

U. S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION



PLANS FOR PROPOSED PROJECT

ID ERFO FS NEZPR117 2019-1(1)  
**NEZ PERCE-CLEARWATER 2019 REPAIRS**

NEZ PERCE-CLEARWATER NATIONAL FORESTS  
IDAHO COUNTY  
IDAHO

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	A.1

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- B. SUMMARY OF QUANTITIES
- C. TYPICAL SECTIONS
- D. PLAN-PROFILE
- E. TURNOUTS AND PULLOUTS
- F. EROSION CONTROL
- G. RETAINING WALLS
- H. DRAINAGE
- I. TEMPORARY TRAFFIC CONTROL

See Sheet A.2 for Sheet Index

TYPE OF CONSTRUCTION:

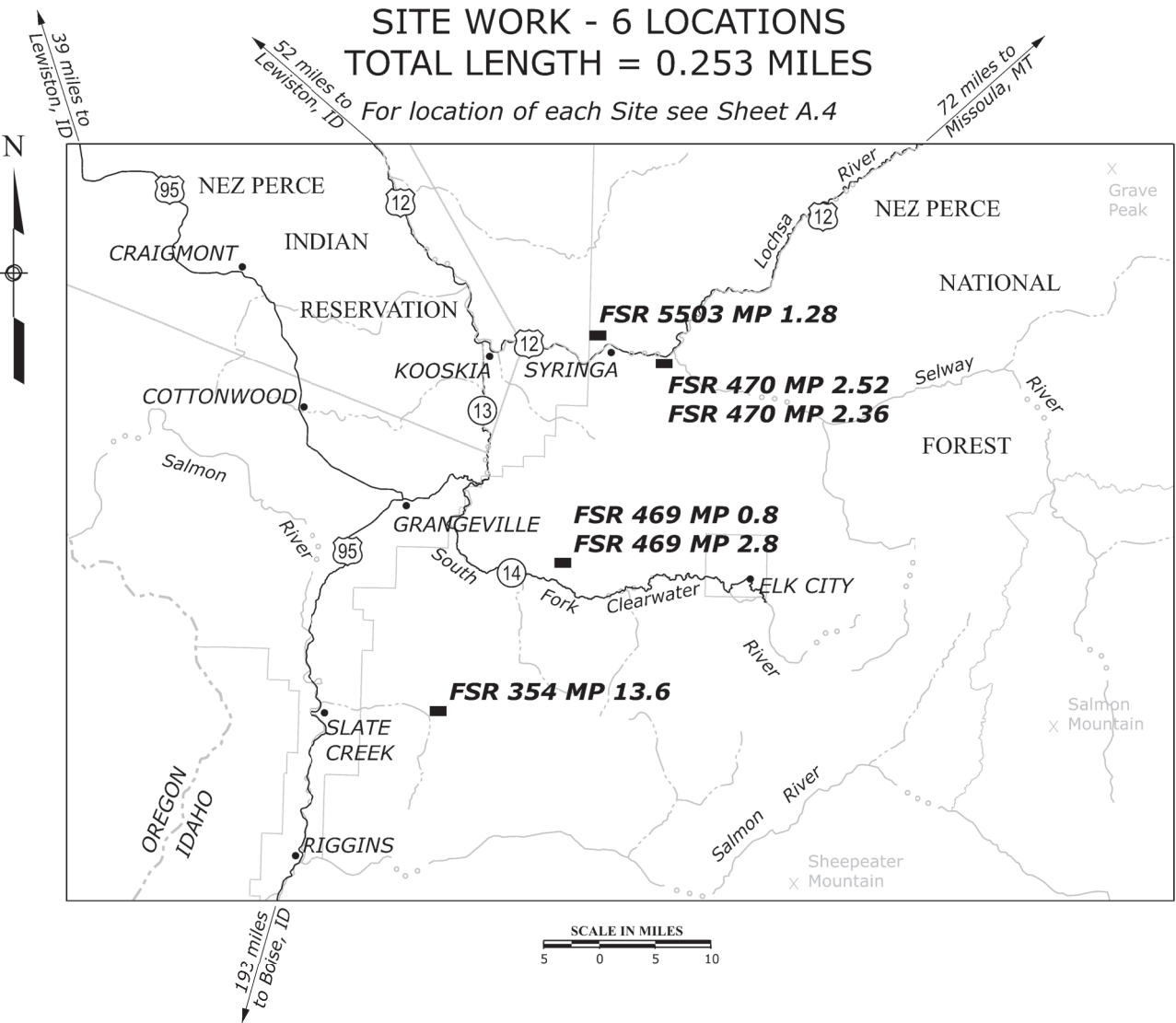
Emergency repairs: Grading, rock embankment, rock buttress, reinforced soil slope, aggregate surfacing, minor drainage.

DESIGN DESIGNATION:

ADT (2022)	<400
ADT (2042)	<400
V	20 MPH
e (max)	0.060

SPECIFICATION:

Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-14



PLANS PREPARED BY  
**U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION**  
WESTERN FEDERAL LANDS HIGHWAY DIVISION  
VANCOUVER, WASHINGTON

PROJECT MANAGER  
C. JORGENSEN

APPROVED:

BRENT L COE

Chief of Engineering,  
Western Federal Lands Highway Division

Digitally signed by BRENT L COE  
Date: 2023.05.09 15:08:26 -07'00'

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25 April 2023 8:54 AM

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	A.2

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c:\pw-wor\0535547\id-ef1901101\_ac.dgn [Det W101-1] 17 April 2023 11:01 AM

$\Delta$	total central angle	M.L.	main line
$\Delta c$	curve central angle	M.P.	mile post
$\emptyset$	diameter	matl.	material
$\theta s$	spiral central angle	max.	maximum
abut.	abutment	MGAL	thousand gallon
ADT	average daily traffic	min.	minimum
AH	ahead	mon.	monument
appr.	approach	N	north
BK	back	NC	normal crown
b.f.	back face		
BM	bench mark	o.c.	on center
BP	balance point	o. to o.	out to out
br.	bridge	OD	outside diameter
brg.	bearing	OG	original ground
btwn	between	OHWM	ordinary high water mark
cc or c. to c.	center to center	PC	point of curve
$\&$	centerline	PCC	point of compound curve
clr.	clear	PCS	point of curve to spiral
CMP	corrugated metal pipe	PI	point of intersection
col.	column	pl.	plate
conc.	concrete	POC	point on curve
conn.	connection	POS	point on spiral
constr. jt.	construction joint	POT	point on tangent
cont.	continuous	PS	point of tangent to spiral
CS	point of curve to spiral	PSF	pounds per square foot
ctrs.	centers	PSI	pounds per square inch
CUFT	cubic foot (feet)	PSC	point of spiral to curve
culv.	culvert	PST	point of spiral to tangent
CUYD	cubic yard(s)	PT	point of tangent
D	diameter	pvmt.	pavement
DHV	design hourly volume	R	radius
dia.	diameter	R.	range
diaph.	diaphragm	R/W	right-of-way
dist.	distance	rdwy.	roadway
drwg(s).	drawing(s)	reinf.	reinforcement
E	east	reqd.	required
e	superelevation rate	rt. or RT	right
e.f.	each face	rte.	route
El. 94.16	elevation in feet	S	south
elev.	elevation	SADT	seasonal average daily traffic
emb.	embankment	SC	section
EOP	edge of pavement	sect.	section
EQ or eq.	equation	shldr.	shoulder
EW	edge of water	SLRY	slurry unit
exc.	excavation	spa.	spacing, spaces or spaced
exp. jt.	expansion joint	SQFT	square foot
f.f.	front face	SQYD	square yard
fin.	finish	SRS	point of spiral to reverse spiral
flg.	flange	SS	point of spiral to spiral (no curve)
ftg.	footing	ST	point of spiral to tangent
ga.	gage (gauge)	STA, Sta.	station
galv.	galvanized	std.	standard
ID	inside diameter	stgr.	stringer
IE	invert elevation	stiff.	stiffener
jt.	joint	struc.	structural
KSI	thousand pounds per square inch	STS	point of spiral to tangent spiral
L	length of curve	T	tangent distance
lat.	latitude	T.	township
LNFT	linear foot (feet)	TBM	temporary bench mark
long.	longitudinal	thd.	thread
LPSM	lump sum	TS	point of tangent to spiral
Ls	length of spiral	Ts	tangent distance (spiraled curve)
lt. or LT	left	typ.	typical
LW	low water	V	design speed (velocity)
		vph	vehicles per hour
		VPI	vertical point of intersection
		W	west

## NOTE:

- Other symbols used in the plans will be shown in a legend on the appropriate plan sheet.

National Boundary

State Boundary

County Boundary

City Boundary

Township or Range Line

Section Line

Section Corner (Found, Projected)

$\frac{1}{4}$  Section Line

$\frac{1}{4}$  Section Corner (Found, Projected)

$\frac{1}{16}$  Section Line

$\frac{1}{16}$  Section Corner (Found, Projected)

Property Line

Parcel Number

National Park Boundary

National Forest Boundary

National Wildlife Refuge Boundary

BLM Lands Boundary

Indian Reservation Boundary

Existing Roadway (Paved, Gravel)

Railroad

Trail

Fiber Roll

Silt Fence

Sandbag

Intermittent Drainage or Small Creek

Large Creek or River

Lake, Pond or Reservoir; Marshland

Spring or Seep

Treeline; Individual Trees

Material Source; Bore Hole; Test Pit

Spot Elevation; Coordinate Grid Tick

Above Ground Tank; Underground Tank

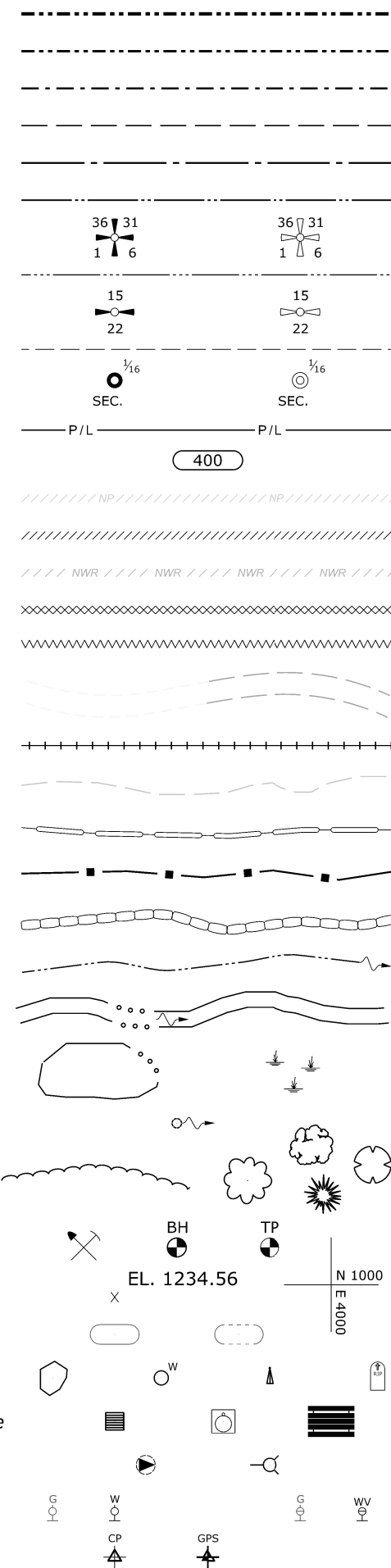
Boulder; Well; Antenna; Grave

Cooking Grate; Garbage Can; Picnic Table

Flagpole; Fire Hydrant

Gas & Water Meter; Gas & Water Valve

Control Point (Terrestrial and GPS)



North Arrow



EXISTING

PROPOSED

Slope Stake Limits

Top of Cut

Toe of Fill

Construction Limits

- no symbol -

Bottom of Ditch

Fence

Gate with Fence

Cattleguard

Guardrail

Concrete Barrier and Guard Wall

Retaining Wall

Signs (single, double post; portable)

Delineators

Pipe Culvert (arrow shows flow)

Pipe Culvert with End Section

Pipe Culvert with Headwall

Pipe Culvert with Drop Inlet

Box Culvert

Underdrain

Overhead/Above Ground Utilities

Underground Utilities

FM = force main, FO = fiber optic, G = gas, IRR = irrigation, O = oil, P = power, SA = sanitary sewer, SD = storm drain, SS = storm sewer, STEAM = steam, T = telephone, TV = CATV, W = water

Poles (Power, Telephone, Joint Use, Light, Support w/Anchor)

Miscellaneous Utility Features

EM = electric meter, TP = telephone pedestal, TV = CATV pedestal, UP = transformer or junction box, WF = water fountain

Building

Right-of-Way Line

Permanent Easement

Construction Easement

Riprap

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION  
OFFICE OF FEDERAL LANDS HIGHWAY

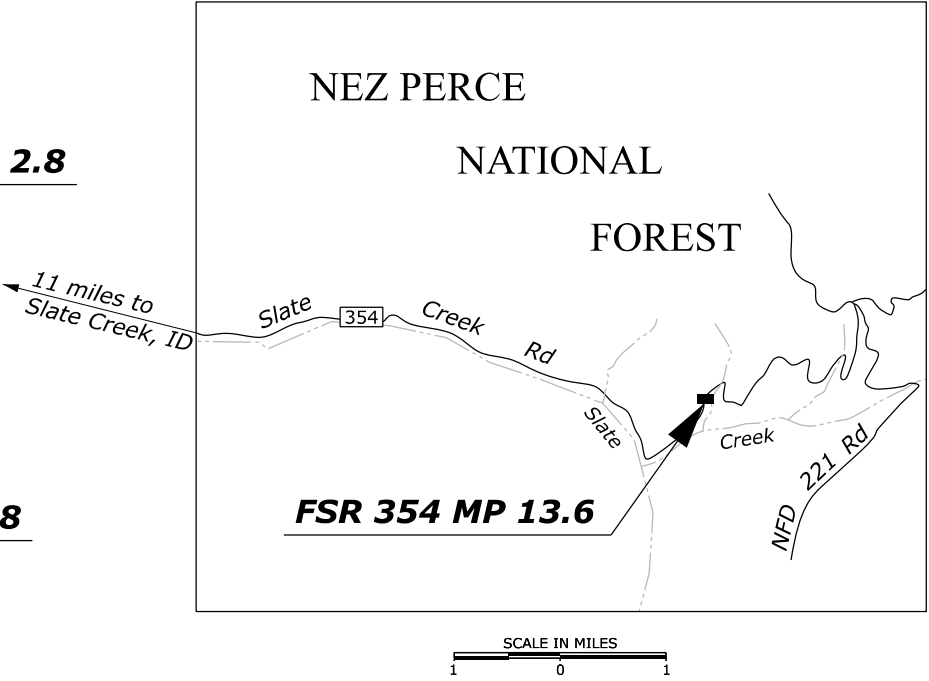
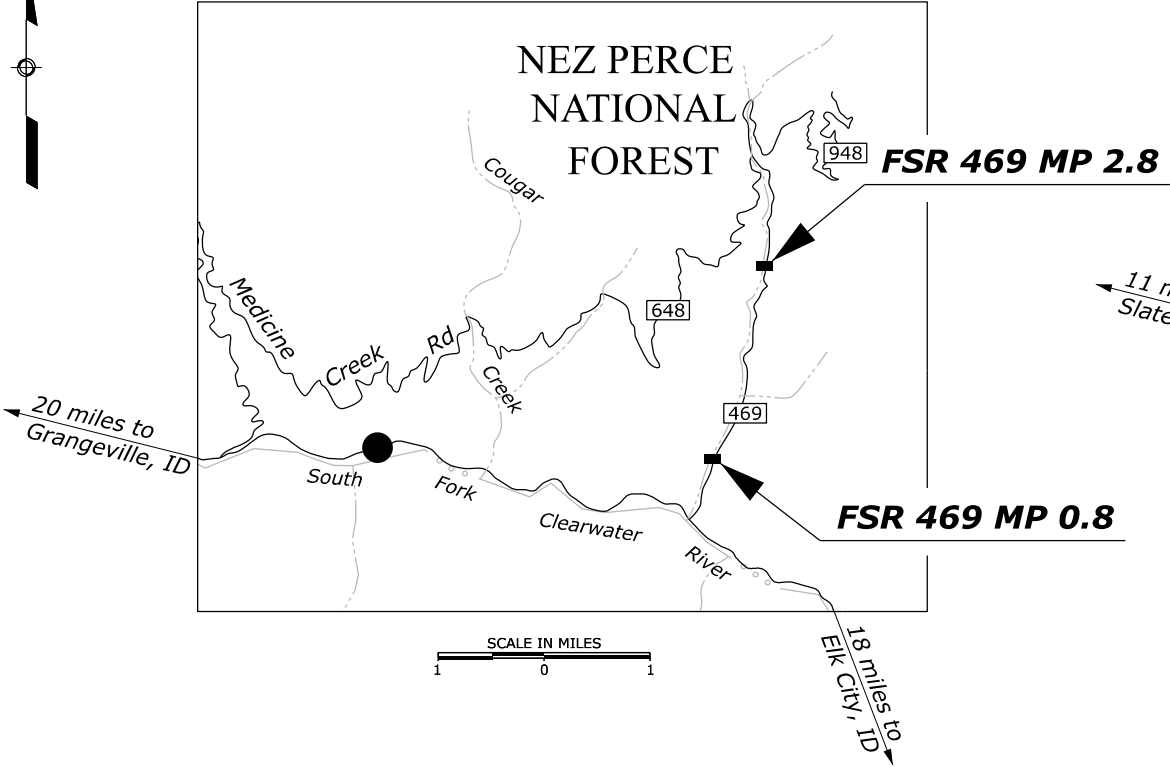
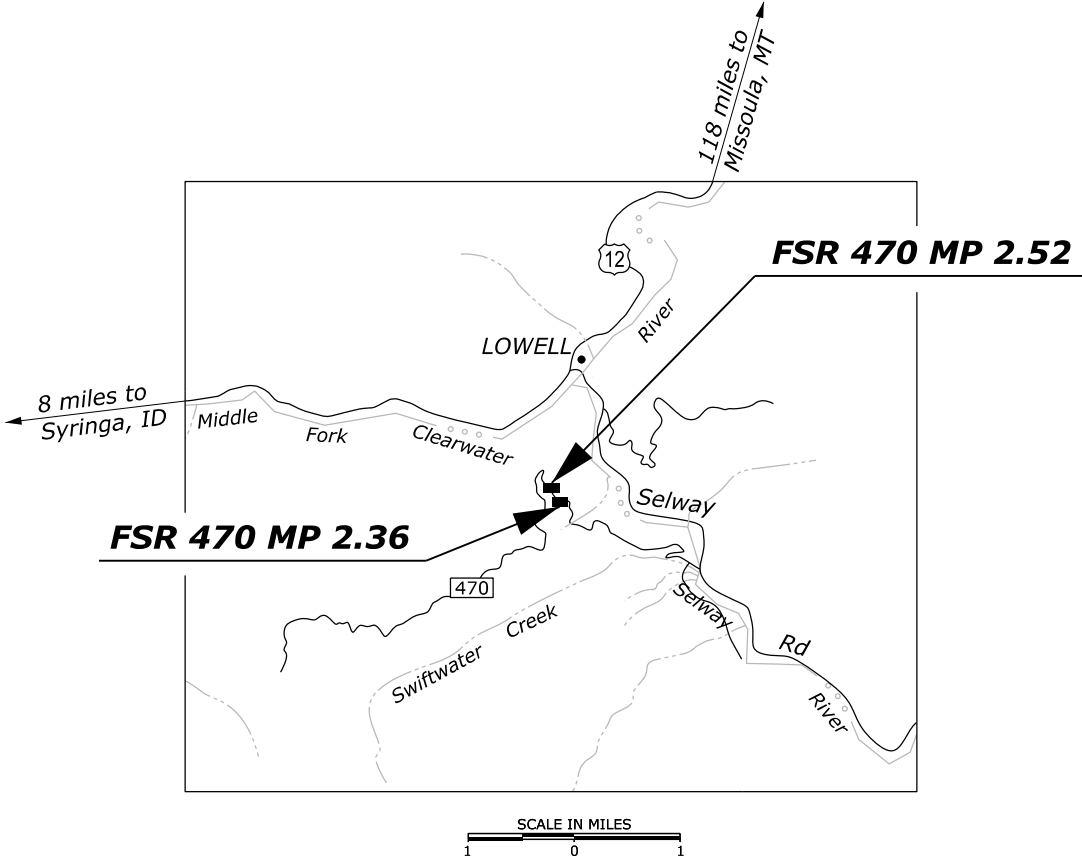
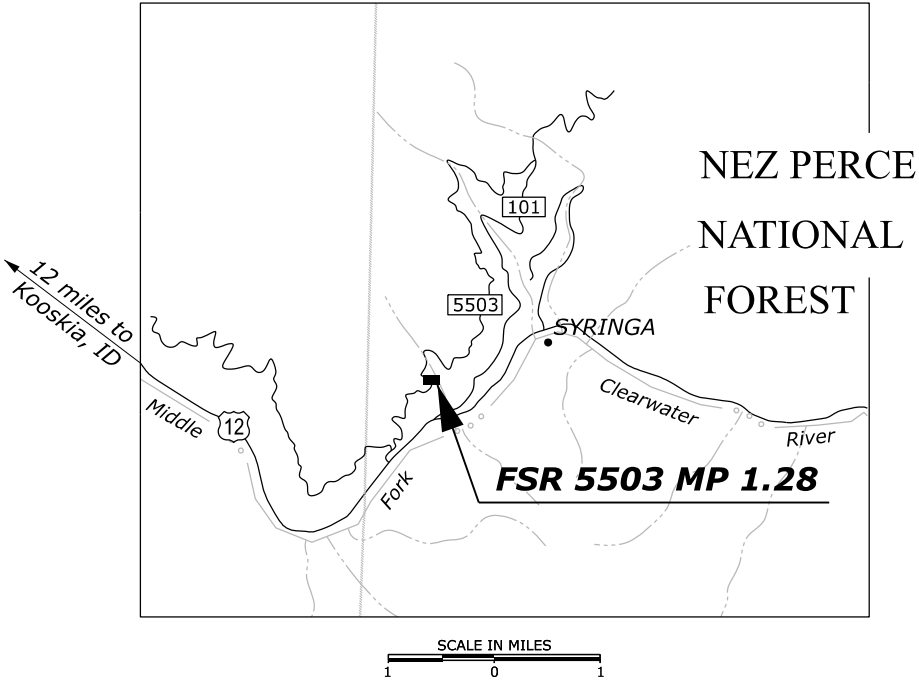
WFLHD DETAIL

## PLAN SYMBOLS AND ABBREVIATIONS

DETAIL APPROVED FOR USE 11/2001  
REVISED: 9/2005 1/2007 10/2009 10/2014  
6/2022

DETAIL  
W101-1

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	A.4

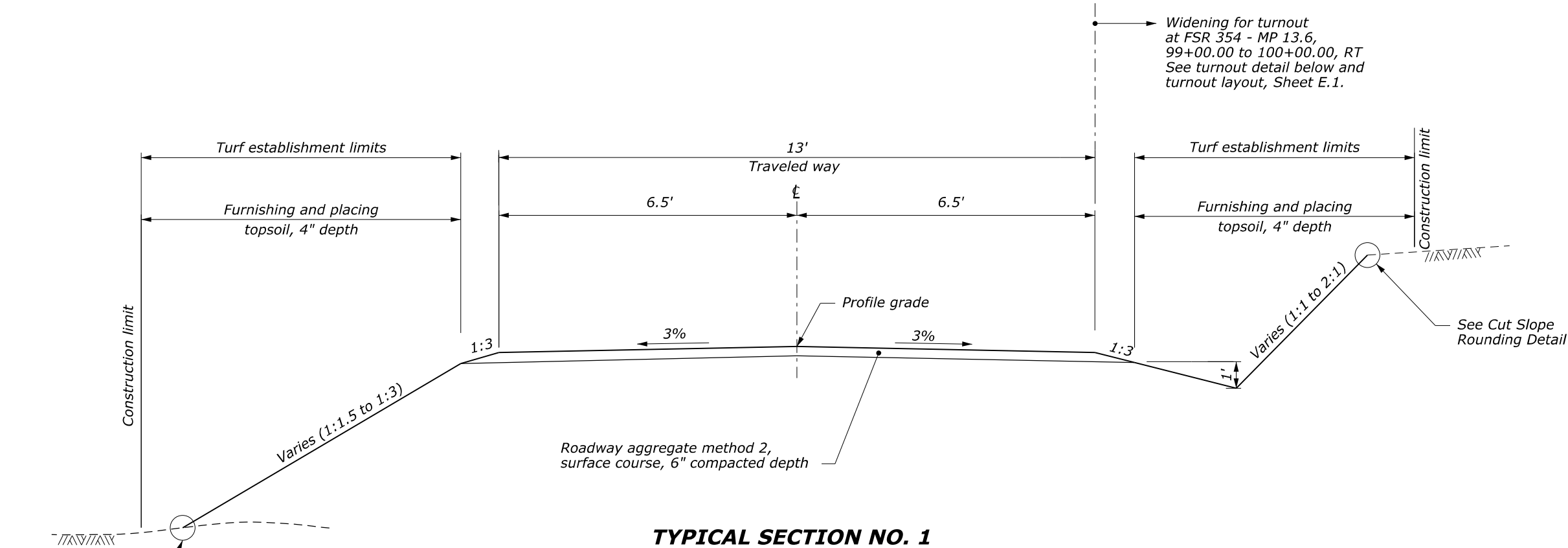


**VICINITY MAPS**





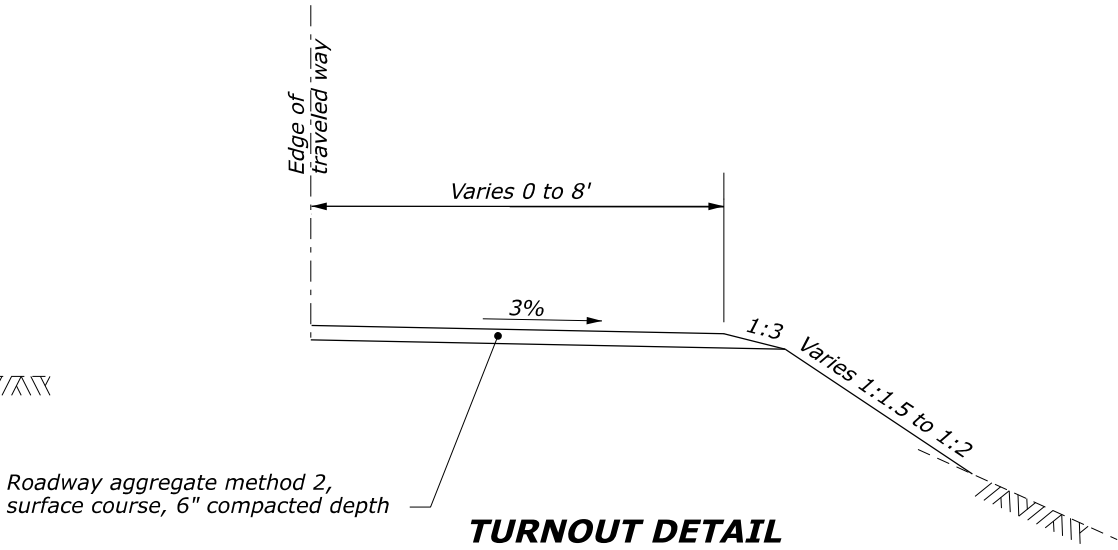
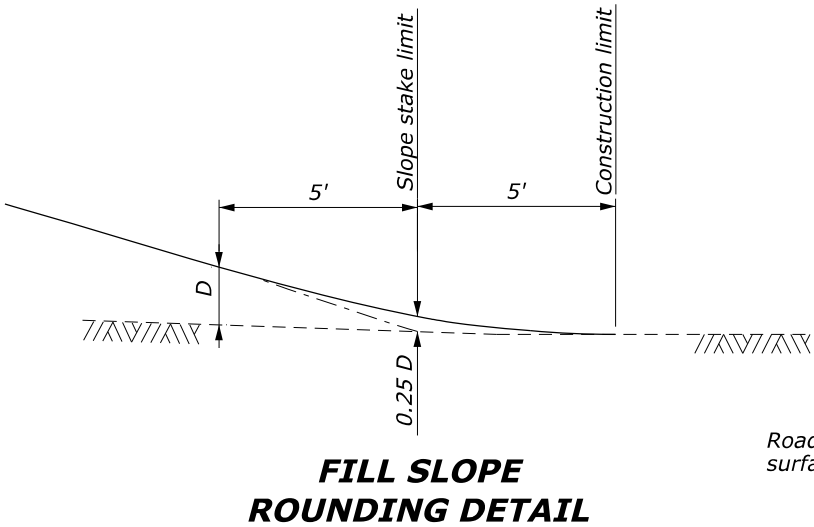
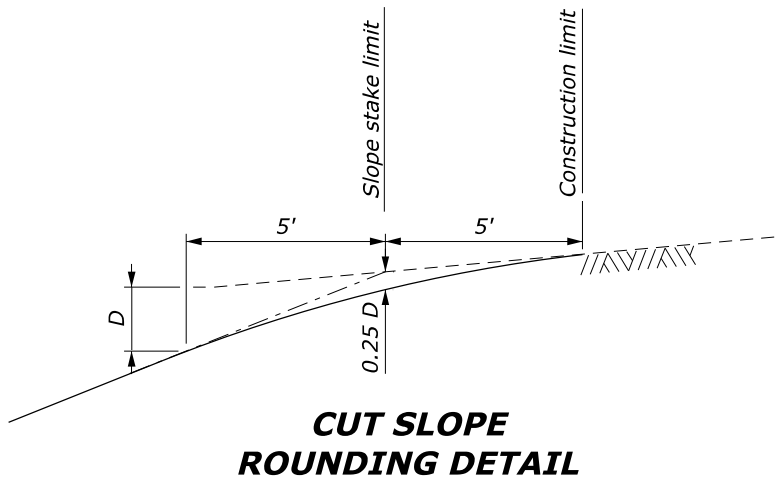
STATE	PROJECT	SHEET
ID	ERFO FS NEZPR117 2019-1(1)	NUMBER C.1



**TYPICAL SECTION NO. 1**

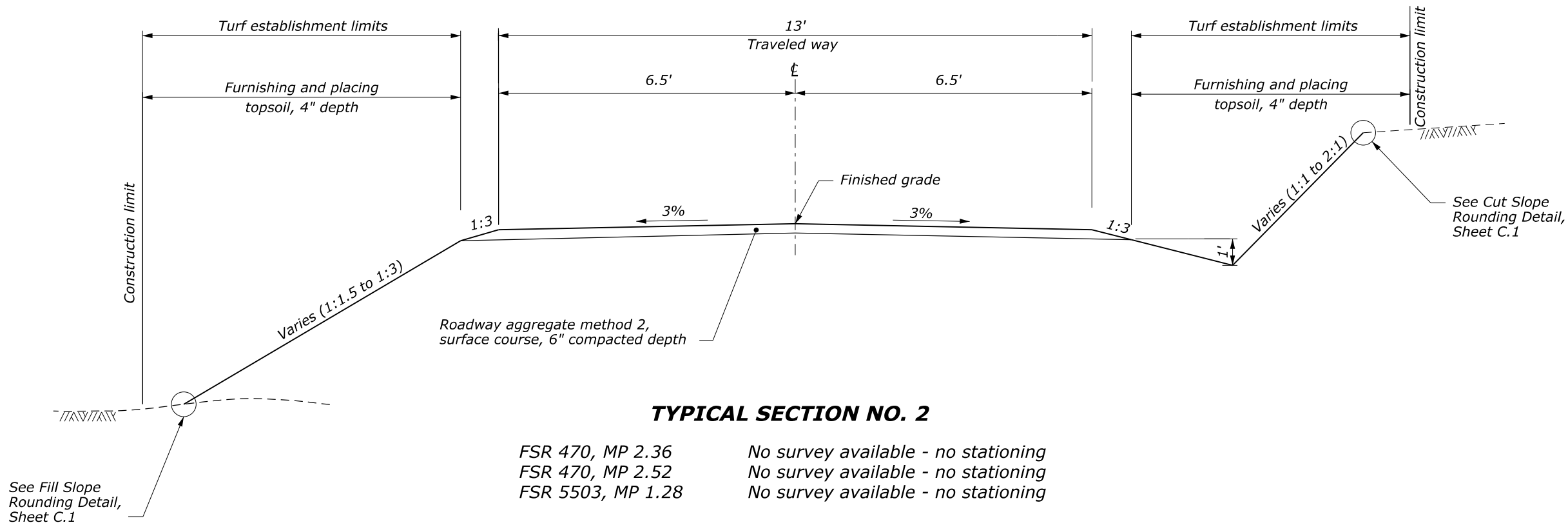
FSR 354, MP 13.6  
FSR 469, MP 0.8  
FSR 469, MP 2.8

99+00.00 to 101+20.00 and 101+80.00 to 102+39.99  
150+00.00 to 150+67.00 and 151+40.00 to 152+37.87  
200+40.00 to 200+80.00 and 201+40.00 to 202+09.55



NO SCALE

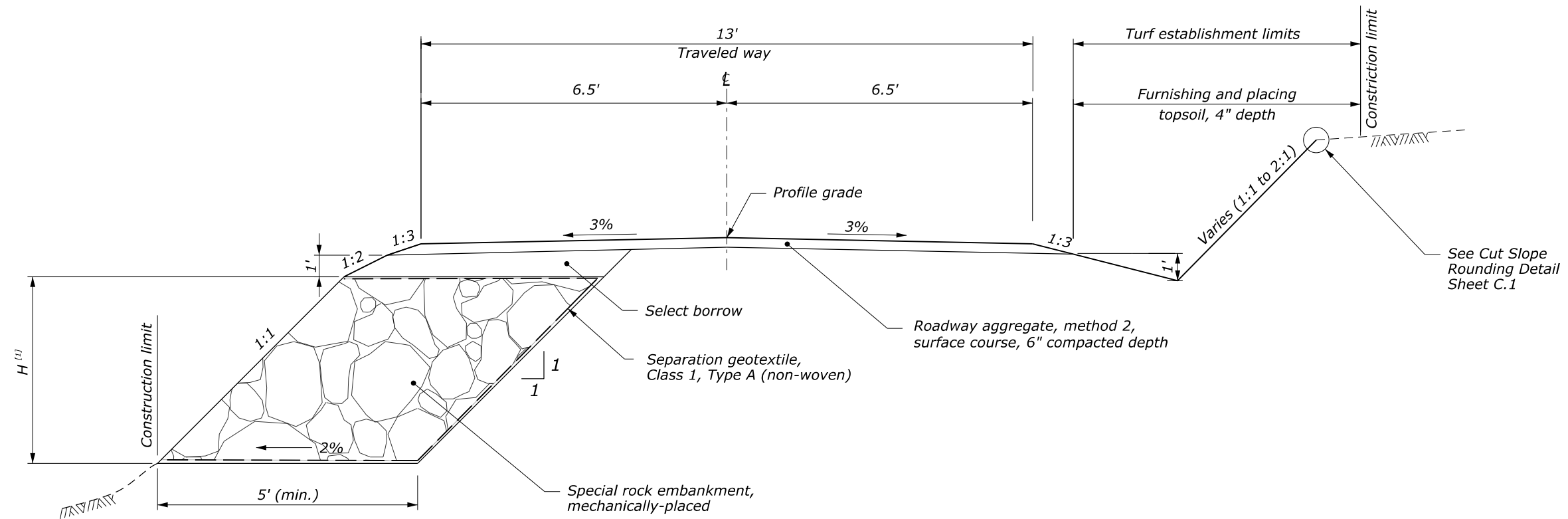
STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	C.2



NO SCALE

**TYPICAL SECTIONS**  
SHEET 2 of 6

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	C.3



**TYPICAL SECTION NO. 3**

FSR 469, MP 0.8  
FSR 469, MP 2.8

150+67.00 to 151+40.00  
200+80.00 to 201+40.00

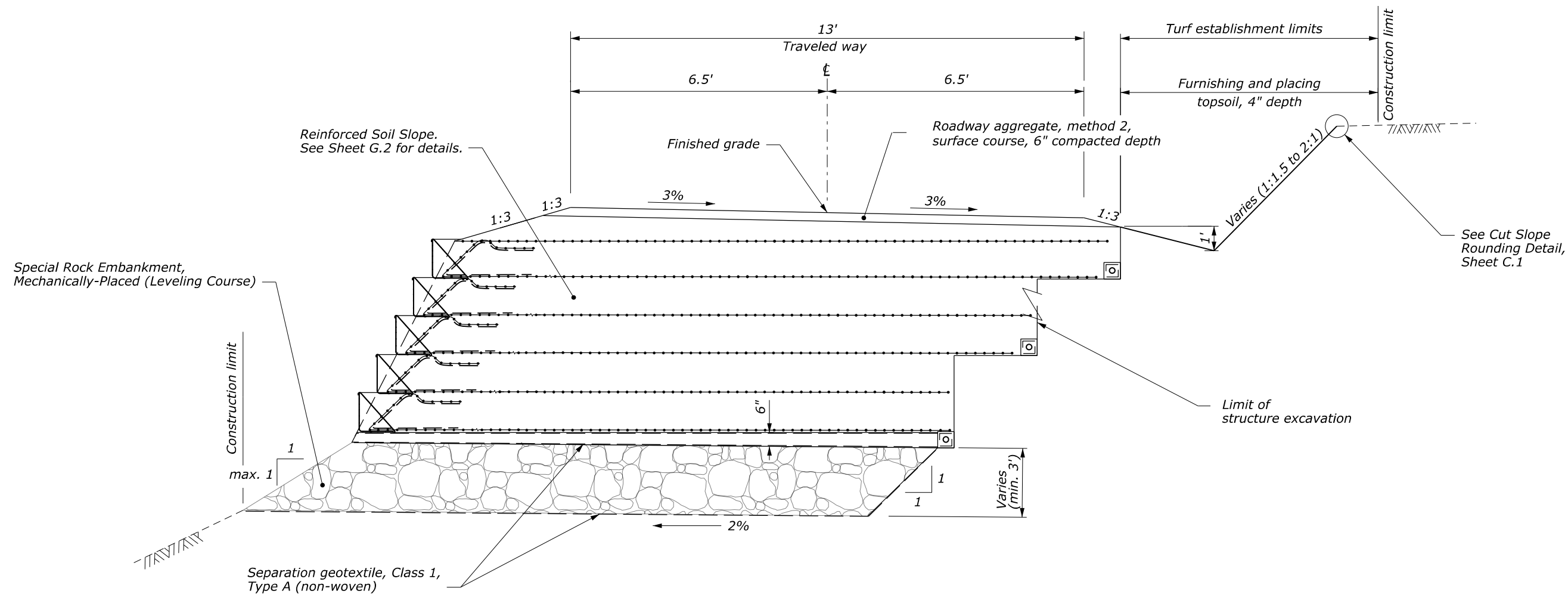
**NOTE:**

1. *Temporary shoring requirements have not been evaluated at these sites.*

**FOOTNOTE:**

[1] *H* varies from 1.7' to 6.3' at FSR 469 MP 0.8 site.  
*H* varies from 2.6' to 14.4' at FSR 469 MP 2.8 site.

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	C.4



**TYPICAL SECTION NO. 4**

FSR 470, MP 2.36  
FSR 470, MP 2.52

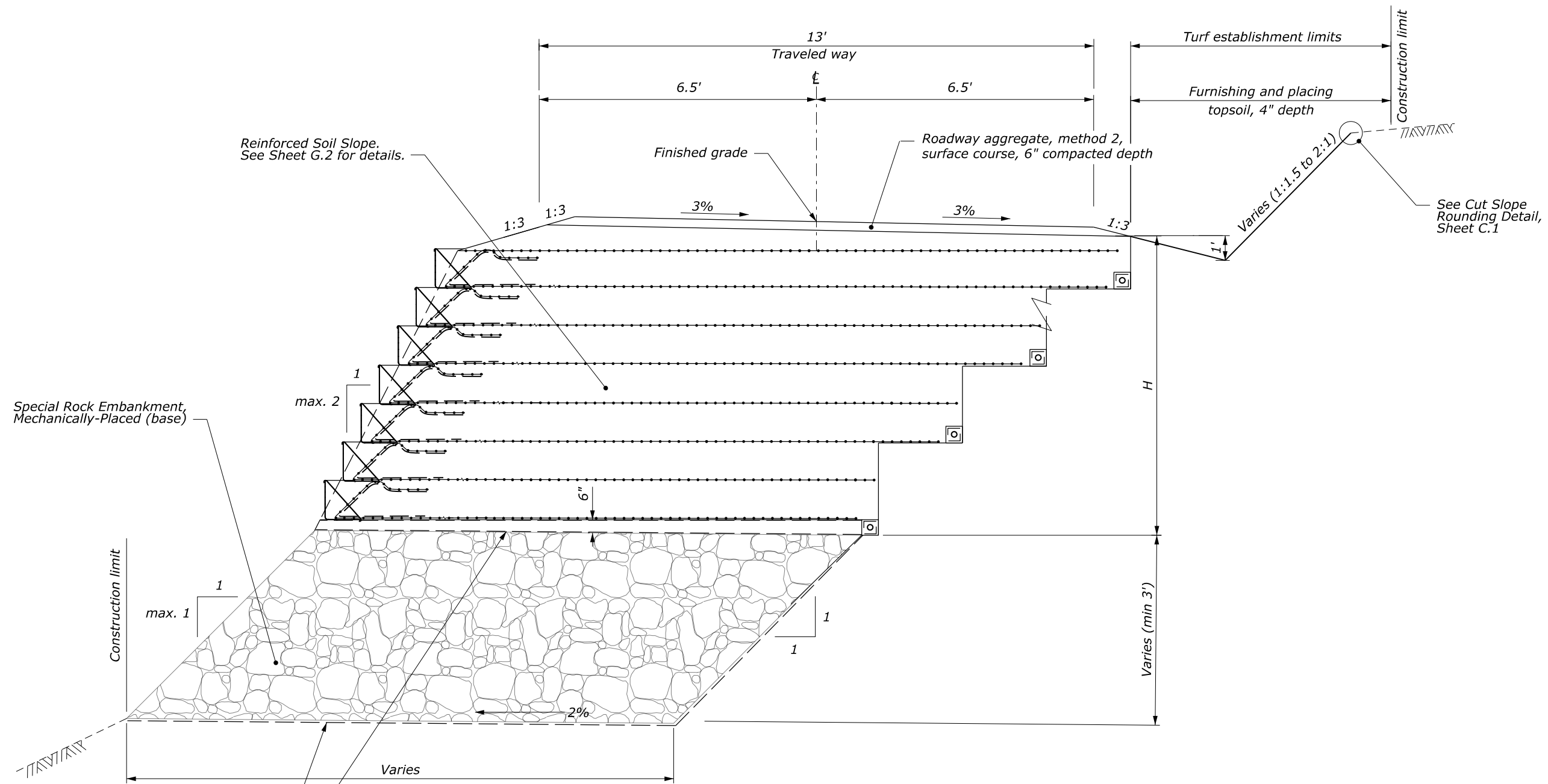
Survey not available - no stationing  
Estimated length = 120'

**NOTE:**

1. Temporary shoring requirements have not been evaluated for these sites.

NO SCALE

**TYPICAL SECTIONS**  
SHEET 4 of 6



**TYPICAL SECTION NO. 5**

FSR 5503, MP 1.28 Survey not available - no stationing  
Estimated length = 100'

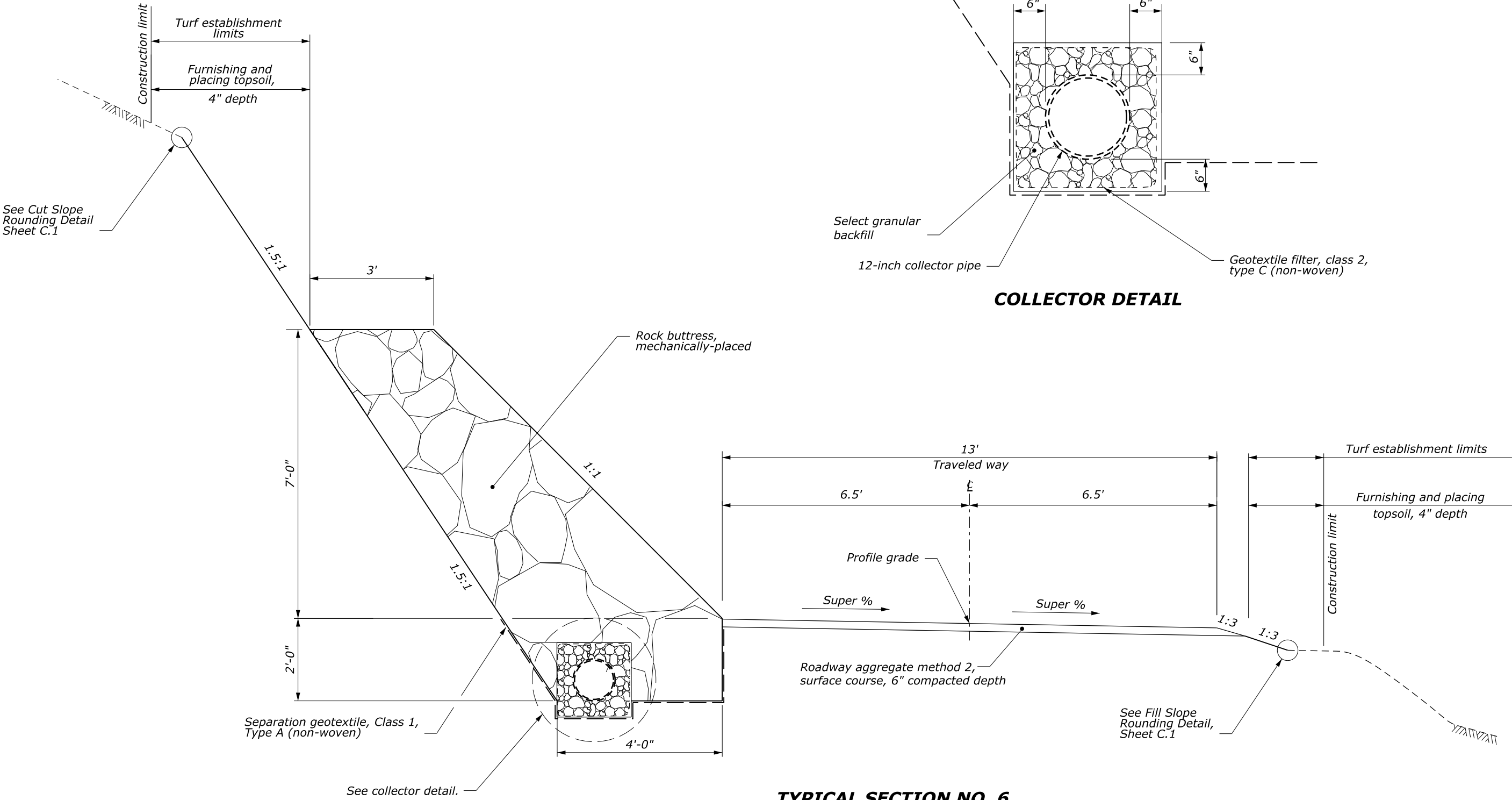
**NOTE:**

1. Temporary shoring requirements have not been evaluated for this site.

**TYPICAL SECTIONS**

SHEET 5 of 6

NO SCALE



**TYPICAL SECTION NO. 6**

FSR 354, MP 13.6      101+20.00 to 101+80.00

NO SCALE



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STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	D.1

TABULATION OF PLAN AND PAVEMENT QUANTITIES							
SITE	20101-0000 CLEARING AND GRUBBING	20411-0000 SELECT BORROW <sup>[1]</sup>	25201-1000 SPECIAL ROCK EMBANKMENT, MECHANICALLY- PLACED	25205-1000 ROCK BUTTRESS, MECHANICALLY- PLACED	30202-2100 ROADWAY AGGREGATE, METHOD 2, SURFACE COURSE <sup>[2]</sup>	62402-0300 FURNISHING AND PLACING TOPSOIL, 4-INCH DEPTH	62501-0000 TURF ESTABLISHMENT
	(ACRE)	(TON)	(CUYD)	(CUYD)	(TON)	(ACRE)	(ACRE)
FSR 354 - MP 13.6	0.3	---	---	95	201	0.3	0.3
FSR 469 - MP 0.8	0.1	22	56	---	126	0.1	0.1
FSR 469 - MP 2.8	0.1	33	186	---	110	0.1	0.1
FSR 470 - MP 2.36	0.2	---	---	---	77	0.2	0.2
FSR 470 - MP 2.52	0.2	---	---	---	71	0.2	0.2
FSR 5503 - MP 1.28	0.2	---	---	---	93	0.2	0.2
TOTAL	1.1	55	242	95	678	1.1	1.1

**FOOTNOTES:**

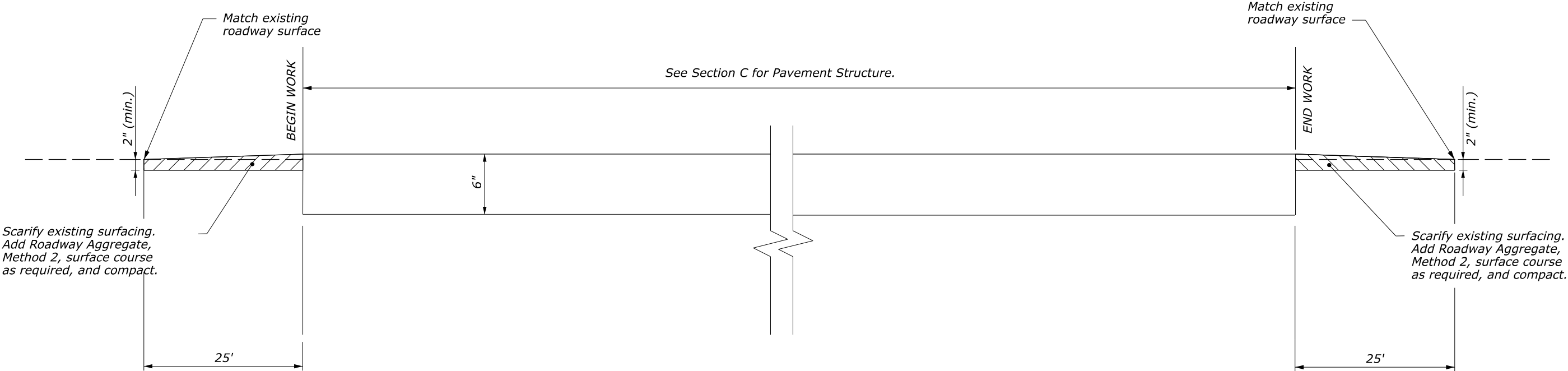
- [1] Quantity conversion for Select Borrow is based on an estimate of 1.85 tons/cuyd.
- [2] Quantity conversion for Roadway aggregate, method 2, surface course is based on an estimate of 1.97 tons/cuyd.

EARTHWORK SUMMARY TABLE													
LOCATION	CUT						FILL				TOTALS		
	Item 20401-0000 ROADWAY CAVATION	(+) Additional Excavation (See Note 2) for info only	(-) Topsoil Stripped from Cuts for info only	(-) Estimate of Unsuitable Material for info only	Total Unadjusted Excavation Available for Fill for info only	Total Estimated Material Available for Fill (adjusted based on shrink/swell factor) (see Note 1) for info only	Embankment for info only	(+) Additional Backfill Needed (See Note 3) for info only	(+) Topsoil stripped from embankment foundation areas for info only	Total Fill Needed for info only	Total Adjusted Available For Fill less Total Fill Needed for info only	Waste for info only	
UNITS	CUYD	CUYD	CUYD	CUYD	CUYD	CUYD	CUYD	CUYD	CUYD	CUYD	CUYD	CUYD	CUYD
Surveyed sites:													
FSR 354 - MP 13.6	1,777	102	-	-	1,878	2,104	16	-	-	16	2,088		
FSR 469 - MP 0.8	61	27	-	-	88	78	4	-	-	4	74		
FSR 469 - MP 2.8	69	120	-	-	190	169	-	-	-	-	169		
Sites with no survey information available (see Note 4):													
FSR 470 - MP 2.36	33	240	-	-	273	254	-	-	-	-	254		
FSR 470 - MP 2.52	31	280	-	-	311	290	-	-	-	-	290		
FSR 5503 - MP 1.28	24	653	-	-	677	602	-	-	-	-	602		
TOTALS	1,995	1,422	-	-	3,416	3,496	20	-	-	20	3,476	3,476	

- NOTE:
1. All volumes are in-place cubic yards (i.e. in situ or compacted in place).
  2. Additional excavation that is suitable for use in embankment construction (Section 209 Structural excavation for rock embankment, rock buttress, MSE wall, RSS, and Culvert installation).
  3. Additional material needed for embankment construction (Structural backfill) will consist of select borrow, not common embankment material.
  4. Quantities at sites without survey information were estimated from field measurements.

EARTHWORK SUMMARY

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	D.3

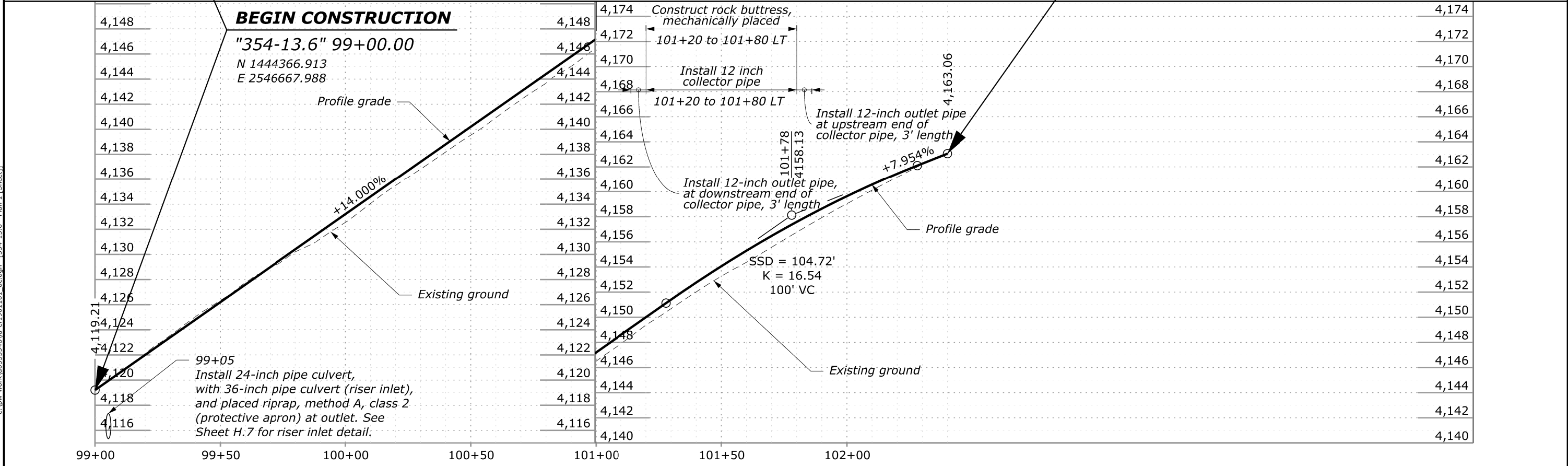
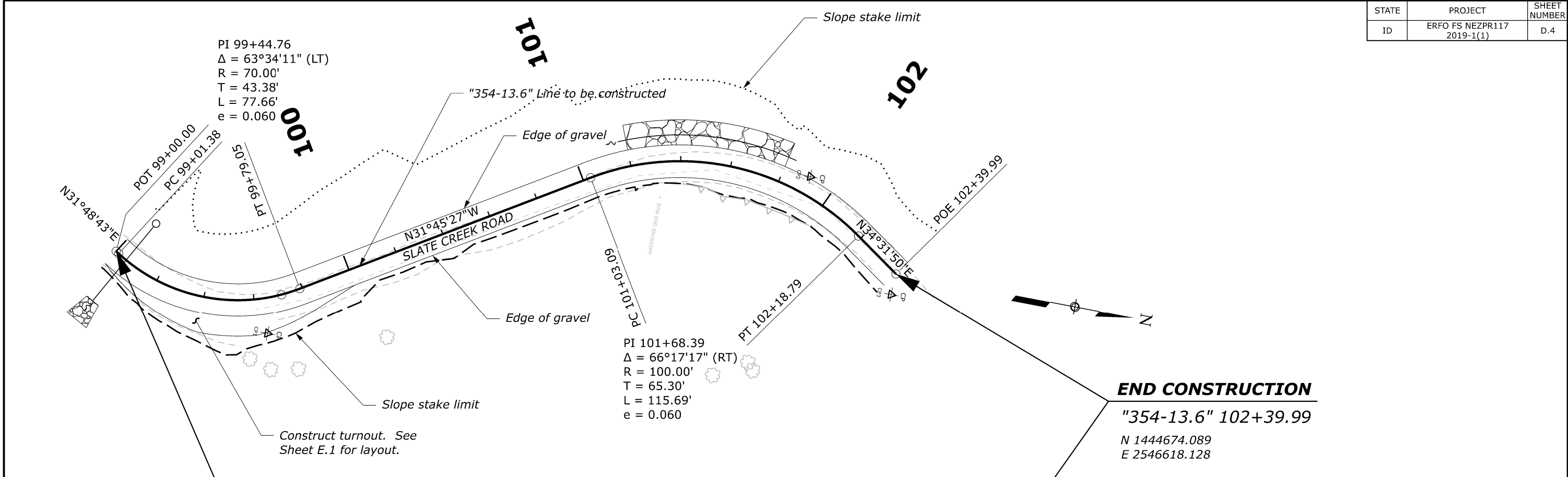


ELEVATION VIEW

NO SCALE

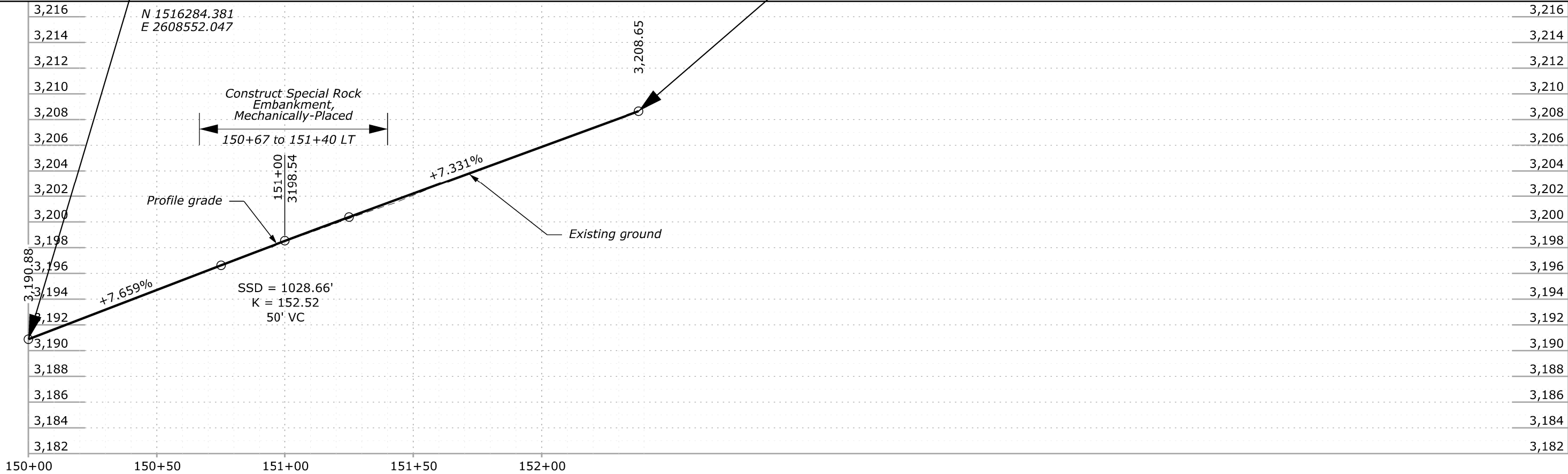
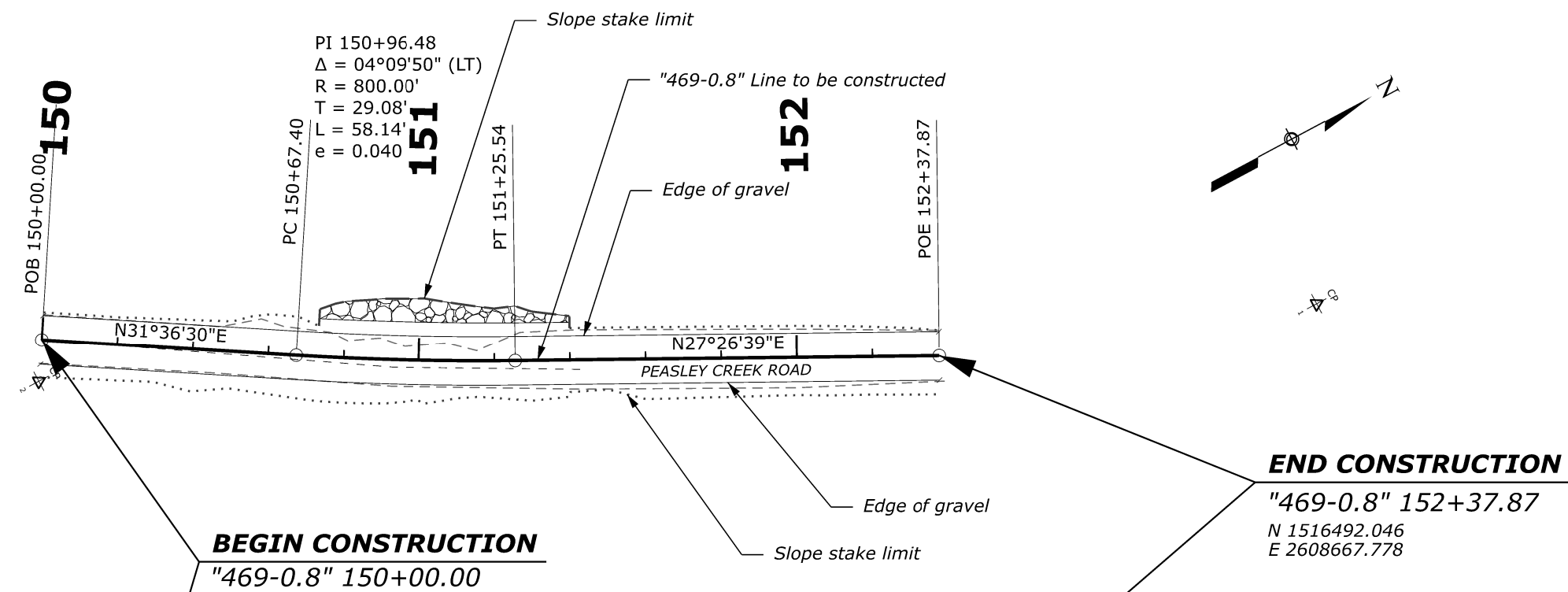
CONNECTION DETAILS

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	D.4



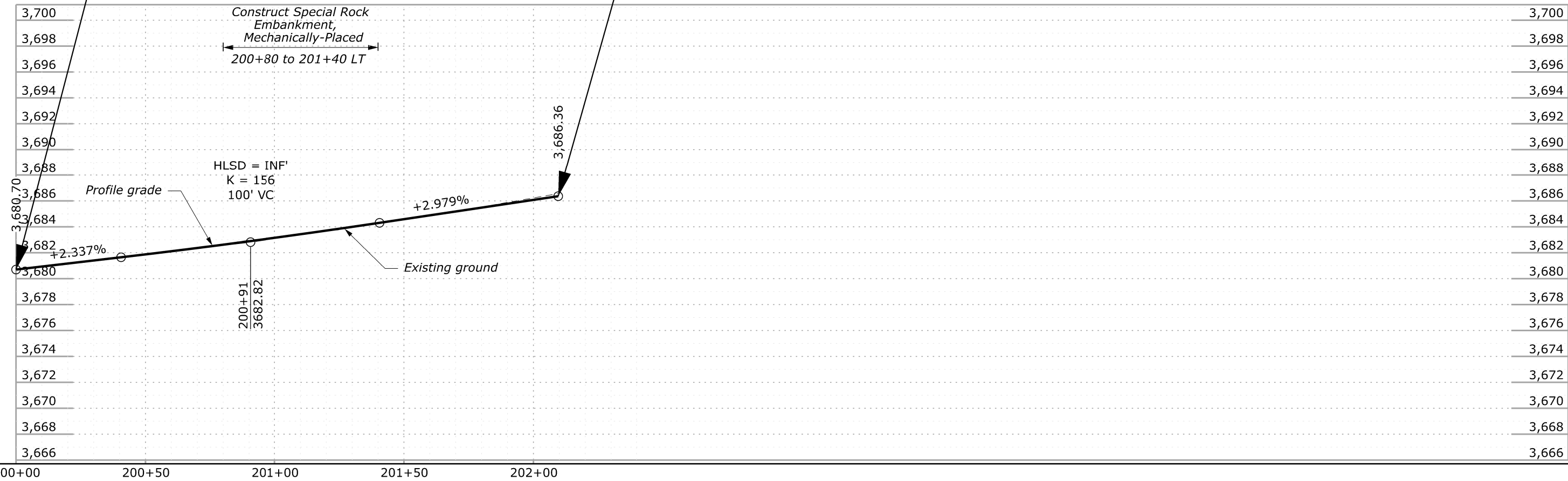
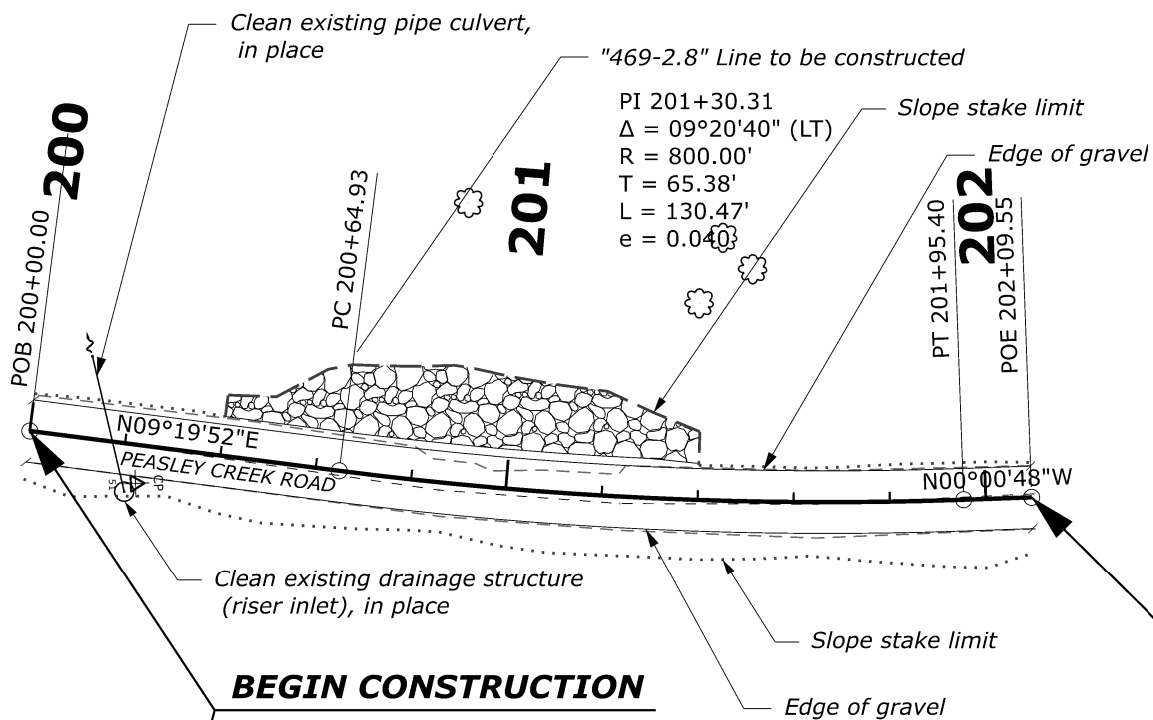
**PLAN AND PROFILE**  
**FSR 354 - MP 13.6**

STATE	PROJECT	SHEET
ID	ERFO FS NEZPR117 2019-1(1)	NUMBER D.5



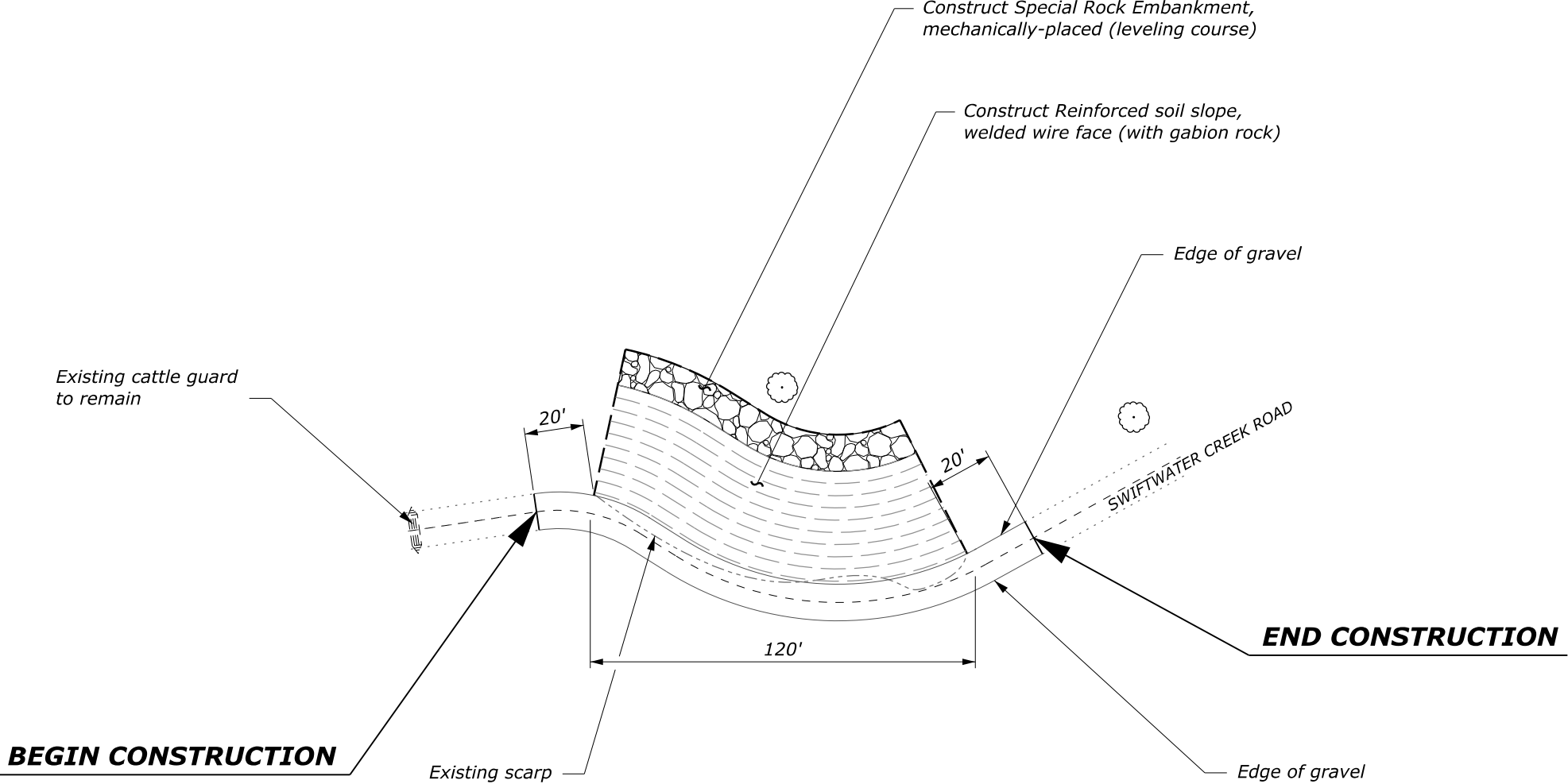
**PLAN AND PROFILE**  
**FSR 469 - MP 0.8**

STATE	PROJECT	SHEET
ID	ERFO FS NEZPR117 2019-1(1)	NUMBER
		D.6



**PLAN AND PROFILE**  
**FSR 469 - MP 2.8**

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	D.7



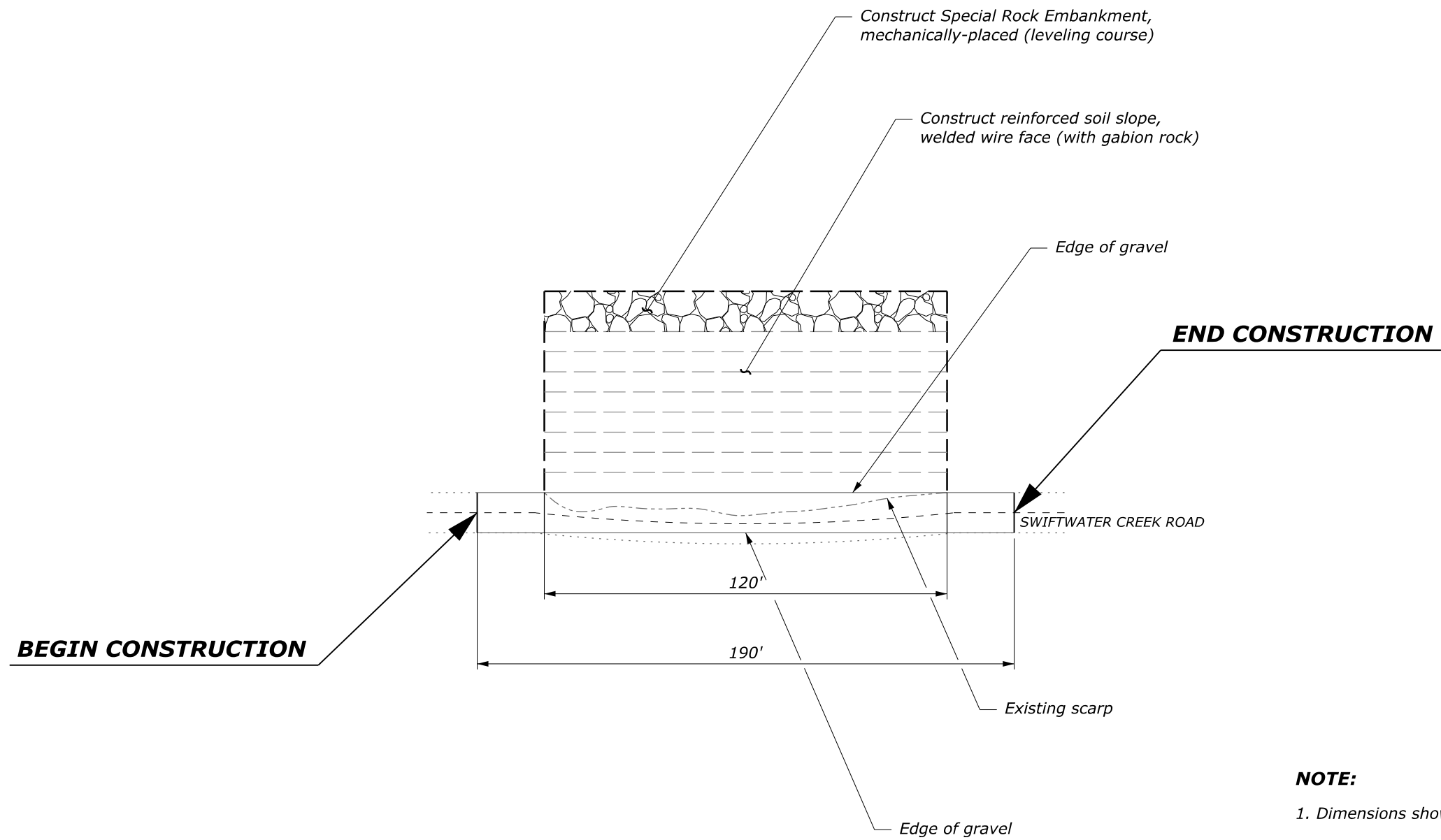
- NOTES:**
1. Dimensions shown are approximate.
  2. Begin Construction and End Construction points will be determined in the field by the CO.

NO SCALE

**PLAN**  
**FSR 470 - MP 2.36**



STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	D.8



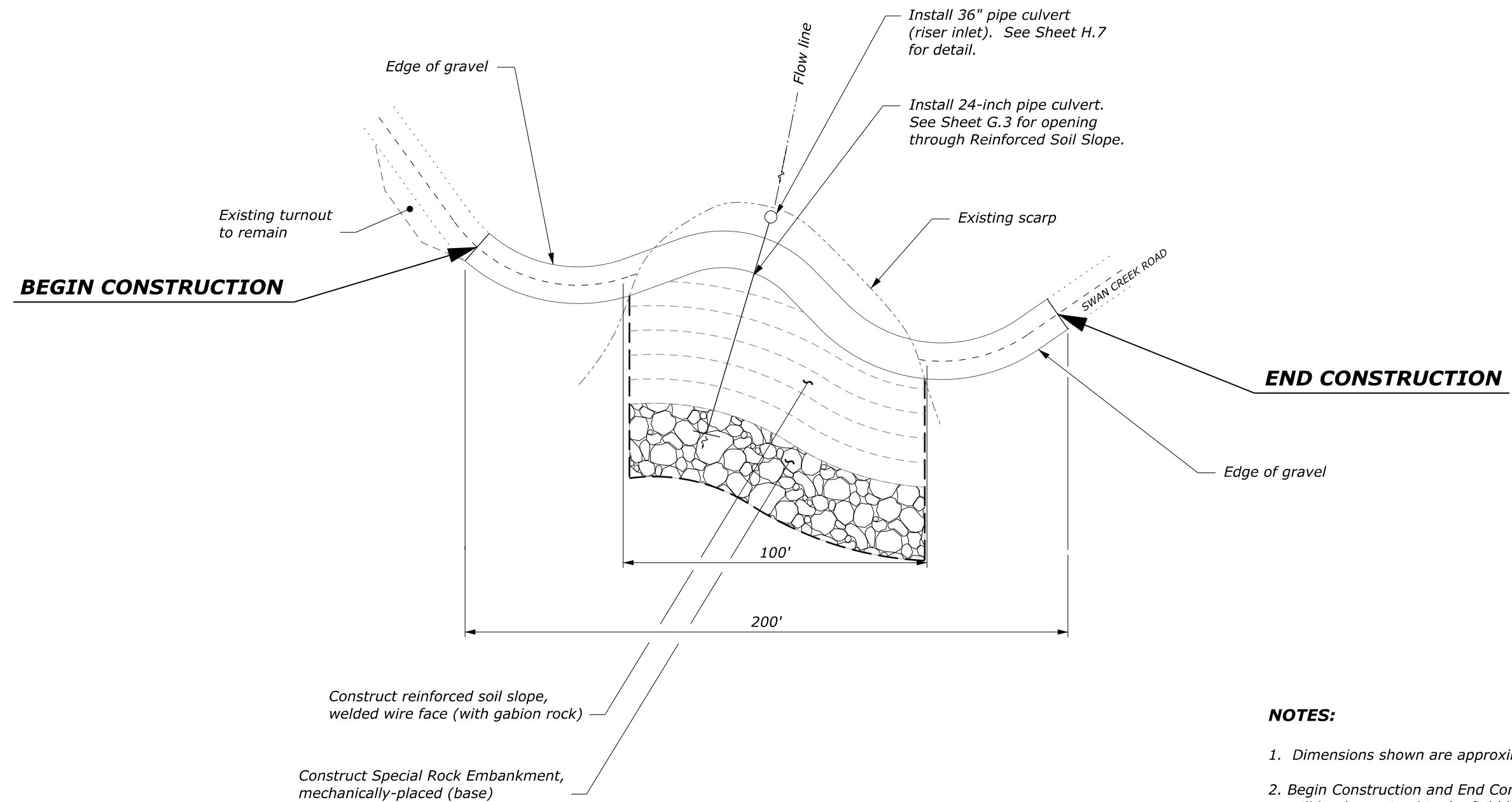
**NOTE:**

1. Dimensions shown are approximate.
2. Begin Construction and End Constructions points will be determined in the field by the CO.

NO SCALE

**PLAN**  
**FSR 470 - MP 2.52**

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	D.9



**NOTES:**

1. Dimensions shown are approximate.
2. Begin Construction and End Construction points will be determined in the field by the CO.

NO SCALE

**PLAN**  
**FSR 5503 - MP 1.28**

25-Apr-2023 9:18 AM

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Designed by:

A. Designer

Checked by:

D. Checker

--/----

PROJECT :Nez Perce 2019 ERFO

DATE OF FIELD WORK :Multiple entries

PROJECT UNITS : US survey foot

COORDINATE SYSTEM : Assumed (scaled to resemble Idaho West State Plane)

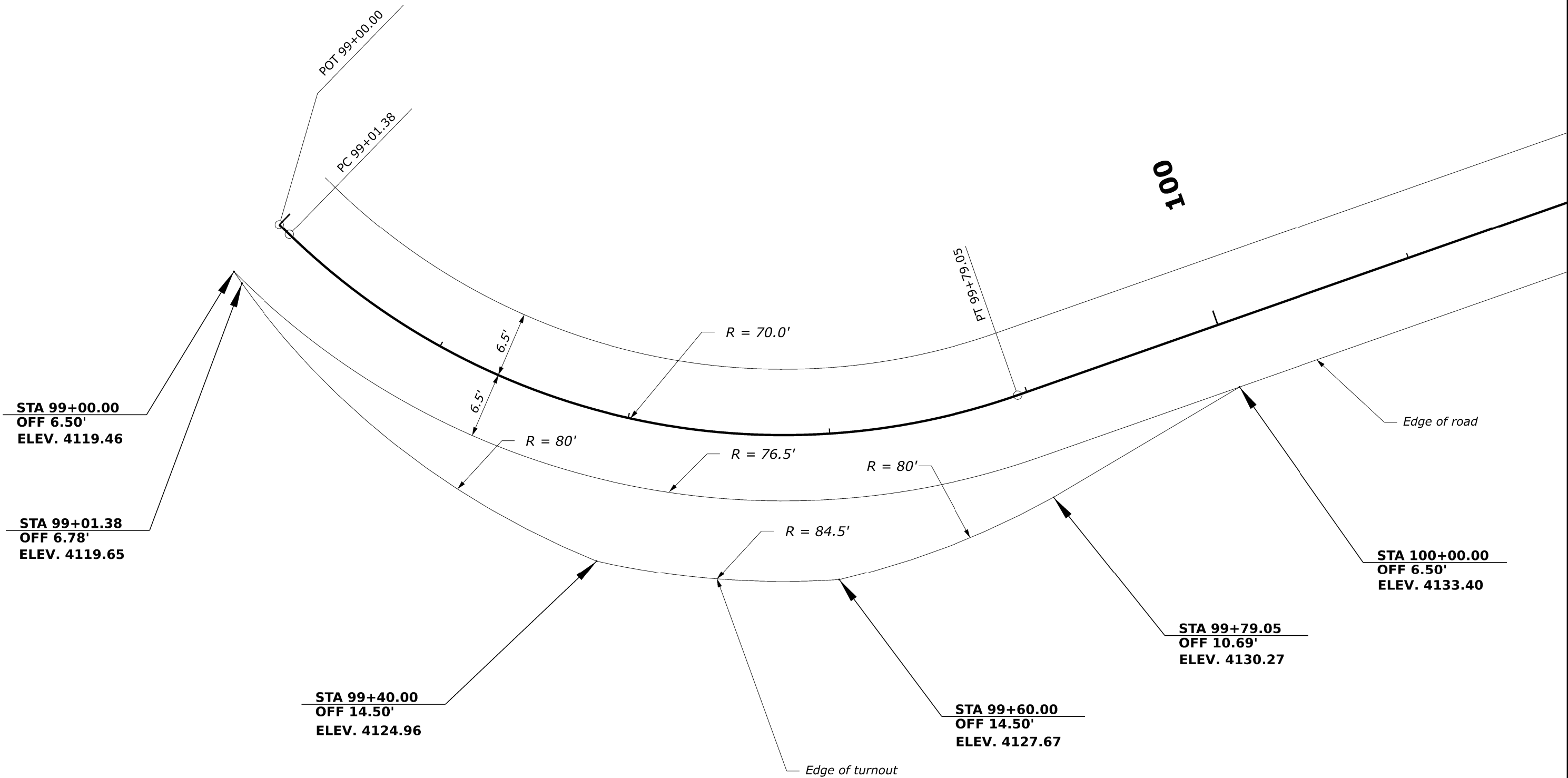
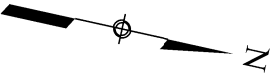
VERTICAL DATUM : Assumed

POINT NUMBER	PROJECT COORDINATES			DESCRIPTION
	NORTH	EAST	ELEVATION	
	Peasley FSR 469 mp.8			
1	1516586.466	2608702.512	3216.209	JUB cap
2	1516278.491	2608561.410	3190.000	JUB cap
	Peasley FSR 469 mp 2.8			
50	1526452.603	2610741.989	3691.918	JUB cap
51	1526108.854	2610740.054	3681.000	JUB cap
	Slate Creek FSR 354 mp 13.6			
CP1	1444432.416	2546688.908	4129.000	JUB cap
CP2	1444633.363	2546586.520	4157.902	JUB cap
CP3	1444673.784	2546626.565	4163.340	JUB cap

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	D.10

SURVEY CONTROL

STATE	PROJECT	SHEET
ID	ERFO FS NEZPR117 2019-1(1)	NUMBER
		E.1



FSR 354 MP 13.6

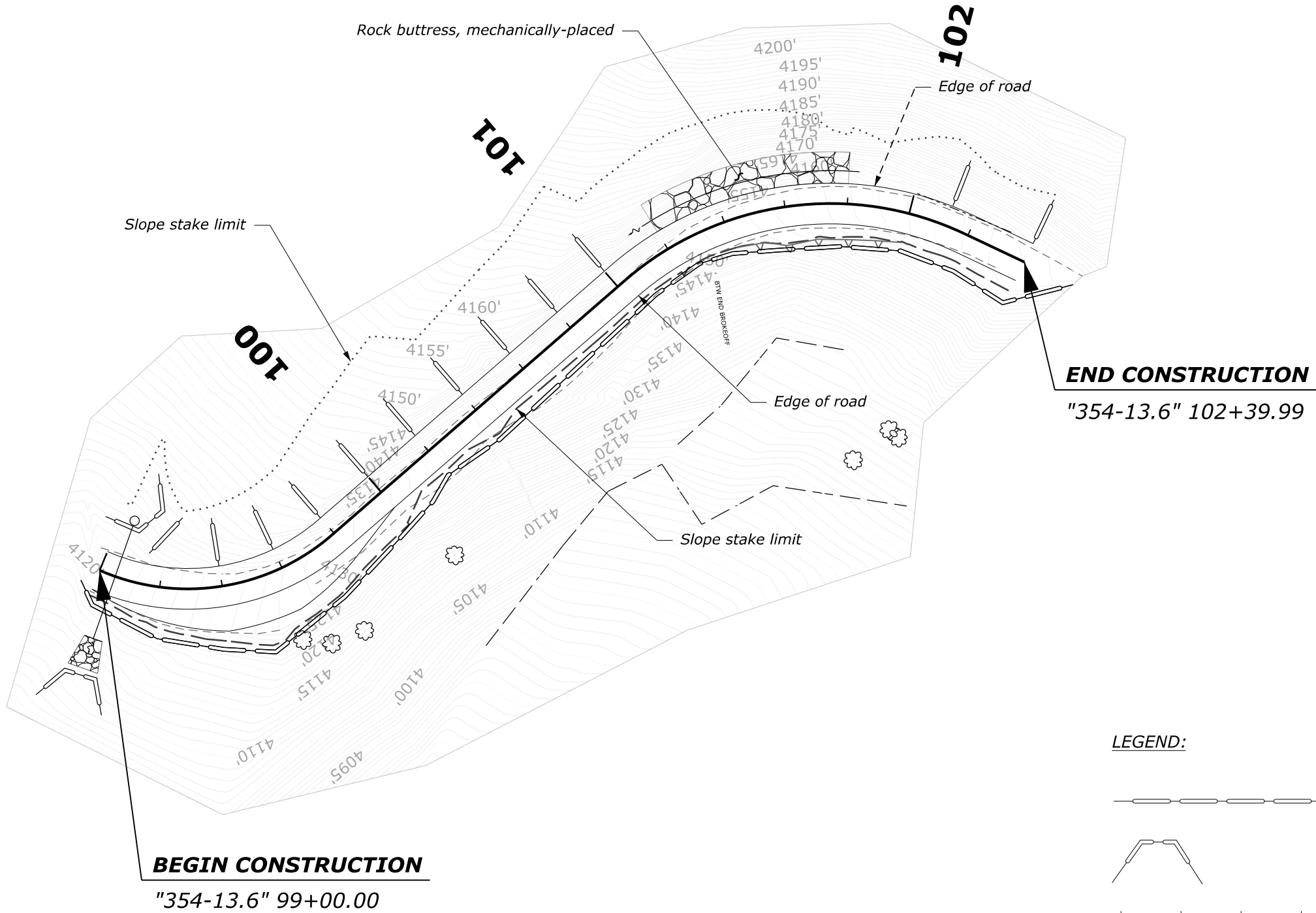
TURNOUT LAYOUT

21 April 2023 1:31 PM

## TURNOUT LAYOUT FSR 354 MP 13.6

TABULATION OF EROSION CONTROL QUANTITIES				
SITE	15703-1500 SOIL EROSION CONTROL, TEMPORARY SOIL TACKIFIER (ACRE)	15705-1400 SOIL EROSION CONTROL, FIBER ROLL (AT INLET AND OUTLET) (LNFT)	15705-1400 SOIL EROSION CONTROL, FIBER ROLL (LNFT)	15706-0200 SOIL EROSION CONTROL, CHECK DAMS (FIBER ROLL) (EACH)
FSR 354 MP 13.6	0.3	20	380	12
FSR 469 MP 0.8	0.1	---	250	6
FSR 469 MP 2.8	0.1	20	240	3
FSR 470 MP 2.36	0.2	---	260	4
FSR 470 MP 2.52	0.2	---	220	3
FSR 5503 MP 1.28	0.2	10	320	4
TOTAL	1.1	50	1670	32

STATE	PROJECT	SHEET
ID	ERFO FS NEZPR117 2019-1(1)	NUMBER F.2

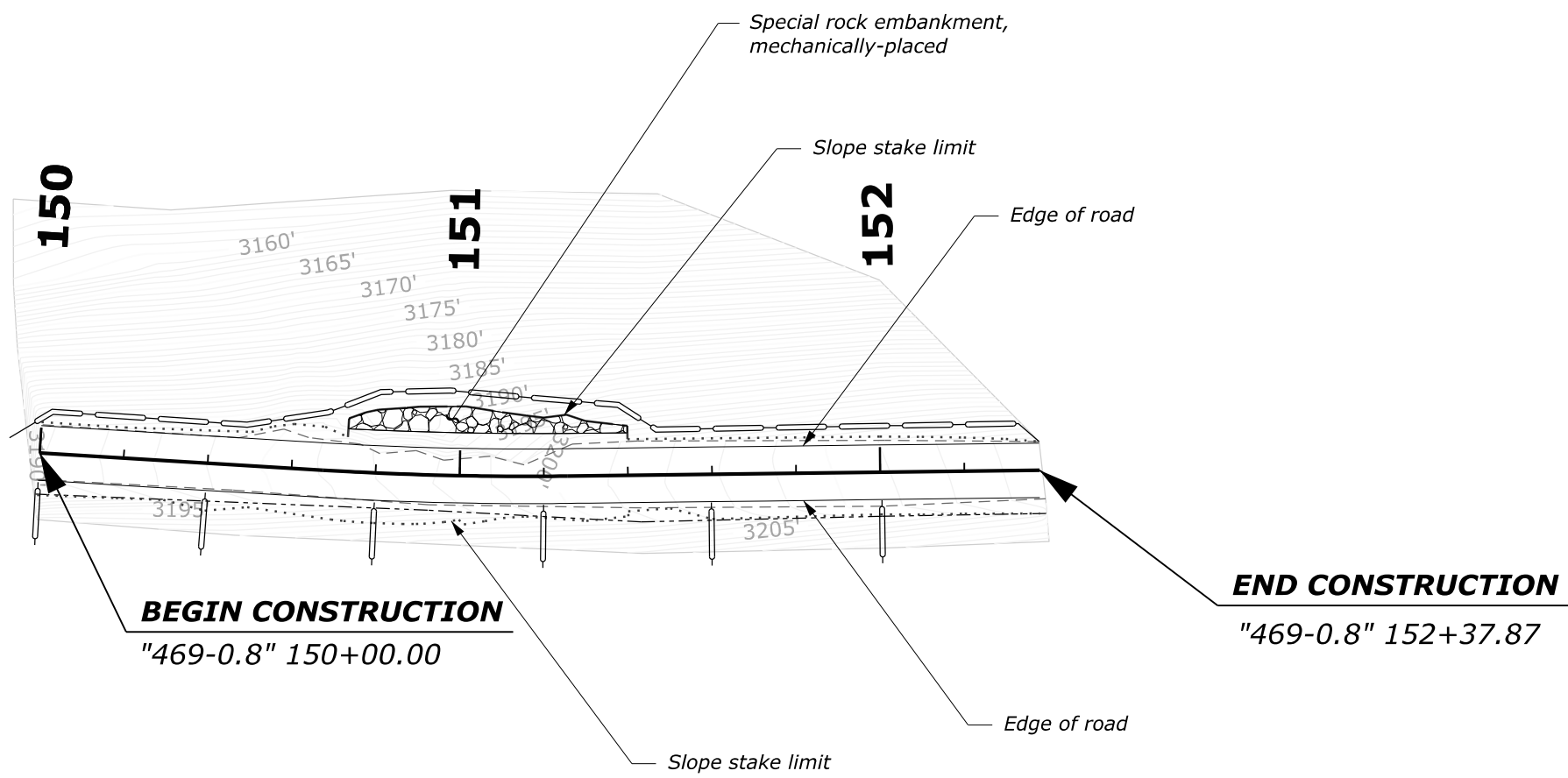


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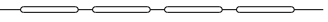
- Soil Erosion Control, Fiber Roll
- Soil Erosion Control, Fiber Roll (at inlet and outlet)
- Soil Erosion Control, Check Dams (Fiber Roll)

**EROSION CONTROL PLAN  
FSR 354 MP 13.6**

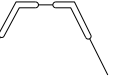
STATE	PROJECT	SHEET
ID	ERFO FS NEZPR117 2019-1(1)	NUMBER F.3



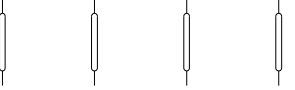
**LEGEND:**



Soil Erosion Control, Fiber Roll



Soil Erosion Control, Fiber Roll  
(at inlet and outlet)

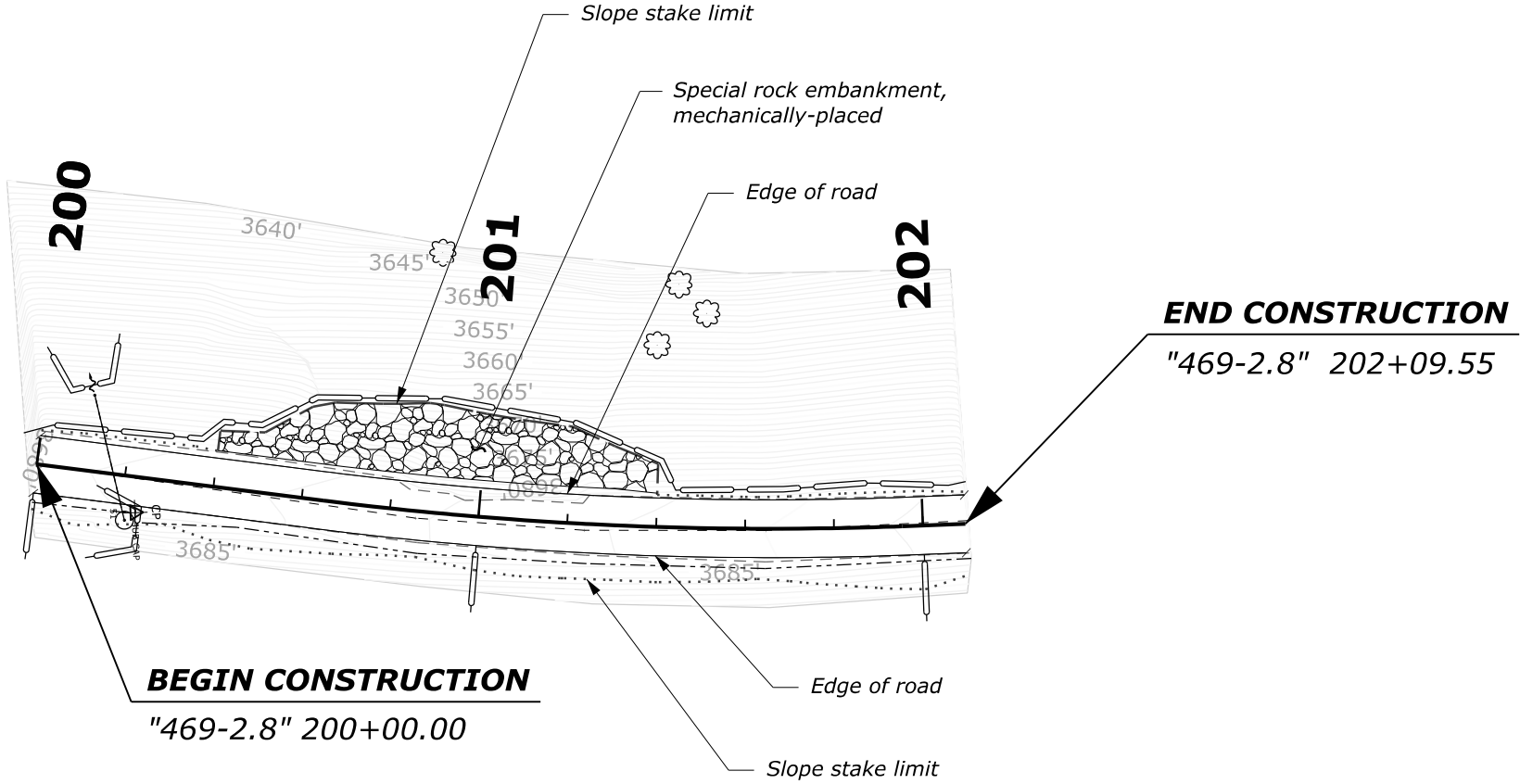


Soil Erosion Control, Check Dams  
(Fiber Roll)

**EROSION CONTROL PLAN**  
**FSR 469 MP 0.8**



STATE	PROJECT	SHEET
ID	ERFO FS NEZPR117 2019-1(1)	NUMBER F.4

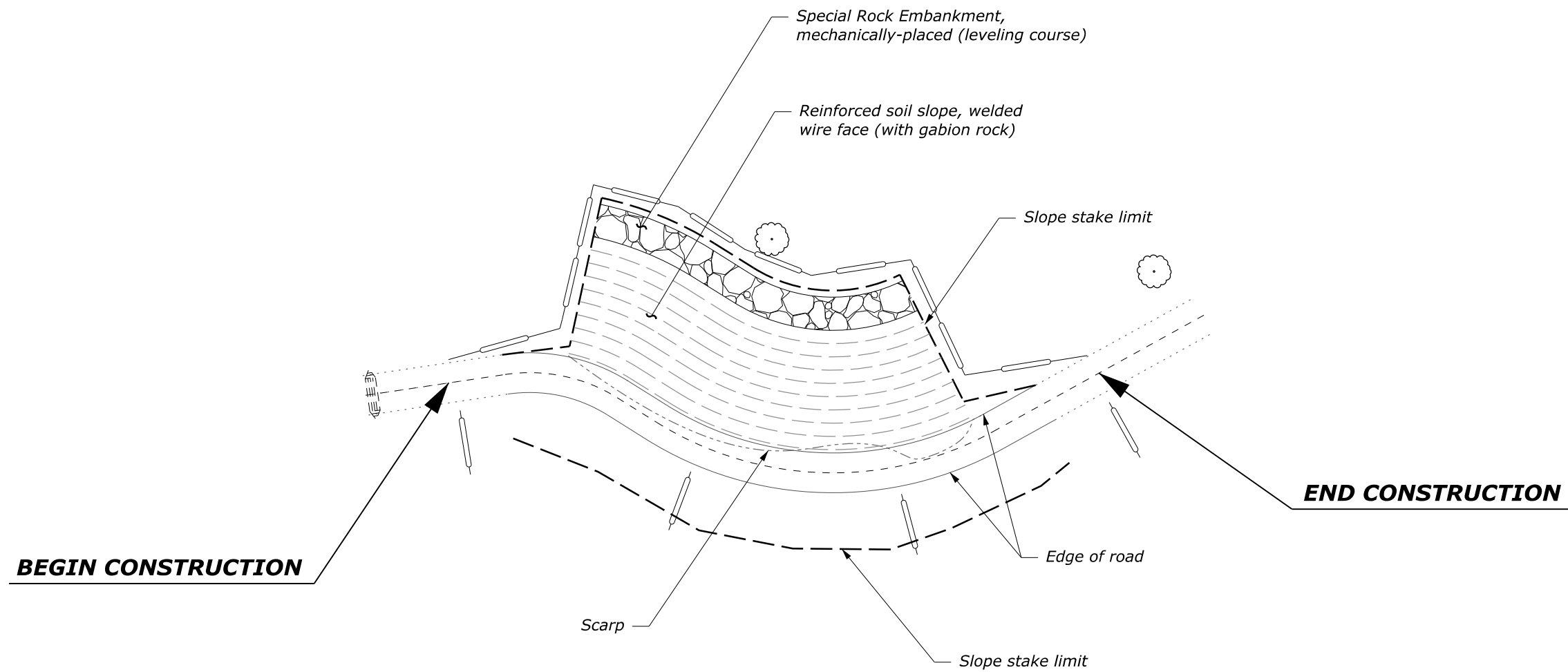


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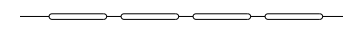
- Soil Erosion Control, Fiber Roll
- Soil Erosion Control, Fiber Roll (at inlet and outlet)
- Soil Erosion Control, Check Dams (Fiber Roll)

**EROSION CONTROL PLAN  
FSR 469 MP 2.8**

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	F.5



**LEGEND:**



Soil Erosion Control, Fiber Roll



Soil Erosion Control, Fiber Roll  
(at inlet and outlet)

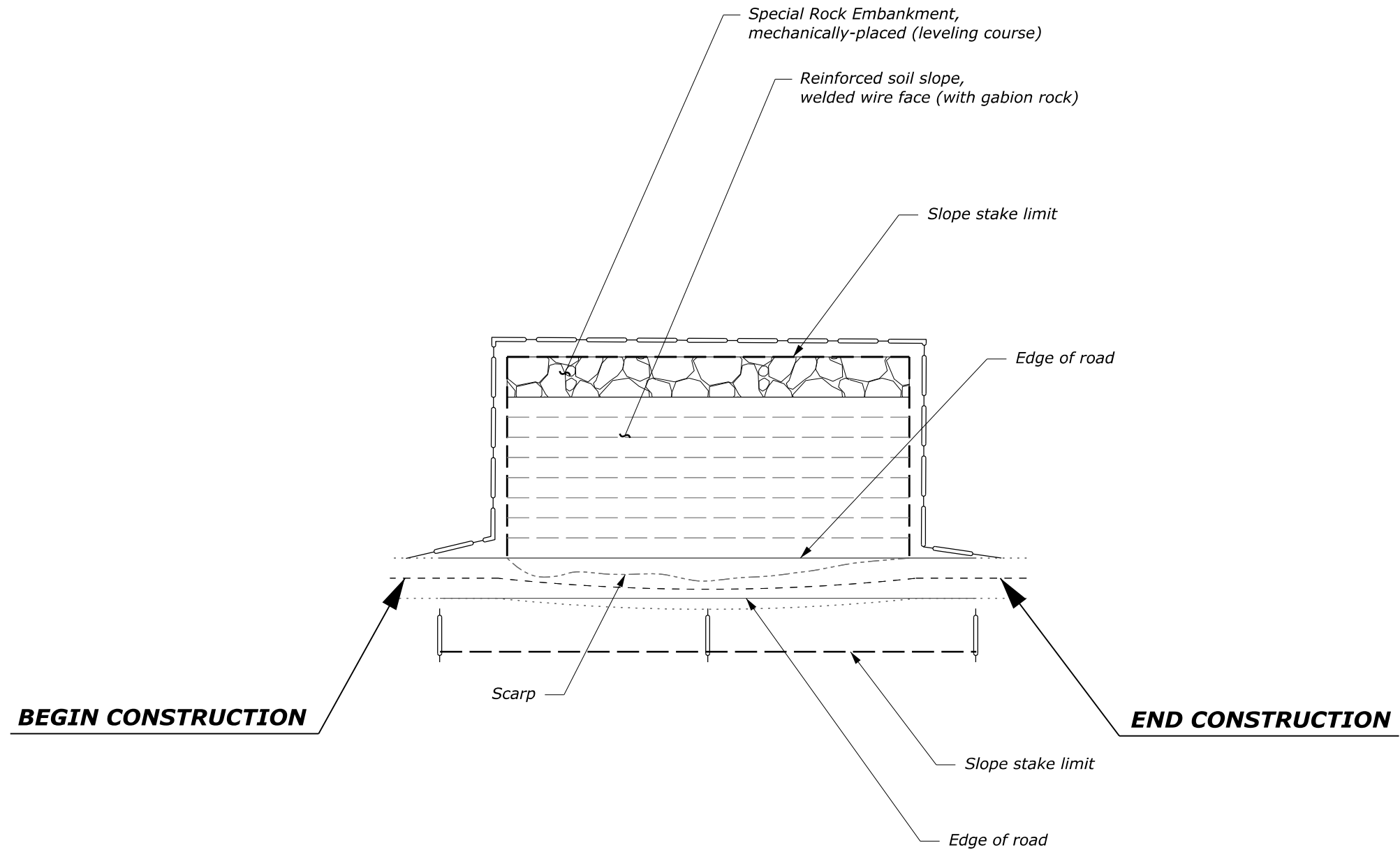


Soil Erosion Control, Check Dams  
(Fiber Roll)

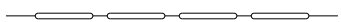
**EROSION CONTROL PLAN  
FSR 470 MP 2.36**

c:\pw-work\0551150\id-ef1901101\_fbe.dgn [EROSION CONTROL PLAN] FSR 470 MP 2.52] 24 April 2023 10:31 AM

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	F.6



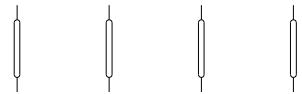
LEGEND:



Soil Erosion Control, Fiber Roll



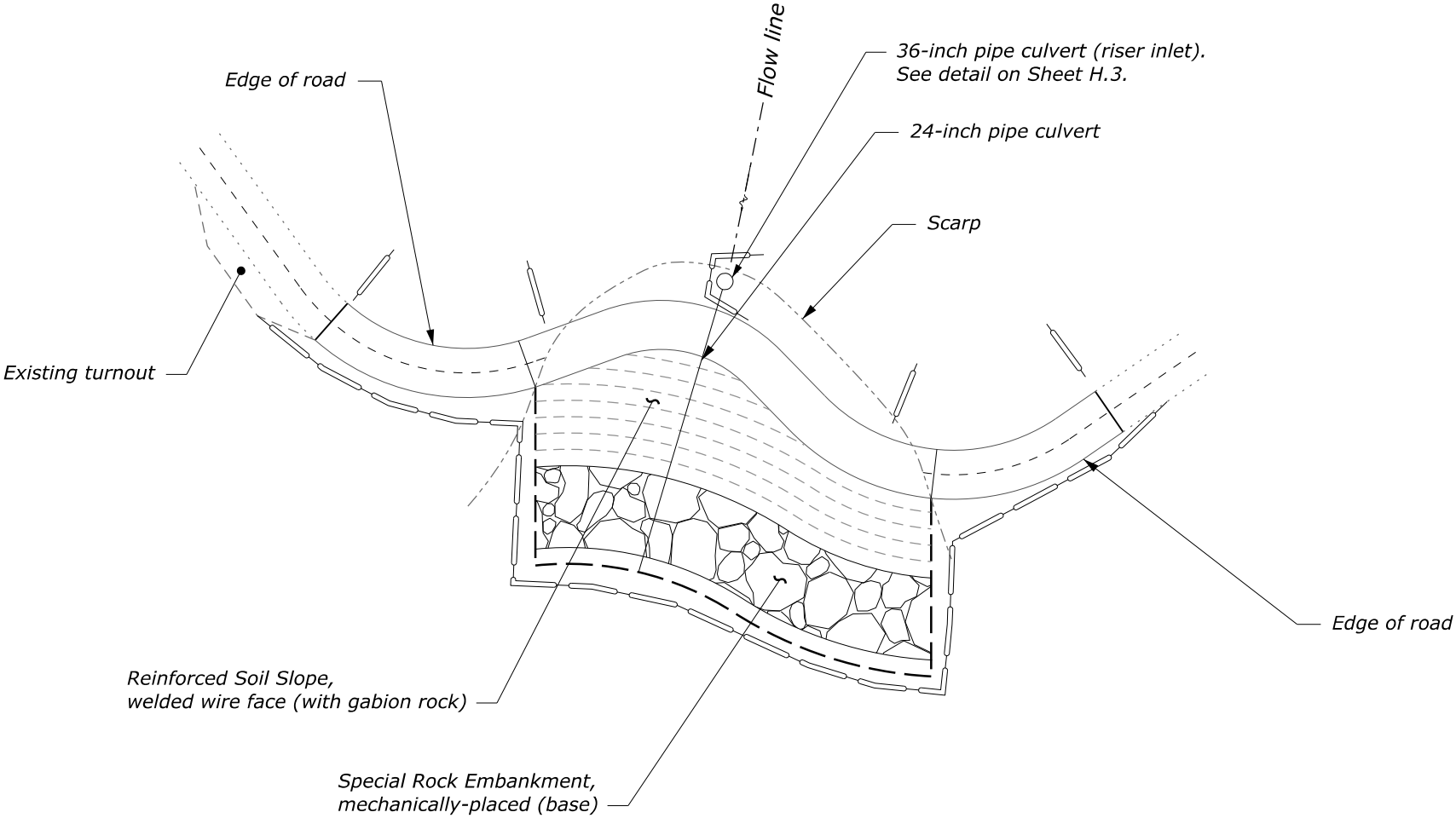
Soil Erosion Control, Fiber Roll  
(at inlet and outlet)



Soil Erosion Control, Check Dams  
(Fiber Roll)

**EROSION CONTROL PLAN  
FSR 470 MP 2.52**

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	F.7



**LEGEND:**

Soil Erosion Control, Fiber Roll

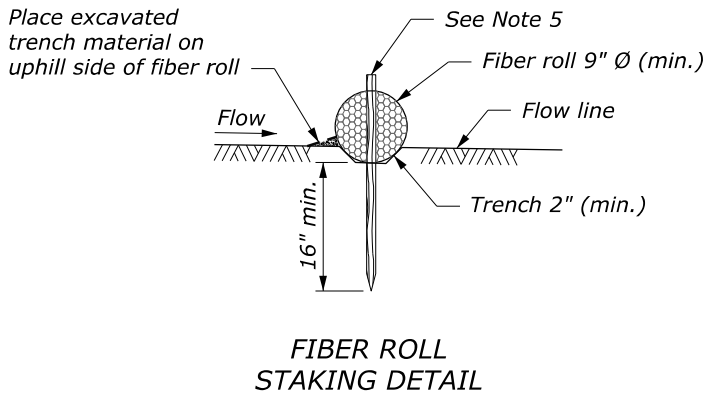
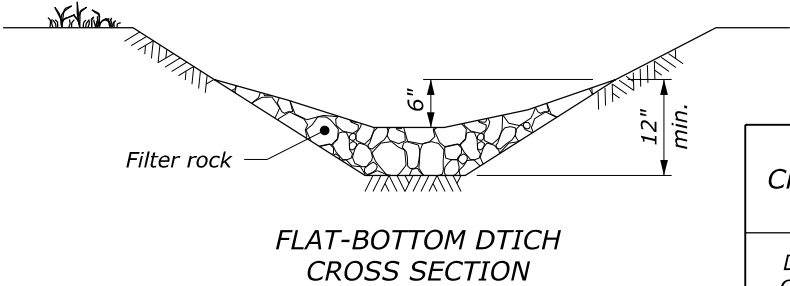
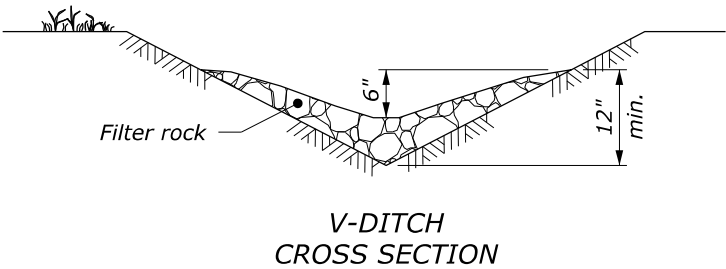
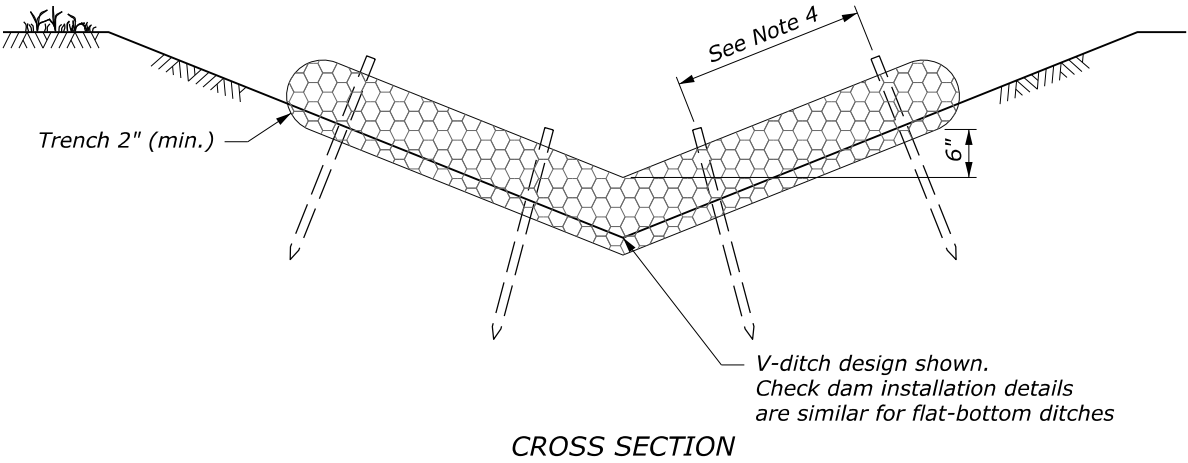
Soil Erosion Control, Fiber Roll  
(at inlet and outlet)

Soil Erosion Control, Check Dams  
(Fiber Roll)

**EROSION CONTROL PLAN  
FSR 5503 MP 1.28**

NOTE:

- Construct check dams from fiber rolls, filter rock, or gravel bags as approved by the CO, to meet the functional requirements of the check dam device.
- Repair all rills or gullies and properly compact prior to installation.
- Install check dams in ditches perpendicular to the flowline.
- Stake fiber rolls in place with 1½-inch x 1⅛-inch wood stakes. Drive stakes at each end of the fiber roll and at 2-foot (max.) spacing.
- Drive stakes into undisturbed soil of trench bottom. Expose stakes 2-inches (min.) above top of fiber roll.
- Provide sufficient length to prevent water from flowing around the ends of the fiber roll.
- Adjust check dam spacing based on site-specific conditions.



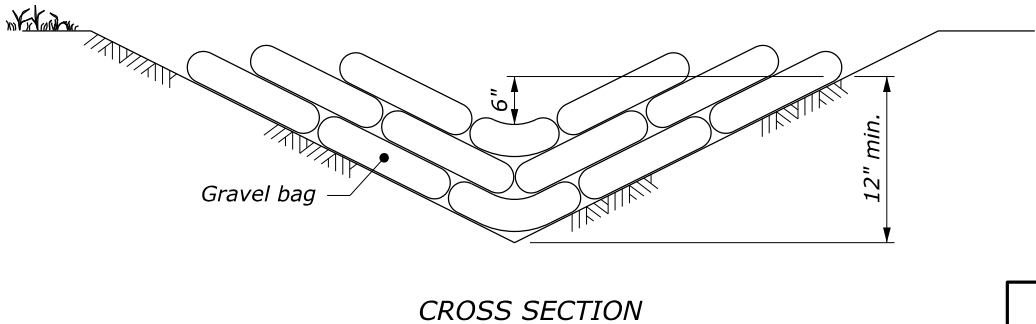
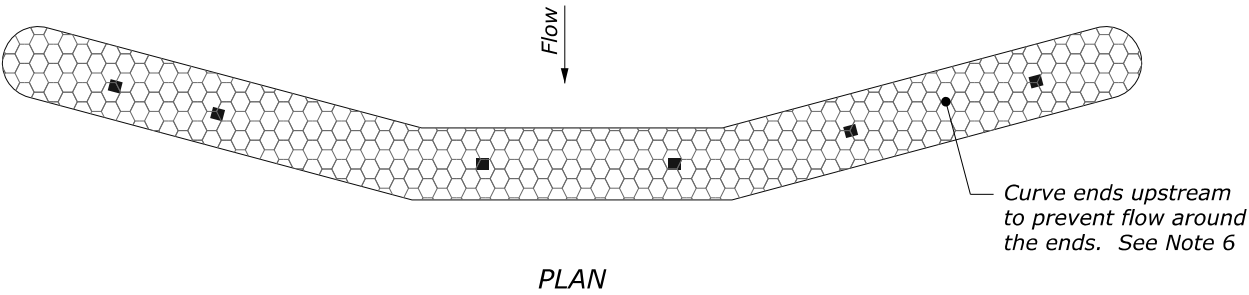
FIBER ROLL CHECK DAM SPACING* (See Note 7)	
DITCH GRADE	CHECK DAM SPACING (max.) (FT)
2%	150
3%	100
4%	80
5%	60

\* Spacing calculated based on 9" Ø minimum fiber roll.  
Do not use fiber roll check dams on ditch grades steeper than 5%.

FILTER ROCK CHECK DAM SPACING (See Note 7)	
DITCH GRADE	CHECK DAM SPACING (max.) (FT)
2%	150
3%	100
4%	80
5%	60
6%	50

GRAVEL BAG CHECK DAM SPACING* (See Note 7)	
DITCH GRADE	CHECK DAM SPACING (max.) (FT)
2%	150
3%	100
4%	80
5%	60
6%	50

\* Do not use gravel bag check dams on ditch grades steeper than 6%.



U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION  
OFFICE OF FEDERAL LANDS HIGHWAY

WFLHD DETAIL

CHECK DAM  
MODERATE GRADES

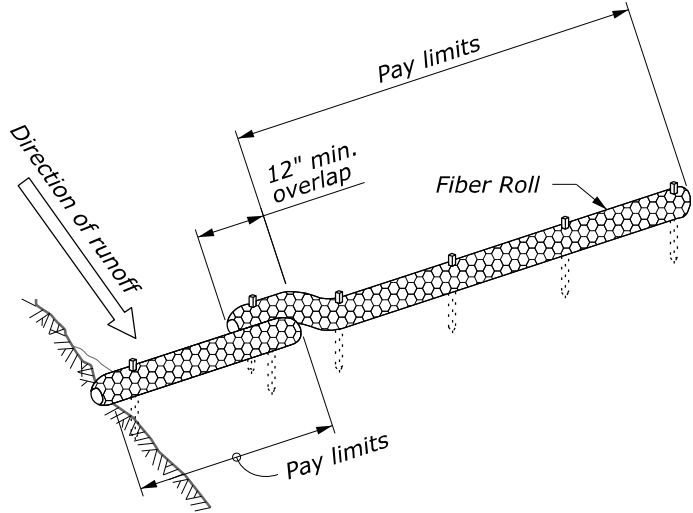
DETAIL APPROVED FOR USE --/----  
REVISED: 7/2016

DETAIL  
W157-15

NO SCALE

NOTE:

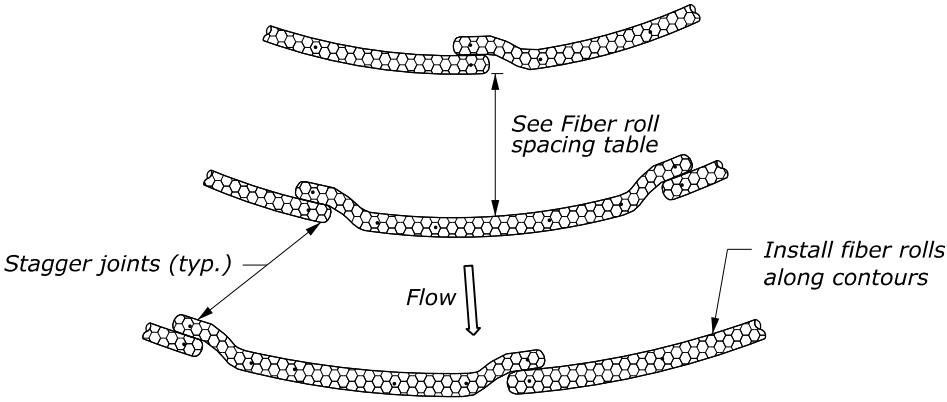
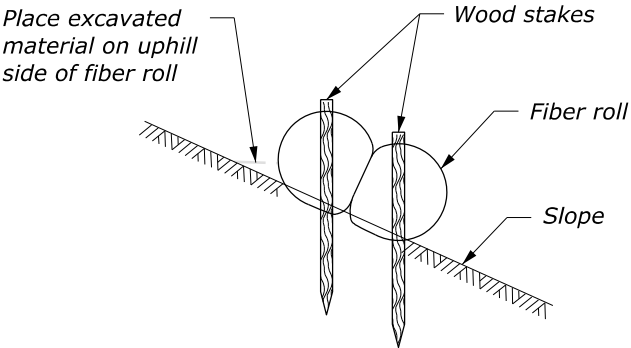
1. Repair all rills or gullies and properly compact prior to installation.
2. Install fiber rolls along slope contours. For any 20' section of fiber roll, do not allow the fiber roll to vary more than 5% from level.
3. Stake fiber rolls in place with 1 "x 1" or 1" Ø wood stakes. Space stakes 4' o.c. max. on slopes and 2' o.c. max. culverts. Stake fiber rolls 6-inches from each end.
4. Drive stakes into undisturbed soil at least 12" deep. Expose stakes 2" above top of fiber roll.
5. For fiber rolls on bare soil, construct trenches parallel to the contour. Place fiber rolls in continuous contact with trench bottom and sides. Tamp soil backfill against upstream side of fiber roll to ensure storm water is forced to flow through fiber roll rather than under it.
6. Place fiber rolls all the way around the inlet when the disturbance is on both the road and around the culvert and all water entering the culvert is crossing the disturbance.



FIBER ROLL SPACING TABLE*	
Slope Gradient	9" Ø Fiber Roll Maximum spacing (ft)
1V:4H or flatter	60
Between 1V:4H and 1V:3H	45
Between 1V:3H and 1V:2H	30
1V:2H and steeper	15

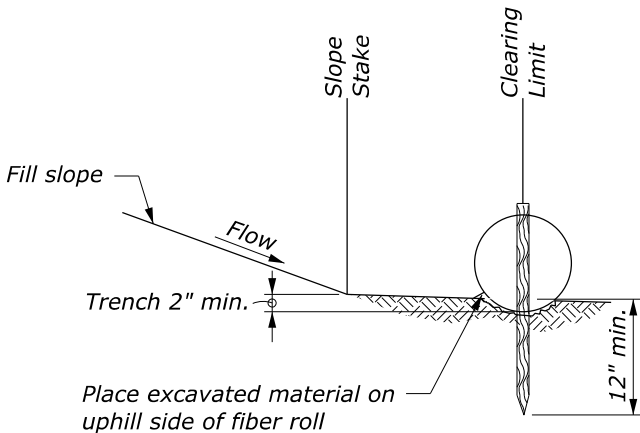
\*Approximate spacing shown. Adjust spacing as needed dut to project-specific conditions.

FIBER ROLL JOINT DETAIL

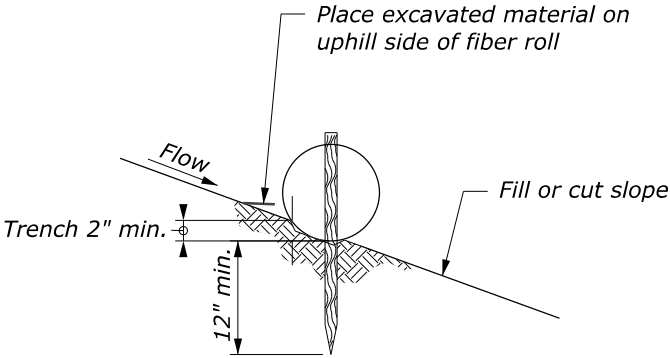


FIBER ROLL SLOPE LAYOUT

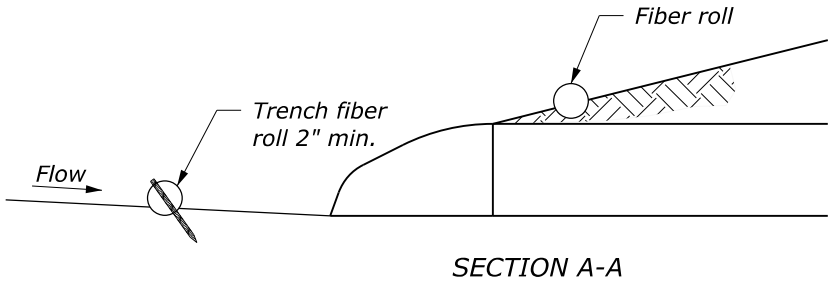
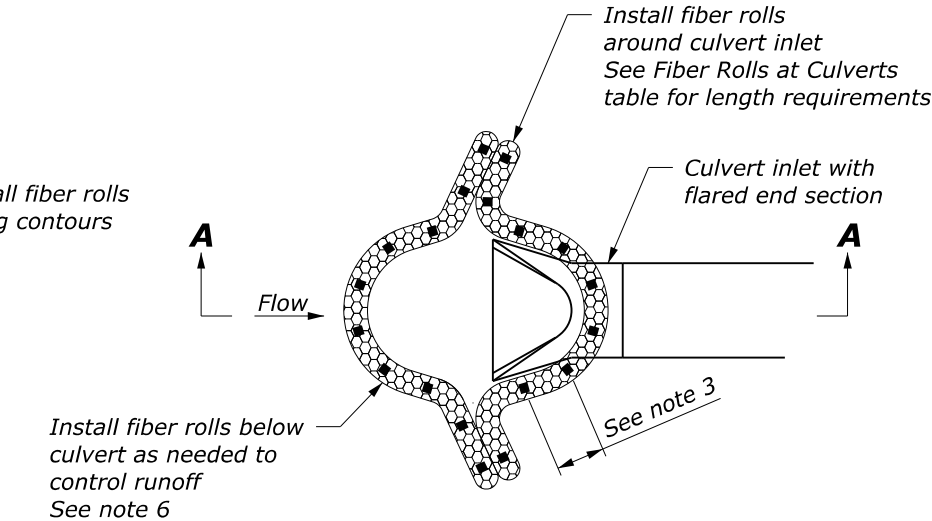
FIBER ROLL LAPPING DETAIL



FIBER ROLL AS PERIMETER CONTROL  
INSTALLATION DETAIL



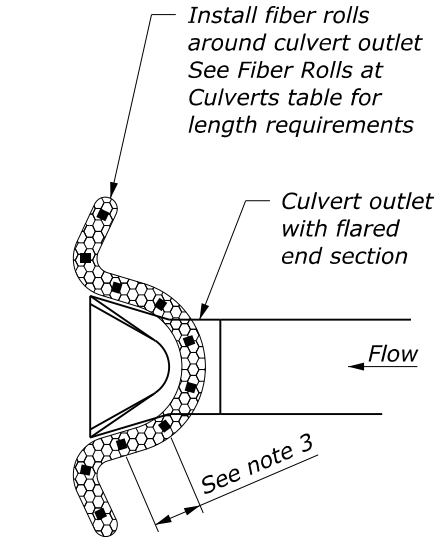
STAKE DETAIL



FIBER ROLL  
AT CULVERT INLET

FIBER ROLL AT CULVERTS*	
Culvert Size	9" Ø Fiber Roll length (ft)
24" or smaller	10
30" to 48"	20
54" or larger	30

\*Approximate length shown for rolls across the top of the culvert inlet only. Adjust length as needed due to project-specific conditions.



FIBER ROLL  
AT CULVERT OUTLET

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION  
FEDERAL HIGHWAY ADMINISTRATION  
CENTRAL FEDERAL LANDS HIGHWAY DIVISION

CFLHD DETAIL

FIBER ROLL

DETAIL APPROVED FOR USE 01/2011  
REVISED: 12/2017 09/2020

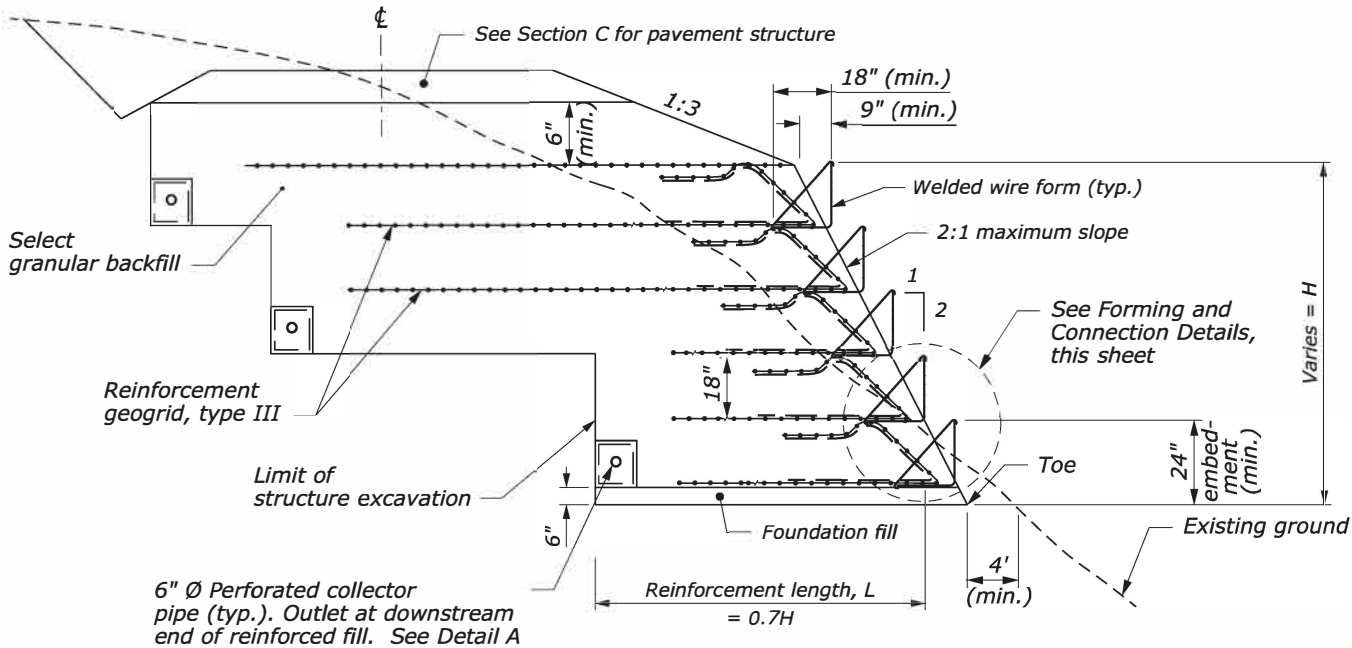
DETAIL  
C157-55

REINFORCED SOIL SLOPE QUANTITIES						
RSS #	SITE	20802-0000 FOUNDATION FILL	25201-1000 SPECIAL ROCK EMBANKMENT, MECHANICALLY- PLACED	25701-0600 CONTRACTOR FURNISHED REINFORCED SOIL SLOPE DESIGN	26102-0000 REINFORCED SOIL SLOPE, WELDED WIRE FACE (WITH GABION ROCK)	26110-0000 SELECT GRANULAR BACKFILL
		(CUYD)	(CUYD)	(LPSM)	(LPSM)	(CUYD)
1	FSR 470 MP 2.36	30	120	ALL	ALL	500
2	FSR 470 MP 2.52	30	120	ALL	ALL	620
3	FSR 5503 MP 1.28	60	400	ALL	ALL	4,480
TOTAL		120	640	ALL	ALL	5,600

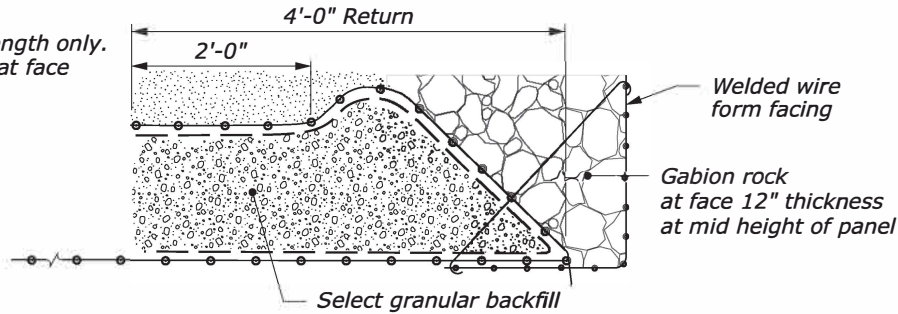


ESTIMATED REINFORCED SOIL SLOPE DATA			
SITE	ESTIMATED LENGTH (FT)	ESTIMATED AVERAGE HEIGHT "H" (FT)	ESTIMATED AREA OF FACE (SQFT)
FSR 470 MP 2.36	120	9	1080
FSR 470 MP 2.52	120	10.5	1250
FSR 5503 MP 1.28	100	29.4	2940

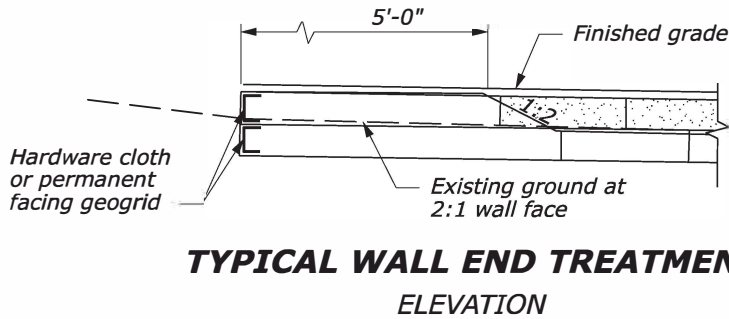
Note: Estimated area is derived from Forest Service damage report. Length and height were estimated by field observations.



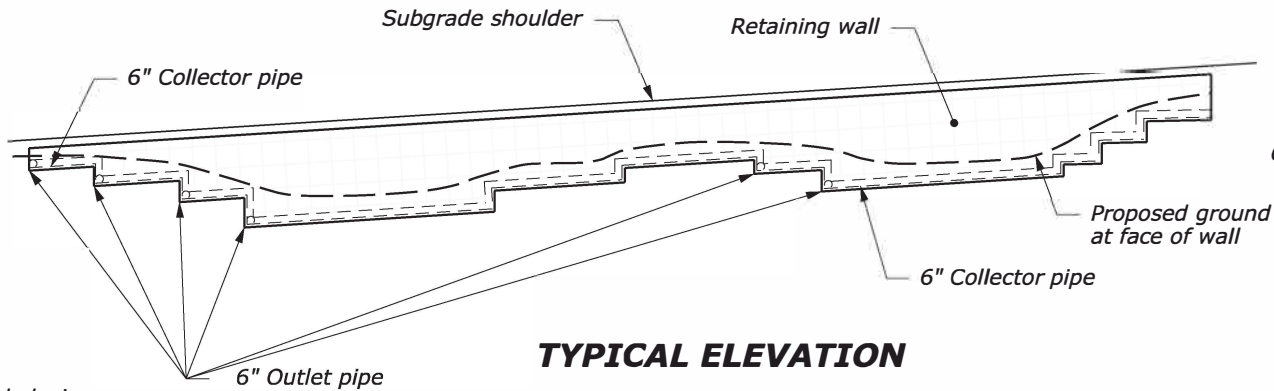
REINFORCED SOIL SLOPE, WELDED WIRE FORM FACE (WITH GABION ROCK)



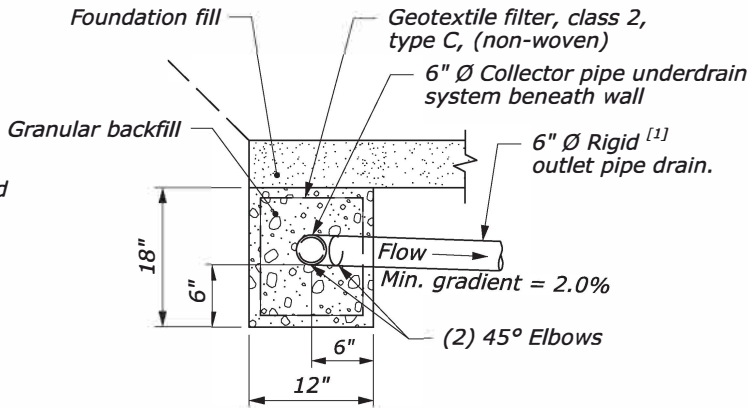
GABION ROCK FACING DETAIL



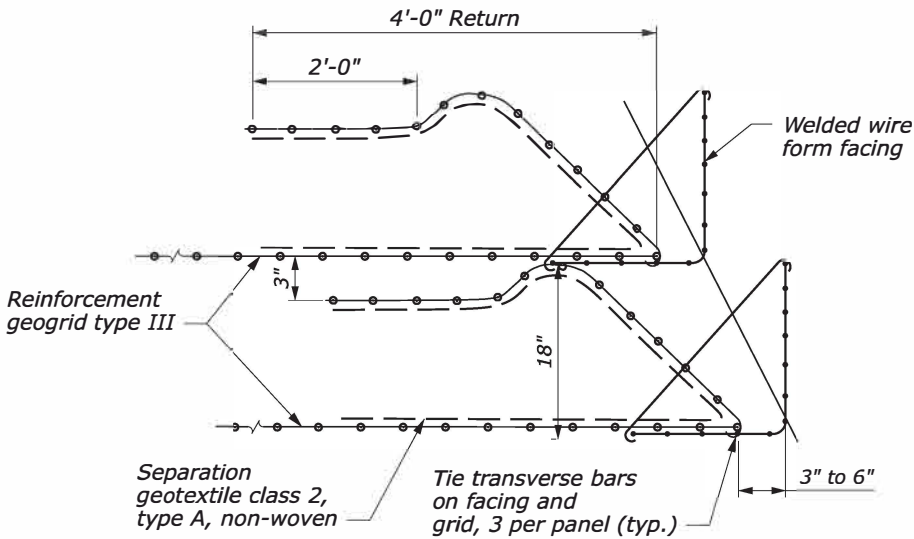
TYPICAL WALL END TREATMENT ELEVATION



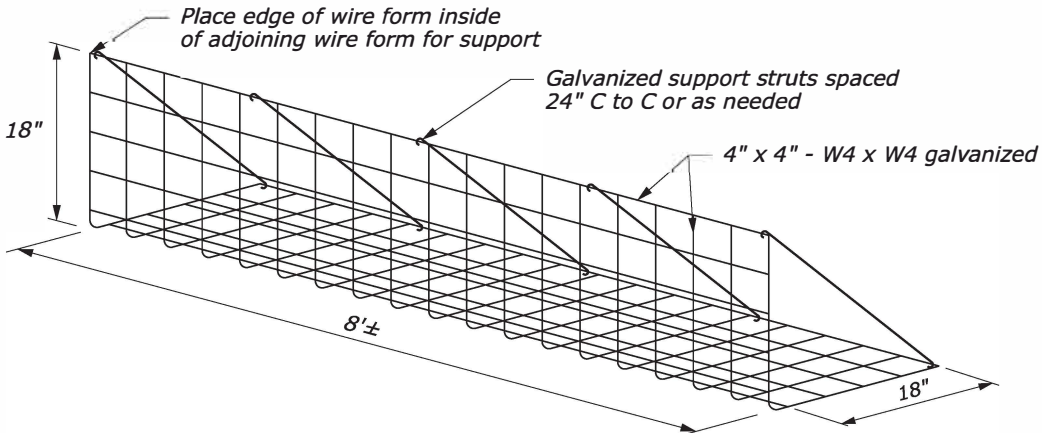
TYPICAL ELEVATION



PERFORATED PIPE UNDERDRAIN SYSTEM DETAIL A



TYPICAL CONNECTION DETAIL



WELDED WIRE FORM DETAIL

NOTE:

1. The details shown on this sheet are for information only. Heights and quantities are subject to field adjustment. Any increase in wall heights over those shown on the plans require investigation to determine that the safe bearing pressure is not exceeded.

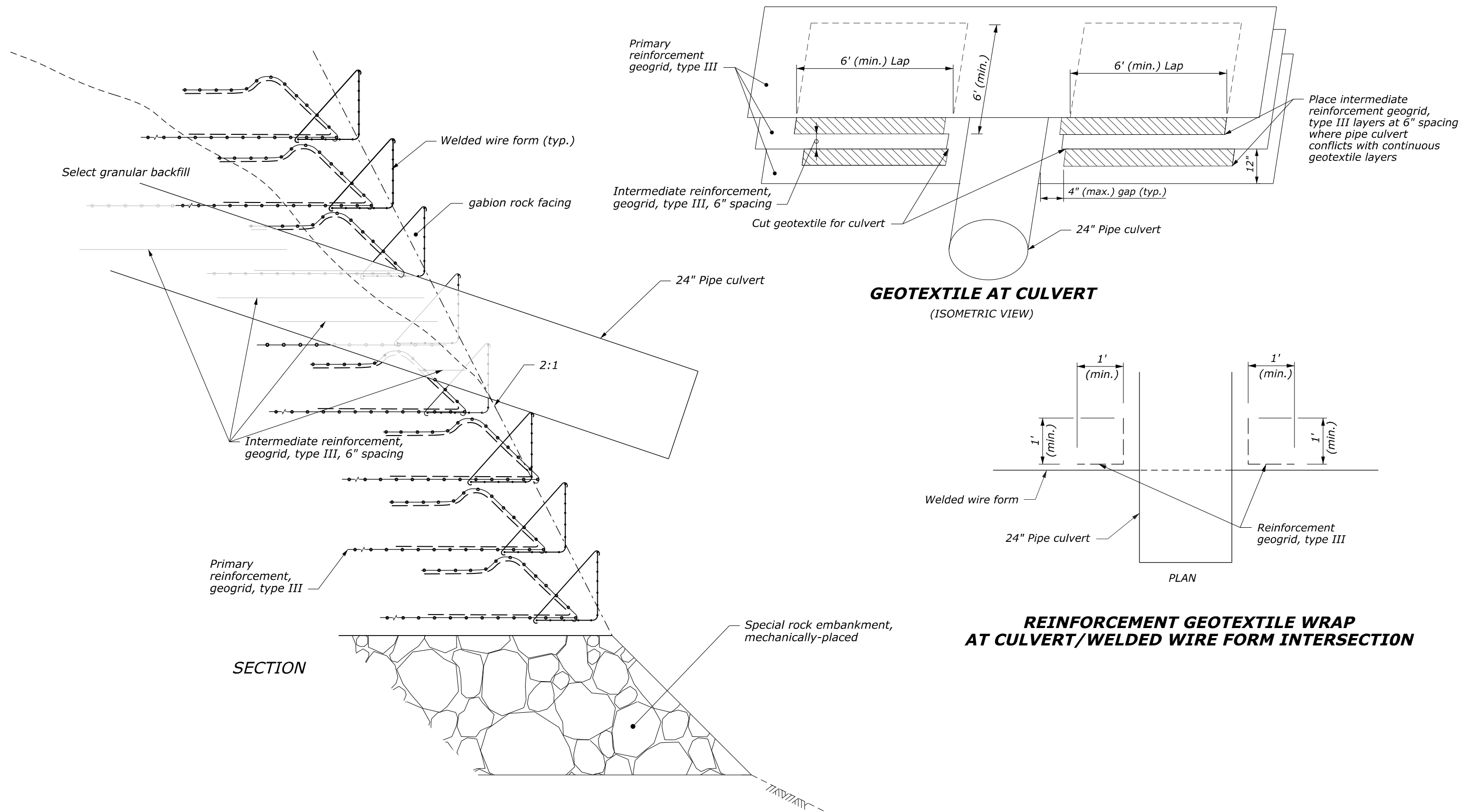
FOOTNOTE:

- [1] Locate end of outlet pipe a minimum of 30-feet from toe of reinforced soil slope. Mark end of outlet pipe with 4-foot long post or other suitable marker. Cover end of outlet pipe with rodent screen.

NO SCALE

REINFORCED SOIL SLOPE WITH WELDED WIRE FORM FACE DETAILS

STATE	PROJECT	SHEET
ID	ERFO FS NEZPR117 2019-1(1)	NUMBER G.3



NO SCALE

**CULVERT THROUGH  
REINFORCED SOIL SLOPE  
DETAILS**



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23 September 2022 1:54 PM

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	H.2

METAL ROUND PIPE CULVERT

FILL HEIGHT AND METAL THICKNESS TABLE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT

STEEL																
PIPE SIZE DIAMETER INCHES	MINIMUM COVER INCHES	2 <sup>2</sup> / <sub>3</sub> " x 1 <sup>1</sup> / <sub>2</sub> " CORRUGATIONS					3" x 1" CORRUGATIONS					5" x 1" CORRUGATIONS				
		METAL THICKNESS (INCH/GAGE)														
		0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.064/16	0.079/14	0.109/12	0.138/10	0.168/8
MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)																
12	12	100	100	100	100	100										
15	12	100	100	100	100	100										
18	12	100	100	100	100	100										
21	12	100	100	100	100	100										
24	12	100	100	100	100	100										
30	12	85	100	100	100	100										
36	12	71	89	100	100	100	81	100	100	100	100					
42	12	61	76	100	100	100	70	87	100	100	100					
48	12	53	66	93	100	100	61	76	100	100	100	54	68	95	100	100
54	12		59	83	100	100	54	68	95	100	100	48	60	85	100	100
60	12			74	97	100	49	61	86	100	100	43	54	76	98	100
66	12				87	100	44	55	78	100	100	39	49	69	89	100
72	12				80	97	40	51	71	92	100	36	45	63	82	100
78	12					87	37	47	66	85	100	33	42	58	75	92
84	12					75	35	43	61	78	96	31	39	54	70	86
90	12						32	40	57	73	90	29	36	51	65	80
96	12							38	53	69	84		34	48	61	75
102	18							36	50	65	79		32	45	57	71
108	18								47	61	75			42	54	67
114	18								45	58	71			40	52	63
120	18								43	55	67			38	49	60
126	18									52	64				47	57
132	18									50	61				44	54
138	18									48	58				42	52
144	18										56					50

ALUMINUM													
PIPE SIZE  DIAMETER  INCHES	MINIMUM COVER  INCHES	2 $\frac{2}{3}$ " x $\frac{1}{2}$ " CORRUGATIONS					3" x 1" CORRUGATIONS						
		METAL THICKNESS (INCH/GAGE)											
		0.060/16	0.075/14	0.105/12	0.135/10	0.164/8	0.060/16	0.075/14	0.105/12	0.135/10	0.164/8		
		MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)											
12	12	100	100	100	100	100							
15	12	100	100	100	100	100							
18	12	100	100	100	100	100							
21	12	88	100	100	100	100							
24	12	77	97	100	100	100							
30	12	62	77	100	100	100	71	89	100	100	100		
36	12	52	64	90	100	100	59	74	100	100	100		
42	12	44	55	77	99	100	51	64	89	100	100		
48	12			67	87	100	44	56	78	100	100		
54	18			54	71	88	39	50	69	93	100		
60	18				57	72	35	45	62	83	98		
66	18					58	32	40	56	76	89		
72	18					45	30	37	55	70	82		
78	24							34	48	64	75		
84	24								44	59	70		
90	24								41	62	65		
96	24								38	51	61		
102	24									46	55		
108	24									42	50		
114	24										45		
120	24										40		

NOTE:

- When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
- Fill heights exceeding 100 feet require special analysis by the CO.
- The fill heights in the table are for helical lockseam and welded seam pipe only. Fill heights for culvert pipe with annular corrugations are more restrictive than those of helical lockseam and welded seam pipe. Obtain approval before furnishing annular corrugation pipe.
- Measure minimum cover from the top of the pipe culvert to the subgrade for flexible pavements, and to the top of the pavement for rigid pavements. Measure maximum fill height from the top of the pipe to the top of the pavement for both flexible and rigid pavement.

METAL PIPE ARCH CULVERT

FILL HEIGHT AND METAL THICKNESS TABLE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT

STEEL																
PIPE ARCH SIZE SPAN x RISE INCHES	EQUI- VALENT DIAMETER INCHES	MINIMUM CORNER RADIUS INCHES	MINIMUM COVER INCHES	2 <sup>2</sup> / <sub>3</sub> " x 1 <sup>1</sup> / <sub>2</sub> " CORRUGATIONS					3" x 1" CORRUGATIONS					5" x 1" CORRUGATIONS		
				METAL THICKNESS (INCH/GAGE)												
				0.064/16	0.079/14	0.109/12	0.138/10	0.168/8	0.079/14	0.109/12	0.138/10	0.168/8	0.079/14	0.109/12	0.138/10	0.168/8
				MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)												
17 x 13	15	3	12	13												
21 x 15	18	3	12	12												
24 x 18	21	3	12	13												
28 x 20	24	3	12	13												
35 x 24	30	3	12	12												
42 x 29	36	3.5	12	12												
49 x 33	42	4	12		12											
57 x 38	48	5	12			12										
60 x 46	54	8	15							21				21		
64 x 43	54	6	12			12										
66 x 51	60	9	15							21				21		
71 x 47	60	7	12				12									
73 x 55	66	12	18							20				20		
77 x 52	66	8	12					12								
81 x 59	72	14	18						17					17		
83 x 57	72	9	12				12									
87 x 63	78	14	18						17					17		
95 x 67	84	16	18						17					17		
103 x 71	90	16	18							17				17		
112 x 75	96	18	21							16					16	
117 x 79	102	18	21							16					16	
128 x 83	108	18	24								16					16
137 x 87	114	18	24								16					16
142 x 91	120	18	24									16				16

ALUMINUM															
PIPE ARCH SIZE SPAN x RISE INCHES	EQUI- VALENT DIAMETER INCHES	MINIMUM CORNER RADIUS INCHES	MINIMUM COVER INCHES	2 <sup>2</sup> / <sub>3</sub> " x 1 <sup>1</sup> / <sub>2</sub> " CORRUGATIONS					3" x 1" CORRUGATIONS						
				METAL THICKNESS (INCH/GAGE)											
				0.060/16	0.075/14	0.105/12	0.135/10	0.060/16	0.075/14	0.105/12	0.135/10				
				MAXIMUM FILL HEIGHT ABOVE TOP OF PIPE (FEET)											
17 x 13	15	3	12	13											
21 x 15	18	3	12	12											
24 x 18	21	3	12	13											
28 x 20	24	3	12		13										
35 x 24	30	3	12		12										
42 x 29	36	3.5	15			12									
49 x 33	42	4	15			12									
57 x 38	48	5	15					12							
60 x 46	54	8	15						21						
64 x 43	54	6	18					12							
66 x 51	60	9	18						21						
73 x 55	66	12	18							20					
81 x 59	72	14	21								17				
87 x 63	78	14	21								17				
95 x 67	84	16	24								17				
103 x 71	90	16	24										17		

NO SCALE

c:\pw-work\0551151\ld-e\1901101\_ec.dgn [H.3 - Std 602-2] 1 November 2022 10:21 AM

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	H.3

COUPLING BANDS FOR METAL PIPE CULVERT <sup>[1]</sup>					
CORRUGATION SIZE <sup>[2]</sup>  INCHES	ROUND PIPE DIAMETER  INCHES	PIPE ARCH  SPAN × RISE  INCHES	MINIMUM BAND WIDTH (INCHES)		
			ANNULAR CORRUGATED BANDS <sup>[3]</sup>	HELICALLY CORRUGATED BANDS <sup>[4]</sup>	SEMI-CORRUGATED BANDS <sup>[5]</sup>
1½ × ¼	underdrain <sup>[6]</sup>	-	10.5	7	10.5
2⅔ × ½	12 to 36	17 × 13 to 42 × 29	7	12	
	42 to 72	49 × 33 to 83 × 57	10.5	12	
	78 to 84	-	10.5	12	10.5
3 × 1	36 to 72	60 × 46 to 81 × 59	12	14	10.5
	78 to 144	87 × 64 to 142 × 91	12	14	10.5
5 × 1	36 to 72	60 × 46 to 81 × 59	20	22	
	78 to 144	87 × 64 to 142 × 91	20	22	

<sup>[1]</sup> Fabricate annular, helical and semi-corrugated type coupling bands from the same metal as the connecting pipe. Provide coupling bands not more than 3 nominal sheet thicknesses thinner than the thickness of the pipe to be connected, and no thinner than 0.052 inch for steel or 0.048 inch for aluminum. Fasten coupling bands with the following diameter of bolt: ⅜" for 18" round culvert (21" × 15" pipe arch) or less ½" for 21" round culvert (24" × 18" pipe arch) or more

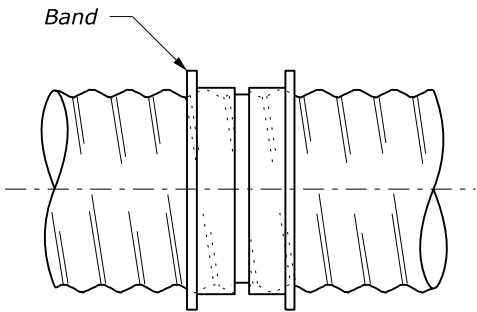
<sup>[2]</sup> For helically corrugated pipe with rerolled ends, the nominal corrugations size refers to the dimension of the end corrugation in the pipe.

<sup>[3]</sup> Use annular corrugated bands with pipes having annular corrugations or with helical pipe having rerolled end to form annular corrugations. A 10.5 inch band is acceptable on pipe ends rerolled with 2⅔" × ½" corrugations. A 12 inch band is acceptable on pipe ends rerolled with 3" × 1" pipe corrugations.

<sup>[4]</sup> Use helical corrugated bands with pipes having helically corrugated ends.

<sup>[5]</sup> The minimum band widths shown for 3" × 1" and 5" × 1" corrugated sizes apply to 2⅔" × ½" corrugations on rerolled pipe ends.

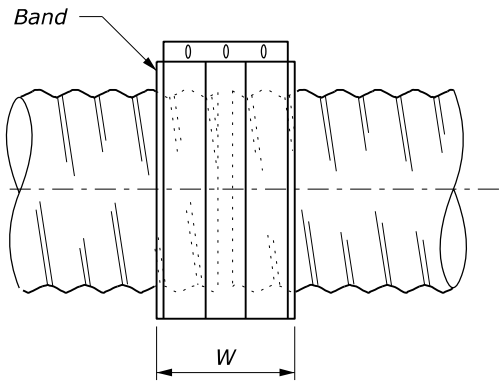
<sup>[6]</sup> Smooth sleeve-type couplers and flat bands may be used for pipe diameters of 12" or less. Use a matching metal having a nominal thickness of not less than 0.040 inch for steel, or 0.036 inch for aluminum, or a plastic with an equivalent strength to metal.



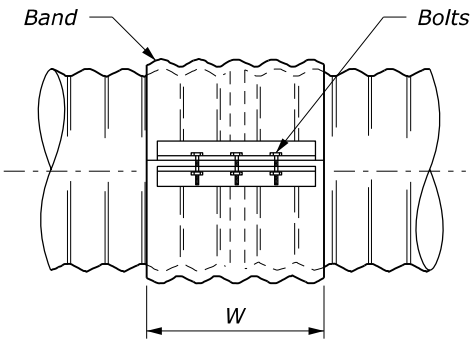
SLEEVE JOINT

Smoother sleeve with center stop.  
Stab type joint

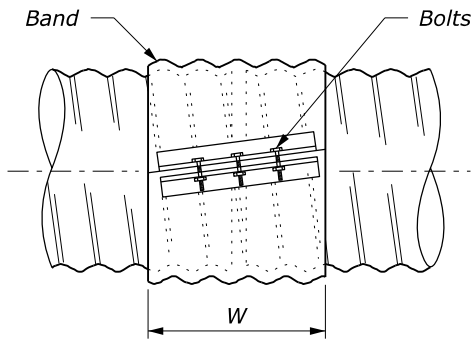
SMOOTH SLEEVE BAND



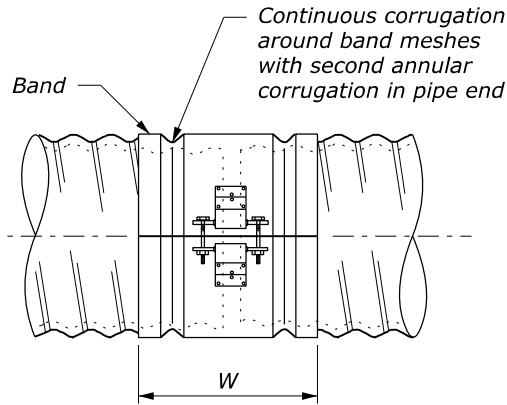
FLAT BAND



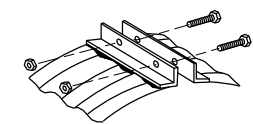
SIDE VIEW



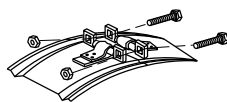
SIDE VIEW



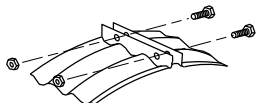
SIDE VIEW



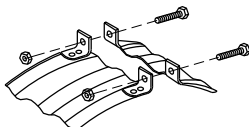
Band Angle



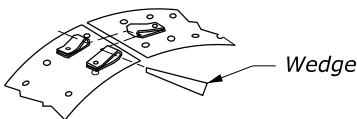
Bar & Strap



Integral Flange

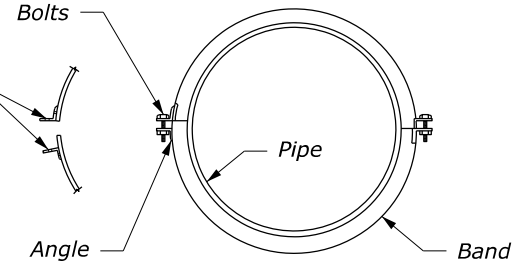


Oval Lug



Wedge and Strap

Rivet, spot weld, or fillet weld at crest of corrugation at heel and toe of angle

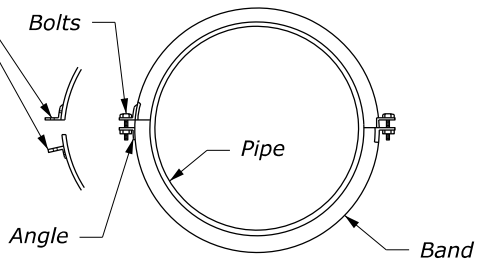


END VIEW

Second angle connection optional to 42" diameter, required above 42" diameter

ANNULAR BAND

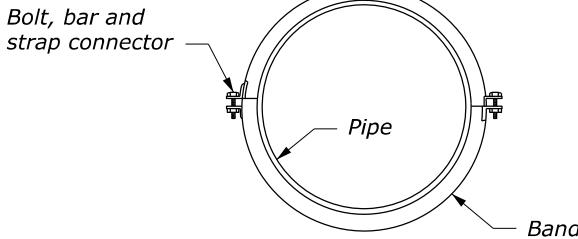
Rivet, spot weld, or fillet weld at crest of corrugation at heel and toe of angle



END VIEW

Second angle connection optional to 42" diameter, required above 42" diameter

HELICAL BAND



END VIEW

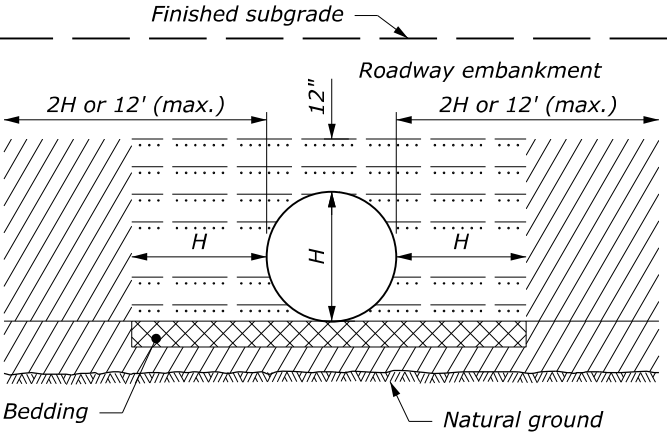
SEMI-CORRUGATED BAND

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
FLH STANDARD	
METAL PIPE CULVERT COUPLING BAND	
STANDARD APPROVED FOR USE 12/1993 REVISED: 4/1994 6/2005	STANDARD 602-2

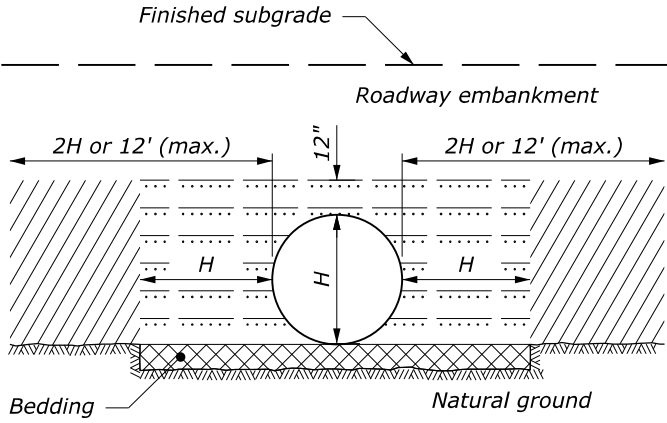
NOTE:

- Watertight pipe joints are not required unless specified in the Special Contract Requirements.
- Other types of coupling bands or fastening devices that comply with the joint performance criteria of AASHTO Standard specifications for Highway Bridges, Division II Section 26 may be used.

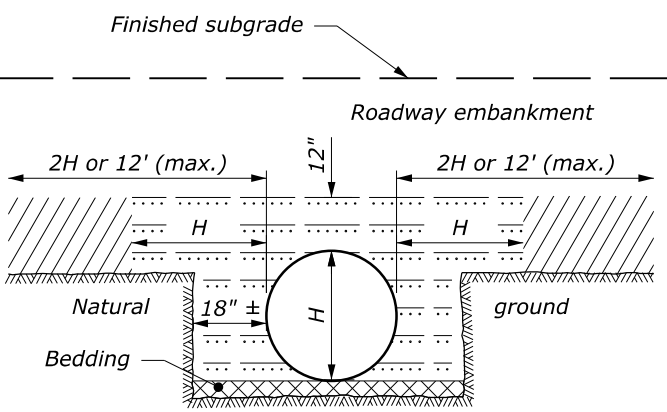
NO SCALE



**ABOVE NATURAL GROUND**



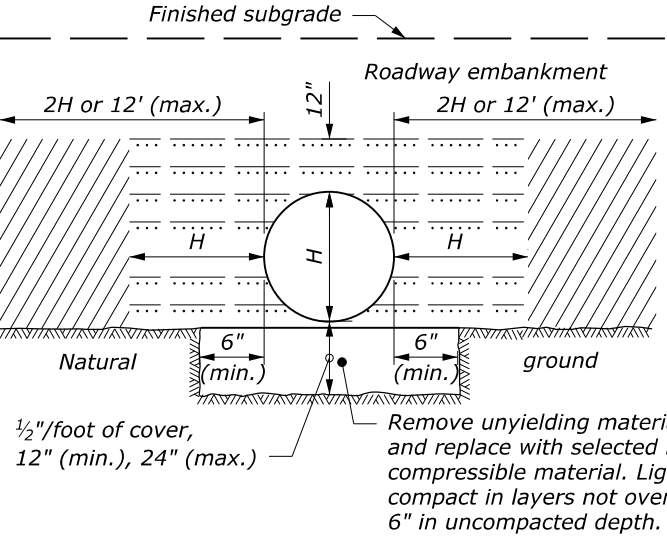
**ON NATURAL GROUND**



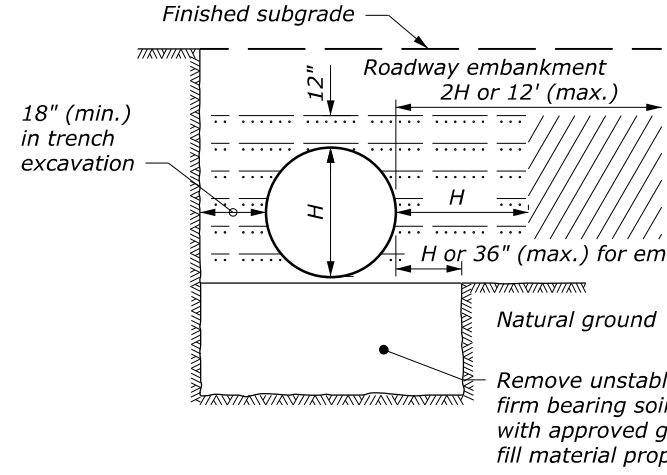
**ABOVE AND BELOW  
NATURAL GROUND**

**LEGEND:**

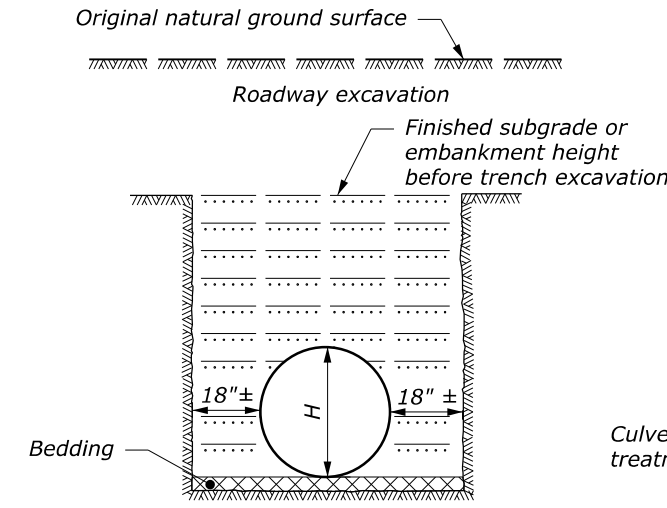
- Bedding material (uncompacted)
- Embankment material placed in layers not exceeding 6" compacted depth.
- Compacted backfill material placed in layers not exceeding 6" compacted depth; or lean concrete backfill in accordance with Section 614.
- Impermeable backfill material.



**ON UNYIELDING MATERIAL**

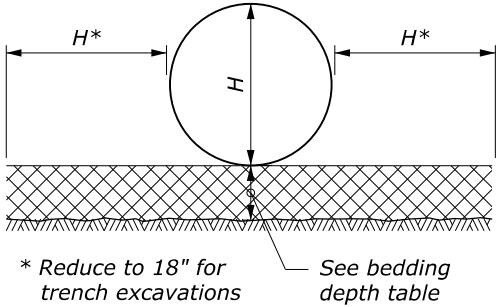


**ON UNSTABLE MATERIAL**



**BELOW NATURAL GROUND OR  
TRENCH EXCAVATION IN EMBANKMENT**

BEDDING DEPTH	
PIPE SIZE (H)	DEPTH
12" to 54"	4"
> 54"	6"

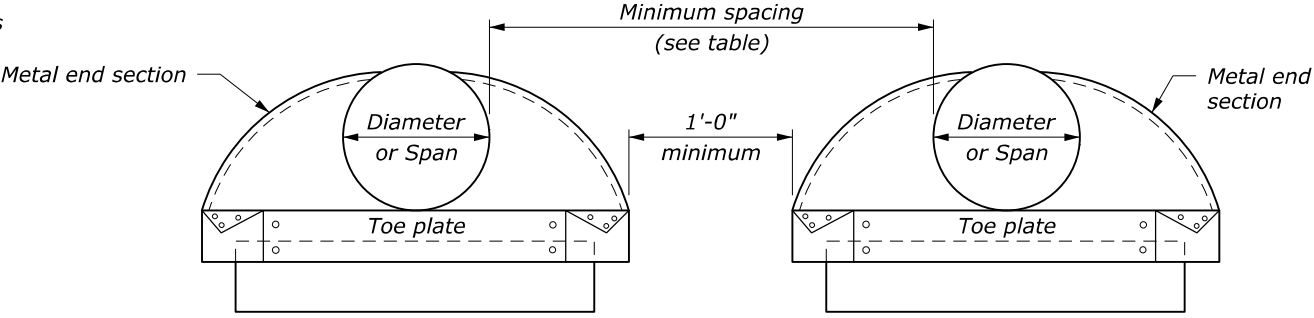


**PIPE BEDDING**

**NOTE:**

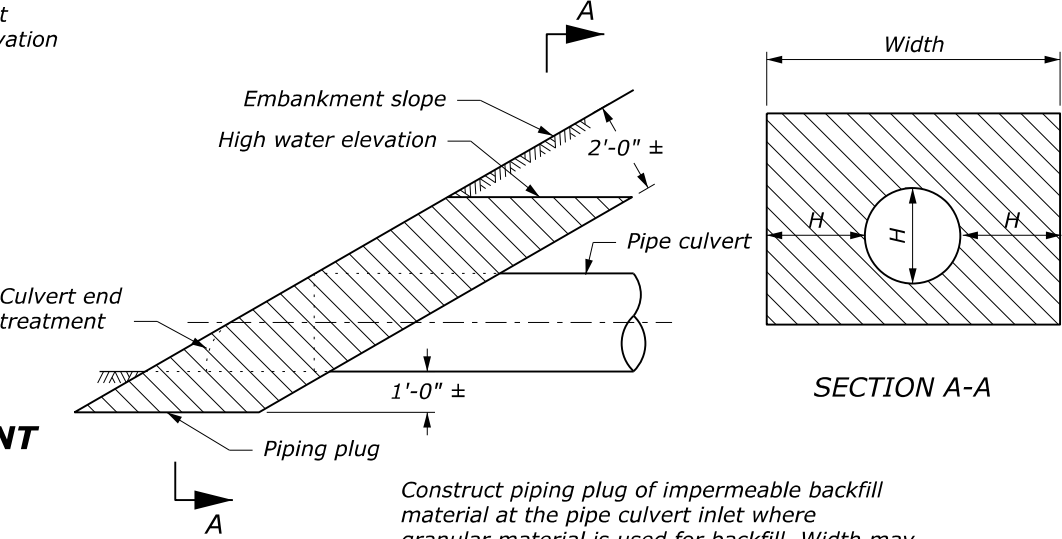
- When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount of camber or increase the pipe culvert gradient.
- H equals the diameter of all round pipe culverts or the rise dimension of all pipe arch culverts.
- See Section 704 for bedding and backfill requirements.

MINIMUM SPACING	
DIAMETER or SPAN	SPACING
UP to 48"	24"
48" and UP	Half diameter or span or 36", whichever is less



**ELEVATION**

**MULTIPLE PIPE INSTALLATION**

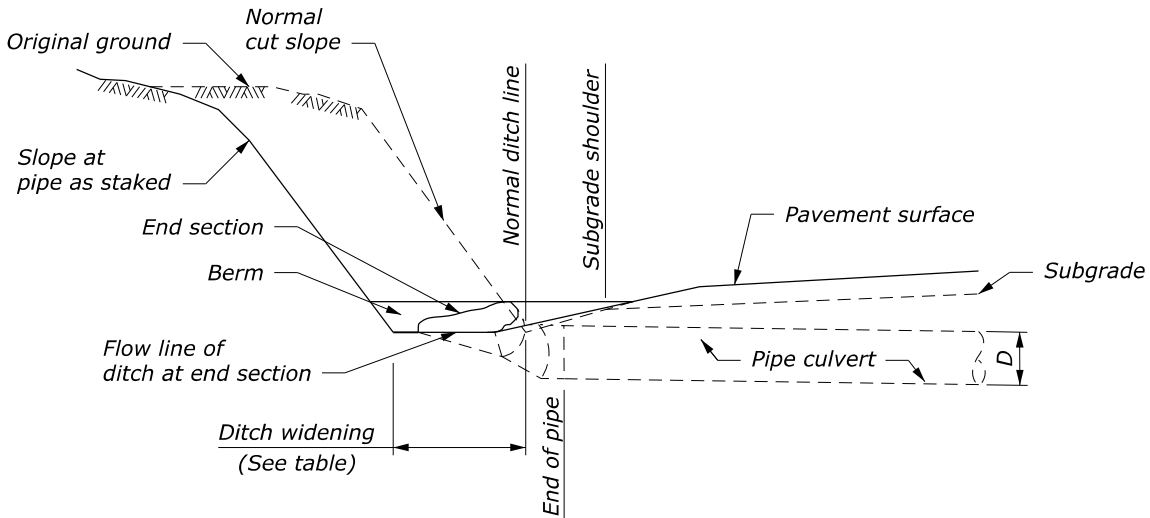
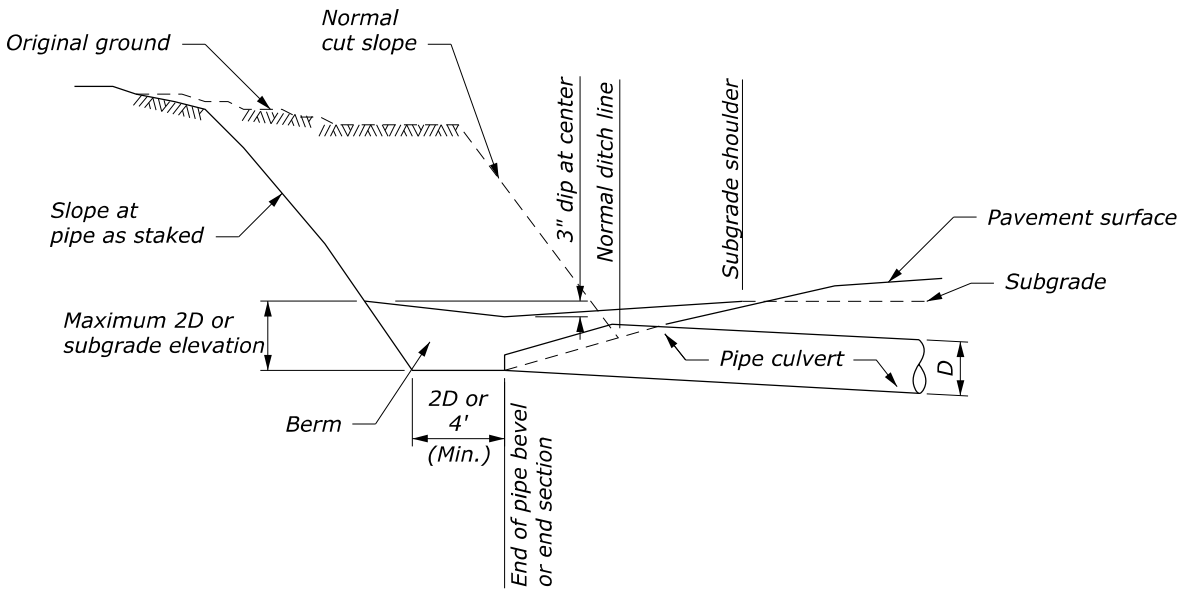
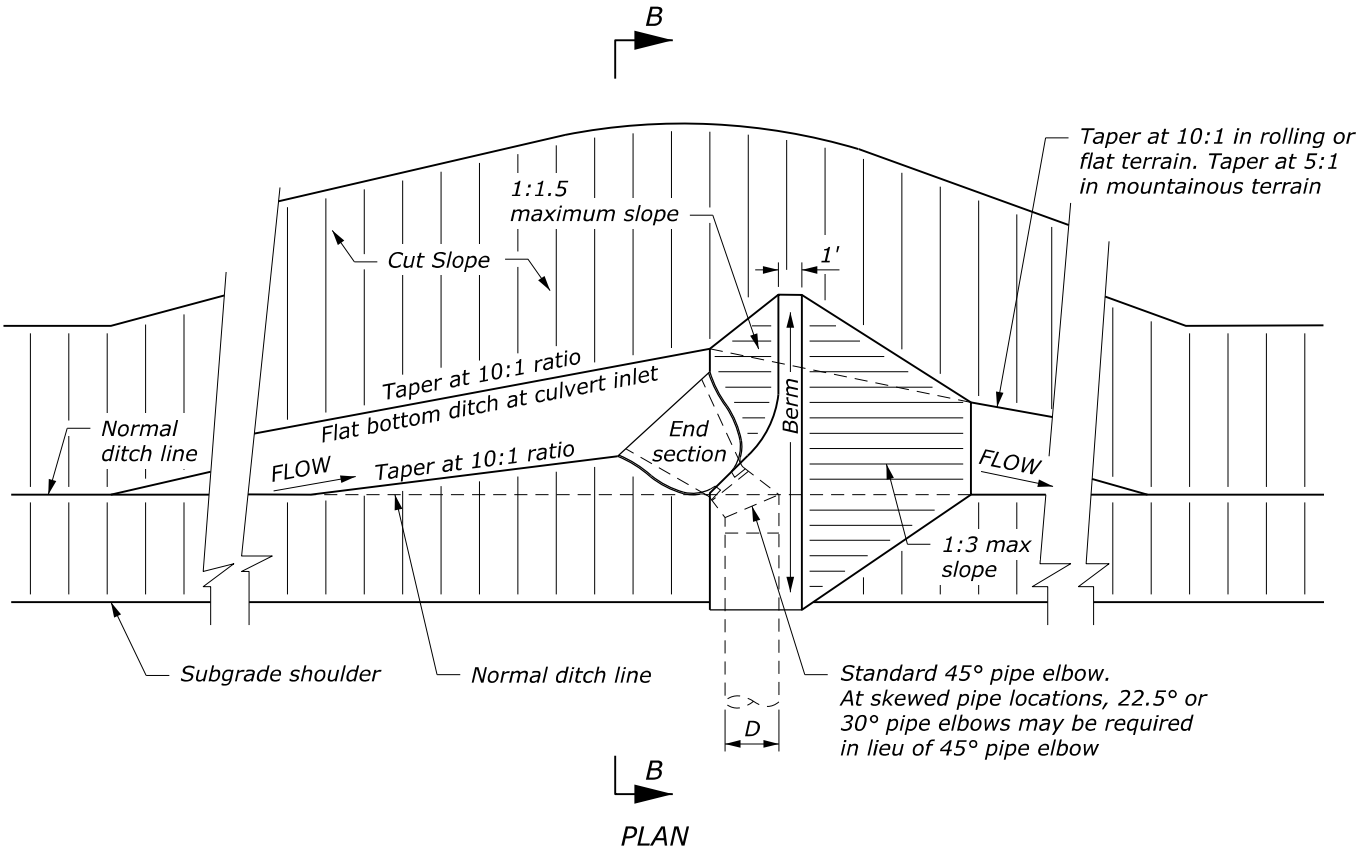
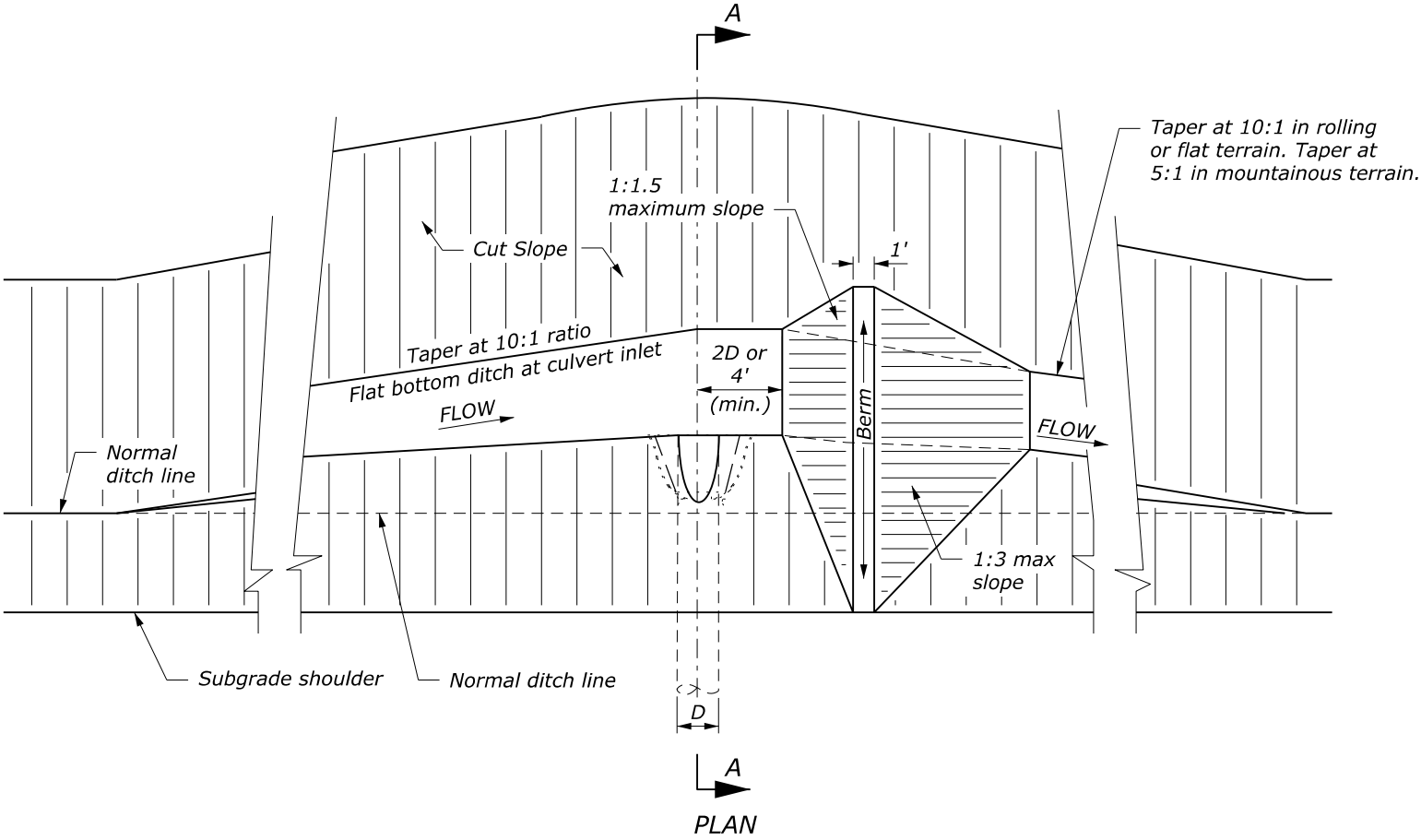


**PIPING PLUG**

NO SCALE

NOTE:

1. *D* equals the diameter of all round pipe or the rise dimension of all pipe arch culverts.



DITCH WIDENING	
PIPE SIZE (D)	WIDENING
18"	5'
24"	6'
30"	7'

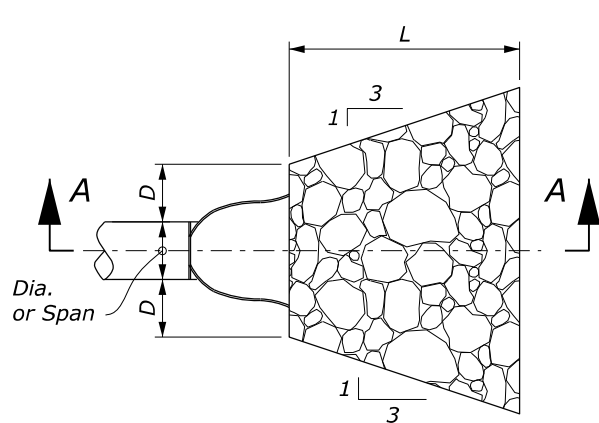
SECTION B-B  
TYPE II

NO SCALE



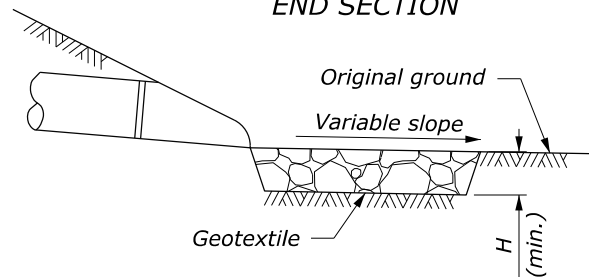
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18 July 2018 7:54 AM

STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	H.6

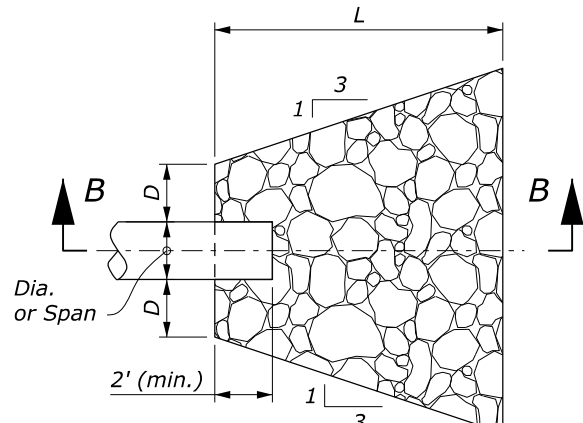


PLAN VIEW

CULVERT WITH STANDARD  
END SECTION

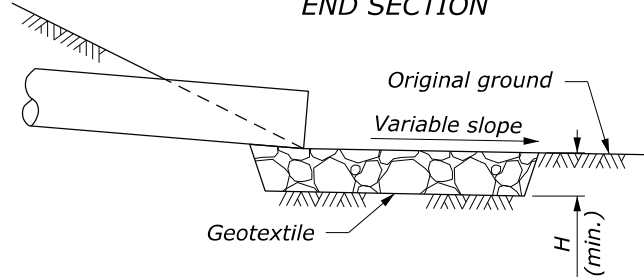


SECTION A-A



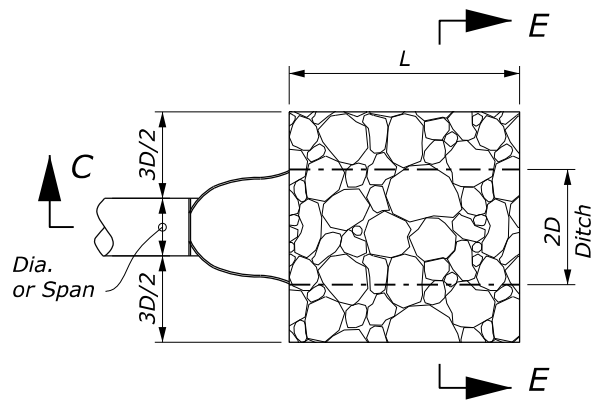
PLAN VIEW

CULVERT WITHOUT STANDARD  
END SECTION



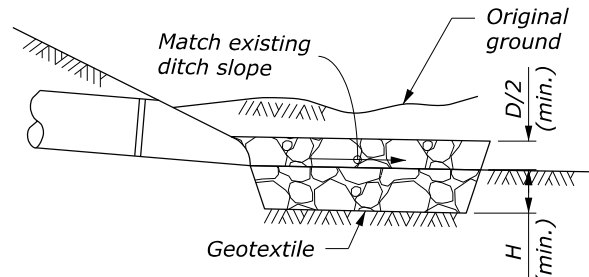
SECTION B-B

**PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH**

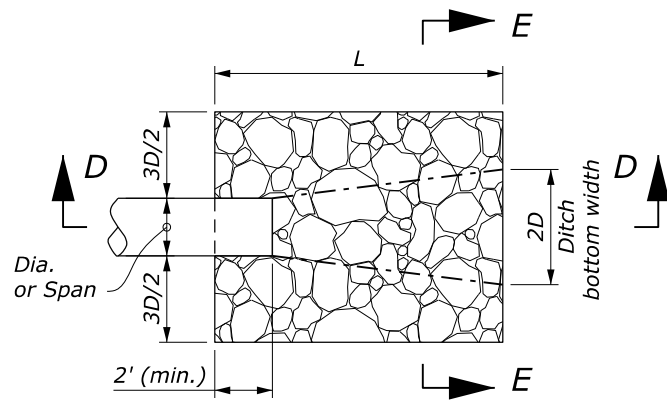


PLAN VIEW

CULVERT WITH STANDARD  
END SECTION

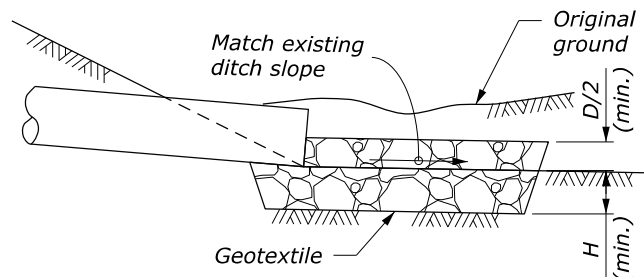


SECTION C-C



PLAN VIEW

CULVERT WITHOUT STANDARD  
END SECTION



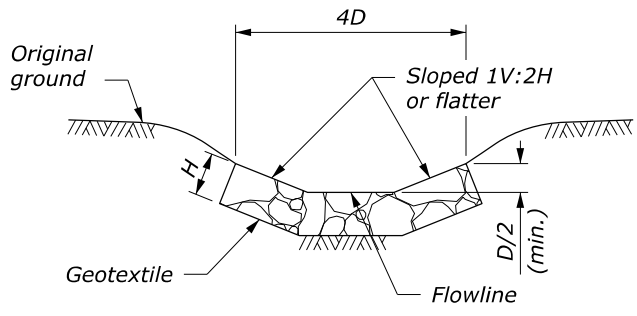
SECTION D-D

**PROTECTIVE APRON AT CULVERT OUTLET WITH DITCH**

OUTLET WITHOUT DITCH PROTECTIVE APRON DIMENSIONS AND QUANTITIES FOR INFORMATION ONLY						
	CULVERT SIZE D (INCHES)	RIPAP CLASS	APRON LENGTH L (FEET)	APRON DEPTH H (INCHES)	ESTIMATED RIPRAP QUANTITY (CUYD)	ESTIMATED GEOTEXTILE QUANTITY (SQYD)
WITH END SECTION	12	2	4	18	1.0	5
	18	2	6	18	2.2	9
	24	2	8	18	3.9	13
	30	3	12.5	24	10.8	27
	36	3	15	24	15.6	37
	42	4	21	30	34.0	63
WITHOUT END SECTION	48	4	24	30	44.4	78
	12	2	6	18	1.7	7
	18	2	8	18	3.2	12
	24	2	10	18	5.2	17
	30	3	14.5	24	13.2	32
	36	3	17	24	18.5	42
	42	4	23	30	38.7	70
	48	4	26	30	49.8	86

**OUTLET WITH DITCH  
PROTECTIVE APRON DIMENSIONS AND QUANTITIES  
FOR INFORMATION ONLY**

	CULVERT SIZE D (INCHES)	RIPAP CLASS	APRON LENGTH L (FEET)	APRON DEPTH H (INCHES)	ESTIMATED RIPRAP QUANTITY (CUYD)	ESTIMATED GEOTEXTILE QUANTITY (SQYD)
WITH END SECTION	12	2	4	18	0.9	4
	18	2	6	18	2.0	8
	24	2	8	18	3.6	12
	30	3	12.5	24	9.3	24
	36	3	15	24	13.3	32
	42	4	21	30	27.2	52
WITHOUT END SECTION	48	4	24	30	35.6	65
	12	2	6	18	1.3	6
	18	2	8	18	2.7	10
	24	2	10	18	4.4	15
	30	3	14.5	24	10.7	27
	36	3	17	24	15.1	36
	42	4	23	30	29.8	56
	48	4	26	30	38.5	70



SECTION E-E

**NOTE:**

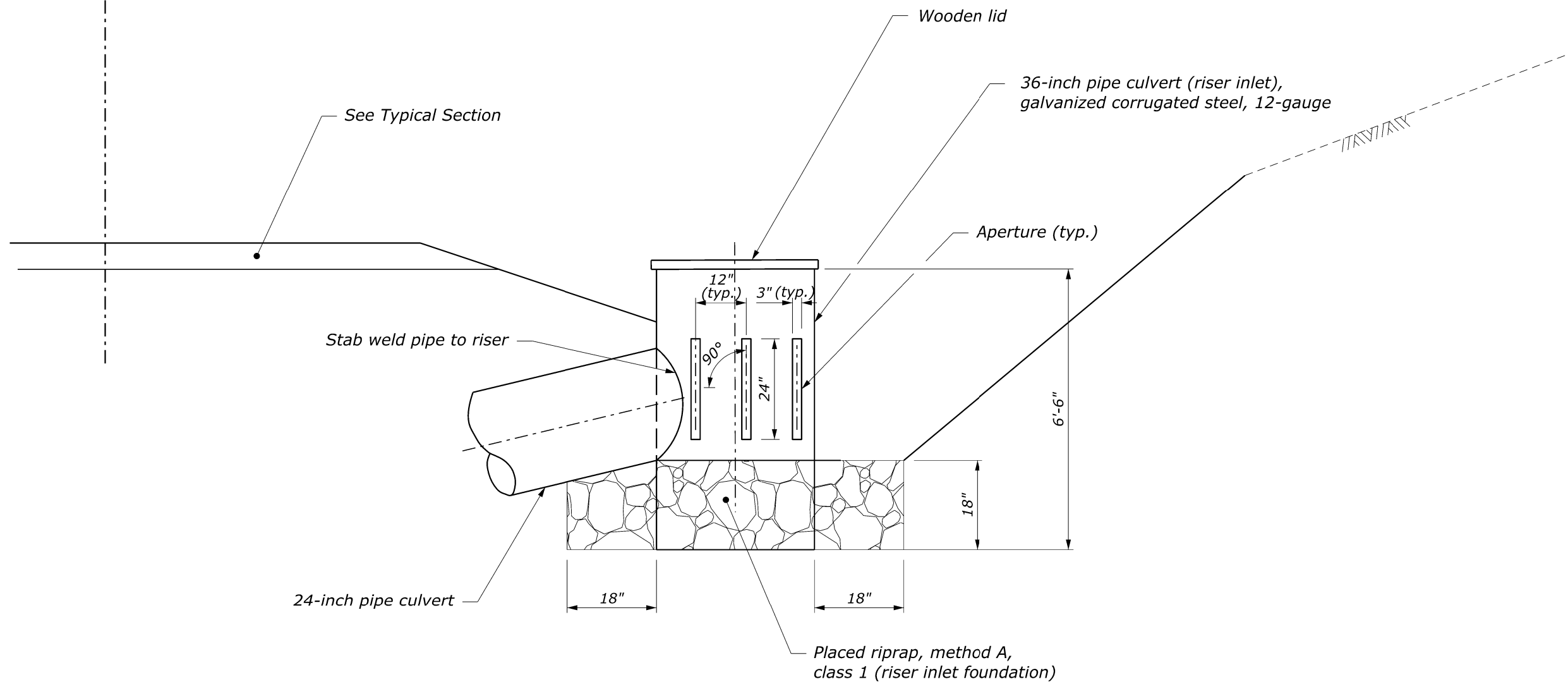
1. Use for aprons serving culverts with slopes less than 10%.
2. Furnish separation and stabilization geotextile.
3. Do not measure riprap placement excavation for payment.

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION WESTERN FEDERAL LANDS HIGHWAY DIVISION	
U.S. CUSTOMARY DETAIL	
<b>PLACED RIPRAP AT CULVERT OUTLETS</b>	
DETAIL APPROVED FOR USE --/----	DETAIL
REVISED: 8/2016	W251-1



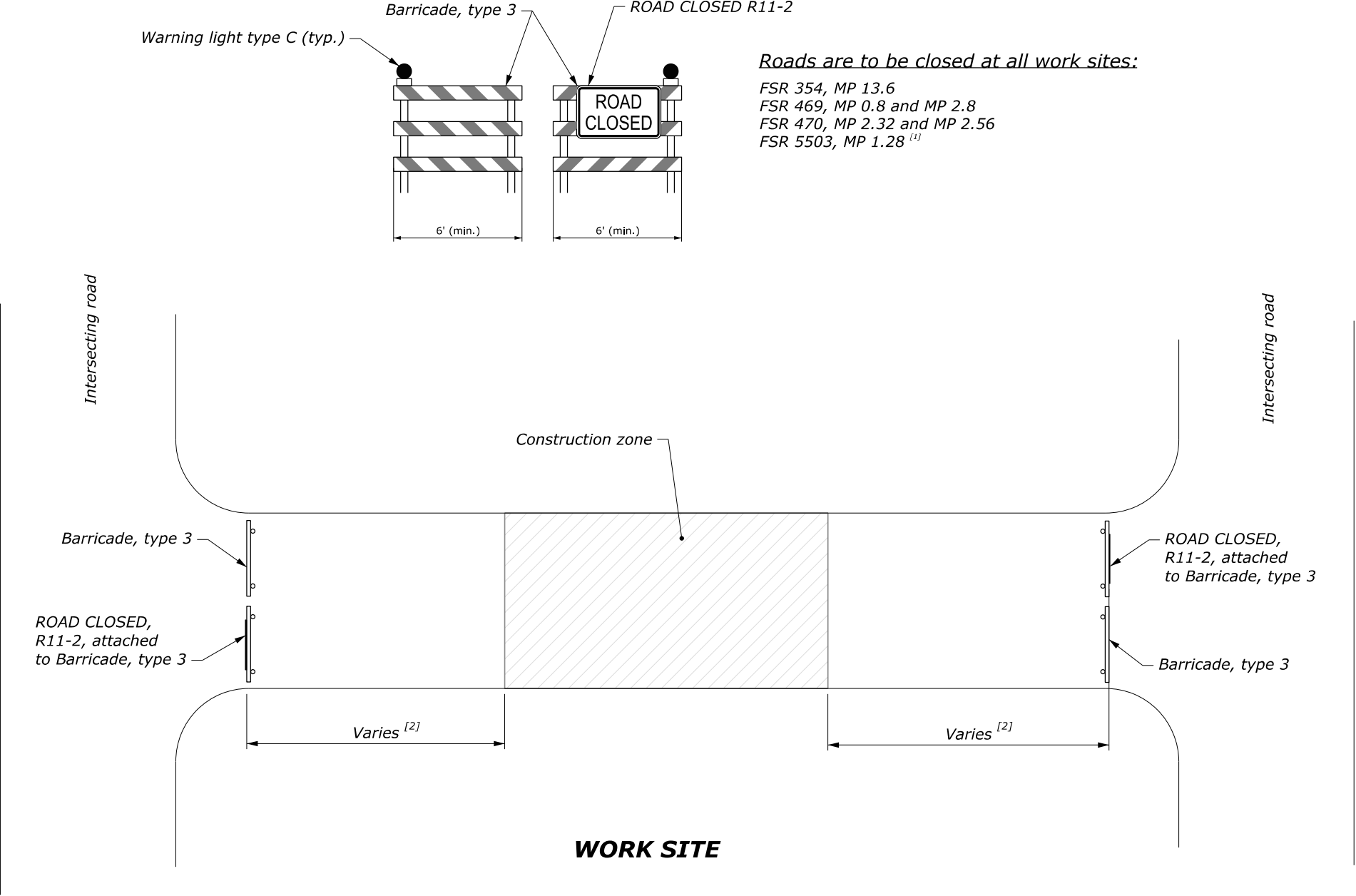
STATE	PROJECT	SHEET NUMBER
ID	ERFO FS NEZPR117 2019-1(1)	H.7



**RISER INLET DETAIL**

ITEM 63504-1000 TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN								
MUTCD NO.	SIGN MESSAGE	SIZE (IN X IN)			AREA (SQFT)	NO. OF SIGNS	QUANTITY (SQFT)	Remarks
R11-2	"ROAD CLOSED"	48	x	30	10.00	12	120.00	Place on Type 3 Barricades. See detail, Sheet I.2.
TOTAL							120.00	

TEMPORARY TRAFFIC CONTROL, OTHER ITEMS			
ITEM NO.	ITEM DESCRIPTION	UNIT	QUANTITY
63502-0600	TEMPORARY TRAFFIC CONTROL, BARRICADE TYPE 3 (6 FOOT MINIMUM)	EACH	24
63502-1700	TEMPORARY TRAFFIC CONTROL, WARNING LIGHT TYPE C	EACH	24



**FOOTNOTE:**

<sup>[1]</sup> FSR 5503 has been closed by the Forest Service with existing gate. Barricades and Road Closed signs are required at all road closure locations.

<sup>[2]</sup> Barricade locations are approximate. Exact locations and distances from work zone to be determined by the CO.

NO SCALE

**ROAD CLOSURE  
DETAILS**