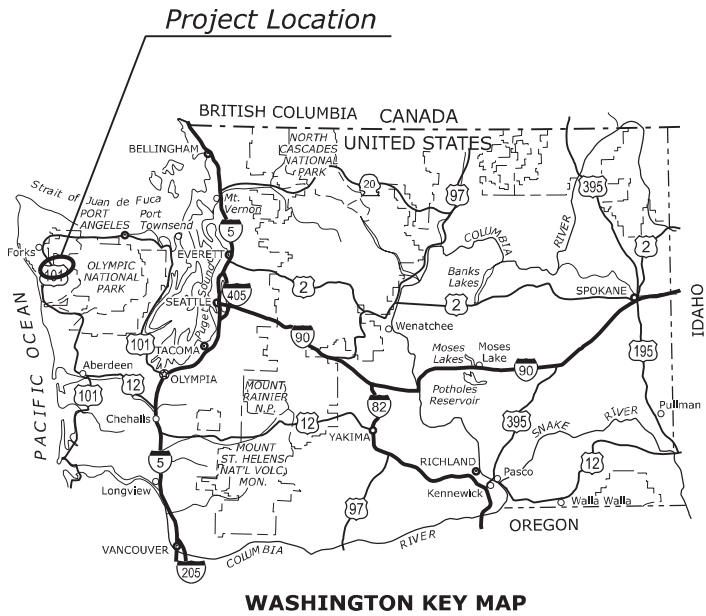


STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	A.1



U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION



PLANS FOR PROPOSED PROJECT
WA FLAP JEFFER 150009(1)

UNDI ROAD BYPASS IMPROVEMENTS

CLALLAM AND JEFFERSON COUNTY
WASHINGTON
LENGTH 2.180 MILES

SECTION INDEX

- A. GENERAL INFORMATION
- B. SUMMARIES
- C. TYPICAL SECTIONS
- D. PLAN-PROFILE
- E. EROSION CONTROL
- F. DRAINAGE PLANS
- G. TEMPORARY TRAFFIC CONTROL
- H. PERMANENT TRAFFIC CONTROL

See Sheet A.2 for complete Index to Sheets.

TYPE OF CONSTRUCTION:

Clearing, excavation, grading,
drainage, paving, signing and
striping.

DESIGN DESIGNATION:

ADT (2023) <100
ADT (2043) <100
V 35 MPH (SITE 1, "UB1")
20 MPH (SITE 1, "U", SITE 2, "UB1",
SITE 3, "UB3")
e (max) 0.06

SPECIFICATION:

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

PLANS PREPARED BY

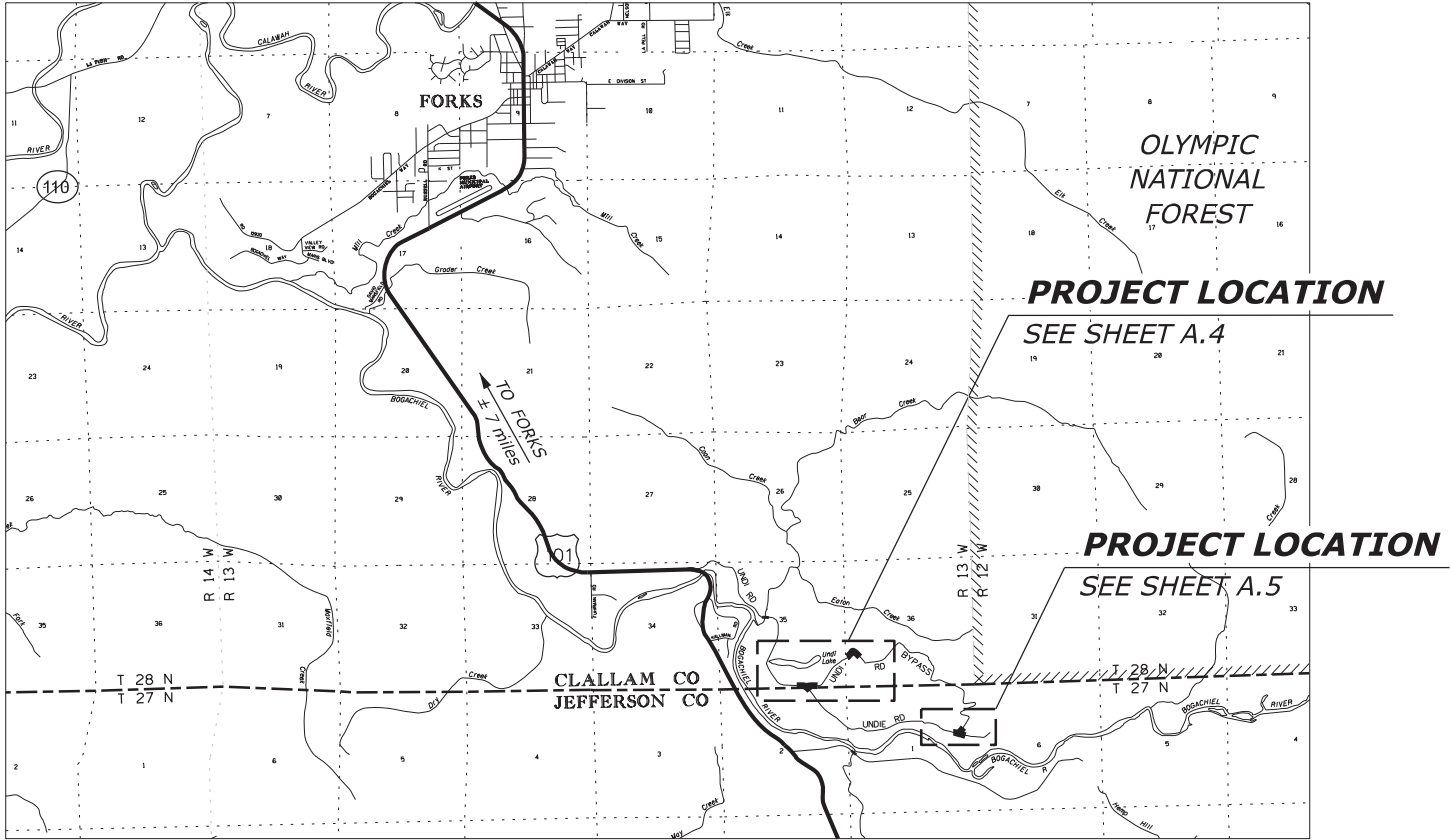


DAVID EVANS
AND ASSOCIATES INC.

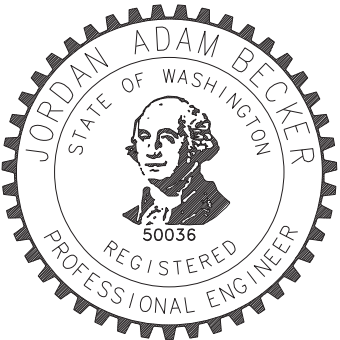
FOR

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

WESTERN FEDERAL LANDS HIGHWAY DIVISION
VANCOUVER, WASHINGTON



Scale in miles



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APPROVED:
BRENT L COE

Chief of Engineering,
Western Federal Lands Highway Division

Digitally signed by BRENT L COE
Date: 2023.03.21 13:55:36 -07'00'
DATE

PROJECT MANAGER
J. DAVIS

P:\FHAX\00000280\0400CAD\RH\SHSHEETS\150009(1).pln_gen.dgn [Sheet A.2] 9 March 2023 11:44 AM

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	A.2

INDEX TO SHEETS

A. GENERAL INFORMATION

- A.1 TITLE SHEET
- A.2 SHEET INDEX
- A.3 PLAN SYMBOLS AND ABBREVIATIONS
- A.4-5 VICINITY MAP

B. SUMMARIES

- B.1-2 SUMMARY OF QUANTITIES

C. TYPICAL SECTIONS

- C.1-4 TYPICAL SECTIONS

D. PLAN-PROFILE

- D.1 TABULATION OF PLAN AND PROFILE QUANTITIES
- D.2 CURVE, TANGENT, AND CROSS SLOPE DATA TABLES
- D.3 SITE 1 PLAN
- D.4 SITE 1 PROFILE (SHEET 1 OF 2)
- D.5 SITE 1 PROFILE (SHEET 2 OF 2)
- D.6 SITE 2 PLAN
- D.7 SITE 2 PROFILE
- D.8 SITE 3 PLAN
- D.9 ROADWAY DETAILS
- D.10 STANDARD DETAIL
- D.11 SURVEY CONTROL

E. EROSION CONTROL

- E.1 TABULATION OF EROSION CONTROL QUANTITIES
- E.2 SITE 1 EROSION CONTROL PLAN
- E.3 SITE 2 EROSION CONTROL PLAN
- E.4-9 STANDARD DETAILS

F. DRAINAGE PLANS

- F.1 TABULATION OF DRAINAGE QUANTITIES
- F.2 CULVERT CROSSING PROFILES
- F.3 RIPRAP DITCH DETAILS
- F.4-12 STANDARD DRAWINGS AND DETAILS

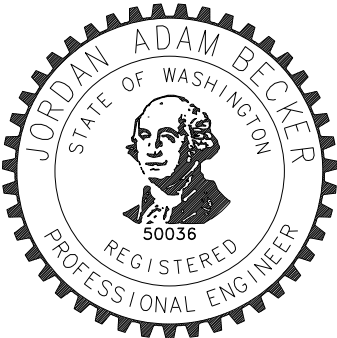
G. TEMPORARY TRAFFIC CONTROL

- G.1 TABULATION OF TEMPORARY TRAFFIC CONTROL QUANTITIES
- G.2-6 STANDARD DRAWINGS

H. PERMANENT TRAFFIC CONTROL

- H.1 TABULATION OF PERMANENT TRAFFIC CONTROL QUANTITIES
- H.2 PERMANENT TRAFFIC CONTROL PLAN SITE 1
- H.3 PERMANENT TRAFFIC CONTROL PLAN SITE 2
- H.4 PERMANENT TRAFFIC CONTROL PLAN SITE 3
- H.5 TABULATION OF SIGNS & POSTS
- H.6 SIGN DETAILS
- H.7-10 STANDARD DETAILS

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
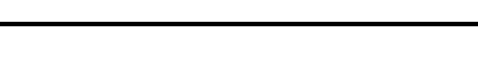
SHEET INDEX

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	A.3

Δ	total central angle	M.L.	main line
Δc	curve central angle	M.P.	mile post
\emptyset	diameter	matl.	material
θs	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	o.c.	on center
BM	bench mark	o. to o.	out to out
BP	balance point	OD	outside diameter
br.	bridge	OG	original ground
brg.	bearing	OHWM	ordinary high water mark
btwn	between		
cc or c. to c.	center to center	PC	point of curve
\textcent	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
		pvmt.	pavement
D	diameter	R	radius
DHV	design hourly volume	R.	range
dia.	diameter	R/W	right-of-way
diaph.	diaphragm	rdwy.	roadway
dist.	distance	reinf.	reinforcement
drgw(s).	drawing(s)	reqd.	required
E	east	rt. or RT	right
e	superelevation rate	rte.	route
e.f.	each face		
El. 94.16	elevation in feet	S	south
elev.	elevation	SADT	seasonal average daily traffic
emb.	embankment	SC	point of spiral to curve
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
		SQYD	square yard
f.f.	front face	SRS	point of spiral to reverse spiral
fin.	finish	SS	point of spiral to spiral (no curve)
flg.	flange	ST	point of spiral to tangent
ftg.	footing	STA, Sta.	station
		std.	standard
ga.	gage (gauge)	stgr.	stringer
galv.	galvanized	stiff.	stiffener
ID	inside diameter	struc.	structural
IE	invert elevation	STS	point of spiral to tangent spiral
jt.	joint		
KSI	thousand pounds per square inch	T	tangent distance
		T.	township
L	length of curve	TBM	temporary bench mark
lat.	latitude	thd.	thread
LNFT	linear foot (feet)	TS	point of tangent to spiral
long.	longitudinal	Ts	tangent distance (spiraed curve)
LPSM	lump sum	typ.	typical
Ls	length of spiral		
lt. or LT	left	V	design speed (velocity)
LW	low water	vph	vehicles per hour
		VPI	vertical point of intersection
		W	west

NOTE:

1. 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)	
1/4 Section Line	
1/4 Section Corner (Found, Projected)	
1/16 Section Line	
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)	

	WA	FLAP JEFFER 150009(1)	A.3
North Arrow			
		EXISTING	PROPOSED
Slope Stake Limits			
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			
		Section A-A	

NO SCALE

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

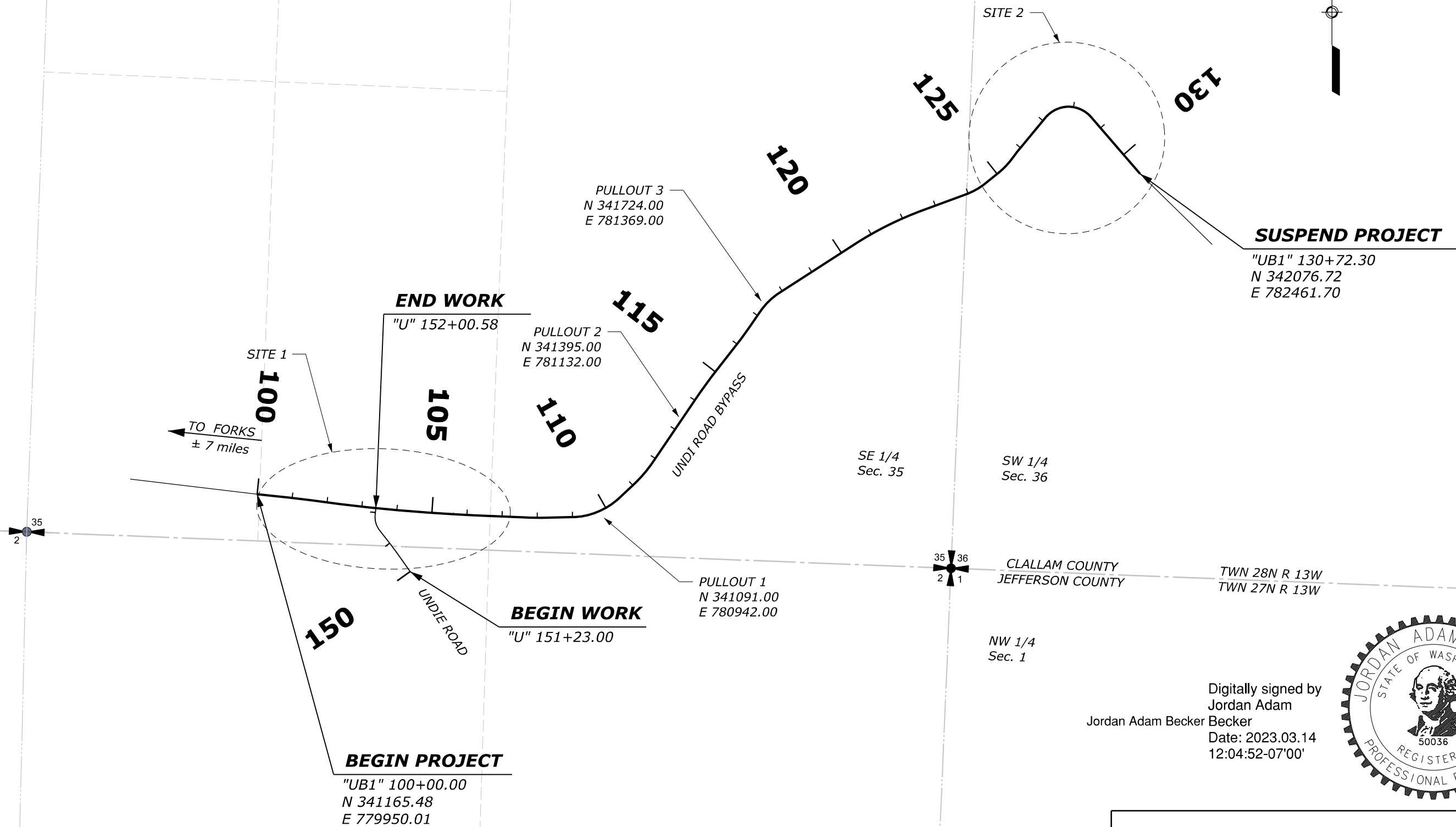
WFLHD DETAIL

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
WA	FLAP JEFFER 150009(1)	A.4



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VICINITY MAP
SHEET 1 OF 2

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	A.5

JEFFERSON COUNTY

OLYMPIC
NATIONAL
FOREST

N



RESUME PROJECT

"UB3" 300+50.00
N 339414.73
E 786785.84

NE 1/4
Sec. 1

SITE 3

BEGIN WORK
"U3" 350+27.43

UNDI ROAD BYPASS
00E

30E

UNDIE ROAD

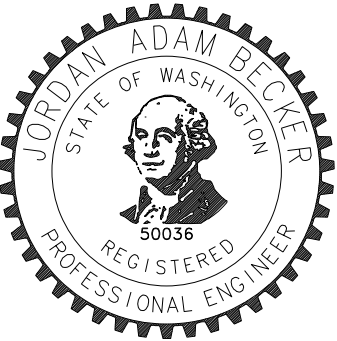
END PROJECT

"UB3" 306+64.75
N 338944.61
E 786397.76

END WORK
"U3" 351+84.72

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by Jordan Adam
Becker
Date:
2023.03.14
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VICINITY MAP
SHEET 2 OF 2

SUMMARY OF QUANTITIES												STATE	PROJECT	SHEET NUMBER
												WA	FLAP JEFFER 150009(1)	B.1
A M E N D	Line Item No.	Pay Item Number	Pay Item Description	Unit	Sheet and Description						Estimated Quantities	Remarks and/or Determination of Estimated Quantity		
					SECTION D	SECTION E	SECTION F	SECTION G	SECTION H	-				
					PLAN - PROFILE	EROSION CONTROL	DRAINAGE PLANS	TEMPORARY TRAFFIC CONTROL	PERMANENT TRAFFIC CONTROL	ALLOWANCE	Bid Schedule			
	A0020	15101-0000	MOBILIZATION	LPSM							ALL			
	A0040	15201-0000	CONSTRUCTION SURVEY AND STAKING	LPSM							ALL			
	A0060	15301-0010	CONTRACTOR QUALITY CONTROL AND ASSURANCE	LPSM							ALL			
	A0080	15401-0000	CONTRACTOR TESTING	LPSM							ALL			
	A0100	15501-0000	CONSTRUCTION SCHEDULE	LPSM							ALL			
	A0120	15705-1400	SOIL EROSION CONTROL, FIBER ROLL	LNFT		1,932				118	2,050			
	A0140	15706-0200	SOIL EROSION CONTROL, CHECK DAM (FIBER ROLL)	EACH		9					9			
	A0160	15706-0200	SOIL EROSION CONTROL, CHECK DAM (FILTER ROCK)	EACH		5					5			
	A0180	15706-1300	SOIL EROSION CONTROL, INLET PROTECTION TYPE C	EACH		1					1			
	A0200	20103-0000	CLEARING AND GRUBBING	SQYD	5,531					69	5,600			
	A0220	20301-0700	REMOVAL OF DELINEATOR	EACH	1						1			
	A0240	20301-2400	REMOVAL OF SIGN	EACH					3		3			
	A0260	20302-0800	REMOVAL OF FENCE, BARBED WIRE	LNFT	283						283			
	A0280	20302-2100	REMOVAL OF PIPE CULVERT	LNFT			41				41			
	A0300	20401-0000	ROADWAY EXCAVATION	CUYD	6,782					218	7,000			
	A0320	20701-0200	SEPARATION-STABILIZATION GEOTEXTILE, CLASS 1, TYPE B	SQYD	3,608					392	4,000			
	A0340	20702-0600	GEOTEXTILE FILTER, CLASS 2, TYPE A	SQYD			634			66	700			
	A0360	21101-1000	ROADWAY OBLITERATION, METHOD 1	SQYD	38						38			
	A0380	25101-0200	PLACED RIPRAP, METHOD A, CLASS 2	CUYD			5				5			
	A0400	25120-0200	RIPRAP DITCH, METHOD A, CLASS 2	LNFT			580				580			
	A0420	30202-2000	ROADWAY AGGREGATE, METHOD 2	TON	2,127					373	2,500			
	A0440	40702-1200	CHIP SEAL, TYPE 2B	SQYD	9,216					284	9,500	Digitally signed by Jordan Adam Becker		
	A0480	60201-0400	12-INCH PIPE CULVERT	LNFT			24			10	34	Date: 2023.03.28 12:06:55-07'00'		
	A0500	60201-0600	18-INCH PIPE CULVERT	LNFT			131			30	161			
	A0520	60210-0400	END SECTION FOR 12-INCH PIPE CULVERT	EACH			2				2			
	A0540	60210-0600	END SECTION FOR 18-INCH PIPE CULVERT	EACH			4				4			
	A0560	60404-1000	CATCH BASIN, FLH TYPE 1 (METAL FRAME AND GRATE TYPE A)	EACH			1				1			
MileStone: 100% Estimate Date Completed: 03/27/23 Report Date: 03/27/23														

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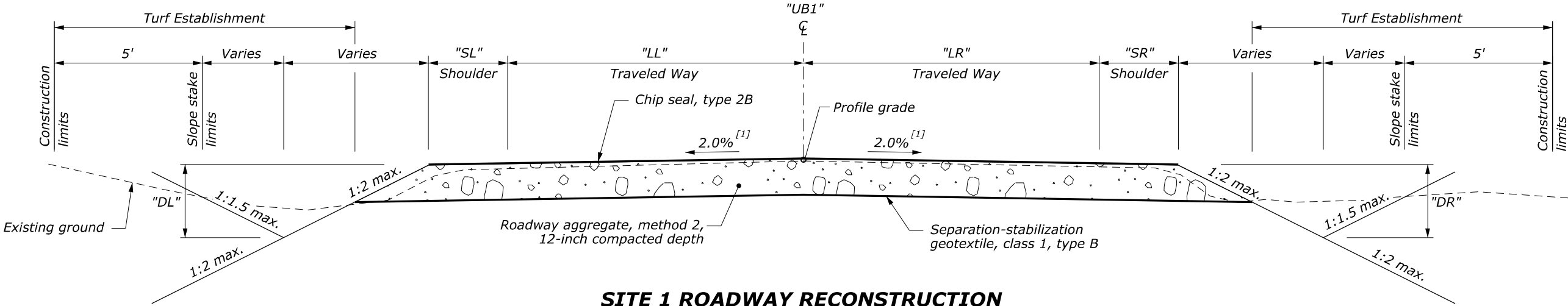
SUMMARY OF QUANTITIES												STATE	PROJECT	SHEET NUMBER
												WA	FLAP JEFFER 150009(1)	B.2
A M E N D	Line Item No.	Pay Item Number	Pay Item Description	Unit	Sheet and Description						Estimated Quantities	Remarks and/or Determination of Estimated Quantity		
					SECTION D	SECTION E	SECTION F	SECTION G	SECTION H	-				
					PLAN - PROFILE	EROSION CONTROL	DRAINAGE PLANS	TEMPORARY TRAFFIC CONTROL	PERMANENT TRAFFIC CONTROL	ALLOWANCE	Bid Schedule			
	A0580	60501-0000	STANDARD UNDERDRAIN SYSTEM	LNFT			140				140			
	A0600	62502-0000	TURF ESTABLISHMENT	SQYD		5,640				360	6,000			
	A0620	62516-2000	MULCHING, HYDRAULIC METHOD	SQYD		5,640				360	6,000			
	A0640	62901-1000	ROLLED EROSION CONTROL PRODUCT, TYPE 3.B	SQYD		3,490				210	3,700			
	A0660	63304-0900	SIGNS, ALUMINUM PANELS, TYPE 3 SHEETING	SQFT					56		56			
	A0680	63305-0400	POSTS, STEEL, 2-INCH X 2-INCH	LNFT					68		68			
	A0700	63305-1800	POSTS, WOOD, 4-INCH X 6-INCH	LNFT					16		16			
	A0720	63316-1000	REMOVE AND RESET SIGN	EACH					4		4			
	A0740	63316-2000	REMOVE AND RESET DELINEATOR	EACH	2						2			
	A0760	63401-0300	PAVEMENT MARKINGS, TYPE B, SOLID (WHITE EDGE LINE)	LNFT					1,768		1,768			
	A0780	63401-0300	PAVEMENT MARKINGS, TYPE B, SOLID (DOUBLE YELLOW CENTERLINE)	LNFT					4,082		4,082			
	A0800	63401-0300	PAVEMENT MARKINGS, TYPE B, SOLID (WHITE STOP BAR)	LNFT					28		28			
	A0820	63502-1300	TEMPORARY TRAFFIC CONTROL, DRUM	EACH				195			195			
	A0840	63504-1000	TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN	SQFT				426			426			
	A0860	63506-0500	TEMPORARY TRAFFIC CONTROL, FLAGGER	HOURL				1,432			1,432			

Shoulder Left Width	
Alignment	"SL"
"UB1" 100+00.00 to 100+70.02	0.5' to 2'
"UB1" 100+70.02 to 104+44.77	2'
"UB1" 104+44.77 to 105+32.29	2' to 0'
"UB1" 105+32.29 to 105+63.98	0'

Lane Left Width	
Alignment	"LL"
"UB1" 100+00.00 to 100+70.02	8.3' to 10'
"UB1" 100+70.02 to 104+44.77	10'
"UB1" 104+44.77 to 105+32.29	10' to 8'
"UB1" 105+32.29 to 105+63.98	8'

Lane Right Width	
Alignment	"LR"
"UB1" 100+00.00 to 100+70.02	7.4' to 10'
"UB1" 100+70.02 to 104+94.04	10'
"UB1" 104+44.77 to 105+63.98	10' to 8.8'

Shoulder Right Width	
Alignment	"SR"
"UB1" 100+00.00 to 100+70.02	0.5' to 2'
"UB1" 100+70.02 to 104+44.77	2'
"UB1" 104+44.77 to 105+63.98	2' to 0'

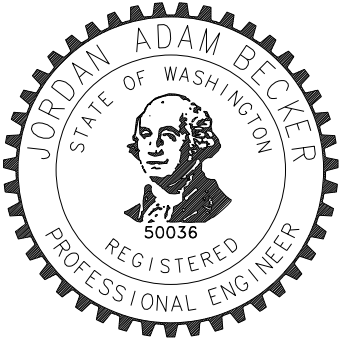


SITE 1 ROADWAY RECONSTRUCTION
"UB1" 100+00.00 to 105+63.98

Ditch Left Depth	
Alignment	"DL"
"UB1" 100+78.00 to 102+00.00	1' to 2'
"UB1" 102+00.00 to 102+50.00	2'
"UB1" 102+50.00 to 103+25.46	2' to 3.8'
"UB1" 103+54.00 to 103+86.00	3.9' to 2'
"UB1" 103+86.00 to 104+43.00	2'
"UB1" 104+43.00 to 104+60.00	2' to 1'
"UB1" 105+50.00 to 105+63.98	2' to 0.7'

Ditch Right Depth	
Alignment	"DR"
"UB1" 100+00.00 to 101+91.21	0.3' to 1.4'
"UB1" 102+40.00 to 103+03.77	2' to 4'
"UB1" 103+61.64 to 103+99.98	3.8' to 2'
"UB1" 104+00.00 to 105+50.00	2'
"UB1" 105+50.0 to 105+63.98	2' to 0.3'

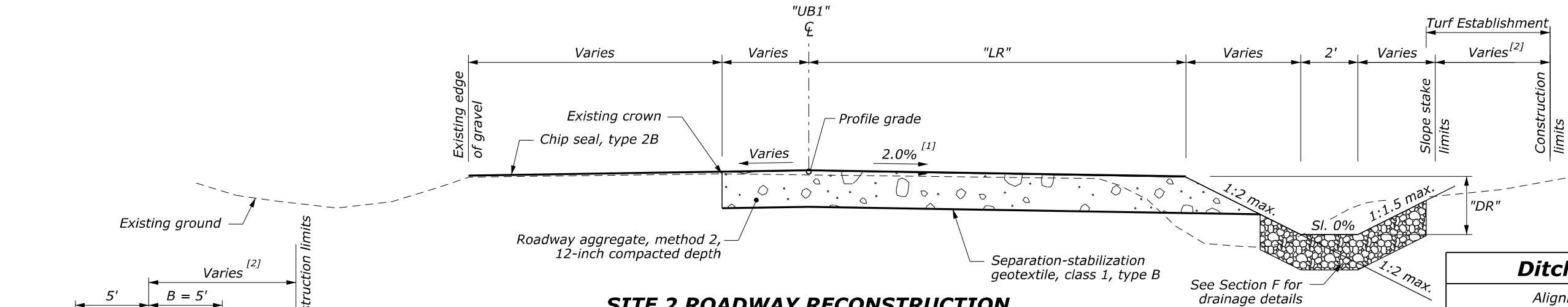
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Becker
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FOOTNOTE:

^[1] See cross slope data shown in Cross Slope Tables on Sheet D.2.

TYPICAL SECTIONS

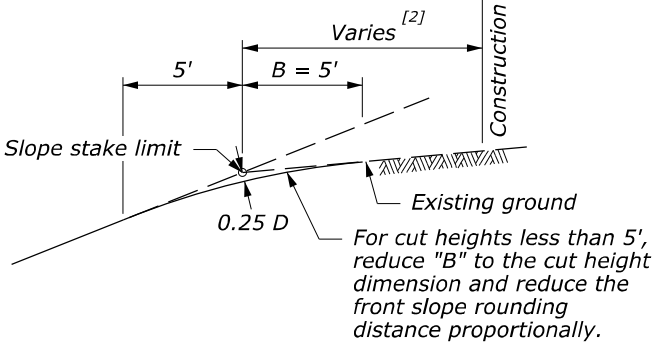


SITE 2 ROADWAY RECONSTRUCTION
"UB1" 125+64.23 to 126+24.18
"UB1" 129+44.23 to 130+72.30

Ditch Right Depth	
Alignment	"DR"
"UB1" 125+84.00 to 126+12.00	1.3' to 2'
"UB1" 126+12.00 to 130+52.00	2'
"UB1" 130+52.00 to 130+72.30	2' to 0.8'

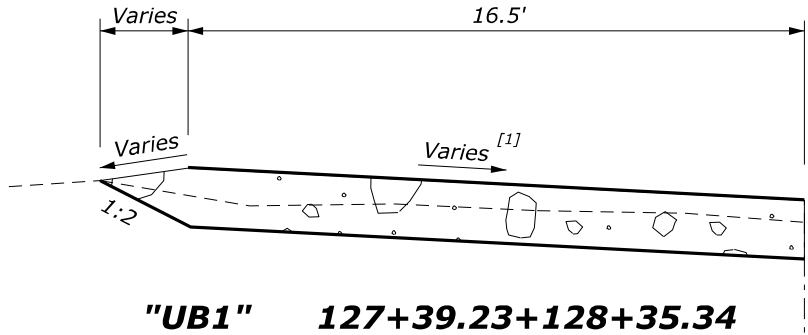
Lane Left Width	
Alignment	"LL"
"UB1" 126+24.18 to 126+54.23	13.6' to 16.5'
"UB1" 126+54.23 to 128+81.23	16.5'
"UB1" 128+81.23 to 129+44.23	16.5' to 12.9'

Lane Right Width	
Alignment	"LR"
"UB1" 125+64.23 to 125+70.23	8.7'
"UB1" 125+70.23 to 126+24.23	8.7' to 15.9'
"UB1" 126+24.23 to 126+54.23	15.9' to 16.5'
"UB1" 126+54.23 to 128+94.23	16.5'
"UB1" 128+94.23 to 129+44.23	16.5' to 9'
"UB1" 129+44.23 to 130+40.23	9'
"UB1" 130+40.23 to 130+72.30	9' to 8.7'

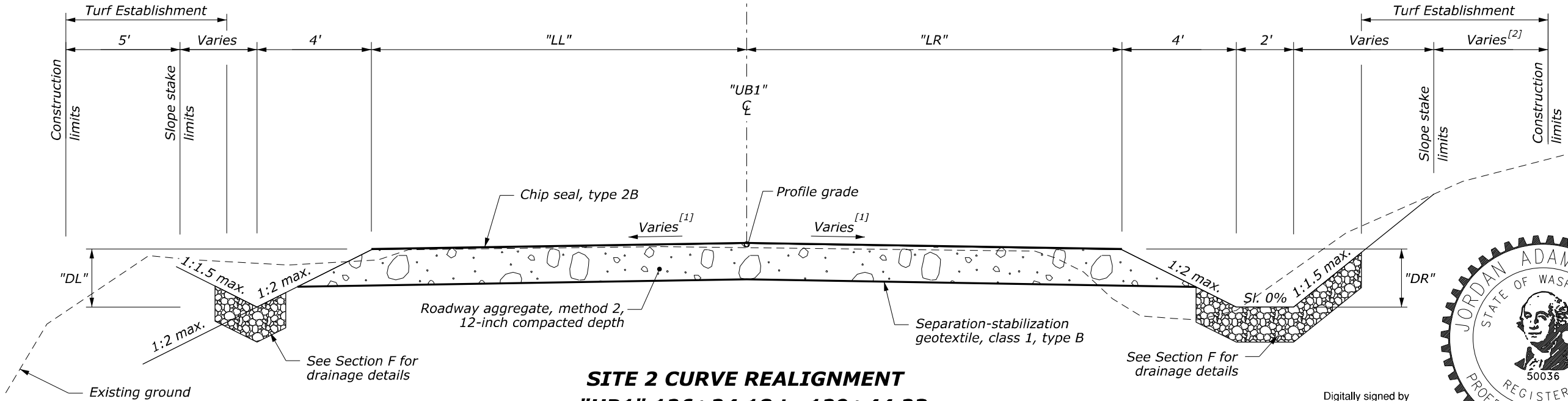


CUT SLOPE ROUNDING
SITE 2

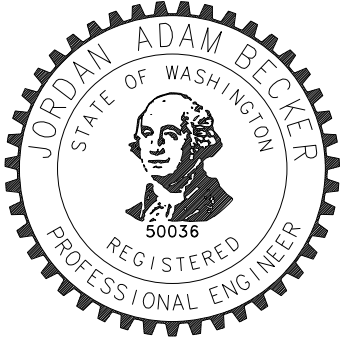
Ditch Left Depth	
Alignment	"DL"
"UB1" 128+52.58 to 129+44.23	2'



"UB1" 127+39.23+128+35.34



SITE 2 CURVE REALIGNMENT
"UB1" 126+24.18 to 129+44.23

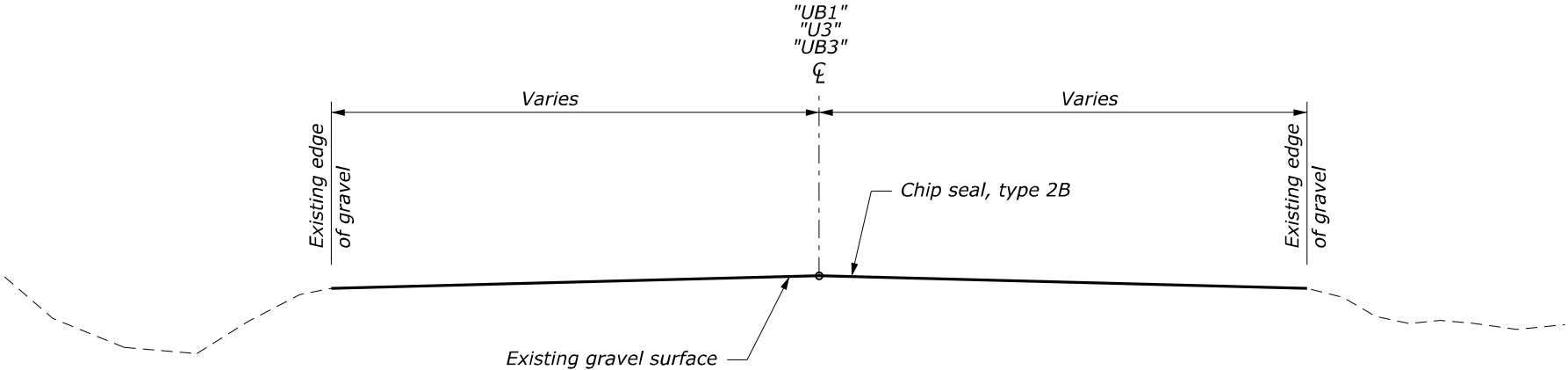


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FOOTNOTE:

- [1] See cross slope data shown in Cross Slope Tables on Sheet D.2.
[2] Construction limits shall not extend beyond TCE as shown on Sheet D.6.

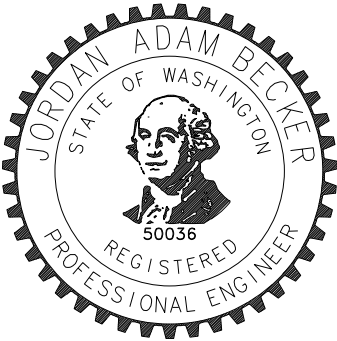
TYPICAL SECTIONS



EXISTING ROADWAY AND PULLOUTS^[1]
"UB1" 105+63.9 TO 125+64.2

SITE 3 ROADWAY SURFACING
"UB3" 300+50.0 to 306+55.19
"U3" 350+27.4 to 351+84.7

Jordan Adam Becker
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Date: 2023.02.14 21:55:57-08'00'



FOOTNOTE:

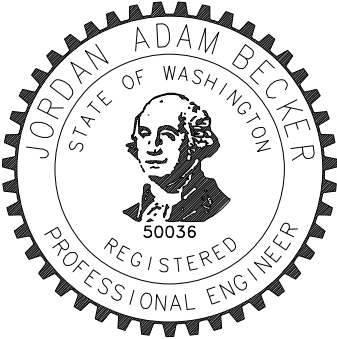
^[1] See vicinity map for pullout locations.

TYPICAL SECTIONS

PLAN & PROFILE QUANTITIES								
ITEM	DESCRIPTION	UNIT	LOCATIONS				TOTAL	NOTES
			SITE 1	SITE 2	SITE 3	BETWEEN SITE 1 AND 2		
20103-0000	Clearing and Grubbing	SQYD	1,647	3,884	-	-	5531	
20301-0700	Removal of Delineator	EACH	1	-	-	-	1	
20302-0800	Removal of Fence, Barbed Wire	LNFT	283	-	-	-	283	
20401-0000	Roadway Excavation	CUYD	817	5,965	-	-	6782	
20701-0200	Separation-Stabilization Geotextile, Class 1, Type B	SQYD	1,986	1,622	-	-	3608	
21101-1000	Roadway Obliteration, Method 1	SQYD	38	-	-	-	38	
30202-2000	Roadway Aggregate, Method 2	TON	1127	960	-	40	2127	1.97 TON/CUYD
40702-1200	Chip Seal, Type 2B	SQYD	1618	1537	1902	4159	9216	
63316-2000	Removal and Reset Delineator	EACH	-	2	-	-	2	

EARTHWORK TABLE		
LOCATION	EXCAVATION (CUYD)	EMBANKMENT (CUYD) INFORMATION ONLY
Site 1 - Rd "U"	97	-
Site 1 - Rd "UB1"	720	28
Site 2 - Rd "UB1"	5965	312
Total	6782	340

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Becker
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TABULATION OF
PLAN AND PROFILE
QUANTITIES

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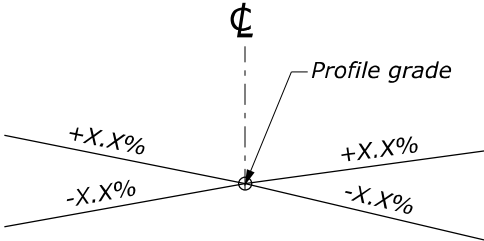
STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	D.2

"UB1" TANGENT TABLE		
NAME	LENGTH (FT)	DIRECTION
L100	57.04	S 83°59'15" E
L101	31.70	S 86°42'23" E
L102	56.37	S 86°42'23" E
L103	109.77	S 87°43'48" E
L104	82.85	N 89°01'31" E
L105	54.66	N 46°55'29" E
L106	215.48	N 34°10'53" E
L107	101.63	N 37°54'48" E
L108	47.33	N 34°25'51" E
L109	249.71	N 57°08'16" E
L110	127.36	N 69°52'55" E
L111	49.47	N 51°18'52" E
L112	7.87	N 36°50'10" E
L113	12.66	N 36°50'10" E
L114	120.03	N 39°38'24" E
L115	213.00	S 40°47'22" E

"U" TANGENT TABLE		
NAME	LENGTH (FT)	DIRECTION
L150	45.37	N 34°51'24" W
L151	51.03	N 38°02'56" W
L152	20.07	N 05°49'14" E

"UB3" TANGENT TABLE		
NAME	LENGTH (FT)	DIRECTION
L300	71.04	S 36°13'24" W
L301	258.64	S 33°58'16" W
L302	89.28	S 52°58'48" W
L303	25.97	S 35°07'19" W

"U3" TANGENT TABLE		
NAME	LENGTH (FT)	DIRECTION
L351	40.23	S 72°08'27" E
L352	63.16	S 70°44'12" E
L353	96.61	S 71°51'60" W



TYPICAL CROSS SLOPE DETAIL

"UB1" CURVE TABLE							
NAME	RADIUS (FT)	ARC LENGTH (FT)	CHORD LENGTH (FT)	TANGENT LENGTH (FT)	MIDDLE ORDINATE	EXTERNAL DISTANCE (FT)	CHORD DIRECTION
C100	4360	134.17	134.16	67.09	0.52	0.52	S 83°06'21" E
C101	4360	341.06	340.97	170.62	3.33	3.34	S 84°27'55" E
C102	2000	35.74	35.74	17.87	0.08	0.08	S 87°13'05" E
C103	800	50.56	50.55	25.29	0.40	0.40	S 89°09'51" E
C104	200	146.96	143.68	76.97	13.35	14.30	N 67°58'30" E
C105	400	88.97	88.78	44.67	2.47	2.49	S 40°33'11" E
C106	1500	97.70	97.69	48.87	0.80	0.80	N 36°02'50" E
C107	1000	60.78	60.77	30.34	0.46	0.46	N 36°10'20" E
C108	200	79.26	78.74	40.16	3.91	3.99	N 45°47'04" E
C109	1000	222.43	221.97	111.67	6.18	6.22	N 63°30'35" E
C110	200	64.81	64.53	32.69	2.62	2.65	N 60°35'53" E
C111	200	50.53	50.40	25.41	1.59	1.61	N 44°04'31" E
C112	300	14.68	14.68	7.34	0.09	0.09	N 38°14'17" E
C113	85	147.72	129.82	100.53	30.12	46.65	N 89°25'31" E

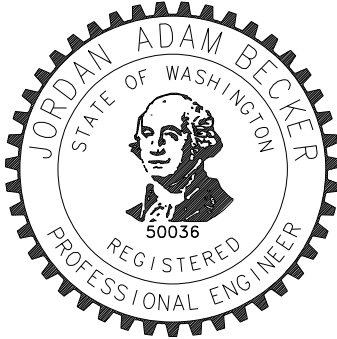
"U" CURVE TABLE							
NAME	RADIUS (FT)	ARC LENGTH (FT)	CHORD LENGTH (FT)	TANGENT LENGTH (FT)	MIDDLE ORDINATE	EXTERNAL DISTANCE (FT)	CHORD DIRECTION
C150	900	50.14	50.14	25.08	0.35	0.35	N 36°27'10" E
C151	60	45.94	44.83	24.16	4.34	4.68	N 05°49'14" E

"UB3" CURVE TABLE							
NAME	RADIUS (FT)	ARC LENGTH (FT)	CHORD LENGTH (FT)	TANGENT LENGTH (FT)	MIDDLE ORDINATE	EXTERNAL DISTANCE (FT)	CHORD DIRECTION
C300	1000	39.31	39.31	19.66	0.19	0.19	S 35°05'50" E
C301	450	149.30	148.61	75.34	6.18	6.26	S 43°28'32" E
C302	100	31.17	31.04	15.71	1.21	1.23	S 44°03'04" E

"UB1" CROSS SLOPE TABLE		
STATION RANGE	LT OR RT	CROSS SLOPE
100+00.00 to 100+50.00	LT	-4.5% to -2.0%
100+50.00 to 105+53.00	LT	-2.0%
105+53.00 to 105+63.97	LT	-2.0% to -4.0%
100+00.00 to 100+50.00	RT	-3.4% to -2.0%
100+50.00 to 105+53.00	RT	-2.0%
105+53.00 to 105+63.97	RT	-2.0% to -3.7%
126+24.18 to 126+27.20	LT	-2.0%
126+27.20 to 127+35.00	LT	-2.0% to 5.0%
127+35.00 to 128+35.00	LT	5.0%
128+35.00 to 129+42.80	LT	5.0% to -2.0%
129+42.80 to 129+44.23	LT	-2.0%
125+64.23 to 126+24.18	RT	-2.0%
126+24.18 to 126+88.80	RT	-2.0%
126+88.80 to 127+35.00	RT	-2.0% to -5.0%
127+35.00 to 128+35.00	RT	-5.0%
128+35.00 to 128+81.20	RT	-5.0% to -2.0%
128+81.20 to 130+07.12	RT	-2.0%
130+07.12 to 130+21.21	RT	-2.0% to -1.0%
130+21.21 to 130+72.30	RT	-1.0% to -3.6%

"U" CROSS SLOPE TABLE		
STATION RANGE	LT OR RT	CROSS SLOPE
151+23.00 to 151+40.00	LT	-4.0% to -2.0%
151+40.00 to 151+79.20	LT	-2.0%
151+79.20 to 152+00.58	LT	-2.0% to -2.1%
151+23.00 to 151+40.00	RT	-2.1% to -2.0%
151+40.00 to 151+79.20	RT	-2.0%
151+79.20 to 152+00.58	RT	-2.0% to 2.1%

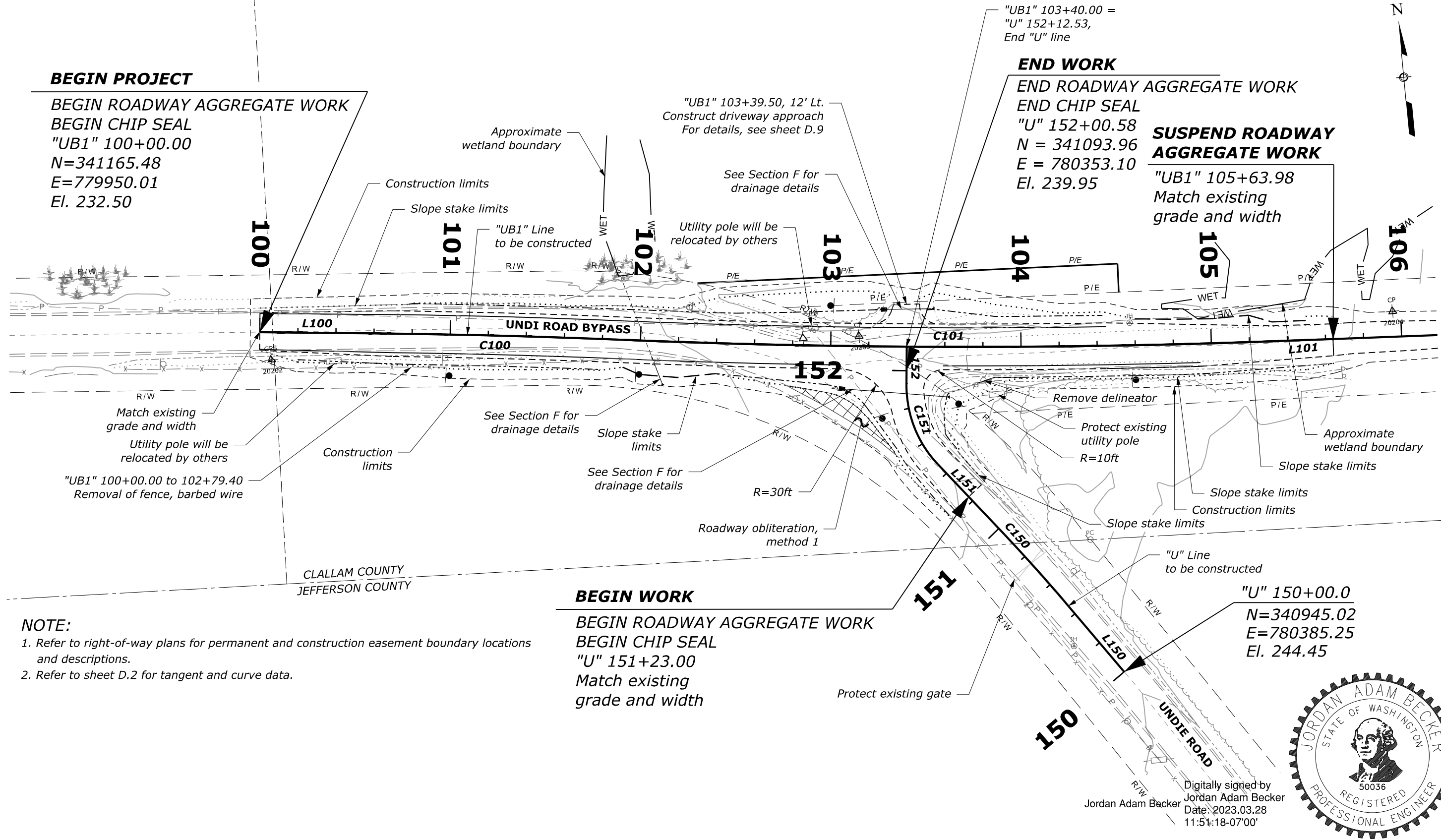
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by Jordan Adam
Becker
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CURVE, TANGENT
AND CROSS SLOPE
DATA TABLES

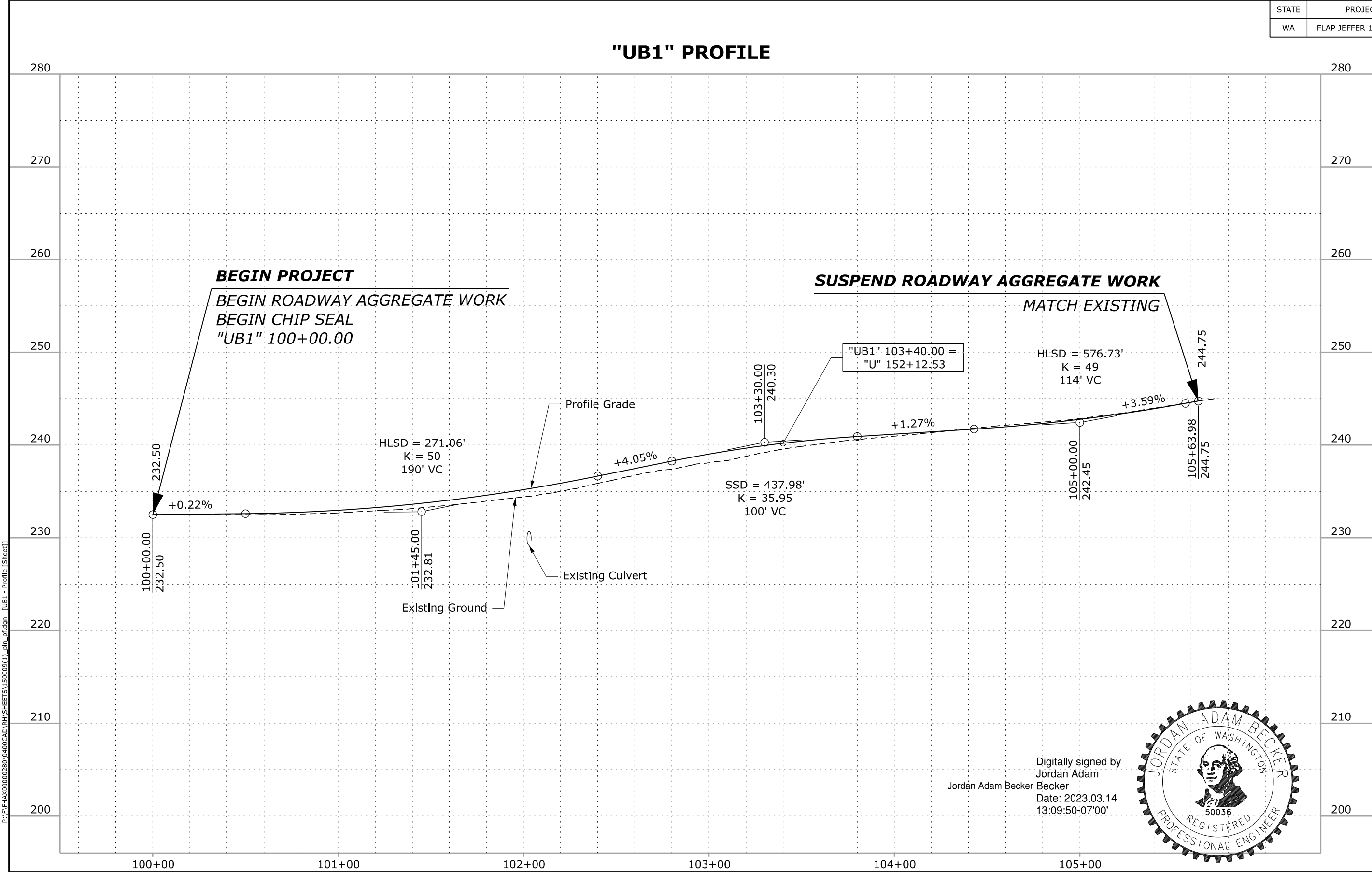
STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	D.3

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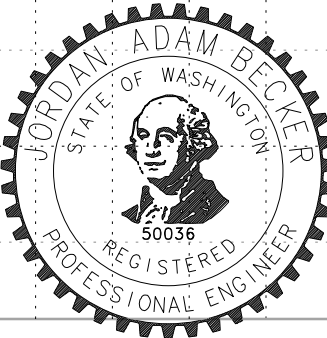


STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	D.4

"UB1" PROFILE

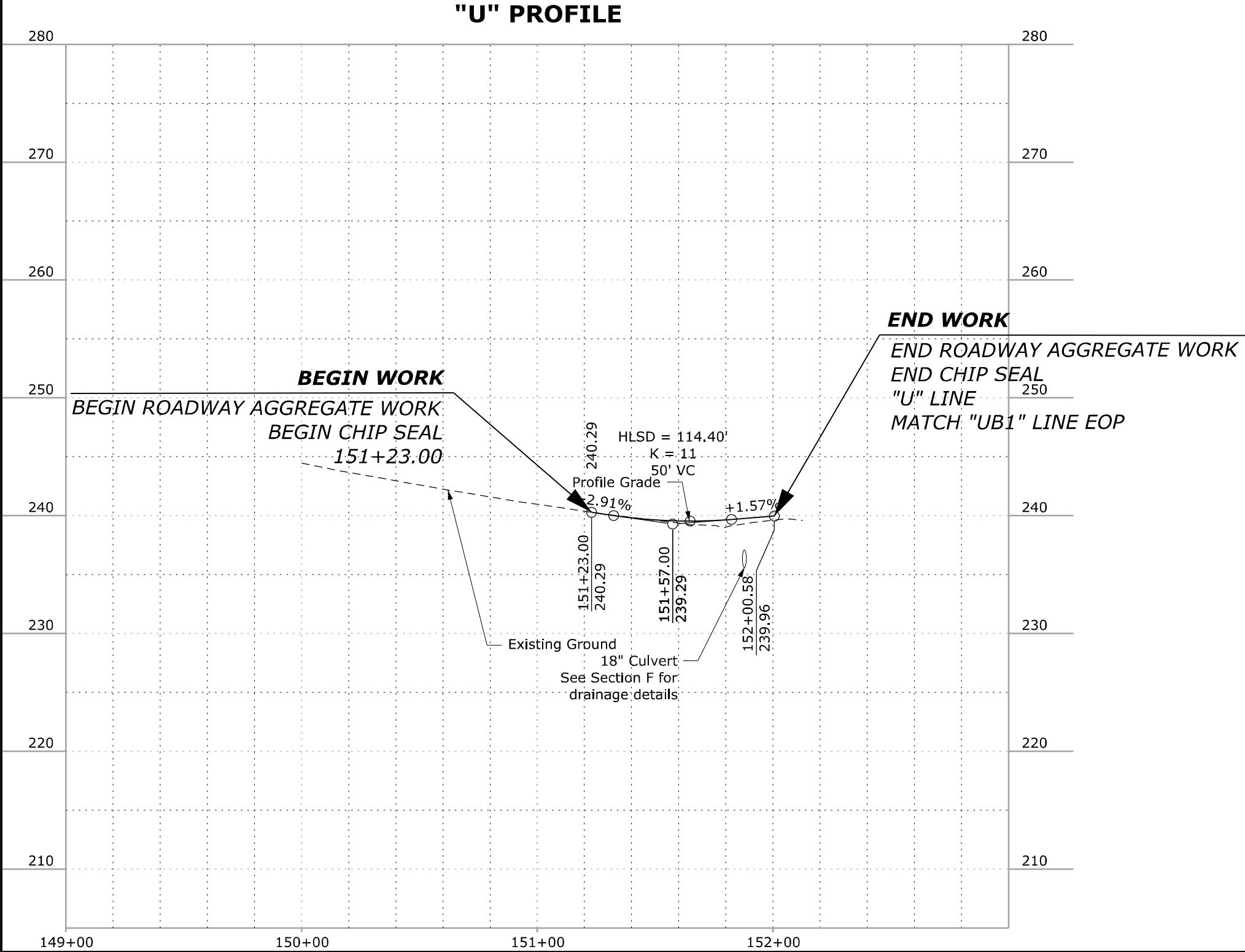


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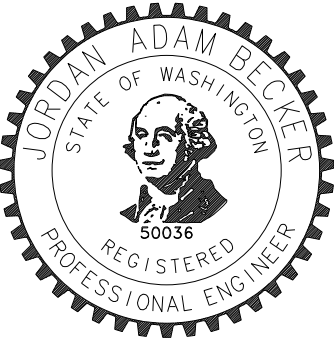


STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	D.5

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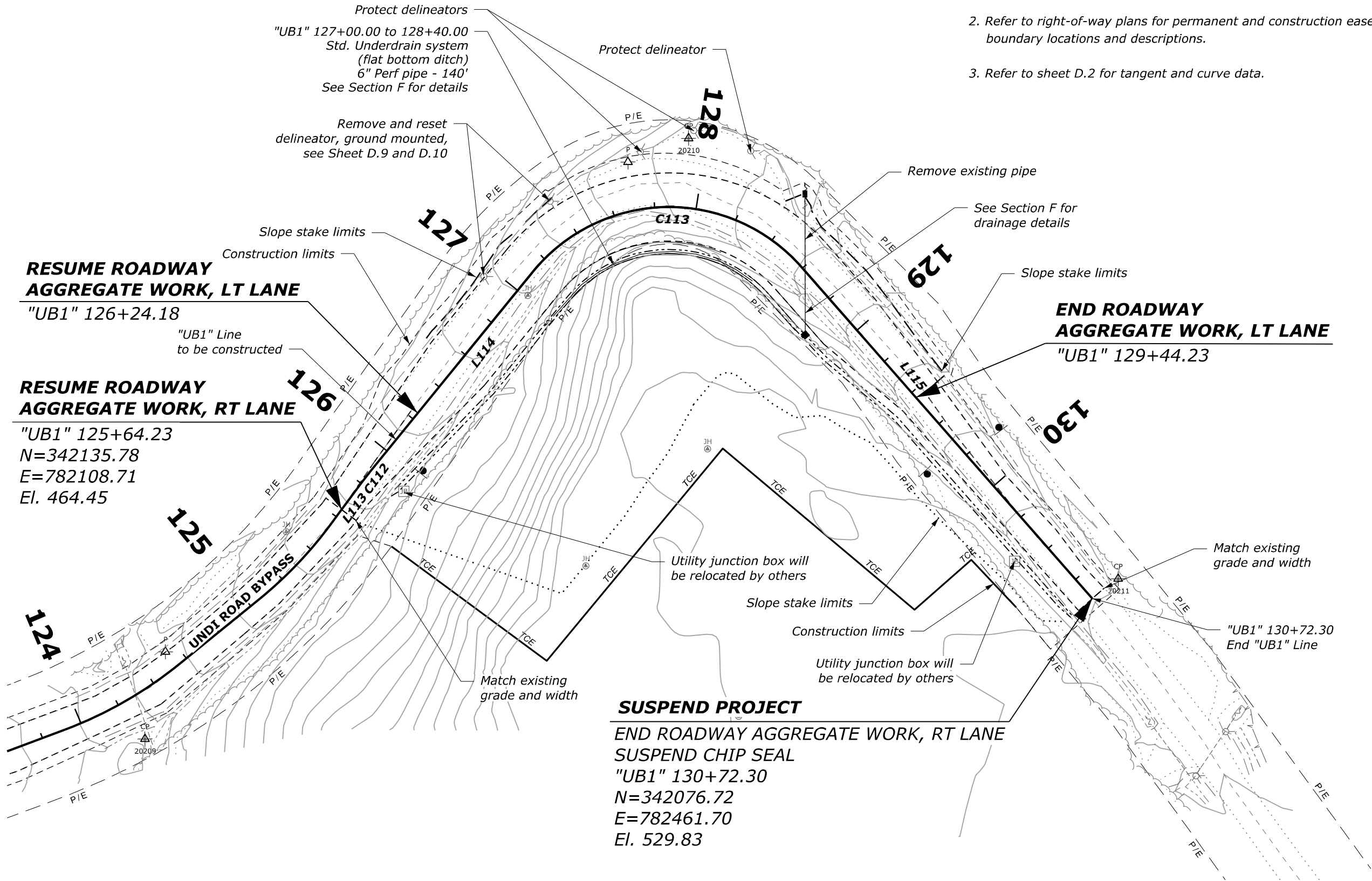


STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	D.6

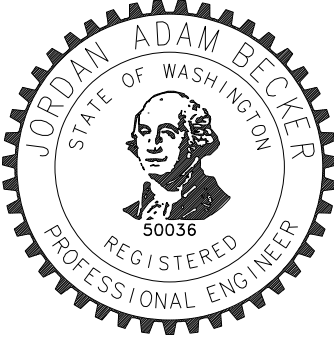
- NOTE:**
1. Provide temporary traffic control at Site 2 in accordance with Std. drwg. 635-6, See Sheet G.4.
 2. Refer to right-of-way plans for permanent and construction easement boundary locations and descriptions.
 3. Refer to sheet D.2 for tangent and curve data.



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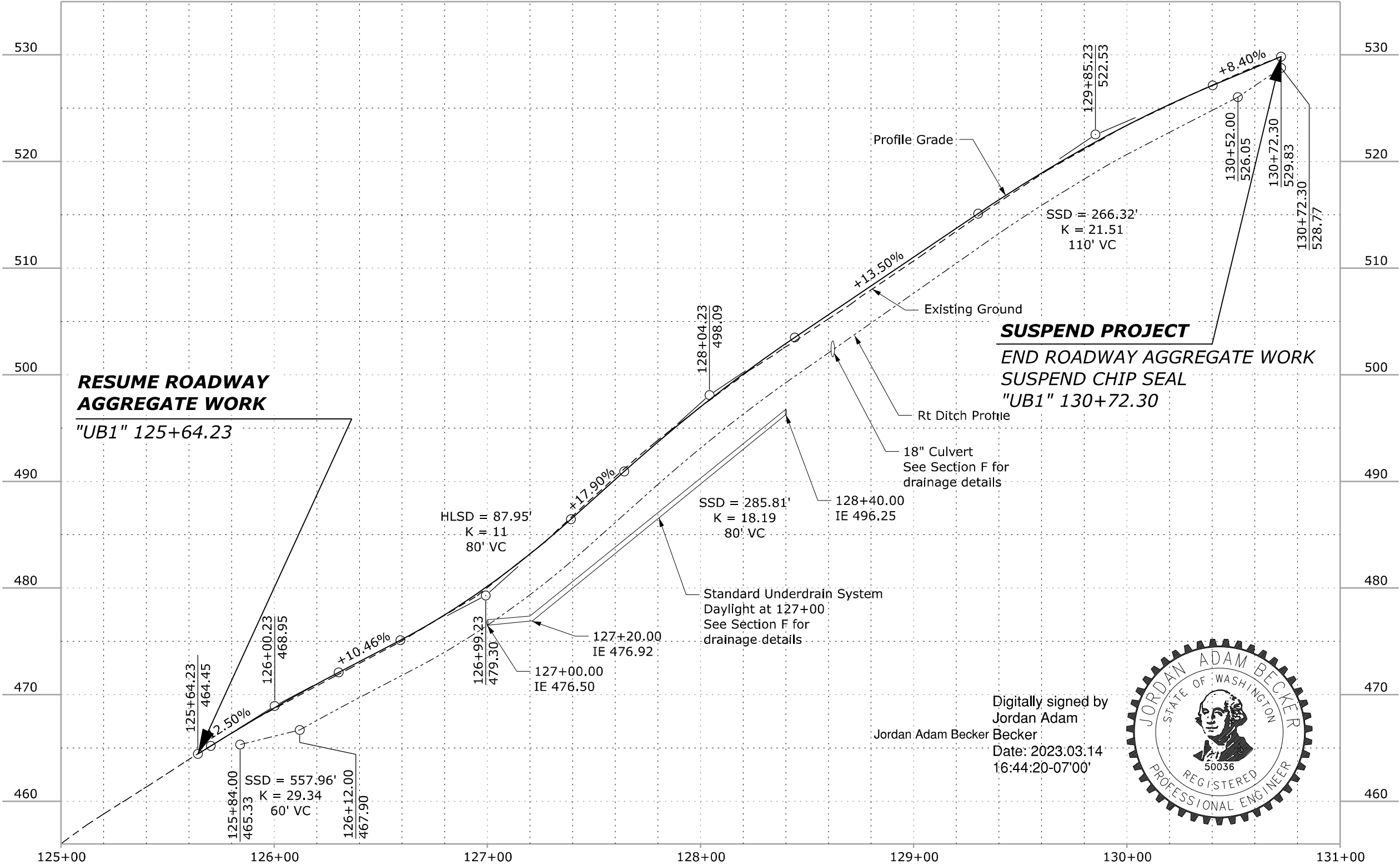
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Jordan Adam Becker
Becker
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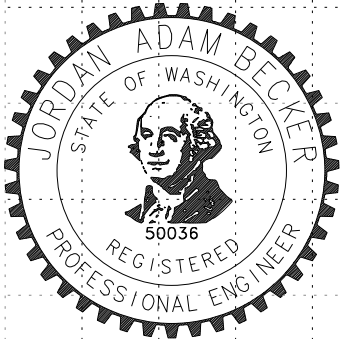
SITE 2 PLAN

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	D.7

"UB1" PROFILE



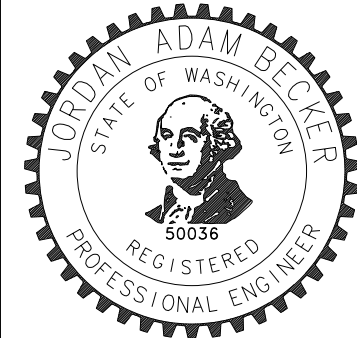
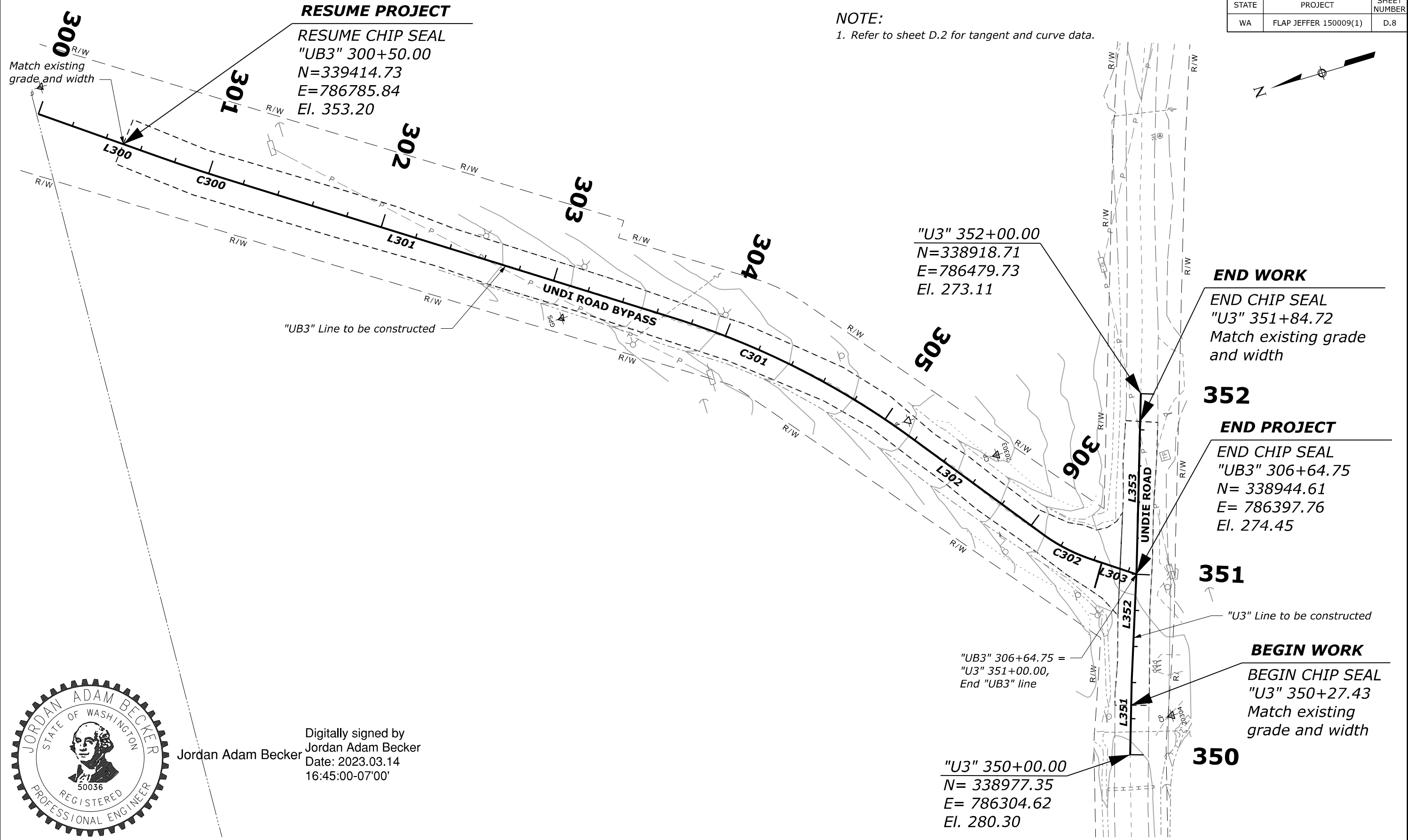
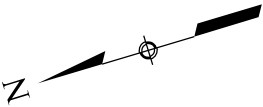
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SITE 2 PROFILE

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	D.8

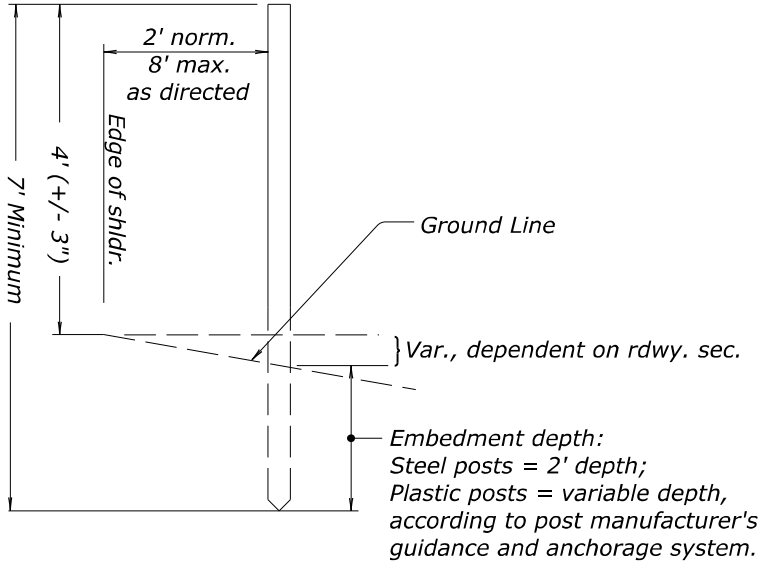
NOTE:
1. Refer to sheet D.2 for tangent and curve data.



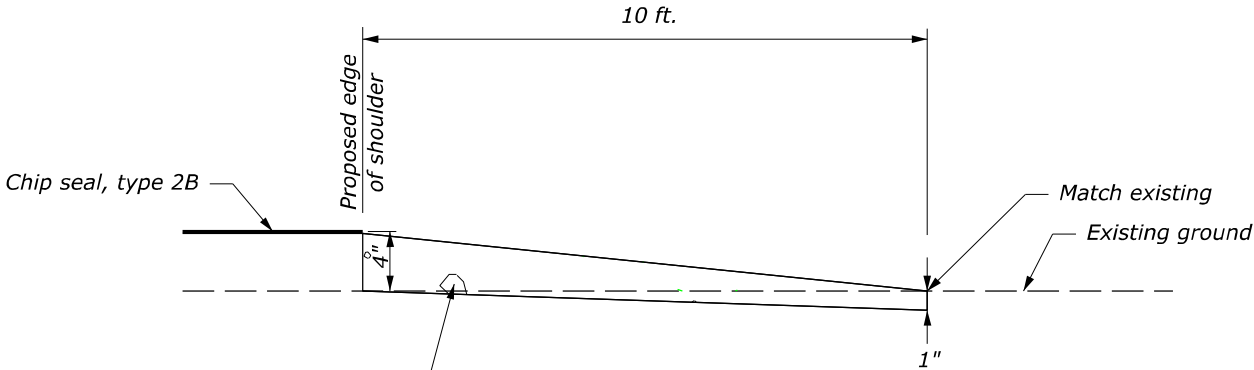
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SITE 3 PLAN

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	D.9

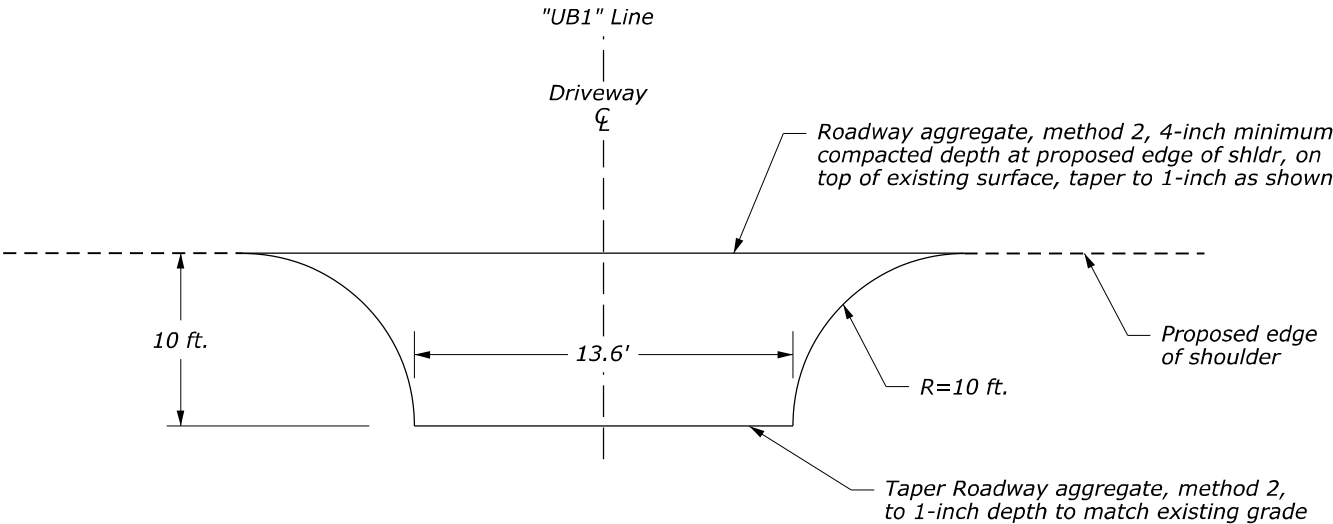


DELINEATOR INSTALLATION DETAIL



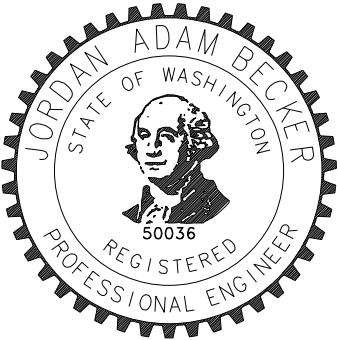
DRIVEWAY APPROACH PROFILE

Roadway aggregate, method 2, 4-inch minimum compacted depth at proposed edge of shldr, on top of existing surface, taper to 1-inch as shown



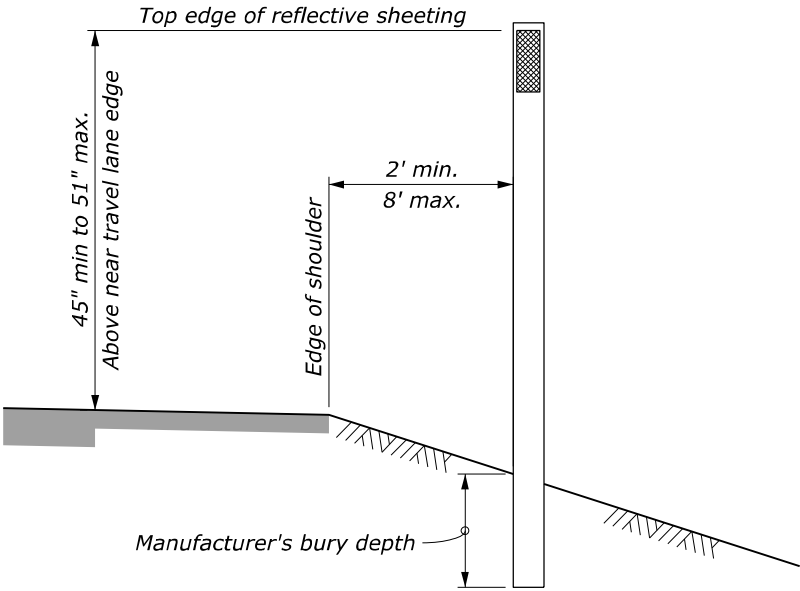
DRIVEWAY APPROACH

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Becker
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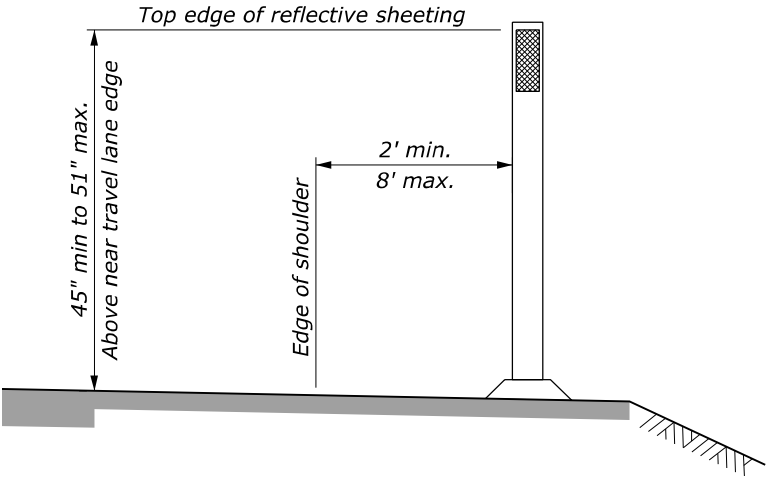


- GENERAL NOTES:**
1. Install delineators with reflectors facing adjacent oncoming traffic.

ROADWAY DETAILS



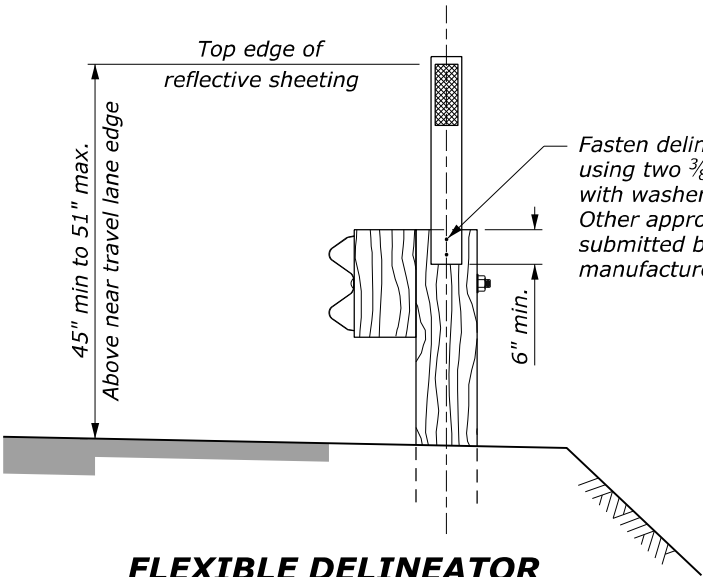
FLEXIBLE DELINEATOR
GROUND MOUNTED



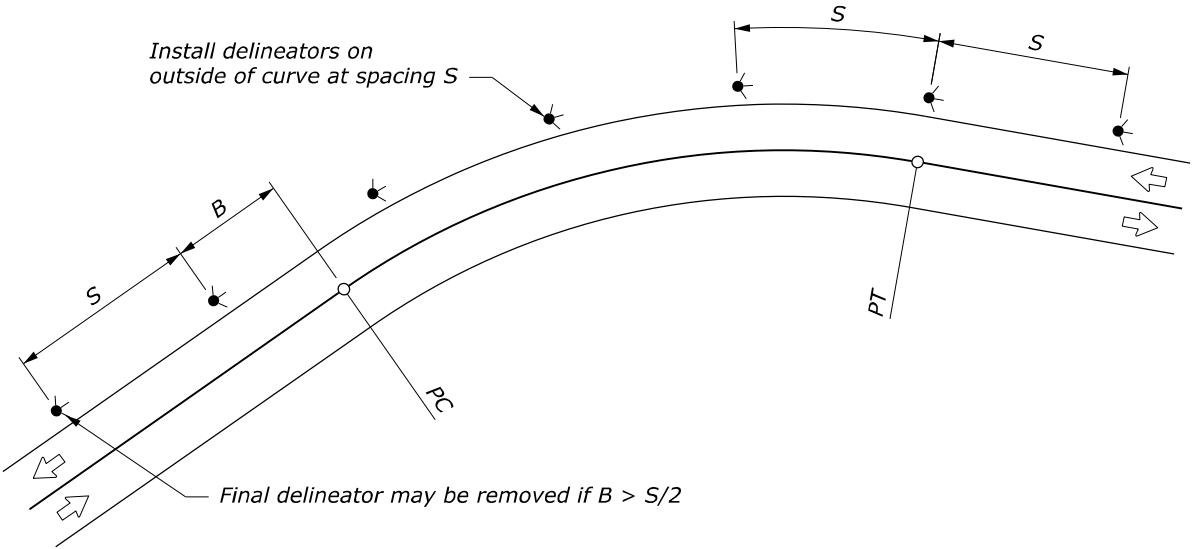
FLEXIBLE DELINEATOR
SURFACE MOUNTED

NOTE:

1. When a delineator falls within a cross road or approach, the delineator may be moved in either direction a distance not to exceed one quarter of the normal spacing. Eliminate the delineator if this allowance is exceeded.
2. Place delineators 2 feet from the edge of design shoulder unless otherwise specified.
3. Install delineators behind the rail at guardrail locations. Either drive the delineator in line with the guardrail posts or mount a shorter delineator onto the guardrail post as shown on this sheet.
4. When the contract does not provide for the construction of the ultimate pavement, allow for the thickness of base and pavement to be placed later when establishing the elevation of the traffic delineators.
5. Use the current edition of the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) as a guide for delineation layout.



FLEXIBLE DELINEATOR
GUARDRAIL MOUNTED OPTION
(Use only with wood guardrail posts)

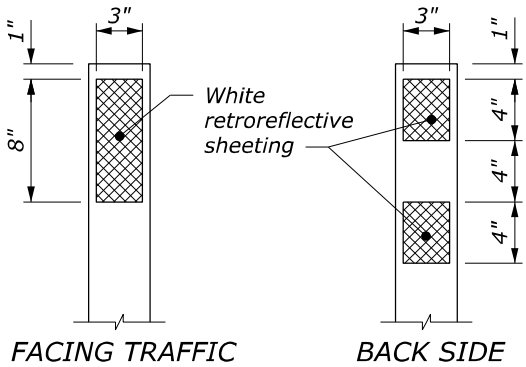


PLACEMENT ON HORIZONTAL CURVES

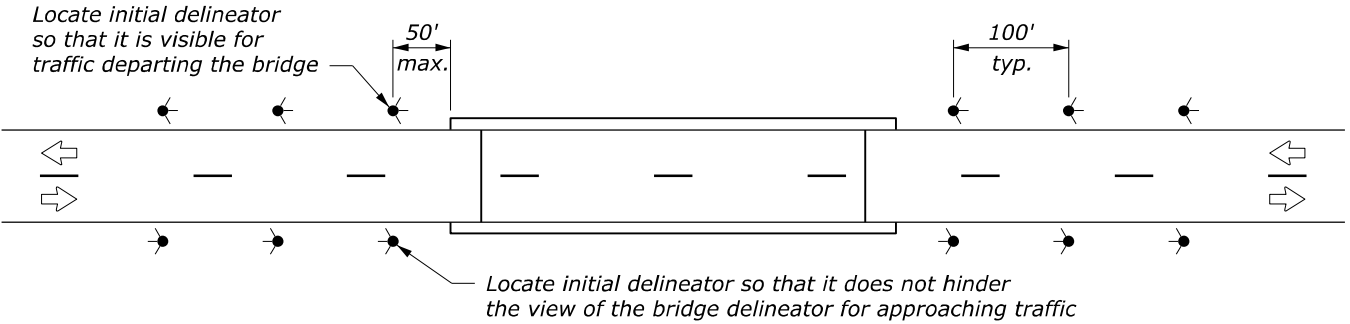
DELINEATOR SPACING ON HORIZONTAL CURVES	
CURVE RADIUS (FEET)	SPACING (S) (FEET)
50	20
115	25
180	35
250	40
300	50
400	55
500	65
600	70
700	75
800	80
900	85
1,000	90

Spacing for a specific curve may be interpolated from the table, or calculated using the formula:
$$\text{Spacing} = 3 \sqrt{R-50}$$

The minimum spacing should be 20 feet.
Curve spacing should not exceed 300 feet.



REFLECTIVE SHEETING DETAIL



PLACEMENT AT BRIDGE APPROACHES

NO SCALE

PROJECT: Undi Road Bypass Improvements
DATE OF FIELD WORK: Jan-Feb 2020
PROJECT UNITS: US SURVEY FOOT

COORDINATE SYSTEM: Washington North SPCS NAD83 2011
VERTICAL DATUM: Orthometric elevations based on the NAVD88 GEOID18
EPOCH DATE: 2010.0000

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	D.11

POINT NUMBER	STATE PLANE COORDINATES			GEO COORDINATES				DESCRIPTION
	NORTH	EAST	ELEVATION	LATITUDE	LONGITUDE	ELLIPSOID HEIGHT	COMBINED FACTOR	
20201	341177.583	779685.544	232.442	47°52'53.471417"N	124°20'32.200299"W	157.7153	0.999943192	5/8" IR W/FHWA ALUM CAP
20202	341149.757	779953.173	232.326	47°52'53.317455"N	124°20'28.259379"W	157.6126	0.9999432	5/8" IR W/FHWA ALUM CAP
20203	341132.967	780261.617	238.575	47°52'53.290607"N	124°20'23.727664"W	163.8776	0.999942901	5/8" IR W/FHWA ALUM CAP
20204	341119.563	780541.858	244.921	47°52'53.284417"N	124°20'19.611551"W	170.2382	0.999942597	5/8" IR W/FHWA ALUM CAP
20205	341092.258	780954.349	250.153	47°52'53.200545"N	124°20'13.547922"W	175.4917	0.999942348	5/8" IR W/FHWA ALUM CAP
20208	341962.835	781774.942	408.738	47°53'02.151970"N	124°20'02.102218"W	334.1536	0.999934592	5/8" IR W/FHWA ALUM CAP
20209	342011.949	782002.070	444.037	47°53'02.738100"N	124°19'58.806061"W	369.4675	0.999932893	5/8" IR W/FHWA ALUM CAP
20210	342299.829	782267.003	497.069	47°53'05.695152"N	124°19'55.114995"W	422.5257	0.999930301	5/8" IR W/FHWA ALUM CAP
20211	342085.453	782472.782	530.822	47°53'03.673905"N	124°19'51.956013"W	456.2828	0.999928728	5/8" IR W/FHWA ALUM CAP
20301	339448.181	786830.863	361.004	47°52'39.622016"N	124°18'46.331355"W	286.6195	0.999937312	5/8" IR W/FHWA ALUM CAP
20302	339208.648	786625.132	318.111	47°52'37.168651"N	124°18'49.187471"W	243.7041	0.999939412	5/8" IR W/FHWA ALUM CAP
20303	338999.782	786483.284	291.126	47°52'35.046125"N	124°18'51.127676"W	216.7021	0.999940745	5/8" IR W/FHWA ALUM CAP
20304	338948.411	786317.167	277.772	47°52'34.465516"N	124°18'53.527971"W	203.3362	0.999941395	5/8" IR W/FHWA ALUM CAP

NOTE:
1. To precisely check distances between points as measured on the ground, inverse the state plane coordinates and divide the computed distance by a mean combined factor of the two points.

SURVEY CONTROL

\\dealinc.com\files\PROJECT\F\HAX00000280\0400CAD\RH\SHEETS\150009(1).pln_ec.dgn [Tabulation Quantities (Sheet)] 7 March 2023 12:42 PM

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	E.1

EROSION CONTROL QUANTITIES					
ITEM	DESCRIPTION	QUANTITY			UNIT
		Site 1	Site 2	Total	
15705-1400	Soil Erosion Control, Fiber Roll	324	1608	1932	LNFT
15706-0200	Soil Erosion Control, Check Dam (Fiber Roll)	9	-	9	EACH
15706-0200	Soil Erosion Control, Check Dam (Filter Rock)	5	-	5	EACH
15706-1300	Soil Erosion Control, Inlet Protection, Type C	-	1	1	EACH
62502-0000	Turf Establishment	1820	3820	5640	SQYD
62516-2000	Mulching, Hydraulic Method	1820	3820	5640	SQYD
62901-1000	Rolled Erosion Control Product, Type 3.B	-	3490	3490	SQYD



TABULATION OF
EROSION CONTROL
QUANTITIES

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	E.2

BEGIN PROJECT

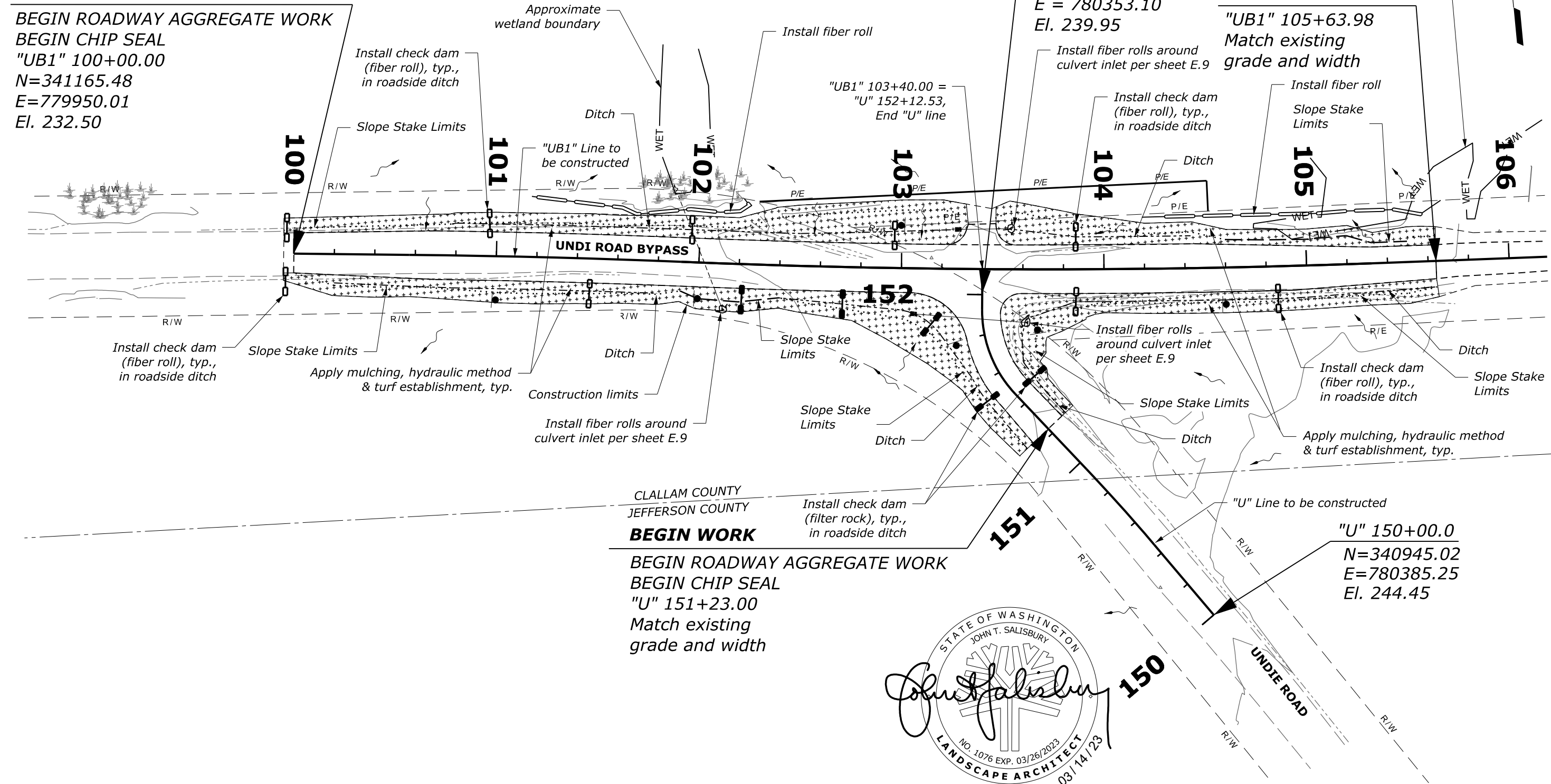
BEGIN ROADWAY AGGREGATE WORK
BEGIN CHIP SEAL
"UB1" 100+00.00
N=341165.48
E=779950.01
El. 232.50

END WORK

END ROADWAY AGGREGATE WORK
END CHIP SEAL
"U" 152+00.58
N = 341093.96
E = 780353.10
El. 239.95

SUSPEND ROADWAY AGGREGATE WORK

"UB1" 105+63.98
Match existing
grade and width



SOIL EROSION CONTROL LEGEND:

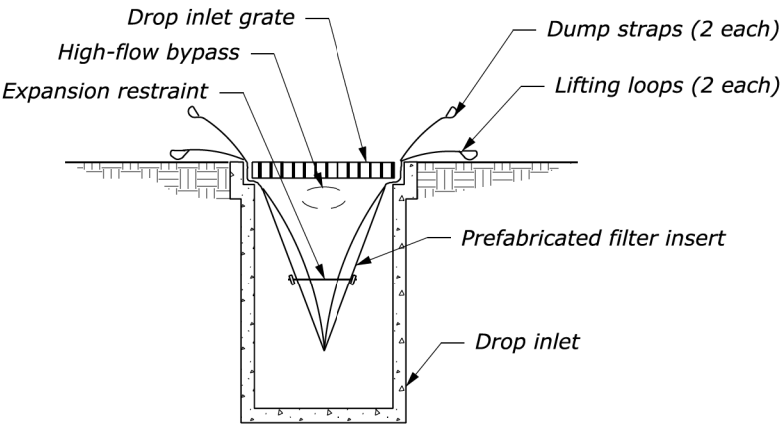
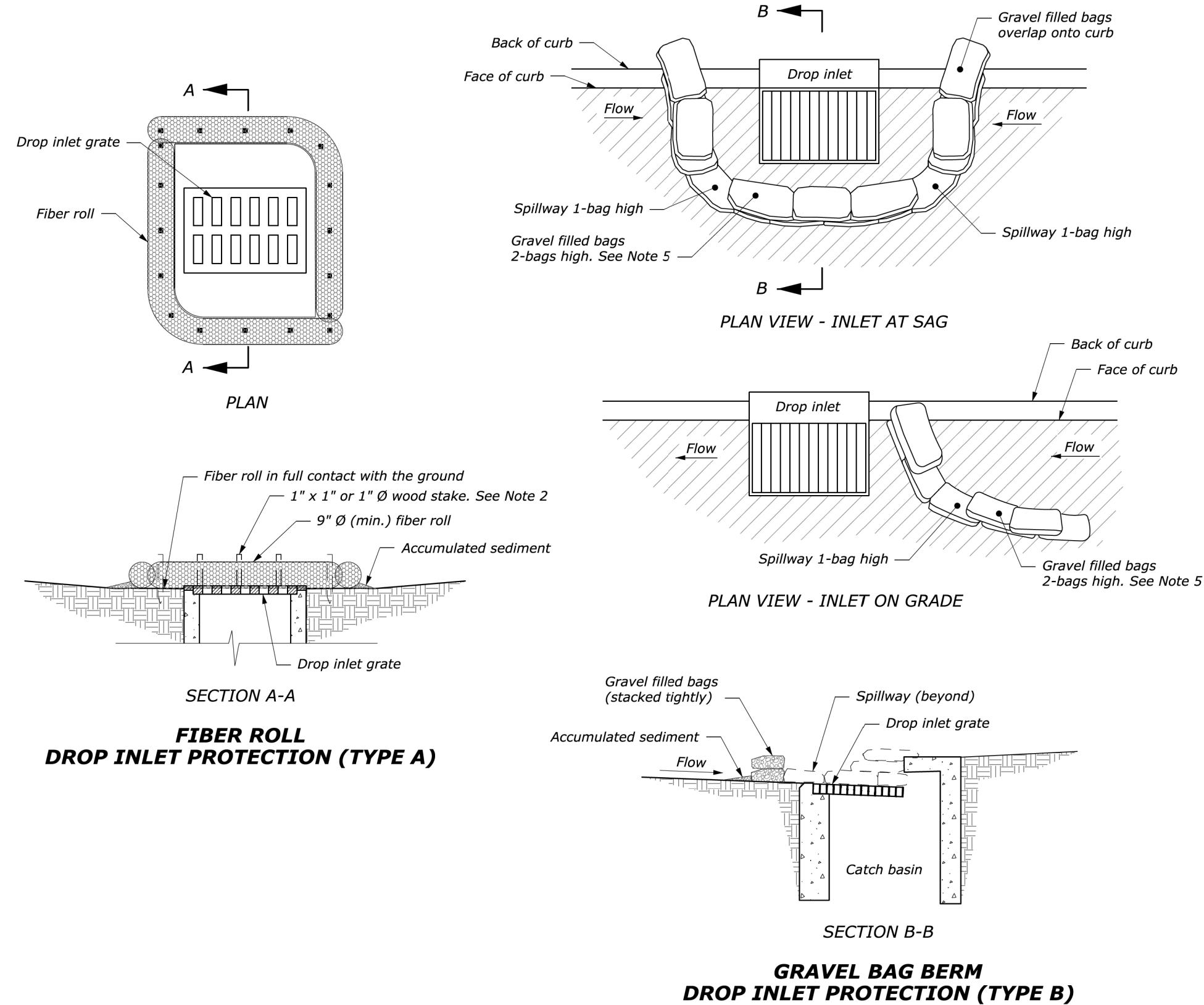
- Fiber roll per sheet E.7
- Direction of drainage
- Check dam (fiber roll) per sheet E.6
- Mulching, hydraulic method & turf establishment
- Check dam (filter rock) per sheet E.6

**SITE 1
EROSION CONTROL PLAN**

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	E.4

NOTE:

1. Select the inlet protection device to fit field conditions as approved by the CO.
2. Install fiber rolls with stakes spaced no more than 24-inches on center. Drive stakes 12-inches (min.) in undisturbed soil.
3. Approximate finished dimension of gravel bags is 12-inches x 18-inches.
4. Maximum top of gravel bag spillway elevation = Top of curve minus 1-inch.
5. Pack gravel filled bags tightly together end to end to ensure no sediment flows between or underneath the bags. Where tight fit is unachievable, install geotextile filter, class 2, type C along the upstream face of the bags. Place fabric over the top of the bags to the spillway elevation. Anchor the fabric by placing the next layer of bags on top of it. Extend the geotextile fabric a minimum of 18-inches upstream of the bags. Cover geotextile fabric to the top of the fabric with clean, silt-free coarse aggregate between 2-inches and 3-inches in diameter.
6. Size the prefabricated filter insert (Type C) to fit the drop inlet and allow collected material removal without spillage. Include a high-flow bypass in the insert.



**PREFABRICATED FILTER INSERT
DROP INLET PROTECTION (TYPE C)**
See Note 6

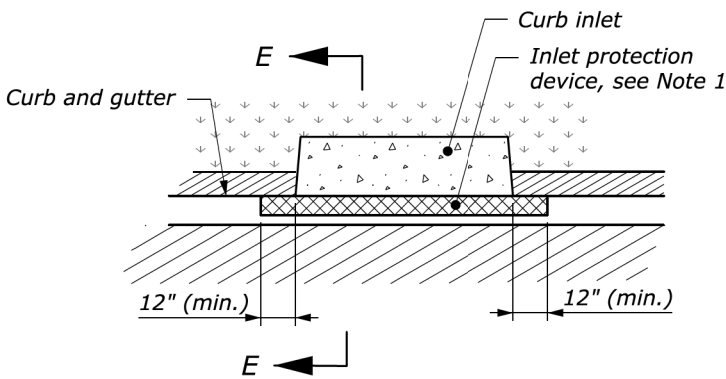
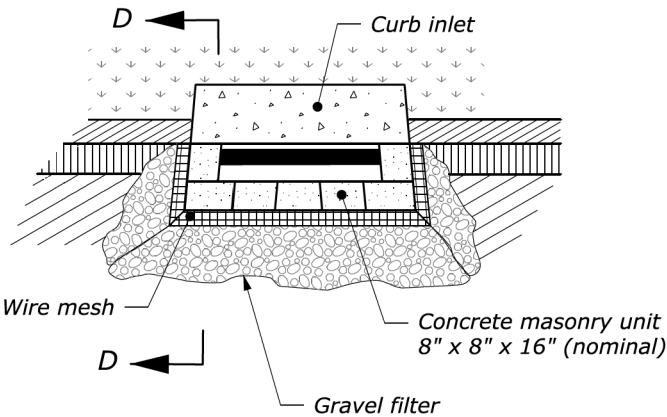
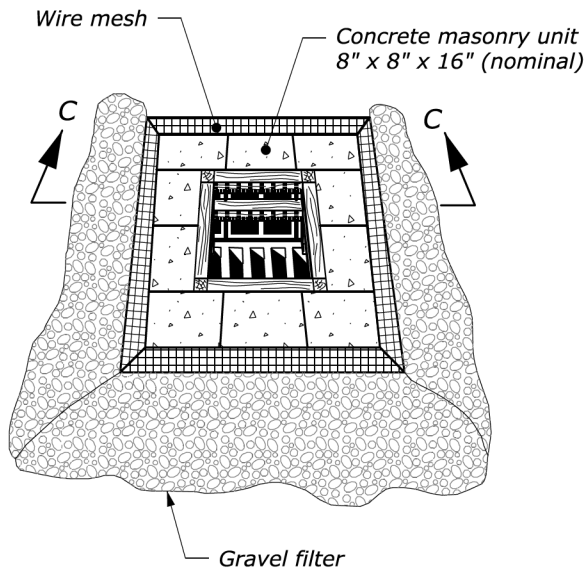
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION WESTERN FEDERAL LANDS HIGHWAY DIVISION	
U.S. CUSTOMARY DETAIL TEMPORARY INLET PROTECTION Sheet 1 of 2	
DETAIL APPROVED FOR USE --/----	DETAIL
REVISED: 7/2016	W157-2

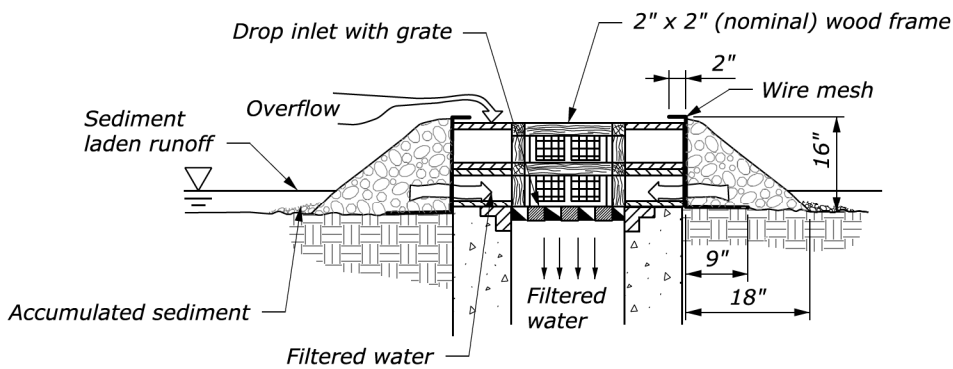
STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	E.5

NOTE:

1. Inlet protection device (type E) may consist of continuous filter tubing filled with gravel or other prefabricated filter material. Install device according to manufacturer's recommendations.
2. Vary dimensions to fit field conditions.

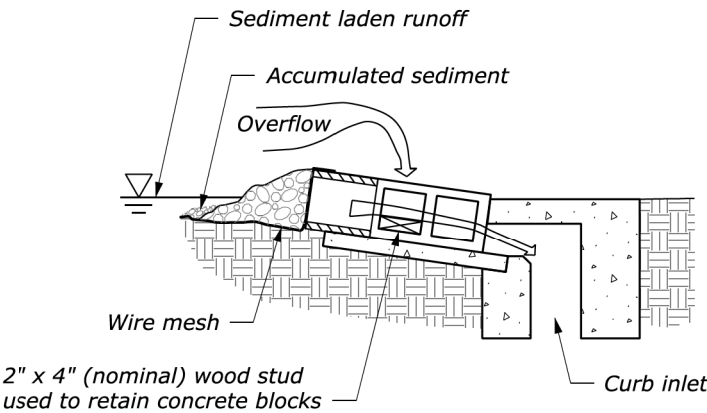


PLAN



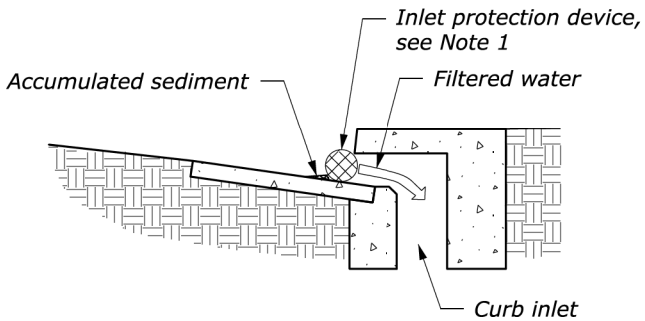
SECTION C-C

**BLOCK AND GRAVEL
DROP INLET PROTECTION (TYPE D1)**



SECTION D-D

**BLOCK AND GRAVEL
CURB INLET PROTECTION (TYPE D2)**



SECTION E-E

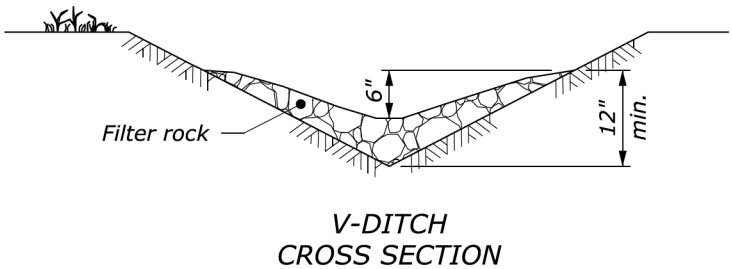
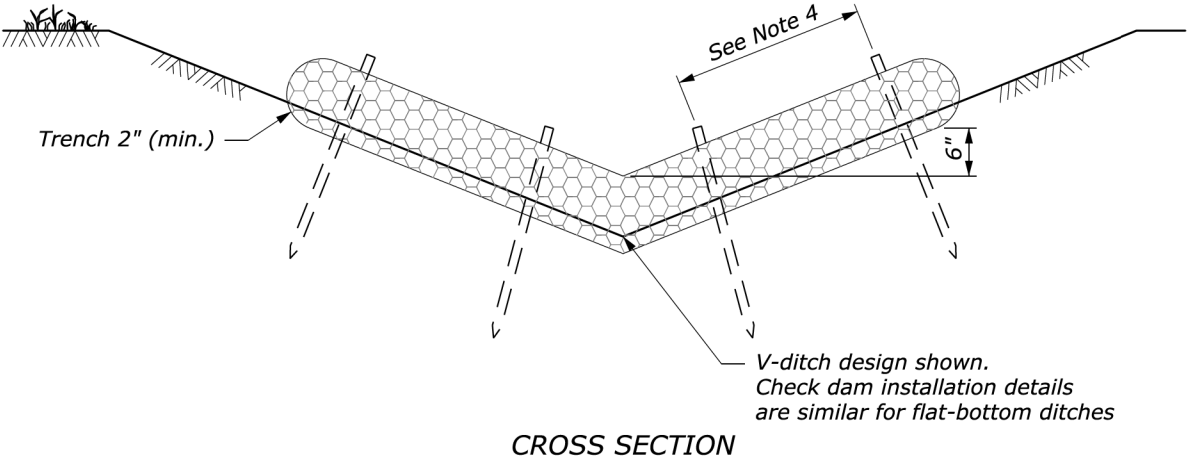
**INLET PROTECTION DEVICE
CURB INLET PROTECTION (TYPE E)**

NO SCALE

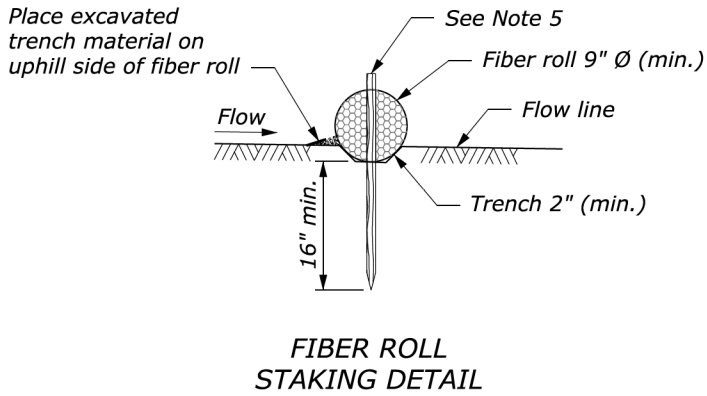
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION WESTERN FEDERAL LANDS HIGHWAY DIVISION	
U.S. CUSTOMARY DETAIL TEMPORARY INLET PROTECTION Sheet 2 of 2	
DETAIL APPROVED FOR USE --/----	DETAIL
REVISED: 7/2016	W157-2

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.



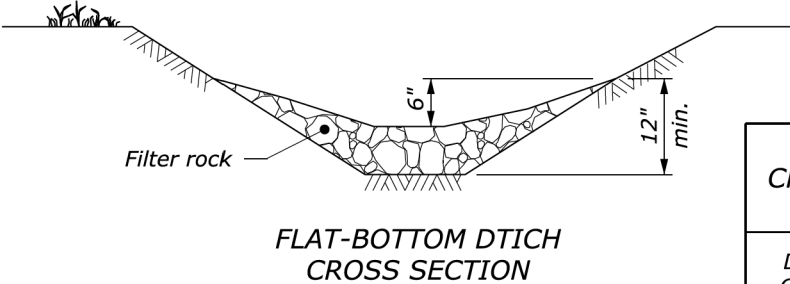
V-DITCH CROSS SECTION



FIBER ROLL STAKING DETAIL

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%.



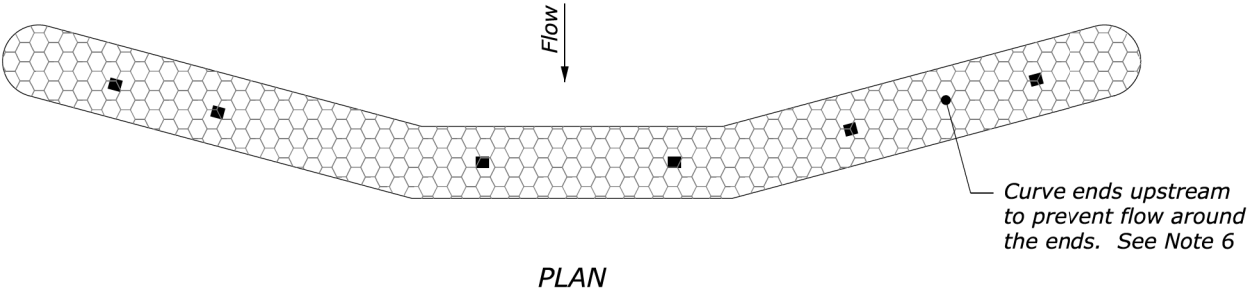
FLAT-BOTTOM DTICH CROSS SECTION

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

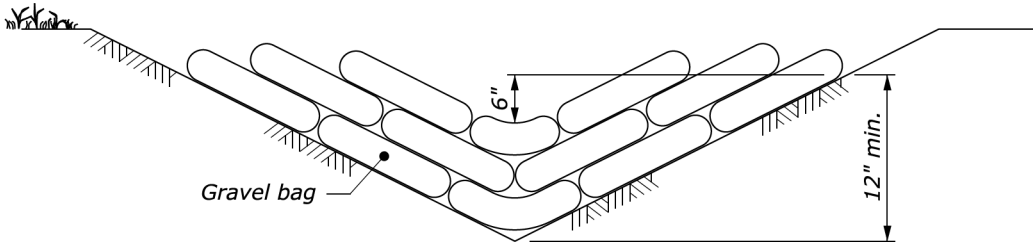
FILTER ROCK CHECK DAM

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%.



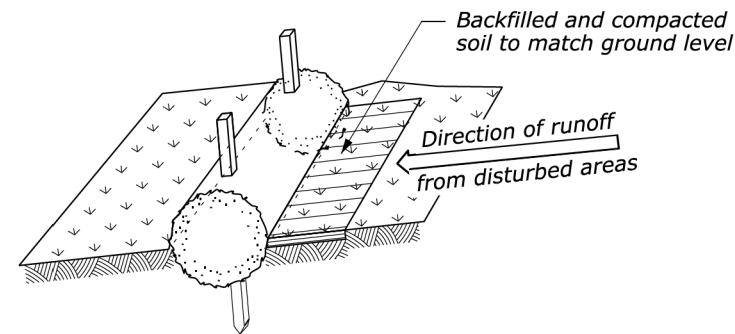
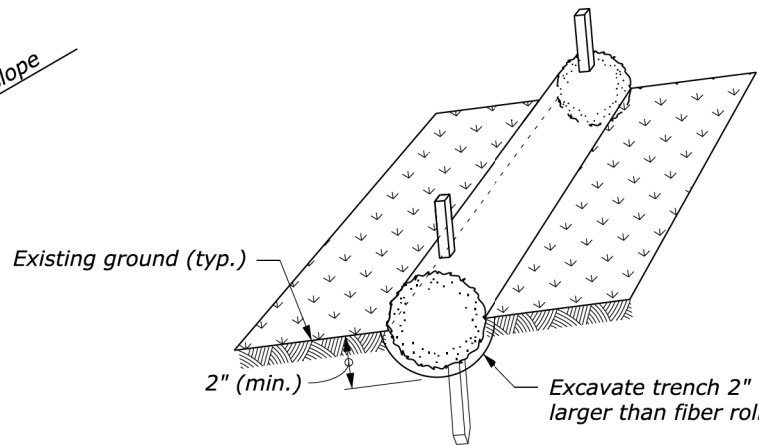
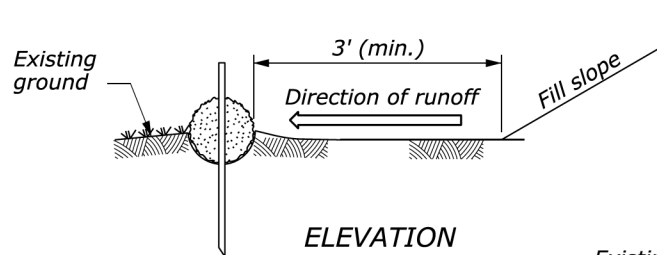
FIBER ROLL CHECK DAM



CROSS SECTION

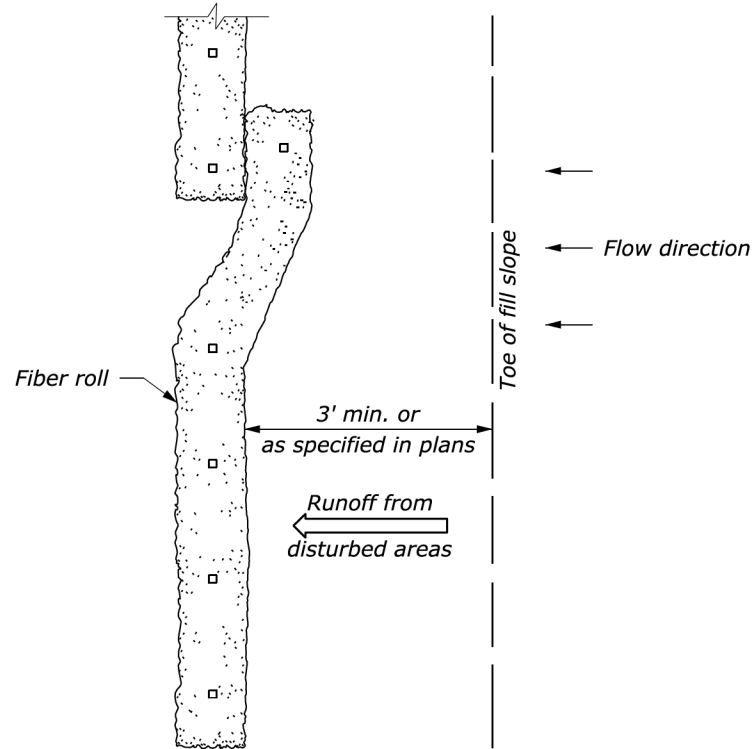
GRAVEL BAG CHECK DAM

NO SCALE



NOTE:

1. Drive stakes at each end and at 4-foot spacing until fiber roll is secure to slope. Live stakes may be used for permanent installations. Do not crush fiber roll while staking.
2. Overlap fiber rolls 12-inch minimum. Drive stakes at 6-inches from fiber roll end angles towards the adjacent fiber roll and space stakes at 4-foot max.



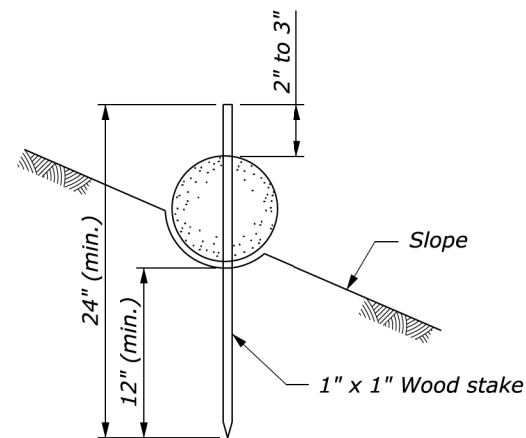
Step 1: Excavate trench and install fiber rolls

Step 2: Backfill soil against fiber rolls

PROPERLY STAKED AND ENTRENCHED FIBER ROLL

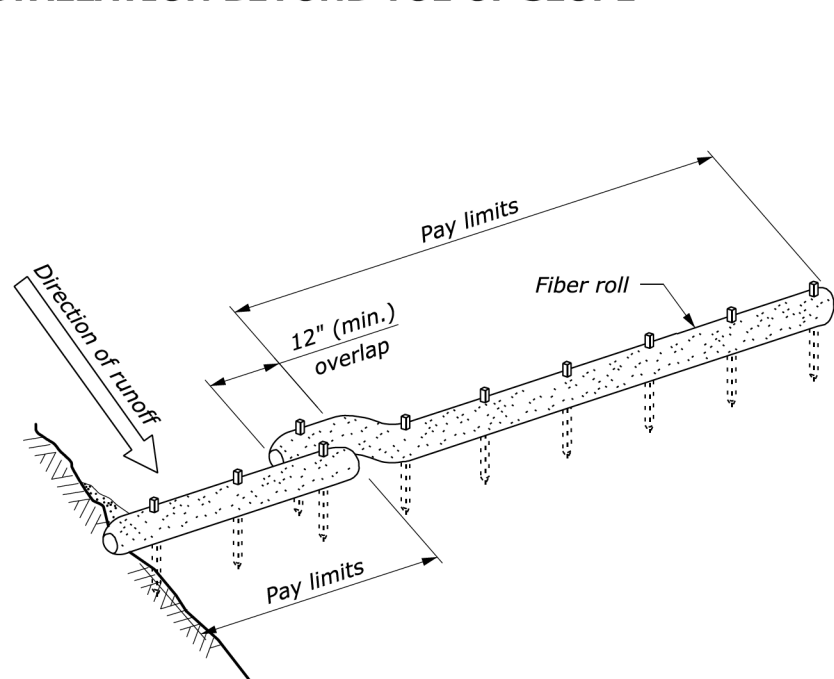
FIBER ROLL SPACING	
Slope	Spacing (FT)
1:4 or flatter	40
1:3	30
1:2	20
1:1	10

STAKES REQUIRED	
Fiber roll length (FT)	Stakes required for each roll
25	8
20	6
12	4

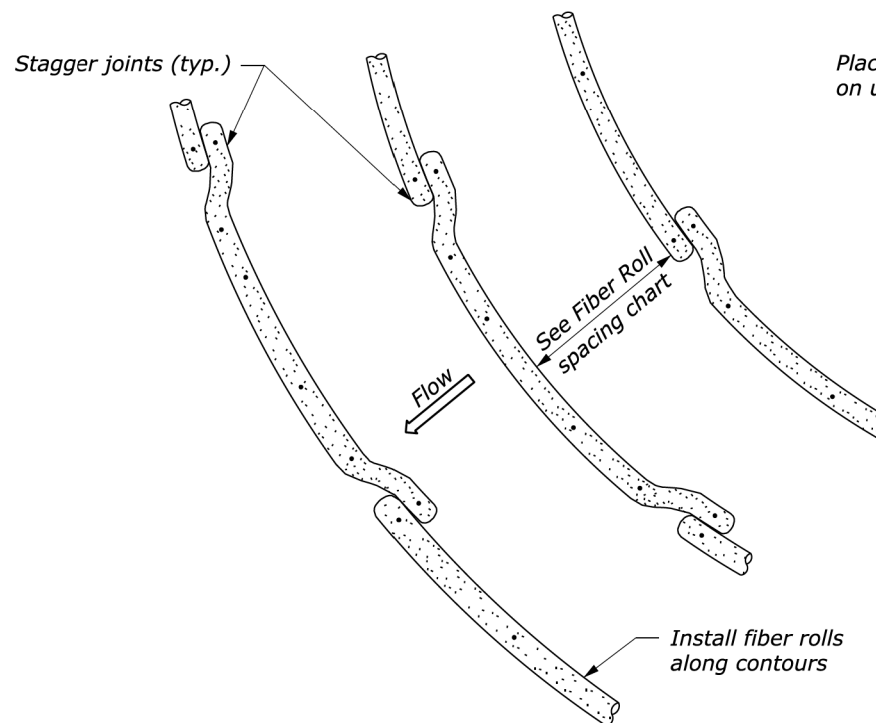


FIBER ROLL STAKING DETAIL

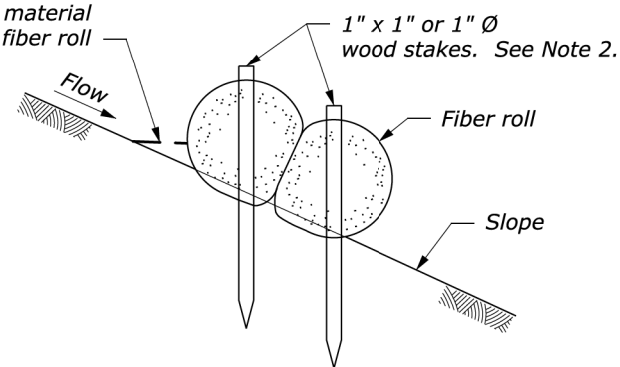
INSTALLATION BEYOND TOE OF SLOPE



**ALTERNATE FIBER ROLL JOINT DETAIL
SLOPE PROTECTION INSTALLATION**



INSTALLATION ALONG SLOPES



FIBER ROLL LAPPING DETAIL

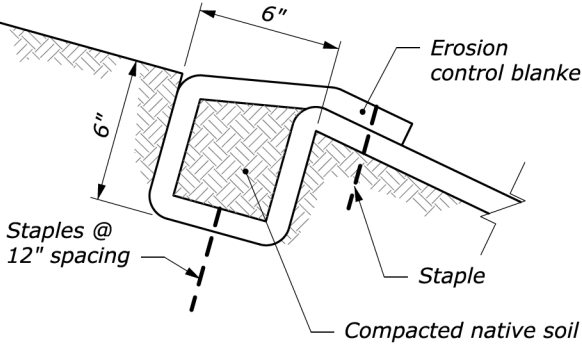
NO SCALE

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	E.8

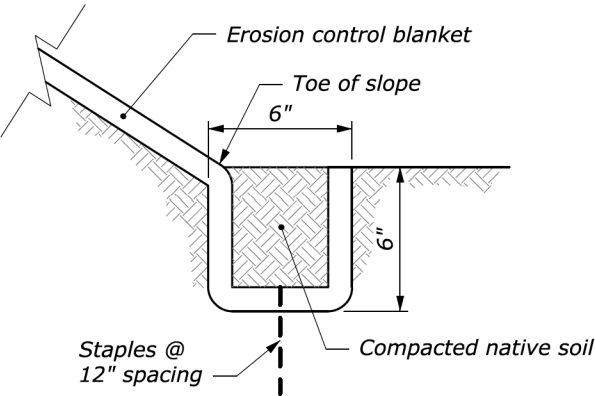
NOTE:

1. Install staples according to the manufacturer's recommendations.
2. Overlap in the direction of the prevailing wind.

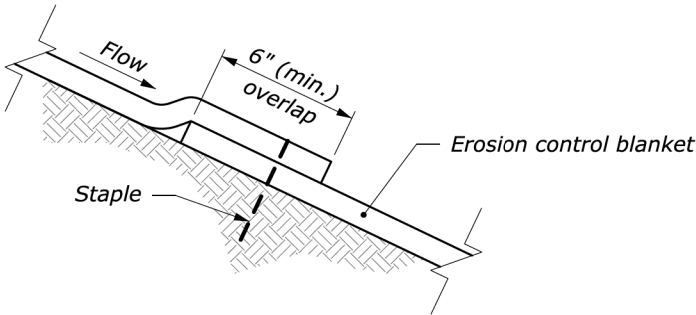
**DETAIL A
ANCHOR TRENCH
AT TOP OF SLOPE**



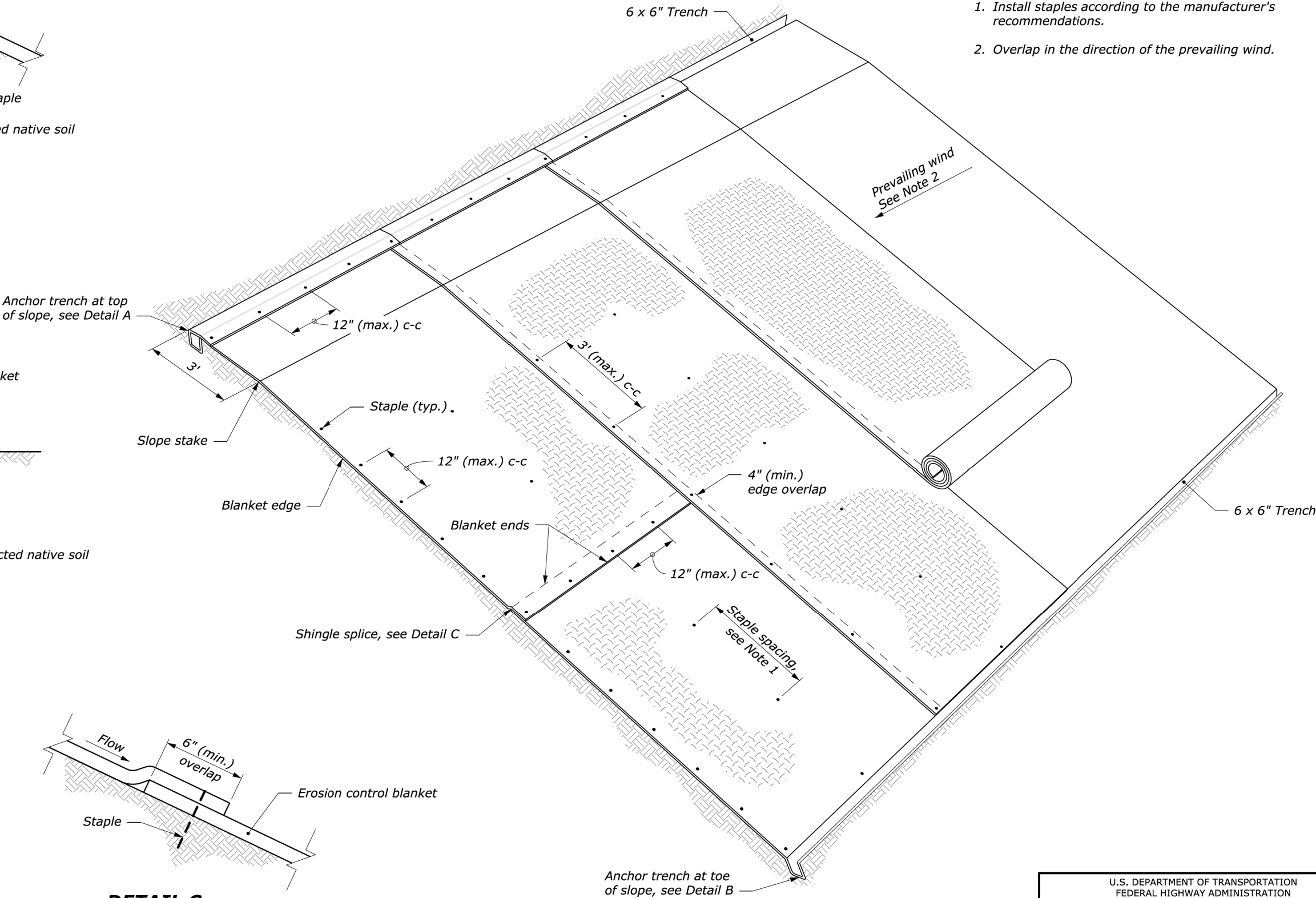
**DETAIL B
ANCHOR TRENCH
AT TOE OF SLOPE**



**DETAIL C
SHINGLE SPLICE**

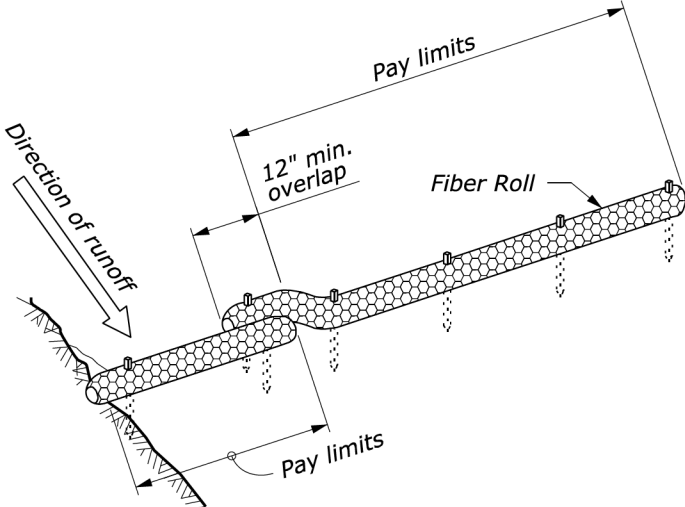


PERSPECTIVE VIEW



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION WESTERN FEDERAL LANDS HIGHWAY DIVISION	
U.S. CUSTOMARY DETAIL	
ROLLED EROSION CONTROL PRODUCT ON SLOPES	
DETAIL APPROVED FOR USE --/----	DETAIL
REVISED: 10/2016	W629-1

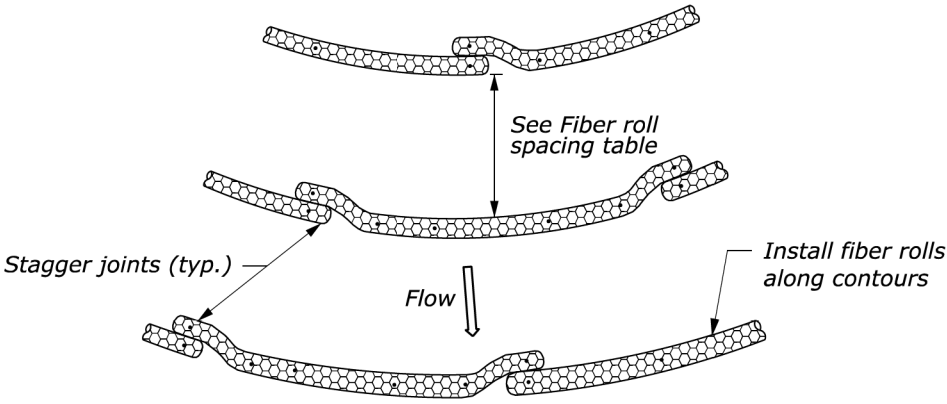
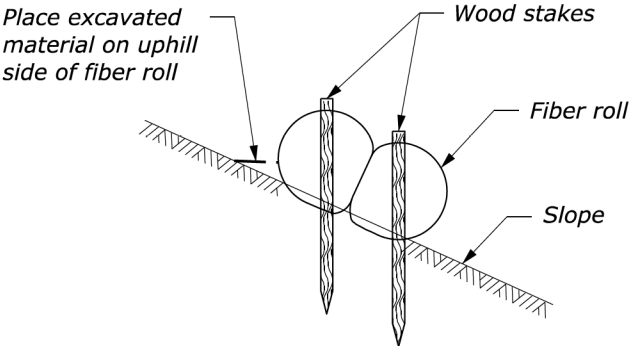


FIBER ROLL SPACING TABLE*	
Slope Gradient	9" Ø Fiber Roll Maximum spacing (ft)
1V:4H or flatter	60
Between 1V:4H and 1V:3H	45
Between 1V:3H and 1V:2H	30
1V:2H and steeper	15

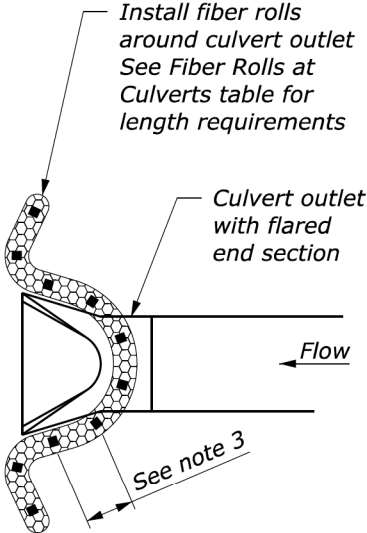
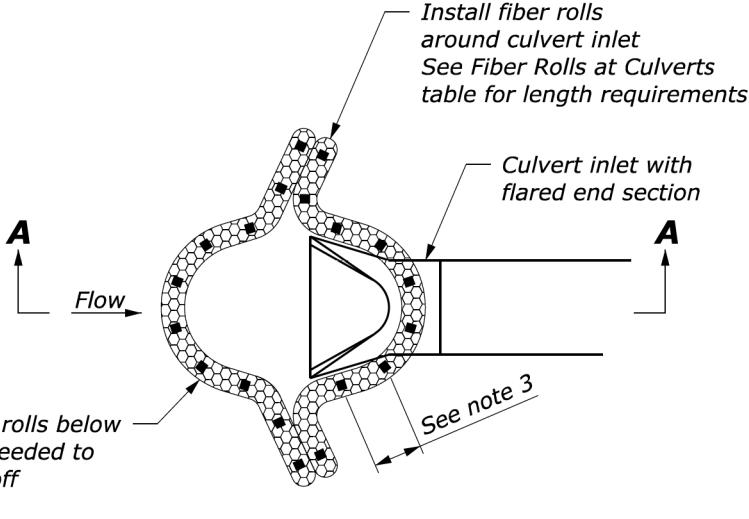
*Approximate spacing shown. Adjust spacing as needed dut to project-specific conditions.

- NOTE:**
- Repair all rills or gullies and properly compact prior to installation.
 - 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.
 - 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.
 - Drive stakes into undisturbed soil at least 12" deep. Expose stakes 2" above top of fiber roll.
 - 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.
 - 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 JOINT DETAIL

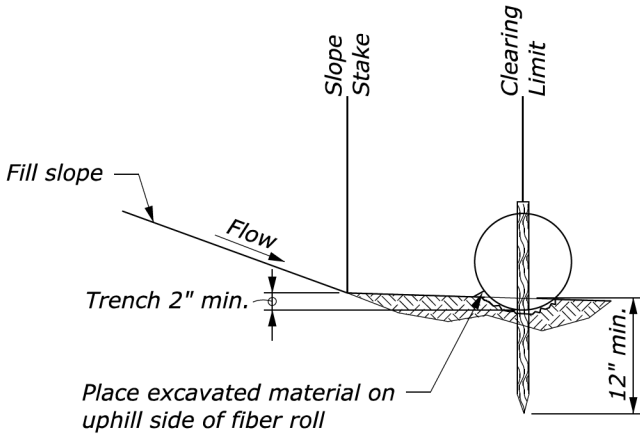


FIBER ROLL SLOPE LAYOUT

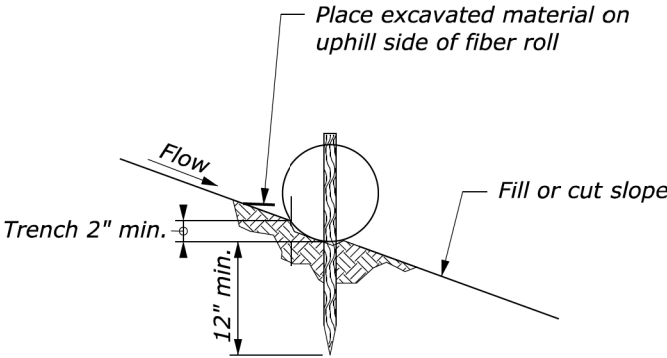


FIBER ROLL AT CULVERT OUTLET

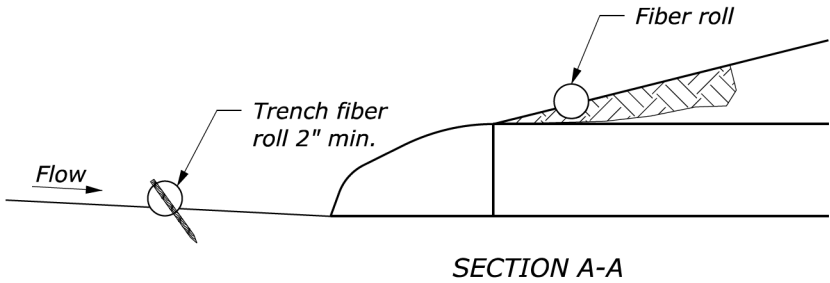
FIBER ROLL LAPPING DETAIL



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.

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

Note: The quantities shown hereon are approximate and are subject to field adjustments.

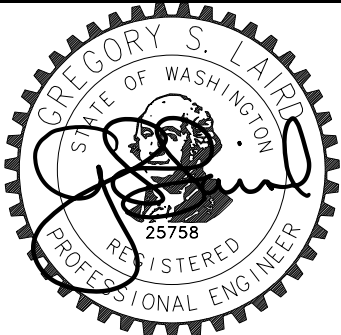
TABULATION OF DRAINAGE QUANTITIES

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009 (1)	F.1

[illegible]

NOTE:

1. Steel pipe culvert minimum wall thickness is the larger of 0.064" or the thickness required by the Std. 602-1 fill height table.
2. Plastic pipe is not allowed when final installation is exposed. Furnish metal end sections for all plastic pipe including those specified with bevels. See Std. 602-5 for acceptable cell class.
3. See Std. 602-7 for acceptable concrete cell class.
4. Estimated Maximum cover is measured to finished grade.
5. Stationing shown is the centerline crossing station or the upstream structure when pipe doesn't cross roadway.



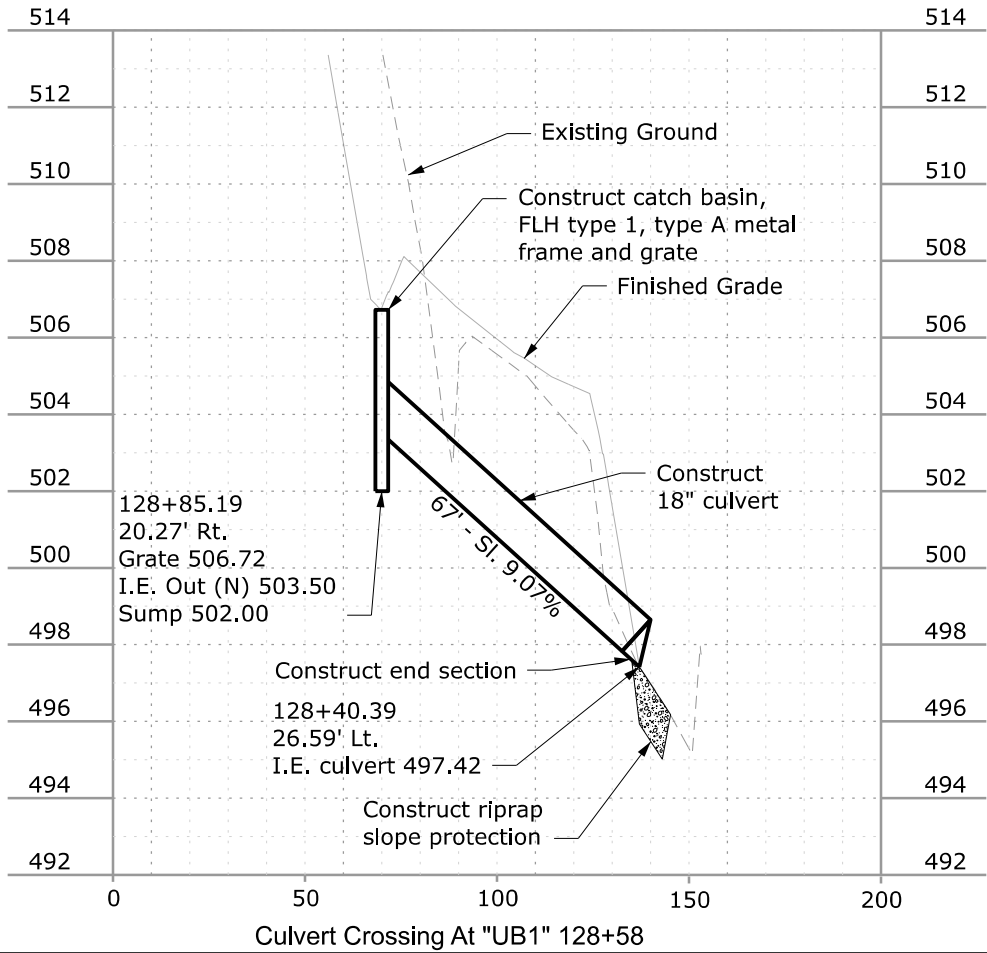
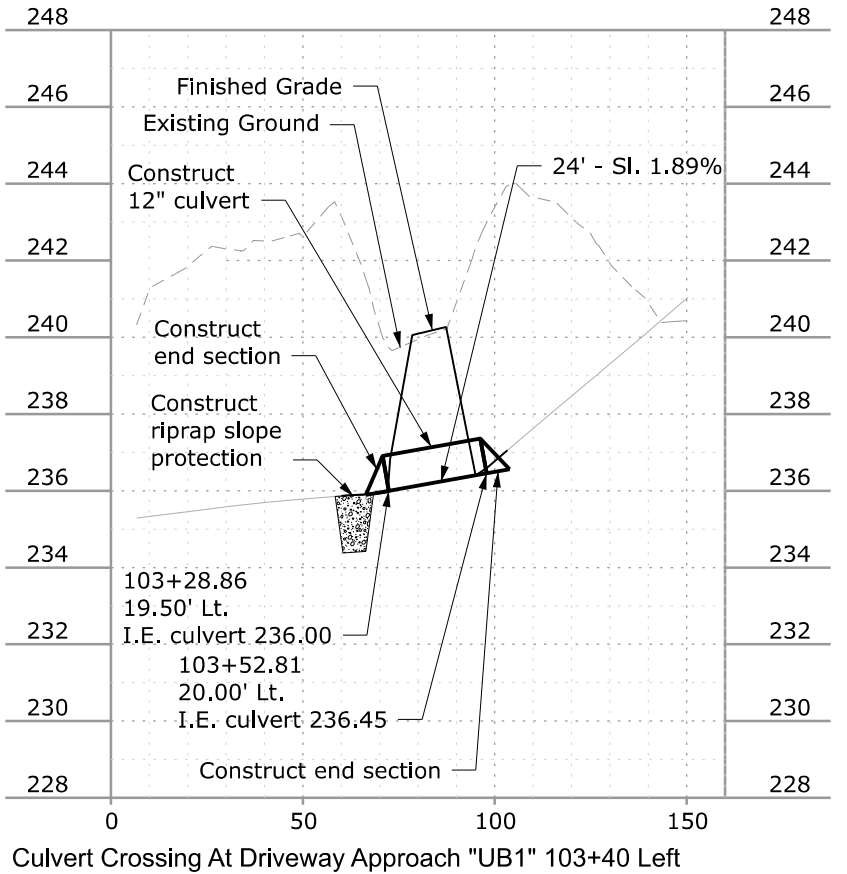
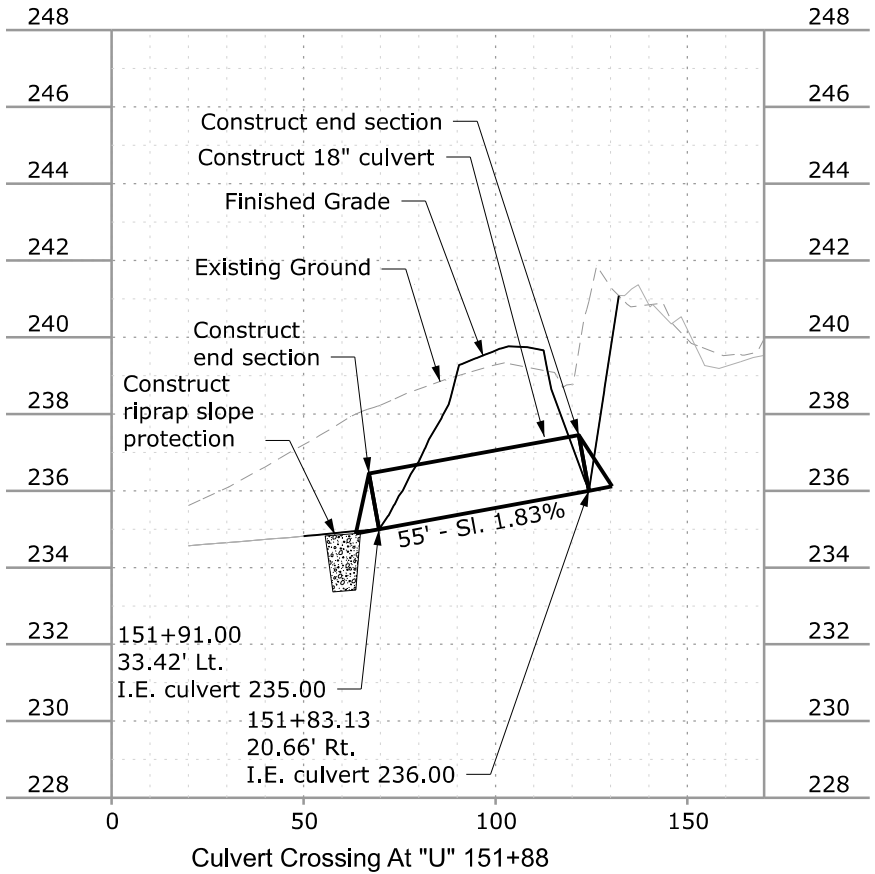
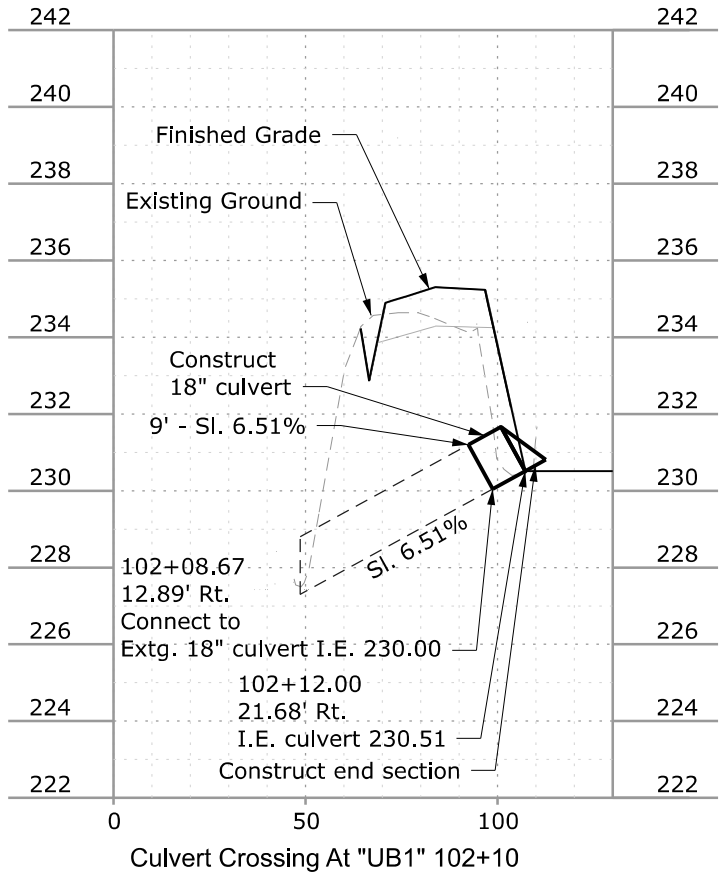
Allowable Pipe Material*

- | | |
|---------|--|
| C | Concrete |
| GS | Galvanized steel |
| P | Plastic |
| DI | Ductile Iron |
| (blank) | Any appropriate material |
| x/___ | Any appropriate material
except ___ |

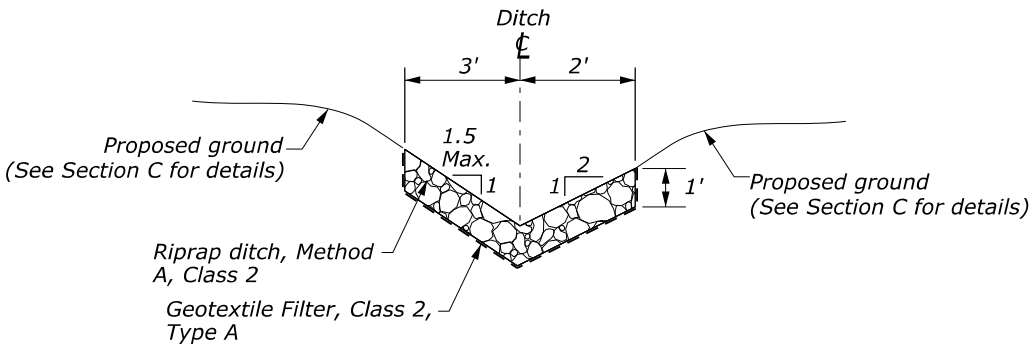
*Aluminum is not an allowed pipe type within Project

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9 March 2023 8:29 PM

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	F.2

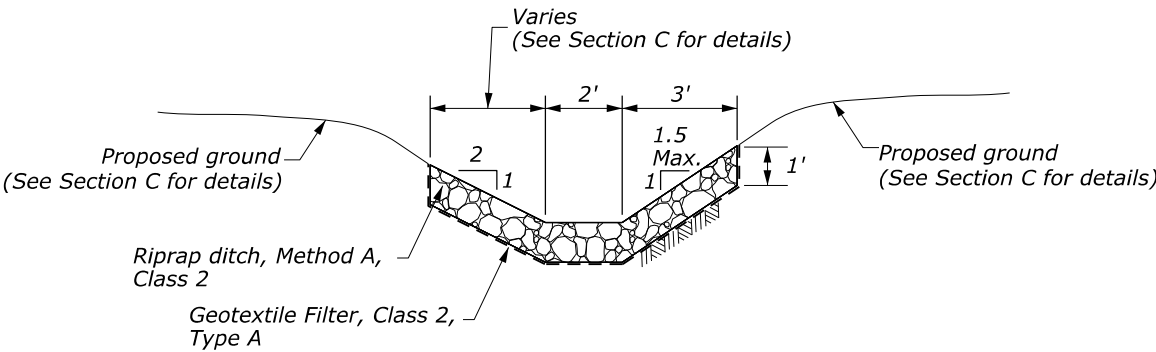


CULVERT CROSSING DETAILS



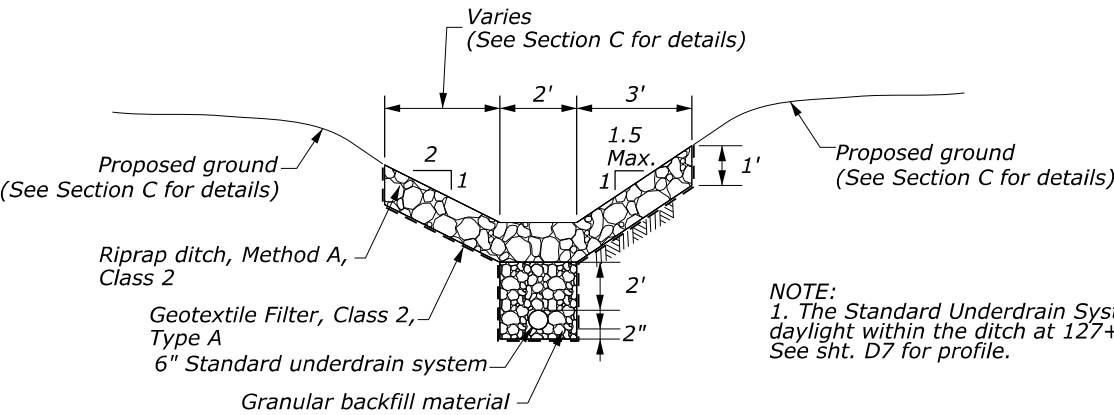
"UB1" 128+52.58 Lt. to "UB1" 129+44.21 Lt.

RIPRAP DITCH
NO SCALE



"UB1" 125+84.00 Rt. to "UB1" 127+00.00 Rt.
"UB1" 128+40.00 Rt. to "UB1" 130+72.30 Rt.

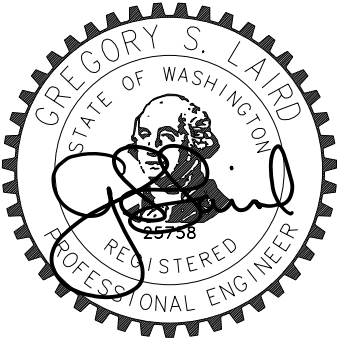
RIPRAP DITCH
NO SCALE



NOTE:
1. The Standard Underdrain System pipe will daylight within the ditch at 127+00.00. See sht. D7 for profile.

"UB1" 127+00.00 Rt. to "UB1" 128+40.00 Rt.

RIPRAP DITCH, WITH STANDARD UNDERDRAIN SYSTEM
NO SCALE



RIPRAP DITCH DETAILS

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	F.4

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 ² / ₃ " x 1 ¹ / ₂ " 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 1 $\frac{1}{2}$ " 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:

1. *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.*
2. *Fill heights exceeding 100 feet require special analysis by the CO.*
3. *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.*
4. *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

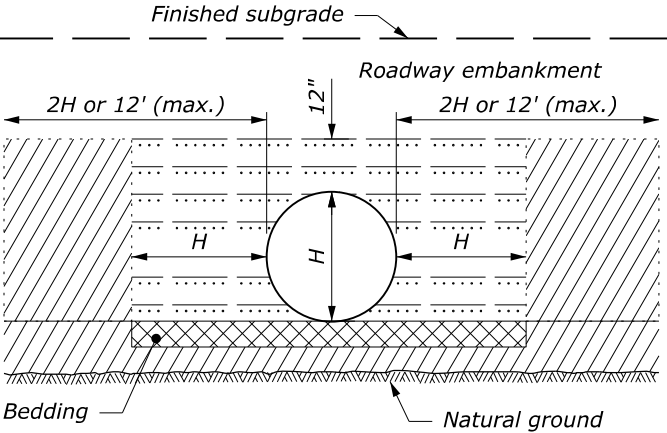
FILL HEIGHT AND METAL THICKNESS TABLE FOR HELICAL LOCKSEAM AND WELDED SEAM PIPE CULVERT

STEEL																
PIPE ARCH SIZE SPAN x RISE INCHES	EQUI- VALENT DIAMETER INCHES	MINIMUM CORNER RADIUS INCHES	MINIMUM COVER INCHES	2 ² / ₃ " x 1 ¹ / ₂ " 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

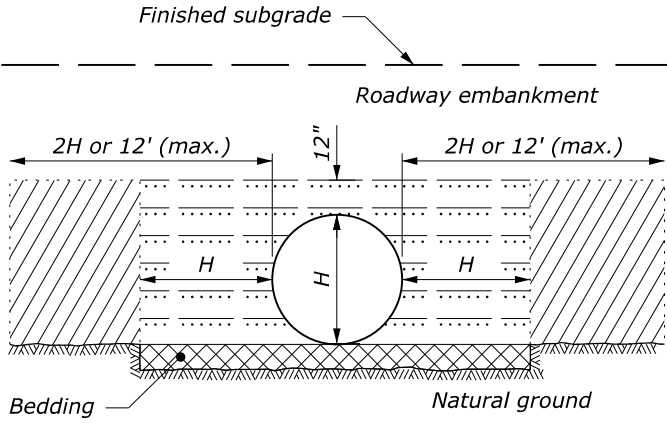
ALUMINUM											
PIPE ARCH SIZE SPAN x RISE INCHES	EQUI- VALENT DIAMETER INCHES	MINIMUM CORNER RADIUS INCHES	MINIMUM COVER INCHES	2 $\frac{2}{3}$ " x 1 $\frac{1}{2}$ " CORRUGATIONS				3" x 1" CORRUGATIONS			
				METAL THICKNESS (INCH/GAGE)							
				0.060/16	0.075/14	0.105/12	0.135/10	0.060/16	0.075/14	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

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
FLH STANDARD	
METAL PIPE CULVERT	
STANDARD APPROVED FOR USE 12/1993 REVISED: 4/1994 6/2005	STANDARD 602-1

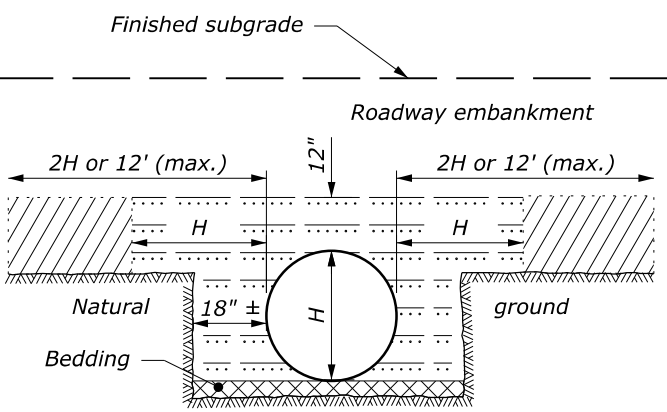
NO SCALE



ABOVE NATURAL GROUND



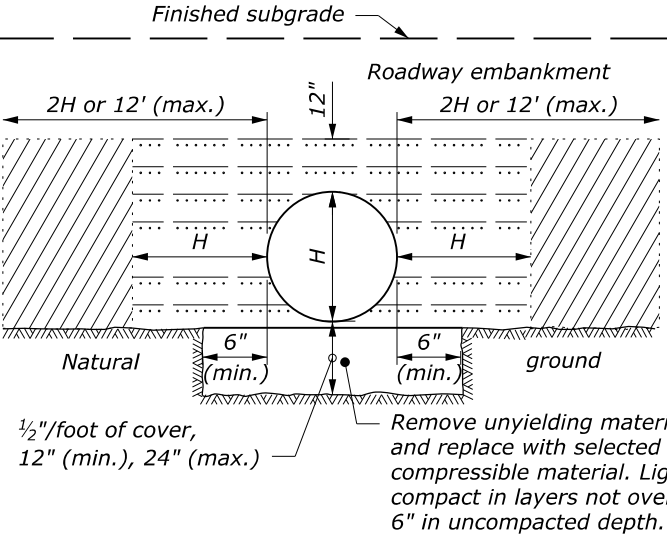
ON NATURAL GROUND



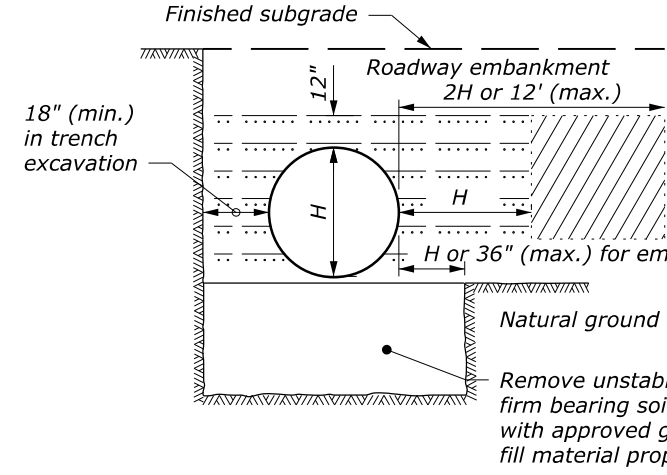
ABOVE AND BELOW NATURAL GROUND

LEGEND:

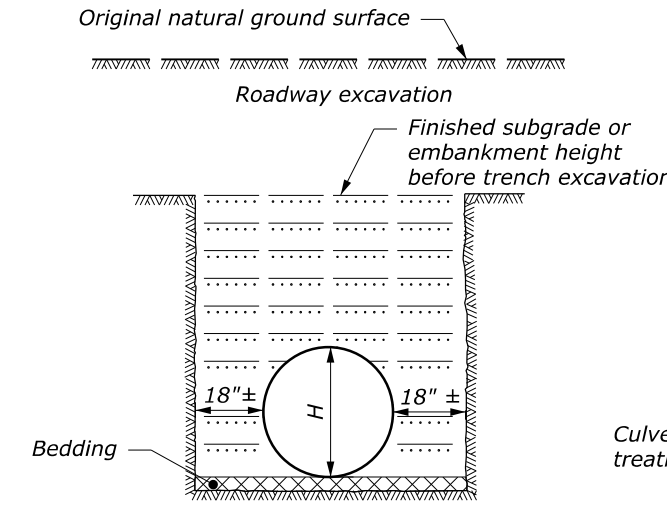
- Bedding material (uncompacted)
- Embankment material placed in layers not exceeding 6" compacted depth.
- Compacted backfill material placed in layers not exceeding 6" compacted depth; or lean concrete backfill in accordance with Section 614.
- Impermeable backfill material.



ON UNYIELDING MATERIAL

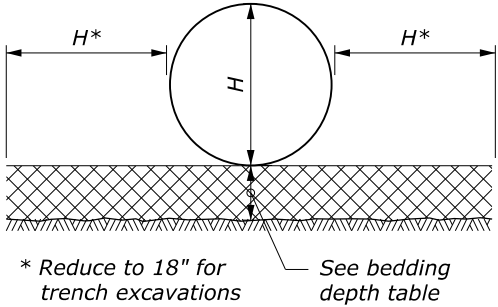


ON UNSTABLE MATERIAL



BELOW NATURAL GROUND OR TRENCH EXCAVATION IN EMBANKMENT

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

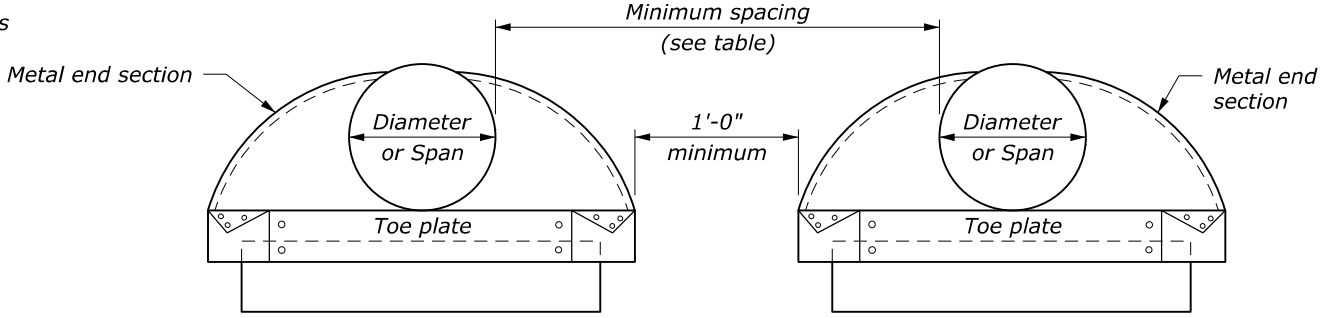


PIPE BEDDING

NOTE:

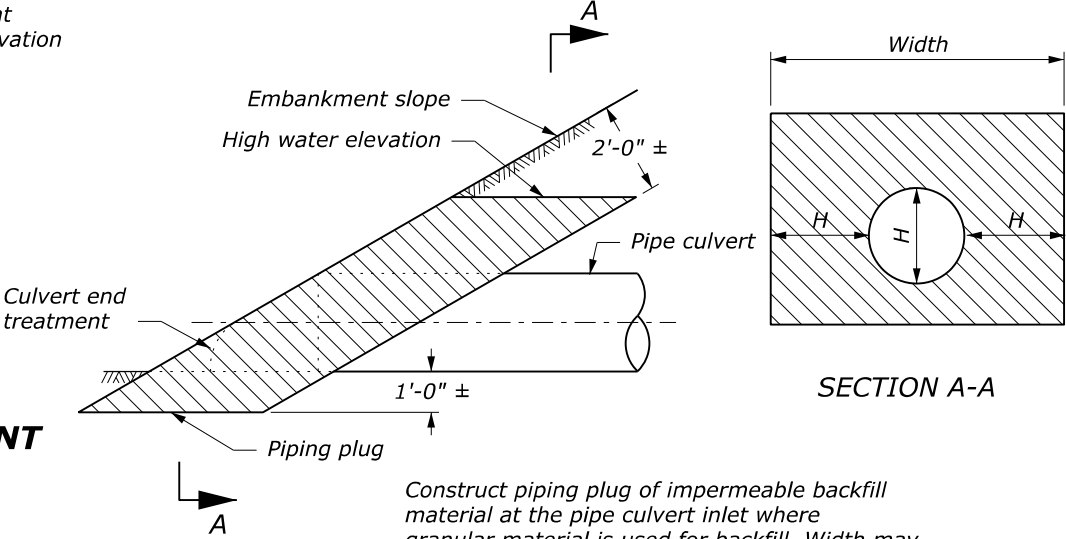
- When directed, camber pipe culverts upward from a chord through the inlet and outlet inverts an ordinate amount equal to 1% of the pipe length. Develop camber on a parabolic curve. If the midpoint elevation on the parabolic curve as designed exceeds the elevation of the inlet invert, reduce the amount 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

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

FLH STANDARD

METAL AND PLASTIC PIPE CULVERT BEDDING

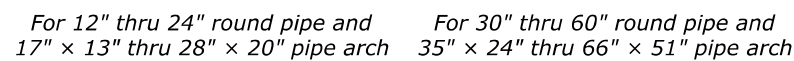
STANDARD APPROVED FOR USE 12/1993
REVISED: 4/1994 6/2005
DRAFT: 10/2017

STANDARD 602-3

END SECTIONS FOR ROUND PIPE CULVERT										
PIPE SIZE DIAMETER INCHES	METAL THICKNESS				DIMENSIONS INCHES					SLOPE Approx
	STEEL		ALUMINUM							
	INCHES	GAGE	INCHES	GAGE	A (min)	B (max)	H (min)	L (±2")	W (max)	
12	0.064	16	0.060	16	5	7	6	21	44	2¼
15	0.064	16	0.060	16	6	8	6	26	52	2¼
18	0.064	16	0.060	16	7	10	6	31	58	2⅛
21	0.064	16	0.060	16	8	12	6	36	66	2⅛
24	0.064	16	0.060	16	9	13	6	41	72	2⅛
30	0.079	14	0.075	14	11	16	8	51	88	2⅛
36	0.079	14	0.075	14	13	19	9	60	105	2
42	0.109	12	0.105	12	15	25	10	69	122	2⅛
48	0.109	12	0.105	12	17	29	12	78	131	2
54	0.109	12	0.105	12	17	33	12	84	143	2
60	0.109	12	0.105	12	17	36	12	87	157	1⅞
66	0.109	12	0.105	12	17	39	12	87	162	1⅞
72	0.109	12	0.105	12	17	44	12	87	169	1½
78	0.109	12	0.105	12	17	48	12	87	178	1⅜
84	0.109	12	0.105	12	17	52	12	87	184	1½
90	0.109	12	0.105	12	17	58	12	87	188	1¼
96	0.109	12	0.105	12	17	58	12	87	197	1⅞



PIPE SIZE SPAN × RISE INCHES	EQUI- VALENT DIAM. (INCHES)	METAL THICKNESS				DIMENSIONS INCHES					SLOPE Approx.
		STEEL		ALUMINUM		A (min)	B (max)	H (min)	L (±2")	W (max)	
		INCHES	GAGE	INCHES	GAGE						
17 × 13	15	0.064	16	0.060	16	7	9	6	19	30	2½
21 × 15	18	0.064	16	0.060	16	7	10	6	23	36	2½
24 × 18	21	0.064	16	0.060	16	8	12	6	28	42	2½
28 × 20	24	0.064	16	0.060	16	9	14	6	32	48	2½
35 × 24	30	0.079	14	0.075	14	10	16	8	39	60	2½
42 × 29	36	0.079	14	0.075	14	12	18	9	46	75	2½
49 × 33	42	0.109	12	0.105	12	13	21	12	53	85	2½
57 × 38	48	0.109	12	0.105	12	18	26	12	63	90	2½
60 × 46	54	0.109	12	0.105	12	18	34	12	70	102	2
64 × 43	54	0.109	12	0.105	12	18	30	12	70	102	2
66 × 51	60	0.109	12	0.105	12	18	33	12	77	116	1½
71 × 47	60	0.109	12	0.105	12	18	33	12	77	114	1½
73 × 55	66	0.109	12	0.105	12	18	36	12	77	126	1½
77 × 52	66	0.109	12	0.105	12	18	36	12	77	126	1½
81 × 59	72	0.109	12	0.105	12	18	39	12	77	138	1½
83 × 57	72	0.109	12	0.105	12	18	39	12	77	138	1½
87 × 63	78	0.109	12	0.105	12	20	38	12	77	148	1½
95 × 67	84	0.109	12	0.105	12	20	34	12	87	162	1½
103 × 71	90	0.109	12	0.105	12	20	38	12	87	174	1½
112 × 75	96	0.109	12	0.105	12	20	40	12	87	174	1½



DESIGN B
CONNECTION TO CONCRETE
PIPE INLET END



NOTE:

1. *Variations in design and dimensions are permitted to allow for manufacturer's standards.*
2. *Fabricate the diameter of the end section of Design B to match the inside diameter of the concrete pipe culvert.*
3. *Design C may be used in lieu of design A for all metal pipe culvert sizes. Coupling bands may be any acceptable type for the pipe culvert specified.*
4. *Fabricate multiple piece bodies with lap seams tightly joined by $\frac{3}{8}$ " rivets or bolts. Fabricate end section center panels for 60" and larger diameter pipe and equivalent pipe arch from 0.138 inch steel or 0.135 inch aluminum.*
5. *On end section center panels for 66" and larger equivalent pipe arch provide $2\frac{1}{2}" \times 2\frac{1}{2}" \times \frac{1}{4}"$ angle reinforcement bolted or riveted under the center panel seam.*
6. *Supplement the reinforced edges of end sections for 60" and larger diameter pipe and 66" and larger equivalent pipe arch with $2\frac{1}{2}" \times 2\frac{1}{2}" \times \frac{1}{4}"$ stiffener angles attached with bolts or rivets.*
7. *Fabricate connector section, corner plate and toe plate extensions from the same metal thickness as the panel body. Use toe plate extension where shown on the plans.*
8. *Warp embankment slopes to match the slope of the flared end sections.*

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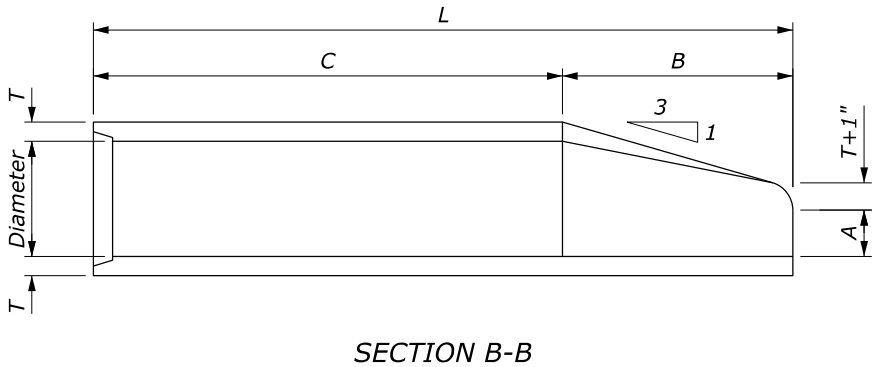
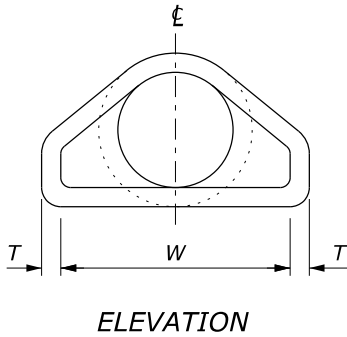
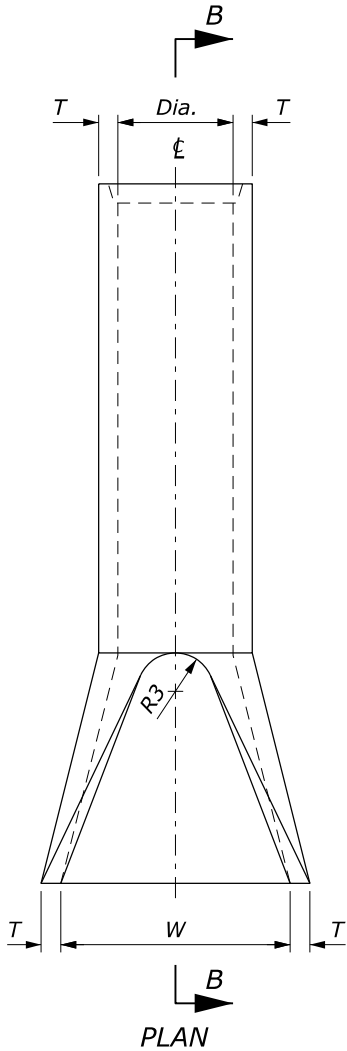
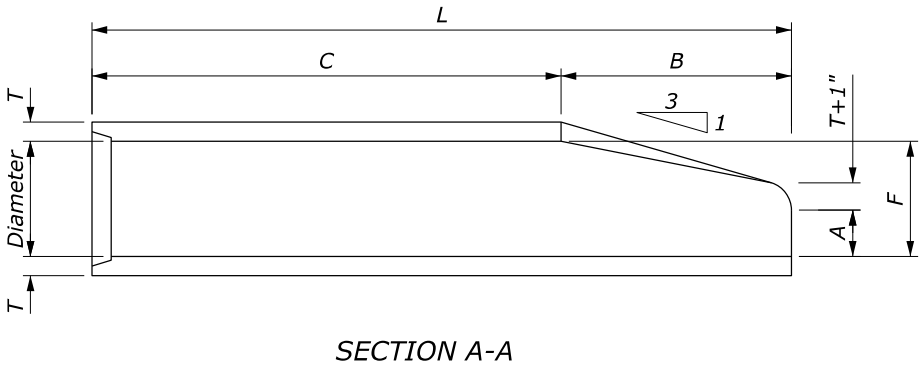
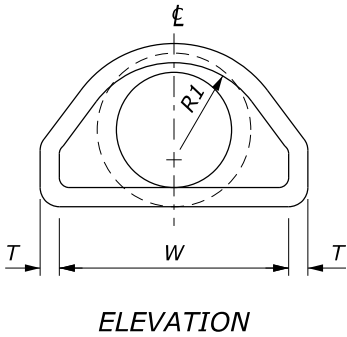
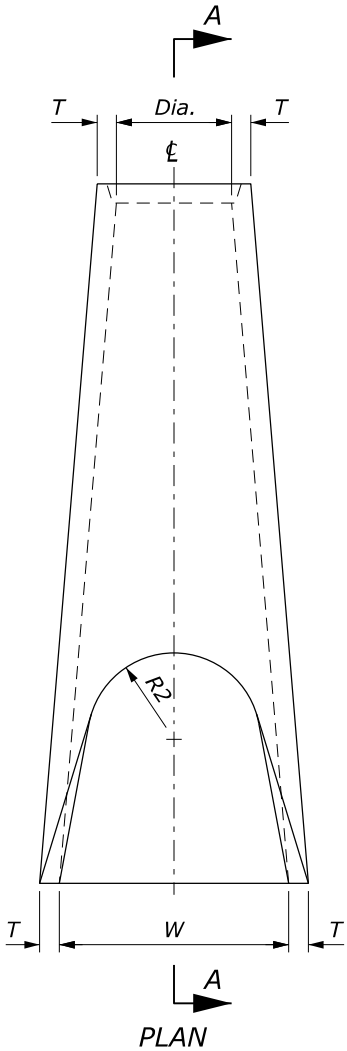
STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	F.9

NOTE:

- Variations in design and dimensions are permitted to allow for manufacturer's standards.
- Fabricate the outlet end section with a groove end and the inlet end section with a tongue end.
- Warp embankment slopes to match the slope of the flared end section.

END SECTIONS FOR ROUND PIPE CULVERT

PIPE SIZE DIAMETER INCHES	DIMENSIONS INCHES									
	T	A	B	C	L	W	F	R1	R2	R3
12	2	4	24	48 ⁷ / ₈	72 ⁷ / ₈	24	13	10 ¹ / ₈	9	4
15	2 ¹ / ₄	6	27		73	30	16	12 ¹ / ₂	11	6
18	2 ¹ / ₂	9	27		73	36	19	15 ¹ / ₂	12	7 ¹ / ₂
21	2 ³ / ₄	9	36		73	42	22	16 ¹ / ₂	13	5
24	3	9 ¹ / ₂	43 ¹ / ₂		73 ¹ / ₂	48	25	16 ³ / ₄	14	8
27	3 ¹ / ₄	10 ¹ / ₂	48	25 ¹ / ₂	73 ¹ / ₂	54	28	--	14 ¹ / ₂	9
30	3 ¹ / ₂	12	54	19 ³ / ₄	73 ³ / ₄	60	31	18 ¹ / ₂	15	8
33	3 ³ / ₄	13 ¹ / ₂ "	59 ¹ / ₂	37 ¹ / ₂	96	66	34	23 ³ / ₄	17 ¹ / ₂	9
36	4	15	63		96	72	37	23 ³ / ₄	20	11
42	4 ¹ / ₂	21	63		96	78	43	--	22	11
48	5	24	72		96	84	49	--	22	12

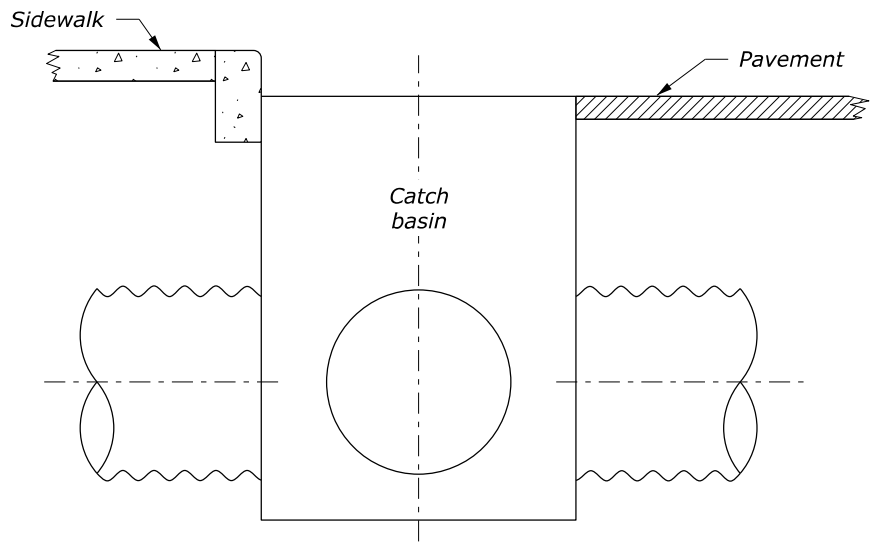


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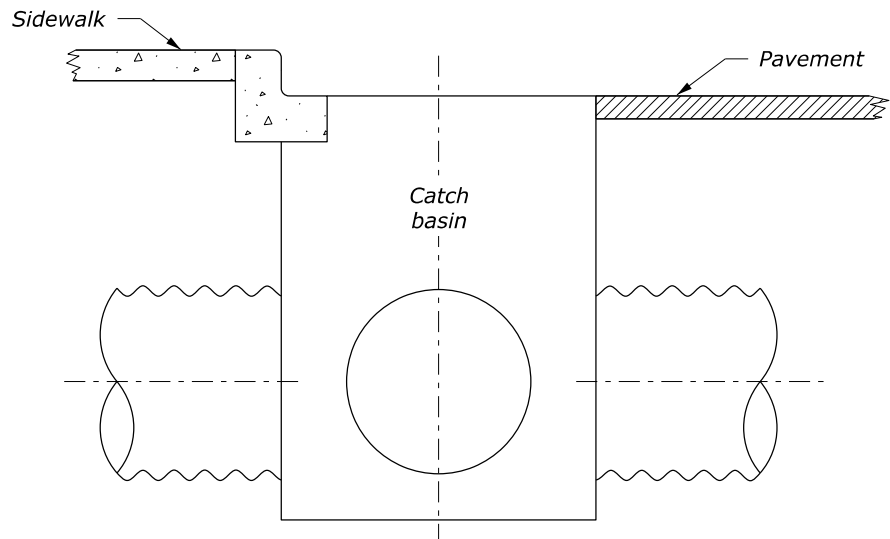
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
FLH STANDARD	
CONCRETE END SECTION FOR ROUND PIPE	
STANDARD APPROVED FOR USE 12/1993 REVISED: 4/1994 6/2005	STANDARD 602-8

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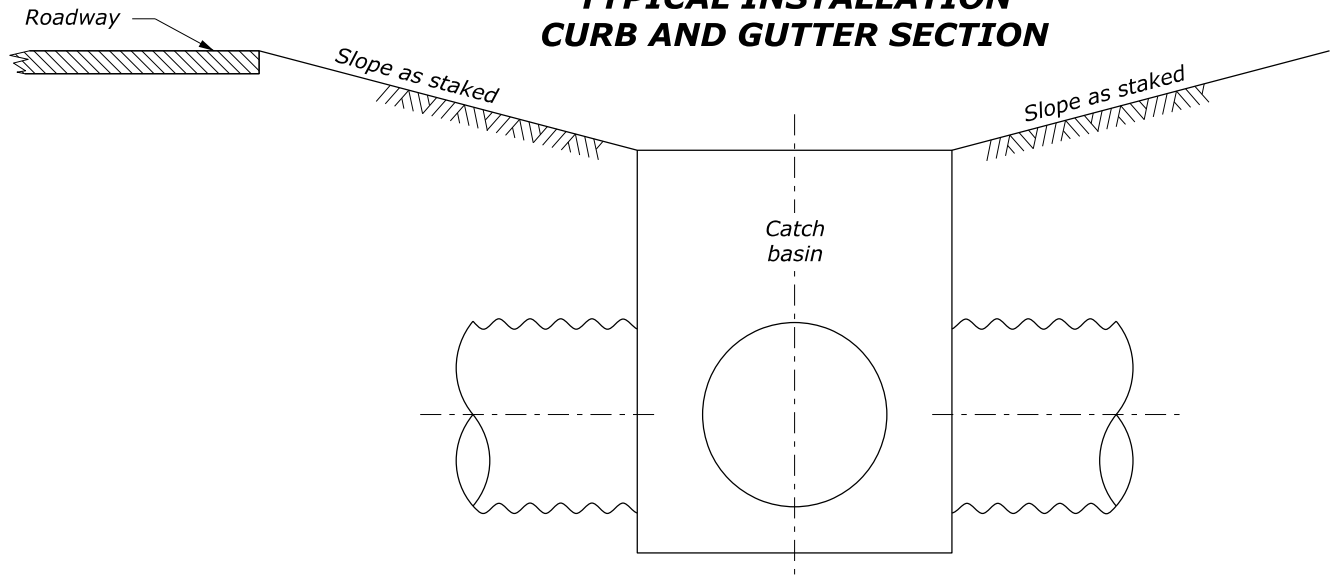
STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	F.10



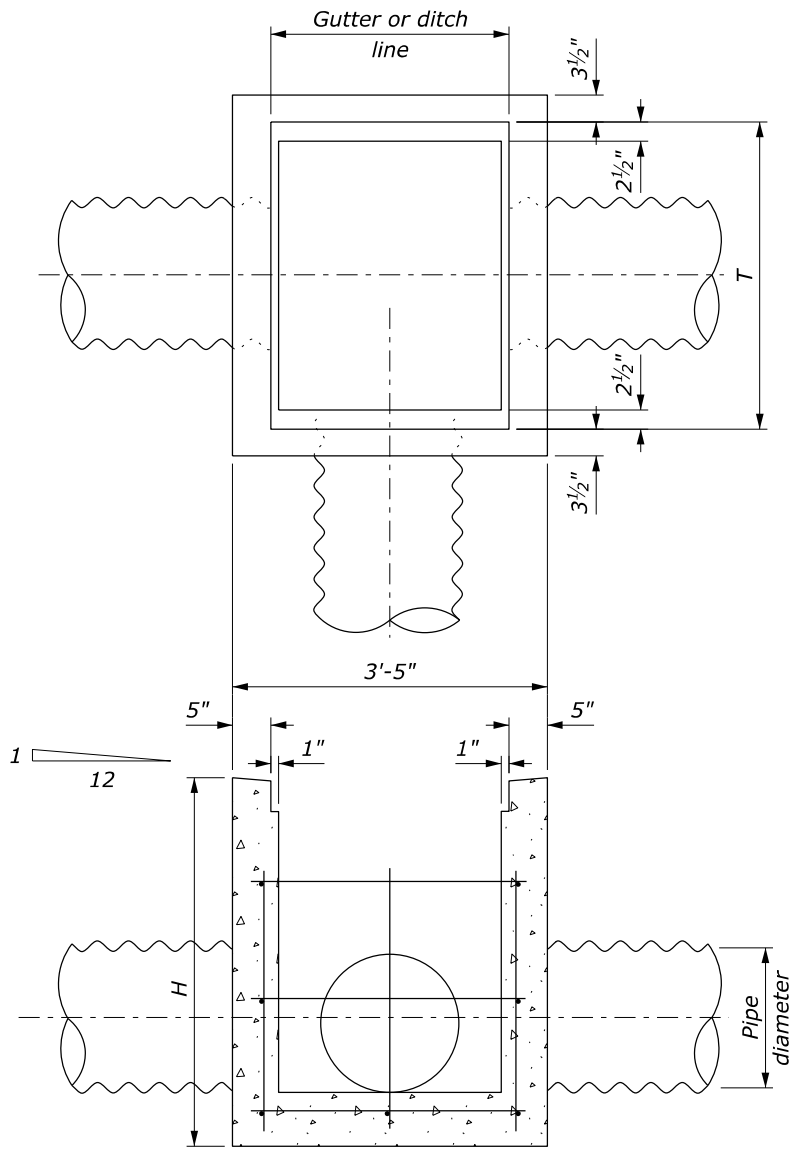
**TYPICAL INSTALLATION
CURB SECTION**



**TYPICAL INSTALLATION
CURB AND GUTTER SECTION**



**TYPICAL INSTALLATION
DITCH SECTION**



All reinforcing steel
#4 at 12"±.
Bend to clear pipe

INLET DETAIL

NOTE:

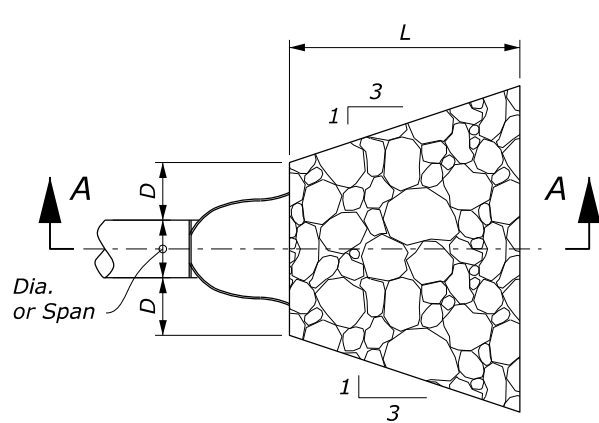
1. **CONCRETE:** Chamfer exposed edges $\frac{3}{4}$ " unless otherwise shown. Give all concrete surfaces a Class 1 finish.
2. The minimum concrete cover to the face of any bar is 2" unless otherwise shown.
3. See Standard 604-2 for Type A Frame and Grate and Standard 604-3 for Type B Frame and Grate.

CONCRETE CATCH BASINS				
PIPE SIZE DIAMETER	DEPTH H	FRAME AND GRATE T		
		TYPE A	TYPE B	
12"	3'-0"	2'-6"	2'-6"	
18"	3'-0"	2'-6"	2'-6"	
24"	4'-0"	3'-3"	3'-4"	
30"	4'-0"	4'-0"	4'-2"	
36"	4'-6"	4'-9"	5'-0"	
42"	5'-0"	5'-6"	5'-5"	
48"	5'-6"	6'-3"	6'-3"	

CONCRETE CATCH BASINS				
PIPE SIZE DIAMETER INCHES	ESTIMATED QUANTITIES			
	CONCRETE CUYD	REINFORCING STEEL LB	FRAME AND GRATE LB	
			TYPE A	TYPE B
12	0.7	54	215	238
18	0.7	54	215	238
24	1.1	81	271	314
30	1.2	92	327	390
36	1.5	101	383	466
42	1.8	131	439	504
48	2.2	151	495	580

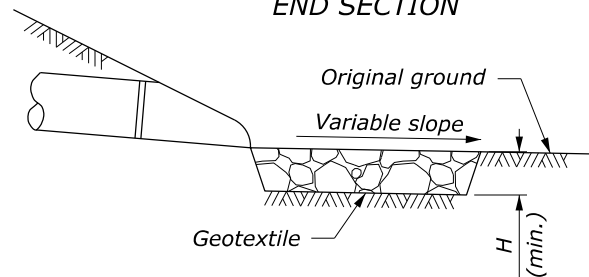
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION FEDERAL LANDS HIGHWAY	
U.S. CUSTOMARY STANDARD	
CATCH BASIN TYPE 1	
STANDARD APPROVED FOR USE 6/2005	STANDARD
REVISED:	604-1

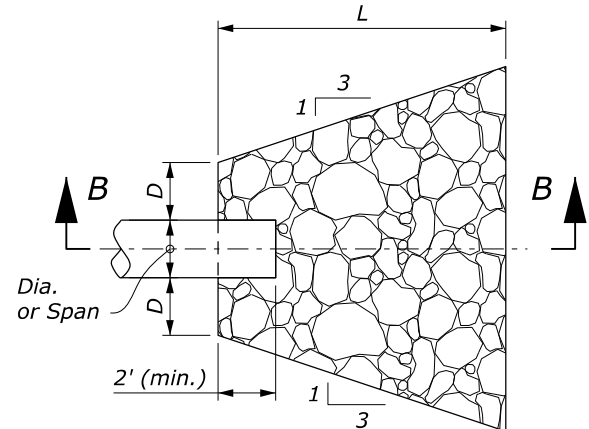


PLAN VIEW

CULVERT WITH STANDARD
END SECTION

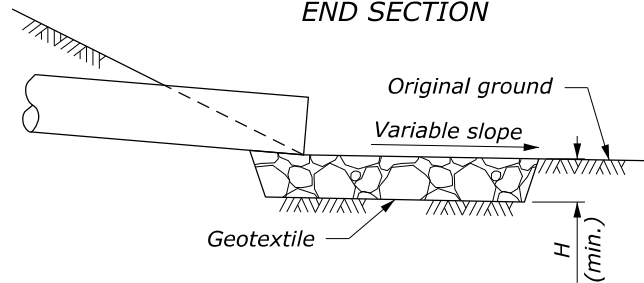


SECTION A-A



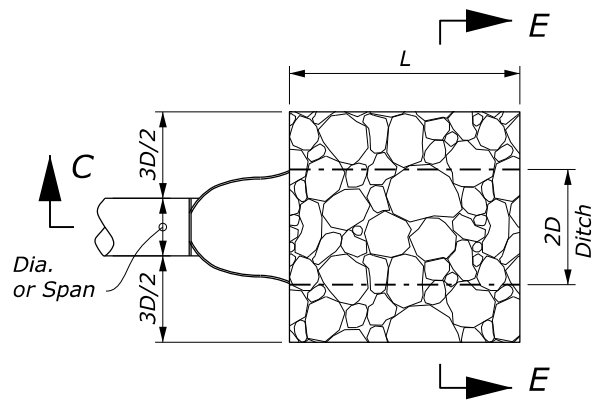
PLAN VIEW

CULVERT WITHOUT STANDARD
END SECTION



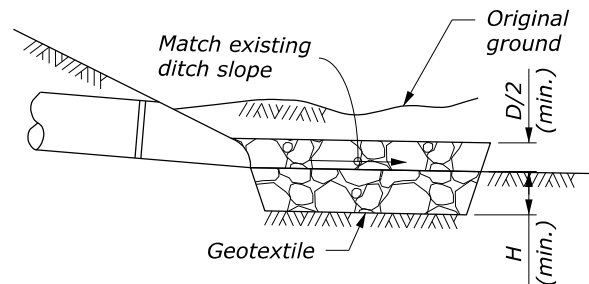
SECTION B-B

PROTECTIVE APRON AT CULVERT OUTLET WITHOUT DITCH

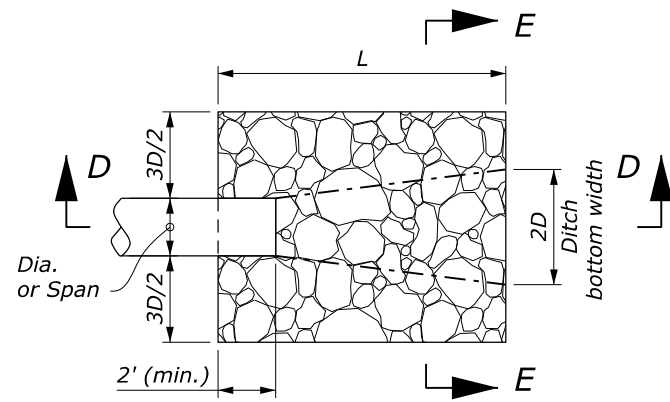


PLAN VIEW

CULVERT WITH STANDARD
END SECTION

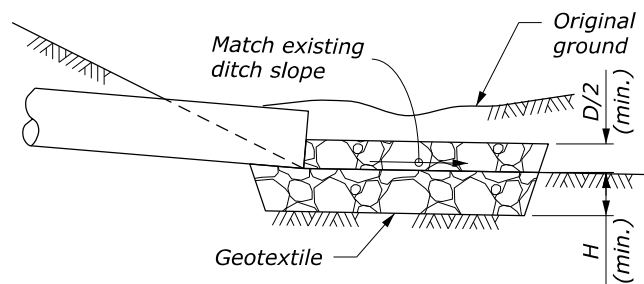


SECTION C-C



PLAN VIEW

CULVERT WITHOUT STANDARD
END SECTION



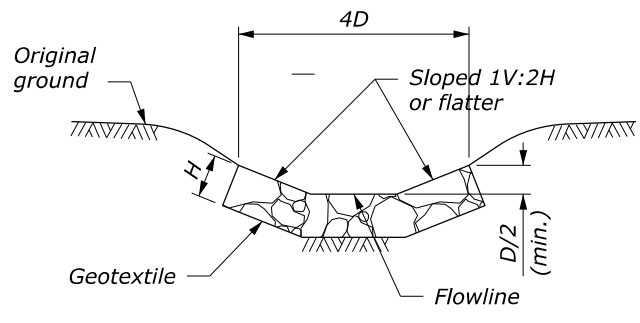
SECTION D-D

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

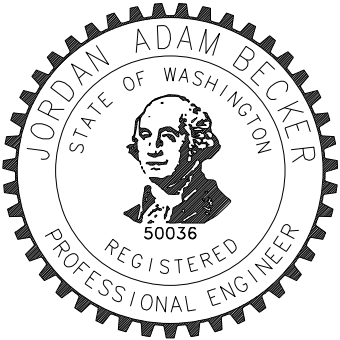
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STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	G.1

TEMPORARY TRAFFIC CONTROL TABULATION OF QUANTITIES							
ITEM	DESCRIPTION	UNIT	LOCATIONS				TOTAL
			SITE 1	SITE 2	SITE 3	BETWEEN SITE 1 AND 2	
63502-1300	Temporary Traffic Control, Drum	EACH	64	31	55	45	195
63504-1000	Temporary Traffic Control, Construction Sign	SQFT	142	121	116	47	426
63506-0500	Temporary Traffic Control, Flagger	HOURL	480	672	120	160	1432

ITEM 63504-1000 TEMPORARY TRAFFIC CONTROL, CONSTRUCTION SIGN						
MUTCD REF. NO.	SIGN LEGEND	SIGN SIZE W x H		SIGN AREA (SQFT)	NUMBER OF SIGNS	TOTAL (SQFT)
W20-1	ROAD WORK AHEAD	36	36	9	8	72
W20-7	Flagger Ahead	36	36	9	8	72
W3-4	BE PREPARED TO STOP	36	36	9	5	45
G20-2	END ROAD WORK	36	18	4.5	8	36
W1-2R	Curve (Right)	36	36	9	1	9
W1-2L	Curve (Left)	36	36	9	1	9
W1-4R	Reverse Curve (Right)	36	36	9	1	9
W1-4L	Reverse Curve (Left)	36	36	9	1	9
W13-1	XX MPH	24	24	4	10	40
W20-4	ONE LANE ROAD AHEAD	36	36	9	8	72
W16-2P	XXX FT	24	18	3	9	27
R1-2	YIELD	36	36	9	1	9
W3-2	Yield Ahead	36	36	9	1	9
R1-2a	TO ONCOMING TRAFFIC	36	30	8	1	8
TOTAL (SQFT):						426

Digitally signed by
Jordan Adam Becker
Date: 2023.02.14
22:12:22-08'00'



TABULATION OF
TEMPORARY TRAFFIC CONTROL
QUANTITIES

P:\FHAX\00000280\0400CAD\RH\SHSHEETS\ FLH-PDF Standards\Std635-5 (1).dgn [Std 635-5]
29 November 2022 11:29 AM

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	G.3

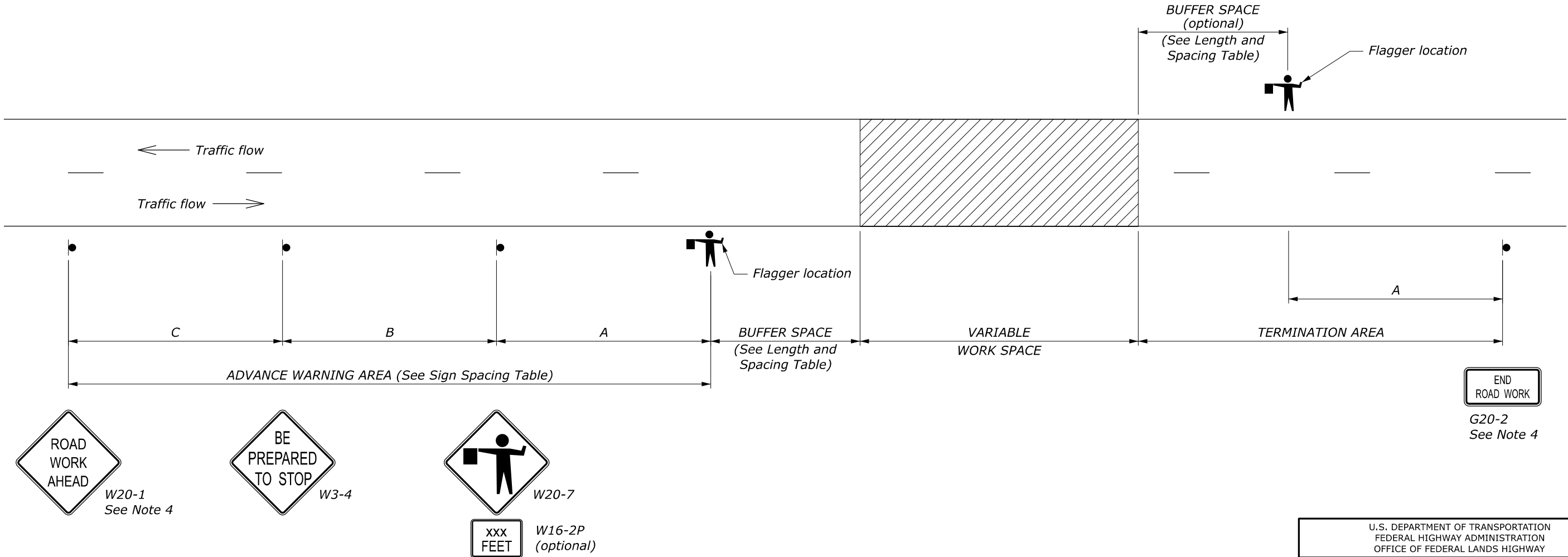
LENGTH AND SPACING TABLE	
APPROACH SPEED*	BUFFER SPACE LENGTH
MPH	FEET
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730

* Approach speed based on the regulatory posted speed, not the advisory speed.

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban and Rural 30 MPH and less	100	100	100
Urban and Rural 35 MPH to 50 MPH	350	350	350
Rural greater than 50 MPH	500	500	500
Expressway / Freeway	1000	1500	2640

NOTE:

1. Signs are shown for one direction of travel only. Place signs similar to those depicted for the opposite direction of travel.
2. Final location and spacing of devices may be changed to fit field conditions as approved by the CO.
3. For pilot car operation, mount the PILOT CAR FOLLOW ME (G20-4) sign at a conspicuous location on the rear of vehicle. Prominently display the name of the Contractor on the pilot car.
4. If closure is completely within the project limits, eliminate the ROAD WORK AHEAD (W20-1) and END ROAD WORK (G20-2) signs.
5. For night time flagging operation, provide floodlighting at flagger stations.
6. Do not allow equipment, materials, or vehicles to be parked or stored in the buffer space.



NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
FLH STANDARD TEMPORARY TRAFFIC CONTROL ROAD CLOSURE LAYOUT (WITH FLAGGERS)	
STANDARD APPROVED FOR USE 6/2005 REVISED: 7/2022	STANDARD 635-5

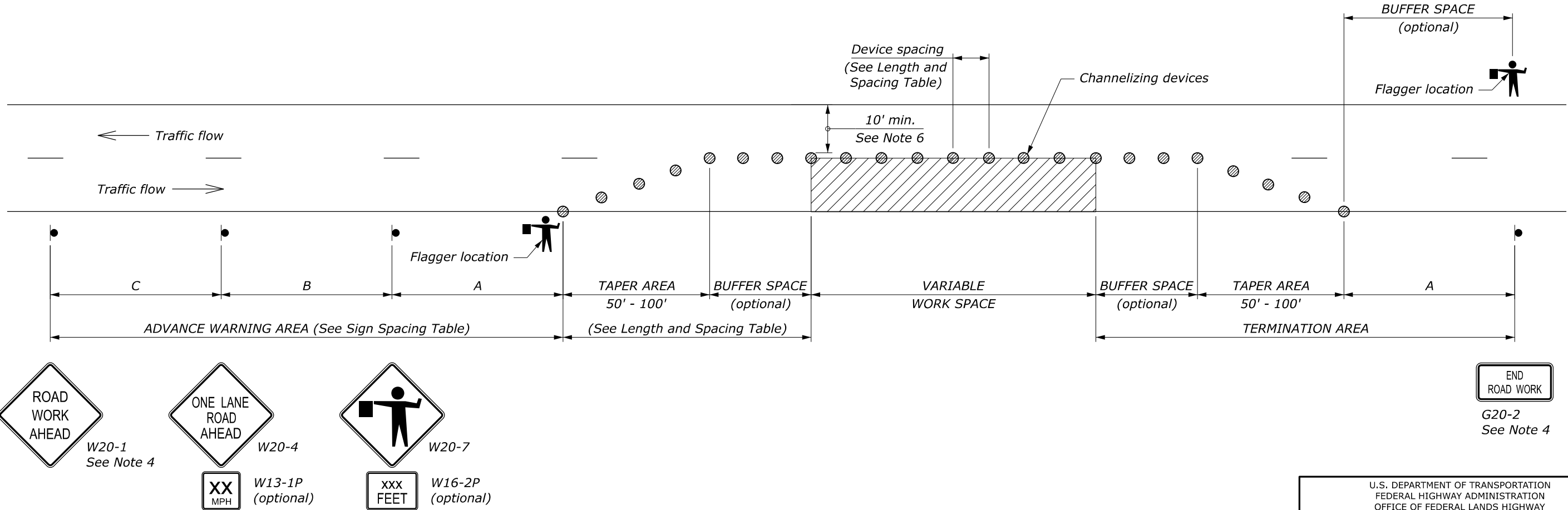
LENGTH AND SPACING TABLE				
APPROACH SPEED*	BUFFER SPACE LENGTH	CHANNELIZING DEVICE		
		TAPER AREA	BUFFER SPACE	WORK SPACE
MPH	FEET	SPACING IN FEET		
20	115	20	40	40
25	155	20	50	50
30	200	20	60	60
35	250	20	70	70
40	305	20	80	80
45	360	20	90	90
50	425	20	100	100
55	495	20	110	110
60	570	20	120	120
65	645	20	130	130
70	730	20	140	140

* Approach speed based on the regulatory posted speed, not the advisory speed.

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban and Rural 30 MPH and less	100	100	100
Urban and Rural 35 MPH to 50 MPH	350	350	350
Rural greater than 50 MPH	500	500	500
Expressway / Freeway	1000	1500	2640

NOTE:

- Signs are shown for one direction of travel only. Place signs similar to those depicted for the opposite direction of travel.
- Final location and spacing of devices may be changed to fit field conditions as approved by the CO.
- For pilot car operation, mount the PILOT CAR FOLLOW ME (G20-4) sign at a conspicuous location on the rear of vehicle. Prominently display the name of the Contractor on the pilot car.
- If closure is completely within the project limits, eliminate the ROAD WORK AHEAD (W20-1) and END ROAD WORK (G20-2) signs.
- For night time flagging operation, provide floodlighting at flagger stations.
- For project specific minimum width, refer to the Special Contract Requirements, Section 156.
- Do not allow equipment, materials, or vehicles to be parked or stored in the buffer space.



NO SCALE

LENGTH AND SPACING TABLE				
APPROACH SPEED*	BUFFER SPACE LENGTH	CHANNELIZING DEVICE		
		TAPER AREA	BUFFER SPACE	WORK SPACE
MPH	FEET	SPACING IN FEET		
20	115	20	40	40
25	155	20	50	50
30	200	20	60	60
35	250	20	70	70
40	305	20	80	80
45	360	20	90	90
50	425	20	100	100
55	495	20	110	110
60	570	20	120	120
65	645	20	130	130
70	730	20	140	140

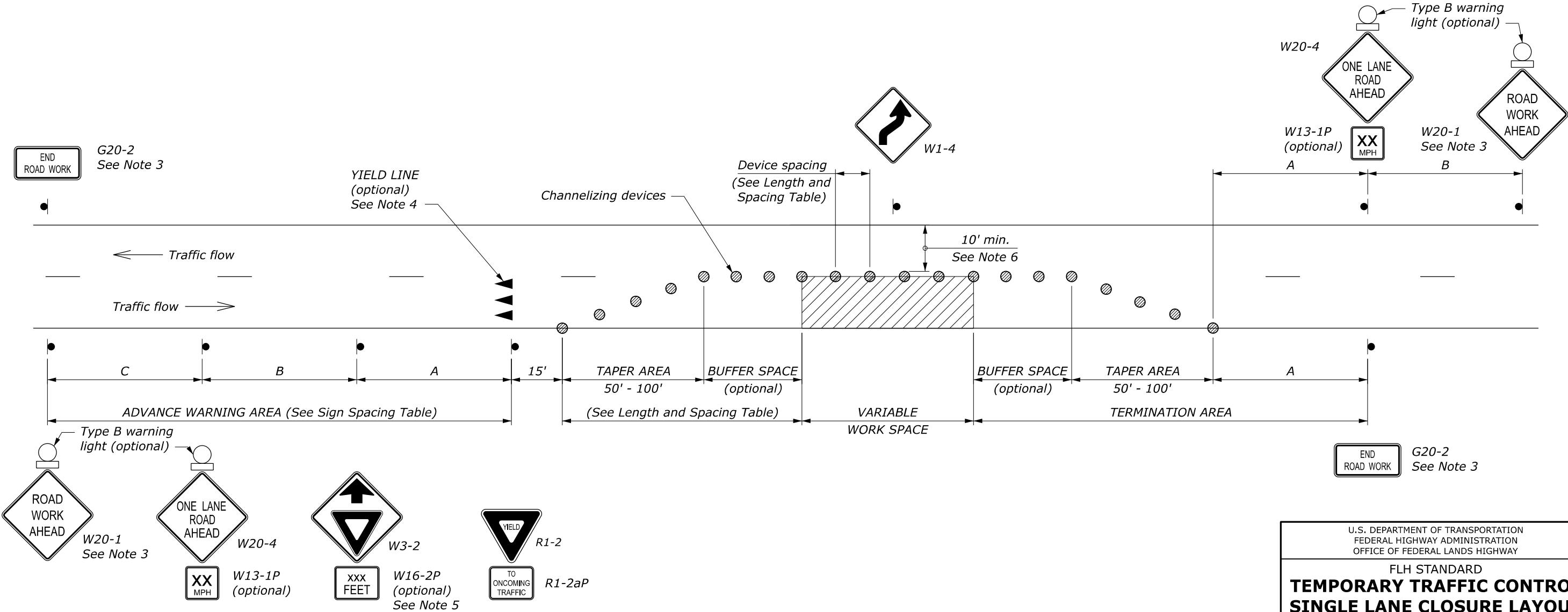
* Approach speed based on the regulatory posted speed, not the advisory speed.

SIGN SPACING TABLE			
ROAD TYPE	DISTANCE BETWEEN SIGNS IN FEET		
	A	B	C
Urban and Rural 30 MPH and less	100	100	100
Urban and Rural 35 MPH to 50 MPH	350	350	350
Rural greater than 50 MPH	500	500	500
Expressway / Freeway	1000	1500	2640

NOTE:

1. Use this layout only if sufficient gaps in oncoming traffic exist for traffic that must yield, and if drivers from both directions are able to see approaching traffic through and beyond the work site.
2. Final location and spacing of devices may be changed to fit field conditions as approved by the CO.
3. If closure is completely within the project limits, eliminate the ROAD WORK AHEAD (W20-1) and END ROAD WORK (G20-2) signs.
4. If the surface is paved, install yield lines that comply with Section 3B.16 of the MUTCD.
5. Use the YIELD AHEAD (W3-2) sign when approach speeds exceed 50 MPH.
6. For project specific minimum width, refer to Special Contract Requirements, Section 156.
7. Do not allow equipment, materials, or vehicles to be parked or stored in the buffer space.

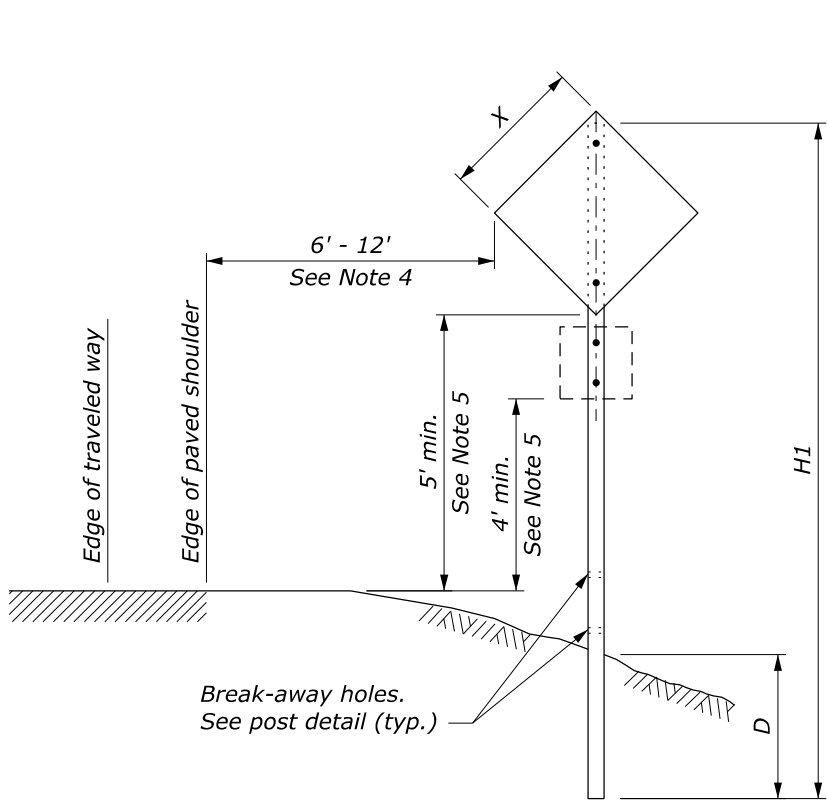
P:\FHAX00000280\0400CAD\RH\SH\HEETS\ FLH-PDF Standards\Std635-7.dgn [Std 635-7]
28 November 2022 1:33 PM



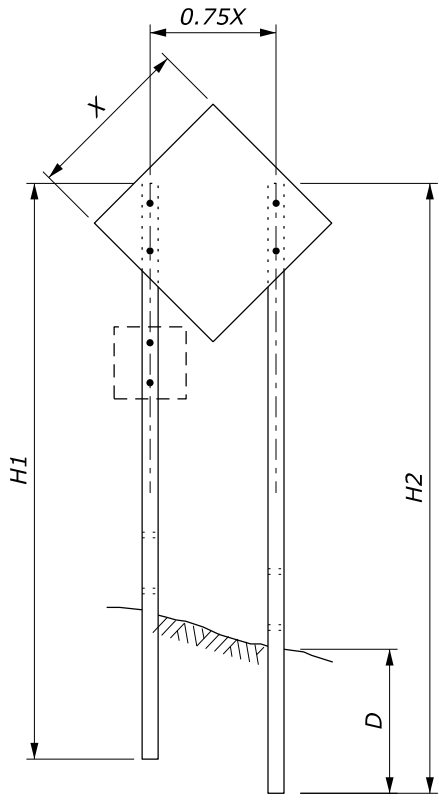
NO SCALE

NOTE:

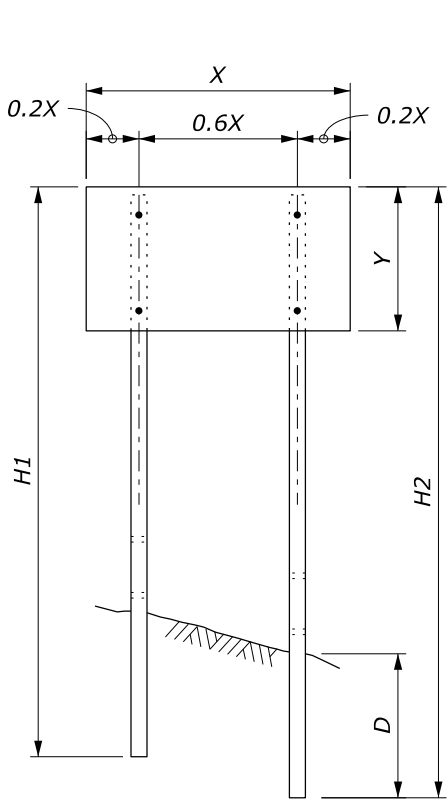
- 1. Attach sign panels with a minimum of 2 - 1/4" dia. bolts per post.
- 2. H1 and H2 = Overall post length. Select post lengths to fit field conditions.
- 3. D = Post embedment depth for average soil conditions.
- 4. In areas where lateral distance is limited, a minimum lateral offset of 2' may be used. In areas with curbs, a minimum lateral distance of 1' behind the face of the curb may be used.
- 5. In pedestrian locations, or in areas with obstructed views, use 7' minimum mounting height for main sign and 6' minimum mounting height for secondary sign.
- 6. Use 7' minimum spacing between posts for sign posts 6" x 6" or larger.
- 7. State standards may be used as an alternative if approved by the CO.



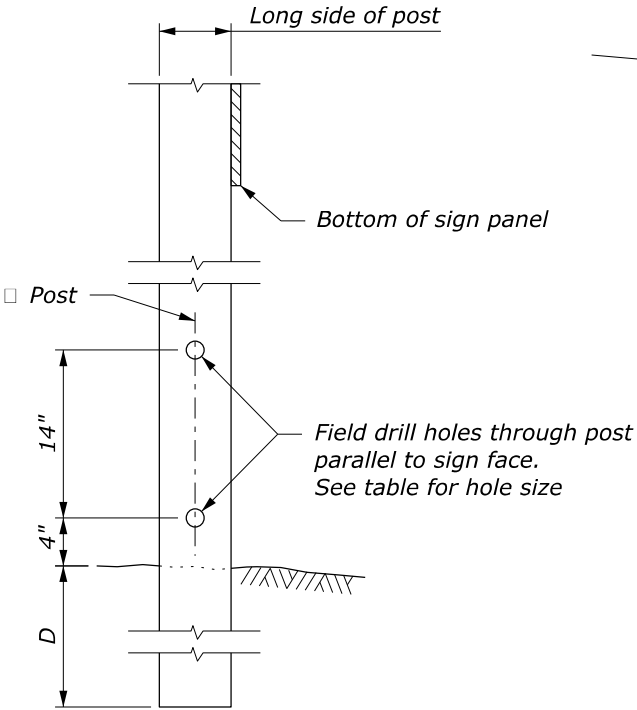
SINGLE POST SIGN



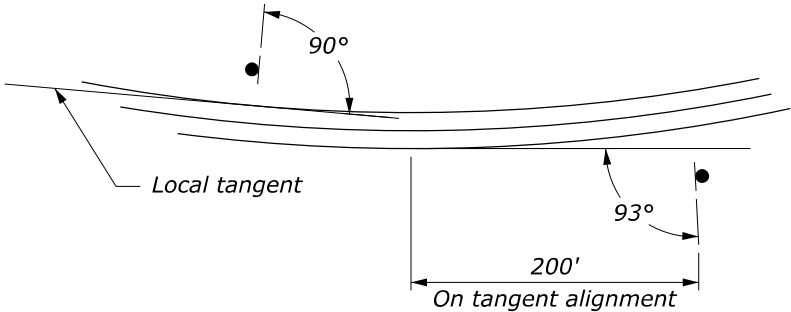
TWO POST SIGN



WOOD POST SELECTION TABLE					
WIDTH "X"	AREA (SQFT)	NUMBER OF POSTS	POST SIZE (INCH)	D (INCH)	HOLE SIZE (INCH)
Diamond ≤ 36" Other Shapes ≤ 48"	< 10	1	4 x 4	36	0
		1	4 x 6	48	1.5
Diamond ≤ 48"	10 - 20	1	6 x 6	48	2
Diamond ≤ 48" Other Shapes ≤ 12'	10 - 20	2	4 x 4	36	0
	20 - 50	2	4 x 6	48	1.5
> 13'	50 - 65	2	6 x 6	48	2
12' - 16'	50 - 65	3	4 x 6	48	1.5
> 17'	65 - 95	4	4 x 6	48	1.5
> 30'	65 - 95	3	6 x 6	48	2



POST DETAIL



SIGN INSTALLATION ANGLE

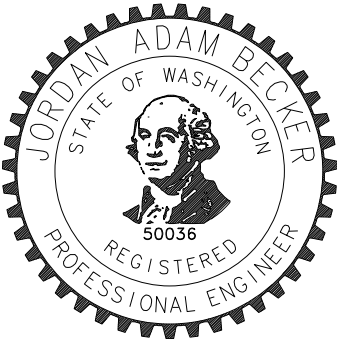
NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
FLH STANDARD TEMPORARY TRAFFIC CONTROL SIGN INSTALLATION WOOD POSTS	
STANDARD APPROVED FOR USE 6/2005 REVISED: 7/2022	STANDARD 635-14

PERMANENT TRAFFIC CONTROL QUANTITIES								
ITEM	DESCRIPTION	UNIT	LOCATIONS				TOTAL	NOTES
			SITE 1	SITE 2	SITE 3	BETWEEN SITE 1 AND 2		
20301-2400	Remove Sign	EACH	3				3	
63304-0900	Signs, Aluminum Panel, Type 3 Sheeting	SQFT	33	23			56	
63305-0400	Posts, Steel, 2-Inch X 2-Inch	LNFT	35	33			68	
63305-1800	Posts, Wood, 4-Inch X 6-Inch	LNFT	16				16	
63316-1000	Remove and Reset Sign	EACH	4				4	
63401-0100	Pavement Markings, Type B, Solid (Double Yellow Centerline)	LNFT	2,034	1,000	1,048		4082	Quantity for 2 coats
63401-0100	Pavement Markings, Type B, Solid (White Edge Line)	LNFT	1768				1768	Quantity for 2 coats
63401-0100	Pavement Markings, Type B, Solid (White Stop Bar)	LNFT			28		28	Quantity for 2 coats

Jordan Adam Becker

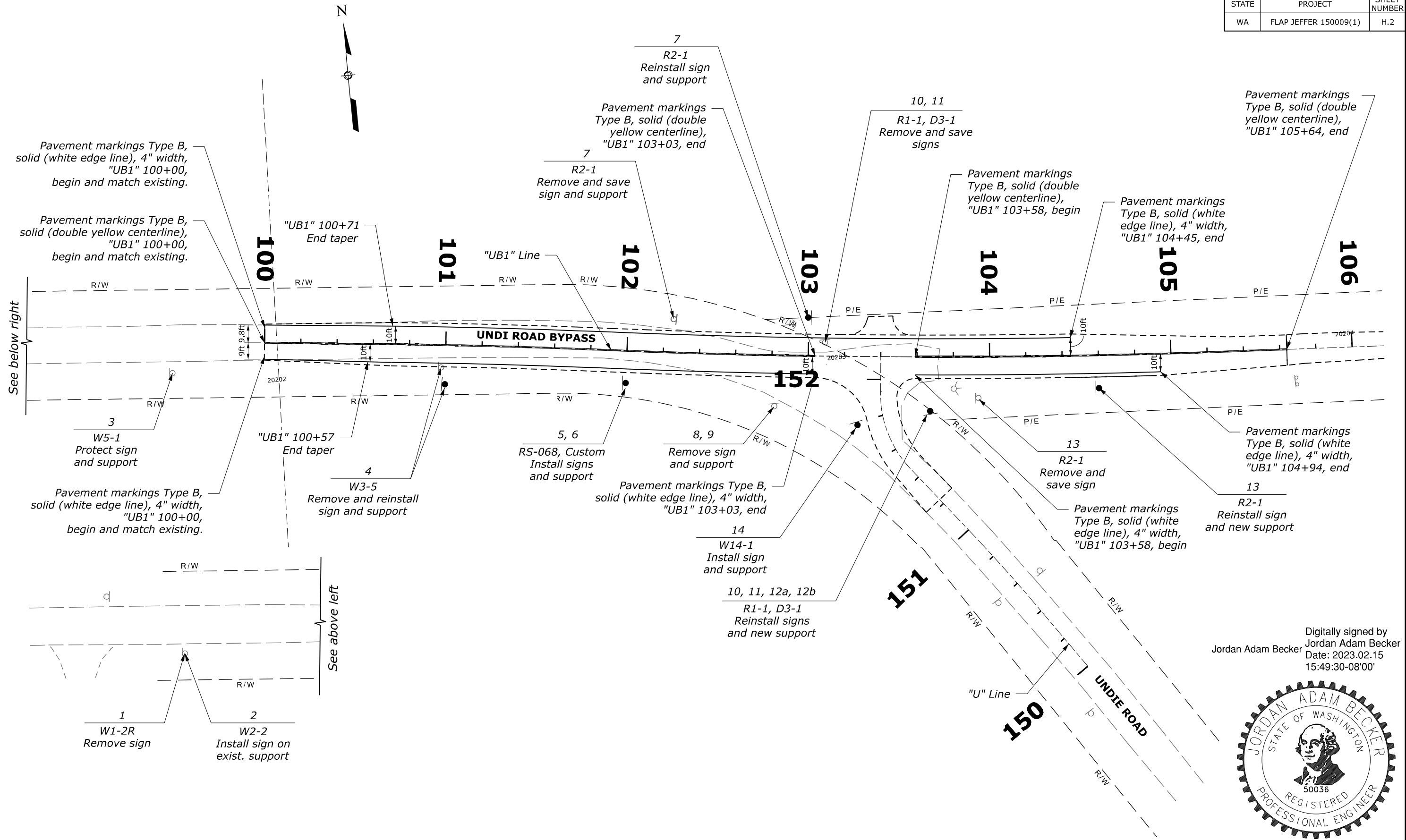
Digitally signed by
Jordan Adam Becker
Date: 2023.02.14
22:20:59-08'00'



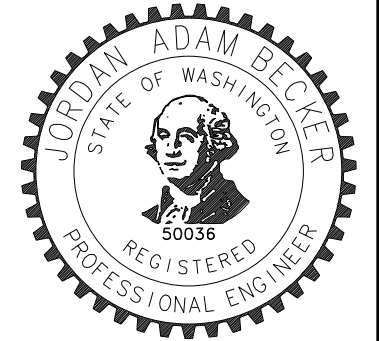
TABULATION OF
PERMANENT TRAFFIC CONTROL
QUANTITIES

P:\FHAX\00000280\0400CAD\RH\SHSHEETS\150009(1).pln_ptc.dgn [Site 1 Plan Sheet]
8 February 2023 10:17 AM

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	H.2



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Jordan Adam Becker
Date: 2023.02.15
15:49:30-08'00'



LEGEND:

1	Sign Number	●	Proposed/relocated sign
R1-1	MUTCD sign designation	○	Existing sign

NOTES:

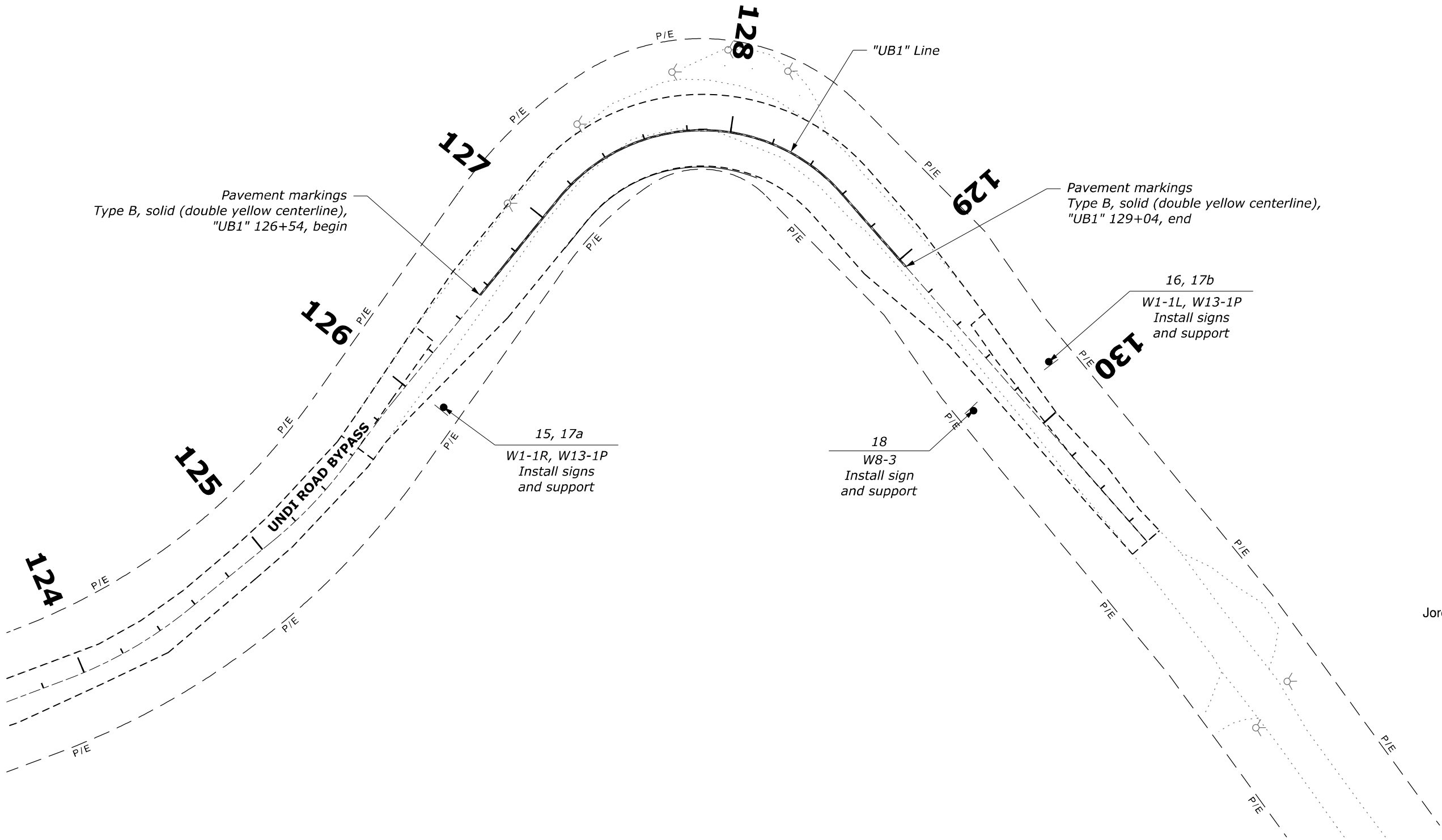
1. See sheet H.5 and H.6 for sign and post details.

**PERMANENT TRAFFIC
CONTROL PLAN
SITE 1**

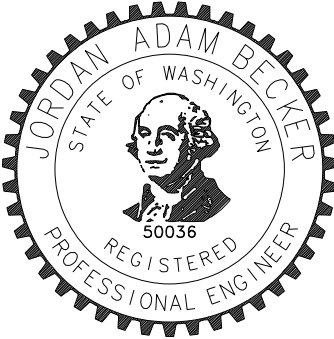
STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	H.3



P:\F\HAX00000280\0400CAD\RH\H\SHEET\150009(1)_pln_ptc.dgn [Site 2 Plan [Sheet]] 8 February 2023 11:49 AM



Digitally signed by
Jordan Adam Becker
Date: 2023.02.15
15:50:14-08'00'



LEGEND:

1 Sign Number
R1-1 MUTCD sign designation

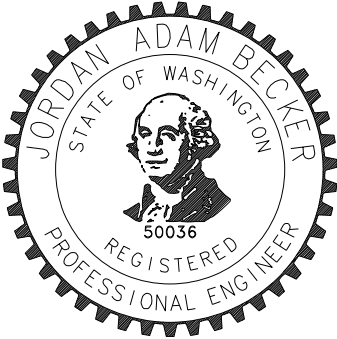
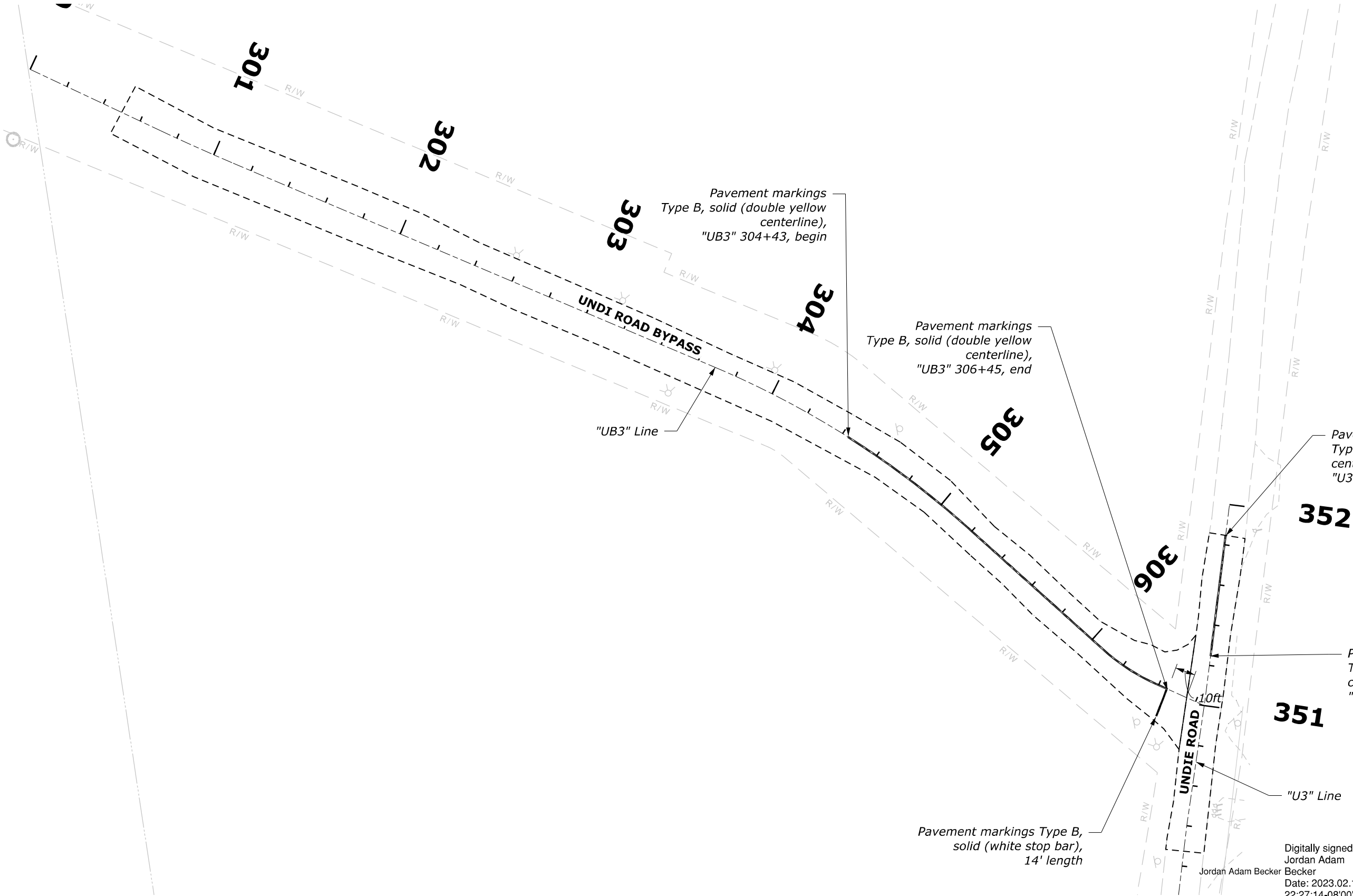
● Proposed/relocated sign

NOTES:

1. See Sheet H.5 and H.6 for sign and post details.

PERMANENT TRAFFIC
CONTROL PLAN
SITE 2

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	H.4



Digitally signed by
Jordan Adam
Becker
Date: 2023.02.14
22:27:14-08'00'

- NOTES:
1. Protect/maintain all existing signs and sign supports at Site 3.

**PERMANENT TRAFFIC
CONTROL PLAN
SITE 3**

P:\FHAX\00000280\0400CAD\RH\SHSHEETS\150009(1)_pLn_ptc.dgn [Sign and Post Data Table] 13 February 2023 2:13 PM

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	H.5

SIGN & POST DATA TABLE

SIGN NO.	SIGN LOCATION [4]	SIGN DIMENSIONS		SUB-STRATE			COLOR [1]						SIGN NO. [2]	TYPE OF SUPPORT		POST	FOOTING		REMARKS
							BACKGROUND			LEGEND						LENGTH	LOCATION [3]	MIN. DEPTH	
		WIDTH	HEIGHT	PLYWOOD	SHEET ALUMINUM	EXTRUDED ALUM.	ASTM TYPE III or TYPE IV	ASTM TYPE IX	NON-REFLECTIVE	ASTM TYPE III or TYPE IV	ASTM TYPE IX	NON-REFLECTIVE		WOOD POST	SQ. TUBE SIGN SUPPORT, 2" x 2"	(MUST BE FIELD VERIFIED)			
2	See Plans	30"	30"		✓		Y					BK	2						Install sign on existing post
3	See Plans	(30")	(30")										3						Protect existing sign and post
4	"UB1" 101+00	(18")	(24")										4				23.5'	3'-0"	Reinstall existing sign and post
5	"UB1" 102+00	24"	24"		✓		BR			W			5	✓		16'-0"	20'	4'-0"	4"x6" post size.
6	"UB1" 102+00	48"	30"		✓		BR			W			6						Install above sign #5
7	"UB1" 103+00	(24")	(30")										7				-23.5'	3'-0"	Reinstall existing sign and post
10	"U" 151+75	(30")	(30")										10		✓	12'-0"	26'	3'-0"	Reinstall existing sign on new post
11	"U" 151+75	(Unk.)	(12")										11						Install exist. sign above sign #10, perpendicular to Undi Rd.
12a	"U" 151+75	36"	12"		✓		G			W			12a						Install above sign #11, perpendicular to Undi Rd. Bypass
12b	"U" 151+75	36"	12"		✓		G			W			12b						Install above sign #11, opposite side of pole from sign #12a
13	"UB1" 104+60	(18")	(24")										13		✓	10'-0"	20'	3'-0"	Install existing sign on new post
14	"U" 151+80	30"	30"		✓		Y					BK	14		✓	13'-0"	-17'	3'-0"	
15	"UB1" 126+00	30"	30"		✓		Y					BK	15		✓	11'-0"	23'	3'-0"	
17a	"UB1" 126+00	18"	18"		✓		Y					BK	17a						Install below sign #15
16	"UB1" 129+80	30"	30"		✓		Y					BK	16		✓	11'-0"	-20.5'	3'-0"	
17b	"UB1" 129+80	18"	18"		✓		Y					BK	17b						Install below sign #16
18	"UB1" 129+75	30"	30"		✓		Y					BK	18		✓	11'-0"	20.5'	3'-0"	

FOOTNOTES:

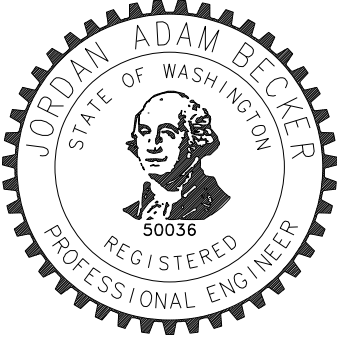
[1]
BK=BLACK R=RED Y=YELLOW
BR=BROWN SW=SILVER-WHITE
G=GREEN W=WHITE

[2]
NOTE: "a" AND "b" IDENTIFY DUPLICATE SIGNS

[3]
DISTANCE FROM ALIGNMENT CENTERLINE TO THE CENTERLINE OF FOOTING.

[4]
THE LOCATIONS SHOWN ARE APPROXIMATE. EXACT LOCATIONS ARE TO BE DETERMINED BY THE ENGINEER

Digitally signed
by Jordan Adam
Jordan Adam Becker Becker
Date: 2023.02.14
22:29:41-08'00'



TABULATION OF
SIGNS & POSTS

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STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	H.6



Sign No. 1



Sign No. 2



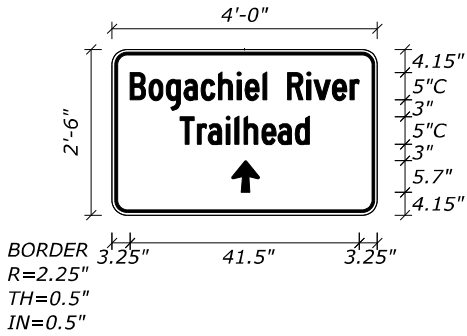
Sign No. 3



Sign No. 4



Sign No. 5

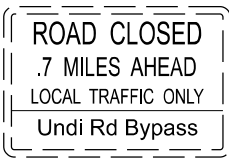


Font: Highway Gothic, Series C
Custom
48" x 30"

Sign No. 6



Sign No. 7



N/A
(Existing)

Sign No. 8



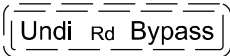
N/A
(Existing)

Sign No. 9



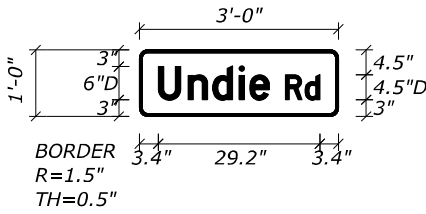
R1-1
(Existing)

Sign No. 10



D3-1
(Existing)

Sign No. 11



Font: Highway Gothic, Series D
D3-1
36" x 12"

Sign No. 12a, 12b



R2-1
(Existing)

Sign No. 13



W14-1
30" x 30"

Sign No. 14



Sign No. 15



Sign No. 16

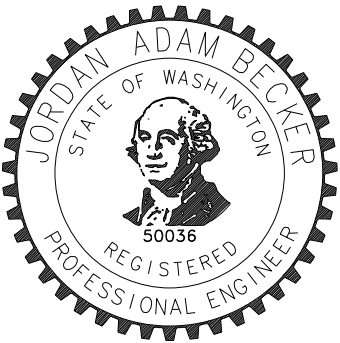


Sign No. 17a, 17b

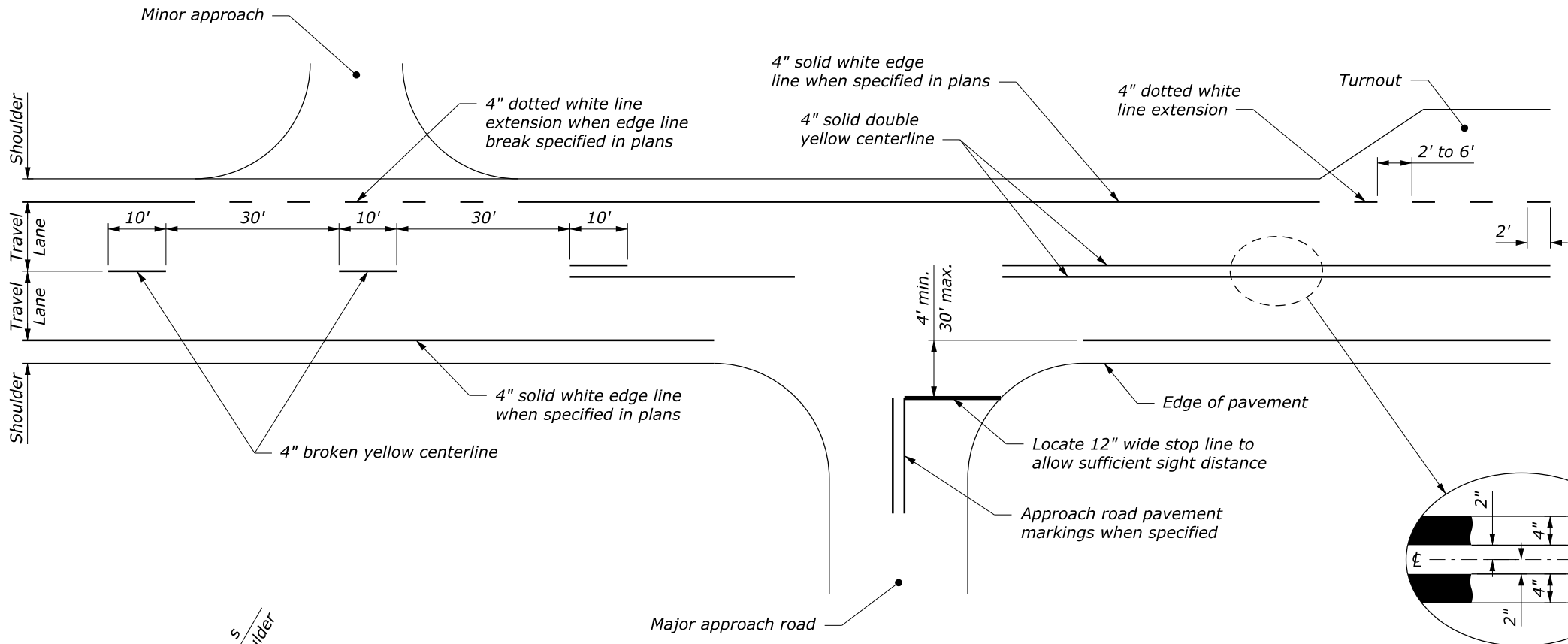


Sign No. 18

Digitally signed by
Jordan Adam Becker
Date: 2023.02.14
22:30:37-08'00'

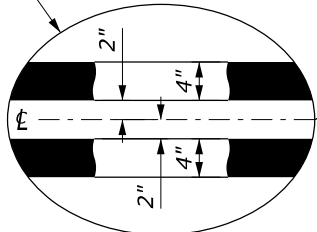


SIGN DETAILS



NOTE:

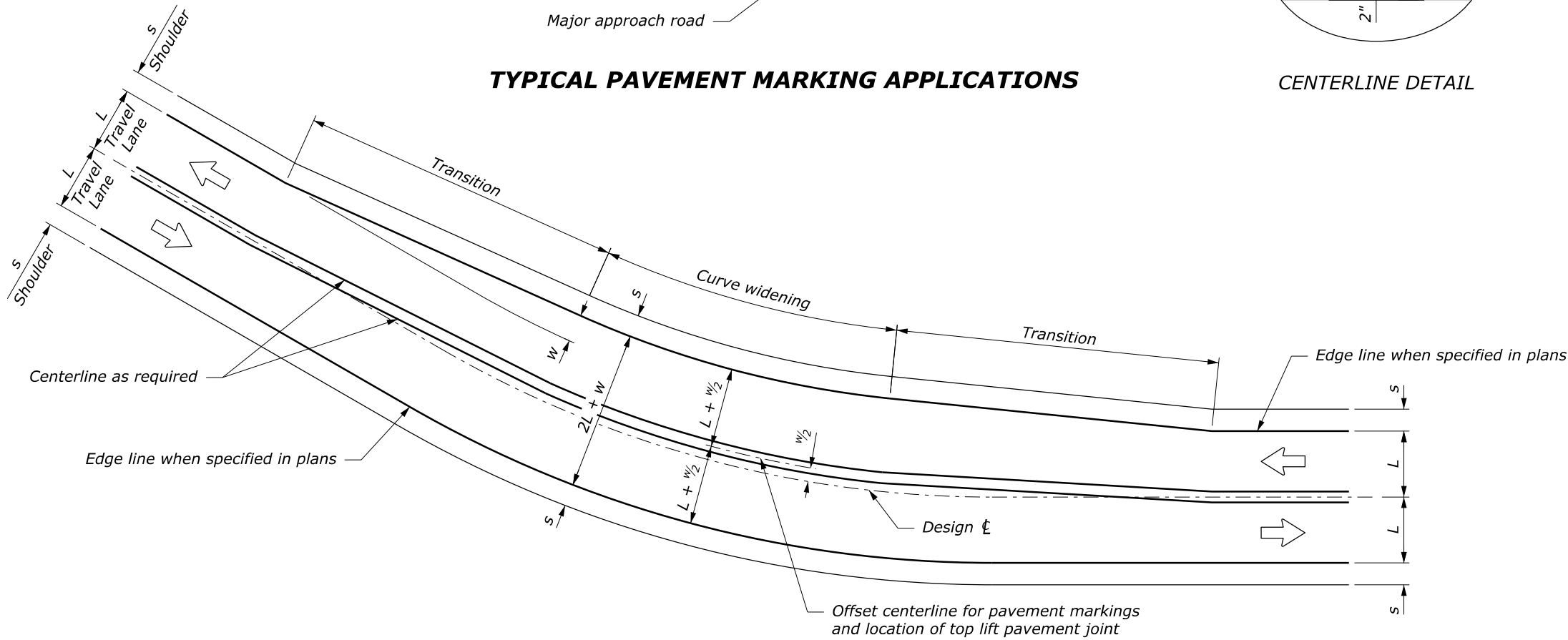
1. Place edge line pavement markings at asphalt/concrete curb interface when curb is present.
2. Paint centerline pavement markings on curves with curve widening "w" to achieve equal lane widths within the roadway. Maintain a constant shoulder width "s" throughout the curve widening area. See staking details for curve widening transition locations.
3. Typical pavement marking widths are shown. Use wider pavement markings when specified on the plans or when required by the maintaining agency.



Increase spacing between parallel lines when specified in the plans or when required by the maintaining agency

TYPICAL PAVEMENT MARKING APPLICATIONS

CENTERLINE DETAIL

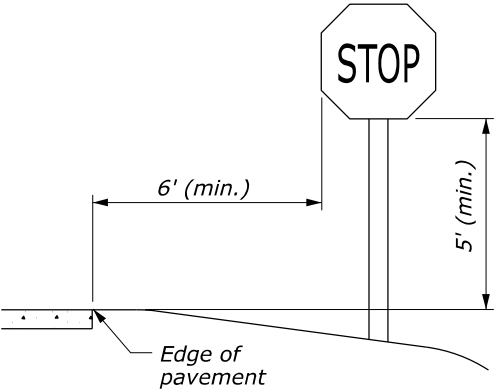


CENTERLINE MODIFICATION FOR CURVES WITH WIDENING APPLIED ON INSIDE

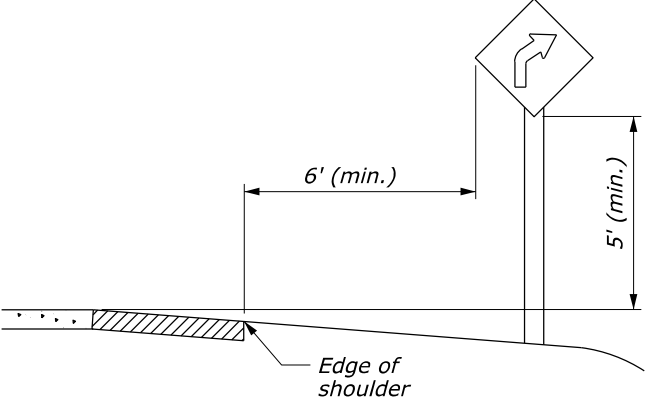
See Note 2 for treatment of curves when widening "w" is split equally on both sides of centerline

NO SCALE

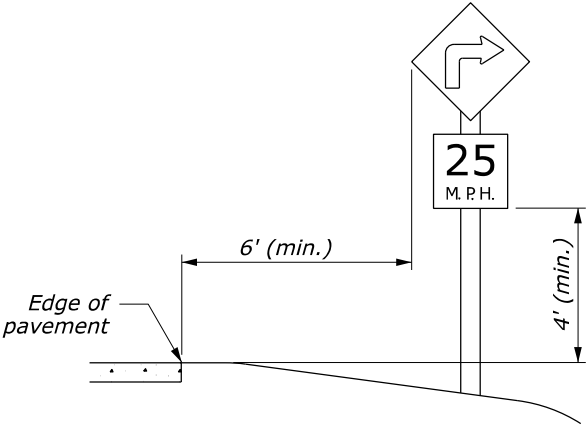
U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
WFLHD DETAIL	
LINEAR PAVEMENT MARKINGS	
DETAIL APPROVED FOR USE 10/2007 REVISED: 10/2012	DETAIL W634-2



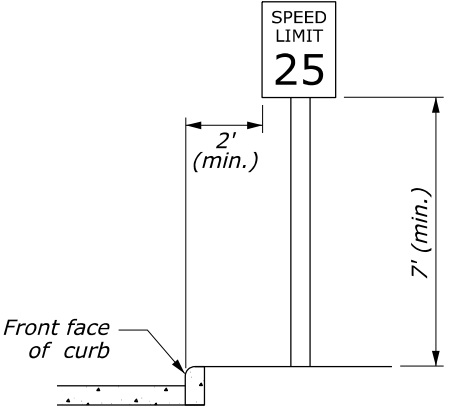
WITHOUT SHOULDER



WITH SHOULDER

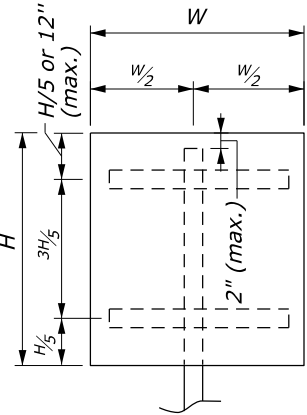


WITH ADVISORY SPEED PLAQUE

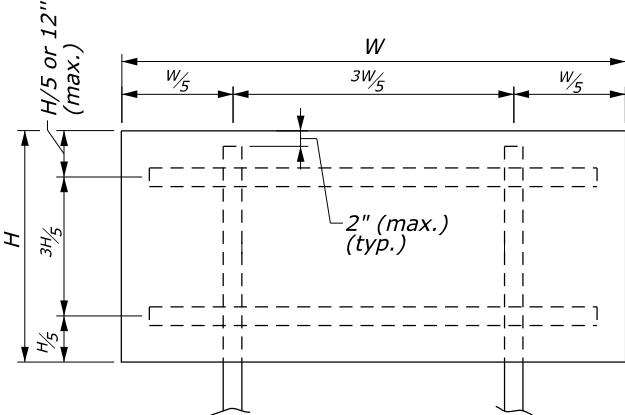


ROADSIDE SIGN IN BUSINESS OR RESIDENTIAL DISTRICT

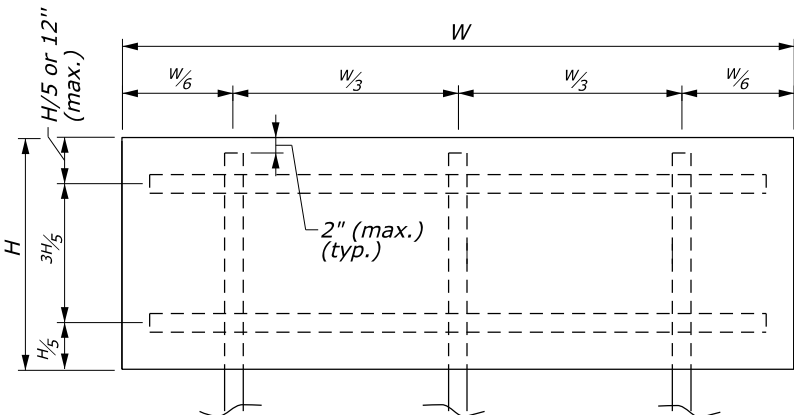
ROADSIDE SIGN IN RURAL DISTRICT



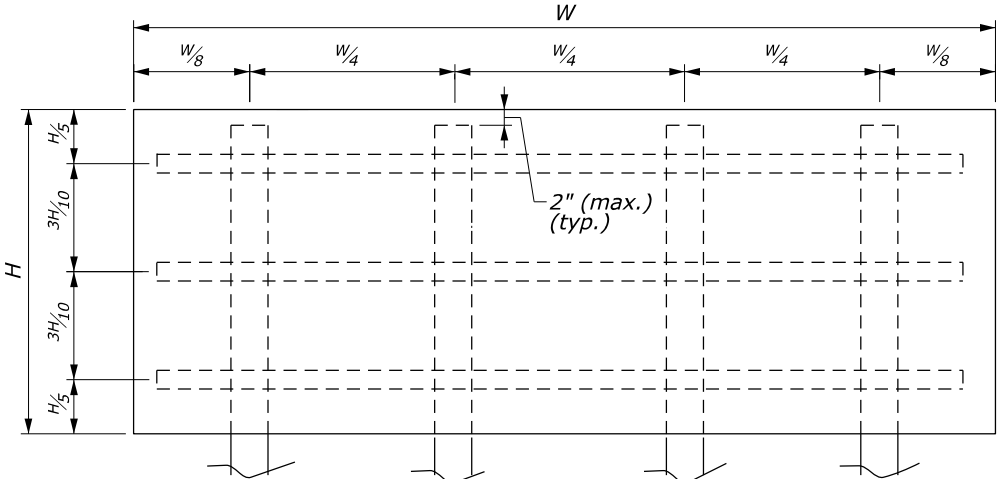
SINGLE POST



DOUBLE POST



TRIPLE POST



QUADRUPLE POST

NOTES:

1. Locate and set sign height according to the "Manual on Uniform Traffic Control Devices" (MUTCD), latest edition.
2. For U-channel, square tubular, and corrosion resistant steel posts for which the sign panel area is 10 square feet or less but W is over 4 feet, use double posts.
3. For square tabular steel double posts for which the sign panel area is equal to 24 square feet, use slip base according to manufacturer's recommendations.
4. Refer to Detail E633-02 for breakaway support details for corrosion resistant steel posts.
5. Refer to Detail E633-03 for breakaway support details for wood, U-channel steel and square tubular steel posts.
6. Refer to Detail E633-04 for bracing details for wood, U-channel steel and square tubular steel posts.
7. Refer to Section 2A.21 of the MUTCD, latest edition, for additional information.

POST SIZE TABLE					
POST TYPE	POST SIZE	MAXIMUM SIGN AREA (SQFT)			
		SINGLE POST	DOUBLE POST	TRIPLE POST	QUADRUPLE POST
Wood	4" x 4"	10	20		
	4" x 6"	15	35	45	60
	6" x 6"	20	50	75	100
U-Channel Steel		10*	24	30	
Square Tubular Steel	2" 12 ga.	10*	16		
	2" 12 ga.	10*	24**		
Corrosion Resistant Steel	2" x 2" 10 ga. Class B	10*	24		

* See Note 2
** See Note 3

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
EFLHD DETAIL	
SIGN STRUCTURES	
DETAIL APPROVED FOR USE APPROVED: MAY 2011 REVISED: SEPTEMBER 2020	DETAIL E633-01

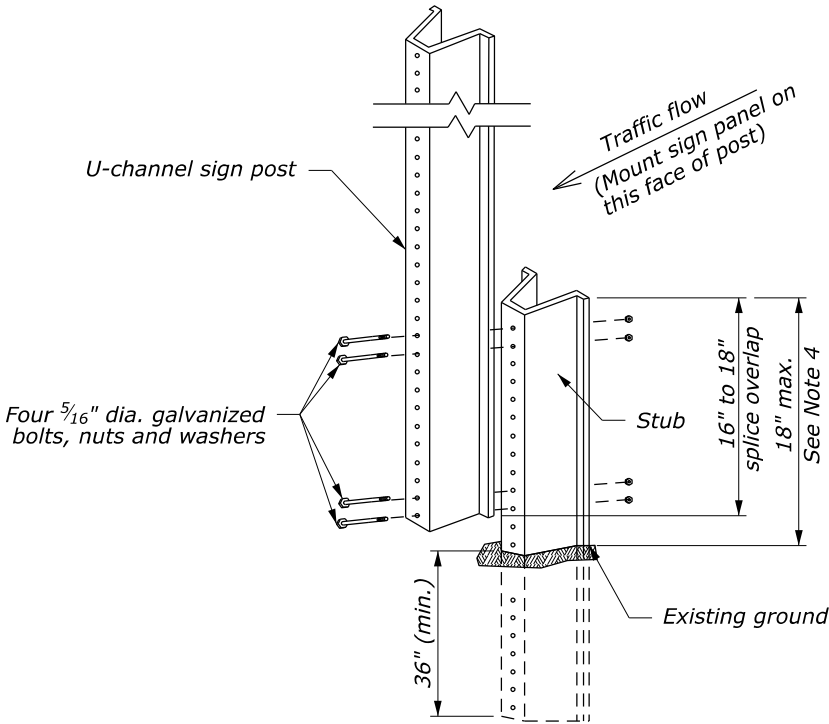
P:\FHAX00000280\0400CAD\RH\SHSHEETS\FLH-PDF Standards\st63303_detail.dgn [Sheet] 18 January 2023 1:35 PM

STATE	PROJECT	SHEET NUMBER
WA	FLAP JEFFER 150009(1)	H.9

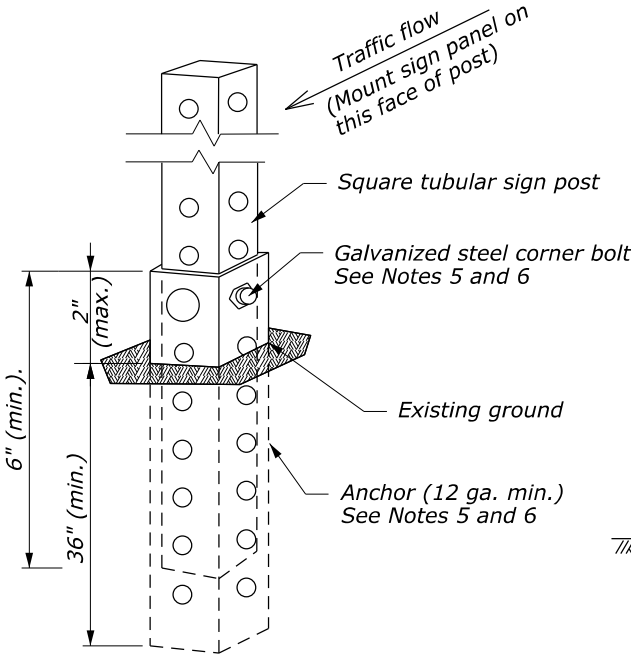
WOOD POST DATA TABLE		
POST SIZE	HOLE DIAMETER	(D) (MIN.)
4" x 4"	Not Required	3'
4" x 6"	1.5"	4'
6" x 6"	2"	4'

NOTES:

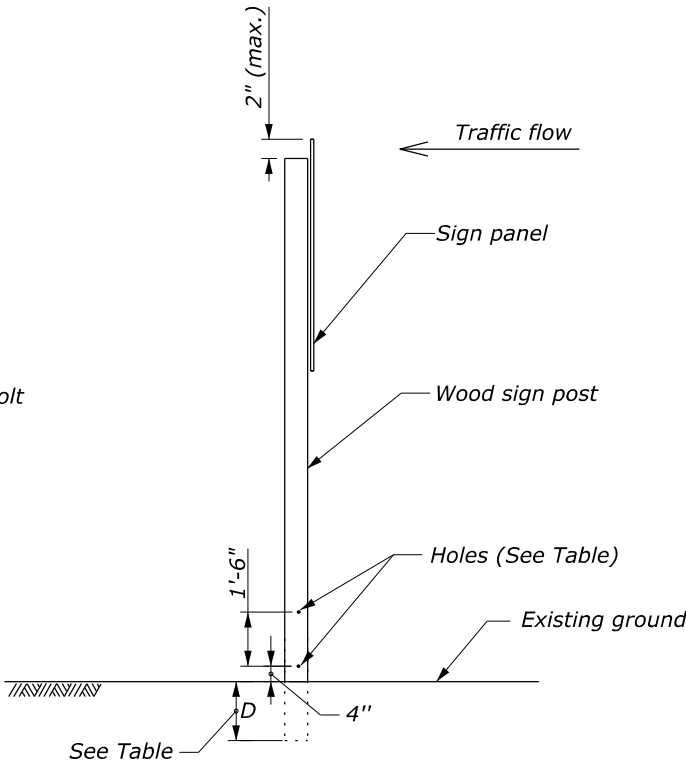
- Breakaway sign support is not required for signs placed behind protective barriers.
- Signs requiring 6-inch by 6-inch wood posts are considered to be non-breakaway if multiple posts are required and posts cannot be spaced a minimum of 7 feet apart.
- Place non-breakaway signs outside the clear zone or shield with approved barrier. Do not place holes in posts of non-breakaway signs.
- Position splice overlap on U-channel steel posts entirely between the ground line and 18 inches above the ground line. Do not place more than one splice per post.
- Attach the square tubular steel post to the anchor with a corner bolt according to the manufacturer's recommendations. Size the anchor according to the manufacturer's recommendations to accept the post size specified.
- Maintain the post assembly in a plumb position.
- For sign punching details, see the blank standards in the "Standard Highway Signs and Markings" as specified in the latest edition of the MUTCD.
- Refer to Detail E633-01 for sign mounting details.
- Refer to Detail E633-04 for sign bracing details.
- Refer to Section 2A.21 of the MUTCD, latest edition, for additional information.



U-CHANNEL STEEL POST



SQUARE TUBULAR STEEL POST



WOOD POST

BREAKAWAY SIGN SUPPORT

NO SCALE

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION OFFICE OF FEDERAL LANDS HIGHWAY	
EFLHD DETAIL	
BREAKAWAY SIGN SUPPORT WOOD AND STEEL POSTS	
DETAIL APPROVED FOR USE APPROVED: MAY 2011 REVISED: SEPTEMBER 2020	DETAIL E633-03

