.
- Prior to construction, a Pre-Construction Conference is required a minimum of 72 hours in advance of commencement of work. To set the Pre-Construction conference, contact Brandon Bernard, Water Superintendent (464-2051) and/or Mark McCormick, Wastewater Superintendent (491-0128) of the Widefield Water and Sanitation District for a date. The Pre-Construction Conference items will be set until 4 sets of signed drawings are received by the Widefield W & S District.  
Pre-Construction Date /Initials

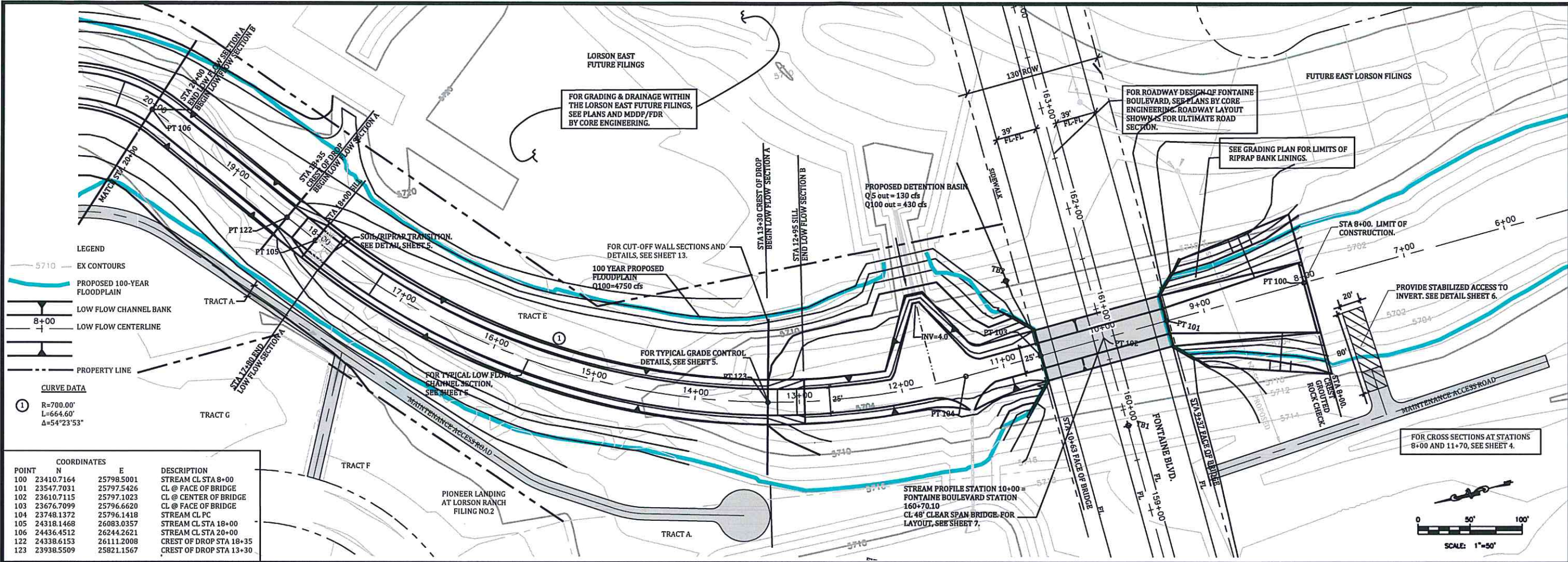


**DEVELOPER:**  
Lorson Development  
212 N. Wahsatch #301  
Colorado Springs, CO  
80903

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

PCD FILE # CDR-16-009





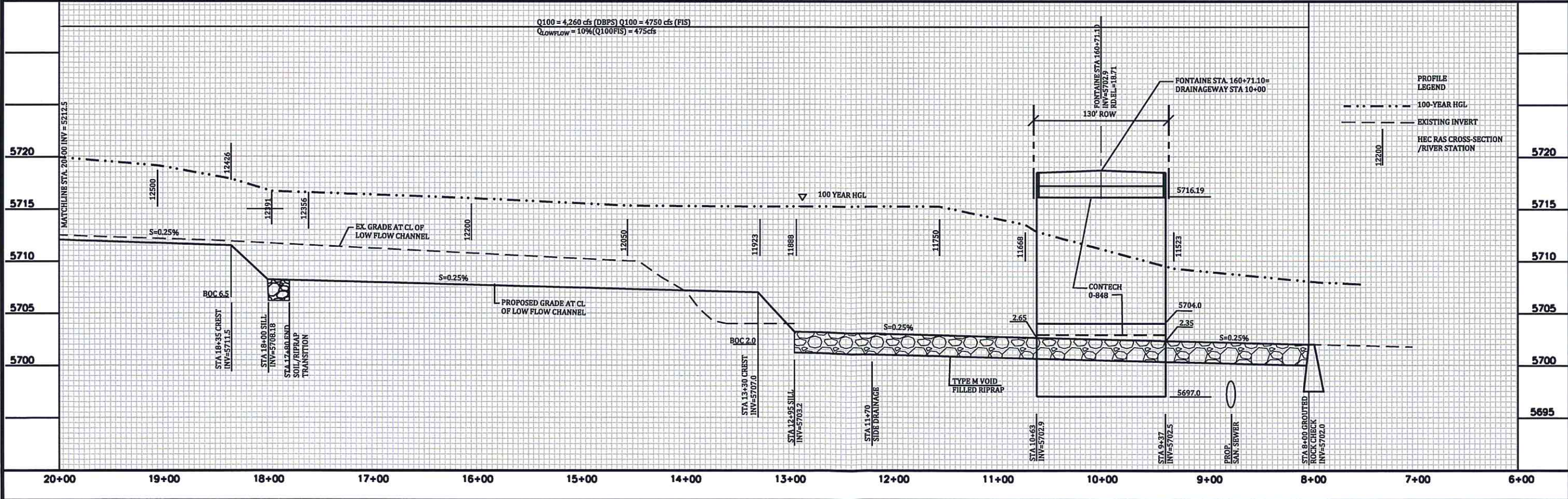
**LEGEND**

- 5710 EX CONTOURS
- PROPOSED 100-YEAR FLOODPLAIN
- LOW FLOW CHANNEL BANK
- LOW FLOW CENTERLINE
- PROPERTY LINE

**CURVE DATA**

① R=700.00'  
L=664.60'  
Δ=54°23'53"

POINT	COORDINATES		DESCRIPTION
	N	E	
100	23410.7164	25798.5001	STREAM CL STA 8+00
101	23547.7031	25797.5426	CL @ FACE OF BRIDGE
102	23610.7115	25797.1023	CL @ CENTER OF BRIDGE
103	23676.7099	25796.6620	CL @ FACE OF BRIDGE
104	23748.1372	25796.1418	STREAM CL PC
105	24318.1468	26083.0357	STREAM CL STA 18+00
106	24436.4512	26244.2621	STREAM CL STA 20+00
122	24338.6153	26111.2008	CREST OF DROP STA 18+35
123	23938.5509	25821.1567	CREST OF DROP STA 13+30



**PROFILE LEGEND**

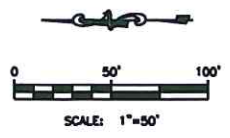
- 100-YEAR HGL
- EXISTING INVERT
- HEC RAS CROSS-SECTION / RIVER STATION

**LORSON RANCH**  
**FONTAINE BOULEVARD BRIDGE AND CHANNEL DESIGN**  
**CHANNEL PLAN AND PROFILE**  
EL PASO COUNTY, COLORADO

Project No.:	16031
Date:	1/26/18
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

16031 Pls 2-13 Rev.dwg/Jan 24, 2018/10:40am

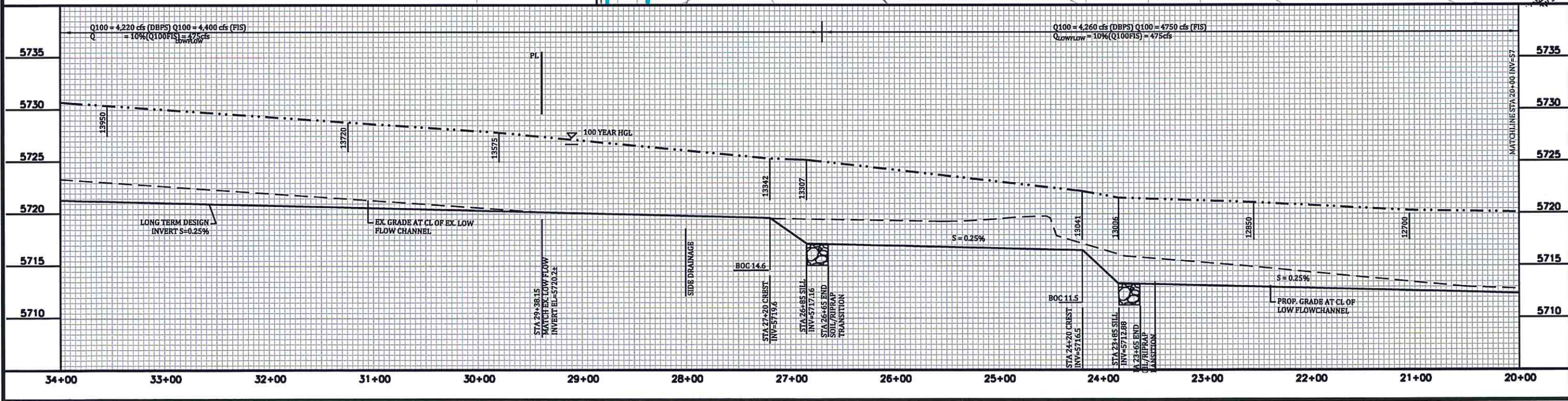
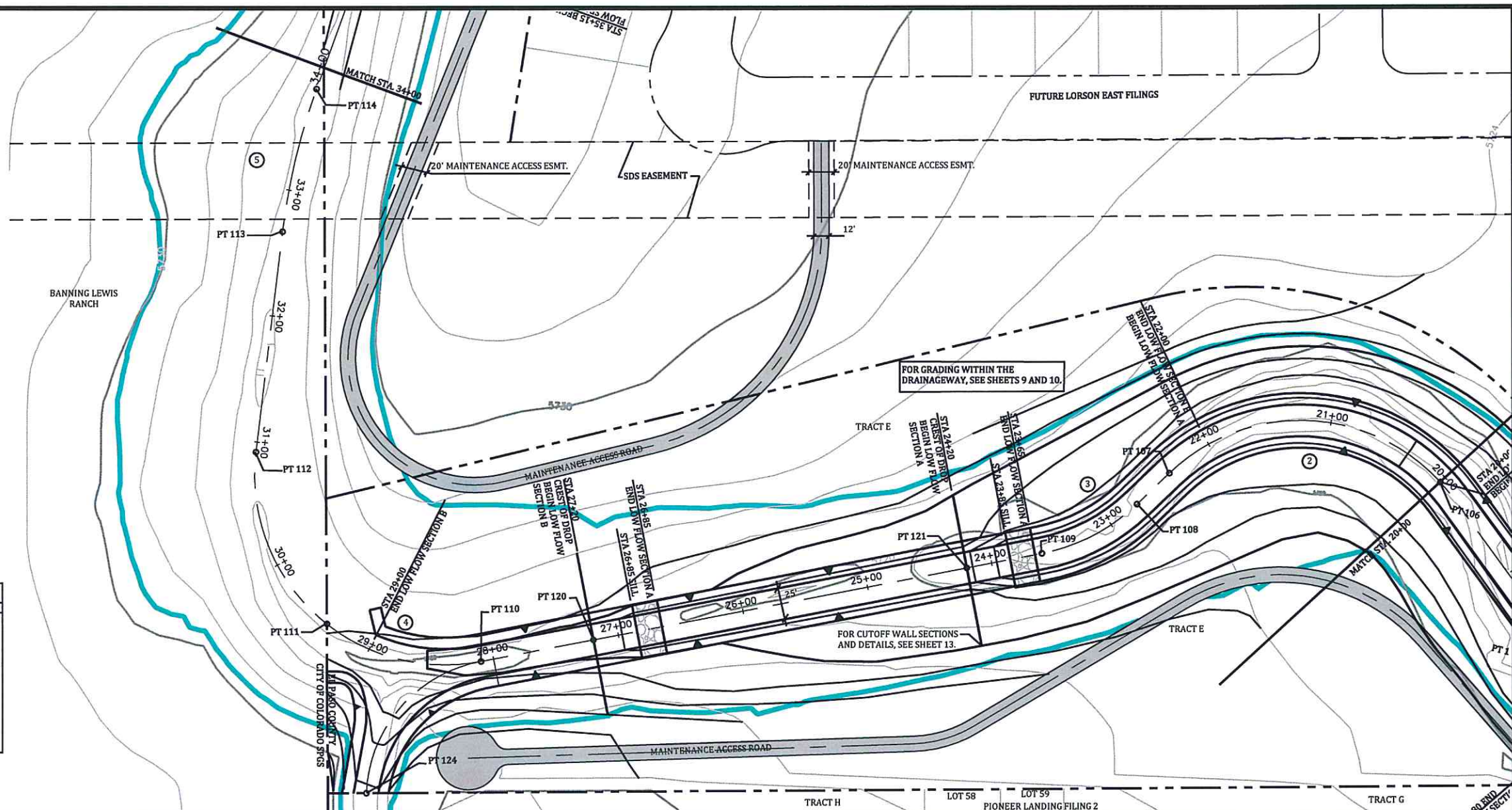




**CURVE DATA**

- ② R=150.00'  
L=255.39'  
Δ=97°33'09"
- ③ R=150.00'  
L=85.57'  
Δ=32°41'08"
- ④ R=150.00'  
L=282.07'  
Δ=107°44'34"
- ⑤ R=500.00'  
L=115.48'  
Δ=13°14'00"

POINT	COORDINATES		DESCRIPTION
	N	E	
107	24650.5855	26251.8330	PT STREAM CL
108	24676.1827	26227.4954	PC STREAM CL
109	24751.2493	26188.8936	PT STREAM CL
110	25193.6482	26103.9461	PC STREAM CL & SIDE CHANNEL CL
111	25315.1867	26113.7647	PROPERTY LINE AT CL
112	25370.8562	26269.2057	PT STREAM CL
113	26349.9531	26442.7041	PC STREAM CL
114	25232.0641	26554.7510	PT STREAM CL
120	25105.2070	26120.9284	CREST OF DROP STA 27+20
121	24810.5892	26177.5003	CREST OF DROP STA 24+20
124	25283.9725	26000.0948	PC SIDE CHANNEL CL @ PL

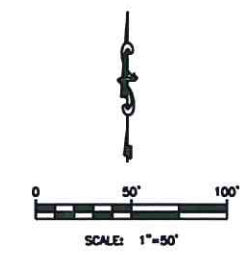
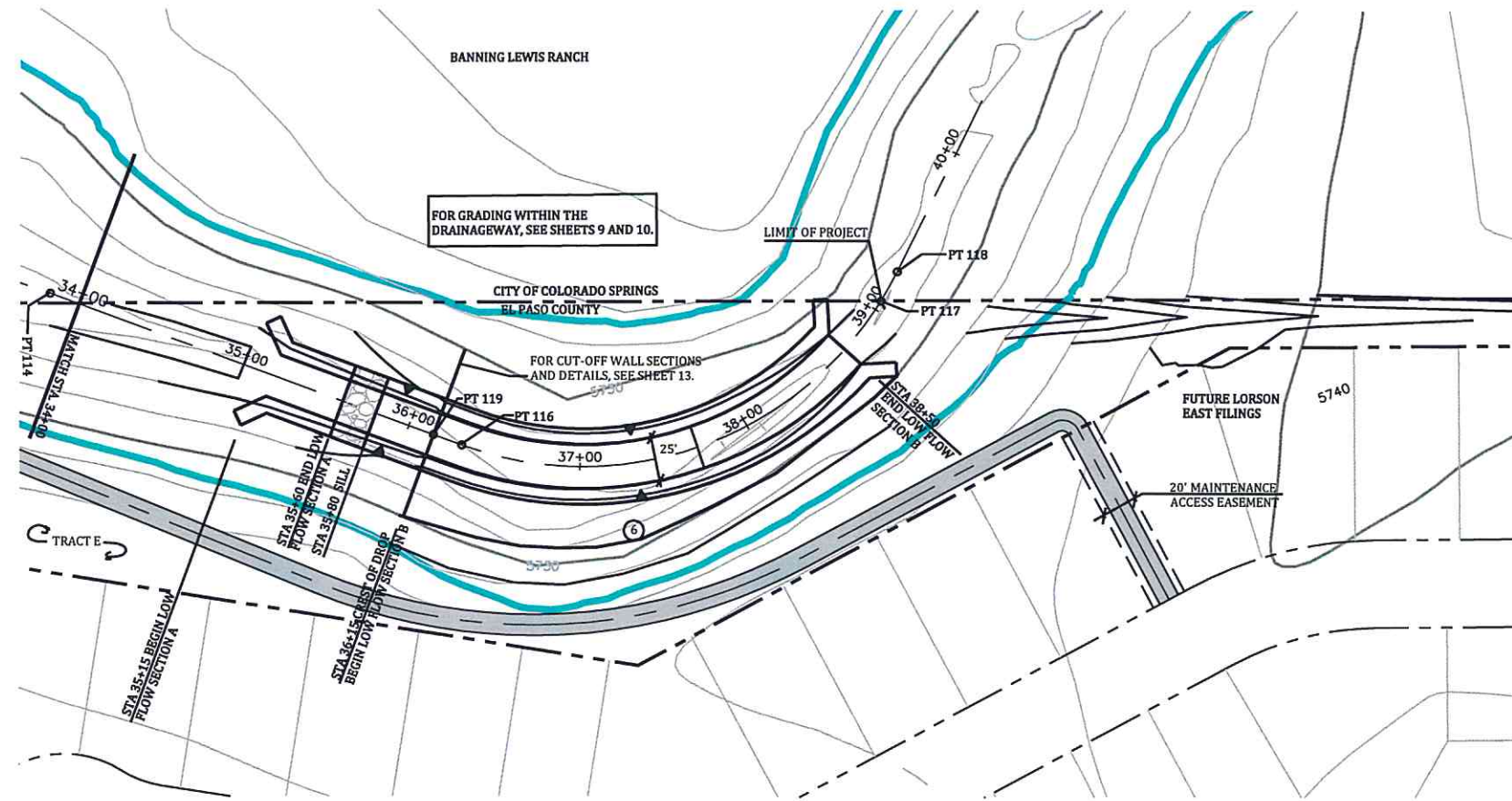


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Revisions:	

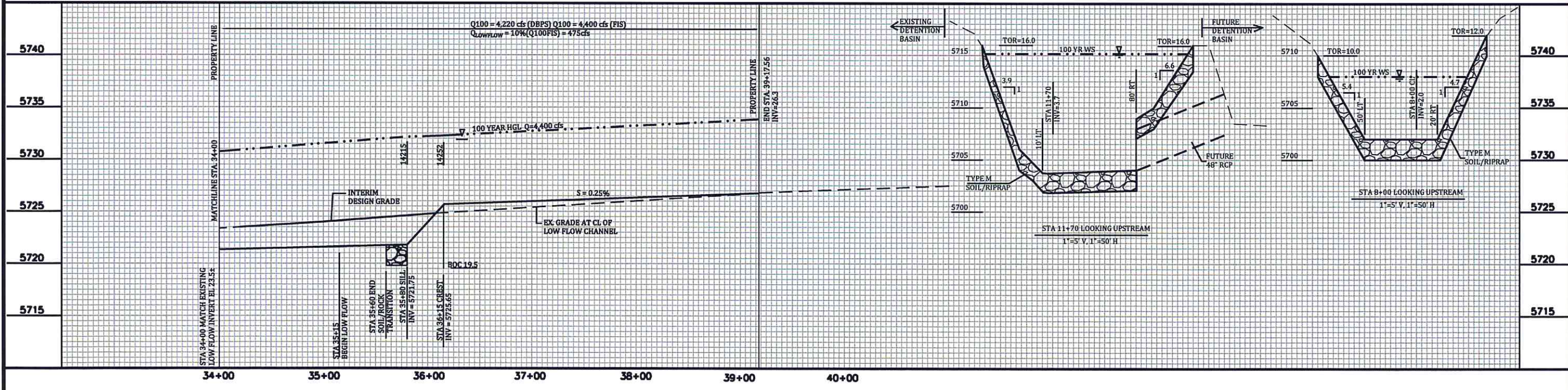
16031 sht 2-13 final.dwg/Jan 24, 2018/4:37pm





**CURVE DATA**  
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 L=292.64'  
 Δ=83°50'09"

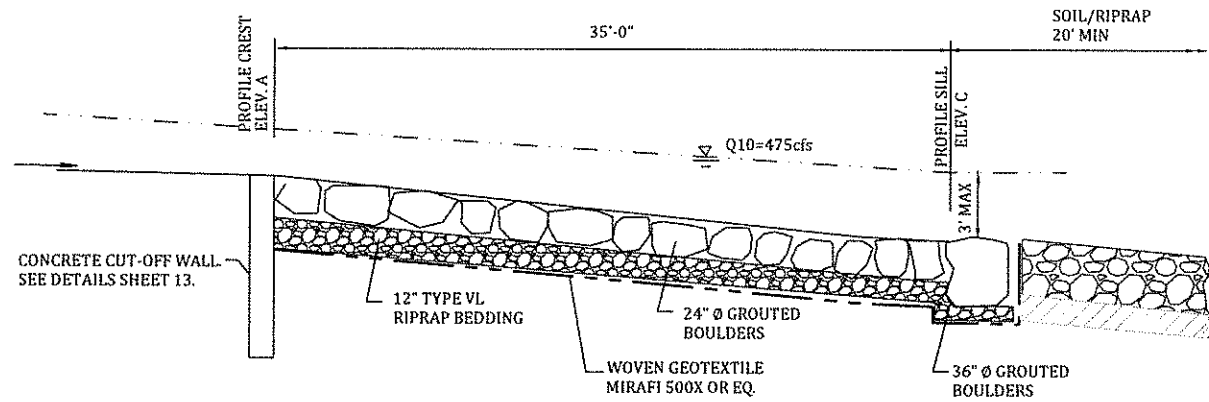
POINT	COORDINATES		DESCRIPTION
	N	E	
116	25237.1696	26789.3871	PC STREAM CL
117	25319.7983	27028.2480	STREAM CL AT PROPERTY LINE
118	25336.4584	27037.4829	PT STREAM CL
119	25243.0917	26773.2099	CREST OF DROP AT STA 36+00



**LORSON RANCH**  
**FONTAINE BOULEVARD BRIDGE AND CHANNEL DESIGN**  
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Project No.:	16031
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Revisions:	



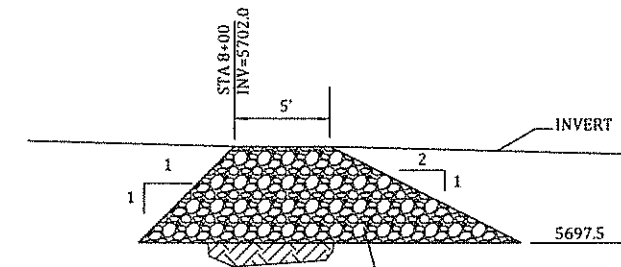


**SECTION A-A**  
1"=5' H&V

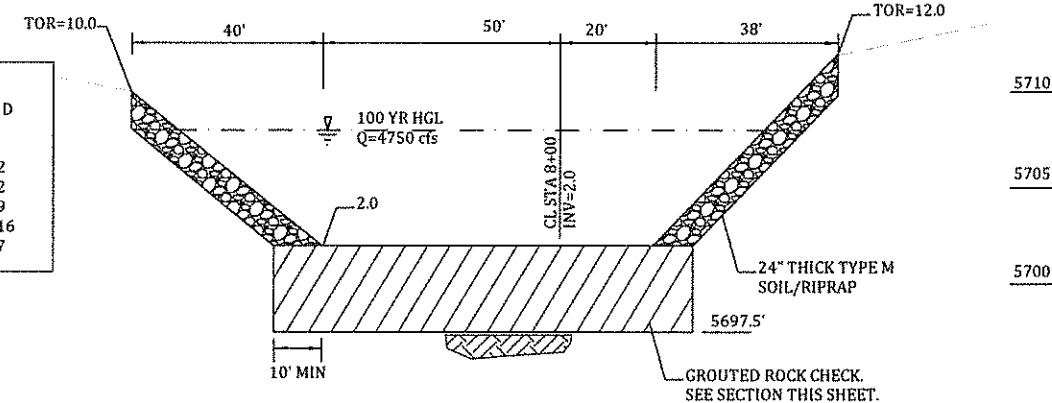
CLASSIFICATION OF BOULDERS		
BOULDER CLASSIFICATION	NOMINAL SIZE AND RANGE IN SMALLEST DIMENSION OF INDIVIDUAL ROCK BOULDERS (INCHES)	MAXIMUM RATIO OF LARGEST TO SMALLEST ROCK DIMENSION OF INDIVIDUAL BOULDERS
B24	24 [22-26]	2.00 [44"-52" MAX.]
B30	30 [28-32]	2.00 [56"-64" MAX.]
B36	36 [34-38]	1.75 [60"-67" 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)

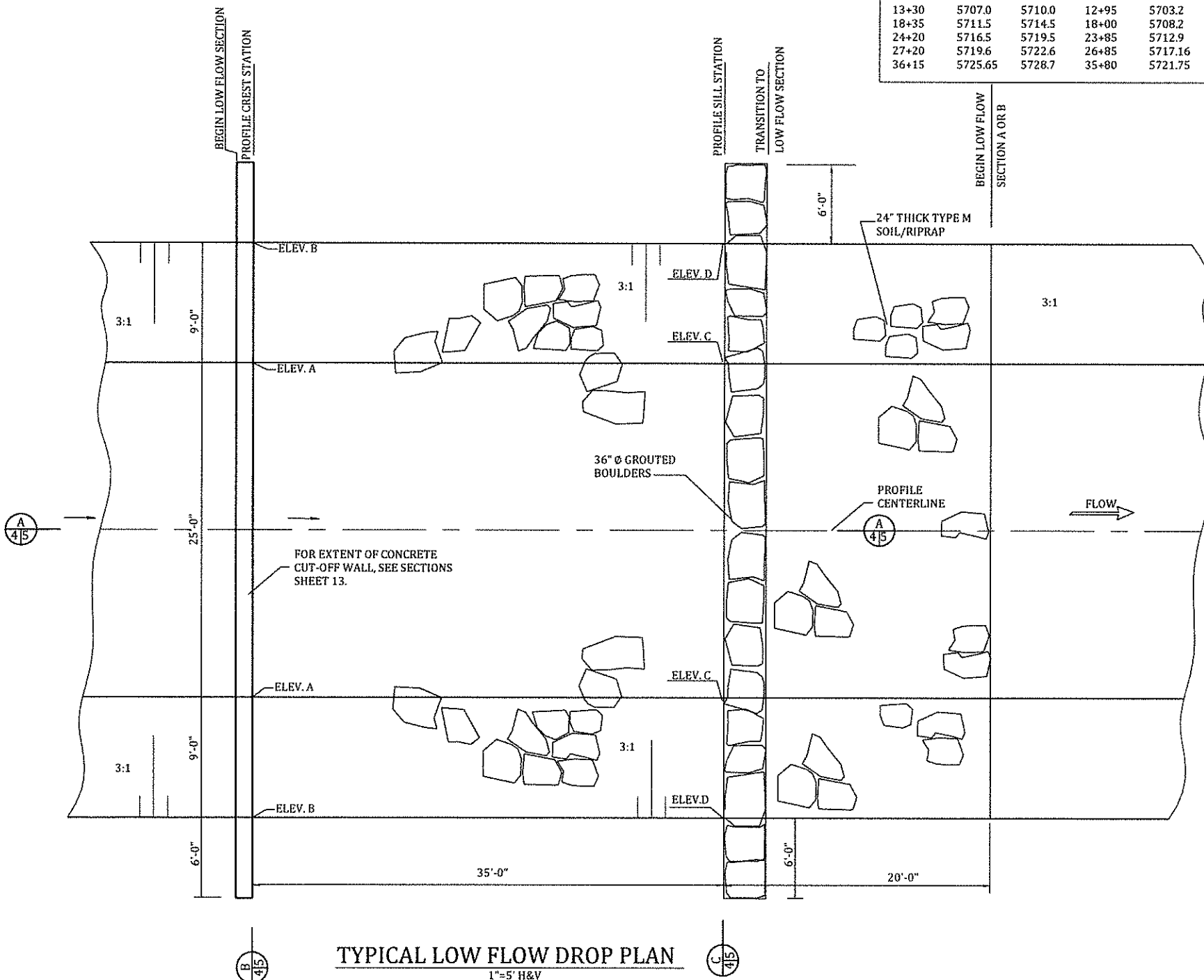
CREST STATION	DROP STRUCTURE SCHEDULE				
	ELEV. A	ELEV. B	SILL STATION	ELEV. C	ELEV. D
13+30	5707.0	5710.0	12+95	5703.2	5706.2
18+35	5711.5	5714.5	18+00	5708.2	5711.2
24+20	5716.5	5719.5	23+85	5712.9	5715.9
27+20	5719.6	5722.6	26+85	5717.16	5720.16
36+15	5725.65	5728.7	35+80	5721.75	5725.7



**GROUTED ROCK CHECK SECTION**  
1"=5' H&V



**CHANNEL SECTION STATION 8+00**  
1"=20' H, 1"=5' V



**TYPICAL LOW FLOW DROP PLAN**  
1"=5' H&V

**GENERAL NOTES:**

1. CONTRACTOR TO CONTACT THE ENGINEER TO REVIEW REPRESENTATIVE BOULDERS AND RIPRAP FOR APPROVAL PRIOR TO DELIVERY TO SITE.
2. THE ENGINEER SHALL BE CONTACTED TO INSPECT SUBGRADE PRIOR TO PLACEMENT OF RIPRAP AND BOULDERS.
3. THE ENGINEER SHALL BE CONTACTED TO INSPECT BOULDER PLACEMENT PRIOR TO GROUT PLACEMENT.
4. ALTHOUGH THE ENGINEER SHALL PROVIDE FIELD INSPECTION, CONTRACTOR HAS FULL RESPONSIBILITY OF CONFORMING WITH THE PROJECT DRAWINGS AND SPECIFICATIONS. ANY REWORK COST SHALL BE BORNE BY THE CONTRACTOR.

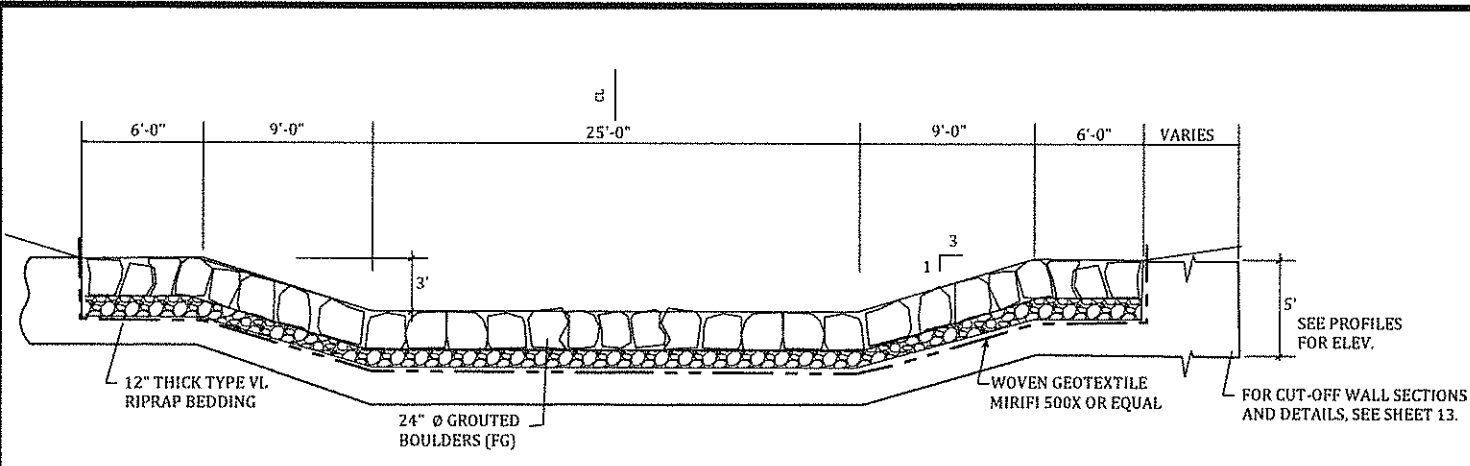
**GROUT MATERIAL SPECIFICATIONS:**

1. ALL GROUT SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH EQUAL TO 3200 PSI.
2. ONE CUBIC YARD OF GROUT SHALL HAVE A MINIMUM OF SIX (6) SACKS OF TYPE II PORTLAND CEMENT.
3. A MAXIMUM OF 25% TYPE F FLY ASH MAY BE SUBSTITUTED FOR THE PORTLAND CEMENT.
4. TYPE B GROUT SHALL BE USED IN STREAMS WITH SIGNIFICANT PERENNIAL FLOWS.
5. FOR TYPE B GROUT, THE AGGREGATE SHALL BE COMPRISED OF ¾ -INCH MAXIMUM GRAVEL, STRUCTURAL CONCRETE AGGREGATE.
6. THE GROUT SLUMP SHALL BE 4-INCHES TO 6-INCHES.
7. AIR ENTRAINMENT SHALL BE 5.5%-7.5%.
8. TO CONTROL SHRINKAGE AND CRACKING, 1.5 POUNDS OF FIBERMESH, OR EQUIVALENT, SHALL BE USED PER CUBIC YARD OF GROUT.
9. COLOR ADDITIVE IN REQUIRED AMOUNTS SHALL BE USED WHEN SO SPECIFIED BY CONTRACT.

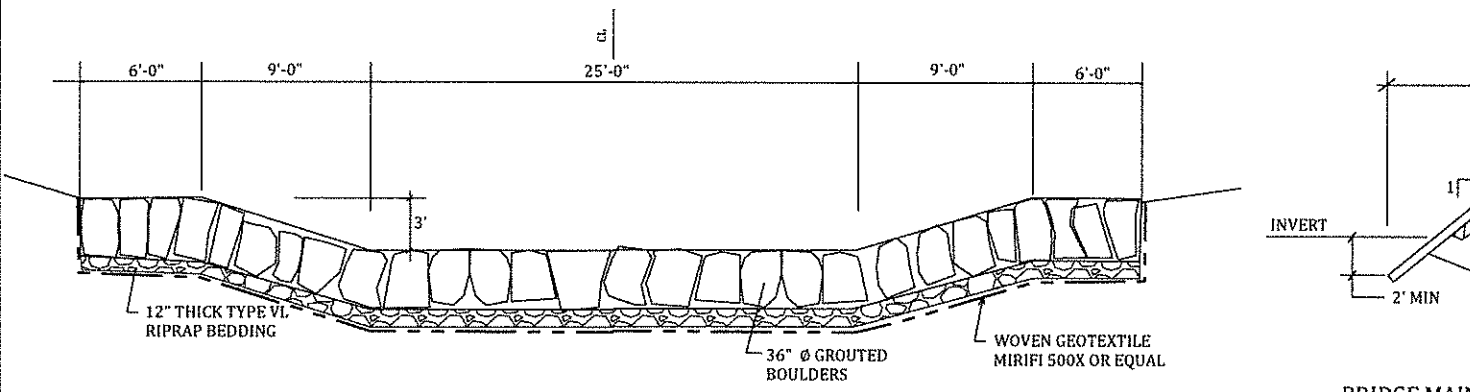
**GROUT PLACEMENT SPECIFICATIONS:**

1. CLEAN BOULDERS BY BRUSHING AND WASHING BEFORE GROUTING TO IMPROVE THE BOND BETWEEN THE GROUT AND BOULDERS.
2. ALL TYPE B GROUT SHALL BE DELIVERED BY MEANS OF A LOW PRESSURE (LESS THAN 10 PSI) CONCRETE PUMP USING A 3-INCH DIAMETER NOZZLE.
3. FULL DEPTH PENETRATION OF THE GROUT INTO THE BOULDER VOIDS SHALL BE ACHIEVED BY INJECTING GROUT STARTING WITH THE NOZZLE NEAR THE BOTTOM AND RAISING IT AS GROUT FILLS, WHILE VIBRATING GROUT INTO PLACE USING A PENCIL VIBRATOR.
4. AFTER GROUT PLACEMENT, EXPOSED BOULDER FACES SHALL BE CLEANED WITH A WET BROOM.
  - 4.1. REMOVE ALL GROUT SPLATTER FROM EXPOSED FACES OF ROCK IMMEDIATELY DURING OR FOLLOWING GROUTING OPERATIONS.
  - 4.2. NO GROUT WILL BE ALLOWED TO REMAIN ON THE EXPOSED BOULDER FACES. THE CITY MAY REQUIRE SANDBLASTING TO REMOVE GROUT SPLATTER OR SPILLS THAT ARE ALLOWED TO DRY AND HARDEN ON THE BOULDER FACES.
5. ALL GROUT BETWEEN BOULDERS SHALL BE TREATED WITH A BROOM FINISH.
6. ALL FINISHED GROUT SURFACES SHALL BE SPRAYED WITH A CLEAR LIQUID MEMBRANE CURING COMPOUND AS SPECIFIED IN ASTM C-309.
7. SPECIAL PROCEDURES SHALL BE REQUIRED FOR GROUT PLACEMENT WHEN THE AIR TEMPERATURES ARE LESS THAN 40°F OR GREATER THAN 90°F. CONTRACTOR SHALL OBTAIN PRIOR APPROVAL FROM THE DESIGN ENGINEER OF THE PROCEDURES TO BE USED FOR PROTECTING THE GROUT.

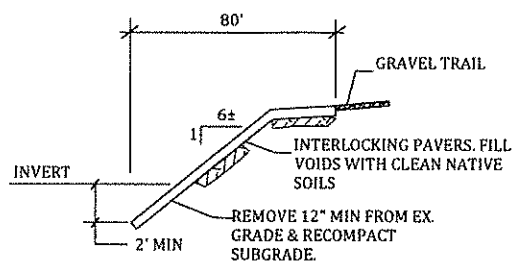
Project No.:	16031
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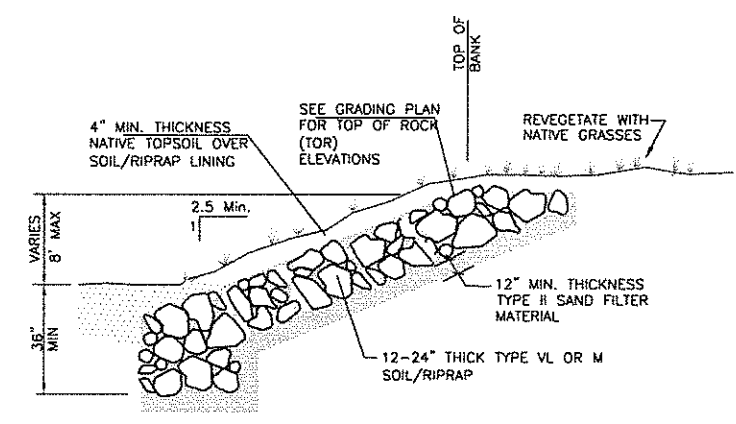
**CREST SECTION B**  
1"=5' H&V



**SECTION C**  
1"=5' H&V



**BRIDGE MAINTENANCE ACCESS**  
NTS



**TYPICAL SOIL/RIPRAP BANK LINING**  
SCALE : N.T.S.

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

\*D<sub>50</sub> = MEAN PARTICLE SIZE

**SOIL RIPRAP**

THE SOIL MATERIAL SHALL BE NATIVE OR TOPSOIL AND MIXED WITH SIXTY FIVE PERCENT (65%) RIPRAP AND THIRTY FIVE PERCENT (35%) SOIL BY VOLUME.

SOIL RIPRAP SHALL CONSIST OF A UNIFORM MIXTURE OF SOIL AND RIPRAP WITHOUT VOIDS.

CONTRACTOR SHALL COOPERATE WITH ENGINEER IN OBTAINING AND PROVIDING SAMPLES OF ALL SPECIFIED MATERIALS.

CONTRACTOR SHALL SUBMIT CERTIFIED LABORATORY TEST CERTIFICATES FOR ALL ITEMS REQUIRED FOR SOIL RIPRAP.

RIPRAP USED SHALL BE THE TYPE DESIGNATED ON THE DRAWINGS AND SHALL CONFORM TO TABLE SHOWN TO THE RIGHT.

THE RIPRAP DESIGNATION AND TOTAL THICKNESS OF RIPRAP SHALL BE AS SHOWN ON THE DRAWINGS. THE MAXIMUM STONE SIZE SHALL NOT LARGER THAN THE THICKNESS OF THE RIPRAP.

NEITHER WIDTH NOR THICKNESS OF A SINGLE STONE OF RIPRAP SHALL BE LESS THAN ONE-THIRD (1/3) OF ITS LENGTH.

THE SPECIFIC GRAVITY OF THE RIPRAP SHALL BE TWO AND ONE-HALF (2.5) OR GREATER.

MINIMUM DENSITY FOR ACCEPTABLE RIPRAP SHALL BE ONE HUNDRED AND SIXTY FIVE (165) POUNDS PER CUBIC FOOT.

RIPRAP SPECIFIC GRAVITY SHALL BE ACCORDING TO THE BULK-SATURATED, SURFACE-DRY BASIS, IN ACCORDANCE WITH AASHTO T85.

THE RIPRAP SHALL HAVE A PERCENTAGE LOSS OF NOT MORE THAN FORTY PERCENT (40%) AFTER FIVE HUNDRED (500) REVOLUTIONS WHEN TESTED IN ACCORDANCE WITH AASHTO T104 FOR LEDGE ROCK USING SODIUM SULFATE.

THE RIPRAP SHALL HAVE A PERCENTAGE LOSS OF NOT MORE THAN TEN (10%) AFTER FIVE (5) CYCLES WHEN TESTED IN ACCORDANCE WITH AASHTO T104 FOR LEDGE ROCK.

THE RIPRAP SHALL HAVE A PERCENTAGE LOSS OF NOT MORE THAN TEN PERCENT (10%) AFTER TWELVE (12) CYCLES OF FREEZING AND THAWING WHEN TESTED IN ACCORDANCE WITH AASHTO T103 FOR LEDGE ROCK, PROCEDURE A. ROCK SHALL BE FREE FROM CALCITE INTRUSIONS.

RUBBLE FOR USE AS SOIL/RIPRAP SHALL BE GRADED TO MEET THE EQUIVALENT ROCK RIPRAP GRADATION. RUBBLE PROPOSED FOR USE IN PLACE OF ROCK RIPRAP SHALL BE STOCKPILED FOR OBSERVATION BY THE ENGINEER PRIOR TO THE COMMENCEMENT OF THE WORK.

**GRADATION:**

A. EACH LOAD OF RIPRAP SHALL BE REASONABLY WELL GRADED FROM THE SMALLEST TO THE LARGEST SIZE SPECIFIED.

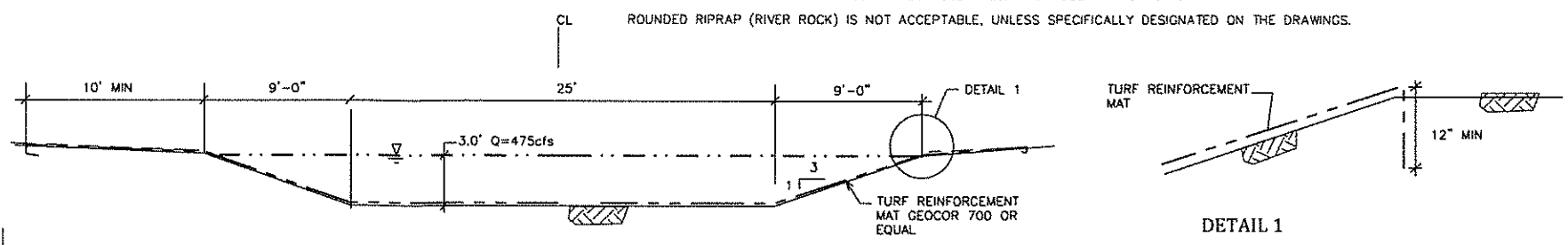
B. STONES SMALLER THAN THE TWO TO TEN PERCENT (2%-10%) SIZE WILL NOT BE PERMITTED IN AN AMOUNT EXCEEDING TEN PERCENT (10%) BY WEIGHT OF EACH LOAD.

C. CONTROL OF GRADATION SHALL BE BY VISUAL INSPECTION, HOWEVER IN THE EVENT THE ENGINEER DETERMINES THE RIPRAP TO BE UNACCEPTABLE, THE ENGINEER SHALL PICK TWO (2) RANDOM TRUCKLOADS TO BE DUMPED AND CHECKED FOR GRADATION.

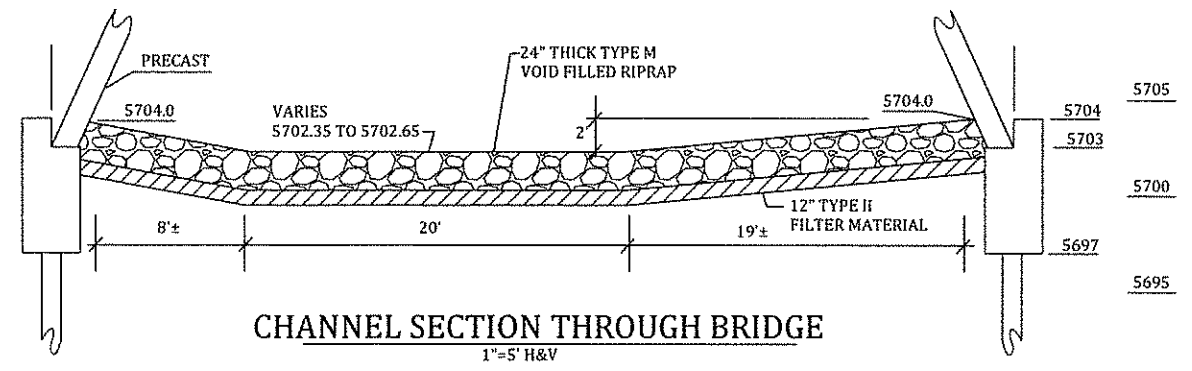
1) MECHANICAL EQUIPMENT AND LABOR NEEDED TO ASSIST IN CHECKING GRADATION SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST.

BROKEN ASPHALT PAVEMENT SHALL NOT BE ACCEPTABLE FOR USE IN THE WORK.

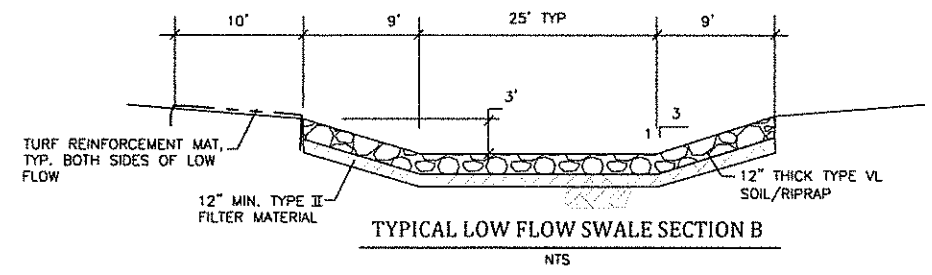
ROUNDED RIPRAP (RIVER ROCK) IS NOT ACCEPTABLE, UNLESS SPECIFICALLY DESIGNATED ON THE DRAWINGS.



**TYPICAL LOW FLOW SWALE SECTION A**  
SCALE : 1"=5'



**CHANNEL SECTION THROUGH BRIDGE**  
1"=5' H&V

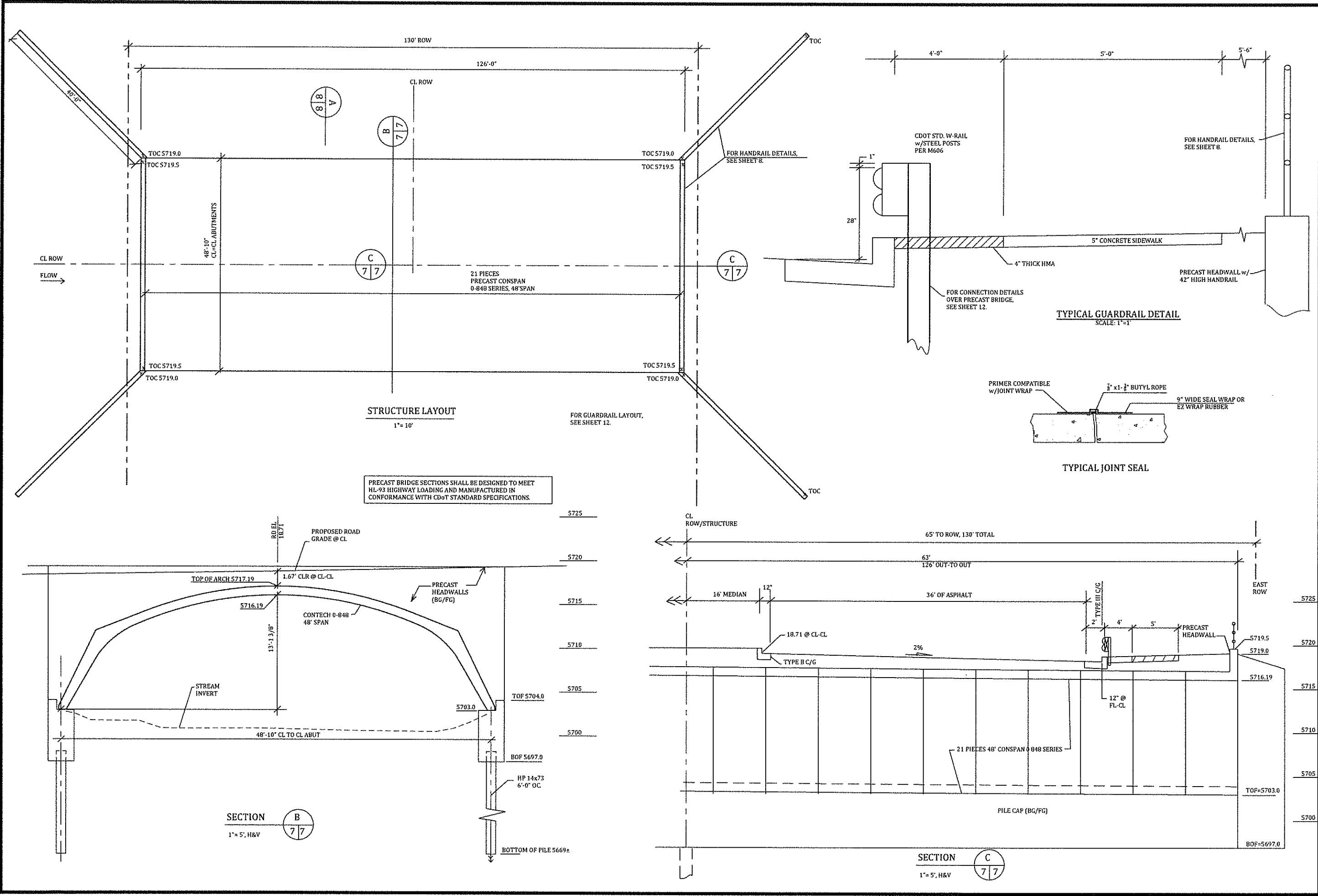


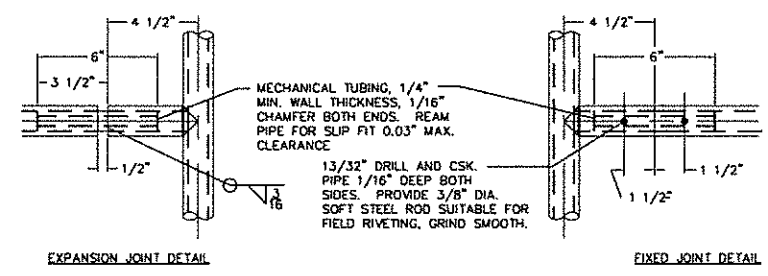
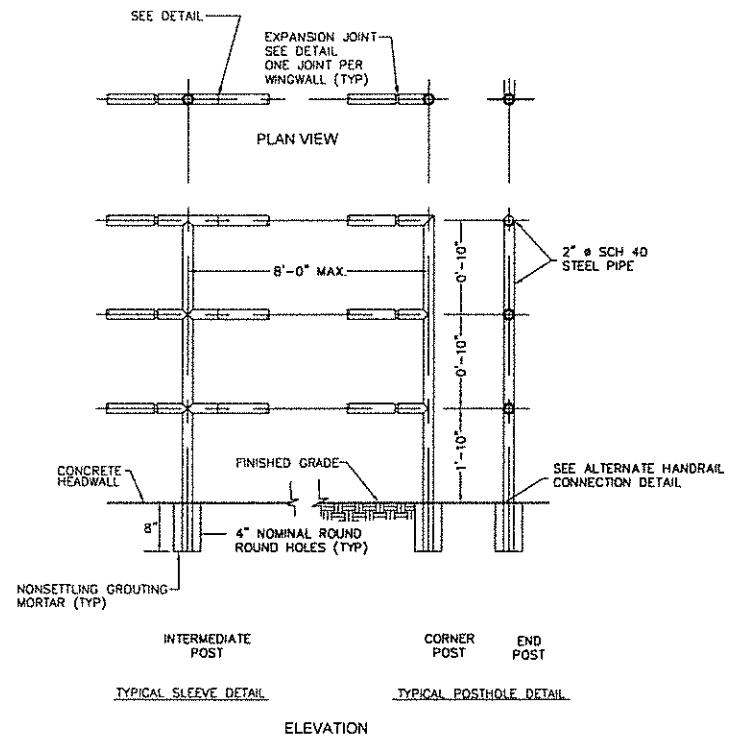
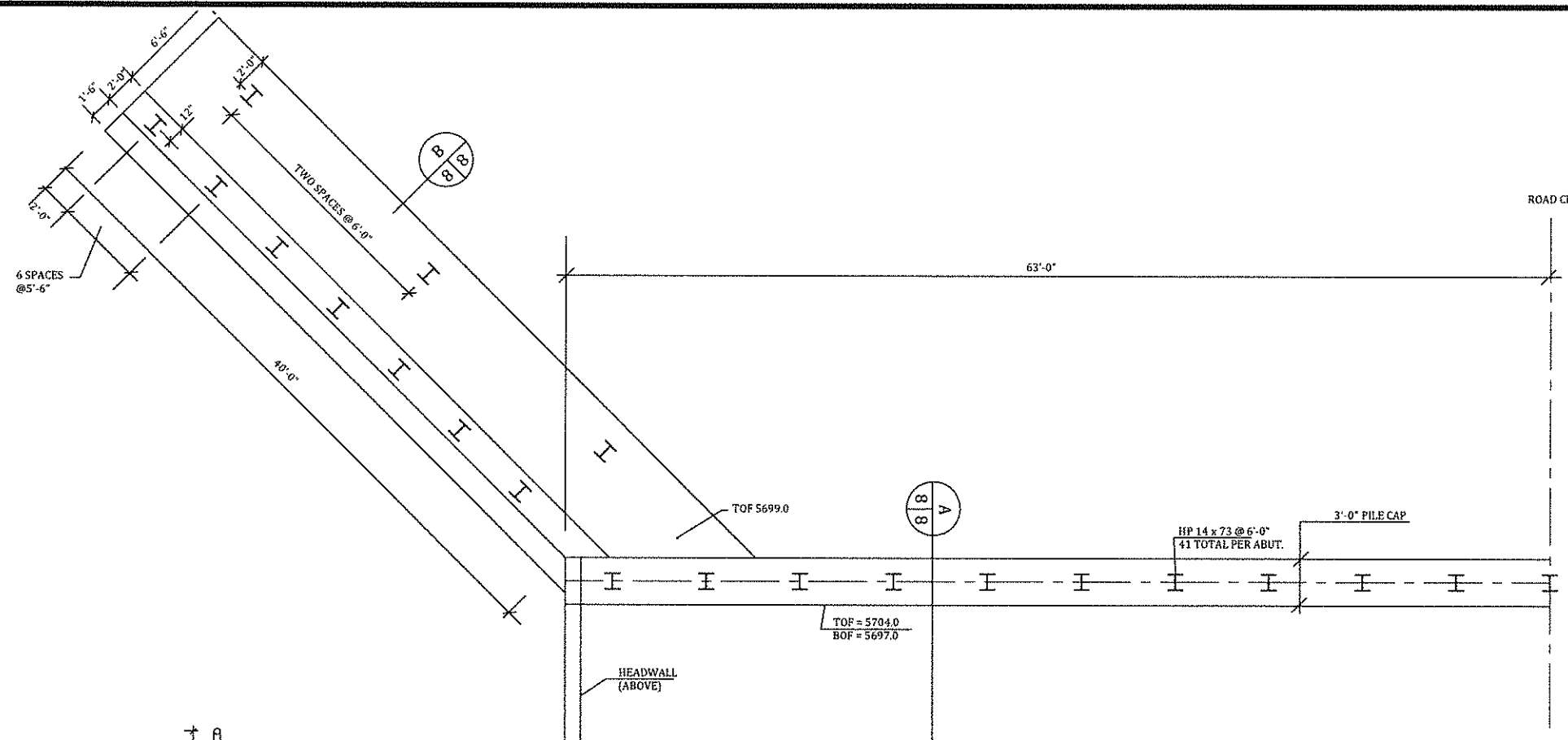
**TYPICAL LOW FLOW SWALE SECTION B**  
NTS

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Revisions:	

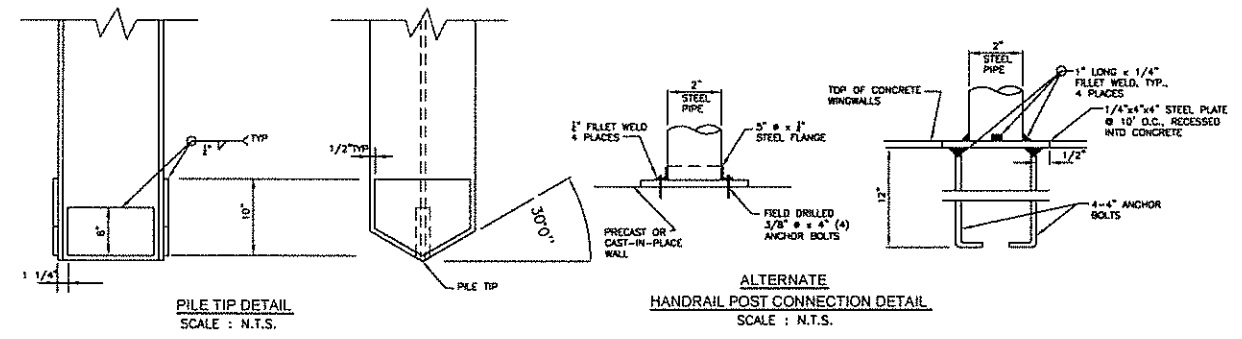
**LORSON RANCH  
FONTAINE BOULEVARD BRIDGE AND CHANNEL DESIGN  
BRIDGE STRUCTURE LAYOUT  
EL PASO COUNTY, COLORADO**

Project No.:	16031
Date:	1/26/18
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Revisions:	





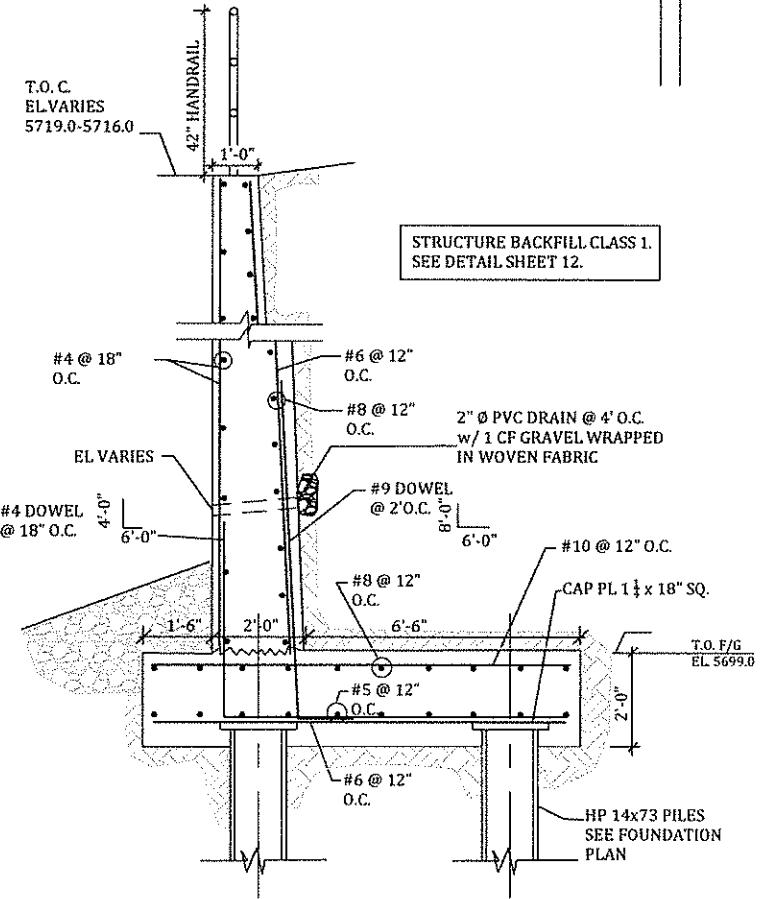
HANDRAIL DETAIL  
SCALE: N.T.S.



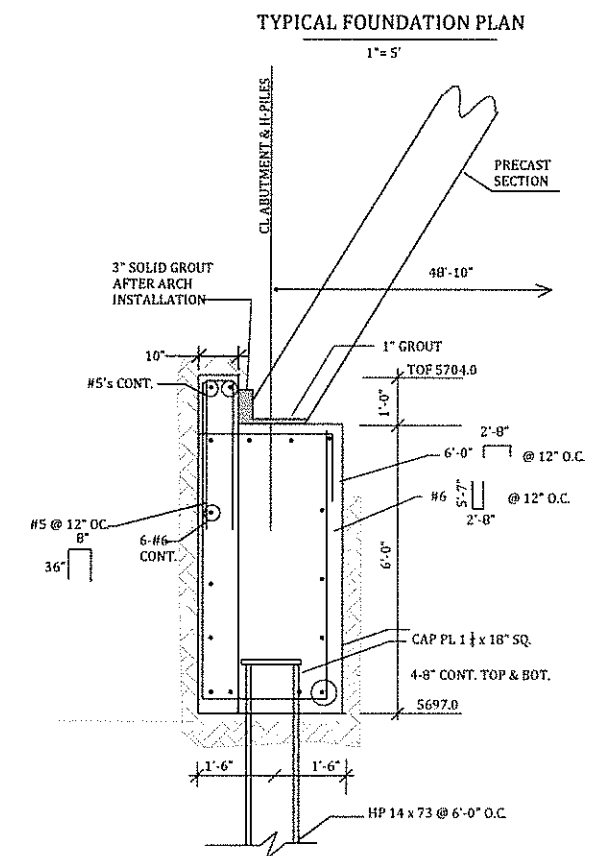
PILE TIP DETAIL  
SCALE: N.T.S.  
AN APPROVED  
COMMERCIAL PILE  
MAY BE USED

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				
LB-LAMP BLACK	2	16	-	-
PG-PHTH GREEN	10	-	-	-
TW-WHITE	2	46	-	-
YO-YELLOW OX	-	50	-	-
PB-PHTH	-	50	-	-
4 GALLON KIT				
B65T00654				640335618



SECTION B  
1" = 2' H&V



FOUNDATION SECTION A  
1" = 2'

LORSON RANCH  
FONTAINE BOULEVARD BRIDGE AND CHANNEL DESIGN  
BRIDGE STRUCTURE PLANS  
EL PASO COUNTY, COLORADO

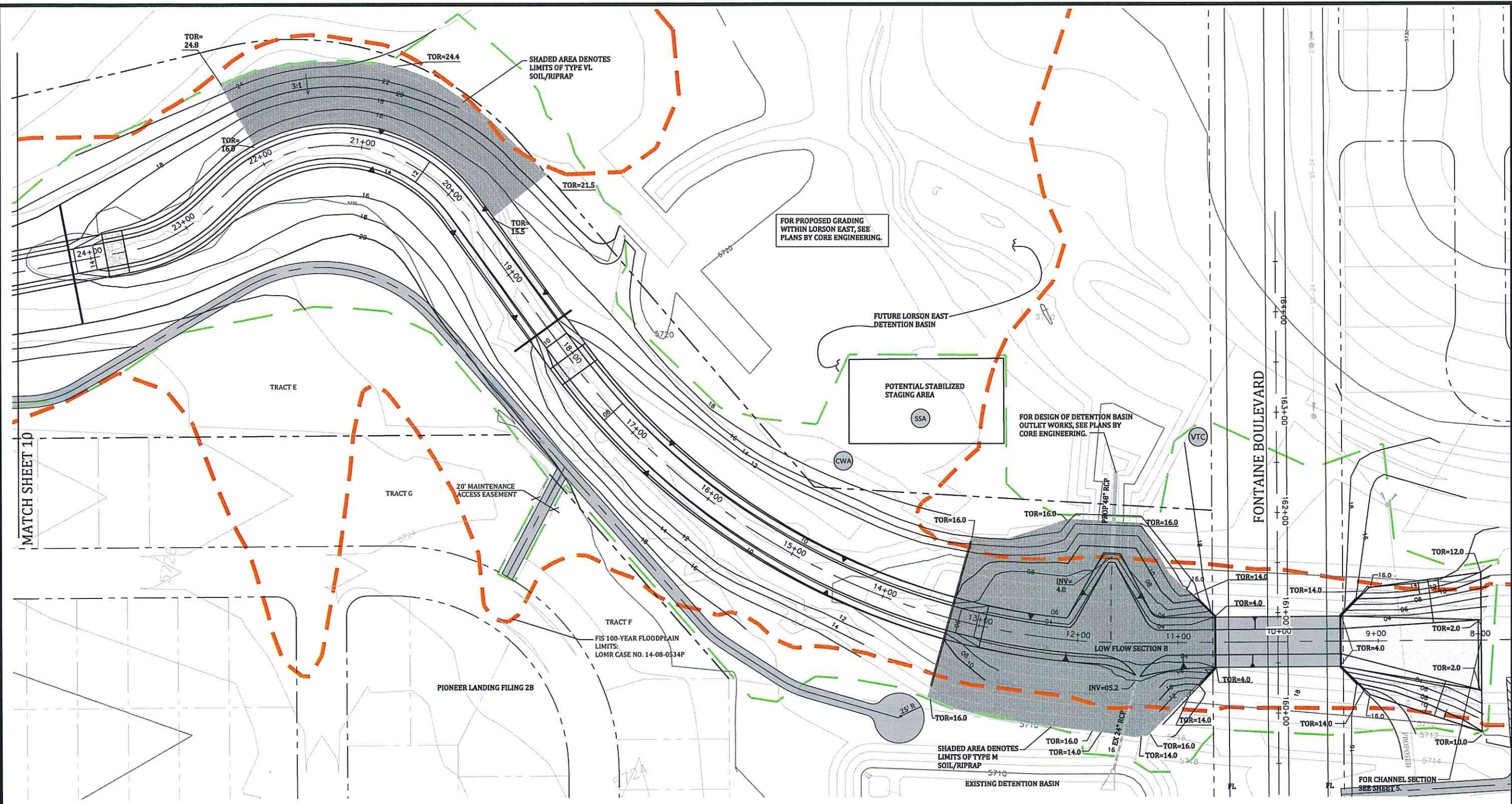
**Kiowa**  
Engineering Corporation  
1604 South 21st Street  
Colorado Springs, Colorado 80904  
(719) 630-7342

Project No.:	16031
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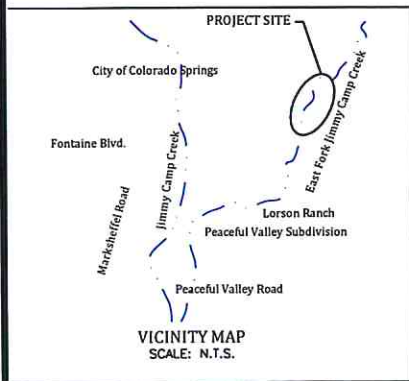


**LORSON RANCH**  
**FONTAINE BOULEVARD BRIDGE AND CHANNEL DESIGN**  
**GRADING PLAN & EROSION CONTROL PLAN**  
EL PASO COUNTY, COLORADO

Project No.:	16031
Date:	1/26/18
Design:	RNW
Drawn:	EAK
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Revisions:	

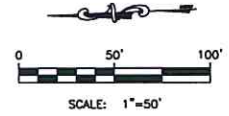


MATCH SHEET 10

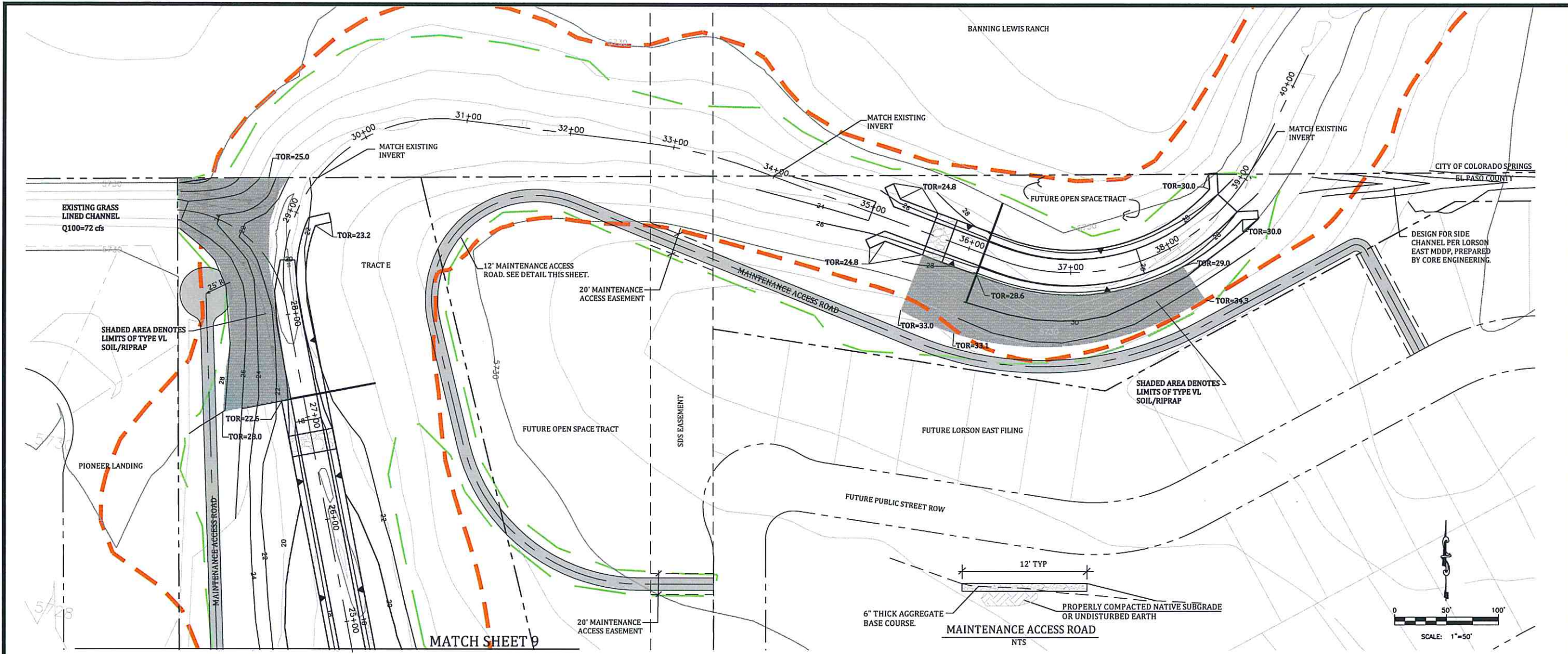


- NOTES:**
- CONTRACTOR TO IDENTIFY MATERIAL AND SOIL STOCKPILES AREA ON THE SWMP PRIOR TO THE COMMENCEMENT OF MOBILIZATION.
  - CONTRACTOR TO IDENTIFY STABILIZED STAGING AREA PRIOR TO THE COMMENCEMENT OF MOBILIZATION.

- LEGEND**
- LIMITS OF GRADING & CONSTRUCTION
  - VTC VEHICLE TRACKING CONTROL
  - CWA CONCRETE WASHOUT AREA
  - SSA STABILIZED STAGING AREA
  - TOR TOP OF SOIL/RIPRAP



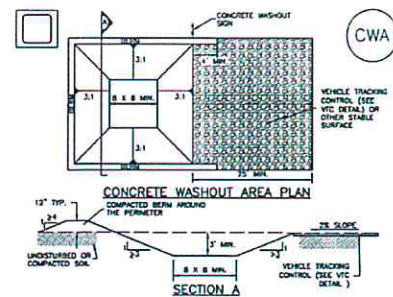




**LORSON RANCH**  
**FONTAINE BOULEVARD BRIDGE AND CHANNEL DESIGN**  
**GRADING & EROSION CONTROL PLAN**  
EL PASO COUNTY, COLORADO

Project No:	16031
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Concrete Washout Area (CWA) MM-1

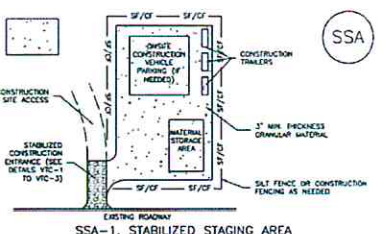


- CWA-1 CONCRETE WASHOUT AREA**
- DEL. INSTALLATION NOTES**
- SEE PLAN VIEW FOR CWA INSTALLATION LOCATION.
  - DO NOT LOCATE AN UNLINED CWA WITHIN 100' OF ANY NATURAL DRAINAGE PATHWAY OR WATERBODIES. DO NOT LOCATE WITHIN 100' OF ANY WELLS OR OTHER WATER SOURCES IF SITE CONSTRAINTS MAKE THIS FEASIBLE, OR IF HIGHLY PERMEABLE SOILS EXIST ON SITE. THE CWA MUST BE INSTALLED WITH AN IMPERMEABLE LINER (18 IN. MIN. THICKNESS) OR SURFACE STORAGE ALTERNATIVES USING PREHARDENED CONCRETE WASHOUT DEVICES ON A UNLINED STORAGE AREA 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" SLOPE LEADING OUT OF THE SUBSURFACE PIT SHALL BE 3:1 OR FLATTER. THE PIT SHALL BE AT LEAST 3' DEEP.
  - BEFORE SURROUNDING SITES AND BACK OF THE CWA SHALL HAVE MINIMUM HEIGHT OF 1'.
  - VEHICLE TRACKING PND 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 BEAM CONSTRUCTION.

Concrete Washout Area (CWA) MM-1

- CWA MAINTENANCE NOTES**
- INSPECT BUMP EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BUMPS SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BUMPS 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 BUMPS IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
  - WHERE BUMPS 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 MATERIAL 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.
- NOTE:** MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM USDFD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.

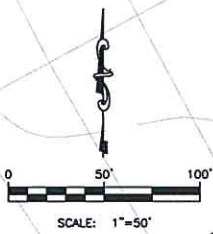
Stabilized Staging Area (SSA) SM-6



- SSA-1 STABILIZED STAGING AREA**
- STABILIZED STAGING AREA INSTALLATION NOTES**
- SEE PLAN VIEW FOR LOCATION OF STAGING AREA(S).
  - CONTRACTOR MAY ADJUST LOCATION AND SIZE OF STAGING AREA WITH APPROVAL FROM THE LOCAL JURISDICTION.
  - STABILIZED STAGING AREA SHOULD BE APPROPRIATE FOR THE NEEDS OF THE SITE. OVERSIZING RESULTS IN A LARGER AREA TO STABILIZE FOLLOWING 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 MATING.
  - UNLESS OTHERWISE SPECIFIED BY LOCAL JURISDICTION, ROCK SHALL CONSIST OF DOT SECT. #393L APPROX #3 GRANITE AGGREGATE OR 8" (MINUS) ROCK.
  - ADDITIONAL PERIMETER BUMPS MAY BE REQUIRED INCLUDING BUT NOT LIMITED TO SALT FENCE AND CONSTRUCTION FENCING.
- STABILIZED STAGING AREA MAINTENANCE NOTES**
- INSPECT BUMP EACH WORKDAY, AND MAINTAIN THEM IN EFFECTIVE OPERATING CONDITION. MAINTENANCE OF BUMPS SHOULD BE PROACTIVE, NOT REACTIVE. INSPECT BUMPS 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 BUMPS IN EFFECTIVE OPERATING CONDITION. INSPECTIONS AND CORRECTIVE MEASURES SHOULD BE DOCUMENTED THOROUGHLY.
  - WHERE BUMPS HAVE FAILED, REPAIR OR REPLACEMENT SHOULD BE INITIATED UPON DISCOVERY OF THE FAILURE.
  - ROCK SHALL BE REPAIRED OR REGRANDED AS NECESSARY IF PUFFING OCCURS OR UNDERLYING SUBGRADE RECESSES EXPOSED.

Stabilized Staging Area (SSA) SM-6

- STABILIZED STAGING AREA MAINTENANCE NOTES**
- STABILIZED STAGING AREA SHALL BE CHANGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNCONFINING OPERATIONS.
  - THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE LOCAL JURISDICTION, USED ON SITE, AND THE AREA COVERED WITH TOPSOIL, SEEDS AND MULCH OR OTHERWISE STABILIZED IN A MANNER APPROVED BY LOCAL JURISDICTION.
- NOTE:** MANY JURISDICTIONS PROHIBIT THE USE OF RECYCLED CONCRETE AS GRANULAR MATERIAL FOR STABILIZED STAGING AREAS DUE TO DIFFICULTIES WITH RE-ESTABLISHMENT OF VEGETATION IN AREAS WHERE RECYCLED CONCRETE WAS PLACED.
- NOTE:** MANY JURISDICTIONS HAVE BMP DETAILS THAT VARY FROM USDFD STANDARD DETAILS. CONSULT WITH LOCAL JURISDICTIONS AS TO WHICH DETAIL SHOULD BE USED WHEN DIFFERENCES ARE NOTED.
- DETAILS ADAPTED FROM USDFD CRMP, COLORADO, NOT AVAILABLE IN HARD COPY.**





**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 BIRDWEED, JOHNSON GRASS, KNAPWEED 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 SEEDING 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 (TRILLED) 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 CLOGS 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 LBS. 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.

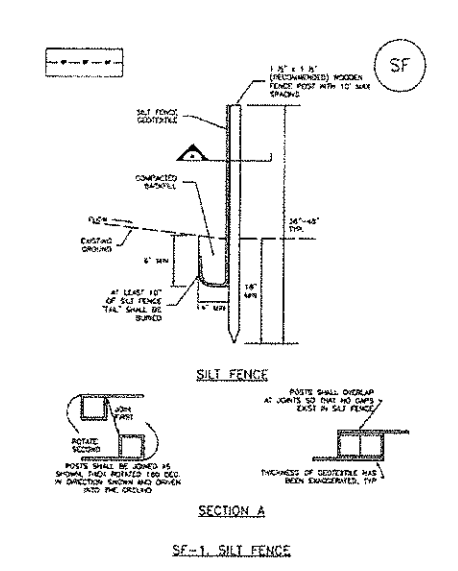
**SEEDING AND MULCHING MAINTENANCE NOTES**

- SEEDING 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.
- 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 60% VEGETATIVE COVER OF 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.

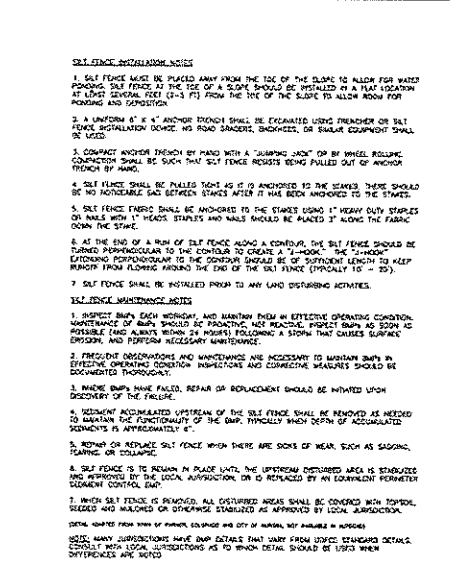
**SEEDING AND MULCH**



**Silt Fence (SF) SC-1**



**Silt Fence (SF) SC-1**



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

November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 SF-4

**PROJECT SPECIFIC GRADING AND EROSION CONTROL NOTES**

- All earthwork required for 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 unclassified 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 haulage and spoiling 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 filed areas, including roadway and detention basin embankments, shall be 95 percent of the maximum Standard Proctor Density (ASTM D998) 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), Geocoil 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, all 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 recompacted 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 Core Engineering. The date of the last survey update was January 2016.
- Proposed Construction Schedule:
  - Begin Construction: pending
  - End Construction: pending
  - Total Site Area = 9.7 Acres
  - Existing 100-year runoff coefficient = 0.25
  - Proposed 100-year runoff coefficient = 0.25
  - Existing Hydrologic Soil Groups: BC (B ASCALON SANDY LOAM)
  - (C MARIANIST CLAY LOAM)
- Site is currently undeveloped and covered with native grasses on moderate to steep slopes (3%-6%).
- Site is located in the Jimmy Camp Creek Drainage Basin.

**STANDARD EPC GRADING AND EROSION CONTROL NOTES**

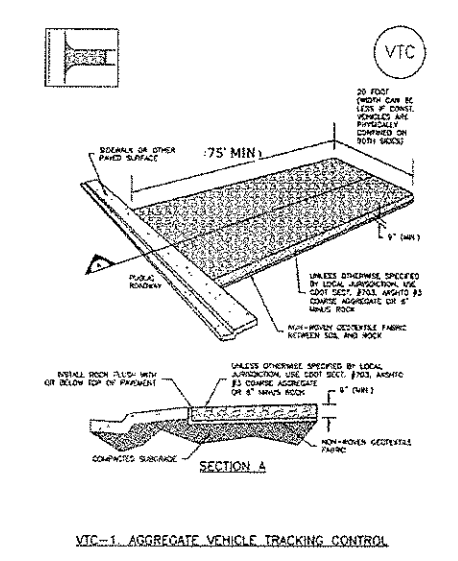
- Construction may not commence until a Construction Permit is obtained from Planning and Community Development Department (PCD) and a Preconstruction Conference is held with PCD inspectors.
- Stormwater discharges from construction sites shall not cause or threaten to cause pollution, contamination, 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 to 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. During construction the SWMP is the responsibility of the designated Stormwater Manager. The SWMP shall be located on site at all times and shall be kept up to date with work progress and changes in the field.
- Once the ESQCP has been issued, the contractor may install the initial stage erosion and sediment control BMP's as indicated on the 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 PCD inspectors staff.
- Soil erosion control measures for all slopes, channels, ditches, or any disturbed land area shall be completed within 21 calendar days after final grading, or earth disturbance, has been completed. Disturbed areas and stockpiles, which are not at final grade but will remain dormant for longer than 30 days, shall also be mulched within 21 days after interim grading. And area that is going to remain an interim for more than 60 days shall also be seeded. All temporary soil erosion control measures and BMP's shall be maintained until permanent soil erosion control measures are implemented and established.
- Temporary soil erosion control facilities shall be removed and earth disturbance areas graded and stabilized with permanent soil erosion control measures pursuant to standards and specification prescribed in the DCM Volume II and the Engineering Criteria Manual (ECM) appendix I.
- All persons engaged with earth disturbance shall implement and maintain acceptable soil erosion and sediment control measures including BMP's in conformance with the erosion control technical standards of the Drainage Criteria Manual (DCM) Volume II and in accordance with the Stormwater Management Plan (SWMP).
- Temporary erosion control facilities including BMP's and all permanent facilities intended to control erosion of any earth disturbance operations shall be installed as defined in the approved plans, the SWMP and the DCM Volume II and maintained throughout the duration of the earth disturbance operation.
- Any earth disturbance shall be conducted in such a manner so as to effectively reduce 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.
- Any temporary or permanent facility designed and constructed for the conveyance of stormwater around, through, or from the earth disturbance area shall be designed to limit the discharge to a non-erosive velocity.
- Concrete wash water shall be contained and disposed of in accordance with the SWMP. No wash water shall be discharged to or allowed to runoff to State Waters, including any surface or subsurface storm drainage system or facilities.
- Erosion control blanketing is to be used on slopes steeper than 3:1.
- Building, construction, excavation, or other 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. BMP's may be used in accordance with the Department of Public Works if deemed necessary, based on specific conditions and circumstances.
- Vehicle tracking of soils and construction debris off-site shall be minimized. Materials tracked off-site shall be cleaned up and properly disposed of immediately.
- 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.
- The owner, site developer, contractor, and/or their authorized agents shall be responsible for the removal of all construction debris, dirt, trash, rock, sediment, and sand that may accumulate in the storm sewer or other drainage conveyance 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 chemicals are to be used by the contractor, which have the potential to be released in stormwater unless permission for the use of a specific chemical is granted in writing by the ECM Administrator. In granting the use of such chemicals, special conditions and monitoring may be required.
- Bulk storage structures for petroleum products and other chemicals shall have adequate protection so as to contain all spills and prevent any spilled material from entering State Waters, including any surface or subsurface storm drainage system or facilities.
- No person shall cause the impediment of stormwater flow in the flow line of the curb and gutter or in the ditchline.
- Individuals shall comply with the "Colorado Water Quality Control Act" (Title 25, Article 8, CRS), and the Clean Water Act" (33 USC 1341), in addition to the requirements included in the DCM Volume II and the ECM Appendix I. All appropriate permits must be obtained by the Contractor prior to the construction (NPDES, Floodplain, 404, fugitive dust, etc.). In the event of conflicts between these requirements and laws, rules, or regulations of other Federal, State, or County Agencies, the more restrictive laws, rules, or regulations shall apply.
- All construction traffic must enter/exit the site at approved construction access points.
- Prior to actual construction the permittee shall verify the location of existing utilities.
- A water source shall be available on site during earthwork operations and utilized as required to minimize dust from earthwork equipment and wind.
- The soils report for this site entitled "Geotechnical Report Fontaine Boulevard Bridge over East Tributary Jimmy Camp Creek, Lorson Ranch, El Paso County, Colorado, prepared by RMG engineers, Sept. 24, 2016 and shall be considered a part of these plans.
- At least ten days prior to the anticipated start of construction, for projects that will disturb 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, Colorado 80248-1530
  - Attn: Permits Unit

**Kiowa**  
Engineering Corporation  
1604 South 21st Street  
Colorado Springs, Colorado 80904  
(719) 590-7342

**LORSON RANCH**  
**FONTAINE BOULEVARD BRIDGE AND CHANNEL DESIGN**  
**EROSION CONTROL DETAILS**  
**EL PASO COUNTY, COLORADO**

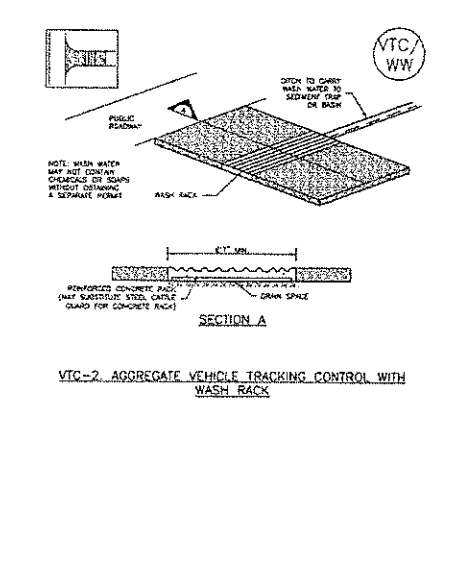
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Date: 1/26/19  
Design: RNW  
Drawn: EAK  
Check: RNW  
Revisions:

**Vehicle Tracking Control (VTC) SM-4**



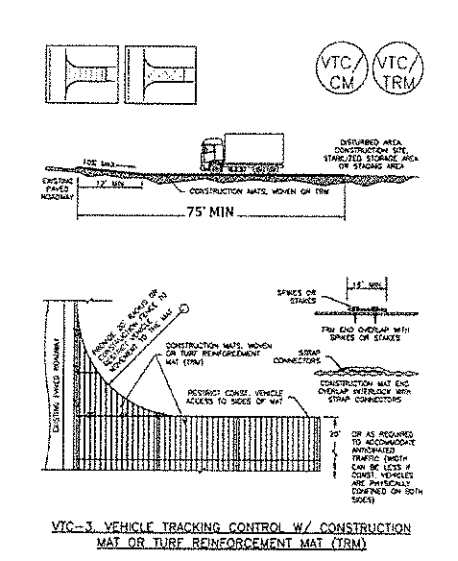
November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 VTC-3

**Vehicle Tracking Control (VTC) SM-4**



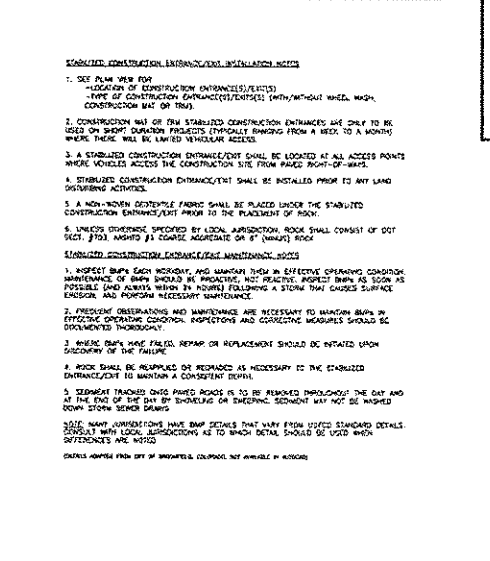
November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 VTC-4

**Vehicle Tracking Control (VTC) SM-4**



November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 VTC-4

**Vehicle Tracking Control (VTC) SM-4**



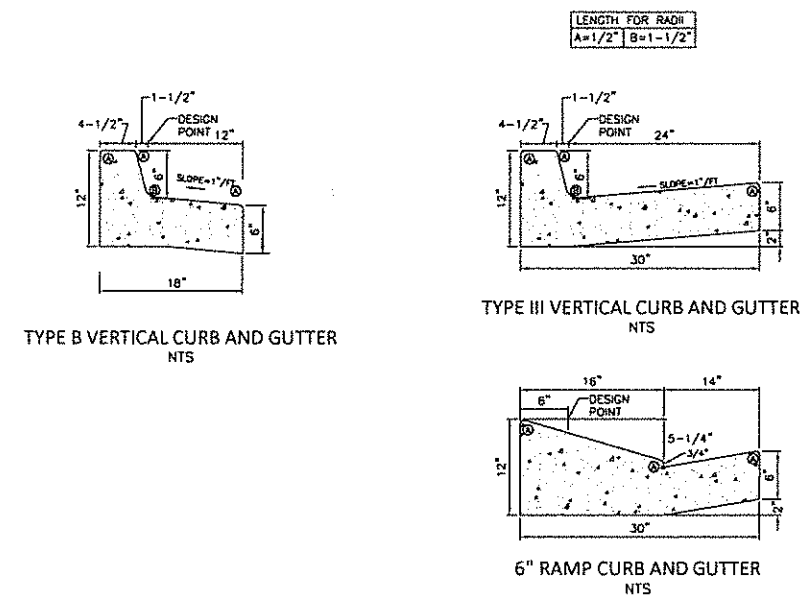
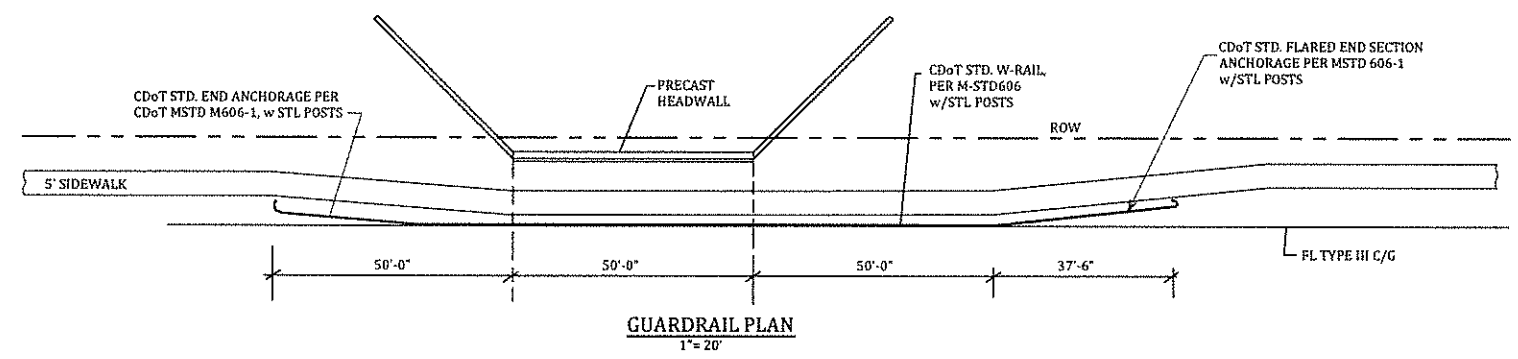
November 2010 Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3 VTC-4



**LORSON RANCH  
FONTAINE BOULEVARD BRIDGE AND CHANNEL DESIGN  
ROADWAY DETAILS  
EL PASO COUNTY, COLORADO**

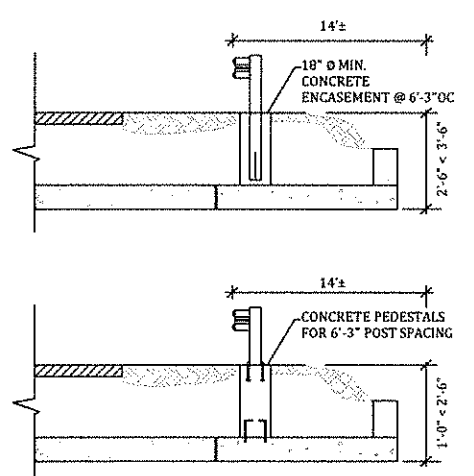
Project No.:	16031
Date:	1/26/18
Design:	RNW
Drawn:	EAK
Check:	RNW
Revisions:	

NOTE: GUARD RAIL INSTALLATION SHALL BE IN CONFORMANCE WITH M-STD 606-1, 2-WAY NORMAL BRIDGE APPLICATION. SHOP DRAWINGS REQUIRED FOR ALL GUARDRAIL COMPONENTS WILL BE SUBJECT TO EPC AND ENGINEERS REVIEW AND ACCEPTANCE PRIOR TO COMMENCEMENT OF INSTALLATION.

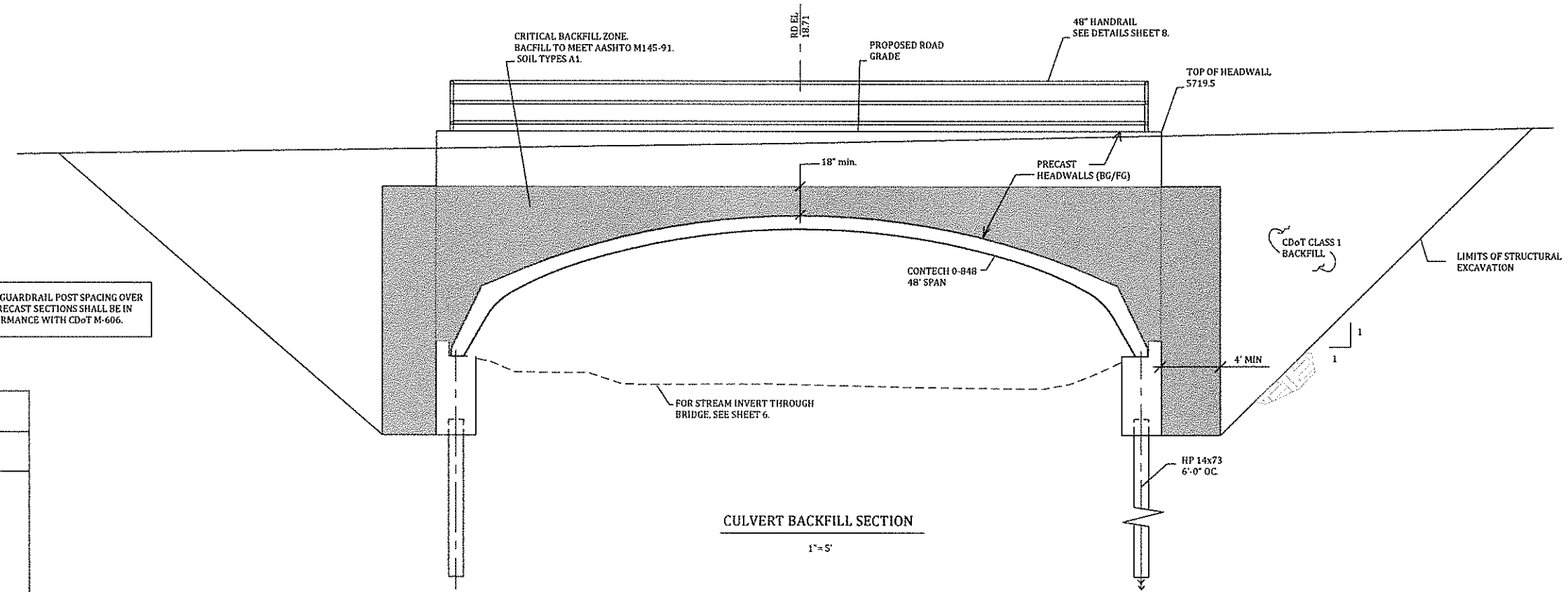


**CURB & GUTTER DETAILS**  
EPC STD. SD\_2-20  
NOT TO SCALE

- PRE-CAST NOTES**
1. PRECAST ELEMENTS SHALL BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER LICENSED TO PRACTICE IN COLORADO.
  2. SHOP DRAWINGS SHALL BE REQUIRED FOR REVIEW BY THE ENGINEER FOR THE FOLLOWING ELEMENTS:
    - PRECAST CULVERT SECTIONS
    - PRECAST HEADWALL SECTIONS
    - GUARDRAIL POST CONNECTION DETAILS MEETING REQUIRED TRAFFIC IMPACT LOADING
    - CONCRETE DESIGN MIX FOR PRECAST ELEMENTS.
  3. SHOP DRAWINGS TO BE SUBJECT TO EPC AND ENGINEER REVIEW AND ACCEPTANCE PRIOR TO COMMENCEMENT OF FABRICATION.



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

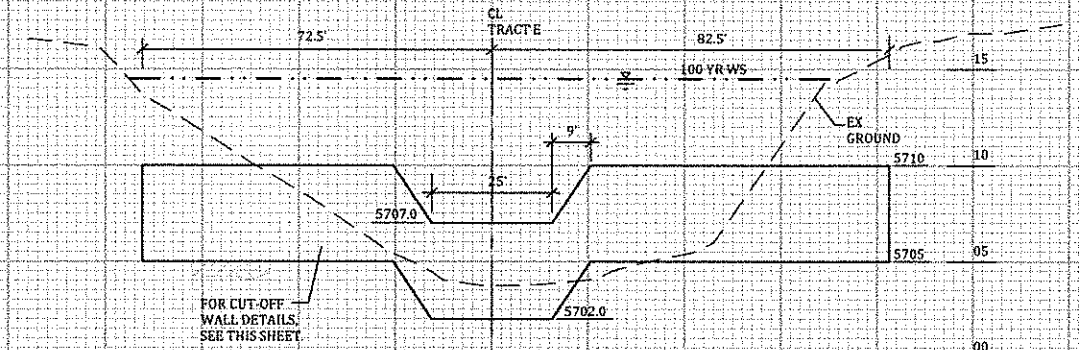


SELECT BACKFILL DESCRIPTION (AASHTO M 145-91)			
GROUP CLASSIFICATION	A-1		A-3
	A-1-a	A-1-b	
SIEVE ANALYSIS (100% PASSING 3" SIEVE)			
NO. 10	50 max	50 max	51 max
NO. 40	30 max	25 max	10 max
NO. 200	15 max		
CHARACTERISTICS OF FRACTION PASSING NO. 40			
LIQUID LIMIT			
USUAL TYPES OF SIGNIFICANT CONSTITUENT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

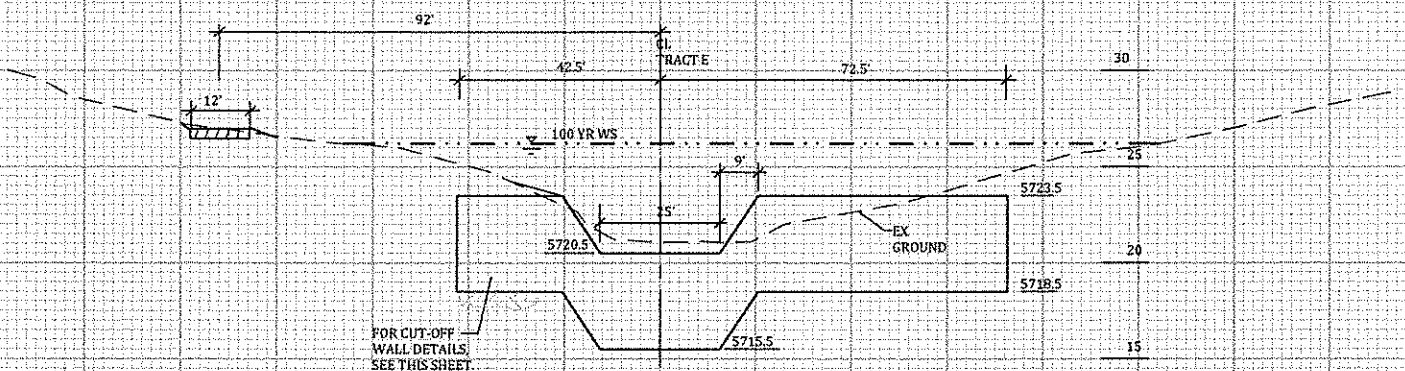


**LORSON RANCH  
FONTAINE BOULEVARD BRIDGE AND CHANNEL DESIGN  
DRAINAGEWAY CROSS-SECTIONS  
EL PASO COUNTY, COLORADO**

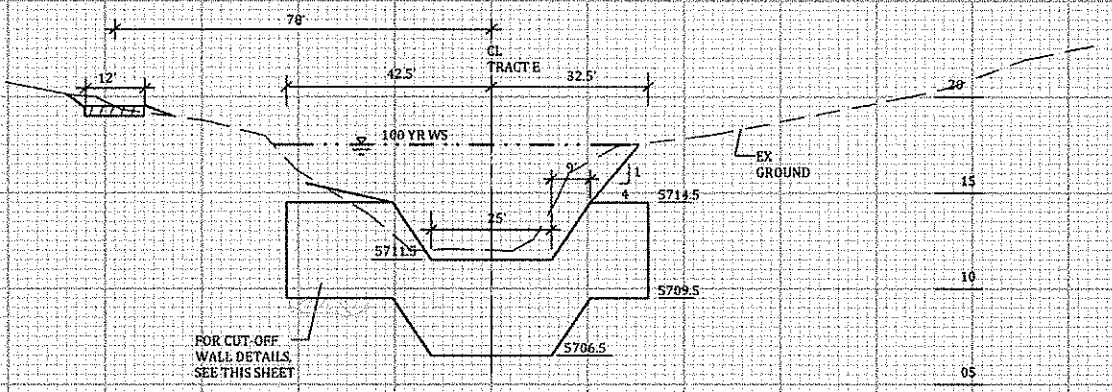
Project No.	16031
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Design	RNW
Drawn	EAK
Check	RNW
Revisions	



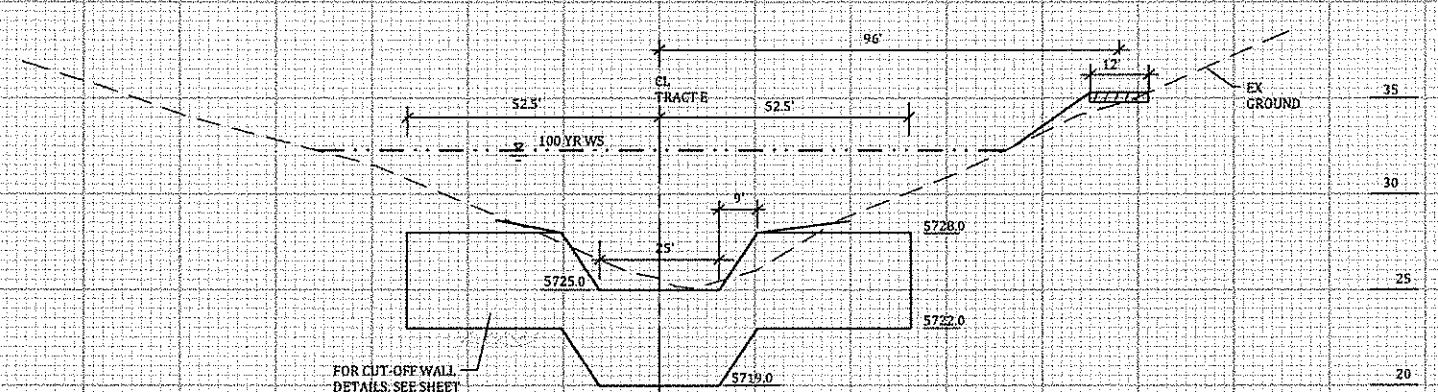
**LOW FLOW DROP STA 13+30**  
1" = 5' V, 1" = 20 H



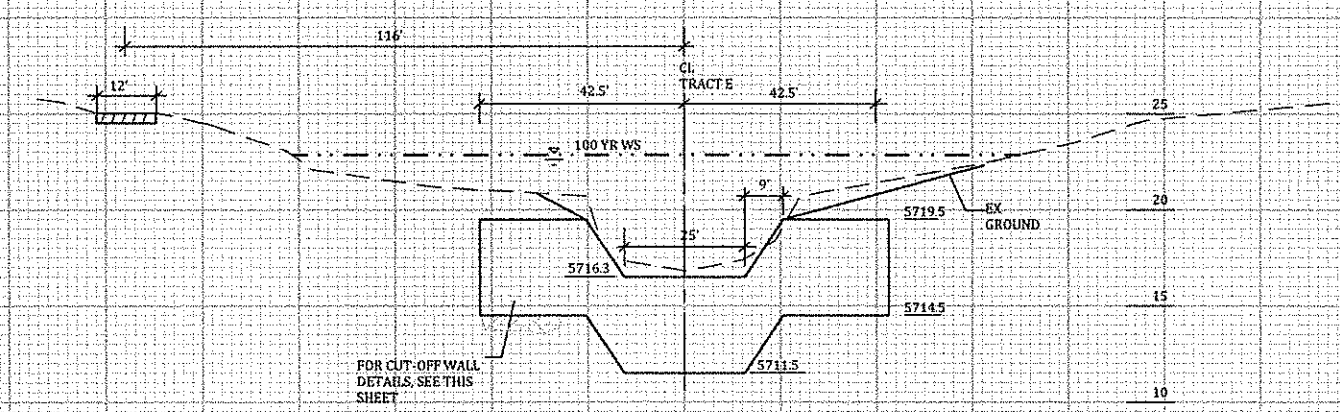
**LOW FLOW DROP STA 27+20**  
1" = 5' V, 1" = 20 H



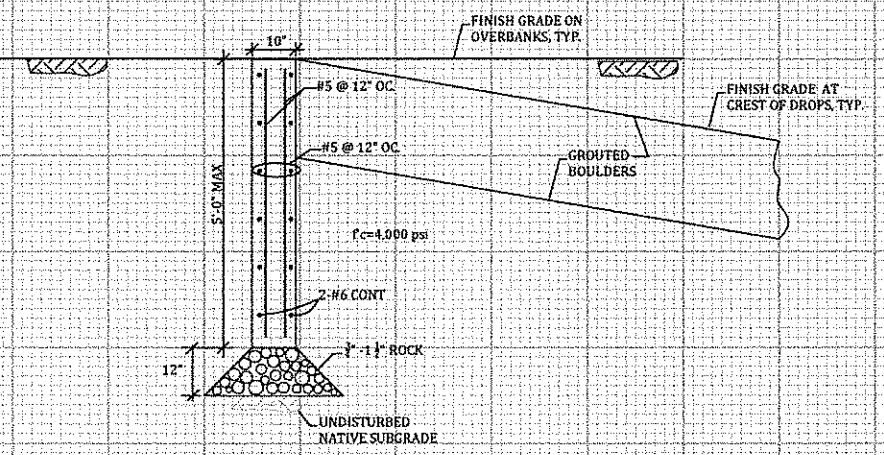
**LOW FLOW DROP STA 18+35**  
1" = 5' V, 1" = 20 H



**LOW FLOW DROP STA 36+15**  
1" = 5' V, 1" = 20 H



**LOW FLOW DROP STA 24+20**  
1" = 5' V, 1" = 20 H



**CUT-OFF WALL**  
1" = 2' H & V