NAVIGABLE STREAMS IN KENTUCKY

Submit an inquiry to the Coast Guard regarding any crossing over those waterways listed below so that they may comment on the need for a permit at that time and place.

WATERWAYS THAT HAD REQUIRED BRIDGE PERMITS

WATERWAYS	UPPER LIMIT
Barren River	Bowling Green, KY Mile 30.0
Benson Creek	Mouth to Mile 1.9
Big Sandy River	Mile 8.0 to Confluence of Tug and Levisa Forks, Mile 26.83
Big Sandy River, Levisa Fork	Mile 19.4
Big Sandy River, Tug Fork	Williamson, WV, Mile 58.0
Cumberland River	Mile 385.4 to Mile 552
Cumberland River, Big South Fork	In Its Entirety
Cumberland River, Clover Fork	Mouth to Mile 10.8
Cumberland River, Martin's Fork	Mouth to Mile 19.5
Cumberland River, Poor Fork	Mile 30.6
Green River	Mile 108.5 to Mouth of Barren River, Mile 150.0
Flat Creek	Mouth to 1.3
Eddy Creek	Mile 4.9, I-24 Bridge
Hammond Creek	Mouth to Mile 1.6
Kentucky River	Confluence North and Middle Forks, Mile 258.6
Knob Creek	Mouth to Mile 1.1
Lawrence Creek	Mouth to Mile 2.6
Lead Creek	Mouth to Mile 3.8
Lick Creek, Arm Barkley Lake	Mile 1.25
Licking River	Mile 18.3
Little River	Mile 25.0
Rough River	Dam No. 1, Mile 7.0
Pond River	Mile 12.5
Tradewater River	0.5 Miles Downstream from Mouth Caney Branch, Mile 2.8
Beaver Creek (Trib. of Lake Cumb.)	Mile 11.5
Otter Creek (Trib. of Lake Cumb.)	Mile 10.0

WATERWAYS THAT HAD BEEN IN ADVANCE APPROVAL CATEGORY

LOCATION OF MOUTH OF WATERWAY	NAME OF WATERWAY	LOWER LIMIT	UPPER LIMIT
Cumberland River, Mile 380.9	Dale Hollow Lake	7.3	58.3
Cumberland River, Mile 546.4	Rock Castle River	Mouth	13.1
Cumberland River, Mile 552.1	Laurel River	Mouth	21.5
Cumberland River, Mile 59.0	Little River	25.0	59.0
Green River, Mile 108.6	Mud River	Mouth	14.0
Green River, Mile 149.5	Barren River	30.0	37.5
Green River, Mile 168.5	Bear Creek	Mouth	11.0
Green River, Mile 183.5	Nolin River	Mouth	7.8
Green River, Mile 71.3	Rough River	7.0	29.0
KY River, Mile 190.3	Red River	Mouth	5.5
KY River, Mile 258.6	KY River, Middle Fork	Mouth	4.7
KY River, Mile 258.6	KY River, North Fork	Mouth	4.7
KY River, Mile 258.6	KY River, South Fork	Mouth	4.0
Ohio River, Mile 336.4	Little Sandy River	Mouth	12.2
Ohio River, Mile 368.2	Kinniconnick Creek	Mouth	0.9
Ohio River, Mile 378.4	Salt Lick River	Mouth	0.4
Ohio River, Mile 426.4	Bracken Creek	Mouth	0.4
Ohio River, Mile 432.8	Big Locust Creek	Mouth	2.0
Ohio River, Mile 512.0	Lick Creek	Mouth	1.0
Ohio River, Mile 513.6	Gunpowder Creek	Mouth	1.0
Ohio River, Mile 514.6	Landing Creek	Mouth	0.7
Ohio River, Mile 516.7	Big Bone Creek	Mouth	1.0
Ohio River, Mile 521.3	Paint Lick Creek	Mouth	1.4
Ohio River, Mile 522.7	Little Sugar Creek	Mouth	0.7
Ohio River, Mile 522.8	Big Sugar Creek	Mouth	0.8
Ohio River, Mile 529.9	Craigs Creek	Mouth	2.7
N/A	Dry Creek (Trib of Craigs Creek)		
Ohio River, Mile 546.6	Little KY River	Mouth	1.0
Ohio River, Mile 596.0	Harrods Creek	Mouth	2.0
Ohio River, Mile 629.0	Salt River	Mouth	5.0
Ohio River, Mile 784.5	Green River	150.0	199.0
Ohio River, Mile 873.5	Tradewater River	2.8	41.5
Tenn. River, Mile 4.3	Clark River	Mouth	13.0
Tenn. River, Mile 51.6	Blood River	Mouth	5.3

WATERWAYS THAT HAD BEEN CONSIDERED NON-NAVIGABLE

WATERWAY	LIMIT
Rough River	Above Mile 29.0
Rough River Reservoir	In Its Entirety
Long Pond Branch	In Its Entirety
Middle Fork, Kentucky River	Mile 4.7 to Mile 79.5

COUNTY OF	ITEM NO.	SHEET NO.

BRIDGE AND CULVERT SUMMARY

DIVISION OF BRIDGE DESIGN ESTIMATE AND PROJECT SUMMARY -- FINAL — SHEET 2
KENTUCKY TRANSPORTATION CABINET, DEPARTMENT OF HIGHWAYS

COUNTY SHELBY — STATE PROJECT NO. FD04 106 7636 — 010 — COMPLETED DATE
ROAD KY 7636 — FEDERAL PROJECT NO. — DISTRIBUTION DATE
REVISION DATE

SPECIAL DRAWINGS 25030/24SH, 25034/8SH, 25036/8SH, 25033/9SH, 25030/24SH, 25034/8SH, 25037/5SH, 25031/39SH

STANDARD DRAWINGS BGX-006-08/1SH, BGX-012-02/1SH, BGX-016-01/1SH, RBR-015-04/1SH, BBP-001-11/1SH, BBP-002-04/1SH, RGX-030-06/1SH, BGX-011-04/1SH, BPS-011-03/1SH

TOTAL PLAN SHEETS 105

DRAWING NUMBER	25030	25034	25037	25031
STATION ON PROJECT ROUTE	157+41.38	164+87.60	29+67.61(KY 53)	273+49.50
DESCRIPTION OF STRUCTURE				
BRIDGE / CULVERT	BRIDGE	CULVERT	CULVERT	BRIDGE
TOTAL LENGTH / TOTAL LENGTH	256.025	319.000	E 65.000	272.354
NO. OF SPANS / NO. OF BARRELS	3 SPAN	SINGLE	SINGLE	3 SPAN
SKEW / SKEW	7.0 RT	40.0 RT	0.0	20.0 LT
FABRICATION / TYPE & SIZE	PCIB	RCBC 7 X 5	RCBC 5 X 4	PCIB
SPAN LENGTH / INLET LENGTH	CONT 75.0	150.000	36.000	73.000
/ INLET ELEV.	CONT 103.0	756.310	761.370	121.000
/ OUTLET LENGTH	CONT 75.0	169.000	29.000	73.000
/ OUTLET ELEV.		753.230	758.370	
/ FOUNDATION		ROCK	EARTH	

QUANTITIES

CODE	UNIT	DESCRIPTION					TOTALS FOR PROJECT
8100	C.Y.	CONCRETE-CLASS A	774.3	321.9	66.3	870.8	3082.8
8104	C.Y.	CONCRETE-CLASS AA	838.1			823.6	1661.7
8150	LBS.	STEEL REINFORCEMENT	90339.	46297.	4130.	97772.	360982.
8151	LBS.	STEEL REINF-EPOXY COATED	267567.			233668.	501235.
8095	EACH	PILE POINTS-14 INCH	52.			56.	108.
8051	L.F.	PILES STEEL HP 14 X 89	2357.			1840.	4197.
8033	L.F.	TEST PILES	100.			152.	252.
8020	TON	CRUSHED AGGREGATE SOPE PROT	1328.				1328.
8019	TON	CYCLOPRAN STONE RIP RAP				3334.	3334.
2231	C.Y.	STRUCTURE GRANULAR BACKFILL	238.			536.	774.
8634	L.F.	PRECAST PC I BEAM TYPE 4	2275.5				2275.5
8636	L.F.	PRECAST PC I BEAM TYPE 5				5336.6	5336.6
2998	S.Y.	MASONRY COATING	1338.			3614.	4952.
3299	L.F.	ARMORED EDGE FOR CONCRETE	173.3			178.8	352.1
8003	L.S.	FOUNDATION PREPARATION	1.	1.	1.	1.	8.
8002	CU M	STRUCTURE EXCAVATION-ROCK	516.	151.		420.	1996.
2403	C.Y.	REMOVING CONCRETE MASONRY			11.7		22.2
21118	ED S.Y.	ANTI-GRAFFITI CLEAR SEALANT				588.	588.
21119	ED S.Y.	CONCRETE FORMLINER				862.	862.
8256	L.F.	HANDRAIL, METAL				968.0	968.
8410	L.S.	LOW FLOW DIVERSION CURB					1.

NOTES AND SPECIAL PROVISIONS
SPECIAL PROVISION 69

PREPARED BY ____ DATE ____
CHECKED BY ____ DATE ____
APPROVED BY ____ DATE ____

Cell Library: kytc.cel
Cell Names: BD

BRIDGE AND CULVERT QUANTITIES ARE NOT INCLUDED IN THE GENERAL SUMMARY.

BRIDGE AND CULVERT SUMMARY

BRIDGE & CULVERT SUMMARY

EXHIBIT 217

EXHIBIT 218

CALCULATION FOLDER TITLE

Sample formats

CALCULATIONS FOR

ROWAN COUNTY, SRS 103 8603 001-003 D
McBrayer-Baldridge Connector
Bridge over Tripplett Creek
Drawing No. 20005 Sta. 56+50
Item No. 9-23
JOHN WORD DESIGN SECTION

HARRISON COUNTY, SSP 049 0062 001-006 D
Georgetown-Cynthiana (US 62)

CALCULATIONS FOR

R.C. Box Culvert

Sta. 183+62 Drawing No. 19159
Item No. 6-47.0

J. R. King Design Section

MASON COUNTY
FSP 081 0010 003-013 D, OOORS 05223 003

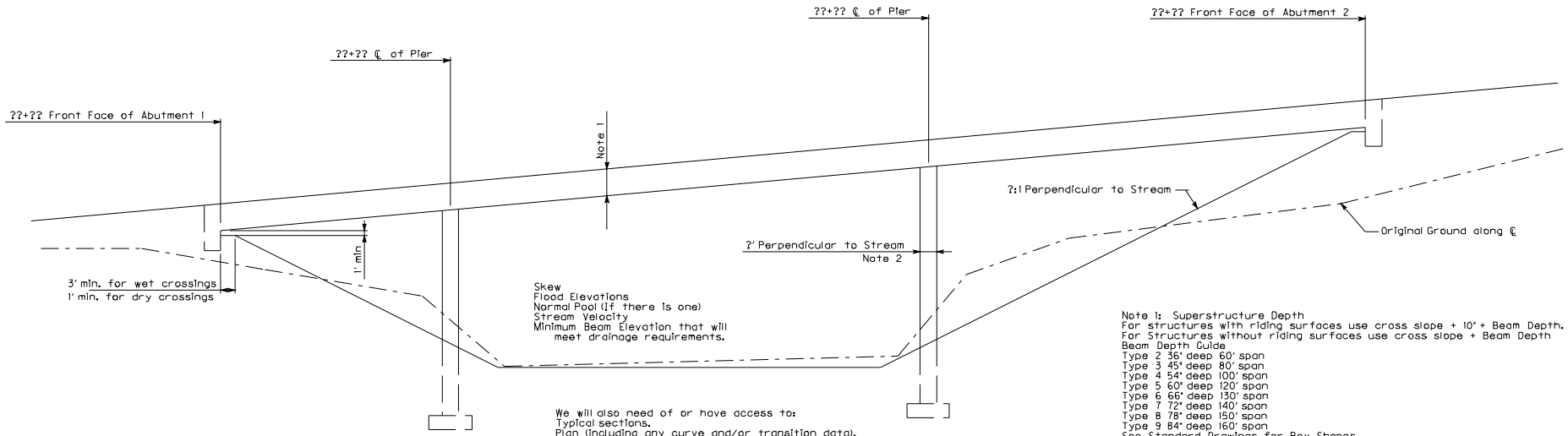
Brooksville-Maysville (KY 10) Road

CALCULATIONS FOR

Box Culverts

Station	Drawing No.
291+90	19819
126+00	19871
226+50	19818

Item No. 9-1120
Wright Morgan and Brown, Inc



Note 1: Superstructure Depth
For structures with riding surfaces use cross slope + 10" + Beam Depth.
For Structures without riding surfaces use cross slope + Beam Depth
Beam Depth Guide
Type 2 36" deep 60' span
Type 3 45" deep 80' span
Type 4 54" deep 100' span
Type 5 60" deep 120' span
Type 6 66" deep 130' span
Type 7 72" deep 140' span
Type 8 78" deep 150' span
Type 9 84" deep 160' span
See Standard Drawings for Box Shapes

Note 2 Column Width
Ratio of column height from top of footing / width < 12

REVISION	DATE
DATE:	CHECKED BY
DESIGNED BY:	
DETAILED BY:	

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

COUNTY

ROUTE | CROSSING

ITEM NUMBER

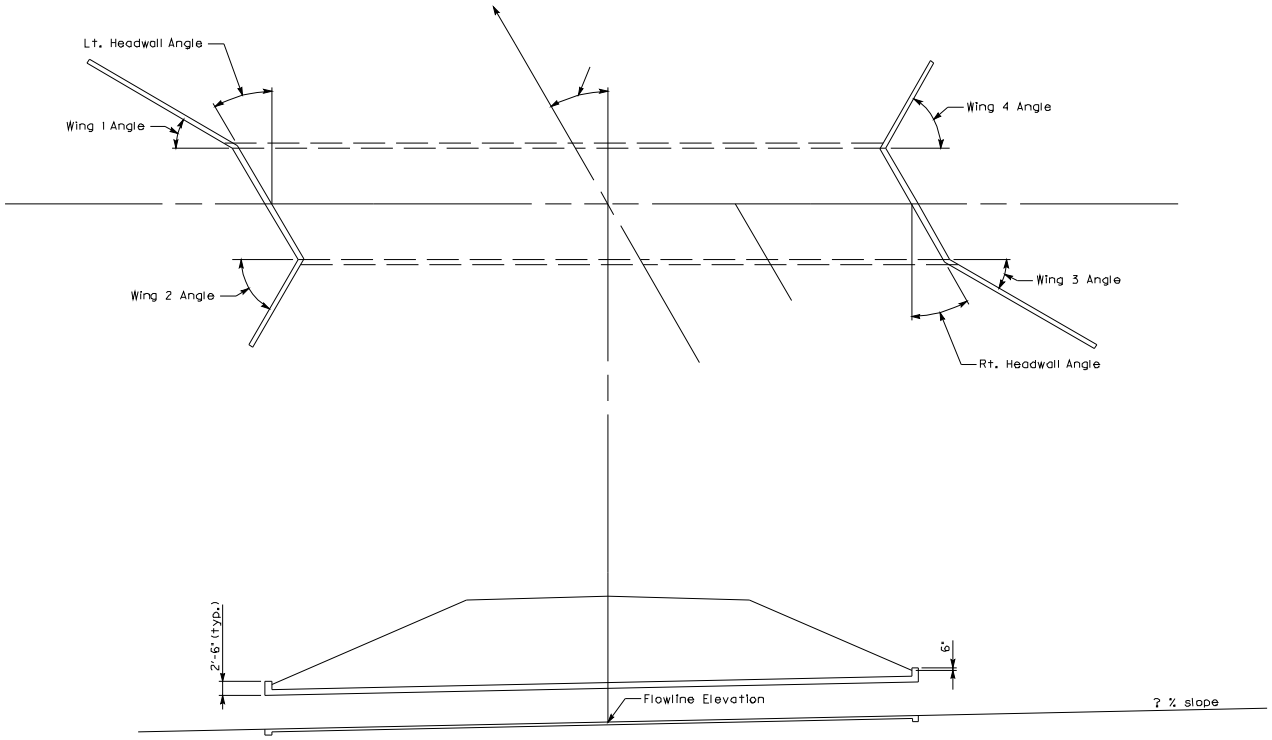
PREPARED BY
Division of Bridge Design

SHEET NO.

DRAWING NO.

NATURAL SCALE ELEVATION - BRIDGE

EXHIBIT 219
Sheet 1 of 2



We will also need of or have access to:
Typical sections.
Plan (including any curve and/or transition data).
Profile (including 2 VPI's, 3 if in vertical curve).
Any other structure requirements.

REVISION	DATE
DATE:	CHECKED BY
DESIGNED BY:	
DETAILED BY:	

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

COUNTY

ROUTE | CROSSING

ITEM NUMBER

PREPARED BY
Division of Bridge Design

SHEET NO.

DRAWING NO.

NATURAL SCALE PLAN/ELEVATION - CULVERT

EXHIBIT 219
Sheet 2 of 2

LETTING DATE

CONSTRUCTION PROJECT NO.

FILE NAME: H:\Guidance Manual\2005\Exhibits\Exhibits.dgn

USERNAME: LDRAVES

DATE: 03-NOV-2005

SHEET LOCATION:

TRANSPORTATION CABINET
DEPARTMENT OF HIGHWAYS

WHITLEY COUNTY
WILLIAMSBURG - CORBIN ROAD
US 25W OVER CSX RAILROAD
STA. 205+49.670

ESTIMATE OF QUANTITIES

	BID ITEM	Concrete Class "A"	Concrete Class "AA"	Steel Reinforcement	Epoxy Coated Steel Reinforcement	PPC I-Beam Type 3	Structure Granular Backfill	Masonry Coating	Piles - Steel HP 12 x 53	Test Piles	Pile Points 12 inch	Armored Edge for Concrete	Crushed Aggregate Slope Protection	Foundation Preparation	Structure Excavation Solid Rock	Chain Link Fence 7 ft.	Approach Slab
	UNIT	C.Y.	C.Y.	LBS.	LBS.	L.F.	C.Y.	S.Y.	L.F.	L.F.	Each	L.F.	Tons	L.S.	C.Y.	L.F.	S.Y.
Substructure	Integral End Bent #1	41.1	10.5		6678		80	60	260.0	26.0	11		171				
	Pier #1	128.0		17566	289			50							57		
	Pier #2	127.9		17566	289			50							100		
	Integral End Bent #2	41.0	10.5		6526		80	60	260.0	25.0	11		171				
Superstructure			463.1		127004	1199.3		256				80.0				345.0	223
BRIDGE TOTALS		338.0	474.1	35132	140786	1199.3	160	476	520.0	51.0	22	80.0	342	1	157	345.0	223

INDEX OF SHEETS

Sheet No.	Description
S1	Title Sheet
S2	General Notes
S3	Layout
S4-S5	Sounding Layout
S6	Foundation Layout
S7-S9	Integral End Bent #1
S10-S11	Pier #1
S12-S13	Pier #2
S14-S16	Integral End Bent #2
S17	Framing Plan
S18	PPC I-Beam, Type 3, Details
S19	Intermediate Diaphragm Details
S20-S21	Superstructure
S22-S23	Construction Elevations
S24	Approach Slab
S25	Chain Link Fence Details

SPECIAL NOTES

SPECIAL PROVISIONS

69 (05) Embankment at Bridge End Bent Structures

STANDARD DRAWINGS

BBP-001-11	Elastomeric Bearing Pads for Prestressed Beams
BBP-002-04	Bearing Details
BGX-006-08	Stencils for Structures
BGX-010-04	Barrier Transition
BGX-012-02	Geotechnical Legend
BJE-001-11	Neoprene Expansion Dams and Armored Edges
BPS-003-08	HP12x53 Steel Pile

SPECIFICATIONS

2004 Standard Specifications for Road and Bridge Construction

2002 AASHTO Standard Specifications for Highway Bridges.

REVISION	DATE

DATE: September 2004	CHECKED BY
DESIGNED BY: Anne Irish	Ajay Shah
DETAILED BY: Tom Mathews	Anne Irish

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

COUNTY: WHITLEY

ROUTE: US 25W

CROSSING: CSX Railroad

TITLE SHEET

ITEM NUMBER: 11-0120.00

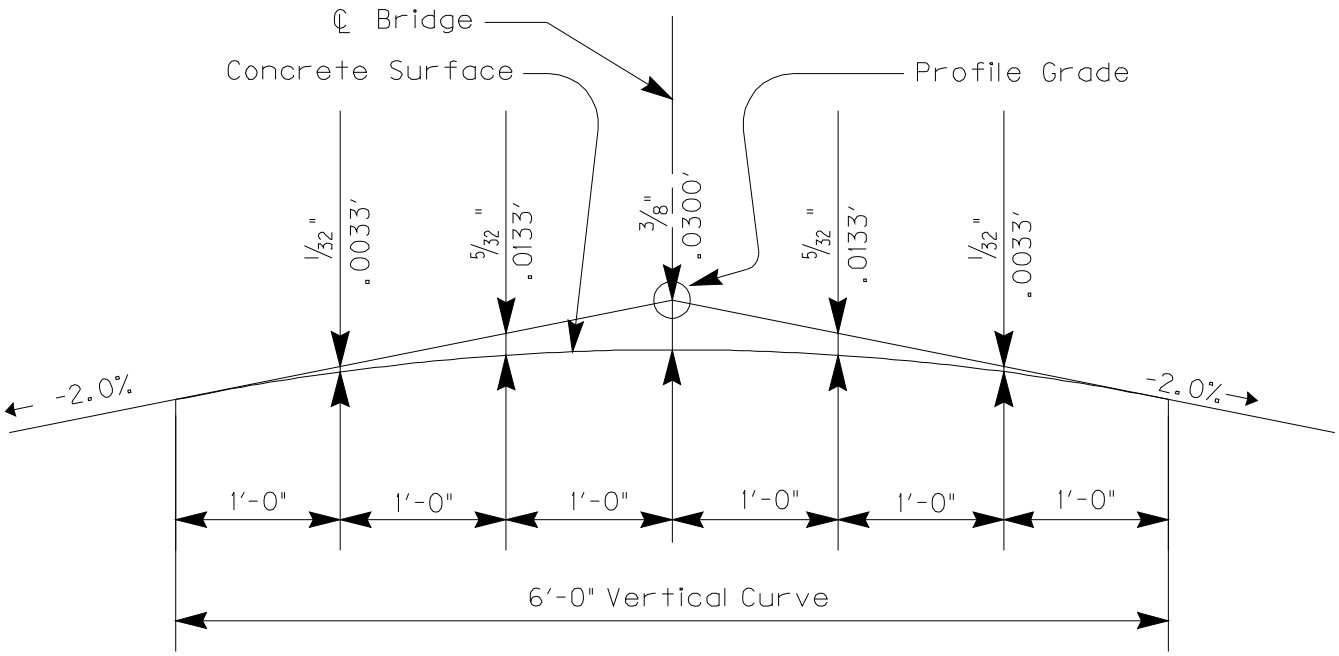
PREPARED BY: Division of Bridge Design
James Simpson Section

SHEET NO. S1

DRAWING NO. 25250

BRIDGE TITLE SHEET

EXHIBIT 301



PARABOLIC CROWN

Text	Size	Font
Drawing No.	.060	90
County	.075	90
Route	.045	90
Crossing	.045	90
Sheet Title	.060	91
Sheet No.	.060	106
Names	.030	2
Revisions	.030	23

REVISION	DATE
DATE: September 2004	CHECKED BY
DESIGNED BY: Anne Irish	Ajay Shaw
DETAILED BY: Tom Mathews	Anne Irish

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

COUNTY
WHITLEY

ROUTE	CROSSING
US 25W	**CSX Railroad**

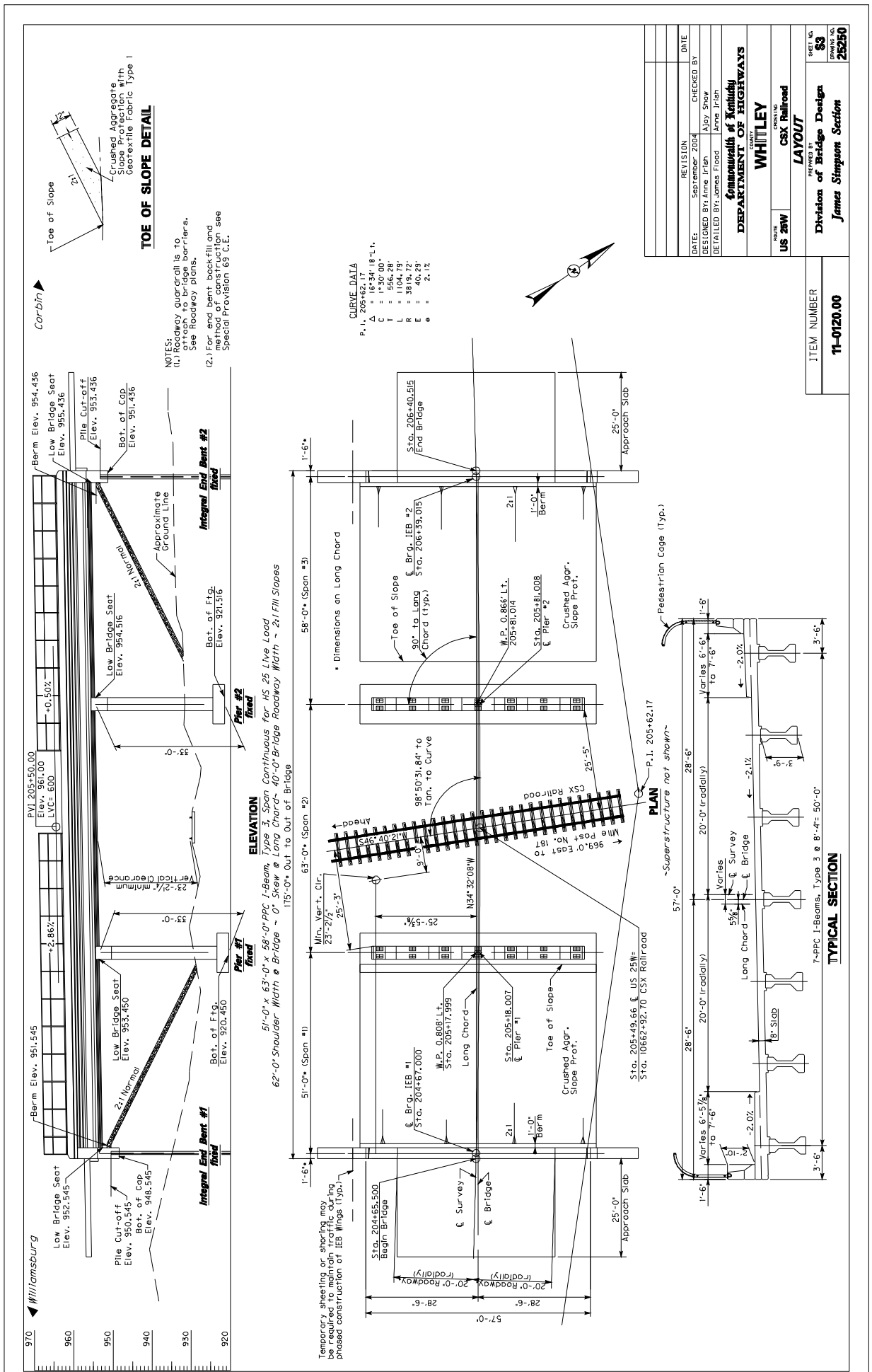
TITLE SHEET

ITEM NUMBER	PREPARED BY	SHEET NO.
11-0120.00	**Division of Bridge Design** ***James Simpson Section***	S1
		DRAWING NO. **25250**

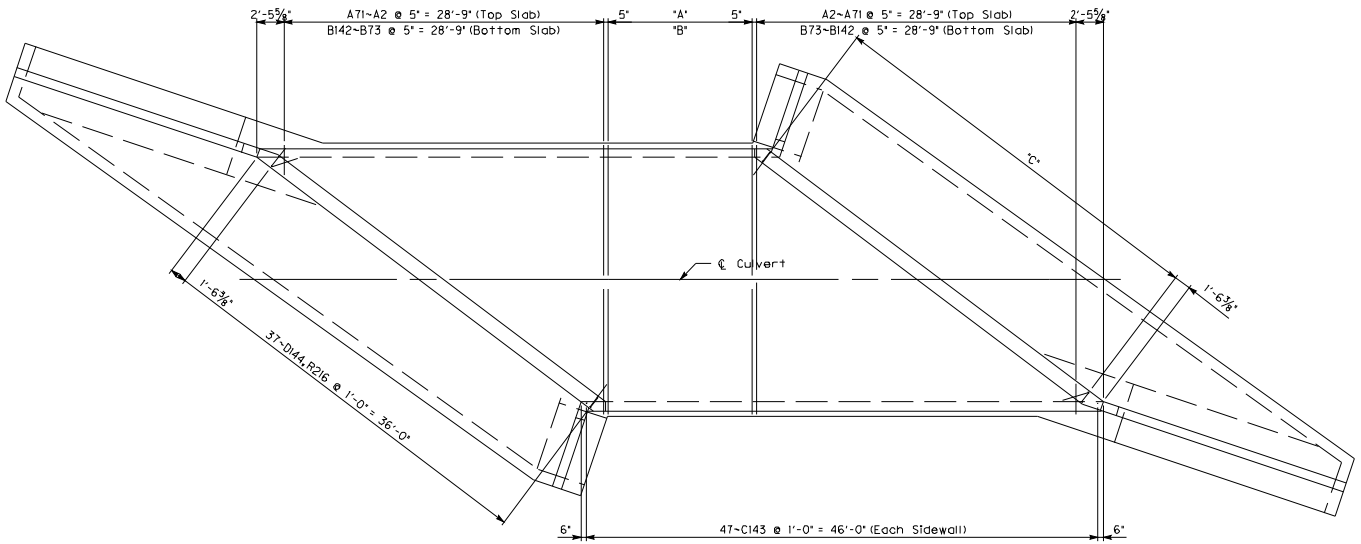
TITLE BLOCK

EXHIBIT 310

EXHIBIT 311

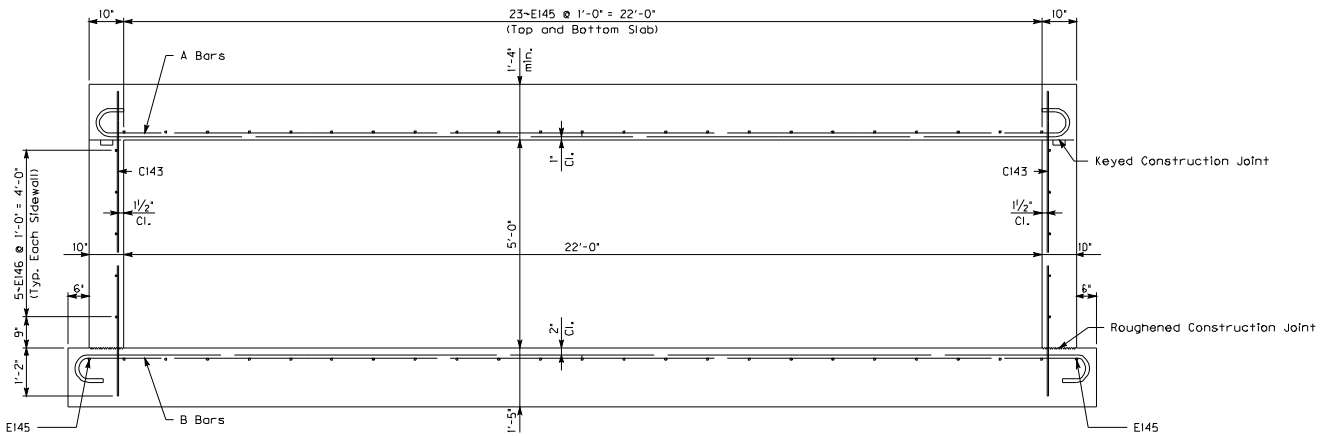


BRIDGE LAYOUT SHEET



PLAN
SCALE = 1:60

"A" 32~A1 @ 5" = 12'-11" (Top Slab)
"B" 32~B72 @ 5" = 12'-11" (Bottom Slab)
"C" 37~D144,R217 @ 1'-0" = 36'-0"
Minimum Lap Distance for E145 Bars 26 in
Minimum Lap Distance for E146 Bars 21 in



TYPICAL BARREL SECTION
SCALE = 1:16

REVISION	DATE

DATE: JUNE 2005	CHECKED BY
DESIGNED BY: Allan Frank	No Body
DETAILED BY: Computer	Allan Frank

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

COUNTY: CARROLL

ROUTE: KY-47 | CROSSING: Tributary of McCools Branch

BARREL

ITEM NUMBER

PREPARED BY: Division of Bridge Design
Allan Frank Section

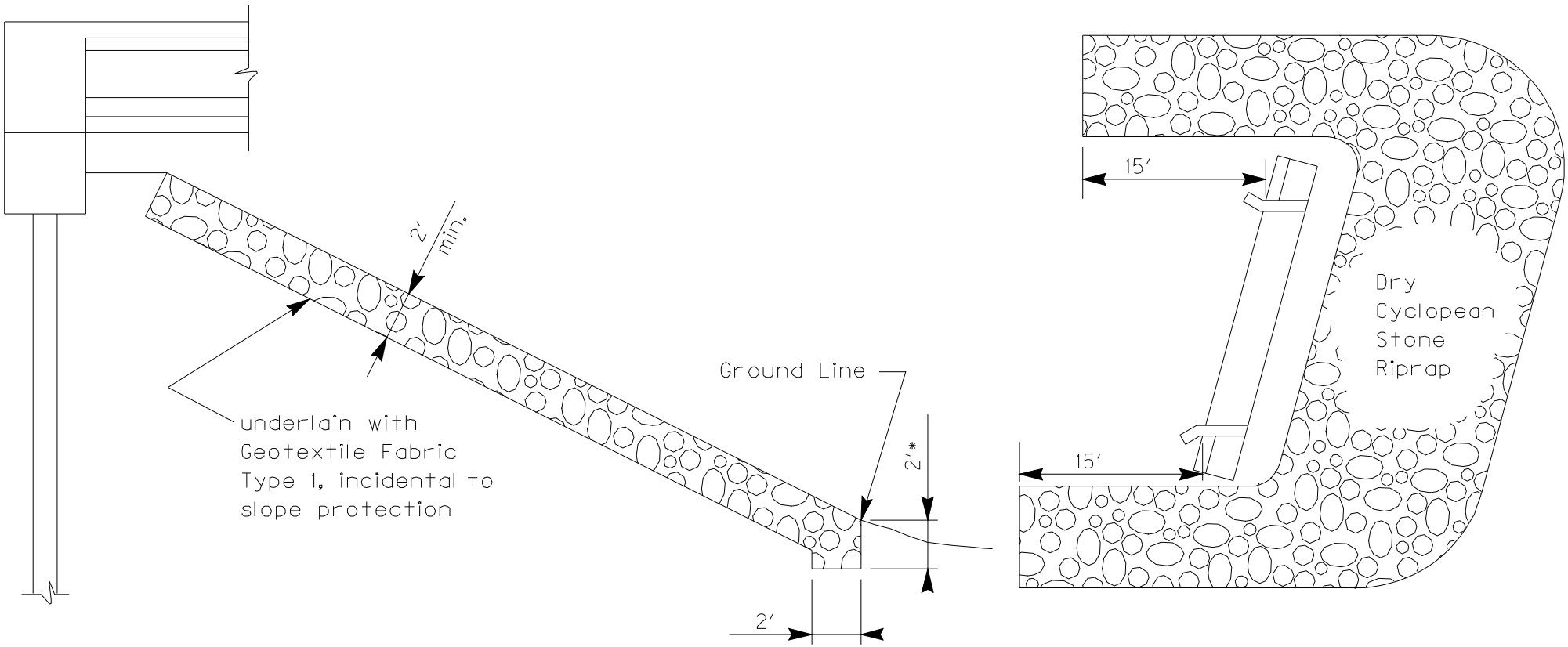
SHEET NO. 3

DRAWING NO. 25964

SHEET LOCATION: DATE: $$$$DATE$$$$ USERNAME: $$$$plotted$by$$$$ FILE NAME: $$$$designfile$specification$$$$

CULVERT LAYOUT SHEET

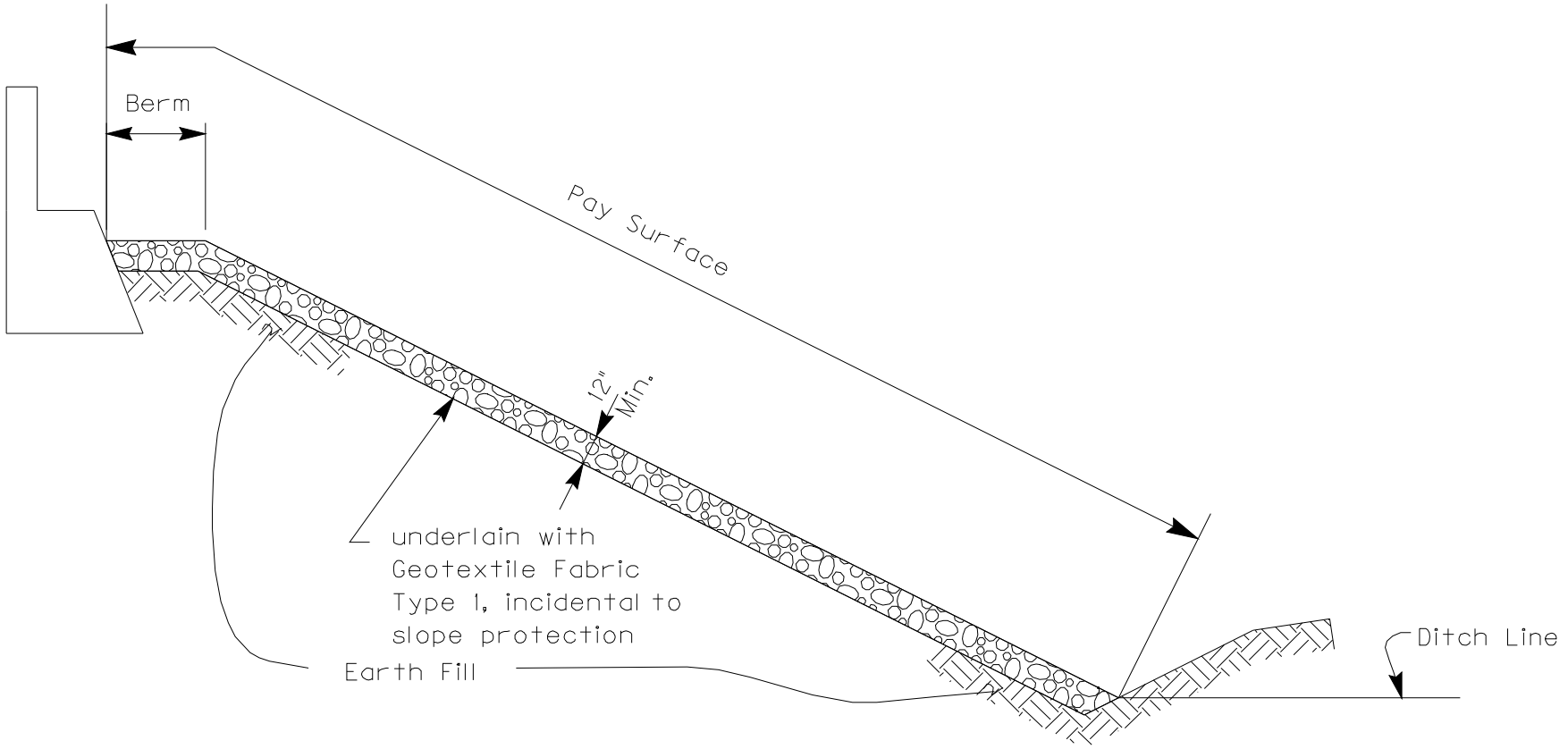
EXHIBIT 312



* when solid rock is encountered, terminate at the rock line

DRY CYCLOPEAN STONE RIPRAP SLOPE PROTECTION

EXHIBIT 313

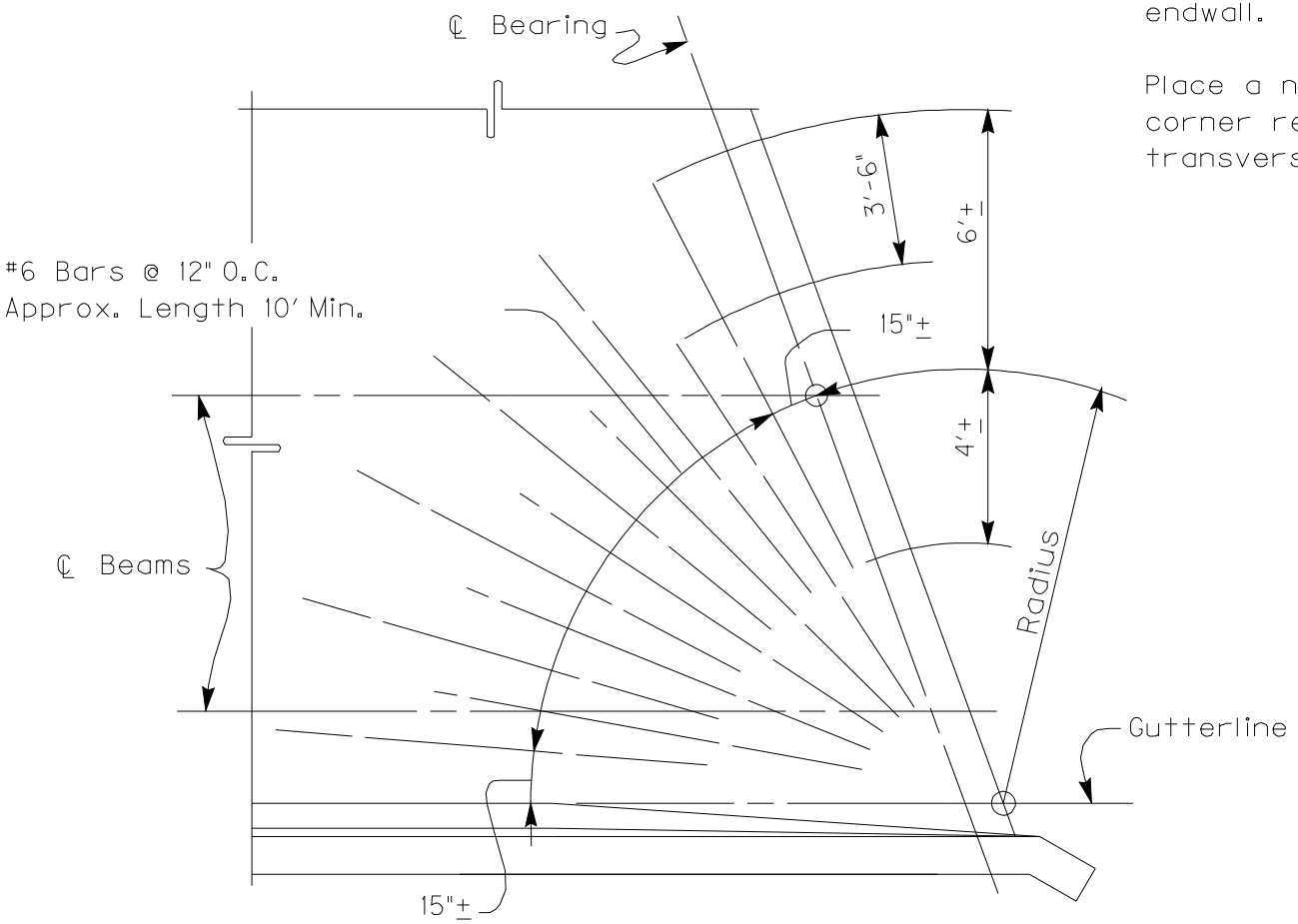


CRUSHED AGGREGATE SLOPE PROTECTION

EXHIBIT 314

The objective of the reinforcement fan is to offset buildup of shrinkage across the long diagonal dimension of the slab which would pull a shrinkage crack across the weak corner of the slab. A portion of the bars must extend back into the corner sufficiently to terminate above the junction of exterior beam and endwall.

Place a note on the plans that states "Place the corner reinforcement beneath the longitudinal and transverse reinforcement in the top of the slab."



TYPICAL FOR SLAB CORNERS OF 75° OR LESS

CORNER REINFORCEMENT DETAIL

EXHIBIT 315

PILE RECORD FOR POINT BEARING PILES

Pile No.	Pile Cut-off Elevation FEET	Pile Length In Place FEET	Point of Pile Elevation As Driven FEET	Design Axial Load TONS	Required Field Bearing TONS	Calculated Field Bearing TONS
			INTEGRAL END BENT #1			
1	950.545			62	150	
2	950.545			62	150	
3	950.545			62	150	
4	950.545			62	150	
5	950.545			62	150	
6	950.545			62	150	
7	950.545			62	150	
8	950.545			62	150	
9	950.545			62	150	
10	950.545			62	150	
11	950.545			62	150	

Definitions of Terms

PILE CUT-OFF ELEVATION: Elevation of the top of pile in the finished structure.

PILE LENGTH IN PLACE: Actual pile length below the Pile Cut-Off Elevation in the finished structure.

POINT OF PILE ELEVATION AS DRIVEN: Actual point of pile elevation in the finished structure.

DESIGN AXIAL LOAD: Service load carried by each pile as estimated from structural design calculations.

REQUIRED FIELD BEARING: Pile bearing value required to achieve 'refusal' for the size of pile used. According to the Division of Construction Guidance Manual, this value is taken as 150 tons for 12-inch steel H-Piles and 180 tons for 14 inch steel H-Piles.

CALCULATED FIELD BEARING: Pile bearing value in place calculated using the appropriate pile driving formula in Section 604.03.07(B) of the Standard Specifications.

Driving Criteria

DRIVING CRITERIA: Drive point bearing piles to refusal and verify that the Calculated Field Bearing equals or exceeds the Required Field Bearing.

Field Data

For each pile, the Project Engineer shall record the following on this sheet: Pile Length in Place, Point of Pile Elevation as Driven, and the Calculated Field Bearing. Submit this record to:

Director, Division of Bridge Design
Station E3-16-01
200 Mero Street
Frankfort, KY 40622-0001

This pile record does not replace other pile records the Project Engineer is required to keep and submit.

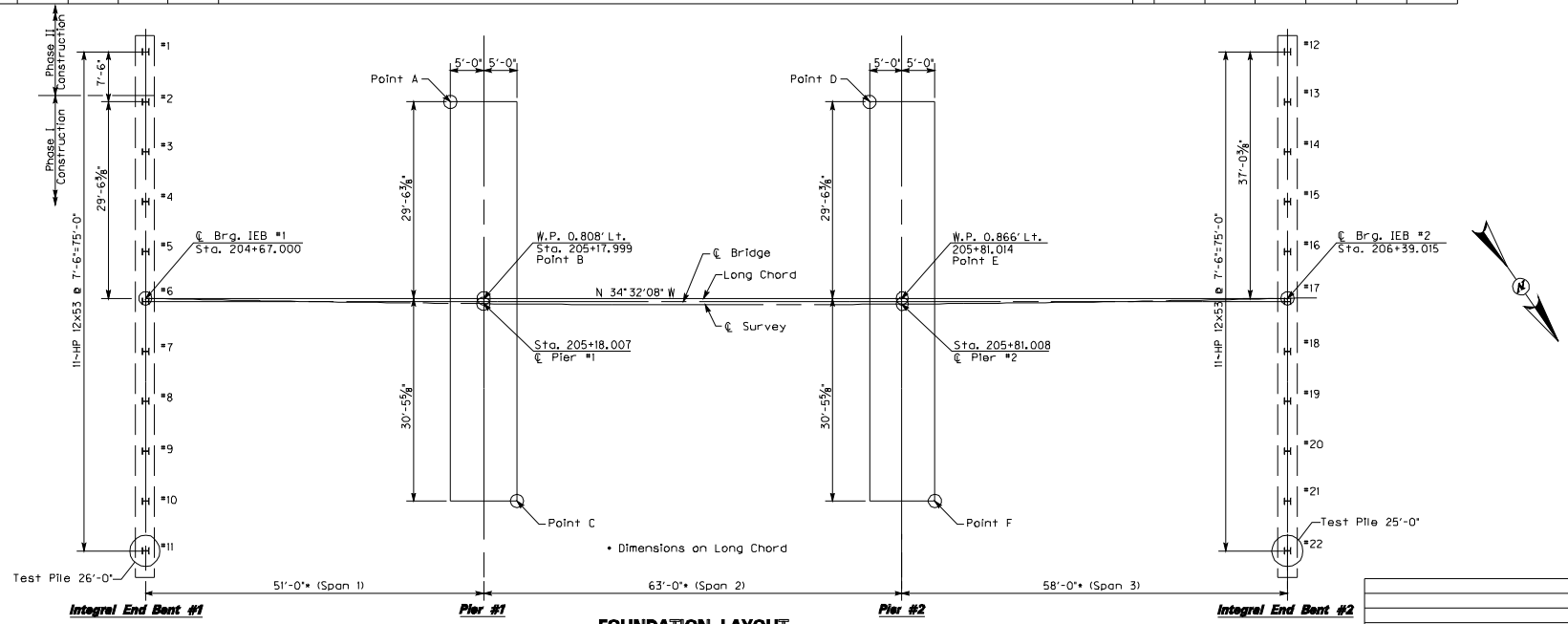
Use HP12x53 in accordance with BPS-003 C.E.

Use reinforced pile points capable of keying into sloping rock surfaces and seating the piles in the shale.

Any commonly utilized hammer allowed by the Division of Construction will be adequate to drive the piles to bedrock without encountering excessive blow counts and over-stressing the piles. The Contractor shall submit his pile driving system to the Department for approval prior to the installation of the first pile. Approval of the pile driving system by the Engineer will be subject to satisfactory field performance of the pile driving procedures.

PILE RECORD FOR POINT BEARING PILES

Pile No.	Pile Cut-off Elevation FEET	Pile Length In Place FEET	Point of Pile Elevation As Driven FEET	Design Axial Load TONS	Required Field Bearing TONS	Calculated Field Bearing TONS
			INTEGRAL END BENT #2			
12	953.436			66	150	
13	953.436			66	150	
14	953.436			66	150	
15	953.436			66	150	
16	953.436			66	150	
17	953.436			66	150	
18	953.436			66	150	
19	953.436			66	150	
20	953.436			66	150	
21	953.436			66	150	
22	953.436			66	150	



FOUNDATION LAYOUT

Spread Footing Pier #1

Point	Plan Footing Elevation	As-Built Footing Elevation
A	920.450	
B	920.450	
C	920.450	

Footing is designed for a maximum pressure of 5.6 KSF.

The allowable bearing capacity is 20 KSF.

NOTE: After all foundations have been placed, the Project Resident Engineer shall record the bottom of footing elevation 'As-Built' and shall submit one copy of this sheet with this data to:

Director, Division of Bridge Design
Station E3-16-01
200 Mero Street
Frankfort, KY 40622-0001

NOTE: If the spread footing foundation is stepped due to unsuitable material found at the given elevation, the location and elevation of the step shall be shown on this sheet and submitted along with as-built elevations.

Spread Footing Pier #2

Point	Plan Footing Elevation	As-Built Footing Elevation
D	921.516	
E	921.516	
F	921.516	

Footing is designed for a maximum pressure of 5.6 KSF.

The allowable bearing capacity is 20 KSF.

REVISION	DATE

DATE: September 2004	CHECKED BY
DESIGNED BY: Anne Irish	Ajay Shaw
DETAILED BY: Tom Mathews	Anne Irish

Commonwealth of Kentucky
DEPARTMENT OF HIGHWAYS

COUNTY: WHITLEY

ROUTE: US 25W

CROSSING: CSX Railroad

FOUNDATION LAYOUT

PREPARED BY: Division of Bridge Design
James Simpson Section

SHEET NO.: S6

DRAWING NO.: 25250

ITEM NUMBER: 11-0120.00

SHEET LOCATION: DATE: $$$$DATE$$$$ USERNAME: $$$$plotted$by$$$$ FILE NAME: $$$$designfile$specification$$$$

EXHIBIT 318

FOUNDATION LAYOUT SHEET

EXHIBIT 319

GRAPIC SHEET LOCATION GRID

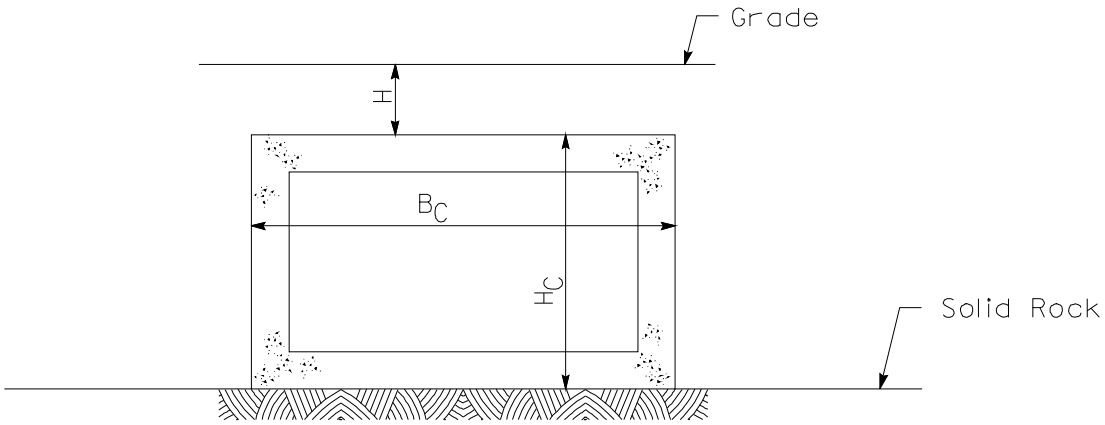
X5 1000, 1500	**X7** 1050, 1500	**PL** 1100, 1500	**M6** 1150, 1500	**K1** 1200, 1500	**K2** 1250, 1500	**K3** 1300, 1500	**K4** 1350, 1500	**K5** 1400, 1500	**K6** 1450, 1500	**K7** 1500, 1500
X4 1000, 1450	**X6** 1050, 1450	**P4** 1100, 1450	**M5** 1150, 1450	**J1** 1200, 1450	**J2** 1250, 1450	**J3** 1300, 1450	**J4** 1350, 1450	**J5** 1400, 1450	**J6** 1450, 1450	**J7** 1500, 1450
X3 1000, 1400	**8SS** 1050, 1400	**P3** 1100, 1400	**M4** 1150, 1400	**I1** 1200, 1400	**I2** 1250, 1400	**I3** 1300, 1400	**I4** 1350, 1400	**I5** 1400, 1400	**I6** 1450, 1400	**I7** 1500, 1400
X2 1000, 1350	**7SS** 1050, 1350	**P2** 1100, 1350	**M3** 1150, 1350	**H1** 1200, 1350	**H2** 1250, 1350	**H3** 1300, 1350	**H4** 1350, 1350	**H5** 1400, 1350	**H6** 1450, 1350	**H7** 1500, 1350
X1 1000, 1300	**6SS** 1050, 1300	**P1** 1100, 1300	**M2** 1150, 1300	**G1** 1200, 1300	**G2** 1250, 1300	**G3** 1300, 1300	**G4** 1350, 1300	**G5** 1400, 1300	**G6** 1450, 1300	**G7** 1500, 1300
BC2 1000, 1250	**5SS** 1050, 1250	**A2C** 1100, 1250	**M1** 1150, 1250	**F1** 1200, 1250	**F2** 1250, 1250	**F3** 1300, 1250	**F4** 1350, 1250	**F5** 1400, 1250	**F6** 1450, 1250	**F7** 1500, 1250
BC1 1000, 1200	**4SS** 1050, 1200	**A2B** 1100, 1200	**TIT** 1150, 1200	**E1** 1200, 1200	**E2** 1250, 1200	**E3** 1300, 1200	**E4** 1350, 1200	**E5** 1400, 1200	**E6** 1450, 1200	**E7** 1500, 1200
AS 1000, 1150	**3SS** 1050, 1150	**A2A** 1100, 1150	**GN3** 1150, 1150	**D1** 1200, 1150	**D2** 1250, 1150	**D3** 1300, 1150	**D4** 1350, 1150	**D5** 1400, 1150	**D6** 1450, 1150	**D7** 1500, 1150
NJ2 1000, 1100	**2SS** 1050, 1100	**A1C** 1100, 1100	**GN2** 1150, 1100	**C1** 1200, 1100	**C2** 1250, 1100	**C3** 1300, 1100	**C4** 1350, 1100	**C5** 1400, 1100	**C6** 1450, 1100	**C7** 1500, 1100
NJ1 1000, 1050	**1SS** 1050, 1050	**A1B** 1100, 1050	**GN1** 1150, 1050	**B1** 1200, 1050	**B2** 1250, 1050	**B3** 1300, 1050	**B4** 1350, 1050	**B5** 1400, 1050	**B6** 1450, 1050	**B7** 1500, 1050
PCI 1000, 1000	**CE** 1050, 1000	**A1A** 1100, 1000	**LAY** 1150, 1000	**A1** 1200, 1000	**A2** 1250, 1000	**A3** 1300, 1000	**A4** 1350, 1000	**A5** 1400, 1000	**A6** 1450, 1000	**A7** 1500, 1000

EXHIBIT 401

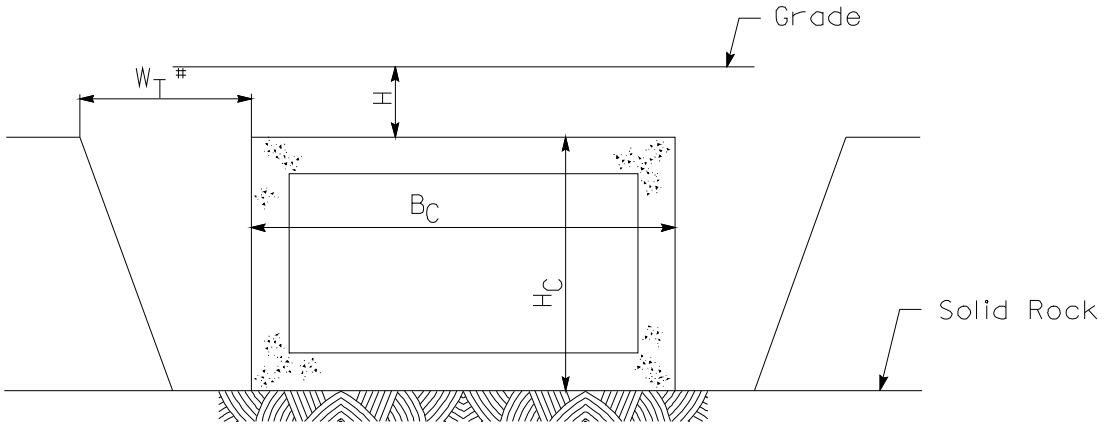
ACCELERATION COEFFICIENT FOR KENTUCKY COUNTIES

Horizontal Acceleration (A, expressed as percent of gravity)
in rock with 90% probability of not being exceeded in 50 years

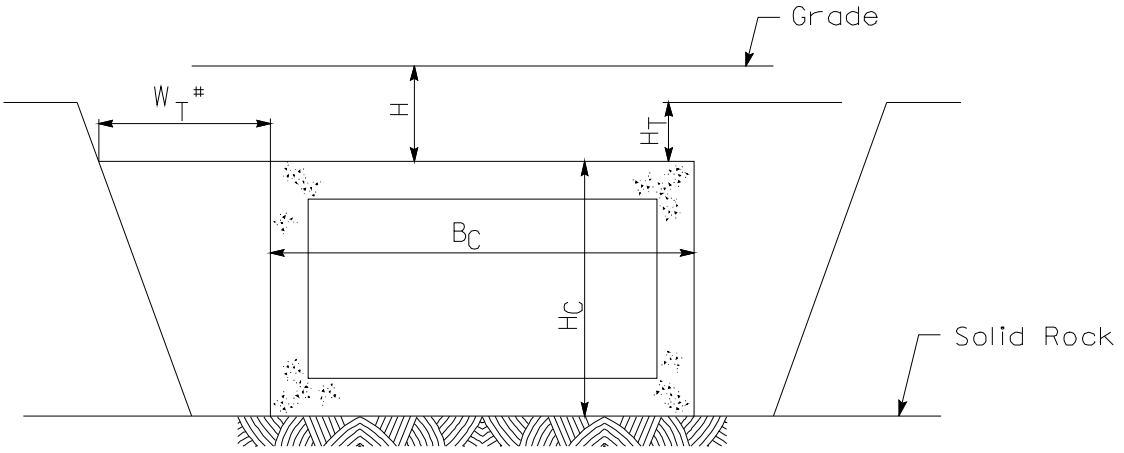
Adair ---------- 9	Grant ---------- 9	Mason ---------- 15
Allen ---------- 9	Graves ---------- 15	Meade ---------- 9
Anderson ---------- 9	Grayson ---------- 9	Menifee ---------- 15
Ballard ---------- 30	Green ---------- 9	Mercer ---------- 9
Barren ---------- 9	Greenup ---------- 15	Metcalfe ---------- 9
Bath ---------- 15	Hancock ---------- 9	Monroe ---------- 9
Bell ---------- 15	Hardin ---------- 9	Montgomery ------ 15
Boone ---------- 9	Harlan ---------- 15	Morgan ---------- 9
Bourbon ---------- 9	Harrison ---------- 9	Muhlenberg --------- 9
Boyd ---------- 15	Hart ---------- 9	Nelson ---------- 9
Boyle ---------- 9	Henderson ------- 15	Nicholas ---------- 15
Bracken ---------- 15	Henry ---------- 9	Ohio ---------- 9
Breathitt ---------- 9	Hickman ---------- 30	Oldham ---------- 9
Breckinridge ------- 9	Hopkins ---------- 9	Owen ---------- 9
Bullitt ---------- 9	Jackson ---------- 9	Owsley ---------- 9
Butler ---------- 9	Jefferson ---------- 9	Pendleton ---------- 9
Caldwell ---------- 9	Jessamine ---------- 9	Perry ---------- 9
Calloway ---------- 15	Johnson ---------- 9	Pike ---------- 9
Campbell ---------- 9	Kenton ---------- 9	Powell ---------- 9
Carlisle ---------- 30	Knott ---------- 9	Pulaski ---------- 9
Carroll ---------- 9	Knox ---------- 15	Robertson --------- 15
Carter ---------- 15	Larue ---------- 9	Rockcastle ---------- 9
Casey ---------- 9	Laurel ---------- 9	Rowan ---------- 15
Christian ---------- 9	Lawrence ---------- 9	Russel ---------- 9
Clark ---------- 9	Lee ---------- 9	Scott ---------- 9
Clay ---------- 9	Leslie ---------- 9	Shelby ---------- 9
Clinton ---------- 9	Letcher ---------- 15	Simpson ---------- 9
Crittenden ---------- 9	Lewis ---------- 15	Spencer ---------- 9
Cumberland ------- 9	Lincoln ---------- 9	Taylor ---------- 9
Daviess ---------- 15	Livingston --------- 15	Todd ---------- 9
Edmonson --------- 9	Logan ---------- 9	Trigg ---------- 9
Elliott ---------- 9	Lyon ---------- 9	Trimble ---------- 9
Estill ---------- 9	McCracken ------- 15	Union ---------- 15
Fayette ---------- 9	McCreary ---------- 9	Warren ---------- 9
Fleming ---------- 15	McLean ---------- 9	Washington --------- 9
Floyd ---------- 9	Madison ---------- 9	Wayne ---------- 9
Franklin ---------- 9	Magoffin ---------- 9	Webster ---------- 9
Fulton ---------- 30	Marion ---------- 9	Whitley ---------- 15
Gallatin ---------- 9	Marshall ---------- 15	Wolfe ---------- 9
Garrard ---------- 9	Martin ---------- 9	Woodford ---------- 9



a. POSITIVE PROJECTION



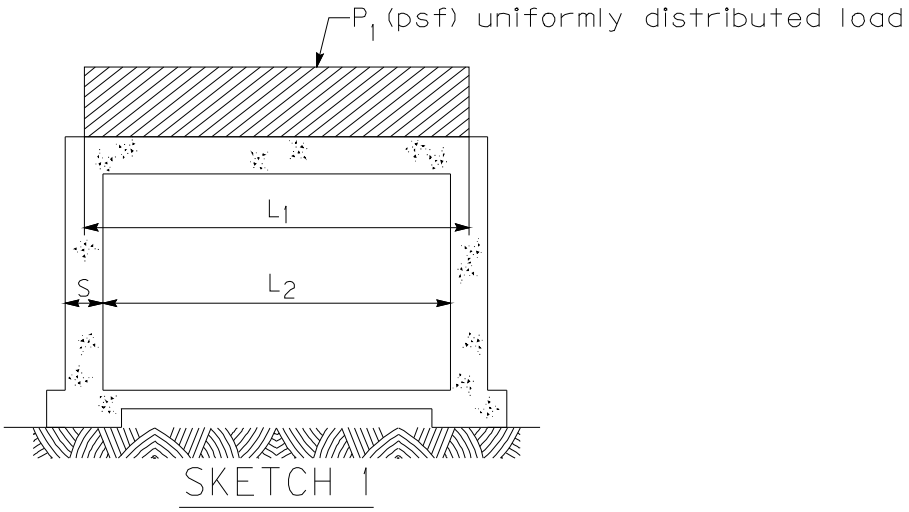
b. ZERO PROJECTION



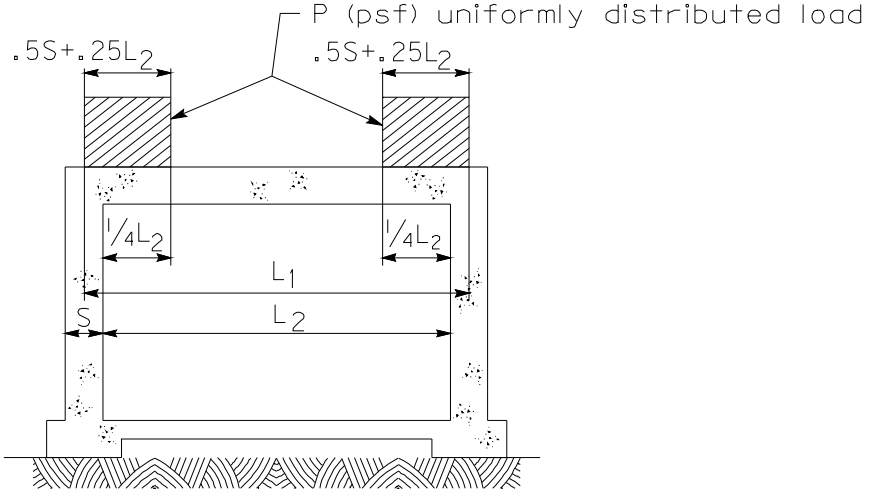
c. NEGATIVE PROJECTION

If W_T exceeds 6' consider the culvert to be in a Positive Projection

CULVERT PROJECTIONS



SKETCH 1



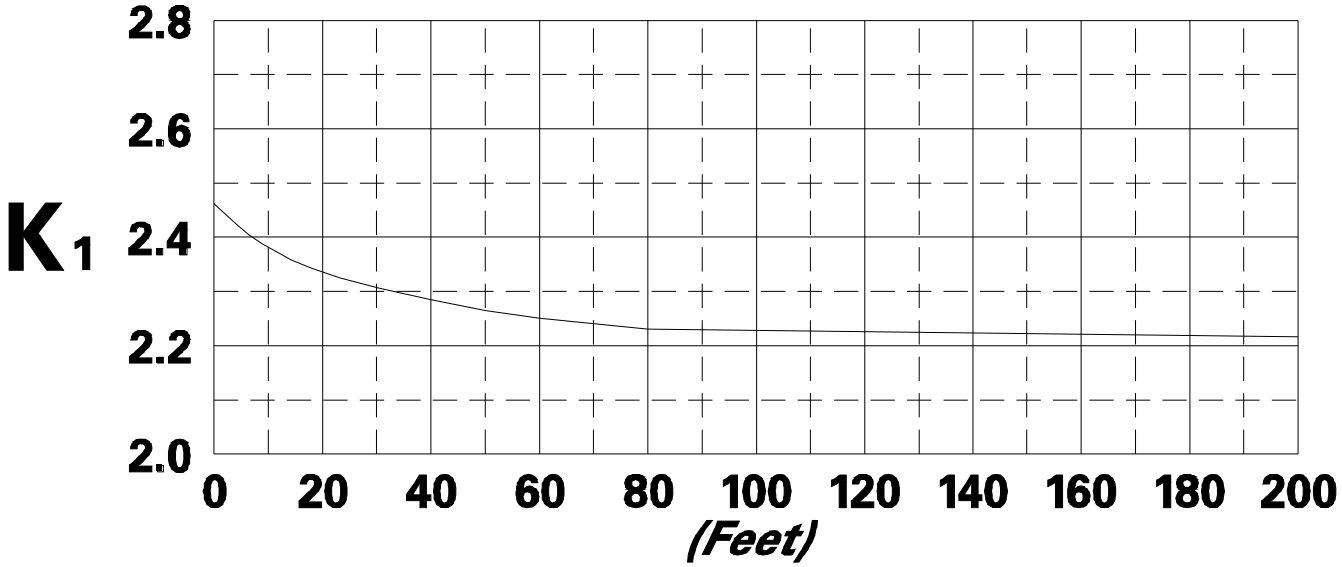
SKETCH 2

On multiple barrel culverts : L_1 = Distance center to center of Exterior Walls

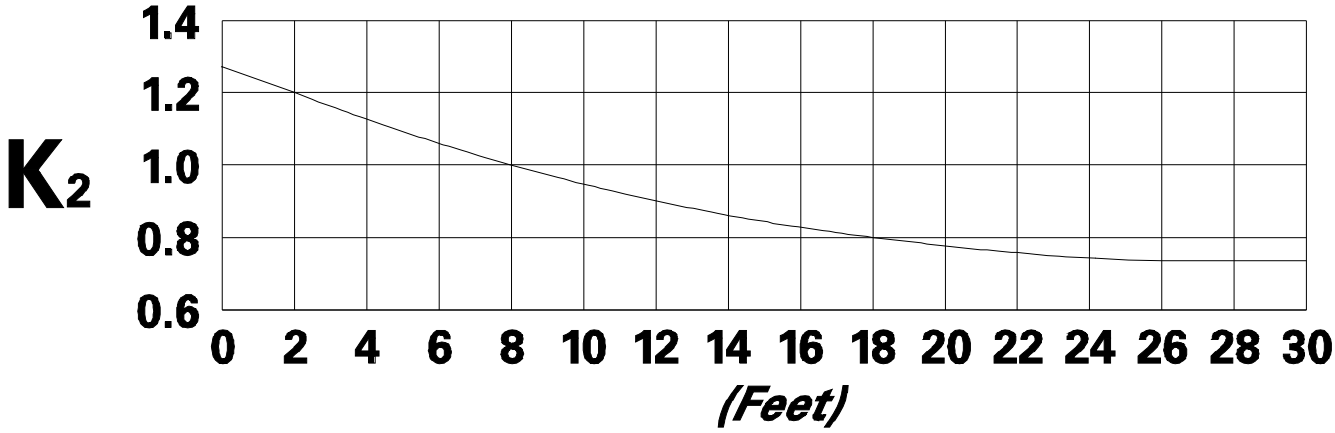
L_2 = Distance from inside of Exterior Wall to inside of Exterior Wall

LOAD DISTRIBUTION ON CULVERT SLAB

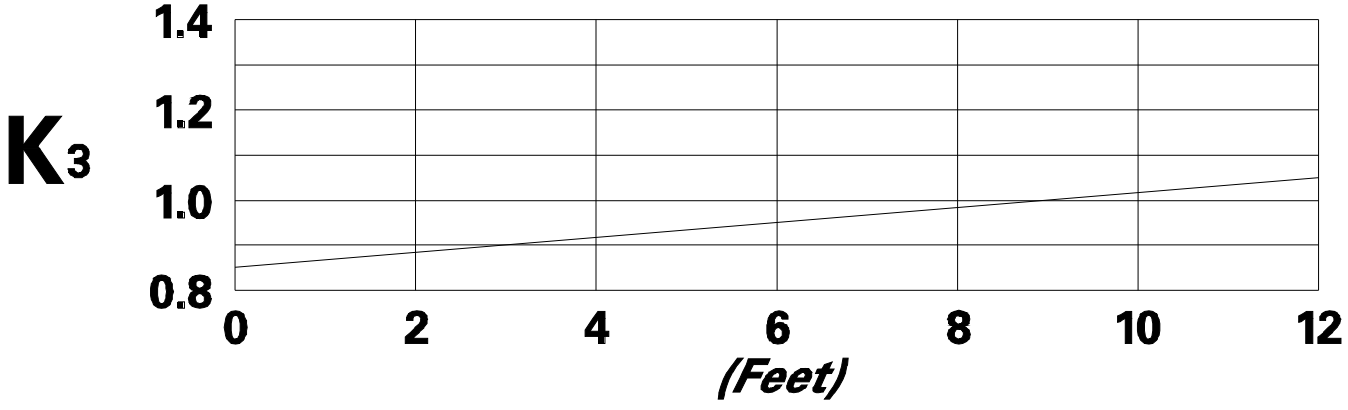
TOP SLAB COEFFICIENT



(H) Fill Height

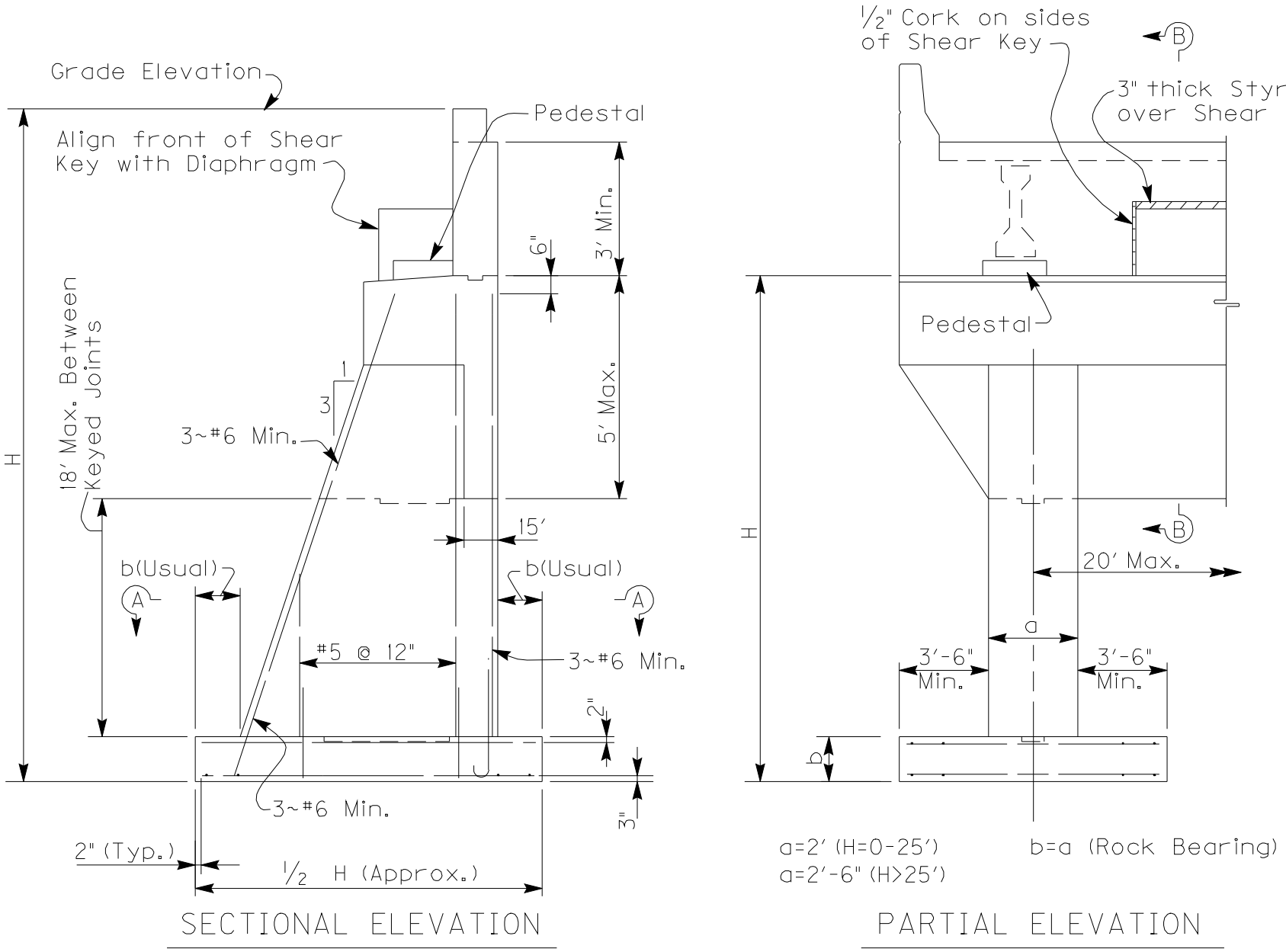


(Bc) Box Width



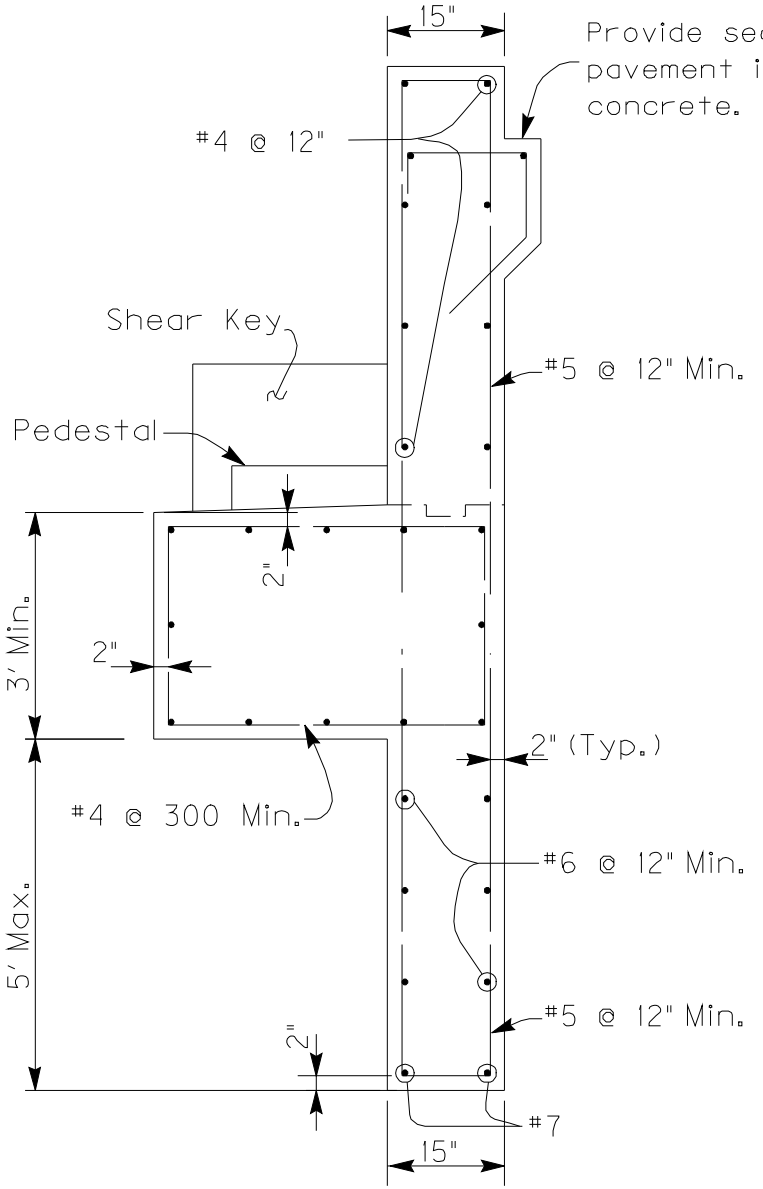
(Hc) Box Height

CULVERT LOAD COEFFICIENTS



OPEN-COLUMN ABUTMENT

EXHIBIT 405
Sheet 1 of 2

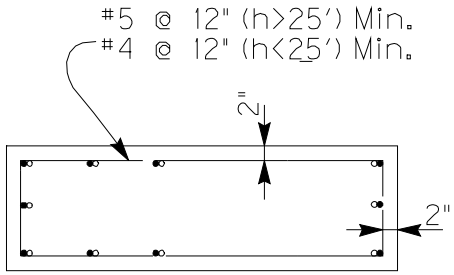


SECTION B-B

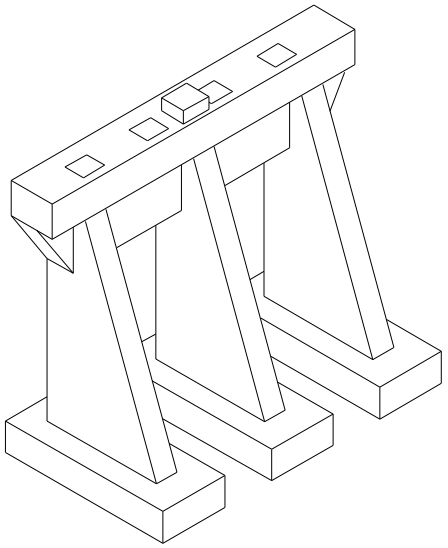
NOTES

1.) Dimensions shown are to be used for general design and shall be determined by stresses whenever necessary. Refer to Par. 7.4 for loading conditions.
2.) Reinforcement shown is to be used as a minumum.
3.) Weight of fill material = 120 pcf
4.) Earth pressure = 34 pcf equivalent fluid pressure minimum.*
5.) Design reinforcement ~ Do not use % of Area.
6.) Make Construction Keys approximatly 1/3 of column area. Keep key minimum of 2" clear of vertical reinforcement. Use recessed keys wherever possible.
7.) Neglect fluid pressure against front face of abutment when calculating OTM.

* Or as recommended by Division of Materials.



SECTION A-A

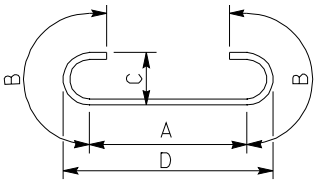


ISOMETRIC VIEW

(Backwall Removed)

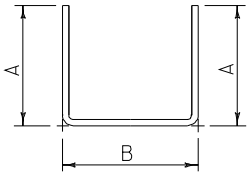
OPEN-COLUMN ABUTMENT

EXHIBIT 405
Sheet 2 of 2



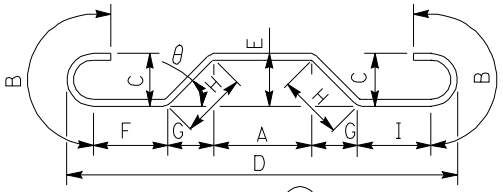
TYPE (1)

Requires D



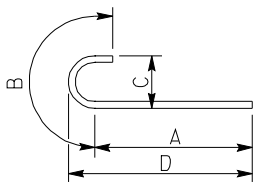
TYPE (2)

Requires A B



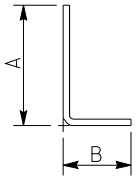
TYPE (3)

Requires A D E F θ
or
Requires A D E F G



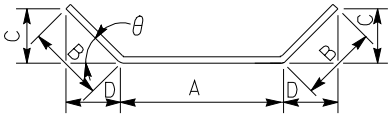
TYPE (4)

Requires D



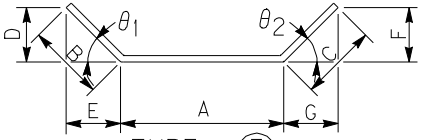
TYPE (5)

Requires A B



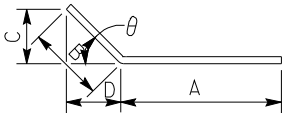
TYPE (6)

Requires A B θ
or
Requires A C D



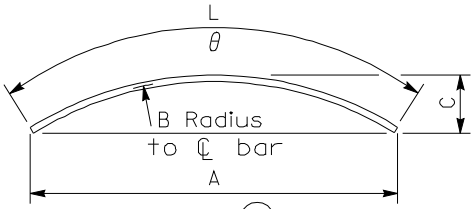
TYPE (7)

Requires A B C θ1 θ2
or
Requires A D E F G



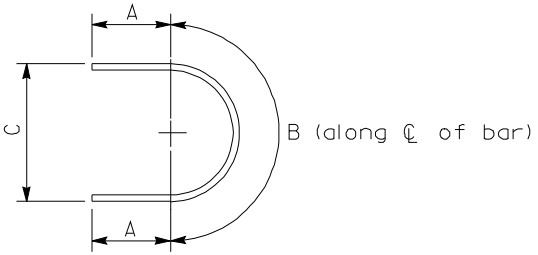
TYPE (8)

Requires A B θ
or
Requires A C D



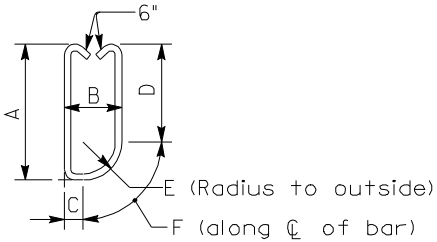
TYPE (9)

Requires L B
or
Requires B θ



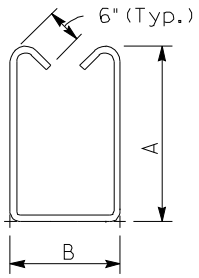
TYPE (10)

Requires A C



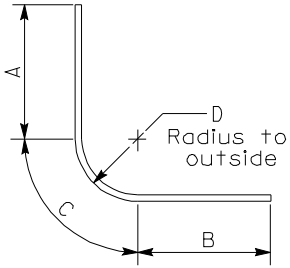
TYPE (11)

Requires A B E



TYPE (12)

Requires A B



TYPE (13)

Requires A B D

Notes on required dimensions:
(For program barbill)

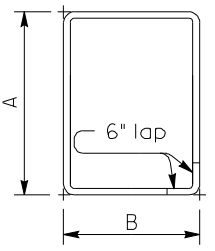
(1.) Type 0 is a straight bar.

(2.) A smooth round pin is entered as the negative diameter of the bar.

(3.) Enter negative bar type to use stirrup bars.

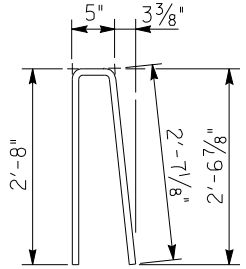
STANDARD BAR TYPES

EXHIBIT 406
Sheet 1 of 2



TYPE (14)

Requires A B



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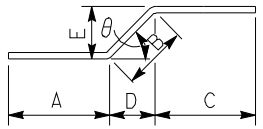
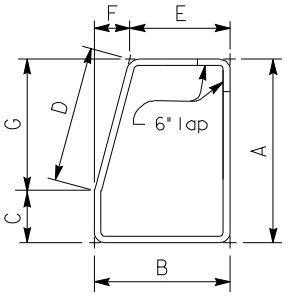


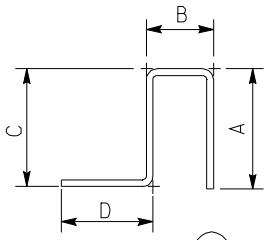
TYPE (21)

Requires A C E θ
or
Requires A C D E



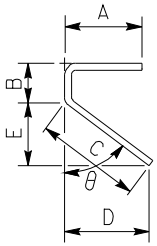
TYPE (24)

Requires A B C E



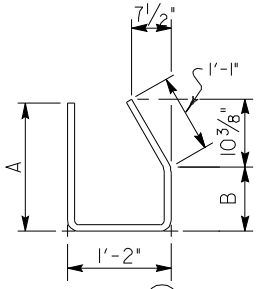
TYPE (26)

Requires A B C D



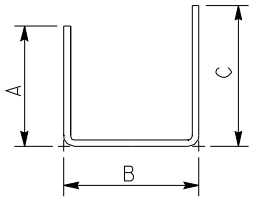
TYPE (15)

Requires A B C θ
or
Requires A B D E



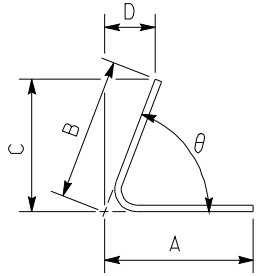
TYPE (17)

Requires slab thickness



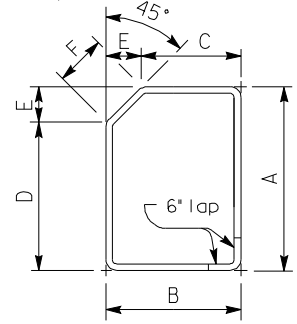
TYPE (22)

Requires A B C



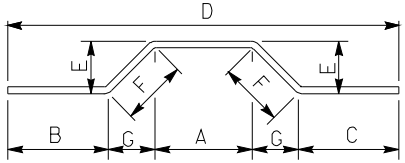
TYPE (25)

Requires A B θ



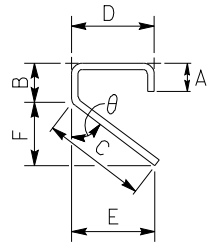
TYPE (27)

Requires A B E



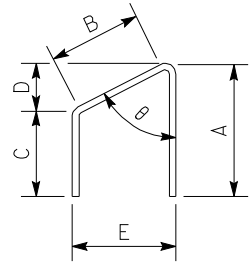
TYPE (19)

Requires A B C D E G



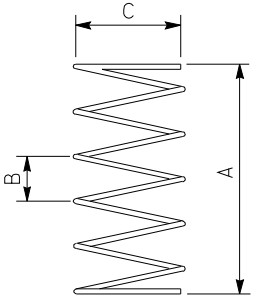
TYPE (23)

Requires A B C D θ
or
Requires A B D E F



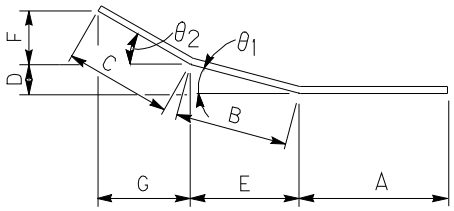
TYPE (28)

Requires A E θ
or
Requires A C E



TYPE (18)

Requires A B C



TYPE (20)

Requires A B C θ1 θ2 or Requires A D E F G

Notes on required dimensions:
(For program barbill)

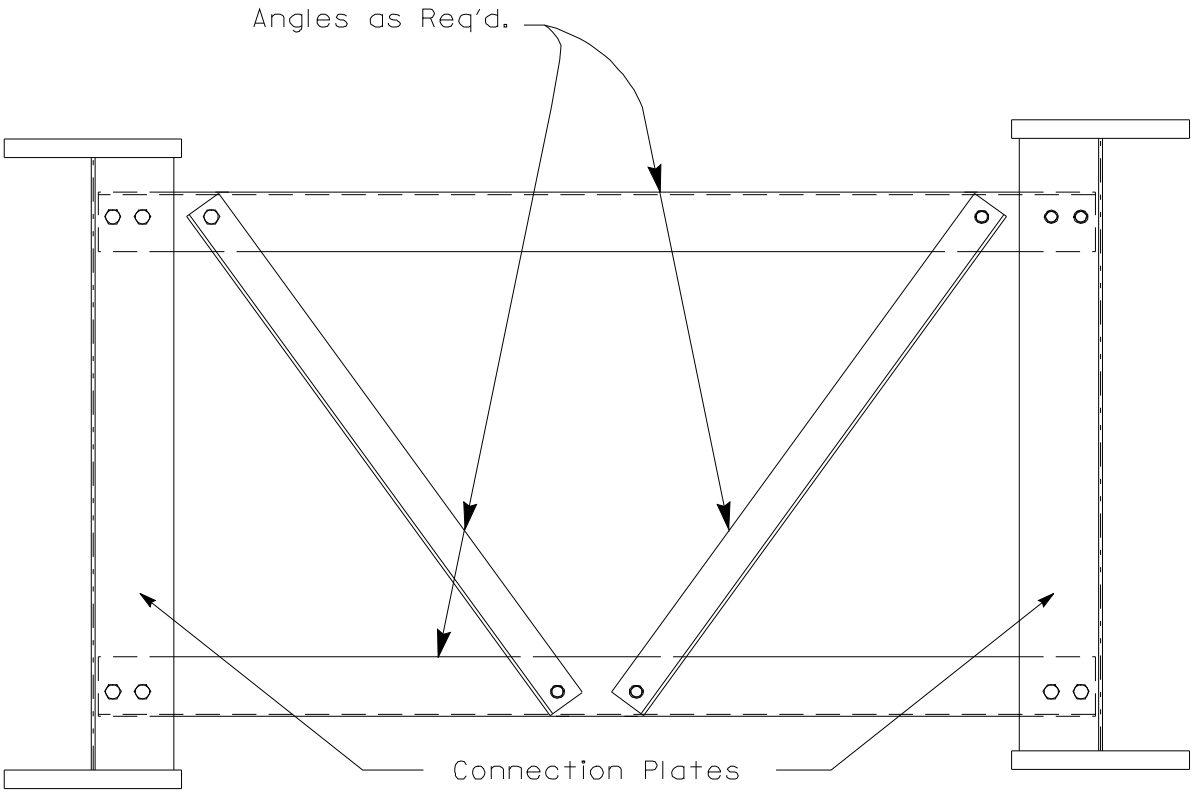
(1.) Type 0 is a straight bar.

(2.) A smooth round pin is entered as the negative diameter of the bar.

(3.) Enter negative bar type to use stirrup bars.

STANDARD BAR TYPES

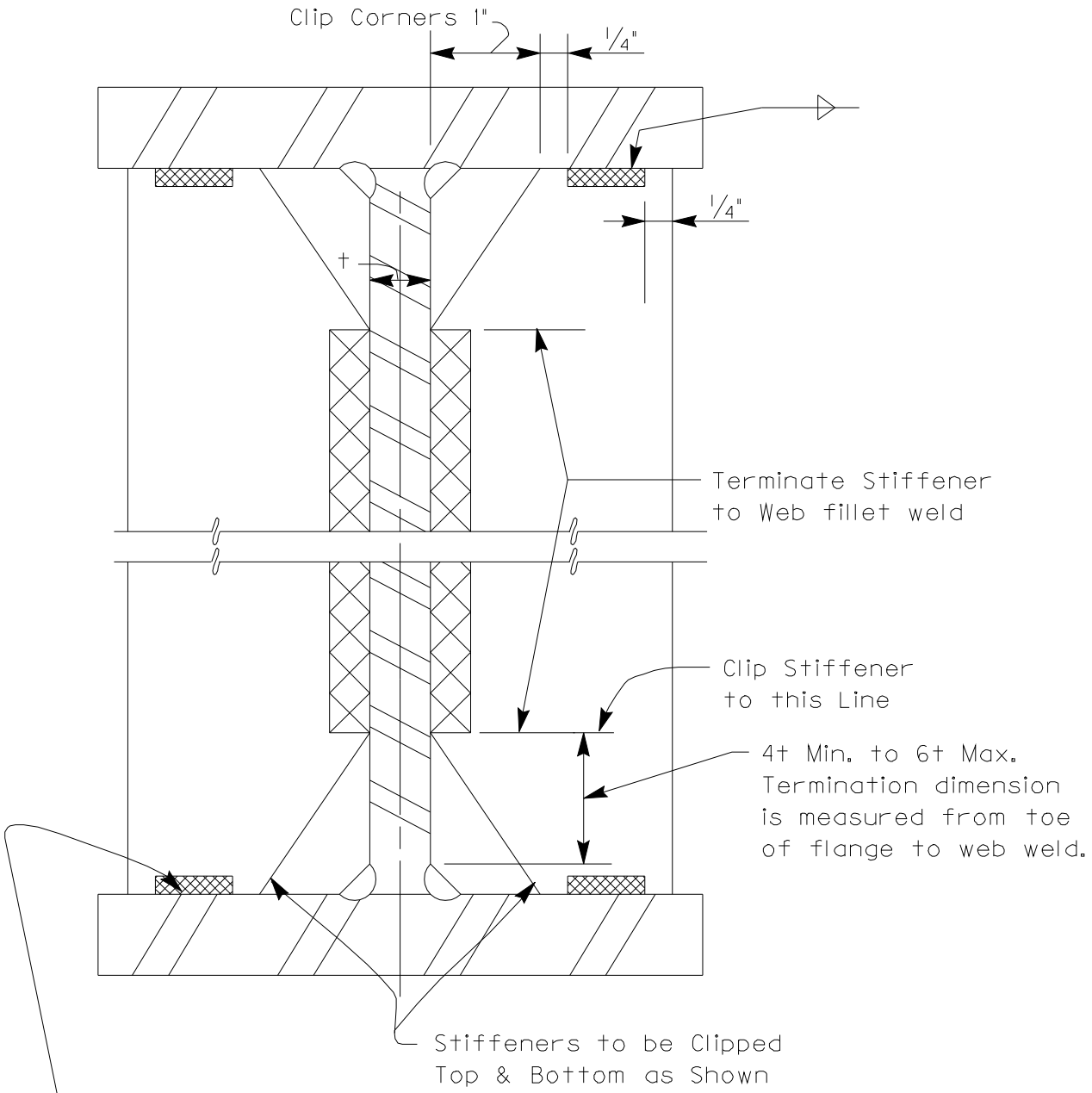
EXHIBIT 406
Sheet 2 of 2



See Art. 10.20 for design criteria.

Fasteners Shown are for illustration only.

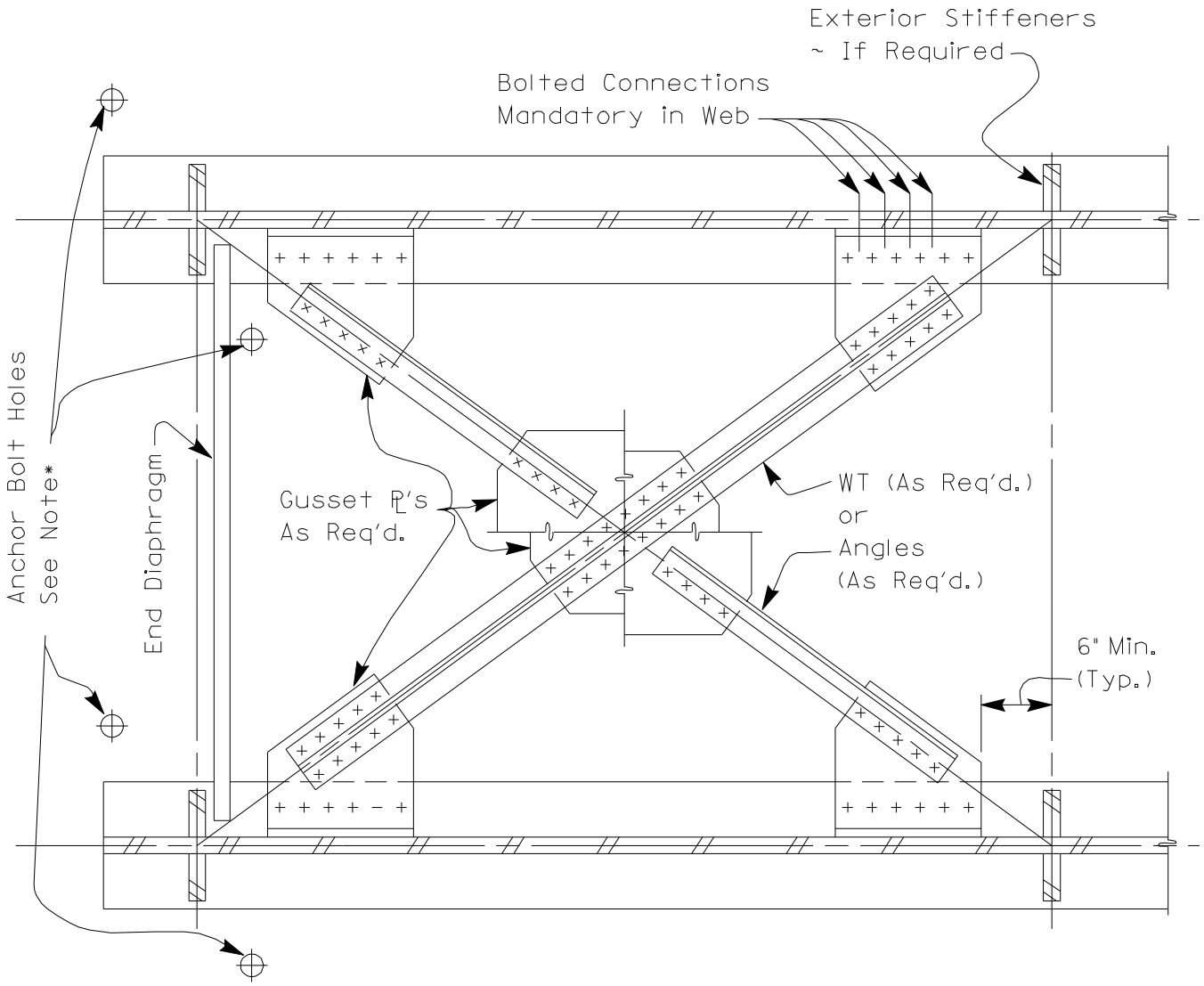
DIAPHRAGM DETAILS



Weld Stiffener to Compression Flange for Intermediate Stiffeners Tight fit at Tension Flanges for Intermediate Stiffeners. Mill to Bear at Bottom Flange and Tight fit at Top Flange for Bearing Stiffeners. Weld Stiffeners to Top and Bottom Flanges where Diaphragms are framed into Stiffeners. Refer to AASHTO Art 10.3 for reduced allowables in the appropriate fatigue category.

STIFFENER DETAILS

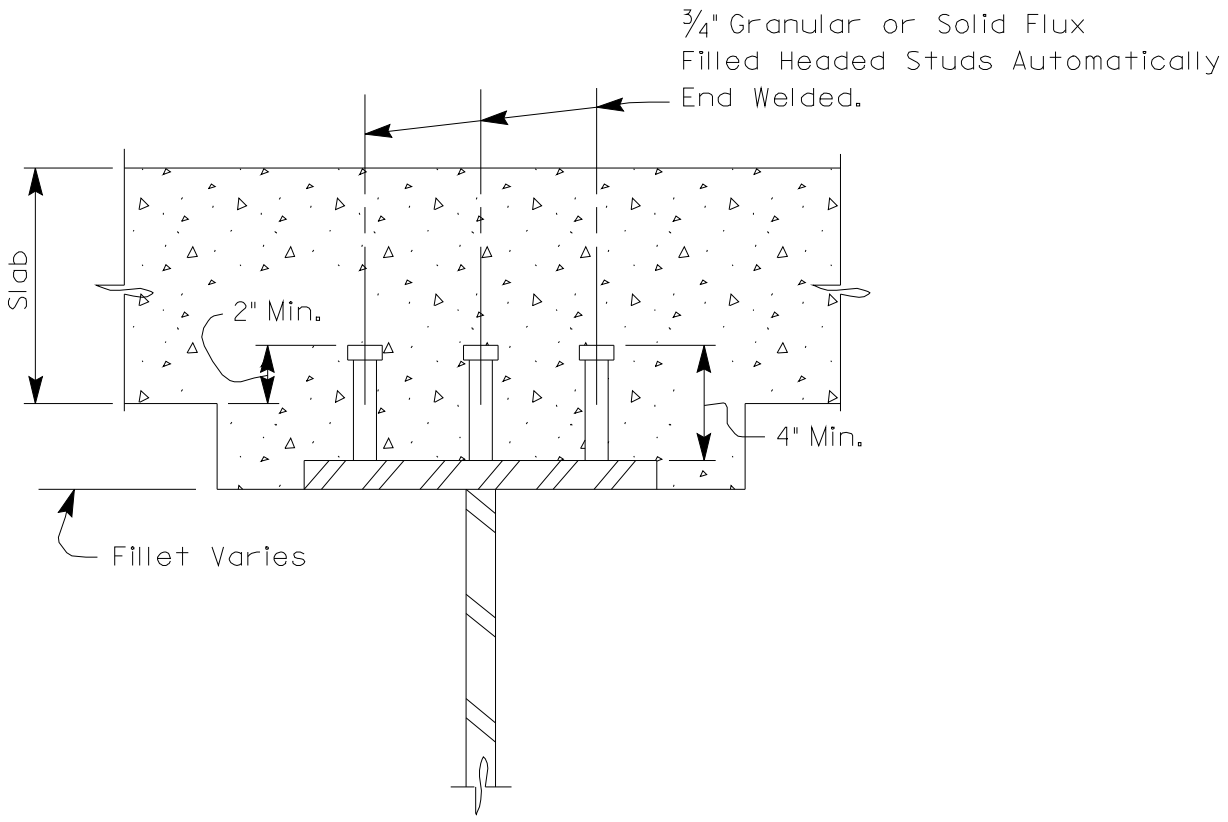
* Exercise caution in placing Anchor Bolt Holes, so that Anchor Bolt Holes may be drilled, in place, without interference from Cross-Frames, Gusset Plates, or other Structural Steel Member.



Fasteners shown are for illustration only. WT's may be welded to Gussets

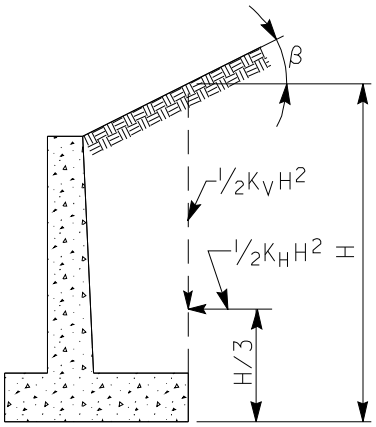
PLAN VIEW
(NORMAL OR SKEWED)

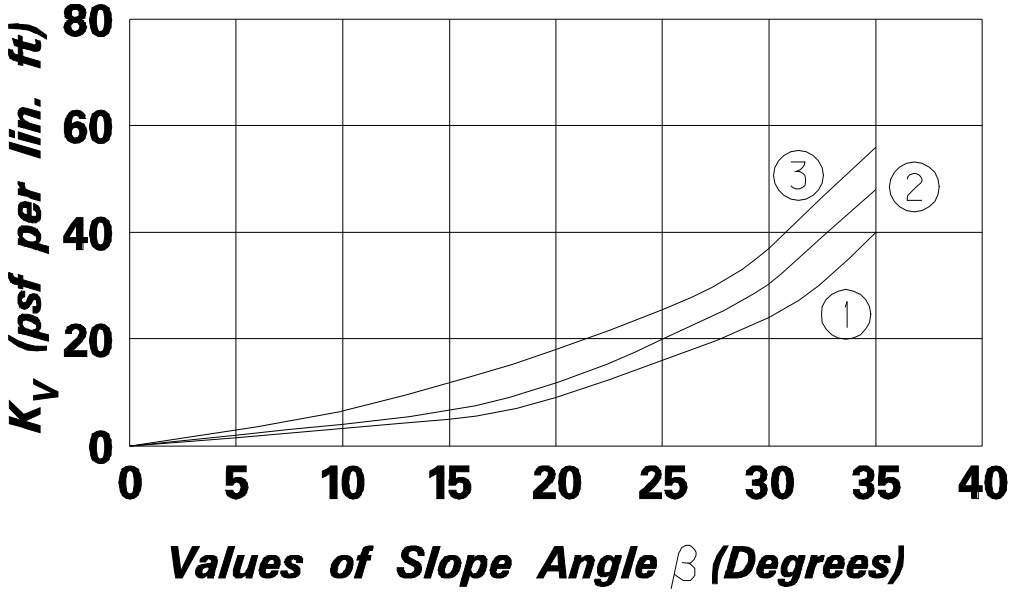
LATERAL BRACING DETAILS

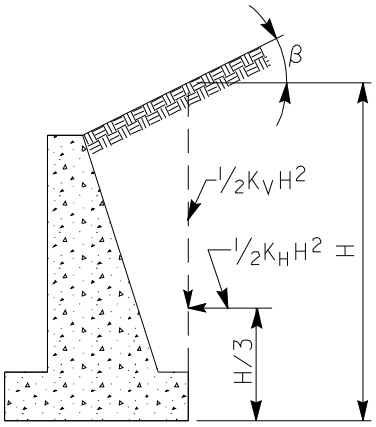


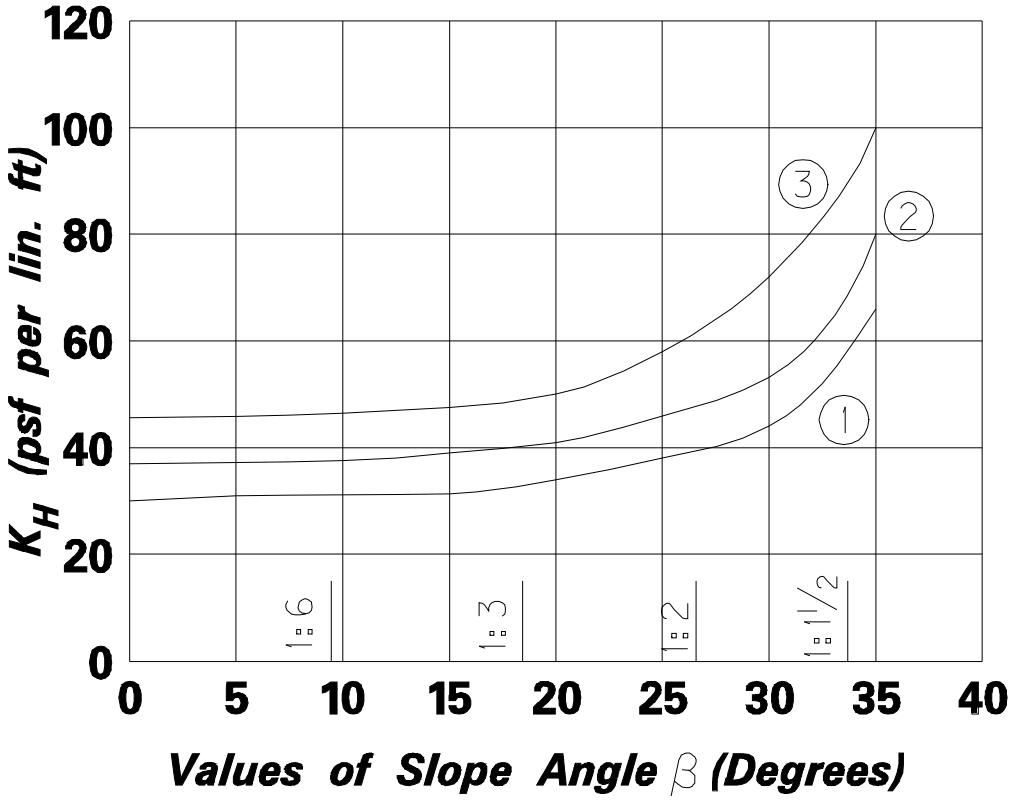
SHEAR CONNECTIONS

Straight Slope Backfill









CIRCLED NUMBERS INDICATE THE FOLLOWING SOIL TYPES

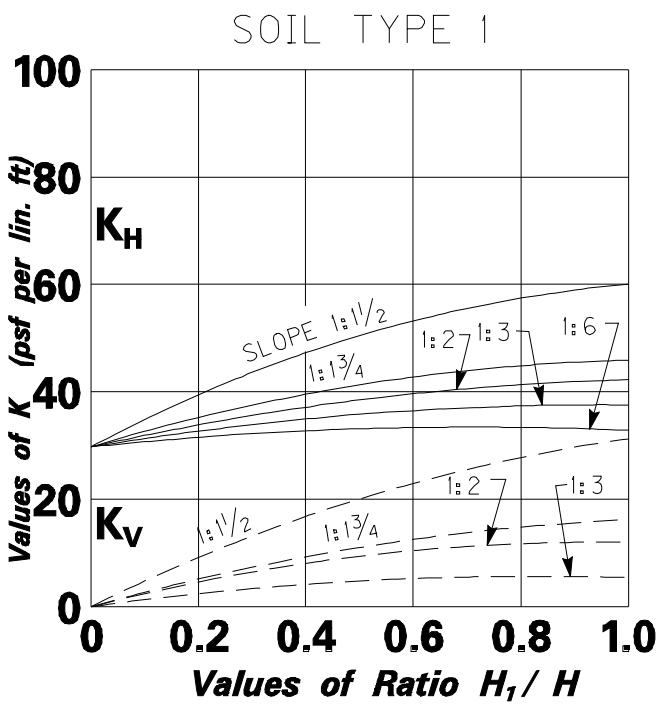
(1) CLEAN SAND AND GRAVEL: GW, GP, SW, SP.

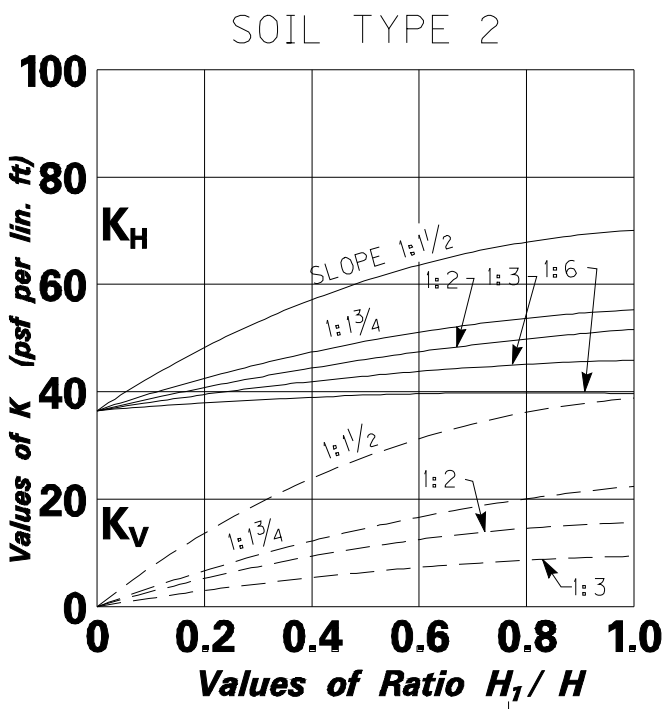
(2) DIRTY SAND AND GRAVEL OF RESTRICTED PERMEABILITY: GM, GM-GP, SM-SP, SM

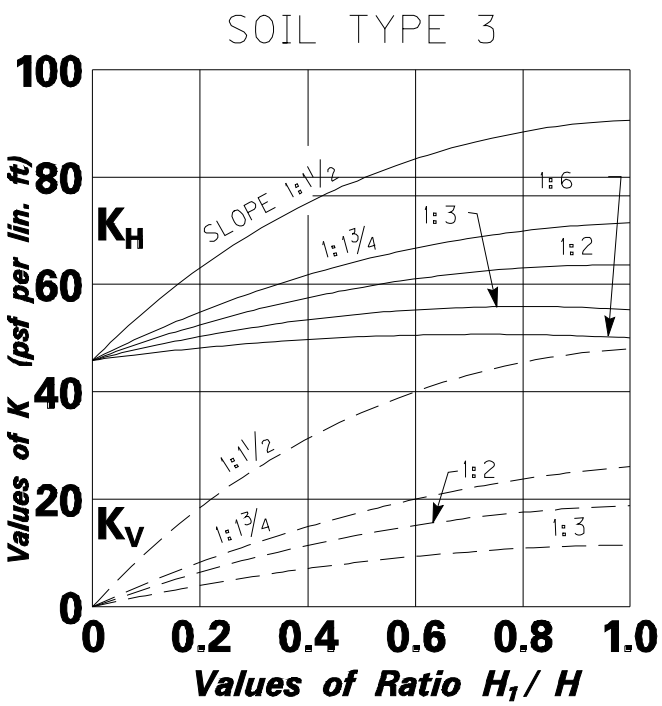
(3) STIFF RESIDUAL SILTS AND CLAYS, SILTY FINE SANDS, CLAYEY SANDS AND GRAVELS: CL, ML, CH, MH, SM, SC, GC.

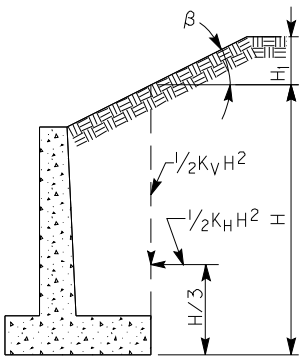
DESIGN LOADS FOR LOW RETAINING WALLS

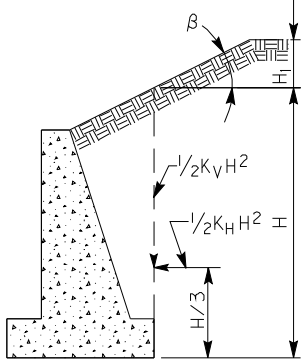
Broken Slope Backfill

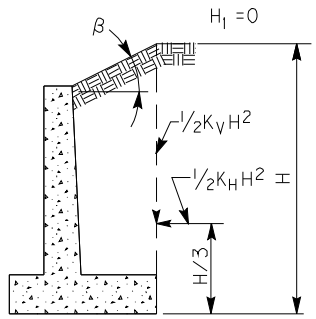






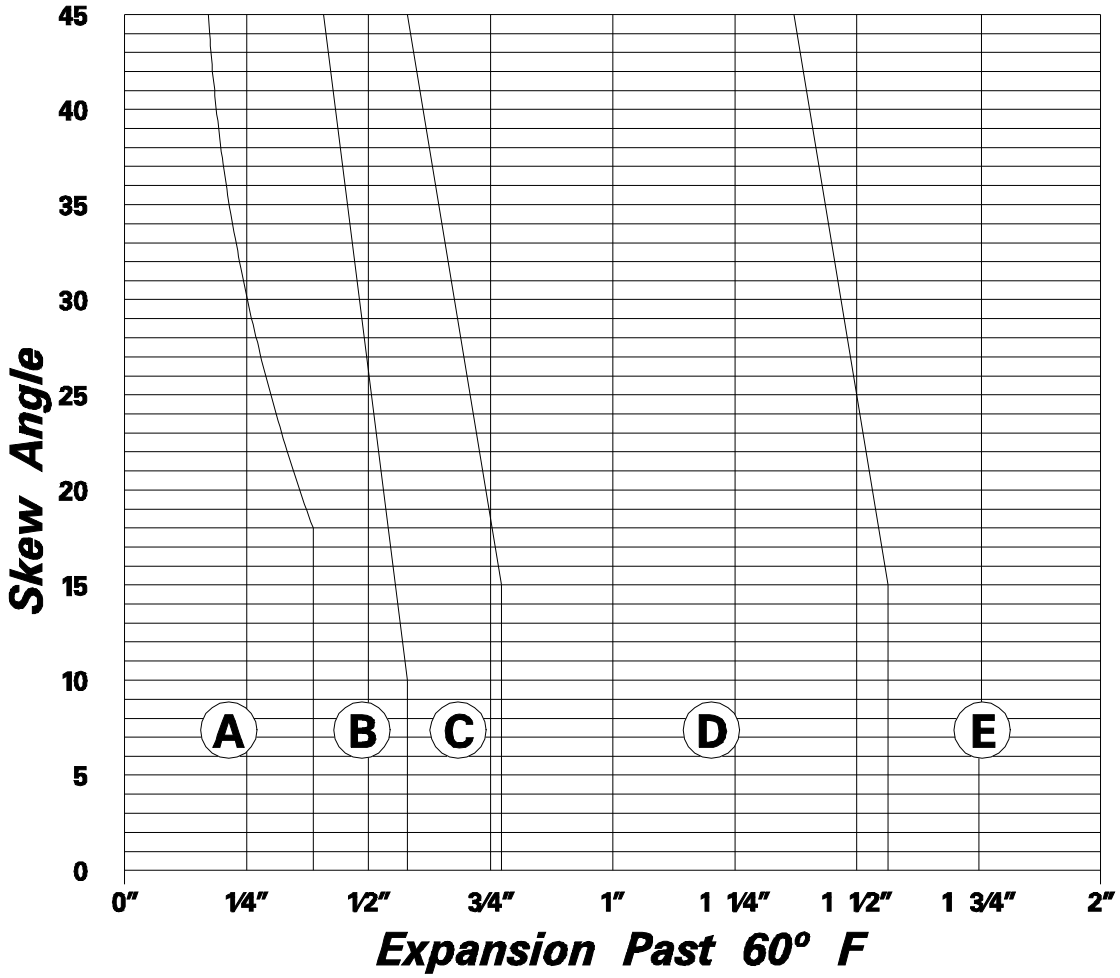






DESIGN LOADS FOR LOW RETAINING WALLS

EXHIBIT 413
Sheet 2 of 2



(A) 1.5" Neoprene Expansion Dam

(B) 2.0" Neoprene Expansion Dam

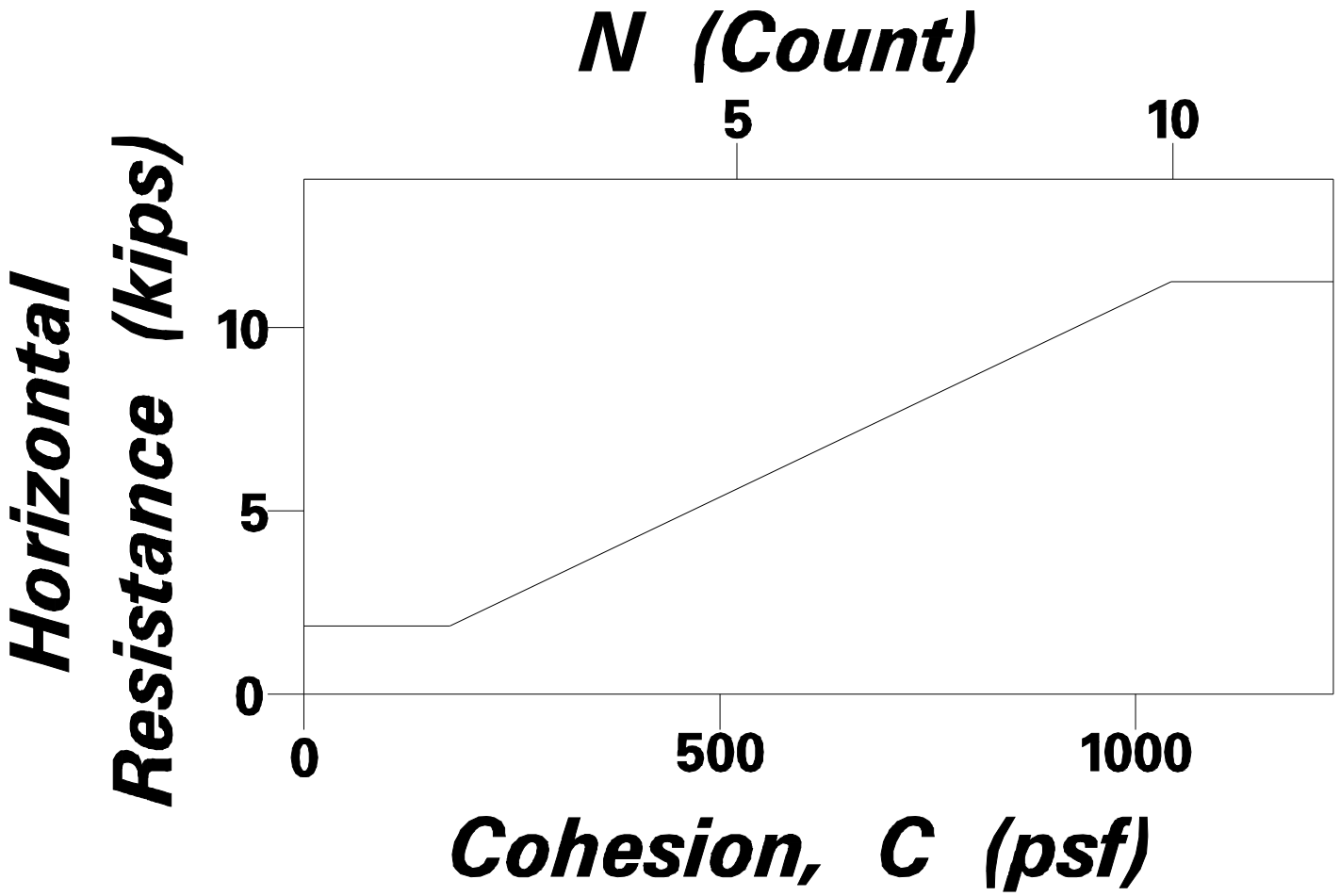
(C) 2.5" Neoprene Expansion Dam

(D) 4.0" Neoprene Expansion Dam

(E) Steel Finger Expansion Dam

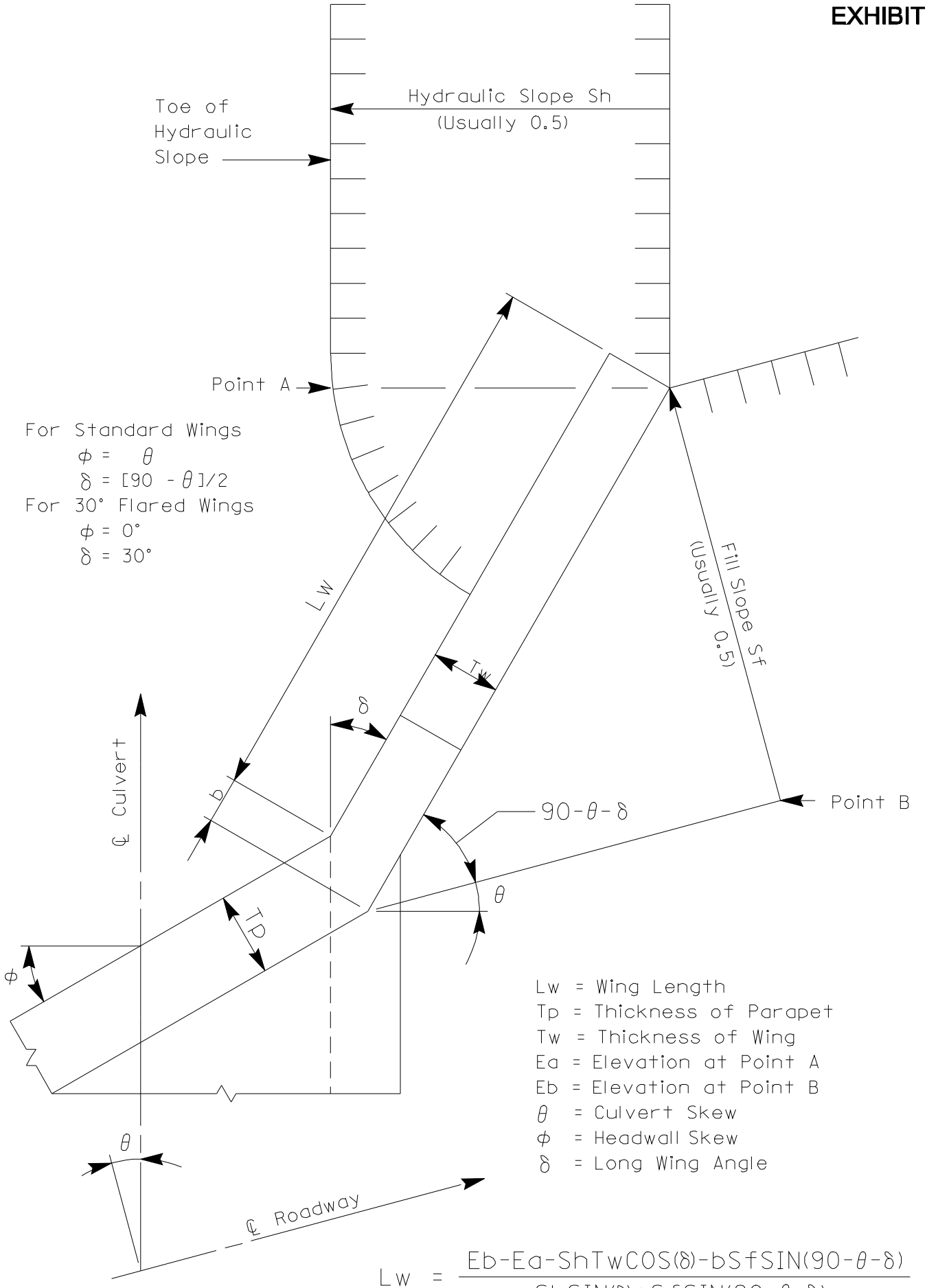
Expansion Past 60° F is the sum of the calculated expansion from the continuous units at the joint location.

EXPANSION JOINT CHART



PERMISSIBLE HORIZONTAL RESISTANCE PER PILE

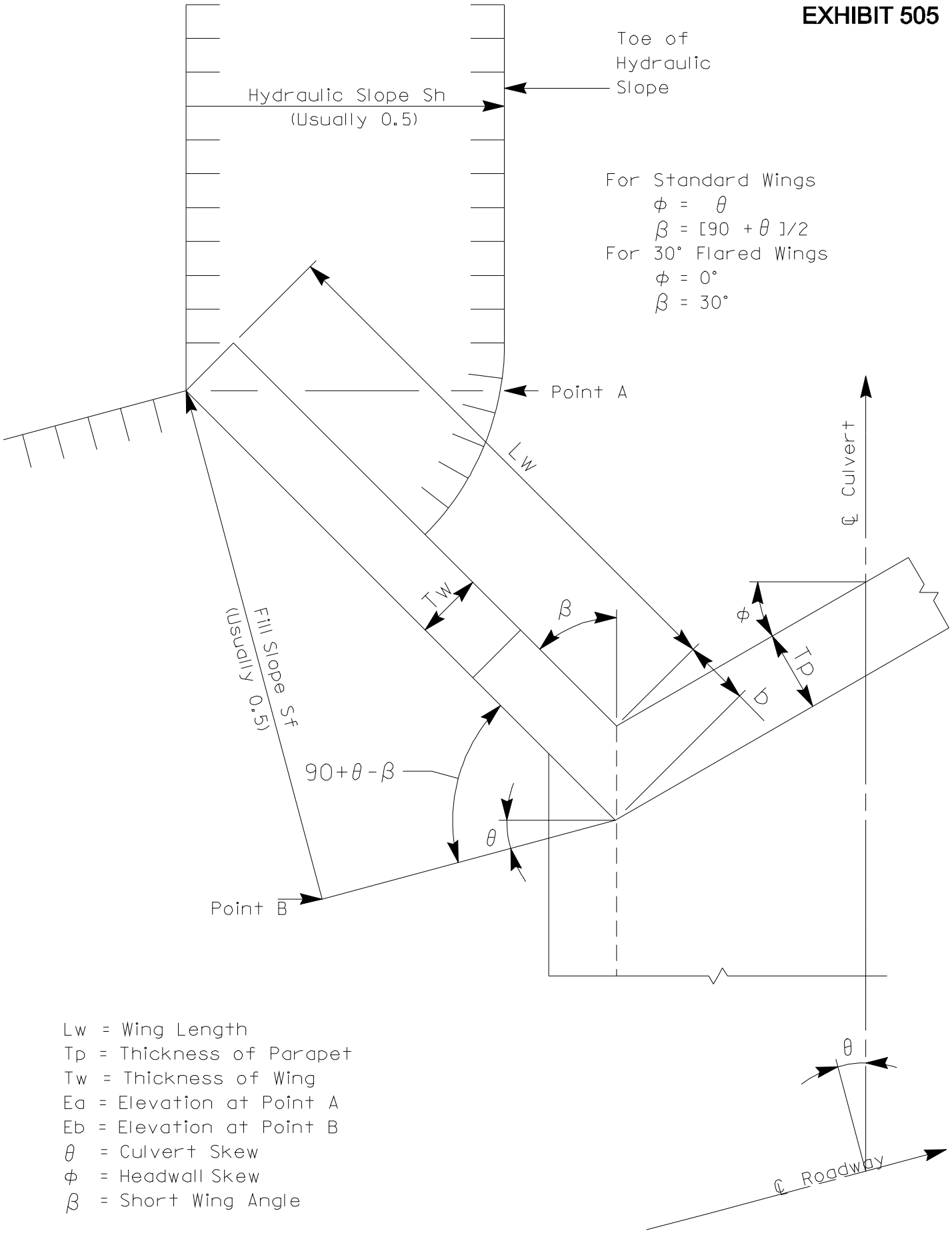
EXHIBIT 504



$$Lw = \frac{Eb-Ea-ShTwCOS(\delta)-bSfSIN(90-\theta-\delta)}{ShSIN(\delta)+SfSIN(90-\theta-\delta)}$$

LAYOUT OF "LONG" WINGS

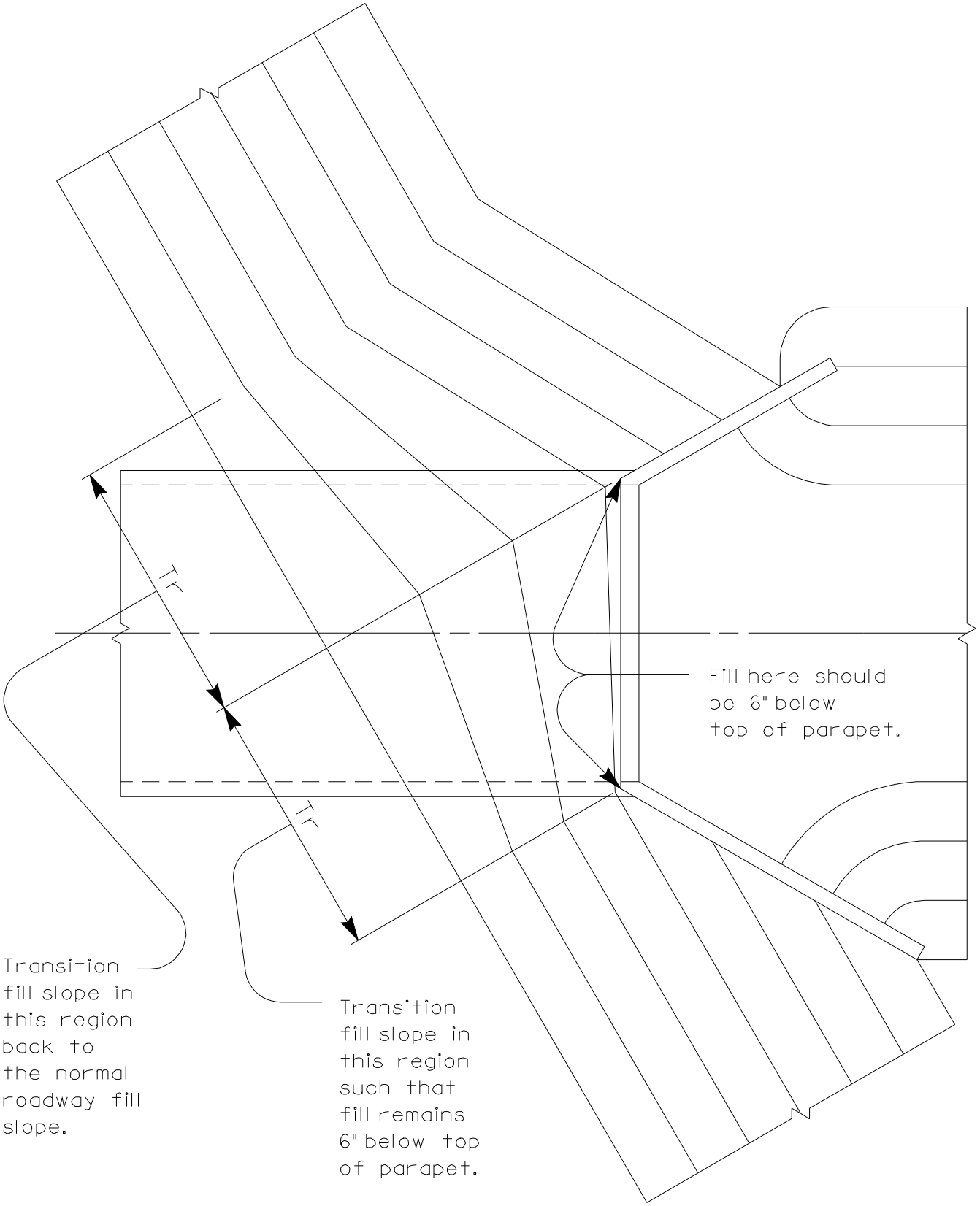
EXHIBIT 505



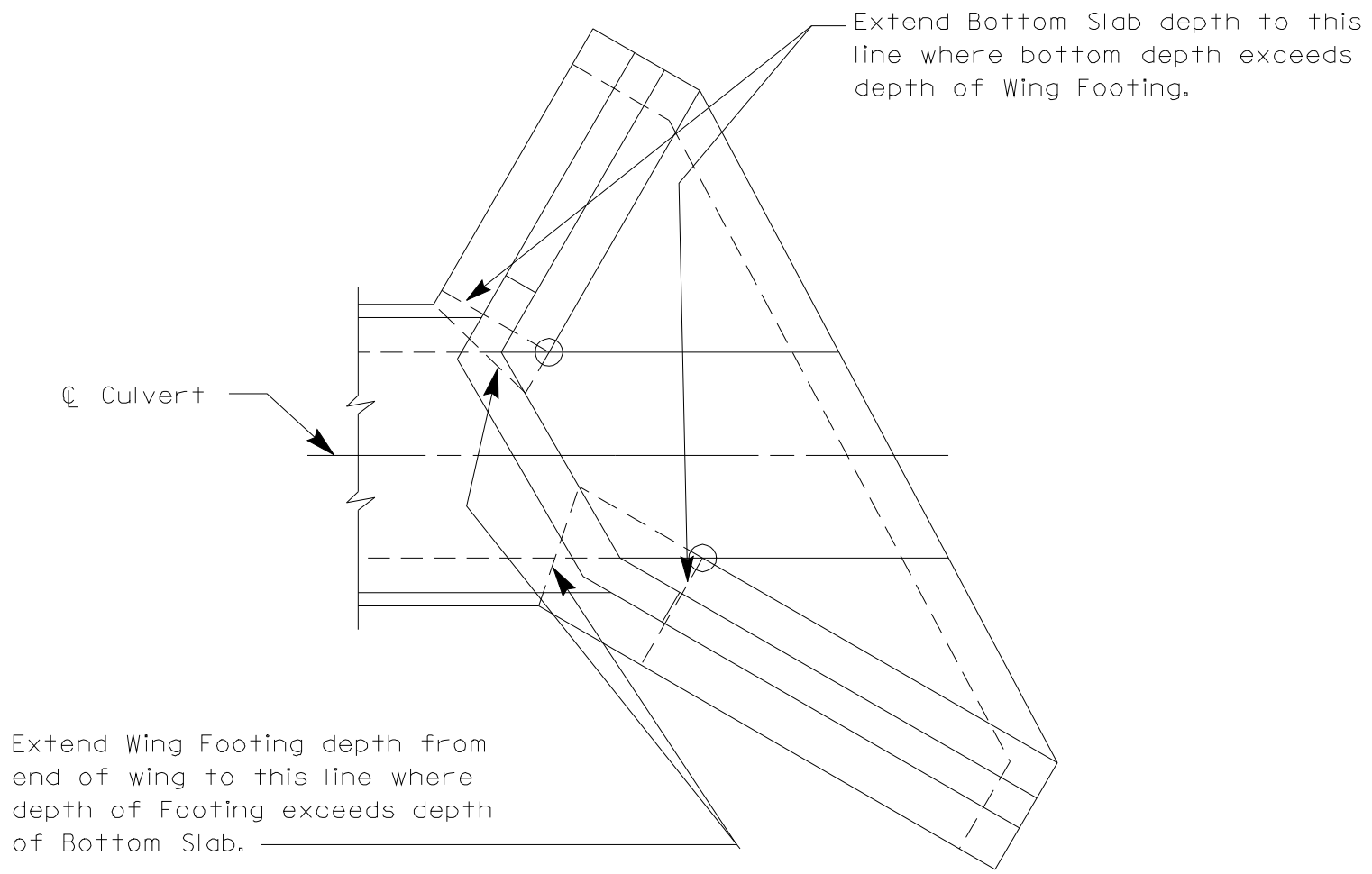
Lw = Wing Length
Tp = Thickness of Parapet
Tw = Thickness of Wing
Ea = Elevation at Point A
Eb = Elevation at Point B
θ = Culvert Skew
ϕ = Headwall Skew
β = Short Wing Angle

$$Lw = \frac{Eb-Ea-ShTwCOS(\beta)-bSfSIN(90+\theta-\beta)}{ShSIN(\beta)+SfSIN(90+\theta-\beta)}$$

LAYOUT OF "SHORT" WINGS



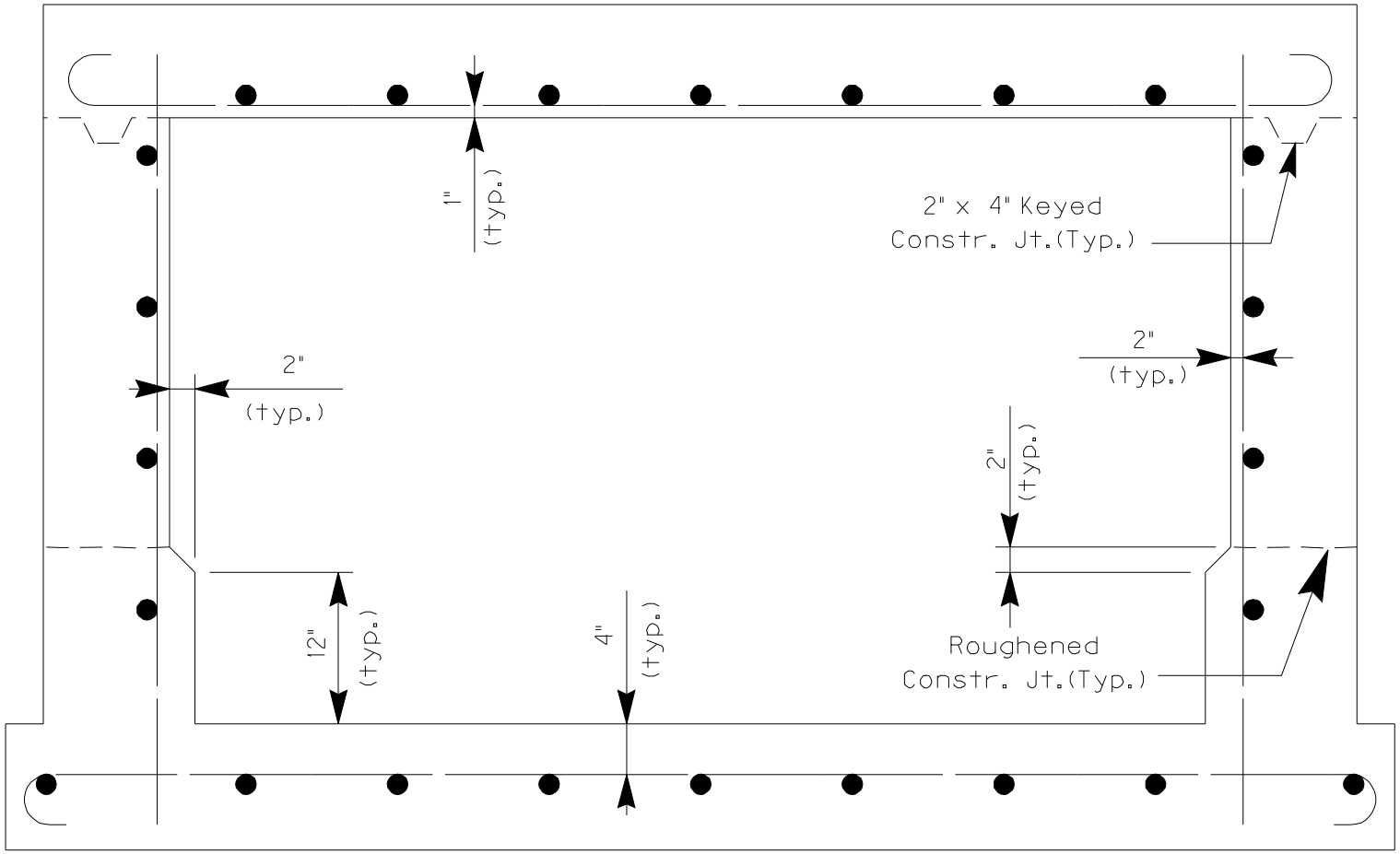
CULVERTS WITH 30° FLARED WINGS



DETAIL OF INTERSECTION OF BOTTOM OF BOTTOM SLAB AND BOTTOM OF WING FOOTING

CULVERT FOOTING DETAIL

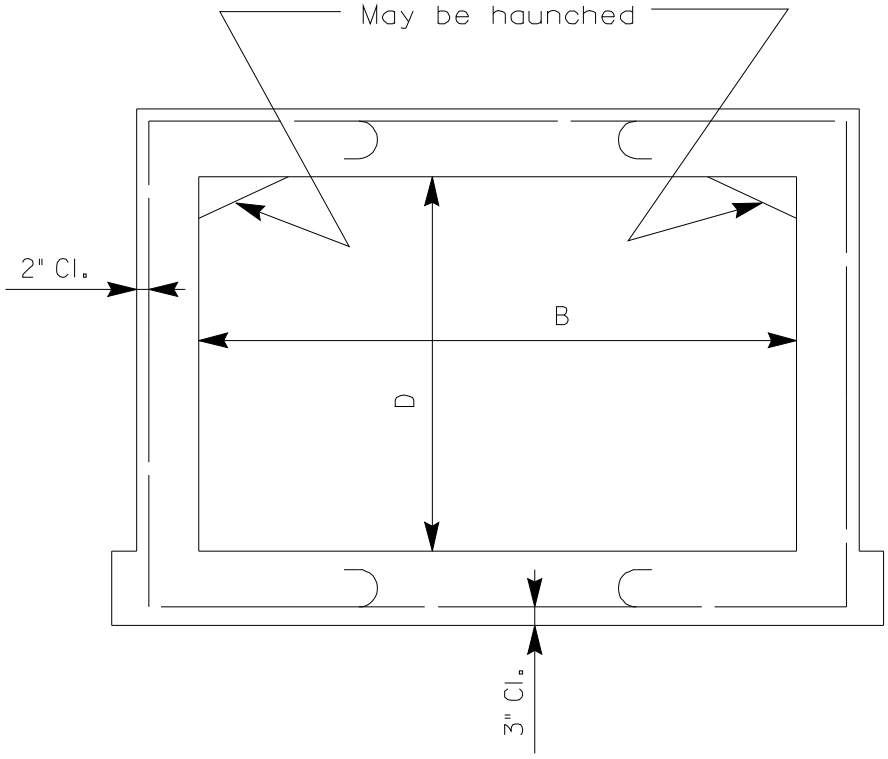
EXHIBIT 507



CULVERT SECTION
ACID WATER and/or HIGHLY ABRASIVE SITUATION

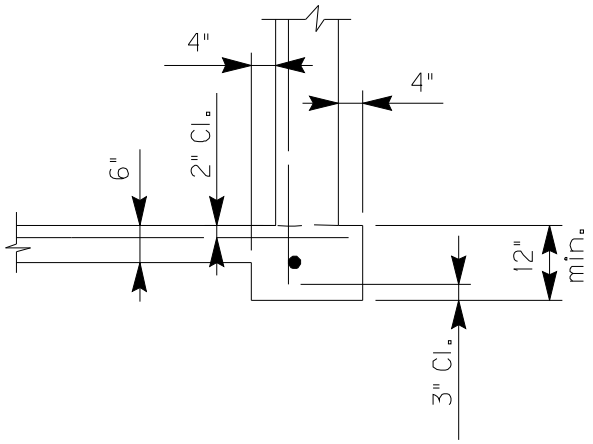
EXHIBIT 508

Showing only additional reinforcement for Frame Condition.

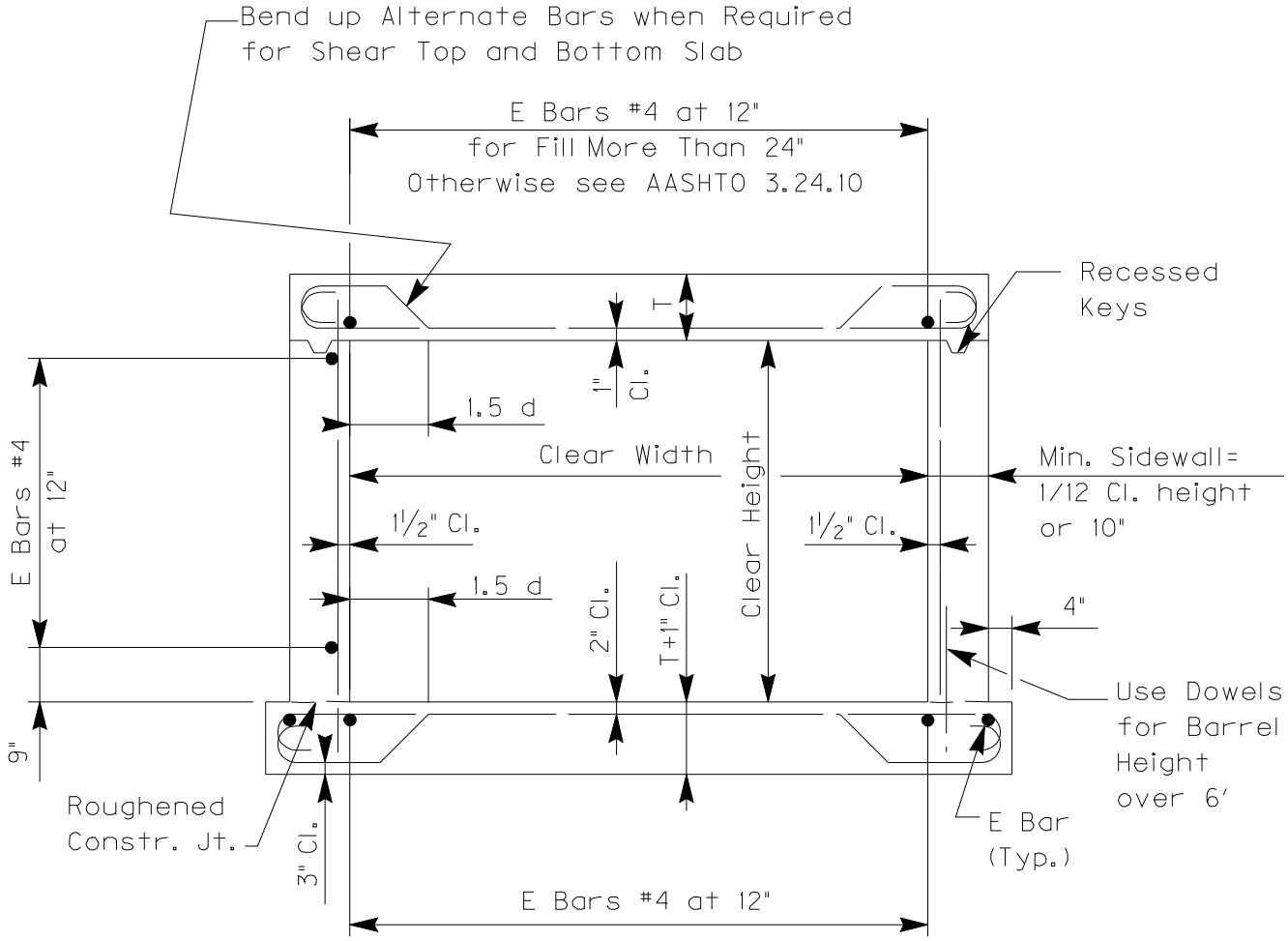


Reinforcement for Corners may be hooked rather than continuous across slab to facilitate placement.

CULVERT SECTION
RIGID FRAME SINGLE BARREL



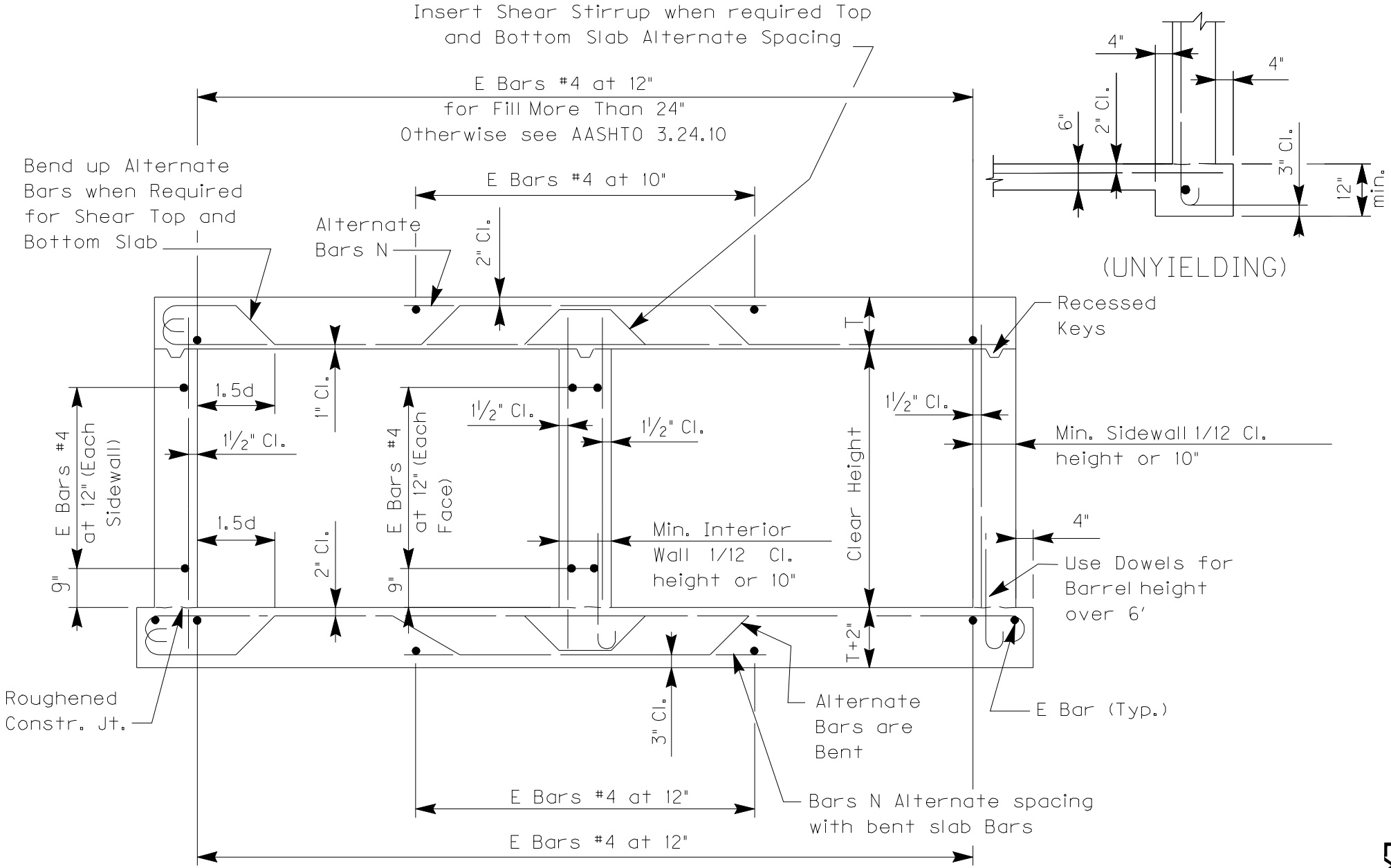
(UNYIELDING)



d= Distance from the extreme compression fiber to the centroid of tension steel.

(YIELDING)

CULVERT SECTION
STANDARD SINGLE BARREL

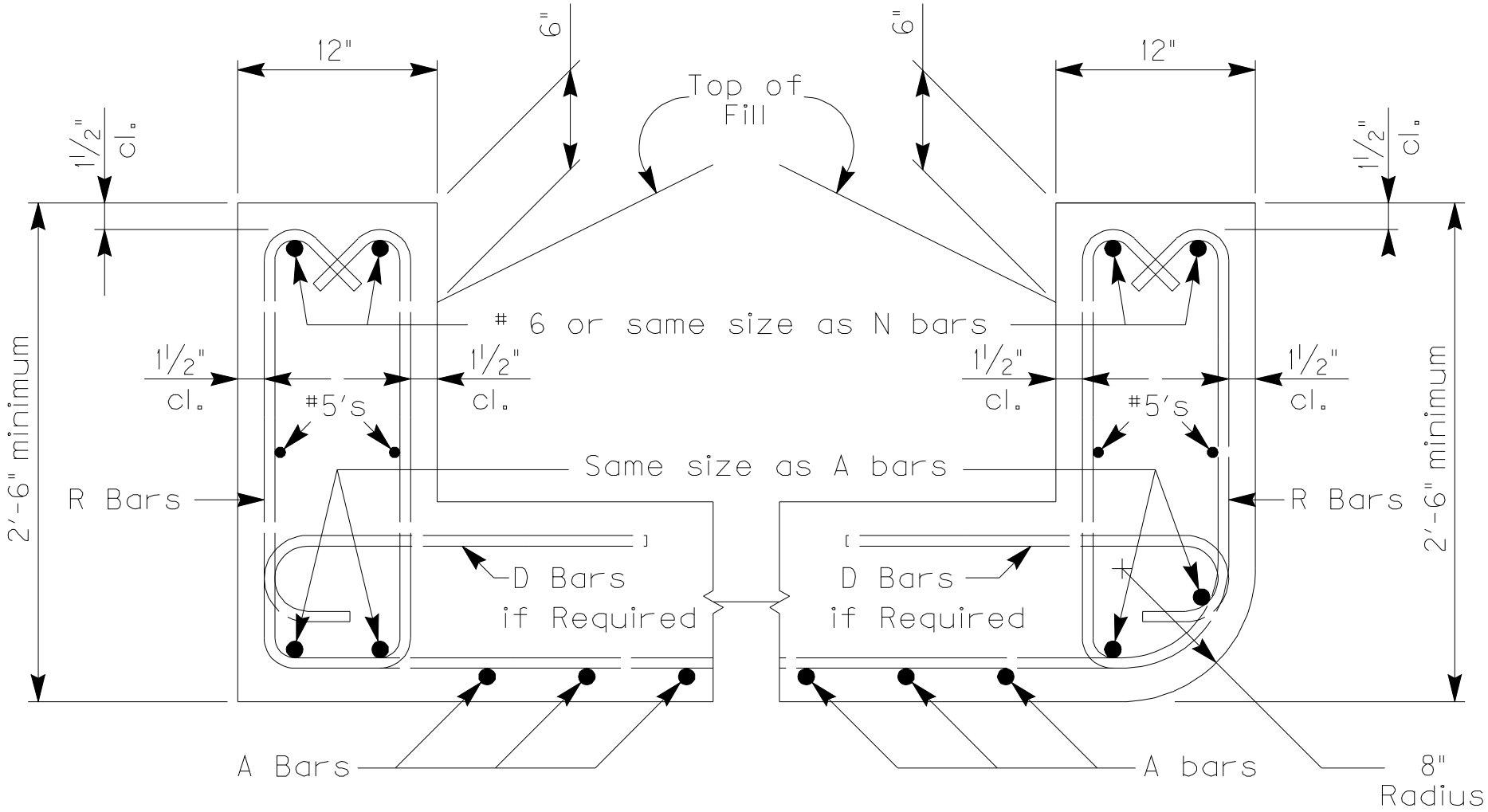


d= Distance from the extreme compression fiber to the centroid of tension steel.

(YIELDING)

CULVERT SECTION - STANDARD MULTIPLE BARREL

EXHIBIT 511



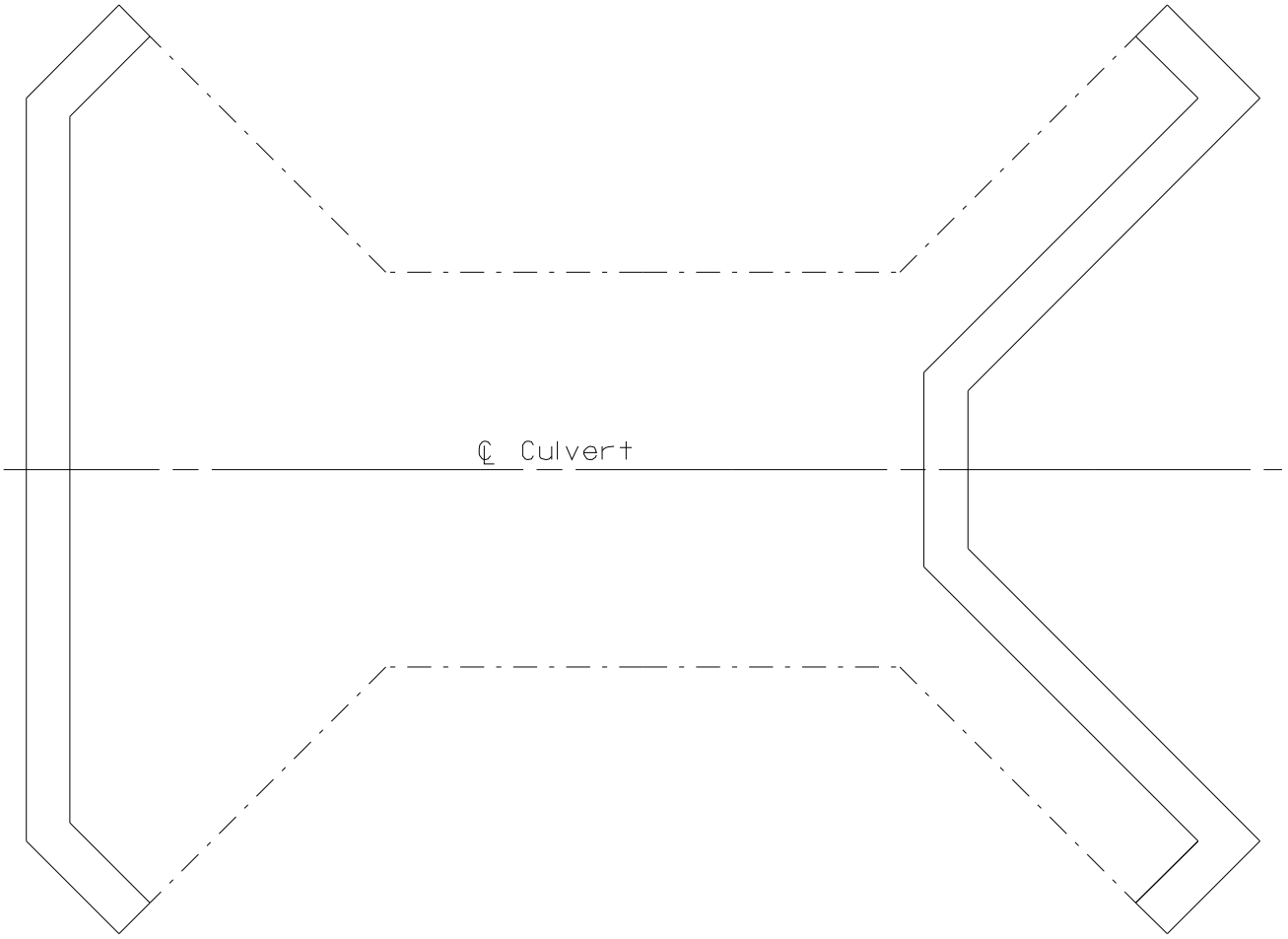
Outlet Parapet Detail

Inlet Parapet Detail

R Bars - # 5 @ 12" minimum
D Bars - # 5 minimum (space with R Bars)

PARAPET DETAILS

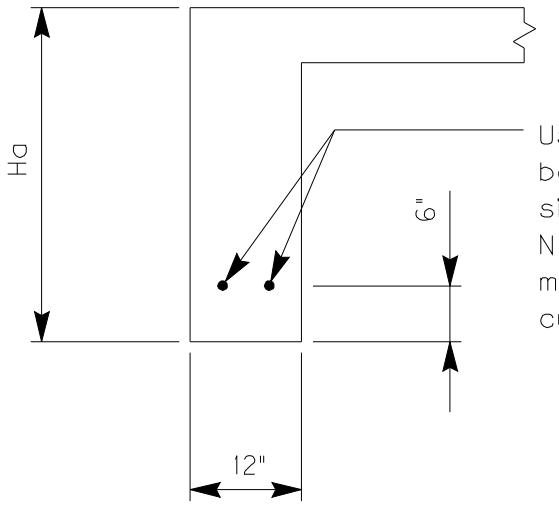
EXHIBIT 512



Plan Showing Outline
of Apron for Culverts
with Paved Inlet/Outlet

Plan Showing Outline
of Apron for Culverts
without Paved Inlet/Outlet

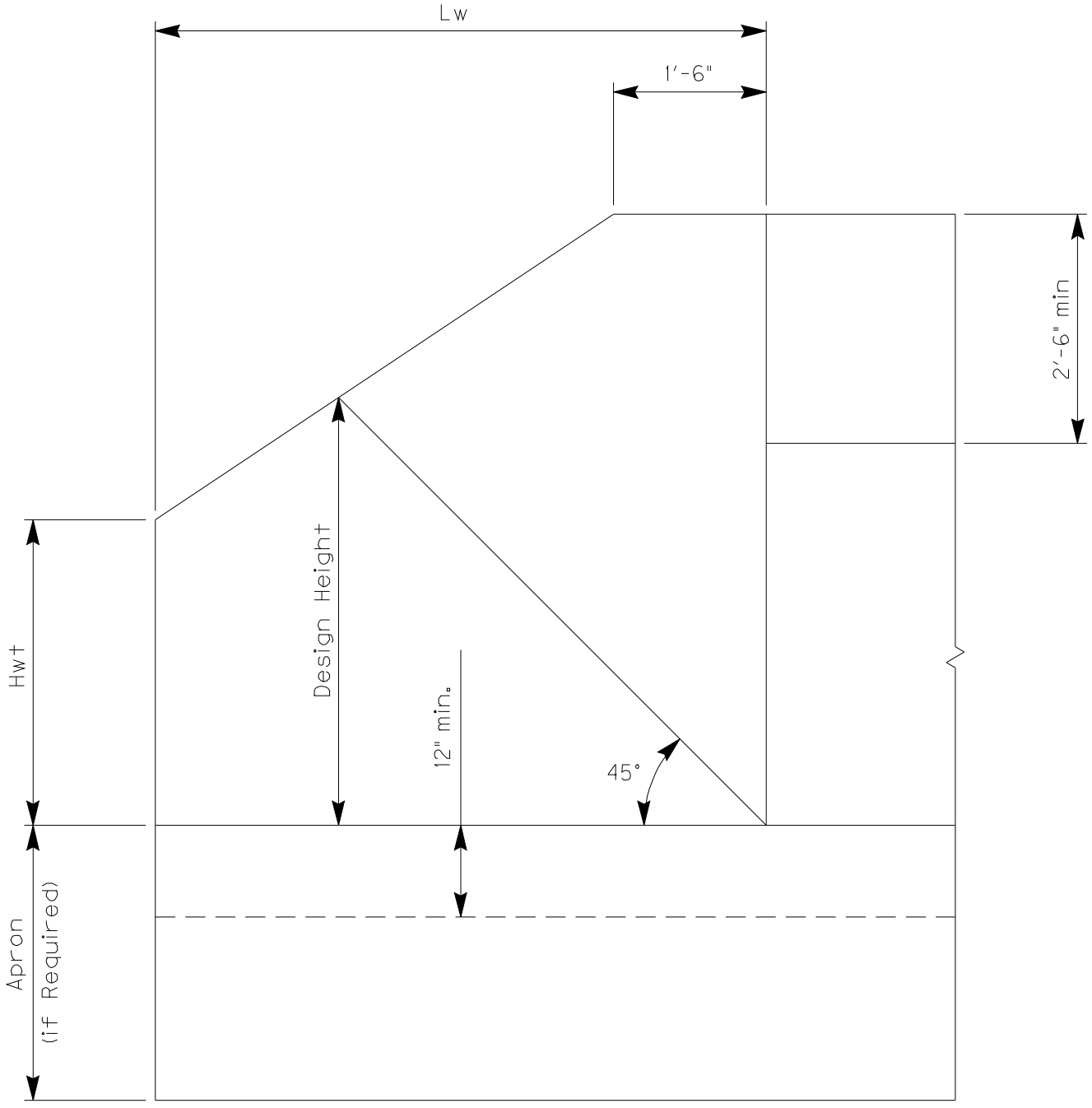
Ha = Depth of Apron
= 3′ for Barrel heights
less that 6′
= 4′ for Barrel heights
6′ or greater



Section

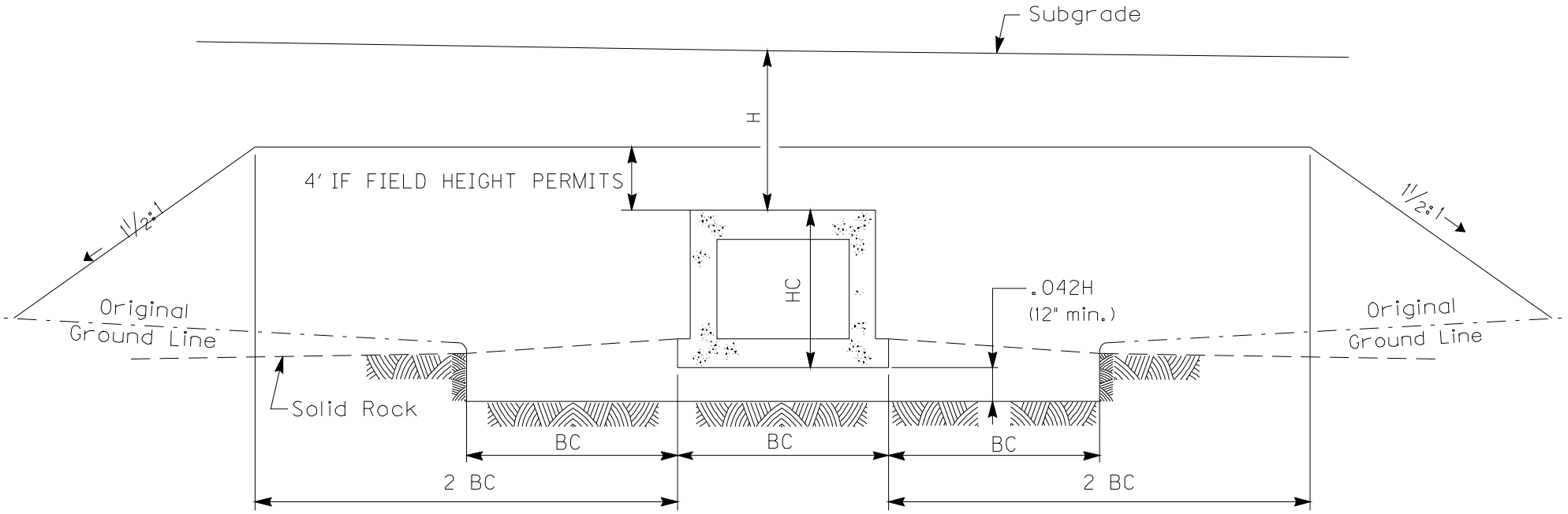
APRON DETAILS

Hwt is set such that the fill is a minimum of 6" below the top of the wing (round up to nearest foot)



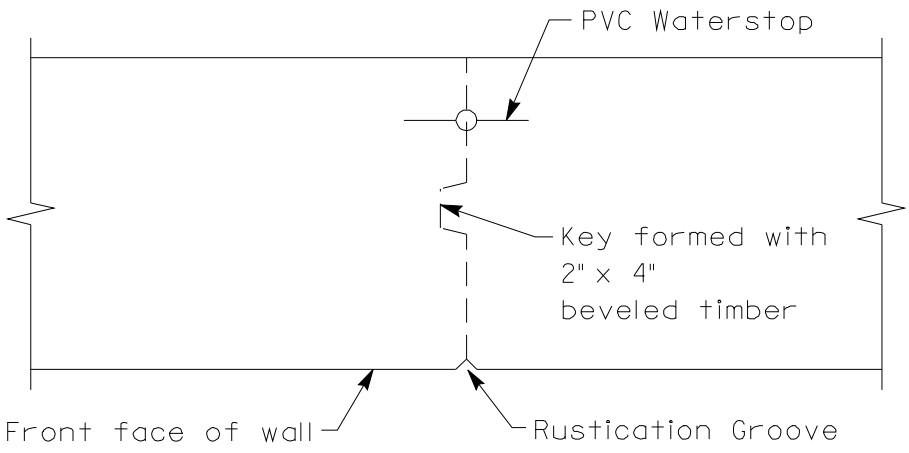
TYPICAL WING ELEVATION

(a.) Remove solid rock to a depth of .042H and width 3BC
(However depth will not be required to be more than .75HC)
(b.) Compact selected fine soil to bottom of culvert elevation over the 3BC width
(c.) Construct box culvert.
(d.) Compact selected fine soil to an elevation 4' above top of culvert in layers of 6" or less to meet density requirements specified for adjacent embankment.
(e.) Proceed with normal roadway construction.



CONSTRUCTION SEQUENCE FOR MAKING CULVERT FOUNDATION YIELDING

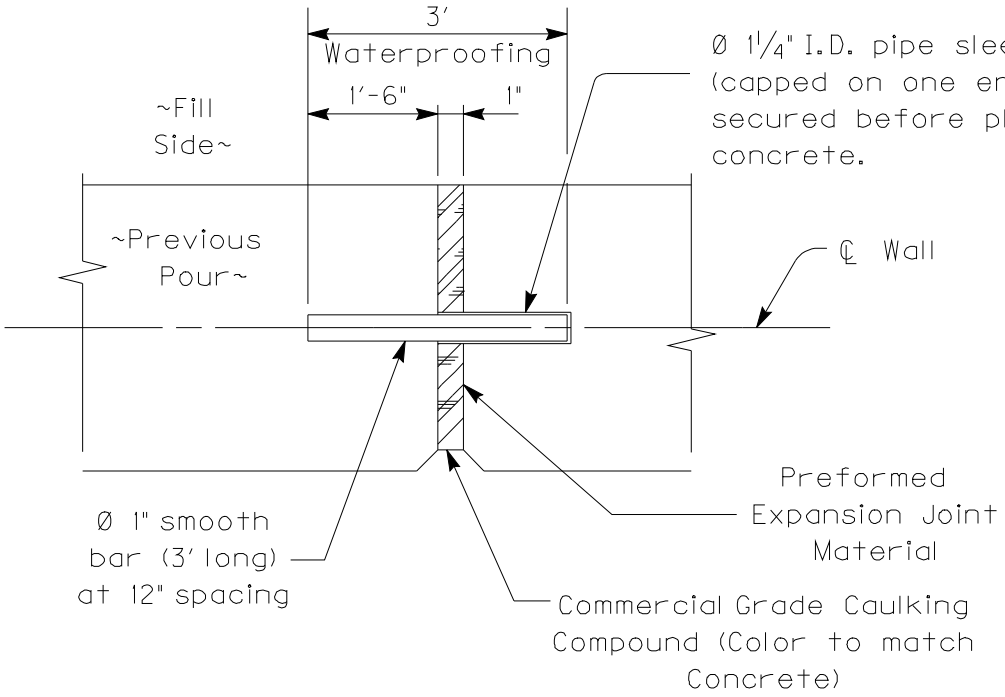
EXHIBIT 515



CONTRACTION JOINT DETAIL

~Spaced at 30' intervals~

Waterproofing Materials consist of Bituminized Cotton Fabric with cutback asphalt or coal-tar pitch.

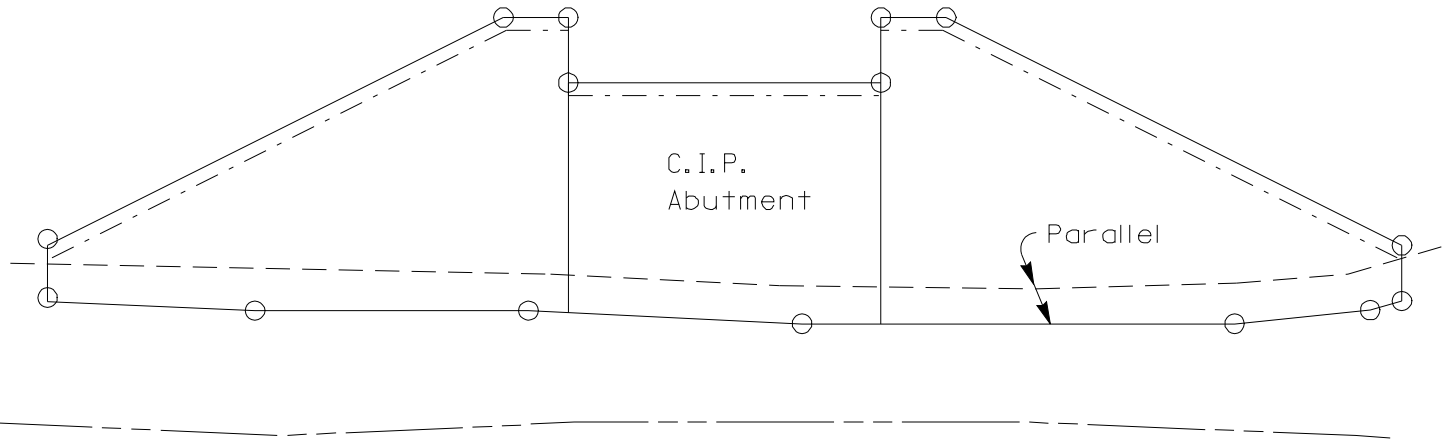


EXPANSION JOINT DETAIL

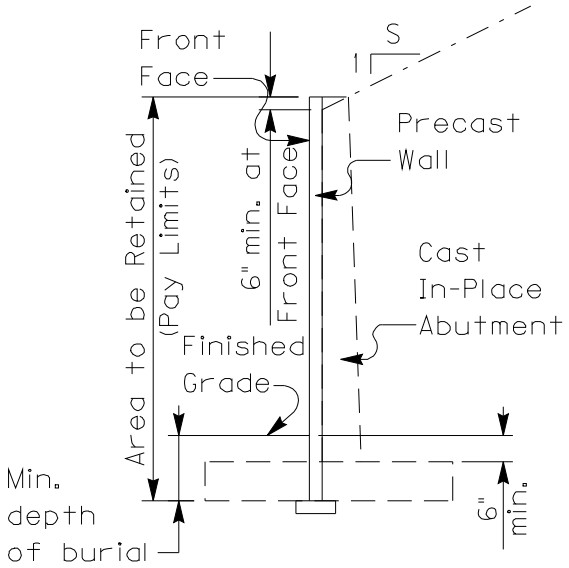
~Spaced at 100' intervals~

All preformed expansion joint material, caulking, waterproofing materials, pipe sleeve, PVC waterstop, and equipment and labor necessary to complete the joints are incidental to the square foot bid for Retaining Walls.

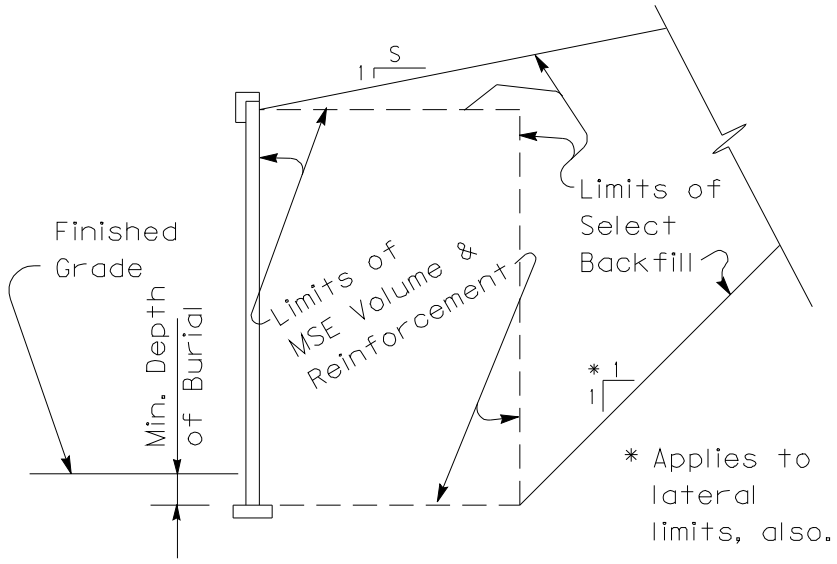
WALL EXPANSION & CONTRACTION JOINT



ELEVATION



TYPICAL SECTION



TYPICAL SECTION
WITH SELECT BACKFILL

~ LEGEND ~

○ Points where Station, Elevation, & Offset are given

——— Pay Limits of Area to be Retained

– – – Finished Grade in front of Wall

—·—· Finished Grade behind Wall

——-- Projected Rock Line

Note: MSE Volume extends 12" minimum past ends of MSE Reinforcement.

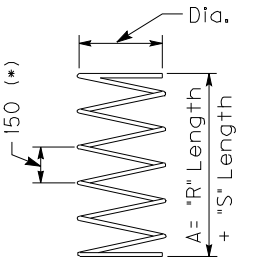
NOTE: Additional panel area outside pay limits (if Permitted) at no cost to the Department.

MSE WALLS

EXHIBIT 517

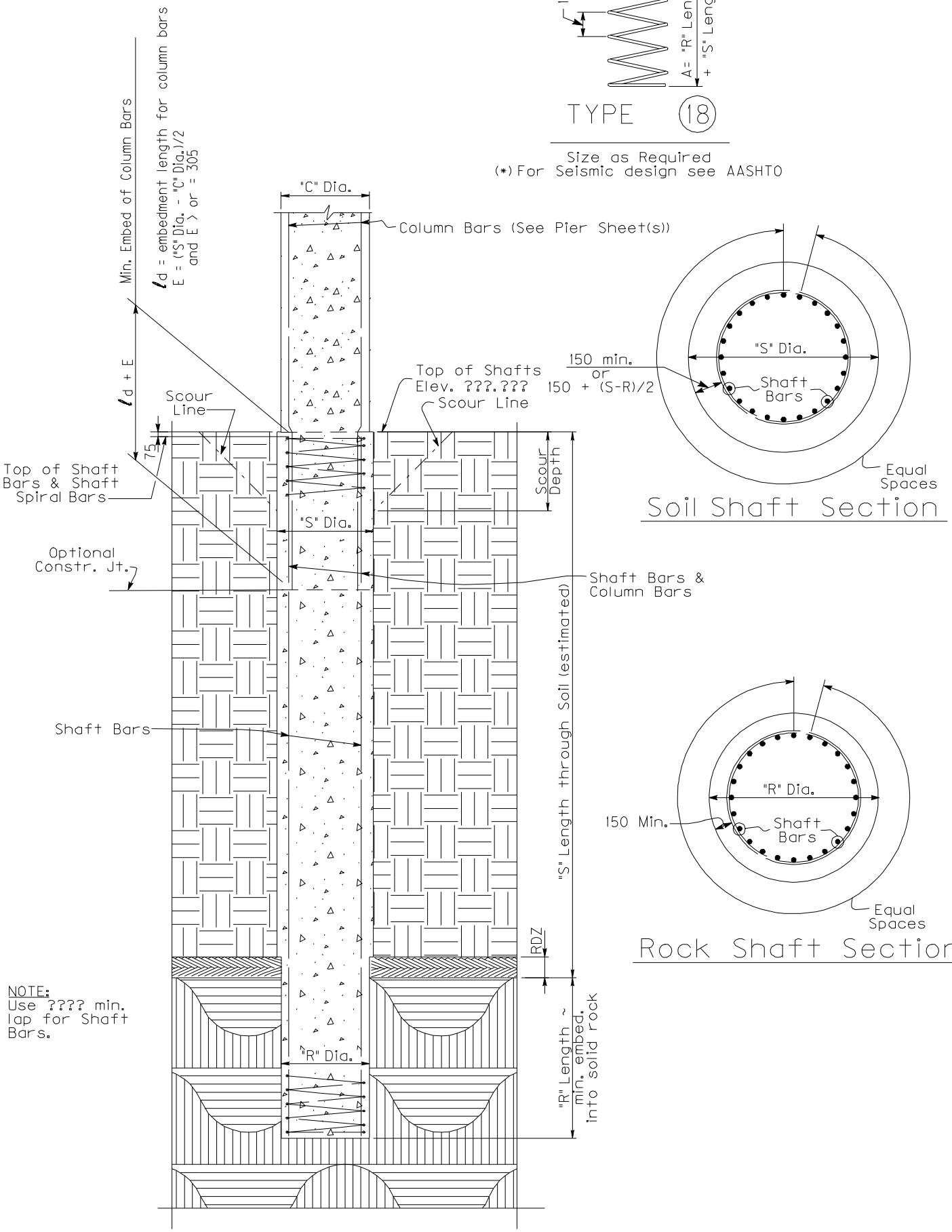
EXHIBIT 518

TABLE OF DIMENSIONS							
PIER NO.	"R" ~ ROCK SOCKET		"S" ~SOIL SHAFT		SCOUR DEPTH	SPIRAL DIM.	
	Diameter	Length	Diameter	Length (est.)		Dia.	A (est.)
1							
2							



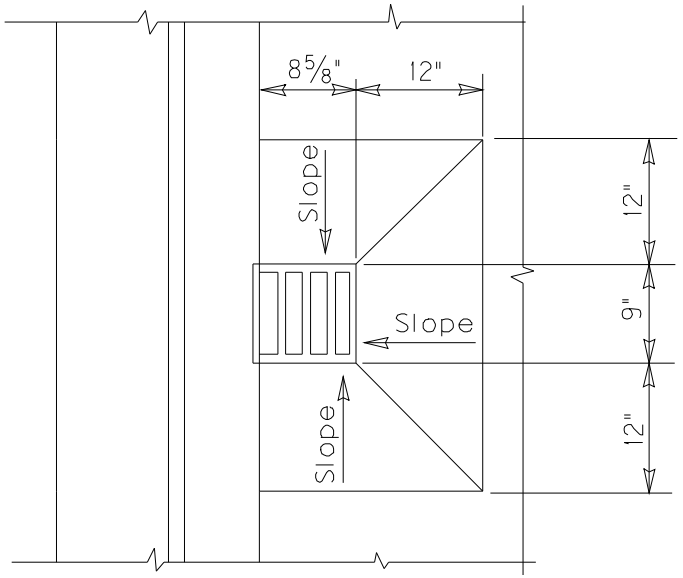
TYPE (18)

Size as Required
(*) For Seismic design see AASHTO



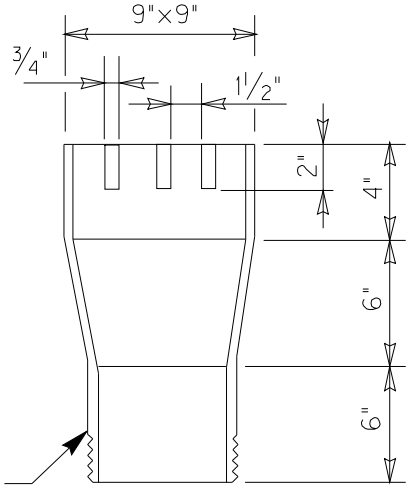
NOTE:
Use ???? min. lap for Shaft Bars.

DRILLED SHAFTS



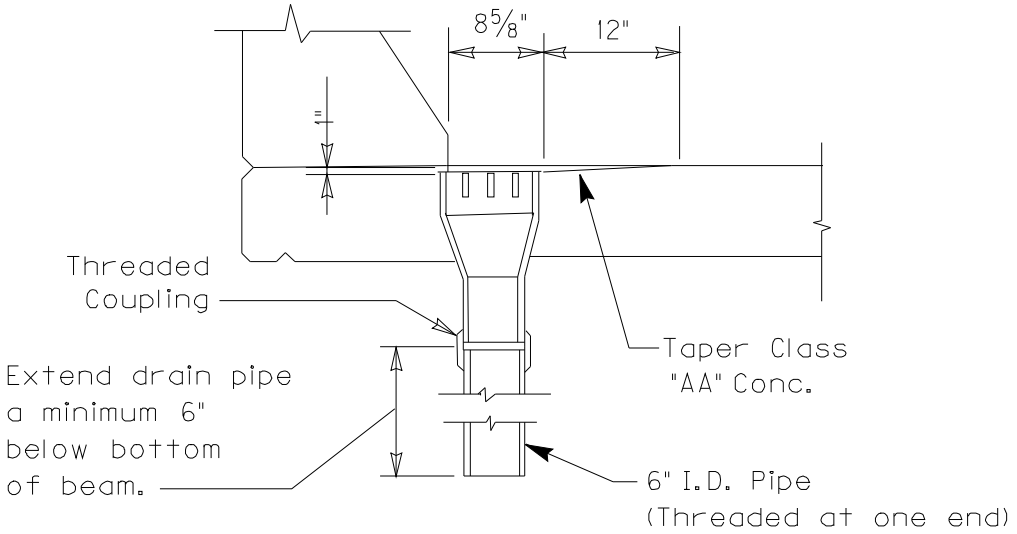
PLAN OF DRAIN

Note: Drain Pipe and Fittings are 6" I.D., 0.25" minimum wall thickness, wound with fiberglass epoxy resin formulation with ultraviolet inhibitors. Supply the pipe pigmented to match the final color of the structure.



DRAIN CASTING

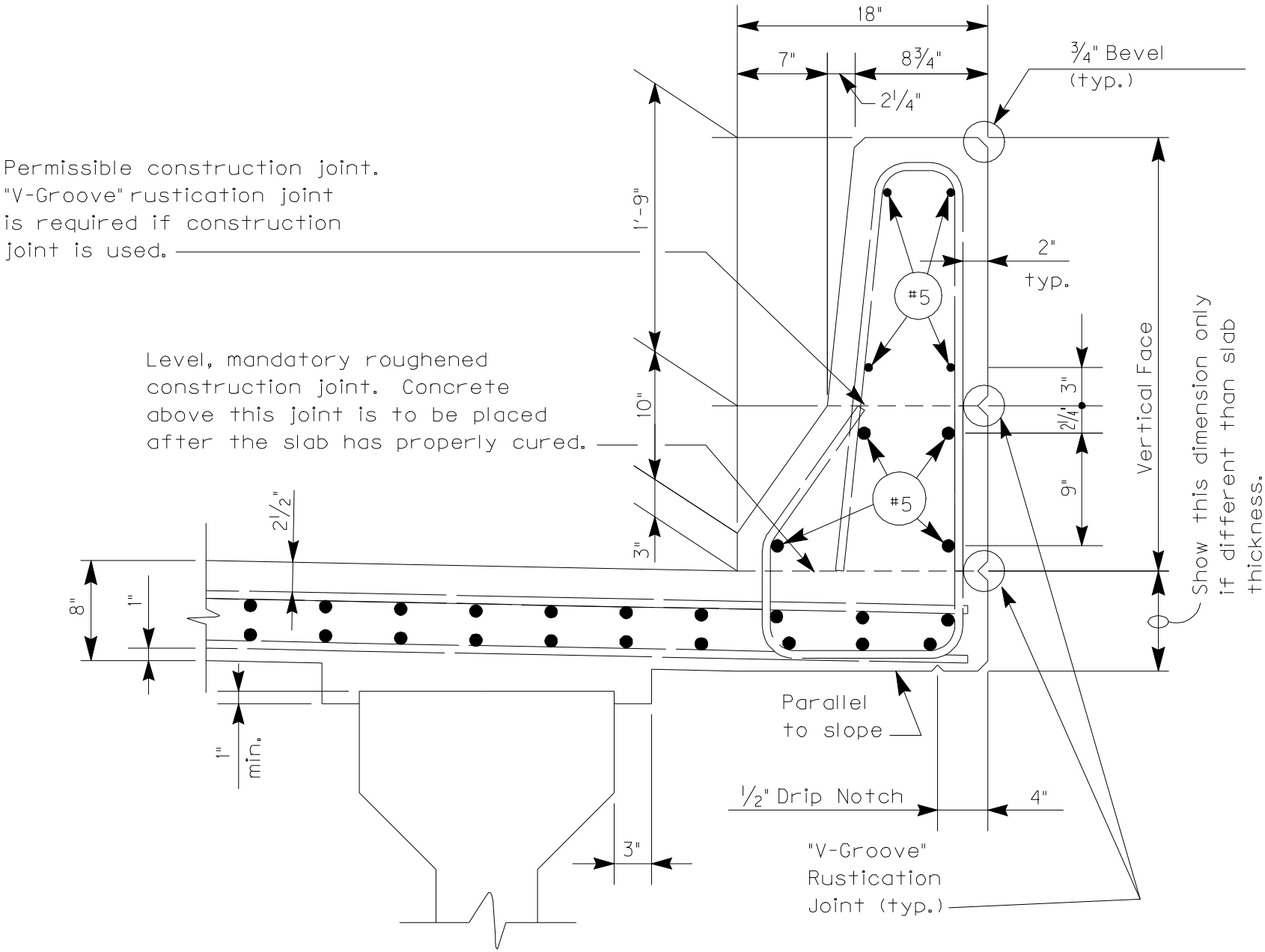
Weight = 60#



DRAIN SECTION

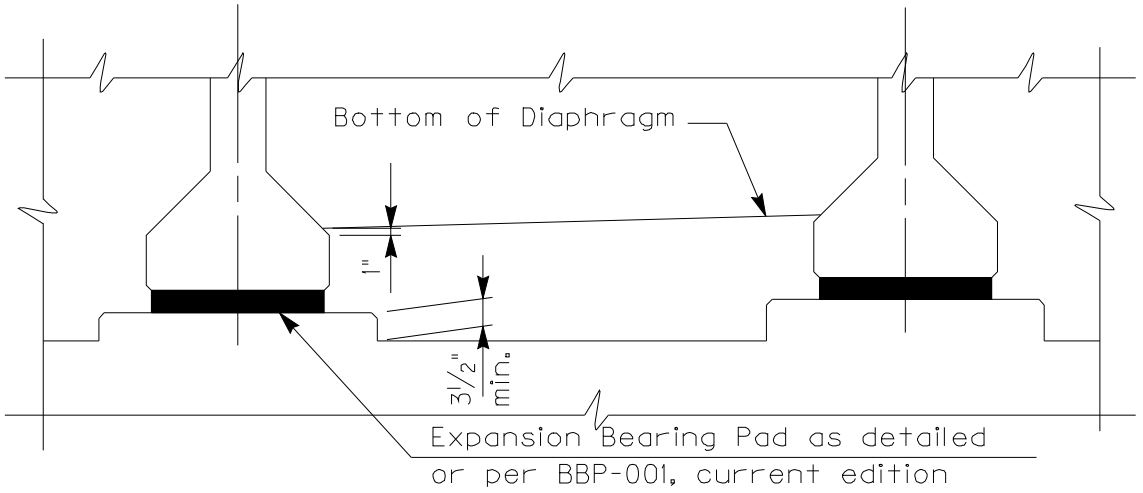
STEEL OR CAST IRON DECK DRAINS

EXHIBIT 519

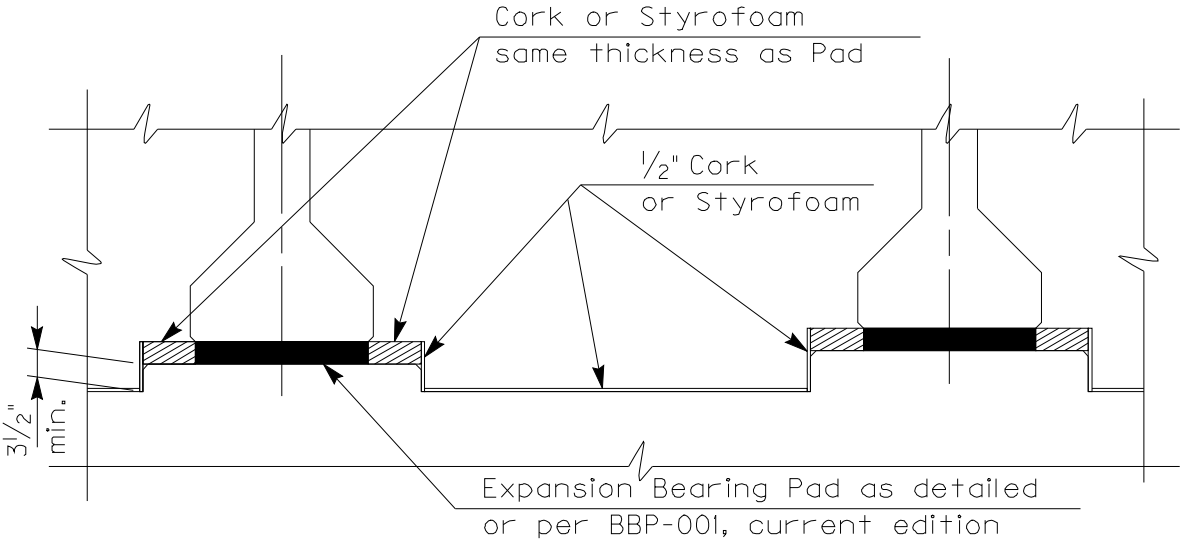


RAILING SYSTEM TYPE III & SLAB DETAILS

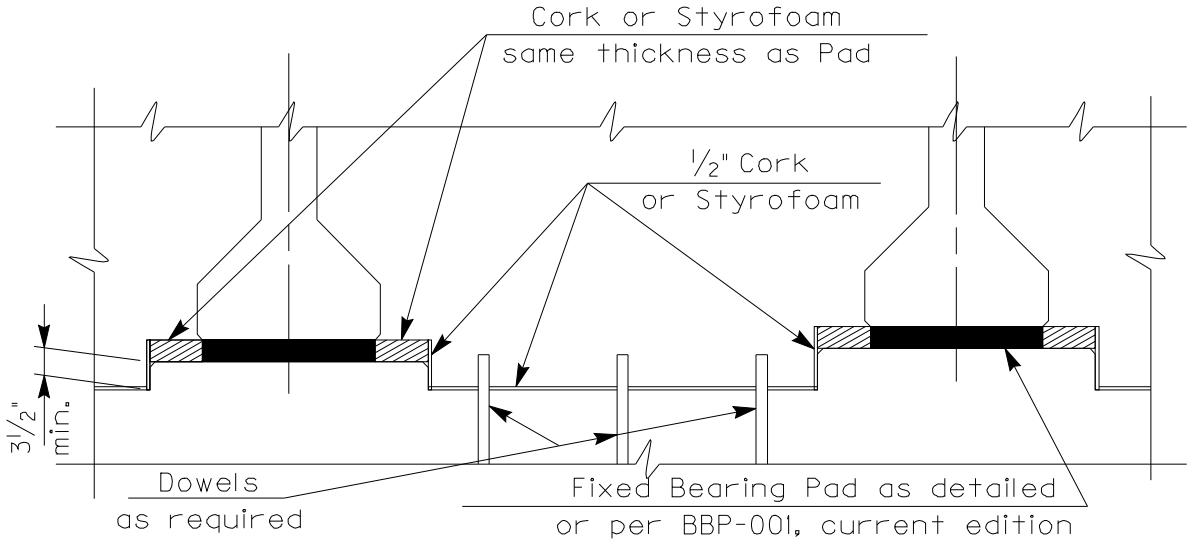
EXHIBIT 601



EXPANSION PIER
~With Joint~

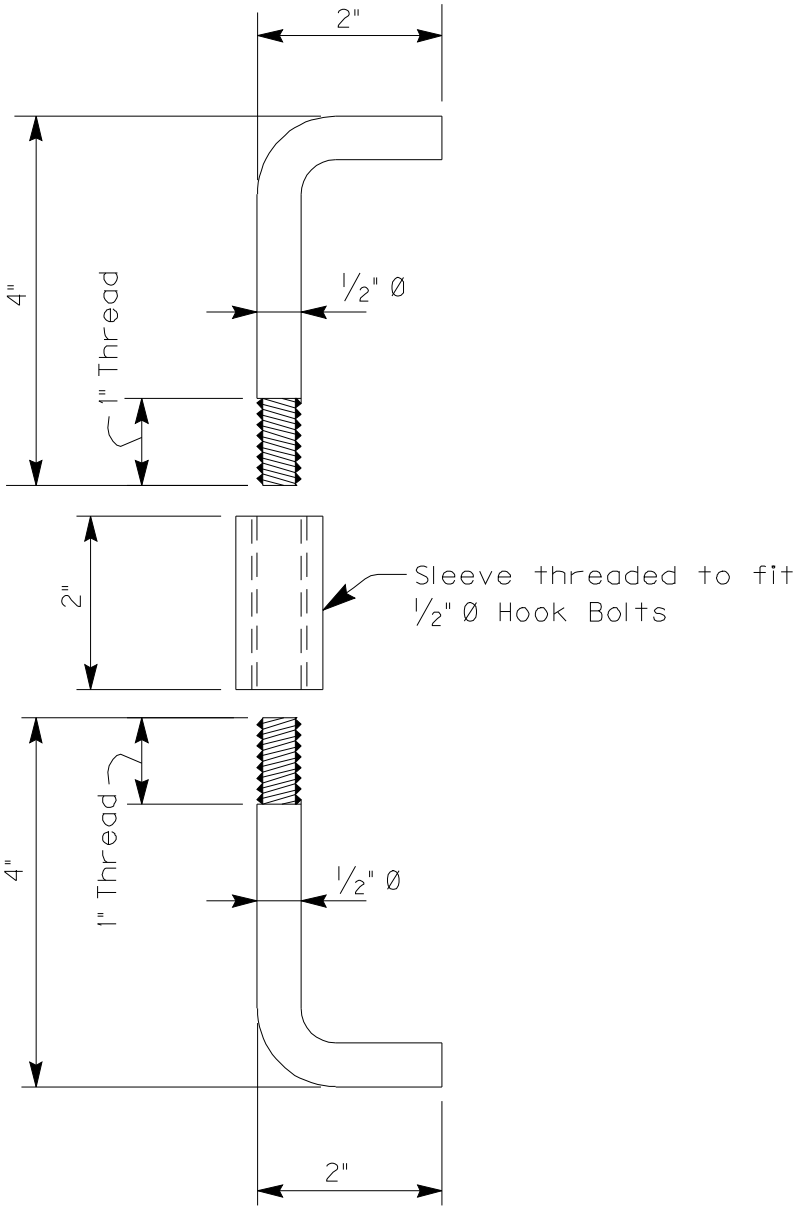


EXPANSION PIER
~Without Joint~



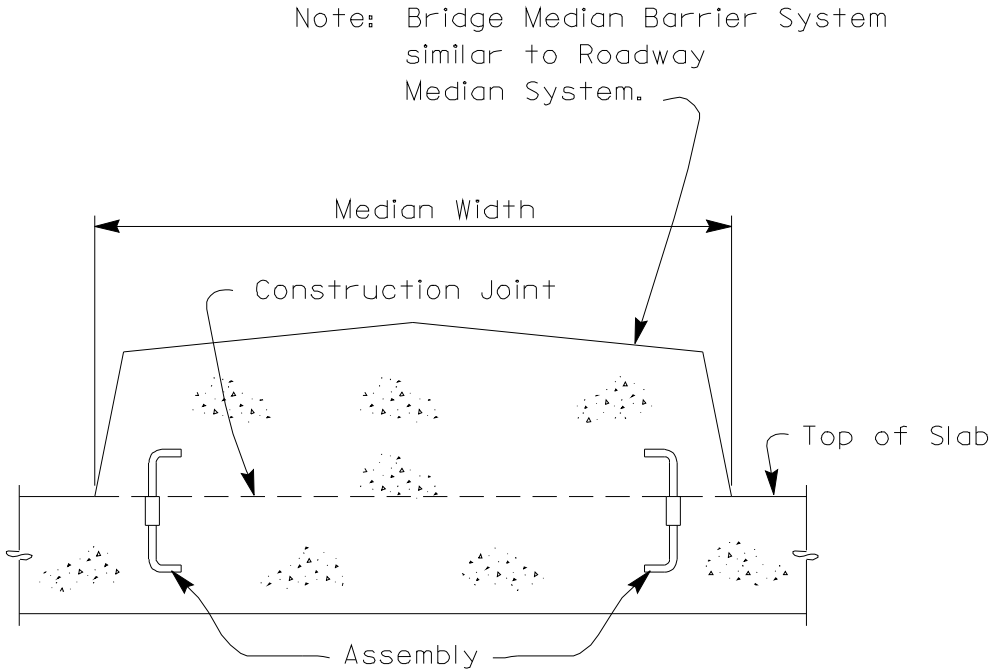
FIXED PIER

PEDESTAL ON PIER CAP



ASSEMBLY DETAIL

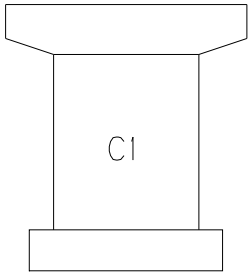
Hook Bolt Assembly requires a minimum tensile strength of 4 kips when assembled as a unit. Both Hook Bolts and Sleeve are made of steel and meet the requirements of ASTM A307.

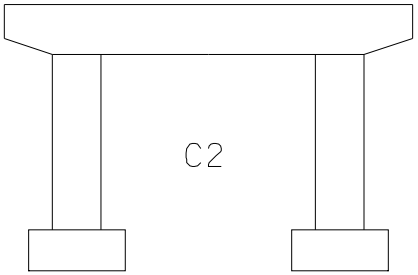


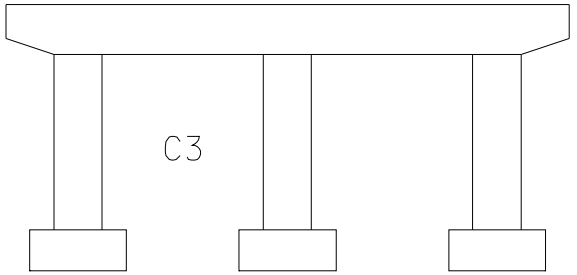
SECTION THROUGH MEDIAN
SHOWING ASSEMBLY IN PLACE

HOOK BOLT ASSEMBLY

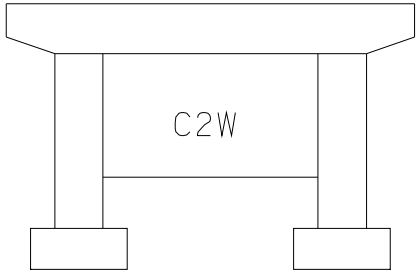
EXHIBIT 603

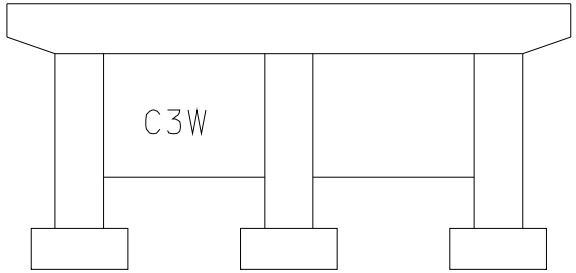




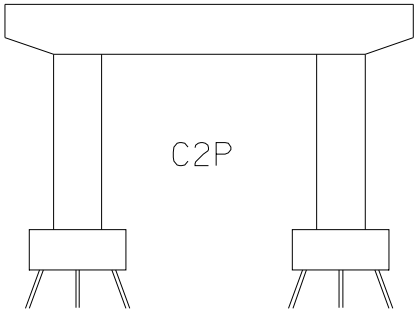


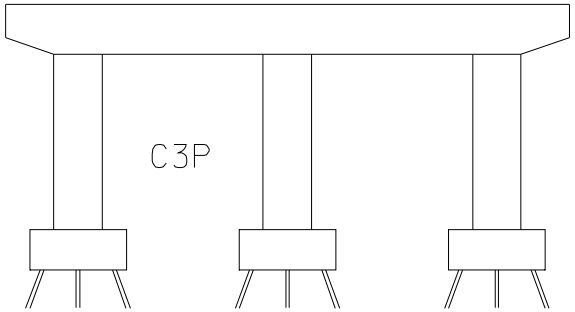
The first character ("C" in this example) Denotes Architectural type.
The second character (2,3,4,5 etc.) Indicates number of Pier columns.



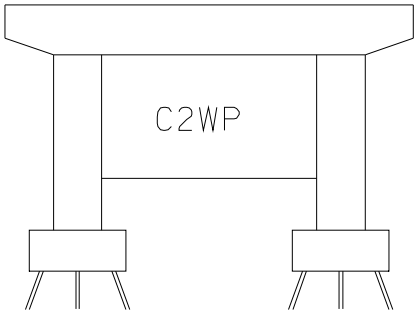


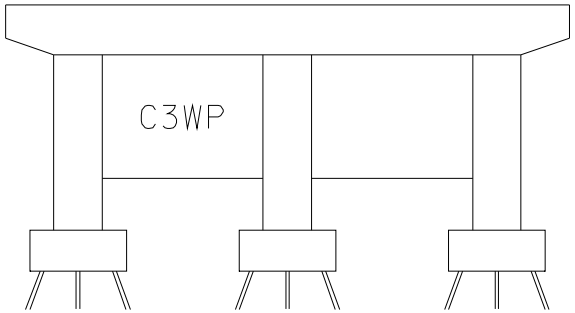
"W" as third character Indicates a webwall between Pier columns.





"P" as third character Indicates piles under Pier footings.

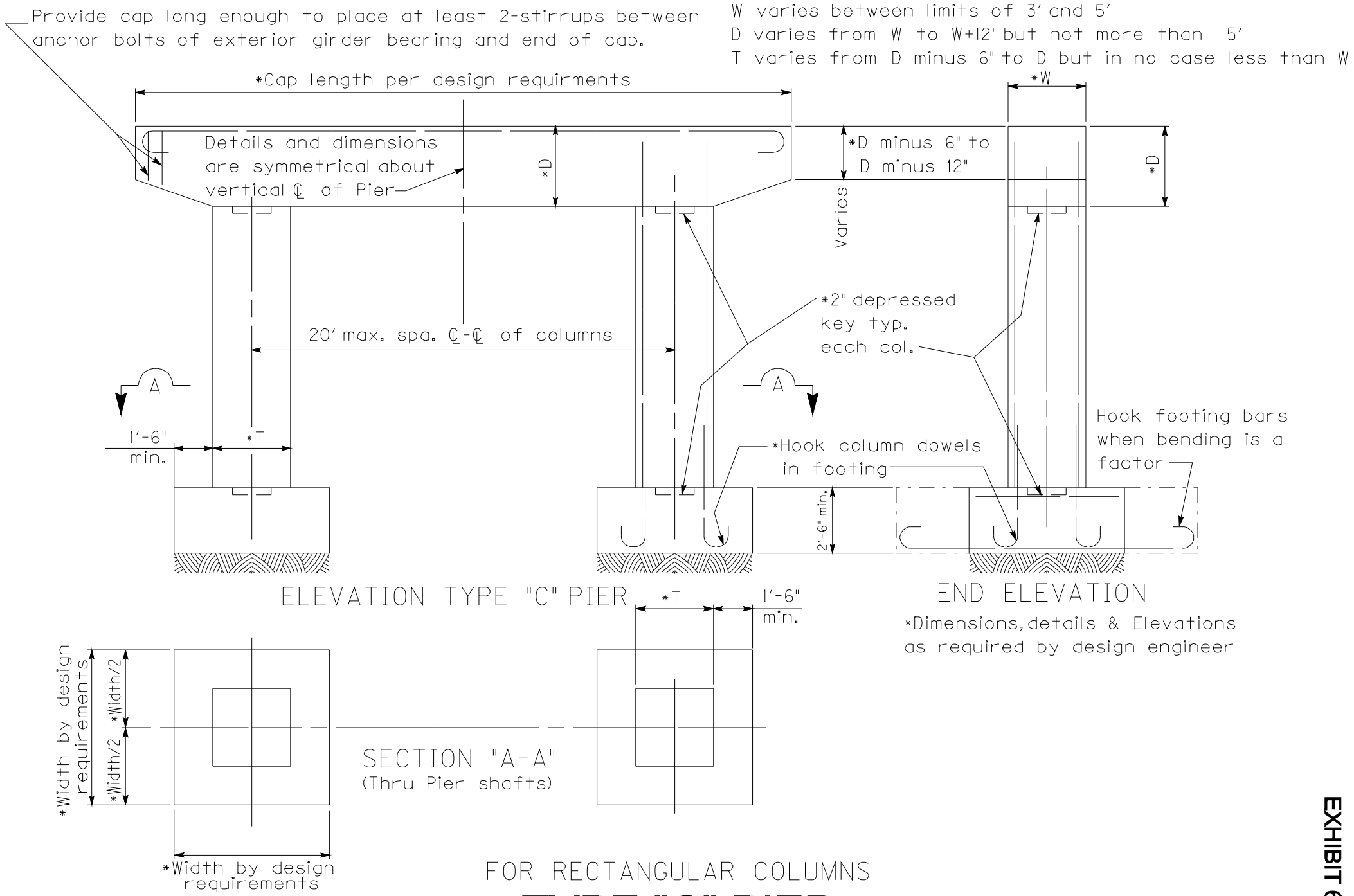




A full four character code word Indicates presence of both webwall and a pile foundation.

METHOD OF CODING BRIDGE PIER TYPES

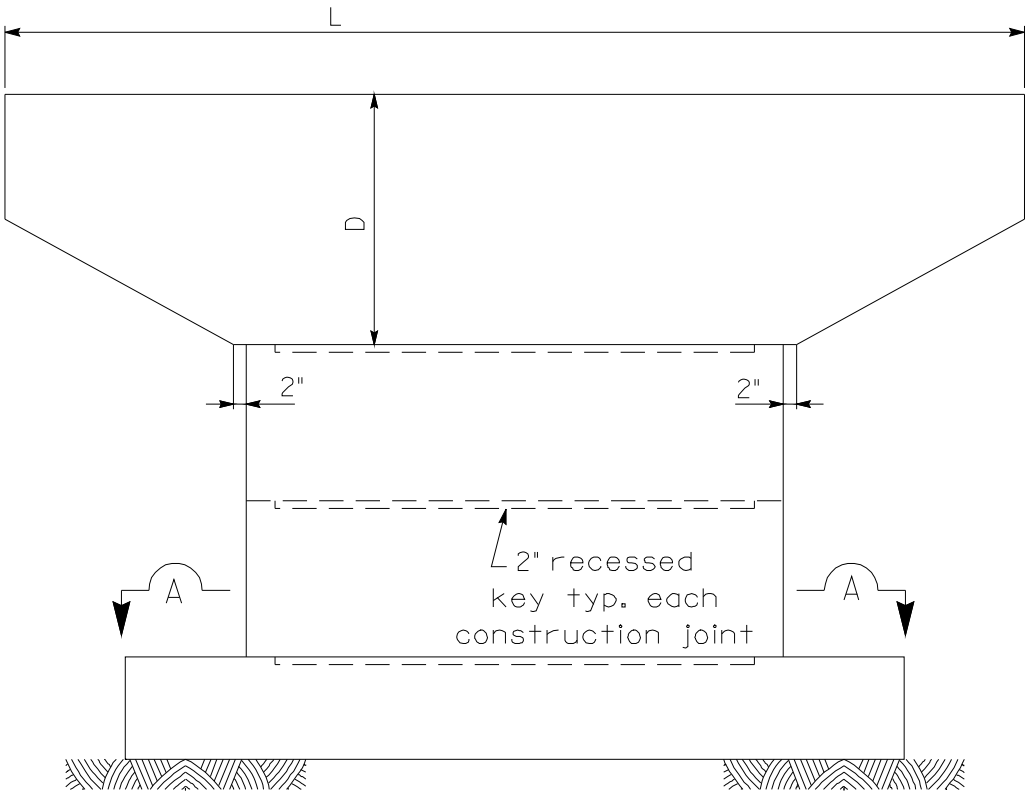
EXHIBIT 604



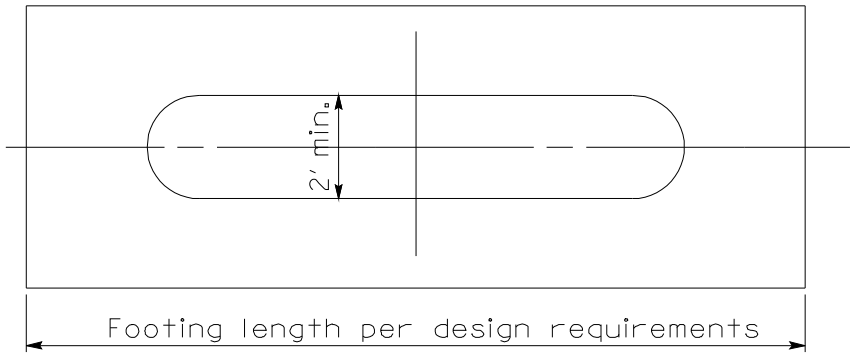
FOR RECTANGULAR COLUMNS

TYPE "C" PIER

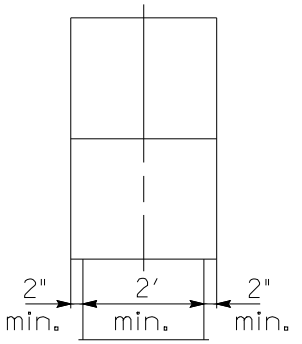
EXHIBIT 605



ELEVATION TYPE "C1" PIER



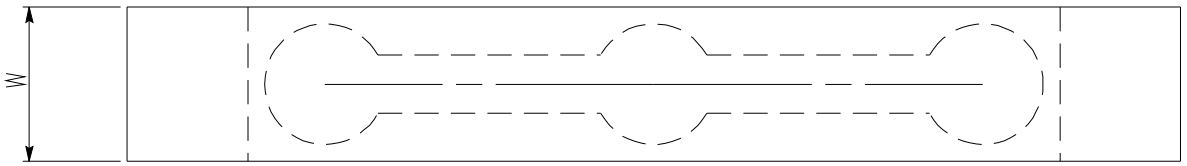
SECTION "A-A"



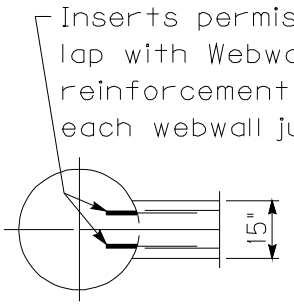
MINIMUM SHAFT
DETAIL

TYPE "C1" PIER

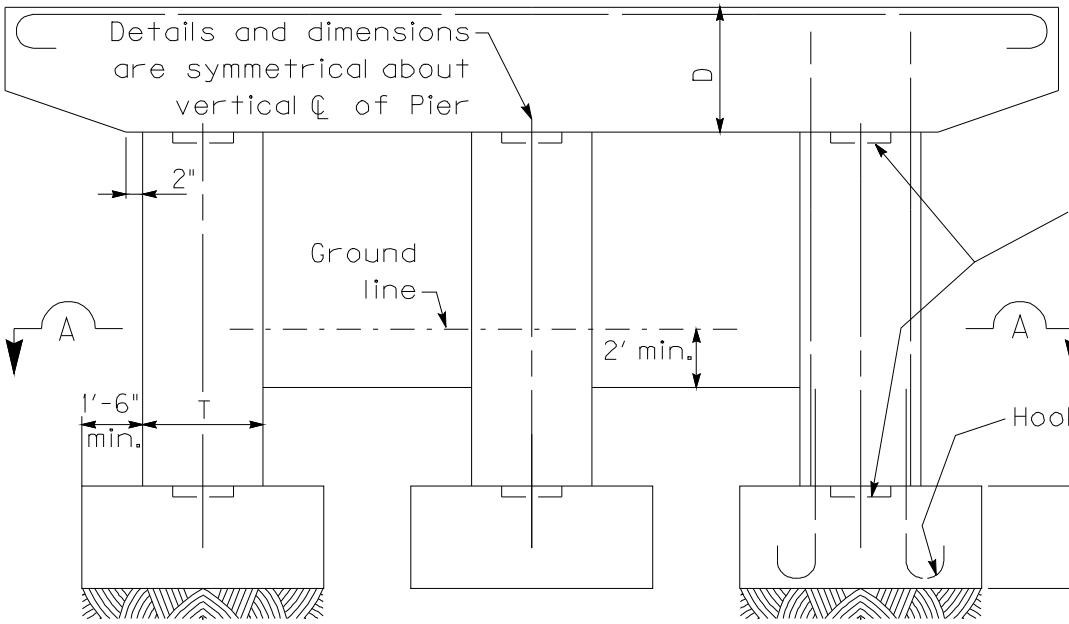
EXHIBIT 606



PLAN OF CAP

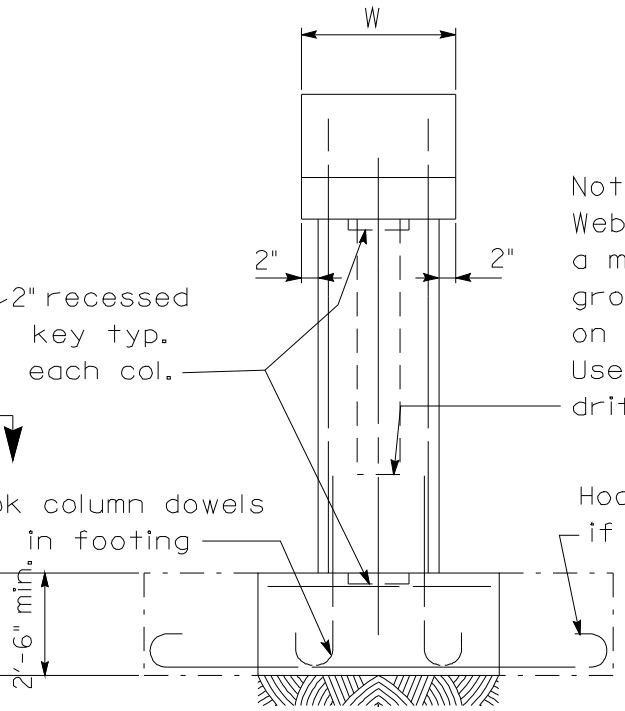


SHAFT-WEBWALL INSERT DETAIL



T= 3' minimum with 6" increments

ELEVATION

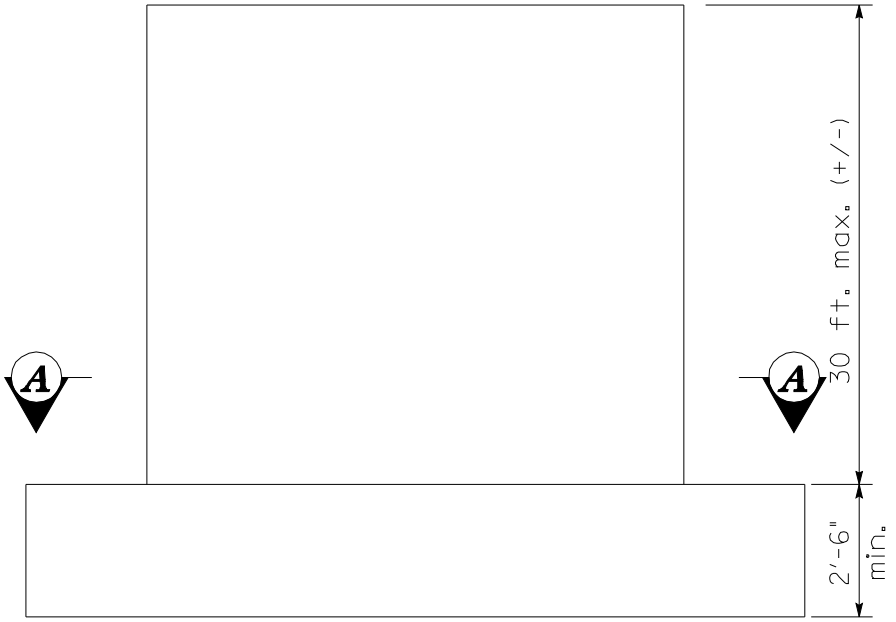


END ELEVATION

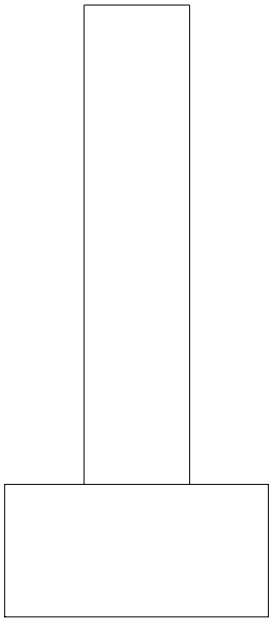
FOR CIRCULAR COLUMNS

TYPE "L" PIER

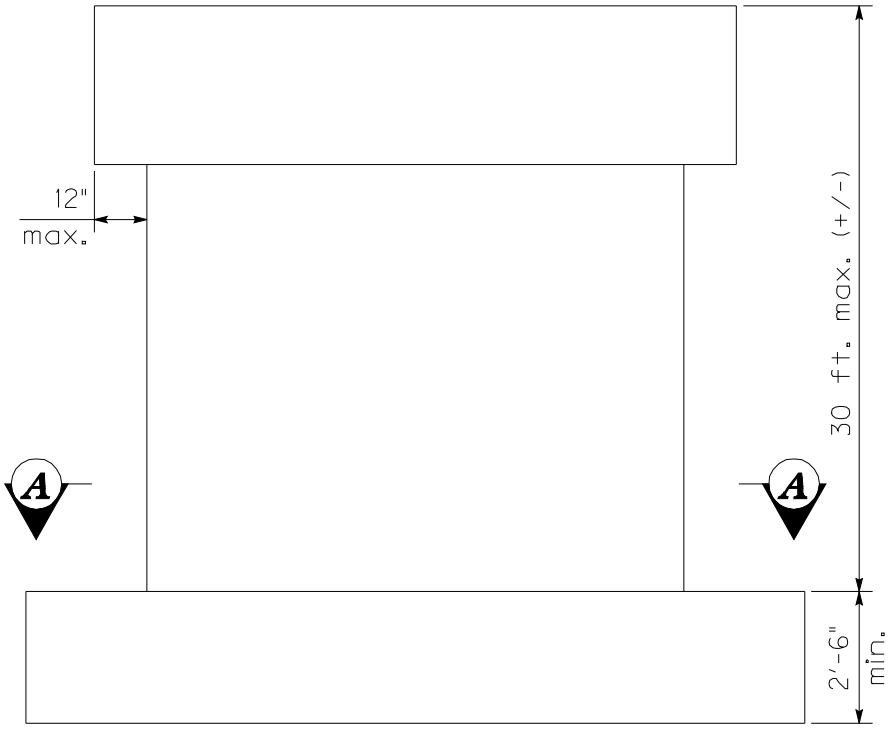
EXHIBIT 609



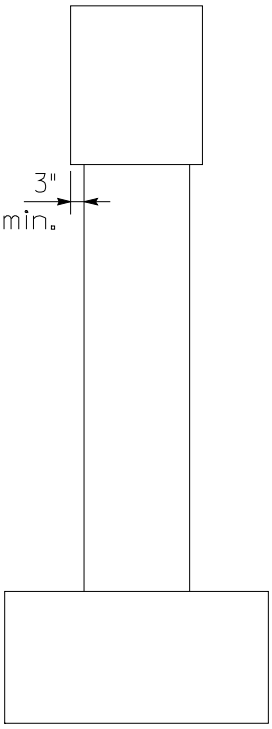
TYPE "N" PIER
~Without Cap~



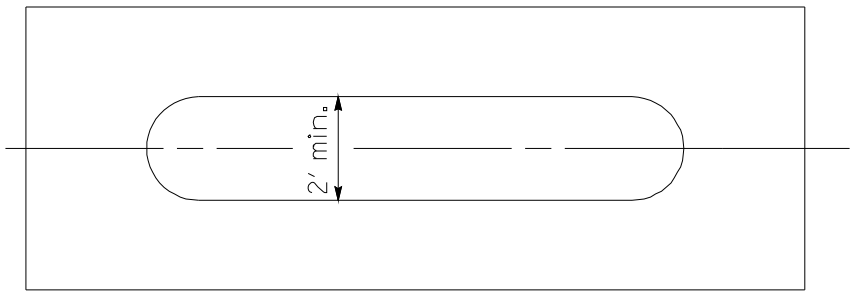
END ELEVATION
~Without Cap~



TYPE "N" PIER
~With Cap~

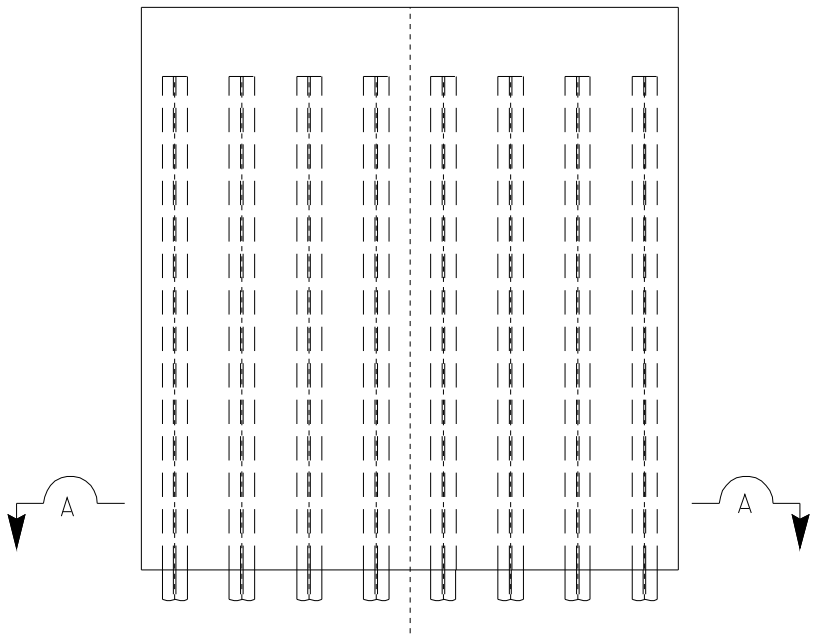


END ELEVATION
~With Cap~

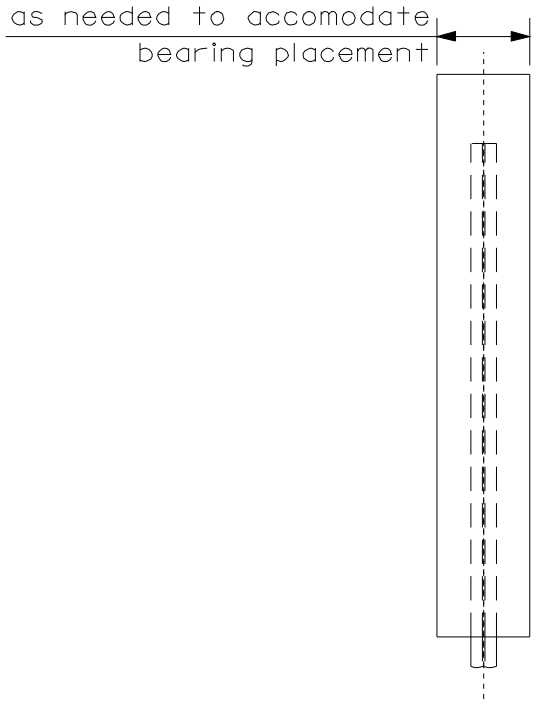


SECTION "A-A"
~Through Pier Shaft~

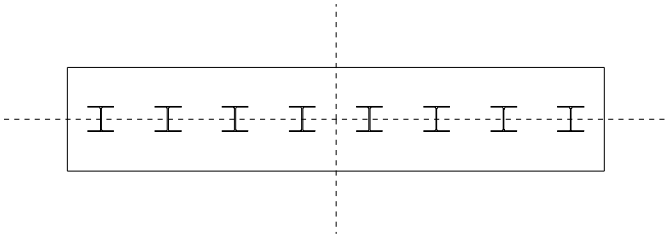
TYPE "N" PIER



ELEVATION



END ELEVATION

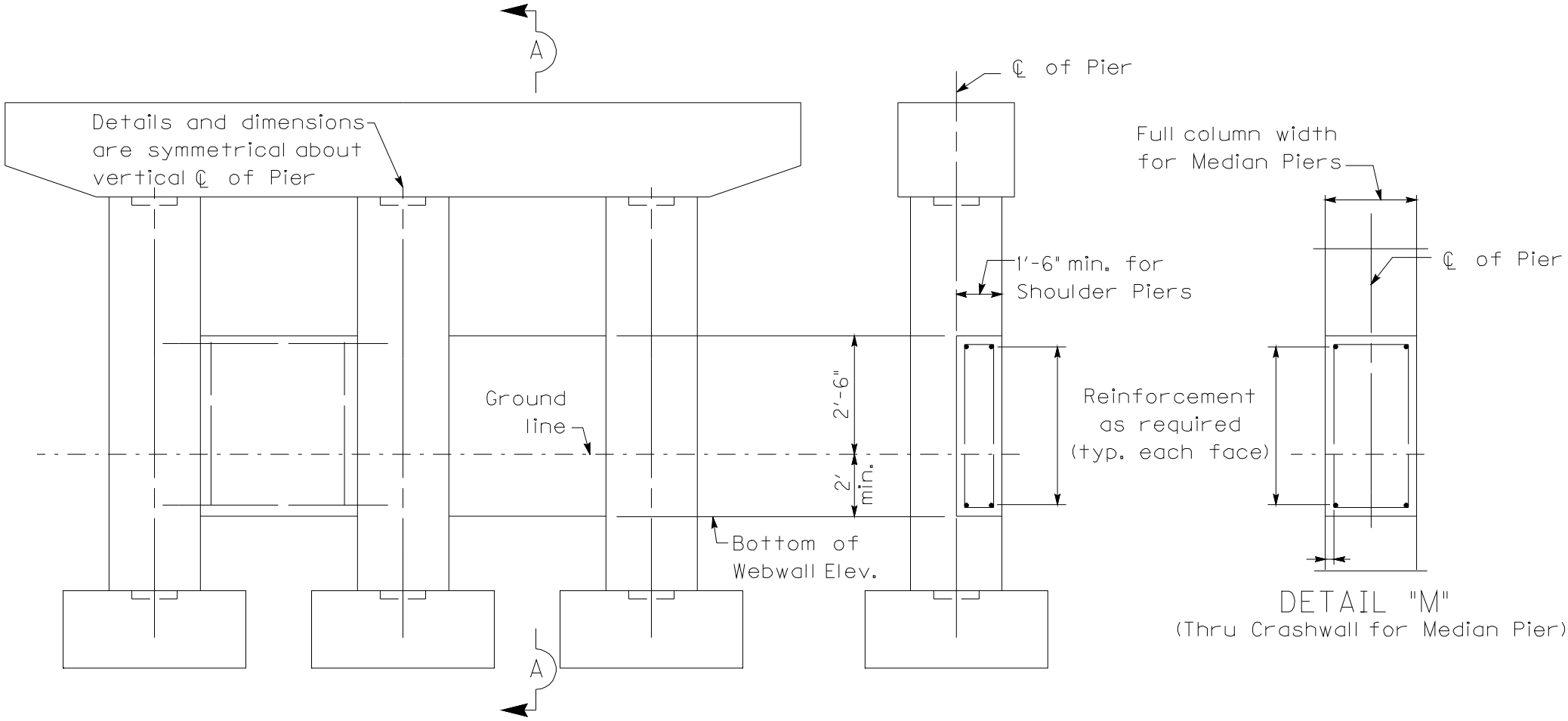


SECTION "A-A"

NOTE: Piles shown are for illustration only.
Use piles of type, spacing, and orientation
as required for design.

TYPE "W" PIER

EXHIBIT 611

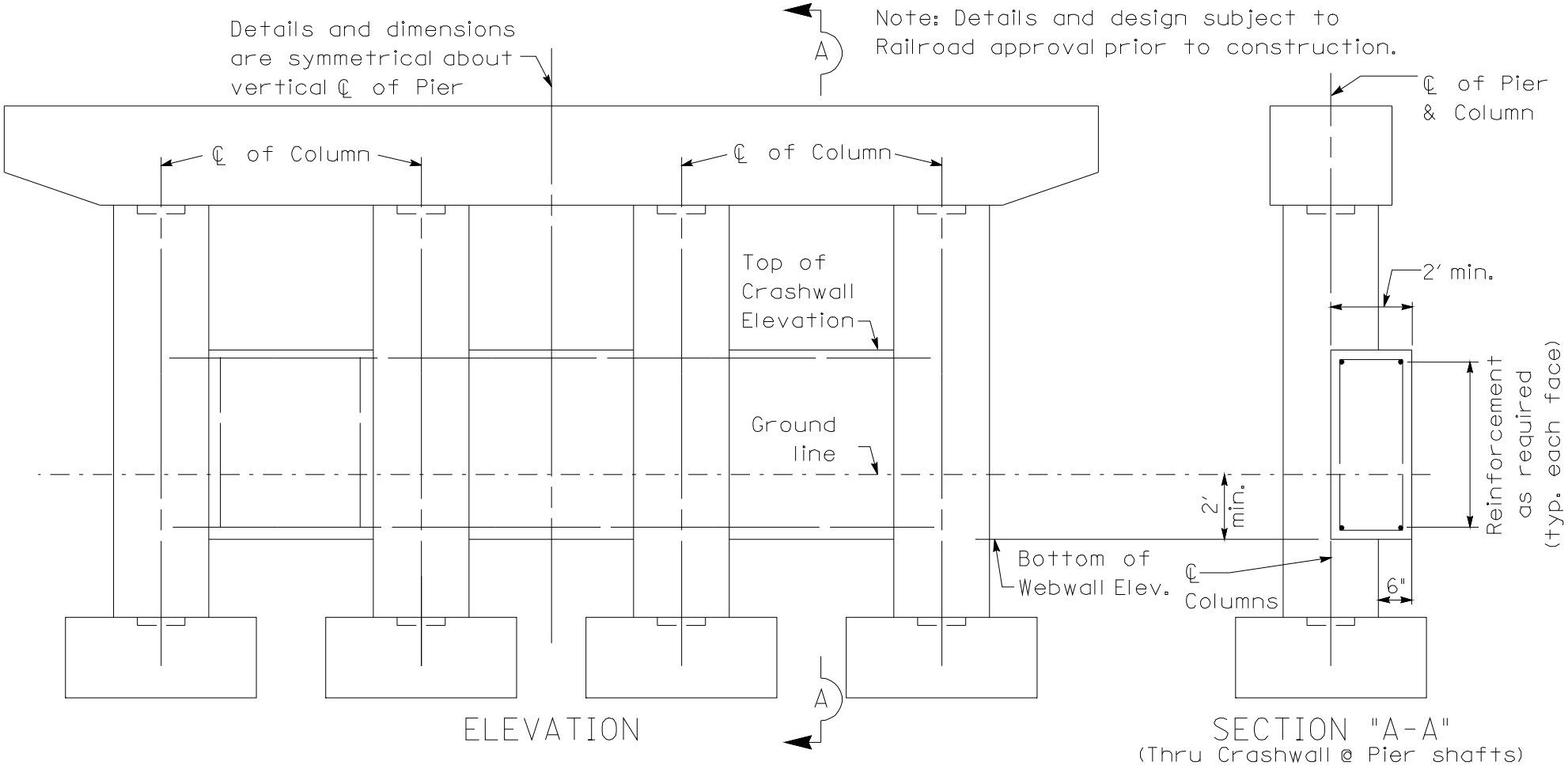


Note: Bottom of Webwall Elevation a minimum 2' below ground line or rest on top of footing.

Note: This detail to be correlated with details shown on Std. Drwg. RBE-065 current edition.

PIER CRASHWALL - HIGHWAY

EXHIBIT 612



Note: Bottom of Webwall Elevation a minimum 2′ below ground line or rest on top of footing.

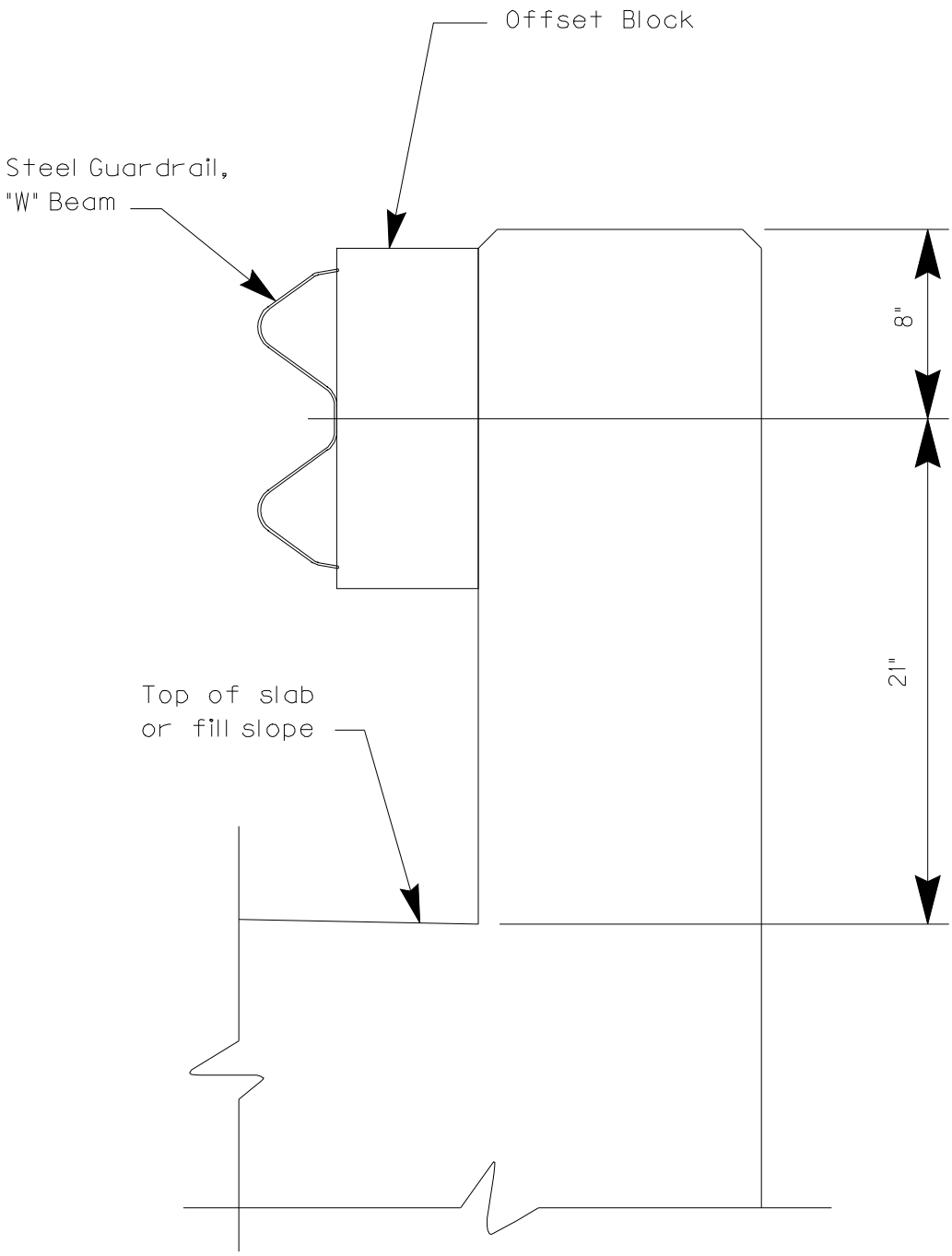
AREA MANUAL FOR RAILWAY ENGINEERING

2.1.5 PIER PROTECTION

Piers supporting bridges over railways and located within 25′ of the centerline of a railroad track shall be of heavy construction or shall be protected by a reinforced concrete crash wall extending to not less than 6′ above top of rail. When two or more light columns compose a pier, a wall at least 2′ thick shall connect the columns. When a pier consists of a single column, it shall be protected by a crash wall parallel to track. The wall shall be at least 2′-6" thick and extend for a distance of at least 6′ from both sides of column. The face of crash walls shall extend a distance of at least 6" beyond the face of column on the side adjacent to the track and shall be anchored to the columns and footings with adequate reinforcement.

PIER CRASHWALL - RAILROAD

EXHIBIT 613



RAILING SYSTEM TYPE I

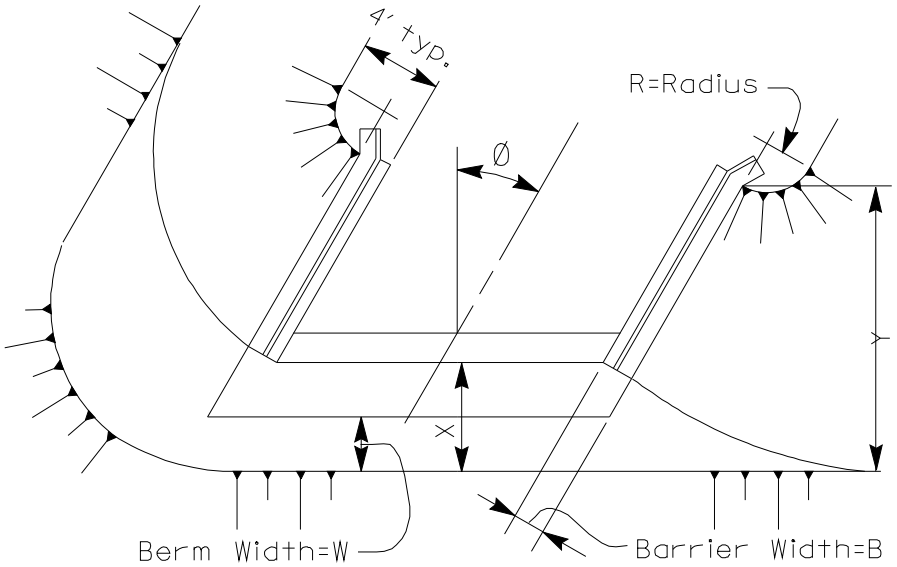


FIGURE 3

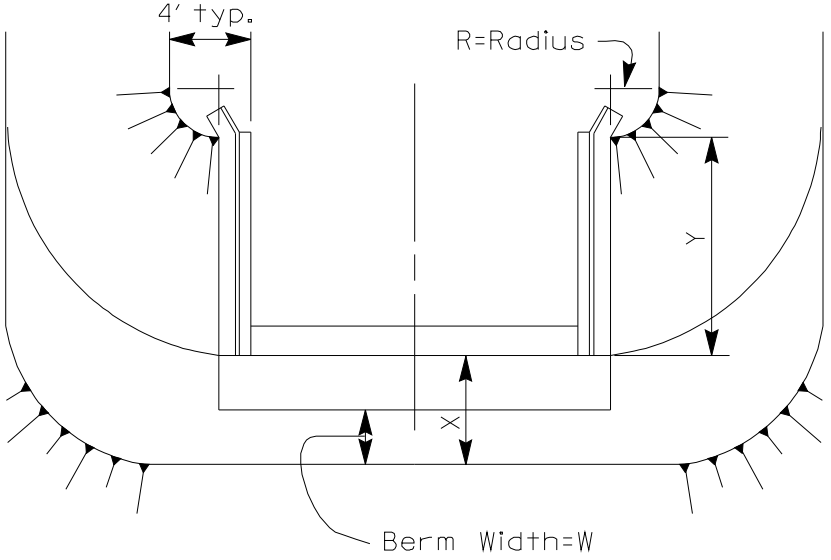


FIGURE 2

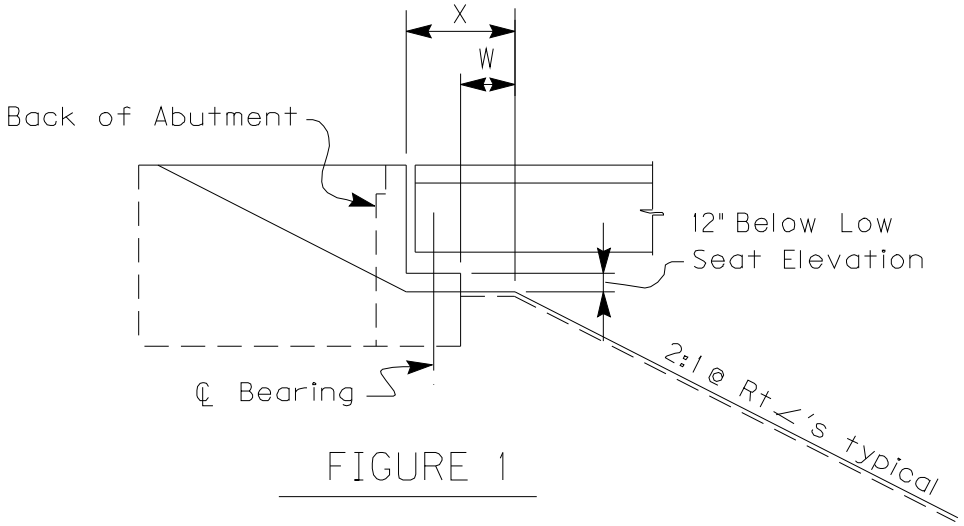
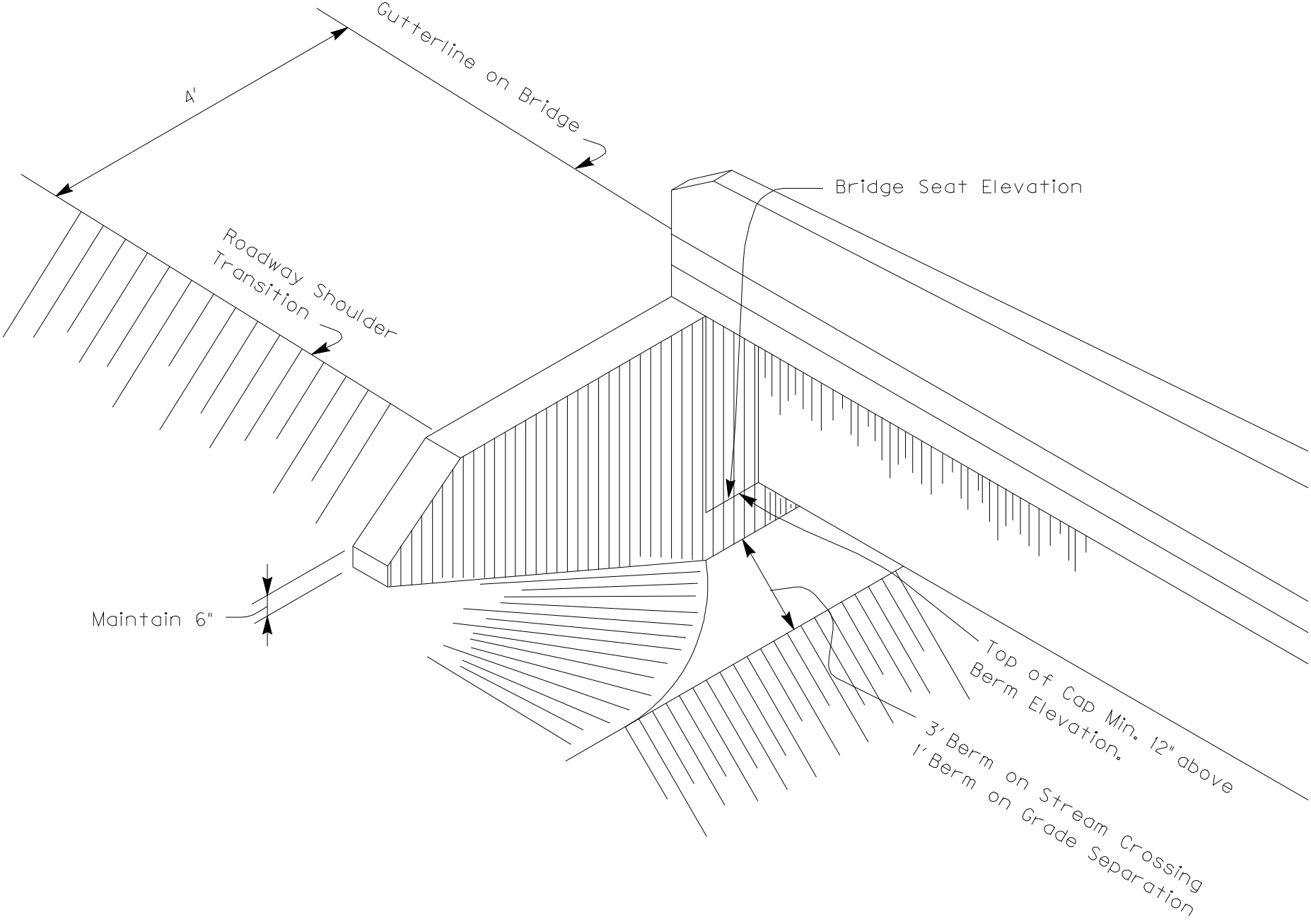


FIGURE 1

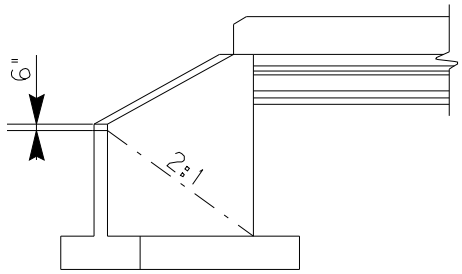
X = W + width of Bridge Seat
Y = 2*[Difference between Shoulder Elevation and Berm Elevation] (for 2:1 slope)
W = 3' on Stream Crossing Structures
W = 1' on Grade Separation Structures

BERM WIDTH DETAILS

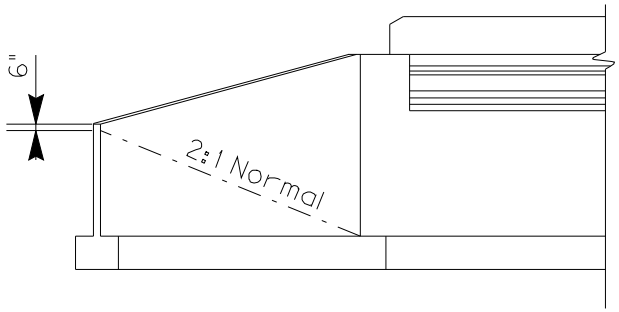
EXHIBIT 615
Sheet 1 of 3



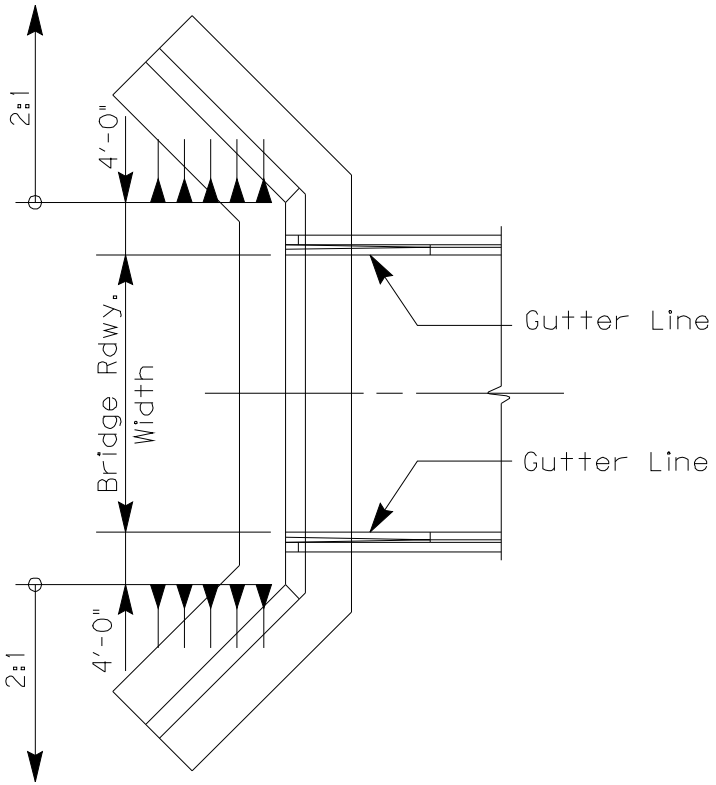
BERM WIDTH DETAILS



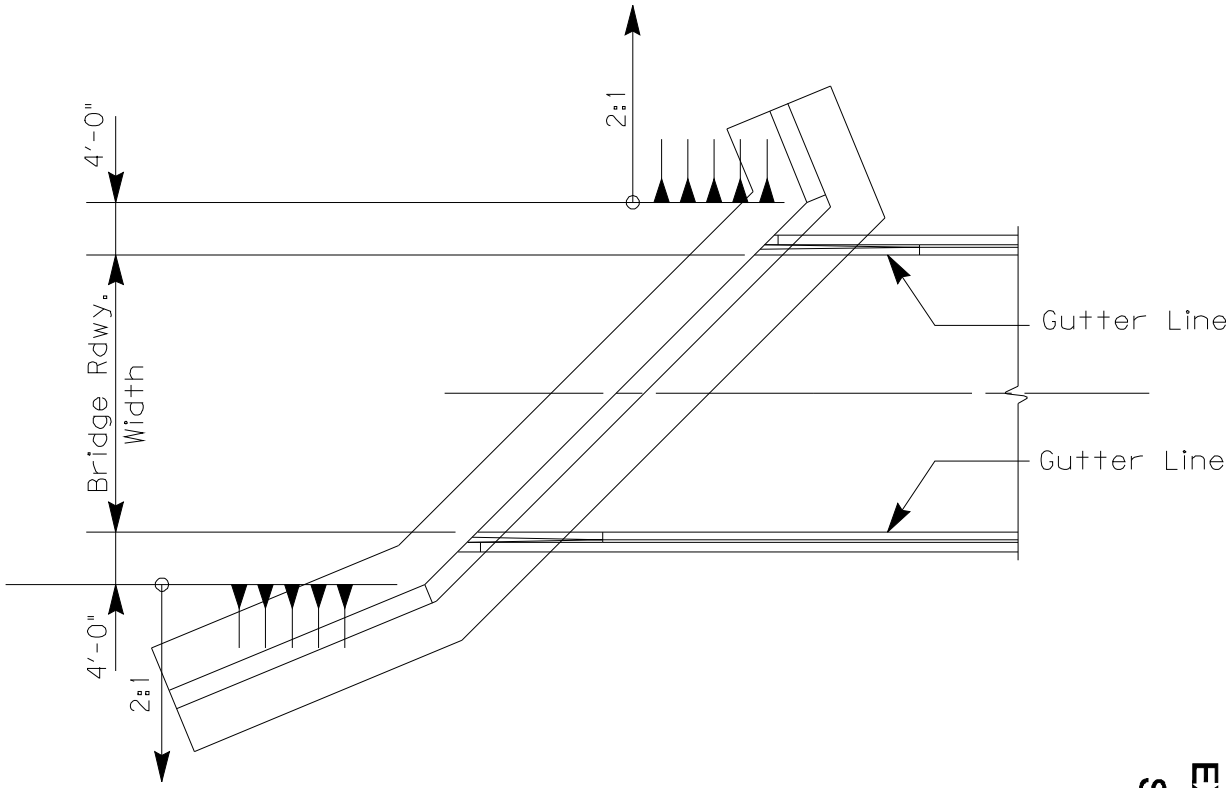
ELEVATION



ELEVATION



PLAN



PLAN

BERM WIDTH DETAILS

EXHIBIT 615
Sheet 3 of 3