

ESTIMATED SHAVER ROAD BRIDGE QUANTITIES

ITEM NO.	ITEM CODE	ITEM	UNIT	TOTAL	AS-BUILD QUANTITY
1	2301-0685550	BRIDGE APPROACH PAVEMENT, AS PER PLAN	SY	169.2	
2	2402-2720000	EXCAVATION, CLASS 20	CY	670 650	△
3	2402-2721000	EXCAVATION, CLASS 21	CY	450 135	
4	2403-0100010	STRUCTURAL CONCRETE (BRIDGE)	CY	1540.1	
5	2403-7303000	STRUCTURAL CONCRETE COATING	SY	630.4	
6	2404-7775000	REINFORCING STEEL	LB	28132	
7	2404-7775005	REINFORCING STEEL, EPOXY COATED	LB	221873	
8	2404-7775009	REINFORCING STEEL, STAINLESS STEEL	LB	10359	
9	2408-7800000	STRUCTURAL STEEL	LB	1325	
10	2414-6425410	CONCRETE BARRIER, REINFORCED, SEPARATION	LF	457.2	
11	2414-6425420	CONCRETE BARRIER, PARAPET	LF	393.3	
12	2414-6445100	STRUCTURAL STEEL PEDESTRIAN HAND RAILING	LF	390.9	
13	2501-0201253	PILES, STEEL, HP 12 X 53	LF	4570	
14	2507-2638610	CONCRETE SLOPE PROTECTION	SY	301	

ITEM NO. ESTIMATE REFERENCE INFORMATION

4 INCLUDES ALL RESILIENT JOINT FILLER AND PREFORMED EXPANSION JOINT FILLER REQUIRED.

INCLUDES MATERIAL AND LABOR ASSOCIATED WITH PROVIDING AND INSTALLING 600 LF OF 2" DIA., 600 LF OF 4" DIA. AND 305 LF OF 6" DIA.
RIGID STEEL CONDUIT AND FITTINGS.

1,045 790 540



INCLUDES PVC WATERSTOP AND ALL MATERIAL REQUIRED TO ATTACH PVC WATERSTOP TO SHEET PILING.

INCLUDES FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), FLOODABLE BACKFILL, POROUS BACKFILL, GEOTEXTILE FABRIC, WATER FLOODING, AND SUBDRAIN OUTLET AT ABUTMENTS AND AT TOE OF SOUTH ABUTMENT CONCRETE SLOPE PROTECTION.

INCLUDES FURNISHING AND PLACING 3 INCH DIAMETER PVC PLASTIC PIPE AND EXPANDING FOAM IN THE SOUTH ABUTMENT WINGS.

INCLUDES FURNISHING AND PLACING CONCRETE SEALER AT FLOOR DRAINS.

INCLUDES COSTS ASSOCIATED WITH CONCRETE MOCKUP PANEL.

9 INCLUDES ABUTMENT BEARING MATERIAL. INCLUDES WEIGHT OF 4 DRAINS AT 61 LBS OF STEEL PER DRAIN.

10, 11 IF PLACEMENT OF CONCRETE IS DONE BY THE SLIPFORMING METHOD, CLASS BR CONCRETE IS REQUIRED. CAST-IN-PLACE BARRIER RAILS SHALL USE CLASS C MIX. PRICE BID FOR THIS ITEM SHALL INCLUDE THE COST OF CAST-IN-PLACE FORMS IF REQUIRED FOR PLACEMENT OF THE CONCRETE.

13 PILING SHALL BE GRADE 50. INCLUDES FURNISHING AND INSTALLING STEEL PILE POINTS.

14 INCLUDES FURNISHING AND PLACING ENGINEERING FABRIC, GRANULAR SUBBASE, REINFORCING STEEL, STRUCTURAL CONCRETE, RESILIENT JOINT FILLER, AND ALL REQUIRED EXCAVATING, SHAPING AND COMPACTING.

ROADWAY QUANTITIES SHOWN ELSEWHERE IN THESE PLANS.

SHEET PILING QUANTITY UNDER BRIDGE ABUTMENTS INCLUDED WITH DIVISION 3 (FLOODWALL) QUANTITIES.

INDEX OF SHAVER ROAD BRIDGE SHEETS

SHEET DESCRIPTIONS	SHEET NUMBER
ESTIMATED QUANTITIES	V.1
SUMMARY QUANTITIES	V.2
GENERAL NOTES	V.3
SITUATION PLAN	V.4
STAKING DIAGRAM	V.5
PIER DETAILS	V.6
SOUTH ABUTMENT DETAILS	V.8
NORTH ABUTMENT DETAILS	V.12
CONCRETE COATING DETAILS	V.15
SUPERSTRUCTURE DETAILS	V.16
TOP OF SLAB ELEVATIONS	V.19
SOUTH ABUTMENT BEARING DETAILS	V.20
CONCRETE PARAPET DETAILS	V.21
SEPARATION BARRIER DETAILS	V.22
PEDESTRIAN RAILING DETAILS	V.24
CONCRETE SLOPE PROTECTION	V.26
SUBDRAIN DETAILS	V.28
ABUTMENT BACKFILL DETAILS	V.29
REINFORCED APPROACH SIDEWALK SLAB	V.30
APPROACH SLAB DETAILS	V.31



STRENGTHENING OUR COMMUNITY

FLOOD CONTROL SYSTEM

1

DATE: APPR.

DESCRIPTION

DATE: APPR.

MARK

1

REVISION #1

DATE: APPR.

MARK

1

REVISION #2

DATE: APPR.

MARK

1

REVISION #3

DATE: APPR.

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REVISION #4

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REVISION #26

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REVISION #27

DATE: APPR.

MARK

1

REVISION #28

DATE: APPR.

MARK

1

REVISION #29

SUMMARY OF CONCRETE QUANTITIES

LOCATION	STRUCTURAL CONCRETE
SOUTH ABUT., WALL, PEDESTALS & SHEAR BLOCKS	19.4
SOUTH ABUT. FTG.	58.3
SOUTH ABUTMENT WINGWALLS	11.5
NORTH ABUT. FTG. + WALL SECTION	128.9
BRIDGE SLAB + S. ABUT. DIAPHRAGM + N. ABUT. DIAPHRAGM	1,056.5
PIER NO. 1	89.0
PIER NO. 2	89.0
SIDEWALK SLAB ON BRIDGE	75.0
APPROACH SIDEWALK SLAB	12.5
TOTAL (CU. YDS.)	1,540.1

SUMMARY OF REINFORCING STEEL

LOCATION	NON-COATED REINFORCING STEEL	EPOXY COATED REINFORCING STEEL	STAINLESS STEEL REINFORCING STEEL
BRIDGE SLAB + SIDEWALK SLAB + S. ABUT. DIAPH. + N. ABUT. WALL	-	208,131	1,916
SOUTH ABUTMENT	7,221	-	-
NORTH ABUTMENT FTG.	5,831	4,202	-
CONCRETE PARAPET RAIL	-	4,206	3,974
SEPARATION BARRIER RAIL	-	4,206	4,357
PIER NO. 1	7,540	-	-
PIER NO. 2	7,540	-	-
APPROACH SIDEWALK SLAB	-	1,128	112
TOTAL (LBS.)	28,132	221,873	10,359

SUMMARY OF EXCAVATION

LOCATION	CLASS 20 EXCAVATION	CLASS 21 EXCAVATION
SOUTH ABUTMENT	210	-
NORTH ABUTMENT	320	-
PIER NO. 1	430- 120	60
PIER NO. 2	40- -	-90- 75
TOTAL (CU. YDS.)	670- 650	450- 135



SUMMARY OF FOUNDATIONS

SUMMARY OF FOUNDATIONS					
LOCATION	SUBSTRUCTURE TYPE	FOUNDATION TYPE	NUMBER	LENGTH (LIN. FT.)	TOTAL (LIN. FT.)
SOUTH ABUTMENT	SEMI-INTEGRAL ABUTMENT	HP 12x53	16	55	880
NORTH ABUTMENT	INTEGRAL ABUTMENT	HP 12x53	30	45	1,350
PIER NO. 1	ENCASED PILE BENT	HP 12x53	18	65	1,170
PIER NO. 2	ENCASED PILE BENT	HP 12x53	18	65	1,170
TOTAL HP 12x53 (LIN. FT.)					4,570

SUMMARY OF STRUCTURAL STEEL

SUMMARY OF BEARINGS

LOCATION	BEARING TYPE	NUMBER	ASSOCIATED BID ITEM
SOUTH ABUTMENT	MASONRY PLATE / LAMINATED NEOPRENE - ASSEMBLY	5	STRUCTURAL STEEL **

* INCLUDES WEIGHT OF SOLE PLATES, KEEPER BARS AND SHEAR CONNECTOR

** LAMINATED PADS ARE INCIDENTAL TO "STRUCTURAL STEEL"

BENCH MARK NO. 50 STA. 17+75.06 37.57' RT PLUG IN WT ELEVATION 734.56

HYDRAULIC DATADRAINAGE AREA = 5.1 SQ. MI.
STREAM SLOPE = 19.5 FT./MI.Q₂ = 1,641 CFS
STAGE = 729.72
AVG. BRIDGE VELOCITY = 4.74 FPSQ₅₀ = 4,964 CFS
STAGE = 733.35
BACKWATER = 0.37 FT.
AVG. BRIDGE VELOCITY = 7.12 FPSQ₁₀₀ = 5,936 CFS
STAGE = 734.20
BACKWATER = 0.45 FT.
AVG. BRIDGE VELOCITY = 7.55 FPS
CALCULATED SCOUR = 716.75Q₅₀₀ = 8,454 CFS
STAGE = 736.17
AVG. BRIDGE VELOCITY = 8.23 FPS
CALCULATED DESIGN SCOUR = 716.65Q₁₀₀₀ = 9,600 CFS
STAGE = 736.93
AVG. BRIDGE VELOCITY = 8.49 FPS
CALCULATED CHECK SCOUR = 716.65Q OVERTOP = N/A
ROADWAY OVERTOP = 741.4
STATION = N/AEXTREME HW STAGE = 741.4
DATE = N/A, DESIGNATED TOP OF FLOOD PROTECTION
AVG. LOW WATER STAGE = 724.95SCOUR VALUES SHOWN APPLY ONLY TO PIERS. NO
SCOUR IS ANTICIPATED AT THE ABUTMENTS AS THE
CHANNEL OUTSIDE THE LOW FLOW CHANNEL IS
DESIGNED TO RESIST SCOUR.BACKWATER CALCULATION COMPLETED AT HEC-RAS
CROSS SECTION 2515STAGE AND VELOCITY FROM HEC-RAS CROSS
SECTION 2451**LOCATION**SHAYER ROAD OVER MCLOUD RUN
T-83N R-7W
SECTION 16
CEDAR RAPIDS SOUTH TOWNSHIP
LINN COUNTY
CITY OF CEDAR RAPIDS
FHWA NO. ?
LATITUDE 41.998417°
LONGITUDE -91.671444°**TRAFFIC ESTIMATE**

2017 AADT 2130 V.P.D.

2037 AADT 2130 V.P.D.

2037 DHV 89 V.P.H.

TRUCKS 8 %

TOTAL DESIGN ESALs N/A

VPC STA. = 18+22.31 VPC ELEV. = 743.57

VPT STA. = 18+21.82 VPT ELEV. = 740.23

VPI STA. = 18+59.81 VPI ELEV. = 742.03

VC = 75'

SHAYER ROAD PROPOSED GRADE

VPC STA. = 62+75.21 VPC ELEV. = 733.02

VPT STA. = 63+50.21 VPT ELEV. = 732.97

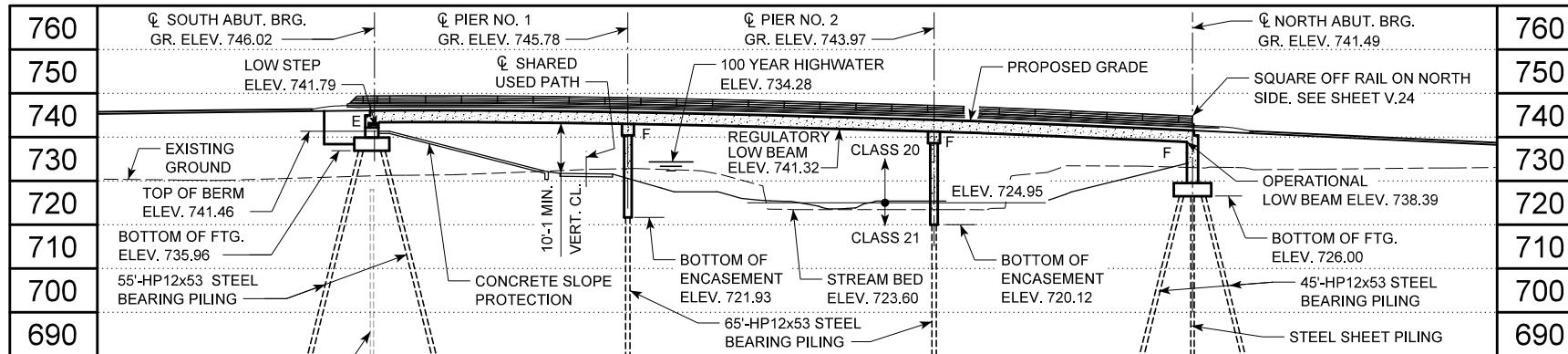
VPI STA. = 63+12.71 VPI ELEV. = 731.22

VC = 75'

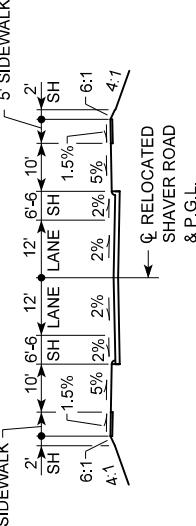
SHEET ID VOL105B
V.4

DESCRIPTION	DATE APPROVED
06/11/2021	06/11/2021

NOTES:
ALL UNITS ARE IN FEET UNLESS NOTED
OTHERWISE.
GRADE ELEVATIONS SHOWN ARE TOP OF
BRIDGE SLAB AT ♀ RELOCATED SHAVER ROAD.
TOP OF BRIDGE SLAB CROWN IS 0.03 FEET
BELOW PROFILE GRADE. SEE CROWN
TEMPLATE ON SHEET V.19.
FOR DETAILS OF STEEL SHEET PILING, SEE
VW SHEETS.

E = EXPANSION BEARING
F = FIXED CONNECTION**BERM SLOPE LOCATION TABLE**

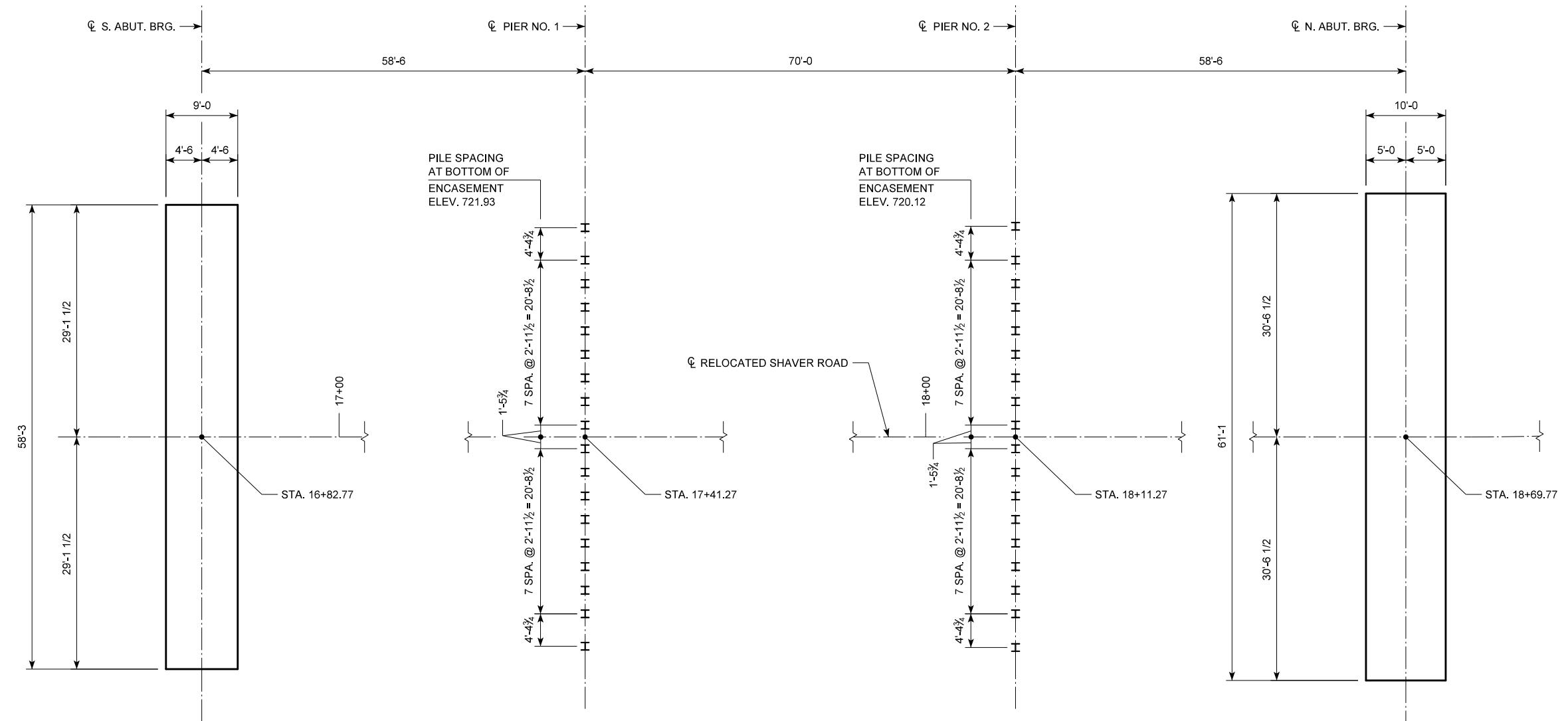
POINTS	STATION	OFFSET	ELEV.
A1	17+22.77	32.13' LT.	733.20
A2	17+22.77	32.13' RT.	733.15
A3	17+22.77	0.00'	732.53
B1	16+87.02	32.13' LT.	741.21
B2	16+87.02	32.13' RT.	741.21
W1	16+71.27	32.13' LT.	746.18
W2	16+71.27	32.13' RT.	746.18

BERM SLOPE ELEVATIONS REFLECT THE
GRADING SURFACE**UTILITIES LEGEND:**

- F01 — FIBER OPTIC - JCN - CITY OF CEDAR RAPIDS
- F03 — FIBER OPTIC - CENTURY LINK
- F07 — FIBER OPTIC - IM ON
- G-C — GAS - MIDAMERICAN ENERGY
- OHE-B — OVERHEAD ELECTRIC - ALLIANT ENERGY
- SS-C — SANITARY SEWER - CITY OF CEDAR RAPIDS
- ST-C — STORM SEWER - CITY OF CEDAR RAPIDS
- W-C — WATER - CITY OF CEDAR RAPIDS

UTILITIES SHOWN ON THIS SHEET ARE FOR
INFORMATION ONLY, SEE ROAD DESIGN SHEETS
FOR FINAL UTILITY INFORMATION.**SITUATION PLAN****SHARED USE TRAIL PROPOSED GRADE**

BENCH MARK NO. 50 STA. 17+75.06, 37.57' RT., PLUG IN WT., ELEVATION 734.56



STAKING DIAGRAM

BRIDGE COORDINATES				
LOCATION	Q. S. ABUT. BRG.	Q. PIER NO. 1	Q. PIER NO. 2	Q. N. ABUT. BRG.
LEFT EDGE OF SLAB	E = 5418271.785 N = 3467744.803	E = 5418252.795 N = 3467800.135	E = 5418230.072 N = 3467866.344	E = 5418211.082 N = 3467921.676
Q. RELOCATED SHAVER ROAD	E = 5418297.836 N = 3467753.743	E = 5418278.845 N = 3467809.075	E = 5418256.122 N = 3467875.284	E = 5418237.132 N = 3467930.616
RIGHT EDGE OF SLAB	E = 5418323.886 N = 3467762.684	E = 5418304.896 N = 3467818.016	E = 5418282.172 N = 3467884.225	E = 5418263.182 N = 3467939.557

NOTE:
THE CONTRACTOR SHALL VERIFY THESE COORDINATES WITH THE PROJECT HORIZONTAL CONTROL INFORMATION PROVIDED IN THE ROAD PLANS.

BENCH MARK NO. 50 STA. 17+75.06, 37.57' RT., PLUG IN WT., ELEVATION 734.56



PIER PILE NOTES:

THE CONTRACT LENGTH OF 65 FEET FOR THE PIER PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 202 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL AND 0.7 FOR ROCK END BEARING. THE NOMINAL AXIAL BEARING RESISTANCE FOR

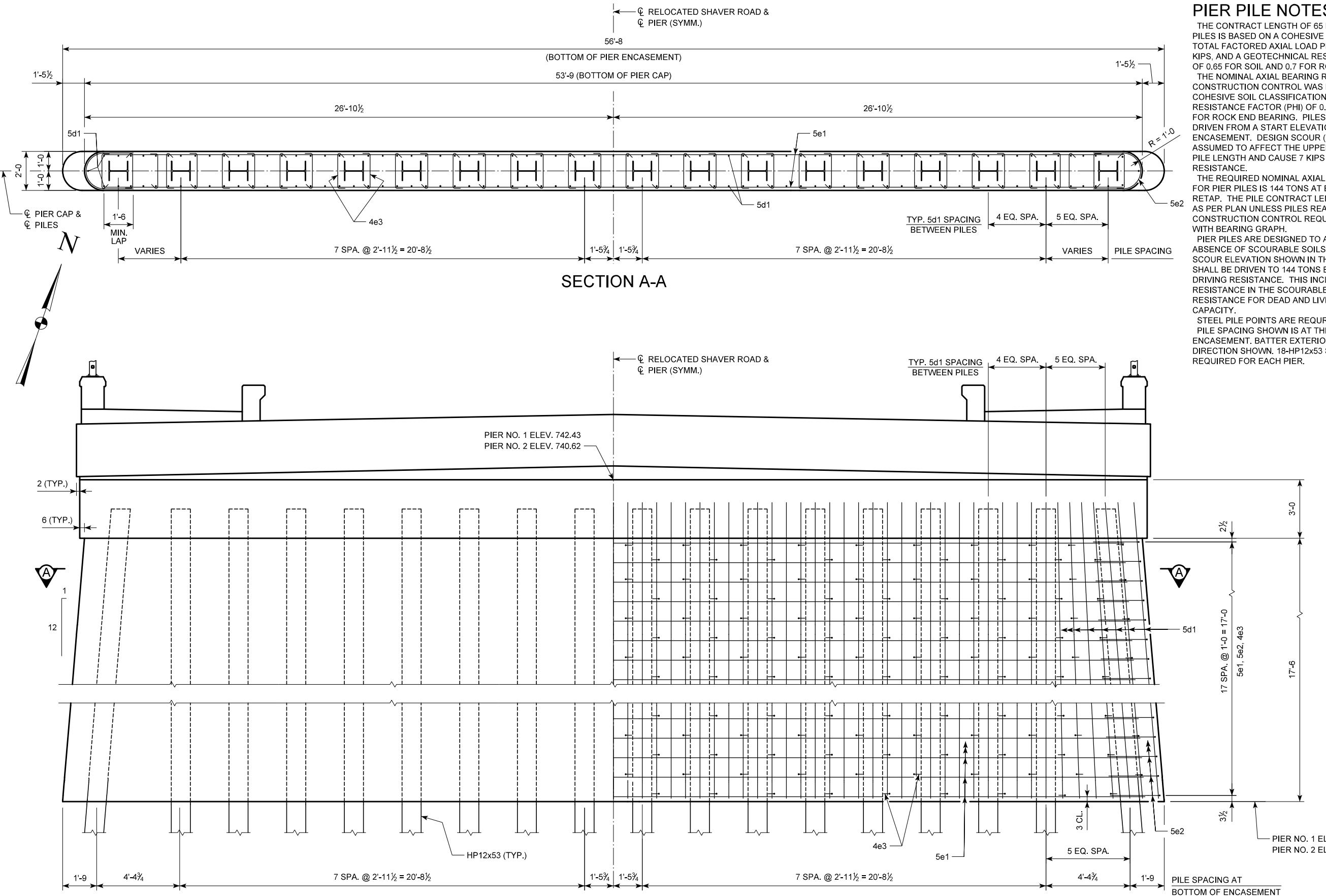
THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.76 FOR SOIL AND 0.7 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF ENCASEMENT. DESIGN SCOUR (500-YEAR) WAS ASSUMED TO AFFECT THE UPPER 5 FEET OF EMBEDDED PILE LENGTH AND CAUSE 7 KIPS OF DRIVING RESISTANCE.

THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR PIER PILES IS 144 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

PIER PILES ARE DESIGNED TO ACCOMMODATE THE ABSENCE OF SCOURABLE SOILS ABOVE THE 500 YEAR SCOUR ELEVATION SHOWN IN THESE PLANS. PILES SHALL BE DRIVEN TO 144 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 4 TONS OF RESISTANCE IN THE SCOURABLE LAYERS, AND 140 TONS RESISTANCE FOR DEAD AND LIVE LOAD BEARING CAPACITY.

STEEL PILE POINTS ARE REQUIRED FOR STEEL H-PILES.
PILE SPACING SHOWN IS AT THE BOTTOM OF
ENCASEMENT. BATTER EXTERIOR PILES 1:12 IN
DIRECTION SHOWN. 18-HP12x53 STEEL BEARING PILING
REQUIRED FOR EACH PIER.

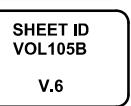
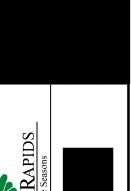
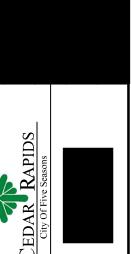
SECTION A-A

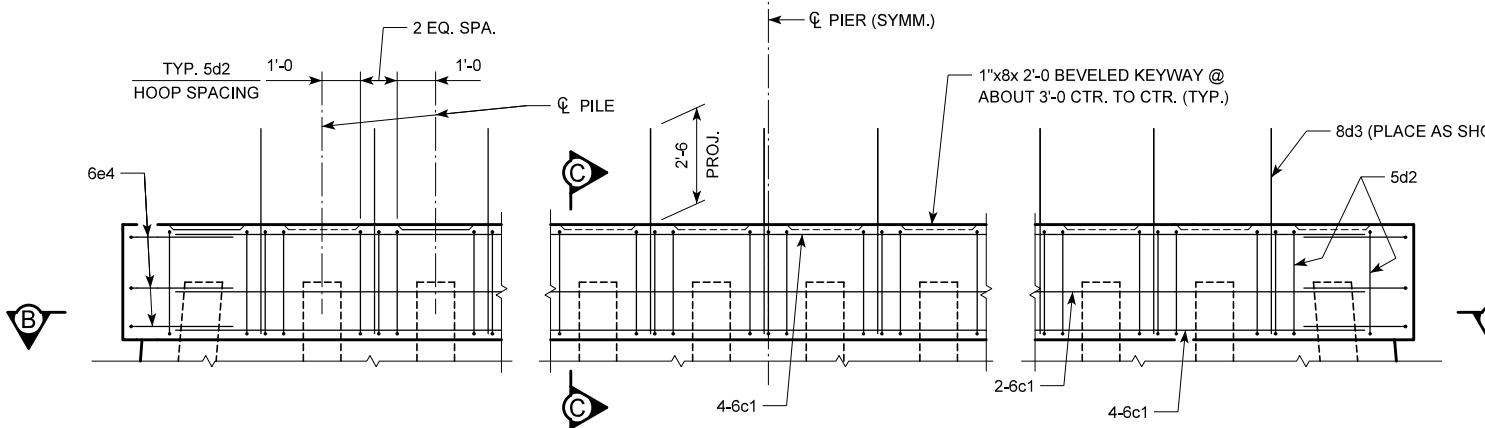
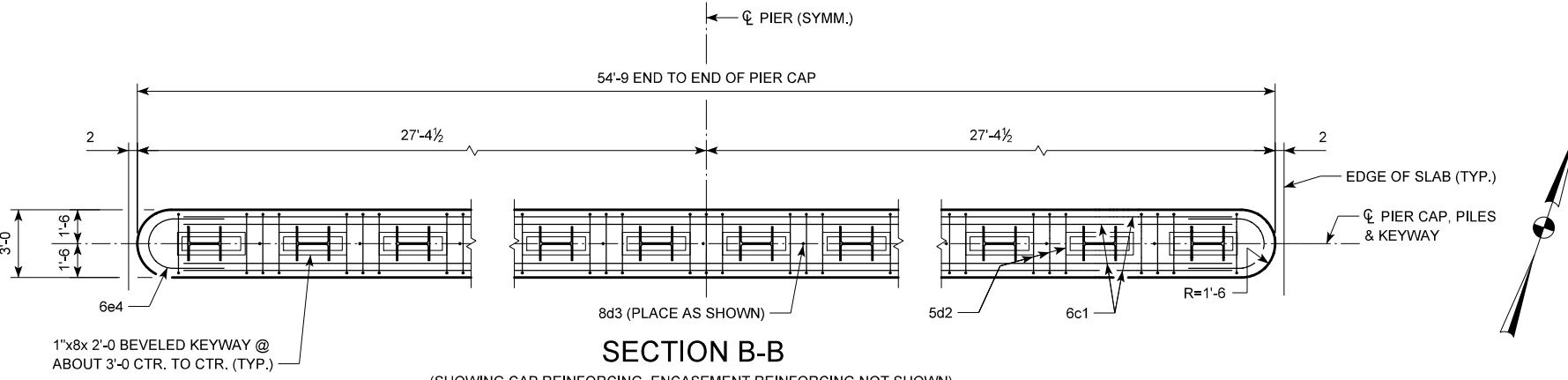


PIER ELEVATION
(LOOKING UPSTATION)
(PIER CAP REINFORCING NOT SHOWN)

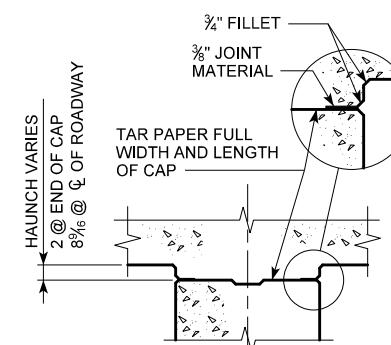
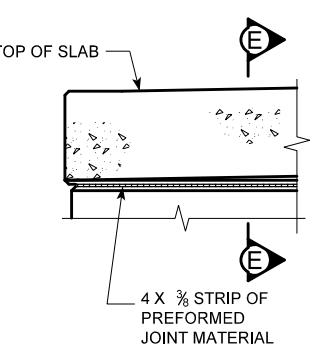
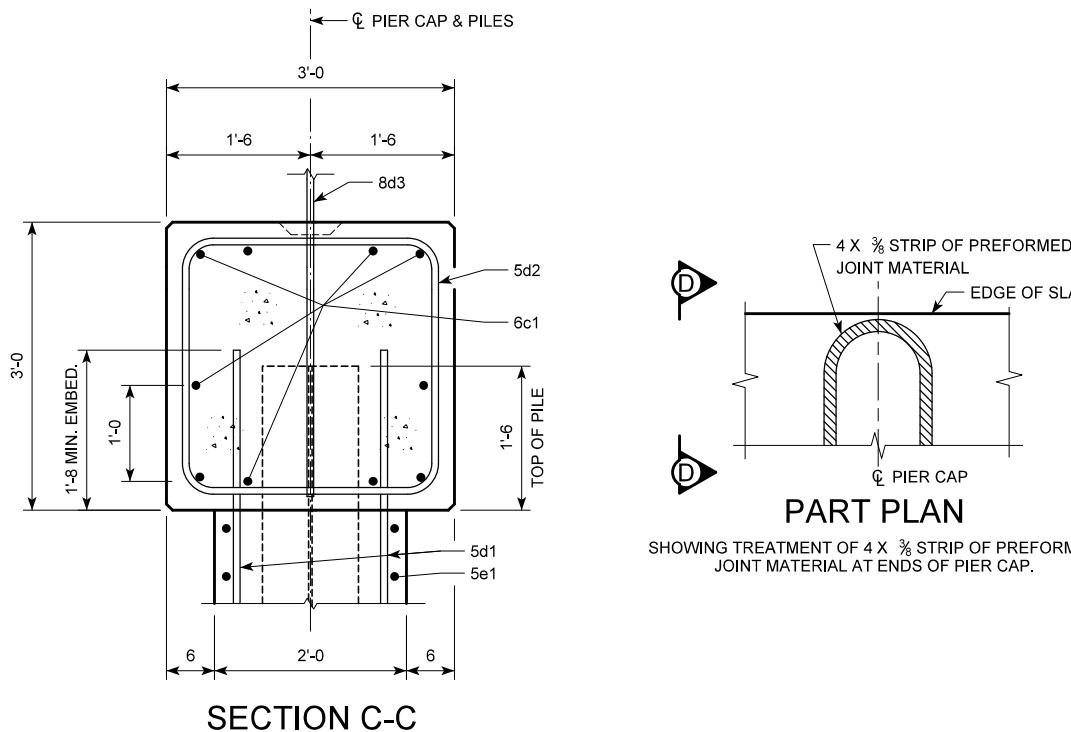
PIER NOTES:

THE MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.





NOTE:
FOR PIER NOTES, SEE SHEET V.6.



REINFORCING BAR LIST - ONE PIER					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6c1	CAP, LONGITUDINAL	—	10	51'-9	777
5d1	ENCASING, VERTICAL	—	148	18'-11	2,920
5d2	CAP, HOOPS	□	53	11'-8	645
8d3	CAP TO SLAB DOWEL	—	17	5'-4	242
5e1	ENCASING, HORIZONTAL	—	36	51'-9	1,943
5e2	ENCASING, END, HORIZONTAL	□	36	10'-0	375
4e3	ENCASING, TIES	□	342	2'-5	552
6e4	CAP, END, HORIZONTAL	□	6	9'-6	86
NON-COATED REINFORCING STEEL - TOTAL (LBS.)					7,540

BENT BAR DETAILS					
5d2	D=2 1/2	2'-8	2'-8	6	6
5e2	D=1 6 3/4	1'-8	3'-8	2 7/8	2 7/8
4e3	D=2	4 1/2	1'-8	4 1/2	4 1/2
6e4	D=2 6 1/2	2'-8	2'-8	4 1/2	4 1/2

NOTE:
ALL DIMENSIONS ARE OUT TO OUT. D=PIN DIAMETER.

CONCRETE PLACEMENT QUANTITIES	
LOCATION	QUANTITY (EACH PIER)
CAP	18.0
ENCASING	71.0
TOTAL (CU. YDS.)	89.0

NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.

CEDAR RAPIDS FLOOD CONTROL SYSTEM	
SHAVER ROAD NE BRIDGE AND LEODWALL	
CONSTRUCTION	
CEDAR RIVER BASIN - CEDAR RIVER	
CEDAR RAPIDS, IOWA	
SHAVER ROAD BRIDGE	
PIER DETAILS	
CITY OF Cedar Rapids	
SHEET ID	VOL105B
DATE	V.7

1

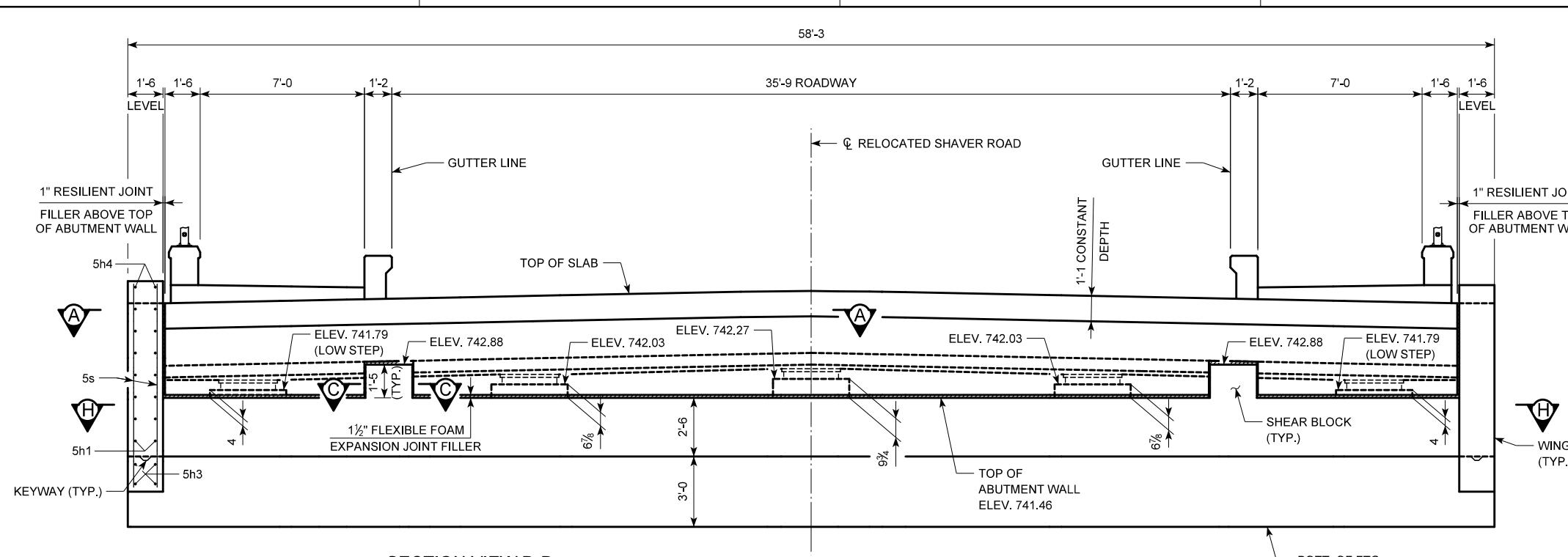
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4

5

BENCH MARK NO. 50 STA. 17+75.06, 37.57' RT., PLUG IN WT., ELEVATION 734.56

**SOUTH ABUTMENT NOTES:**

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.
CONSTRUCTION JOINT KEYWAYS ARE TO BE FORMED WITH BEVELED 2x6's UNLESS NOTED OTHERWISE.

ALL FORMWORK BETWEEN TOP OF ABUTMENT WALL AND ABUTMENT DIAPHRAGM AND ON THE BACK FACE OF PEDESTALS SHALL BE REMOVED.

** VERTICAL BUTYL RUBBER MEMBRANES SHALL BE PLACED AFTER HORIZONTAL BUTYL RUBBER MEMBRANE. VERTICAL MEMBRANE SHALL EXTEND FROM BOTTOM OF APPROACH SLAB NOTCH TO 1 1/2" JOINT.

MEMBRANE SHALL BE CENTERED ABOUT VERTICAL JOINT AND FASTENED TO BOTH CONCRETE FACES WITH AN APPROVED WATERPROOF ADHESIVE. SEE ABUTMENT BACKFILL DETAILS SHEET FOR LOOP DETAIL. RESILIENT JOINT FILLER AND PVC WATERSTOP MATERIAL SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)".

FOR SECTION C-C, TYPICAL SECTION THROUGH ABUTMENT AND SECTION THROUGH ABUTMENT AT SHEAR BLOCK, SEE SHEET V.9.
FOR VIEW E-E AND SECTION H-H SEE SHEET V.10.

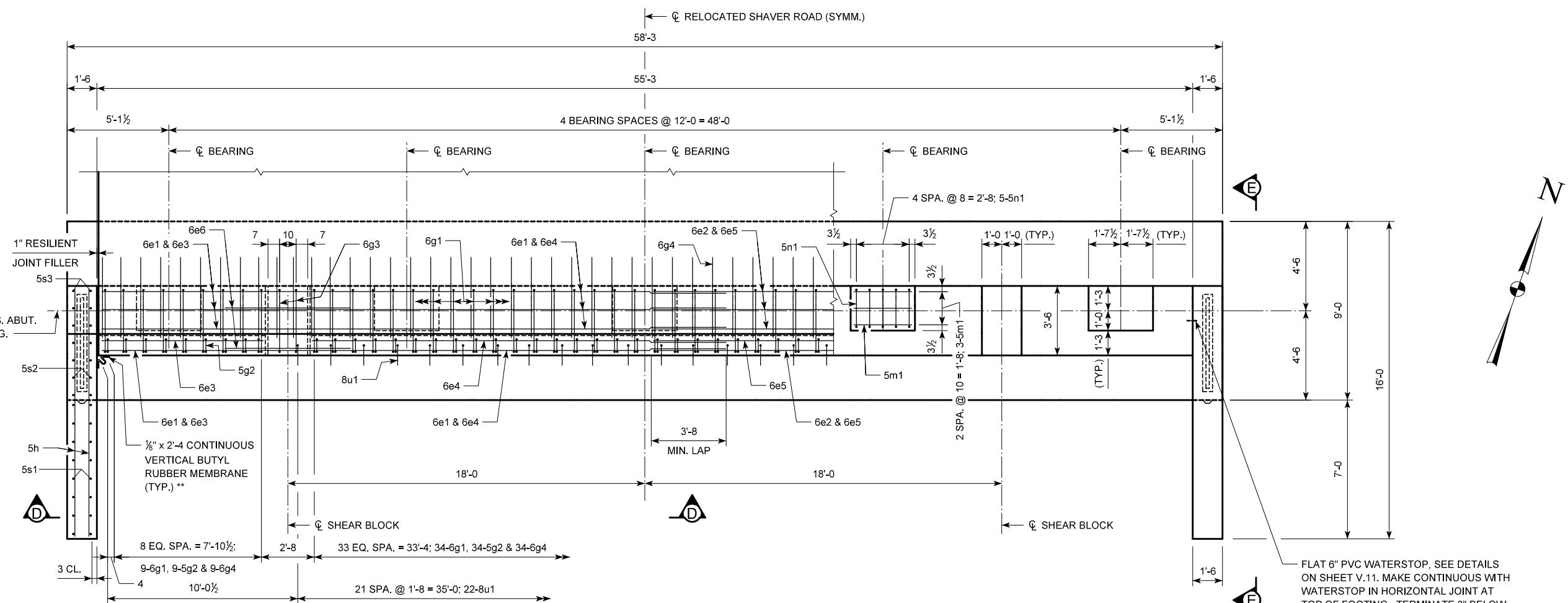
C

B

A

PART SECTION A-A
THROUGH DIAPHRAGM
(SLAB REINFORCING NOT SHOWN)

PART PLAN VIEW
OF ABUTMENT WALL



TOP OF SHEATH
BLOCK

This technical drawing shows a detailed cross-section of a concrete slab foundation wall. The slab thickness varies from 8 inches at the top to 3 inches at the bottom. Reinforcement includes 8u1 bars at the top, 6e1 & 6e2 bars in the shear block, and 6g1 through 6g4 bars in the slab. A horizontal butyl rubber membrane is applied with a 1/8" overlap. A flat PVC waterstop is installed at the bottom. The wall features a roughened constant joint and a stepped base. Foundation piles are shown at the bottom.

1'-1 CONSTANT DEPTH

1" CHAMFER

8u1

1/8" RADIUS

TOP OF SLAB

VARIABLES

TOP OF SHEAR BLOCK

6e1 & 6e2

6e3, 6e4 & 6e5

5g2

SLAB REINFORCING

2-8

3

2-6

1-0 = 2-0
2 SPA. @

** 1/8" x 2'-4
HORIZONTAL
BUTYL RUBBER
MEMBRANE

1'-0

3

1'-0

3-0

1"-CL

1'-4 MIN.

STEP

6

5m1

5n1

6a1

6d1

6d2

6f1

6f3

3 CL.

7f2

6f4

TOP OF PILE

1'-0

ROUGHENED CONST. JT.

FLAT 6" PVC
WATERSTOP ***,
SEE DETAILS ON
SHEET V.11.

1

6

HP12x53 (TYPE)

1'-6

3'-0

3'-0

1'-6

9'-0

TYPICAL SECTION THROUGH ABUTMENT

NOTES:
FOR LOCATION OF SECTION C-C , SEE SHEET V.8.
** HORIZONTAL BUTYL RUBBER MEMBRANE SHALL BE
CENTERED AND FASTENED TO THE CONCRETE ON BOTH
SIDES OF THE JOINT WITH AN APPROVED WATERPROOF
ADHESIVE.
*** FLAT 6" PVC WATERSTOP IN HORIZONTAL CONST. JT.
SHALL EXTEND FROM END TO END OF ABUTMENT FOOTING.
FLAT 6" PVC WATERSTOP IN VERTICAL CONST. JT. BETWEEN
ABUTMENT WALL AND WINGS SHALL TEE INTO AND BE
MADE CONTINUOUS WITH HORIZONTAL WATERSTOP TO
PROVIDE A WATERTIGHT SEAL.

This technical diagram illustrates the cross-section of a concrete wall foundation joint. The top part shows a vertical concrete wall with a horizontal joint at the bottom. A horizontal line labeled "TOP OF ABUTMENT WALL" marks the top of the wall. A dashed horizontal line labeled "LIMITS OF ADHESIVE" indicates the width of the adhesive application. A dimension line above the wall specifies a minimum width of "1'-0 (MIN.)". A callout arrow points to the top of the wall with the label "TOP OF ABUTMENT WALL". Another callout arrow points to the dashed line with the label "LIMITS OF ADHESIVE". The bottom part of the diagram shows a cross-section of the joint. It features a "1" (TYP.) thick horizontal layer of "1/8" BUTYL RUBBER MEMBRANE (LAYER 1) (TYP.). Above this is a "1/8" BUTYL RUBBER MEMBRANE (LAYER 2). A callout arrow points to this upper membrane with the label "1/8" BUTYL RUBBER MEMBRANE (LAYER 2). FASTEN TO ABUTMENT DIAPHRAGM ONLY WITH APPROVED WATERPROOF ADHESIVE." The diagram also includes labels "C SHEAR BLOCK" and "VIEW C-C" at the top and bottom respectively.

VIEW G-G

** $\frac{1}{8}$ " x 2'-4 HORIZONTAL
BUTYL RUBBER MEMBRANE
(LAYER 1) (TYP.)

IEW G-G

SECTION THROUGH ABUTMENT AT SHEAR BLOCK

(BUTYL RUBBER MEMBRANES AND SHEAR BLOCK REINFORCING NOT SHOWN FOR CLARITY)

This technical drawing illustrates a cross-section of a concrete wall with various dimensions and reinforcement details. The wall height is 3'-6". The top horizontal distance from the base to the top of the slab is 1'-1". The distance between the top of the slab and the top of the shear block is 1'-2". The distance from the top of the shear block to the bottom of the wall is 1'-3". A vertical dimension line indicates a height of 7" from the top of the slab down to the center of a circular hole. The thickness of the wall varies, with a minimum thickness of 1 1/2" (min) and a maximum thickness of 2" (max) at the base. A 1" chamfer is shown at the top edge. Reinforcement bars are indicated: 8u1 at the top, 6e6 and 6e2 near the base, and 6g3 in the slab. The drawing also shows the 'TOP OF SHEAR BLOCK' and 'SLAB REINFORCING (TYP.)'. A note specifies '1 1/2" (MIN), 2" (MAX) FLEXIBLE FOAM EXPANSION JOINT FILLER'.

This technical diagram illustrates a cross-section of a foundation system, specifically a shear block, used in bridge construction. The diagram shows a vertical cross-section with various layers and dimensions:

- Top Layer:** A horizontal line labeled "SHEAR BLOCK" with a dimension of "2'-0".
- Resilient Joint Filler:** A layer labeled "½" RESILIENT JOINT FILLER (TYP.)" with a thickness of "½".
- Expansion Joint Filler:** A layer labeled "FOAM EXPANSION JOINT FILLER" with a thickness of "1½" (MIN.), 2" (MAX.).
- Reinforcement:** A central vertical column labeled "5m2" at the top and "5n3 (PLACE AS SHOWN)" below it.
- Bottom Layer:** A horizontal line labeled "TOP OF ABUTMENT WALL" with a dimension of "3 EQ. SPA.".
- Foundation:** A base layer labeled "5n2".
- Side Labels:** On the left side, there are two labels: "1-10 MIN." above a "FLEXIBLE FOAM" layer, and "1½" FLEXIBLE FOAM" below it. The "FLEXIBLE FOAM" label also includes the text "EXPANSION JOINT FILLER".

The diagram uses dashed lines to indicate hidden features and arrows to point to specific components like the reinforcement bars.

SECTION F-F

(ABUTMENT DIAPHRAGM REINFORCING NOT SHOWN FOR CLARITY)

Shear Block Dimensions:

- Total width: 2'-0"
- Width of central rectangular area: 1'-0"
- Width of side vertical columns: 1'-0"
- Width of side rectangular areas: 4"
- Length of side rectangular areas: 2 EQ. SPA.
- Length of side vertical columns: 3-5n2
- Height of side vertical columns: 5m2

Reinforcement:

- Vertical columns: 5n2
- Side rectangular areas: 2-5n3

Support Conditions:

- Left side: Fixed support (F)
- Right side: Free end (G)
- Bottom: Fixed support (F)
- Top: Free end (G)

Annotations:

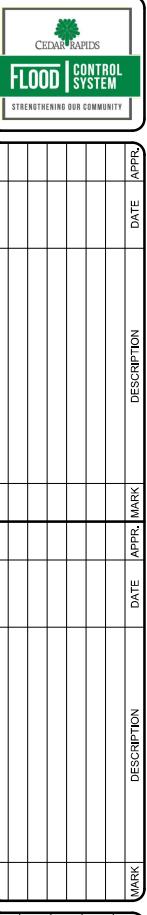
- BACK FACE OF ABUTMENT
- ESSENTIAL JOINT FILLER

SECTION C-C

(ABUTMENT DIAPHRAGM REINFORCING AND BUTYL RUBBER
MEMBRANE NOT SHOWN FOR CLARITY)

RAPIDS FLOOD CONTROL SYSTEM
ROAD NE BRIDGE AND FLOODWALL
CONSTRUCTION
R RIVER BASIN - CEDAR RIVER
CEDAR RAPIDS, IOWA
SHAYER ROAD, IOWA
SOUTH ABUTMENT DETAILS

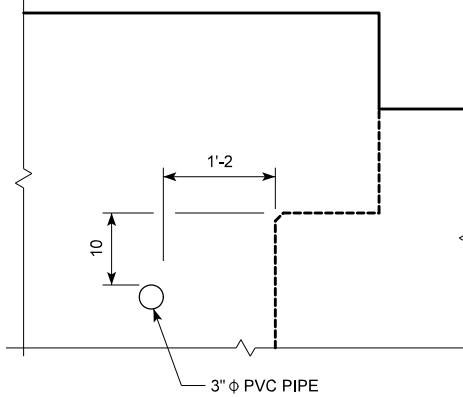
SHEET ID
VOL105B
V.9



12'-9 WINGWALL

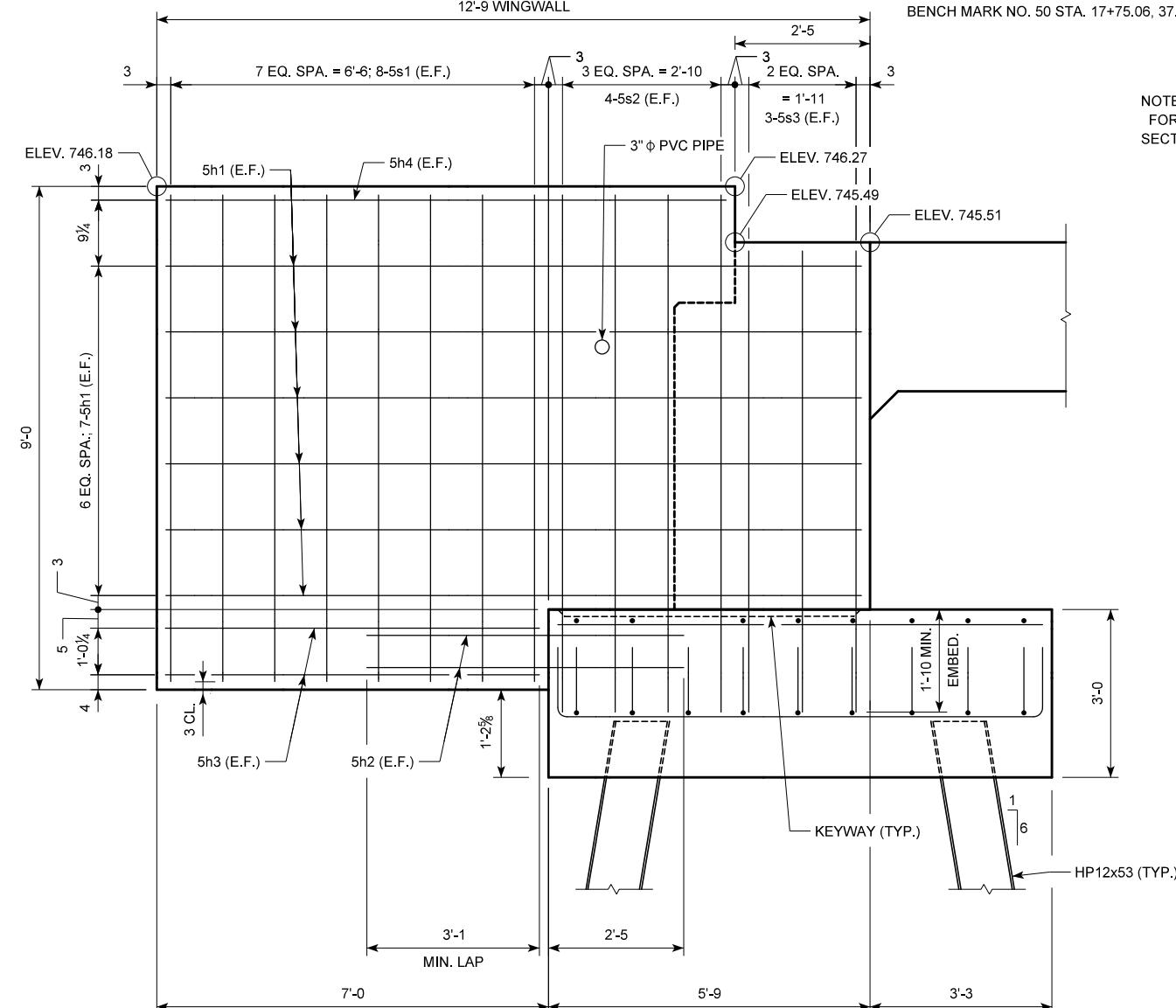
BENCH MARK NO. 50 STA. 17+75.06, 37.57' RT., PLUG IN WT., ELEVATION 734.56

NOTE:
FOR LOCATION OF VIEW E-E AND
SECTION H-H, SEE SHEET V.8.

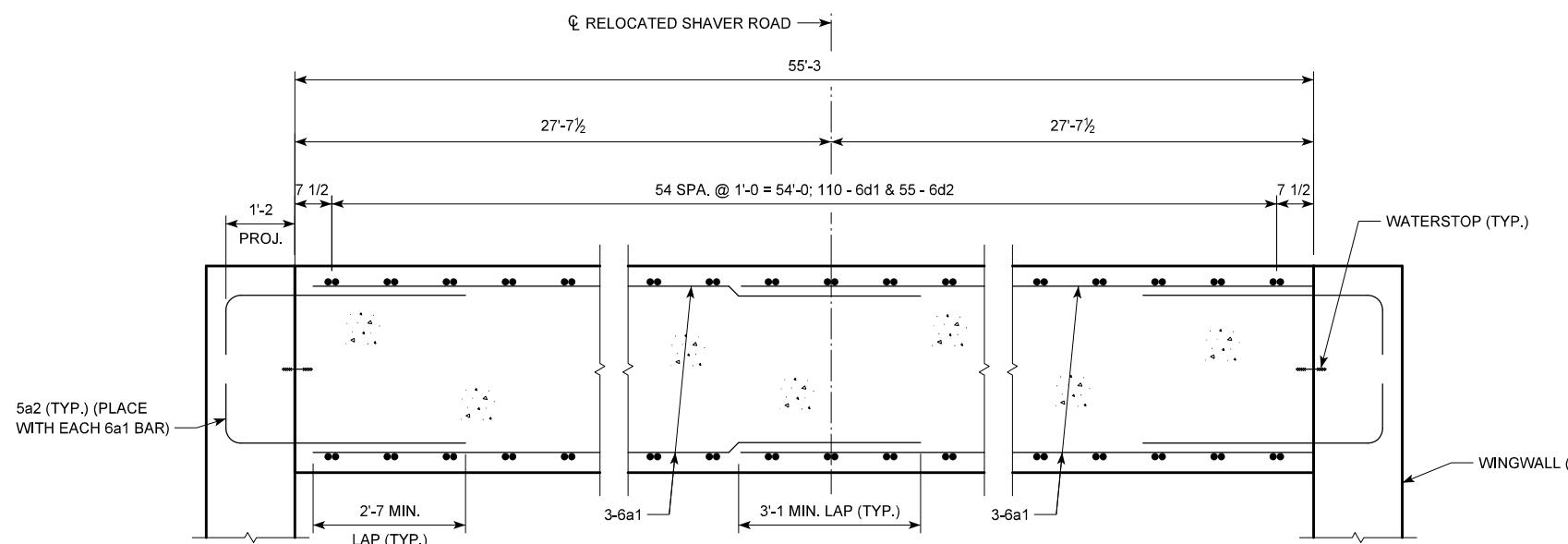


PVC PIPE LOCATION

NOTE:
PLUG 3" ϕ PVC PIPE WITH EXPANDING FOAM
PRIOR TO BACKFILLING BEHIND ABUTMENTS.



VIEW E-E



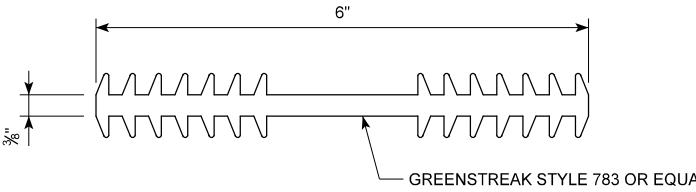
SECTION H-H

CONCRETE PLACEMENT QUANTITIES

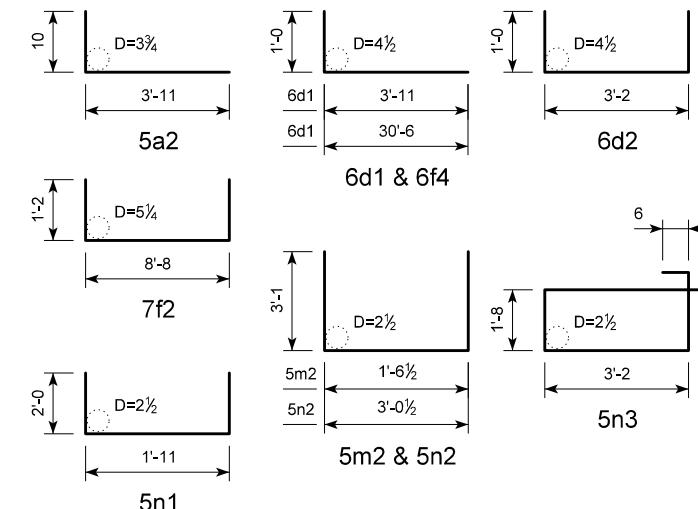
LOCATION	QUANTITY
WALL, PEDESTALS & SHEAR BLOCKS	19.4
FOOTING	58.3
WINGWALLS	11.5
TOTAL (CU. YDS.)	89.2

SOUTH ABUTMENT PILE NOTES:

DIMENSIONS SHOWN ON FOOTING PLAN ARE AT BOTTOM OF FOOTING. BATTER PILES 1:6 IN DIRECTION SHOWN. 1- HP12x53 STEEL BEARING PILING REQUIRED AT SOUTH ABUTMENT.
THE CONTRACT LENGTH OF 55 FEET FOR THE SOUTH ABUTMENT PILES IS BASED ON A MIXED SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 202 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL AND 0.7 FOR ROCK END BEARING.
THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A MIXED SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL AND 0.7 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING.
THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR SOUTH ABUTMENT PILES IS 149 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL.
CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.
STEEL PILE POINTS ARE REQUIRED FOR THE STEEL H-PILES.
ALL BATTERED PILES SHALL BE TRIMMED TO A HORIZONTAL LINE TO AID IN THE PLACEMENT OF REINFORCING.



BENT BAR DETAILS



NOTE:
ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

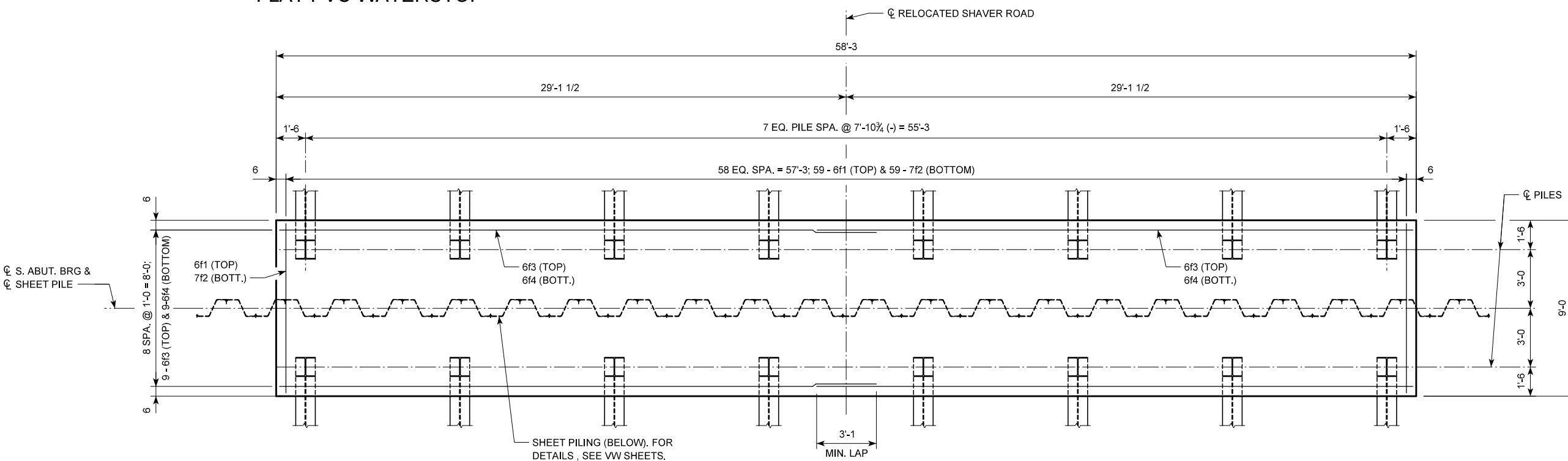
NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES
ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET

REINFORCING BAR LIST - SOUTH ABUTMENT

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	WALL, LONGITUDINAL	—	16	29'-0	697
5a2	WALL TO WING DOWEL	L	16	4'-9	79
6d1	FOOTING TO WALL DOWEL	L	110	4'-9	785
6d2	WALL, TRANSVERSE	L	55	5'-2	427
6f1	FOOTING, TOP, TRANSVERSE	—	59	8'-8	768
7f2	FOOTING, BOTTOM, TRANSVERSE	L	59	11'-0	1,327
6f3	FOOTING, TOP, LONGITUDINAL	—	18	30'-6	825
6f4	FOOTING, BOTTOM, LONGITUDINAL	L	18	31'-6	852
5h1	WINGWALL, HORIZONTAL	—	28	12'-5	363
5h2	WINGWALL TO FOOTING DOWEL	—	8	5'-8	47
5h3	WINGWALL, HORIZONTAL	—	8	6'-8	56
5h4	WINGWALL, HORIZONTAL	—	4	10'-0	42
5m1	PEDESTAL, LONGITUDINAL	—	15	2'-11	46
5m2	SHEAR BLOCK, LONGITUDINAL	L	14	7'-9	113
5n1	PEDESTAL, TRANSVERSE	L	25	5'-11	154
5n2	SHEAR BLOCK, TRANSVERSE	L	6	9'-3	58
5n3	SHEAR BLOCK, HOOP	□	4	10'-8	45
5s1	WINGWALL, VERTICAL	—	32	8'-7	286
5s2	WINGWALL, VERTICAL	—	16	8'-11	149
5s3	WINGWALL, VERTICAL	—	12	8'-2	102

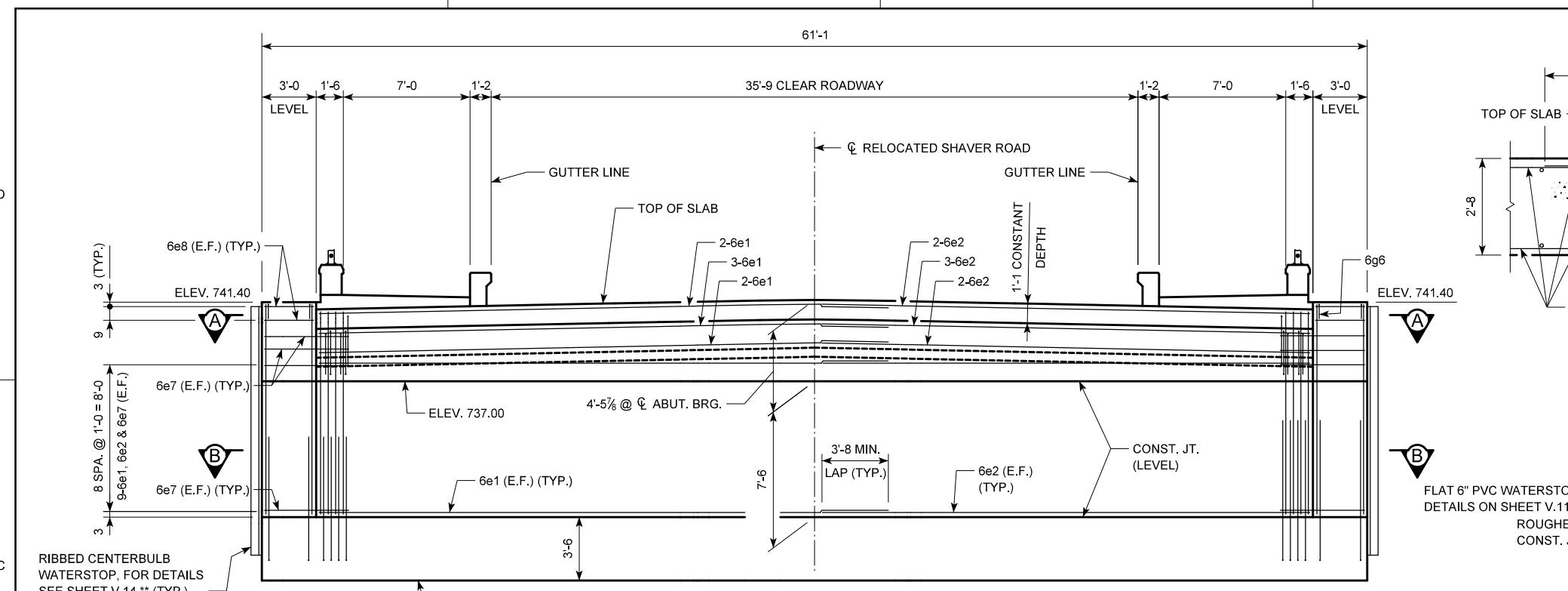
NON-COATED REINFORCING STEEL - TOTAL (LBS.) 7,221

FLAT PVC WATERSTOP

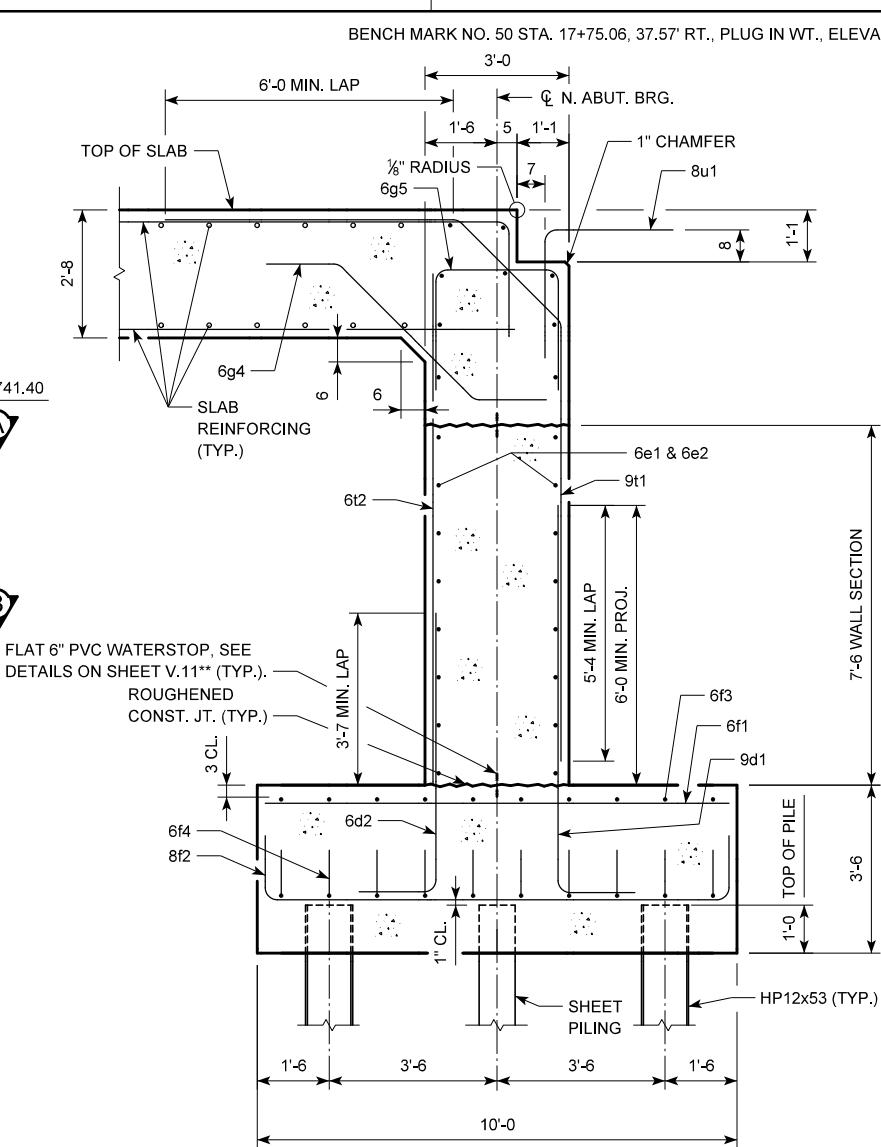


FOOTING PLAN

NOTE:
SEE SHEET V.10 FOR WING REINFORCING IN FOOTING.



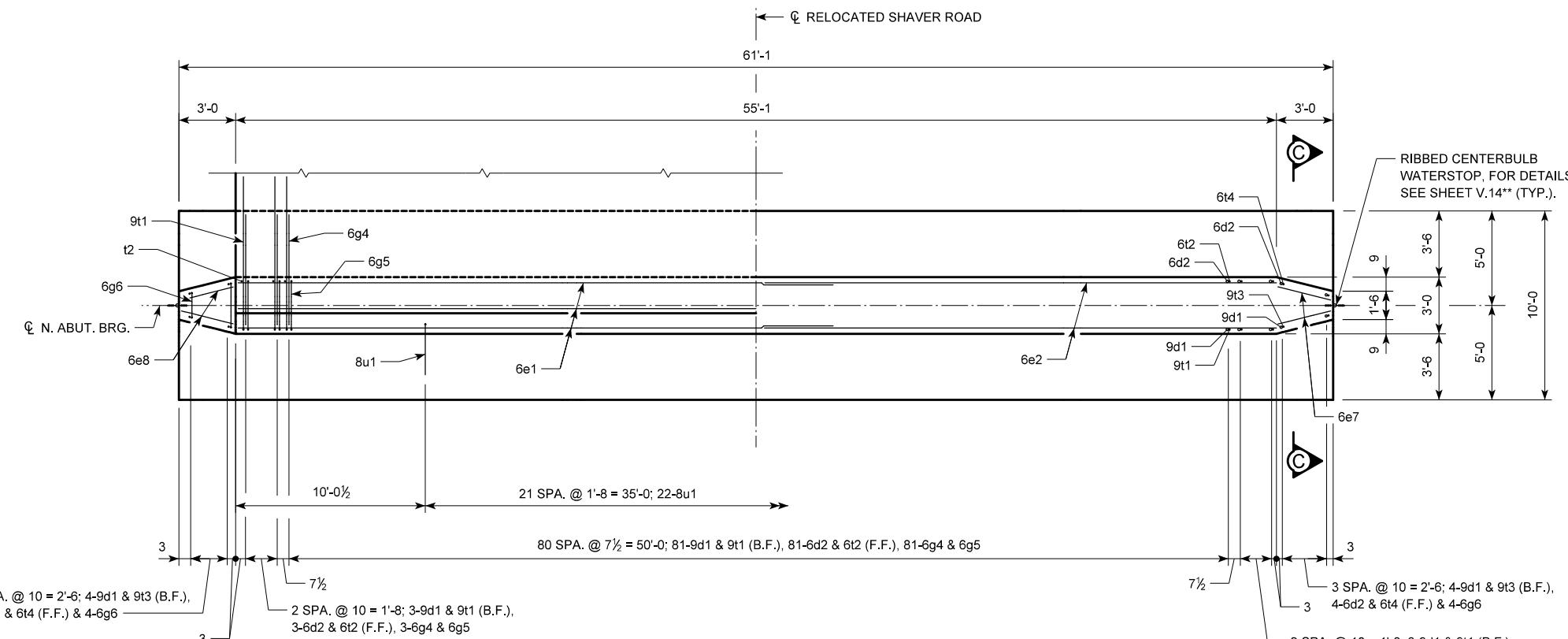
REAR ELEVATION



TYPICAL SECTION THROUGH ABUTMENT

** HORIZONTAL FLAT 6" PVC WATERSTOPS TO BE SEAL WELDED TO ENDS OF VERTICAL RIBBED CENTERBULB WATERSTOPS AT ENDS OF ABUTMENT TO PROVIDE A CONTINUOUS SEAL

NOTE:
NORTH ABUTMENT SHALL BE CONSTRUCTED SIMULTANEOUSLY WITH
OR AFTER THE FLOODWALL MONOLITHS DIRECTLY ADJACENT TO THE
NORTH ABUTMENT. FOR FLOODWALL DETAILS, SEE VV SHEETS.

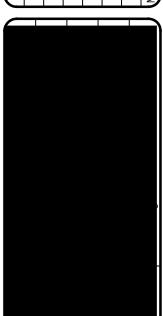


PART SECTION A-A

PART SECTION B-B

NORTH ABUTMENT NOTES:

NORTH ADJUSTMENT NOTES:
MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR
REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.
FOR SECTION C-C. SEE SHEET V.13.



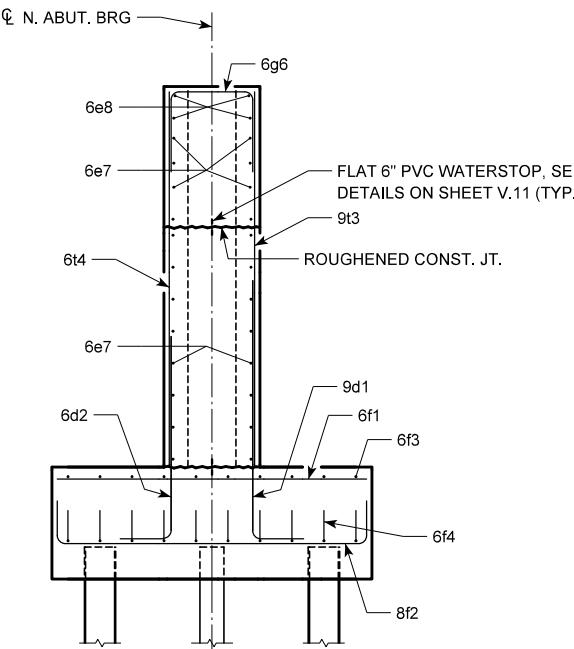
RAPIDS FLOOD CONTROL SYSTEM
ROAD NE BRIDGE AND FLOODWALL
CONSTRUCTION
RIVER BASIN - CEDAR RIVER
CEDAR RAPIDS, IOWA
SHAYER ROAD BRIDGE
NORTH ABUTMENT DETAILS

SHEET ID
VOL105B

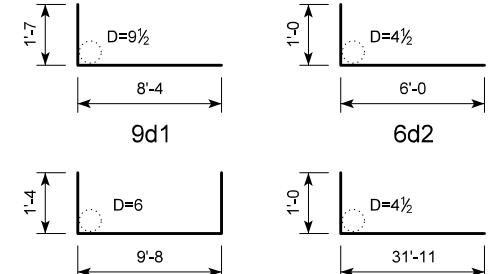
NOTES:
FOR LOCATION OF SECTION C-C, SEE SHEET V.12.
CONCRETE AND REINFORCING STEEL QUANTITIES
ARE INCLUDED ON THE SUMMARY QUANTITIES
SHEET.

CONCRETE PLACEMENT QUANTITY

LOCATION	QUANTITY
FOOTING	79.2
WALL SECTION (FTG. TO CONST. JT.)	49.7
TOTAL (CU. YDS.)	128.9



BENT BAR DETAILS



NOTE:
ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

REINFORCING BAR LIST - N. ABUT. FOOTING

NORTH ABUTMENT PILE NOTES:

THE CONTRACT LENGTH OF 45 FEET FOR THE NORTH ABUTMENT PILES IS BASED ON A COHESIVE SOIL CLASSIFICATION, A TOTAL FACTORED AXIAL LOAD PER PILE (PU) OF 202 KIPS, AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.65 FOR SOIL AND 0.7 FOR ROCK END BEARING. TO ACCOUNT FOR SOIL CONSOLIDATION UNDER THE NEW FILL, THE FACTORED AXIAL LOAD INCLUDES A FACTORED DOWNDRAK LOAD OF 10 KIPS. ABUTMENT PILES ALSO WERE DESIGNED FOR A FACTORED TENSION FORCE OF 14 KIPS.

THE NOMINAL AXIAL BEARING RESISTANCE FOR CONSTRUCTION CONTROL WAS DETERMINED FROM A COHESIVE SOIL CLASSIFICATION AND A GEOTECHNICAL RESISTANCE FACTOR (PHI) OF 0.77 FOR SOIL AND 0.7 FOR ROCK END BEARING. PILES ARE ASSUMED TO BE DRIVEN FROM A START ELEVATION AT THE BOTTOM OF FOOTING.

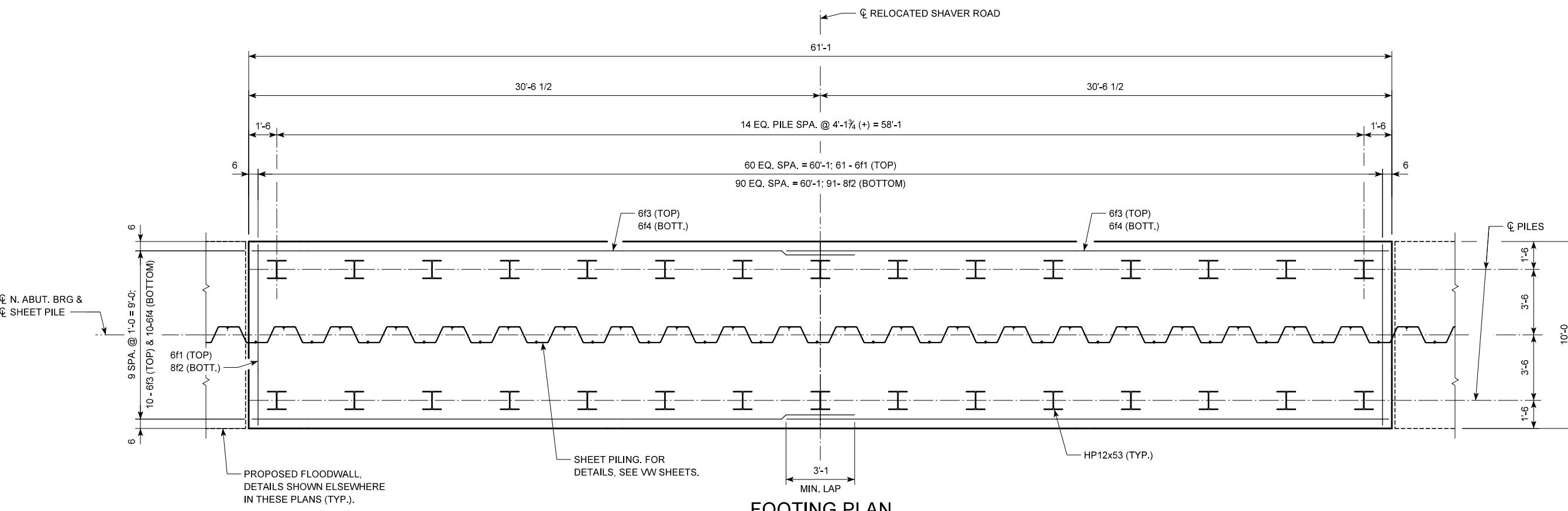
THE REQUIRED NOMINAL AXIAL BEARING RESISTANCE FOR NORTH ABUTMENT PILES IS 144 TONS AT END OF DRIVE OR RETAP. THE PILE CONTRACT LENGTH SHALL BE DRIVEN AS PER PLAN UNLESS PILES REACH REFUSAL. IN NO CASE SHALL A PILE BE EMBEDDED LESS THAN 15 FEET. CONSTRUCTION CONTROL REQUIRES A WEAP ANALYSIS WITH BEARING GRAPH.

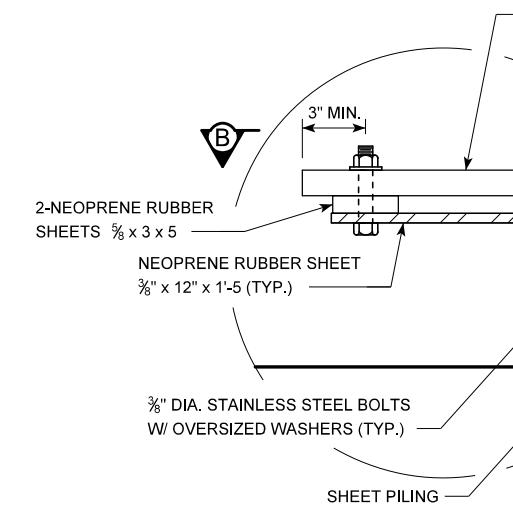
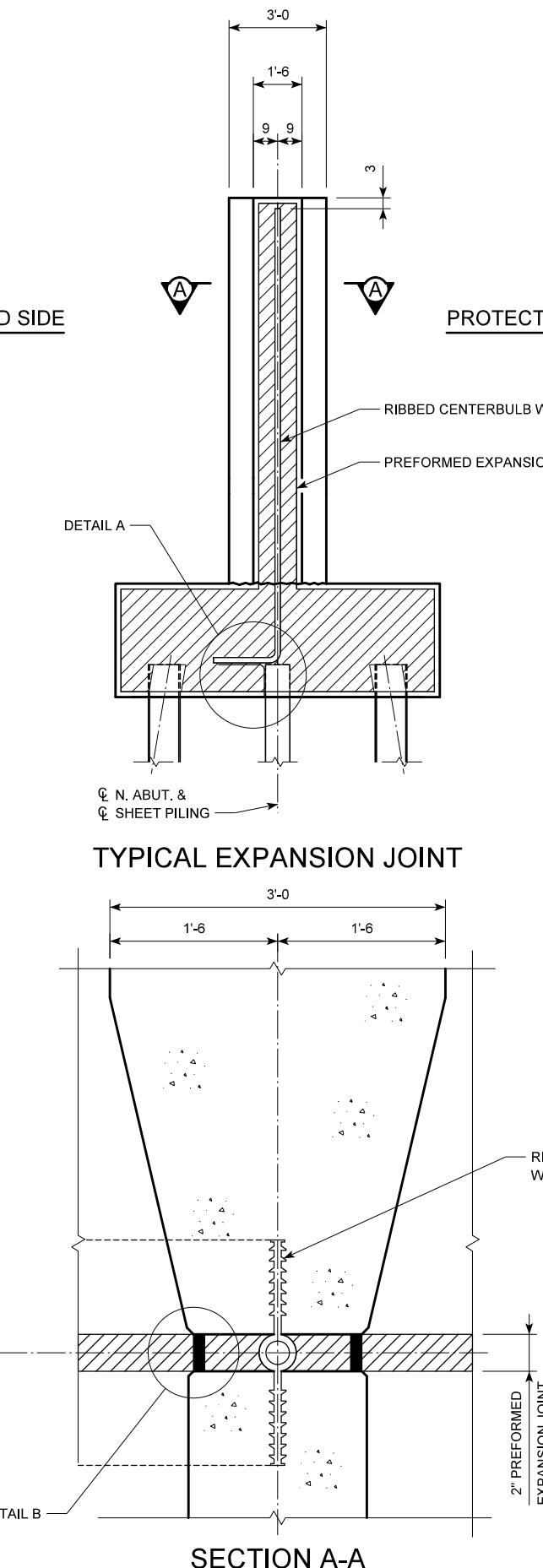
ABUTMENT PILES ARE DESIGNED TO ACCOMMODATE DOWNDRAF FORCE DUE TO SOIL CONSOLIDATION UNDER THE NEW EARTH FILL. PILES SHALL BE DRIVEN TO 144 TONS BASED ON THEORETICAL DRIVING RESISTANCE. THIS INCLUDES 5 TONS OF RESISTANCE IN AND ABOVE THE COMPRESSIBLE LAYERS, 7 TONS RESISTANCE FOR

DIMENSIONS SHOWN ON FOOTING PLAN ARE AT BOTTOM OF FOOTING. 30 - HP12x53 STEEL BEARING PILING

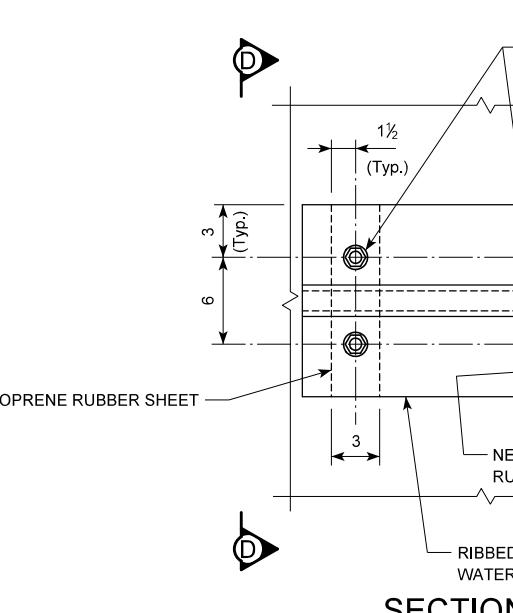
REQUIRED AT NORTH ABUTMENT.

SECTION C-C

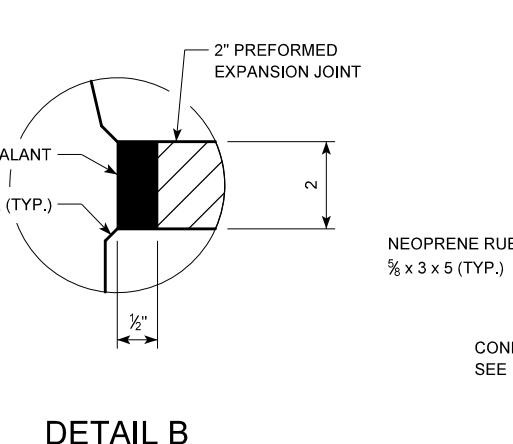




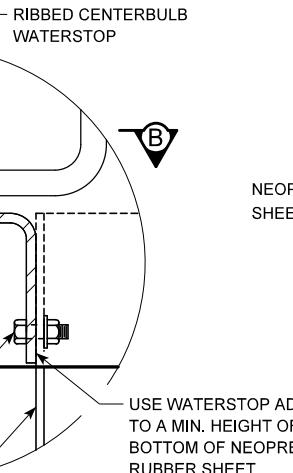
NEOPRENE RUBBER SHEET $\frac{3}{8}'' \times 3 \times 5$
NEOPRENE RUBBER SHEET $\frac{3}{8}'' \times 12'' \times 1\text{-}5$ (TYP.)
3/8" DIA. STAINLESS STEEL BOLTS W/ OVERRSIZED WASHERS (TYP.)
USE WATERSTOP ADHESIVE TO A MIN. HEIGHT OF 3" ABOVE BOTTOM OF NEOPRENE RUBBER SHEET.
SHEET PILING



NEOPRENE RUBBER SHEET
RIBBED CENTERBULB WATERSTOP
NEOPRENE RUBBER SHEET
RIBBED CENTERBULB WATERSTOP



2" PREFORMED EXPANSION JOINT
1/2" CHAMFER (TYP.)
SEALANT
NEOPRENE RUBBER SHEET $\frac{3}{8}'' \times 3 \times 5$ (TYP.)
CONNECTION MATERIAL, SEE DETAIL A



NEOPRENE RUBBER SHEET $\frac{3}{8}'' \times 3 \times 5$
SHEET PILE TO PLATE $\frac{1}{4}'' \times \frac{1}{4}''$
3" MIN.
SHEET PILING

USE WATERSTOP ADHESIVE TO A MIN. HEIGHT OF 3" ABOVE BOTTOM OF NEOPRENE RUBBER SHEET.

SHEET PILING

3/8" DIA. STAINLESS STEEL BOLTS W/ OVERRSIZED WASHERS (TYP.)

3 (TYP.)

6

3

1 1/2 (TYP.)

2"

JOINT

NEOPRENE RUBBER SHEET
RIBBED CENTERBULB WATERSTOP

NEOPRENE RUBBER SHEET
RIBBED CENTERBULB WATERSTOP

USE WATERSTOP ADHESIVE TO FILL VOIDS AROUND BULB AND RIBS TO A MIN. DEPTH OF 3"

RIBBED CENTERBULB WATERSTOP

GREENSTREAK STYLE 726 OR EQUAL

1 1/4" ID & 2" OD

7/8"

1 1/2"

1 1/2"

1 1/2"

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CONCRETE COATING NOTES:

CONCRETE SURFACES, AS NOTED AND SHOWN IN THE PLANS, SHALL BE FINISHED WITH EVERKOTE 300 POTASSIUM SILICATE CONCRETE STAIN BY EDISON COATINGS OR EQUAL. PRIOR TO CONCRETE COATING APPLICATION, PREPARE SURFACES IN ACCORDANCE WITH THE "DEVELOPMENTAL SPECIFICATIONS FOR CONCRETE SURFACE PREPARATION AND TESTING PRIOR TO COATING APPLICATION". APPLY MINERAL SILICATE PAINT IN ACCORDANCE WITH THE "DEVELOPMENTAL SPECIFICATIONS FOR STRUCTURAL CONCRETE COATING". SUBMIT PAINT COLOR SAMPLES ON 8½" x 11" DRAW-DOWN CARDS FOR EACH COLOR. DELIVER SAMPLES TO ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDERING MATERIALS. THERE ARE FOUR COLOR FINISH TYPES TO BE USED ON THE BRIDGE. "COLOR NO. 1" SHALL MATCH DAVIS COLOR: OUTBACK, NO. 677. "COLOR NO. 2" SHALL MATCH FEDERAL COLOR STANDARD NUMBER 36642 (LIGHT GRAY). "COLOR NO. 3" SHALL MATCH DAVIS COLOR: DARK GRAY, NO. 860. "COLOR NO. 4" SHALL MATCH DAVIS COLOR: GRAPHITE, NO. 860. SUBMIT PRODUCT SPECIFICATION SHEETS AND COLOR SAMPLES TO THE ENGINEER AS DESCRIBED IN THE DEVELOPMENTAL SPECIFICATIONS.

COATED SURFACE AREA TABULATION (SY):

COLOR NO. 1	
SLAB:	32.3 SY
PARAPET:	54.6 SY

COLOR NO. 2	
SLAB:	119.1 SY
PARAPET:	151.9 SY
WINGWALLS:	12.2 SY
SEPARATION BARRIER:	221.3 SY
SIDEWALK:	0.5 SY

COLOR NO. 3	
NORTH ABUTMENT:	28.3 SY

COLOR NO. 4	
NORTH ABUTMENT:	10.2 SY

ALL COSTS ASSOCIATED WITH SURFACE PREPARATION AND APPLICATION OF MINERAL SILICATE PAINT SHALL BE INCLUDED IN THE BID ITEM, "STRUCTURAL CONCRETE COATING".

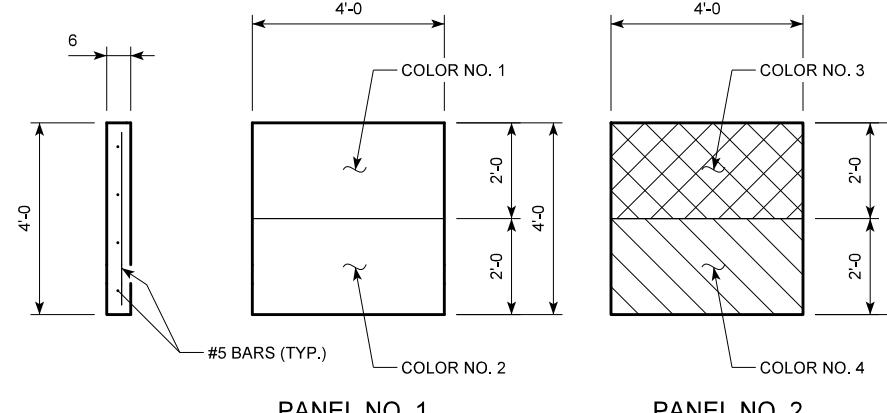
CONCRETE MOCKUP PANEL NOTES:

PRIOR TO BEGINNING ANY PRODUCTION PAINTING WORK, DEMONSTRATE SURFACE PREPARATION METHODS AND PAINT APPLICATION ON CONCRETE MOCKUP PANELS. THE CONCRETE MOCKUP PANELS MUST BE REVIEWED AND APPROVED BY THE ENGINEER. CONSTRUCT TWO 4-FOOT HIGH, BY 6-INCH WIDE (MIN.), BY 4-FOOT LONG MOCKUP PANELS IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND THESE PLANS. SEE MOCKUP PANEL DETAILS ON THIS SHEET.

CAST THE MOCKUP PANELS ON SITE, USING THE SAME FORMING METHODS, PROCEDURES, AND CONCRETE MIXTURE(S) AS ARE PROPOSED FOR THE PRODUCTION WORK. A SINGLE MAT OF NO. 5 REINFORCING BARS IN TWO DIRECTIONS SHALL BE PLACED AT THE CENTER OF THE PANELS.

AFTER CURING THE MOCKUP PANELS FOR A MINIMUM OF 28 DAYS, DEMONSTRATE SURFACE PREPARATION AND MINERAL SILICATE PAINT APPLICATION ON THE MOCKUPS. SEE DETAILS AND NOTES ON THIS SHEET FOR FURTHER INFORMATION. BEGIN PRODUCTION PAINTING WORK ONLY AFTER THE MOCKUPS AND COLORS HAVE BEEN APPROVED BY THE ENGINEER. APPROVED MOCKUPS SHALL REMAIN IN PLACE NEAR THE BRIDGE FOR COMPARISON TO PRODUCTION PAINTING UNTIL WORK IS COMPLETED. AFTER COMPLETION OF ALL PRODUCTION PAINTING WORK, THE MOCKUP PANELS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.

ALL COSTS ASSOCIATED WITH THE CONCRETE MOCKUP PANELS SHALL BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)".

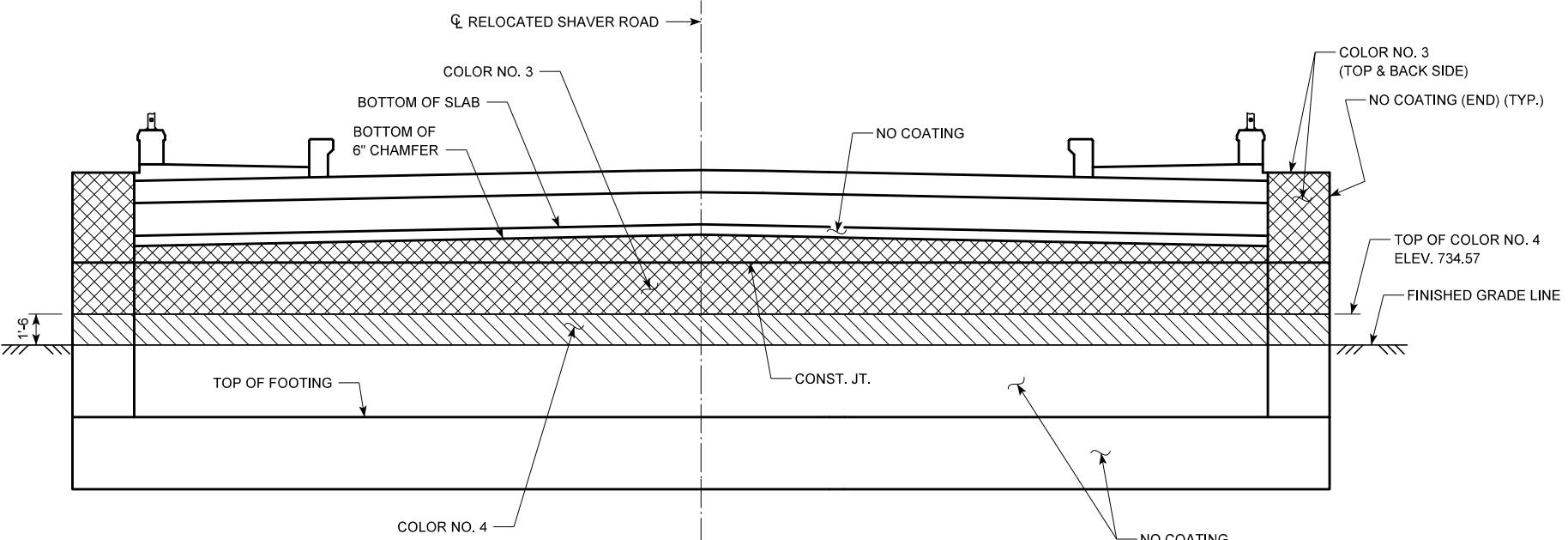


MOCKUP PANEL DETAILS

PART SECTION THROUGH SLAB

SECTION A-A

SOUTH ABUTMENT WING ELEVATION

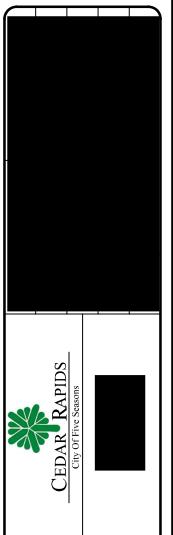


NORTH ABUTMENT FRONT ELEVATION

CONCRETE COATING QUANTITY		
LOCATION	UNIT	QUANTITY
NORTH ABUTMENT	SY	38.5
SLAB	SY	151.4
SIDEWALK	SY	0.5
PARAPET	SY	206.5
SOUTH ABUT. WINGWALLS	SY	12.2
SEPARATION BARRIER	SY	221.3
TOTAL (SY)		630.4

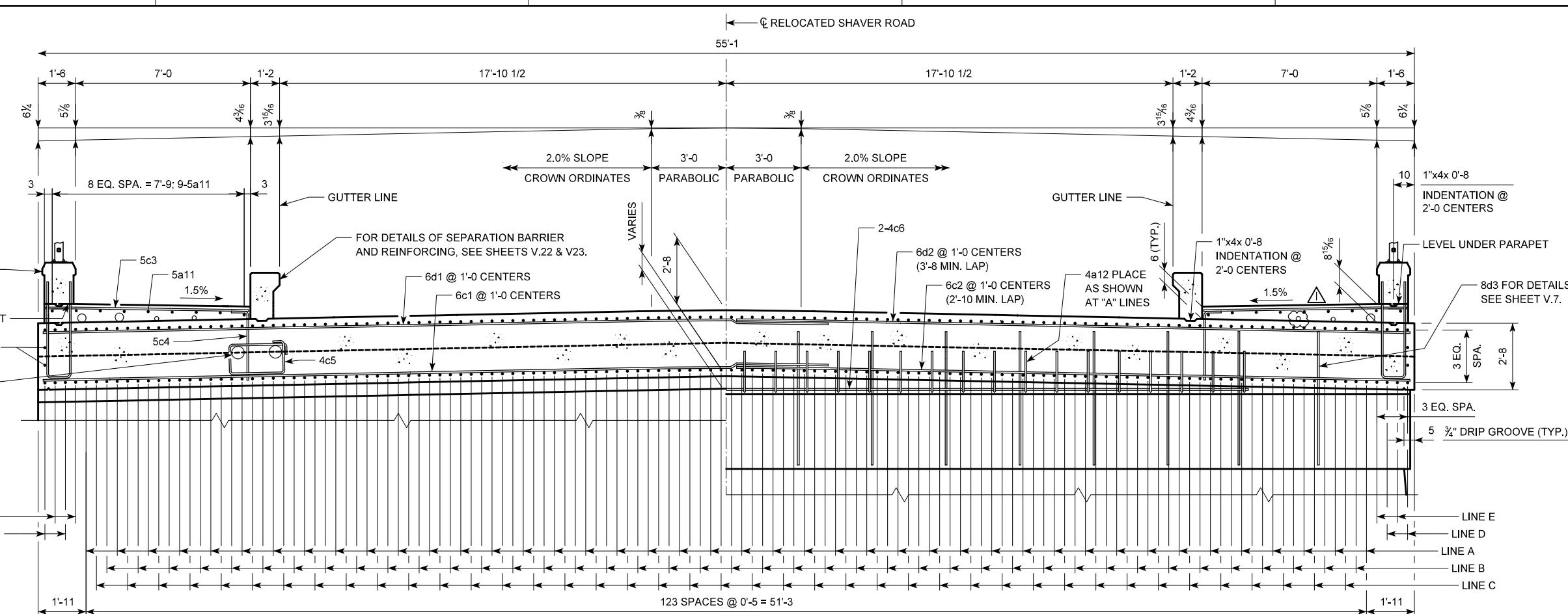


DESCRIPTION	DATE	APPR. MARK

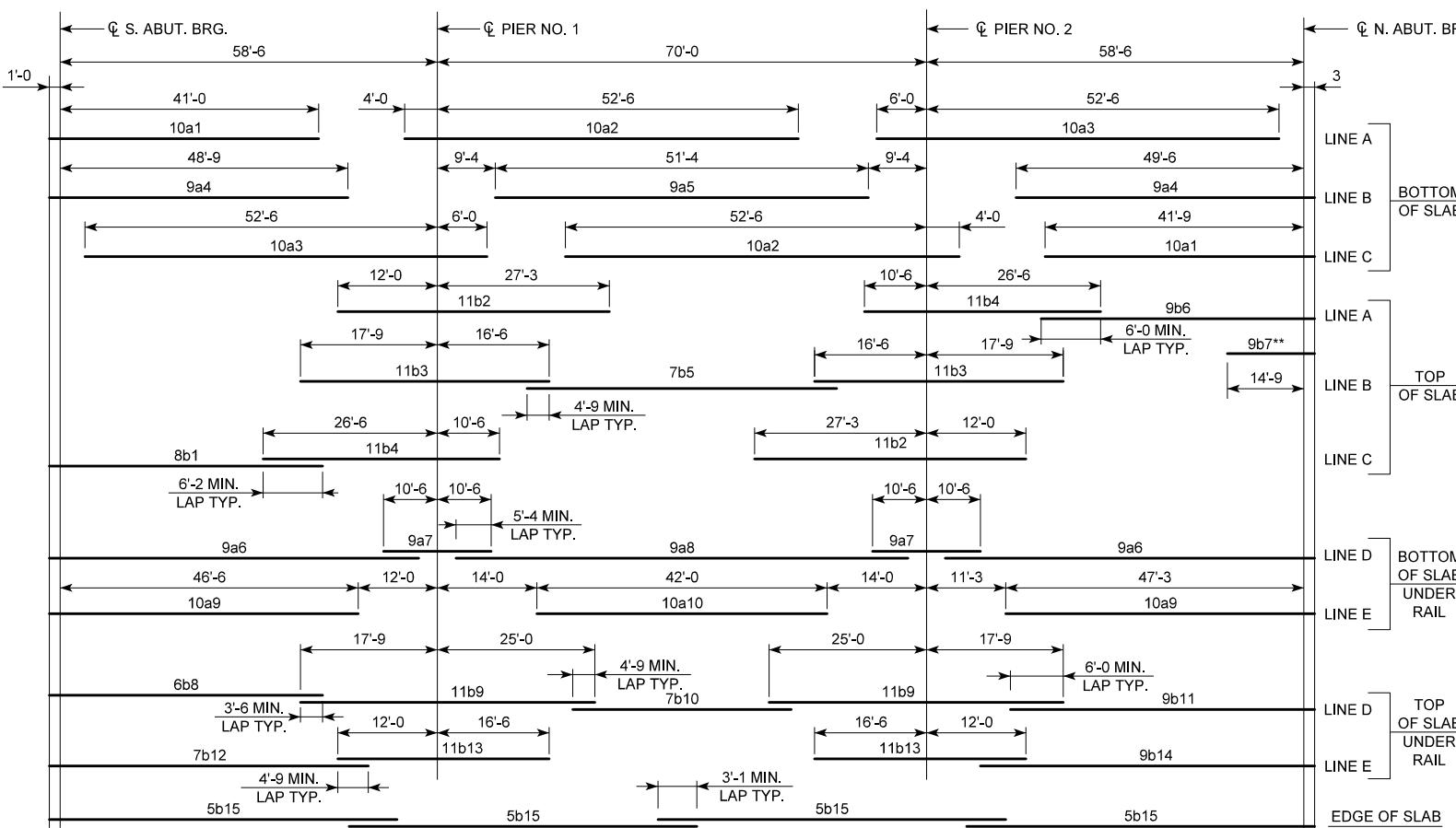


CEDAR RAPIDS FLOOD CONTROL SYSTEM SHAVER ROAD NE BRIDGE AND LEODWALL CONSTRUCTION CEDAR RIVER BASIN - CEDAR RIVER SHAVER ROAD BRIDGE CONCRETE COATING DETAILS		

SHEET ID	DATE
VOL105B	V.15



HALF SECTION NEAR ABUTMENT

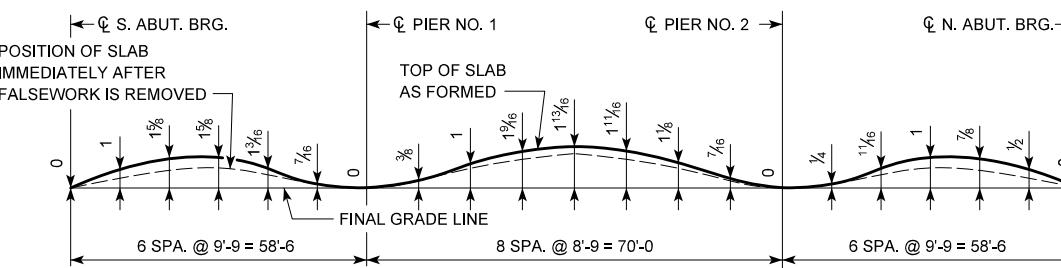


PLACEMENT FOR LONGITUDINAL REINFORCEMENT

HALF SECTION NEAR PIER

SLAB CROSS-SECTIONAL AREA = 146.86 SQ. FT.
SLAB AREA DOES NOT INCLUDE THE RAISED SIDEWALKS.

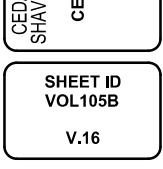
NOTE:
TOP LONGITUDINAL REINFORCING STEEL IS TO BE
PARALLEL TO AND 2½" CLEAR BELOW TOP OF SLAB AND
SIDEWALK. BOTTOM LONGITUDINAL REINFORCING
STEEL IS TO BE PARALLEL TO AND 1½" CLEAR ABOVE
BOTTOM OF SLAB. REINFORCING STEEL IS TO BE
SECURELY WIRED IN PLACE AND ADEQUATELY
SUPPORTED ON BAR CHAIRS BEFORE CONCRETE IS
POURED. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR
BAR CHAIRS.
FOR CROWN TEMPLATE SEE SHEET V.19.

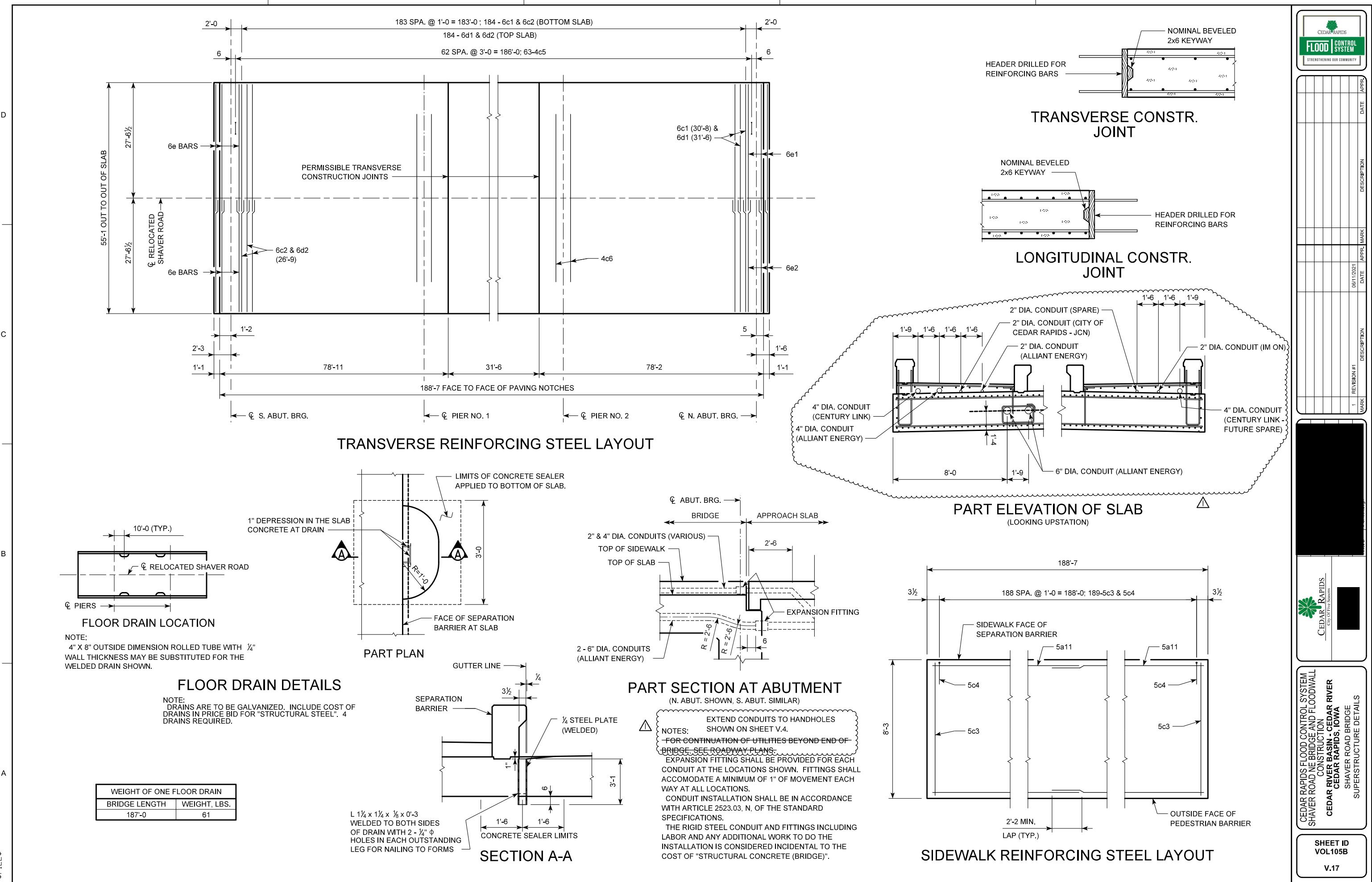


FORM CAMBER DIAGRAM

THIS DIAGRAM SHOWS THE FORM CAMBER REQUIRED TO COMPENSATE FOR THE ANTICIPATED ULTIMATE DEAD LOAD DEFLECTION. THE ABOVE DIMENSIONS DO NOT INCLUDE ANY ALLOWANCE FOR FORM DEFLECTION OR FAI SEWORk SETTLEMENT

** 9b7 BARS SHALL BE PLACED MIDWAY BETWEEN "A" LINES. LAP WITH 9d3 BARS SHOWN IN THE NORTH ABUTMENT DETAILS





SUPERSTRUCTURE NOTES:

THE SLAB AS SHOWN INCLUDES A $\frac{1}{2}$ INCH INTEGRAL WEARING SURFACE.

THE MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR SHALL BE 2 INCHES UNLESS OTHERWISE NOTED OR SHOWN. ALL REINFORCING STEEL IS TO BE SECURELY WIRED IN PLACE. SEE "BAR CHAIR NOTE".

ALL REINFORCING STEEL SHALL BE EPOXY COATED EXCEPT AS NOTED.

ABUTMENT PAVING NOTCH DOWELS SHALL BE STAINLESS STEEL DEFORMED BAR GRADE 60, MEETING THE REQUIREMENTS OF MATERIALS I.M. 452.

THE CONCRETE SLAB IS TO BE PLACED WITH A MINIMUM NUMBER OF CONSTRUCTION JOINTS.

PROCEDURES FOR PLACING SLAB CONCRETE SHALL BE SUBMITTED FOR APPROVAL TOGETHER WITH A STATEMENT OF THE PROPOSED METHOD AND EVIDENCE THAT THE CONTRACTOR POSSESSES THE NECESSARY EQUIPMENT AND FACILITIES TO ACCOMPLISH THE REQUIRED RESULT. SLAB FALSEWORK SHALL BE REMOVED PRIOR TO CONSTRUCTION OF THE SIDEWALKS, SEPARATION BARRIERS AND PARAPETS.

NOTE THAT WHEN PORTLAND CEMENT APPROACH PAVEMENT IS PLACED, COMPRESSIBLE JOINT MATERIAL MUST BE USED BETWEEN PAVEMENT AND END OF BRIDGE.

IF NECESSARY TO PREVENT DAMAGE TO THE END OF THE BRIDGE DECK OR BACKWALL FROM CONSTRUCTION EQUIPMENT, AN APPROPRIATE METHOD OF PROTECTION APPROVED BY THE ENGINEER SHALL BE PROVIDED BY THE BRIDGE CONTRACTOR AT NO EXTRA COST TO THE CITY.

COST OF FURNISHING AND PLACING 3" DIAMETER PVC PIPE IN THE SOUTH ABUTMENT WINGS IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)".

BAR CHAIR NOTE:

TOP MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0" CENTERS LONGITUDINALLY AND TRANSVERSELY. THE BOTTOM MAT OF REINFORCING STEEL IS TO BE SUPPORTED BY INDIVIDUAL BAR CHAIRS SPACED AT NOT MORE THAN 3'-0" CENTERS LONGITUDINALLY AND TRANSVERSELY, OR BY CONTINUOUS ROWS OF BAR HIGH CHAIRS OR SLAB BOLSTERS SPACED 4'-0" APART. I.M. 451.01 REQUIREMENTS SHALL APPLY FOR BAR CHAIRS, BAR HIGH CHAIRS, AND SLAB BOLSTERS.

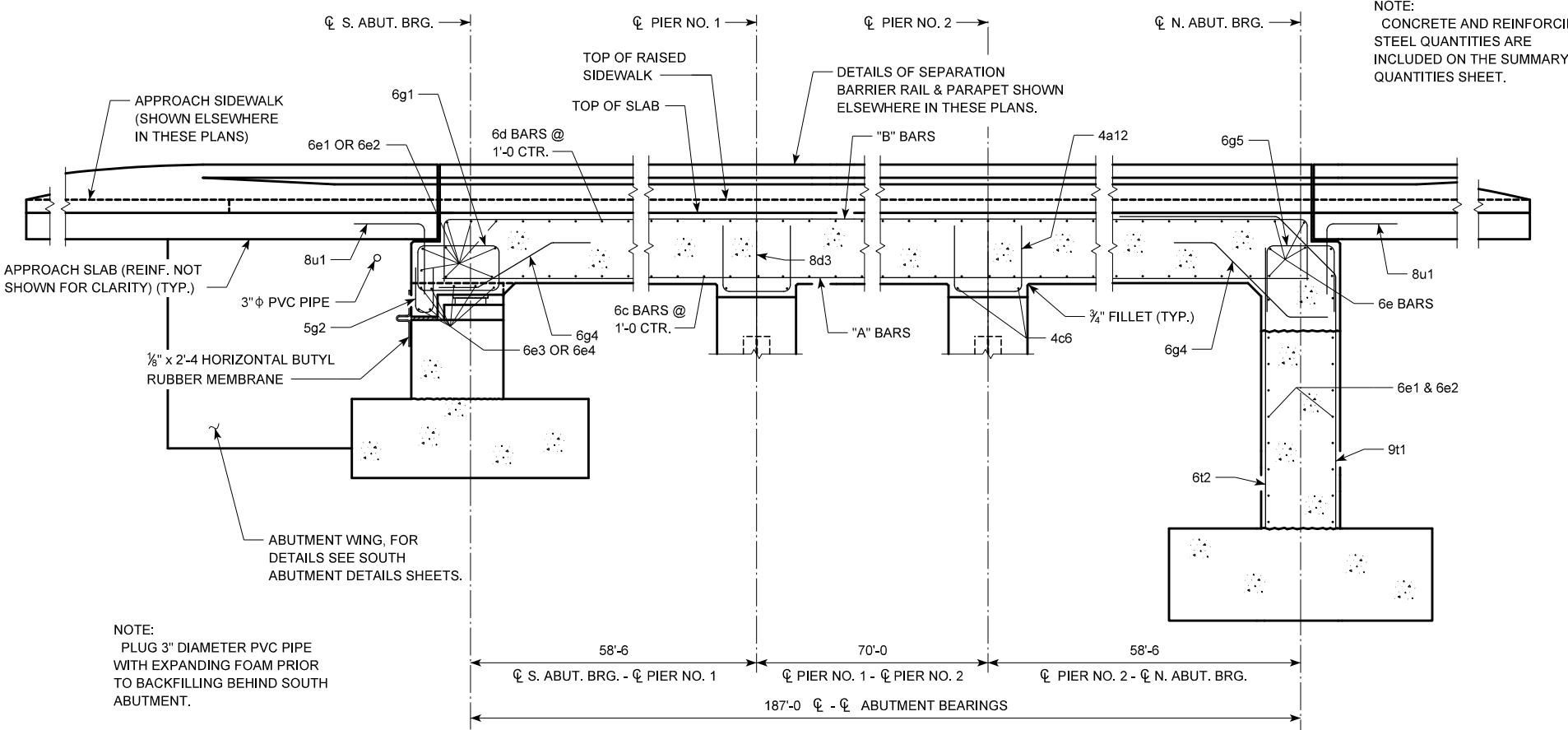
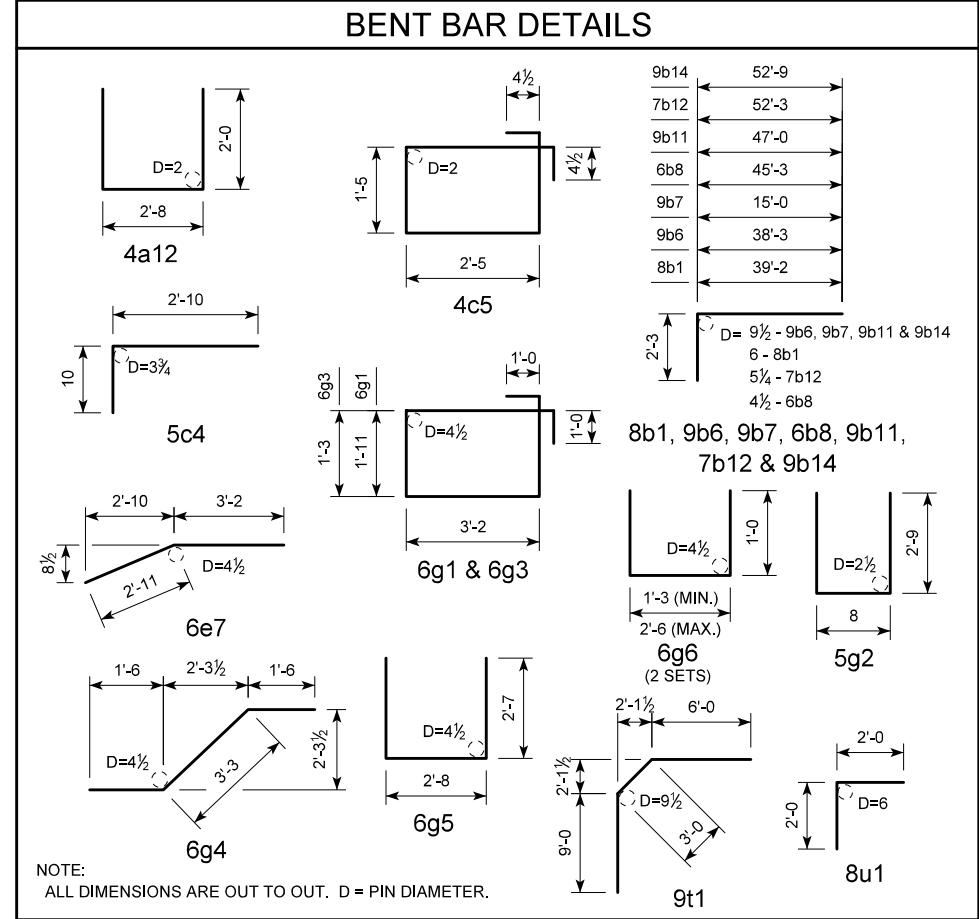
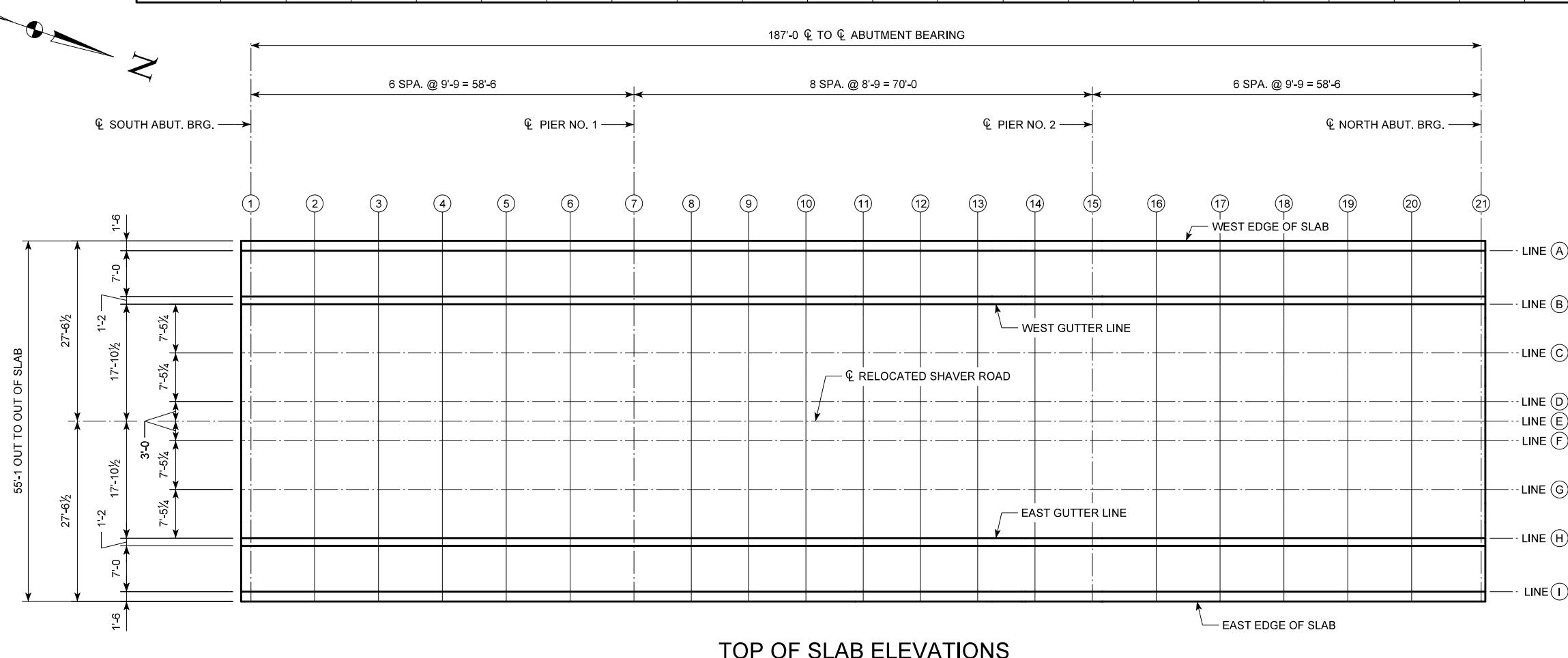
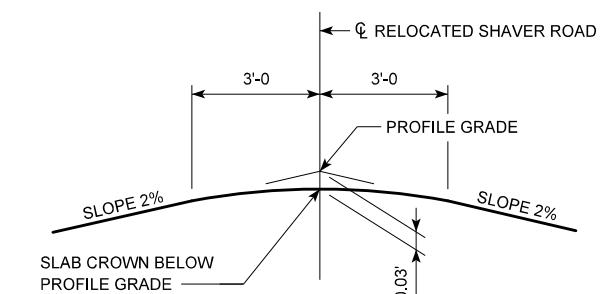


TABLE OF TOP OF SLAB ELEVATIONS

	Q SOUTH ABUT. BRG						Q PIER NO. 1							Q PIER NO. 2					Q NORTH ABUT. BRG		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
LINE (A)	745.53	745.57	745.58	745.55	745.49	745.41	745.29	745.15	744.99	744.80	744.59	744.35	744.09	743.80	743.48	743.10	742.70	742.29	741.86	741.43	741.00
LINE (B)	745.69	745.73	745.74	745.71	745.66	745.57	745.45	745.31	745.15	744.97	744.75	744.52	744.25	743.96	743.65	743.27	742.86	742.45	742.03	741.60	741.16
LINE (C)	745.84	745.88	745.89	745.86	745.81	745.72	745.60	745.46	745.30	745.12	744.90	744.66	744.40	744.11	743.80	743.41	743.01	742.60	742.18	741.75	741.31
LINE (D)	745.99	746.03	746.04	746.01	745.96	745.87	745.75	745.61	745.45	745.26	745.05	744.81	744.55	744.26	743.94	743.56	743.16	742.75	742.33	741.90	741.46
LINE (E)	746.02	746.06	746.07	746.04	745.99	745.90	745.78	745.64	745.48	745.29	745.08	744.84	744.58	744.29	743.97	743.59	743.19	742.78	742.36	741.93	741.49
LINE (F)	745.99	746.03	746.04	746.01	745.96	745.87	745.75	745.61	745.45	745.26	745.05	744.81	744.55	744.26	743.94	743.56	743.16	742.75	742.33	741.90	741.46
LINE (G)	745.84	745.88	745.89	745.86	745.81	745.72	745.60	745.46	745.30	745.12	744.90	744.66	744.40	744.11	743.80	743.41	743.01	742.60	742.18	741.75	741.31
LINE (H)	745.69	745.73	745.74	745.71	745.66	745.57	745.45	745.31	745.15	744.97	744.75	744.52	744.25	743.96	743.65	743.27	742.86	742.45	742.03	741.60	741.16
LINE (I)	745.53	745.57	745.58	745.55	745.49	745.41	745.29	745.15	744.99	744.80	744.59	744.35	744.09	743.80	743.48	743.10	742.70	742.29	741.86	741.43	741.00



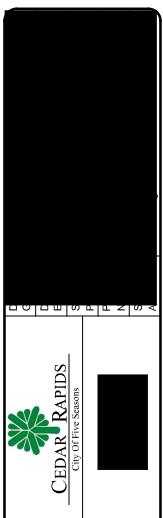
TOP OF SLAB ELEVATIONS

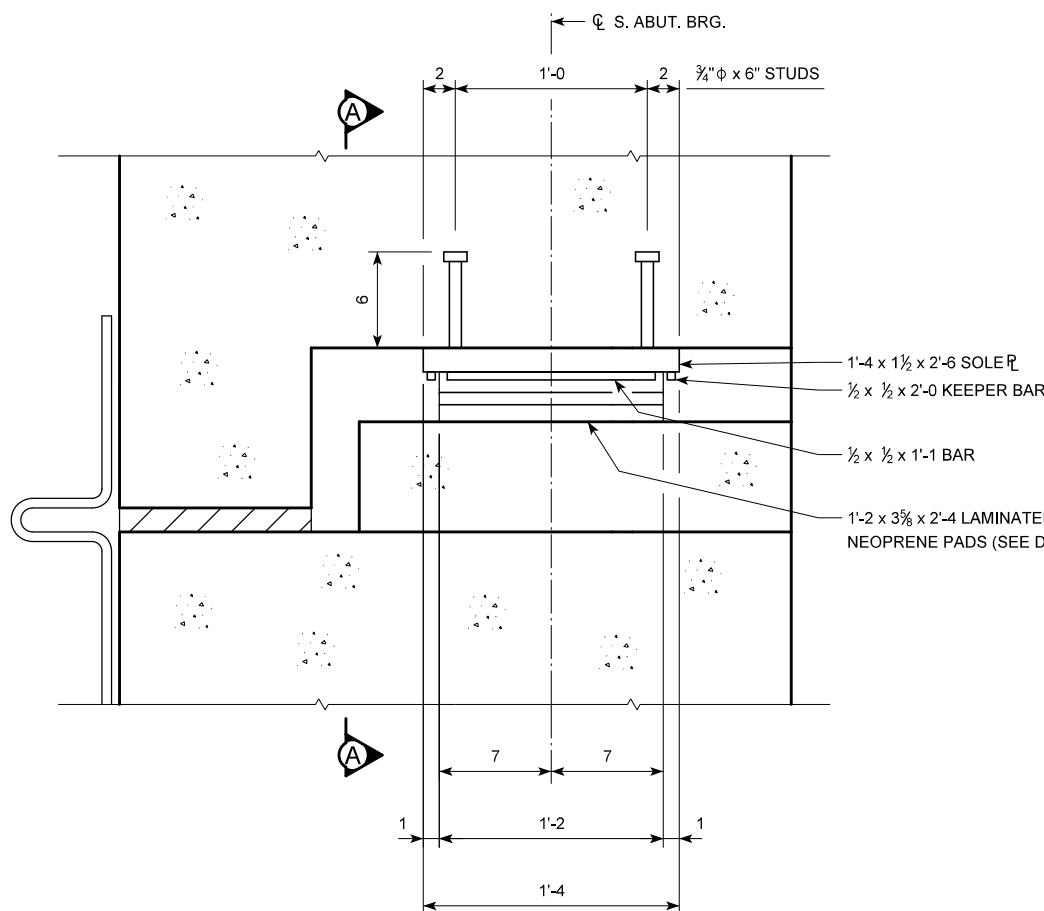
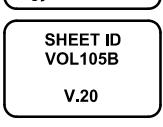
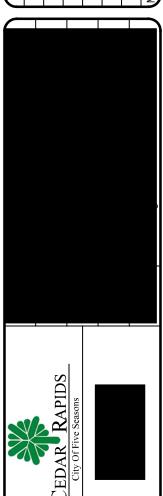


CROWN TEMPLATE

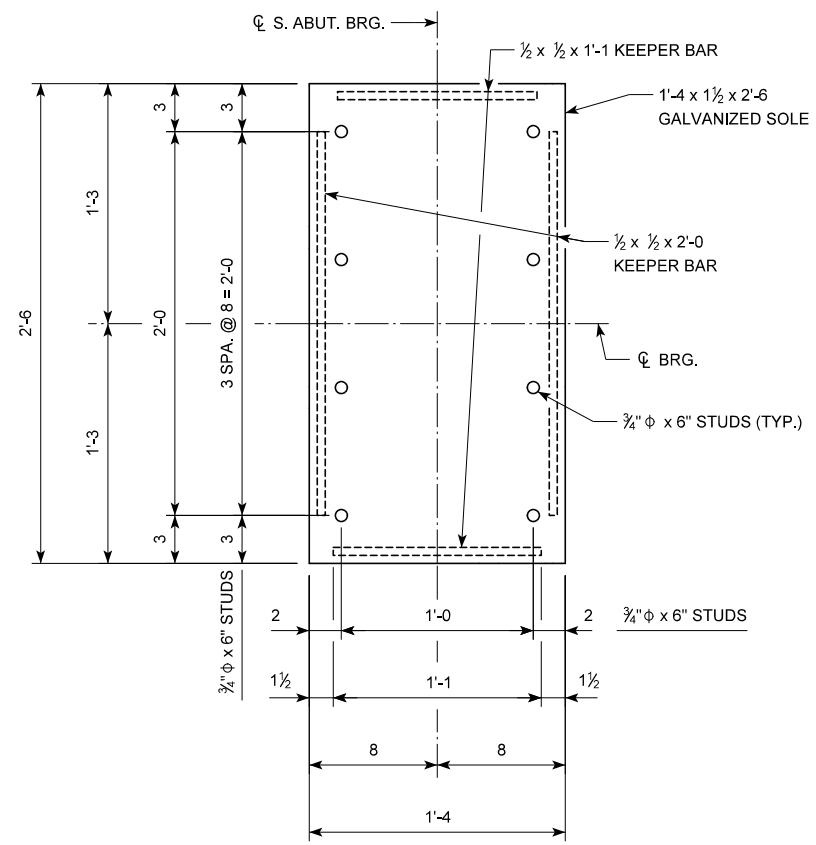
CEDAR RAPIDS FLOOD CONTROL SYSTEM
SHAKER ROAD NE BRIDGE AND ELDORAD
CONSTRUCTION
CEDAR RIVER BASIN - CEDAR RIVER
CEDAR RAPIDS, IOWA
SHAKER ROAD BRIDGE
TOP OF SLAB ELEVATIONS

SHEET ID
VOL105B
V.19

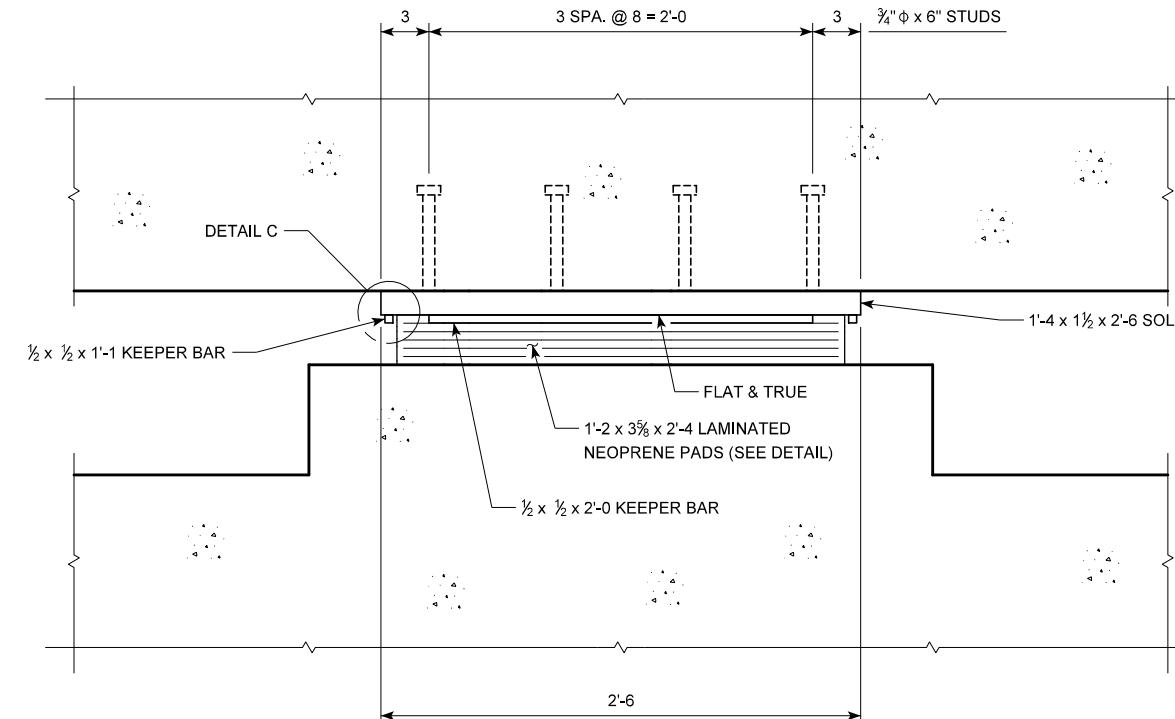




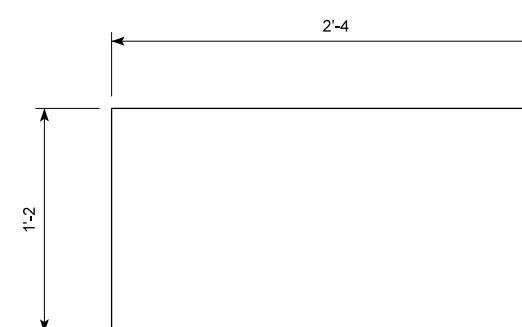
PART ELEVATION



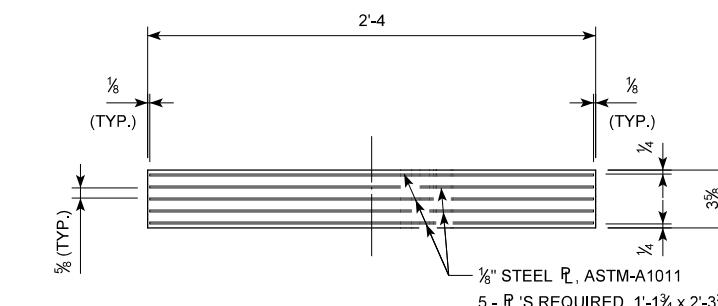
PLAN OF SOLE PLATE



SECTION A-A



LAMINATED NEOPRENE PADS



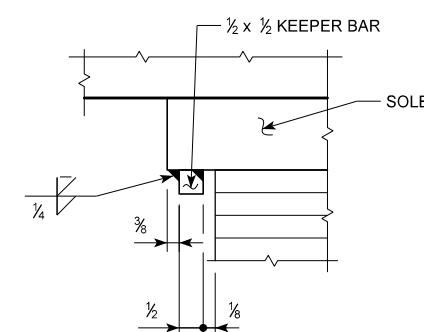
SOUTH ABUTMENT BEARING NOTES:

SOUTH ABUTMENT BEARING NOTES.
SOLE PLATES, KEEPER BARS AND SHEAR STUDS ARE A PART OF THE SUPERSTRUCTURE "STRUCTURAL STEEL" QUANTITY. COST OF NEOPRENE BEARING PADS SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEM "STRUCTURAL STEEL".

THE SOLE PLATES SHALL BE GALVANIZED. ALL WELDING SHALL BE COMPLETED PRIOR TO GALVANIZING. THE SURFACE OF THE SOLE PLATE IN CONTACT WITH THE LAMINATED NEOPRENE PADS SHALL BE FREE OF PROJECTIONS DUE TO THE

GALVANIZING.
BEARING PADS AND SOLE PLATES ARE TO BE SET PRIOR TO PLACING CONCRETE SLAB AT SOUTH ABUTMENT. TOP OF FORMS SHALL BE SET FLUSH WITH TOP OF SOLE PLATE.

SOLE PLATES AND KEEPER BARS SHALL COMPLY WITH ASTM A709 GRADE 50



DETAIL C

STRUCTURAL STEEL

NOTE:
STRUCTURAL STEEL WEIGHT IS INCLUDED
ON THE SUMMARY QUANTITIES SHEET.

PARAPET NOTES:

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER. CONSTRUCTION JOINT SHALL BE SPACED A MINIMUM OF 1 FOOT FROM ANY CENTERLINE PEDESTRIAN RAILING POST.

COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.

THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.

ALL PARAPET REINFORCING IS TO BE EITHER EPOXY COATED OR STAINLESS STEEL AS SHOWN. THE STAINLESS STEEL REINFORCING STEEL SHALL BE DEFORMED BAR GRADE 60 MEETING THE REQUIREMENTS OF MATERIALS I.M. 452.

THE CONCRETE PARAPET IS TO BE BID ON A LINEAR FOOT BASIS MEASURED FROM END TO END OF PARAPET. THE NUMBER OF LINEAR FEET OF PARAPET INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAR FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR "CONCRETE BARRIER, PARAPET" SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL, AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE PARAPET IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.

TOP OF THE PARAPET IS TO BE PARALLEL TO THE THEORETICAL CENTERLINE GRADE.

CROSS SECTIONAL AREA OF THE CONCRETE PARAPET = 2.00 SQUARE FEET. FINISHED PARAPET CONCRETE SHALL BE SMOOTH AND SHOW NO WOOD GRAIN OR OTHER TEXTURE FROM THE FACE OF THE FORMS USED. ALL COSTS FOR REPAIR OR COVERING OF WOOD GRAIN OR OTHER TEXTURES ON THESE SURFACES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

FOR PEDESTRIAN RAILING POST LOCATIONS, SEE SHEETS V.24 & V.25.
▲ PLACE 1 ADDITIONAL 5c10 BAR AT EACH CENTERLINE OF PEDESTRIAN RAILING POST BASE.

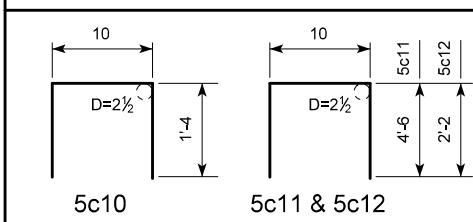
CONCRETE PLACEMENT SUMMARY

SECTION	TOTAL
WEST CONCRETE PARAPET	196.67' @ 0.0739 CU. YD. PER FT.
EAST CONCRETE PARAPET	196.67' @ 0.0739 CU. YD. PER FT.
TOTAL (CU. YDS.)	29.0

CONCRETE PARAPET QUANTITY

ITEM	UNIT	QUANTITY
CONCRETE BARRIER, PARAPET	L.F.	393.3

NOTE:
REINFORCING STEEL QUANTITIES ARE INCLUDED
ON THE SUMMARY QUANTITIES SHEET.

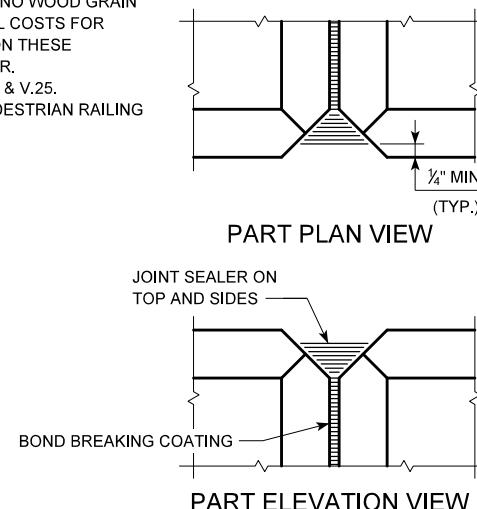
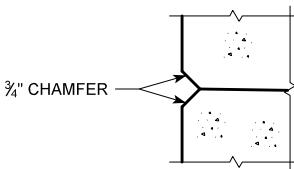
BENT BAR DETAILS

NOTE:
ALL DIMENSIONS ARE OUT TO OUT. D = PIN DIAMETER.

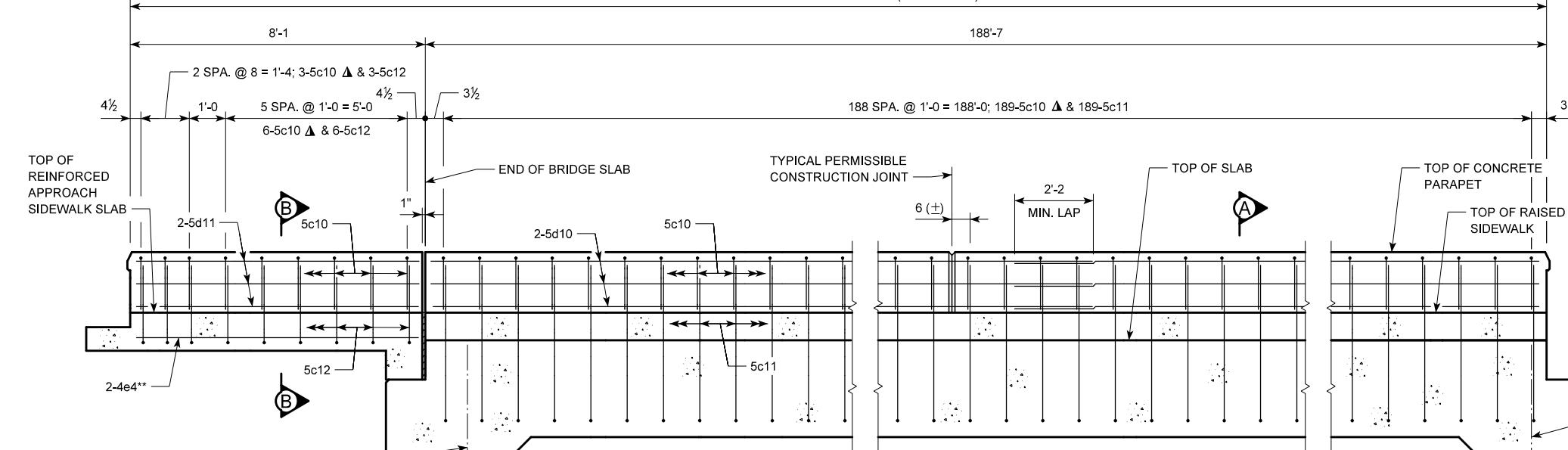
REINFORCING BAR LIST-TWO PARAPET RAILS

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
5c10	RAIL, VERTICAL	□	450	3'-6	1,643
5d10	RAIL, LONGITUDINAL	—	60	39'-5	2,467
5d11	RAIL, LONGITUDINAL	—	12	7'-8	96
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					
5c11	RAIL, VERTICAL	□	378	9'-10	3,877
5c12	RAIL, VERTICAL	□	18	5'-2	97
STAINLESS STEEL - TOTAL (LBS.)					
3,974					

SEE BARRIER CHAMFER DETAIL
JOINT SEALER ON TOP AND SIDES
BOND BREAKING COATING
HATCHED AREA INDICATES AREA OF BOND BREAKING COATING.

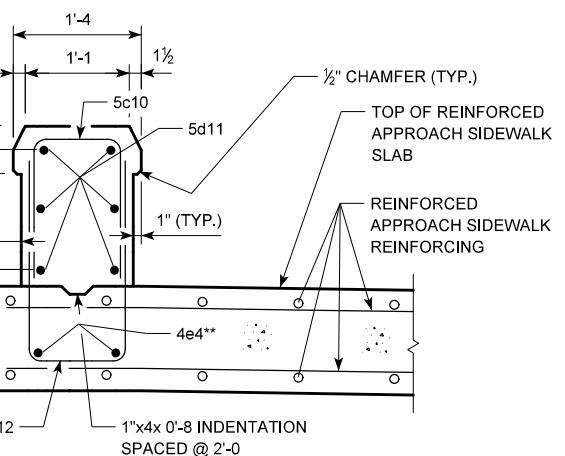
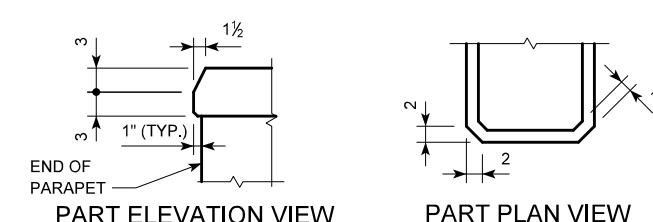
**BARRIER CHAMFER DETAIL****CONCRETE PARAPET JOINT DETAILS**

196'-8 END TO END OF PARAPET (BID LENGTH)

**ELEVATION OF CONCRETE PARAPET****PART SECTION A-A**

(SLAB REINFORCING NOT SHOWN)

NOTE:
**4e4 BARS INCLUDED IN
REINFORCED APPROACH SIDEWALK
SLAB REINFORCING BAR LIST.

**PART SECTION B-B****PART ELEVATION VIEW**
PART PLAN VIEW**PARAPET END DETAILS**

FLOOD CONTROL SYSTEM

STRENGTHENING OUR COMMUNITY

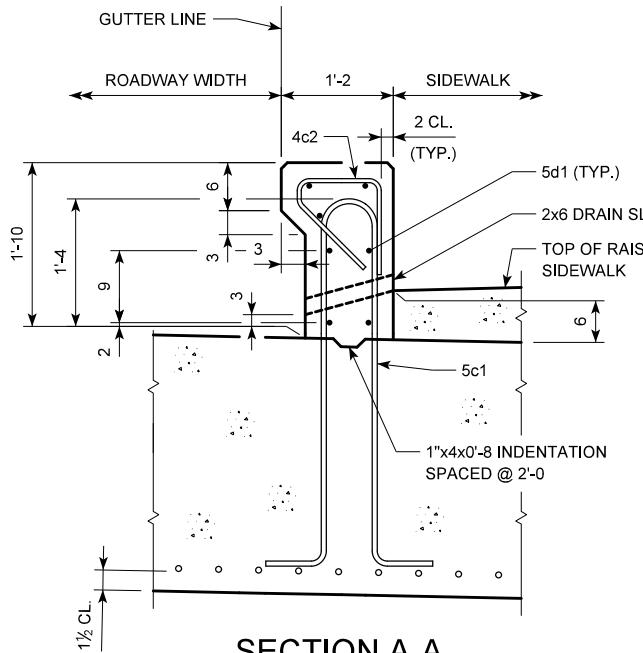
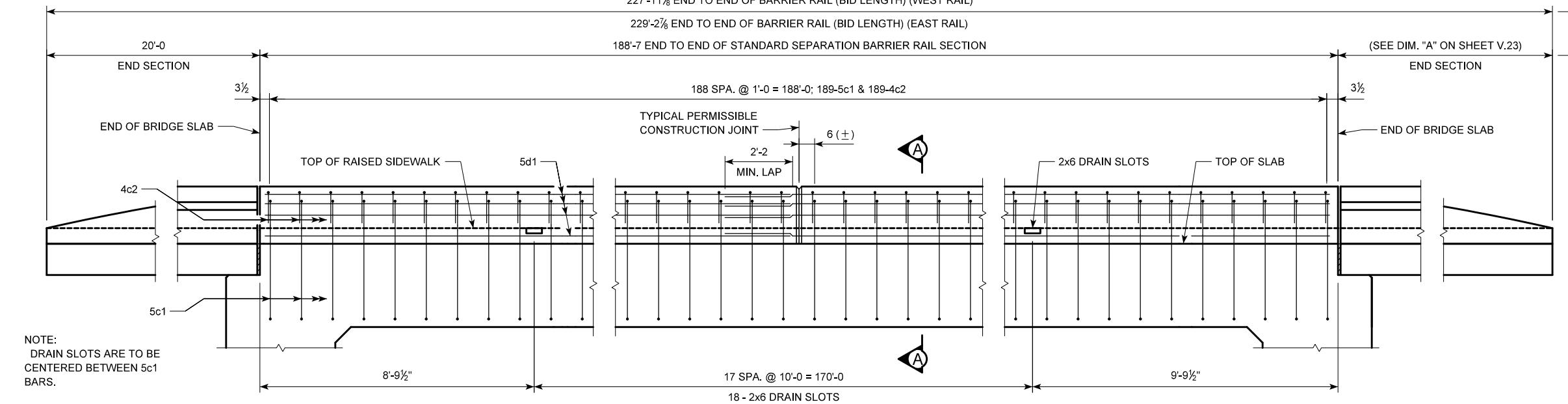


CITY OFFICE OF DESIGN

CEDAR RAPIDS FLOOD CONTROL SYSTEM
SHAWER ROAD NE BRIDGE AND LEODWALL
CEDAR RIVER BASIN - CEDAR RIVER
CEDAR RAPIDS, IOWA
SHAWER ROAD BRIDGE
CONCRETE PARAPET DETAILS

SHEET ID
VOL105B
V.21

D



SEPARATION BARRIER RAIL NOTES:

MINIMUM CLEAR DISTANCE FROM FACE OF CONCRETE TO NEAR REINFORCING BAR IS TO BE 2" UNLESS OTHERWISE NOTED OR SHOWN.

TOP OF THE SEPARATION BARRIER RAIL IS TO BE PARALLEL TO THE THEORETICAL $\frac{1}{4}$ GRADE.

THE PERMISSIBLE CONSTRUCTION JOINTS ARE TO BE PLACED BETWEEN VERTICAL BARS AT A MINIMUM SPACING OF 20 FEET. CONSTRUCTION JOINT CONTACT SURFACES ARE TO BE COATED WITH AN APPROVED BOND BREAKER. COST OF THE JOINT SEALER AND BOND BREAKER SHALL BE CONSIDERED INCIDENTAL TO OTHER CONSTRUCTION.

THE JOINT SEALER SHALL BE LIGHT GRAY NONSAG LATEX CAULKING SEALER MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED.

ALL SEPARATION BARRIER RAIL REINFORCING STEEL IS TO BE EITHER EPOXY COATED OR STAINLESS STEEL AS SHOWN. THE STAINLESS STEEL REINFORCING STEEL SHALL BE DEFORMED BAR GRADE 60 MEETING THE REQUIREMENTS OF MATERIALS I.M. 452.

THE SEPARATION BARRIER RAIL IS TO BE BID ON A LINEAL FOOT BASIS MEASURED FROM END TO END OF RAIL. THE NUMBER OF LINEAL FOOT OF BARRIER RAIL INSTALLED WILL BE PAID FOR AT THE CONTRACT PRICE PER LINEAL FOOT BASED ON PLAN QUANTITIES. PRICE BID FOR "CONCRETE BARRIER, REINFORCED, SEPARATION" SHALL BE FULL COMPENSATION FOR FURNISHING ALL MATERIAL, EXCLUDING REINFORCING STEEL AND ALL THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAIL IN ACCORDANCE WITH THESE PLANS AND CURRENT SPECIFICATIONS.

CROSS SECTIONAL AREA OF SEPARATION BARRIER RAIL TYPICAL SECTION = 1.84 SQUARE FEET.

ELEVATION OF SEPARATION BARRIER RAIL
(FRONT FACE OF WEST BARRIER SHOWN, EAST BARRIER SIMILAR)

SEPARATION BARRIER RAIL JOINT DETAILS

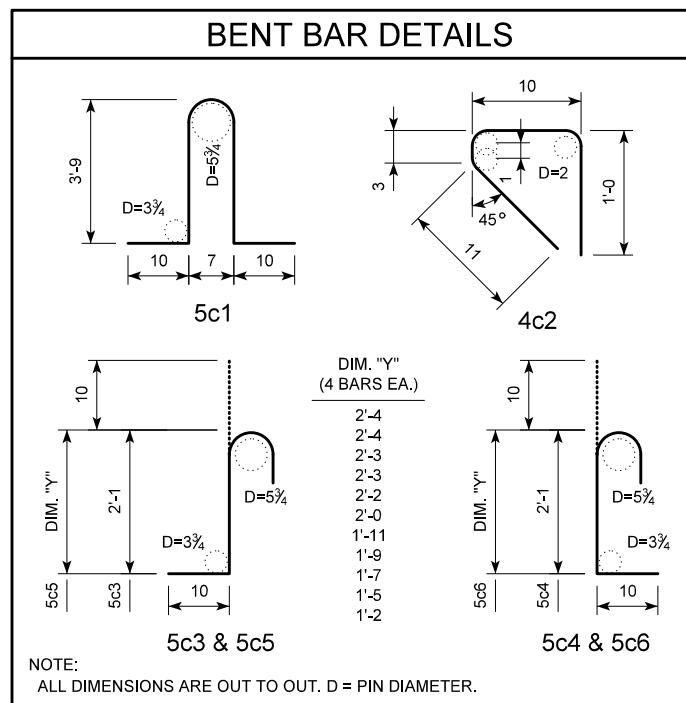
NOTE:
REINFORCING STEEL QUANTITIES ARE INCLUDED
ON THE SUMMARY QUANTITIES SHEET.

SEPARATION BARRIER RAIL QUANTITY

ITEM	UNIT	QUANTITY
WEST CONCRETE BARRIER, REINFORCED, SEPARATION	L.F.	227.93
EAST CONCRETE BARRIER, REINFORCED, SEPARATION	L.F.	229.24
	TOTAL	457.17

CONCRETE PLACEMENT SUMMARY

SECTION	TOTAL
WEST SEPARATION BARRIER - STANDARD SECTION	188.58' @ 0.0682 CU. YD. PER FT.
EAST SEPARATION BARRIER - STANDARD SECTION	188.58' @ 0.0682 CU. YD. PER FT.
SEPARATION BARRIER - END SECTION	4 @ 1.30 CU. YD. EACH
	TOTAL (CU. YDS.)
	31.0

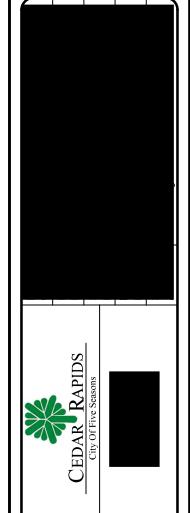


REINFORCING BAR LIST - TWO SEPARATION BARRIER RAILS

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4c2	RAIL, VERTICAL	□	414	3'-0	830
5d1	RAIL, LONGITUDINAL	—	84	33'-3	2,913
5d2	RAIL, LONGITUDINAL	—	4	19'-8	82
5d3	RAIL, LONGITUDINAL	—	4	16'-2	67
5d4	RAIL, LONGITUDINAL	—	4	19'-9	82
5d5	RAIL, LONGITUDINAL	—	2	19'-0	40
5d6	RAIL, LONGITUDINAL	—	2	15'-6	32
5d7	RAIL, LONGITUDINAL	—	2	19'-1	40
5d8	RAIL, LONGITUDINAL	—	2	20'-3	42
5d9	RAIL, LONGITUDINAL	—	2	16'-9	35
5d10	RAIL, LONGITUDINAL	—	2	20'-5	43
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					4,206
5c1	RAIL, VERTICAL	□	378	9'-6	3,745
5c3	RAIL, VERTICAL	□	36	3'-9	141
5c4	RAIL, VERTICAL	□	36	3'-9	141
5c5	RAIL, VERTICAL	□	44	VARIABLE	165
5c6	RAIL, VERTICAL	□	44	VARIABLE	165
STAINLESS STEEL - TOTAL (LBS.)					4,357



DESCRIPTION	DATE	APPR.



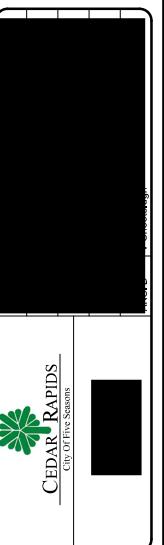
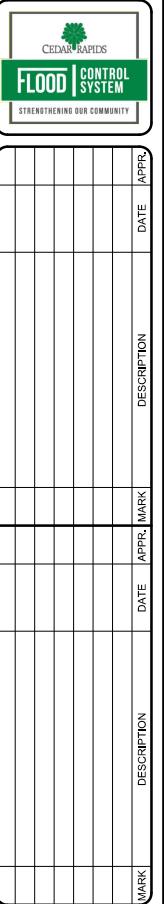
SECTION B-B

SECTION C-C

SECTION D-D

NOTE:
FOR SEPARATION BARRIER RAIL NOTES AND
SEPARATION BARRIER RAIL JOINT DETAILS, SEE
SHEET V.22.

SHEET ID
VOL105B
V.23



PART PLAN VIEW

PART VIEW F-F

SECTION B-B

SECTION C-C

SECTION D-D

SEPARATION RAIL END SECTION DIMENSIONS

DIM.	SOUTH APPROACH		NORTH APPROACH	
	WEST RAIL	EAST RAIL	WEST RAIL	EAST RAIL
"A"	20'-0	20'-0	19'-4 $\frac{1}{8}$	20'-7 $\frac{7}{8}$
"B"	9'-0	9'-0	8'-4 $\frac{1}{8}$	9'-7 $\frac{7}{8}$
"C"	4'-0	4'-0	3'-4 $\frac{1}{8}$	4'-7 $\frac{7}{8}$

1 | 2 | 3 | 4 | 5



195'-5½ END TO END OF PEDESTRIAN RAILING (BID LENGTH)

APPROACH SECTION =

FACE OF PAVING NOTCH AT S. ABUT. →

187'-10½

Q POST → ← FACE OF PAVING NOTCH AT N. ABUT.

→ → →

This technical drawing illustrates a cross-section of a building's exterior wall and roof. The roof features a stepped design with multiple levels. A vertical dimension line indicates a height of 6 units from the base of the wall to the top of the roof. The wall itself is composed of several horizontal layers, possibly representing different materials or construction techniques. At the base of the wall, there is a stepped foundation. Three specific points are labeled with letters: 'A' is located at the top edge of the wall; 'B' is positioned on one of the horizontal layers near the center; and 'C' is located on the right side of the drawing, pointing towards the roofline. The overall style is that of a technical architectural or engineering diagram.

This technical drawing shows a cross-section of a raised sidewalk. The sidewalk is depicted as a thick horizontal line at the top, supported by vertical columns. Below the sidewalk, there are two sets of parallel horizontal lines representing the ground level. The area between the sidewalk and the ground level is shaded with diagonal lines. A callout arrow points from the text 'TOP OF RAISED SIDEWALK' to the top edge of the sidewalk. To the right, a vertical dimension line indicates a height of 4' 0" from the ground level to the top of the sidewalk. The drawing uses standard architectural conventions like leader lines and dimension lines.

An architectural line drawing of a building's exterior. The drawing shows a balcony with horizontal railings supported by vertical posts. Below the balcony is a sidewalk. A vertical line extends from the top of the balcony down to the sidewalk, with the label "E POST" at the top. The drawing uses fine lines and cross-hatching for shading.

ELEVATION OF PEDESTRIAN RAILING AT CONCRETE PARAPET

(INSIDE FACE OF PEDESTRIAN RAILING SHOWN)

This technical diagram illustrates the cross-section of a steel railing post. The post is composed of several horizontal HSS (Hollow Structural Section) components. At the top, a vertical HSS $5 \times 2 \times \frac{3}{16}$ is shown with a bracket labeled 'BENT PLATE $\frac{1}{4} \times 7 \times 10\frac{1}{2}$ (SEE SPLICE DETAIL)' attached. Below this, a series of horizontal HSS sections are arranged: HSS $4 \times 2 \times \frac{3}{16}$, HSS $2 \times 2 \times \frac{3}{16}$ (TYP.), and HSS $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{16}$ (TYP.). These sections are connected by a central vertical column with square cutouts. The overall height of the post is indicated as 2'-10". The base of the post features a flared, octagonal foundation plate with dimensions of 8' on each side and a thickness of 2". A note at the top right specifies 'C PEDESTRIAN RAILING & C PARAPET'.

This technical cross-section diagram illustrates the construction of a bridge parapet railing. The railing consists of a concrete parapet base, a steel HSS 5x2x3/16 top rail, and a lower HSS 2x2x3/16 rail. Vertical posts are made of HSS 1 1/2x1 1/2x3/16. The diagram shows the connection of these components through bent plates and bolts. Labels include: FACE OF PAVING NOTCH AT S. ABUT., 187'-10 1/2, 2'6, 24 POST SPACES @ 8'-0 MAX. CTR = 185-4 1/2, 6, 2 1/2, 1" GAP AT SPLICE, BENT PLATE 1/4 x 7 x 10 1/2, HSS 5x2x3/16, HSS 1 1/2x1 1/2x3/16 (TYP.), HSS 2x2x3/16 (TYP.), TYP., TYP., TYP., TYP., TYP., TOP OF CONCRETE PARAPET, and SEE HSS END DETAIL.

TYPICAL POST SECTION AND SECTION C-C

ELEVATION OF PEDESTRIAN RAILING ON BRIDGE

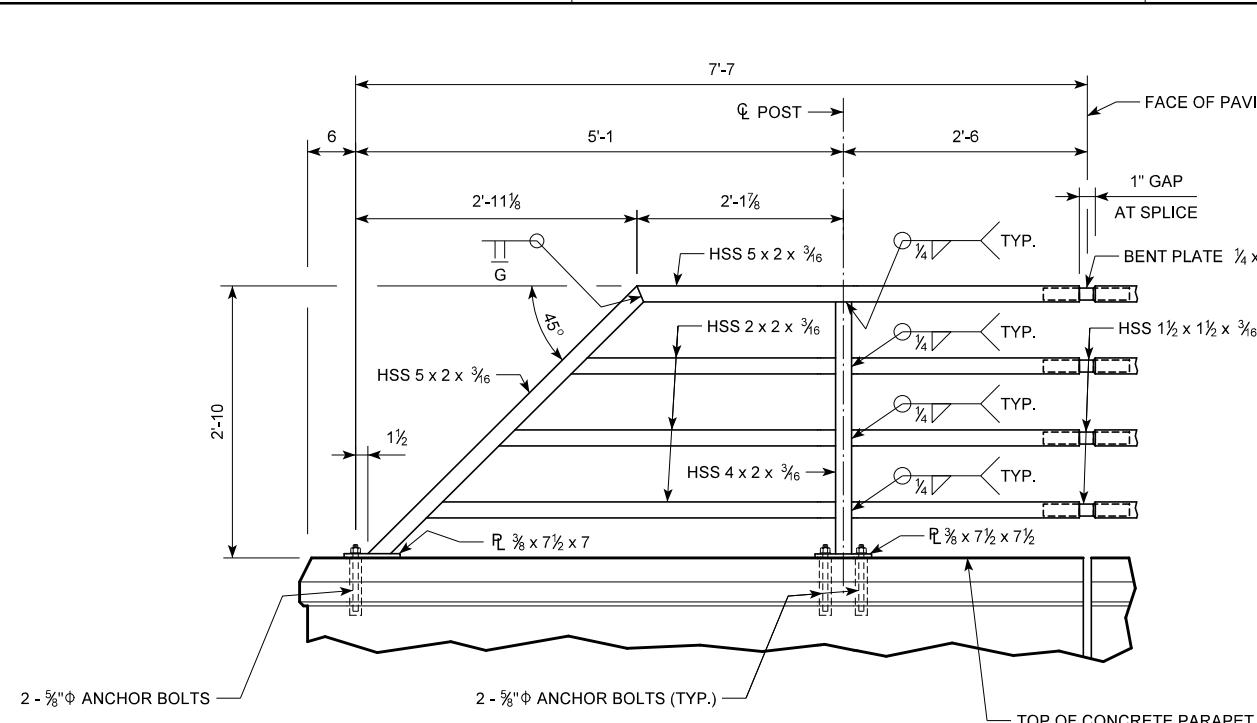
NOTE:
FOR PEDESTRIAN RAILING NOTES,
SPLICING DETAIL, HSS END DETAIL,
SECTION A-A AND SECTION B-B, SEE
SHEET V-25.

**R RAPIDS FLOOD CONTROL SYSTEM
RR ROAD NE BRIDGE AND FLOODWALL
CONSTRUCTION
IAR RIVER BASIN - CEDAR RIVER
CEDAR RAPIDS, IOWA**

**SHAYER ROAD BRIDGE
PEDESTRIAN RAILING DETAILS**

SHEET ID
VOL105B
V.24

/12/2021 \$TIME\$ \$USER\$
\$FILE\$ A



HSS END DETAIL

PEDESTRIAN RAILING NOTES:

THE MATERIAL FOR HOLLOW STRUCTURAL SECTIONS SHALL MEET THE REQUIREMENTS OF ASTM A500, GRADE B. STEEL PLATES SHALL MEET THE REQUIREMENTS OF ASTM A709, GRADE 36. THE PEDESTRIAN RAILING AND ALL RAILING ASSEMBLY HARDWARE AND SHIMS SHALL BE GALVANIZED PER THE STANDARD SPECIFICATIONS AND THESE PLANS.

GRIND SMOOTH ALL BURRS AND SHARP CORNERS OF STEEL RAILING COMPONENTS PRIOR TO GALVANIZING.

THE RAILING COMPONENTS SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123. PREPARE THE FABRICATED RAILING SURFACES BY ABRASIVE BLAST CLEANING TO A MINIMUM OF SSPC SP 6 "COMMERCIAL BLAST CLEANING" PRIOR TO HOT-DIP GALVANIZING. DO NOT QUENCH COMPONENTS AFTER GALVANIZING.

ALL RAILING MEMBERS SHALL BE FLAT AND STRAIGHT AFTER FABRICATION AND GALVANIZING TO WITHIN $\frac{1}{8}$ INCH IN 10 FEET. STRAIGHTEN BY MECHANICAL MEANS WITHOUT DAMAGE TO THE ZINC COATING.

ALL STRUCTURAL STEEL FOR THE PEDESTRIAN RAILING SHALL BE PAINTED AFTER GALVANIZING IN ACCORDANCE WITH SECTION 2509 OF THE STANDARD SPECIFICATIONS. PAINT COLOR IS TO MATCH FEDERAL STANDARD COLOR NUMBER 2703B (BLACK). ANCHOR BOLTS AND HARDWARE SHALL BE PAINTED AFTER INSTALLATION DURING THE TOUCH UP PAINTING ON OTHER PEDESTRIAN RAILING MEMBERS. SUBMIT SEQUENCE OF PAINTING OPERATION AND COLOR SAMPLE TO THE ENGINEER FOR APPROVAL PRIOR TO ORDERING MATERIALS.

PROTECT ALL PAINTED RAILING SURFACES FROM DAMAGE DURING SHIPPING, HANDLING, AND INSTALLATION.

HOLLOW STRUCTURAL SECTIONS FOR THE PEDESTRIAN RAILING SHALL HAVE A MINIMUM LENGTH OF 20'-0 AND A MAXIMUM LENGTH OF 40'-0 BETWEEN SPLICES. SPLICES SHALL BE PLACED WITHIN 2'-6 OF CENTERLINE POSTS. ALL AREAS OF PEDESTRIAN RAILING FABRICATION WHICH CAN RETAIN WATER SHALL BE PROVIDED WITH A $\frac{3}{8}$ " DIA. DRAIN HOLE.

SUBMIT SHOP DRAWINGS FOR ALL COMPONENTS OF THE RAILING.

THE PEDESTRIAN RAILING IS TO BE BID ON A LINEAL FOOT BASIS MEASURED END TO END OF RAILING. THE PRICE BID FOR "STRUCTURAL STEEL PEDESTRIAN HAND RAILING" SHALL BE FULL COMPENSATION FOR FURNISHING AND SURFACE PREPARATION OF ALL MATERIAL, INCLUDING ANCHOR BOLTS AND ALL OF THE EQUIPMENT AND LABOR REQUIRED TO ERECT THE RAILING IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS.

FOR DETAILS OF CONCRETE PARAPET RAIL, SEE SHEET V.21.

DIMENSIONS SHOWN ARE ALONG CENTERLINE RAIL AND ARE IN HORIZONTAL PLANE ONLY. CONTRACTOR SHALL ADJUST FOR SLOPE AND VERTICAL CURVE TO CONFORM TO THE HORIZONTAL AND VERTICAL ALIGNMENT OF THE BRIDGE.

RAILING INSTALLATION NOTES:

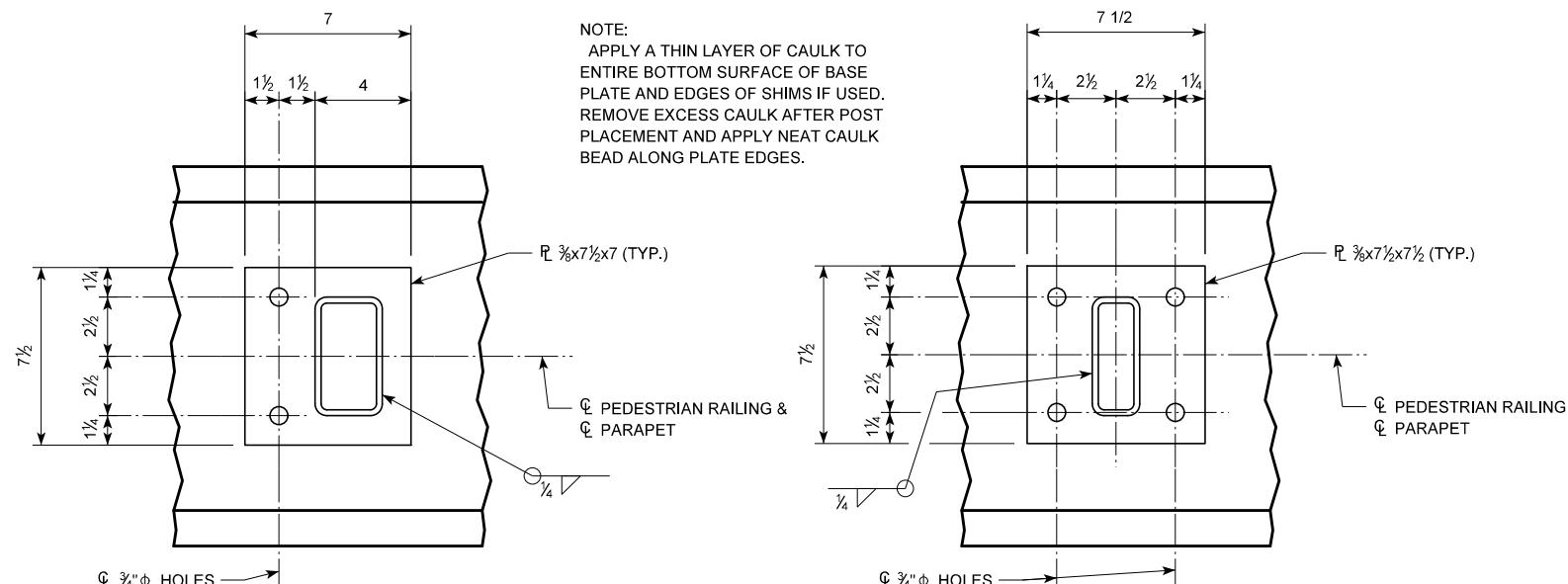
CONTRACTOR SHALL VERIFY DIMENSIONS OF THE CONCRETE PARAPET PRIOR TO COMMENCING FINAL LAYOUT AND INSTALLATION OF RAILING. NOTIFY THE ENGINEER OF ANY DISCREPANCIES IN CONCRETE DIMENSIONS PRIOR TO RAILING INSTALLATION.

SET ALL RAILING POSTS PLUMB. SHIM BASE PLATES AS NECESSARY TO SET POSTS PLUMB.

ANCHOR BOLTS SHALL BE FULLY THREADED AND COMPLY WITH ASTM F-1554 GRADE 55. HEX NUTS SHALL COMPLY WITH ASTM A563-DH. WASHERS SHALL COMPLY WITH ASTM F-436. ANCHOR BOLTS, NUTS, AND WASHERS ARE TO BE GALVANIZED IN ACCORDANCE WITH ASTM A153, CLASS C.

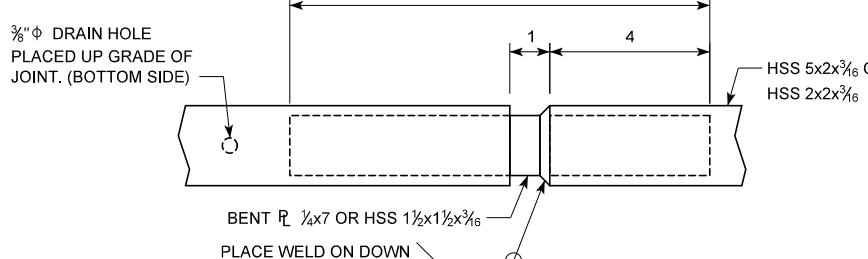
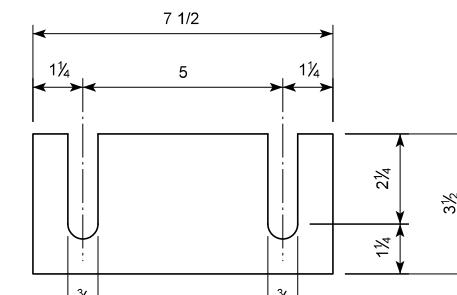
THE ANCHOR BOLTS SHALL BE SET IN DRILLED HOLES. THE HOLES ARE TO BE A MINIMUM OF 8" DEEP. THE EPOXY GROUT SYSTEM TO BE USED AS THE BONDING AGENT SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS ARTICLE 2301.03, E. THE MATERIALS TO BE USED SHALL ALSO BE IN ACCORDANCE WITH THE ADHESIVE MANUFACTURER'S REQUIREMENTS AND BE CAPABLE OF OBTAINING AN ULTIMATE LOAD PER BOLT OF 12 KIPS IN TENSION. SUBMIT EVIDENCE OF THE PROPOSED EPOXY ADHESIVE ANCHORAGES SYSTEM'S ABILITY TO DEVELOP THIS LOAD TO THE ENGINEER FOR APPROVAL PRIOR TO USE. ANCHOR BOLT INSTALLATION, INCLUDING HOLE SIZE, DRILLING, AND CLEAN-OUT SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. CAULK FOR BASE PLATES SHALL BE LIGHT GREY NONSAG LATEX CAULK MARKETED FOR OUTDOOR USE. NO TESTING OR CERTIFICATION IS REQUIRED. DO NOT CONTAMINATE ADJACENT CONCRETE SURFACES WITH CAULK.

ELEVATION OF PEDESTRIAN RAILING ON SOUTH SIDEWALK APPROACH SLAB



SECTION A-A

SECTION B-B

SPICE DETAIL
PLAN VIEW

SHIM PLATE DETAILS

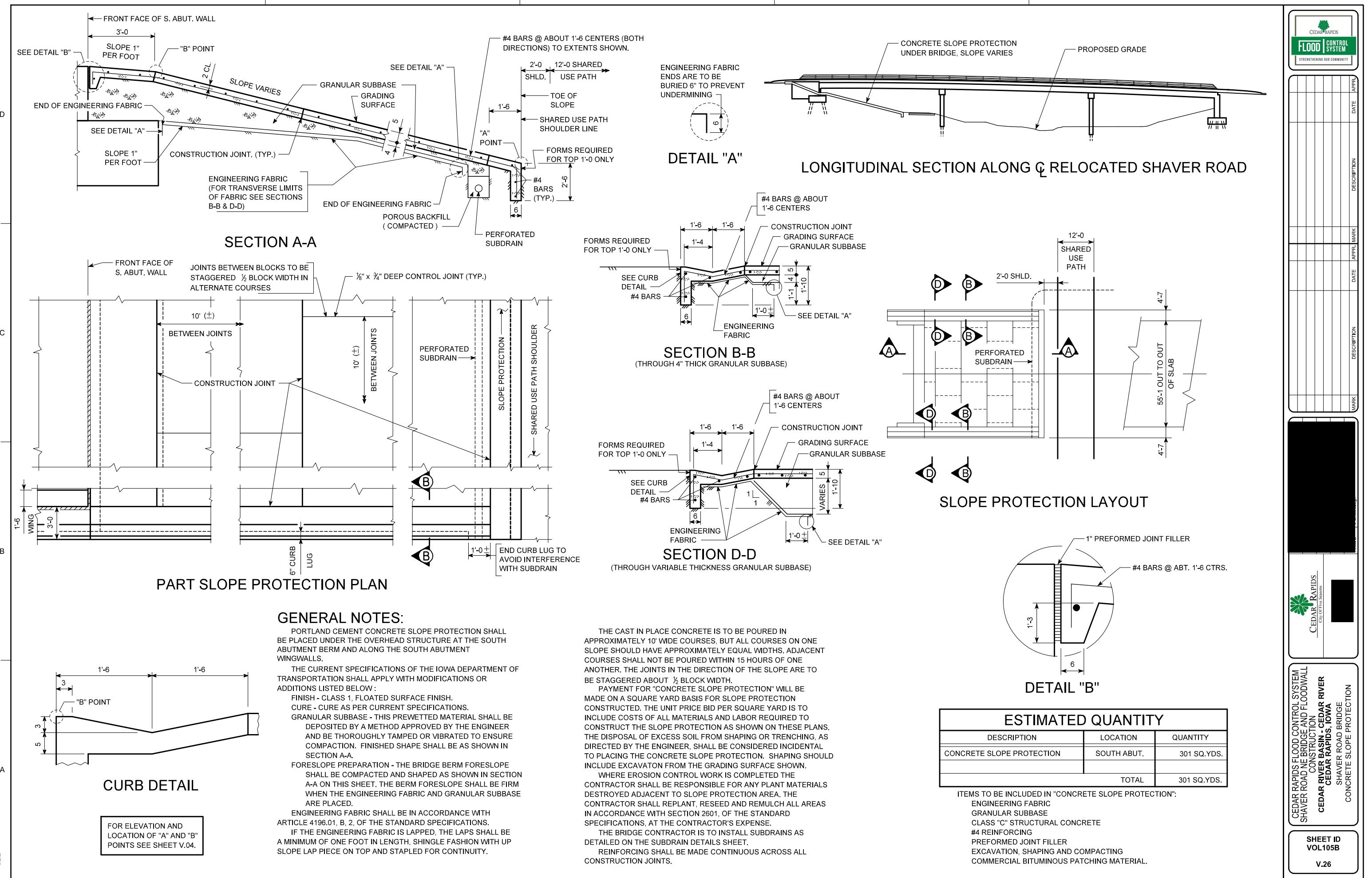
QUANTITY		
ITEM	UNIT	QUANTITY
STRUCTURAL STEEL PEDESTRIAN HAND RAILING (WEST)	L.F.	195.46
STRUCTURAL STEEL PEDESTRIAN HAND RAILING (EAST)	L.F.	195.46
	TOTAL (L.F.)	390.9

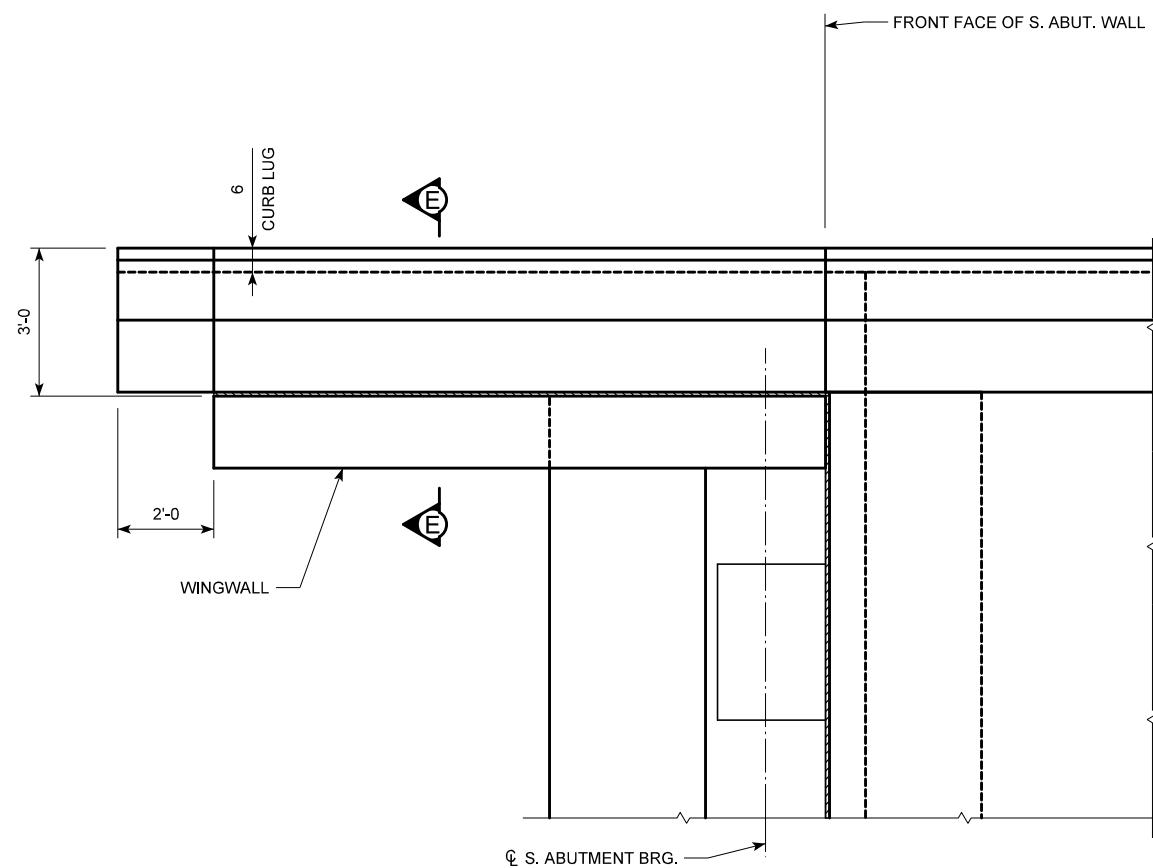
NOTE:
PROVIDE 2 - 1/16 GALVANIZED STEEL SHIMS FOR EACH RAILING POST, TO BE USED AS REQUIRED.

NOTE:
FOR LOCATION OF SECTION A-A AND SECTION B-B, SEE SHEET V.24.

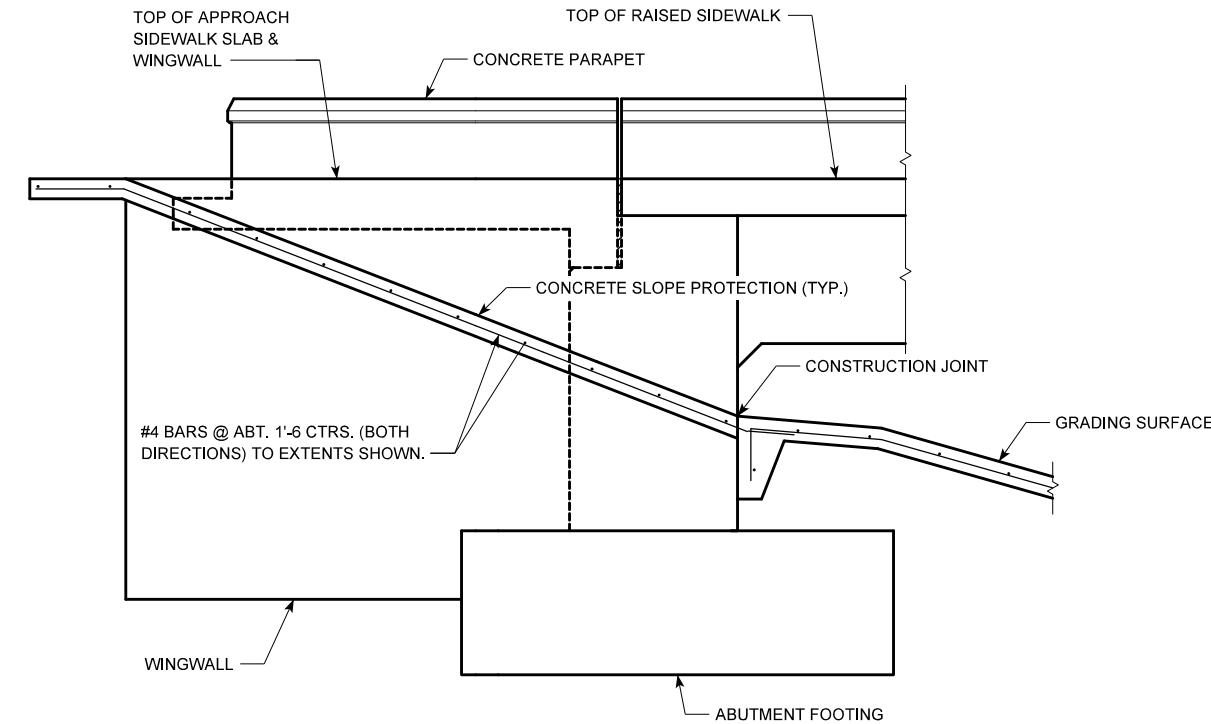
CEDAR RAPIDS FLOOD CONTROL SYSTEM
CONSTRUCTION
CEDAR RIVER BASIN - CEDAR RIVER
SHAYER ROAD BRIDGE
PEDESTRIAN RAILING DETAILS

SHEET ID
VOL105B
V.25

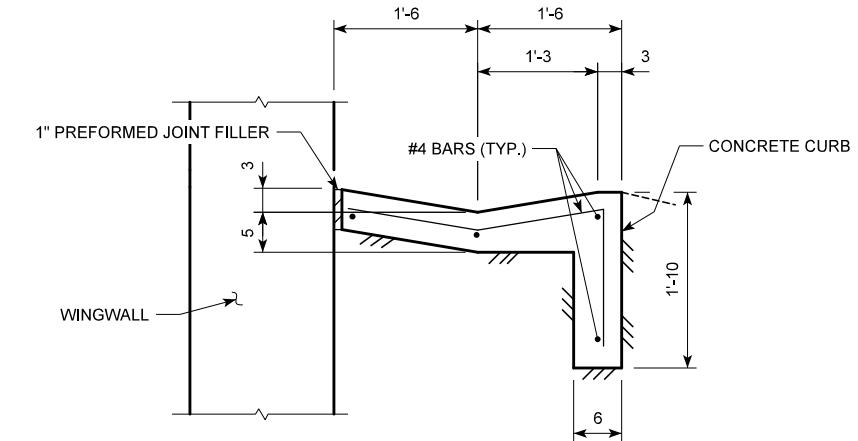




TOP VIEW OF CONCRETE SLOPE PROTECTION
ALONG WINGWALL - PART PLAN



PROFILE VIEW OF CONCRETE SLOPE
PROTECTION ALONG WINGWALL - ELEVATION



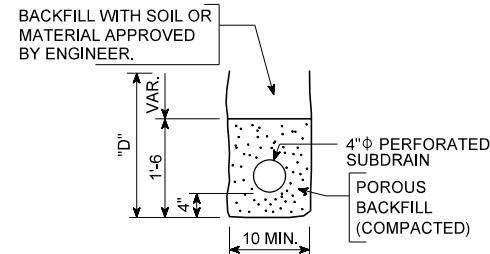
SECTION E-E

NOTES:
GRANULAR SUBBASE AND ENGINEERING FABRIC NOT REQUIRED
UNDER CONCRETE SLOPE PROTECTION ADJACENT TO WINGWALLS.
THE SUBGRADE ADJACENT TO THE WINGWALLS SHALL BE
COMPACTED AND SHAPED AS SHOWN IN SECTION E-E. THE
SUBGRADE SHALL BE FIRM WHEN P.C.C. IS PLACED.

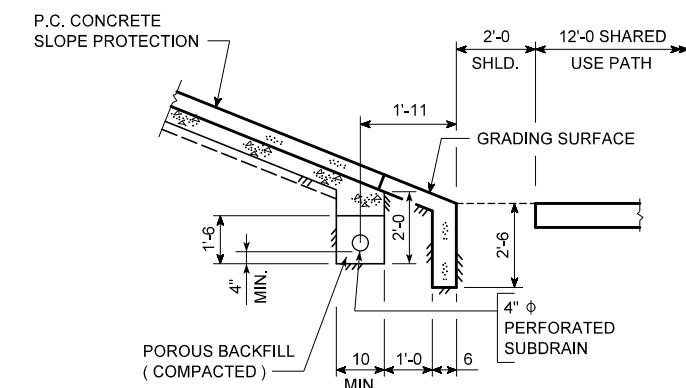
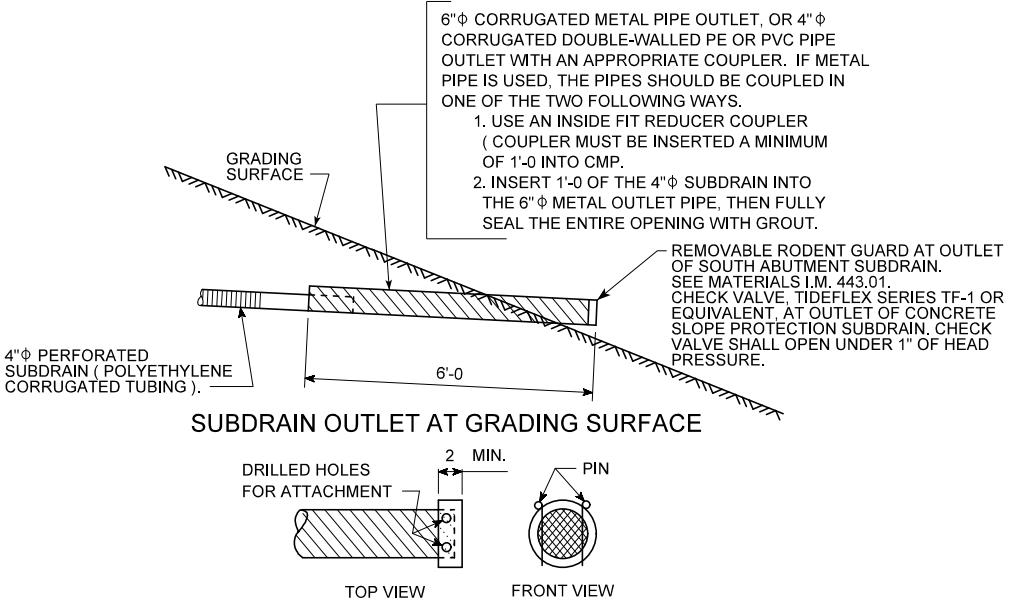


CEDAR RAPIDS FLOOD CONTROL SYSTEM
SHAVER ROAD NE BRIDGE AND FLOODWALL
CONSTRUCTION
CEDAR RIVER BASIN - CEDAR RIVER
CEDAR RAPIDS, IOWA
SHAVER ROAD BRIDGE
CONCRETE SLOPE PROTECTION

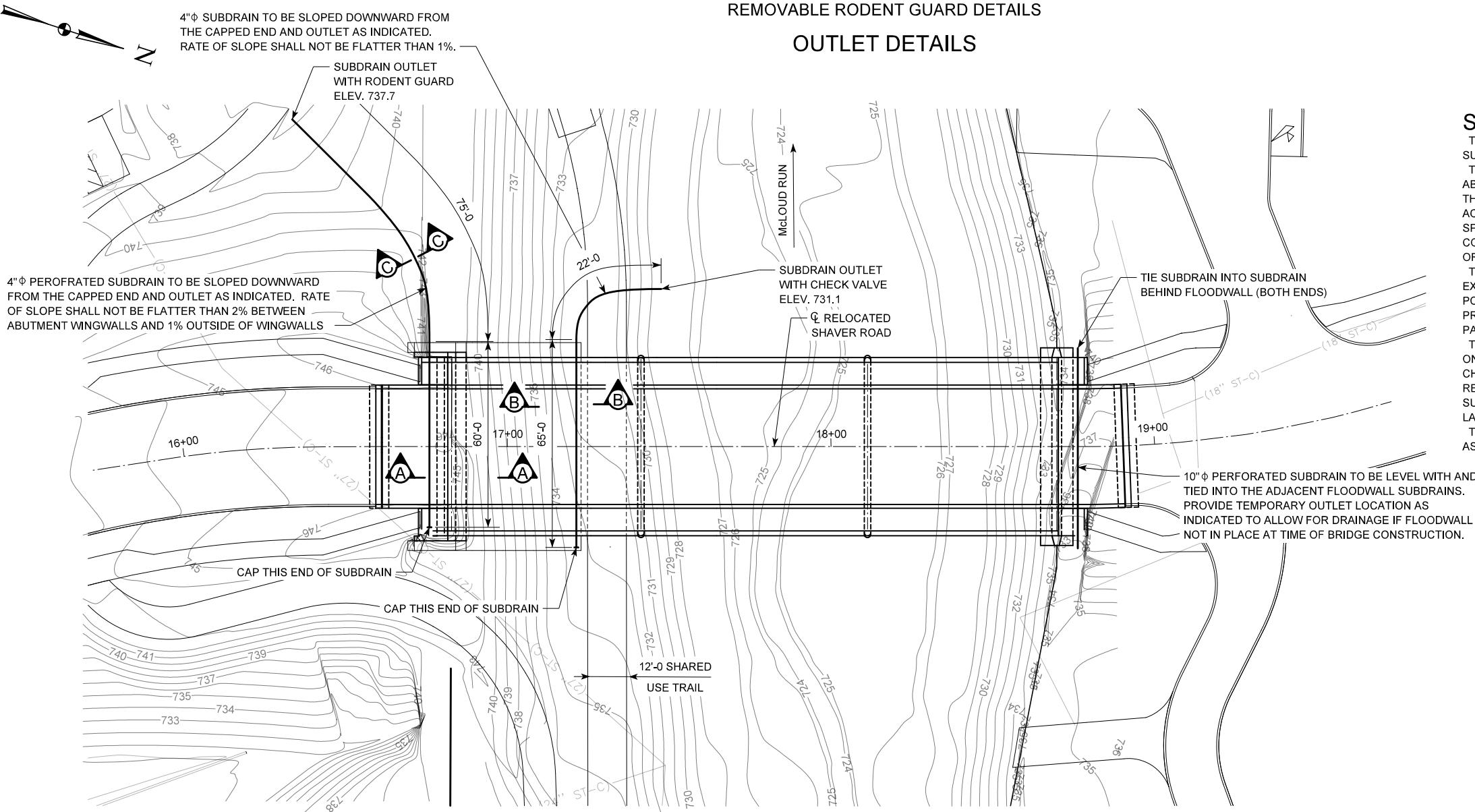
SHEET ID
VOL105B
V.27



SECTION C-C (TYPICAL)



SECTION B-B



SUBDRAIN NOTES:

THIS PLAN SHEET SHOWS DETAILS FOR PLACING ALL SUBDRAINS AND SUBDRAIN OUTLETS REQUIRED FOR THIS STRUCTURE.

THE SUBDRAINS SHALL BE 10" IN DIAMETER BEHIND THE NORTH ABUTMENT AND 4" IN DIAMETER BEHIND THE SOUTH ABUTMENT AND AT THE TOE OF THE CONCRETE SLOPE PROTECTION AND SHALL BE IN ACCORDANCE WITH ARTICAL 4143.01, B, OF THE STANDARD SPECIFICATIONS. THE SUBDRAIN OUTLET AT GRADING SURFACE SHALL CONSIST OF A 6'-0" LENGTH OF PIPE WITH A REMOVABLE RODENT GUARD OR CHECK VALVE AS DETAILED ON THIS SHEET.

THE COST OF FURNISHING AND PLACING SUBDRAIN (INCLUDING EXCAVATION), COMPACTING SOIL BACKFILL, GRANULAR BACKFILL, POROUS BACKFILL, AND SUBDRAIN OUTLET IS TO BE INCLUDED IN THE PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)". NO EXTRA PAYMENT WILL BE MADE.

THE DIMENSIONS SHOWN FOR THE PROPOSED SUBDRAINS ARE BASED ON THE PROPOSED GRADING LAYOUT OF APPROACH ROADWAY AND CHANNEL. THE DIMENSIONS SHOWN ARE FOR ESTIMATING ONLY. REQUIRED LENGTHS AND GENERAL LOCATIONS OF SUBDRAINS ARE SUBJECT TO CHANGE DUE TO FIELD ADJUSTMENTS OF THE GRADING LAYOUT.

THE UPHILL END OF THE PERFORATED SUBDRAINS SHALL BE CAPPED AS APPROVED BY THE ENGINEER.



CEDAR RAPIDS
CITY OFFICE OF DESIGN

CEDAR RAPIDS FLOOD CONTROL SYSTEM
SHAKER ROAD NE BRIDGE AND FLOODWALL
CEDAR RIVER BASIN - CEDAR RIVER
CEDAR RAPIDS, IOWA
SHAKER ROAD BRIDGE
SUBDRAIN DETAILS

SHEET ID
VOL105B
V.28

LIMITS OF COMPAKTED BACKFILL SOIL, POROUS BACKFILL AND GRANULAR BACKFILL

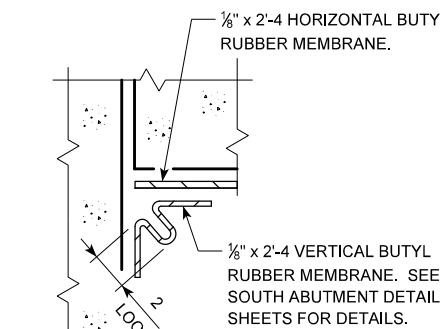
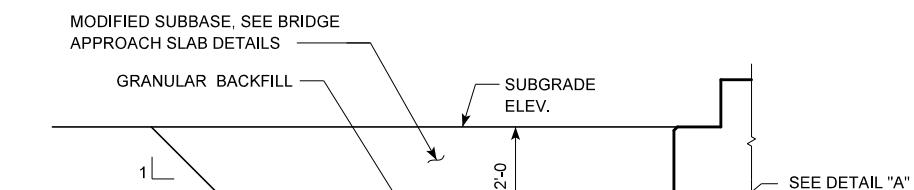
LIMITS OF TOP SLOPE OF GEOTEXTILE FABRIC ALONG ABUTMENT

TIE INTO
FLOODWALL
SUBDRAIN
(TYP.)TOP SLOPE OF
GEOTEXTILE FABRICTOE OF SLOPE & LIMIT OF BOTTOM
OF TRENCH FOR EXCAVATIONBACK FACE OF
ABUTMENT FOOTINGBACK FACE OF
ABUTMENT WALL

10"φ SUBDRAIN

½" x 2'-4 HORIZONTAL BUTYL
RUBBER MEMBRANE. SEE
SOUTH ABUTMENT DETAILS
SHEETS FOR DETAILS.GEOTEXTILE
FABRIC2
LOOP

DETAIL "A"

DETAIL "B"
(SHOWN ABOVE 1½" JOINT)CAP HIGH END
OF SUBDRAINMODIFIED SUBBASE, SEE BRIDGE
APPROACH SLAB DETAILS

GRANULAR BACKFILL

SUBGRADE
ELEV.

2'-0

SEE DETAIL "A"

BUTYL RUBBER
UNDER FABRIC (AT
S. ABUT. ONLY)

POROUS BACKFILL

3'-0

2'-0

4"-φ SUBDRAIN (S. ABUT.)

10"-φ SUBDRAIN (N. ABUT.)

COMPACTED BACKFILL SOIL

4% SLOPE

GEOTEXTILE
FABRIC LIMITS▲ 2'-6 AT NORTH ABUT.
VERIFY ELEVATION OF
SUBDRAIN MATCHES
ADJACENT FLOODWALL
SUBDRAIN.2'-6 MIN. AT SOUTH
ABUTMENT. DIMENSION
VARIES DUE TO 2%
SUBDRAIN SLOPE.NOTE:
GEOTEXTILE FABRIC WILL BE ATTACHED
TO FACE OF ABUTMENT FOOTING, WALL
AND WINGWALLS.SECTION A-A
BACKFILL DETAILS
(S. ABUT. SHOWN, N. ABUT. SIMILAR)

ABUTMENT BACKFILL PROCESS:

THE COMPAKTED BACKFILL SOIL AS SHOWN IN THE "BACKFILL DETAILS" SHALL BE COMPAKTED WITH A MECHANICAL VIBRATORY PLATE OR COMPARABLE DEVICE. AFTER COMPAKTION, THE BACKFILL SOIL IS TO BE GRADED WITH A 4% SLOPE AWAY FROM THE ABUTMENT FOOTING. AT THE NORTH ABUTMENT, THE HEIGHT OF THE BACKFILL SOIL SHALL BE CONSTANT TO PROVIDE A LEVEL SUBDRAIN. THE ELEVATION OF THE SUBDRAIN SHALL MATCH THE SUBDRAIN IN THE ADJACENT FLOODWALL. AT THE SOUTH ABUTMENT, MAINTAIN A 2% CROSS SLOPE IN THE DIRECTION OF THE SUBDRAIN OUTLET. THIS SHAPING IS TO BE DONE PRIOR TO BEGINNING INSTALLATION OF THE GEOTEXTILE AND BACKFILL MATERIAL.

AFTER THE BACKFILL SOIL HAS BEEN SHAPED, THE GEOTEXTILE FABRIC SHALL BE INSTALLED IN ACCORDANCE WITH THE DETAILS SHOWN. THE FABRIC IS INTENDED TO BE INSTALLED AT THE BASE OF THE POROUS BACKFILL AND EXTENDED VERTICALLY UP THE ABUTMENT FOOTING, WALL, WINGWALLS, AND EXCAVATION FACE TO A HEIGHT THAT WILL BE APPROXIMATELY 1 FOOT HIGHER THAN THE HEIGHT OF THE POROUS BACKFILL PLACEMENT AS SHOWN IN THE "BACKFILL DETAILS" ON THIS SHEET. THE STRIPS OF THE FABRIC PLACED SHALL OVERLAP APPROXIMATELY 1 FOOT AND SHALL BE PINNED IN PLACE. THE FABRIC SHALL BE ATTACHED TO THE ABUTMENT WALL BY USING LATH FOLDED IN THE FABRIC AND SECURED TO THE CONCRETE WITH SHALLOW CONCRETE NAILS. THE FABRIC PLACED AGAINST THE EXCAVATION FACE SHALL BE PINNED.

WHEN THE FABRIC IS IN PLACE, THE SUBDRAIN SHALL BE INSTALLED DIRECTLY ON THE FABRIC AT THE TOE OF THE REAR EXCAVATION SLOPE. A SLOT WILL NEED TO BE CUT IN THE FABRIC AT THE POINT WHERE THE SUBDRAIN EXITS THE FABRIC NEAR THE END OF THE ABUTMENT.

POROUS BACKFILL IS THEN PLACED AND LEVELED, NO COMPAKTION IS REQUIRED. POROUS BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 4131 OF THE STANDARD SPECIFICATIONS.

GRANULAR BACKFILL MATERIAL SHALL MEET THE REQUIREMENTS OF SECTION 4133 OF THE STANDARD SPECIFICATIONS. COMPACT THE GRANULAR BACKFILL MATERIAL ACCORDING TO ARTICLE 2107.03, H OF THE STANDARD SPECIFICATIONS. PLACE THE GRANULAR BACKFILL MATERIAL IN THE MAXIMUM 8 INCH LIFTS, COMPACTED TO A MINIMUM 95% OF STANDARD PROCTOR DENSITY (ASTM D 698). ENSURE MOISTURE LIMITS ARE BETWEEN 1% UNDER OPTIMUM MOISTURE TO NOT MORE THAN 2% OVER OPTIMUM MOISTURE CONTENT. ONLY HAND OPERATED COMPAKTION EQUIPMENT WILL BE ALLOWED WITHIN 3 FEET OF ABUTMENT.

GRANULAR BACKFILL, SUBDRAINS, POROUS BACKFILL, BUTYL RUBBER MEMBRANES, WATERPROOF ADHESIVE, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS WILL NOT BE MEASURED SEPARATELY FOR PAYMENT.

THE COST OF GRANULAR BACKFILL, SUBDRAINS, POROUS BACKFILL, BUTYL RUBBER MEMBRANES, WATERPROOF ADHESIVE, AND GEOTEXTILE FABRIC FURNISHED AT THE BRIDGE ABUTMENTS SHALL BE INCLUDED IN THE CONTRACT UNIT PRICE BID FOR "STRUCTURAL CONCRETE (BRIDGE)".



FLOOD CONTROL SYSTEM

STRENGTHENING OUR COMMUNITY

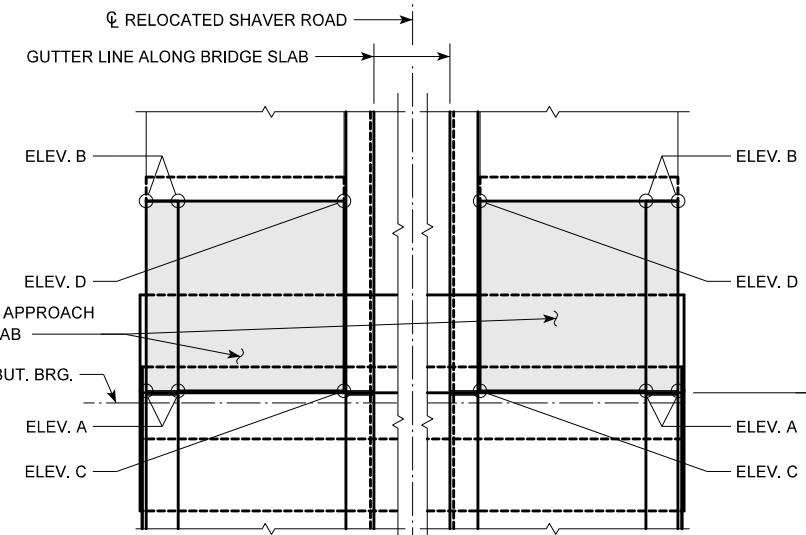
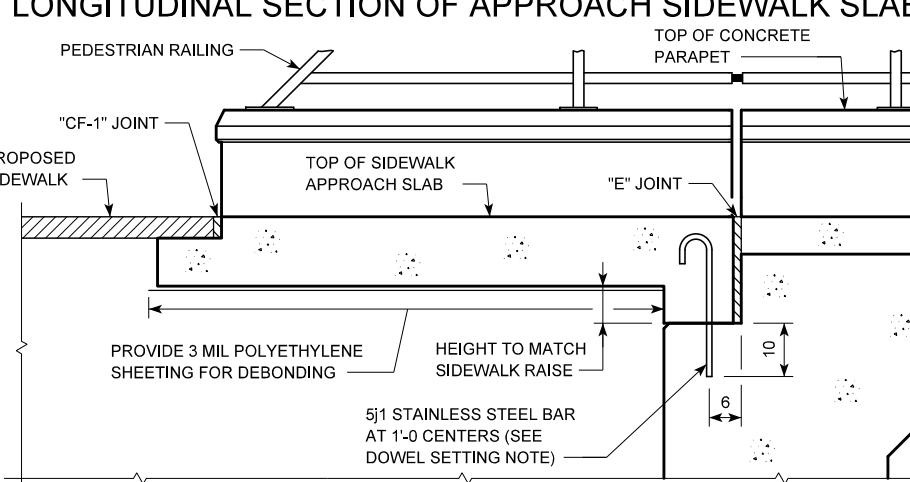
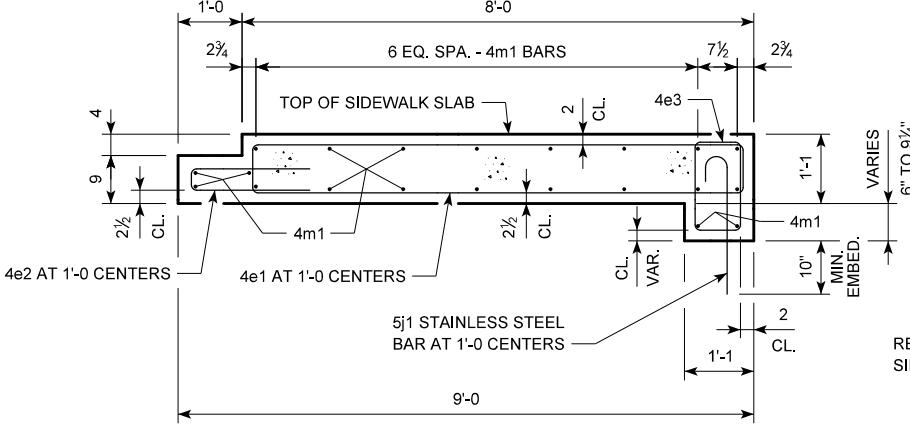
APPR. DATE

DESCRIPTION

DATE

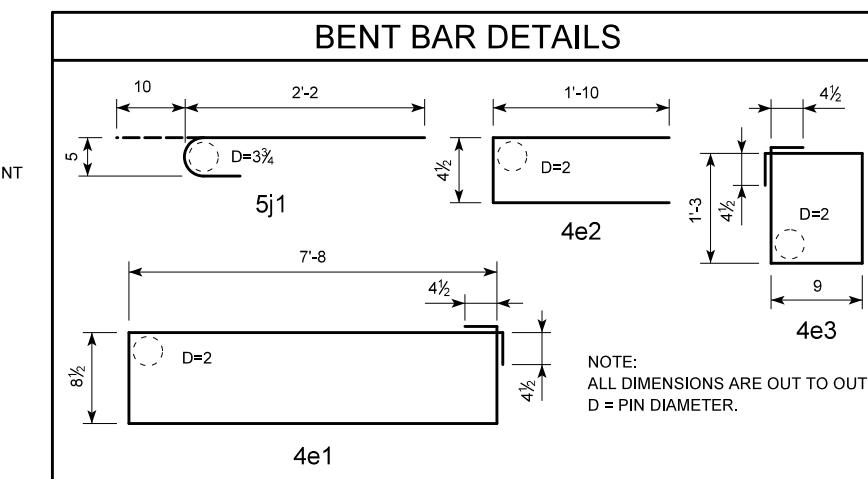
APPR. MARK

D



REINFORCING BAR LIST - ONE SIDEWALK SLAB					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4e1	SIDEWALK SLAB HOOPS	□	9	17'-6	105
4e2	SIDEWALK SLAB HOOPS AT SIDEWALK LIP	□	9	4'-1	25
4e3	SIDEWALK SLAB HOOPS AT PAVING NOTCH	□	9	4'-9	29
4e4	SIDEWALK SLAB AT PARAPET	—	2	7'-8	10
4m1	SIDEWALK SLAB TRANSV. TOP & BOTTOM	—	21	8'-1	113
REINFORCING STEEL EPOXY COATED - TOTAL (LBS.)					
5j1	SIDEWALK SLAB DOWEL BAR	C	9	3'-0	28
STAINLESS STEEL - TOTAL (LBS.)					

NOTES:
ALL REINFORCING STEEL IS TO BE EITHER EPOXY COATED OR STAINLESS STEEL AS SHOWN. THE STAINLESS STEEL REINFORCING STEEL SHALL BE DEFORMED BAR GRADE 60 MEETING THE REQUIREMENTS OF MATERIALS I.M. 452.
REINFORCING STEEL QUANTITIES ARE INCLUDED ON THE SUMMARY QUANTITIES SHEET.



DOWEL SETTING NOTE:
THE 5j1 BARS SHALL BE SET AS DOWELS IN DRILLED HOLES. HOLES ARE TO BE 10" DEEP. THE DOWELS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. ONE OF THE FOLLOWING SYSTEMS SHALL BE USED AS A BONDING AGENT FOR THE DOWELS:
A. POLYMER GROUT SYSTEM IN ACCORDANCE WITH ARTICLE 2301.03, E, OF THE STANDARD SPECIFICATIONS.
B. HYDRAULIC CEMENT GROUT SYSTEMS. DRILLED HOLES ARE TO BE 2 1/2 TIMES THE DOWEL DIAMETER AND ARE TO BE BLOWN CLEAN WITH COMPRESSED AIR IMMEDIATELY PRIOR TO PLACING GROUT. THE HYDRAULIC CEMENT GROUT SHALL BE ONE OF THOSE APPROVED IN MATERIALS I.M. 491.13 AND SHALL BE USED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

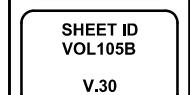
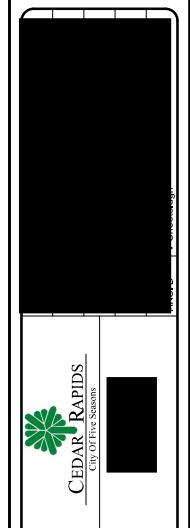
CONCRETE PLACEMENT QUANTITY		
ITEM	UNIT	QUANTITY
STRUCTURAL CONCRETE (BRIDGE) (4 @ 3,125 CU. YDS.)	CU. YDS.	12,5

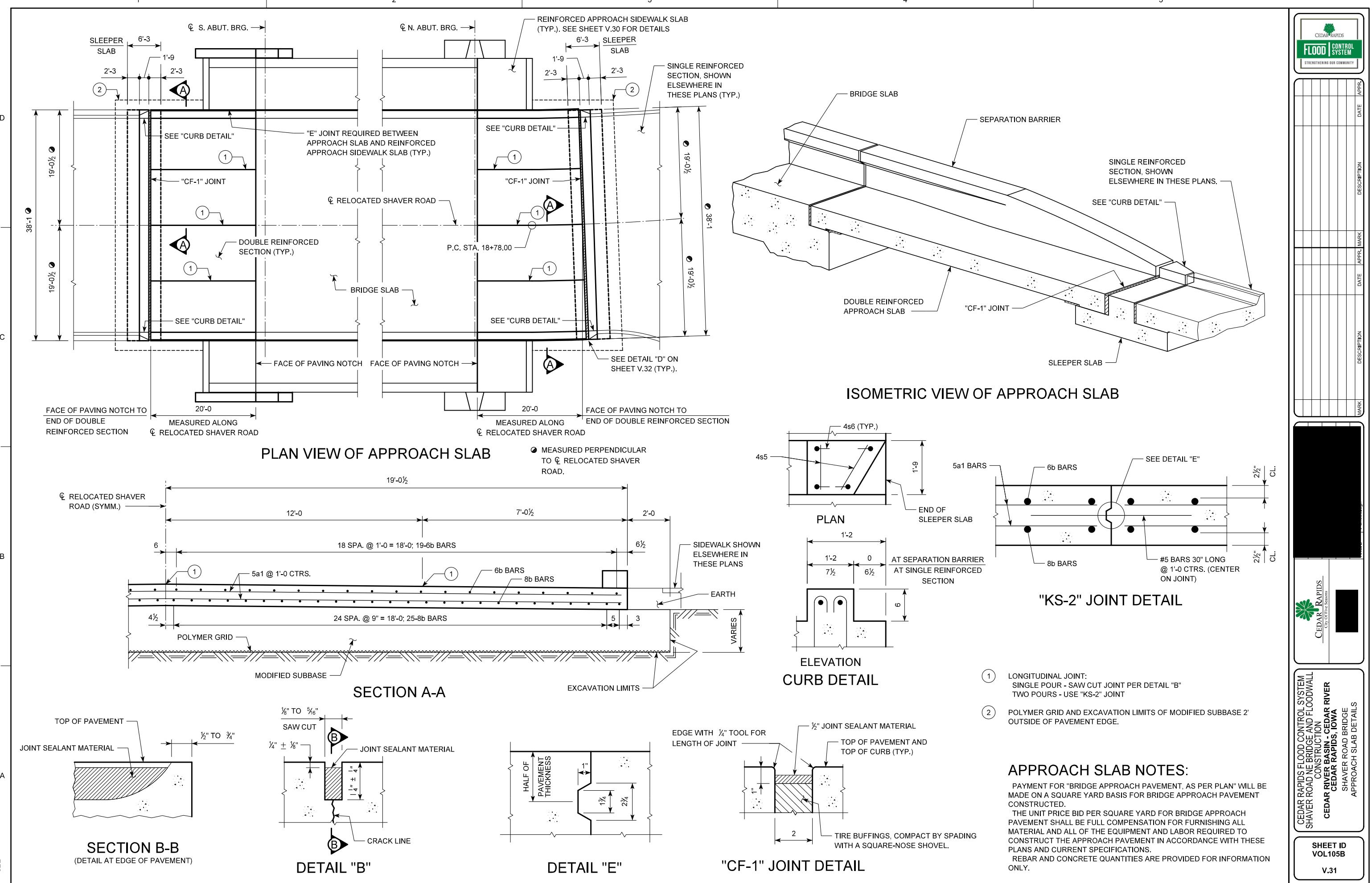
NOTES:
COST OF "E" JOINT MATERIAL AND POLYETHYLENE SHEETING IS CONSIDERED INCIDENTAL TO THE COST OF "STRUCTURAL CONCRETE (BRIDGE)". CONCRETE QUANTITY IS TO BE INCLUDED ON THE SUMMARY QUANTITIES SHEET. FOR "CF-1" JOINT DETAIL, SEE SHEET V.31.

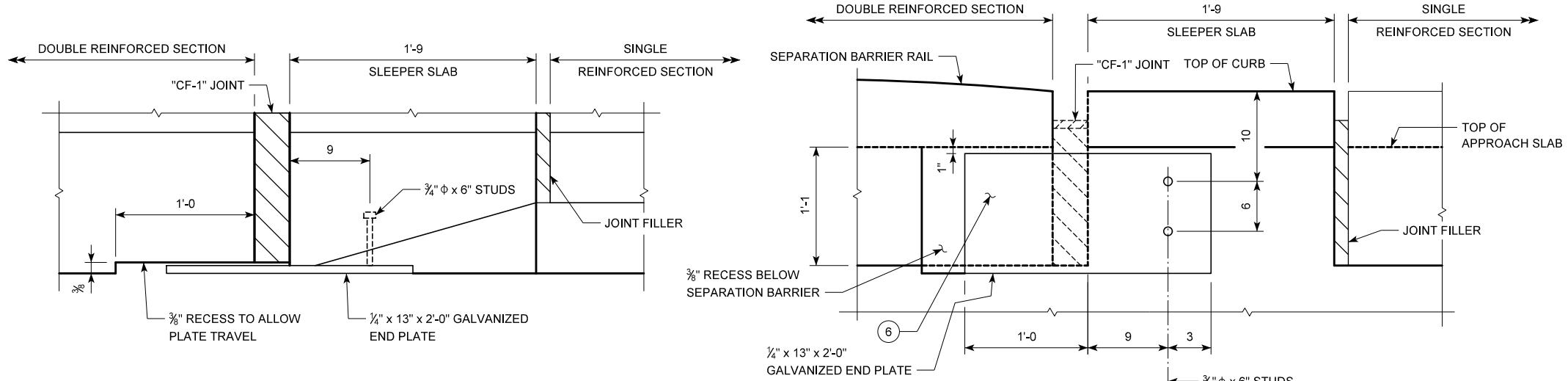
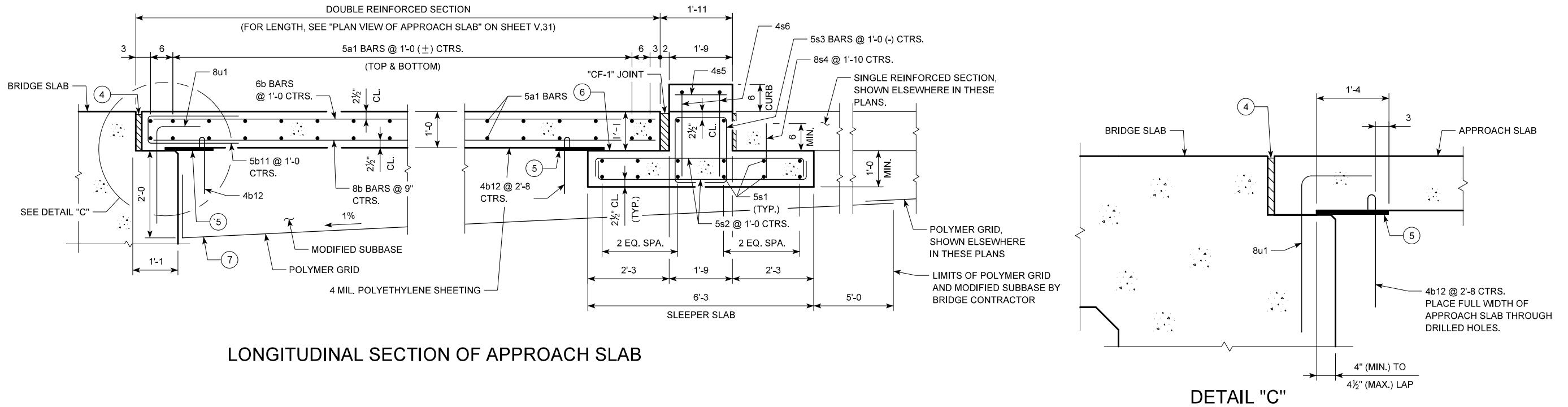
TABLE OF SIDEWALK SLAB ELEVATIONS		
LOCATION	SOUTH APPROACHES	NORTH APPROACHES
A	746.27	741.72
B	746.21	741.35
C	746.16	741.61
D	746.10	741.25



ITEM	DESCRIPTION	DATE	APPR. MARK







- (4) ¼" RESILIENT JOINT FILLER AND SEAL TOP.
- (5) ¾" x 1'-4" WIDE RESILIENT JOINT FILLER FOR FULL WIDTH OF APPROACH SLAB.
- (6) DEBOND WITH 2 LAYERS OF 30# ASPHALTIC FELT PAPER FULL LENGTH.
- (7) EXCAVATE TO EXISTING GRANULAR BACKFILL LINE.

CEDAR RAPIDS FLOOD CONTROL SYSTEM
CONSTRUCTION
CEDAR RIVER BASIN - CEDAR RIVER
CEDAR RAPIDS, IOWA
SHAYER ROAD BRIDGE
APPROACH SLAB DETAILS

