DOUGLAS COUNTY
HESS ROAD OVER WILDLIFE CROSSING PROJECT

CONSTRUCTION BID PLANS OF PROPOSED
BRIDGE DOUHESS-0.65 IMPROVEMENTS
PUBLIC WORKS DEPARTMENT
PROJECT NO. CI 2024-022

EXHIBIT A

TABULATION OF LENGTH		
STATION	LENGTH	
	LINEAR FEET	MILES
HESS RD		
BEGIN – STA 101+69.16	266	0.05
END – STA 104+35.12		
TOTAL PROJECT LENGTH	266	0.05

TOWN OF CASTLE ROCK DESIGN DATA	
DESIGN SPEED	55 MPH
GRADE RANGE	2.65% TO 3.83%
CROSS SLOPE	0.89% TO 4.00%
CURRENT ADT (2022)	7200
CLEAR ZONE	28'

DOUGLAS COUNTY COLORADO

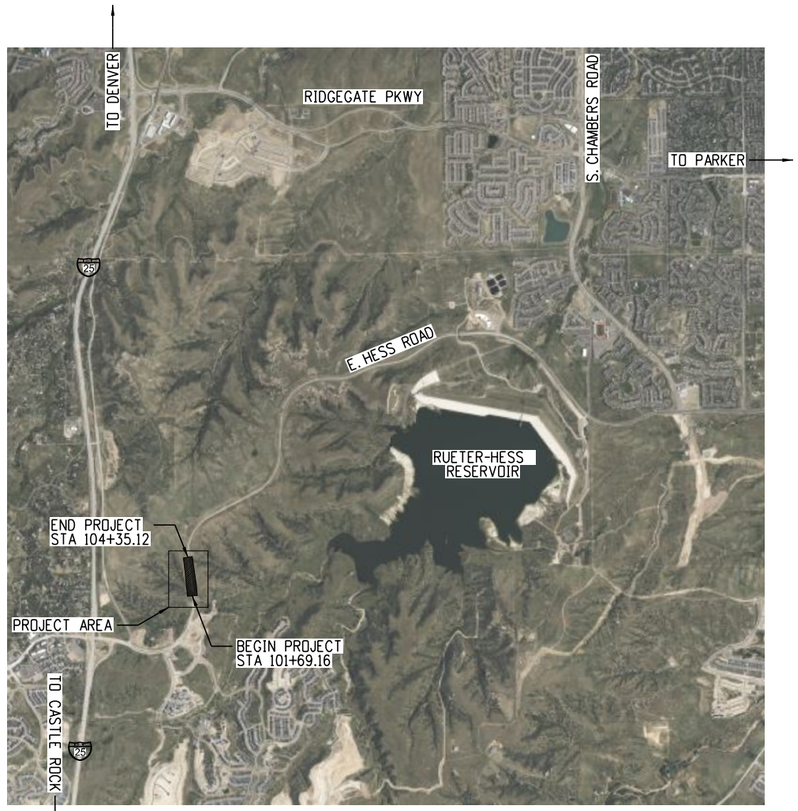
DOUGLAS COUNTY DEPARTMENT OF PUBLIC WORKS ENGINEERING
100 THIRD ST.
CASTLE ROCK, COLORADO 80104
303-660-7490

JANET R. HERMAN, PE — DATE
DIRECTOR OF PUBLIC WORKS

SEAN P. OWENS, PE — DATE
SPECIAL PROJECTS MANAGER

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

FOR BURIED UTILITY INFORMATION
THREE (3) BUSINESS DAYS
BEFORE YOU DIG
CALL 811
(or 1-800-922-1987)
UTILITY NOTIFICATION
CENTER OF COLORADO (UNCC)
www.uncc.org



VICINITY MAP

INDEX OF SHEETS

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DOUGLAS COUNTY COLORADO

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Resident Engineer:
Project Engineer:
PROJECT STARTED: / / ACCEPTED: / /
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Project No./Code
CI 2024-022

Sheet Number 001

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COLORADO
DEPARTMENT OF TRANSPORTATION

M&S STANDARDS PLANS LIST

July 31, 2019

Revised on April 25, 2025

ALL OF THE M&S STANDARD PLANS, AS SUPPLEMENTED AND REVISED, APPLY TO THIS PROJECT WHEN USED BY DESIGNATED PAY ITEM OR SUBSIDIARY ITEM.

THE M&S STANDARD PLANS USED TO DESIGN THIS PROJECT ARE INDICATED BY A MARKED BOX ■, AND WILL BE ATTACHED TO THE PLANS. ALL OTHER M&S STANDARD PLANS ARE STILL ELIGIBLE FOR USE IN CONSTRUCTION IF APPROVED BY AN APPROPRIATE CDOT ENGINEER.

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☐ S-614-42	CABINET FOUNDATION DETAIL (4 SHEETS) *(REVISED ON APRIL 4, 2024)*	241-244
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Sheet Revisions

Date:	Comments	Init.

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DOUGLAS COUNTY COLORADO

As Constructed
No Revisions:
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Void:

HESS ROAD OVER WILDLIFE CROSSING
M&S STANDARDS

Designer: JTS
Detailer: JTS
Sheet Subset: M&S
Structure Numbers:
Subset Sheets: 1 of 01

Project No./Code
CI 2024-022

Sheet Number 002

GENERAL NOTES:

1. ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION OF PUBLIC IMPROVEMENTS SHALL MEET OR EXCEED THE STANDARDS AND SPECIFICATIONS SET FORTH IN THE DOUGLAS COUNTY DESIGN AND CONSTRUCTION STANDARDS, TECHNICAL MANUALS, AND APPLICABLE STATE AND FEDERAL REGULATIONS.

2. THE CONTRACTOR MUST CALL THE UTILITY NOTIFICATION CENTER OF COLORADO AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATIONS OF THE UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY PERTINENT LOCATIONS AND ELEVATIONS, ESPECIALLY AT CONNECTION POINTS AND AT POTENTIAL UTILITY CONFLICTS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES THAT CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THESE PLANS.

3. THE CONTRACTOR SHALL COORDINATE AND COOPERATE WITH THE COUNTY AND ALL UTILITY COMPANIES INVOLVED WITH REGARD TO RELOCATIONS OR ADJUSTMENTS OF EXISTING UTILITIES DURING CONSTRUCTION AND TO ASSURE THAT THE WORK IS ACCOMPLISHED IN A TIMELY FASHION AND WITH A MINIMUM DISRUPTION OF SERVICE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING ALL PARTIES AFFECTED BY ANY DISRUPTION OF ANY UTILITY SERVICE.

4. THE CONTRACTOR SHALL HAVE ONE (1) SIGNED COPY OF THE APPROVED PLANS, ONE (1) COPY OF THE APPROPRIATE CRITERIA AND SPECIFICATIONS, AND A COPY OF ANY PERMITS AND EXTENSION AGREEMENTS NEEDED FOR THE JOB ONSITE AT ALL TIMES.

5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ASPECTS OF SAFETY INCLUDING, BUT NOT LIMITED TO, EXCAVATION, TRENCHING, SHORING, TRAFFIC CONTROL, AND SECURITY.

6. IF DURING CONSTRUCTION, CONDITIONS ARE ENCOUNTERED WHICH SHOULD INDICATE A SITUATION THAT IS NOT IDENTIFIED IN THE PLANS OR SPECIFICATIONS, THE CONTRACTOR SHALL CONTACT THE CONSTRUCTION INSPECTOR IMMEDIATELY.

7. ALL REFERENCES TO ANY PUBLISHED STANDARDS SHALL REFER TO THE LATEST REVISION OF SAID STANDARD UNLESS SPECIFICALLY STATED OTHERWISE.

8. THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) TO THE APPROPRIATE RIGHT-OF-WAY AUTHORITY FOR APPROVAL, PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN OR AFFECTING THE RIGHT-OF-WAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY AND ALL TRAFFIC CONTROL DEVICES AS MAY BE REQUIRED BY THE CONSTRUCTION ACTIVITIES. ALL TRAFFIC CONTROL DEVICES SHALL MEET MUTCD SIZE, RETROREFLECTIVE OR LIGHTING REQUIREMENTS FOR NIGHTTIME USE.

9. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LABOR AND MATERIALS NECESSARY FOR THE COMPLETION OF THE INTENDED IMPROVEMENTS SHOWN ON THESE DRAWINGS OR AS DESIGNATED TO BE PROVIDED, INSTALLED, OR CONSTRUCTED UNLESS SPECIFICALLY NOTED OTHERWISE.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR RECORDING AS-BUILT INFORMATION ON A SET OF RECORD DRAWINGS KEPT ON THE CONSTRUCTION SITE AND AVAILABLE TO THE CONSTRUCTION INSPECTOR AT ALL TIMES.

11. DIMENSIONS FOR LAYOUT AND CONSTRUCTION ARE NOT TO BE SCALED FROM ANY DRAWING. IF PERTINENT DIMENSIONS ARE NOT SHOWN, CONTACT THE CONSULTANT ENGINEER FOR CLARIFICATION AND ANNOTATE THE DIMENSION ON THE AS-BUILT RECORD DRAWINGS.

12. THERE SHALL BE NO SITE CONSTRUCTION ACTIVITIES ON SATURDAYS UNLESS SPECIFICALLY APPROVED BY THE CONSTRUCTION INSPECTOR AND NO SITE CONSTRUCTION ACTIVITIES ON SUNDAYS OR HOLIDAYS UNLESS THERE IS PRIOR WRITTEN APPROVAL BY THE PUBLIC WORKS DIRECTOR.

13. FOR PRELIMINARY PLAN QUANTITIES OF PAVEMENT MATERIALS, THE FOLLOWING RATES WERE UTILIZED:
    - HOT MIX ASPHALT – 110 LBS/SY/IN THICK
    - TACK COAT DILUTED EMULSIFIED ASPHALT (SLOW SETTING) – 0.10 GAL/SY

14. ALL CONCRETE PAVEMENT REMOVAL SHALL BE FULL DEPTH SAWCUT PRIOR TO REMOVAL.

15. THE CONTRACTOR SHALL MAINTAIN PROPER DRAINAGE DURING CONSTRUCTION OR AS DIRECTED BY THE ENGINEER. MAINTAINING DRAINAGE WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF WORK.

16. ALL QUANTITIES ARE APPROXIMATE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK NECESSARY TO COMPLETE THE CONSTRUCTION SHOWN ON THESE PLANS.

17. CONCRETE JOINTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH M-STANDARD M-412-1.

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DOUGLAS COUNTY COLORADO

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HESS ROAD OVER WILDLIFE CROSSING
GENERAL NOTES

Designer: JTS
Detailer: JTS
Sheet Subset: GENNO
Structure Numbers:
Subset Sheets: 1 of 01

Project No./Code
CI 2024-022

Sheet Number 003

CONTRACT ITEM NO.	CONTRACT ITEM	UNIT	ROADWAY/ TRAFFIC						PROJECT TOTALS	
			PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.	PLAN	AS CONST.
202-00210	REMOVAL OF CONCRETE PAVEMENT	SY	179						179	
202-00240	REMOVAL OF ASPHALT MAT (PLANING)	SY	791						791	
203-00060	EMBANKMENT MATERIAL (COMPLETE IN PLACE)	CY	15						15	
207-00205	TOPSOIL	CY	55						55	
208-00002	EROSION CONTROL LOG TYPE 1 (12 INCH)	LF	200						200	
208-00045	CONCRETE WASHOUT STRUCTURE	EA	1						1	
208-00070	VEHICLE TRACKING PAD	EA	1						1	
208-00103	REMOVAL AND DISPOSAL OF SEDIMENT (LABOR)	HOUR	8						8	
208-00105	REMOVAL AND DISPOSAL OF SEDIMENT (EQUIPMENT)	HOUR	8						8	
208-00106	SWEEPING (SEDIMENT REMOVAL)	HOUR	12						12	
208-00207	EROSION CONTROL MANAGEMENT	DAY	18						18	
210-01130	RESET GUARDRAIL TYPE 3	LF	132						132	
212-00006	SEEDING (NATIVE)	ACRE	0.07						0.070	
216-00201	SOIL RETENTION BLANKET (STRAW/COCONUT) (BIODEGRADABLE CLASS 1)	SY	328						328	
304-06007	AGGREGATE BASE COURSE (CLASS 6)	CY	47						47	
403-00720	HOT MIX ASPHALT (PATCHING)(ASPHALT)	TON	9						9	
403-34741	HOT MIX ASPHALT (GRADING SX)(75) (PG 64-22)	TON	131						131	
412-00800	CONCRETE PAVEMENT (8 INCH)	SY	179						179	
506-00209	RIPRAP (9 INCH)	CY	1						1	
507-00400	ASPHALT SLOPE AND DITCH PAVING (ASPHALT)	TON	3						3	
515-00120	WATERPROOFING (MEMBRANE)	SY	791						791	
609-60011	CURB TYPE 6 (SECTION M)	LF	63						63	
615-00050	EMBANKMENT PROTECTOR TYPE 5	EA	1						1	
620-00020	SANITARY FACILITY	EA	1						1	
626-00000	MOBILIZATION	LS	1						1	
627-00008	MODIFIED EPOXY PAVEMENT MARKING	GAL	24						24	
630-00016	TRAFFIC CONTROL (SPECIAL)	LS	1						1	
700-70010	F/A MINOR CONTRACT REVISIONS	FA	1						1	
700-70380	F/A EROSION CONTROL	FA	1						1	

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HESS ROAD OVER WILDLIFE CROSSING SUMMARY OF APPROXIMATE QUANTITIES

Designer: JTS
Detailer: JTS
Sheet Subset: SDAQ
Structure Numbers:
Subset Sheets: 1 of 01

Project No./Code
CI 2024-022

Sheet Number 004

TABULATION OF REMOVALS AND RESETS

LOCATION (STATION RANGE)			SIDE	202-00210 REMOVAL OF CONCRETE PAVEMENT (SY)	202-00240 REMOVAL OF ASPHALT MAT (PLANING) (SY)	210-01130 RESET GUARDRAIL TYPE 3 (LF)
101+69	TO	102+01	LT			33.0
101+71	TO	101+90	RT			20.5
101+76	TO	101+96	LT/RT	74		
101+95	TO	103+98	LT/RT		791	
103+88	TO	104+34	RT			45.5
103+97	TO	104+24	LT/RT	105		
104+02	TO	104+36	LT			33.0
TOTAL				179	791	132

REMOVAL NOTES:

1. SEE REVISION OF SECTION 210 RESET BRIDGE RAILING AND GUARDRAIL END TRANSITION FOR RESET GUARDRAIL TYPE 3.

TABULATION OF PAVEMENT MARKINGS

LOCATION		627-00008 MODIFIED EPOXY PAVEMENT MARKING: 4" DOUBLE YELLOW CENTER LANE LINE (LF)	627-00008 MODIFIED EPOXY PAVEMENT MARKING: 4" WHITE EDGE LINE (LF)
	SIDE		
HESS ROAD	LT		670
HESS ROAD	RT		672
HESS ROAD	LT/RT	671	
SUBTOTALS		1342	1342
TOTAL (SF)		448	448
TOTAL (GALLONS)		6	6

PAVEMENT MARKING NOTES:

1. EPOXY PAVEMENT MARKING QUANTITIES ARE BASED ON AN APPLICATION RATE OF 85 SF / GAL.

TABULATION OF EARTHWORK

ITEM NO.	ITEM	UNIT
		CY
203-00060	EMBANKMENT MATERIAL (COMPLETE IN PLACE)	15
207-00205	TOPSOIL	55
FOR INFORMATION ONLY		
	EMBANKMENT MATERIAL	15
	EMBANKMENT X FACTOR (1.15)	18
	EXCAVATION (ROADWAY)	5
	REQUIRED FROM CONTRACTOR'S SOURCE	13

EARTHWORK NOTES:

1. HAULING WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF THE WORK.
2. THERE IS NO DESIGNATED BORROW SITE. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE EMBANKMENT BORROW SITE.
3. TOPSOIL WILL BE REQUIRED TO A DEPTH OF 6 INCHES ON AREAS TO BE SEEDED. EXISTING TOPSOIL WITHIN THE LIMITS OF DISTURBANCE MAY BE STRIPPED AND REUSED. STRIPPING AND STOCKPILING EXISTING TOPSOIL WILL NOT BE PAID FOR SEPARATELY, BUT SHALL BE INCLUDED IN THE COST OF THE WORK.
4. THE EMBANKMENT COMPACTION FACTOR IS AN ESTIMATE AND HAS NOT BEEN VERIFIED.
5. EXCESS MATERIAL SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE DISPOSED OF OFFSITE IN ACCORDANCE WITH APPLICABLE REGULATIONS.
6. EXCAVATION REQUIRED FOR SUBGRADE STABILIZATION WILL BE PAID AT THE UNIT PRICE FOR EMBANKMENT MATERIAL (CIP) MEASURED IN PLACE. EXCAVATED MATERIAL WILL BE REPLACED WITH AGGREGATE BASE COURSE CLASS 6 AT THE UNIT PRICE FOR THAT ITEM.

TABULATION OF ROADWAY ITEMS

LOCATION (STATION RANGE)			SIDE	304-06005 AGGREGATE BASE COURSE (CLASS 6) (CY)	403-00720 HOT MIX ASPHALT (PATCHING) (ASPHALT) (TON)	403-34741 HOT MIX ASPHALT (GRADING SX) (75) (PG 64-22) (TON)	412-00800 CONCRETE PAVEMENT (8 INCH) (SY)	506-00209 RIPRAP (9 INCH) (CY)	507-00400 ASPHALT SLOPE AND DITCH PAVING (ASPHALT) (TON)	515-00120 WATERPROOFING (MEMBRANE) (SY)	609-60011 CURB TYPE 6 (SECTION M) (LF)	615-00050 EMBANKMENT PROTECTOR TYPE 5 (EA)
100+27	TO	100+42	LT					1	3			1
101+69	TO	102+01	LT		2						33	
101+71	TO	101+90	RT		2							
101+76	TO	101+96	LT/RT	21			74					
101+95	TO	103+98	LT/RT			131				791		
103+88	TO	104+34	RT		3							
103+97	TO	104+24	LT/RT	30			105					
104+02	TO	104+36	LT		2							
AS REQUESTED BY THE ENGINEER (TO REPLACE UNSUITABLE SUBGRADE)				40								
TOTAL				91	9	131	179	1	3	791	33	

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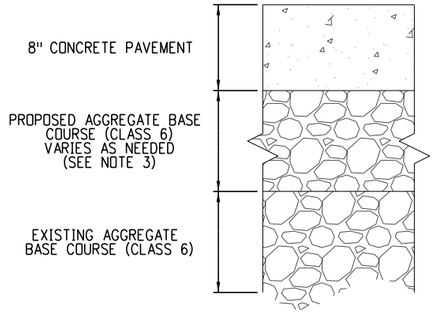
HESS ROAD OVER WILDLIFE CROSSING TABULATIONS

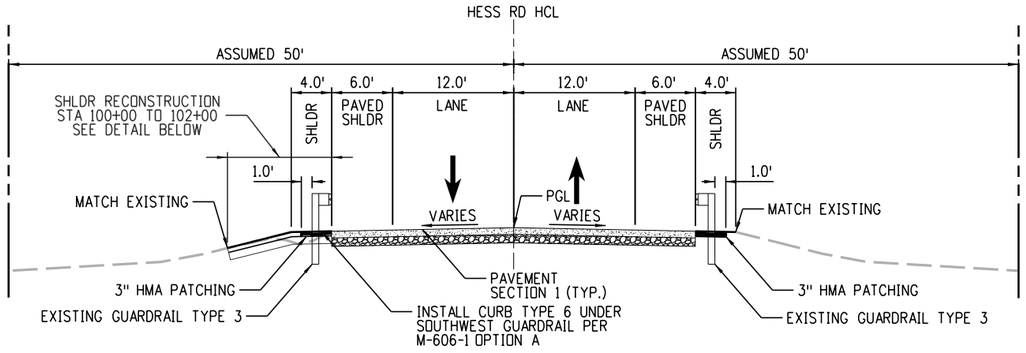
Designer: JTS
Detailer: JTS
Sheet Subset: TABS
Structure Numbers:
Subset Sheets: 1 of 01

Project No./Code
CI 2024-022

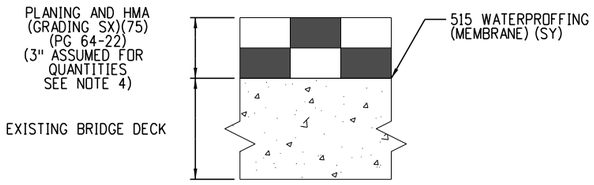
Sheet Number 005



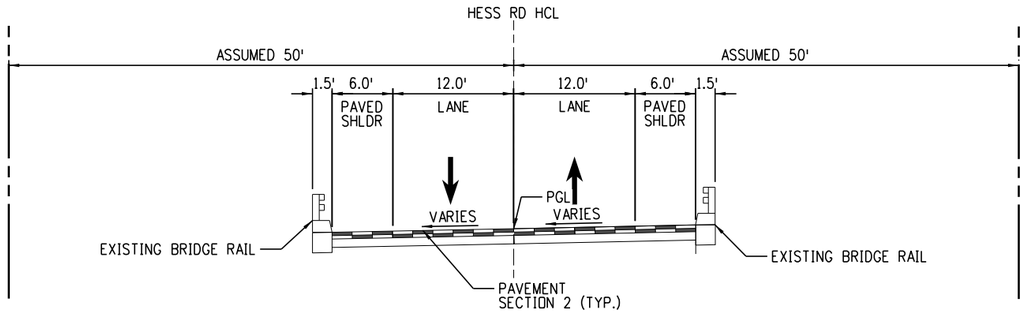
PAVEMENT SECTION 1
CONCRETE PAVEMENT



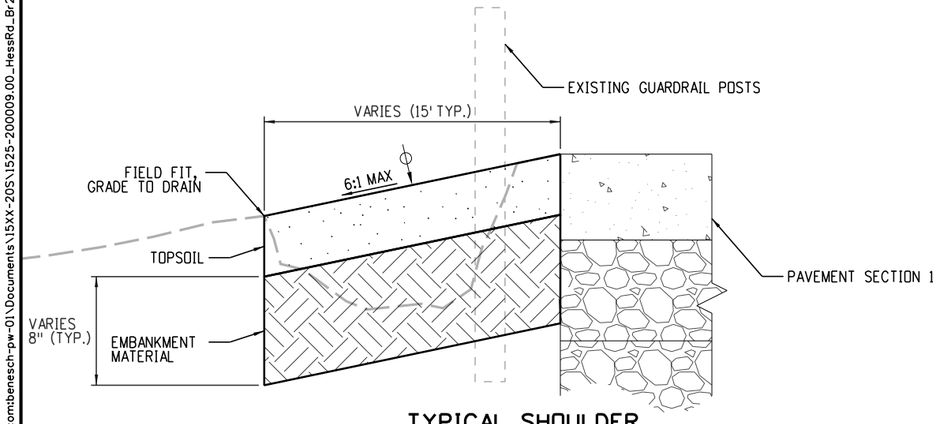
TYPICAL SECTION 1
STA 101+76 TO STA 101+96
STA 103+97 TO STA 104+24



PAVEMENT SECTION 2
ASPHALT PAVEMENT



TYPICAL SECTION 2
STA 101+97 TO STA 103+95



TYPICAL SHOULDER RECONSTRUCTION DETAIL
SEE STORMWATER MANAGEMENT PLAN
INITIAL - INTERIM SHEET FOR LOCATION

LEGEND:

PLACE 6 INCHES OF TOPSOIL UP TO THIS LINE AFTER COMPLETION OF GRADING AND PAVING OPERATIONS. APPLY DOUGLAS COUNTY PERMANENT DRILL SEED MIX, IN APPENDIX E OF THE DOUGLAS COUNTY GRADING, DRAINAGE AND EROSION CONTROL MANUAL.

ABC = AGGREGATE BASE COURSE
HCL = HORIZONTAL CONTROL LINE
HMA = HOT MIX ASPHALT
PGL = PROFILE GRADE LINE

NOTES:

1. TYPICAL SECTIONS PROVIDE CROSS SECTIONAL ELEMENTS, DEPTHS, WIDTHS, MATERIAL AND APPROXIMATE SLOPES OVER VARYING STATION RANGES. DIMENSIONS SHOWN ARE TYPICAL. SAWCUT LOCATIONS, CROSS SLOPES, AND SHOULDER/BIKE LANE WIDTHS VARY AT SOME LOCATIONS. FOR ADDITIONAL INFORMATION, REFER TO THE ROADWAY PLANS, SIGNING AND STRIPING PLANS.
2. ROADWAY CROSS SLOPE VARIES. SEE ROADWAY PLAN AND PROFILE SHEETS FOR ADDITIONAL INFORMATION.
3. DEPTH OF AGGREGATE BASE COURSE (CLASS 6) FOR PAVEMENT SECTION 1 VARIES TO ACHIEVE PROPOSED PROFILE.
4. HMA THICKNESS FOR PAVEMENT SECTION 2 VARIES TO ACHIEVE THE PROPER SUPERELEVATION BASED ON THE PROPOSED PROFILE.

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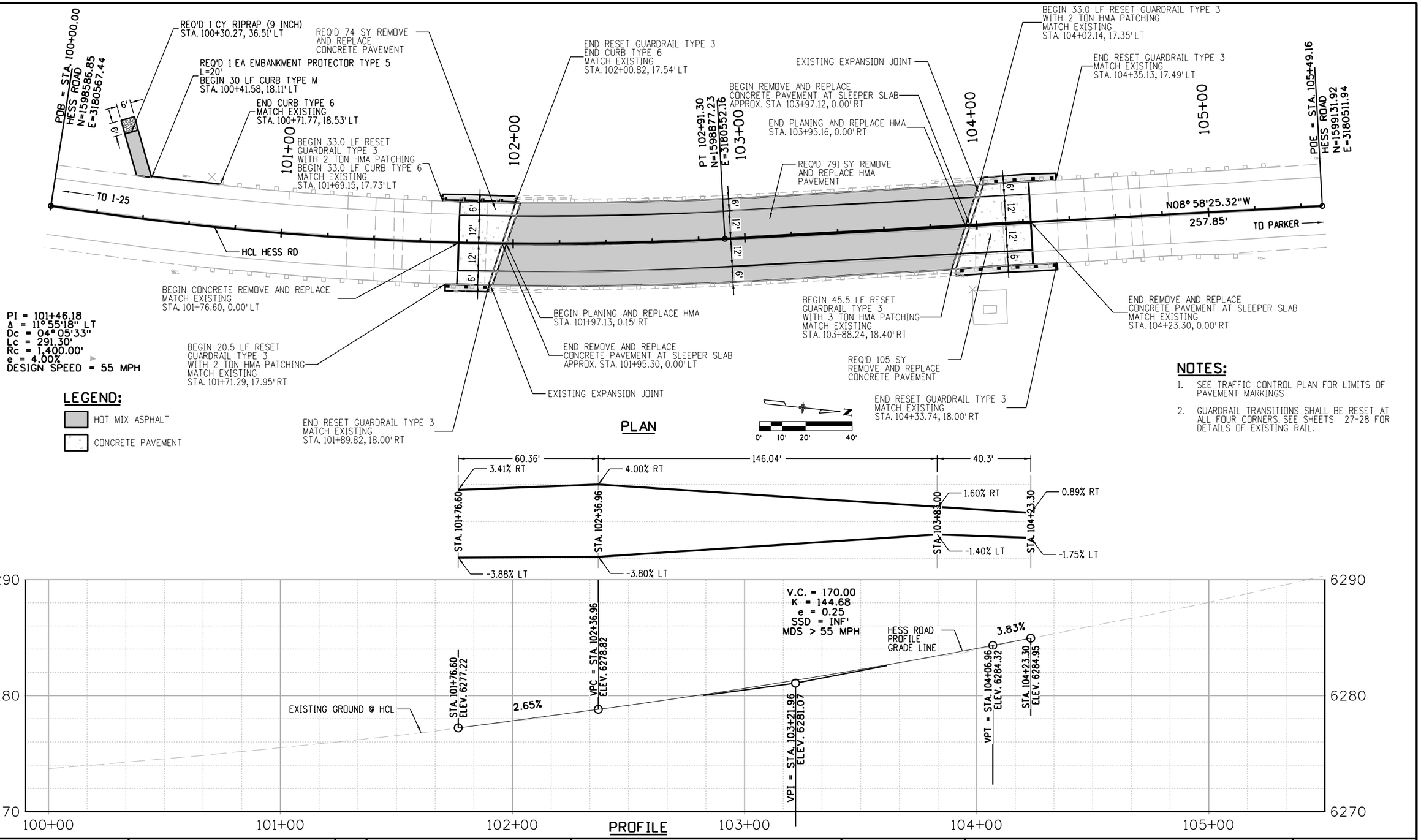
HESS ROAD OVER WILDLIFE CROSSING TYPICAL SECTIONS

Designer: JTS
Detailer: JTS
Sheet Subset: TYP
Structure Numbers:
Subset Sheets: 1 of 01

Project No./Code: CI 2024-022
Sheet Number 006



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HESS ROAD OVER WILDLIFE CROSSING ROADWAY PLAN AND PROFILE

Designer: JTS
Detailer: JTS
Sheet Subset: RDPNP
Structure Numbers:
Subset Sheets: 1 of 01

Project No./Code
CI 2024-022

Sheet Number 007

ALL ITEMS ON THIS PAGE WILL NOT BE MEASURED AND PAID FOR BUT SHALL BE INCLUDED IN TRAFFIC CONTROL (SPECIAL) LUMP SUM

TEMPORARY PAVEMENT MARKING QUANTITIES

LOCATION	627-00011 PAVEMENT MARKING PAINT (WATERBORNE)	
	YELLOW	WHITE
	LF	LF
HESS RD	1342	
4" EDGE LINE		1342
SUBTOTALS	1342	1342
TOTAL (SF)	448	448
TOTAL (GALLONS)	6	6

TRAFFIC CONTROL QUANTITIES

PAY ITEM	DESCRIPTION	UNIT	QUANTITY
630-00007	TRAFFIC CONTROL INSPECTION	DAY	30
630-00012	TRAFFIC CONTROL MANAGEMENT	DAY	70
630-80355	PORTABLE MESSAGE SIGN PANEL	EACH	2
630-80335	BARRICADE (TYPE 3 M-B)(TEMPORARY)	EACH	2
630-80360	DRUM CHANNELIZING DEVICE	EACH	100
630-80001	FLASHING BEACON (PORTABLE)	EACH	2
	TRAFFIC SIGNAL (TEMPORARY)	EACH	1

TEMPORARY SIGN QUANTITIES

SIGN CODE	SIGN DESCRIPTION	SIGN SIZE W X H (INCHES)	PANEL SIZE (EACH)		
			A	B	SPECIAL
G20-2	END ROAD WORK	36 X 18	2		
G20-5P	WORK ZONE	24 X 18	2		
R2-1(35)	SPEED LIMIT (35)	30 X 36	2		
R2-1(50)	SPEED LIMIT (50)	30 X 36	2		
R2-10	BEGIN DOUBLE FINES ZONE	24 X 30	2		
R2-11	END DOUBLE FINES ZONE	24 X 30	2		
R10-6	STOP HERE ON RED	24 X 30	2		
W3-3	SIGNAL AHEAD	36 X 36	2		
W11-1	BIKE SYMBOL	36 X 36	2		
W16-1P	IN ROAD	18 X 12	2		
W20-1	ROAD WORK AHEAD	36 X 36	2		
W20-4 (1000 FT)	ONE LANE ROAD 1000 FT	36 X 36	2		
TOTAL			24	0	0

TRAFFIC CONTROL GENERAL NOTES:

1. TEMPORARY SIGN QUANTITIES REPRESENTS A SUMMATION OF ALL TEMPORARY SIGNS FOR PHASES 1–2.
2. THE CONTRACTOR SHALL PROVIDE THE TRAVELING PUBLIC WITH TWO WEEKS NOTICE PRIOR TO THE COMMENCEMENT OF WORK AND ANY TEMPORARY ROAD CLOSURES. PRIOR NOTICE SHALL BE PROVIDED USING VARIABLE MESSAGE SIGNS.
3. THE CONTRACTOR SHALL MAINTAIN CONTINUOUS ACCESS THROUGHOUT THE PROJECT FOR BICYCLISTS. WHEN THE EXISTING ROUTE IS DISTURBED BY CONSTRUCTION, A TEMPORARY ALL–WEATHER ACCESS SHALL BE PROVIDED.
4. THE CONTRACTOR SHALL REMOVE ALL EXISTING PAVEMENT MARKINGS THAT CONFLICT WITH THE TEMPORARY PAVEMENT MARKINGS. REMOVAL OF TEMPORARY PAVEMENT MARKING WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF WORK.
5. UNLESS OTHERWISE PROVIDED IN THE PLANS, EXISTING SIGNS SHALL BE MAINTAINED AND/OR RELOCATED AS NECESSARY DURING CONSTRUCTION. ANY EXISTING SIGNS THAT CONFLICT WITH TEMPORARY SIGNS SHALL BE MASKED OR REMOVED. THE COST OF MAINTAINING, RELOCATING, OR MASKING EXISTING SIGNS SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF WORK.
6. WHEN CONSTRUCTION TRAFFIC CONTROL SIGNS ARE NOT IN USE, THEY SHALL BE MASKED, TURNED IN A WAY THAT THEY ARE UNREADABLE, OR REMOVED.
7. THE CONSTRUCTION PHASING DEPICTED ON SHEETS 8–10 IS SUGGESTED ONLY. THE CONTRACTOR MAY PROPOSE AN ALTERNATE PHASING AND TRAFFIC CONTROL PLAN. PROPOSED CHANGES MUST BE SUBMITTED TO THE COUNTY AND APPROVED PRIOR TO BID SUBMITTAL. WITHOUT APPROVAL PRIOR TO BID, THE CONTRACTOR SHALL ONLY BE PAID FOR THE TRAFFIC CONTROL AND PHASING SHOWN IN THESE PLANS.

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HESS ROAD OVER WILDLIFE CROSSING
TABULATION OF TRAFFIC CONTROL QUANTITIES

Designer: JTS
Detailer: JTS
Sheet Subset: TCP TAB
Structure Numbers:
Subset Sheets: 1 of 01

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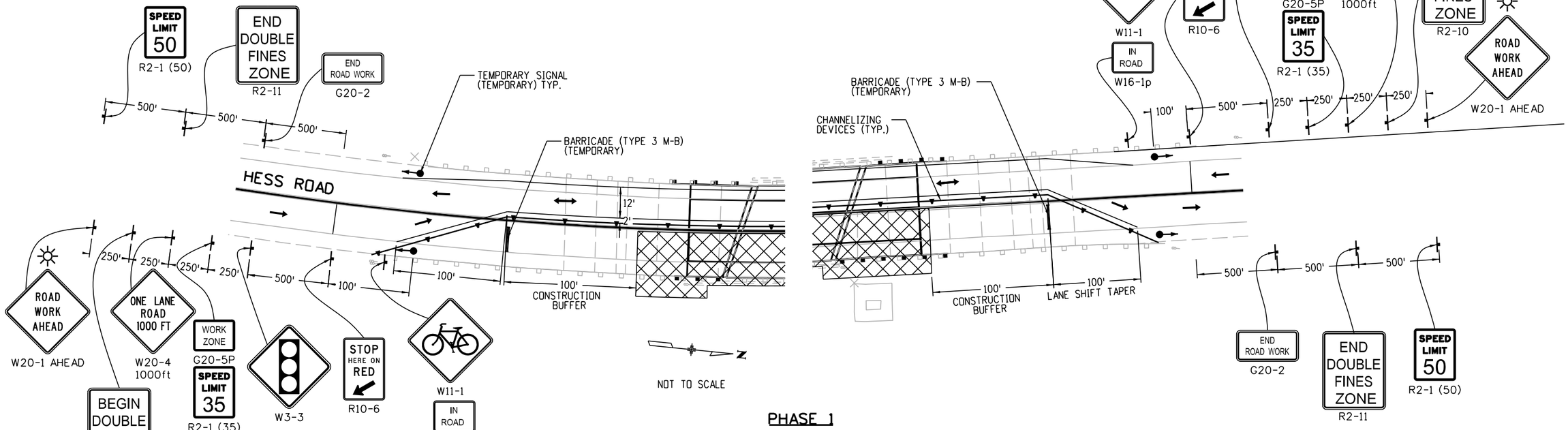
Sheet Number 008



NOTES:

1. SIGN LAYOUT SHOWN IS FOR ILLUSTRATION ONLY. FINAL DESIGN MUST COMPLY WITH THE MUTCD AND CDOT S-STANDARD S-630-1 AND BE APPROVED BY THE ENGINEER.
2. TRAFFIC CONTROL SHALL BE DESIGED FOR A MINIMUM OF 40 MPH BUT SHALL BE POSTED AT 35 MPH.
3. THE TEMPORARY TRAFFIC SIGNAL SYSTEM SHALL CONSIST OF TWO TEMPORARY TRAFFIC SIGNAL UNITS. THE UNITS SHALL BE INTERCONNECTED VIA RADIO OR WIRE. THE CONTRACTOR SHALL DEVELOP A SIGNAL TIMING PLAN THAT ACCOUNTS FOR ADEQUATE VEHICLE CLERANCE TIMES FOR ALL MOVEMENTS.

PHASE 1

1. SHIFT BOTH DIRECTIONS OF TRAFFIC TO WB LANES; WITH A TEMPORARY SIGNAL FOR ALTERNATING FLOW.
2. REMOVE EXISTING EB LANE AND SHOULDER PAVEMENT.
3. REPAIR THE EB HALF OF THE BRIDGE. CONSTRUCT THE EB HALF OF THE ROADWAY.
4. CONSTRUCT THE EB GUARDRAIL TRANSITIONS.

LEGEND

CONSTRUCTION AREA FOR CURRENT PHASE

COMPLEED CONSTRUCTION AREA FROM PREVIOUS PHASE

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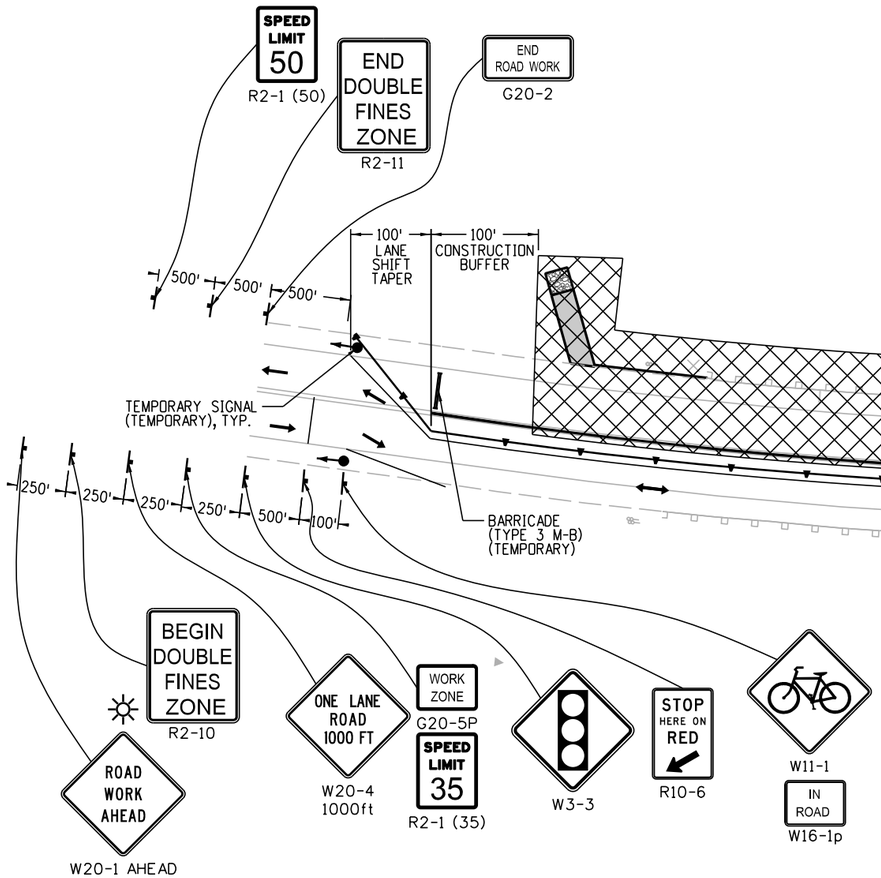
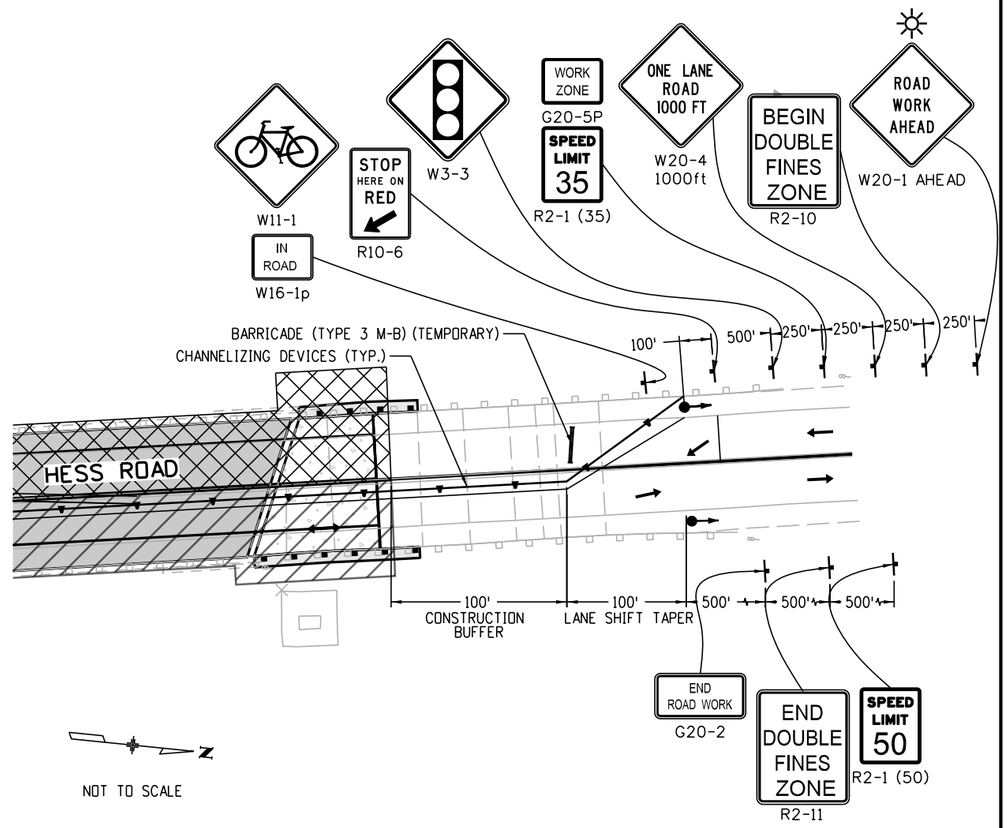
HESS ROAD OVER WILDLIFE CROSSING PHASING PLAN

Designer: JJW
Detailer: JTS
Sheet Subset: PHASE
Structure Numbers:
Subset Sheets: 1 of 02

Project No./Code: CI 2024-022

Sheet Number 009





PHASE 2

NOT TO SCALE

NOTES:

1. SIGN LAYOUT SHOWN IS FOR ILLUSTRATION ONLY. FINAL DESIGN MUST COMPLY WITH THE MUTCD AND CDOT S-STANDARD S-630-1 AND BE APPROVED BY THE ENGINEER.
2. TRAFFIC CONTROL SHALL BE DESIGED FOR A MINIMUM OF 40 MPH BUT SHALL BE POSTED AT 35 MPH.
3. THE TEMPORARY TRAFFIC SIGNAL SYSTEM SHALL CONSIST OF TWO TEMPORARY TRAFFIC SIGNAL UNITS. THE UNITS SHALL BE INTERCONNECTED VIA RADIO OR WIRE. THE CONTRACTOR SHALL DEVELOP A SIGNAL TIMING PLAN THAT ACCOUNTS FOR ADEQUATE VEHICLE CLERANCE TIMES FOR ALL MOVEMENTS.

PHASE 2

1. SHIFT BOTH DIRECTIONS OF TRAFFIC TO NEW EB SHOULDER.
2. REMOVE EXISTING WB LANE AND SHOULDER PAVEMENT.
3. REPAIR THE WB HALF OF THE BRIDGE. CONSTRUCT THE WB HALF OF THE ROADWAY.
4. CONSTRUCT THE WB GUARDRAIL TRANSITIONS AND EMBANKMENT PROTECTOR.
5. INSTALL PERMANENT PAVEMENT MARKINGS.

LEGEND

CONSTRUCTION AREA FOR CURRENT PHASE

COMPLEED CONSTRUCTION AREA FROM PREVIOUS PHASE

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HESS ROAD OVER WILDLIFE CROSSING PHASING PLAN

Designer: JJW
Detailer: JTS
Sheet Subset: PHASE
Structure Numbers:
Subset Sheets: 2 of 02

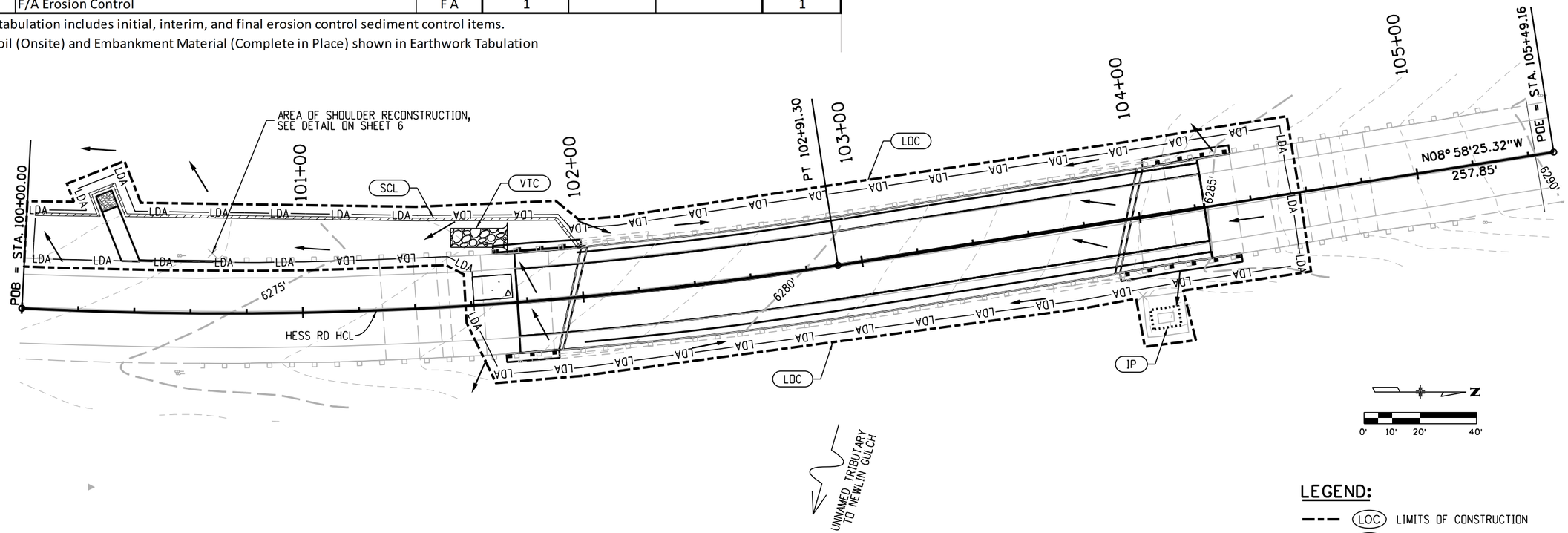
Project No./Code: CI 2024-022

Sheet Number 010

STORMWATER MANAGEMENT PLAN QUANTITIES

PAY ITEM	DESCRIPTION	UNIT	INITIAL CONST.	INTERIM CONST.	PERMANENT STABILIZATION	TOTAL QUANTITY
208-00002	Erosion Log Type 1 (12 Inch)	LF	220			220
208-00045	Concrete Washout Structure	EACH	1			1
208-00070	Vehicle Tracking Pad	EACH	1			1
208-00103	Removal and Disposal of Sediment (Labor)	HOUR		8		8
208-00105	Removal and Disposal of Sediment (Equipment)	HOUR		8		8
208-00106	Sweeping (Sediment Removal)	HOUR		12		12
208-00207	Erosion Control Management	DAY		18		18
212-00005	Seeding (Native)	ACRE			0.07	0.07
216-00201	Soil Retention Blanket (Straw-Coconut) (Biodegradable Class 1)	SY			316	316
700-70380	F/A Erosion Control	F A	1			1

Note: This tabulation includes initial, interim, and final erosion control sediment control items.
Topsoil (Onsite) and Embankment Material (Complete in Place) shown in Earthwork Tabulation



LEGEND:

- LOC — LIMITS OF CONSTRUCTION
- LDA — LIMITS DISTURBED AREA
- IP — INLET PROTECTION
- S — SEEDING
- ECB — EROSION CONTROL BLANKET
- SCL — SEDIMENT CONTROL LOG
- CWA — CONCRETE WASHOUT AREA
- VTC — VEHICLE TRACKING CONTROL

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HESS ROAD OVER WILDLIFE CROSSING STORMWATER MANAGEMENT PLAN INITIAL - INTERIM SITE MAP

Designer: JTS
Detailer: JTS
Sheet Subset: SWMP
Structure Numbers:
Subset Sheets: 1 of 02

Project No./Code: CI 2024-022

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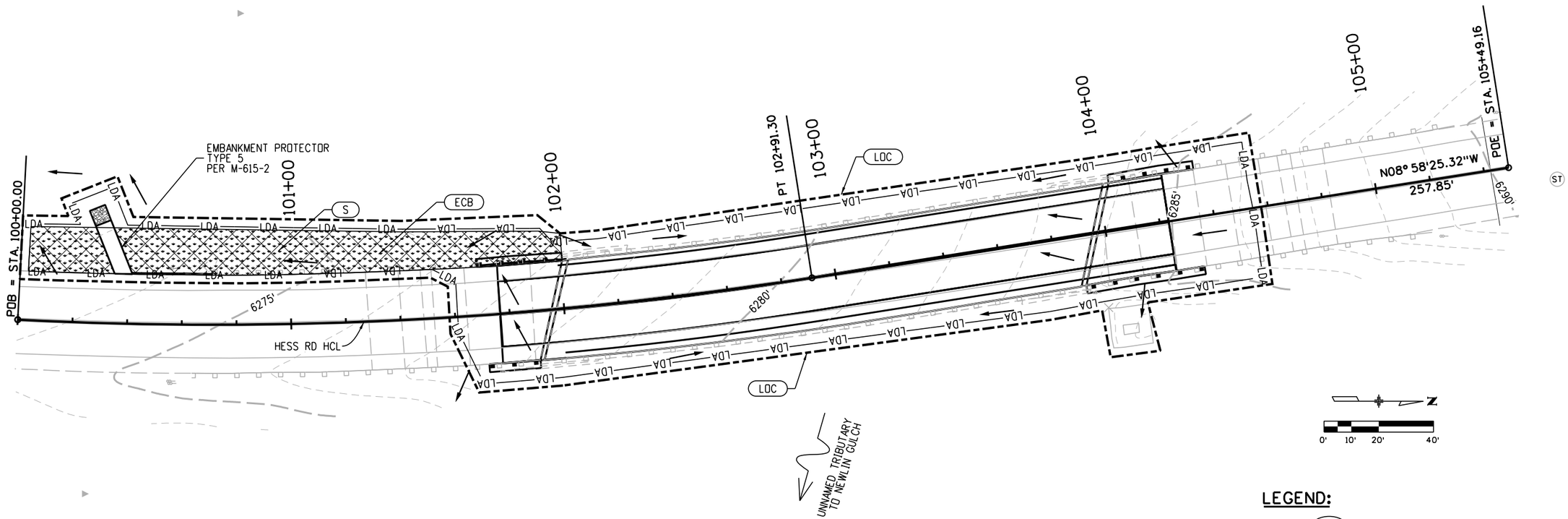

LEGEND:

- LOC — LIMITS OF CONSTRUCTION
- LDA — LIMITS DISTURBED AREA
- IP — INLET PROTECTION
- S — SEEDING
- ECB — EROSION CONTROL BLANKET
- SCL — SEDIMENT CONTROL LOG
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HESS ROAD OVER WILDLIFE CROSSING STORMWATER MANAGEMENT PLAN FINAL SITE MAP

Designer: JTS
Detailer: JTS
Sheet Subset: SWMP
Structure Numbers:
Subset Sheets: 2 of 02

Project No./Code: CI 2024-022

Sheet Number 012

GRADING, EROSION, AND SEDIMENT CONTROL (GESC) GENERAL NOTES

1. THE DOUGLAS COUNTY ENGINEER'S SIGNATURE AFFIXED TO THIS DOCUMENT INDICATES THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING HAS REVIEWED THE DOCUMENT AND FOUND IT IN GENERAL COMPLIANCE WITH THE DOUGLAS COUNTY GRADING, EROSION AND SEDIMENT CONTROL (GESC) CRITERIA MANUAL. THE DOUGLAS COUNTY DIRECTOR OF ENGINEERING SERVICES, THROUGH ACCEPTANCE OF THIS DOCUMENT, ASSUMES NO RESPONSIBILITY (OTHER THAN AS STATED ABOVE) FOR THE COMPLETENESS AND/OR ACCURACY OF THESE DOCUMENTS.

2. THE ADEQUACY OF THIS GESC PLAN LIES WITH THE ORIGINAL DESIGN ENGINEER.

3. THE GESC PLAN SHALL BE CONSIDERED VALID FOR THREE (3) YEARS FROM THE DATE OF ACCEPTANCE BY DOUGLAS COUNTY, AFTER WHICH TIME THE PLAN SHALL BE VOID AND WILL BE SUBJECT TO RE-REVIEW AND RE-ACCEPTANCE BY DOUGLAS COUNTY.

4. ALL MATERIALS AND WORKMANSHIP SHALL BE SUBJECT TO INSPECTION BY THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING. DOUGLAS COUNTY RESERVES THE RIGHT TO ACCEPT OR REJECT ANY SUCH MATERIALS AND WORKMANSHIP THAT DOES NOT CONFORM TO THE GESC MANUAL, GESC PLAN OR GESC PERMIT.

5. THE PLACEMENT OF EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMPs) SHALL BE IN ACCORDANCE WITH THE DOUGLAS COUNTY ACCEPTED GESC PLAN AND THE DOUGLAS COUNTY GESC MANUAL, AS AMENDED.

6. ANY VARIATION IN MATERIAL, TYPE OR LOCATION OF EROSION AND SEDIMENT CONTROL BMPs FROM THE DOUGLAS COUNTY ACCEPTED GESC PLAN WILL REQUIRE APPROVAL FROM AN ACCOUNTABLE REPRESENTATIVE OF THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING.

7. AFTER THE GESC PLAN HAS BEEN ACCEPTED, THE GESC PERMIT APPLIED FOR, FEES AND FISCAL SECURITY SUBMITTED TO THE COUNTY, AND THE GESC FIELD MANUAL OBTAINED AND REVIEWED, THE CONTRACTOR MAY INSTALL THE INITIAL-STAGE EROSION AND SEDIMENT CONTROL BMPs INDICATED ON THE ACCEPTED GESC PLAN.

8. THE FIRST BMP TO BE INSTALLED ON THE SITE SHALL BE CONSTRUCTION FENCE, MARKERS, OR OTHER APPROVED MEANS OF DEFINING THE LIMITS OF CONSTRUCTION, INCLUDING CONSTRUCTION LIMITS ADJACENT TO STREAM CORRIDORS AND OTHER AREAS TO BE PRESERVED.

9. AFTER INSTALLATION OF THE INITIAL-STAGE EROSION AND SEDIMENT CONTROL BMPs, THE PERMITTEE SHALL CALL THE DOUGLAS COUNTY ENGINEERING PERMITS STAFF AT 303-660-7487 TO SCHEDULE A PRECONSTRUCTION MEETING AT THE PROJECT SITE. THE REQUEST SHALL BE MADE A MINIMUM OF THREE BUSINESS DAYS PRIOR TO THE REQUESTED MEETING TIME. NO CONSTRUCTION ACTIVITIES SHALL BE PLANNED WITHIN 24 HOURS AFTER THE PRECONSTRUCTION MEETING.

10. THE OWNER OR OWNER'S REPRESENTATIVE, THE GESC MANAGER, THE GENERAL CONTRACTOR, AND THE GRADING SUBCONTRACTOR, IF DIFFERENT FROM THE GENERAL CONTRACTOR, MUST ATTEND THE PRECONSTRUCTION MEETING. IF ANY OF THE REQUIRED PARTICIPANTS FAIL TO ATTEND THE PRECONSTRUCTION MEETING, OR IF THE GESC FIELD MANUAL IS NOT ON SITE, OR IF THE INSTALLATION OF THE INITIAL BMPs ARE NOT APPROVED BY THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR, THE APPLICANT WILL HAVE TO PAY A REINSPECTION FEE, ADDRESS ANY PROBLEMS WITH BMP INSTALLATION, AND CALL TO RESCHEDULE THE MEETING, WITH A CORRESPONDING DELAY IN THE START OF CONSTRUCTION. DOUGLAS COUNTY STRONGLY ENCOURAGES THE APPLICANT TO HAVE THE ENGINEER OF RECORD AT THE PRECONSTRUCTION MEETING.

11. CONSTRUCTION SHALL NOT BEGIN UNTIL THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR APPROVES THE INSTALLATION OF THE INITIAL BMPs AND THE APPROVED GESC PERMIT IS PICKED UP FROM THE COUNTY AND IS IN-HAND ON THE SITE. THE COMPLETED PERMIT WILL BE AVAILABLE WITHIN 24-HOURS AFTER THE INSTALLATION OF THE INITIAL BMPs ARE APPROVED.

12. THE GESC MANAGER SHALL STRICTLY ADHERE TO THE DOUGLAS COUNTY-APPROVED LIMITS OF CONSTRUCTION AT ALL TIMES. THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING MUST APPROVE ANY CHANGES TO THE LIMITS OF CONSTRUCTION AND, AT THE DISCRETION OF THE ENGINEERING DIVISION, ADDITIONAL EROSION/SEDIMENT CONTROLS MAY BE REQUIRED IN ANY ADDITIONAL AREAS OF CONSTRUCTION.

13. THE MAXIMUM AREA OF CONSTRUCTION SHALL BE LIMITED TO 40 ACRES (70 ACRES IF APPROVED FOR SOIL MITIGATION OPERATIONS) TO REDUCE THE AMOUNT OF LAND DISTURBED AT ANY ONE TIME. LARGER SITES SHALL BE DIVIDED INTO PHASES THAT ARE EACH 40 (OR 70) ACRES OR LESS IN SIZE. THESE PROJECTS SHALL CONDUCT GRADING ACTIVITIES IN ACCORDANCE WITH THE ACCEPTED GESC PLAN. BMP INSTALLATION AND APPROVAL BY DOUGLAS COUNTY AT THE START AND COMPLETION OF EACH PHASE SHALL BE CONDUCTED IN ACCORDANCE WITH THE PROCEDURES OUTLINED IN THE GESC MANUAL AND/OR GESC FIELD MANUAL.

14. PRIOR TO ANY CONSTRUCTION ACTIVITY, THE PERMITTEE SHALL VERIFY THE LOCATION OF EXISTING UTILITIES. FOR INFORMATION, CONTACT THE UTILITY NOTIFICATION CENTER OF COLORADO (UNCC) AT 811, 1-800-922-1987, OR WWW.COLORADO811.ORG.

15. NATURAL VEGETATION SHALL BE RETAINED AND PROTECTED WHEREVER POSSIBLE. EXPOSURE OF SOIL TO EROSION BY REMOVAL OR DISTURBANCE OF VEGETATION SHALL BE LIMITED TO THE AREA REQUIRED FOR IMMEDIATE CONSTRUCTION OPERATIONS.

16. THE GESC PERMIT SHALL BE VALID FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ISSUANCE.

17. A COPY OF THE GESC PERMIT, ACCEPTED GESC PLANS AND THE GESC FIELD MANUAL SHALL BE ON SITE AT ALL TIMES.

18. THE GESC MANAGER SHALL BE RESPONSIBLE FOR ENSURING THAT THE SITE REMAINS IN COMPLIANCE WITH THE GESC PERMIT AND SHALL BE THE PERMITTEE'S CONTACT PERSON WITH THE COUNTY FOR ALL MATTERS PERTAINING TO THE GESC PERMIT. THE GESC MANAGER SHALL BE PRESENT AT THE SITE THE MAJORITY OF THE TIME AND SHALL BE AVAILABLE THROUGH A 24-HOUR CONTACT NUMBER. IN THE EVENT THAT THE CONTRACTOR'S GESC MANAGER IS NOT ON SITE AND CANNOT BE REACHED DURING A VIOLATION, THE ALTERNATE GESC MANAGER SHALL BE CONTACTED. IF NEITHER THE GESC MANAGER NOR ALTERNATE GESC MANAGER CAN BE CONTACTED DURING ANY VIOLATION, A STOP WORK ORDER MAY BE ISSUED.

19. ALL CONSTRUCTION TRAFFIC MUST ENTER/EXIT THE SITE THROUGH THE DOUGLAS COUNTY-APPROVED ACCESS POINT. A VEHICLE TRACKING CONTROL PAD IS REQUIRED AT ALL ACCESS POINTS ON THE SITE. ADDITIONAL STABILIZED CONSTRUCTION ENTRANCES MAY BE ADDED WITH AUTHORIZATION FROM THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING.

20. THE GESC MANAGER IS RESPONSIBLE FOR CLEANUP OF SEDIMENT OR CONSTRUCTION DEBRIS TRACKED ONTO ADJACENT PAVED AREAS. PAVED AREAS INCLUDING STREETS ARE TO BE KEPT CLEAN THROUGHOUT BUILD-OUT AND SHALL BE CLEANED, WITH A STREET SWEEPER OR SIMILAR DEVICE, AT FIRST NOTICE OF ACCIDENTAL TRACKING OR AT THE DISCRETION OF THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR. STREET WASHING IS NOT ALLOWED. DOUGLAS COUNTY RESERVES THE RIGHT TO REQUIRE ADDITIONAL MEASURES TO ENSURE AREA STREETS ARE KEPT FREE OF SEDIMENT AND/OR CONSTRUCTION DEBRIS.

21. APPROVED EROSION AND SEDIMENT CONTROL BMPs SHALL BE MAINTAINED AND KEPT IN GOOD REPAIR FOR THE DURATION OF THIS PROJECT. AT A MINIMUM, THE GESC MANAGER SHALL INSPECT ALL BMPs IN ACCORDANCE WITH THE ACCEPTED GESC PLAN AND GESC MANUAL. LEVEL III VIOLATIONS SHALL BE CORRECTED IMMEDIATELY AFTER THE PERMITTEE(S) NOTICE THE VIOLATION(S) OR ARE NOTIFIED OF THE VIOLATION(S). GENERALLY DOUGLAS COUNTY WILL REINSPECT FOR COMPLIANCE WITHIN 48 HOURS OF NOTIFICATION OF LEVEL III VIOLATIONS. LEVEL II VIOLATIONS SHALL BE CORRECTED IMMEDIATELY, OR AS DIRECTED BY A DOUGLAS COUNTY EROSION CONTROL INSPECTOR. ACCUMULATED SEDIMENT AND CONSTRUCTION DEBRIS SHALL BE REMOVED AND PROPERLY DISPOSED.

22. STRAW BALES ARE NOT A DOUGLAS COUNTY ACCEPTED SEDIMENT CONTROL BMP.

23. TOPSOIL SHALL BE STRIPPED AND STOCKPILED IN THE LOCATION SHOWN ON THE ACCEPTED GESC PLAN. THE GESC MANAGER SHALL SCHEDULE AN INSPECTION WITH THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR AS SOON AS TOPSOIL STRIPPING IS COMPLETED. FAILURE TO SCHEDULE SUCH INSPECTION OR FAILURE TO STOCKPILE TOPSOIL SHALL RESULT IN ISSUANCE OF A STOP WORK ORDER. THE STOP WORK ORDER SHALL REMAIN IN PLACE UNTIL TOPSOIL IS STOCKPILED ON SITE OR APPROPRIATE SOIL AMENDMENTS ARE STOCKPILED ON SITE.

24. THE ACCEPTED GESC PLAN MAY REQUIRE CHANGES OR ALTERATIONS AFTER APPROVAL TO MEET CHANGING SITE OR PROJECT CONDITIONS OR TO ADDRESS INEFFICIENCIES IN DESIGN OR INSTALLATION. THE GESC MANAGER SHALL OBTAIN PRIOR APPROVAL FROM THE DESIGN ENGINEER AND DOUGLAS COUNTY PUBLIC WORKS ENGINEERING FOR ANY PROPOSED CHANGES.

25. LINING OF TEMPORARY SWALES AND DITCHES SHALL BE IN ACCORDANCE WITH THE GESC CRITERIA MANUAL.

26. NO PERMANENT EARTH SLOPES GREATER THAN 3:1 SHALL BE ALLOWED.

27. ANY SETTLEMENT OR SOIL ACCUMULATIONS BEYOND THE LIMITS OF CONSTRUCTION DUE TO GRADING OR EROSION SHALL BE REPAIRED IMMEDIATELY BY THE GESC MANAGER. THE GESC MANAGER SHALL BE HELD RESPONSIBLE FOR OBTAINING ACCESS RIGHTS TO ADJACENT PROPERTY, IF NEEDED, AND REMEDIATING ANY ADVERSE IMPACTS TO ADJACENT WATERWAYS, WETLANDS, PROPERTIES, ETC. RESULTING FROM WORK DONE AS PART OF THIS PROJECT.

28. A WATER SOURCE SHALL BE AVAILABLE ON SITE DURING EARTHWORK OPERATIONS AND UTILIZED AS REQUIRED TO MINIMIZE DUST FROM EARTHWORK EQUIPMENT AND WIND.

29. SOILS THAT WILL BE STOCKPILED FOR MORE THAN THIRTY (30) DAYS SHALL BE SEEDED AND MULCHED WITHIN FOURTEEN (14) DAYS OF STOCKPILE CONSTRUCTION. NO STOCKPILES SHALL BE PLACED WITHIN ONE HUNDRED (100) FEET OF A DRAINAGE WAY UNLESS APPROVED BY THE DOUGLAS COUNTY PUBLIC WORKS ENGINEERING.

30. ALL CHEMICAL OR HAZARDOUS MATERIAL SPILLS WHICH MAY ENTER WATERS OF THE STATE OF COLORADO, WHICH INCLUDE BUT ARE NOT LIMITED TO, SURFACE WATER, GROUND WATER AND DRY GULLIES OR STORM SEWER LEADING TO SURFACE WATER, SHALL BE IMMEDIATELY REPORTED TO THE CDPHE PER CRS 25-8-601, AND DOUGLAS COUNTY. RELEASES OF PETROLEUM PRODUCTS AND CERTAIN HAZARDOUS SUBSTANCES LISTED UNDER THE FEDERAL CLEAN WATER ACT (40 CFR PART 116) MUST BE REPORTED TO THE NATIONAL RESPONSE CENTER AS WELL AS THE CDPHE. CONTACT INFORMATION FOR CDPHE, DOUGLAS COUNTY AND THE NATIONAL RESPONSE CENTER CAN BE FOUND IN APPENDIX A OF THE GESC MANUAL, AS AMENDED. SPILLS THAT POSE AN IMMEDIATE RISK TO HUMAN LIFE SHALL BE REPORTED TO 911. FAILURE TO REPORT AND CLEAN UP ANY SPILL MAY RESULT IN ISSUANCE OF A STOP WORK ORDER.

31. ALL WORK ON SITE SHALL STAY A MINIMUM OF ONE HUNDRED (100) FEET AWAY FROM ANY DRAINAGEWAY, WETLAND, ETC. UNLESS OTHERWISE NOTED ON AN ACCEPTED DOUGLAS COUNTY GESC PLAN.

32. ALL PROJECTS SHALL BALANCE EARTHWORK QUANTITIES ON SITE. IN THE EVENT A VARIANCE IS GRANTED BY THE COUNTY DIRECTOR OF ENGINEERING SERVICES TO ALLOW IMPORT OR EXPORT OF MATERIAL, THE PERMITTEE SHALL HAVE A GESC PERMIT IN HAND FOR THE IMPORT OR EXPORT SITE PRIOR TO ANY TRANSPORTING OF EARTHEN MATERIAL. THE GESC MANAGER SHALL NOTIFY THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR OF THE LOCATION AND PERMIT NUMBERS OF BOTH THE EXPORTING AND IMPORTING SITES PRIOR TO ANY IMPORT/ EXPORT OPERATIONS.

33. THE USE OF REBAR, STEEL STAKES OR STEEL FENCE POSTS FOR STAKING OR SUPPORT OF ANY EROSION OR SEDIMENT CONTROL BMP IS PROHIBITED (EXCEPT STEEL TEE-POSTS FOR USE IN SUPPORTING CONSTRUCTION FENCE).

34. THE CLEANING OF CONCRETE DELIVERY TRUCK CHUTES IS RESTRICTED TO APPROVED CONCRETE WASH OUT LOCATIONS ON THE JOB SITE. THE DISCHARGE OF WATER CONTAINING WASTE CONCRETE TO THE STORM SEWER SYSTEM IS PROHIBITED. ALL CONCRETE WASTE SHALL BE PROPERLY CLEANED UP AND DISPOSED AT AN APPROPRIATE LOCATION.

35. ALL DEWATERING ON SITE SHALL BE COORDINATED WITH A DOUGLAS COUNTY EROSION CONTROL INSPECTOR AND BE FREE OF SEDIMENT IN ACCORDANCE WITH THE GESC MANUAL.

36. ALL PERMANENT INSTALLATIONS OF PIPES FOR STORM SEWERS, SLOPE DRAINS, AND CULVERTS, TOGETHER WITH RIPRAP APRONS OR OTHER INLET AND OUTLET PROTECTION, REQUIRE INSPECTION BY DOUGLAS COUNTY PUBLIC WORKS ENGINEERING (SEPARATE FROM GESC INSPECTIONS).

37. ALL DISTURBED AREAS SHALL BE DRILL SEEDED AND CRIMP MULCHED IN ACCORDANCE WITH THE GESC CRITERIA MANUAL WITHIN THIRTY (30) DAYS OF INITIAL EXPOSURE OR WITHIN FOURTEEN (14) DAYS OF SUBSTANTIAL COMPLETION (AS DEFINED BY DOUGLAS COUNTY) OF AN AREA, WHICHEVER IS LESS. THIS MAY REQUIRE MULTIPLE MOBILIZATIONS FOR SEEDING AND MULCHING.

38. ALL SLOPES STEEPER THEN 4:1 REQUIRE EROSION CONTROL BLANKETING.

39. HYDRAULIC SEEDING AND HYDRAULIC MULCHING ARE NOT AN ACCEPTABLE METHOD OF SEEDING OR MULCHING IN DOUGLAS COUNTY.

40. NO CURB AND GUTTER PERMITS SHALL BE ISSUED UNTIL ALL DISTURBED AREAS ARE DRILL SEEDED AND CRIMP MULCHED.

41. NO PAVING PERMITS SHALL BE ISSUED UNTIL ALL INTERIM INLET PROTECTION IS INSTALLED AND APPROVED BY THE EROSION CONTROL INSPECTOR.

42. A GESC INSPECTION SHALL BE CONDUCTED FOR CERTIFICATE OR TEMPORARY CERTIFICATE OF OCCUPANCY OR INITIAL ACCEPTANCE.

43. GESC MANAGER SHALL PROVIDE AND MAINTAIN PORTABLE TOILETS AND TRASH DUMPSTERS FOR THE PROJECT.

DETAIL NO.	SHEET NO.	BMP LEGEND	
1	2	CD	CHECK DAM
2	2	CB	COMPOST BLANKET
3	2	CFB	COMPOST FILTER BERM
4	3	CWA	CONCRETE WASHOUT AREA
5	3	CF	CONSTRUCTION FENCE
6	3	CM	CONSTRUCTION MARKER
7	3	CS	CURB SOCK
8	4	DW	DEWATERING
9	4	DD	DIVERSION DITCH
10	5	ECB	EROSION CONTROL BLANKET
11	6	IP	INLET PROTECTION
12	7	RCD	REINFORCED CHECK DAM
13	7	RRB	REINFORCED ROCK BERM
14	7	RRC	RRB FOR CULVERT PROTECTION
15	8	SB	SEDIMENT BASIN
16	9	SCL	SEDIMENT CONTROL LOG
17	9	ST	SEDIMENT TRAP
18	10	SM	SEEDING AND MULCHING
19	11	SF	SILT FENCE
20	11	SSA	STABILIZED STAGING AREA
21	11	SR	SURFACE ROUGHENING
22	12	TSD	TEMPORARY SLOPE DRAIN
23	12	TSC	TEMPORARY STREAM CROSSING
24	13	TER	TERRACING
25	13	VTC	VEHICLE TRACKING CONTROL
26	13	WW	VTC WITH WHEEL WASH
	14		ROCK AND RIPRAP GRADATIONS
		LOC	LIMITS OF CONSTRUCTION

Sheet Revisions		
1	DOUGLAS COUNTY REISSUE	1/17

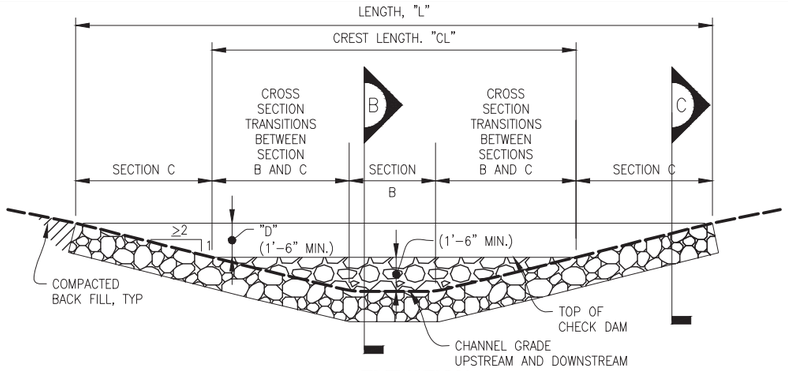
NOTE: SCALES SHOWN ARE FOR 22"x34" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

DOUGLAS COUNTY COLORADO

GESC GRADING, EROSION, AND SEDIMENT CONTROL

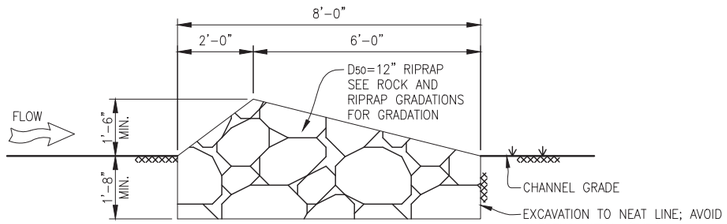
GESC PLAN STANDARD NOTES AND DETAILS

SHEET 1 OF 14



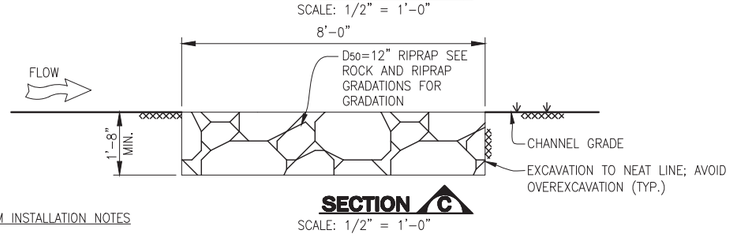
ELEVATION

SCALE: 1" = 5'–0"



SECTION B

SCALE: 1/2" = 1'–0"



SECTION C

SCALE: 1/2" = 1'–0"

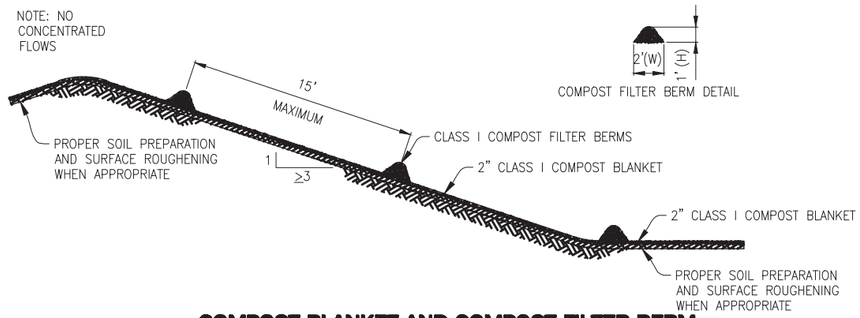
CHECK DAM INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATIONS OF CHECK DAMS.
   - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
   - LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
2. CHECK DAMS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND–DISTURBING ACTIVITIES.
3. RIPRAP UTILIZED FOR CHECK DAMS SHALL HAVE A D_{50} MEDIAN STONE SIZE OF 12".
4. RIPRAP PAD SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'–8".
5. THE ENDS OF THE CHECK DAM SHALL BE A MINIMUM OF 1'–6" HIGHER THAN THE CENTER OF THE CHECK DAM.

CHECK DAM MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR CHECK DAMS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CHECK DAM IS WITHIN 1/2 OF THE HEIGHT OF THE CREST.
3. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND VEGETATED COVER IS APPROVED BY THE COUNTY.
4. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACKFILL. ANY DISTURBED AREA SHALL BE SEEDED AND MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

CD **CHECK DAM** 1



COMPOST BLANKET AND COMPOST FILTER BERM

SCALE: 1" = 5'–0"

COMPOST BLANKET NOTES:

1. SEE PLAN VIEW FOR AREA OF COMPOST BLANKET.
2. MAY BE USED IN PLACE OF STRAW MULCH OR EROSION CONTROL BLANKET IN AREAS WHERE ACCESS IS DIFFICULT DUE TO LANDSCAPING OR OTHER OBJECTS OR IN AREAS WHERE A SMOOTH TURF GRASS FINISH IS DESIRED.
3. SHALL ONLY BE UTILIZED IN AREAS WHERE SHEET FLOW CONDITIONS PREVAIL; SHALL BE PROHIBITED IN AREAS OF POSSIBLE CONCENTRATED FLOW.
4. SOIL PREPARATION SHALL BE COMPLETE PER THE SPECIFICATIONS OUTLINED IN THESE CRITERIA PRIOR TO APPLICATION.
5. WHEN TURF GRASS FINISH IS NOT DESIRED, SURFACE ROUGHENING ON SLOPES SHALL TAKE PLACE PRIOR TO APPLICATION.
6. SHALL BE EVENLY APPLIED AT A DEPTH OF 2 INCH.
7. MAYBE APPLIED UTILIZING PNEUMATIC BLOWER, OR BY HAND.
8. SEEDING SHALL BE DRILLED PRIOR TO THE APPLICATION OF COMPOST OR SEED MAY BE COMBINED AND BLOWN WITH THE PNEUMATIC BLOWER.
9. COMPOST FILTER BERM SHALL BE UTILIZED ON SLOPES WITH A MAXIMUM SPACING OF 15 FEET PER THE REQUIREMENTS FOUND IN THE COMPOST FILTER BERM SECTION.
10. THE RECOMMENDED INSPECTION FREQUENCY IS WEEKLY, DURING AND AFTER ANY STORM EVENT.
11. COMPOST USED IN THE APPLICATION OF THE COMPOST BLANKET SHALL BE A CLASS I COMPOST AS DEFINED BY THE FOLLOWING PHYSICAL, CHEMICAL, AND BIOLOGICAL PARAMETERS:

PARAMETERS	CLASS I COMPOST FOR COMPOST BLANKET
MINIMUM STABILITY INDICATOR	STABLE TO VERY STABLE
SOLUBLE SALTS	MAXIMUM 5mmhos/cm
PH	6.0 – 8.0
AG INDEX	> 10
MATURITY INDICATOR EXPRESSED AS PERCENTAGE OF GERMINATION/VIGOR	80+/80+
MATURITY INDICATOR EXPRESSED AS AMMONIA N/ NITRATE N RATIO	< 4
MATURITY INDICATOR EXPRESSED AS CARBON TO NITROGEN RATIO	20:1
TESTED FOR CLOPYRALID	YES/NEGATIVE RESULT
MOISTURE CONTENT	30–60 %
ORGANIC MATTER CONTENT	25–45 % OF DRY WEIGHT
PARTICLE SIZE DISTRIBUTION	3" (75mm) 100% PASSING 1" (25mm) 95% TO 100% PASSING 3/4" (19mm) 85% TO 90% PASSING 3/8" (9.5mm) 50% TO 60% PASSING #4 20 TO 35% PASSING
PRIMARY, SECONDARY NUTRIENTS; TRACE ELEMENT	MUST BE REPORTED
TESTING AND TEST REPORT SUBMITTAL REQUIREMENTS	STA + CLOPYRALID
ORGANIC MATTER PER CUBIC YARD	MUST REPORT
CHEMICAL CONTAMINANTS	MEET OR EXCEED US EPA CLASS A STANDARD, 40 CFR 503.1 TABLES 1 & 3 LEVELS
MINIMUM MANUFACTURING/PRODUCTION REQUIREMENT	FULLY PERMITTED UNDER COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
RISK FACTOR RELATING TO PLANT GERMINATION AND HEALTH	LOW

NOTE: CLOPYRALID IS THE COMMON NAME OF A HERBICIDE THAT KILLS BROAD–LEAVED WEEDS SUCH AS DANDELIONS, CLOVER AND THISTLE.

CB **COMPOST BLANKET** 2

COMPOST FILTER BERM NOTES:

1. SEE PLAN VIEW FOR LENGTH OF COMPOST FILTER BERM.
2. SHALL BE APPLIED TO ALL SLOPES RECEIVING A COMPOST BLANKET AT 15' INCREMENTS.
3. FILTER BERMS SHALL RUN PARALLEL TO THE CONTOUR.
4. FILTER BERMS SHALL BE A MINIMUM OF 1' H x 2' W.
5. FILTER BERMS SHALL BE APPLIED UTILIZING PNEUMATIC BLOWER, OR BY HAND.
6. SHALL ONLY BE UTILIZED IN AREAS WHERE SHEET FLOW CONDITIONS PREVAIL; SHALL BE PROHIBITED IN AREAS OF POSSIBLE CONCENTRATED FLOW.
7. SOIL PREPARATION SHALL BE COMPLETE PER THE SPECIFICATIONS OUTLINED IN THESE CRITERIA PRIOR TO APPLICATION.
8. WHEN TURF GRASS FINISH IS NOT DESIRED, SURFACE ROUGHENING ON SLOPES SHALL TAKE PLACE PRIOR TO APPLICATION.
9. SEEDING SHALL BE DRILLED BEFORE THE APPLICATION OF COMPOST OR SEED MAY BE COMBINED AND BLOWN WITH THE PNEUMATIC BLOWER.
10. THE RECOMMENDED INSPECTION FREQUENCY IS WEEKLY, DURING AND AFTER ANY STORM EVENT.
11. COMPOST USED IN THE APPLICATION OF THE COMPOST BLANKET SHALL BE A CLASS I COMPOST AS DEFINED BY THE FOLLOWING PHYSICAL, CHEMICAL, AND BIOLOGICAL PARAMETERS:

PARAMETERS	CLASS I COMPOST FOR COMPOST FILTER BERM
MINIMUM STABILITY INDICATOR	STABLE TO VERY STABLE
SOLUBLE SALTS	MAXIMUM 5mmhos/cm
PH	6.0 – 8.0
AG INDEX	> 10
MATURITY INDICATOR EXPRESSED AS PERCENTAGE OF GERMINATION/VIGOR	80+/80+
MATURITY INDICATOR EXPRESSED AS AMMONIA N/ NITRATE N RATIO	< 4
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PRIMARY, SECONDARY NUTRIENTS; TRACE ELEMENT	MUST BE REPORTED
TESTING AND TEST REPORT SUBMITTAL REQUIREMENTS	STA + CLOPYRALID
ORGANIC MATTER PER CUBIC YARD	MUST REPORT
CHEMICAL CONTAMINANTS	MEET OR EXCEED US EPA CLASS A STANDARD, 40 CFR 503.1 TABLES 1 & 3 LEVELS
MINIMUM MANUFACTURING/PRODUCTION REQUIREMENT	FULLY PERMITTED UNDER COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION
RISK FACTOR RELATING TO PLANT GERMINATION AND HEALTH	LOW

NOTE: IF A BIOSOLID COMPOST IS TO BE UTILIZED IT SHALL BE PRODUCED BY A FACILITY IN POSSESSION OF A VALID NOTICE OF AUTHORIZATION (NOA) FOR THE UNRESTRICTED USE AND DISTRIBUTION BY THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT. THE NOA SHALL BE PROVIDED UPON REQUEST TO DOUGLAS COUNTY.

NOTE: A LAB TEST DETAILING THE CHEMICAL, PHYSICAL, AND BIOLOGICAL PARAMETERS SHALL BE PROVIDED UPON REQUEST BY DOUGLAS COUNTY.

CFB **COMPOST FILTER BERM** 3

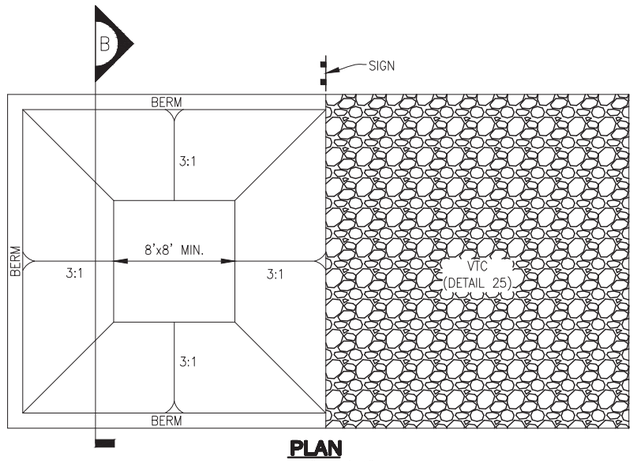
Sheet Revisions			NOTE: SCALES SHOWN ARE FOR 22"x34" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.
1	DOUGLAS COUNTY REISSUE	1/17	

DOUGLAS COUNTY COLORADO

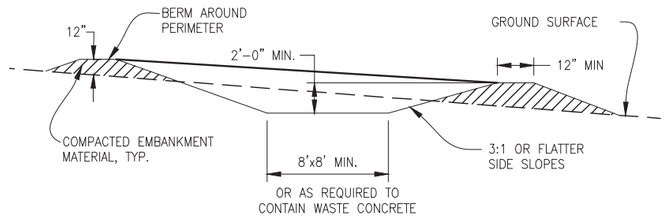
GESC **GRADING, EROSION, AND SEDIMENT CONTROL**

GESC PLAN STANDARD NOTES AND DETAILS

SHEET 2 OF 14



PLAN
SCALE: 1" = 5'-0"



SECTION B
SCALE: 1" = 5'-0"

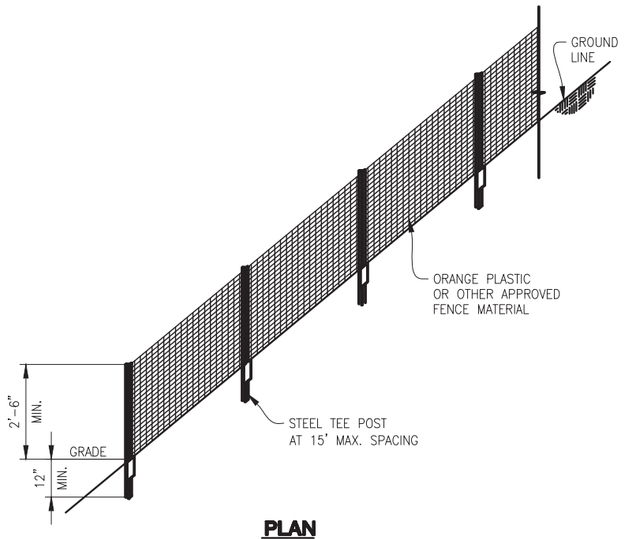
CONCRETE WASHOUT AREA INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   – LOCATIONS OF CONCRETE WASHOUT AREA.
2. THE CONCRETE WASHOUT AREA SHALL BE INSTALLED PRIOR TO ANY CONCRETE PLACEMENT ON SITE.
3. VEHICLE TRACKING CONTROL (DETAIL 25) IS REQUIRED AT THE ACCESS POINT.
4. SIGNS SHALL BE PLACED AT THE CONSTRUCTION ENTRANCE, AT THE WASHOUT AREA, AND ELSEWHERE AS NECESSARY TO CLEARLY INDICATE THE LOCATION OF THE CONCRETE WASHOUT AREA TO OPERATORS OF CONCRETE TRUCKS AND PUMP RIGS.
5. EXCAVATED MATERIAL SHALL BE UTILIZED IN PERIMETER BERM CONSTRUCTION.
6. DURABLE PORTABLE CONCRETE WASHOUT BASINS OR TUBS MAY BE USED WITH THE APPROVAL OF THE EROSION CONTROL INSPECTOR.

CONCRETE WASHOUT AREA MAINTENANCE NOTES

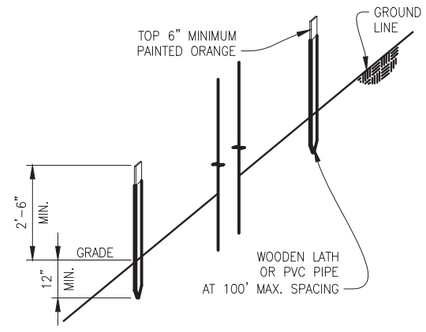
1. THE CONCRETE WASHOUT AREA SHALL BE REPAIRED AND ENLARGED OR CLEANED OUT AS NECESSARY TO MAINTAIN CAPACITY FOR WASTED CONCRETE.
2. AT THE END OF CONSTRUCTION, ALL CONCRETE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF AT AN APPROVED WASTE SITE.
3. WHEN THE CONCRETE WASHOUT AREA IS REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.
4. RECOMMENDED INSPECTION FREQUENCY IS WEEKLY, DURING AND AFTER ANY STORM EVENT.

CWA CONCRETE WASHOUT AREA 4



PLAN
SCALE: 1/2" = 1'-0"

CF CONSTRUCTION FENCE 5



(ALTERNATIVE TO CONSTRUCTION FENCE)
SCALE: 1/2" = 1'-0"

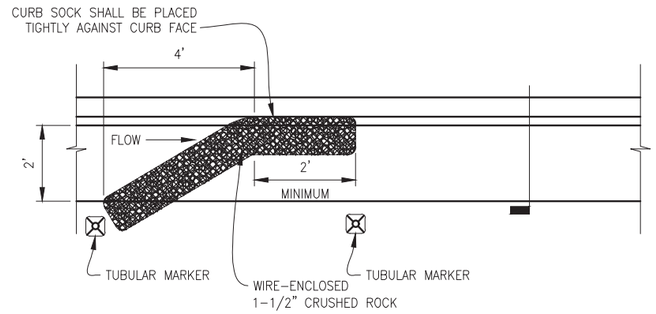
CM CONSTRUCTION MARKERS 6

CONSTRUCTION FENCE INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   – TYPE OF CONSTRUCTION LIMIT INDICATOR (FENCE OR MARKERS).
   – LOCATION AND LENGTH OF FENCE OR LINE OF MARKERS.
2. CONSTRUCTION FENCE OR MARKERS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO OTHER BMPS AND ANY LAND–DISTURBING ACTIVITIES.
3. STEEL TEE POSTS SHALL BE UTILIZED FOR SUPPORT OF CONSTRUCTION FENCE. MAXIMUM SPACING FOR TEE POSTS SHALL BE 15'.

CONSTRUCTION FENCE MAINTENANCE NOTES

1. ANY DAMAGED FENCE OR MARKERS SHALL BE REPAIRED ON A DAILY BASIS.
2. FENCE OR MARKERS SHALL BE REMOVED AT THE END OF CONSTRUCTION. IF ANY DISTURBED AREA EXISTS AFTER FENCE REMOVAL, IT SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.



MAXIMUM SPACING ALONG STREET GRADE

STREET SLOPE	CURB SOCK SPACING (FT.)
0.5%	100
1.0%	100
2.0%	75
3.0%	50
4.0%	50
5.0%	50
6.0%	25
7.0%	25
8.0%	25

CURB SOCK INSTALLATION NOTES

1. SEE PLAN VIEW FOR LOCATION OF CURB SOCK.
2. CURB SOCKS INDICATED ON THE GESC PLAN SHALL BE INSTALLED PRIOR TO ANY UPSTREAM LAND DISTURBING ACTIVITIES.
3. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH THE GRADATION SHOWN ON SHEET 1 (1 ½").
4. WIRE MESH SHALL BE FABRICATED OF 20 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48 INCHES.
5. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6–INCH CENTERS ALONG ALL JOINTS AND 2–INCH CENTERS ON THE ENDS.
6. TUBULAR MARKERS SHALL MEET REQUIREMENTS OF MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED.
7. THE TOP OF THE CURB SOCK SHALL BE ½" TO 1" BELOW TOP OF CURB.
8. CURB SOCK SHALL BE CONSTRUCTED IN ONE PIECE.

CURB SOCK MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR CURB SOCKS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF CURB SOCK SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF THE CURB SOCK IS WITHIN 2 ½" OF THE CREST.
3. CURB SOCKS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED, UNLESS THE COUNTY APPROVES EARLIER REMOVAL OF CURB SOCKS IN STREETS.

CS CURB SOCK 7

Sheet Revisions		
1	DOUGLAS COUNTY REISSUE	1/17

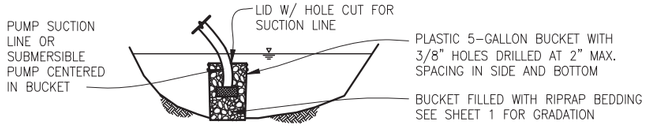
NOTE: SCALES SHOWN ARE FOR 22"x34" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

DOUGLAS COUNTY COLORADO

GESC GRADING, EROSION, AND SEDIMENT CONTROL

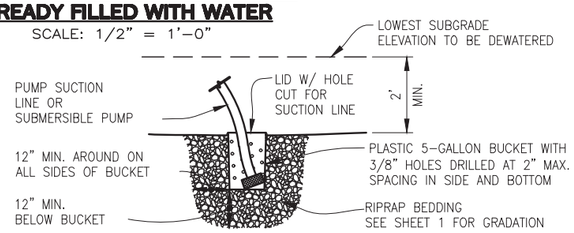
GESC PLAN STANDARD NOTES AND DETAILS

SHEET 3 OF 14



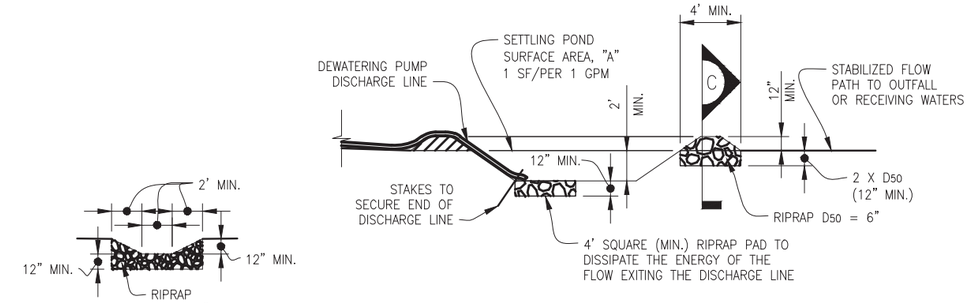
ALTERNATIVE FOR DRAINING POND ALREADY FILLED WITH WATER

SCALE: 1/2" = 1'-0"



DEWATERING SUMP FOR SUBMERSIBLE PUMP

SCALE: 1/2" = 1'-0"



BASIN OUTLET - SECTION C

SCALE: 1" = 5'-0"

SUMP DISCHARGE SETTLING BASIN

SCALE: 1" = 5'-0"

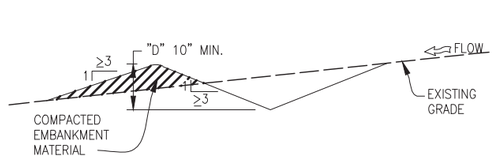
DEWATERING INSTALLATION NOTES

1. THE PERMITTEE(S) SHALL SCHEDULE AN ONSITE INSPECTION WITH THE EROSION CONTROL INSPECTOR PRIOR TO ANY SITE DEWATERING OPERATIONS BEGIN.
2. THE GESC MANAGER SHALL OBTAIN A CONSTRUCTION DEWATERING PERMIT (DEWATERING PERMIT) FROM THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT (CDPHE) PRIOR TO ANY DEWATERING OPERATIONS THAT REQUIRE A DEWATERING PERMIT.
3. AT A MINIMUM, THE DEWATERING BMPs SHALL CONSIST OF THE FOLLOWING:
   PRE-FILTER ON THE SUCTION END OF THE PUMP/HOSE.
   FILTER BMP PRIOR TO FINAL DISCHARGE, AND
   ENERGY DISSIPATING BMP AT THE DISCHARGE END OF THE HOSE/PUMP.
4. THE TYPE AND PLACEMENT OF DEWATERING CONTROLS SHALL BE COORDINATED WITH, AND APPROVED BY, THE EROSION CONTROL INSPECTOR PRIOR TO THE DISCHARGE OF ANY WATER.

DEWATERING MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY IS HOURLY FOR DEWATERING SYSTEMS AND PERFORM ANY NECESSARY REPAIRS OR MAINTENANCE.
2. TEMPORARY SETTLING BASINS SHALL BE REMOVED WHEN NO LONGER NEEDED FOR DEWATERING OPERATIONS. ANY DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

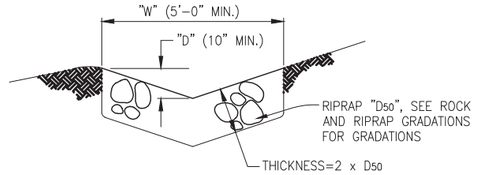
DW **DEWATERING** 8



UNLINED

LONGITUDINAL SLOPE ≤ 0.5%

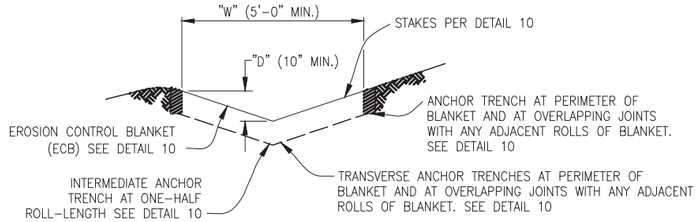
SCALE: 1/2" = 1'-0"



RIPRAP LINED

LONGITUDINAL SLOPE 3% TO 33%

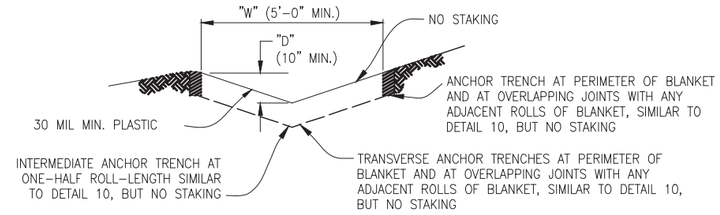
SCALE: 1/2" = 1'-0"



EROSION CONTROL BLANKET (ECB) LINED

LONGITUDINAL SLOPE 0.5% TO 3%

SCALE: 1/2" = 1'-0"



PLASTIC LINED

LONGITUDINAL SLOPE 3% TO 33%

SCALE: 1/2" = 1'-0"

DIVERSION DITCH INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF DIVERSION DITCH.
   - TYPE OF DITCH (UNLINED, ECB LINED, PLASTIC LINED OR RIPRAP LINED).
   - LENGTH OF EACH TYPE OF DITCH.
   - DEPTH, "D", AND WIDTH, "W" DIMENSIONS.
   - FOR ECB LINED DITCH, EROSION CONTROL BLANKET TYPE (SEE DETAIL 10).
   - FOR RIPRAP LINED DITCH, SIZE OF RIPRAP, "D50".
2. SEE DRAINAGE PLANS FOR DETAILS OF ANY PERMANENT CONVEYANCE FACILITIES OR DIVERSION DITCHES EXCEEDING A 2-YEAR FLOW RATE OF 10 CFS.
3. DIVERSION DITCHES INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.
4. FOR ECB LINED DITCHES, INSTALLATION OF EROSION CONTROL BLANKET SHALL CONFORM TO THE REQUIREMENTS OF DETAIL 10.
5. IN LOCATIONS WHERE CONSTRUCTION TRAFFIC MUST CROSS A DIVERSION DITCH, THE PERMITTEES SHALL INSTALL A TEMPORARY CULVERT WITH A MINIMUM DIAMETER OF 12-INCHES.

DIVERSION DITCH MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR DIVERSION DITCHES IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. DIVERSION DITCHES ARE TO REMAIN IN PLACE UNTIL THE END OF CONSTRUCTION, OR, IF APPROVED BY THE COUNTY, LEFT IN PLACE.
3. IF DIVERSION DITCHES ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

DD **DIVERSION DITCH** 9

Sheet Revisions		
1	DOUGLAS COUNTY REISSUE	1/17

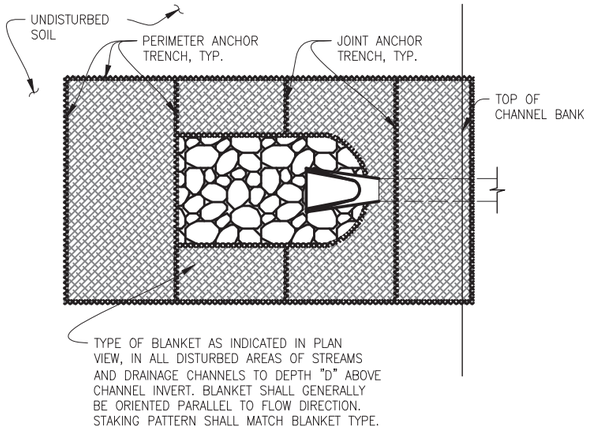
NOTE: SCALES SHOWN ARE FOR 22"x34" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

DOUGLAS COUNTY COLORADO

GESC **GRADING, EROSION, AND SEDIMENT CONTROL**

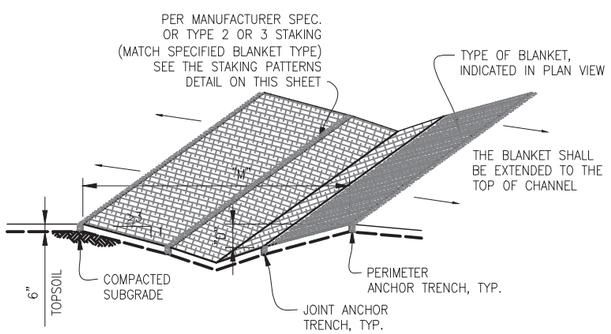
GESC PLAN STANDARD NOTES AND DETAILS

SHEET 4 OF 14



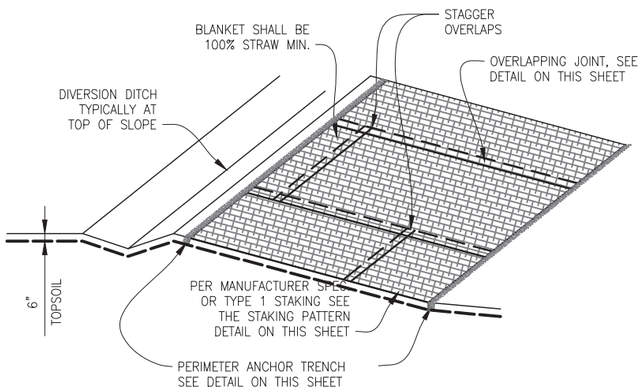
IN DISTURBED AREAS OF STREAMS AND DRAINAGE CHANNELS

SCALE: 1" = 5'-0"



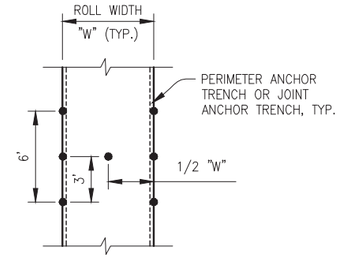
IN DIVERSION DITCH OR SMALL DITCH DRAINAGEWAY

SCALE: 1" = 5'-0"

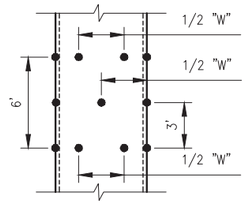


OUTSIDE OF STREAMS AND DRAINAGE CHANNELS

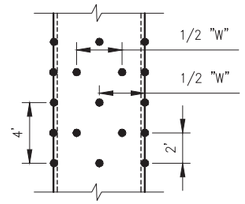
SCALE: 1" = 5'-0"



STRAW



STRAW-COCONUT

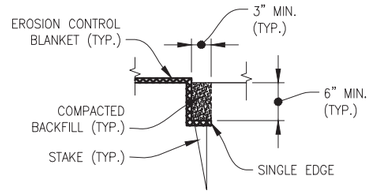


COCONUT OR EXCELSIOR

STAKING PATTERNS

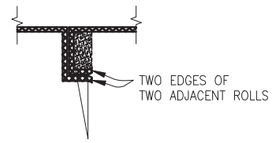
SCALE: 1" = 5'-0"

SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATION. IF NO MANUFACTURER'S SPECIFICATION IS AVAILABLE USE THE ACCEPTABLE STAKING PATTERN (AS SHOWN ABOVE),



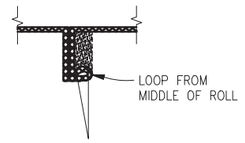
PERIMETER ANCHOR TRENCH

SCALE: 1" = 1'-0"



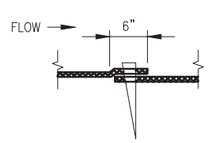
JOINT ANCHOR TRENCH

SCALE: 1" = 1'-0"



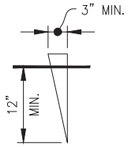
INTERMEDIATE ANCHOR TRENCH

SCALE: 1" = 5'-0"



OVERLAPPING JOINT

SCALE: 1" = 1'-0"



WOOD STAKE DETAIL

SCALE: 1" = 1'-0"
MINIMUM THICKNESS 1/2"

EROSION CONTROL BLANKET INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION OF PERIMETER OF EROSION CONTROL BLANKET.
   - TYPE OF BLANKET (STRAW, STRAW-COCONUT, COCONUT, OR EXCELSIOR).
   - AREA "A" IN SQUARE YARDS OF EACH TYPE OF BLANKET.
2. ALL EROSION CONTROL BLANKETS AND NETTING SHALL BE MADE OF 100% NATURAL AND BIODEGRADABLE MATERIAL; NO PLASTIC OR OTHER SYNTHETIC MATERIAL, EVEN IF PHOTO DEGRADABLE, SHALL BE ALLOWED.
3. IN AREAS WHERE EROSION CONTROL BLANKET IS SHOWN ON THE PLANS, THE PERMITTEE SHALL PLACE TOPSOIL AND PERFORM FINAL GRADING, SURFACE PREPARATION, AND SEEDING BELOW THE BLANKET IN ACCORDANCE WITH THE REQUIREMENTS OF DETAIL 12, SEEDING AND MULCHING. SUBGRADE SHALL BE SMOOTH AND MOIST PRIOR TO BLANKET INSTALLATION AND THE BLANKET SHALL BE IN FULL CONTACT WITH SUBGRADE, NO GAPS OR VOIDS SHALL EXIST UNDER THE BLANKET.
4. PERIMETER ANCHOR TRENCH SHALL BE USED AT OUTSIDE PERIMETER OF ALL BLANKET AREAS.
5. JOINT ANCHOR TRENCH SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER (LONGITUDINALLY AND TRANSVERSELY) FOR ALL BLANKET INSTALLATIONS IN A DRAINAGEWAY EXCEPT STRAW, WHICH MAY USE AN OVERLAPPING JOINT.
6. INTERMEDIATE ANCHOR TRENCH SHALL BE USED AT SPACING OF ONE-HALF THE ROLL LENGTH FOR COCONUT AND EXCELSIOR BLANKETS.
7. THE OVERLAPPING JOINT DETAIL SHALL BE USED TO JOIN ROLLS OF BLANKETS TOGETHER FOR BLANKETS ON SLOPES.
8. MATERIAL SPECIFICATIONS OF EROSION CONTROL BLANKET SHALL CONFORM TO TABLE 7.1.

EROSION CONTROL BLANKET INSTALLATION NOTES – CONTINUED

9. ANY AREAS OF SEEDING AND MULCHING DISTURBED IN THE PROCESS OF INSTALLING EROSION CONTROL BLANKET SHALL BE RESEEDED AND MULCHED IN ACCORDANCE WITH DETAIL 18.
10. SEE DRAINAGE DESIGN PLANS FOR MAJOR DRAINAGEWAY STABILIZATION MEASURES THAT MAY EXCEED THE DESIGN CONDITIONS ASSOCIATED WITH THE DETAILS ABOVE.
11. METAL STAKES OR STAPLES MAY BE USED FOR EROSION CONTROL BLANKET INSTALLATIONS OUTSIDE OF DRAINAGE CHANNELS.

TABLE 7.1 – EROSION CONTROL BLANKET TYPE

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

* FOR OUTSIDE OF STREAMS AND DRAINAGE CHANNELS

EROSION CONTROL BLANKET MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR EROSION CONTROL BLANKETS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
2. EROSION CONTROL BLANKET IS TO BE LEFT IN PLACE UNLESS REQUESTED TO BE REMOVED BY THE COUNTY.
3. ANY EROSION CONTROL BLANKET PULLED OUT, TORN, OR OTHERWISE DAMAGED SHALL BE RE-INSTALLED. ANY SUBGRADE AREAS BELOW THE BLANKET THAT HAVE ERODED TO CREATE A VOID UNDER THE BLANKET, OR THAT REMAIN DEVOID OF GRASS SHALL BE REPAIRED, RESEEDED AND MULCHED AND THE EROSION CONTROL BLANKET REINSTALLED.

ECB EROSION CONTROL BLANKET 10

Sheet Revisions		
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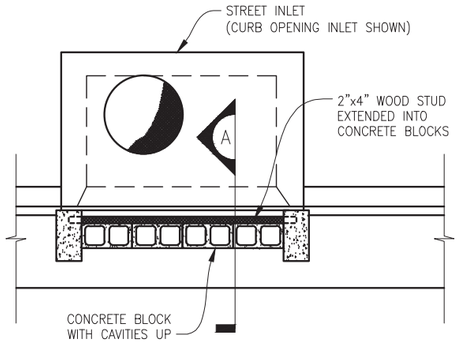
DOUGLAS COUNTY COLORADO

GESC GRADING, EROSION, AND SEDIMENT CONTROL

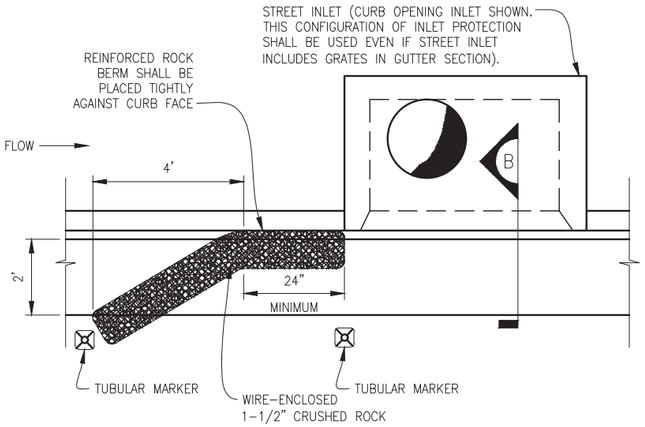
GESC PLAN STANDARD NOTES AND DETAILS

SHEET 5 OF 14



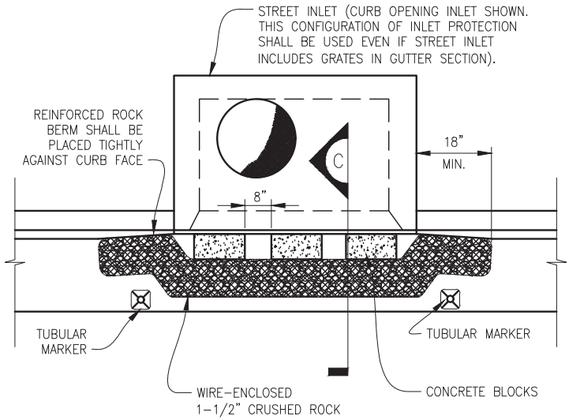
INTERIM CONFIGURATION (BEFORE PAVING) STREET INLET - PLAN

SCALE: 1/2" = 1'-0"



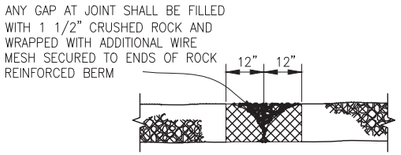
STREET INLET ON CONTINUOUS GRADE (AFTER PAVING) - PLAN

SCALE: 1/2" = 1'-0"



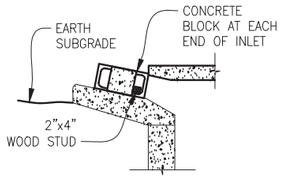
STREET INLET IN SUMP (AFTER PAVING) - PLAN

SCALE: 1/2" = 1'-0"



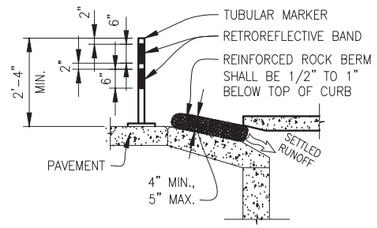
JOINT DETAIL

SCALE: 1/2" = 1'-0"



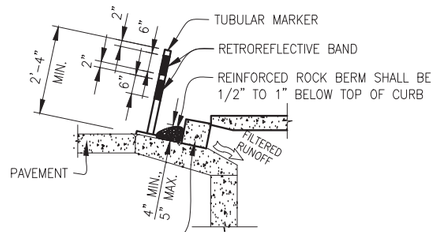
SECTION A

SCALE: 1/2" = 1'-0"



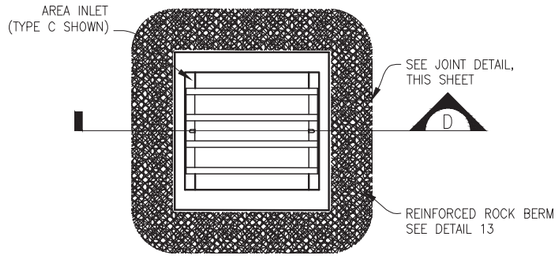
SECTION B

SCALE: 1/2" = 1'-0"



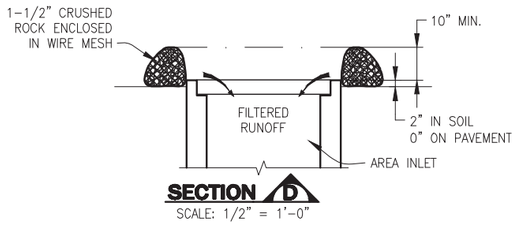
SECTION C

SCALE: 1/2" = 1'-0"



AREA INLET - PLAN

SCALE: 1/2" = 1'-0"



SECTION D

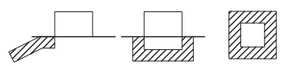
SCALE: 1/2" = 1'-0"

INLET PROTECTION INSTALLATION NOTES

1. INTERIM CONFIGURATION OF INLET PROTECTION IN STREETS SHALL BE INSTALLED WITHIN 48-HOURS OF POURING INLET. INLET PROTECTION (AFTER PAVEMENT) SHALL BE INSTALLED WITHIN 48 HOURS AFTER PAVING IS PLACED.
2. INLET PROTECTION AT AREA INLETS SHALL BE INSTALLED WITHIN 48-HOURS OF POURING INLET.
3. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON ROCK AND RIPRAP GRADATIONS (1-1/2").
4. WIRE MESH SHALL BE FABRICATED OF 20 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48-INCHES.
5. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
6. REINFORCED ROCK BERM SHALL BE CONSTRUCTED IN ONE PIECE OR SHALL BE CONSTRUCTED USING JOINT DETAIL.
7. TUBULAR MARKERS SHALL MEET REQUIREMENTS OF MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED.
8. THE TOP OF REINFORCED ROCK BERM SHALL BE 1/2"-1" BELOW TOP OF CURB.

INLET PROTECTION MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR INLET PROTECTION IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY. MORE FREQUENT INSPECTIONS AND REPAIRS MAY BE REQUIRED DURING WINTER CONDITIONS DUE TO FREEZE/THAW PROBLEMS.
2. SEDIMENT ACCUMULATED UPSTREAM OF INLET PROTECTION SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF ROCK BERM IS WITHIN 2-1/2 INCHES OF THE CREST.
3. INLET PROTECTION IS TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED, UNLESS THE COUNTY APPROVES EARLIER REMOVAL OF INLET PROTECTION IN STREETS.
4. WHEN INLET PROTECTION AT AREA INLETS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.



IP **INLET PROTECTION** 11

Sheet Revisions		
1	DOUGLAS COUNTY REISSUE	1/17

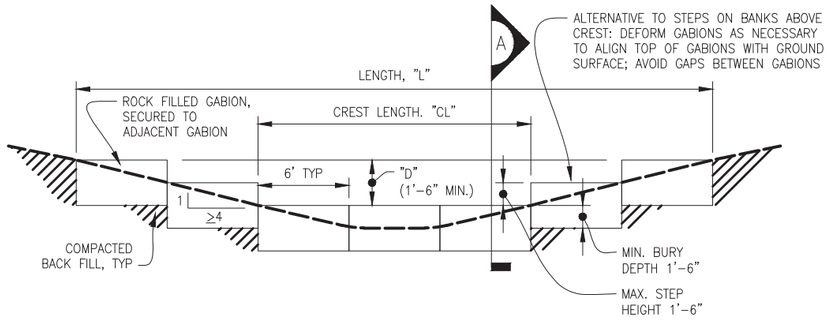
NOTE: SCALES SHOWN ARE FOR 22"x34" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

DOUGLAS COUNTY COLORADO

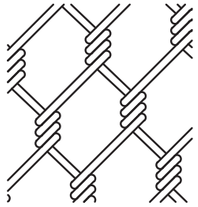
GESC **GRADING, EROSION, AND SEDIMENT CONTROL**

GESC PLAN STANDARD NOTES AND DETAILS

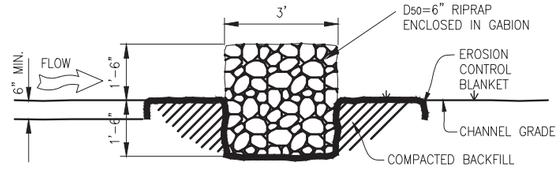
SHEET 6 OF 14



REINFORCED - ELEVATION
SCALE: 1" = 5'-0"



BLOW UP OF TWISTED WIRE GABION
SCALE: NTS



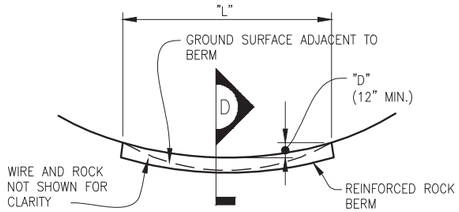
REINFORCED - SECTION A
SCALE: 1/2" = 1'-0"

REINFORCED CHECK DAM INSTALLATION NOTES

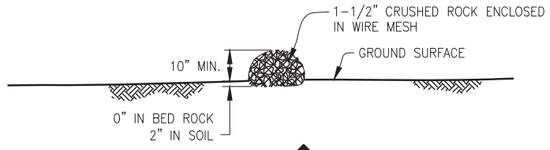
1. SEE PLAN VIEW FOR:
   - LOCATIONS OF CHECK DAMS.
   - CHECK DAM TYPE (CHECK DAM OR REINFORCED CHECK DAM).
   - LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
2. CHECK DAMS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED AFTER CONSTRUCTION FENCE, BUT PRIOR TO ANY UPSTREAM LAND-DISTURBING ACTIVITIES.
3. REINFORCED CHECK DAMS, GABIONS SHALL HAVE GALVANIZED TWISTED WIRE NETTING WITH A MAXIMUM OPENING DIMENSION OF 4-1/2" AND A MINIMUM WIRE THICKNESS OF 0.10". WIRE "HOG RINGS" AT 4" SPACING OR OTHER APPROVED MEANS SHALL BE USED AT ALL GABION SEAMS AND TO SECURE THE GABION TO THE ADJACENT GABION.
4. THE CHECK DAM SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 1'-6".
5. EROSION BLANKET SHALL BE PLACED IN THE REINFORCED CHECK DAM TRENCH EXTENDING A MINIMUM OF 1'-6" ON BOTH THE UPSTREAM AND DOWNSTREAM SIDES OF THE REINFORCED CHECK DAM.

REINFORCED CHECK DAM MAINTENANCE NOTES

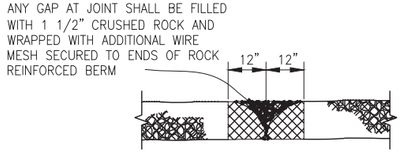
1. THE RECOMMENDED INSPECTION FREQUENCY FOR CHECK DAMS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF CHECK DAMS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CHECK DAM IS WITHIN 1/2 OF THE HEIGHT OF THE CREST.
3. CHECK DAMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE COUNTY.
4. WHEN CHECK DAMS ARE REMOVED, EXCAVATIONS SHALL BE FILLED WITH SUITABLE COMPACTED BACK FILL. ANY DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.



ELEVATION
SCALE: 1" = 5'-0"



SECTION D
SCALE: 1/2" = 1'-0"



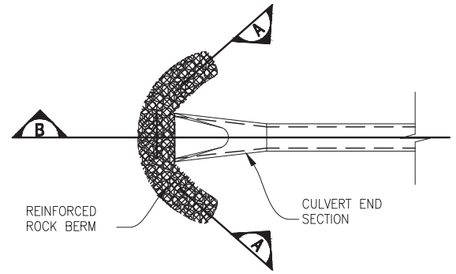
JOINT DETAIL
SCALE: 1/2" = 1'-0"

REINFORCED ROCK BERM INSTALLATION NOTES

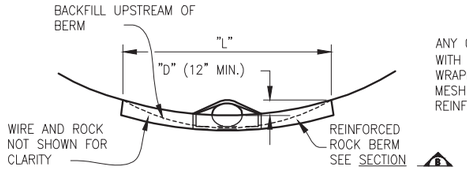
1. SEE PLAN VIEW FOR:
   - LOCATIONS OF REINFORCED ROCK BERMS.
   - LENGTH, "L", AND DEPTH, "D" DIMENSIONS.
2. REINFORCED ROCK BERM SECTION APPLIES TO CULVERT INLET FILTER AND INLET PROTECTION.
3. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON ROCK AND RIPRAP GRADATIONS (1-1/2").
4. WIRE MESH SHALL BE FABRICATED OF 20 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48-INCHES.
5. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
6. FOR CONCENTRATED FLOW AREAS THE ENDS OF THE REINFORCED ROCK BERM SHALL BE 12" HIGHER THAN THE CENTER OF THE BERM.

REINFORCED ROCK BERM MAINTENANCE NOTES

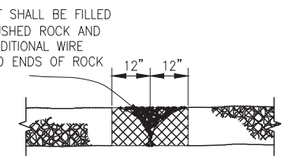
1. THE RECOMMENDED INSPECTION FREQUENCY FOR REINFORCED ROCK BERM IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF REINFORCED ROCK BERM SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF FILTER IS WITHIN 5 INCHES OF THE CREST.
3. REINFORCED ROCK BERMS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED.
4. WHEN REINFORCED ROCK BERMS ARE REMOVED, ANY DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.



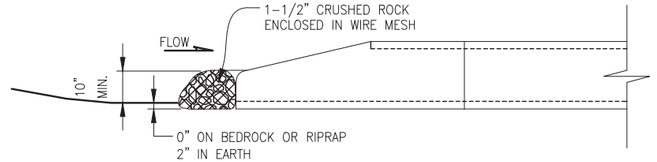
PLAN
SCALE: 1" = 5'-0"



SECTION A
SCALE: 1" = 5'-0"



JOINT DETAIL
SCALE: 1/2" = 1'-0"



SECTION B
SCALE: 1/2" = 1'-0"

INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATIONS OF CULVERT INLET FILTERS.
   - LENGTH, "L", AND DEPTH, "D".
2. CRUSHED ROCK SHALL BE FRACTURED FACE (ALL SIDES) AND SHALL COMPLY WITH GRADATION SHOWN ON ROCK AND RIPRAP GRADATIONS (1-1/2").
3. WIRE MESH SHALL BE FABRICATED OF 20 GAUGE WIRE TWISTED INTO A MESH WITH A MAXIMUM OPENING OF 1.0 INCH (COMMONLY TERMED "CHICKEN WIRE"). ROLL WIDTH SHALL BE 48-INCHES.
4. WIRE MESH SHALL BE SECURED USING "HOG RINGS" OR WIRE TIES AT 6-INCH CENTERS ALONG ALL JOINTS AND AT 2-INCH CENTERS ON ENDS OF BERM.
5. THE ENDS OF THE REINFORCED ROCK BERM SHALL BE 12" HIGHER THAN THE CENTER OF THE BERM.

MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR RRB FOR CULVERT PROTECTION IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF RRB FOR CULVERT PROTECTION SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF FILTER IS 1/2 THE HEIGHT OF THE REINFORCED ROCK BERM.
3. RRB FOR CULVERT PROTECTION ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE COUNTY.
4. WHEN RRB FOR CULVERT PROTECTION ARE REMOVED, ANY DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

RCD **REINFORCED CHECK DAM** 12

RRB **REINFORCED ROCK BERM** 13

RRC **RRB FOR CULVERT PROTECTION** 14

Sheet Revisions		
1	DOUGLAS COUNTY REISSUE	1/17

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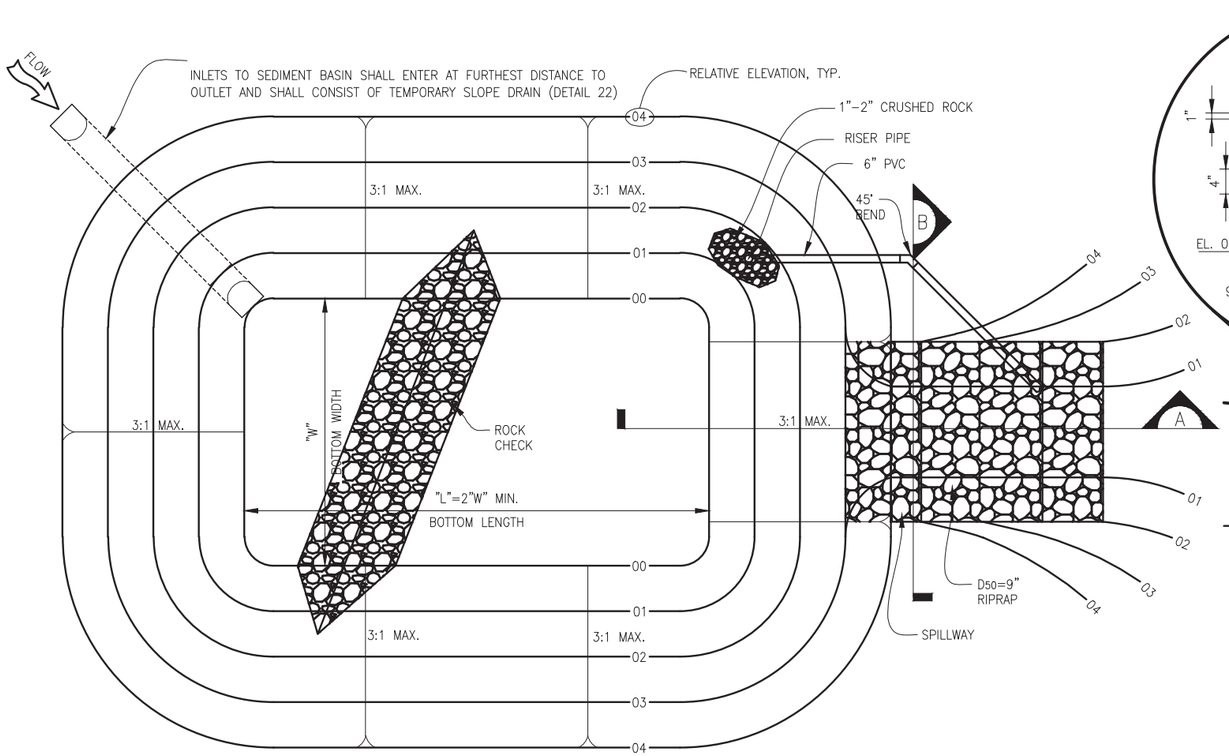
DOUGLAS COUNTY COLORADO

GESC **GRADING, EROSION, AND SEDIMENT CONTROL**

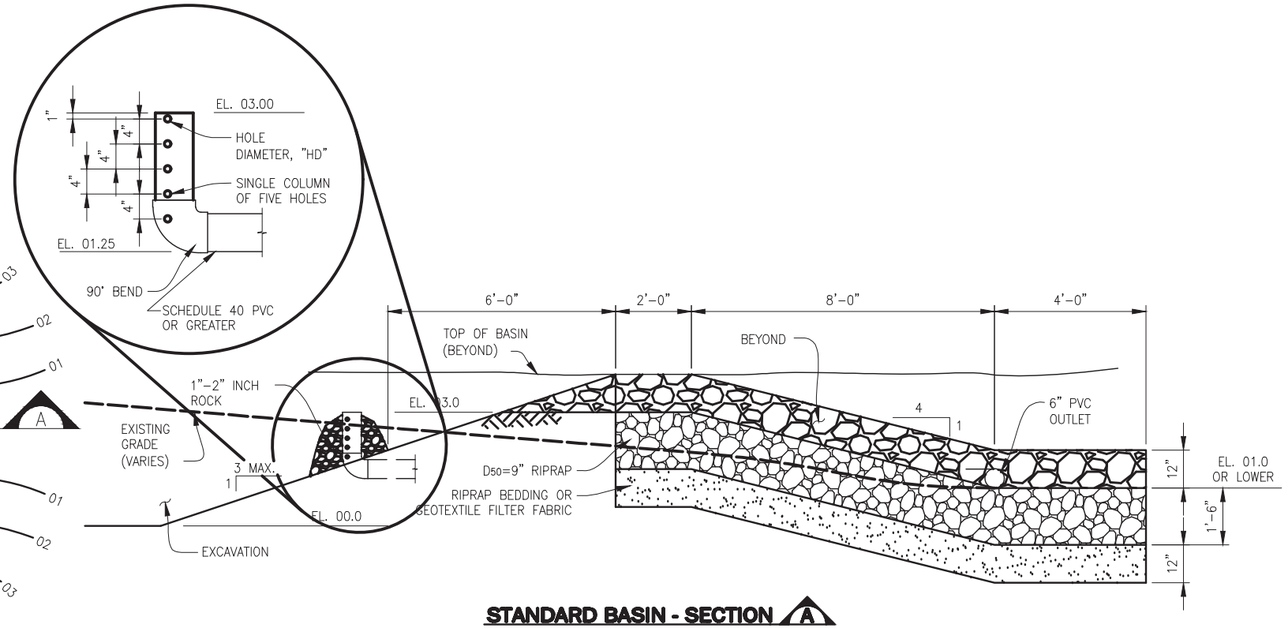
GESC PLAN STANDARD NOTES AND DETAILS

SHEET 7 OF 14



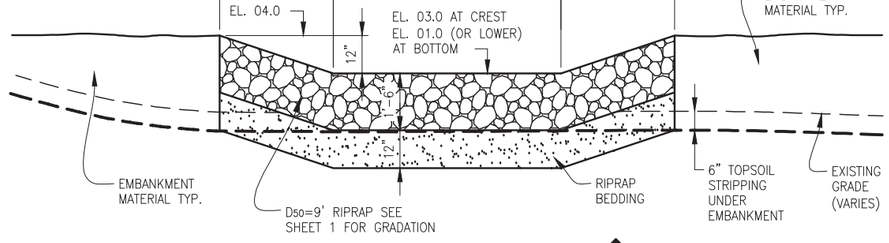
STANDARD BASIN - PLAN

SCALE: 1" = 5'–0"



STANDARD BASIN - SECTION A

SCALE: 1/2" = 1'–0"



STANDARD BASIN - SECTION B

SCALE: 1/2" = 1'–0"

SEDIMENT BASIN INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   – LOCATION OF SEDIMENT BASIN.
   – TYPE OF BASIN (STANDARD BASIN OR NON–STANDARD BASIN).
   – FOR STANDARD BASIN, CREST LENGTH, "CL", BOTTOM WIDTH, "W", AND HOLE DIAMETER, "HD".
   – FOR NON–STANDARD BASIN, SEE CONSTRUCTION DRAWINGS FOR DESIGN OF BASIN INCLUDING RISER HEIGHT, "H", NUMBER OF COLUMNS, "N", HOLE DIAMETER, "HD", AND PIPE DIAMETER "D".
2. FOR STANDARD BASIN, BOTTOM DIMENSION MAY BE MODIFIED AS LONG AS BOTTOM AREA IS NOT REDUCED.
3. SEDIMENT BASINS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY OTHER LAND–DISTURBING ACTIVITY.
4. EMBANKMENT MATERIAL SHALL CONSIST OF SOIL FREE OF DEBRIS, ORGANIC MATERIAL, AND ROCKS OR CONCRETE GREATER THAN 3 INCHES AND SHALL HAVE A MINIMUM OF 15 PERCENT BY WEIGHT PASSING THE NO. 200 SIEVE.
5. EMBANKMENT MATERIAL SHALL BE COMPACTED TO AT LEAST 95 PERCENT OF MAXIMUM DENSITY WITHIN 2 PERCENTAGE POINTS OF OPTIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
6. PIPE SCH 40 OR GREATER SHALL BE USED.
7. THE DETAILS SHOWN ON THIS SHEET PERTAIN TO STANDARD SEDIMENT BASIN(S) IDENTIFIED ON THE GESC PLAN VIEW DRAWINGS USED FOR DRAINAGE AREAS LESS THAN 15 ACRES. SEE CONSTRUCTION DRAWINGS FOR EMBANKMENT, STORAGE VOLUME, SPILLWAY, OUTLET, AND OUTLET PROTECTION DETAILS FOR ANY SEDIMENT BASIN(S) THAT HAVE BEEN INDIVIDUALLY DESIGNED FOR DRAINAGE AREAS LARGER THAN 15 ACRES.

SEDIMENT BASIN MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SEDIMENT BASIN IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT AS NECESSARY.
2. SEDIMENT ACCUMULATED IN SEDIMENT BASIN SHALL BE REMOVED WHEN THE SEDIMENT DEPTH IS 1.0 FOOT.
3. SEDIMENT BASINS ARE TO REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE COUNTY.
4. IF SEDIMENT BASINS ARE REMOVED, THE DISTURBED AREA SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

SIZING INFORMATION FOR STANDARD SEDIMENT BASIN

Upstream Drainage Area (rounded to nearest acre), (ac)	Basin Bottom Width (W), (ft)	Spillway Crest Length (CL), (ft)	Hole Diameter (HD), (in)
1	16	2.0	7/16
2	22	4.0	5/8
3	27	6.0	3/4
4	31	8.0	7/8
5	35	10.0	1.0
6	38	12.0	1 1/8
7	41	14.0	1 1/4
8	44	16.0	1 1/4
9	47	18.0	1 3/8
10	49	20.0	1 3/8
11	52	22.0	1 1/2
12	54	24.0	1 1/2
13	56	26.0	1 5/8
14	59	28.0	1 5/8
15	61	30.0	1 5/8

SB SEDIMENT BASIN 15

Sheet Revisions

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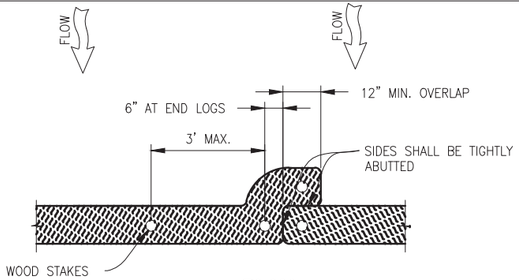
DOUGLAS COUNTY COLORADO

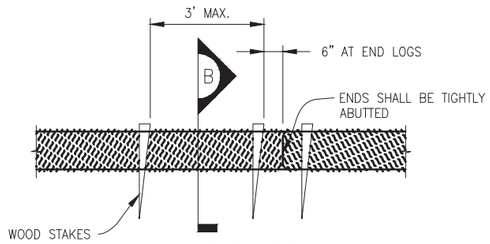
GESC GRADING, EROSION, AND SEDIMENT CONTROL

GESC PLAN STANDARD NOTES AND DETAILS

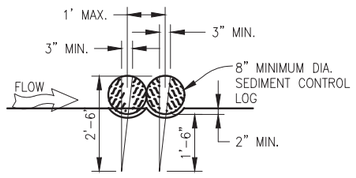
SHEET 8 OF 14



PLAN
SCALE: 1/2" = 1'-0"



ELEVATION
SCALE: 1/2" = 1'-0"



SECTION B
SCALE: 1/2" = 1'-0"

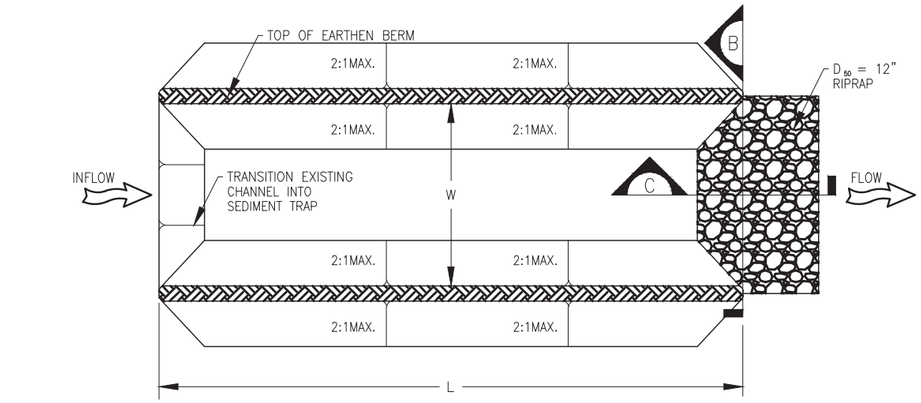
SEDIMENT CONTROL LOG INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   – LOCATION AND LENGTH OF SEDIMENT CONTROL LOG.
2. SEDIMENT CONTROL LOGS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND–DISTURBING ACTIVITIES.
3. SEDIMENT CONTROL LOGS SHALL CONSIST OF STRAW, COMPOST, EXCELSIOR, OR COCONUT FIBER.
4. NOT FOR USE IN CONCENTRATED FLOW AREAS.
5. THE SEDIMENT CONTROL LOG SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF 2".

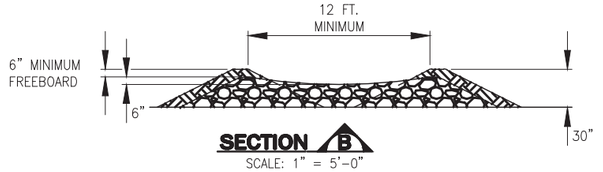
SEDIMENT CONTROL LOG MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SEDIMENT CONTROL LOGS IS DAILY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF SEDIMENT CONTROL LOGS SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN ½ THE HEIGHT OF THE CREST OF LOG.
3. SEDIMENT CONTROL LOG SHALL REMAIN IN PLACE UNTIL THE VEGETATIVE COVER IS APPROVED BY THE EROSION CONTROL INSPECTOR. IF ANY DISTURBED AREA EXISTS AFTER REMOVAL, IT SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

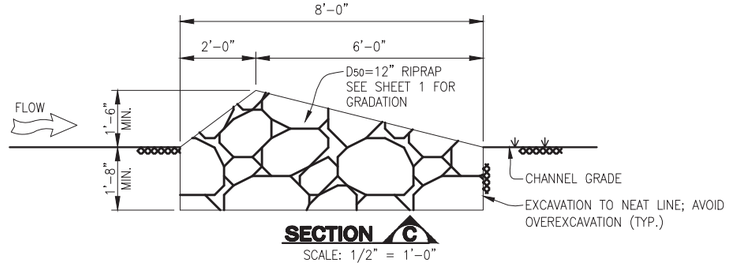
SCL SEDIMENT CONTROL LOG 16



PLAN
SCALE: 1" = 5'-0"



SECTION B
SCALE: 1" = 5'-0"



SECTION C
SCALE: 1/2" = 1'-0"

SEDIMENT TRAP INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   – LOCATION, LENGTH AND WIDTH OF SEDIMENT TRAP.
2. SEDIMENT TRAPS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND–DISTURBING ACTIVITIES.
3. SEDIMENT TRAP BERM SHALL BE CONSTRUCTED FROM MATERIAL FROM EXCAVATION. THE BERM SHALL BE COMPACTED TO 95% OF THE MAXIMUM DENSITY IN ACCORDANCE WITH ASTM D698.
4. RIPRAP OUTLET SHALL BE CONSTRUCTED WITH D_{50} =12" RIPRAP WITH A MINIMUM OVERFLOW OF 6".
5. THE TOP OF THE EARTHEN BERM SHALL BE A MINIMUM OF 6" HIGHER THAN THE TOP OF THE RIPRAP OUTLET STRUCTURE.
6. THE ENDS OF THE RIPRAP OUTLET STRUCTURE SHALL BE MINIMUM OF 6" HIGHER THAN THE CENTER OF THE OUTLET STRUCTURE.

SEDIMENT TRAP MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SEDIMENT TRAPS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF RIPRAP SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT DEPTH IS WITHIN ½ THE HEIGHT OF THE RIPRAP OUTLET STRUCTURE.
3. SEDIMENT TRAPS SHALL REMAIN IN PLACE UNTIL THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVERAGE IS APPROVED BY THE COUNTY.
4. WHEN SEDIMENT TRAPS ARE REMOVED THE DISTURBED AREA SHALL BE DRILLED SEEDED AND CRIMP MULCHED OR STABILIZED IN A MANNER APPROVED BY THE COUNTY.

ST SEDIMENT TRAP 17

Sheet Revisions			NOTE: SCALES SHOWN ARE FOR 22"x34" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.
1	DOUGLAS COUNTY REISSUE	1/17	

DOUGLAS COUNTY COLORADO

GESC GRADING, EROSION, AND SEDIMENT CONTROL

GESC PLAN STANDARD NOTES AND DETAILS

SHEET 9 OF 14

SEEDING AND MULCHING INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   – AREA OF SEEDING AND MULCHING.
   – TYPE OF SEED MIX (PERMANENT, TEMPORARY, OR LOW–GROWTH).
2. 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.
3. 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 DOUGLAS COUNTY UPON REQUEST.
4. DRILL SEEDING MIX SHALL CONFORM TO THE TABLE ON THE RIGHT:
5. 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 THE CONTRACTOR AND FORWARDED TO THE DOUGLAS COUNTY EROSION CONTROL INSPECTOR.
6. 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).
7. PERMANENT SEED MIX SHALL BE USED UNLESS OTHERWISE APPROVED BY THE COUNTY.
8. 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 LOOSENED TO A DEPTH OF 6 INCHES PRIOR TO SPREADING TOPSOIL.
9. SOIL IS TO BE THOROUGHLY LOOSENED (TILLED) 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 LOOSENED SHALL BE REJECTED.
10. SEED IS TO BE APPLIED USING A MECHANICAL DRILL TO A DEPTH NOT LESS THAN 1/4 INCH AND NOT MORE THAN 3/4 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.
11. IF THE PERMITTEE DEMONSTRATES TO THE COUNTY 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.
12. SEEDING AND MULCHING SHALL BE COMPLETED WITHIN 30 DAYS OF INITIAL EXPOSURE OR 14 DAYS AFTER GRADING IS SUBSTANTIALLY COMPLETE IN A GIVEN AREA (AS DEFINED BY THE COUNTY). THIS MAY REQUIRE MULTIPLE MOBILIZATIONS FOR SEEDING AND MULCHING.
13. MULCH SHALL BE APPLIED WITHIN 24–HOURS OF SEEDING.
14. TACKIFIER SHOULD BE UTILIZED TO HELP PREVENT STRAW DISPLACEMENT.

SEEDING AND MULCHING MAINTENANCE NOTES

1. 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.
2. REQUIRED COVERAGE FOR STANDARD, OPEN SPACE AND LOW GROWTH SEED MIXES SHALL BE DEFINED AS FOLLOWS:
   1. 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.
   2. NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO–FEET BY TWO–FEET OR EQUIVALENT).
   3. FREE OF ERODED AREAS.
   4. FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC MANUAL.
3. REQUIRED COVERAGE FOR TURF GRASS AREAS SHALL BE DEFINED AS FOLLOWS:
   1. AT LEAST 80% VEGETATIVE COVER OF GRASS SPECIES PLANTED.
   2. NO BARE AREAS LARGER THAN 4 SQUARE FEET (TWO–FEET BY TWO–FEET OR EQUIVALENT).
   3. FREE OF ERODED AREAS.
   4. FREE FROM INFESTATION OF NOXIOUS WEEDS IN ACCORDANCE WITH SECTION 6.4 OF THE GESC MANUAL.
4. RILL AND GULLY EROSION SHALL BE FILLED WITH TOPSOIL PRIOR TO RESEEDING. THE RESEEDING METHOD SHALL BE APPROVED BY THE COUNTY.

DOUGLAS COUNTY PERMANENT DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
BIG BLUESTEM	KAW	PNWS	10	1.1
YELLOW INDIANGRASS	CHEYENNE	PNWS	10	1
SWITCHGRASS	BLACKWELL	PNWS	10	0.4
SIDEOATS GRAMA	VAUGHN	PNWB	10	0.9
WESTERN WHEATGRASS	ARRIBA	PNCS	10	1.6
BLUE GRAMA	HACHITA	PNWB	10	0.3
THICKSPIKE WHEATGRASS	CRITANA	PNCS	10	1
PRAIRIE SANDREED	GOSHEN	PNWS	10	0.7
GREEN NEEDLEGRASS	LODORM	PNCB	10	1
SLENDER WHEATGRASS	PRYOR	PNCB	5	0.6
STREAMBANK WHEATGRASS	SODAR	PNCS	5	0.6
			TOTAL	9.2

DOUGLAS COUNTY TEMPORARY DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
SMOOTH BROMEGRASS	LINCOLN	PICS	30	3.9
INTERMEDIATE WHEATGRASS	OAHE	PICS	30	4.5
PUBESCENT WHEATGRASS	LUNA	PICS	30	4.2
ANNUAL RYEGRASS	N/A	AICB	10	0.8
			TOTAL	13.4

DOUGLAS COUNTY LOW–GROWTH DRILL SEEDING MIX

SPECIES	VARIETY	NOTES	% IN MIX	POUNDS OF PLS PER ACRE
BUFFALOGRASS	TEXOKA	PNWS	20	3.2
BLUE GRAMA	HACHITA	PNWB	20	0.6
WESTERN WHEATGRASS	ARRIBA	PNCS	20	3.2
SIDEOATS GRAMA	VAUGHN	PNWB	20	1.8
THICKSPIKE WHEATGRASS	CRITANA	PNCS	10	1
STREAMBANK WHEATGRASS	SODAR	PNCS	10	1.2
			TOTAL	11.0

NOTES:
P=PERENNIAL
A=ANNUAL
N=NATIVE
I=INTRODUCED
W=WARM SEASON
C=COOL SEASON
S=SOD FORMER
B=BUNCHGRASS

SM SEEDING AND MULCHING 18

Sheet Revisions

1	DOUGLAS COUNTY REISSUE	1/17

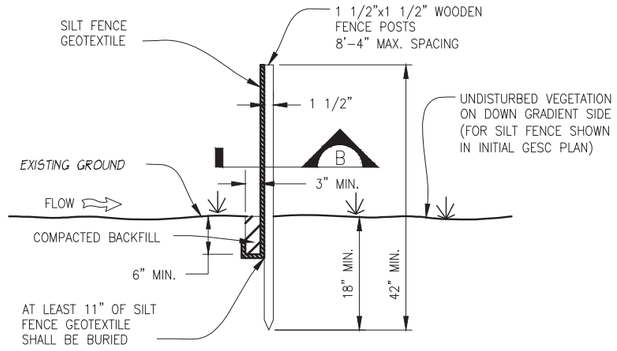
NOTE: SCALES SHOWN ARE FOR 22"x34" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.

DOUGLAS COUNTY COLORADO

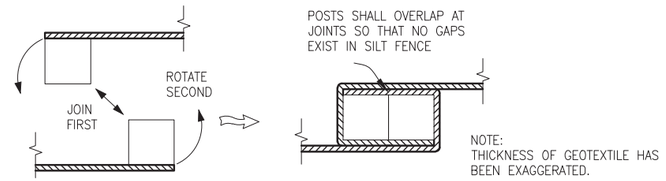
GESC GRADING, EROSION, AND SEDIMENT CONTROL

GESC PLAN STANDARD NOTES AND DETAILS

SHEET 10 OF 14

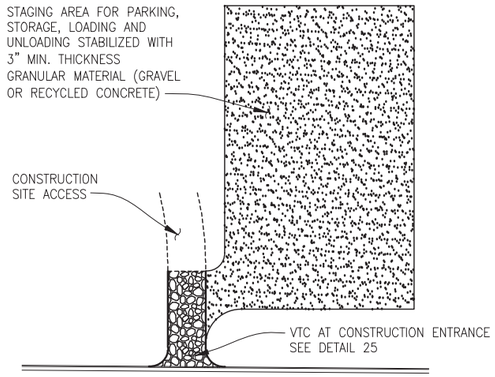


ELEVATION
SCALE: 1" = 1'-0"



POST SHALL BE JOINED AS SHOWN, THEN ROTATED 180° IN DIRECTION SHOWN AND DRIVEN INTO THE GROUND

JOINTS - SECTION B
SCALE: N.T.S.



PLAN
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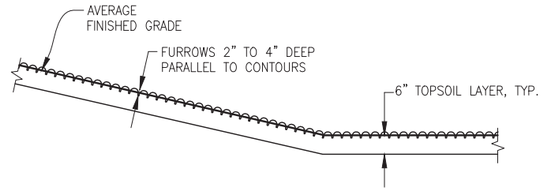

ELEVATION
SCALE: 1/2" = 1'-0"

SILT FENCE INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION AND LENGTH OF FENCE.
2. ANCHOR TRENCH SHALL BE EXCAVATED WITH TRENCHER, OR WITH SILT FENCE INSTALLATION MACHINE; NO ROAD GRADERS, BACKHOES, ETC. SHALL BE USED. TRENCH SHALL BE COMPACTED BY HAND, WITH "JUMPING JACK", OR BY WHEEL ROLLING. COMPACTION SHALL BE SUCH THAT SILT FENCE RESISTS BEING PULLED OUT OF ANCHOR TRENCH BY HAND.
3. SILT FENCE GEOTEXTILE SHALL MEET THE FOLLOWING REQUIREMENTS:
   - 6-TO 12-GALLONS PER MINUTE PER SQUARE FOOT FLOW CAPACITY.
   - 90 LB. TENSILE STRENGTH PER ASTM D4622.
   - UV DESIGN AT 500 HRS MIN. 70% STRENGTH RETAINED PER ASTM D4355.
4. SILT FENCE INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY LAND-DISTURBING ACTIVITIES.

SILT FENCE MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SILT FENCE IS DAILY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF SILT FENCE SHALL BE REMOVED WHEN THE UPSTREAM SEDIMENT REACHES A DEPTH OF 6-INCHES.
3. SILT FENCE SHALL BE REMOVED WHEN THE UPSTREAM DISTURBED AREA IS STABILIZED AND GRASS COVER IS APPROVED BY THE COUNTY. IF ANY DISTURBED AREA EXISTS AFTER REMOVAL, IT SHALL BE SEEDED AND MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

STABILIZED STAGING AREA INSTALLATION NOTES

1. SEE PLAN VIEW FOR GENERAL LOCATION OF STAGING AREA. CONTRACTOR MAY MODIFY LOCATION AND SIZE OF STABILIZED STAGING AREA WITH COUNTY APPROVAL.
2. STABILIZED STAGING AREA SHALL BE LARGE ENOUGH TO FULLY CONTAIN PARKING, STORAGE, AND UNLOADING AND LOADING OPERATIONS.
3. IF REQUIRED BY THE COUNTY, SITE ACCESS ROADS SHALL BE STABILIZED IN THE SAME MANNER AS THE STAGING AREA.
4. STAGING AREA SHALL BE STABILIZED PRIOR TO ANY OTHER OPERATIONS ON THE SITE.
5. THE STABILIZED STAGING AREA SHALL CONSIST OF A MINIMUM OF 3" OF GRANULAR MATERIAL (GRAVEL OR RECYCLED CONCRETE).

STABILIZED STAGING AREA MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR THE STABILIZED STAGING AREA IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. GESC MANAGER SHALL PROVIDE ADDITIONAL THICKNESS OF GRANULAR MATERIAL IF ANY RUTTING OCCURS OR UNDERLYING SUBGRADE BECOMES EXPOSED.
3. STABILIZED STAGING AREA SHALL BE ENLARGED IF NECESSARY TO CONTAIN PARKING, STORAGE, AND UNLOADING AND LOADING OPERATIONS.
4. ANY ACCUMULATED DIRT OR MUD SHALL BE REMOVED FROM THE SURFACE OF THE STABILIZED STAGING AREA.
5. THE STABILIZED STAGING AREA SHALL BE REMOVED AT THE END OF CONSTRUCTION. THE GRANULAR MATERIAL SHALL BE REMOVED OR, IF APPROVED BY THE COUNTY, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED.

SURFACE ROUGHENING INSTALLATION NOTES

1. SURFACE ROUGHENING SHALL BE PROVIDED ON ALL FINISHED GRADES (SLOPES AND "FLAT" AREAS) WITHIN 2 DAYS OF COMPLETION OF FINISHED GRADE (FOR AREAS NOT RECEIVING TOPSOIL) OR WITHIN 2 DAYS OF TOPSOIL PLACEMENT.
2. AREAS WHERE BUILDING FOUNDATIONS, PAVEMENT, OR SOD IS TO BE PLACED WITHIN 7-DAYS OF FINISHED GRADING DO NOT NEED TO BE SURFACE ROUGHENED.
3. DISTURBED SURFACES SHALL BE ROUGHENED USING RIPPING OR TILLING EQUIPMENT ON THE CONTOUR OR TRACKING UP AND DOWN A SLOPE USING EQUIPMENT TREADS.

SURFACE ROUGHENING MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SURFACE ROUGHENING IS WEEKLY, DURING AND AFTER ANY STORM EVENT, AND MAKE REPAIRS.
2. VEHICLES AND EQUIPMENT SHALL GENERALLY BE CONFINED TO ACCESS DRIVES AND SHALL NOT BE DRIVEN OVER AREAS THAT HAVE BEEN SURFACE ROUGHENED.
3. IN NON-TURF GRASS FINISHED AREAS, SEEDING AND MULCHING SHALL TAKE PLACE DIRECTLY OVER SURFACE ROUGHENED AREAS WITHOUT FIRST SMOOTHING OUT THE SURFACE.
4. IN AREAS NOT SEEDED AND MULCHED AFTER SURFACE ROUGHENING, SURFACES SHALL BE RE-ROUGHENED AS NECESSARY TO MAINTAIN GROOVE DEPTH AND SMOOTH OVER ANY RILL EROSION.

SF **SILT FENCE** 19

SSA **STABILIZED STAGING AREA** 20

SR **SURFACE ROUGHENING** 21

Sheet Revisions		
1	DOUGLAS COUNTY REISSUE	1/17

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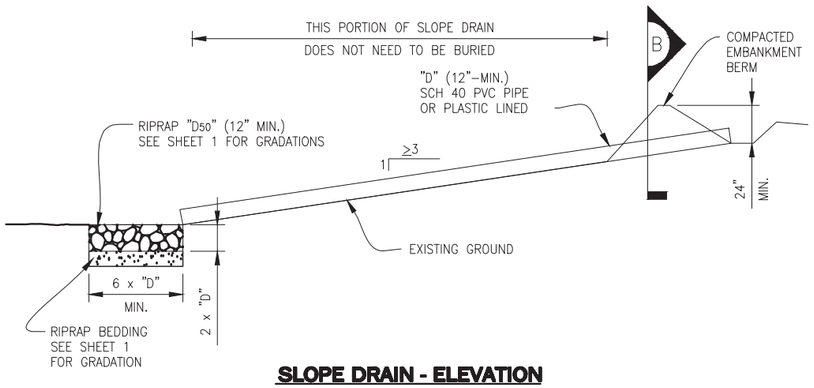
DOUGLAS COUNTY COLORADO

GESC **GRADING, EROSION, AND SEDIMENT CONTROL**

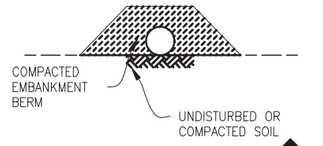
GESC PLAN STANDARD NOTES AND DETAILS

SHEET 11 OF 14



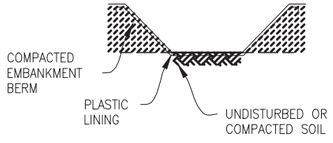
SLOPE DRAIN - ELEVATION

SCALE: 1" = 5'-0"



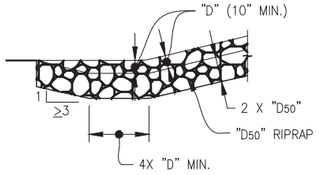
SLOPE DRAIN - SECTION B

SCALE: 1" = 5'-0"



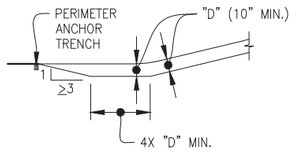
PLASTIC LINED DRAIN - OPTION

SCALE: 1" = 5'-0"



TERMINATION OF RIPRAP LINED SLOPE DRAIN

SCALE: 1" = 5'-0"



TERMINATION OF PLASTIC LINED SLOPE DRAIN

SCALE: 1" = 5'-0"

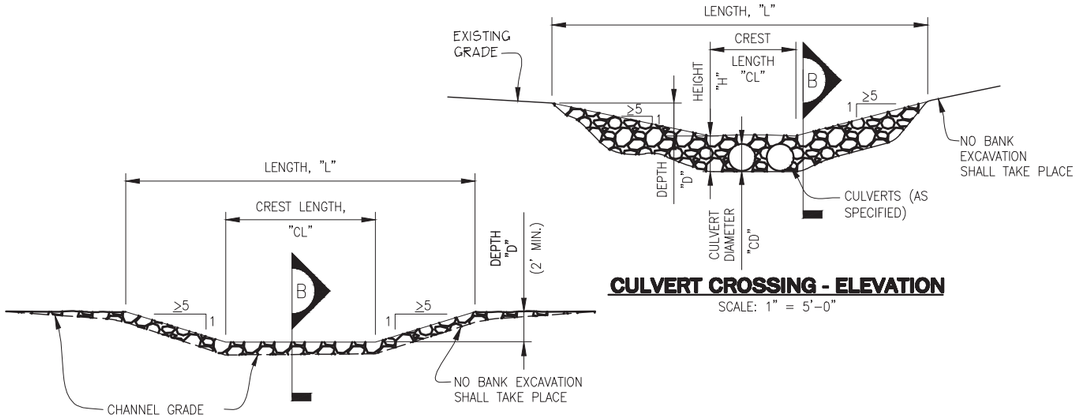
SLOPE DRAIN INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATION AND LENGTH OF SLOPE DRAIN.
   - PIPE DIAMETER, "D", AND RIPRAP SIZE, "D_{50}".
2. SLOPE DRAIN DIMENSIONS SHALL BE CONSIDERED MINIMUM DIMENSIONS; CONTRACTOR MAY ELECT TO INSTALL LARGER FACILITIES. ANY DAMAGE TO SLOPE OR SLOPE DRAIN DURING RUNOFF EVENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
3. SLOPE DRAINS INDICATED ON INITIAL GESC PLAN SHALL BE INSTALLED PRIOR TO ANY UPSTREAM LAND-DISTURBING ACTIVITIES.
4. FOR TEMPORARY SLOPE DRAINS, PIPE MAY BE INSTALLED ON TOP OF SLOPE; HOWEVER, 12" MIN. COVER AT TOP OF SLOPE SHALL BE PROVIDED.
5. A RIPRAP PAD SHALL BE PLACED AT THE OUTFALL OF THE SLOPE DRAIN.

SLOPE DRAIN MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR SLOPE DRAINS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS AS NECESSARY.
2. TEMPORARY SLOPE DRAINS ARE TO REMAIN IN PLACE UNTIL NO LONGER NEEDED, BUT SHALL BE REMOVED PRIOR TO THE END OF CONSTRUCTION. WHEN SLOPE DRAINS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

TSD **TEMPORARY SLOPE DRAIN** 22

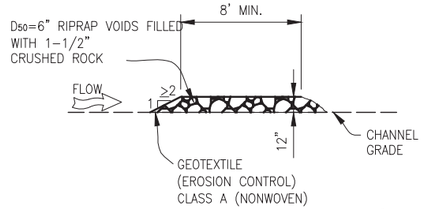


CULVERT CROSSING - ELEVATION

SCALE: 1" = 5'-0"

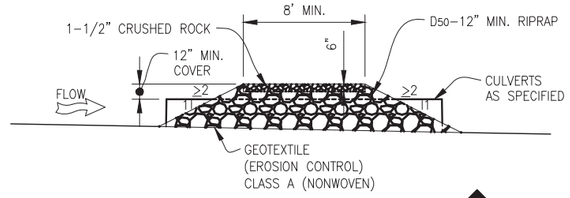
FORD CROSSING - ELEVATION

SCALE: 1" = 5'-0"



FORD CROSSING - SECTION B

SCALE: 1" = 5'-0"



CULVERT CROSSING - SECTION B

SCALE: 1" = 5'-0"

TEMPORARY STREAM CROSSING INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   - LOCATIONS OF TEMPORARY STREAM CROSSING.
   - STREAM CROSSING TYPE (FORD OR CULVERT).
   - FOR FORD CROSSING: LENGTH, "L", CREST LENGTH, "CL", AND DEPTH, "D".
   - FOR CULVERT CROSSING : LENGTH, "L", CREST LENGTH, "CL", CROSSING HEIGHT, "H", DEPTH, "D", CULVERT DIAMETER, "CD", AND NUMBER, TYPE AND CLASS OR GAUGE OF CULVERTS.
2. TEMPORARY STREAM CROSSING DIMENSIONS, D50, AND NUMBER OF CULVERTS INDICATED (FOR CULVERT CROSSING) SHALL BE CONSIDERED MINIMUM DIMENSIONS; ENGINEER MAY ELECT TO INSTALL LARGER FACILITIES. ANY DAMAGE TO STREAM CROSSING OR EXISTING STREAM CHANNEL DURING BASEFLOW OR FLOOD EVENTS SHALL BE THE CONTRACTOR'S RESPONSIBILITY.
3. SEE ROCK AND RIPRAP GRADATIONS FOR RIPRAP AND 1-1/2" CRUSHED ROCK GRADATIONS.
4. FOR A TEMPORARY STREAM CROSSING THAT WILL CARRY LOADS, THE TEMPORARY STREAM CROSSING MUST BE DESIGNED BY THE DESIGN ENGINEER.

TEMPORARY STREAM CROSSING MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR TEMPORARY STREAM CROSSINGS IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. SEDIMENT ACCUMULATED UPSTREAM OF TEMPORARY STREAM CROSSINGS SHALL BE REMOVED WHEN THE SEDIMENT DEPTH UPSTREAM OF CROSSING IS WITHIN 6-INCHES OF THE CREST (FORD CROSSING) OR GREATER THAN AN AVERAGE DEPTH OF 12-INCHES (CULVERT CROSSING).
3. TEMPORARY STREAM CROSSINGS ARE TO REMAIN IN PLACE UNTIL NO LONGER NEEDED, BUT SHALL BE REMOVED PRIOR TO THE END OF CONSTRUCTION.
4. WHEN TEMPORARY STREAM CROSSINGS ARE REMOVED, THE DISTURBED AREA SHALL BE DRILL SEEDED AND CRIMP MULCHED AND COVERED WITH EROSION CONTROL BLANKET OR OTHERWISE STABILIZED IN A MANNER APPROVED BY THE COUNTY.

TSC **TEMPORARY STREAM CROSSING** 23

Sheet Revisions		
1	DOUGLAS COUNTY REISSUE	1/17

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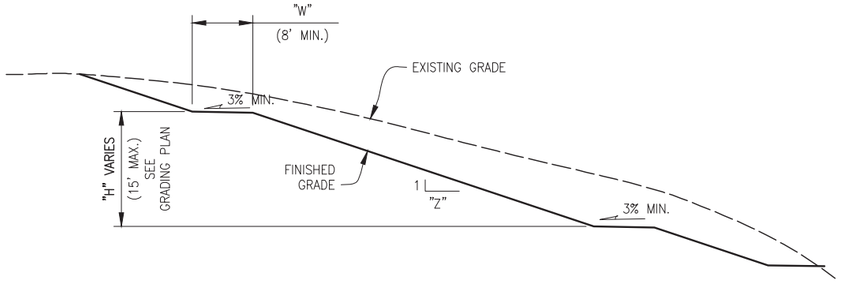
DOUGLAS COUNTY COLORADO

GESC **GRADING, EROSION, AND SEDIMENT CONTROL**

GESC PLAN STANDARD NOTES AND DETAILS

SHEET 12 OF 14



ELEVATION
SCALE: 1/2" = 1'-0"

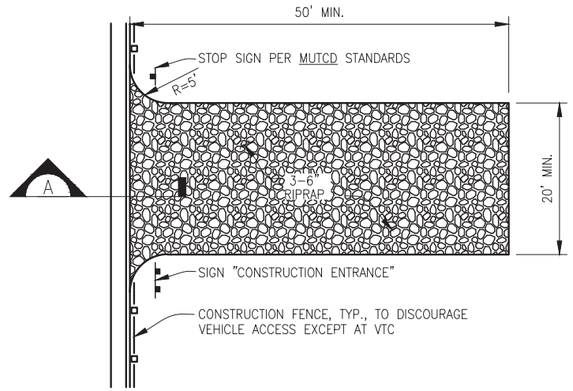
TERRACING INSTALLATION NOTES

1. SEE PLAN VIEW FOR:
   – WIDTH, "W", AND SLOPE, "Z".
2. TERRACING IS NOT REQUIRED FOR SLOPES OF 4 TO 1 OR FLATTER.
3. EARTH (VEGETATED) SLOPES STEEPER THAN 3 TO 1 ARE NOT ALLOWED ON THE SITE.

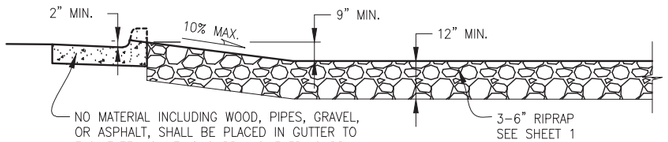
TERRACING MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR TERRACING IS WEEKLY, DURING AND AFTER ANY STORM EVENT AND MAKE REPAIRS OR CLEAN OUT UPSTREAM SEDIMENT AS NECESSARY.
2. ANY RILL EROSION OCCURRING ON SLOPES SHALL BE REPAIRED AND RESEEDED AND MULCHED IN ACCORDANCE WITH DETAIL 18.

TER **TERRACING** 24



PLAN
SCALE: 1" = 10'-0"



SECTION A
SCALE: 1/2" = 1'-0"

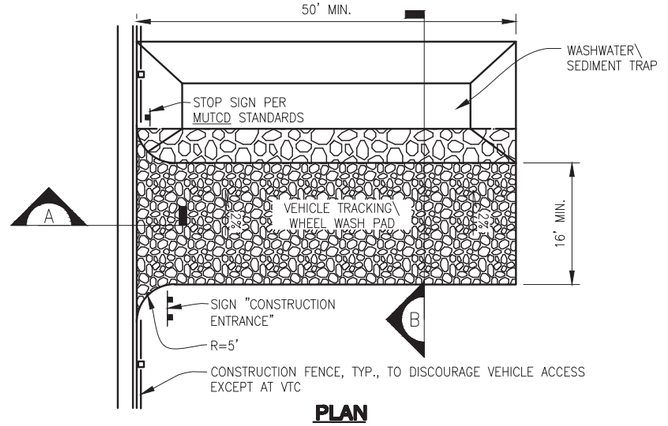
VEHICLE TRACKING CONTROL INSTALLATION NOTES

1. VEHICLE TRACKING CONTROL PADS SHALL BE INSTALLED AT EVERY ACCESS POINT TO SITE.
2. VEHICLE TRACKING CONTROL PADS SHALL CONSIST OF HARD, DENSE, DURABLE STONE, ANGULAR IN SHAPE AND RESISTANT TO WEATHERING. ROUNDED STONE OR BOULDERS WILL NOT BE ACCEPTABLE. THE STONES SHALL BE 3" WITH A MAXIMUM SIZE OF 6". THE STONE SHALL HAVE A SPECIFIC GRAVITY OF AT LEAST 2.6. CONTROL OF GRADATION WILL BE BY VISUAL INSPECTIONS.
3. ANY CRACKED OR DAMAGED CURB AND GUTTER AND SIDEWALK SHALL BE REPLACED BY PERMITTEE.
4. A DOUGLAS COUNTY TEMPORARY CONSTRUCTION ACCESS PERMIT IS REQUIRED FOR EACH POINT ONTO DOUGLAS COUNTY R.O.W.
5. A STOP SIGN INSTALLED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED, SHALL BE INSTALLED FOR EXITING TRAFFIC AT THE VTC.

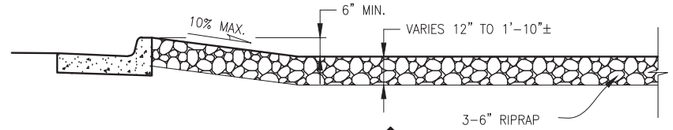
VEHICLE TRACKING CONTROL MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR VEHICLE TRACKING CONTROL IS DAILY. GRAVEL SURFACE SHALL BE CLEAN AND LOOSE ENOUGH TO RUT SLIGHTLY UNDER WHEEL LOADS AND CAUSE LOOSE GRAVEL TO DISLODGE MUD FROM TIRES. WHEN GRAVEL BECOMES COMPACTED OR FILLED WITH SEDIMENT SO THAT THE EFFECTIVENESS OF THE PAD IS DIMINISHED, CONTRACTOR SHALL RIP, TURN OVER, OR OTHERWISE LOOSEN GRAVEL, PLACE ADDITIONAL NEW GRAVEL, OR REPLACE WITH NEW GRAVEL AS NECESSARY TO RESTORE EFFECTIVENESS.
2. VEHICLE TRACKING CONTROL SHALL BE REMOVED AT THE END OF CONSTRUCTION, THE GRAVEL MATERIAL REMOVED OR, IF APPROVED BY THE COUNTY, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED.

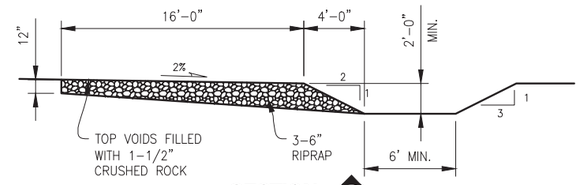
VTC **VEHICLE TRACKING CONTROL** 25



PLAN
SCALE: 1" = 10'-0"



SECTION A
SCALE: 1/2" = 1'-0"



SECTION B
SCALE: 1" = 5'-0"

VEHICLE TRACKING CONTROL WITH WHEEL WASH INSTALLATION NOTES

1. ALTHOUGH NOT NORMALLY USED, THE COUNTY RESERVES THE RIGHT TO REQUIRE VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITIES AT SITES WHERE TRACKING ONTO PAVED AREAS BECOMES A SIGNIFICANT PROBLEM.
2. IF VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITIES ARE REQUIRED, ALL WHEELS ON EVERY VEHICLE LEAVING THE SITE SHALL BE CLEANED OF MUD USING A PRESSURE-WASHER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A WATER SOURCE.
3. VEHICLE TRACKING CONTROL PADS SHALL CONSIST OF HARD, DENSE, DURABLE STONE, ANGULAR IN SHAPE AND RESISTANT TO WEATHERING. ROUNDED STONE OR BOULDERS WILL NOT BE ACCEPTABLE. THE STONES SHALL BE 3" WITH A MAXIMUM SIZE OF 6". THE STONE SHALL HAVE A SPECIFIC GRAVITY OF AT LEAST 2.6. CONTROL OF GRADATION WILL BE BY VISUAL INSPECTIONS.
4. ANY CRACKED OR DAMAGED CURB AND GUTTER AND SIDEWALK SHALL BE REPLACED BY CONTRACTOR.
5. A STOP SIGN INSTALLED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AS AMENDED, SHALL BE INSTALLED FOR EXITING TRAFFIC AT THE VTC.

VEHICLE TRACKING CONTROL WITH WHEEL WASH MAINTENANCE NOTES

1. THE RECOMMENDED INSPECTION FREQUENCY FOR VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITIES IS DAILY. ACCUMULATED SEDIMENTS SHALL BE REMOVED FROM PAD SURFACE.
2. ACCUMULATED SEDIMENT IN THE WASHWATER/SEDIMENT TRAP SHALL BE REMOVED WHEN THE SEDIMENT DEPTH REACHES AN AVERAGE OF 12-INCHES.
3. VEHICLE TRACKING CONTROL WITH WHEEL WASH FACILITY SHALL BE REMOVED AT THE END OF CONSTRUCTION, THE RIPRAP MATERIAL REMOVED OR, IF APPROVED BY THE COUNTY, USED ON SITE, AND THE AREA TOPSOILED, DRILL SEEDED AND CRIMP MULCHED OR OTHERWISE STABILIZED.

WW **VTC WITH WHEEL WASH** 26

Sheet Revisions			NOTE: SCALES SHOWN ARE FOR 22"x34" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.
1	DOUGLAS COUNTY REISSUE	1/17	

DOUGLAS COUNTY COLORADO

GESC **GRADING, EROSION, AND SEDIMENT CONTROL**

GESC PLAN STANDARD NOTES AND DETAILS

SHEET 13 OF 14

ROCK AND RIPRAP GRADATIONS

TABLE 1. RIPRAP GRADATIONS

RIPRAP TYPE	D50 MEDIAN STONE SIZE (INCHES)	% OF MATERIAL SMALLER THAN TYPICAL STONE	TYPICAL STONE EQUIVALENT DIAMETER (INCHES)	TYPICAL STONE WEIGHT (POUNDS)
VL	6	70 – 100 50 – 70 35 – 50 2 – 10	12 9 6 2	85 35 10 0.4
L	9	70 – 100 50 – 70 35 – 50 2 – 10	15 12 9 3	160 85 35 1.3
M	12	70 – 100 50 – 70 35 – 50 2 – 10	21 18 12 4	440 275 85 3
H	18	100 50 – 70 35 – 50 2 – 10	30 24 18 6	1280 650 275 10
VH	24	100 50 – 70 35 – 50 2 – 10	42 33 24 9	3500 1700 650 35

TABLE 2. RIPRAP BEDDING

SIEVE SIZE	MASS PERCENT PASSING SQUARE MESH SIEVES
	CLASS A
3"	100
1 1/2"	20 – 90
NO. 4	0 – 20
NO. 200	0 – 3

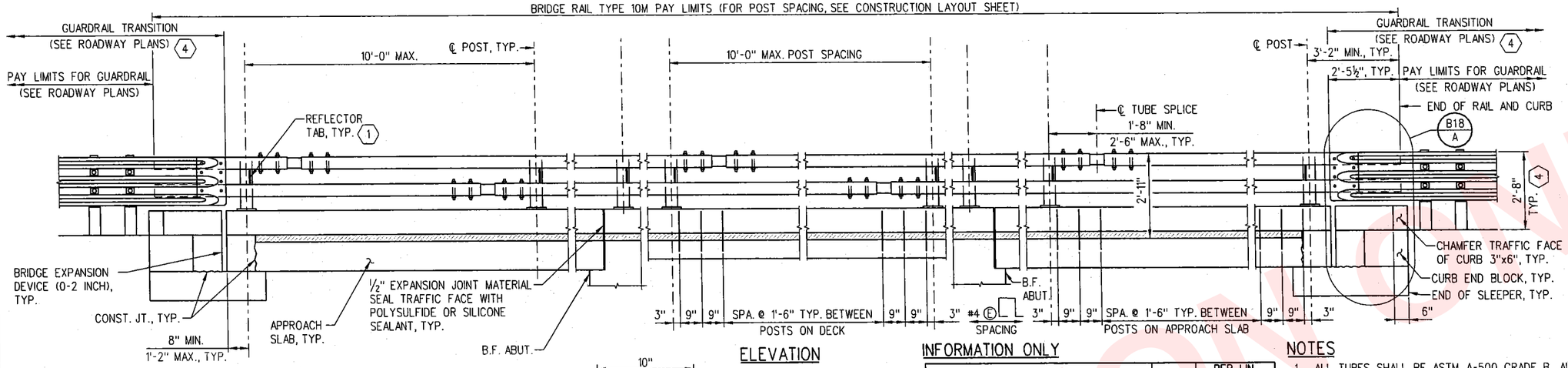
MATCHES SPECIFICATIONS FOR CDOT CLASS A FILTER MATERIAL AND UDFCD TYPE 1 BEDDING. ALL ROCK SHALL BE FRACTURED FACE, ALL SIDES.

TABLE 3. 1 1/2" CRUSHED ROCK

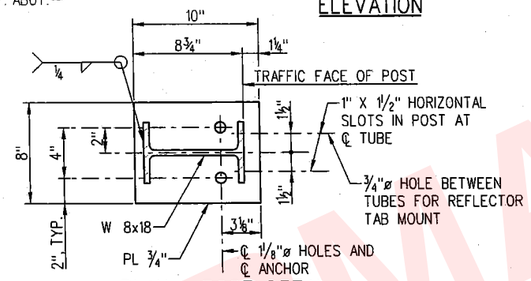
SIEVE SIZE	MASS PERCENT PASSING SQUARE MESH SIEVES
	NO. 4
2"	100
1 1/2"	90 – 100
1"	20 – 55
3/4"	0 – 15
3/8"	0 – 5

MATCHES SPECIFICATIONS FOR NO. 4 COARSE AGGREGATE FOR CONCRETE PER AASHTO M43. ALL ROCK SHALL BE FRACTURED FACE, ALL SIDES.

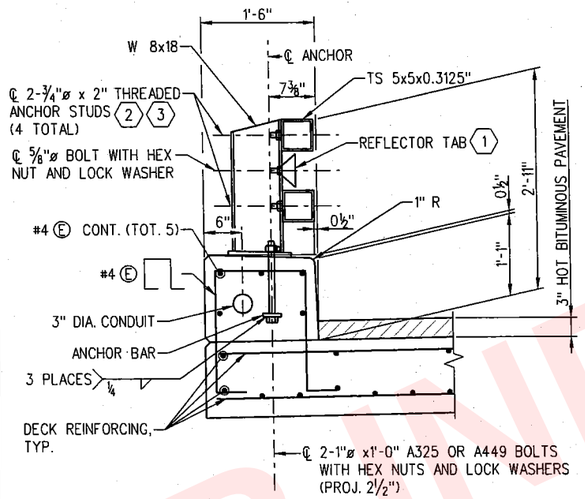
Sheet Revisions			NOTE: SCALES SHOWN ARE FOR 22"x34" SHEETS; ADJUST ACCORDINGLY FOR 11"x17" SHEETS.	DOUGLAS COUNTY COLORADO	GESC GRADING, EROSION, AND SEDIMENT CONTROL	GESC PLAN STANDARD NOTES AND DETAILS	SHEET 14 OF 14
1	DOUGLAS COUNTY REISSUE	1/17					



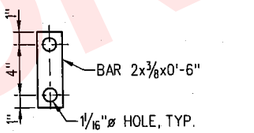
ELEVATION



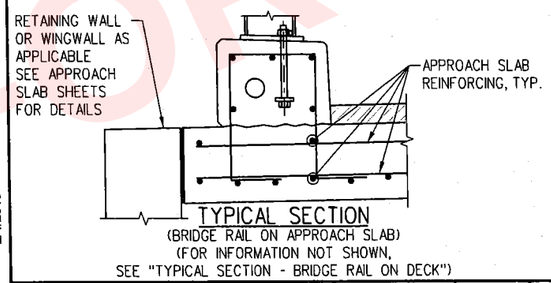
PLAN - POST DETAIL



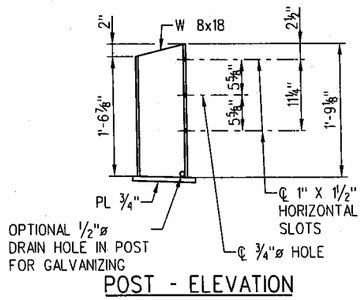
TYPICAL SECTION
(BRIDGE RAIL ON DECK)



ANCHOR DETAIL



TYPICAL SECTION
(BRIDGE RAIL ON APPROACH SLAB)
(FOR INFORMATION NOT SHOWN, SEE "TYPICAL SECTION - BRIDGE RAIL ON DECK")



POST - ELEVATION

INFORMATION ONLY

DESCRIPTION	UNIT	PER LIN. FT.
STRUCTURAL STEEL (GALVANIZED)	LB.	45.1
CONCRETE CLASS D (BRIDGE)	CU. YD.	0.06
REINFORCING STEEL (EPOXY COATED)	LB.	6.6

KEY NOTES

1. REFLECTOR TABS SHALL BE LOCATED AT EACH POST. SEE M-606-1 FOR DETAILS.
2. PROVIDE HEX NUTS, WASHERS, AND LOCK WASHERS. HARDENED WASHERS SHALL BE PROVIDED FOR ¾"øx2" THREADED ANCHOR STUDS.
3. AUTOMATICALLY END WELDED TO TUBE.
4. FOR GUARDRAIL TRANSITION DETAILS, SEE STD. PLAN NO. M-606-1. THE HEIGHT OF THE TRANSITION WILL VARY TO MATCH BRIDGE RAIL AND ROADWAY GUARDRAIL. SEE ROADWAY PLANS FOR TRANSITION TYPE AND LOCATION.

NOTES

1. ALL TUBES SHALL BE ASTM A-500 GRADE B. ALL POSTS AND BASE PLATES SHALL BE ASTM A-572 GRADE 50. ALL OTHER STEEL SHALL BE ASTM A-36 UNLESS OTHERWISE NOTED.
2. THE ABOVE MATERIAL AND ALL ANCHOR BOLTS AND MISCELLANEOUS BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 509. CONCRETE, REINFORCING STEEL, AND STRUCTURAL STEEL ELEMENTS SHALL CONFORM TO THE REQUIREMENTS OF SECTIONS 601, 602 AND 509, RESPECTIVELY.
3. EXPOSED SURFACES OF POSTS, TUBES, AND BASE PLATES SHALL BE PAINTED IN ACCORDANCE WITH SECTION 509. TOP COAT SHALL BE LIGHT BROWN, EQUIVALENT TO FEDERAL STANDARD 595B COLOR NO. 23531.
4. POST ANCHOR, ENCASED IN CONCRETE, SHALL BE ASTM A-36 (AASHTO M-183) STEEL AND NEED NOT BE GALVANIZED.
5. THE TUBES SHALL BE SHOP BENT OR FABRICATED TO FIT HORIZONTAL CURVE WHEN RADIUS IS LESS THAN 1500 FEET.
6. TUBES SHALL BE CONTINUOUS OVER NOT LESS THAN TWO POSTS. NO WELDED BUTT SPLICES WILL BE ALLOWED IN THE TUBE SECTIONS.
7. THE CENTERLINE OF THE TUBE SPLICE SHALL BE 1'-8" MINIMUM AND 2'-6" MAXIMUM FROM THE CENTERLINE OF THE POSTS.
8. ALL BOLTS THAT HAVE LOCK WASHERS SHALL BE TIGHTENED TO SNUG ONLY.
9. POSTS SHALL BE PERPENDICULAR TO THE LONGITUDINAL ROADWAY GRADE.
10. ONE OR MORE 10'-0" POST SPACINGS MAY BE REDUCED (6'-8" MIN.) IN ORDER TO MAINTAIN DIMENSIONS FROM THE END OF THE RAIL AND EXPANSION JOINTS.
11. PAYMENT WILL BE MADE UNDER ITEM 606, BRIDGE RAIL TYPE 10M FOR ALL POSTS, POST ANCHORS, BASE PLATES, BACKING PLATES, ANCHOR BOLTS, MISCELLANEOUS BOLTS, NUTS, WASHERS, TUBES, TUBE EXPANSION DEVICES, TUBE SPLICES, END PLATES, END TRANSITION, CURB CONCRETE (CLASS D), CURB REINFORCING STEEL, AND REFLECTOR TABS.
12. PRIOR TO FABRICATION OF THIS ITEM, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105, SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION ONLY.
13. STRUCTURAL STEEL:
    AASHTO M-183 (ASTM A-36) fy = 36,000 psi
    AASHTO M-223 (ASTM A-572) GRADE 50 fy = 50,000 psi
    COLD FORMED ASTM A-500 GRADE B fy = 46,000 psi
14. FOR ADDITIONAL DETAILS, SEE SHT. B43.

COLORADO LICENSED
SAMUEL ABRAHAM
39706
PROFESSIONAL ENGINEER

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Index of Revisions		

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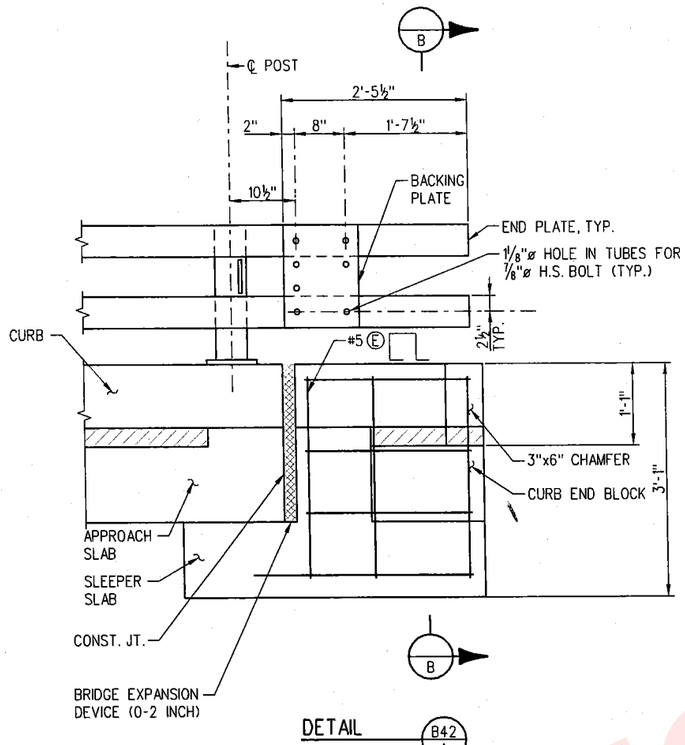
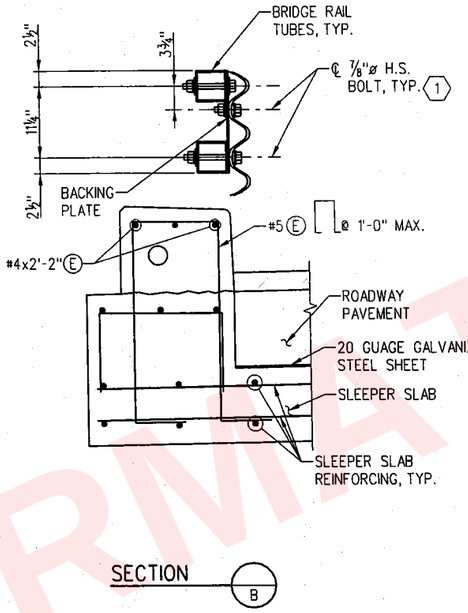
As Constructed			
No. Revisions:			
Revised:	Designer: S. Abraham	Structure Numbers	
Void:	Detailer: E. Schawo		
	Sheet Subset: BRIDGE	Subset Sheets: B42 of 49	Sheet Number: 104

HESS ROAD BRIDGES
BRIDGE RAIL TYPE 10M (1 OF 2)

Project No.
C.I. 01-022



DETAIL B42 A



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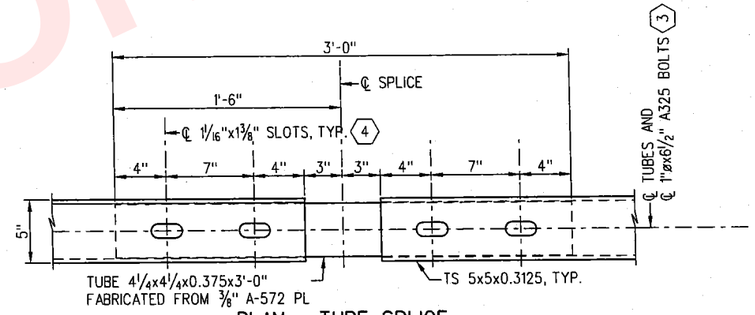
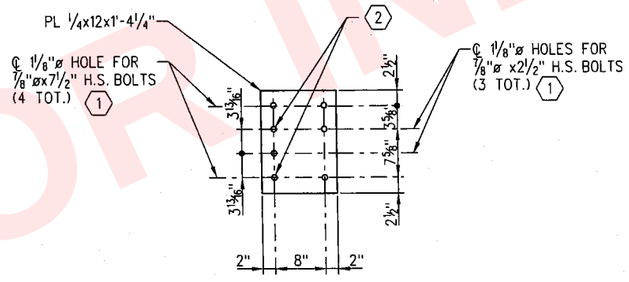
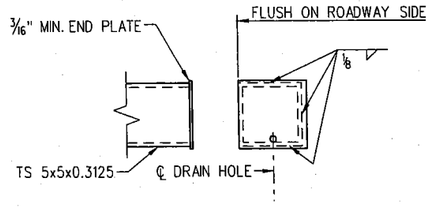


PLAN - TUBE SPLICE



BACKING PLATE



END PLATE DETAIL

NOTES

1. SEE SHEET B42 FOR ADDITIONAL DETAILS.

KEY NOTES

1. PROVIDE HEX NUTS, 2 PLATE WASHERS, AND 1 LOCK WASHER.
2. FIELD DRILL TERMINAL SECTION TO MATCH THE BOLT LOCATIONS.
3. PROVIDE HEX NUTS, WASHERS, AND LOCK WASHERS. HARDENED WASHERS SHALL BE PROVIDED FOR ¾"øx2" THREADED ANCHOR STUDS.
4. ⅛" X 4¼" SLOTS AT BRIDGE EXPANSION DEVICE. SLOT BOTH INNER AND OUTER TUBES. STAGGER TOP AND BOTTOM SPLICES INTO DIFFERENT POST SPACINGS EXCEPT AT EXPANSION JOINT, PLACE AT OPPOSITE ENDS OF SAME POST SPACE.

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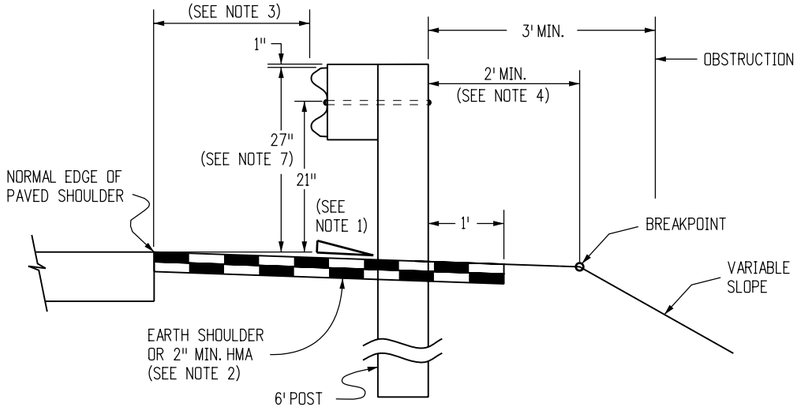
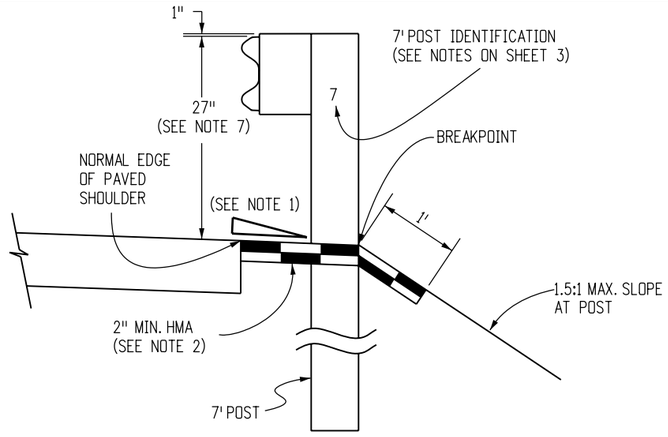
As Constructed	HESS ROAD BRIDGES BRIDGE RAIL TYPE 10M (2 OF 2)			Project No.
No. Revisions:				C.I. 01-022
Revised:	Designer: S. Abraham	Structure Numbers		
Void:	Detailer: D. Oberosler			
	Sheet Subset: BRIDGE	Subset Sheets: B43 of 49		Sheet Number: 105

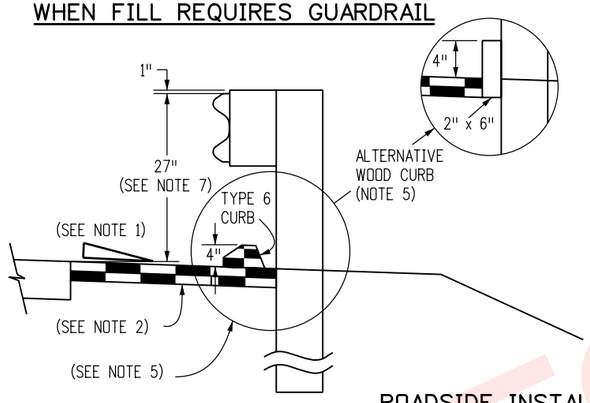


NORMAL ROADSIDE INSTALLATION WHEN FILL REQUIRES GUARDRAIL

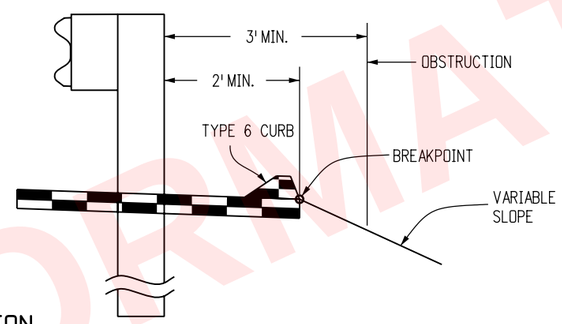


RESTRICTIVE ROADSIDE INSTALLATION WITH 7 FOOT GUARDRAIL POSTS

(SEE NOTE 4)

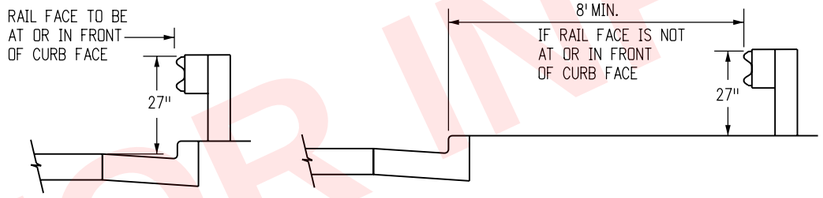


OPTION A



OPTION B

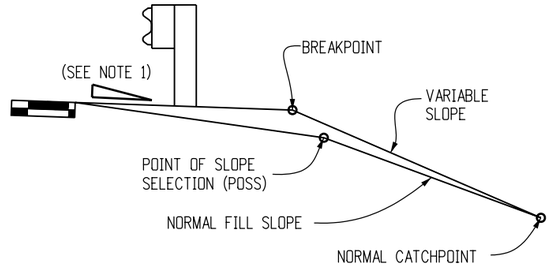
ROADSIDE INSTALLATION WITH EROSION CONTROL CURB



URBAN ROADSIDE INSTALLATION WITH CURB AND GUTTER

LOCATION	SPACING
ALL LOCATIONS EXCEPT BRIDGE RAIL LOCATIONS	6'-3"
BRIDGE OR STRUCTURE APPROACH	SEE SHEETS 10 & 17

NORMAL CENTER-TO-CENTER POST SPACING



EMBANKMENT WITH GUARDRAIL

(NOTE: THE CATCHPOINT REMAINS THE SAME AS THAT FOR "NORMAL" FILL SLOPE. FOR THE WIDER "Z" DISTANCES, THE VARIABLE SLOPE MAY "CATCH" AT THE POSS.)

GENERAL NOTES

1. RATE OF SLOPE DEPENDS ON GUARDRAIL LOCATION:
   A. FOR GUARDRAIL FACE 2 FT. OR LESS FROM THE NORMAL EDGE OF PAVED SHOULDER, CONTINUE THE RATE OF SLOPE OF THE NORMAL PAVED SHOULDER TO THE BREAKPOINT.
   B. FOR GUARDRAIL FACE MORE THAN 2 FT. FROM THE NORMAL EDGE OF THE PAVED SHOULDER, THE SLOPE SHALL BE 10:1 OR FLATTER.
2. WHEN SPECIFIED ON THE PLANS, EXTEND A 2 IN. MINIMUM THICKNESS PAVED SURFACE TO 1 FT. BEHIND THE GUARDRAIL POSTS OR TO THE EROSION CONTROL CURB AS SHOWN ON PLANS. ASPHALT CUTTING & PATCHING OR OTHER APPROVED METHOD SHALL BE USED TO MINIMIZE DAMAGE TO ALL PAVED SURFACES UNDER GUARDRAIL INSTALLATIONS. ALL REPAIRS TO THE PAVED AREA WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK. A MINIMUM 3 IN. THICK FIBER REINFORCED CONCRETE PAVEMENT MAY ALSO BE USED FOR PAVING BENEATH THE GUARDRAIL. INSTALL THE POST IN A $\frac{1}{2}$ IN. OVERSIZED FORMED HOLE FOR GUARDRAIL RUNS AND TERMINALS AS DIRECTED. PAYMENT FOR THIS PAVED SURFACE WILL BE MADE UNDER A PAVEMENT OR CONCRETE PAY ITEM WITH QUANTITIES SHOWN ON THE PLANS.
3. THE MINIMUM GUARDRAIL OFFSET FROM PAVED SHOULDER EDGE SHALL BE:
   0 FT. FOR SHOULDERS 8 FT. OR WIDER
   2 FT. FOR SHOULDERS 6 FT. OR LESS

   THE GUARDRAIL OFFSET FROM PAVED INSIDE SHOULDER EDGE OF A DIVIDED HIGHWAY SHALL BE;
   0 FT. MINIMUM FOR SHOULDERS 6 FT. OR WIDER
   2 FT. DESIRABLE FOR 4 FT. SHOULDERS

   THE ABOVE 2 FT. GUARDRAIL TO SHOULDER OFFSET IS DESIRABLE BUT NOT REQUIRED FOR:
   A. FOR AN EXISTING HIGHWAY WITH A DESIGN SPEED LESS THAN 50 MPH, THE MINIMUM OFFSET OF RAIL IS 0 FT. FROM ANY WIDTH PAVED SHOULDER, OR 4 FT. MINIMUM FROM THE TRAVELED WAY.
   B. FOR A ONE-WAY ONE-LANE RAMP, AND WHERE ONE OR MORE OF THE FOLLOWING ARE TRUE:
      (1) THE NON-OFFSET GUARDRAIL BEGINS AT LEAST 100 FT. BEYOND RAMP NOSE.
      (2) THE NON-OFFSET GUARDRAIL IS NOT LOCATED ON THE RAMP EXIT OR ENTRANCE CURVE CONNECTION TO THE MAJOR HIGHWAY.
      (3) THE RAMP SHOULDERS ARE 4 FT. OR WIDER.

   USE OF GREATER THAN MINIMUM OFFSET DIMENSIONS IS ENCOURAGED TO MEET THE DESIRABLE GOAL OF PLACING THE GUARDRAIL AS FAR AS POSSIBLE FROM THE TRAVEL WAY, EVEN FOR SHORT DISTANCES, WHILE PROVIDING A SMOOTH CHANGE IN GUARDRAIL ALIGNMENT.
4. IF 2 FT. CANNOT BE PROVIDED BETWEEN THE BACK OF THE GUARDRAIL POST AND THE BREAKPOINT, USE 7 FT. GUARDRAIL POSTS. REFER TO THE "RESTRICTIVE ROADSIDE INSTALLATION" DETAIL.
5. WHEN SPECIFIED ON THE PLANS, INSTALL 4 IN. HIGH TYPE 6 CURB WITH ITS FACE AT OR BEHIND THE RAIL FACE. AS AN ALTERNATIVE WHEN SPECIFIED ON THE PLANS, INSTALL A 2 IN. x 6 IN. TREATED (AASHTO M 133) WOOD CURB. FASTEN WITH A 4 IN. LAG BOLT AND WASHER AT EACH WOOD POST, OR WITH A $\frac{1}{4}$ IN. DIA. BOLT WITH WASHER AND NUT AT EACH STEEL POST. IF THE 2 IN. x 6 IN. WOOD CURB IS SPECIFIED, IT WILL BE INCLUDED IN THE COST OF THE GUARDRAIL. IF APPROVED BY THE ENGINEER, A 2 IN. x 4 IN. TREATED WOOD CURB MAY BE SUBSTITUTED FOR THE 2 IN. x 6 IN. CURB AND SET ON TOP OF PAVEMENT SURFACE AND ATTACHED AS DESCRIBED ABOVE. NO SPLICING SHALL BE ALLOWED IN WOOD CURBS. ADJACENT BOARDS SHALL BE BUTTED TOGETHER AND BOLTED AT A POST LOCATION. JOINTS SHALL BE LOCATED AT THE POSTS.
6. SEE SHEET 6 FOR CURB TREATMENTS AT GUARDRAIL TERMINALS.
7. RESET GUARDRAIL IF THIS DIMENSION WILL BE LESS THAN 24 IN.
8. ALL W-BEAM SPLICES, AND SPLICES OF TERMINAL CONNECTORS TO W-BEAM SHALL BE LAPPED IN THE DIRECTION OF TRAFFIC UNLESS OTHERWISE NOTED.
9. MATERIAL TYPE AND SHAPE OF POSTS AND BLOCKS SHALL BE THE SAME THROUGHOUT THE PROJECT EXCEPT WHEN SPECIFIC POSTS AND BLOCKS ARE SPECIFIED, i.e. AT END ANCHORAGES AND BOX CULVERTS.
10. CONCRETE MAY BE READY-MIXED OR FIELD-MIXED AND SHALL CONSIST OF A MINIMUM OF 1 PART CEMENT TO 6 PARTS AGGREGATE BY VOLUME.

THE GENERAL NOTES ARE CONTINUED ON SHEET 2.

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Sheet Revisions	
Date:	Comments
8/11/10	Revised Sheet 13 and 17.
	Added Sheet 14
	Added the 1" dimension to Option A detail.

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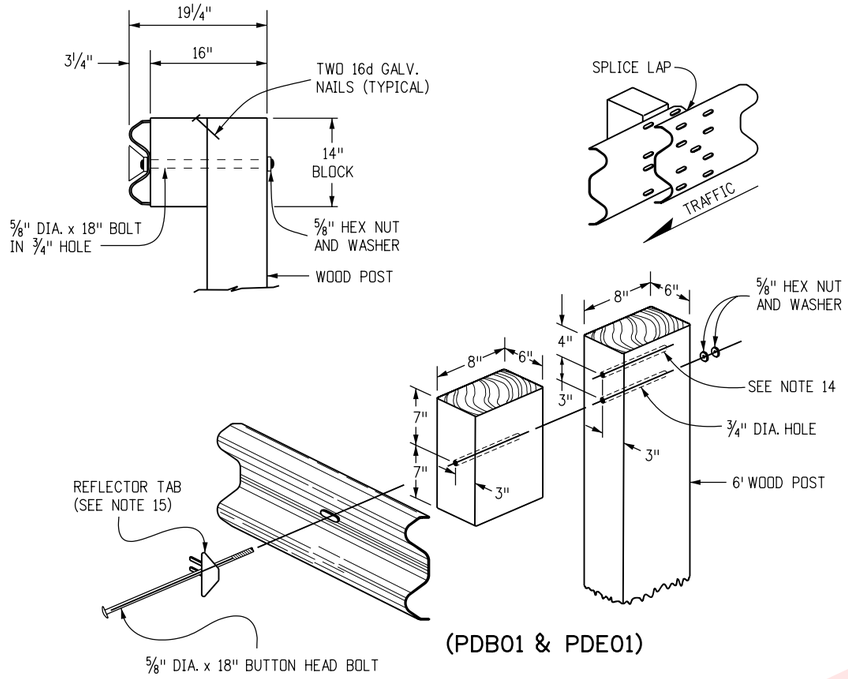
Project Development Branch DD/LTA

GUARDRAIL TYPE 3 W-BEAM

Issued By: Project Development Branch July 04, 2006

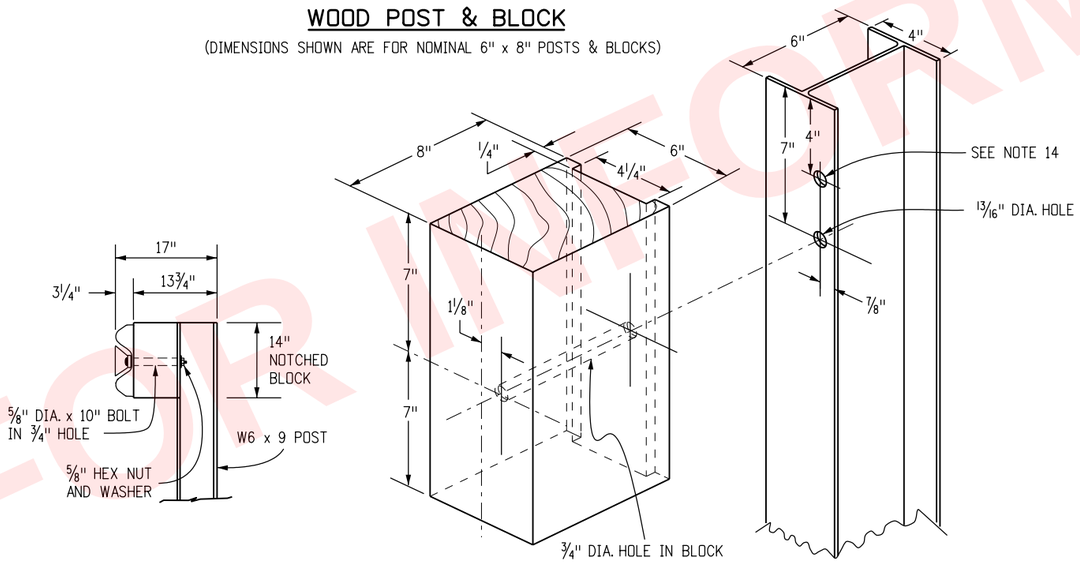
STANDARD PLAN NO.
M-606-1
Sheet No. 1 of 17



(PDB01 & PDE01)

WOOD POST & BLOCK

(DIMENSIONS SHOWN ARE FOR NOMINAL 6" x 8" POSTS & BLOCKS)



STEEL POST & NOTCHED BLOCK

(NOMINAL DIMENSIONS ARE SHOWN FOR THE POSTS & BLOCKS)

(PWE01)

GENERAL NOTES (CONTINUED FROM SHEET 1)

11. WHEN SPECIFIED IN THE CONTRACT, 7 FT. POSTS SHALL BE INSTALLED INSTEAD OF THE STANDARD 6 FT. POSTS. THE 7 FT. POSTS SHALL BE MARKED WITH THE NUMBER 7 TO ENSURE PERMANENT INDENTIFICATION. STEEL POSTS SHALL BE STAMPED PRIOR TO GALVANIZING. THE NUMBER 7 SHALL BE A MINIMUM 2 IN. TALL AND LOCATED AS SHOWN ON THE ELEVATION VIEW ON SHEET 1.

12. THE STANDARD 3 IN. X 1¾ IN. X 3/16 IN. RECTANGULAR WASHER USED UNDER POST BOLT HEADS IN THE PAST MAY REMAIN IN EXISTING INSTALLATIONS BUT SHALL NOT BE USED IN NEW CONSTRUCTION, REPAIRS, OR RESETTING OF RAIL, EXCEPT WHEN SPECIFICALLY IDENTIFIED ON THE STANDARD PLAN.

13. STANDARD GALVANIZED ROUND STEEL WASHERS SHALL BE USED UNDER ALL NUTS IN CONTACT WITH WOOD POSTS.

14. AN ADDITIONAL HOLE SHALL BE PROVIDED IN THE POSTS TO FACILITATE FUTURE RAISING OF THE RAIL ELEMENTS AND BLOCKS FOR OVERLAYS.

15. RETROREFLECTOR TABS SHALL BE INSTALLED AT 25 FT. INTERVALS (SEE SHEETS 5 AND 7 FOR EXCEPTIONS). RETROREFLECTOR TABS WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK. THE TABS SHALL BE MOUNTED SO THE BOLT SLOT FACES AWAY FROM TRAFFIC, AND THE RETROREFLECTOR SURFACE FACES THE APPROACHING TRAFFIC FOR ONE-WAY ROADS. FOR TWO-WAY ROADS, BOTH SIDES OF THE TABS SHALL BE RETROREFLECTIVE, SO THAT DELINEATION IS PROVIDED FOR BOTH DIRECTIONS OF TRAVEL. THE RETROREFLECTIVE SHEETING COLOR SHALL MATCH THE COLOR OF THE ADJACENT TRAVEL WAY EDGE LINE. SEE THE RETROREFLECTOR TAB DETAIL ON SHEET 3.

16. AT THE TIME OF INSTALLATION, WOOD POSTS OR BLOCKS WITH SEASONING CHECKS GREATER THAN ¼ IN. SHALL NOT BE USED WHEN THE CHECK EXTENDS THE FULL LENGTH OF THE PIECE.

17. WOOD BLOCKS SHALL BE CUT FROM THE SAME CROSS-SECTION, SPECIES, AND GRADE, AND SHALL RECEIVE THE SAME PRESERVATIVE TREATMENT AS THE POSTS WHEN WOOD POSTS ARE USED.

18. REFERENCES SUCH AS θθPDB01", θθPDE01", AND θθPWE01" IN THIS STANDARD PLAN SPECIFY HARDWARE DETAILS FROM θθA GUIDE TO STANDARDIZED HIGHWAY BARRIER HARDWARE" PREPARED BY THE AASHTO-AGC-ARTBA JOINT COOPERATIVE COMMITTEE.

19. NOTCHED RAIL BLOCKS MANUFACTURED FROM SYNTHETIC MATERIAL WILL BE ACCEPTED AS ALTERNATIVES TO WOOD NOTCHED BLOCKS FOR USE WITH STEEL POSTS PROVIDED THAT THE BLOCKS HAVE RECEIVED FHWA APPROVAL AND ARE CERTIFIED AS IDENTICAL TO THE SPECIMENS USED FOR TESTING AND APPROVAL.

20. WOOD POSTS SHALL BE MADE OF TIMBER WITH AN EXTREME FIBER STRESS IN BENDING OF 1200 PSI STRESS GRADING AND POST DIMENSIONS SHALL CONFORM WITH THE RULES OF THE WEST COAST INSPECTION BUREAU, OR THE SOUTHERN PINE BUREAU, OR THE WESTERN WOOD PRODUCTS ASSOCIATION. TIMBER FOR POSTS SHALL BE EITHER ROUGH SAWN (UNPLANED) OR S4S (SURFACED FOUR SIDES) WITH NOMINAL DIMENSIONS INDICATED. ONLY ONE TYPE OF SURFACE FINISH SHALL BE USED FOR POSTS AND BLOCKS IN ANY ONE CONTINUOUS LENGTH OF GUARDRAIL.

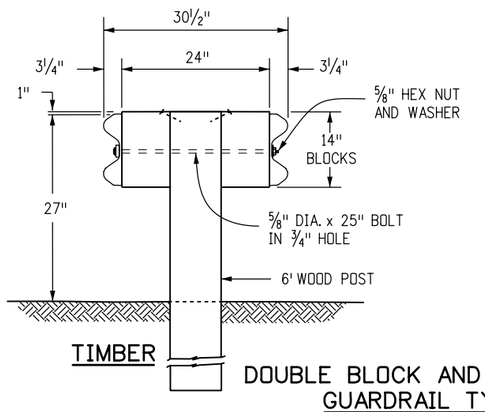
21. GLULAM POSTS AND BLOCKS WILL BE ACCEPTED AS ALTERNATIVES PROVIDED THAT THE SUPPLIED MATERIALS HAVE RECEIVED FHWA APPROVAL AND ARE CERTIFIED AS IDENTICAL TO THE SPECIMENS USED FOR TESTING AND APPROVAL.

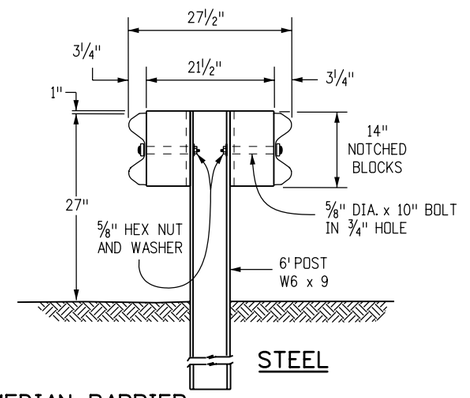
22. PRESSURE TREATMENT OF POSTS AND BLOCKS SHALL CONFORM TO AASHTO M 133 EXCEPT THAT BLOCKS NEED NOT BE INCISED. PRESERVATION ASSAY RETENTION REPORTS SHALL BE SUBMITTED TO THE ENGINEER. THE CONTRACTOR SHALL CERTIFY THAT THE SPECIES AND GRADE MEET THE REQUIREMENTS OF THE CONTRACT.

23. W-BEAM AND THRIE-BEAM GUARDRAIL POSTS SHALL BE MANUFACTURED USING AASHTO M 270 (ASTM A 709) GRADE 36 STEEL UNLESS CORROSION RESISTANT STEEL IS REQUIRED, IN WHICH CASE THE POST SHALL BE MANUFACTURED FROM AASHTO M 270 (ASTM A 709) GRADE 50W STEEL. THE DIMENSIONS OF THE CROSS-SECTION SHALL CONFORM TO A W6 X 9 SECTION AS DEFINED IN AASHTO M 160 (ASTM A 6). W6 X 8.5 WIDE FLANGE STEEL POSTS ARE AN ACCEPTABLE ALTERNATIVE TO THE W6 X 9.

24. AFTER THE SECTION IS CUT AND ALL HOLES ARE DRILLED OR PUNCHED THE COMPONENT SHALL BE ZINC-COATED CONFORMING TO AASHTO M 111 (ASTM A 123) UNLESS CORROSION-RESISTANT STEEL IS USED. WHEN CORROSION-RESISTANT STEEL IS USED THE PORTION OF THE POST TO BE EMBEDDED IN SOIL SHALL BE ZINC-COATED CONFORMING TO AASHTO M 111 (ASTM A 123) AND THE PORTION ABOVE THE SOIL SHALL NOT BE ZINC-COATED, PAINTED OR OTHERWISE TREATED.

25. FIELD MODIFICATION TO RAIL ELEMENTS ONLY IS ALLOWED BY SAWING AND DRILLING OF HOLES. FLAME CUTTING IS NOT PERMITTED. POSTS SHALL NOT BE MODIFIED. COMPONENTS ON WHICH THE SPELTER COATING HAS BEEN DAMAGED SHALL BE EITHER REGALVANIZED OR RECOATED IN CONFORMANCE WITH AASHTO M 36, OR PAINTED WITH ONE FULL BRUSH COAT OF ZINC RICH PAINT CONFORMING TO MILITARY SPECIFICATION DOD-P-21035A.





DOUBLE BLOCK AND RAIL MEDIAN BARRIER
GUARDRAIL TYPE 3 (DOUBLE)

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GUARDRAIL TYPE 3 W-BEAM

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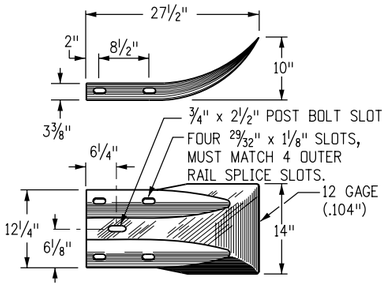
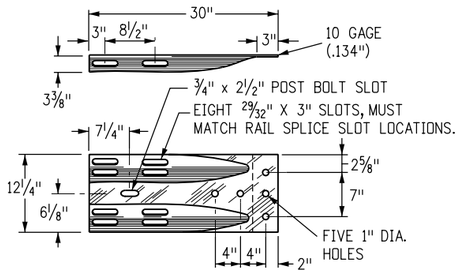
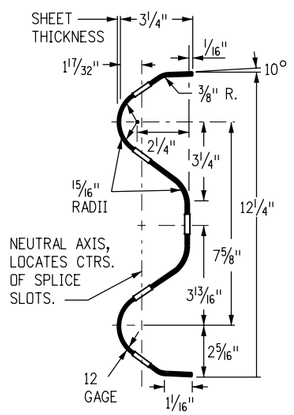


(RWE01a)

TERMINAL SECTION (FLARED)

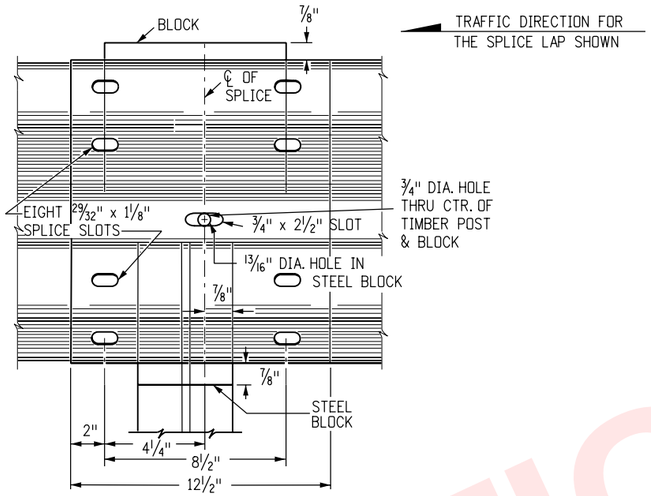


TERMINAL SECTION (CONNECTOR)

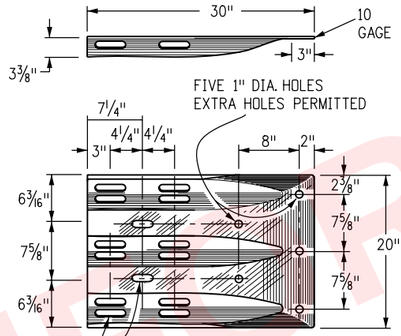


(RWM02a)

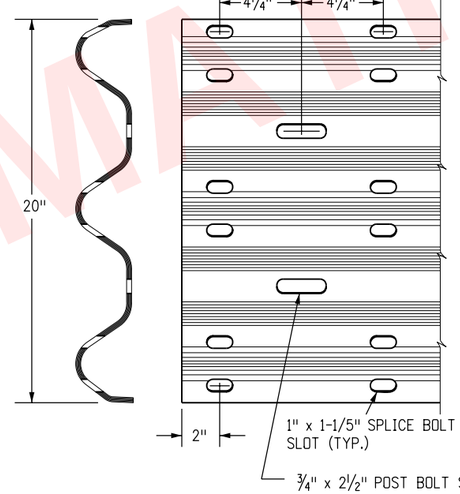
W-BEAM RAIL SECTION



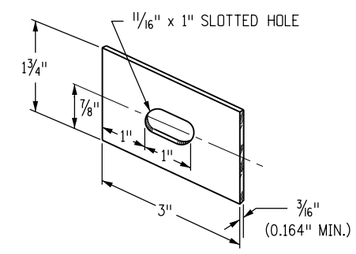
RAIL SPLICE



THRIE BEAM TERMINAL SECTION (CONNECTOR)



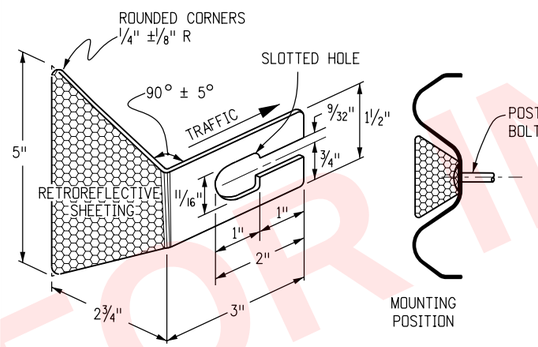
THRIE BEAM DETAIL



(FWR03)

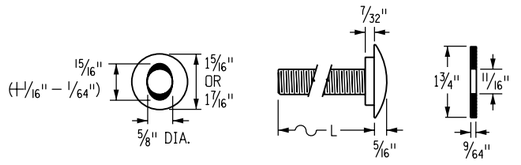
RECTANGULAR WASHER

(TO BE USED ONLY WHERE SPECIFIED.)



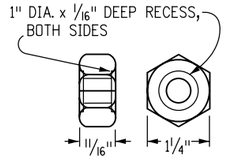
RETROREFLECTOR TAB

RETROREFLECTOR TABS SHALL BE MANUFACTURED FROM 12 TO 14 GAUGE STEEL. RETROREFLECTIVE SHEETING SHALL CONFORM TO ASTM D4956 TYPE III. SEE NOTE 7 ON SHEET 5



BUTTON HEAD BOLT WITH OVAL SHOULDER

WASHER



HEX NUT

PART	MATERIAL SPEC.	GALVANIZING SPEC.	CORROSION-RESISTANT SPEC.
W-BEAM RAIL & TERMINAL SECTIONS	AASHTO M 180, CLASS A OR B	AASHTO M 180, TYPE 1 OR 2	AASHTO M 180, TYPE 4
BASE PLATE	ASTM A 36	AASHTO M 111	N.A.
NUTS, BOLTS & STUDS FOR GENERAL USE	ASTM A 307	AASHTO M 232, CLASS C OR ASTM B 695 CLASS 50 TYPE 1	
HIGH STRENGTH BOLTS & NUTS	ASTM A 325		
HIGH STRENGTH STUDS & NUTS	ASTM A 449		
ROUND STEEL WASHERS	ASTM F 436		
RECTANGULAR WASHERS	AASHTO M 180		
OTHER FITTINGS	ASTM A 36	AASHTO M 111	

THE TABULATION OF GUARDRAIL WILL SPECIFY THE TYPE OF CORROSION PROTECTION: GALVANIZED OR CORROSION - RESISTANT STEEL.

STEEL POSTS SHALL HAVE THE SAME CORROSION PROTECTION AS SPECIFIED FOR THE METAL BEAM RAIL. PUNCHING, DRILLING, CUTTING, OR WELDING OF POSTS WILL NOT BE PERMITTED AFTER GALVANIZING.

DIAMETER & TYPE (INCHES)	LENGTH L (INCHES)	THREAD LENGTH (INCHES)	INTENDED USE	AASHTO-AGC-ARTBA STANDARD NUMBER	NO. BOLTS, NUTS & WASHERS
⅝ BUTTON HEAD	1¼	FULL (1 1/32)	ALL RAIL SPLICES	FBB01	8 PER SPLICE*
OVAL	18	MIN. 2½	SINGLE BLOCK & POST (TIMBER)	FBB04	1 PER POST
SHLDR.	25	MIN. 2	DOUBLE BLOCK & POST (TIMBER)	FBB05	1 PER POST
	10	MIN. 2	FASTEN NOTCHED BLOCK TO STEEL POST	FBB03	1 PER BLOCK

* WASHERS NOT USED AT RAIL SPLICES

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GUARDRAIL TYPE 3 W-BEAM

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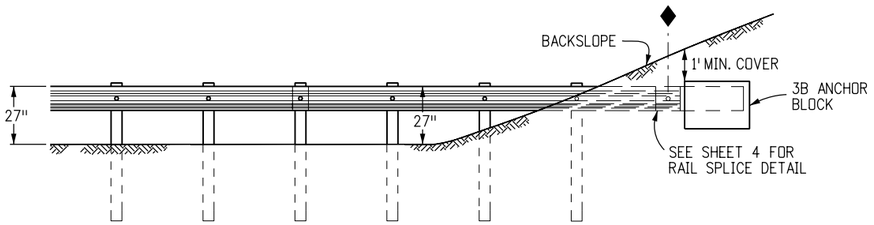
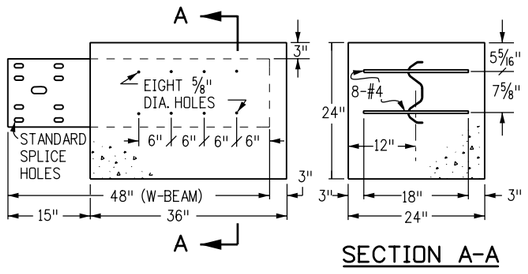


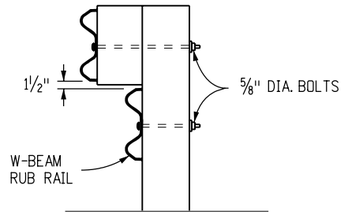
SEE TYPE 3B (RUB RAIL) PLAN VIEW FOR ALIGNMENT. THE 100 FT. FLARE LENGTH MAY BE SHORTENED IF THE SLOPE IS LESS THAN 8 FT. WIDE.

END ANCHORAGE TYPE 3B
(WITHOUT ROADSIDE DITCH AT GUARDRAIL)



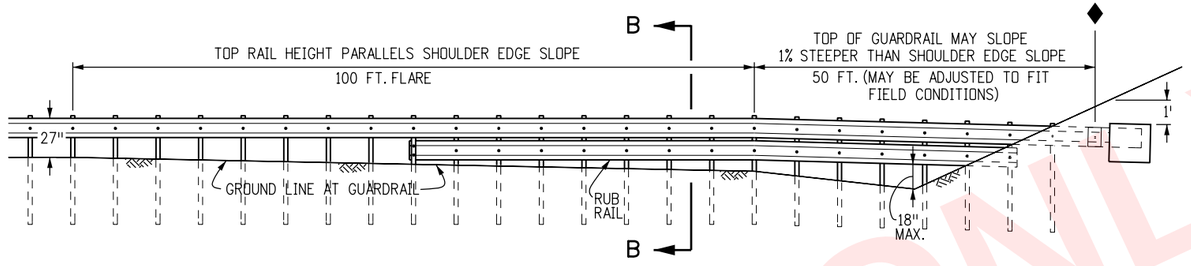
SECTION A-A

TYPE 3B ANCHOR BLOCK DETAIL

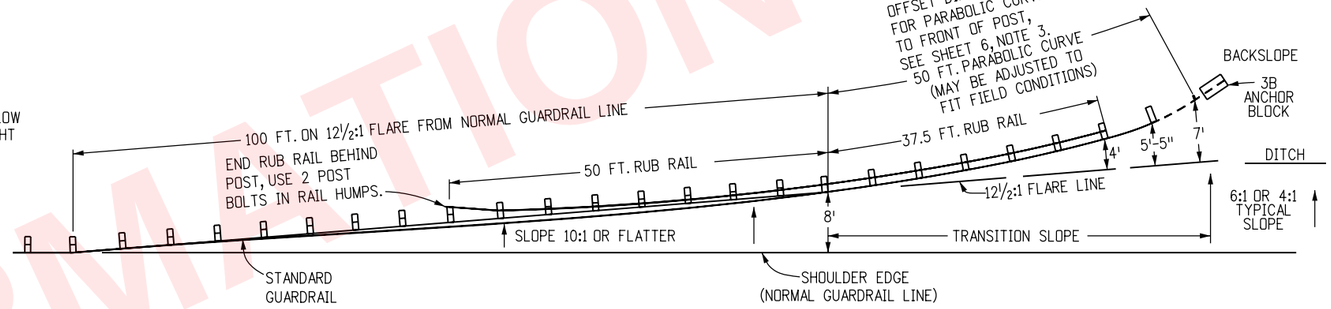


SECTION B-B

MOUNT A W-BEAM RUB RAIL 1-1/2 IN. BELOW THE TOP RAIL WHEN THE TOP RAIL HEIGHT EXCEEDS 30 IN. ABOVE THE GROUND



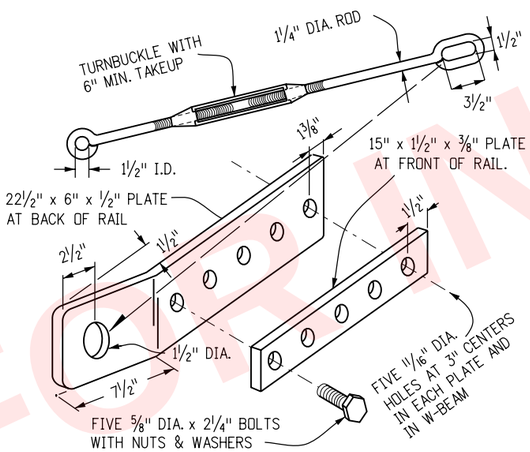
ELEVATION VIEW



PLAN VIEW

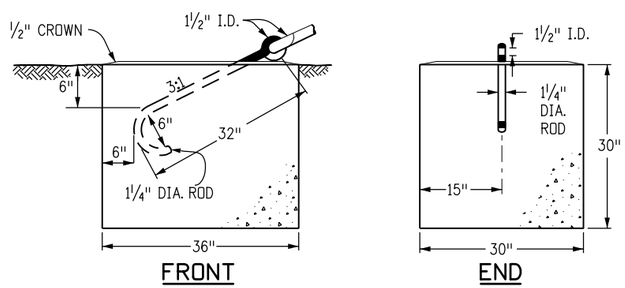
◆ END OF GUARDRAIL PAY LENGTH

END ANCHORAGE TYPE 3B (RUB RAIL)
(WITH ROADSIDE DITCH AT GUARDRAIL)



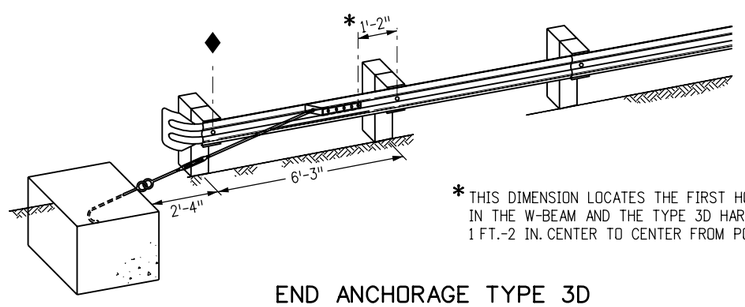
TYPE 3D HARDWARE DETAILS

NOTE: ALL PARTS SHALL BE GALVANIZED



FRONT END

TYPE 3D ANCHOR BLOCK DETAIL



* THIS DIMENSION LOCATES THE FIRST HOLE IN THE W-BEAM AND THE TYPE 3D HARDWARE. 1 FT.-2 IN. CENTER TO CENTER FROM POST BOLT HOLE.

END ANCHORAGE TYPE 3D DEPARTURE TERMINAL

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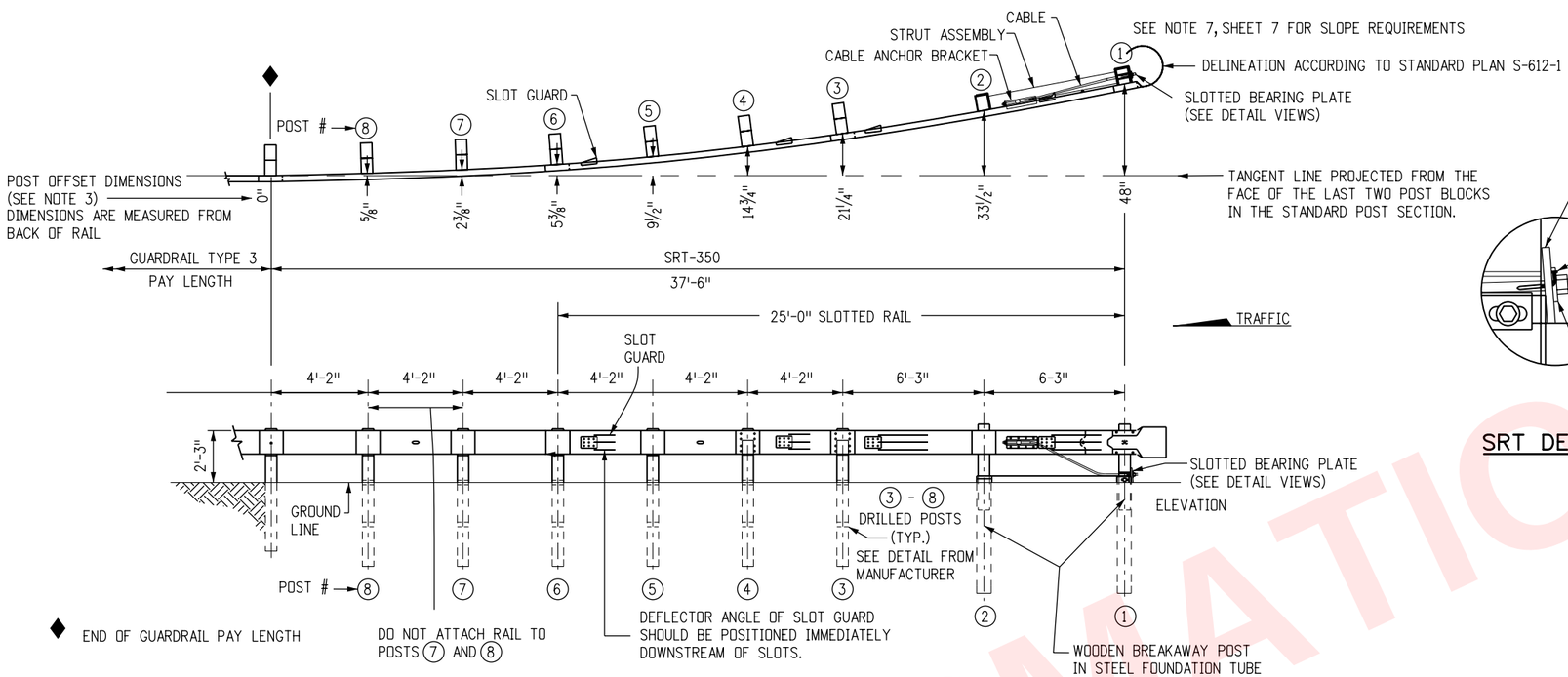
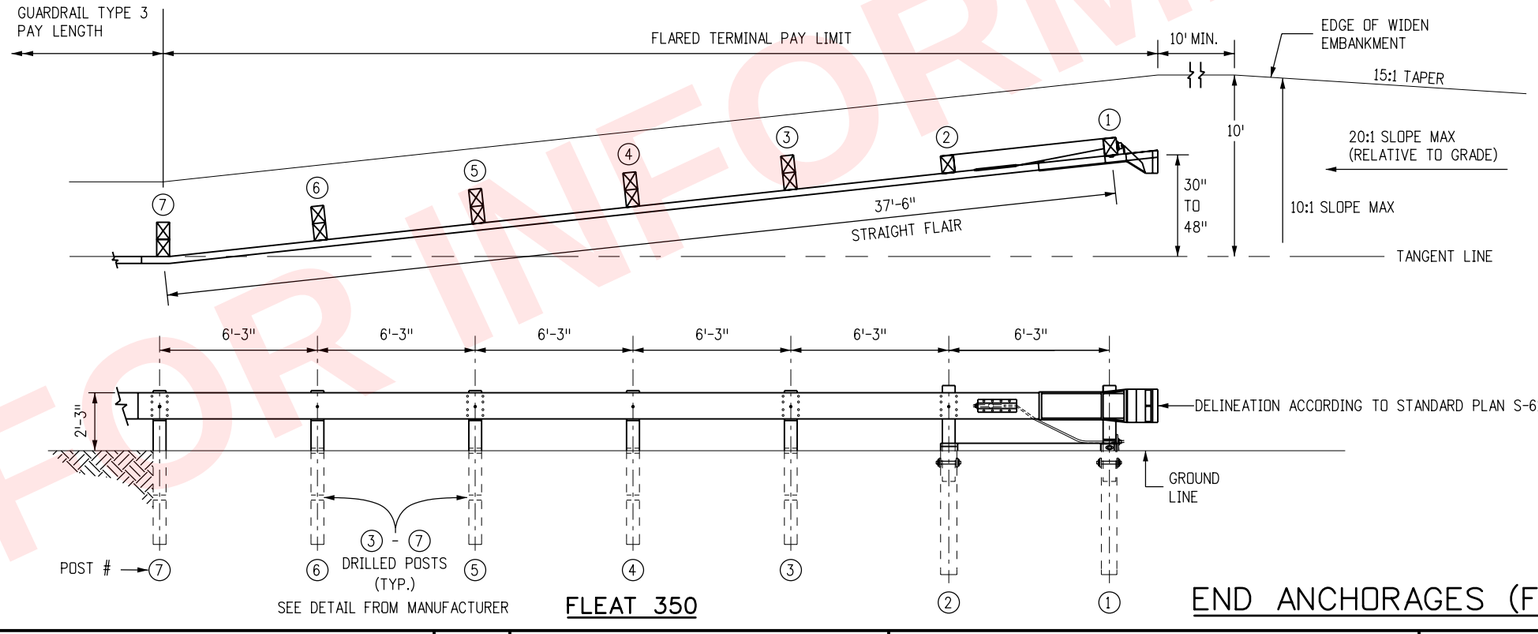
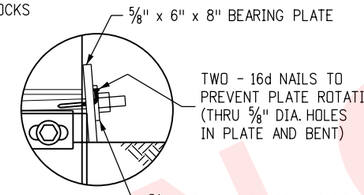


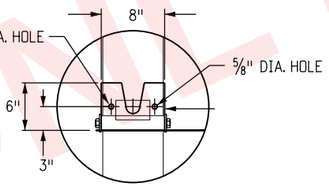
SLOTTED RAIL TERMINAL (SRT)



FLEAT 350



SRT DETAIL VIEW



PLACE SLOTTED BEARING PLATE WITH SLOT ORIENTED UP AS SHOWN.

SRT FRONT VIEW

SLOTTED BEARING PLATE DETAIL

NOTES

1. THE END ANCHORAGE (FLARED) SHALL BE THE SLOTTED RAIL TERMINAL (SRT-350), AS MANUFACTURED BY TRINITY INDUSTRIES, INC. (TELEPHONE #: 800-644-7976), OR THE FLEAT-350, AS MANUFACTURED BY ROAD SYSTEMS INC. (TELEPHONE #: 915-263-2435). ONE END ANCHORAGE (FLARED) SHALL INCLUDE ALL POST, RAIL, AND HARDWARE ITEMS REQUIRED FOR A COMPLETE UNIT. THE END ANCHORAGE (FLARES) SHALL BE INSTALLED CONFORMING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PARTS LIST TO THE ENGINEER PRIOR TO INSTALLATION OF THE DEVICE.
2. IN HEAVY SNOW LOCATIONS, TRIM POSTS 1 AND 2 FLUSH WITH RAIL TOP AND TREAT END WITH SEALANT, IN CONFORMANCE WITH AASHTO M 133.
3. THE POST OFFSET DIMENSIONS ARE GIVEN TO THE CENTER OF THE TRAFFIC FACE OF THE BLOCKOUTS FROM THE PROJECTED RAIL TANGENT LINE, EXCEPT AT THE FIRST TWO POSTS WHERE THE DIMENSION IS TO THE CENTER OF THE TRAFFIC FACE OF THE POST. OFFSET POINTS SHALL BE LOCATED BY CHORD MEASUREMENTS AT THE BACK OF THE RAIL AND BE EQUAL TO THE NOMINAL POST SPACINGS SHOWN. POSTS ARE TO BE SET APPROXIMATELY RADIAL TO THE RAILING AT EACH POST LOCATION.
4. THE SRT SLOTTED BEARING PLATE SHALL BE INSTALLED WITH THE SLOT FACING UP.
5. POSTS SHALL BE DRILLED FOR BREAKAWAY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
6. SEE SHEETS 1, 3 AND 4 FOR STANDARD GUARDRAIL TYPE 3 AND INSTALLATION DETAILS.
7. RETROREFLECTOR TABS SHALL NOT BE USED ON POSTS 1 THROUGH 8.
8. SRT PANELS SHALL BE SUPPLIED IN EITHER THREE 12 FT. - 6 IN. RAIL PANELS, OR ONE 25 FT. - 0 IN. AND ONE 12 FT. - 6 IN. RAIL PANELS.
9. SRT - STRAIGHT FLARED OPTION. SEE MANUFACTURER'S DETAILS.
10. HINGED BREAK AWAY (HBA) STEEL POSTS MAY BE USED AS AN ALTERNATIVE ON THE SRT FOR POSTS 2 THRU 8. SEE MANUFACTURER'S DETAILS.
11. HINGED BREAK AWAY (HBA) STEEL POSTS OR WELDED POSTS (PW) MAY BE USED AS AN ALTERNATIVE ON THE FLEAT FOR POSTS 3 THRU 7. SEE MANUFACTURER'S DETAILS.
12. DELINEATION SHALL BE APPLIED TO THE END PIECE, AND SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

END ANCHORAGES (FLARED)

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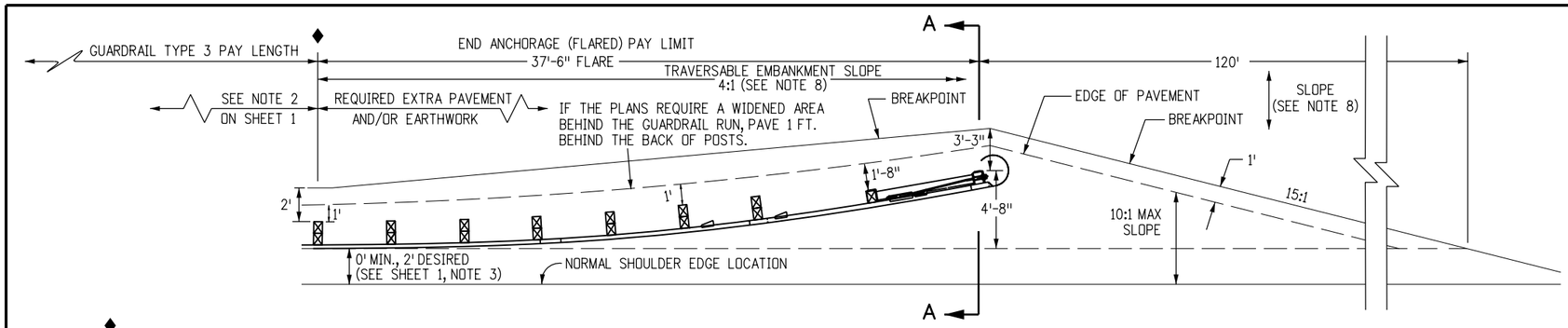
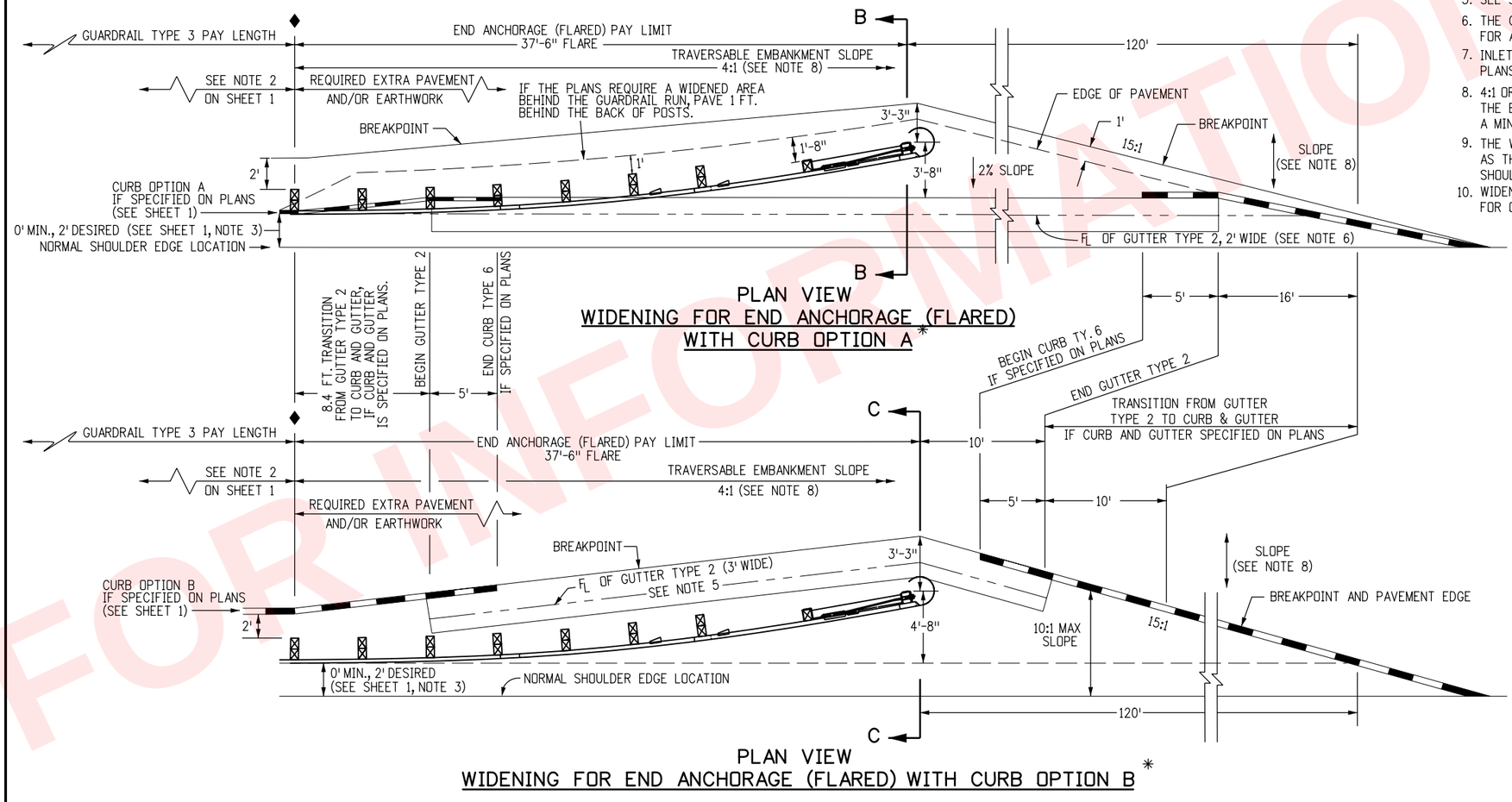


◆ END OF GUARDRAIL PAY LENGTH

PLAN VIEW
WIDENING FOR END ANCHORAGE (FLARED) *

* THIS PLAN VIEW SHOWS ONLY THE SRT. THE FLEAT-350 USES THE SAME WIDENING DETAILS.

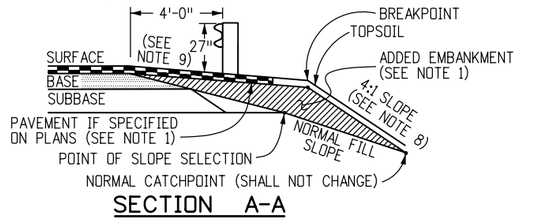


PLAN VIEW
WIDENING FOR END ANCHORAGE (FLARED) WITH CURB OPTION A *

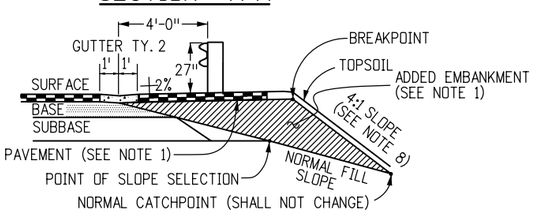
PLAN VIEW
WIDENING FOR END ANCHORAGE (FLARED) WITH CURB OPTION B *

NOTES

1. PAYMENT FOR THE ADDED EMBANKMENT (APPROXIMATELY 45 CU. YDS.) FOR THE FLARE SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 203 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 203
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (FLARED) WHEN THE CONTRACT PLANS DO NOT INCLUDE PAY ITEM 203. THE ADDED EMBANKMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH SUBSECTION 203.07, AASHTO T 99.
2. WHEN THE WIDENED AREA IS PAVED, PAYMENT FOR THE PAVEMENT (APPROX. 70 SQ. YDS.) SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 403 OR 412 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 403 OR 412
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (FLARED) WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 403 OR 412 (SEE SHEET 1, NOTE 2 FOR PAVEMENT TYPES)
3. CONCRETE PAVED AREAS SHALL HAVE THEIR TAPERED ENDS SQUARED OFF AS DIRECTED BY THE ENGINEER.
4. WHEN OVERLAY PAVING, THE FINISHED SURFACE AT EACH POST SHALL NOT BE ABOVE THE TOP BREAKAWAY HOLE OR STRUT ASSEMBLY. THE WIDENED AREA AT THE FLARED END ANCHORAGE SHOULD NOT BE OVERLAYED UNLESS PAVEMENT CONDITIONS WARRANT IT BEING OVERLAYED. ANY OVERLAY PAVEMENT ABUTTING THE FLARED END ANCHORAGE SHALL BE TAPERED TO PREVENT A DROP IN THE PAVED SURFACE BELOW THE RAIL.
5. SEE SHEETS 1, 3 AND 4 FOR STANDARD TYPE 3 GUARDRAIL AND INSTALLATION DETAILS.
6. THE COST OF THE GUTTER WILL BE PAID FOR AS "GUTTER TYPE 2 (2 FT.)" FOR A LENGTH OF 134 FT. OR "GUTTER TY. 2 (3 FT.)" FOR A LENGTH OF 40 FT.
7. INLETS OR RUNDOWNS MAY BE USED INSTEAD OF THE GUTTER IF SPECIFIED ON THE PLANS. NO ADDITIONAL CURB SHALL BE ADDED IN THE VICINITY OF THE END ANCHORAGE.
8. 4:1 OR FLATTER SLOPES IN THE TRAVERSABLE AREA SHALL BE USED BEHIND THE END ANCHORAGE, AND IN ADVANCE OF POST (1). IF THIS IS NOT POSSIBLE, A MINIMUM 3:1 SLOPE MAY BE USED IF APPROVED BY THE ENGINEER.
9. THE WIDENED AREA, EXCEPT FOR CURB OPTION A, SHALL HAVE THE SAME GRADING AS THE ADJACENT GUARDRAIL: 10:1 OR FLATTER IF MORE THAN 2 FT. FROM SHOULDER OR SLOPE EQUAL TO ROADWAY SLOPE IF 2 FT. OR LESS FROM SHOULDER.
10. WIDENING FOR END ANCHORAGES SHALL BE PAVED ON INTERSTATES AND FREEWAYS. FOR OTHER HIGHWAYS, PAVING SHALL BE AS SHOWN ON THE PLANS.



SECTION A-A



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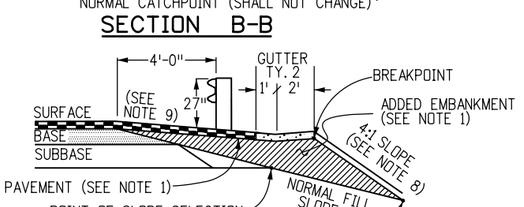

SECTION C-C

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GUARDRAIL TYPE 3 W-BEAM

Issued By: Project Development Branch July 04, 2006

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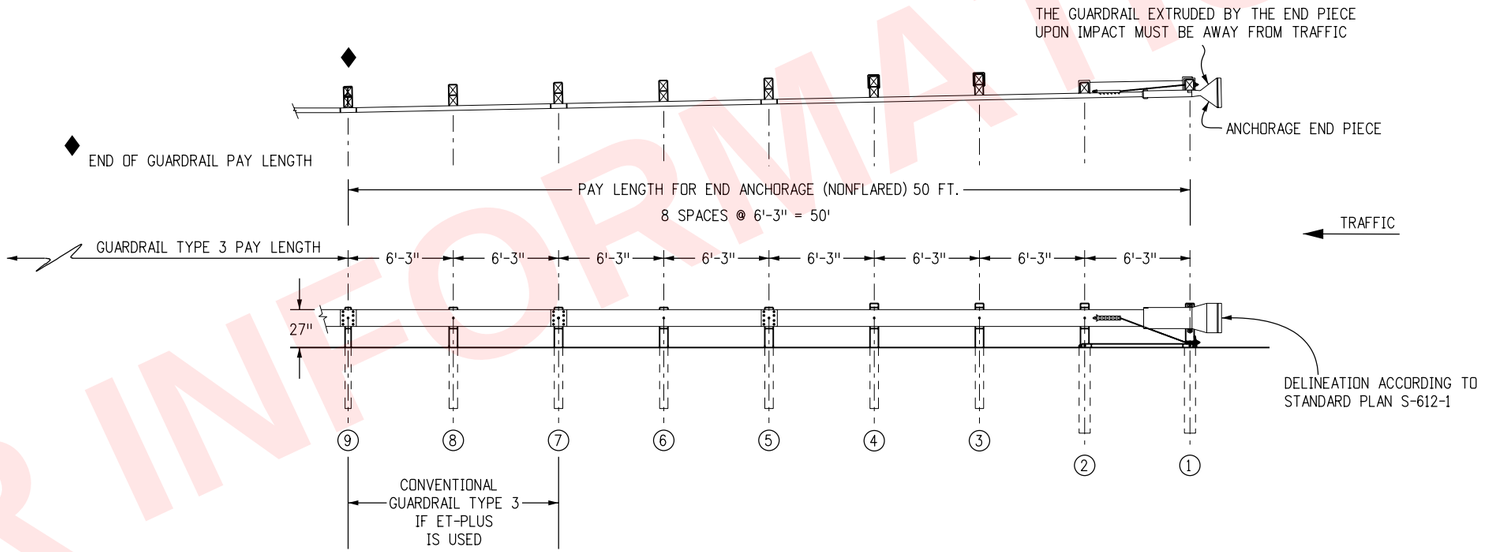
NOTES

1. THE END ANCHORAGE (NONFLARED) SHALL EITHER BE THE ET-PLUS AS MANUFACTURED BY TRINITY INDUSTRIES INC. (TEL. #: 800-644-7976), OR THE SKT GUARDRAIL AS MANUFACTURED BY ROAD SYSTEMS, INC. (TEL. #: 915-263-2435). THE END ANCHORAGE (NONFLARED) SHALL INCLUDE ALL POST, RAIL, AND HARDWARE ITEMS REQUIRED FOR A COMPLETE UNIT. THE END ANCHORAGE (NONFLARED) SHALL BE INSTALLED CONFORMING TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PARTS LIST TO THE ENGINEER PRIOR TO THE INSTALLATION OF THE DEVICE.
2. WOOD POSTS SHALL BE DRILLED FOR BREAKAWAY CONFORMING TO THE MANUFACTURER'S INSTRUCTIONS.
3. HINGED BREAK AWAY (HBA) STEEL POSTS MAY BE USED CONFORMING TO THE MANUFACTURER'S INSTRUCTIONS.
4. RETROREFLECTOR TABS SHALL NOT BE USED ON THE LAST SEVEN POSTS OF THE END ANCHORAGE (NONFLARED).
5. USE MANUFACTURER'S SPECIFIED STEEL FOUNDATION TUBE FOR POSTS (1) AND (2) FOR ET-PLUS AND SKT END ANCHORAGES (NONFLARED).
6. DELINEATION SHALL BE APPLIED TO THE END PIECE AND SHALL NOT BE PAID FOR SEPARATELY BUT BE INCLUDED IN THE COST OF THE WORK. SEE STANDARD PLAN S-612-1.



END ANCHORAGE (NONFLARED)

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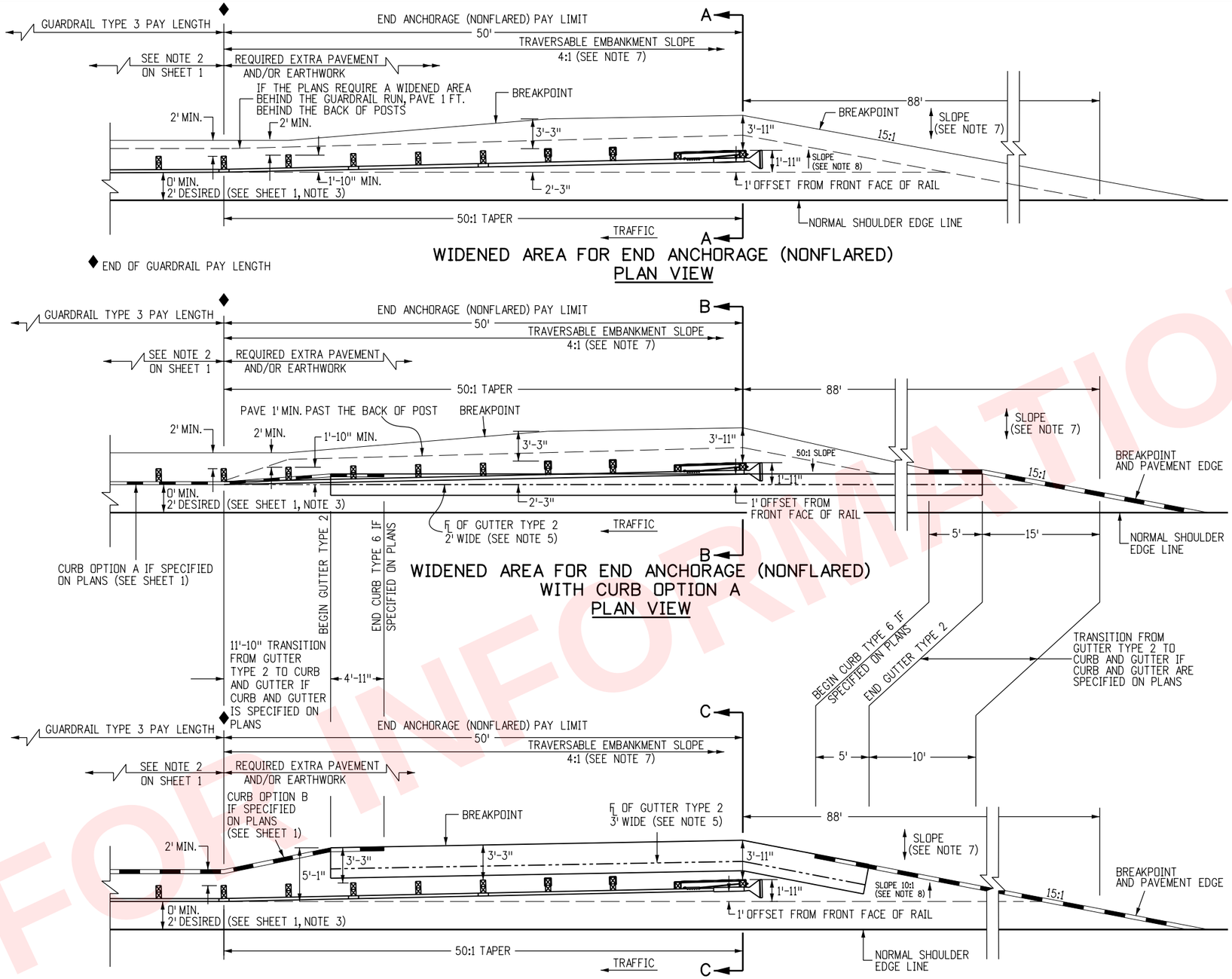
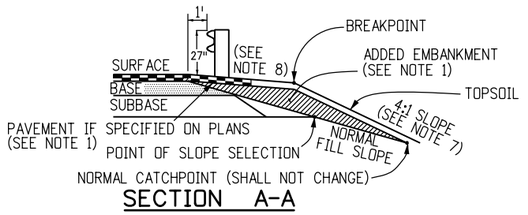
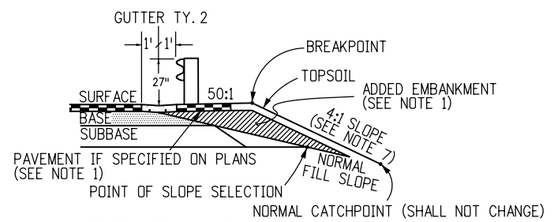


NOTES

1. PAYMENT FOR THE ADDED EMBANKMENT (APPROXIMATELY 25 CU. YDS.) FOR THE FLARE SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 203 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 203.
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (NONFLARED) WHEN THE CONTRACT PLANS DOES NOT INCLUDE PAY ITEM 203. THE ADDED EMBANKMENT SHALL BE BE CONSTRUCTED IN ACCORDANCE WITH SUBSECTION 203.07, AASHTO T 99.
2. WHEN THE WIDENED AREA IS PAVED, PAYMENT FOR THE PAVEMENT (APPROX. 39 SQ. YDS.) SHALL BE AS FOLLOWS:
   A. UNDER PAY ITEM 403 OR 412 WHEN THE CONTRACT PLAN INCLUDES PAY ITEM 403 OR 412.
   B. INCLUDED IN THE COST OF THE END ANCHORAGE (NONFLARED) WHEN THE CONTRACT PLAN DOES NOT INCLUDE PAY ITEM 403 OR 412, (SEE SHEET 1, NOTE 2 FOR PAYMENT TYPES).
3. WHEN OVERLAY PAVING, THE FINISHED SURFACE AT EACH POST SHALL NOT BE ABOVE THE TOP BREAKWAY HOLE OR STRUT ASSEMBLY. THE WIDENED AREA AT THE END ANCHORAGE (NONFLARED) SHALL NOT BE OVERLAYED UNLESS PAVEMENT CONDITIONS WARRANT IT BEING OVERLAYED. ANY OVERLAY PAVEMENT ABUTTING THE END ANCHORAGE (NONFLARED) SHALL BE TAPERED TO PREVENT A DROP IN THE PAVED SURFACE BELOW THE RAIL.
4. SEE SHEETS 1, 2 AND 3 FOR STANDARD TYPE 3 GUARDRAIL AND INSTALLATIONS DETAILS.
5. THE COST OF THE GUTTER WILL BE PAID FOR AS "GUTTER TYPE 2 (2 FT.)" FOR A LENGTH OF 111 FT., OR "GUTTER TY. 2 (3 FT.)" FOR A LENGTH OF 50 FT.
6. INLETS OR RUNDOWNS MAY BE USED INSTEAD OF THE GUTTER IF SPECIFIED ON THE PLANS. NO ADDITIONAL CURB SHALL BE ADDED IN THE VICINITY OF THE END TREATMENT.
7. 4:1 OR FLATTER SLOPES IN THE TRAVERSABLE AREA SHALL BE USED BEHIND THE END ANCHORAGE AREA, AND IN ADVANCE OF POST (1). IF THIS IS NOT POSSIBLE A MINIMUM 3:1 SLOPE MAY BE USED IF APPROVED BY THE ENGINEER.
8. THE WIDENED AREA, EXCEPT FOR CURB OPTION A, SHALL HAVE THE SAME GRADING AS BENEATH THE ADJACENT GUARDRAIL: 10:1 OR FLATTER IF MORE THAN 2 FT. FROM SHOULDER, OR SLOPE EQUAL TO ROADWAY SLOPE IF 2 FT. OR LESS FROM SHOULDER.
9. WIDENING FOR END ANCHORAGES SHALL BE PAVED ON INTERSTATES AND FREEWAYS. FOR OTHER HIGHWAYS, PAVING SHALL BE AS SHOWN ON THE PLANS.
10. HINGED BREAK AWAY (HBA) STEEL POSTS MAY BE USED. SEE MANUFACTURER'S DETAILS.



SECTION A-A



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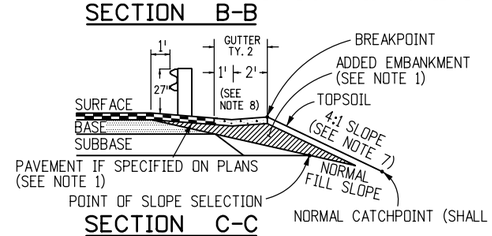

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GUARDRAIL TYPE 3 W-BEAM

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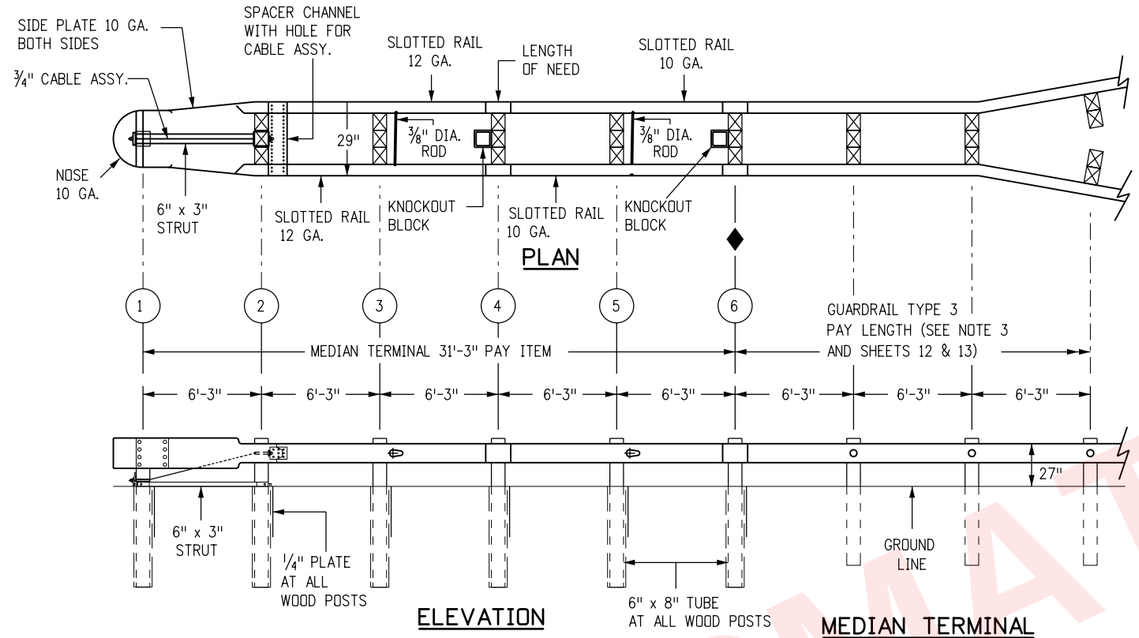
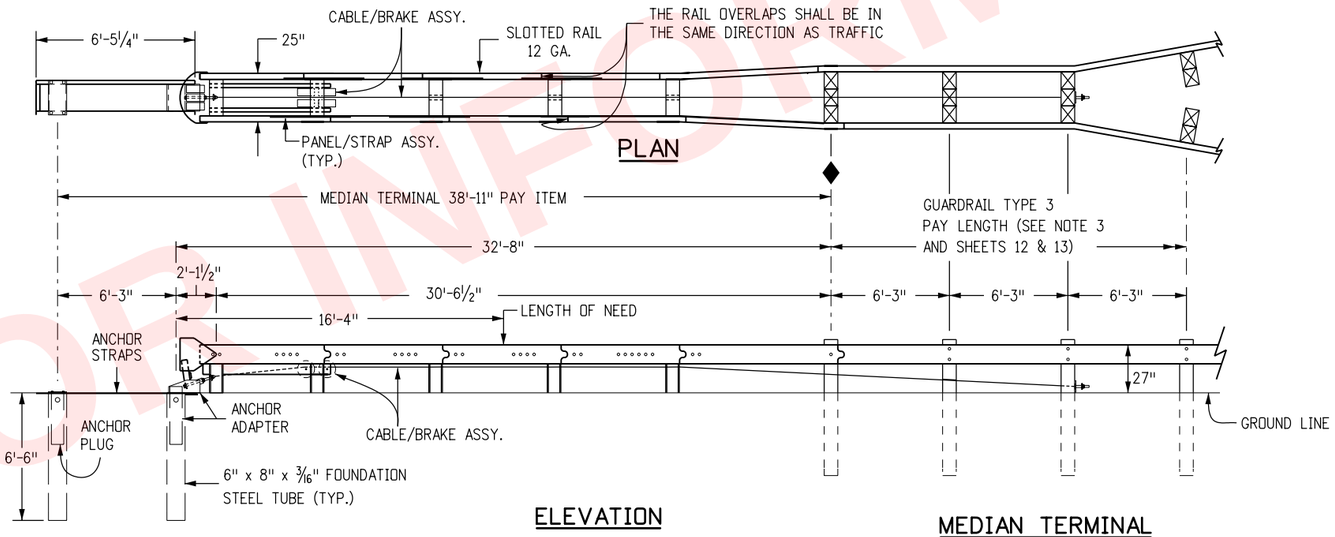


MEDIAN TERMINAL
(CAT OPTION)

◆ END OF GUARDRAIL PAY LENGTH

NOTES

1. THE MEDIAN TERMINAL SHALL BE THE CAT 350 AS MANUFACTURED BY TRINITY INDUSTRIES INC. (TEL #: 800-644-7976), OR THE BRAKEMASTER AS MANUFACTURED BY ENERGY ABSORPTION SYSTEMS, INC. AS DISTRIBUTED BY INTERWEST SAFETY SUPPLY (TEL #: 303-733-8447). ONE MEDIAN TERMINAL SHALL INCLUDE ALL POSTS, RAIL, AND HARDWARE ITEMS REQUIRED FOR A COMPLETE UNIT. THE DEVICE SHALL BE INSTALLED IN CONFORMANCE WITH THE MANUFACTURER'S INSTRUCTIONS. THE CONTRACTOR SHALL PROVIDE A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND PARTS LISTS TO THE ENGINEER PRIOR TO THE INSTALLATION OF THE DEVICE.
2. UNLESS OTHERWISE SPECIFIED ON THE PLANS, THE MEDIAN TERMINAL SHALL BE INSTALLED FOR BIDIRECTIONAL TRAFFIC APPLICATION.
3. MEDIAN GUARDRAIL POSTS MAY BE STEEL OR WOOD.
4. EACH INSTALLATION SHALL BE SUPERVISED AND CERTIFIED AS CORRECT UPON COMPLETION BY A REPRESENTATIVE OF THE DEVICE MANUFACTURER OR BY AN EMPLOYEE OF THE CONTRACTOR WHO IS A CERTIFIED INSTALLER. THE CERTIFIED INSTALLER SHALL HAVE COMPLETED DEVICE TRAINING AND SHALL BE REGISTERED WITH THE MANUFACTURER AS A CERTIFIED INSTALLER.
5. DELINEATION, IF REQUIRED, SHALL BE APPLIED TO THE END PIECE AND WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE COST OF THE WORK. SEE STANDARD PLAN S-612-1.



MEDIAN TERMINAL
(BRAKEMASTER OPTION)

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GUARDRAIL TYPE 3 W-BEAM

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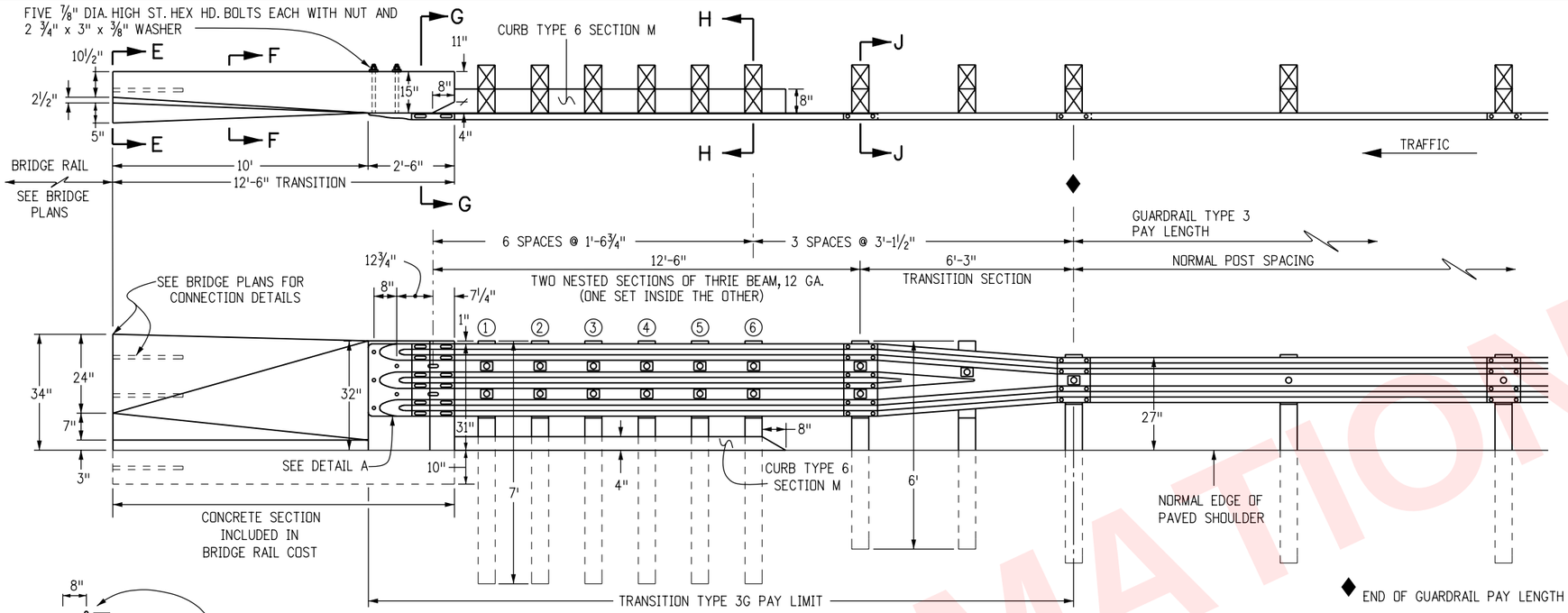
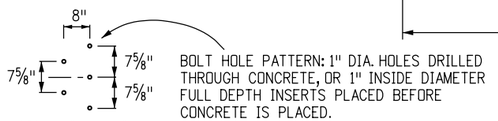
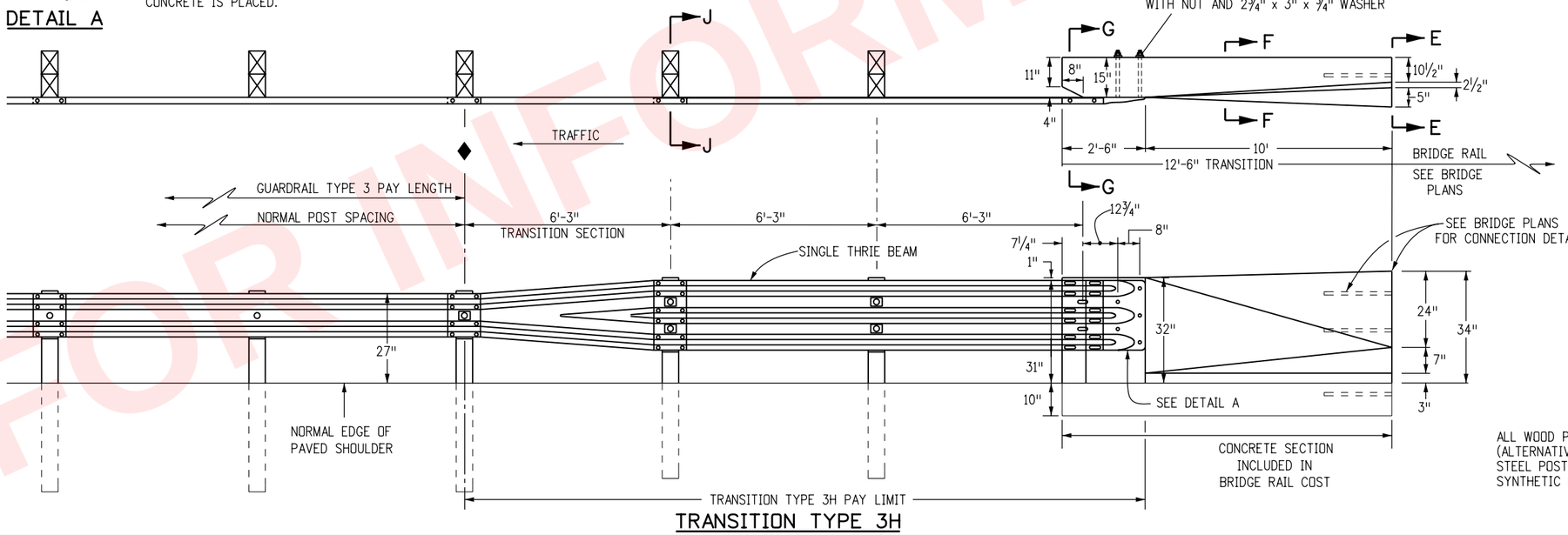


TRANSITION TYPE 3G



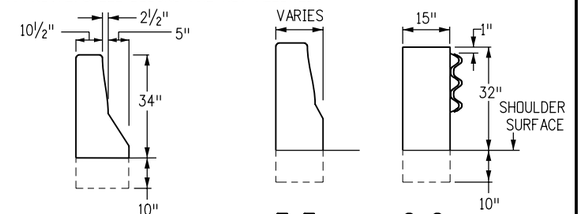
DETAIL A

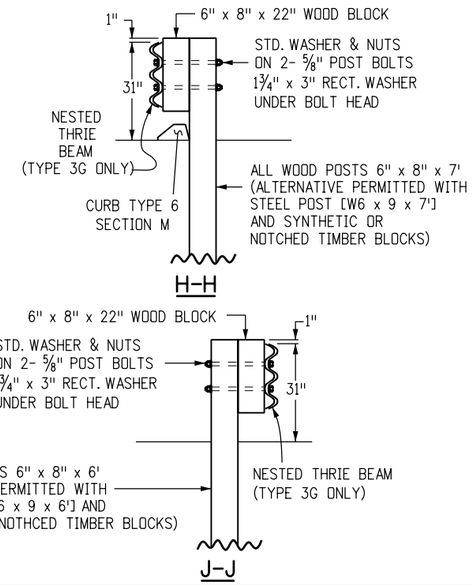


TRANSITION TYPE 3H

NOTES

1. TRANSITION TYPE 3G IS FOR USE AT BOTH ENDS OF BRIDGES ON TWO-WAY HIGHWAYS AND AT THE APPROACH END OF BRIDGES ON ONE-WAY HIGHWAYS.
2. TRANSITION TYPE 3H IS FOR USE AT THE TRAILING END OF BRIDGES ON ONE-WAY HIGHWAYS.
3. THE THRIE BEAM SECTION IN TRANSITIONS TYPES 3G AND 3H MAY BE SHOP BENT TO FIT CURVES THAT ARE GREATER THAN OR EQUAL TO A 10 FT. RADIUS. HOWEVER, THE 6 FT.-3 IN. TRANSITION SECTION SHALL NOT BE BENT.
4. A 12 FT.-6 IN. CONCRETE TRANSITION IS REQUIRED BETWEEN THE TYPE 3G OR 3H AND TYPE 7 BRIDGE RAIL. SEE STANDARD PLAN M-606-13 FOR THE TRANSITION BETWEEN TYPE 3 GUARDRAIL AND TYPE 7 GUARDRAIL.
5. TRANSITIONS TYPE 3G AND TYPE 3H ARE ALSO USED TO CONNECT TO TYPE 8 AND TYPE 10 BRIDGE RAIL. SEE BRIDGE PLANS FOR CONNECTION DETAILS.
6. BACKUP PLATE IS NOT REQUIRED AT POSTS ON TYPE 3G AND 3H.
7. ▣ THIS SYMBOL IN THE ELEVATION DRAWINGS SHOWS THE LOCATIONS WHERE A RECTANGULAR WASHER IS REQUIRED UNDER THE POST BOLT HEAD.
8. CURB TYPE 6 SECTION M, MAY BE ASPHALT OR CONCRETE. THE COST OF CURB IS INCLUDED IN THE WORK, UNLESS A SEPARATE PAY ITEM IS INCLUDED IN THE BID SCHEDULE.
9. POSTS (1) THRU (6) ARE 7 FT. LONG. ALL OTHER POSTS SHALL BE STANDARD 6 FT. IN LENGTH UNLESS OTHERWISE SPECIFIED IN THE CONTRACT.
10. NOTCHED RAIL BLOCKS MANUFACTURED FROM SYNTHETIC MATERIAL WILL BE ACCEPTED AS ALTERNATIVES TO WOOD NOTCHED BLOCKS FOR USE WITH STEEL POSTS PROVIDED THAT THE BLOCKS HAVE RECEIVED FHWA APPROVAL AND ARE CERTIFIED AS IDENTICAL TO THE SPECIMENS USED FOR TESTING AND APPROVAL. STEEL BLOCKS ARE NOT ALLOWED.





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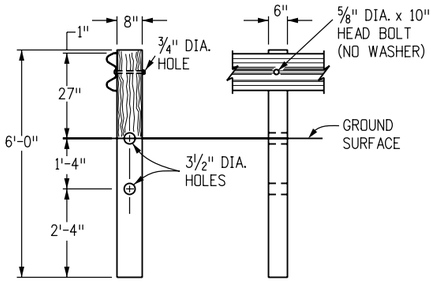
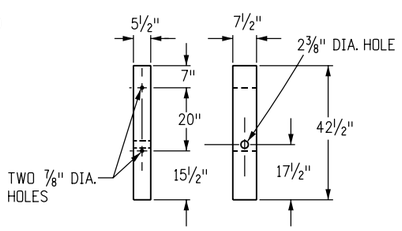


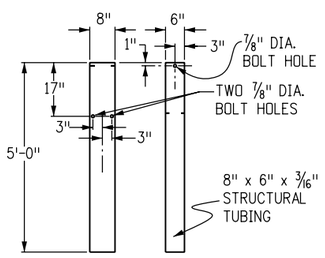
CONTROLLED RELEASING TERMINAL (CRT) POST ①



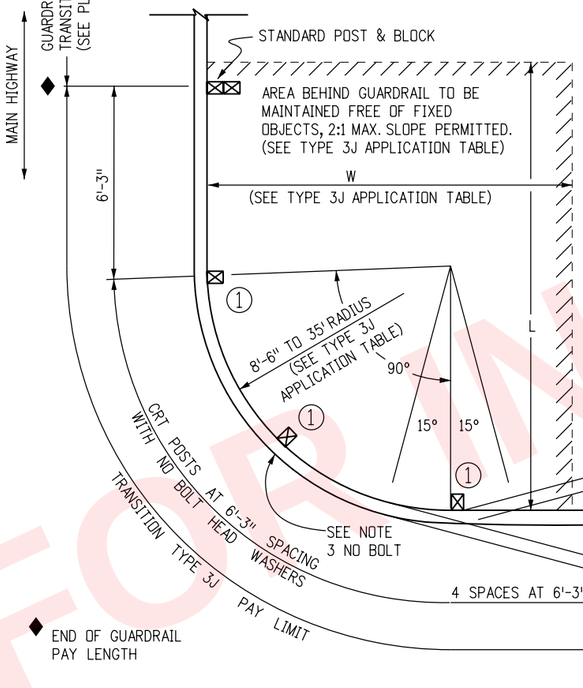
WOOD BREAKAWAY POST ②

POST	DIMENSIONS	TYPE
①	6" x 8" x 6'	CRT
②	5 1/2" x 7 1/2" x 42 1/2"	BREAKAWAY

POSTS



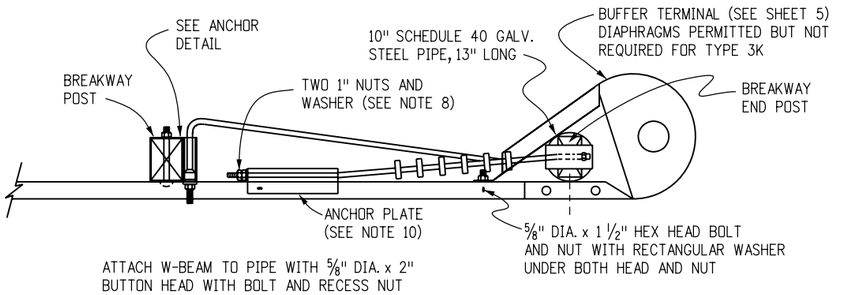
STEEL TUBE

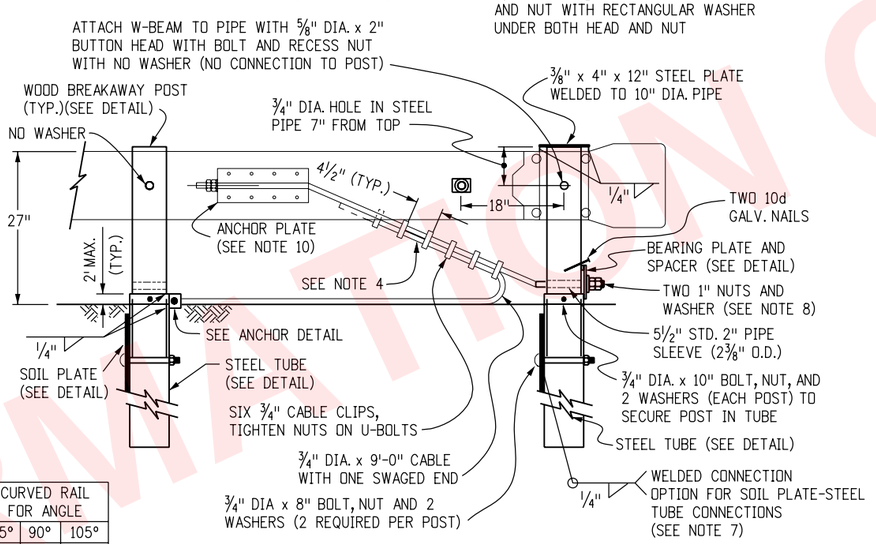


RADIUS	ANGLE	NO. CRT POSTS	AREA FREE OF FIXED OBJECTS L	AREA FREE OF FIXED OBJECTS W	CURVED RAIL FOR ANGLE 75°	90°	105°
8'-6"	75°-105°	5	25'	15'	11'	13'	15'
17'	75°-90°	6	30'	15'	22"	27'	31'
	91°-105°	7					
25'-6"	75°-85°	7	40'	20'	33'	40'	47'
	86°-95°	8					
	96°-105°	9					
35'	75°-85°	9	50'	20'	46'	55'	64'
	86°-95°	10					
	96°-105°	11					

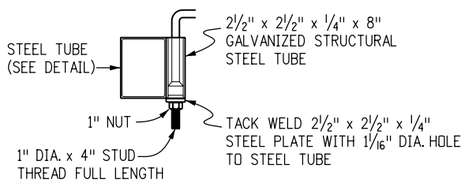
TRANSITION TYPE 3J APPLICATION

INTERSECTING ROADWAYS TRANSITION - TYPE 3J TRANSITION

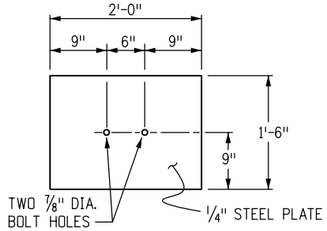




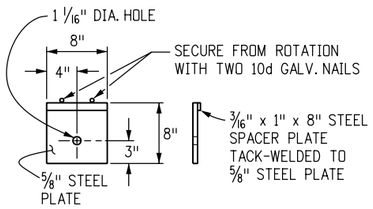
LOW SPEED TERMINAL - TYPE 3K



ANCHOR DETAIL



SOIL PLATE



BEARING PLATE FOR STEEL TUBE

NOTES

1. APPLICATION: THE TRANSITION TYPE 3J MAY BE USED TO SHIELD HAZARDS AT THE INTERSECTION OF TWO ROADWAYS. TYPICAL APPLICATIONS INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
   A. CANAL SERVICE ROADS AT BRIDGE ENDS.
   B. INTERRUPTIONS IN GUARDRAIL RUNS BY INTERSECTING ROADWAYS, ETC..

   THE LOW SPEED (<45 MPH) END ANCHORAGE TYPE 3K SHALL BE USED ONLY ON DRIVEWAYS AND LOW SPEED SERVICE ROADS. WHEN AN APPROVED CRASH-TESTED END TREATMENT IS REQUIRED USE THE END ANCHORAGE (FLARED) OR (NONFLARED) WITH 37 FT.-6 IN. LENGTH.
2. GRADING AND PAVING FOR THE 3J & 3K SHALL MATCH THE GRADING AND PAVING OF THE GUARDRAIL TO WHICH THEY ARE ATTACHED, AND SHALL BE IN ACCORDANCE WITH SHEET ONE OF THIS STANDARD. MAXIMUM FILL SLOPE SHALL BE 2:1.
3. THE RAIL IS NOT BOLTED TO THE CRT POST AT THE CENTER OF THE CURVE FOR THE 8 FT.-6 IN., 17 FT., AND 25 FT.-6 IN. RADII. PLATES SHALL CONFORM TO ASTM A 36, AND THE STRUCTURAL TUBING TO ASTM A 500.
4. THE 3/4IN. GALVANIZED WIRE ROPE (CABLE) SHALL CONFORM TO AASHTO M 30 TYPE II.
5. PLATES SHALL CONFORM TO ASTM A 36, AND STRUCTURAL TUBING TO ASTM A 500. WELDING SHALL MEET ALL REQUIREMENTS OF THE AMERICAN WELDING SOCIETY.
6. ALL STRUCTURAL STEEL SHALL BE GALVANIZED IN CONFORMANCE WITH ASTM A 123. POSTS SHALL NOT BE PUNCHED, DRILLED, CUT, OR WELDED AFTER GALVANIZING.
7. WHEN THE SOIL PLATE WELDED OPTION IS SELECTED, SOIL PLATE CONNECTION BOLT HOLES ARE NOT REQUIRED.
8. OUTSIDE NUT SHALL BE TORQUED AGAINST INSIDE NUT WITH THE CABLE INSTALLED TAUT BETWEEN THE ANCHOR PLATE AND FIRST POST.
9. ALL CURVED GUARDRAIL SHALL BE SHOP BENT.
10. SEE SHEET 5 FOR ANCHOR PLATE AND OTHER DETAILS.
11. THE STEEL TUBE MAY BE DRIVEN WITH WOOD POST INSERTED IF NO DAMAGE OCCURS TO THE POST OR BOLTS.

Computer File Information		Sheet Revisions	
Creation Date: 07/04/06 Initials: DD		Date:	Comments
Last Modification Date: 08/11/10 Initials: LTA	(R-X)		
Full Path: www.dot.state.co.us/DesignSupport/	(R-X)		
Drawing File Name: 60601011017.dgn	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

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GUARDRAIL TYPE 3 W-BEAM

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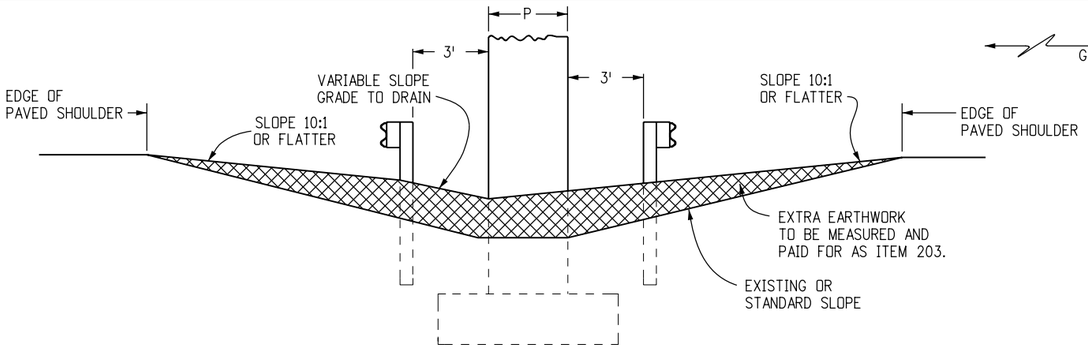
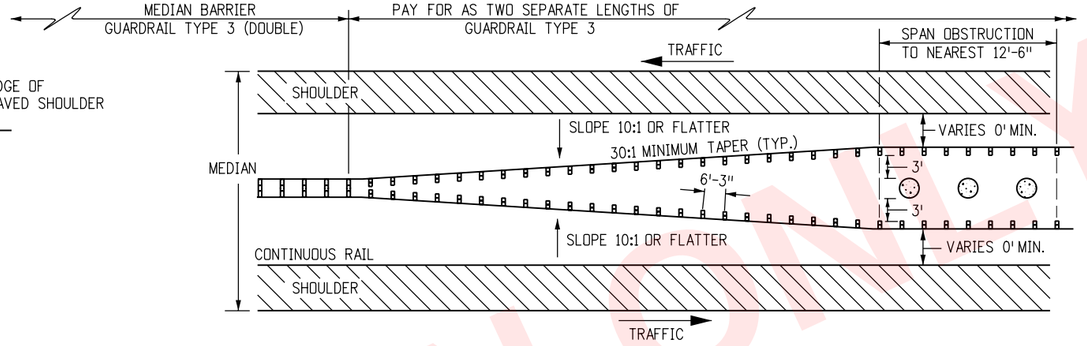
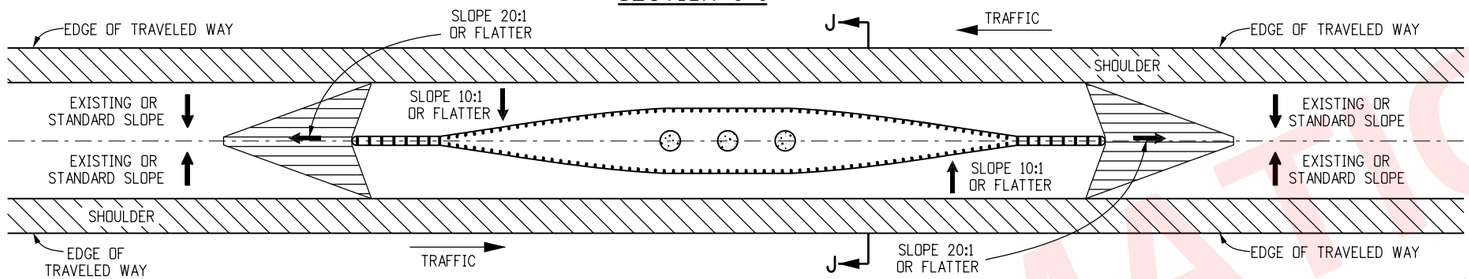


SECTION J-J

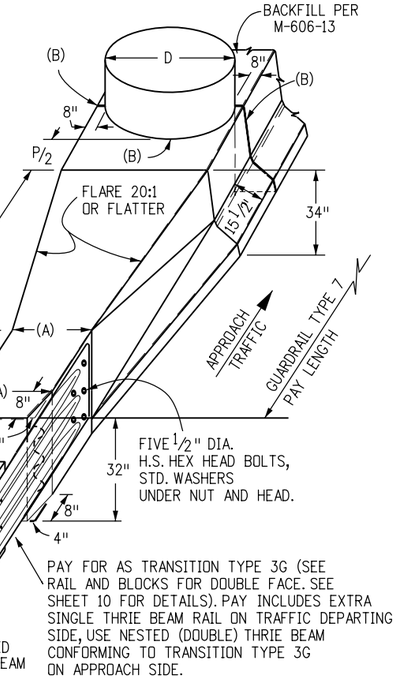


OBSTRUCTION IN MEDIAN 30 FT. WIDE OR LESS



GRADING FOR MEDIAN OBSTRUCTION

D	F
1'	10'
2'	18'
3'	28'
4'	38'
5'	48'



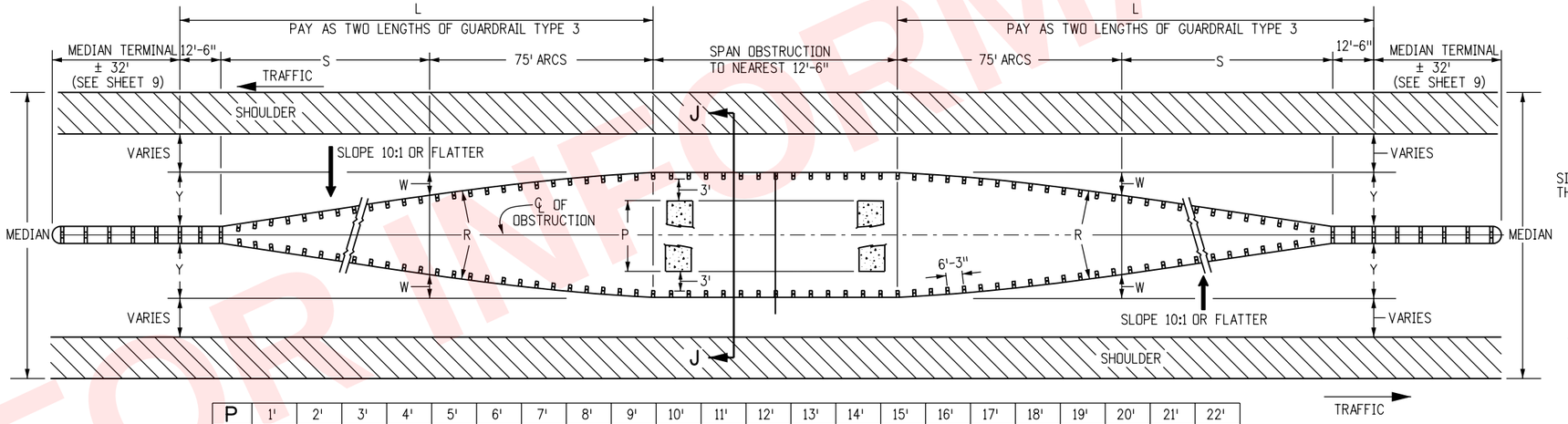
(A). TIMBER POSTS 2 FT., STEEL POSTS 1 FT.-9½IN.

(B). ½ IN. PREFORMED JOINT MATERIAL

NARROW MEDIAN DETAIL

USUALLY LESS THAN 30 FT. WIDE MEDIAN
WITH ALL PAVED SURFACE

◆ END OF GUARDRAIL PAY LENGTH



P	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'
Y	4'-1"	4'-7"	5'-1"	5'-7"	6'-1"	6'-7"	7'-1"	7'-7"	8'-1"	8'-7"	9'-1"	9'-7"	10'-1"	10'-7"	11'-1"	11'-7"	12'-1"	12'-7"	13'-1"	13'-7"	14'-1"	14'-7"
W	1'-5"	1'-11"	2'-5"	2'-11"	3'-5"	3'-11"	3'-4"	3'-8"	4'-1"	3'-7"	3'-11"	3'-6"	3'-8"	4'-0"	3'-7"	3'-10"	4'-0"	3'-8"	3'-11"	3'-7"	3'-10"	4'-0"
R	2009'	1480'	1171'	969'	827'	720'	852'	760'	685'	781'	720'	803'	760'	702'	781'	739'	702'	760'	720'	781'	739'	702'
S	25'						37'-6"			50'		62'-6"			75'			87'-6"		100'		
L	112'-6"						125'			137'-6"		150'			162'-6"			175'		187'-6"		

GUARDRAIL FOR OBSTRUCTION IN MEDIANS WIDER THAN 30 FT.

NOTE: FOR OBSTRUCTIONS (P) THAT ARE WIDER THAN 22 FT. IN MEDIANS 31 FT. OR WIDER, USE THE OPTION 2 DETAIL ON SHEET 13, OPTION 2.

OBSTRUCTIONS IN MEDIANS

Computer File Information		Sheet Revisions	
Creation Date: 07/04/06 Initials: DD		Date:	Comments
Last Modification Date: 08/11/10 Initials: LTA	(R-X)		
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CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

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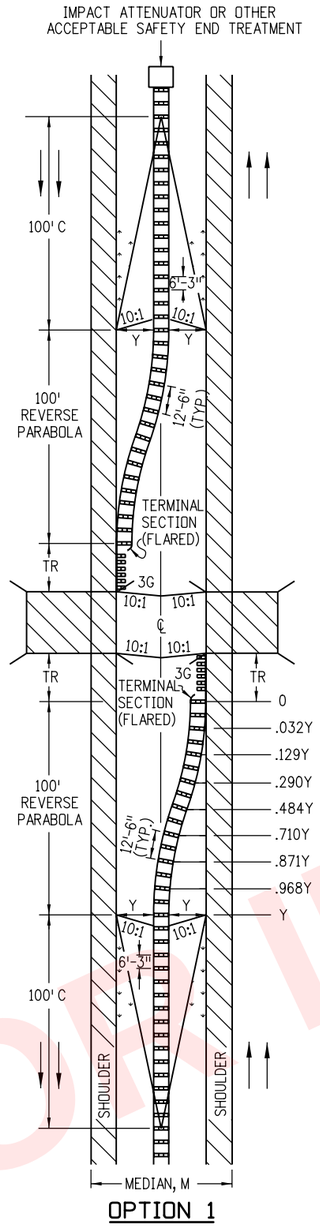
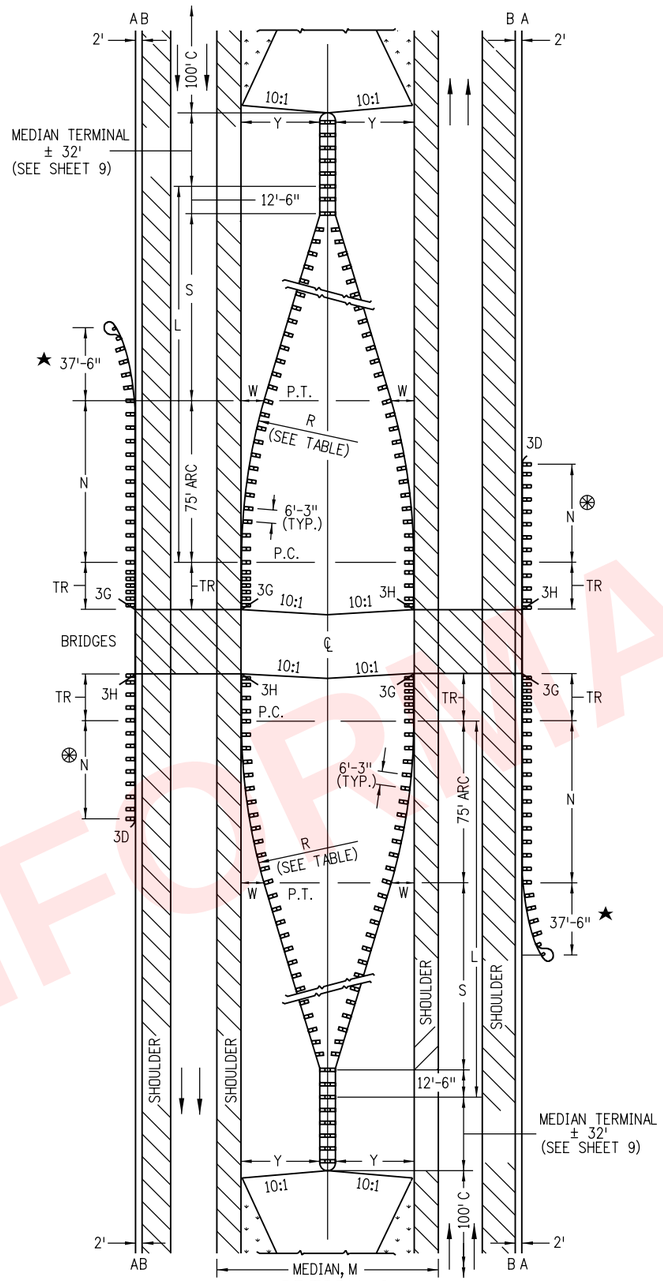


OPTION 1



OPTION 2

31 FT. - 59 FT. MEDIANS

MEDIAN M FT.	END Y FT.	ARC. W FT.	RADIUS R FT.	EXTENS. S FT.	LENGTH L FT.
31	10.5	3.9	720	62.5	150.0
32	11.0	4.2	669		
33	11.5	3.8	739	75.0	162.5
34	12.0	4.0	702		
35	12.5	4.2	669		
36	13.0	3.9	720	87.5	175.0
37	13.5	4.1	685		
38	14.0	3.8	739	100.0	187.5
39	14.5	3.9	720		
40	15.0	4.1	685		
41	15.5	3.9	720	112.5	200.0
42	16.0	4.0	702		
43	16.5	4.2	669		
44	17.0	3.9	720	125.0	212.5
45	17.5	4.0	702		
46	18.0	3.8	739	137.5	225.0
47	18.5	4.0	702		
48	19.0	4.1	685		
49	19.5	3.9	720	150.0	237.5
50	20.0	4.0	702		
51	20.5	4.1	685		
52	21.0	3.0	720	162.5	250.0
53	21.5	4.0	702		
54	22.0	3.9	739	175.0	262.5
55	22.5	4.0	702		
56	23.0	4.1	685		
57	23.5	3.0	739	187.5	275.0
58	24.0	4.0	702		
59	24.5	4.1	685		

⊛ = DO NOT CONSTRUCT THE TR AND GUARDRAIL ON THE TRAILING BRIDGE ENDS IF SITE CONDITIONS DO NOT WARRANT THE USE OF GUARDRAIL.

N = SHOWN ON PLANS. LENGTH TO SHIELD ALL HAZARDS IS BASED ON GUARDRAIL'S LENGTH OF NEED COMPUTATION. SEE AASHTO ROADWAY DESIGN GUIDE. THE MINIMUM SHALL BE 12 FT. - 6 IN., WHERE SITE CONDITIONS ALLOW. THE TOTAL LENGTH OF NEED WILL INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL (N), AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.

▼ = THE TABLE IS BASED ON 4 FT. SHOULDER.

a = EDGE OF 8 FT. OR 10 FT. SHOULDER.

b = EDGE OF 6 FT. OR LESS SHOULDER.

C = CHANGE: 100 FT. TRANSITION TO NORMAL SLOPE.

R = RADIUS OF 75 FT. ARC.

S = STRAIGHT EXTENSION, TANGENT TO ARC, FROM W TO GUARDRAIL TYPE 3 (DOUBLE) ATTACHED TO MEDIAN TERMINAL.

TR = 18 FT.-9 IN. FOR 3G AND 3H.

L = TOTAL LENGTH PAID FOR AS GUARDRAIL TYPE 3.

W = OFFSET AT END OF ARC.

Y = FINAL OFFSET AT END.

M = WIDTH OF MEDIAN.

★ = CAN USE END ANCHORAGE (FLARED) OR (NONFLARED).

MULTILANE DIVIDED HIGHWAYS - (DEPRESSED MEDIANS, 21 FT. - 59 FT. WIDE, WITH OPEN HAZARDS OR OBSTRUCTIONS)

Computer File Information		
Creation Date: 07/04/06	Initials: DD	
Last Modification Date: 08/11/10	Initials: LTA	(R-X)
Full Path: www.dot.state.co.us/DesignSupport/		(R-X)
Drawing File Name: 60601013017.dgn		(R-X)
CAD Ver.: MicroStation V8 Scale: Not to Scale	Units: English	(R-X)

Sheet Revisions	
Date:	Comments
8/11/10	Removed 60 ft. median design.

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GUARDRAIL TYPE 3 W-BEAM

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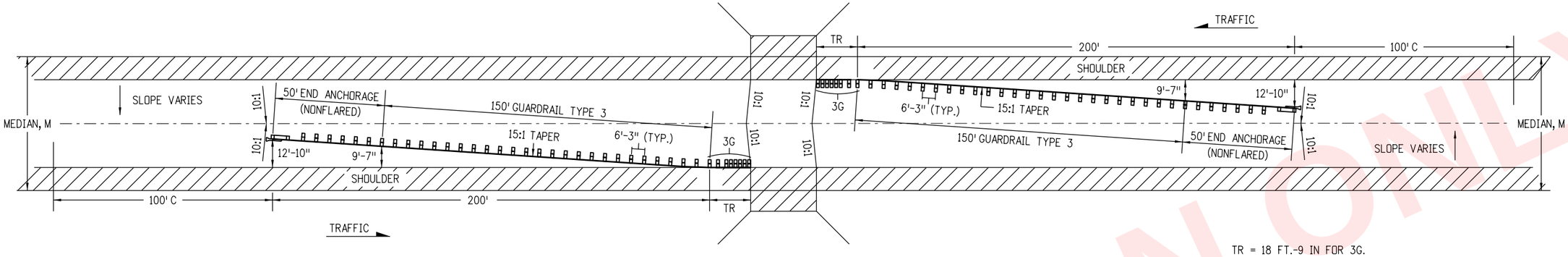
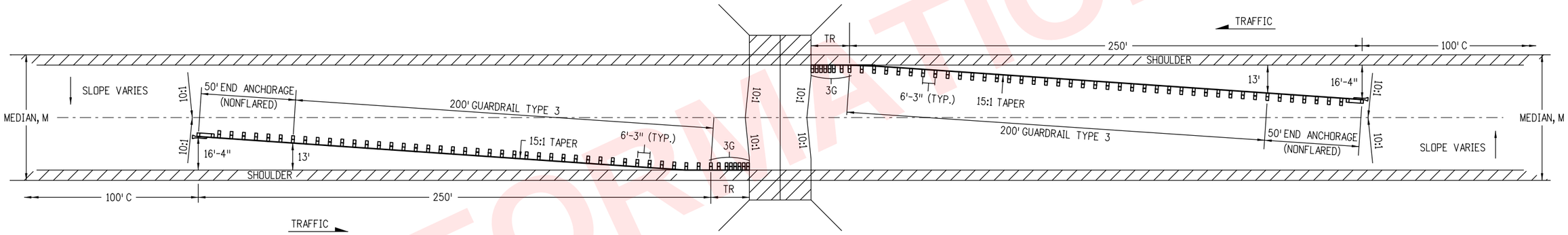
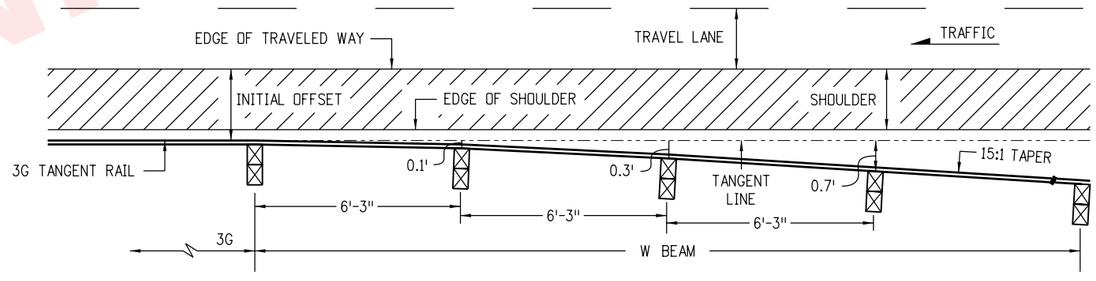


TR = 18 FT.-9 IN FOR 3G.
C = CHANGE: 100 FT. TRANSITION TO NORMAL SLOPE.
M = WIDTH OF MEDIAN.

MEDIANS 60 FT. AND OVER WITH 10 FT. OR WIDER SHOULDERS.



MEDIANS 60 FT. AND OVER WITH 4 to 8 FT. SHOULDERS.



TRANSITION TO TYPICAL 15:1 TAPER

NOTES:

1. GUARDRAIL TRANSITIONS FROM PARALLEL TO ROADWAY SHOULDER AT 3G TO 15:1 TAPER WITHIN 18'-9" BASED ON POST OFFSET DIMENSIONS SHOWN.
2. SEE SHEET 13, OPTION 2 FOR RIGHT SHOULDER GUARDRAIL LAYOUT.

MULTILANE DIVIDED HIGHWAYS - (DEPRESSED MEDIANS, 60 FT. AND OVER WITH OPEN HAZARDS OR OBSTRUCTIONS)

Computer File Information		Sheet Revisions	
Creation Date: 04/20/10 Initials: DD		Date:	Comments
Last Modification Date: 08/11/10 Initials: LTA	(R-X)	8/11/10	Added Sheet 14 of 17.
Full Path: www.dot.state.co.us/DesignSupport/	(R-X)		New median design for 60 ft.
Drawing File Name: 60601013017.dgn	(R-X)		
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)		

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GUARDRAIL TYPE 3
W-BEAM

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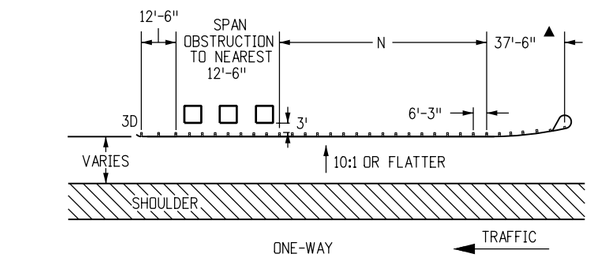
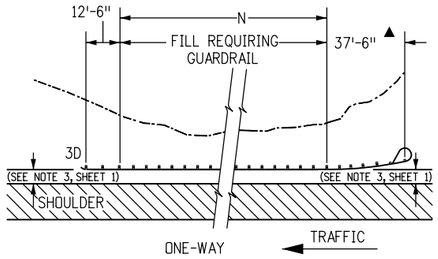
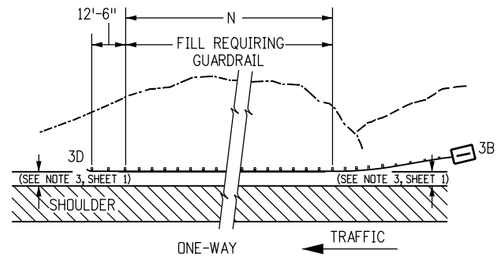
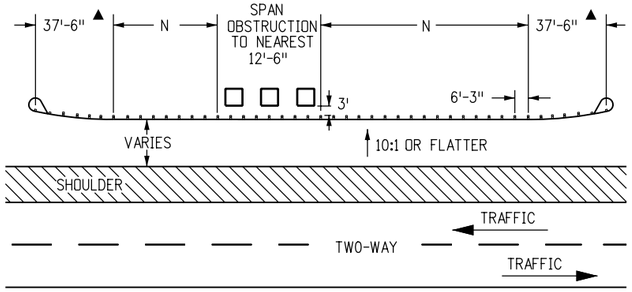
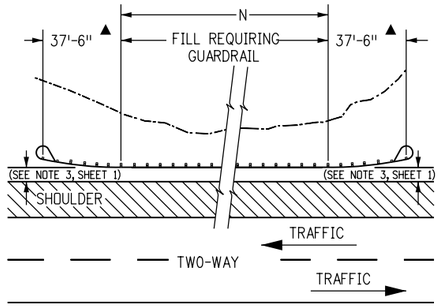




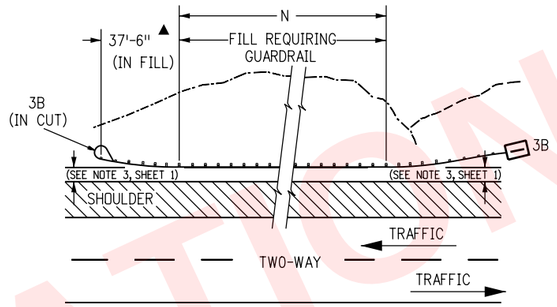




GUARDRAIL FOR ROADSIDE OBSTRUCTIONS



GUARDRAIL FOR ROADSIDE FILL CONSTRUCTION

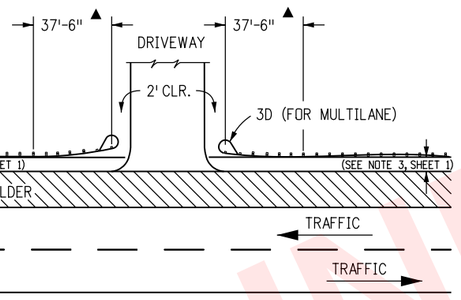


GUARDRAIL FOR ROADSIDE CUT-TO-FILL CONDITION

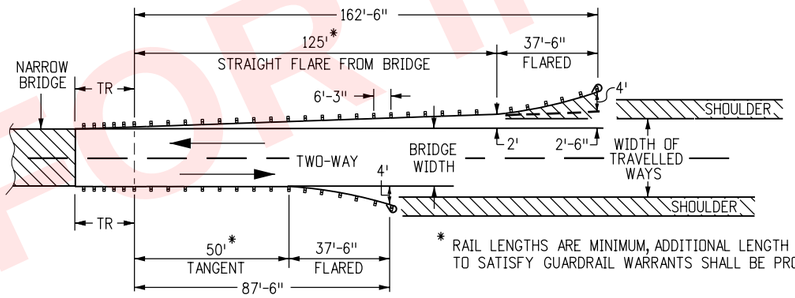
NOTES

1. THE TYPE 3G OR 3H TRANSITIONS (SEE SHEET 10) SHALL BE USED TO CONNECT A TYPE 3 W-BEAM TO TYPE 7 CONCRETE BARRIER OR TO A TYPE 7, 8, OR 10 BRIDGE RAIL. FOR A TRANSITION FROM A ROADWAY TYPE 3 W-BEAM TO A BRIDGE RAIL TYPE 3 WITH BACKING TUBES, THE TRANSITION TYPE 3L SHOWN ON SHEET 16 SHALL BE USED.
2. "TR" WILL BE 18 FT.-9 IN. FOR THE TRANSITIONS TYPE 3G AND 3H, AND 25 FT. FOR THE TRANSITION TYPE 3L.
3. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND IS SHOWN ON THE PLANS. THE MINIMUM IS 12 FT.-6 IN. WHERE SITE CONDITIONS ALLOW. THE OVERALL REQUIRED LENGTH OF NEED CAN INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL (N), AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT. A TRAVERSABLE SLOPE SHALL BE PROVIDED BEHIND THE TERMINAL TO DIMENSION "N" PRIOR TO THE OBSTRUCTION UNLESS OTHERWISE APPROVED BY THE ENGINEER.

▲ END ANCHORAGE CAN BE FLARED OR NONFLARED

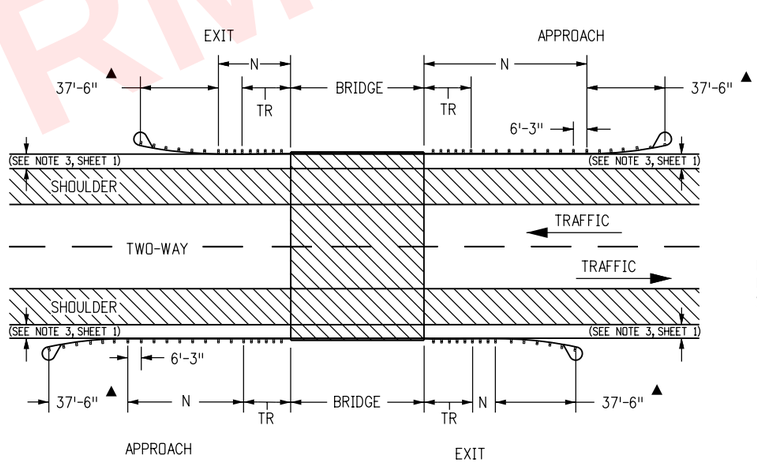


LAYOUT FOR DRIVEWAY APPROACH

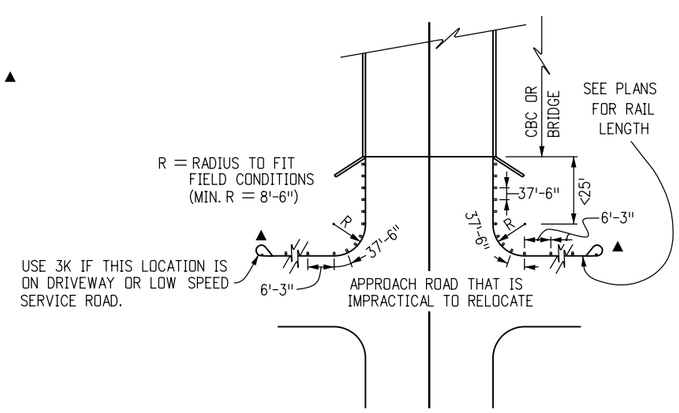


* RAIL LENGTHS ARE MINIMUM, ADDITIONAL LENGTH TO SATISFY GUARDRAIL WARRANTS SHALL BE PROVIDED

2-WAY NARROW APPLICATION



2-WAY NORMAL BRIDGE APPLICATION



GUARDRAIL TYPE 3 WITH BLOCKED OUT POSTS SPACED AT 3'-1½" FROM STRUCTURE AROUND CURVE.

INTERRUPTED STRUCTURE APPROACH

(USE TYPE 3J ON SHEET 11 WHEN PRACTICAL)

Computer File Information		Sheet Revisions	
Creation Date: 07/04/06 Initials: DD		Date:	Comments
Last Modification Date: 08/11/10 Initials: LTA	(R-X)	8/11/10	Revised sheet number.
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GUARDRAIL TYPE 3 W-BEAM

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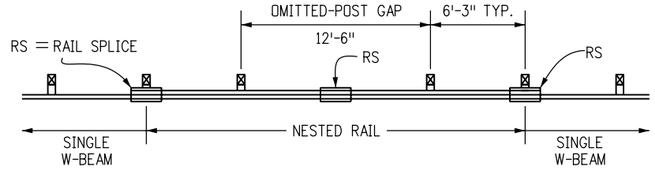
NOTES

1. FOR ONE OMITTED POST IN THE GUARDRAIL RUN, i.e. AT A PIPE CULVERT WITH MINIMUM COVER, SEE THE "NESTED RAIL AT ONE OMITTED POST" DETAIL ON THIS SHEET. THE W-BEAM RAILS SPANNING THE OMITTED-POST GAP SHALL BE DOUBLED (ONE RAIL NESTED IN THE OTHER), AND SHALL EXTEND A MINIMUM OF 6 FT.-3 IN. ON EITHER SIDE OF THE GAP. USING 12 FT.-6 IN. SECTIONS OF RAIL, AND DEPENDING ON THE SPLICE LOCATION, ONE OMITTED POST SECTION REQUIRES EITHER 25 FT. OR 37 FT. - 6 IN. OF NESTED RAIL.

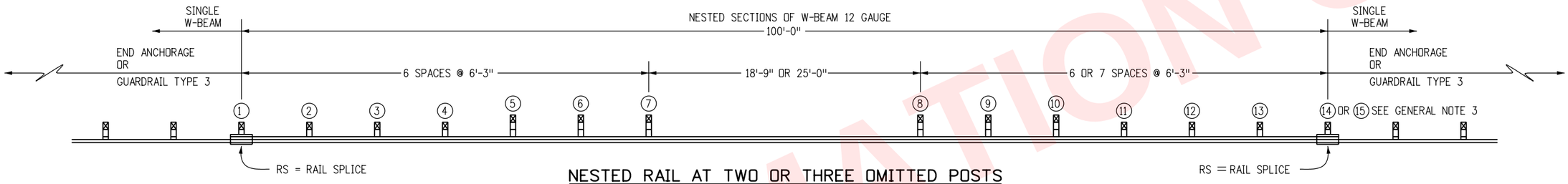
2. FOR TWO OR THREE OMITTED POSTS, SEE THE "NESTED RAIL AT TWO OR THREE OMITTED POSTS" DETAIL ON THIS SHEET. RAIL SPLICES IN THE 100 FT. NESTED SECTION MAY BE PLACED TO FACILITATE CONSTRUCTABILITY. HOWEVER ONLY ONE RAIL SPLICE MAY BE PLACED IN THE OMITTED POSTS SECTION, AND ONLY AT THE MIDPOINT OF THE 25 FT. LENGTH.

3. POST (15) REQUIRED WHEN TWO POSTS ARE OMITTED FOR THE 18 FT.-9 IN. LENGTH.

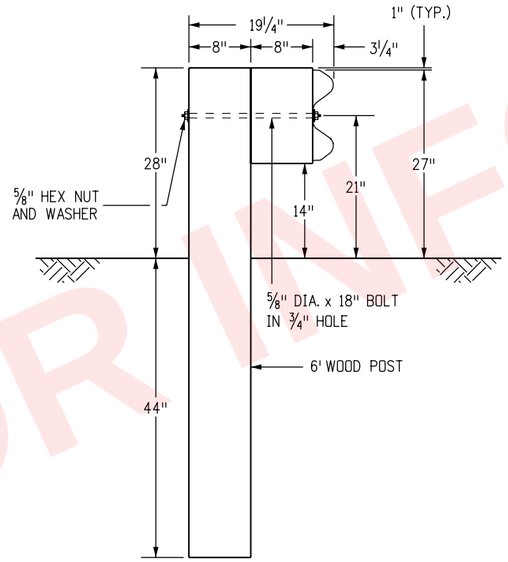
4. ONLY TIMBER POSTS AND BLOCKS ARE ALLOWED FOR WEAKENED POSTS 5 THROUGH 10.



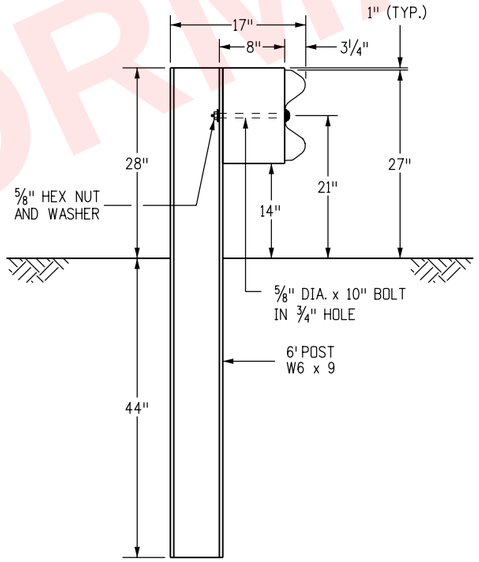
NESTED RAIL AT ONE OMITTED POST



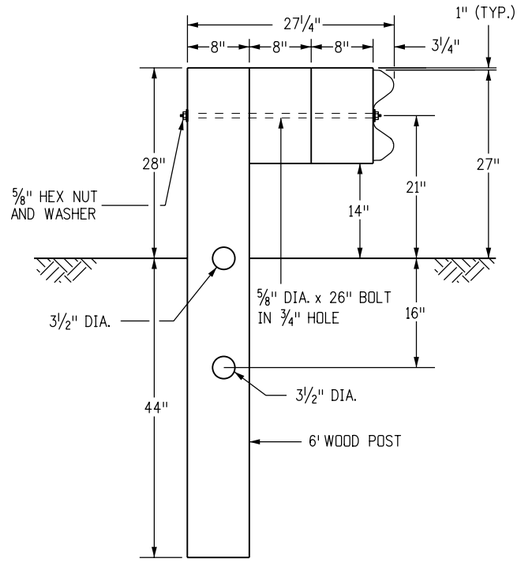
NESTED RAIL AT TWO OR THREE OMITTED POSTS



TIMBER
POSTS (1) - (4) AND (11) - (15)



STEEL
POSTS (1) - (4) AND (11) - (15)



TIMBER
POSTS (5) - (10)

Computer File Information	
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Last Modification Date: 08/11/10 Initials: LTA	(R-X)
Full Path: www.dot.state.co.us/DesignSupport/	(R-X)
Drawing File Name: 60601016017.dgn	(R-X)
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)

Sheet Revisions	
Date:	Comments
08/11/10	Added "Weaken" in Note 4.
	Revised sheet number.

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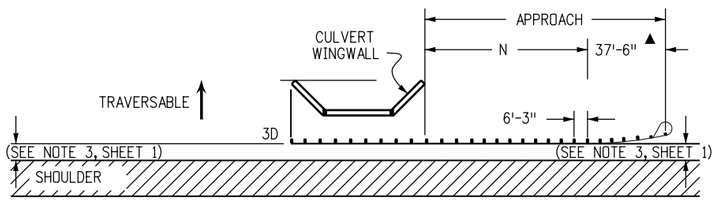
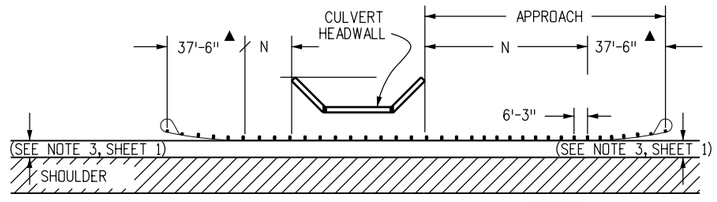
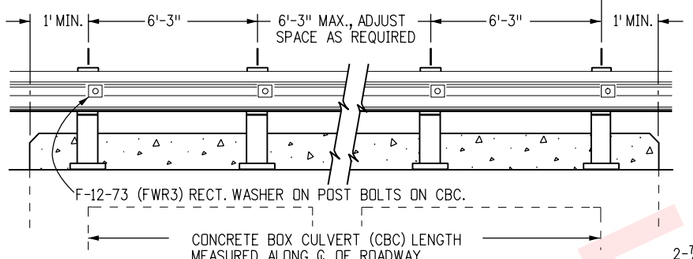
▲ END ANCHORAGE CAN BE FLARED OR NONFLARED.



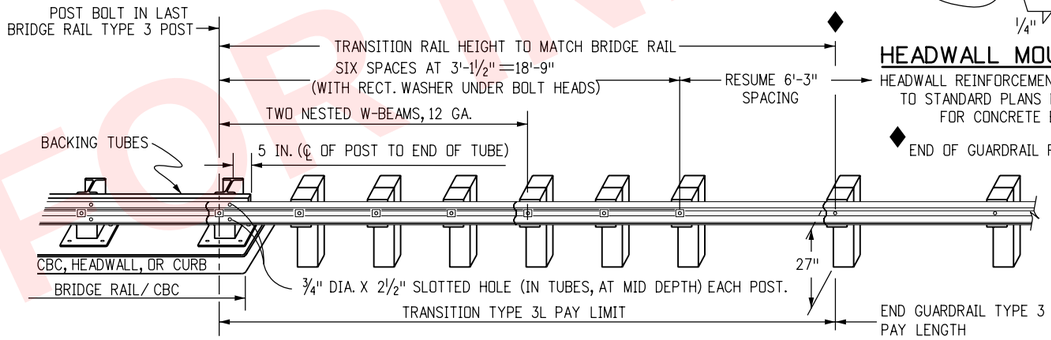


GUARDRAIL FOR CULVERTS

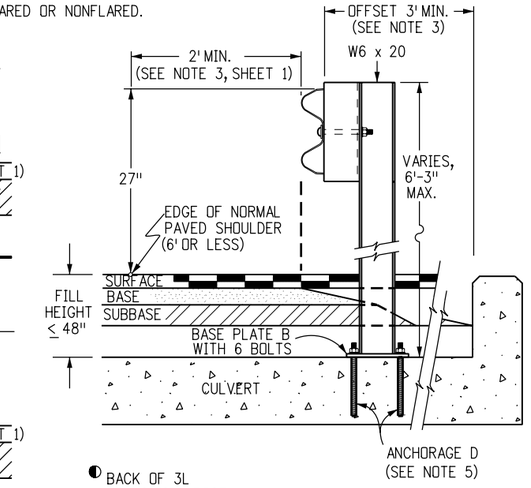


RAIL PLACEMENT FOR INSIDE OR HEADWALL MOUNT

* USE 3L TRANSITION AT BOTH APPROACH AND EXIT ENDS OF BRIDGE RAIL TYPE 3 (HEADWALL MOUNT)

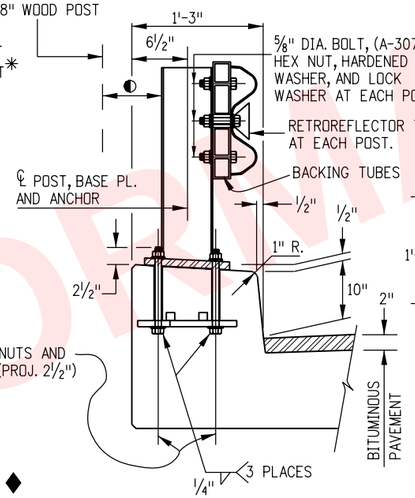


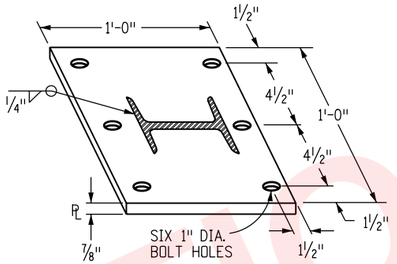
TRANSITION TYPE 3L AND GUARDRAIL TYPE 3 APPROACH



◐ BACK OF 3L TRANSITION POST 5.75" STEEL POST OR 8" WOOD POST

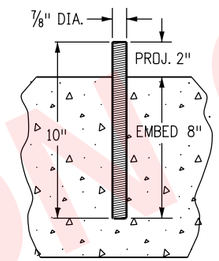
INSIDE MOUNT ON CBC





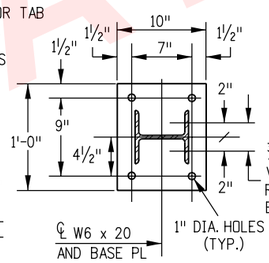
BASE PLATE B

(FOR INSIDE MOUNT)

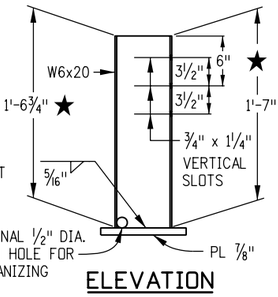


ANCHORAGE D

(FOR INSIDE MOUNT)



PLAN



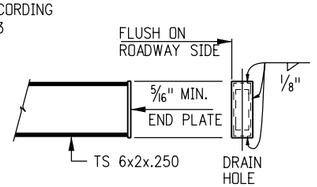
ELEVATION

HEADWALL MOUNT POST DETAIL

HEADWALL MOUNT ON CBC

HEADWALL REINFORCEMENT SHALL BE ACCORDING TO STANDARD PLANS M-601-1, 2, AND 3 FOR CONCRETE BOX CULVERTS.

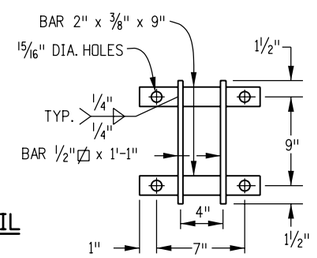
◆ END OF GUARDRAIL PAY LENGTH



BACKING TUBES END DETAIL

(FOR HEADWALL MOUNT)

TUBES SHALL BE CONTINUOUS. NEITHER BOLTED NOR WELDED SPLICES WILL BE ALLOWED.



● ANCHOR DETAIL

(FOR HEADWALL MOUNT)

NOTES

1. LOCATION AND LENGTH OF MEDIAN GUARDRAIL APPROACHES TO CULVERTS WITH FULL HEADWALL AND WINGWALLS SHALL BE AS SHOWN FOR BRIDGES ON SHEET 15. THE GUARDRAIL TYPE 3 SHALL CONTINUE ACROSS THE CULVERT AS SHOWN ON THIS SHEET.
2. RIGHT SHOULDER BOX CULVERT TREATMENT IS SHOWN ON THIS SHEET FOR CULVERTS 20 FT. OR LESS IN LENGTH.
3. GUARDRAIL ACROSS CULVERTS WITH A LENGTH OF 20 FT. OR LESS SHALL BE AS FOLLOWS:
   A. FILL HEIGHT AT GUARDRAIL POST 48 IN. OR GREATER: CONSTRUCTION AND PAYMENT WILL BE AS GUARDRAIL TYPE 3.
   B. FILL HEIGHT AT GUARDRAIL POST LESS THAN 48 IN. AND BLOCK FACE TO HEADWALL OFFSET OF 3 FT. OR GREATER: CONSTRUCTION AND PAYMENT AS GUARDRAIL TYPE 3.
   C. FILL HEIGHT AT GUARDRAIL POST 48 IN. OR LESS AND BLOCK FACE TO HEADWALL OFFSET LESS THAN 3 FT: CONSTRUCTION ACCORDING TO HEADWALL MOUNT DETAILS AND PAYMENT AS BRIDGE RAIL TYPE 3.
4. GUARDRAIL ACROSS CULVERTS WITH LENGTH GREATER THAN 20 FT. SHALL BE AS FOLLOWS:
   A. FILL HEIGHT AT GUARDRAIL POSTS 48 IN. OR GREATER: CONSTRUCTION AND PAYMENT WILL BE FOR STANDARD GUARDRAIL TYPE 3.
   B. FILL HEIGHT AT GUARDRAIL POSTS 48 IN. OR LESS: CONSTRUCTION AND PAYMENT IN ACCORDANCE WITH THE CONTRACT BRIDGE PLANS. WHEN BLOCK FACE TO HEADWALL OFFSET IS 3 FT. OR GREATER: CONSTRUCTION AND PAYMENT AS GUARDRAIL TYPE 3.
5. ANCHORAGE D: SIX BOLTS FOR BASE PLATE "B" WITH INSIDE MOUNT. THE BOLTS SHALL BE 7/8 IN. DIA X 10 IN. HIGH STRENGTH RODS THREADED FULL LENGTH AND ALL GALVANIZED. RODS SHALL BE CAST-IN-PLACE FOR A NEW STRUCTURE. FOR AN EXISTING STRUCTURE, THE RODS SHALL BE INSTALLED IN 1-1/4 IN. DIA HOLES WITH NON-SHRINK GROUT OR EPOXY CONFORMING TO ASTM C 881.
6. TYPE 3L POSTS SHALL BE STEEL OR WOOD TO MATCH POSTS USED ON THE APPROACH GUARDRAIL.
7. THE GUARDRAIL LENGTH DIMENSION "N" IS THE LENGTH AS DETERMINED BY THE LENGTH OF NEED COMPUTATION AND IS SHOWN ON THE PLANS. THE MINIMUM IS 12 FT.-6 IN. WHERE SITE CONDITIONS ALLOW. THE OVERALL REQUIRED LENGTH OF NEED CAN INCLUDE THE LENGTH OF TRANSITION, THE LENGTH OF RAIL (N), AND ANY REDIRECTIVE LENGTH IN THE RAIL END TREATMENT.
8. ALL BRIDGE RAIL TYPE 3 BACKING TUBES SHALL BE FABRICATED FROM ASTM A 500 GRADE B. ALL POSTS, BASE PLATES, AND ANCHOR BOLTS SHALL BE FABRICATED FROM ASTM A 36 STEEL. THE ABOVE MATERIAL, W-BEAM, AND ALL ANCHOR BOLTS AND MISCELLANEOUS BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SECTION 509. CONCRETE, REINFORCING STEEL, AND STRUCTURAL STEEL ELEMENTS SHALL BE IN ACCORDANCE WITH SECTIONS 601, 602, AND 509, RESPECTIVELY.
9. POST ANCHORS, ENCASED IN CONCRETE, SHALL BE ASTM A 36 STEEL, AND NEED NOT BE GALVANIZED.
10. PRIOR TO FABRICATION OF BRIDGE RAIL, THREE SETS OF WORKING DRAWINGS WHICH COMPLY WITH THE REQUIREMENTS OF SECTION 105 SHALL BE SUBMITTED TO THE ENGINEER FOR INFORMATION ONLY.
11. IF HEADWALL MOUNT GUARDRAIL IS USED, SEE STANDARD PLAN M-601, AND NOTES BELOW:
    A. ALL ITEMS ABOVE TOP OF CBC HEADWALL WILL BE MEASURED AND PAID FOR AS LINEAR FEET OF BRIDGE RAIL TYPE 3.
    B. HEADWALL MOUNTING OF RAIL WILL NOT BE MEASURED AND PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

★ FOR STANDARD 12 IN. HEADWALL WITH NO PAVEMENT, THE POST HEIGHT SHALL BE 1 FT.- 5 IN. ADJUST POST HEIGHT FOR PAVEMENT THICKNESS.

● ONE ANCHOR ASSEMBLY SHALL BE PLACED FOR EACH RAIL POST.

Computer File Information			Sheet Revisions	
Creation Date: 07/04/06 Initials: DD		Date:	Comments	
Last Modification Date: 08/11/10 Initials: LTA	(R-X)	08/11/10	Revised sheet number.	
Full Path: www.dot.state.co.us/DesignSupport/	(R-X)		Revised note 4B.	
Drawing File Name: 60601017017.dgn	(R-X)			
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	(R-X)			

Colorado Department of Transportation
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Project Development Branch DD/LTA

GUARDRAIL TYPE 3 W-BEAM

Issued By: Project Development Branch July 04, 2006

STANDARD PLAN NO.
M-606-1
Sheet No. 17 of 17

EXHIBIT A

HESS ROAD OVER WILDLIFE CROSSING PROJECT
DOUGLAS COUNTY PROJECT NO. CI 2024-022

SPECIAL PROVISIONS

BID # CI 2024-022

DOUGLAS COUNTY
100 THIRD STREET
CASTLE ROCK, CO 80104

DOUGLAS COUNTY
PUBLIC WORKS ENGINEERING DEPARTMENT

Bridge DOUHESS-0.65 Improvements

The Colorado Department of Transportation 2023 Standard Specifications for Road and Bridge Construction controls the construction of this project. The following special specifications supplement or modify the Standard Specifications and take precedence over the Standard Specifications and plans.

PROJECT SPECIAL PROVISIONS

Project Special Provisions Index

CDOT STANDARD SPECIAL PROVISIONS

CDOT Standard Special Provisions Index

COMMENCEMENT AND COMPLETION OF WORK

The Contractor shall commence work under the Contract on or before the 15th day following the Contract execution unless such time for beginning the work is changed by the Project Engineer in the "Notice to Proceed."

The work shall be substantially complete within 60 working days in accordance with the "Notice to Proceed" and the punch list items shall be completed within 10 working days. Once work begins, the work shall continue without interruption until its completion. Punch list work shall be done efficiently and effectively so as not to unnecessarily delay work.

The contractor shall notify the County a minimum of 14 calendar days in advance of their desired construction start date.

GENERAL INFORMATION

1. The Colorado Department of Transportation "Standards Specifications for Road and Bridge Construction 2023 (hereafter referred to as the "Standard Specifications") are made a part of this Contract by this reference except as revised herein.

2. The Contractor shall have access to the "Standards Specifications" on the project at all times.

3. Douglas County reserves the right to change quantities by up to 33% without constituting a material change to the character of the work: such changes shall not be considered an extra to the Contract because of the Change.

4. The Contractor is responsible for obtaining any additional permits, licenses, and/or certifications required to complete the work included in the Contract Documents as required by project stakeholders including but not limited to County and State agencies.

REVISION TO SECTION 101
DEFINITIONS AND TERMS

Certain terms utilized in the latest edition of the Colorado Department of Transportation Standard Specifications for Road and Bridge Construction shall be interpreted to have different meanings within the scope of this Contract. A summary of redefinitions is as follows:

Section 101 of the Standard Specifications is hereby revised for this project as follows:

"CDOT Project Engineer" shall be replaced with "Project Engineer" within these specifications. When applicable and when these documents reference a CDOT engineer, this reference shall be construed to mean Project Engineer.

"Consultant Project Engineer" is the consultant employee under the responsible charge of the consultant's Professional Engineer who is in direct charge of the work and is responsible for the administration and satisfactory completion of the project. The Consultant Project Engineer's duties are delegated by the Project Engineer in accordance with the scope of work in the consultant's contract with Douglas County. The Consultant Project Engineer is not authorized to sign or approve Contract Modification Orders.

"Contractor" shall mean prefabricator and/or contractor.

"Department" shall mean Douglas County (where applicable).

"Engineer" shall mean the Douglas County Engineer or designated representative (where applicable).

Additional holidays recognized by Douglas County are:
New Year's Eve Day, Starting at Noon, if falls on Tuesday through Thursday
Full Day New Year's Eve, only if day falls on Monday.
President's Day
Election Day (even years)
Day after Thanksgiving Day
Christmas Eve, Starting at Noon, if falls on Tuesday through Thursday
Full Day Christmas Eve, only if day falls on Monday

"Laboratory" shall mean the Douglas County Engineer or their designated representative.

"Project Engineer" shall mean Douglas County's duly authorized representative who may be a Douglas County employee or an employee of a consulting engineer (consultant) under contract to Douglas County (where applicable).

"Region Transportation Director" shall mean the Douglas County Engineer or designated representative (where applicable).

"State" shall mean Douglas County (where applicable).

REVISION TO SECTION 104
SCOPE OF WORK

Section 104 of the Standard Specifications is revised for this project as follows:

Subsection 104.04, Maintaining Traffic, shall include the following:

The project shall be constructed in two phases with Hess Road reduced to one lane two-way traffic through the work zone with a temporary signal installed for control.

REVISION OF SECTION 107
LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

Section 107 of the Standard Specifications is hereby revised for this project as follows:

Subsection 107.06 shall be revised to include the following:

The Contractor and any subcontractor shall not require any laborer or mechanic employed in performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to their health or safety, as determined under construction safety and health standards (Rules and Regulations of the Federal Occupational Safety and Health Act of 1970 (OSHA) and as amended).

All facilities and work conditions shall comply with Colorado and local Health Department Regulations and with OSHA requirements.

Subsection 107.07, Public Convenience and Safety, add the following:

The Contractor is to notify fire department, sheriff department, residents and businesses within the work area, one week in advance, concerning the hours and dates of the work.

The Contractor will be responsible for coordinating with the property owner/tenants adjacent to the project site. Owners/tenants must be kept up to date on the construction schedule and any inconvenience to their driveways, ingress, egress, etc. Full closure of driveway access shall not be allowed.

Subsection 107.12 shall include the following:

The Contractor shall perform all the work in such a manner that the least environmental damage will result. Any questionable areas or items shall be brought to the attention of the Engineer for approval prior to vegetation removal or any damaging activity. Damaged or destroyed trees, shrubs, or wetlands, which could have been saved, shall be replaced at the expense of the Contractor.

Subsection 107.17, Contractor's Responsibility for Work, add the following:

The Contractor shall be responsible for any damage to their work arising from running water from either a natural source or from landscape watering at no additional cost to the contract.

The Contractor shall be responsible for any damage done by the contractor including to irrigation facilities, landscaping, or private property.

REVISION TO SECTION 108
PROSECUTION AND PROGRESS

Section 108 of the Standard Specifications is hereby revised for this project as follows:

Subsection 108.03, shall include the following:

The Contractor shall submit a CPM baseline schedule to the Engineer at least three (3) working days prior to the preconstruction meeting. This CPM baseline schedule shall show the major salient features of the project through completion.

The minimum salient features to be shown on the Contractor's CPM Schedule are:

- Mobilization
- Erosion Control
- Traffic Control
- Removals/Excavation
- Bridge Construction
- Paving
- Site Restoration

Meetings will be required to review progress and plan upcoming activities. The Erosion Control Supervisor, other representatives, as appropriate, the Contractor, and all active subcontractors shall attend the meetings. Such meetings will be required on a weekly basis at a time to be determined by the Engineer and the Contractor. The Contractor's Superintendent can also serve as the Erosion Control Supervisor, provided they meet the required qualifications.

At the weekly progress meetings, the Contractor shall submit a written statement of planned activities and anticipated inspection, testing, and surveying requirements for the upcoming three (3) weeks. The Contractor shall provide a minimum twenty-four (24) hour notice to the Engineer if the Contractor elects to change a planned activity.

Subsection 108.05, shall include the following:

All work performed by the Contractor or any of their agents shall be accomplished during the established working hours of 7:00 A.M. and 7:00 P.M., Monday through Friday. Neither the Contractor nor their agents shall work outside of the daily working hours without prior written approval by the Engineer.

Subsection 108.06 shall include the following:

The Contractor shall have a Construction Supervisor on the work site at all times to communicate with the Douglas County Representative and control and direct the work. This will not be paid separately but shall be included in the work.

Subsection 108.09 shall include the following:

PROJECT LIQUIDATED DAMAGES:
The Contractor must complete all aspects of the project including punch-list items within an approved not-to-exceed period indicated in the Project Special Provision "Commencement and Completion of Work" or liquidated damages per the table included in Section 108.09 of the CDOT Standard Special Provisions will be incurred.

REVISION OF SECTION 202
REMOVAL OF ASPHALT MAT (PLANING)

Revise Section 202 of the Standard Specifications for this project as follows:

Delete subsection 202.09, and replace it with the following:

202.09 Removal of Asphalt Mat (Planing). Before beginning planing operations, the Contractor shall submit a planing plan and a Process Control Plan (PCP) for approval by the Engineer. The planing plan shall include at a minimum:

(1) The number, types and sizes of planers to be used.

(2) The width and location of each planing pass.

(3) The number and types of brooms to be used and their locations with respect to the planers.

(4) The proposed method for planing and wedging around existing structures such as manholes, valve boxes, and inlets.

(5) The longitudinal and transverse typical sections for tie-ins at the end of the day.

(6) If requested by the Engineer, a plan sheet showing the milling passes.

The PCP shall include as a minimum:

(1) The schedule for replacing the cutting teeth.

(2) The daily preventive maintenance schedule and checklist.

(3) Proposed use of automatic grade controls.

(4) The surface testing schedule for smoothness.

(5) The process for filling distressed areas.

(6) The schedule for testing macrotexture of the milled surface.

(7) Corrective procedures if the milled surface does not meet the minimum macrotexture specification.

(8) Corrective procedures if the milled surface does not meet the minimum transverse or longitudinal surface finish when measured with a 10 foot straightedge.

The Contractor shall not start the planing operation until the hot mix asphalt (HMA) mix design has been approved and a Form 43 has been signed by the Engineer.

The existing pavement shall be milled to the cross-slope as shown on the plans and shall have a surface finish that does not vary longitudinally or transversely more than ⅜ inch from a 10-foot straightedge. A 10-foot straightedge shall be supplied by the Contractor.

All milled surfaces shall be broomed with a pick-up broom, unless otherwise specified, before being opened to traffic. A sufficient number of brooms shall be used immediately after planing to remove all milled material remaining in the roadway.

If the Contractor fails to adequately clean the roadway, work shall cease until the Engineer has approved the Contractor's revised written proposal to adequately clean the roadway.

The milled surface shall have a macrotexture equal to or less than 0.170 inches for single-lift overlays and 0.215 inches for multiple-lift overlays as tested per CP 77. Milled surfaces that do not meet these criteria shall require corrective action per the PCP. The Contractor shall be responsible for testing the macrotexture of the milled surface at the location directed by the Engineer per CP 77 at a stratified random frequency of one test per 10,000 square yards or a minimum of once per work day.

At the completion of each day's work, longitudinal vertical edges greater than 1 inch shall be tapered. No transverse vertical edges will be allowed. Longitudinal milled surface tie-ins to existing pavement shall be tapered to not less than a 3:1 slope, transverse milled surface tie-ins to existing pavement shall be tapered to not less than a 50:1 slope. Transverse tapered joints may be tapered with the planing machine, a temporary asphalt ramp, or other methods approved by the Engineer. No longitudinal joint between the milled and existing surfaces shall fall between 1 to 5 feet of any lane line.

If the transverse joint is tapered with a temporary asphalt ramp, the milled surface at the joint shall be constructed as a butt joint the full depth of the lift of asphalt to be placed on the milled surface. The Contractor shall be responsible for maintaining this asphalt ramp until all corresponding HMA is placed. All work associated with this joint will not be paid for separately but shall be included in the cost of planing.

If the transverse joint is tapered with a planing machine, a butt joint shall be cut into the taper the full depth of the lift of asphalt to be placed on the milled surface before commencement of resurfacing. All work associated with this joint will not be paid for separately but shall be included in the cost of planing.

Other approved transverse joint tapers shall be maintained at the expense of the Contractor, and at a minimum shall incorporate a butt joint the full depth of the lift of asphalt to be placed on the milled surface before commencement of resurfacing.

Distressed or irregular areas identified in the planed surface by the Engineer shall be patched.

The roadway shall be left in a safe and usable condition at the end of each work day. The Contractor shall take appropriate measures to ensure that the milled surface does not trap or hold water. All required pavement markings removed by the planing shall be restored before the roadway is opened to traffic.

All planing shall be completed full width and parallel to the travel lanes before resurfacing commences unless otherwise directed by the Engineer.

All material generated by the planing operation shall become the property of the Contractor unless otherwise noted in the Contract.

Each planer shall conform to the following:

The planer shall have sufficient power, traction and stability to maintain an accurate depth of cut. The propulsion and guidance system of the planer shall be maintained in such condition that the planer may be operated to straight and true lines.

The planer shall be capable of operating with automatic grade controls (contact or non-contact) on both sides of the machine using a 30 foot averaging system or other approved grade control systems. The use of such controls shall be described in the Contractor's PCP.

The planer shall be capable of picking up the removed material in a single operation. A self-loading conveyor shall be an integral part of the planer. Windrows will not be allowed.

Subsection 202.12 shall include the following:

Macrotexture testing, macrotexture corrective actions, planers, brooms, and all other work necessary to complete the item, Removal of Asphalt Mat (Planing), will not be measured and paid for separately, but shall be included in the work.

REVISION OF SECTION 208
EROSION CONTROL

Section 208 of the Standard Specification is hereby revised as follows:

Subsection 208.02(k) shall include the following:

Prior to the initial arrival onto the project site, all equipment shall be thoroughly power washed, including the undercarriages and tires. Equipment must be clean of mud, vegetative matter, and other debris to prevent importation of non-native and noxious weed seeds from other project sites.

REVISION OF SECTION 209
DUST PALLIATIVES

Section 209 of the Standard Specifications is hereby revised for this project as follows:

Subsection 209.05 shall include:

The contractor shall be responsible for controlling vehicle and equipment speeds within the project site to keep dust to a minimum. The Contractor shall monitor activities daily for dust. If excessive dust is being generated by construction vehicles or equipment, the contractor shall immediately take corrective action to ensure operators and drivers control speeds, thereby, assisting in dust suppression.

REVISION OF SECTION 210
RESET GUARDRAIL END TRANSITION

Revise **Section 210** of the Standard Specifications for this project to include the following:

DESCRIPTION

This work consists of resetting the temporarily removed portion of guardrail per these specifications and conforming to the lines and details shown on the plans. All reset items shall be carefully removed, stored, reinstalled, or adjusted in a manner that will avoid loss or damage.

CONSTRUCTION REQUIREMENTS

a) General:

At least 10 working days before beginning removal, the Contractor shall submit a method statement to the Engineer with details of the adjustment and reset operations including the means, methods, sequence, tools, and equipment to be used.

The Contractor's Method Statement shall also include proposed methods used to:

- Repair or replace any damaged anchorages, timber posts, etc. found deficient during reset.
- Track and identify the location of removed items.
- Temporarily store guardrail and components, methods used to store, and location where stored before it is reset.
- Protect the traveling public using and adjacent to the structure during reset operations.

The Engineer must approve all operations, methods, and equipment before the work begins.

The Contractor shall take all steps necessary to protect the bridge railing, guardrail, and existing structure. Any damage caused by the Contractor to any portion of the structure damaged during the reset operation shall be repaired in kind by the Contractor at the Contractor's expense using means and methods approved by the Engineer with no allowance for contract time extension.

Conduct reset operations to protect the traveling public and minimize interference with the traveling public on the structure.

The Contractor shall supply and install any new materials needed to restore the guardrail to an acceptable condition. New materials shall include reflectors and hardware needed to complete the installation.

Existing bridge rail post anchor bar assemblies shall remain in place. Where the surrounding guardrail is to be removed and replaced, the existing bridge rail anchor bar assemblies shall remain

in place. The Contractor may clean and reuse the existing anchor bar assemblies with approval from the Engineer. Replacement anchor bar assemblies shall match the existing assemblies. Record drawings for the existing bridge rail are included in the plans.

Structural steel elements shall conform to the requirements of sections 509.

METHOD OF MEASUREMENT

Reset Guardrail Type 3 will be measured by the actual lengths completed and accepted.

BASIS OF PAYMENT

Payment will be made under:

Pay Item	**Pay Unit**
Reset Guardrail Type 3	Linear Feet

Payment for Reset Guardrail Type 3 will be total compensation for all labor, materials, tools, equipment, and incidentals required to complete the item including but not limited to:

- Temporary storage.
- Cleaning of salvaged material, including posts, tubes, splices, and miscellaneous hardware required for the reset.
- Anchor bars, anchor bolts, miscellaneous bolts, nuts, washers, epoxy grout, and replacement timber posts required for the reset.

HMA patching under the guardrail posts shall be paid for under Section 403.

Curb Type 6 installation shall be paid for under Section 609.

REVISION OF SECTION 403
HOT MIX ASPHALT

Revise Section 403 of the Standard Specifications for this project as follows:

Subsection 403.02 shall include the following:

The design mix for hot mix asphalt shall conform to the following:

Table 403-1

Property	Test Method	Value For Grading
		SX(75)
Air Voids, percent at: N (design)	CPL 5115	3.5 – 4.5
Lab Compaction (Revolutions): N (design)	CPL 5115	75
Stability, minimum	CPL 5106	28
Aggregate Retained on the 4.75 mm (No. 4) Sieve for S, SX and SG, and on the 2.36mm (No. 8) Sieve for ST and SF with at least 2 Mechanically Induced fractured faces, % minimum*	CP 45	60
Accelerated Moisture Susceptibility Tensile Strength Ratio (Lottman), minimum	CPL 5109 Method B	80
Minimum Dry Split Tensile Strength, kPa (psi)	CPL 5109 Method B	205 (30)
Grade of Asphalt Cement, Top Layer		PG 64-22
Grade of Asphalt Cement, Layers below Top		PG 64-22
Voids in the Mineral Aggregate (VMA) % minimum	CP 48	See Table 403-2
Voids Filled with Asphalt (VFA), %	AI MS-2	65-80
Dust to Asphalt Ratio Fine Gradation Coarse Gradation	CP 50	 0.6 – 1.2 0.8 – 1.6

Note: AI MS-2 = Asphalt Institute Manual Series 2
Note: Mixes with gradations having less than 40% passing the 4.75 mm (No. 4) sieve shall be approached with caution because of constructability problems.
Note: Gradations for mixes with a nominal maximum aggregate size of one-inch or larger are considered a coarse gradation if they pass below the maximum density line at the #4 screen.
Gradations for mixes with a nominal maximum aggregate size of 3/4" to 3/8" are considered a coarse gradation if they pass below the maximum density line at the #8 screen.
Gradations for mixes with a nominal maximum aggregate size of #4 or smaller are considered a coarse gradation if they pass below the maximum density line at the #16 screen.
*Fractured face requirements for SF may be waived by RME depending on project conditions.

All mix designs shall be run with a gyratory compaction angle of 1.25 degrees and properties must satisfy Table 403-1. Form 43 will establish construction targets for Asphalt Cement and all mix properties at Air

Voids up to 1.0 percent below the mix design optimum. Douglass County will establish the production asphalt cement and volumetric targets based on the Contractor's mix design and the relationships shown between the hot mix asphalt mixture volumetric properties and asphalt cement contents on the Form 429. Douglass County may select a different AC content other than the one shown at optimum on the Contractor's mix design in order to establish the production targets as contained on the Form 43. Historically, Air Voids adjustments typically result in asphalt cement increases from 0.1 to 0.5 percent. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

Table 403-2

Nominal Maximum Size*, mm (inches)	Minimum Voids in the Mineral Aggregate (VMA)			
	***Design Air Voids **			
	3.5%	4.0%	4.5%	5.0%
37.5 (1½)	11.6	11.7	11.8	N/A
25.0 (1)	12.6	12.7	12.8	
19.0 (¾)	13.6	13.7	13.8	
12.5 (½)	14.6	14.7	14.8	
9.5 (⅜)	15.6	15.7	15.8	
4.75 (No. 4)	16.6	16.7	16.8	16.9
	* The Nominal Maximum Size is defined as one sieve larger than the first sieve to retain more than 10%. ** Interpolate specified VMA values for design air voids between those listed. *** Extrapolate specified VMA values for production air voids beyond those listed.			

The Contractor shall prepare a quality control plan outlining the steps taken to minimize segregation of HMA. This plan shall be submitted to the Engineer and approved before beginning the paving operations. When the Engineer determines that segregation is unacceptable, the paving shall stop and the cause of segregation shall be corrected before paving operations will be allowed to resume.

The hot mix asphalt shall not contain any reclaimed asphalt pavement.

Acceptance samples shall be taken at the location specified in either Method B or C of CP 41.

Delete subsection 403.05 and replace with the following:

403.05 The accepted quantities of hot mix asphalt will be paid for per subsection 401.22, at the contract unit price per ton for the bituminous mixture.

Payment will be made under:

Pay Item	**Pay Unit**
Hot Mix Asphalt (Grading SX)(75)(PG 64-22)	Ton

Aggregate, asphalt recycling agent, asphalt cement, additives, hydrated lime, and all other work and materials necessary to complete each hot mix asphalt item will not be paid for separately but shall be included in the unit price bid. When the pay item includes the PG binder grade, any change to the submitted mix design optimum asphalt cement content to establish production targets on the Form 43 will not be measured and paid for separately but shall be included in the work. No additional compensation will be considered or paid for any additional asphalt cement, plant modifications and

additional personnel required to produce the HMA as a result in a change to the mix design asphalt cement content.

Historically, typical asphalt cement increases reflected on the Form 43 are from 0.1 to 0.5 percent. However, the Contractor should anticipate the AC increases typical of their mixes. Contractors bidding the project should anticipate this change and factor it into their unit price bid.

When the pay item does not include the PG binder grade, asphalt cement will be measured and paid for per Section 411. Asphalt cement used in Hot Mix Asphalt (Patching) will not be measured and paid for separately but shall be included in the work.

Excavation, preparation, and tack coat of areas to be patched will not be measured and paid for separately but shall be included in the work.

REVISION OF SECTION 630
CONSTRUCTION ZONE TRAFFIC CONTROL

Section 630 of the Standard Specifications is hereby revised for this project to include the following:

Subsection 630.01 shall be revised to include the following:

The Contractor shall implement a temporary signal on Hess Road, with traffic in one-lane two-way operation on the bridge during both phases. Any variation from the plans must be approved, in advance, by Douglas County.

Subsection 630.17 is hereby revised as follows:

Traffic Control (Special) shall include all work, materials and labor to provide construction traffic control for the Project in accordance with these specifications and in conformity with the lines and grades shown on the Contract drawings. The terms Traffic Control (Special) and Construction Traffic Control shall be used interchangeably.

No separate measurement and payment will be made for, but not limited to, the following: construction traffic signs and posts, access roads, radios, mobile phones, telephones, Traffic Control Supervisor, Uniformed Traffic Control, variable message signs, shoring, temporary concrete barrier, temporary pavement markings, removal of temporary pavement markings, vertical panels, batteries for flashers, drums, cones, delineators, barricades, supervision, flagging, pilot cars, detour roads, detour signs and posts, temporary culverts, additional earthwork for detours, temporary traffic signals and all other miscellaneous labor, equipment and materials required to complete the Project.

Throughout the duration of the work the Contractor shall maintain one open lane of traffic at all times.

For the Waterproofing (Membrane) and paving operations, the Contractor shall develop a plan on how to maintain one open lane of traffic while protecting the new Waterproofing (Membrane). Traffic shall not be permitted to drive on the new Waterproofing (Membrane) until it is covered by asphalt.

Subsection 630.18 is hereby revised as follows:

Payment will be made under:

Pay Item	**Pay Unit**
Traffic Control (Special)	Lump Sum

REVISION OF SECTION 630
PORTABLE MESSAGE SIGN PANEL

Section 630 of the Standard Specifications is hereby revised for this project as follows:

Subsection 630.01 shall include the following:

This work includes furnishing, operating, and maintaining a portable message sign panel.

Add subsection 630.031 immediately following subsection 630.03 as follows:

630.031 Portable Message Sign Panel. Portable message sign panel shall be furnished as a device fully self-contained on a portable trailer, capable of being licensed for normal highway travel, and shall include leveling and stabilization jacks. The panel shall display a minimum of three eight-character lines. The panel shall be a dot matrix type with an LED legend on a flat black background. LED signs shall have a pre-default message that activates before a power failure. The sign shall be solar powered with independent back up battery power. The sign shall be capable of 360 degrees rotation and shall be able to be elevated to a height of at least five feet above the ground measured at the bottom of the sign. The sign shall be visible from one half mile under both day and night conditions. The message shall be legible from a minimum of 750 feet. The sign shall automatically adjust its light source to meet the legibility requirements during the hours of darkness. The sign enclosure shall be weather tight and provide a clear polycarbonate front cover.

Solar powered message signs shall be capable of operating continuously for 10 days without any sun. All instrumentation and controls shall be contained in a lockable enclosure. The sign shall be capable of changing and displaying sign messages and other sign features such as flash rates, moving arrows, etc.

Each sign shall also conform to the following:

1. In addition to the onboard solar power operation with battery back-up, each sign shall be capable of operating on a hard wire, 100 110 VAC, external power source.
2. All electrical wiring, including connectors and switch controls necessary to enable all required sign functions shall be provided with each sign.
3. Each sign shall be furnished with an operating and parts manual, wiring diagrams, and trouble shooting guide.
4. The portable message sign shall be capable of maintaining all required operations under Colorado mountain winter weather conditions.
5. Each sign shall be furnished with an attached license plate and mounting bracket.
6. Each sign shall be wired with a 7-prong male electric plug for the brake light wiring system.

Subsection 630.13 shall include the following:

The portable message sign panel shall be on the project site at least 7 calendar days prior to the start of active roadway construction. Maintenance, storage, operation, relocation to different sites during the project, and all repairs of portable message sign panels shall be the responsibility of the Contractor.

Subsection 630.15 shall include the following:

Portable message sign panels will not be measured but shall be included in Traffic Control (Special).

UTILITIES

This project is not a "Subsurface Utility Engineering – Required Project". Subsurface utility information shown on the plans may not comply with designation requirements of C.R.S. 9-1.5-101 Et Seq. or American Society of Civil Engineers Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data Manual 38. It is the contractor's responsibility to field verify the size, material, location, and elevation of all utilities prior to commencement of construction.

The work described in these plans and specifications requires full cooperation between the Contractor and the utility owners in accordance with Subsection 105.11 in conducting their respective operations, to complete the utility work with minimum delay to the project.

The Contractor shall perform the following work:

- Avoid and protect existing utilities.
- Provide an accurate construction schedule to each utility owner. Provide each utility owner with weekly updates to the schedule.
- Conduct detailed utility coordination meetings prior to each construction phase to coordinate all requirements and schedules, and provide other necessary accommodations as directed by the Engineer.
- Allow each utility owner reasonable access to the project site before, during, and after construction and demolition so that each utility owner can inspect and ensure the protection of their facilities.
- Prior to excavating, the Contractor shall positively locate (through potholing if necessary) all potential conflicts with existing underground utilities and proposed construction, as determined by the Contractor according to proposed methods and schedule of construction. The Contractor shall modify construction plans to avoid existing underground facilities as needed, and as approved by the Engineer. Please note that UNCC marks only its members' facilities – Other facilities, such as ditches and drainage pipes may exist, and it is the Contractor's responsibility to investigate, locate and avoid such facilities.
- The Contractor shall comply with Article 1.5 of Title 9, CRS ("Excavation Requirements") when excavating or grading is planned in the area of underground utility facilities. The Contractor shall notify all affected utilities at least two (2) business days, not including the actual day of notice, prior to commencing such operations. The Contractor shall contact the Utility Notification Center of Colorado (UNCC) at phone no. 811, to have locations of UNCC registered lines marked by member companies. All other underground facilities shall be located by contacting the respective owner. Utility service laterals shall also be located prior to beginning excavation or grading.

All costs incidental to the foregoing requirements will not be paid for separately but shall be included in the work.

SHOP DRAWINGS, CONSTRUCTION INSPECTION, AND TESTING

The Contractor shall provide shop drawings to the Engineer for review. This review shall not relieve the Contractor from any liability or from compliance with the requirements of the plans and specifications.

The Contractor is solely responsible for QA/QC of all submittals. The Contractor shall not rely on reviews by the Engineer or other stakeholders for QC. The Contractor is solely responsible for mistakes, omissions, or other errors on shop drawings and other submittals. Comments or lack of comments from the Engineer or other stakeholders shall not relieve the Contractor of any liability or from compliance with the requirements of the plans and specifications.

Inspection and testing services during construction shall be provided in accordance with the more stringent of the following specifications.

- Project special provisions
- CDOT Standard Specifications
- CDOT Field Material Manual - BABA

Reports of inspections and tests shall be submitted to the Engineer for review. Reports shall indicate that the work inspected or tested was or was not completed in accordance with the approved construction documents. Reports shall also indicate which specification (listed above) governed for each inspection or test.

FORCE ACCOUNT ITEMS

DESCRIPTION

This special provision contains the estimate for force account items included in the Contract. The estimated amounts marked with an asterisk will be added to the total bid to determine the amount of the performance and payment bonds. Force Account work shall be performed as directed by the Engineer.

F/A Minor Contract Revisions – Consists of minor work authorized and approved by the Engineer, which is not included in the contract drawings or specifications and is necessary to accomplish the scope of work of this contract.

F/A Erosion Control – This work includes any supplemental erosion control measures required by the engineer, but not provided for in the contract drawings or specifications.

BASIS OF PAYMENT

Payment will be made in accordance with subsection 109.04. Payment will constitute full compensation for all work necessary to complete the item.

Force account work valued at $5,000 or less, that must be performed by a licensed journeyman in order to comply with federal, state, or local codes, may be paid for after receipt of an itemized statement endorsed by the Contractor.

Force Account Item	Estimated Quantity	Amount
F/A Minor Contract Revisions	F.A.	$ 21,000
F/A Erosion Control	F.A.	$ 5,000

CDOT STANDARD SPECIAL PROVISIONS

Revision of Section 103
Colorado Resident Bid Preference

Section 103 of the Standard Specifications is hereby revised for this project as follows:

Subsection 103.01 shall include the following:

(a) Colorado Resident Bid Preference. A resident bidder shall be allowed a preference against a nonresident bidder from a state or foreign country equal to the preference given or required by the state or foreign country in which the nonresident bidder is a resident.

Resident bidder means:

(1) A person, partnership, corporation, or joint venture which is authorized to transact business in Colorado, and which maintains its principal place of business in Colorado: or,

(2) A person, partnership, corporation, or joint venture, which is authorized to transact business in Colorado, which maintains a place of business in Colorado, and which has paid Colorado unemployment compensation taxes in at least seventy-five percent of the eight quarters immediately prior to bidding on a construction contract for a public project.

To determine the resident bid preference status of a bidder, the bidder shall submit a completed Form 604 with the proposal. Failure to submit the residency Form with the proposal will be justification for and may result in the rejection of the proposal and forfeiture of the proposal guaranty.

The proposals will be treated as follows:

(1) All proposals will be checked for accuracy by the Department.

(2) The dollar amount of the checked proposal from nonresident bidders will be adjusted by a percentage equal to the percentage preference given or required by the state or foreign country of the bidder's residency. If the state or foreign country does not give or require a residency preference, no adjustment in the proposal dollar amount will be made.

(3) Adjusted proposals from nonresident bidders will then be compared to proposals from resident bidders, and the bidder with the lowest total will be considered the apparent low bidder.

(4) Should a nonresident bidder be the apparent low bidder, in accordance with paragraph (3) above, an award will be made on the basis of the original proposal, not the adjusted proposal.

(5) The Department will proceed with its normal award procedure.

October 1, 2023

1
Revision of Section 105
Construction Drawings

Section 105 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 105.02(f).

1
Revision of Section 105
Control Of Work

Revise Section 105 of the Standard Specifications as follows:

Revise Paragraphs 4, 5 and 6 of Subsection 105.20 as follows:
If damage occurs to an existing structure through improper maintenance per 105.19, the Contractor shall submit a repair procedure to the Engineer to repair the defect(s).

The repair categories and requirements are defined as follows:

a) *"In-kind" repairs*. In-kind repairs are repairs where the As-Built or Advertised plans are utilized to replace or repair damaged components with identical dimensions and materials used plans and where no plan modifications are made. In-kind repair procedures shall be reviewed and accepted by the Engineer before any repair. The use of approved repair grouts or doweled reinforcing with epoxy adhesive is permitted in in-kind repairs. Doweled reinforcing shall meet or exceed the strength requirements of the original design.

b) "*Modified repairs*". Modified repairs are those which deviate in dimensions and/or materials from the As-Built or Advertised plans or where plans are not available. Modified repair procedure submittals shall include calculations, independent design calculations, shop drawings, and/or working drawings per 105.02, and any other applicable section of the specifications for the needed repair. The Contractor's Engineer shall electronically seal Modified repair submittals.

Damage to new structures or modified structures, shall be repaired per the contract documents.

The Engineer of Record shall be notified and review all corresponding submittals before any repairs.

REVISION OF SECTIONS OF 105
DISPUTE REVIEW BOARD AND
CLAIMS FOR UNRESOLVED DISPUTES

Revise Section 105 of the Standard Specifications as follows:

Delete and replace Section 105.23 (i) with the following:

(i) Dispute Review Board Recommendation. The DRB shall issue a Recommendation per the following procedures:

1. The DRB shall not make a recommendation on the dispute at the meeting. Before the closure of the hearing, the DRB members and the Contractor and CDOT together will discuss the time needed for analysis and review of the dispute and the issuance of the DRB's recommendation. The maximum time shall be 30 days unless otherwise agreed to by both parties.

2. After the meeting has been closed, the DRB shall prepare a written Recommendation signed by each member of the DRB. In the case of a three member DRB where one member dissents, that member shall prepare a written dissent and sign it. The DRB's recommendation shall include the following:

(a) A summary of the issues and factual evidence presented by the Contractor and CDOT concerning the dispute.

(b) Recommendations concerning the validity of the dispute.

(c) Recommendations concerning the value of the dispute as to cost impacts if the dispute is determined to be valid.

(d) The contractual and factual bases supporting the recommendation(s) made including an explanation as to why each and every position was accepted or rejected.

(e) Detailed and supportable calculations which support any recommendation(s).

3. The chairperson shall transmit the signed Recommendation and any supporting documents to both parties.

105.24 Claims for Unresolved Disputes delete and replace with the following:

105.24 Claims for Unresolved Disputes. The Contractor may file a claim only if the disputes resolution process described in subsections 105.22 and 105.23 has been exhausted without resolution of the dispute. Other methods of nonbinding dispute resolution, exclusive of litigation, can be used if agreed to by both parties.

This subsection applies to any unresolved dispute or set of disputes between CDOT and the Contractor with an aggregate value of more than $15,000. Unresolved disputes with an aggregate value of more than $15,000 from subcontractors, materials suppliers or any other entity not a party to the Contract shall be submitted through the Contractor per this subsection as a pass-through claim. Review of a pass-through claim does not create privity of Contract between CDOT and any other entity.

Subsections 105.22, 105.23 and 105.24 provide both contractual alternative dispute resolution

processes and constitute remedy- granting provisions pursuant to Colorado Revised Statutes (CRS) which must be exhausted in their entirety.

Litigation proceedings must commence within 180-calendar days of the Chief Engineer's decision, absent written agreement otherwise by both parties.

The venue for all unresolved disputes with an aggregate value $15,000 or less shall be the County Court for the City and County of Denver.

Non-binding Forms of alternative dispute resolution such as Mediation are available upon mutual agreement of the parties for all claims submitted per this subsection.

The cost of the non-binding ADR process shall be shared equally by both parties with each party bearing its own preparation costs. The type of nonbinding ADR process shall be agreed upon by the parties and shall be conducted within the State of Colorado at a mutually acceptable location. Participation in a nonbinding ADR process does not in any way waive the requirement that litigation proceedings must commence within 180-calendar days of the Chief Engineer's decision, absent written agreement otherwise by both parties.

(a) Notice of Intent to File a Claim. Within 30 days after rejection of the Dispute Resolution Board's Recommendation issued per subsection 105.23, the Contractor shall provide the Region Transportation Director (RTD) with a written notice of intent to file a claim. The Contractor shall also send a copy of this notice to the Resident Engineer. For the purpose of this subsection, Region Transportation Director shall mean the Region Transportation Director or the Region Transportation Director's designated representative. CDOT will acknowledge in writing receipt of Notice of Intent within seven days.

(b) Claim Package Submission. Within 60 days after submitting the notice of intent to file a claim, the Contractor shall submit to the RTD five copies of a complete claim package representing the final position the Contractor wishes to have considered. All claims shall be in writing and in sufficient detail to enable the RTD to ascertain the basis and amount of claim. The claim package shall include all documents supporting the claim, regardless of whether such documents were provided previously to CDOT.

If requested by the Contractor, the 60-day period may be extended by the RTD in writing before final acceptance. At a minimum, the following information shall accompany each claim:

1. A claim certification containing the following language, as appropriate:

REVISION OF SECTIONS OF 105 DISPUTE REVIEW BOARD AND CLAIMS FOR UNRESOLVED DISPUTES

A. For a direct claim by the Contractor:

CONTRACTOR'S CLAIM CERTIFICATION

Under penalty of law for perjury or falsification, the undersigned, (name)_____, (title)_____, of _____(company)_____, hereby certifies that the claim of $___for extra compensation and _____Days additional time, made for work on this Contract is true to the best of my knowledge and belief and supported under the Contract between the parties.

This claim package contains all available documents that support the claims made and I understand that no additional information, other than for clarification and data supporting previously submitted documentation, may be presented by me.

Dated _____/s/__

Subscribed and sworn before me this day of

.

NOTARY PUBLIC

My Commission Expires: _____

B. For a pass-through claim:

PASS-THROUGH CLAIM CERTIFICATION

Under penalty of law for perjury or falsification, the undersigned, (name)_____, (title)_____, , of _____(company)_____, hereby certifies that the claim of $__ for extra compensation and _____ Days additional time, made for work on this Project is true to the best of my knowledge and belief and supported under the Contract between the parties.

This claim package contains all available documents that support the claims made and I understand that no additional information, other than for clarification and data supporting previously submitted documentation, may be presented by me.

_

Dated _____/s/__

Subscribed and sworn before me this day of _

NOTARY PUBLIC

My Commission Expires: _____

Dated _____/s

The Contractor certifies that the claim being passed through to CDOT is passed through in good faith and is accurate and complete to the best of my knowledge and belief.

_

Dated _____/s/__

Subscribed and sworn before me this day

of_

NOTARY PUBLIC

My Commission Expires: _____

2. A detailed factual statement of the claim for additional compensation, time, or both, providing all necessary dates, locations, and items of work affected by the claim. The Contractor's detailed factual statement shall expressly describe the basis of the claim and factual evidence supporting the claim. This requirement is not satisfied by simply incorporating into the claim package other documents that describe the basis of the claim and supporting factual evidence.
3. The date on which facts were discovered which gave rise to the claim.
4. The name, title, and activity of all known CDOT, Consultant, and other individuals who may be knowledgeable about facts giving rise to such claim.
5. The name, title, and activity of all known Contractor, subcontractor, supplier and other individuals who may be knowledgeable about facts giving rise to such claim.
6. The specific provisions of the Contract, which support the claim and a statement of the reasons why such provisions support the claim.
7. If the claim relates to a decision of the Project Engineer, which the Contract leaves to the Project Engineer's discretion, the Contractor shall set out in detail all facts supporting its position relating to the decision of the Project Engineer.
8. The identification of any documents and the substance of all oral communications that support the claim.
9. Copies of all known documents that support the claim.
10. The Dispute Review Board Recommendation.
11. If an extension of contract time is sought, the documents required by subsection 108.08(d).
12. If additional compensation is sought, the exact amount sought and a breakdown of that amount into the following categories:

    A. These categories represent the only costs that, if applicable, are recoverable by the Contractor. All other costs or categories of costs are not recoverable:

    (1) Actual wages and benefits, including FICA, paid for additional labor.

    (2) Costs for additional bond, insurance, and tax.

    (3) Increased costs for materials.

    (4) Equipment costs calculated per subsection 109.04(c) for Contractor owned equipment and based on certified invoice costs for rented equipment.

    (5) Costs of extended job site overhead (only applies if the dispute also includes a time extension).

    (6) Salaried employees assigned to the project (only applies if the dispute also includes a time extension or if the dispute required salaried employee(s) to be added to the Project).

    (7) Claims from subcontractors and suppliers at any level (the same level of detail as specified is required for all such claims).

(8) An additional 16 percent will be added to the total of items (1) through (7) as compensation for items for which no specific allowance is provided, including profit and home office overhead.

(9) Interest shall be paid per CRS 5-12-102 beginning from the date of the Notice of Intent to File Claim.

B. In adjustment for the costs as allowed above, the Department will have no liability for the following items of damages or expense:

(1) Profit in excess of that provided in 12.A.(8) above.

(2) Loss of Profit.

(3) Additional cost of labor inefficiencies in excess of that provided in A. above.

(4) Home office overhead in excess of that provided in A. above.

(5) Consequential damages, including but not limited to loss of bonding capacity, loss of bidding opportunities, and insolvency.

(6) Indirect costs or expenses of any nature in excess of that provided in A. above.

(7) Attorney's fees, claim preparation fees, and expert fees.

(c) Region Transportation Director Decision. When the Contractor properly files a claim, the RTD will review the claim and render a written decision to the Contractor to either affirm or deny the claim, in whole or in part, per the following procedure.

The RTD may consolidate all related claims on a project and issue one decision, provided that consolidation does not extend the time period within which the RTD is to render a decision. Consolidation of unrelated claims will not be made.

The RTD will render a written decision to the Contractor within 90 days after the receipt of the claim package or receipt of the audit whichever is later. In rendering the decision, the RTD: (1) will review the information in the Contractor's claim; (2) will conduct a hearing if requested by either party; and (3) may consider any other information available in rendering a decision.

The RTD will assemble and maintain a claim record comprised of all information physically submitted by the Contractor in support of the claim and all other discoverable information considered by the RTD in reaching a decision. Once the RTD assembles the claim record, the submission and consideration of additional information, other than for clarification and data supporting previously submitted documentation, at any subsequent level of review by anyone, will not be permitted.

The RTD will provide a copy of the claim record and the written decision to the Contractor describing the information considered by the RTD in reaching a decision and the basis for that decision. If the RTD fails to render a written decision within the 60-day period, or within any extended time period as agreed to by both parties, the Contractor shall either: (1) accept this as a denial of the claim, or (2) appeal the claim to the Chief Engineer, as

described in this subsection.

If the Contractor accepts the RTD decision, the provisions of the decision shall be implemented per subsections 108.08, 109.04, 109.05, or 109.10 and the claim is resolved.

If the Contractor disagrees with the RTD decision, the Contractor shall either: (1) accept the RTD decision as final, or (2) file a written appeal to the Chief Engineer within 30 days from the receipt of the RTD decision. The Contractor hereby agrees that if a written appeal is not properly filed, the RTD decision is final.

(d) Chief Engineer Decision. When a claim is appealed, the RTD will provide the claim record to the Chief Engineer. Within 15 days of the appeal either party may submit a written request for a hearing with the Chief Engineer or duly authorized Headquarters delegates. The Chief Engineer or a duly authorized Headquarters delegate will review the claim and render a decision to affirm, overrule, or modify the RTD decision per the following.

The Chief Engineer will render a written decision within 60 days after receiving the written appeal. The Chief Engineer will not consider any information that was not previously made a part of the claim record, other than clarification and data supporting previously submitted documentation.

The Contractor shall have 30 days to accept or reject the Chief Engineer's decision. The Contractor shall notify the Chief Engineer of its acceptance or rejection in writing.

If the Contractor accepts the Chief Engineer's decision, the provisions of the decision will be implemented per subsections 108.08, 109.04, 109.05, or 109.10 and the claim is resolved.

If the Contractor disagrees with the Chief Engineer's decision, the Contractor shall either (1) pursue an alternative dispute resolution process per this specification or (2) initiate litigation per subsection 105.24(f).

If the Chief Engineer does not issue a decision as required, the Contractor may immediately initiate litigation per subsection 105.24(f).

For the convenience of the parties to the Contract it is mutually agreed by the parties that any merit binding or De Novo litigation shall be brought within 180-calendar days from the date of the Chief Engineer's decision. The parties understand and agree that the Contractor's failure to bring suit within the time period provided, shall be a complete bar to any such claims or causes of action.

(e) De Novo Litigation If the Contractor disagrees with the Chief Engineer's decision, the Contractor may initiate de novo litigation to finally resolve the claim that the Contractor submitted to CDOT. Such litigation shall be strictly limited to those claims that were previously submitted and decided in the contractual dispute and claims processes outlined. This does not preclude the joining in one litigation of multiple claims from the same project provided that each claim has gone through the dispute and claim process specified in subsections 105.22 through 105.24. The parties may agree, in writing, at any time, to pursue some other form of alternative dispute resolution.

Any offer made by the Contractor or the Department at any stage of the claims process,

as set forth in this subsection, shall be deemed an offer of settlement pursuant to Colorado Rule of Evidence 408 and therefore inadmissible in any litigation.

If the Contractor selected litigation, then de novo litigation shall proceed per the Colorado Rules of Civil Procedure and the proper venue is the Colorado State District Court in and for the City and County of Denver.

REVISION OF SECTIONS OF 105 DISPUTE REVIEW BOARD AND CLAIMS FOR UNRESOLVED DISPUTES

Figure 105-1 DISPUTES AND CLAIMS FLOW CHART
(Note: If an audit is to be performed, durations in this flow chart are extended accordingly)

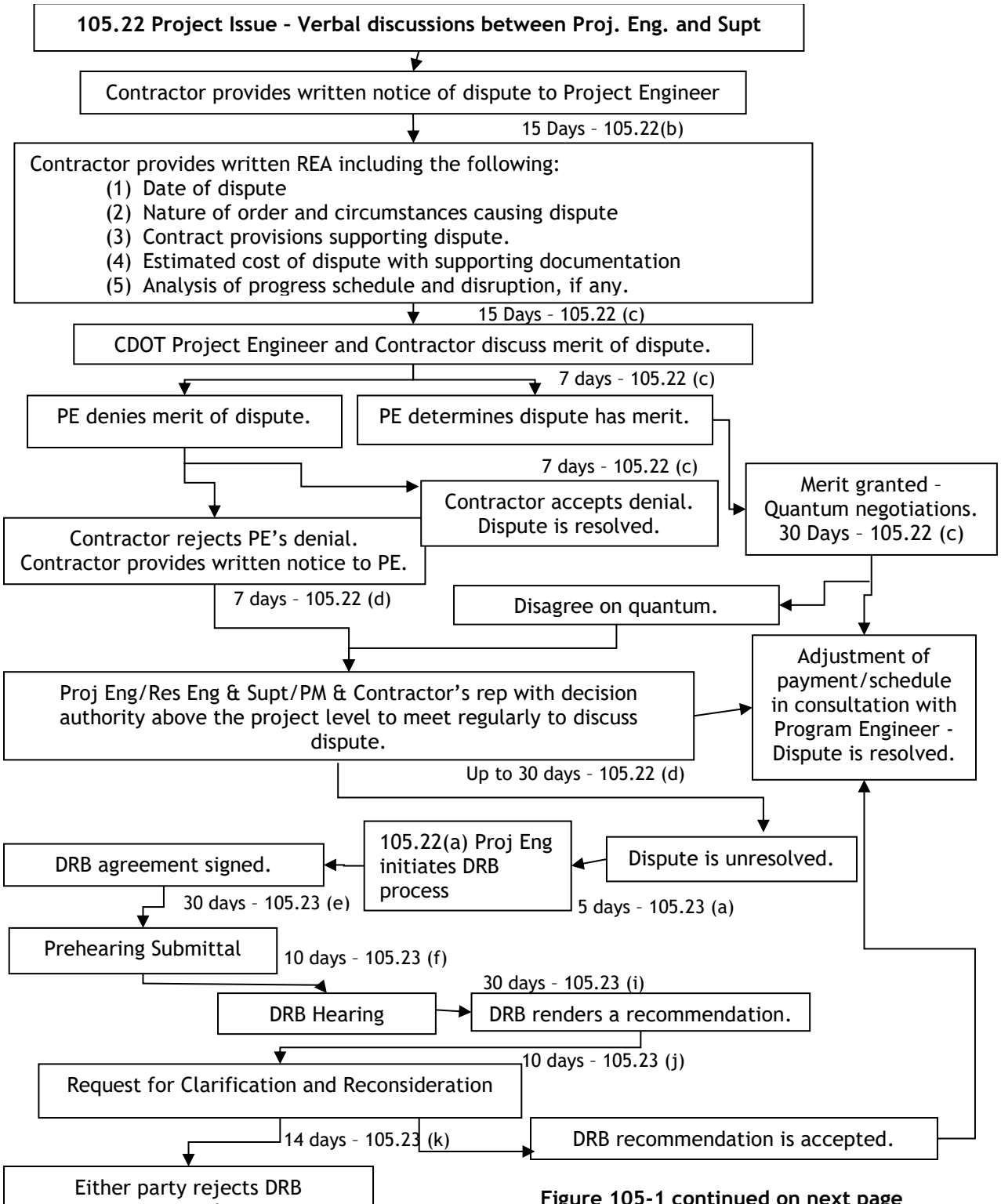
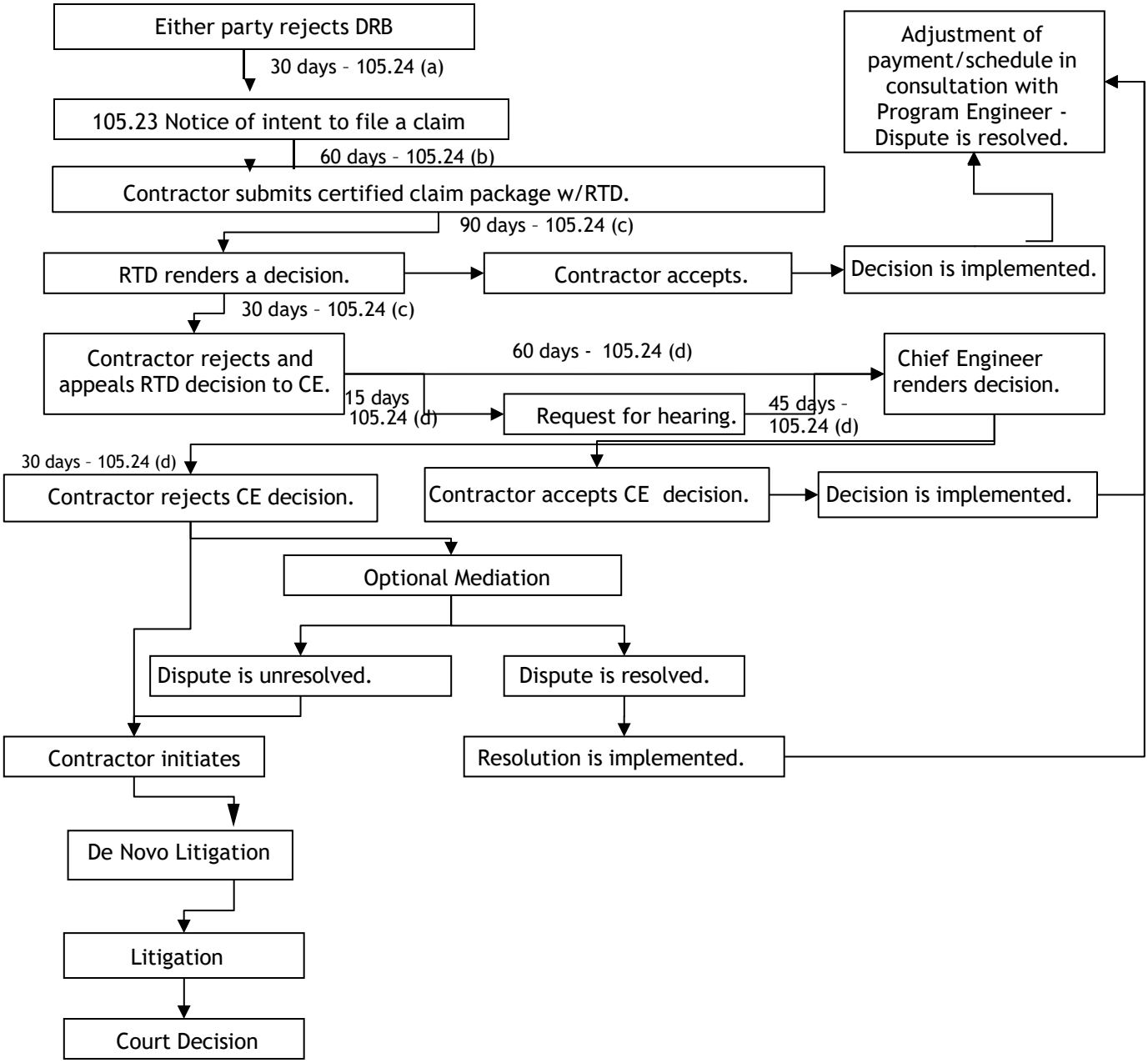


Figure 105-1 continued on next page

REVISION OF SECTIONS OF 105
DISPUTE REVIEW BOARD AND
CLAIMS FOR UNRESOLVED DISPUTES

Figure 105-1
(continued)



January 8, 2024

1

Revision Of Section 105
E-Signature

Revise Section 105 of the Standard Specifications as follows:

Add the following to Subsection 105.08:

105.08 Document Management and Professional Engineer and Professional Land Surveyor Electronic Seals. Where the specifications require the Contractor to submit or return documents either in writing or the format is not specified, an electronic file is preferred. The Contractor shall submit the schedule native file, video recordings, photographs, image files, and other media formats in their native file formats. When the document format is not specified, the contractor shall submit electronic documents in PDF. When a submittal requires multiple copies, one electronic document shall satisfy the requirement.

Where a signature is needed, an electronic signature is acceptable. An original signature is a signature signed in ink. Where original signatures or original documents are required a scan shall satisfy the requirement.

The Department will issue Contract Modification Orders (Form 90) and Form 105s that authorize additional work for signature via AdobeSign.

CDOT forms and records shall be signed with an electronic signature that includes the signer's name, date, and time the document was signed, in addition to locking the appropriate portions after signing. This guidance does not change the approval process or the content requirements for Buy America, COC, and CTR documentation, rather it allows the documentation to either be all electronically signed or a Scanned Original Wet Signature.

An electronic seal is when a Contractor's Engineer, a Professional Engineer or a Professional Land Surveyor affix their electronic signature and seal to plans or documents prepared under their responsible charge or control. The electronic seal needs to meet State of Colorado Architects, Professional Engineers, and Professional Land Surveyors Rules and Regulations, 4 CCR 730-1 requirements, lock the document after signature and shall have a non-expiring transaction identification number that can be used to view the final locked and signed document online.

Revision Of Sections 105, 106, 412 & 601
PCCP Acceptance

Delete Subsection 105.06 and replace with the following:

105.06 Conformity to the Contract of Portland Cement Concrete Pavement. Conformity to the Contract of all Portland Cement Concrete Pavement, Item 412, will be determined per the following:

When the Engineer finds that the materials furnished, the work performed, or the finished product does not conform to the Contract, or the Pay Factor (PF) for an element's process is less than 0.75 but that reasonably acceptable work has been produced, the Engineer will determine the extent of the work that will be accepted and remain in place. The Engineer will use a Contract Modification Order to document the justification for allowing the work to remain in place and the price adjustment that will be applied.

When the Engineer finds the materials furnished, work performed, or the finished product is not in conformity with the Contract, or the PF for an element's process is less than 0.75 and has resulted in an inferior or unsatisfactory product, the work or material shall be removed and replaced or otherwise corrected by and at the expense of the Contractor. When the PF for any process is 0.75 or greater, the finished quantity of work represented by the process will be accepted at the calculated pay factor.

Materials will be sampled and tested by the Contractor and the Department per subsection 106.06 and with procedures contained in the Department's Field Materials Manual. The approximate quantity represented by each sample will be as set forth in subsection 106.06, Table 106-3. Additional samples may be selected and tested at the Engineer's discretion.

(a) Incentive and Disincentive Payments (I/DP) will be made based on a statistical analysis that yields Pay Factors (PF) and Quality Levels (QL). The PF and QL will be made based on test results for the elements of compressive strength and pavement thickness.

The QL will be calculated for the elements of compressive strength and pavement thickness on a process basis. A process will consist of the test results from a series of random samples. Test results determined to have sampling or testing errors will not be used. All materials produced will be assigned to a process. Changes in mix design, design pavement thickness, or a break of more than 120 working days between placements will create a new process. The following is provided to clarify changes in processes for each element:

1. Construction of mainline pavement, including the shoulders if placed with the mainline, is a single process for the compressive or flexural strength element, when the mix design does not change and there is not a break of more than 120 days between placements.
2. Construction of mainline pavement, including the shoulders if placed with the mainline, is a single process for the thickness element when the planned thickness does not change and there is not a break of more than 120 days between placements.
3. Construction of ramps, acceleration and deceleration lanes and shoulders placed separately are considered separate processes.

4. Changes in paving equipment, changes in placement method, changes in hauling equipment, adjustments to mix designs that do not require a new mix design, changes in weather conditions, and changes in production rate shall not create a new process in the strength or thickness elements.

The Contractor and Engineer will determine element processes and what distinguishes them as processes during the Pre-pave meeting before concrete placement.

(b) When it is necessary to represent material by one or two tests, each test shall have a PF computed per the following:

If the value of the test is at or above the lower tolerance limit, then PF = 1.000. If the value of the test is below the lower tolerance limit, then:

$PF = 1.00 - [0.25(T_L - T_0)/V]$

Where PF = pay factor.

V = V factor from Tables 105-10

T_0 = the individual test value.

T_L = lower tolerance limit.

(c) The following procedures will be used to compute Incentive and Disincentive Payments (I/DP), quality levels (QL), and pay factors (PF) for processes represented by three or more tests:

1. Quality Level (QL) will be calculated according to CP-71.
2. Compute the PF for the process. When the process has been completed, the number of tests (Pn) it includes shall determine the formula to be used to compute the final pay factor per the following:

A. For pavement thickness:

When $3 \le Pn \le 5$

If $QL \ge 85$, then $PF = 1.00 + (QL - 85)0.001333$

If $QL < 85$, then $PF = 1.00 + (QL - 85)0.005208$

When $6 \le Pn \le 9$

If $QL \ge 90$, then $PF = 1.00 + (QL - 90)0.002000$

If $QL < 90$, then $PF = 1.00 + (QL - 90)0.005682$

When $10 \le Pn \le 25$

If $QL \ge 93$, then $PF = 1.00 + (QL - 93)0.002857$

If $QL < 93$, then $PF = 1.00 + (QL - 93)0.006098$

When $Pn \ge 26$

If $QL \ge 95$, then $PF = 1.00 + (QL - 95)0.004000$

If $QL < 95$, then $PF = 1.00 + (QL - 95)0.006757$

B. For compressive strength:

When $3 \leq Pn \leq 5$

If $QL \geq 85$, then $PF = 1.00 + (QL - 85)0.002000$

If $QL < 85$, then $PF = 1.00 + (QL - 85)0.005208$

When $6 \leq Pn \leq 9$

If $QL \geq 90$, then $PF = 1.00 + (QL - 90)0.003000$

If $QL < 90$, then $PF = 1.00 + (QL - 90)0.005682$

When $10 \leq Pn \leq 25$

If $QL \geq 93$, then $PF = 1.00 + (QL - 93)0.004286$

If $QL < 93$, then $PF = 1.00 + (QL - 93)0.006098$

When $Pn \geq 26$

If $QL \geq 95$, then $PF = 1.00 + (QL - 95)0.006000$

If $QL < 95$, then $PF = 1.00 + (QL - 95)0.006757$

3. Compute the I/DP for the process:

$I/DP = (PF-1)(QR)(UP)$

where: QR = Quantity Represented by the process.
UP = Unit Price bid for the Item.

The total I/DP for an element shall be computed by accumulating the individual I/DP for each process of that element.

(d) As acceptance test results become available, they will be used to calculate accumulated QL and Incentive and Disincentive Payments (I/DP) for each element and for the item. The Contractor's test results and the accumulated calculations shall be made available to the Engineer upon request. The Engineer's test results and the calculations will be made available to the Contractor as early as reasonably practical. Numbers from the calculations shall be carried to significant figures and rounded according to AASHTO Standard Recommended Practice R-11, Rounding Method.

I/DP will be made to the Contractor per subsection 412.24(a). During production, interim I/DP will be computed for information only. The Pn will change as production continues and test results accumulate. The Pn at the time and I/DP is computed shall determine the formula to be used.

(e) The Contractor shall not have the option of accepting a price reduction or disincentive in lieu of producing specification material. Continued production of non-specification material will not be permitted. Material that is defective may be isolated and rejected without regard to sampling sequence or location within a process.

(f) The Contractor may take cores at his own expense and per Colorado Procedure 65 to provide an alternative determination of strength to replace acceptance test results with a compressive

strength less than **TL**. The core compressive strength shall be used for I/DP regardless of the result.

Table 105-10
"V" Factors and Incentive Payments

Element	V factor	Maximum Incentive Payment	Lower Tolerance Limit, TL	Plan Value
Compressive Strength	400 psi	3.00 %	4200 psi	4500 psi
Pavement Thickness	0.4 inch	2.00 %	Plan Thickness -0.4 inch	Plan Thickness

(g) Sand Equivalence. The sand equivalence (SE) as determined by CP 37 will be considered acceptable when the running average of three consecutive tests is greater than 80 percent and no individual test result is less than 75 percent. When the running average of three consecutive SE tests falls below 80 percent or an individual SE test result falls below 75 percent, paving operations shall be suspended. The Contractor shall submit a written plan to correct the low SE test results to the Engineer for approval. The Contractor shall not continue paving operations until the Engineer approves the plan in writing and three SE test results from random samples in the stockpile are above 80 percent.

(h) Pavement Surface Texture. The Contractor shall perform process control (PC) testing for the pavement surface texture depth per CP 77 Method B. All PC results for surface texture depth measurements shall be included in the Contractor's QC notebook. The start of PC testing for texturing depth shall be completed within 24 hours after the first 500 linear feet of textured pavement is placed for each lane. Paving shall not proceed until results are accepted by the Engineer.

Surface texture will be considered acceptable when the average texture depth (ATD) of the panel is greater than 0.05 inch. When the ATD is less than 0.05 inches, the Contractor shall determine the area represented by this test. The area shall be determined by taking additional tests at 15-foot intervals parallel to the centerline in each direction from the affected location until two consecutive tests are found to be within the specified limits. Any surface with unacceptable texturing exceeding 25 linear feet in any lane or shoulder greater than 8 feet wide shall be diamond ground full width of the lane. Upon the second unacceptable test result, the Contractor shall notify the Engineer, in writing, of the action taken to provide an acceptable surface texture.

The Department will perform surface texture acceptance testing per CP 77 Method B. The Department will determine the panel locations where acceptance test measurements are to

be taken. One stratified random acceptance test per 2,500 linear feet or fraction thereof in each lane and shoulder wider than 8 feet shall be taken with a minimum of one test per day when the Contractor is paving.

When the Department locates areas of surface texture that do not meet the minimum ATD, the Contractor will be notified, and the Contractor shall identify the limits of the deficient texture depth. After the Engineer approves the limits, the Contractor shall correct the deficient surface texture by diamond grinding full lane width to provide an ATD greater than 0.05 inch at no additional cost to the project. The Contractor shall correct surface texture deficiencies before pavement smoothness testing and pavement thickness determinations.

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Revision Of Sections 105, 106, 412 & 601
PCCP Acceptance

Delete Subsection 106.06 and replace with the following:

106.06 Sampling and Testing of Portland Cement Concrete Paving. All Portland Cement Concrete Pavement, Item 412, shall be tested per the following process control and acceptance testing procedures:

(a) Process Control Testing. The Contractor shall be responsible for process control testing of all elements listed in Table 106-3. Process control testing shall be performed at the expense of the Contractor. The Contractor shall develop a process control plan (PCP) per the following:

1. Process Control Plan. For each element listed in Table 106-3, the PCP must provide adequate details to ensure that the Contractor will perform process control. The Contractor shall submit the PCP to the Engineer at the Pre- construction Conference. The Contractor shall not start any work on the project until the Engineer has approved the PCP in writing.

   A. Frequency of Tests or Measurements. The PCP shall indicate a random sampling frequency, which shall be equal to or more frequent than that shown in Table 106-3. The process control tests shall be independent of acceptance tests.

   B. Test Result Chart. For each process control test result, the appropriate area, volume, and tolerance limits shall be plotted. The chart shall be posted daily at a location convenient for viewing by the Engineer.

   C. Quality Level Chart. The QL for each element in Table 106-3 shall be plotted. The QL shall be calculated per the procedure in CP 71 for Determining Quality Level. The QL shall be calculated on tests 1 through 3, then tests 1 through 4, then tests 1 through 5, and then thereafter the last five consecutive test results. The area of material represented by the last test result shall correspond to the QL.

2. Point of Sampling. The material for process control testing shall be sampled by the Contractor using CP 61. The location where material samples will be taken shall be indicated in the PCP.

3. Testing Standards. The PCP shall indicate which testing standards will be followed. Acceptable standards are Colorado Procedures, AASHTO and ASTM. The order of precedence is Colorado Procedures, AASHTO procedures and then ASTM procedures.

   The compressive strength test for process control will be the average strength of two test cylinders cast in plastic molds from a single sample of concrete, cured under standard laboratory conditions, and tested three to seven days after molding.

4. Testing Supervisor Qualifications. The person in charge of and responsible for the process control testing shall be identified in the PCP. This person shall be present on the project and possess one or more of the following qualifications:

   A. Registration as a Professional Engineer in the State of Colorado.

   B. Registration as an Engineer in Training in the State of Colorado with two years of paving experience.

C. A Bachelor of Science in Civil Engineering or Civil Engineering Technology with three years of paving experience.

D. National Institute for Certification in Engineering (NICET) certification at level III or higher in the subfields of Transportation Engineering Technology, Highway Materials, or Construction Materials Testing Engineering Technology, Concrete and four years of paving experience.

5. Technician Qualifications. Technicians performing tests shall meet the requirements of Colorado Procedure 10.

6. Testing Equipment. All of the testing equipment used to conduct process control testing shall conform to the standards specified in the test procedures and be in good working order., For projects with greater than 50,000 SY of PCCP or projects that do not have a certified lab within 40 miles of the project limits then the Contractor shall provide the following equipment and supplies, which will not be paid for separately but shall be included in the work:

   A. A separate, temperature-controlled facility of at least 300 square feet of usable space. This facility shall be used exclusively for the molding, storage and testing of concrete test specimens as required. This facility shall be provided in addition to other facilities required in Section 620. The storage facility shall have sufficient water storage capacity for curing all required test specimens. The storage facility shall provide separate storage tanks for each type of required testing. Each storage tank shall have a continuously recording thermometer and sufficient blank charts for the project. Temperatures of each storage tank shall be recorded for the duration of the project.

   B. A machine for testing the compressive strength of concrete specimens. The machine shall meet the requirements of ASTM C39 and shall have a minimum capacity of 250,000 lbs. The machine shall have a digital monitor capable of displaying load rate and total load. The following or an approved equal by the Region Materials Engineer may be used:

      (1) Forney 250 series compression machine with digital monitor.

      (2) Humboldt HCM-2500 series with an i7 Digital Indicator.

      (3) Gilson MC-250 series with a Pro Controller.

      (4) Test Mark Industries CM-2500 series with an i720 Digital Indicator.

      Both the Contractor and the Engineer may use this machine for testing concrete specimens. After the machine has been certified and accepted by the Engineer it shall not be moved until all portland cement concrete paving and compressive strength acceptance tests have been completed.

   C. The Contractor shall supply an MIT Scan T2 or MIT Scan T3 and the associated test plates when pavement thickness acceptance is based on magnetic pulse induction

(MPI).

7. Reporting and Record Keeping. The Contractor shall report the results of the tests to the Engineer electronically at least once per day.

   The Contractor shall assemble a process control (PC) notebook and update it daily. This notebook shall contain all worksheets, test results forms, test results charts and quality level charts for each of the elements listed in Table 106-3. The Contractor shall submit examples of worksheets, test result forms and test results charts per CP 12B as part of the Contractor's Process Control Plan (PCP). The Contractor shall submit the PC notebook electronically to the Engineer for review once a month on the date agreed to at the Pre-construction Conference.

   A list of recognized deficiencies will be returned to the Contractor within two workdays after submittal. Deficiencies may include but are not limited to, the failure to submit the notebook on time or an absence of the required reports. For any month that deficiencies are identified, the PC notebook will be submitted for review two weeks after the PC notebook is returned. Upon the second recognized deficiency, the Engineer will notify the Contractor, and the pay estimate shall be withheld until the Contractor submits, in writing, a report detailing the cause of the recognized deficiency. The report shall include how the Contractor plans to resolve the deficiencies. Additional recognized deficiencies will result in a delay of the pay estimate until the Contractor has identified and resolved the deficiency along with revising and resubmitting his PCP to address these issues. Once the Engineer has reviewed and approved the revised PCP the estimate may be paid. Upon submittal of the PC notebook for the semi-final estimate, the PC notebook shall become the property of the Department. The Contractor shall make provisions such that the Engineer can inspect process control work in progress, including PC notebook, sampling, testing, plants, and the Contractor's testing facilities at any time.

8. PC Stockpile Management. For Projects greater than 25,000 SY of PCCP, the contractor shall perform PC Testing for each aggregate source. All aggregates furnished for the project shall conform to the range of tolerances listed in Table 106-2 when compared to the approved mix design gradations. Individual gradation testing shall be at a minimum frequency of 1/day or 1/1,000 tons, whichever is greater, as aggregate is delivered to the batch plant and incorporated into the stockpile. If material does not meet the listed tolerances, the area of the stockpile represented by the sample may be remixed and retested. If material fails to meet the tolerances a second time, it shall be rejected. If multiple batch plants are being utilized, aggregates at each plant shall be tested separately. Testing and Tracking methods shall be included in the Contractor's Process Control Plan.

Table 106-2
Individual Aggregate Gradation Tolerances

Sieve Size	Tolerance (%)
≥No. 4	±6
No.8 – No. 30	±4
No. 50	±3
No. 100	±2

No. 200	±1

9. Optimized Gradation. The Contractor shall perform PC testing of the combined aggregate gradation (CAG) when an Optimized Gradation (OG) is used for Class P Concrete. A sample of the combined aggregate from the first 100 cubic yards of concrete shall be tested; then one test per 750 cubic yards shall be performed. The frequency shall be a minimum of one per day if production is less than 750 cubic yards per day.

   The Department will perform one gradation test each day which may be a split of one of the PC samples. This data will not be used to determine the acceptability of the material but as information only.

   The Contractor's gradation test data will be used to evaluate the gradation optimization based on the mix design optimization.

   When the Contractor's gradation test results fail to meet their optimization range, the Contractor shall immediately make corrections to bring the aggregate gradation optimization into range and notify the Engineer. If two or more consecutive test results for any single day or two successive days are found to fall outside the optimization range, the Contractor shall immediately suspend production and provide a written corrective plan to the Engineer for approval before resuming production.

   Upon being allowed to resume production, the Contractor shall follow the daily sampling frequency. If the next two consecutive gradation tests indicate that they meet the optimization range, the Contractor may continue production. If the first two aggregate samples do not meet the optimization range, production shall be suspended.

   Before resuming production, the Contractor shall sample the individual aggregate stockpiles at two or more locations to determine the range of variability within each stockpile, make appropriate adjustments to the percentages for each aggregate component, and discharge and sample the combined aggregates. The combined aggregate gradation shall be tested to determine if the optimization range is met. Production can resume if the optimization range is met.. Production will continue to be suspended for additional evaluation of stockpiles and aggregate feed rates until gradation sampling and testing indicate the optimization range is met.

   All gradation test information during production shall be provided to the Engineer daily. The Contractor shall immediately report all gradation test data to the Engineer for evaluation during periods when production is suspended or upon resuming production. The Contractor will be notified in writing in all cases when production may resume or shall remain suspended.

10. **Aggregate Moisture Content**. An aggregate moisture content sample from the first 100 cubic yards of concrete shall be tested; then one test per 750 cubic yards shall be performed. The frequency shall be a minimum of one per day if production is less than 750 cubic yards per day. The moisture content sample maybe the same sample used for gradation PC testing. Moisture content of each aggregate shall be tested per CP 33. As they become available, results shall be immediately input into the batching computer

and reflected on batch tickets.

11. Concrete Test Reports. The Contractor shall distribute electronically to the concrete supplier all compressive- strength PC data for the concrete supplied to the project. The Contractor shall distribute the PC compressive strength data within two business days of the 7-day and 28-day compressive strength testing. The data shall include the compressive strength and batch ticket number at a minimum.

(b) Acceptance Testing. Acceptance testing frequencies will follow the Schedule (Owner Acceptance) in the Department's Field Materials Manual. Acceptance sampling and testing procedures will be per the Department's Field Materials Manual with the following exceptions and inclusions:

A split sample from an acceptance test shall not be used for a process control test. The Engineer will designate the location where samples are to be taken. Samples shall be taken by the Contractor per CP 61. The Engineer will be present during the sampling and take possession of all acceptance samples. Samples transported in different containers will be combined and mixed before molding specimens. All materials are subject to inspection and testing at all times.

Pavement thickness acceptance will be determined by cores or magnetic pulse induction (MPI).

Acceptance tests for thickness using MPI shall be the Contractor's process control tests. MPI testing shall be per AASHTO T359.

When compressive strength testing is specified, the Engineer will distribute electronically to the concrete supplier all compressive strength Owner Acceptance (OA) data for the concrete supplied to the project. The Engineer will distribute the OA compressive strength data within two business days of the 7-day and 28-day compressive strength testing. The data will include the compressive strength and batch ticket number at a minimum. The Contractor shall not have a valid dispute or claim as a result of any action or inaction by the Department related to the distribution of test results.

The compressive strength test for acceptance will be the average compressive strength of three test cylinders cast in plastic molds from a single sample of concrete and cured under standard laboratory conditions before testing. If the compressive strength of any one specimen differs from the average by more than 10 percent, that specimen will be deleted, and the average strength will be determined using the remaining two specimens. If the compressive strength of more than one specimen differs from the average by more than 10 percent, the average strength will be determined using all three specimens. Each set of three cylinders will be tested at 28 days after molding.

(c) Check Testing. The Contractor and the Engineer shall conduct a check testing program (CTP) before the placement of any concrete pavement. The check testing program will include a conference directed by the Region Materials Engineer, the Contractor's testers, and the Department's testers concerning methods, procedures and equipment for compressive strength testing. Check testing shall be completed before any portland cement concrete pavement (PCCP) is placed. A set of three cylinders will be molded by both the Contractor's

and the Department's project testers from a split sample. The specimens will be sampled, molded and cured for seven days and tested for compressive strength according to the procedures of Section 106. The Department's Independent Assurance Tester will also mold, cure and test a set of three cylinders, but the Independent Assurance Test results will not be entered in the check testing analysis. If the results of the check tests do not meet the following criteria, then the check testing will be repeated until the following criteria are met:

(1) The average of the Contractor's test results, and the average of the Department's test results shall be within 10 percent of the average of all test results.

(2) Each specimen test result shall be within 15 percent of the average of all test results.

When compressive strength criteria is indicated, a check test must also be conducted on the sand equivalent test. A set of 5 sand equivalents will be run by both the Contractor's and the Department's project tester, from a split sample. The average of the absolute differences between tests taken by the process control personnel and the acceptance testing personnel will be compared to the acceptable limits shown in Table 13-1 of CP 13. The CTP will be continued until the acceptance and process control test results are within the permissible ranges shown in Table 13-1 of CP 13.

During production, split samples of randomly selected acceptance tests will be compared to the permissible ranges shown in Table 13-1 of CP 13. The minimum frequency will be as shown in Table 106-3.

If production has been suspended and then resumed, the Engineer may order a CTP between tests taken by process control and acceptance testing persons to ensure the test results are within the permissible ranges shown in Table 13-1 of CP 13. Check test results shall not be included in process control testing. The Region Materials Engineer shall be called upon to resolve differences if a CTP shows unresolved differences beyond the ranges shown in Table 13-1 of CP 13.

(d) Independent Assurance Testing. The sample for the IAT will be a split sample of the Contractor's process control test. The Department's representative performing verification tests shall also use a split sample of the Contractor's process control test and participate in the IAT.

(e) Testing Schedule. All samples used to determine Incentive or Disincentive payment by quality level formulas per Section 105 will be selected by a stratified random process.

Table 106-3
PC Testing Schedule - Item 412 Portland Cement Concrete Pavement

Element	Minimum Testing Frequency Contractor's Process Control
Aggregate Gradation each source or combined gradation	Minimum of 1/day, then 1 per 2500 cu. yds. When an OG is used, follow 106.06(a) 9
Slump and Air Content	First three loads each day, then as needed for control
Compressive Strength, Slump Air Content, Yield, and Sand Equivalent	Minimum of 1/day, then 1/2500 sq. yds.
Pavement Thickness	Per subsection 412.21
Pull Test Joints	Minimum of six transverse and six longitudinal joint locations for the first 2,500 linear feet, then three transverse and three longitudinal joints thereafter
Load Transfer Dowel Bar Placement	Per subsection 412.13(b)2
Average Texture Depth	1 per 528 linear feet in each lane and shoulder wider than 8 feet
Water Cement Ratio	First three loads each day, then 1/500 cu. yds.
Aggregate Moisture Content	Per subsection 106.06(a) 10

In Subsection 412.24, delete:
"All costs associated with developing correlation curves used to evaluate low flexural strength results per the Contract, or as requested by the Engineer, shall be included in the work. This shall include all materials, forms, testing, equipment and labor."

In Subsection 601.02 Class P, delete:
"(1) The Required Field Flexural Strength shall be 650 psi."

Subsection 601.02 shall include the following:

When an optimized gradation is used for any class of concrete, the Shilstone, Tarantula or Power-45 optimization method shall be used.

October 1, 2023

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Revision of Section 107
Water Quality Control
(Under One Acre of Disturbance)

Section 107.25 of the Standard Specifications is hereby deleted and replaced as follows:

107.25 Water Quality Control. The project work shall be performed using practices (including but not limited to those listed below) that minimize the pollution of any State waters, including wetlands.

(a) Definitions.

(1) Areas of Disturbance (AD). Locations where any activity has altered the existing soil cover or topography, including vegetative and non-vegetative activities during construction.

(2) Construction Site Boundary/Limits of Construction (LOC). The project area defined by the Environmental Clearance document.

(3) Discharge of Pollutants. One or more pollutants leaving the Limits of Construction (LOC) or entering State waters or other conveyances.

(4) Limits of Disturbed Area (LDA). Proposed limits of ground disturbance as shown on the Plans.

(5) Pollutant. Dredged spoil, dirt, slurry, solid waste, incinerator residue, sewage, sewage sludge, garbage, trash, chemical waste, biological nutrient, biological material, radioactive material, heat, wrecked or discarded equipment, rock, sand, or any industrial, municipal, or agricultural waste, as defined in the Colorado Code of Regulations (CCR) [5 CCR 1002-61, 2(76)]

(6) Pollution. Man-made, man-induced, or natural alteration of the physical, chemical, biological, and radiological integrity of water. [25-8-103 (16), CRS]

(7) State waters. Defined in Section 101.

(b) Construction Requirements

The Contractor shall comply with the "Colorado Water Quality Control Act" (Title 25, article 8, CRS), the "Protection of Fishing Streams" (Title 33, Article 5, CRS), the "Clean Water Act" (33 USC 1344), regulations promulgated, certifications or permits issued, and to the requirements listed below. In the event of conflicts between these requirements and water quality control laws, rules, or regulations of other Federal, or State agencies, the more restrictive laws, rules, or regulations shall apply.

If the Contractor determines construction of the project will result in a change to

the activities or LDA, the Contractor shall detail the changes in a written report to the Engineer. Upon receipt of the report, the Engineer will coordinate with the Region Planning and Environmental Manager (RPEM) regarding the change. The Engineer, within five days after receipt of the report, will approve or reject in writing the request for change. If approved, the Engineer will detail a course of action including revision of existing permits or obtaining new permits.

If construction activities result in noncompliance of any permit requirement, the project will be suspended and the permitting agency notified, if required. The project will remain suspended until the Engineer receives written approval by the permitting agency.

The Contractor is legally required to obtain all permits associated with project specific water quality activities within, or off the Right of Way, such as borrow pits, concrete or asphalt plant sites, waste disposal sites, or other facilities. It is the Contractor's responsibility to obtain these permits. The Contractor shall consult with the Engineer and contact the Colorado Department of Public Health and Environment (CDPHE) or other appropriate federal, state, or local agency to determine the need for any permit.

The Contractor shall conduct the work in a manner that prevents pollution of any adjacent State waters, as defined in section 101. Erosion control work shall be performed in accordance with Section 208, this subsection, and all other applicable parts of the Contract.

Prior to construction, the Stormwater Management Plan (SWMP) Administrator, identified in Section 208, shall identify and describe all potential pollutant sources, including materials and activities, and evaluate them for the potential to contribute pollutants to stormwater discharges associated with construction activities. The list of potential pollutants shall be continuously updated during construction. At a minimum, each of the following shall be evaluated for the potential for contributing pollutants to stormwater discharges and identified in the SWMP, as described in Section 208:

(1) All exposed and stored soils.

(2) Vehicle tracking of sediments.

(3) Management of contaminated soils.

(4) Vehicle and equipment maintenance and fueling.

(5) Outdoor storage activities (building materials, fertilizers, chemicals, etc.).

(6) Significant dust or particle generating processes.

(7) Routine maintenance involving fertilizers, pesticides, detergents, fuels, solvents, oils, etc.

(8) On-site waste management practices (waste piles, dumpsters, etc.).

(9) Dedicated asphalt and concrete batch plants.

(10) Concrete truck and equipment washing, including the concrete truck chute and associated fixtures and equipment.

(11) Concrete placement and finishing tool cleaning.

(12) Non-industrial waste sources that may be significant, such as worker trash and portable toilets.

(13) Loading and unloading operations.

(14) Other areas or procedures where spills could occur.

The SWMP Administrator shall record the location of potential pollutants on the site map, if applicable. Descriptions of the potential pollutants shall be added to the SWMP.

Prior to construction the Contractor shall submit a Spill Response Plan for any petroleum products, chemicals, solvents, or other hazardous materials in use, or in storage, at the work site. See Section 208 for Spill Response Plan requirements. Work shall not be started until the plan has been submitted to and approved by the Engineer.

On site above ground bulk storage containers with a cumulative storage shell capacity greater than 1,320 U.S. gallons, or storage containers having a “reasonable expectation of an oil discharge” to State waters, are subject to the Spill Prevention, Control and Countermeasure Plan (SPCC) Rule. Oil of any type and in any form is covered, including, but not limited to petroleum; fuel oil; sludge; oil refuse; oil mixed with wastes other than dredged spoil. EPA Region 8 is responsible for administering and enforcing the SPCC plan requirements in Colorado. Prior to start of work, the Contractor shall submit a SPCC Form, if applicable, which has been approved by the EPA for the project.

The Contractor shall obtain a Construction Dewatering (CDW) permit from CDPHE anytime uncontaminated groundwater, including groundwater that is commingled with stormwater or surface water, is encountered during construction activities and the groundwater or commingled water needs to be discharged to State waters. If contaminated groundwater is encountered, a Remediation permit may be needed

from CDPHE in accordance with Section 250.

October 1, 2023

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Revision of Section 107
Water Quality Control
(Under One Acre of Disturbance)

Water from dewatering operations shall not be directly discharged into any State waters, unless allowed by a permit. Water from dewatering shall not be discharged into a ditch unless:

1. Written permission is obtained from the owner of the ditch.

2. It is covered in the approved CDW or Remediation Permit that allows the discharge.

3. A copy of this approval is submitted to the Engineer. A copy of the Permit shall be submitted to the Engineer prior to dewatering operations commencing.

Construction Dewatering may be discharged to the ground on projects where CDPHE's Low Risk Guidance Document for Discharges of Uncontaminated Groundwater to Land are met. The conditions of this guidance are:

1. The source of the discharge is solely uncontaminated groundwater or uncontaminated groundwater combined with stormwater and does not contain pollutants in concentrations that exceed water quality standards for groundwater referenced above.

2. Discharges from vaults or similar structures shall not be contaminated. Potential sources of contamination include process materials used, stored, or conveyed in the structures, or introduced surface water runoff from outside environments that may contain oil, grease, and corrosives.

3. The groundwater discharge does not leave the project boundary limits where construction is occurring.

4. Land application is conducted at a rate and location that does not allow for any runoff into State waters or other drainage conveyance systems, including but not limited to streets, curb and gutter, inlets, borrow ditches, open channels, etc.

5. Land application is conducted at a rate that does not allow for any ponding of the groundwater on the surface, unless the ponding is a result of implementing control measures that are designed to reduce velocity flow. If the control measures used result in ponding, the land application shall be done in an area with a constructed containment, such as an excavation or berm area with no outfall. The constructed containment shall prevent the discharge of the

ponding water offsite as runoff.

6. A visible sheen is not evident in the discharge.

7. Control measures are implemented to prevent any sediment deposited during land application from being transported by stormwater runoff to surface waters or other conveyances.

8. All control measures used shall be selected, installed, implemented, and maintained according to good engineering, hydrologic, and pollution control practices. The selected control measures shall provide control for all potential pollutant sources associated with the discharge of uncontaminated groundwater to land. The discharge shall be routed in such a way that it will not cause erosion to land surface. Energy dissipation devices designed to protect downstream areas from erosion by reducing the velocity of flow (such as hose attachments, sediment and erosion controls) shall be used when necessary to prevent erosion.

All dewatering operations shall be recorded in the SWMP as follows:

1. The source is identified in the SWMP and updated by the Contractor.

2. The SWMP describes and locates the practices implemented at the site to control stormwater pollution from the dewatering of groundwater or stormwater.

3. The SWMP describes and locates the practices to be used that will ensure that no groundwater from construction dewatering is discharged from the LOC as surface runoff or to surface waters or storm sewers.

4. Groundwater and groundwater combined with stormwater do not contain pollutants in concentrations exceeding the State groundwater standards in Regulations 5 CCR 1002-41 and 42.

If surface waters are diverted around a construction area and no pollutants are introduced during the diversion, a CDW Permit is not required. If the diverted water enters the construction area and contacts pollutant sources (e.g., disturbed soil, concrete washout, etc.), the Contractor shall obtain a CDW permit for the discharge of this water to State waters or to the ground.

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Revision of Section 107
Water Quality Control
(Under One Acre of Disturbance)

At least 15 days prior to commencing dredging or fill operations in a watercourse, the Contractor shall provide written notification to owners or operators of domestic or public water supply intakes or diversion facilities, if these facilities are within 20 miles downstream from the dredging or fill operations. Notification shall also be given to Owners or operators of other intakes or diversions that are located within five miles downstream from the site of the project. Identities of downstream owners and operators can be obtained from Colorado Division of Water Resources, Office of the State Engineer.

Temporary fill into wetlands or streams shall not be allowed, except as specified in the Contract and permits. If such work is allowed, upon completion of the work all temporary fills shall be removed in their entirety and disposed of in an upland location outside of flood plains unless otherwise specified in the Contract.

Construction operations in waters of the United States as defined in 33 CFR Part 328.3, including wetlands, shall be restricted to areas and activities authorized by the U.S. Army Corps of Engineers as shown in the Contract. Fording waters shall be allowed only as authorized by the U.S. Army Corps of Engineers 404 Permit. Wetland areas outside of the permitted limits of disturbance shall not be used for storage, parking, waste disposal, access, borrow material, or any other construction support activity.

Pollutant byproducts of highway construction, such as concrete, asphalt, solids, sludges, pollutants removed in the course of treatment of wastewater, excavation or excess fill material, and material from sediment traps shall be handled, stockpiled, and disposed of in a manner that prevents entry into State waters, including wetlands. Removal of concrete waste and washout water from mixer trucks, concrete finishing tools, concrete saw, and all concrete material removed in the course of construction operations or cleaning shall be performed in a manner that prevents waste material from entering State waters and shall not leave the site as surface runoff. A minimum of ten days prior to the start of the construction activity, the Contractor shall submit in writing a Method Statement for Containing Pollutant Byproducts to the Engineer for approval.

The use of chemicals such as soil stabilizers, dust palliatives, herbicides, growth inhibitors, fertilizers, deicing salts, etc., shall be in accordance with the manufacturer’s recommended application rates, frequency, and instructions.

All materials stored on-site shall be stored in a neat, orderly manner, in their original containers, with the original manufacturer’s label. Materials shall not be stored in a location where they may be carried into State waters at any time.

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Revision of Section 107
Water Quality Control
(Under One Acre of Disturbance)

Spill prevention and containment measures conforming to Section 208 shall be used at storage, and equipment fueling and servicing areas to prevent the pollution of any State waters, including wetlands. All spills shall be cleaned up immediately after discovery, or contained until appropriate cleanup methods can be employed. Manufacturer's recommended methods for spill cleanup shall be followed, along with proper disposal methods. When required by the Colorado Water Quality Control Act, Regulation 5 CCR 1002-61, spills shall be reported to the Engineer and CDPHE in writing.

The Contractor shall prevent construction activities from causing grass or brush fires.

The construction activities shall not impair Indian tribal rights, including, but not limited to, water rights, and treaty fishing and hunting rights.

Prior to start of work, the Contractor shall certify in writing to the Engineer that construction equipment has been cleaned prior to initial site arrival. Vehicles and equipment shall be free of soil and debris capable of transporting noxious weed seeds or invasive species onto the site. Additional equipment required for construction shall also be certified prior to being brought onto the project site.

Vehicles which have been certified by the Contractor as having been cleaned prior to arrival on site may be cleaned on site at an approved area where wash water can be properly contained. Vehicles leaving and reentering the project site shall be recertified.

At the end of each day the Contractor shall collect all trash and dispose of it in appropriate containers.

All construction site wastes shall be properly managed to prevent potential pollution of State waters. Construction waste that is considered a pollutant or contaminant shall be collected and disposed of in appropriate containers. This material may be stockpiled on the project when it is contained or protected by an appropriate control measure.

Discharges from the project area shall not cause, have the reasonable potential to cause, or measurably contribute to an exceedance of any applicable water quality standard, including narrative standards for water quality.

Stormwater Construction Permit. A Colorado Discharge Permit System Stormwater Construction Permit (CDPS-SCP) is not required for this project. A CDPS-SCP will be obtained from CDPHE, if any of the following activities apply:

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Water Quality Control
(Under One Acre of Disturbance)

(1) Construction sites that will disturb one acre or more; or

(2) Construction sites that are part of a common plan of development or sale; or

(3) It is specified in the contract; or

Stormwater discharges that are designated by the division as needing a stormwater permit because the discharge:

1. Contributes to a violation of a water quality standard; or

2. is a significant contributor of pollutants to State waters.

Dewatering, erosion control for dewatering, and disposal of water resulting from dewatering operations, including all costs for permits, will not be measured and paid for separately, but shall be included in the work.

The Contractor shall be liable for any penalty (including monetary fines) applied to the Department caused by the Contractor's noncompliance with any water quality permit or certification. Monetary fines shall be deducted from any money due to the Contractor. If the monetary fine is in excess of all the money due to the Contractor, then the Contractor shall pay to the Department the amount of such excess.

The Contractor shall not receive additional compensation, or time extensions, for any disruption of work or loss of time caused by any actions brought against the Contractor for failure to comply with good Engineering, hydrologic and pollution control practices.

If a spill occurs as a direct result of the Contractor's actions or negligence, the cleanup of such spill shall be performed by the Contractor at the Contractor's expense.

Areas exposed to erosion by fire resulting from the Contractor's operations shall be stabilized in accordance with Section 208 by the Contractor, at the Contractor's expense.

Revision of Section 207
Topsoil

Delete Section 207 of the Standard Specifications for this project and replace it with the following:

Description

207.01 This work consists of salvaging topsoil from onsite locations, stockpiling, maintaining, and preparing the subsoils for the placement of the topsoil at locations shown on the plans. It also includes creating seeding media by amending subsoils, and importing offsite topsoil when shown on the plans.

Substitutions from this specification will not be allowed unless submitted in writing to the Engineer and approved by the Region or Headquarters Landscape Architect.

Materials

207.02 General. Topsoil shall be salvaged onsite, imported, or produced as shown on the plans. Topsoil shall be free of refuse and litter along with noxious weed seed and reproductive plant parts, as listed in current State of Colorado A and B Noxious Weed List and local agency weed lists. Topsoil shall not include heavy clay, hard clods, toxic substances, pathogens, or other material, which would be detrimental to growing native vegetation. All required amendments shall be thoroughly incorporated to parent material, onsite. All amendments shall conform to Section 212. Topsoil and parent material shall be free of clods, sticks, stones, debris, concrete, and asphalt in excess of 4 inches in any dimension for all material used within the designed clear zone for the project. Topsoil outside of the clear zone may contain rock larger than 4 inches in any dimension. For slopes with no structures being used to protect areas from falling rocks the Contractor shall remove or secure any rocks deemed unstable and could pose a safety hazard.

Topsoil shall be generated from one or more of the following as shown on the plans:

(a) Topsoil (Onsite). Topsoil shall consist of the upper 6-inch layer of the A horizon, as defined by the Soil Science Society of America, or at the depths and locations shown on the Stormwater Management Plan (SWMP). It shall consist of loose friable soil, salvaged from onsite and stockpiled or windrowed. Litter and duff (layer of partially decomposed plant material) shall be collected as part of the salvaging of topsoil unless specified to be removed and hauled offsite on the plans.

(b) Topsoil (Wetland). Wetland topsoil shall consist of moist, organic soil obtained from delineated wetlands, including any existing wetland vegetation and seeds. Wetland topsoil shall be extracted from the project site at locations shown on the plans or as directed, to a minimum depth of 12 inches or at the depths as shown on the plans.

Revision of Section 207
Topsoil

(c) Seeding Media. Seeding Media shall consist of one or all of the following approved materials: sub-soil, overburden, or material generated from rock. Contractor shall select onsite or offsite locations to generate material that meet the requirements of Table 207-1. The Contractor shall provide a Certified Test Report (CTR) in accordance with subsection 106.13, excluding lot, heat, and batch confirming that the excavated material conforms to Table 207-1.

(d) Topsoil (Offsite). The Contractor shall submit a CTR for Topsoil (Offsite) for approval a minimum of 60 days prior to import in accordance with subsection 106.13. The Contractor shall include with the CTR a complete Soil Nutrient Analysis for the properties listed in Table 207-2 from an independent laboratory that participates in the National Association for Proficiency Testing (NAPT). If topsoil nutrient analysis is deficient, an Amendment Protocol shall be submitted by the Contractor for approval. The Amendment Protocol shall contain a complete list of amendments and associated quantities to produce topsoil that conforms to Table 207-2.

The Contractor shall submit a Certificate of Compliance (COC) for Topsoil (Offsite) for approval a minimum of 60 days prior to import that the source has controlled noxious weeds in accordance with the State of Colorado Noxious Weed Act 35-5.5-115.

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Topsoil

Table 207-1
Physical Properties of Seeding Media

Property	Range	Test
Soil pH (s.u.)	5.6 – 7.5	ASA Mono. #9, Part 2, Method 10-3.2 or TMECC 04.11-A
Soil Electrical Conductivity (EC) (mmhos/cm or ds/m)	< 5.0	ASA Mono. #9, Part 2, Method 10-3.3
Soil SAR (s.u.)	0 - 10	ASA Mono. #9, Part 2, Method 10-3.4
Rock Content (%)	≤ 25	USDA NRCS Rock Fragment Modifier Usage
Trace Contaminants (Arsenic, Cadmium, Copper, Mercury, Selenium, Zinc, Nickel, and Lead)	Meets US EPA, 40 CFR 503 Regulations	TMECC 04.06 or EPA6020/ASA (American Society of Agronomy)
Rock Content (%) greater than 3" diameter	≤ 25	USDA NRCS Rock Fragment Modifier Usage
USDA Soil Texture	No more than 70% clay, silt, and sand by percentage volume of topsoil.	ASA Monograph #9, Part 1, Method 15-4 or ASA 1 43-5
All Particle Sizes	< 6 Inches	
Physical contaminants (man-made inerts) (%)	< 1	TMECC 03.08-C
C:N ratio	<20	TMECC 05.02-A
* Fines % when manufacturing material from rock	>25% material passing through #4 sieve	ASTM D6913

Amendments to the base imported material shall have the quantities of material verified onsite prior to incorporation into parent material, either at the stockpiles or after placement of parent material. Topsoil amended at the stockpiles shall be distributed to the site within seven days. * Substitute this requirement for
USDA Soil Texture requirement when project are approved to use material manufactured from native rock material on site.

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Topsoil

Table 207-2
Topsoil (Offsite) Properties

Property	Range	Test Methods
Soil pH (s.u)	5.6 – 7.5	ASA Mono. #9, Part 2, Method 10-3.2 or TMECC 04.11-A
Salt by Electrical Conductivity (EC) (mmhos/cm or ds/m)	< 2.0	ASA Mono. #9, Part 2, Method 10-3.3
Soil SAR (s.u.)	0 – 10	ASA Mono. #9, Part 2, Method 10-3.4
Soil OM (%)	3 – 5	Methods of Soil Analysis, Part 3, Method 34
Soil N (NO_3-n, ppm)	≥ 20.0	Methods of Soil Analysis, Part 3. Chemical Methods. Ch. 38 Nitrogen – Inorganic Forms
Soil P (ppm)	≥ 13.0	ASA Mono. #9, Part 2, Method 24-5.4 or others as required based on soil pH
Soil K (ppm)	≥ 80	ASA Mono. #9, Part 2, Method 13-3.5
Rock Content (%) greater than 3" diameter	≤ 25	USDA NRCS Rock Fragment Modifier Usage
Bioassay (seedling emergence and relative vigor)	> 80% of control	TMECC 05.05-A or Approved Germination Test
Soil Texture	No more than 70% clay, silt and sand by percentage volume of topsoil	ASA Mono. #9, Part 1, Method 15-4
Physical contaminants (man-made inerts) (%)	< 1	TMECC 03.08-C
Trace Contaminants (Arsenic, Cadmium, Copper, Mercury, Selenium, Zinc, Nickel, and Lead)	Meets US EPA, 40 CFR 503 Regulations	TMECC 04.06 or EPA6020/ASA (American Society of Agronomy)
All Particle Sizes	< 6 Inches	
C:N ratio	<20	TMECC 05.02-A

Revision of Section 207
Topsoil

The Contractor shall utilize a rod penetrometer for determining subgrade soil preparation and determining looseness of soil after ripping. The penetrometer shall have a psi pressure gage, and shall meet the following requirements:

(1) Steel rod with a minimum diameter of ½ inch with graduations (tick marks) every 6 inches.

(2) The rod shall be made of stainless steel or other metal that will not bend when weight is applied.

(3) The end of the rod shall have a 30-degree cone tip.

(4) The diameter of the cone at its tip shall be no more than 0.1 inch.

(5) The top of the rod shall be a T-handled configuration.

CONSTRUCTION REQUIREMENTS

207.03 Site Pre-vegetation Conference. Prior to the start of the initial Subgrade Soil Preparation for the project, the Contractor shall request a Site Pre-vegetation Conference. The Engineer will set up the conference and will include: the Engineer or designated representative, the Superintendent or designated representative, the sub-contractor(s) performing the subgrade soil preparation and soil amendments, and the CDOT Landscape Architect representing the Region. Only one meeting is required for the project unless a new sub-contractor is brought on that did not attend the previous meeting.

The Agenda of the Pre-vegetation Conference can be found in Appendix A of the Construction Manual and includes the following:

(1) Final review of the Topsoil (Offsite) Amendment Protocol

(2) Review of the Method Statement detailing the equipment which will be used for the subgrade soil preparation operations

(3) Review of rod penetrometer which will be used to determine subgrade soil preparation of topsoil

(4) Permanent Stabilization Phasing Plan (identify strategies and site management measures to protect de-compacted, topsoil amended, seeded, and blanketed areas from foot, vehicle loads, and other disturbances).

(5) Seeding. See subsection 212.03 for submittal requirements.

(6) Meeting attendee sign-in log

Revision of Section 207
Topsoil

207.04 Topsoil Stockpiling. Stockpiles of topsoil shall be created as shown on the plans or as approved by the Engineer. All Stockpiles of topsoil which are scheduled to remain in place for 14 days or more shall receive interim stabilization in accordance with subsection 208.04. All topsoil stockpiles shall be identified using white pin flags with "TOPSOIL" printed in black letters and shall have their locations shown on the SWMP Plans. Each individual stockpile shall require at least one flag, and one additional flag for each 10 cubic yards of salvaged topsoil. The contractor shall provide only perimeter flags for stockpile larger than 100 cubic yards with a minimum spacing of 25 feet.

Topsoil may be placed in stockpiles or windrowed at the edge of the disturbance. Windrowed topsoil shall not be used as perimeter erosion control or extensively compacted. When topsoil is windrowed, all stockpile requirements still apply.

(1) Upland Topsoil. If included on the plans, stockpiles shall be treated with herbicide, in accordance with Section 217, or as directed.

(2) Wetland Topsoil. Wetland stockpiles shall not be treated with herbicide. Weeds shall be hand pulled.

Wetland topsoil shall be placed within 24 hours from excavation, unless otherwise approved by the Engineer. Wetland topsoil shall not be stockpiled for more than six months.

207.05 Subgrade Soil Preparation. Before placement of topsoil, the subgrade shall be ripped to a minimum depth of 14 inches. Subgrade shall be mostly dry and friable. Subgrade shall crumble without sticking together, yet not be so dry and hard that it does not break apart easily.

Underground utilities shall be located prior to soil preparation.

Subgrade soil preparation equipment shall meet the requirements for either winged tip or parabolic shanks. Operation shall be performed to fracture the soil uniformly without lifting or furrowing the surface excessively. The Contractor shall submit a method statement for subgrade soil preparation other equipment will be considered.

1. Winged tip shanks (dozer equipment) shall be a minimum of 6 inches wide and have 2 inches of vertical profile change on the blade with a 40 – 60-degree sweep angle.

The Contractor shall calibrate the subgrade soil preparation equipment using a minimum 30 linear feet of the initial pass. The Contractor shall utilize the rod penetrometer to verify that that de-compaction was successfully done. The Contractor shall take penetration measurements every 6 inches across a transect perpendicular to the direction of the tractor and spanning the width of the subgrade soil preparation. Depths of penetration shall confirm that a minimum of 12 inches can be achieved without reaching 300 psi on the rod penetrometer pressure gage (approximately 30 pounds of pressure on the T-handle).

Existing subgrade shall be de-compacted to a depth of 14 inches. If multiple passes are needed, the subsequent passes shall be positioned so that the ripping equipment (subsoilers)

from the previous pass are split by the subsequent pass. Following ripping, the Contractor shall remove all sticks, stones, debris, clods, and all other substances greater than 6 inches in diameter. The Contractor shall restrict motorized vehicle and foot traffic from passing over the ripped area since this would recompact the areas that received subgrade soil preparation.

The first 4 feet from the edge of pavement shall be ripped to a depth of 6 inches. If the project is going to use aggregate base course or recycled asphalt as a shouldering technique, those areas will not require subgrade soil preparation. Depth of soil ripping for the subgrade soil preparation shall be checked with the rod penetrometer.

The Contractor shall verify adequate de-compaction of the entire area to have topsoil placed using a rod penetrometer in the presence of the Engineer. Tests shall be performed at a minimum of ten random locations per each acre as selected by the Engineer. The Test shall verify that a depth of 12 inches of penetration into the soil can be achieved without reaching 300 psi on the rod penetrometer pressure gage (approximately 30 pounds of pressure on the T-handle). If this depth cannot be achieved for 80 percent of the penetrations, the Contractor shall re-rip the area at no additional cost to the Department.

207.06 Placement of Topsoil and Seeding Media. Topsoil and Seeding Media shall be hauled and placed at the locations disturbed and will be re-vegetated or as shown on the plans. The contractor shall place a minimum thickness of 6 inches and should only be handled when it is dry enough to work without damaging soil structure. Topsoil and Seeding Media shall be placed a minimum depth of twelve (12) inches when placed over riprap as required on the plans. No Topsoil or Seeding Media shall be placed below ordinary high water mark except as otherwise specified in bio-stabilization bank treatments.

Salvaged topsoil placement deeper than 6 inches is allowed if additional approved material is on-site.

Contractor shall place topsoil in a method that does not re-compact subgrade material using low ground-contact pressure equipment, or by excavators and/or backhoes operating adjacent to it.

The final grade shall be free of all materials greater than 4 inches in diameter within the designed clear zone for the project. Equipment not required for revegetation work will not be permitted in the areas of placed topsoil.

Soil amendments, seedbed preparation, and permanent stabilization mulching shall be accomplished within four working days of placing the topsoil on the de-compacted civil subgrades. If placed topsoil is not mulched with permanent stabilization mulch within four working days, the Contractor shall complete interim stabilization methods in accordance with subsection 208.04(e), at no additional cost to the Department. Time to perform the work may be extended for delays due to weather.

Revision of Section 207
Topsoil

Method of Measurement

207.07 Topsoil material will be measured by the actual number of cubic yards of topsoil placed and accepted.
Subgrade soil preparation will be measured by the square yards of subgrade which is ripped and accepted for adequate de-compaction.

Basis of Payment

207.08 The accepted quantities measured will be paid for at the Contract unit price for each of the pay items listed below that appear in the bid schedule.

Payment will be made under:

Pay Item	Pay Unit
Topsoil (Onsite)	Cubic Yard
Seeding Media	Cubic Yard
Topsoil (Offsite)	Cubic Yard
Topsoil (Wetland)	Cubic Yard
Subgrade Soil Preparation	Square Yard

Amendments for Topsoil (Onsite) and Seeding Media will be measured and paid for in accordance with Section 212.

Amendments for Topsoil (Offsite) will not be measured and paid for separately, but shall be included in the work.

Noxious Weed Management will be measured and paid for in accordance with Section 217.

Stockpiling or windrowing of topsoil will not be measured and paid for separately, but shall be included in the work.

Testing of Seeding Medial and Topsoil (Offsite) will not be measured and paid for separately but shall be included in the work.

Rod penetrometer and associated verification testing of random locations will not be measured and paid for separately, but shall be included in the work.

The Site Pre-vegetation Conference will not be paid for separately, but shall be included in the work.

Additional passes with the ripping equipment to achieve the desired de-compaction will not be measured and paid for separately, but shall be included in the work.

Revision of Section 207
Topsoil

Removing of clods, sticks, stones, debris, concrete, and asphalt in excess of 4 inches in any dimension for all topsoil and Seeding Media used within the designed clear zone for the project will not be measured and paid for separely, but shall be included in the work.

1
Revision of Section 208
Erosion Control
(Under One Acre of Disturbance)

Delete Section 208 of the Standard Specifications and replace it with the following:

Description

208.01 This work consists of constructing, installing, maintaining, and removing when required, control measures during the life of the Contract to prevent or minimize erosion, sedimentation, and pollution of any State waters as defined Section 101.

Stormwater runoff from all disturbed areas and soil storage areas for which permanent or interim stabilization is not implemented, must flow to at least one control measure to minimize sediment in the discharge. This shall be accomplished through filtering, settling, or straining. The control measure shall be selected, designed, installed, and adequately sized in accordance with good engineering, hydrologic, and pollution control practices. The control measures shall contain or filter flows in order to prevent the bypass of flows without treatment and shall be appropriate for stormwater runoff from disturbed areas and for the expected flow rate, duration, and flow conditions (i.e., sheet or concentrated flow).

The Contractor shall coordinate the construction of temporary control measures with the construction of permanent control measures to assure economical, effective, and continuous erosion and sediment control throughout the construction period.

When a provision of Section 208 or an order by the Engineer requires that an action be immediate or taken immediately, it shall be understood that the Contractor shall at once begin affecting completion of the action and pursue it to completion in a manner acceptable to the Engineer.

2
Revision of Section 208
Erosion Control
(Under One Acre of Disturbance)

Materials

208.02 Erosion control materials are subject to acceptance in accordance with Section 106. Erosion control materials shall be subject to the following approval process:

Material	Approval Process	Notes:
Erosion Bales (Weed Free)	COC	The Contractor shall provide a transit certificate number or a copy of the transit certificate as supplied from the producer.
Silt Fence	COC	
Silt Berm	APL	
Erosion Log (Type 1, Type 2, and Type 3)	COC	
Silt Dikes	COC	
Pre-fabricated Concrete Washout Structures (above ground)	APL	
Pre-fabricated Vehicle Tracking Pad	APL	
Aggregate Bag	COC	
Storm Drain Inlet Protection (Type I, II, and III)	APL	

COC = Certificate of Compliance; APL= Approved Product List

The material for control measures shall conform to the following:

(a) Erosion Bales. Material for erosion bales shall consist of Certified Weed Free hay or straw. The hay or straw shall be certified under the Colorado Department of Agriculture Weed Free Forage Certification Program and inspected as regulated by the Weed Free Forage Act, Title 35, Article 27.5, CRS. Each certified weed free erosion bale shall be identified by blue and orange twine binding the bales.

The Contractor shall not place certified weed free erosion bales or remove their identifying twine until the Engineer has inspected them.

The Contractor may obtain a current list of Colorado Weed Free Forage Crop Producers who have completed certification by contacting the:

Colorado Department of Agriculture, Weed Free Forage Program, 305 Interlocken Pkwy, Broomfield, CO 80021

Contact the Weed Free Forage Coordinator at (303) 869-9038. Also available at www.colorado.gov/ag/csd.

Bales shall be approximately 5 cubic feet of material and weigh at least 35 pounds. Stakes shall be wood and shall be 1.5 inch by 1.5 inch by 30 inch actual.

(b) *Silt Fence*. Silt fence posts shall be wood with a minimum length of 46 inches. Wood posts shall be 1.5-inch width by 1.5-inch thickness actual dimensions with 1/8-inch tolerance. Geotextile shall be attached to wood posts with three or more staples per post.

Silt fence geotextile shall conform to the following requirements:

Physical Requirements for Silt Fence Geotextiles

Property	Wire Fence Supported Requirements	Self-Supported Requirements Geotextile Elongation <50%	Test Method
Grab Strength, lbs.	90 minimum	124 minimum	ASTM D4632
Permittivity sec-1	0.05	0.05	ASTM D4491
Ultraviolet Stability	Minimum 70% Strength Retained	Minimum 70% Strength Retained	ASTM D4355

Silt Fence (Reinforced). Silt fence posts shall be metal "studded tee" T-post with a minimum length of 66 inches. Metal posts shall be “studded tee” with 0.095-inch minimum wall thickness. Wire fabric reinforcement for the silt fence geotextile shall be a minimum of 14 gauge with a maximum mesh spacing of 6 inches. Geotextile shall be attached to welded wire fabric with ties or nylon cable ties at 12 inches on center at top, middle and bottom wire. Welded wire fabric shall be

attached to the post with a minimum three 12-gauge wire ties per post. Vinyl or rubber safety caps shall be installed on all T-post.

(c) Temporary Berms. Temporary berms shall be constructed out of compacted embankment (subsoil) and not out of salvaged topsoil.

(d) Temporary Slope Drains. Temporary slope drains shall consist of fiber mats, plastic sheets, stone, concrete or asphalt gutters, half round pipe, metal or plastic pipe, wood flume, flexible rubber, or other materials suitable to carry accumulated water down the slopes. Outlet protection riprap shall conform to Section 506. Erosion control geotextile shall be a minimum Class 2, conforming to Section 712.

(e) Silt Berm. Silt berm shall consist of permeable multi-use material consisting of ultraviolet (UV) stabilized high-density polyethylene or other approved material effective in reducing water velocity. Designed and tested system shall be installed on a Turf Reinforcement Mat or Soil Retention Blanket in accordance with Section 216. The segment shall be secured to the ground with either metal or wood stakes. Minimum requirements for securing stakes shall be in accordance with the plans. Dimensions of individual segments shall meet the following criteria:

Width	Height	Weight	Percent Open Area
6 - 11 inches	6 - 10 inches	> 0.25 lbs./sq. ft.	20 – 50%

(f) Rock Check Dam. Rock Check dams shall be constructed of stone. Stone shall meet the requirements of Section 506.

(g) Sediment Trap. In constructing an excavated sediment trap, excavated soil may be used to construct the dam embankment, provided the soil meets the requirements of Section 203. Outlet protection riprap shall be the size specified in the Contract and shall conform to Section 506. Erosion control geotextile shall be a minimum Class 1, conforming to Section 712.

(h) Erosion Logs. Erosion logs shall be one of the following types unless otherwise shown on the plans:

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Revision of Section 208
Erosion Control
(Under One Acre of Disturbance)

(1) Erosion Log (Type 1) shall consist of cylinder casings filled with curled aspen wood excelsior with a consistent width of fibers evenly distributed throughout the log. The casing shall be seamless, photo-degradable tube netting. The curled aspen wood excelsior shall be fungus free, resin free, and free of growth or germination inhibiting substances.

(2) Erosion Log (Type 2) shall consist of cylinder casings filled with Erosion Log (Type 2) Compost in accordance with Section 212. The compost-wood chip blend may be pneumatically shot into a geotextile cylindrical casing or be pre-manufactured. The geotextile casing shall consist of high density polyethylene (HDPE) or polypropylene mesh (knitted, not extruded) with openings of ⅛ to ⅜ inch and contain the compost-wood chip material while not limiting water infiltration.

(3) Erosion Log (Type 3) shall consist of cylinder casings filled with curled aspen wood excelsior with a consistent width of fibers evenly distributed throughout the log. The casing shall be seamless, 100 percent natural fiber cylinder netting (compostable) and shall have minimum dimensions as shown in Table 208-1, based on the diameter of the log shown on the plans. Netting shall be a woven cotton or cellulose base mesh that has an approval to compost certification with a maximum mesh size of 0.075 inches and index values as shown in Table 208-2. The curled aspen wood excelsior shall be fungus free, resin free, and free of growth or germination inhibiting substances.

Natural compostable fiber netting shall not contain any synthetic material woven into the netting such as polypropylene, nylon, polyethylene, or polyester dyes. Oxo-degradable or oxo-biodegradable petrochemical-based fiber shall not be part of the netting material. Burlap netting material shall not be used for Erosion Log (Type 3).

Erosion Log (Type 1, Type 2, and Type 3) shall have minimum dimensions as shown in Table 208-1, based on the specified diameter of the log.

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Table 208-1
Dimensions of Erosion Logs

Diameter Type 1 & 3 (Inches)	Diameter Type 2 (Inches)	Min. Length (ft)	Max. Length (ft)	Weight (minimum) (pounds/foot)	Stake Dimensions (Inches)
9	8	10	180	1.6	3/4 thickness by 3/4 width by 18 long
12	12	10	180	2.5	1.5 thickness by 1.25 width by 24 long
20	18	10	100	4.0	1.5 thickness by 1.25 width by 30 long

Wood stake acceptable tolerance +/- 1/8 inch.

Table 208-2
Index Values for Natural Fiber Netting

Property	Requirement	Test Method
Fabric Tensile Strength	>70 lbs.	ASTM D3822
Biodegradable	100%	ASTM D5988
Mesh Pattern	Rib	

Stakes to secure erosion logs shall consist of pinewood or hardwood.

(i) *Silt Dikes*. Silt dikes shall be pre-manufactured flexible sediment barrier that will fully rebound when driven over by heavy equipment. Material shall consist of outer geotextile fabric covering closed cell urethane or polyethylene foam core. The geotextile fabric aprons shall extend beyond the foam core a minimum of 8 inches on both sides.

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Table 208-3
Geotextile Requirements

Property	Requirement	Test Method
Water Flow Rate	100-150 gallons per minute/square foot	ASTM D4491
Grab Breaking Load	200 lbs. minimum in each direction	ASTM D4632
Ultraviolet Degradation	70% of original unexposed grab breaking load after 500 hours	ASTM D4595

Each silt dike segment shall have the following dimensions:

Dimension	Length
Vertical height after installation	>5 inches
Geotextile sleeve section to interlock segments	>8 inches

Silt dike segments shall be anchored down using the minimum requirements shown in Table 208-4.

Table 208-4
Silt Dike Segment Requirements

Surface	Nail	Washers
Soil Surface	Installed in 4 inch deep trench with 6 inch nails no more than 4 feet O.C. (on center)	1 inch washers
Hard Surface	1 inch concrete nails no more than 4 feet O.C.	1 inch washers and solvent-free adhesive

(j) *Concrete Washout Structure*. The Contractor shall construct a washout structure that will contain washout from concrete placement, construction equipment cleaning operations, and residue from cutting, coring, grinding, grooving, and hydro-concrete demolition. Embankment required for the concrete washout structure may be excavated material, provided that this material meets the requirements of Section 203 for embankment. If the bottom of the excavated structure is within 5 feet of anticipated high ground water elevation or the soil

does not have adequate buffering capacity to meet water quality standards, an impermeable synthetic liner shall be installed with the minimum properties shown in Table 208-5.

Table 208-5
Impermeable Synthetic Liner Requirements

Tested Property	Test Method	Units	Value
Thickness	ASTM D5199	mil	>30 +/- 1.5
Tear Strength	ASTM D1004	lbs.	>8
Low Temperature Impact	ASTM D1790	°F	Pass at -20

(k) Pre-Fabricated Concrete Washout Structure. Pre-Fabricated Concrete Washout Structures shall be one of the following types unless otherwise shown on the plans:

(1) Pre-Fabricated Concrete Washout Structure (Type 1). Type 1 portable bins shall be used only when specified in the Contract. It shall consist of a watertight multi-use container designed to contain liquid concrete washout wastewater, solid residual concrete waste from washout operations, and residue from saw cutting, coring, grinding, grooving, and hydro-concrete demolition. Minimum capacity including freeboard shall be 440 gallons.

(2) Pre-Fabricated Concrete Washout Structure (Type 2). Type 2 portable bins shall be used only when specified in the Contract. It shall consist of a watertight one-time use container designed to contain liquid concrete washout wastewater, solid residual concrete waste from washout operations, and residue from saw cutting, coring, grinding, grooving, and hydro-concrete demolition. The structure shall have a system to secure to the ground. Minimum capacity including freeboard shall be 50 gallons.

(l) Vehicle Tracking Pad (VTP). Aggregate for the vehicle tracking pad shall be crushed natural aggregate with at least two fractured faces that meets the following graduation requirements:

Sieve size	Percent by weight Passing Square Mesh Sieves
75 mm (3 inch)	100
50 mm (2 inch)	0 to 25
19.0 mm (3/4 inch)	0 to 15

Recycled crushed concrete or asphalt shall not be used for vehicle tracking pads.

Erosion control geotextile shall be a minimum Class 2, conforming to Section 712.

Pre-Fabricated or manufactured vehicle tracking pads shall only be used if specified in the Contract. Multi-use pads shall consist of industrial grade materials and shall be designed to minimize sediment leaving the project.

Minimum dimensions of the modular systems shall be:

Width	Length of pad
12 feet	35 feet

To accommodate construction traffic turning radii between the tracking pad and a stabilized surface, additional flared sections of approved pads or aggregate in accordance with this specification shall be used at no additional cost to CDOT.

Weight (min.) (lbs./sq. ft.)	Crush strength (min.) (psi)
8	400

A thin layer of stone, geotextile, or other stable surface may be required to stop rutting under the pad or area where the vehicles mount or dismount the manufactured trackout control device.

(m) Aggregate Bag. Aggregate bags shall consist of crushed stone or recycled rubber filled fabric with the following properties:

Diameter (inches)	Weight (minimum) (pounds per foot)
6-8	6

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Diameter (inches)	Weight (minimum) (pounds per foot)
10	10
12	15

Rubber used in bags shall be clean, 95 percent free of metal and particulates.

Crushed stone contained in the aggregate bags shall conform to Table 703-1 for Coarse Aggregate No. 6.

The aggregate bag shall consist of a woven geotextile fabric with the following properties:

Property	Requirement	Test Method
Grab Tensile Strength	90 lbs. min.	ASTM D4632
Trapezoid Tear Strength	25 lbs. min.	ASTM D4533
Mullen Burst	300 psi	ASTM D3786
Ultraviolet Resistance	70%	ASTM D4355

(n) Storm Drain Inlet Protection. Storm drain inlet protection shall consist of aggregate filled fabric with the following dimensions:

Storm Drain Inlet Protection Properties	Protection Type I*	Protection Type II#	Protection Type III◂
Diameter	4 in.	4 in.	N/A
Minimum Section Length	7 ft.	5 ft.	5 ft.
Apron Insert	---	30 in. or sized to grate	30 in or sized to grate

*Type I protection shall be used with Inlet Type R.
#Type II protection shall be used with Combination Inlet. Option A or B
◂ Type III protection shall be used with Vane Grate Inlet only. Option A or B
Note: Options A and B are shown on Standard Plan M-208-1.

The Storm Drain Inlet Protection (Type I, II and III) shall consist of a woven

geotextile fabric with the following properties:

Property	Test Method	Unit	Requirement
Grab tensile strength	ASTM D4632	lbs.	minimum 150X200
Mullen Burst Strength	ASTM D3786	lbs.	400
Trapezoid Tear Strength	ASTM D4533	lbs.	minimum 60X60
Percent Open Area	COE-22125-86	%	≥20
Water Flow Rate	ASTM D4491	gal./min./sq. ft.	≥100
Ultraviolet Resistance	ASTM D4355	%	≥70

Curb roll for Storm Drain Inlet Protection (Type I and II) shall have a weight >4 pounds per linear foot of device. The device shall be capable of conforming to the shape of the curb. Aggregate contained in the storm drain inlet device shall consist of gravel or crushed stone conforming Table 703-1 for Coarse Aggregate No. 6.

CONSTRUCTION REQUIREMENTS

208.03 Project Review, Schedule, and Erosion Control Management. Prior to construction the Contractor shall implement control measures in accordance with the approved project schedule as described in this section.

At the Pre-Construction Conference, the attendees shall discuss the Stormwater Management Plan (SWMP), maintaining water quality standards, sensitive habitats on-site, wetlands, other vegetation to be protected, and the enforcement mechanisms for not meeting the requirements of this specification.
Prior to beginning construction, the Contractor shall evaluate the project site for storm water draining into or through the site. When such drainage is identified, control measures shall be used if possible to divert stormwater from running on-site and becoming contaminated with sediment or other pollutants. The diversion may be accomplished with a temporary pipe or other conveyance to prevent water

contamination or contact with pollutants. Run-on water that cannot be diverted shall be treated as construction runoff and adequate control measures shall be employed.

The SWMP Administrator shall evaluate all non-stormwater coming onto the site, such as springs, seeps, and landscape irrigation return flow. If such flow is identified, control measures shall be used to protect off-site water from becoming contaminated with sediment or other pollutants.

The SWMP Administrator shall review existing inlets and culverts to determine if inlet protection is needed due to water flow patterns. Prior to beginning construction, inlets and culverts needing protection shall be protected and the location of the implemented control measure added to the SWMP site map.

Prior to construction, the Contractor shall implement appropriate control measures for protection of wetlands, sensitive habitat, and existing vegetation from ground disturbance and other pollutant sources, in accordance with the approved project schedule as described in Section 208.

When additional control measures are required and approved by the Engineer, the Contractor shall implement the additional control measures and the SWMP Administrator shall record and describe them on the SWMP site map. The approved control measures will be measured and paid for in accordance with Section 208.

(a) Project Review. The Contractor shall submit modifications to the Contractor's control measures or SWMP in a written proposal to the Engineer. The written proposal shall include the following information:

(1) Reasons for changing the control measures.

(2) Diagrams showing details and locations of all proposed changes.

(3) List of appropriate pay items indicating new and revised quantities.

(4) Schedules for accomplishing all erosion and sediment control work.

(5) Effects on certifications caused by the proposed changes.

The Engineer will approve or reject the written proposal in writing within seven days after receipt of the submittal. The Engineer may require additional control measures prior to approving the proposed modifications. Additional modifications and additional control measures will be paid for at the Contract Unit Price for the

specific items involved. If no items exist, they will be paid for as extra work in accordance with Section 109.

(b) Erosion and Sediment Control Activities. The erosion and sediment control activities shall be included in the weekly meeting update. The project schedule shall specifically indicate the sequence of clearing and grubbing, earthwork operations, and construction of temporary and permanent erosion control features and stabilization. The project schedule shall include erosion and sediment control work for haul roads, borrow pits, storage, asphalt or concrete batch sites, and all areas within the project limits. If during construction the Contractor proposes changes which would affect the Contract's control measures, the Contractor shall propose revised control measures to the Engineer for approval in writing. If necessary, the Contractor shall update proposed sequencing of major activities in the SWMP. Revisions shall not be implemented until the proposed measures have been approved in writing by the Engineer.

(c) Erosion Control Management (ECM). Erosion Control Management for this project shall consist of SWMP Administration and Erosion Control Inspection. All ECM staff shall have working knowledge and experience in construction, and shall have successfully completed the Transportation Erosion Control Supervisory Certificate Training (TECS) as provided by the Department. The Superintendent may be permitted to serve in an ECM role, unless otherwise specified in the contract.

1. SWMP Administration. The SWMP shall be maintained by a SWMP Administrator. The name of the SWMP Administrator shall be recorded on the SWMP. The SWMP Administrator shall have full responsibility to maintain and update the SWMP and identify all critical action items needed to maintain water quality standards:

   (1) Complete the SWMP as described in Section 208.

   (2) Participate in the Pre-Construction Conference.

   (3) Attend erosion and sediment control meetings.

   (4) Implement necessary actions to reduce erosion or water quality problems, anticipated or presently existing, resulting from construction activities.

   (5) Ensure that all labor, material, and equipment needed to install, maintain, and remove control measures are available as needed.

(6) During construction, the SWMP site map shall be updated to reflect current field conditions and include, at a minimum, the following if applicable:

(i) Limits of Construction (LOC).

(ii) Areas of disturbance (AD), including areas of borrow and fill.

(iii) Limits of Disturbance (LDA).

(iv) Areas used for storage of construction materials, equipment, soils, or wastes.

(v) Location of dedicated asphalt, concrete batch plants, and masonry mixing stations.

(vi) Location of construction offices and staging areas.

(vii) Location of work access routes during construction.

(viii) Location of waste accumulation areas, including areas for liquid, concrete, masonry, and asphalt.

(ix) Location of temporary, interim and permanent stabilization.

(x) Location of outfalls.

(xi) Flow arrows that depict stormwater flow directions on-site and runoff direction.

(xii) Location of structural and non-structural control measures.

(xiii) Location of springs, streams, wetlands, and other State waters, including areas that require pre-existing vegetation be maintained within 50 horizontal feet of a receiving water, unless infeasible.

(xiv) Location of stream crossings located within the construction site boundary.

(7) Start a new site map before the current one becomes illegible. All site

maps shall remain as part of the SWMP.

(8) Install control measures according to Standard Plans M-208-1, M-216-1, and M-615-1.

(9) Record in the SWMP, the approved Method Statement for Containing Pollutant Byproducts.

(10) Update the Potential Pollutants list in the SWMP and Spill Response Plan throughout construction.

2. Erosion Control Inspector (ECI).

The SWMP Administrator shall complete the duties of the ECI.

(1) ECI duties shall be as follows:

(i) Inspect initial placement and adherence to approved SWMP and SWMP site plan control measures

(ii) Assess the adequacy of control measures at the site to identify areas requiring new or modified control measures to minimize pollutant discharges.

(iii) Identify all areas of concern that may impact water quality and, if necessary, implement corrective actions.

(iv) Ensure all other agency Stormwater and inspection requirements are followed unless a waiver or other agreement has been made.

(2) The ECI shall immediately report to the Contractor and Engineer the following instances:

(i) Noncompliance which may endanger health or the environment, regardless of the cause of the incident.

(ii) Spills or discharges which exceeds any water quality standards.

(iii) Upset conditions which cause an exceedance of any water quality standards.

(3) Document spills, leaks, or overflows that result in the discharge of pollutants. The ECI shall record the time and date, weather conditions, reasons for spill, and how it was remediated.

(d) Documentation Available on the Project. The following Contract documents and references shall be made available for reference at the CDOT field office during construction:

1. SWMP. The Engineer will provide an approved SWMP design (includes items (1) through (4) as listed below) at the Pre-construction Conference, which is and shall remain the property of CDOT. The following Contract documents and reports shall be included or kept maintained, (as applicable), and updated in the SWMP under the appropriate items by the SWMP Administrator:

   (1) SWMP Plan Sheets – Notes, tabulation, site description, sequence of major activities, area of disturbance, existing soil data, existing vegetation percent cover, potential pollutant sources, receiving water, non-stormwater discharges and environmental impacts.

   (2) SWMP Site Maps and Project Plan Title Sheet, if included in the original contract.

   (3) Specifications – Standard and project special provisions related to stormwater and erosion control.

   (4) Standard Plans M-208-1, M-216-1 and M-615-1.

   (5) Control measure Details not in Standard Plan M-208-1 – project specific non-standard details.

   (6) All Water Quality Audit Reports and Form 105(s) relating to Water Quality, if applicable.

   (7) Spill Response Plan – Reports of reportable spills submitted to CDPHE.

   (8) List and Evaluation of Potential Pollutants – List of potential pollutants as described in Section 107 and approved Method Statement for Containing Pollutant Byproducts.

(9) Other Correspondence including agreements with other Municipal Separate Storm Sewer System (MS4s), approved deferral request, CDPHE audit documentation.

(10) TECS Certifications of the SWMP Administrator, kept current through the life of the project.

(11) Pre-construction Conference – Conference agenda with a certification of understanding for maintaining water quality standards and SWMP. The certification shall be signed by all attendees. A certification shall also be signed by all attendees of meetings held for new subcontractors beginning work on the project that could adversely affect water quality after the Pre-construction Conference has been held, if applicable.

(12) All Project Environmental Permits – All project environmental permits and associated applications and certifications, including, water quality standards, Senate Bill 40, USACE 404, temporary stream crossings, dewatering, biological opinions, and all other permits applicable to the project, including any separate permits obtained by the Contractor for staging area on private property, asphalt or concrete batch plant, etc.

The Engineer will incorporate the documents and reports available at the time of award. The Contractor shall provide and insert all other documents and reports as they become available during construction.

2. Reference Materials. The following Reference materials shall be used:

(1) CDOT Erosion Control and Stormwater Quality Guide.

(2) CDOT Erosion Control and Stormwater Quality Field Guide.

(e) *Weekly Meetings*: If applicable, the Contractor shall conduct a weekly meeting with the Engineer and subcontractors to discuss construction activities that could adversely affect water quality, including the following:

(1) Unresolved issues from observations.

(2) Requirements of the SWMP.

(3) Problems that may have arisen in implementing the site specific SWMP or maintaining control measures.

(4) Control measures that are to be installed, removed, modified, or maintained, and associated SWMP modifications.

(5) Planned activities that will affect stormwater in order to proactively phase control measures.

208.04 Control Measures for Stormwater. The SWMP Administrator shall modify the SWMP to clearly describe and locate all control measures implemented at the site to control potential sediment discharges.

Vehicle tracking pads shall be used at all vehicle and equipment exit points from the site to prevent sediment exiting the limits of construction (LOC) of the project site. Access shall be provided only at locations approved by the Engineer. The SWMP Administrator shall record vehicle tracking pad locations on the SWMP site map.

New inlets and culverts shall be protected during their construction. Appropriate protection of each culvert and inlet shall be installed immediately. When riprap is called for at the outlet of a culvert, it shall be installed within 24 hours of completion of each pipe. The Contractor shall remove sediment, millings, debris, and other pollutants from within the newly constructed drainage system, prior to use, at the Contractor's expense. All removed sediment shall be disposed of outside the project limits in accordance with all applicable regulations.

Concrete products wasted on the ground during construction including, but not limited to, excess concrete removed from forms, spills, slop, and all other unused concrete are potential pollutants that shall be removed from the site or contained at a pre-approved containment area that has been identified in the SWMP. The concrete shall be picked up and recycled in accordance with 6 CCR 1007-2 (CDPHE Regulations Pertaining to Solid Waste Sites and Facilities) at regular intervals, as needed, or as directed by the Engineer.

(a) *Unforeseen Conditions*. The Contractor shall design and implement erosion and sediment control measures for correcting conditions unforeseen during the design of the project, or for emergency situations that develop during construction. The Department's Erosion Control and Stormwater Quality Guide shall be used as a reference document for the purpose of designing erosion and sediment control measures. Measures and methods proposed by the Contractor shall be reviewed and approved in writing by the Engineer prior to installation.

(b) *Other Agencies*. If CDPHE, US Army Corps of Engineers (USACE), the Environmental

Protection Agency (EPA), or a Local Agency reviews the project site and requires additional measures to prevent and control erosion, sediment, or pollutants, the Contractor shall cease and desist activities resulting in pollutant discharge and immediately implement these measures. If the work may negatively affect another MS4, the Contractor shall cease and desist activities resulting in the discharge and shall implement appropriate measures to protect the neighboring MS4, including installing additional measures. Implementation of these additional measures will be paid for at contract unit prices.

(c) *Work Outside the Right of Way*. Disturbed areas, including staging areas, which are outside CDOT ROW and outside easements acquired by CDOT for construction, are the responsibility of the Contractor.

(d) *Construction Implementation*. The Contractor shall incorporate control measures into the project as outlined in the accepted schedule.

(e) *Stabilization*. Once earthwork has started, the Contractor shall maintain erosion control measures until permanent stabilization of the area has been completed and accepted. Clearing, grubbing and slope stabilization measures shall be performed regularly to ensure final stabilization. Failure to properly maintain erosion control and stabilization methods, either through improper phasing or sequencing will require the Contractor to repair or replace sections of earthwork at the Contractor's expense. The Contractor shall schedule and implement the following stabilization measures during the course of the project:

1. Temporary Stabilization. At the end of each day, the Contractor shall stabilize disturbed areas by surface roughening, vertical tracking, or a combination thereof. Disturbed areas are locations where actions have been taken to alter the existing vegetation or underlying soil of a site, such as clearing, grading, road bed preparation, soil compaction, and movement and stockpiling of sediment and materials. Designated topsoil distributed on the surface or in stockpiles shall not receive temporary stabilization. Other stabilization measures may be implemented, as approved.

2. Interim Stabilization. As soon as it is known with reasonable certainty that work will be temporarily halted for 14 days or more, sediment and material stockpiles and disturbed areas shall be stabilized using one or more of the specified following methods:

   (1) Application of 1.5 tons per acres of mechanically crimped certified weed free hay or straw in combination with an approved organic mulch tackifier.

(2) Placement of bonded fiber matrix in accordance with Section 213.

(3) Placement of mulching (hydraulic) wood cellulose fiber mulch with tackifier, in accordance with Section 213.

(4) Application of spray-on mulch blanket in accordance with Section 213. Magnesium Chloride, Potassium Chloride and Sodium Chloride, or other salt products, shall not be used as a stabilization method.

(5) Topsoil stockpiles shall receive interim stabilization in accordance with Section 207, unless specified as a different material than the other disturbed areas on-site.

3. Summer and Winter Stabilization. Summer and winter stabilization is defined as stabilization during months when seeding will not be permitted. As soon as the Contractor knows shutdown is to occur, interim stabilization shall be applied to the disturbed area. Protection of the interim stabilization method is required. Reapplication of interim stabilization may be required as directed.

4. Permanent Stabilization. Permanent stabilization is defined as the covering of disturbed areas with topsoil, seeding, mulching with tackifier, soil retention coverings, and such non-erodible methods as riprap, road shouldering, etc., or a combination thereof as required by the Contract. Other permanent stabilization techniques may be proposed by the Contractor, in writing, and shall be used when approved in writing by the Engineer. All permanent stabilization requirements shown on the plans shall be completed within four working days of the placement of the topsoil in accordance with Section 207.

5. Final Stabilization. Final stabilization is achieved when all ground disturbing activities at the site have been completed, and uniform vegetative cover has been established with an individual plant density of at least 70 percent of pre-disturbance levels, or equivalent permanent physical erosion reduction methods have been employed.

(f) *Maintenance*. Erosion and sediment control practices and other protective measures identified in the SWMP as control measures for stormwater pollution prevention shall be maintained in effective operating condition until final acceptance of the project. Control measures shall be continuously maintained in accordance with good engineering, hydrologic, and pollution control practices, including removal of collected sediment when silt depth is 50 percent or more of

the effective height of the erosion control device. When possible, the Contractor shall use equipment with an operator rather than labor alone to remove the sediment.

Maintenance of erosion and sediment control devices shall include replacement of such devices upon the end of their useful service life as recommended by the Contractor and approved by the Engineer. Maintenance of rock check dams and vehicle tracking pads shall be limited to removal and disposal of sediment or addition of aggregate. Damages resulting from failure to maintain control measures shall be repaired at the Contractor's expense.

Site assessments shall be performed to assess the adequacy of control measures at the site and the necessity of changes to those control measures to ensure continued effective performance. Where site assessment results in the determination that new or replacement control measures are necessary, the control measures shall be installed to ensure continuous effectiveness. When identified, control measures shall be maintained, added, modified or replaced as soon as possible, immediately in most cases.

Approved new or replaced control measures will be measured and paid for in accordance with this section. Devices damaged due to the Contractor's negligence shall be replaced at the Contractor's expense.

From the time seeding and mulching work begins until project acceptance the Contractor shall maintain all seeded areas. Damage to seeded areas or to mulch materials shall be immediately restored. If damage is due to Contractor negligence, it shall be restored at the Contractor's expense. Restoration of other damaged areas will be measured and paid for under the appropriate bid item.

Temporary control measures may be removed prior to final acceptance of the project, as determined by the Engineer. If removed, the area in which these control measures were constructed shall be returned to a condition similar to that which existed prior to its disturbance. Removed control measures shall become the property of the Contractor. Maintenance shall be notified of the locations of any control measures left in place.

If the Contractor fails to complete construction within the approved contract time, the Contractor shall continue erosion and sediment control operations at its expense until acceptance of the work.

Sediment removed during maintenance of control measures and material from

street sweeping may be used in or on embankment, provided it meets the requirements of Section 203 and is distributed evenly across the embankment.

Whenever sediment collects on the paved surface, the surface shall be cleaned. Street washing will not be allowed. Storm drain inlet protection shall be in place prior to shoveling, sweeping, or vacuuming. Sweeping shall be completed with a pickup broom or equipment capable of collecting sediment. Sweeping with a kick broom will not be allowed.

Material from pavement saw cutting operations shall be cleaned from the roadway surface during operations using a vacuum. A control measure, such as a berm, shall be placed to contain slurry from joint flushing operations until the residue can be removed from the soil surface. Aggregate bags, erosion logs or other permeable control measures shall not be used. Residue shall not flow into driving lanes. It shall be removed and disposed of in accordance with Section 107. Material containment and removal will not be paid for separately, but shall be included in the work.

208.05 Construction of Control Measures. Control measures shall be constructed in accordance with Standard Plans M-208-1 and M-216-1, and with the following:

(a) Seeding, Mulching, Sodding, Soil Retention Blanket. Seeding, mulching, sodding, and soil retention blanket installation shall be performed in accordance with Sections 212, 213, and 216.

(b) Erosion Bales. The bales shall be anchored securely to the ground with wood stakes. Erosion Bales shall be entrenched 4 inches minimum into the soil, tightly abutted with no gaps, staked, and backfilled around the entire outside perimeter. Erosion Bales cannot be used for Check Dams.

(c) Silt Fence. Silt fence shall be installed in locations as per M standard plans 208-1 and as specified in the Contract.

(d) Temporary Berms. Berms shall be constructed to the dimensions as per M 208-1 standard plans and as shown in the Contract, and sufficiently compacted to prevent erosion or failure. If the berm erodes or fails, it shall be immediately repaired or replaced at the Contractor's expense. Berms must be at least 18 inches tall or high enough to prevent overtopping. Berms must have a minimum of 4 to 6-foot base. Gradient of all receiving area above berm must be less than 2:1, or flatter. Outlets of anticipated flow from captured water behind berms must be designed with additional control measures suitable to control concentrated flow.

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Maximum drainage area for each outlet must be limited to 2 acres.

(e) Temporary Diversion. Diversions shall be constructed to the dimensions as per M standard plans 208-1 and as shown in the Contract and graded to drain to a designated outlet. The berm shall be sufficiently compacted to prevent erosion or failure. If the diversion erodes or fails, it shall be immediately repaired or replaced at the Contractor's expense.

(f) Temporary Slope Drains. Temporary slope drains shall be installed prior to installation of permanent facilities or growth of adequate ground cover on the slopes. All temporary slope drains shall be securely anchored to the slope. The inlets and outlets of temporary slope drains shall be protected to prevent erosion. Ensure drainage area for every slope drain is smaller than 5 acres. Ensure pipe or channel is properly sized, and for drainage areas larger than 1 acre the pipe size must be designed by an Engineer to ensure the drainage structure can accommodate the runoff resulting from a 2-year, 24-hour storm event. The use of prefabricated flared inlet sections is recommended.

(g) Silt Berm. Prior to installation of silt berms, the Contractor shall prepare the surface of the areas in which the berms are to be installed such that are they free of materials greater than 2 inches in diameter and are suitably smooth for the installation of the silt berms, as approved. See M standard 208-1 for details. Silt berms shall be secured with spikes. The Contractor shall install the silt berm in a manner that will prevent water from going around or under the silt berm. Silt berms shall be installed on top of soil retention blanket or turf reinforcement blanket.

(h) Rock Check Dam. Rock shall be installed at locations shown on the plans. Rock check dams shall conform to the dimensions shown on the plans. The Geotextile Erosion Control shall be Class 2 and conform to the requirements of Section 712, and shall extend up ⅔ of the riprap height with 6inch minimum cover over geotextile. Rock Check Dam shall be installed within a ditch sub excavated 6 inches below the flow line. The ends of the rip rap check dam shall be a minimum of 6 inches higher than the center of the check dam. Stone shall meet the requirements of Section 506. Larger rocks with larger void spaces should be used on top. See M standard 208-1 for details.

(i) Riprap Outlet Protection. Geotextile used shall be protected from cutting or tearing. Overlaps between two pieces of geotextile shall be 1-foot minimum. Riprap size shall be in accordance with Section 506 and as shown on the plans.

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(j) Storm Drain Inlet Protection. Prior to installation, the Contractor shall sweep the surface of the area in which the storm drain inlet protection devices are to be installed such that the pavement is free of sediment and debris. The ends of the inlet protection Type 1 and Type 2 shall extend a minimum of 1 foot past each end of the inlet.

The Contractor shall remove all accumulated sediment and debris from the surface surrounding all storm drain inlet protection devices after each rain event or as directed. The Contractor shall remove accumulated sediment from each Type II and III containment area when it is more than one third full of sediment, or as directed.

The Contractor shall protect storm drain facilities adjacent to locations where pavement cutting operations involving wheel cutting, saw cutting, sand blasting, or abrasive water jet blasting are to take place.

(k) Sediment Trap. Sediment traps shall be installed to collect sediment laden water and to minimize the potential of pollutants leaving the project site. Locations shall be in accordance with M standard 208-1 and as shown on the plans or as directed.

Sediment traps shall be constructed prior to disturbance of upslope areas and shall be placed in locations where runoff from disturbed areas can be diverted into the trap.

The area under the embankment shall be cleared, grubbed, and stripped of any vegetation and roots.

Fill material for the embankment shall be free of roots or other vegetation, organic material, large stones, and other objectionable material.

Sediment shall be removed from the trap when it has accumulated to one half of the wet storage depth of the trap and shall be disposed of in accordance with Section 208.

(l) Erosion Logs. Erosion logs shall be embedded 2 inches into the soil. Stakes shall be embedded so that the top of the stake does not extend past the top erosion log more than 2 inches, at the discretion of the Engineer, a shallower stake depth may be permitted if adverse site conditions are encountered, e.g. rock or frozen ground.

The Contractor shall maintain the erosion logs during construction to prevent

sediment from passing over or under the logs. See M standard 208-1 for details.

(m) Silt Dikes. Prior to installation of silt dikes, the Contractor shall prepare the surface of the areas in which the silt dikes are to be installed such that they are free of materials greater than two inches in diameter and are suitably smooth for the installation of the silt dikes, as approved by the Engineer.

(n) Concrete Washout Structure. The concrete washout structure shall meet or exceed the dimensions shown on the plans. Work on this structure shall not begin until written acceptance of location is provided by the Engineer. See M standard 208-1 for details.

Control measures designed for concrete washout waste shall be implemented. If the bottom of the excavated structure is within 5 feet of anticipated high ground water elevation or the soil does not have adequate buffering capacity to meet water quality standards, an impermeable synthetic liner shall be installed with the minimum properties shown in Table 208-5 or use a prefabricated washout.

The following requirements shall be met:

(1) The structure shall contain all washout water.

(2) Stormwater shall not carry wastes from washout and disposal locations.

(3) The site shall be located a minimum of 50 horizontal feet away from State waters and shall meet all requirements for containment and disposal as defined in Section 107.

(4) The site shall be signed as “Concrete Washout”.

(5) The site shall be accessible to appropriate vehicles.

(6) Freeboard capacity shall be included in the structure design to reasonably ensure the structure will not overtop during or because of a precipitation event.

(7) The Contractor shall prevent tracking of washout material out of the washout structure.

(8) Solvents, flocculants, and acid shall not be added to wash water.

(9) The structure shall be surrounded on three sides by a compacted berm.

(10) The structure shall be fenced with orange plastic construction fencing conforming to Section 607, to provide a barrier to construction equipment and to aid in identification of the concrete washout area.

(11) Concrete waste, liquid and solid, shall not exceed ⅔ the storage capacity of the washout structure.

(12) A concrete washout sign shall have letters at least 3 inches high and conform to Section 630.

(o) Pre-fabricated concrete washout structures (Type 1 and Type 2). Structures and sites shall meet the following requirements:

(1) Structure shall contain all washout water. If bins are determined to be leaking, the Contractor shall replace the bin on-site and clean up the spilled material and dispose of it properly.

(2) Structure shall be located a minimum of 50 horizontal feet away from State waters, and shall be confined so that no potential pollutants will enter State waters and other sensitive areas as defined in the Contract. Locations shall be as approved by the Engineer. The pre-fabricated structure shall be signed as "Concrete Washout". Sign can be on portable bin.

(3) The site shall be accessible to appropriate vehicles.

(4) Washout bins shall be covered with a tarp tied down to the structure or staked to the ground when a storm event is anticipated.

(5) Solvents, flocculants, and acid shall not be added to wash water.

(6) Concrete waste, liquid and solid, shall not exceed ⅔ the storage capacity of the washout structure.

(7) Prefabricated structures cannot be moved when they contain liquid, unless otherwise approved.

(8) The concrete washout structure shall be installed and ready for use prior to concrete placement operations.

(9) Washout areas shall be checked and maintained as required. On-site permanent disposal of concrete washout waste is not allowed.

All liquid and solid wastes, including contaminated sediment and soils generated from concrete washout shall be hauled away from the site and disposed of properly at the Contractor's expense.

Delivery to the site shall not occur until written acceptance is provided by the Engineer for both the product and the concrete waste disposal facility.

(p) Vehicle Tracking Pad (VTP). Vehicle tracking pads shall be constructed to the minimum dimensions shown in the Contract, unless otherwise directed by the Engineer. Construction of approved vehicle tracking pads shall be completed before any disturbance of the area.

The Contractor shall maintain each vehicle tracking pad during the entire time that it is in use for the project. The vehicle tracking pad shall be removed at the completion of the project unless otherwise directed by the Engineer. Additional aggregate may be required for maintenance and will be paid for under Pay Item, Maintenance Aggregate (Vehicle Tracking Pad).

(q) Detention Pond. Permanent detention ponds shown on the construction plans may be used as temporary control measures if all the following conditions are met:

(1) The pond is designated as a construction control measure in the SWMP.

(2) The pond outfall and outlet are designed and implemented for use as a control measure during construction in accordance with good engineering, hydrologic, and pollution control practices. The stormwater discharges from the outfall shall not cause degradation or pollution of State waters, and shall have control measures, as appropriate.

(3) All silt shall be removed and the pond returned to the design grade and contour prior to project acceptance.

(r) Aggregate Bag. Aggregate bags shall be placed on a stable surface, consisting of hardscape or compacted gravel. If approved by the Engineer, the aggregate bag may be placed on compacted dirt areas, where bags conform to the surface and can effectively minimize sediment transport. Aggregate bags can be used on frozen ground when other control measures cannot be trenched or staked, but only until the ground is capable of being trenched and staked. Aggregate bags

shall not be placed in concentrated flow areas, other than gutter pans. Aggregate bags shall be placed to conform to the surface without gaps to ensure that discharge water does not cause erosion. See M standard 208-1 for details.

(s) Surface roughening. Surface roughening creates horizontal grooves along the contour of the slope. Roughening may be accomplished by furrowing, scarifying, ripping, or disking the soil surface to create a 2 to 4-inch minimum variation in soil surface.

(t) Vertical Tracking. Vertical tracking involves driving a tracked vehicle up and down the soil surface and creating horizontal grooves and ridges along the contour of the slope. Sandy soils or soils that are primarily rock need not be tracked.

208.06 Materials Handling and Spill Prevention. The SWMP Administrator shall clearly describe and record on the SWMP, all practices implemented at the site to minimize impacts from procedures or significant material that could contribute pollutants to runoff. Areas or procedures where potential spills can occur shall have a Spill Response Plan in place as specified in Section 107 or Section 208. Construction equipment, fuels, lubricants, and other petroleum distillates shall not be stored or stockpiled within 50 horizontal feet of any State waters or more if the Contractor determines necessary. Equipment fueling and servicing shall occur only within approved designated areas.

(a) Bulk storage structures. Bulk storage structures for petroleum products and other chemicals shall have impervious secondary containment or equivalent adequate protection so as to contain all spills and prevent any spilled material from entering State waters. Secondary containment shall be capable of containing the combined volume of all the storage containers plus at least 10 percent freeboard. For secondary containment that is used and may result in accumulation of stormwater within the containment, a plan shall be implemented to properly manage and dispose of all accumulated stormwater which is deemed to be contaminated (e.g., has an unusual odor or sheen).

(b) Lubricant Leaks. The Contractor shall inspect equipment, vehicles, and repair areas daily to ensure petroleum, oils, and lubricants (POL) are not leaking onto the soil or pavement. Absorbent material or containers approved by the Engineer shall be used to prevent leaking POL from reaching the soil or pavement. The Contractor shall have onsite approved absorbent material or containers of sufficient capacity to contain any POL leak that can reasonably be foreseen. The Contractor shall inform all Spill Response Coordinators in accordance with the Spill Response Plan if unforeseen leakage is encountered. All materials resulting from

POL leakage control and cleanup shall become the property of the Contractor and shall be removed from the site. Control, cleanup, and removal of by-products resulting from POL leaks shall be performed at the Contractor's expense.

(c) Spill Response Plan. A Spill Response Plan shall be developed and implemented to establish operating procedures for handling potential pollutants and preventing spills.

The Response Plan shall contain the following information:

(1) Identification and contact information of each Spill Response Coordinators.

(2) Locations of areas on the project site where equipment fueling and servicing operations are permitted.

(3) Location of cleanup kits.

(4) Quantities of chemicals and locations stored on site.

(5) Label system for chemicals and Safety Data Sheets (SDS) for products.

(6) Clean up procedures to be implemented in the event of a spill that does not enter State waters or ground water.

(7) Procedures for spills of any size that enter surface waters or ground water, or have the potential to do so. CDOT's Erosion Control and Stormwater Quality Guide contains spill notification contacts and phone numbers required in the Spill Response Plan.

(8) A summary of the employee training provided.

Information in items (1) through (8) shall be updated in the SWMP when they change.

208.07 Stockpile Management. Material stockpiles shall be located 50 horizontal feet away from State waters, and shall be confined so that no potential pollutants will enter State waters and other sensitive areas as defined in the Contract. Locations shall be approved by the Engineer.

Erodible stockpiles (including topsoil) shall be contained with acceptable control measures at the toe (or within 20 feet of the toe) throughout construction. Control

measures shall be approved by the Engineer. The SWMP Administrator shall describe, detail, and record the sediment control devices on the SWMP.

208.08 Limits of Disturbance. The Contractor shall limit construction activities to those areas within the limits of disturbance shown on the plans and cross-sections. Construction activities, in addition to the Contract work, shall include the on-site parking of vehicles or equipment, on-site staging, on-site batch plants, haul roads or work access, and all other activities which would disturb existing soil conditions. Staging areas within the LDA shall be as approved by the Engineer. Construction activities beyond the limits of disturbance due to Contractor negligence shall be restored to the original condition by the Contractor at the Contractor's expense. The SWMP Administrator shall tabulate additional disturbances not identified in the SWMP. If the disturbance at any time exceeds 1 acre (including as part of a common plan of development), the Contractor will need to apply for a Colorado Discharge Permit System- Stormwater Construction Permit (CDPS-SCP) and comply with all of CDOT's over one acre specifications.

The Contractor shall pursue stabilization of all disturbances to completion.

208.09 Regulatory Mechanism for Water Quality. Failure to implement the Stormwater Management Plan is a violation of the Colorado Water Quality Control Act. Penalties may be assessed to the Contractor by the appropriate agencies. All fines assessed to the Department for the Contractor's failure to implement the SWMP will be deducted from monies due the Contractor.

The Contractor shall be subject to liquidated damages for incidents of failure to perform erosion control as required by the Contract. Liquidated damages will be applied for failure to comply with these specifications, including the following:

(1) Failure of the Contractor to implement necessary actions required by the Engineer as required by this section.

(2) Failure to construct or implement erosion control or spill containment measures required by the Contract, or failure to construct or implement them in accordance with the Contractor's schedule.

(3) Failure to stabilize disturbed areas as required by this section.

(4) Failure to replace or perform maintenance on an erosion control feature after notice from the Engineer to replace or perform maintenance as required by this section.

(5) Failure to remove and dispose of sediment from control measures as required.

(6) Failure to install and properly utilize a concrete washout structure for containing washout from concrete placement operations.

(7) Failure to perform permanent stabilization as required by this section.

(8) Failure to prevent discharges not composed entirely of stormwater from leaving the construction site.

(9) Failure to provide the survey of Permanent Water Quality features when required on the project in accordance with this section.

The Engineer will immediately notify the Contractor of each incident of failure to perform erosion control in accordance with any water quality standards, specifications, including items (1) through (9) above by issuing a Form 105. Correction shall be made as soon as possible, immediately in most cases, but no later than 48 hours from the date of notification to correct the failure. The Contractor will be charged liquidated damages in the amount of $970 for each day after the 48-hour period has expired that one or more of the incidents of failure to perform the requirements for each Form 105 remains uncorrected. Liquidated damages will begin at Midnight of the date on which the 48 hours has expired.

This deduction will not be considered a penalty, but will be considered liquidated damages based on estimated additional construction engineering costs. The liquidated damages will accumulate, for each cumulative day that one or more of the incidents remain uncorrected. The number of days for which liquidated damages are assessed will be cumulative for the duration of the project; that is: the damages for a particular day will be added to the total number of days for which liquidated damages are accumulated on the project. The liquidated damages will be deducted from any monies due the Contractor.

If all other failures are not corrected within 48 hours after liquidated damages have begun to be assessed, the Engineer will issue a Stop Work Order in accordance with Section 105. Work shall not resume until the Engineer has approved a written corrective action plan submitted by the Contractor that includes measures to prevent future violations and a schedule for implementation.

If the Contractor requires more than 96 hours to perform the corrective work from the date on the Form 105, the Contractor shall submit a request for deferment. The deferment request shall be in writing and shall include the specific failure,

temporary measures until final correction is made, the methodology which will be employed to make the correction, and interim milestones to completing the work. The Region Water Pollution Control Manager (RWPCM), Engineer, the SWMP Administrator, and the Contractor shall concur on this deferral and set a proposed date of completion. If approved, the Contractor shall complete the corrective measures by Midnight of the proposed completion date. If corrective work is not corrected by the completion date the Engineer will issue a Stop Work Order. Liquidated Damages will apply retroactively back to the 48 hours after the Form 105 date of notification. Liquidated Damages will be assessed until the corrective work has been completed and accepted.

Deferment of work to correct failures to perform erosion control will not affect the Contractor's other contractual responsibilities, notifications for other non-compliance, nor the final completion date of the project. Liquidated Damages for other non-compliance notifications will continue to apply during the deferment period in addition to liquidated damages associated with the deferment.

Based on the submittal date of the approved deferment, Liquated Damages and a Stop Work Order may not be mandated to the Contractor.

Disagreements regarding the suggested corrective action for a control measure compliance issue between the Project Engineer, SWMP Administrator, and Superintendent, shall be discussed with the Resident Engineer and Region Water Pollution Control Manager. If after the discussions, the Project Engineer and the Contractor are still in disagreement and the Contractor believes that additional compensation is owed, the Contractor shall follow the decision of the Project Engineer, keep track of the costs and negotiate further with the Project Engineer. If after pursuing the issue, the Contractor is unable to reach an agreement with the Project Engineer, then the Contractor can follow the dispute process outlined in Section 105.

If the Contractor's corrective action plan and schedule are not submitted and approved within 96 hours of the initial notice, the Engineer will issue a Stop Work Order and have an on-site meeting with the Superintendent, SWMP Administrator, and the Superintendent's supervisor. This meeting will also be attended by the Resident Engineer, the Region Water Pollution Control Manager, and the Region Program Engineer. This meeting will identify and document needed corrective actions and a schedule for completion. If after the meeting, the unacceptable work is not remedied within the schedule as agreed to in the meeting, the Engineer will take action to effect compliance with the Contract and these specifications by utilizing CDOT Maintenance personnel or other non-Contractor forces and deduct the cost from any monies due or to become due to the Contractor pursuant to Section 105. Delays due to these Stop Work Orders shall be considered non- excusable. The

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Stop Work Order shall be in place until the project is in compliance.

If the Contractor remains non-responsive to requirements of the on-site meeting, the Engineer will start default or Contract termination procedures in accordance with Section 108. CDOT will proceed with corrective or disciplinary action in accordance with the Rules for Prequalification, Debarment, Bidding and Work on Transportation, Road, Highway and Bridge Public Projects.

When a failure meets any one of the following conditions, the Engineer will immediately issue a Stop Work Order in accordance with Section 105 irrespective of any other available remedy:

(1) It may endanger health or the environment.

(2) It consists of a spill or discharge of hazardous substances or oil which may cause pollution of the waters of the state.

(3) It consists of a discharge which may cause a violation of water quality standards.

208 Items to Be Completed Prior to Requesting Partial Acceptance of Water Quality Work.

(a) Reclamation of Washout Areas. After concrete operations are complete, washout areas shall be reclaimed in accordance with this section at the Contractor's expense.

(b) Survey. When Permanent Water Quality (PWQ) control measures are required on the project and once built, the Contractor shall survey the control measures to confirm that the PWQ control measures conform to the configuration, grade, and volume shown on the plans. The survey shall conform to Section 625. The results of the survey shall be submitted in accordance with CDOT's Survey Manual (AutoCAD to GIS and TMOSS Codes), or GIS with attribute tables, showing both designed and final elevations and configurations. Paper versions of the drawings shall be submitted with the stamp and seal of the Contractor's Surveyor.

PWQ control measures that do not meet the Contract requirements will be identified in writing by the Engineer, and shall be repaired or replaced at the Contractor's expense. Correction surveys shall be performed at the Contractor's expense to confirm the locations, dimensions, and volume certification (for water quality capture volume structures only) of each PWQ control measure. The Engineer, CDOT Hydraulics Engineer for the region, Headquarters Permanent

Water Quality Manager, and Headquarters Maintenance staff will perform a walkthrough of the PWQ control measures to confirm conformance to material requirements, locations, and dimensions. Before the walkthrough, the Contractor shall provide the corrected survey to the Engineer, Regional, and Headquarters Permanent Water Quality Managers.

(c) Locations of Temporary Control Measures. The Engineer will identify locations where modification, cleaning, or removal of temporary control measures are required and will provide these in writing to the Contractor. Upon completion of work required, the SWMP Administrator shall modify the SWMP to provide an accurate depiction of control measures to remain on the project site.

All punch list and walkthrough items shall be completed and approved by the Engineer and Maintenance.

Method of Measurement

208.11 Erosion Control Management on projects having less than one acre of total disturbed area will not be measured and paid for separately but shall be included in the work, unless otherwise specified in the contract (bid schedule). If contracted, ECM work will be measured as the actual number of days of ECM work performed, regardless of the number of personnel required for SWMP Administration and Erosion Control Inspection, including erosion control inspections, documentation, meeting participation, SWMP Administration, and the preparation of the SWMP. If the combined hours of SWMP Administration and Erosion Control Inspection is four hours or less in a day, the work will be measured as ½ day. If the combined hours of SWMP Administration and Erosion Control Inspection is more than four hours in a day, the work will be measured as one day. Total combined hours of ECM work exceeding eight hours in a day will still be paid as one day.

Erosion bales and rock check dams will be measured by the actual number installed and accepted.

Silt fence, silt berms, erosion logs, aggregate bags, silt dikes, temporary berms, temporary diversions, and temporary slope drains, will be measured by the actual number of linear feet that are installed and accepted. Measured length will not include required overlap.

Concrete washout structure will be measured by the actual number of structures that are installed and accepted.

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Pre-fabricated concrete washout structures will be measured by the actual number of structures delivered to the site. It shall not include structures moved on-site.

Storm drain inlet protection will be measured by linear foot or actual number of devices that are installed and accepted.

Sediment trap quantities will be measured by the actual number installed and accepted.

Removal of trash that is not generated by construction activities will be measured by the actual number of hours that Contractor workers actively remove trash from the project. Each week the Contractor shall submit to the Engineer a list of workers and the hours spent collecting such trash.

Removal of accumulated sediment from traps, basins, areas adjacent to silt fences and erosion bales, and other clean out excavation of accumulated sediment, and the disposal of such sediment, will be measured by the number of hours that equipment, labor, or both are used for sediment removal.

Vehicle tracking pads will be measured by the actual number constructed and accepted.

Additional aggregate required for maintaining vehicle tracking pads will be measured as the actual number of cubic yards installed and accepted.

Pre-fabricated vehicle tracking pads will be measured by the actual number of pads delivered to the site and set up to the minimum dimensions. It shall not include pads moved on-site.

Basis of Payment

208.12 Control measures will be paid for at the Contract unit price for each of the items listed below that appear in the contract. Erosion Control management (ECM) duties on projects having less than one acre of total disturbed area will not be measured and paid for separately but shall be included in the work, unless otherwise specified in the contract.

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Payment will be made under:

Pay Item	Pay Unit
Aggregate Bag	Linear Foot
Concrete Washout Structure	Each
Erosion Bales (Weed Free)	Each
Erosion Control Management	Day (If in the contract)
Erosion Log (Type 1) (_____ Inch)	Linear Foot
Erosion Log (Type 2) (_____Inch)	Linear Foot
Erosion Log (Type 3) (_____Inch)	Linear Foot
Pre-Fabricated Concrete Washout Structure (Type 1)	Each
Pre-Fabricated Concrete Washout Structure (Type 2)	Each
Pre-Fabricated Vehicle Tracking Pad	Each
Maintenance Aggregate (Vehicle Tracking Pad)	Cubic Yard
Removal and Disposal of Sediment (Equipment)	Hour
Removal and Disposal of Sediment (Labor)	Hour
Removal of Trash	Hour
Rock Check Dam	Each
Sediment Basin	Each
Sediment Trap	Each
Silt Berm	Linear Foot
Silt Dike	Linear Foot
Silt Fence	Linear Foot
Silt Fence (Reinforced)	Linear Foot
Storm Drain Inlet Protection (Type__)	Linear Foot
Storm Drain Inlet Protection (Type__)	Each
Sweeping (Sediment Removal)	Hour
Temporary Berm	Linear Foot
Temporary Diversion	Linear Foot
Temporary Slope Drain	Linear Foot
Vehicle Tracking Pad	Each

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Modifications to the SWMP due to construction errors or survey errors by the Contractor shall be made at the Contractor's expense.

Surface roughening and vertical tracking (temporary stabilization) will not be measured and paid for separately but shall be included in the work. Payment for each control measure item will be full compensation for all work and materials required to furnish, install, maintain, and remove the control measure when directed.

Payment for Removal and Disposal of Sediment (Equipment) will be full compensation for use of the equipment, including the operator. Payment for Removal and Disposal of Sediment (Labor) will be full compensation for use of the labor.

Payment for concrete washout structure, whether constructed or prefabricated, will be full compensation for all work and materials required to install, maintain, and remove the item. Maintenance and relocation, as required, of these structures throughout the duration of the project will not be measured and paid for separately, but shall be included in the work.

Silt berm spikes and wood spikes will not be measured and paid for separately, but shall be included in the work. When required, soil retention blankets will be measured and paid for in accordance with Section 216.

Compost and wood stakes for Erosion Log (Type 2) will not be measured and paid for separately, but shall be included in the work.

Spray-on mulch blankets required by the Contract, including those used in both interim and final stabilization, will be measured and paid for in accordance with Section 213.

Payment for storm drain inlet protection will be full compensation for all work, materials, and equipment required to complete the item, including surface preparation, maintenance throughout the project, and removal upon completion of the work. Aggregate will not be measured and paid for separately, but shall be included in the work.

Sweeping, when used as a control measure as shown in the Contract, will be measured by the number of hours that a pickup broom or equipment capable of collecting sediment, authorized by the Engineer, is used to remove sediment from the roadway or other paved surfaces. Each week the Contractor shall submit to the Engineer a statement detailing the type of sweeping equipment used and the number of hours it was used to pick up sediment. The operator will not be measured and paid

for separately, but shall be included in the work.

Stakes, anchors, connections, geotextile, riprap, and tie downs used for temporary slope drains will not be measured and paid for separately, but shall be included in the work.

Payment for vehicle tracking pad will be full compensation for all work, materials and equipment required to construct, maintain, and remove the entrance upon completion of the work. Aggregate and geotextile will not be measured and paid for separately, but shall be included in the work. If additional aggregate for maintenance of vehicle tracking pads is required, it will be measured by the cubic yard in accordance with Section 304 and will be paid for under this Section as Maintenance Aggregate (Vehicle Tracking Pad).

Seeding, sod, mulching, soil retention blanket, and riprap will be measured and paid for in accordance with Sections 212, 213, 216, and 506.

All work and materials required to perform the permanent control measure survey and furnish the electronic files shall be included in the original unit price bid for surveying. Surveying will be measured and paid for in accordance with Section 625.

Payment will be made for control measures replaced as approved by the Engineer. Temporary erosion and sediment control measures required due to the Contractor’s negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or ordered by the Engineer or for the Contractor's convenience, shall be performed at the Contractor’s expense. If the Contractor fails to complete construction within the contract time, payment will not be made for Section 208 pay items for the period of time after expiration of the contract time. These items shall be provided at the Contractor's expense.

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Revision of Section 212
Soil Amendments, Seeding, and Sodding

Delete Section 212 of the Standard Specifications for this project and replace it with the following:

Description

212.01 This work consists of application of fertilizer, soil amendments, seedbed preparation, and placing seed and sod.

Substitutions from this specification will not be allowed unless submitted in writing to the Engineer and approved by the Region or Headquarters Landscape Architect.

Materials

212.02 Seed, Fertilizers, Soil Conditioners, Mycorrhizae, Elemental Sulfur, and Sod.

(a) Seed. Seed shall be delivered to the project site in sealed bags tagged by a registered seed supplier conforming to the requirements of the Colorado Seed Act, CRS 35-27-111(1). Seed used on the project shall not be in the Contractor's possession for more than 30 days from the date of pickup or delivery on the seed vendors packing slip. Bags which have been opened or damaged before Engineer inspection will be rejected. The State required legal tags shall remain on the bag until opened and the seed is placed in either the drill or hydraulic seeders in the presence of the Engineer. The Engineer shall remove all tags after seed has been planted. Each seed tag shall clearly show the following:

(1) Name and address of the supplier

(2) Botanical and common name for each species

(3) Lot numbers

(4) Percent by weight of inert ingredients

(5) Guaranteed percentage of purity and germination

(6) Pounds of Pure Live Seed (PLS) of each seed species

(7) Total net weight in pounds of PLS in the sealed bag

(8) Calendar month and year of test date

Seeds shall be free from all noxious weed seeds per Colorado Seed Act (CRS 35-17)

prohibited noxious weed seed list.

Weed seed content shall not exceed the requirements in part 7.2 of the Colorado Department of Agriculture's Seed Act Rules and Regulations.

Seed which has become wet, moldy, or damaged in transit or in storage will not be accepted.

Seed and seed labels shall conform to all current State regulations and to the testing provisions of the Association of Official Seed Analysis. Computations for quantity of seed required on the project shall include the percent of purity and percent of germination.

The Contractor shall store seed under dry conditions, at temperatures between 35°F to 90°F, under low humidity and out of direct sunlight. The Contractor shall provide the location of where seed is stored and access to stored seed locations to the Engineer. Seed stored by the Contractor for longer than 30 days will be rejected.

(b) *Organic Fertilizer*. Fertilizer derived directly from plant or animal sources shall conform to Colorado Revised Fertilizer Rules 8 CCR 1202-4. Fertilizer shall be uniform in composition and shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's name, address, and nutrient analysis. Fertilizer bags (containers) which arrive at the project site opened, damaged, or lacking a label will be rejected. The Contractor shall only use bulk shipments such as tote bags or super sacks that have a manufacturer's original label and sealed at the manufacturing facility. Fertilizer which becomes caked or damaged will not be accepted. Fertilizer shall be stored according to manufacturer's recommendations in a dry area where the fertilizer will not be damaged.

Organic fertilizer formulation being submitted for use must be registered with the Colorado Department of Agriculture.

Verification tests may be conducted by CDOT on grab samples of organic fertilizer delivered to the site to determine the reliability of bag label analysis and for ingredients which are injurious to plants. If a product of any supplier is found to consistently deviate from the bag level analysis, the acceptance of that product will be discontinued. Copies of the failing test reports will be furnished to the Colorado State Board of Agriculture for appropriate action under the "Colorado Fertilizer Law".

Fertilizer shall be supplied in one of the following physical forms:

(1) A dry free-flowing granular fertilizer, suitable for application by agricultural fertilizer spreader.

(2) A homogeneous pellet, suitable for application by agricultural fertilizer spreader.

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Revision of Section 212
Soil Amendments, Seeding, and Sodding

Pellet size shall be 2-3 mm. Smaller may be allowed when Seeding (Native) Hydraulic is shown on the plans.

(3) A soluble form that will permit complete suspension of insoluble particles in water, suitable for application by power sprayer.

The application rate of the organic fertilizer shall be either as high or low nitrogen (N) fertilizer as shown on the plans.

High N organic fertilizer chemical analysis shall conform to Table 212-1.

Table 212-1
Chemical Analysis for High N Fertilizer

Ingredient	Range	Test Method
Nitrogen (N) (%)	6 - 10	AOAC Official Method 993.13 Nitrogen (Total) in Fertilizers Combustion Method
Phosphorus (P) (%)	1 - 8	AOAC Official Method 960.03 Phosphorus (Available) in Fertilizers
Potassium (K) (%)	1 - 8	AOAC Official Method 983.02 Potassium in Fertilizers

Low N organic fertilizer chemical analysis shall conform to Table 212-2.

Table 212-2
Chemical Analysis for Low N Fertilizer

Ingredient	Range	Test Method
Nitrogen (N) (%)	2 -5	AOAC Official Method 993.13 Nitrogen (Total) in Fertilizers Combustion Method
Phosphorus (P) (%)	3 - 8	AOAC Official Method 960.03 Phosphorus (Available) in Fertilizers
Potassium (K) (%)	1 - 8	AOAC Official Method 983.02 Potassium in Fertilizers

Organic fertilizers shall conform to Table 212-3.

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Revision of Section 212
Soil Amendments, Seeding, and Sodding

Table 212-3
Organic Fertilizer Properties

Criteria	Range
Moisture content by weight	< 6%

(c) Compost (Mechanically Applied). Compost shall be suitable for use in Erosion Log (Type 2) and permanent seeding applications. Compost shall not contain visible refuse, other physical contaminants, or substances considered harmful to plant growth. Compost shall be used per all applicable EPA 40 CFR 503 standards for Class A biosolids including the time and temperature standards. Materials that have been treated with chemical preservatives as a compost feedstock will not be permitted.

The Contractor shall provide material that has been aerobically composted in a commercial facility. Compost shall be from a producer that participates in the United States Composting Council's (USCC) Seal of Testing Assurance (STA) program. The Department will only accept STA approved compost that is tested per the USCC Test Methods for Examining of Composting and Compost (TMECC) manual.

Verification tests may be conducted by CDOT on grab samples of compost delivered to the site to determine the gradation and physical properties. Testing may be done for indication of ingredients which are injurious to plants. Sampling procedures will follow the STA 02.01 Field Sampling of Compost Materials and 02.01-B Selection of Sampling Locations for Windrows and Piles. If a product is found to consistently deviate from the gradation and property analysis, the acceptance of that product will be discontinued. Copies of the failing test reports will be furnished to the USCC.

Compost for permanent seeding soil conditioner locations onsite and application rates shall be as shown on the plans.

Organic matter in compost shall be no more than 2 inches in length.

Compost (Mechanically Applied) for permanent seeding shall meet the gradation and physical properties as shown in Table 212-4 and Table 212-5. The Contractor shall provide a written explanation for compost tested parameters not within the acceptable requirements for review and consideration.
The Contractor shall provide documentation from the composting facility confirming that the material has been tested per USCC TMECC.

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Table 212-4
Gradation for Permanent Seeding Compost
(Test Method TMECC 02.02-B,
"Sample Sieving for Aggregate Size Classification")

Sieve Size	Minimum, Percent Passing	Maximum, Percent Passing
25.0 mm (1")	100	
19.0 mm (3/4")	90	100
6.25 mm (1/4")	70	100

Note: Compost shall be from a producer that participates in the USCC STA program.

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Table 212-5
Properties for Permanent Seeding Compost

Compost Parameters	Reported as	Requirements	Test Method
pH	pH units	6.0 – 8.5	TMECC 04.11-A
Soluble Salts (Electrical Conductivity)	dS/m (mmhos/cm)	< 5.0	TMECC 04.10-A
Moisture Content	%, wet weight basis	25% - 50%	TMECC 03.09-A
Organic Matter Content	%, dry weight basis	20% - 50%	TMECC 05.07-A
Organic Matter Content	pounds per cubic yard	>240	
Carbon to Nitrogen Ratio (C:N)		< 15:1	
Manufactured Inert Contamination (Plastic, concrete, ceramics, metal)	%, dry weight basis	< 1%	TMECC 03.08-A
Stability (respirometry)	mg CO_2-C per g TS per day mg CO_2-C per g OM per day	8 or below	TMECC 05.08-B
Select Pathogens and weed free	(PASS/FAIL) Limits: Salmonella < 3 MPN/4 grams of TS, or Coliform Bacteria < 1000 MPN/gram	Pass	TMECC 07.01-B Fecal Coliforms, or 07.02 Salmonella
Trace Metals	(PASS/FAIL) Limits (mg $kg^{-1,}$ dw basis): Arsenic (As) 41, Cadmium (Cd) 39, Copper (Cu)1500, Lead (Pb) 300, Mercury (Hg) 17, Nickel (Ni) 420, Selenium (Se) 100, Zinc (Zn) 2800	Pass	TMECC 04.06

Use the STA Lab bulk density lb/cu ft as received, multiplied by organic matter % as received, multiplied by 27 to calculate pounds per cubic yard of organic matter.

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1. Compost for Erosion Log (Type 2) shall meet the gradation and physical properties as shown in Table 212-6 and Table 212-7.

Table 212-6
Gradation for Erosion Log (Type 2) Compost
(Using Test Method TMECC 02.02-B,
"Sample Sieving for Aggregate Size Classification")

Sieve Size	Percent Passing, Minimum	Percent Passing, Maximum
75.0 mm (3")	100	
25.0 mm (1")	90	100
9.5 mm (3/8")	10	50

Note: Organic matter for erosion log compost shall be no more than 4 inches in length. Compost shall be from a producer that participates in the USCC STA program.

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Table 212-7
Properties for Erosion Log (Type 2) Compost

Compost Parameters	Reported as	Requirements	Test Method
pH	pH units	6.0 - 8.5	TMECC 04.11-A
Soluble Salts (Electrical Conductivity)	dS/m (mmhos/cm)	< 5.0	TMECC 04.10-A
Moisture Content	%, wet weight basis	< 60%	TMECC 03.09-A
Organic Matter Content	%, dry weight basis	25% - 100%	TMECC 05.07-A
Manufactured Inert Contamination (plastic, concrete, ceramics, metal)	%, dry weight basis	< 0.5%	TMECC 03.08-A
Stability (respirometry)	mg CO_2-C per g TS per day mg CO_2-C per g OM per day	N/A	TMECC 05.08-B
Select Pathogens and weed free	(PASS/FAIL) Limits: Salmonella < 3 MPN/4 grams of TS, or Coliform Bacteria < 1000 MPN/gram	Pass	TMECC 07.01-B Fecal Coliforms, or 07.02 Salmonella
Trace Metals	(PASS/FAIL) Limits (mg $kg^{-1,}$ dw basis): Arsenic (As) 41, Cadmium (Cd) 39, Copper (Cu)1500, Lead (Pb) 300, Mercury (Hg) 17, Nickel (Ni) 420, Selenium (Se) 100, Zinc (Zn) 2800	Pass	TMECC 04.06

(d) Biotic Soil Amendments (Hydraulically Applied). Soil amendments shall be a combination of natural fibers, growth stimulants, and other biologically active material designed to improve seed germination and vegetation establishment as shown in Table 212-8. Biotic soil amendments shall be pre-packaged in ultraviolet and weather resistant packaging and labeled from the manufacturer. Bags (containers) which arrive at the project site opened, damaged, or lacking a label will be rejected. Bulk shipments such as tote bags will be rejected. Biotic soil amendments shall be stored in locations not exceeding 80 °F. Acceptance of material shall be subject to the requirements of the Department's Approved Product List (APL).

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The application rate of the biotic soil amendments shall be per the rates shown on the plans. Use of mulch tackifier (Plantago Insularis or pre-gelatinized corn starch polymer) shall be per Section 213. It shall be used as a wetting agent at a rate of 30 pounds per acre. Biotic soil amendments shall provide a continuous and uniform cover and shall consist of one of the components in Table 212-8 and all of the performance and physical properties in Table 212-9.

Table 212-8
Required Percentage Ranges of Biotic Soil Amendments

Components	Units	Requirement
Professional grade sphagnum peat moss, professional grade reed sedge peat moss or compost that meets the Seal of Testing Assurance Program of the US Composting Council	%, dry weight basis	> 41%
Mechanically processed straw consisting of weed free agricultural straw, flexible flax fiber or rice hulls	%, dry weight basis	< 57%

Table 212-9
Performance and Physical Requirements of Biotic Soil Amendments

Parameters	Reported as	Requirement	Test Method
pH	pH units	5.0 – 7.5	ASTM D1293
Moisture Content	%, wet weight basis	10% - 50%	ASTM D 2974
Organic matter content	%, dry weight basis	> 85%	ASTM D586
Carbon Nitrogen Ratio	Ratio C:N	< 38:1	ASTM E1508
Manufactured inert contamination	%, dry weight basis	< 1.0%	
Acute Toxicity	(Pass/Fail)	Pass (non-toxic)	ASTM E729-96(2014) or EPA Method 2021.0 or EPA Method 2002.0
Vegetative Minimum		> 400%	ASTM 7322

The Contractor shall provide a CTR with independent laboratory analysis for the required

parameters per subsection 106.13.

(e) Humate. The Contractor shall provide a screened dry granular form of organic humic and fulvic acid substance. Humate shall be pre-packaged and labeled from the manufacturer. Bags (containers) which arrive at the project site opened, damaged, or lacking label will be rejected. The Contractor shall only use bulk shipments such as tote bags or super sacks that have a manufacture's original label and sealed at the manufacturing facility. Humate shall be stored in locations not exceeding 80°F. Humate shall be provided per the rates shown on the plans. Product shall conform to the parameters in Table 212-10 and Table 212-11.

Table 212-10
Screened Size Requirements for Humate

Seeding Method	Reported as	Requirement
Seeding (Native) Drill, Hydraulic and Broadcast	inches	< 1/4

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Table 212-11
Performance and Physical Requirements of Humate

Parameters	Reported as	Requirement	Test Method
Organic Matter	%, dry weight basis	>70%	
Fines (material that is finer than the No. 200 (75-µm) sieve)	%, dry weight basis	<2%	ASTM D7928
pH	pH units	3.0 - 4.5	ASTM D1293
Acute Toxicity	Pass / Fail	Non Toxic	ASTM 7101 or EPA Method 2021 or 2002
Humic and Fulvic Acids	%, dry weight basis	> 70%	A & L Western method; total alkali extractable
Carbon Content	%, dry weight basis	40% - 50%	
Moisture Content	%, dry weight basis	< 20%	
Heavy Metal / Ash Content	%, dry weight basis	< 15%	

The Contractor shall provide a CTR with independent laboratory analysis for the required parameters per subsection 106.13.

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(f) Mycorrhizae. Mycorrhizae shall arrive onsite in original and undamaged packaging. Handling of this material shall follow manufacturer's safety recommendations. Mycorrhizae shall be stored onsite in such a way as to avoid exposure to direct sunlight for more than four hours and to prevent package temperatures to rise above 85 °F. The endo mycorrhizal inoculum shall provide at least 60,000 propagules per pound and shall contain all of the following species and conform to the parameters in Table 212-12:

(1) Glomus intraradices (a.k.a. Rhizophagus intraradices)

(2) Glomus mosseae (a.k.a. Funneliformis mosseae)

(3) Glomus aggregatum (a.k.a. rhizophagus aggregatus)

(4) Glomus etunicatum (a.k.a. Claroideoglomus etunicatum)

Table 212-12
Physical Requirements of Endo Mycorrhizae

Parameters	Reported as	Requirement	Test Method
Acute Toxicity	Pass or Fail	Non Toxic	ASTM 7101 or EPA Method 2021 or 2002

The Contractor shall provide a CTR with independent laboratory analysis for the required parameters per subsection 106.13.

The following rates shall be used for Seeding Methods:

(1) For Seeding (Native) Drill, the mycorrhizae product shall be provided as a dry free-flowing granular material, suitable for application by agricultural drill seeder. Application rate shall be 8 pounds per acre.

(2) For Seeding (Native) Hydraulic, the mycorrhizae product shall be provided as a fine granular (< 2 mm) or powdered form (particle size less than 300 microns) that will permit complete suspension and used with hydro-seeder equipment. Application rate shall be 20 pounds per acre.

(3) For Seeding (Native) Broadcast, the mycorrhizae product shall be provided as a dry free-flowing granular material, suitable for application by fertilizer spreader. Application rate shall be 20 pounds per acre.

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(g) Elemental Sulfur. The Contractor shall provide a free-flowing granular material consistent in size suitable for application by agricultural spreader and conform to the parameters in Table 212-13. Elemental sulfur shall arrive onsite in original and undamaged packaging.

Table 212-13
Physical Requirements of Elemental Sulfur

Parameters	Reported as	Requirement
Guaranteed Analysis of Elemental Sulfur (S)	%	> 90
Bulk Density	Lb per cu. ft.	> 75

(h) Sod. Sod shall be nursery grown and 99 percent weed free. Species shall be as shown on the plans. The 1 percent allowable weeds shall not include undesirable perennial or annual grasses or plants defined as noxious by current State statute or county noxious weed list. Soil thickness of sod cuts shall not be less than ¾ inch or more than 1 inch. Sod shall be cut in uniform strips with minimum dimensions of 18 inches in width and 48 inches in length. The Contractor shall submit a sample of the sod proposed for use, which shall serve as a standard if approved. Sod furnished, whether in place or not, that is not up to the standard of the sample will be rejected. CDOT will reject all sod that was cut more than 72 hours before installation.

Each load of sod shall be accompanied by a certificate from the grower stating the type of sod and the date and time of cutting. The Contractor shall submit the certificate to the Engineer before application of the sod. Only sod that is accompanied by the certificate from the grower will be accepted and paid for.

Construction Requirements

212.03 Submittals. The Contractor shall provide the name and contact information of the seeding contractor 30 days before start of seeding work. The Contractor shall provide two copies of items (1) - (14) listed below to the Pre-vegetation Conference per Section 207. When the Contractor provides resubmittals to meet Contract requirements, the Region or Headquarters Landscape Architect shall be copied on all correspondence.

(1) Written confirmation from the registered seed supplier, on the Contractor's letterhead, that the Contract specified seed has been secured. No substitutions of the contract specified seed will be permitted unless evidence is submitted, from one of the registered seed suppliers that the Contract specified seed is not available and will not become available during the anticipated construction period.

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(2) Seed vendor's "seed dealer" endorsement.

(3) A copy of each seed species germination report of analysis that verifies the lot has been tested by a recognized laboratory for seed testing within 13 months before the date of seeding.

(4) A copy of each seed species purity laboratory report of analysis that verifies that the lot has been tested by a recognized laboratory for seed testing. The report shall list all identified species, seed count, and date of test.

(5) Manufacturer's documentation stating that the fertilizer meets the Contract requirements.

(6) Organic fertilizer documentation showing manufacturer and chemical analysis.

(7) Permit issued from CDPHE confirming that the vendor can produce or sell compost per House Bill (HB) 1181.

(8) Documentation from the compost manufacturer that it is a participating member of in the U.S. Composting Council's Seal of Testing Assurance Program (STA).

(9) Results of compost testing on an STA Compost Technical Data Sheet confirming all required test methods are met using the STA Program.

(10) Sample of physical compost (at least one cubic foot of material).

(11) Manufacturer's documentation confirming that biotic soil amendment meets the required physical and performance criteria based on independent testing by the manufacturer.

(12) Manufacturer's documentation confirming that humate meets the required physical and performance criteria based on independent testing by the manufacture.

(13) Manufacturer's documentation confirming that mycorrhizae meet the physical criteria based on independent testing and that the minimum required species is provided.

(14) Pictures and descriptions of seeding equipment proposed to be used on the project. Based on the seeding methods required at a minimum this should include the drill seeder, hydraulic seeder, cultipacker or seed bed roller implements.

(15) Instructions and documentation on how seeders will be calibrated onsite, per subsection 212.05(a).

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212.04 Seeding Seasons. Seeding in areas that are unirrigated shall be restricted according to the parameters in Table 212-14.

Table 212-14
Seeding Seasons

Areas other than the Western Slope

Zone	Spring Seeding	Fall Seeding
Below 6000’	Spring thaw to June 1	September 15 until consistent ground freeze
6000’ - 7000’	Spring thaw to June 1	September 1 until consistent ground freeze
7000’ - 8000’	Spring thaw to July 15	August 1 until consistent ground freeze
Above 8000’	Spring thaw to consistent ground freeze	

Western Slope

Zone	Spring Seeding	Fall Seeding
Below 6000’	Spring thaw to May 1	August 1 until consistent ground freeze
6000’ - 7000’	Spring thaw to June 15	September 1 until consistent ground freeze
Above 7000’	Spring thaw to consistent ground freeze	

(1) "Spring thaw" is the earliest date in a new calendar year in which seed can be buried 1/2 inch into the surface soil (topsoil) through normal drill seeding methods.

(2) "Consistent ground freeze" is the time during the fall months in which the surface soil (topsoil), due to freeze conditions, prevents burying the seed 1/2 inch through normal drill seeding operations. Seed shall not be sown, drilled, or planted when the surface soil or topsoil is in a frozen or crusted state.

Seeding accomplished outside the time periods listed above will be allowed only when the Contractor's request is approved by the Engineer in writing, with coordination from the Region Landscape Architect. If requested by the Contractor, the Contractor must agree to perform the following work at no cost to the Department: reseed, remulch, and

repair areas which fail to produce species indicated in the Contract.

If seeding is ordered by the Engineer outside the time periods listed above, the cost to repair areas that fail to produce species will be paid for by the Department.

212.05 Native Seeding Methods. Areas to be seeded shall be installed per SWMP Permanent Stabilization Plan.

All amendments and seeding shall be applied based on the seeding method and rates specified on the plans.

The Contractor shall complete the Amendments Verification Prerequisite for each of the seeding methods described herein. This shall be done by completing a Seed and Amendment Quantities Worksheet for each work area. This worksheet shall have a list of all amendments and the seed labels for each of the areas to be worked on. The State required legal tags shall remain on the bag until opened and the seed placed in either the drill or hydraulic seeders in the presence of the Engineer. Seeding work shall not begin until written approval of the worksheet has been received from the Engineer.

In determining the weight of seed required for each work area, the Contractor shall use the Pure Live Seed (PLS) weight shown on each bag of seed. Calculations based on net weight will not be accepted.

The Contractor shall submit a proposed Permanent Stabilization Phasing Plan to the Engineer before the Pre-revegetation Conference for approval showing how the SWMP Permanent Stabilization Plans will be implemented to minimize traffic loading damage to subgrade soil prepared and seeded areas. The proposed sequencing shall consider and identify strategies and site management control measures to protect seeded areas from foot, vehicle, and other disturbances. The strategic planning of the permanent seeding and mulch shall consider all other phasing of construction activities including traffic management and utility work. Areas damaged due to the Contractor’s failing to protect the seeded areas shall be repaired at no cost to the Department. Seeded areas damaged due to circumstances beyond the Contractor's control shall be repaired and reseeded as ordered. Payment for corrective work, when ordered, shall be at the Contract prices shown and per subsection 109.04.

The following seeding application methods shall not be implemented during winds which are consistently higher than 20 MPH, or when the ground is frozen, excessively wet, or otherwise untillable. The Engineer may test to see if the moisture level in the soil is acceptable to work the soil by performing a Soil Plasticity Test as described in the Construction Manual. Multiple seeding operations shall be anticipated, based on acceptable seeding conditions. The seeding methods to be implemented shall be one or more of the following, as shown on the plans:

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(a) Seeding (Native) Drill.

1. Fertilizer, Compost, Humates and Elemental Sulfur. The Contractor shall uniformly apply compost and elemental sulfur on the surface of the topsoil using an agricultural spreader at the rate of application specified on the plans. All competitive, non-native vegetation shall be uprooted and hauled offsite before spreading amendments. Before starting incorporation of compost and elemental sulfur, the Contractor shall receive written acceptance from the Engineer on the Seed and Amendment Quantities Worksheet. Verification Prerequisite for this method also requires documentation on the Permanent Stabilization SWMP Site Maps with the approved areas outlined, signed, and dated by the Engineer to track progress. If SWMP Site Maps are not included in the Contract, the Contractor shall use the Contract grading or roadway plan sheets.

   Once the Quantities Verification Prerequisite is completed for an area, the Contractor shall homogenously incorporate the compost and elemental sulfur into the top 6 inches of topsoil. Tillage of the amendments shall be completed using a disc and harrow, field cultivator, vibra-shank, or other method suitable to site conditions. For small areas tillage shall be completed using rotary tillers. No measurable depth of organic amendment shall be present on the surface.

   The shanks on the back of a grader or dozer shall not be used for tillage. Tillage may take multiple passes to achieve the desired harmonious incorporation. If multiple passes are required, the Contractor shall cross till the soil with the second pass occurring at a 30-degree angle to the first pass. On slope areas, all tillage shall be parallel to the contour. For project that will utilize aggregate or recycled asphalt shouldering material amendments, tillage is not required under shouldering material. Projects seeding up to the edge of pavement, tillage is not required for first 12 inches from the edge of pavement.

   Once incorporation of compost and elemental sulfur is approved, the Contractor shall uniformly apply fertilizer and humates on the surface of the topsoil using an agricultural spreader, as shown in the Contract documents.

2. Seedbed Preparation. Amended topsoil shall be cultivated to a firm but friable seedbed using cultipacker or seed bed roller implements. Crusted hard soils shall be broken up and all areas shall be free of clods, sticks, stones, debris, concrete, and asphalt in excess of 4 inches in any dimension per Section 207. Areas shall be left in a rough and uncompacted condition with a surface variance of 2 to 4 inches.

3. Seed and Mycorrhizae. Before seeding, the finished grade of the soil shall be 1 inch below the top of all curbs, junction and valve boxes, walks, drives and other structures. Seeding shall be done within two days of seedbed preparation efforts (tilling or scarifying). If a rain event occurs that compacts or erodes the seedbed before performing seeding, the seedbed shall be re-prepared as directed by the

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Engineer.

Areas shall be seeded by mechanical power drawn drills suitable for area soils, topography, and size followed by packer wheels. Mechanical power drawn drills shall have furrow openers and depth bands set to maintain a planting depth of at least 1/4 inch and not more than 1/2 inch and shall be set to space the rows not more than 8 inches apart. Seeding equipment shall have a double disk opener, seed box agitator, and seed metering device.

The seeder shall be calibrated by collecting seed from a single drop tube in the presence of the Engineer based on the following procedure. The Contractor shall provide the tape measure, scale, collection cup, and seed bag with complete label from the supplier. The Contractor may submit an alternative method for approval at the site Pre-vegetation Conference.

A. Measure the total width (W) of the drill seeder in feet.
B. Count the number of drill rows (N) on the seeder.
C. On drill seeders that the tire drives the seeding mechanism, measure the tire circumference (C) in feet.
D. Calculate the number of rotations the tire will complete per acre using the following equation:
   A = one acre or 43,560 square feet (SF)
   A /W = feet (F) the drill seeder needs to travel for each acre
   F/C = number of rotations (R) of the tire per acre
E. Reduce the amount of tire rotations by one tenth.
   .90R = # Tire rotations to calibrate seeder (RCS)
F. Find the seeding rate (LBS PLS / Acre) on the Stormwater Management Plan.
G. Using the information from the seed tag, convert the PLS seed rate to a bulk seeding rate using the following equations:
   % PLS = (% purity (in decimal form) from seed label) x (% germination (in decimal form) from seed label)
   (LBS PLS / Acre) from the SWMP / % PLS = Required bulk seed per acre in LBS
H. Reduce the required bulk seed per acre based on the number of seeder tubes.
   Required bulk seed per acre / N = Weight in LBS of bulk seed from one tube
I. Reduce the required bulk seed rate from the tube by one tenth.
   0.90 x Weight of bulk seed from one tube = Collected bulk seed weight (CBS) in LBS
J. Set the drill seeder to the correct seeding rate using the manufacturer's recommendation.
K. With the collection cup under one tube and the driving wheel jacked up, rotate the tire the RCS number of times. Use the value stem to count the rotations.
L. Using the scale, weigh the seed in the collection cup.
M. Adjust the drill calibration until the weight of bulk seed in the collection cup equals the CBS in LBS.

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Drill seeders shall be recalibrated every time the drill is mobilized onsite. The Contractor shall submit a written statement that the equipment is calibrated and shall provide the correct depth based on conditions before seeding actions are initiated. The Contractor shall continuously monitor equipment to ensure that it is providing a uniform seed application.

If mycorrhizae are called for on the plans, the granules shall be included with the seed in the drill seeder such that the mycorrhizae are placed at or below the seed.

The distance between furrows produced using the drill shall not be more than 8 inches. If rows on the drill exceed 8 inches, the Contractor shall drill the areas twice (if achievable at 30-degree angles to each other) at no additional cost to the Department.

After seeding, the furrows that were created by the drill shall be maintained in place. Construction traffic, other than what is needed to mulch the areas, shall not be permitted on the areas completed.

Permanent stabilization mulching shall be accomplished within 24 hours of drill seeding.

(b) Seeding (Native) Hydraulic.

This method utilizes water as the carrying agent and mixes biotic soil amendments, seed, organic fertilizer, humates, mycorrhizae and elemental sulfur into a single slurry for hydraulic application. The Contractor shall furnish and place combined slurry with a hydro-seeder that will maintain a continuous agitation and apply homogenous mixture through a spray nozzle. The pump shall produce enough pressure to maintain a continuous, non-fluctuating spray that will reach the extremities of the seeding area. Water tanks shall have a means of measuring volume in the tank. Seed shall be added to the slurry onsite, no more than 60 minutes before starting application. Slurry shall be applied from a minimum of two opposing directions to achieve complete soil coverage.

The application of the single slurry shall be applied within four hours of adding Mycorrhizae.

The Contractor shall prevent seed, fertilizer, and mulch from falling or drifting onto areas occupied by rock base, rock shoulders, plant beds, or other areas where grass is detrimental. The Contractor shall remove material that falls on plants, roadways, gravel shoulders, structures, and other surfaces where material is not specified.

A. *Seedbed Preparation*. All areas shall be loosened to at least 6 inches, leaving the surface in rough condition with a surface variance of 6 to 8 inches. On steep slopes, tillage shall be accomplished with appropriate equipment as the slope is constructed.

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Soil areas shall be tilled to produce loose and friable surfaces with crusted hard soils broken up. All slopes shall be free of clods, sticks, stones, debris, concrete, asphalt and all other materials in excess of 4 inches in any dimension. All competitive, non-native vegetation shall be uprooted and hauled offsite before spreading amendments. Under no circumstances shall the ground surface be smooth and compacted.

B. *Biotic Soil Amendment, Fertilizer, Humate, Mycorrhizae and Seed*. The Contractor shall assemble all materials for proposed areas to hydro-seed and review quantities with area of coverage with the Engineer as the Quantities Verification Prerequisite for this method. Before mixing in the tank, the Contractor shall receive written acceptance from the Engineer on the Seed and Amendment Quantities Worksheet that the correct quantities are onsite. This quantities verification prerequisite also requires documentation on the Permanent Stabilization SWMP Site Maps with the approved areas outlined, signed, and dated by the Engineer to track progress. If SWMP Site Maps were not included in the Contract, grading or roadway plan sheets shall be used. For the verification process, the Contractor shall provide the Engineer with all documentation for materials in unopened packaging.

After the Quantities Verification Prerequisite has been approved, the hydro-seeder shall be filled with water to 1/3 of its required volume. Following this, water and biotic soil amendments shall be added to the hydro-seeder at a consistent rate. The ratio of water to Biotic Soil Amendments shall be per manufacturer's recommendations. Fertilizer, humates and mycorrhizae shall then be added until the tank has reached 3/4 of its required volume. The tank shall then be filled with water to the required volume. Uniform slurries shall be agitated or mixed for a minimum of ten minutes after all water and materials are in the tank.

Hydraulic seeding equipment shall include a pump capable of being operated at 100 gallons per minute and at 100 pounds per square inch pressure. The equipment shall have a nozzle adaptable to hydraulic seeding requirements. Storage tanks shall have a means of estimating the volume used or remaining in the tank.

Seed shall be added to the slurry onsite no more than 60 minutes before starting application. The Contractor shall increase the Seed Plan rates (LBS PLS / Acre) as shown on the plans by 1.5 times at no additional cost to the Department. The Contractor may be required to apply slurry using multiple hoses to ensure uniform application to all areas of the site. Coverage rates shall be based on the volume of material in the tank, as verified by the Engineer. Areas of lighter applications (covering more area than what is calculated) will require additional application, as directed.

An appropriate curing period shall be per manufacturer's recommendations and shall consider forecasted weather conditions.

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Permanent stabilization mulching shall be accomplished within 24 hours of hydraulic application of native seed.

(c) Seeding (Native) Broadcast.

This method utilizes hand equipment to broadcast spread amendments and seed over prepared seedbeds.

A. *Fertilizing, Compost, Humate and Elemental Sulfur*. The Contractor shall uniformly apply compost and elemental sulfur on the surface of the placed topsoil using an agricultural spreader at the rate of application specified on the plans. All competitive non-native vegetation shall be uprooted and hauled offsite before spreading amendments. Before starting incorporation, the Contractor shall receive written acceptance from the Engineer on the Seed and Amendment Quantities Worksheet that the correct quantities will be applied. The Quantities Verification Prerequisite for this method also requires documentation on the Permanent Stabilization SWMP Site Maps with the approved areas outlined, signed, and dated by the Engineer to track progress. If SWMP Site Maps are not included in the Contract, the grading or roadway plan sheets shall be used.

   Once the Quantities Verification Prerequisite is completed for an area, the Contractor shall homogenously incorporate the Compost into the top 6 inches of soil. Tillage of the amendments shall be completed using appropriate tools depending on the size of the area to be worked. Contractor shall use hand tillers or approved small space implements.

   Once incorporation of compost and elemental sulfur is approved, the Contractor shall uniformly apply organic fertilizer and humates on the surface of the topsoil using an agricultural spreader.

B. *Seedbed Preparation*. Amended topsoil shall be cultivated to a firm but friable seedbed using tractor implements. Crusted hard soils shall be broken up and all areas shall be free of clods, sticks, stones, debris, concrete, and asphalt in excess of 4 inches in any dimension per Section 207. Areas shall be left in a rough condition with a surface variance of 2 to 4 inches. Under no circumstances shall the ground surface be smooth and compacted.

C. *Seed and Mycorrhizae*. Before seeding, the finished grade of the soil shall be 1 inch below the top of all curbs, junction and valve boxes, walks, drives and other structures. Seeding shall be accomplished within two days of seedbed preparation efforts (tilling or scarifying) to make additional seedbed preparation unnecessary. If a rain event occurs that compacts or erodes the seedbed before performing seeding, the seedbed shall be re-prepared as directed.

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Revision of Section 212
Soil Amendments, Seeding, and Sodding

Areas shall be seeded by broadcast-type seeders (cyclone or approved mechanical seeders). The Contractor shall increase the Seed Plan rates (LBS PLS / Acre) as shown on the plans by 1.5 times at no additional cost to the Department.

After seeding, mycorrhizae shall be evenly hand-distributed across the area. Seed and mycorrhizae shall be covered by hand raking and covering with ¼ to ½ inch of topsoil. To ensure seeds have a firm contact with the soil the Contractor shall use a heavy roller as approved in the Site Pre-vegetation Conference. Mycorrhizae shall not be exposed to sunlight for more than four hours. Using equipment with continuous cleat tracks (cat-tracking) to cover seed is not permitted.

Permanent stabilization mulching shall be accomplished within 24 hours of broadcast seed application of native seed.

212.06 Seeding (Temporary). Areas of topsoil shall be seeded with annual grasses per SWMP Interim Site Maps or as directed by the Engineer.

Seeding may take place at any time during the year as long as the ground is not covered in snow and topsoil is not frozen. Topsoil may be placed in a stockpile or distributed on-grade after receiving subgrade soil preparation.

Interim stabilization for areas that receive temporary seeding shall be per subsection 208.04(e)2. Seed shall not be included with interim hydraulic mulch applications.

The Contractor shall wait to amend topsoil until the area is ready for permanent seeding with native seed mix shown on the SWMP. The Contractor shall use either the drill, hydraulic, or broadcast method of seeding. Seeding rates (LBS PLS / Acre) shall be increased by 1.5 times for hydraulic and broadcast methods at no additional cost to the Department.

Seed shall meet the requirements of 212.02(a) and shall be selected from Table 212-1 based on the application time.

Table 212-15
Temporary Seed Mixes

Common Name	Botanical Name	Application Time	Seeding Rates (LBS PLS / Acre)	Planting Depth (inches)
Oats	Avena sativa	October 1 - May 1	35	1 - 2
Foxtail Millet	Setaria italica	May 2 - September 30	30	1/2 - 3/4

The Contractor shall restrict motorized vehicle and foot traffic from areas that have received temporary seeding.

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Revision of Section 212
Soil Amendments, Seeding, and Sodding

212.07 Seeding (Lawn). Lawn grass seeding shall be accomplished in the seeding seasons per subsection 212.03.

(a) Fertilizing and Soil Conditioning. The first application of fertilizer, soil conditioner, or both shall be incorporated into the soil immediately before seeding, and shall consist of a soil conditioner, commercial fertilizer, or both as designated in the Contract. Fertilizer called for on the plans shall be worked into the top 4 inches of soil at the rate specified in the Contract. Biological nutrient, culture, or humate based material called for on the plans shall be applied in a uniform application onto the soil service. Organic amendments shall be applied uniformly over the soil surface and incorporated into the top 6 inches of soil.

The second application of fertilizer shall consist of a fertilizer having an available nutrient analysis of 20-10-5 applied at the rate of 100 pounds per acre. It shall be uniformly broadcast over the seeded area three weeks after germination or emergence. The area shall then be thoroughly soaked with water to a depth of 1 inch.

Fertilizer shall not be applied when the application will damage the new lawn.

(b) Seedbed Preparation. In preparation of seeding lawn grass, irregularities in the ground surface, except the saucers for trees and shrubs, shall be removed. Measures shall be taken to prevent the formation of low places and pockets where water will stand.

Immediately before seeding, the ground surface shall be tilled or hand worked into an even and loose seedbed to a depth of 6 inches, free of clods, sticks, stones, debris, concrete, and asphalt in excess of 2 inches in any dimension and brought to the desired line and grade.

(c) Seeding. Seed shall be drilled with mechanical landscape type drills. Broadcast type seeders or hydraulic seeding will be permitted only on small areas not accessible to drills. Seed shall not be drilled or broadcast during windy weather or when the ground is frozen or untillable.

212.08 Sodding.

(a) Fertilizing and Soil Conditioning. Before laying sod, the 4 inches of subsoil underlying the sod shall be treated by tilling in fertilizer, compost, or humates as specified on the plans. Amendments shall be applied uniformly over the soil surface and incorporated into the top 6 inches of soil.

After laying the sod, it shall be fertilized with a fertilizer having a nutrient analysis of 20-10-5 at the rate of 200 pounds per acre. Fertilizer shall not be applied when the application will damage the sod.

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Revision of Section 212
Soil Amendments, Seeding, and Sodding

(b) Soil Preparation. Before sodding, the ground shall be tilled or hand worked into an even and loose sod bed to a depth of 6 inches, and irregularities in the ground surface shall be removed. Sticks, stones, debris, clods, asphalt, concrete, and other material more than 2 inches in any dimension shall be removed. Depressions or variances from a smooth grade shall be corrected. Areas to be sodded shall be smooth before sodding occurs.

(c) Sodding. Sod shall be placed by staggering joints with all edges touching. On slopes, the sod shall run approximately parallel to the slope contours. Where the sod abuts a drop inlet, the subgrade shall be adjusted so that the sod shall be 1-½ inches below the top of the inlet.

Within one hour after the sod is placed and fertilized it shall be watered. After watering, the sod shall be permitted to dry to the point where it is still wet enough for effective rolling. The Contractor shall roll the sod in two directions with a lawn roller capable of applying between 50 - 80 pounds per square inch of surface pressure to eliminate air pockets.

Method of Measurement

212.09 The quantities of lawn seeding, and the three native seeding types will not be measured but shall be the quantities designated in the Contract, except that measurements will be made for revisions requested by the Engineer, or for discrepancies of plus or minus five percent of the total quantity designated in the Contract.

The quantity of sod will be by the actual number of square feet, including soil preparation, water, fertilizer, and sod, completed and accepted.

Organic Fertilizer, Compost (Mechanically Applied), Humates, Mycorrhizae soil amendments for Seeding (Native) methods drill, hydraulic, and broadcast will be measured by the actual quantity of material applied and accepted.

Measurement for acres will be by slope distances.

Basis of Payment

212.10 The accepted quantities of lawn seeding, native seeding, soil conditioning, and sod will be paid for at the contract unit price for each of the pay items listed below that appear in the bid schedule. Rejected seed that has been stored longer than 30 days shall be re-ordered at the expense of the Contractor.

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Revision of Section 212
Soil Amendments, Seeding, and Sodding

Payment will be made under:

Pay Item	Pay Unit
Organic Fertilizer	Pound
Compost (Mechanically Applied)	Cubic Yard
Biotic Soil Amendments (Hydraulic Applied)	Pound
Humate	Pound
Mycorrhizae	Pound
Elemental Sulfur	Pound
Seeding (Native) Drill	Acre
Seeding (Native) Hydraulic	Acre
Seeding (Native) Broadcast	Acre
Seeding (Wetland) Drill	Acre
Seeding (Wetland) Hydraulic	Acre
Seeding (Wetland) Broadcast	Acre
Seeding (Temporary)	Acre
Seeding (Lawn)	Acre
Sod	Square Foot

Topsoil preparation including incorporating and applying amendments, seedbed preparation, water, and seed mix (LBS PLS / Acre) will not be measured and paid for separately but shall be included in the work.
Calibrating, adjusting, or readjusting seeding or fertilizing equipment will not be measured and paid for separately but shall be included in the work.
No additional cost will be accepted for approved substitution of specified seed mix.
No payment will be made for areas seeded using one of the seeding methods without receiving signed Seed and Amendment Quantities Worksheet from the Engineer.

Additional seedbed preparation before seeding to correct compaction or erosion from storm events will not be measured and paid for separately but shall be included in the work.

Additional mobilizations as needed to complete seeding within allowed seeding seasons will not be measured and paid for separately but shall be included in the work.

Removal of all competitive, non-native vegetation before spreading amendments will not be measured and paid for separately but shall be included in the work.

Revision Of Section 401
Plant Mix Pavements - General

Section 401 of the Standard Specifications shall be revised as follows:

Delete Subsection 401.17 of the Standard Specifications and replace with the following:

401.17 Compaction. The hot mix asphalt shall be compacted by rolling. Both steel wheel and pneumatic tire rollers will be required. The number, weight, and type of rollers furnished shall be sufficient to obtain the required density while the mixture is in a workable condition. Compaction shall begin immediately after the mixture is placed and be continuous until the required density is obtained. When the mixture contains unmodified asphalt cement (PG 58-28 or PG 64-22) or modified (PG 58-34), and the surface temperature falls below 185 °F, further compaction effort shall not be applied unless approved, provided the Contractor can demonstrate that there is no damage to the finished mat. If the mixture contains modified asphalt cement (PG 76-28, PG 70-28 or PG 64-28) and the surface temperature falls below 230 °F, further compaction effort shall not be applied unless approved, provided the Contractor can demonstrate that there is no damage to the finished mat.

Warm Mix Asphalt compaction requirements shall conform to CP 59.

All roller marks shall be removed with the finish rolling. Use of vibratory rollers with the vibrator on will not be permitted during surface course final rolling and will not be permitted on any rolling on bridge decks covered with waterproofing membrane.

SMA shall be compacted to a density of 93 to 98 percent of the daily theoretical maximum specific gravity, determined according to CP 51. All other HMA shall be compacted to a density of 92 to 98 percent of the daily theoretical maximum specific gravity, determined according to CP 51. If more than one theoretical maximum specific gravity test is taken in a day, the average of the theoretical maximum specific gravity results will be used to determine the percent compaction. Field density determinations will be made per CP 44 or 81.

The longitudinal joints shall be compacted to a density of 90 to 98 percent of the theoretical maximum specific gravity. The theoretical maximum specific gravity used to determine the joint density will be the average of the daily theoretical maximum specific gravities for the material that was placed on either side of the joint. Density (percent relative compaction) will be determined per CP 44.

The Contractor shall obtain one 6-inch diameter core at a random location within each longitudinal joint sampling section for determination of the joint density. The Contractor shall mark and drill the cores at the location directed by the Engineer and in the presence of the Engineer. The Engineer will take possession of the cores for

testing. The Contractor may take additional cores at his own expense. Coring locations shall be centered on the visible line where the joint between the two adjacent lifts abuts the surface. The center of all joint cores shall be within 1 inch of this visible joint line. Core holes shall be repaired by the Contractor using materials and methods approved by the Engineer. PC and OA joint coring shall be completed within five calendar days of joint construction.

Longitudinal joint coring applies to all pavement layers. When constructing joints in an echelon paving process, the joints shall be clearly marked to ensure consistent coring location. In small areas, such as intersections, where the Engineer prescribes paving and phasing methods, the Engineer may temporarily waive the requirement for joint density testing.

Incentive or disincentive payment determined for joint density per subsection 105.05 will apply to the HMA on each side of the joint. If a layer of pavement has joints constructed on both sides, incentive or disincentive payment for each of those joints will apply to one half of the pavement between the joints.

Along forms, curbs, headers, walls, and all other places not accessible to the rollers, the mixture shall be thoroughly compacted with mechanical tampers.

Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective, shall be immediately removed and replaced with fresh hot mixture, and compacted to conform to the surrounding area.

The Contractor shall construct a compaction pavement test section (CTS) for each job mix where 2,000 or more tons are required for the project. The CTS will be used to evaluate the number of rollers and the most effective combination of rollers and rolling patterns for achieving the specified densities. Factors to be considered include, but are not limited to, the following:

(1) Number, size, and type of rollers.

(2) Amplitude, frequency, size and speed of vibratory rollers.

(3) Size, speed, and tire pressure of rubber tire rollers.

(4) Temperature of mixture being compacted.

(5) Roller patterns.

The CTS shall be constructed according to the following procedures:

The CTS shall be constructed to provide the nominal layer thickness specified. The first 500 tons of hot mix asphalt on the project location shall constitute the CTS. The production and placement rates of the CTS shall closely approximate the anticipated

production and placement rates for the remainder of the Contract.

Compaction of the CTS shall commence immediately after the hot mix asphalt has been spread and shall be continuous and uniform over the entire CTS. For the CTS, compaction shall continue until no discernible increase in density is obtained by additional compactive efforts. All compaction shall be completed before the surface temperature of the mixture drops below 185 °F.

Approved types of rollers shall be used to achieve the specified density. The Contractor shall determine what methods and procedures are to be used for the compaction operation. The compaction methods and procedures shall be used uniformly over the entire last 200 tons. The Contractor shall record the following information and a copy of this data shall be furnished to the Engineer.

(1) Type, size, amplitude, frequency, and speed of roller.

(2) Tire pressure for rubber tire rollers, and whether the pass for vibratory rollers is vibratory or static.

(3) Surface temperature of mixture behind the laydown machine and subsequent temperatures and densities after each roller pass.

(4) Sequence and distance from laydown machine for each roller, and number of passes of each roller to obtain specified density.

Two sets of random cores shall be taken within the last 200 tons of the CTS. Each set shall consist of seven random cores. The Engineer will determine the coring locations using a stratified random sampling process. The locations of these cores will be such that one set can serve as a duplicate of the other. One set of these cores shall be immediately submitted to the Engineer. This set will be used for determining acceptance of the CTS and determining density correction factors for nuclear density equipment. Densities of the random samples will be determined by cores according to CP 44. Density correction factors for nuclear density equipment will be determined according to CP 81. Coring shall be performed under CDOT observation. Coring will not be measured and paid for separately but shall be included in the work. For SMA, a CTS is not used. The Contractor shall follow the requirements for the demonstration control strip per the Revision of Section 403, Stone Matrix Asphalt Pavement.

The CTS meets requirements if the Quality Level of the random samples is greater than or equal to 75. The Quality Level will be determined according to CP 71. Once constructed and accepted, the CTS shall remain in place and become part of the hot mix asphalt on the project.

When the Quality level is less than 75 the Contractor shall construct an additional test

section, utilizing different rollers, or roller positions, or roller patterns as required. A written proposal detailing the changes in methods and procedures that will be used to obtain density is to be submitted to the Engineer for review before constructing the additional test section.

If the Quality Level of a CTS is less than 75 and greater than or equal to 44, the Engineer may accept the material at a reduced price per Section 105.

If the Quality Level of a CTS is less than 44, the Engineer may:

(1) Require complete removal and replacement with specification material at the Contractor's expense.

(2) Where the finished product is found to be capable of performing the intended purpose and the value of the finished product is not affected, as determined by the Engineer, permit the Contractor to leave the material in place with a pay factor, but not more than 75 percent of the bid price.

Each CTS shall be 500 tons. If in-place densities of the CTS, as determined by nuclear density equipment before determining density of the cores, meet the CTS density requirements, the Contractor may begin production paving and continue to place hot mix asphalt pavement under the following conditions:

(1) The period during which the Contractor continues to pave without test results from cores shall not exceed one workday.

(2) Construction proceeds at the Contractor's risk. If correlation with the cores reveals that the densities do not meet the CTS requirements, the hot mix asphalt pavement placed subsequently will be subject to price reduction or removal and replacement.

After production paving work has begun, a new CTS shall be required for different layers of pavement, unless otherwise approved by the Engineer. Each additional CTS shall be constructed and documented as specified herein, and shall be sampled, tested, and accepted or rejected as described herein.

All additional costs associated with construction of the CTS shall be at the Contractor's expense. The hot mix asphalt placed in the CTS will be paid for per subsection 401.22, at the contract price for the hot mix asphalt.

If the Contractor requests changes to the roller pattern that was established during the CTS, the Contractor must perform a Roller Pass Study to demonstrate that the specified density is obtained with the new roller pattern before proceeding with the paving operation with Engineer Approval.

April 9, 2024

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Revision of Section 601
Concrete Acceptance

Revise Section 601 of the Standard Specifications for this project as follows:

Delete Sub-Sections 601.17 (c) and 601.17 (d) and replace with the following:

(c) Strength (When Specified).

The concrete will be considered acceptable when the running average of three consecutive strength tests per mix design for an individual structure is equal to or greater than the specified strength and no single test falls below the specified strength by more than 450 psi. A test is defined as the average strength of three test cylinders cast in plastic molds from a single sample of concrete and cured under standard laboratory conditions before testing. If the compressive strength of any one test cylinder differs from the average by more than 10 percent, that compressive strength will be deleted and the average strength will be determined using the compressive strength of the remaining two test cylinders.

When the average of three consecutive strength tests is below the specified strength, the individual low tests will be used to determine the pay factor per Table 601-3. If less than three strength tests are available the individual low tests, if any, will be used to determine the pay factor per Table 601-3. The pay factor will be applied to the quantity of concrete represented by the individual low test.

When the compressive strength test is below the specified strength by more than 450 psi but not more than 1,000 psi, the concrete represented will be evaluated by the Department for removal, corrective action, or acceptance at a reduced price. All costs of the evaluation shall be at the Contractor's expense.

When the compressive strength test is below the specified strength by more than 1,000 psi, the concrete represented will be rejected.

The Contractor may take cores at its own expense and per Colorado Procedure 65 within 10 working days of being notified of a price reduction or up to 45 days after placement, whichever is later, to provide an alternative determination of strength. When cored, price reduction for strength will be based on the corresponding cores' strength. If the core compressive strength is at least 90 percent of the specified field compressive strength, the concrete represented by the cores will be accepted with no price reduction.

April 9, 2024

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Revision of Section 601
Concrete Acceptance

When the Contractor fails to provide proper curing or cold weather protection, the Engineer may use cores to determine acceptance or rejection of a part of the structure instead of acceptance cylinders with the following procedure:

1. The Engineer will notify the Contractor in writing that CDOT will core the structure. The location of the coring will be directed by the Engineer. Coring and testing will be performed at the expense of the Department regardless of the result. Cores will be taken and tested per AASHTO T24 between 28 days and 45 days after concrete placement. Cores will be a minimum of 4 inches in diameter unless otherwise approved by the Engineer. A minimum of three cores in a two-square-foot area will be obtained for locations of the structure that are suspect. If the compressive strength of any one core differs from the average by more than 10 percent, that compressive strength will be deleted and the average strength will be determined using the compressive strength of the remaining two cores. If the compressive strength of more than one core differs from the average by more than 10 percent, the average strength will be determined using all three compressive strengths of the cores. If the average core compressive strength is greater than or equal to 85 percent of the specified 28-day compressive strength, the concrete represented by the cores will be accepted.

2. If the average core compressive strength is less than 85 percent of the specified 28-day compressive strength, the structure will be evaluated by the Department according to subsection 105.03 for removal and replacement. Pay factors will not be based on cores taken by the Engineer. If the concrete represented by the cores is accepted, all costs associated with the repair of the core holes, including preparation and submittal of the repair method, will be measured, and paid for separately.

3. After the Department performs additional core testing as described above, the Contractor may make one request that the structure be cored by the Contractor, tested, and re-evaluated by the Department within 45 days after concrete placement. Coring and testing costs will be at the expense of the Contractor regardless of the result. Cores shall be taken at the same area of the structure as those obtained by the Engineer. The Engineer will approve the location of the cores before the Contractor coring the structure. All costs associated with the repair of these core holes including preparation and

submittal of the repair method, will not be measured, and paid for separately but shall be included in the work.

If the concrete in the structure is found to be sufficient resulting time delays will be considered excusable. If the concrete in the structure is still found to be deficient, resulting time delays will be considered non-excusable for this evaluation. Compensation for time delays will be evaluated by the Engineer per subsection 108.08.

The Contractor shall submit a proposed repair method for the core holes for approval before coring. The method shall use an approved non-shrink concrete patching material with a minimum compressive strength of 4,500 psi. The Contractor shall submit the manufacturer's recommendations along with the repair method. The Engineer will review and approve the proposed methodology before patching.

The Engineer will distribute electronically to the concrete supplier all compressive strength Owner Acceptance (OA) data for the concrete supplied to the project. The Engineer will distribute the OA compressive strength data within two business days of the 7-day and 28-day compressive strength testing. The data will include the compressive strength and batch ticket number at a minimum. The Contractor shall not have a valid dispute or claim as a result of any action or inaction by the Department related to the distribution of test results.

(d) Pay Factors. The pay factor for concrete that is allowed to remain in place at a reduced price shall be determined according to Table 601-3 and shall be applied to the unit price bid for the Item.

If deviations occur in air content and strength within the same batch, the pay factor for the batch shall be the product of the individual pay factors.

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Revision of Section 601
Concrete Acceptance

Table 601-3
PAY FACTORS FOR DEVIATIONS ON
CONCRETE AIR CONTENT AND STRENGTH

Below Specified Strength (psi)	**Pay Factor (Percent)** *See Note
1 – 100	98
101 – 200	96
201 – 300	92
301 – 400	84
401 – 450	75
451-1000	Evaluate by Department
451 – 600	65***
601 – 700	54***
701 – 800	42***
801 – 900	29***
901 – 1000	15***
Over 1000**	Reject

Deviations From Specified Air (Percent)	**Pay Factor (Percent)** *See Note
0.0 – 0.2	98
0.3 – 0.4	96
0.5 – 0.6	92
0.7 – 0.8	84
0.9 – 1.0	75
Over 1.0	Reject

* Concrete represented by out-of-spec tests will only be priced reduced with the lowest pay factor, not for each pay factor.

** After coring.

*** Concrete represented by this set is rejected for being more than 450 psi below specification. The concrete represented by this set can only be price reduced and left in place if a structural evaluation by the Structural Engineer of Record is completed and the structural evaluation indicates the structure is structurally sound.

AFFIRMATIVE ACTION REQUIREMENTS
EQUAL EMPLOYMENT OPPORTUNITY

A. AFFIRMATIVE ACTION REQUIREMENTS

Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity (Executive Order 11246)

1. The Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals and timetables for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area are as follows:

Goals and Timetable for Minority Utilization

Timetable - Until Further Notice			
Economic Area	**Standard Metropolitan Statistical Area (SMSA)**	**Counties Involved**	**Goal**
157 (Denver)	2080 Denver-Boulder	Adams, Arapahoe, Boulder, Denver, Douglas, Gilpin, Jefferson.....	13.8%
	2670 Fort Collins	Larimer.....	6.9%
	3060 Greeley	Weld.....	13.1%
	Non SMSA Counties	Cheyenne, Clear Creek, Elbert, Grand, Kit Carson, Logan, Morgan, Park, Phillips, Sedgwick, Summit, Washington & Yuma.....	12.8%
158 (Colo. Spgs. - Pueblo)	1720 Colorado Springs	El Paso, Teller.....	10.9%
	6560 Pueblo	Pueblo.....	27.5%
	Non SMSA Counties	Alamosa, Baca, Bent, Chaffee, Conejos, Costilla, Crowley, Custer, Fremont, Huerfano, Kiowa, Lake, Las Animas, Lincoln, Mineral, Otero, Prowers, Rio Grande, Saguache.....	19.0%
159 (Grand Junction)	Non SMSA	Archuleta, Delta, Dolores, Eagle, Garfield, Gunnison, Hinsdale, La Plata, Mesa, Moffat, Montezuma, Montrose, Ouray, Pitkin, Rio Blanco, Routt, San Juan, San Miguel	10.2%
156 (Cheyenne - Casper WY)	Non SMSA	Jackson County, Colorado.....	7.5%
GOALS AND TIMETABLES FOR FEMALE UTILIZATION			
Until Further Notice.....6.9% -- Statewide			

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AFFIRMATIVE ACTION REQUIREMENTS
EQUAL EMPLOYMENT OPPORTUNITY

These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause specific affirmative action obligations required by the specifications set forth in 41 CFR 60-4.3(a), and its efforts meet the goals established for the geographical area where the contract resulting form this solicitation is to be performed. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in 41 CFR Par 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs within 10 working days of award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this solicitation. The notification shall list the name, address and telephone number of the subcontractor; employer identification number; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the contract is to be performed.

4. As used in this specification, and in the contract resulting from this solicitation, the "covered area" is the county or counties shown on the Invitation for Bids and on the plans. In cases where the work is in two or more counties covered by differing percentage goals, the highest percentage will govern.

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AFFIRMATIVE ACTION REQUIREMENTS
EQUAL EMPLOYMENT OPPORTUNITY

B. STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS

Standard Federal Equal Employment Opportunity Construction Contract Specifications (Executive Order 11246)

1. As used in these Specifications:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

   d. "Minority" includes;

      (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required

to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractor toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any office of Federal Contract Compliance Programs Office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following;

   a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with

specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its union have employment opportunities available, and maintain a record of the organization's responses.

c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source of community organization and of what action was taken with respect to each individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when he Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc., by specific review of the policy with all management personnel and with all minority and female employees at least once a year, and by posting the Contractor's EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the Contractor's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc. such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and Contractor's activities are non-segregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the Contractor's EEO policies and affirmative action obligation.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these specifications provided that the Contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goal and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even thought the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

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13 The Contractor in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form, however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

C. SPECIFIC EQUAL EMPLOYMENT OPPORTUNITY RESPONSIBILITIES.

1. *General*.

   a. Equal employment opportunity requirements not to discriminate and to take affirmative action to assure equal employment opportunity as required by Executive Order 11246 and Executive Order 11375 are set forth in Required Contract. Provisions (Form FHWA 1273 or 1316, as appropriate) and these Special Provisions which are imposed pursuant to Section 140 of Title 23, U.S.C., as established by Section 22 of the Federal-Aid highway Act of 1968. The requirements set forth in these Special Provisions shall constitute the specific affirmative action requirements for project activities under this contract and supplement the equal employment opportunity requirements set forth in the Required Contract provisions.

   b. The Contractor will work with the State highway agencies and the Federal Government in carrying out equal employment opportunity obligations and in their review of his/her activities under the contract.

   c. The Contractor and all his/her subcontractors holding subcontracts not including material suppliers, of $10,000 or more, will comply with the following minimum specific requirement activities of equal employment opportunity: (The equal

employment opportunity requirements of Executive Order 11246, as set forth in Volume 6, Chapter 4, Section 1, Subsection 1 of the Federal-Aid Highway Program Manual, are applicable to material suppliers as well as contractors and subcontractors.) The Contractor will include these requirements in every subcontract of $10,000 or more with such modification of language as is necessary to make them binding on the subcontractor.

2. *Equal Employment Opportunity Policy*. The Contractor will accept as his operating policy the following statement which is designed to further the provision of equal employment opportunity to all persons without regard to their race, color, religion, sex, or national origin, and to promote the full realization of equal employment opportunity through a positive continuing program;

   It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, or national origin. Such action shall include; employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, pre-apprenticeship, and/or on-the-job training.

3. *Equal Employment Opportunity Officer*. The Contractor will designate and make known to the State highway agency contracting officers and equal employment opportunity officer (herein after referred to as the EEO Officer) who will have the responsibility for an must be capable of effectively administering and promoting an active contractor program of equal employment opportunity and who must be assigned adequate authority and responsibility to do so.

4. *Dissemination of Policy*.

   a. All members of the Contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the Contractor's equal employment opportunity policy and contractual responsibilities to provide equal employment opportunity in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum;

      (1) Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the Contractor's equal employment opportunity policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer or other knowledgeable company official.

      (2) All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer or other knowledgeable company official,

covering all major aspects of the Contractor's equal employment opportunity obligations within thirty days following their reporting for duty with the Contractor.

(3) All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer or appropriate company official in the Contractor's procedures for locating and hiring minority group employees.

b. In order to make the Contractor's equal employment opportunity policy known to all employees, prospective employees and potential sources of employees, i.e., schools, employment agencies, labor unions (where appropriate), college placement officers, etc., the Contractor will take the following actions:

(1) Notices and posters setting forth the Contractor's equal employment opportunity policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

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(2) The Contractor's equal employment opportunity policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

5. *Recruitment*.

a. When advertising for employees, the Contractor will include in all advertisements for employees the notation; "An Equal Opportunity Employer." All such advertisements will be published in newspapers or other publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

b. The Contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants, including, but not limited to, State employment agencies, schools, colleges and minority group organizations. To meet this requirement, the Contractor will, through his EEO Officer, identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the Contractor for employment consideration.

In the event the Contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the Contractor's compliance with equal employment opportunity contract provisions. (The U.S. Department of Labor has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the Contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The Contractor will encourage his present employees to refer minority group applicants for employment by posting appropriate notices or bulletins in areas accessible to all such employees. In addition, information and procedures with regard to referring minority group applicants will be discussed with employees.

`6. *Personnel Actions*. Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken

without regard to race, color, religion, sex, or national origin. The following procedures shall be followed;

a. The Contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The Contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The Contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the Contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The Contract will promptly investigate all complaints of alleged discrimination made to the Contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the Contractor will inform every complainant of all of his avenues of appeal.

7. *Training and Promotion*.

a. The Contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the Contractor's work force requirements and as permissible under Federal and State regulations, the Contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training.

c. The Contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The Contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

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AFFIRMATIVE ACTION REQUIREMENTS
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8. *Unions*. If the Contractor relies in whole or in part upon unions as a source of employees, the Contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women with the unions, and to effect referrals by such unions of minority and female employees. Actions by the Contractor either directly or thorough a contractor's association acting as agent will include the procedures set forth below:

   a. The Contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

   b. The Contractor will use best efforts to incorporate an equal employment opportunity clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, or national origin.

   c. The Contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the Contractor, the Contractor shall so certify to the State highway department and shall set forth what efforts have been made to obtain such information.

   d. In the event the union is unable to provide the Contractor with a reasonable flow of minority and women referrals within he time limit set forth in the collective bargaining agreement, the Contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex or national origin; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The U.S. Department of Labor has held that it shall be no excuse that the union with which the Contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the Contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such Contractor shall immediately notify the State highway agency.

9. *Subcontracting*.

   a. The Contractor will use his best efforts to solicit bids from and to utilize minority group subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of minority-owned construction firms from State highway agency personnel.

   b. The Contractor will use his best efforts to ensure subcontractor compliance with their equal employment opportunity obligations.

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AFFIRMATIVE ACTION REQUIREMENTS
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10. *Records and Reports.*

a. The Contractor will keep such records as are necessary to determine compliance with the Contractor's equal employment opportunity obligations. The records kept by the Contractor will be designed to indicate:

(1) The number of minority and nonminority group members and women employed in each work classification on the project.

(2) The Progress and efforts being made in cooperation with unions to increase employment opportunities for minorities and women (applicable only to contractors who rely in whole or in part on unions as a source of their work force).

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees, and

(4) The progress and efforts being made in securing the services of minority group subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. All such records must be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the State highway agency and the Federal Highway Administration.

c. The Contractors will submit an annual report to the State highway agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form PR 1391.

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Special Construction Requirements
Fire Protection Plan

(a) *Fire Protection Plan*. Prior to start of work, the Contractor shall submit a Fire Control Plan in writing to the Engineer for approval. The plan shall include the following:

(1) The name and contact information of a Fire Control Coordinator who shall be assigned to the project.

(2) A list of numbers to call in case of a fire, including 911 (or the equivalent in the area).

(3) A complete list, including storage locations, of all tools and equipment the Contractor will use in the event of a fire within project limits.

(4) Methods that will be employed if a fire is encountered or started during construction activities within the project limits.

(5) Specific fire prevention precautions, and the required firefighting equipment, for every activity which has the potential for starting a fire. At a minimum the plan shall address prevention planning related to use of heavy equipment, vehicles, hand tools, storage and parking areas.

(6) Specific precautions for fueling operations.

(7) Provisions for field safety meetings. The Contractor shall conduct field safety meetings (also known as toolbox or tailgate meetings) at least once per week. The Contractor shall encourage participation by all persons working at the project site. Participants shall discuss specific fire prevention precautions for construction activities.

(b) *Equipment and Procedures*.

(1) Fire Boxes. Fire boxes shall contain tools and equipment that shall be used exclusively for controlling or suppressing fires which occur due to construction activities on project sites. Each fire box shall contain, as a minimum, the following:

(1) five round-pointed shovels,
(2) two double-bitted axes,
(3) three pulaskis or mattocks, and
(4) two backpack pumps

(2) Welding. If welding at field locations is required, the welding shall be done at a location where all flammable material has been cleared away for a distance of 16 feet around the area.

(3) Spark Arrestors. All diesel and gasoline powered engines, both mobile and stationary, shall be equipped with serviceable spark arrestors.

(4) Power Saws. Each gasoline power saw shall be provided with a spark screen and a muffler in good condition. Spill-proof metal safety cans shall be used for refueling.

(5) Storage and Parking Areas. Batch plant areas, equipment service areas, parking areas, gas and oil drum storage areas, and explosive storage areas shall be cleared of all flammable materials for a distance of 50 feet. Small stationary engine sites shall be cleared of all flammable material for distance of 17 feet. Other mitigation methods may be used as approved by the Engineer.

(c) *Fire Control Coordinator Responsibilities.* The Fire Control Coordinator shall:

(1) Implement the Fire Control Plan.

(2) Monitor, manage, and adjust the Fire Control Plan as needed as construction work progresses.

(3) Document in a letter to the Engineer changes to the Fire Control Plan.

(4) Immediately contact firefighting authorities when a fire is started due to construction activities within project limits.

(5) Coordinate fire control and suppression activities until authorities arrive, including the evacuation of staff.

(6) When the Fire Control Coordinator cannot be on the project site, he shall designate a person who is on site to serve as the Fire Control Coordinator. The Fire Control Coordinator, or his designee, shall be on site at all times that work is being performed.

(d) *Costs.* All costs associated with the preparation and implementation of the Plan and compliance with all fire protection provisions and requirements will not be measured and paid for separately, but shall be included in the work.