APPENDIX
MR-2021

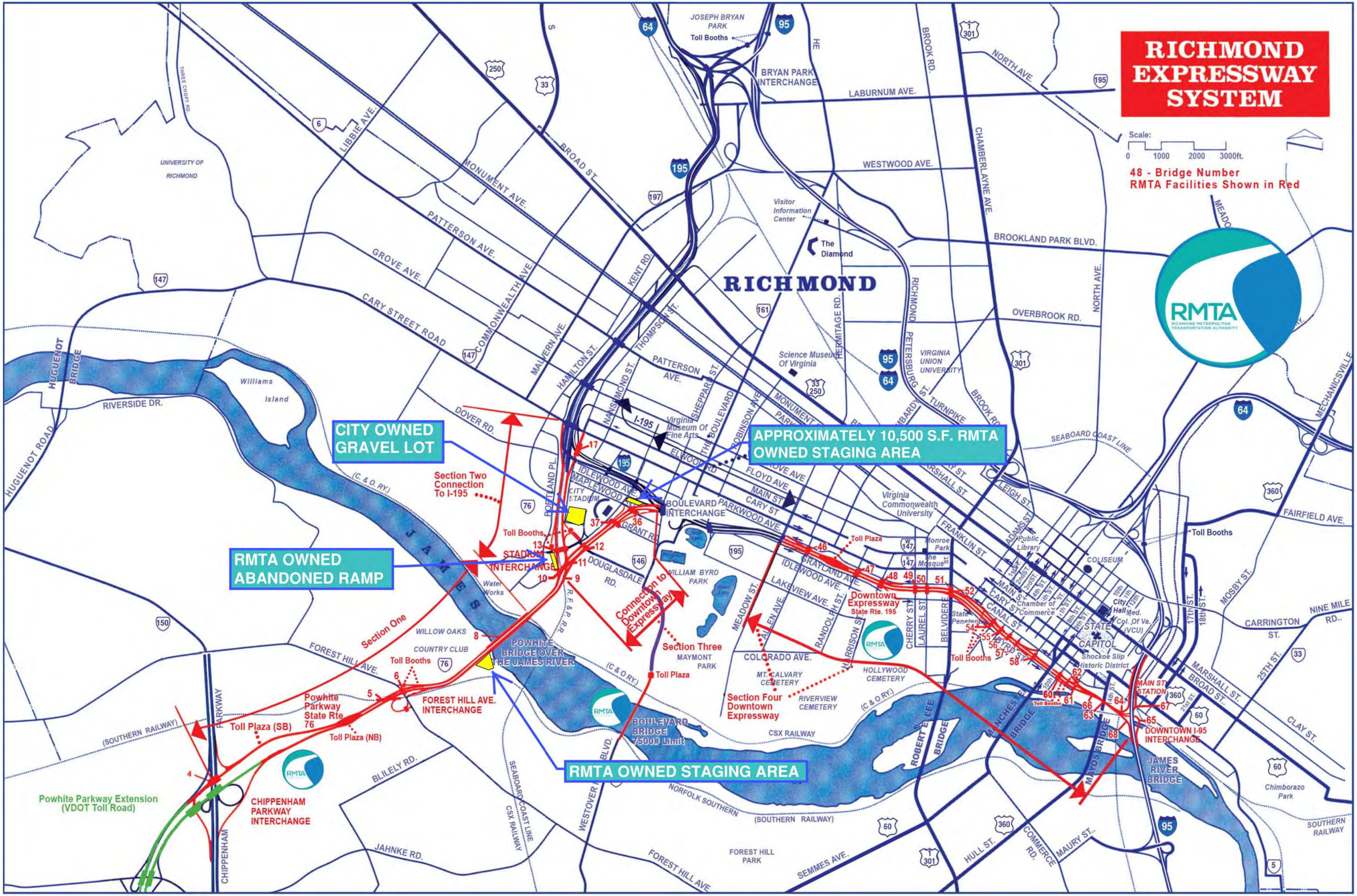
RECORD DRAWINGS

Contract C-10 - Standard Details
Contract C-10 - Bridge Fire Protection Dry Standpipe System
RMTA BRIDGES 8, 13, 17, 47, 62, 63, 64, 66, & 67

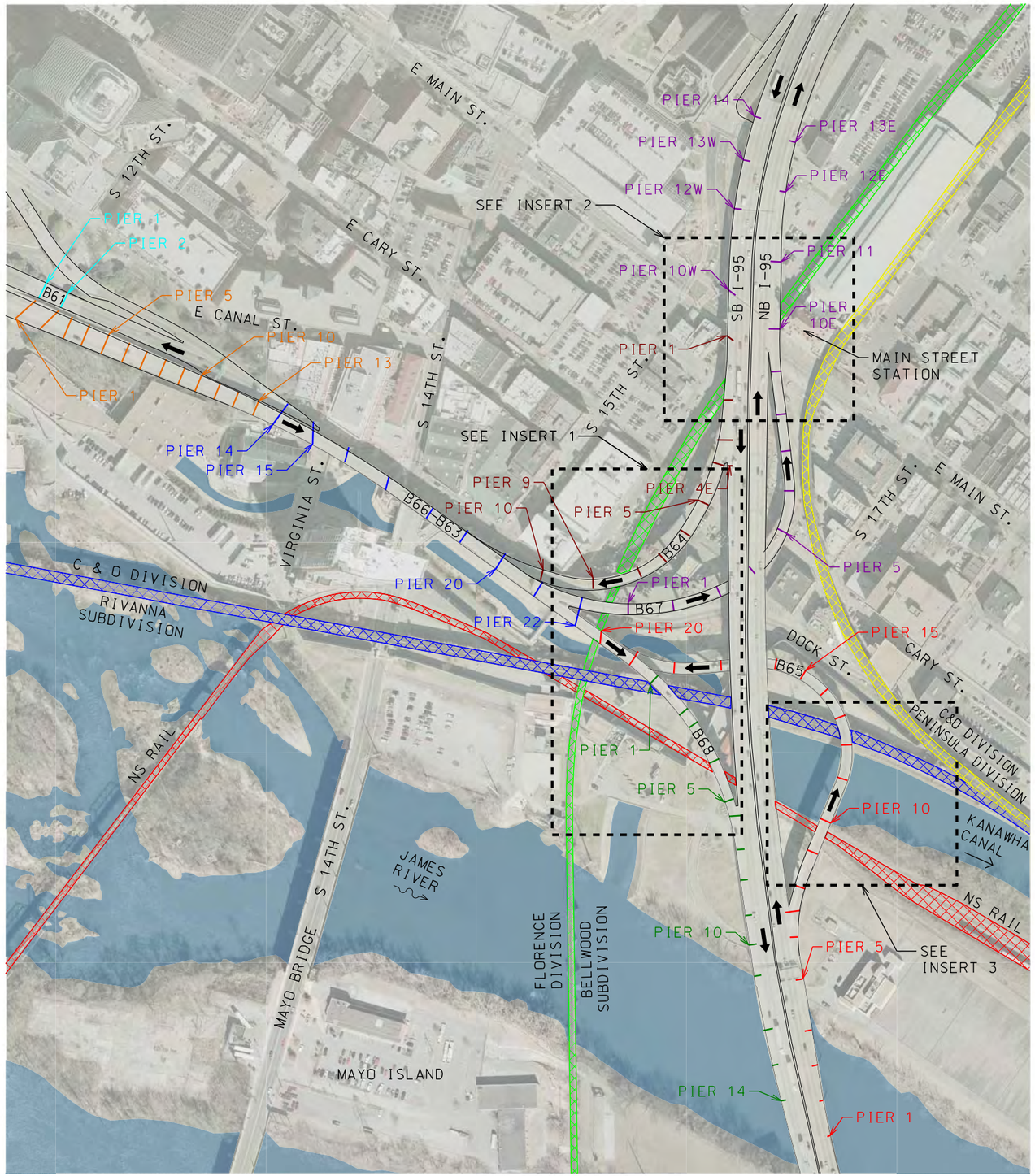
(NOTE: Additional sheets of the As-built Plans are Available upon Request to the Engineer)

RMTA

System Map


RICHMOND EXPRESSWAY SYSTEM
Scale:
0 1000 2000 3000ft.
48 - Bridge Number
RMTA Facilities Shown in Red
RMTA
RICHMOND METROPOLITAN TRANSPORTATION AUTHORITY
RICHMOND
CITY OWNED GRAVEL LOT
APPROXIMATELY 10,500 S.F. RMTA OWNED STAGING AREA
RMTA OWNED ABANDONED RAMP
RMTA OWNED STAGING AREA
Section One
Section Two Connection To I-195
Section Three
Section Four Downtown Expressway
Connection to Downtown Expressway
Downtown Expressway State Rte. 195
Powhite Parkway State Rte 76
Powhite Parkway Extension (VDOT Toll Road)
CHIPPENHAM PARKWAY INTERCHANGE
FOREST HILL AVE. INTERCHANGE
STADIUM INTERCHANGE
BOULEVARD INTERCHANGE
DOWNTOWN I-95 INTERCHANGE
BRYAN PARK INTERCHANGE
POWHITE BRIDGE OVER THE JAMES RIVER
BOULEVARD BRIDGE 7500# Limit
JAMES RIVER BRIDGE
MAYOS BRIDGE
MANCHESTER BRIDGE
ROBERT E. LEE BRIDGE
HUGUENOT BRIDGE
MAIN ST. STATION
Toll Plaza (SB)
Toll Plaza (NB)
Toll Plaza
Toll Booths
JAMES
JOSEPH BRYAN PARK
UNIVERSITY OF RICHMOND
Williams Island
WILLOW OAKS COUNTRY CLUB
Water Works
CITY STADIUM
WILLIAM BYRD PARK
MAYMONT PARK
MT. CALVARY CEMETERY
RIVERVIEW CEMETERY
HOLLYWOOD CEMETERY
FOREST HILL PARK
Chimborazo Park
Visitor Information Center
The Diamond
Science Museum Of Virginia
Virginia Museum Of Fine Arts
VIRGINIA UNION UNIVERSITY
Virginia Commonwealth University
Monroe Park
The Mosque
Public Library
COLISEUM
City Hall
Med. Col. Of Va. (VCU)
STATE CAPITOL
Shockoe Slip Historic District
State Penetentiary
Chamber of Commerce
HUGUENOT ROAD
RIVERSIDE DR.
THREE CHOPT RD.
LIBBIE AVE.
MONUMENT AVE.
PATTERSON AVE.
GROVE AVE.
CARY STREET ROAD
BROAD ST.
COMMONWEALTH AVE.
MALVERN AVE.
HAMILTON ST.
KENT RD.
THOMPSON ST.
NANSEMOND ST.
SHEPPARD ST.
THE BOULEVARD
ROBINSON AVE.
DOVER RD.
PORTLAND PL.
IDLEWOOD AVE.
MAPLEWOOD AVE.
ELWOOD RD
FLOYD AVE
MAIN ST
CARY ST
PARKWOOD AVE.
GRANT RD
DOUGLASDALE RD.
R.F.&P. R.R.
GRAYLAND AVE.
LAKEVIEW AVE.
MEADOW ST.
ALLEN AVE.
RANDOLPH ST.
HARRISON ST.
CHERRY ST.
LAUREL ST.
BELVIDERE ST.
COLORADO AVE.
FRANKLIN ST
CANAL ST
BYRD ST
ADAMS ST.
LEIGH ST.
MARSHALL ST.
BROAD ST.
CLAY ST.
17th ST.
18th ST.
21st ST.
25TH ST.
MOSBY ST.
CARRINGTON ST.
NINE MILE RD.
FAIRFIELD AVE.
MECHANICSVILLE
LABURNUM AVE.
WESTWOOD AVE.
BROOKLAND PARK BLVD.
OVERBROOK RD.
NORTH AVE.
BROOK RD.
CHAMBERLAYNE AVE.
HERMITAGE RD.
RICHMOND PETERSBURG ST. TURNPIKE
SEABOARD COAST LINE
FOREST HILL AVE.
WESTOVER BLVD.
BLILELY RD.
JAHNKE RD.
SEMMES AVE.
HULL ST.
COMMERCE RD.
MAURY ST.
CHIPPENHAM PARKWAY
(C. & O. RY.)
(SOUTHERN RAILWAY)
NORFOLK SOUTHERN
CSX RAILWAY
SOUTHERN RAILWAY
I-195
64
95
195
250
33
6
147
197
161
146
150
76
301
360
60
5

RMTA DTE, I-95 Ra RMTA DTE, I-95 Ramps Pier Location Exhibit



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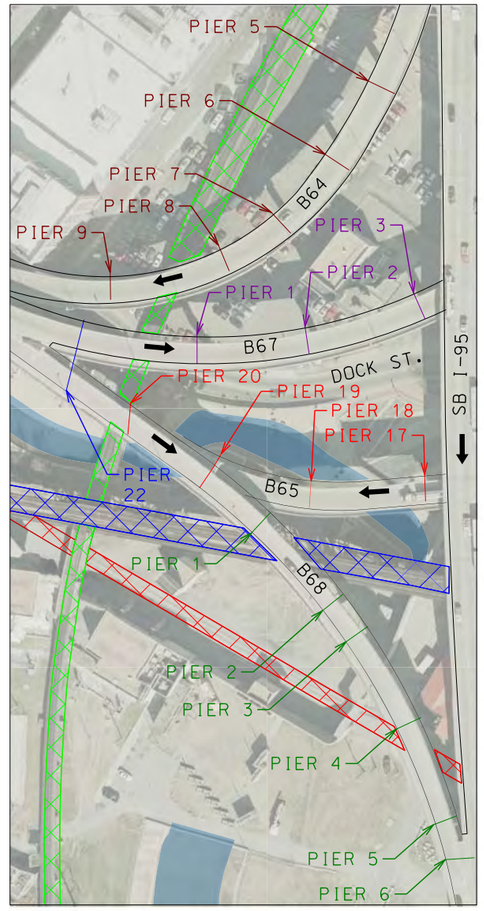

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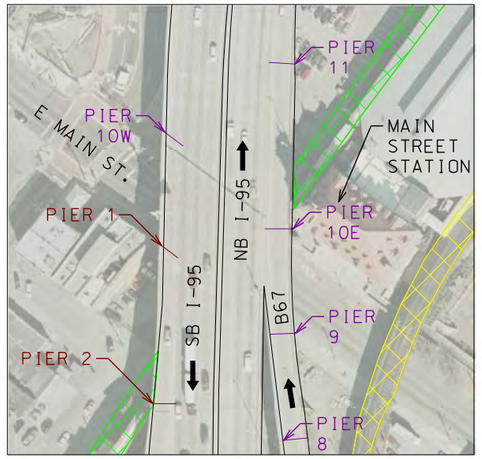

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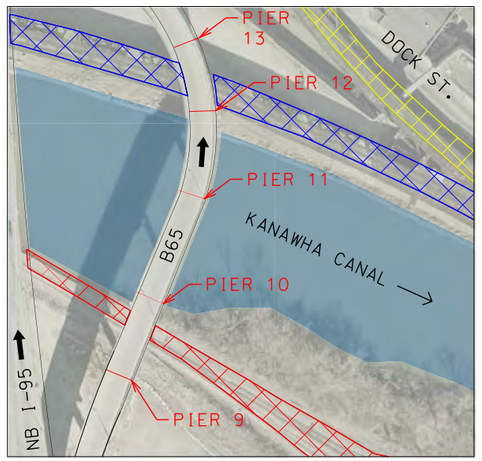


LEGEND:
- BRIDGE 63
- BRIDGE 64
- BRIDGE 65
- BRIDGE 66
- BRIDGE 67
- BRIDGE 68
- N&S RAILROAD
- CSX RAILROAD
- CSX RAILROAD
- CSX RAILROAD

NOTES:
1) PIER NUMBERS BASED ON AS-BUILT DRAWINGS FROM CONTRACTS C-10 AND C-11.
2) RAILROAD LIMITS AND PIER LOCATIONS BASED ON AERIAL PHOTOGRAPHY.
3) THIS EXHIBIT IS FOR REFERENCE ONLY. REFER TO AS-BUILT DRAWINGS FOR EXACT PIER LOCATIONS.
4) BRIDGE 63 IS ON BOTTOM, BRIDGE 66 IS ON TOP.

RICHMOND METROPOLITAN TRANSPORTATION AUTHORITY

HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

I-95 RAMPS PIER LOCATION EXHIBIT

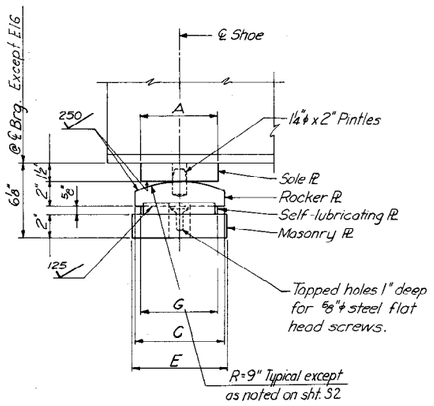
Scale:	Date:	Contract No.:	Sheet:
N.T.S.	MAY 2015	MR-2015	1 OF 1

Pier Map-DR2016.dgn
3/4/2016

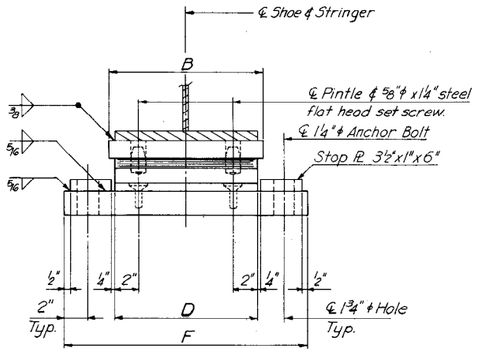
Contract C-10
Standard Details

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	259	265



SIDE ELEVATION



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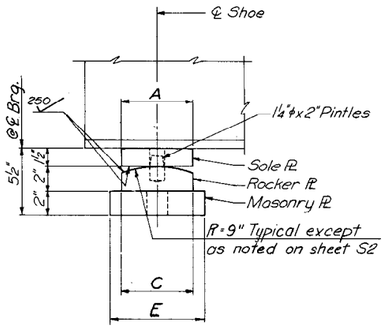

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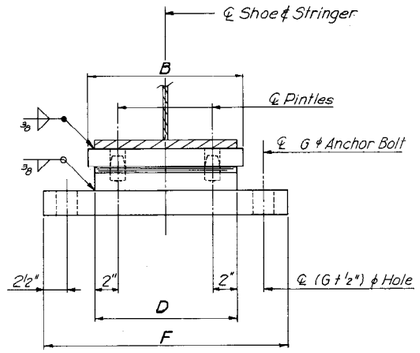
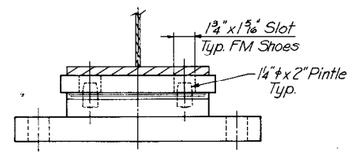


END ELEVATION

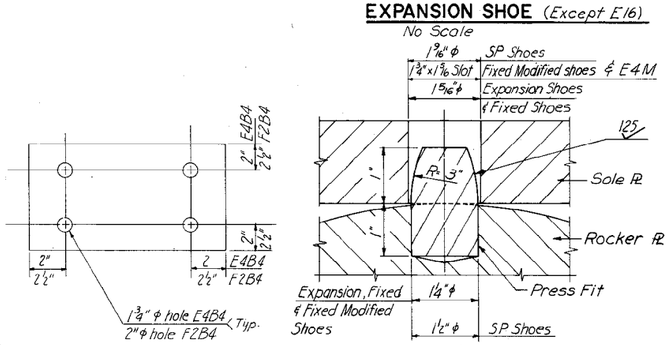


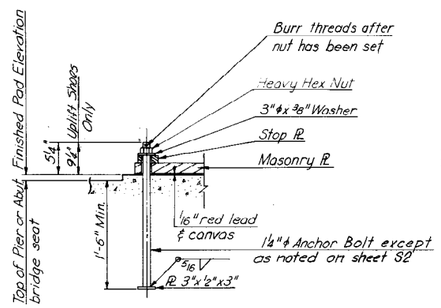
END ELEVATION

Note:
Fixed Modified Shoes same as Fixed Shoes except as shown.

EXPANSION SHOE (Except E16)

No Scale

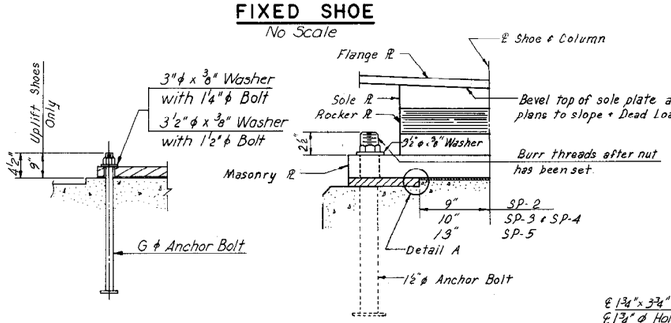




EXPANSION SHOE

FIXED SHOE

No Scale



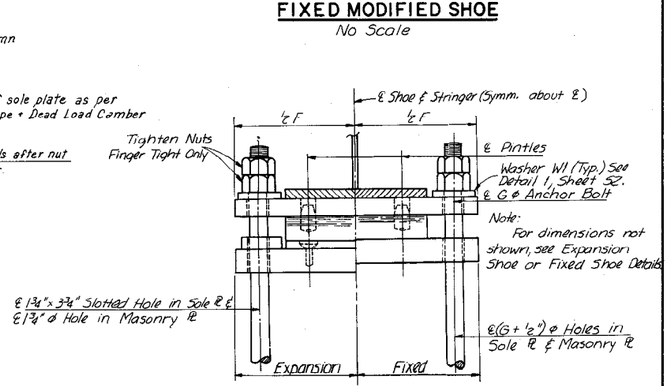
FIXED SHOE

SP-2 THRU SP-5

No Scale

FIXED MODIFIED SHOE

No Scale



UPLIFT SHOE

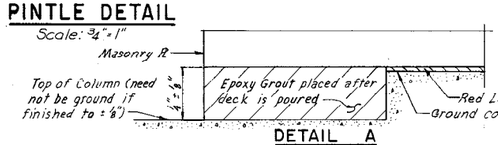
No Scale

Note:
For shoe schedules see sheet S2.
For shoe notes, see sheet S2.

MASONRY PLATE DETAIL E4B4 & F2B4

PINTLE DETAIL

Scale: ¾"=1"



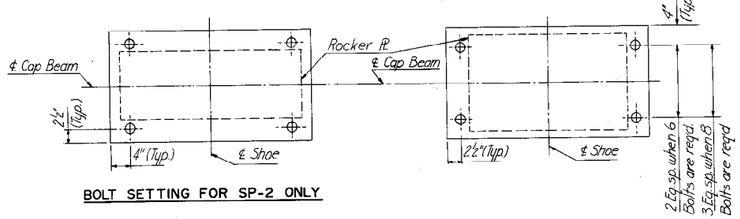
DETAIL A

No Scale

ANCHOR BOLT DETAIL

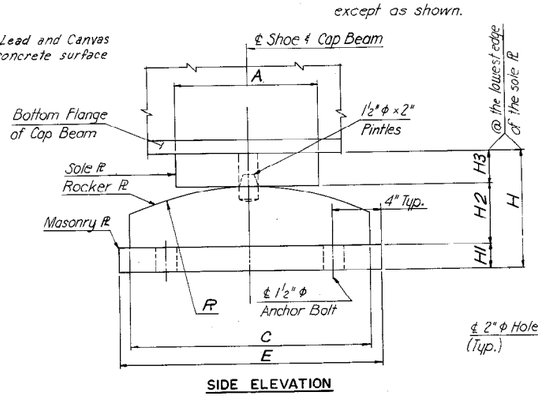
No Scale

Note:
Anchor Bolt for Fixed Shoes & SP Shoes same as Anchor Bolt for Exp. Shoes except as shown.

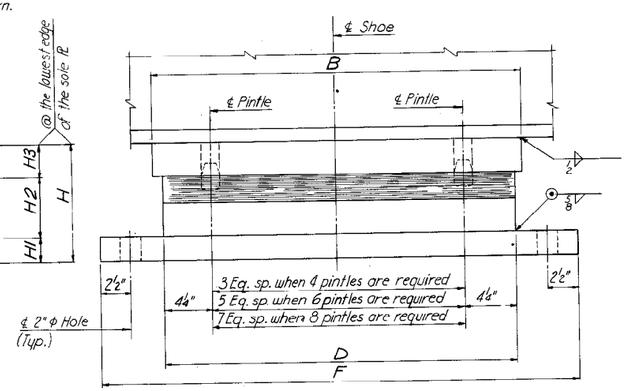


BOLT SETTING FOR SP-2 ONLY

MASONRY PLATE PLAN
SP SHOE



SIDE ELEVATION



END ELEVATION

SP SHOE

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	HBW	7-68	1	Added Uplift Shoe	LRH	4-19-74
CHECKED	FGC	7-68	2	Expansion Shoe	MDS	10-14-74
IN CHARGE	FXH		3	SP-2 thru SP-5	DMG	11-14-74

4 As Built TEM 6-77

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

STANDARD SHOE DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO. C-10
SHEET NO. S1 OF 7

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	260	265

EXPANSION SHOE DIMENSIONS

TYPE	A	B	C	D	E	F	G	REMARKS
E1	6"	1'-1"	7½"	1'-0"	8"	1'-8½"	6"	
E2	6"	1'-1"	8½"	1'-0"	9"	1'-8½"	6½"	
E3	6"	1'-1"	9"	1'-1"	9½"	1'-9½"	7"	
E4	6"	1'-5½"	8"	1'-4½"	8½"	2'-1"	6"	
E4B4	6"	1'-5½"	8"	1'-4½"	8½"	2'-1"	6"	4 Bolts in Masonry Pl.
E4M	6"	1'-5½"	8"	1'-4½"	8½"	2'-1"	6"	
E5	6"	1'-5½"	9"	1'-4½"	9½"	2'-1"	7"	
E6	6"	1'-7"	8"	1'-6"	8½"	2'-2½"	6"	
E7	6"	1'-7"	9½"	1'-6"	10½"	2'-2½"	7½"	
E8	6"	1'-9"	9"	1'-8"	9½"	2'-4½"	6½"	
E9	6"	1'-9"	10"	1'-8"	11"	2'-4½"	7½"	
E12	6"	2'-1"	9"	2'-0"	9½"	2'-8½"	6½"	
E13	6"	2'-1"	10"	2'-0"	11"	2'-8½"	7½"	
E14	6"	1'-1"	9"	1'-1"	11"	1'-9½"	7"	R=12"
E15	6"	1'-5"	10"	1'-4"	11½"	2'-4½"	7½"	R=12"
E8U	6"	–	9"	1'-8"	9½"	2'-4½"	6½"	Uplift Shoe
E9U	6"	–	10"	1'-8"	11"	2'-4½"	7½"	Uplift Shoe
E16	*	*	8½"	1'-0"	9"	1'-10"	6½"	*For these dim. See detail A

SHOE SCHEDULE

EXPANSION SHOES

TYPE	BRIDGE B-63	BRIDGE B-64		BRIDGE B-66	BRIDGE B-67	BRIDGE B-654	BRIDGE B-653 *	TOTAL
E1				101	4	8		113
E2	6	5			8	12		31
E3	4	5		4	4			17
E4	5			5	3			13
E4B4								—
E4M		1						1
E5	15	16		20		4		55
E6				5	2			7
E7	21			13	12			46
E8		4			4			8
E9	1							1
E12		3						3
E13		4						4
E14					4			4
E15								—
E8U					4			4
E9U					8			8
B16		1						1

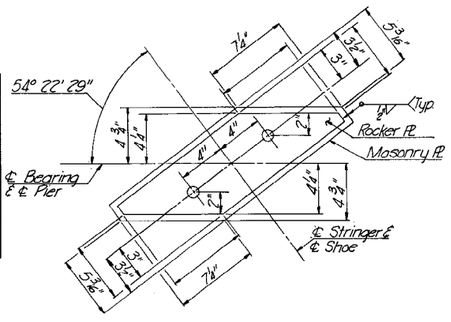
FIXED SHOES

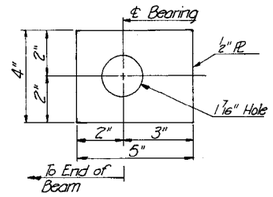
TYPE	BRIDGE B-63	BRIDGE B-64		BRIDGE B-66	BRIDGE B-67	BRIDGE B-654	BRIDGE B-653*	TOTAL
F1	6	4		62	2	20		94
F1M		2		39	2			43
F2	5	8				4		17
F2M								—
F2BD	15							15
F2B4								—
F3		8						8
F4	17							17
F4M	2				4			6
F4BD								—
FGM		3						3
F7		4			12			16
F7U					12			12
F9					3			3
F11		4						4
F12	4	4			8			16
F15	1							1
								—
SP-1					4			4
SP-2				1				1
SP-3				11				11
SP-4				4				4
SP-5				2				2
S1T					2			2
S1B					2			2
SF4					1			1
R3A					1			1

* Note:
For Shoe Details for Bridge B-653, see Sheets 6 & 11 of the detailed drawings for Bridge B-653 (Sheet 232 of 265).

SPECIAL SHOE DIMENSIONS

TYPE	A	B	C	D	E	F	H1	H2	H3	H	R	NO. OF BOLTS OR PINTLES
SP-1	1'-0"	1'-11"	1'-6"	1'-11"	1'-8"	2'-8"	2"	4½"	3"	9½"	1'-6"	4
SP-2	1'-0"	2'-4"	1'-8"	2'-4"	2'-5"	2'-5"	2"	5"	2¾"	9¾"	1'-6"	4
SP-3	1'-0"	2'-7"	1'-8"	2'-7"	1'-10"	3'-4"	2"	5"	2¾"	9¾"	1'-6"	4
SP-4	1'-0"	2'-7"	2'-4"	2'-7"	2'-6"	3'-4"	2"	6½"	3½"	12"	1'-6"	6
SP-5	1'-6"	3'-4"	3'-0"	3'-4"	3'-2"	4'-1"	2"	7"	4½"	13½"	3'-0"	8



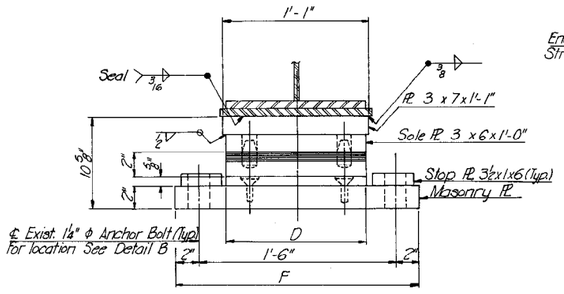


WASHER W-1 DETAIL
Scale: None

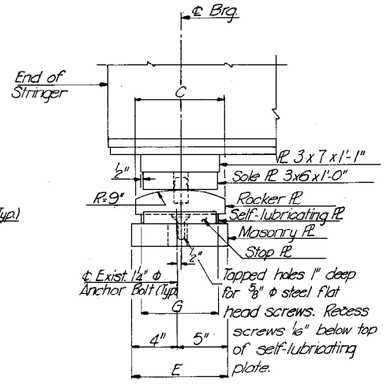
FIXED SHOE DIMENSIONS

TYPE	A	B	C	D	E	F	G	REMARKS
F1	6"	1'-1"	6"	1'-0"	7½"	1'-9"	14"	
F1M	6"	1'-1"	6"	1'-0"	7½"	1'-9"	14"	
F2	6"	1'-5½"	6"	1'-4½"	7"	2'-2"	14"	
F2M	6"	1'-5½"	6"	1'-4½"	7"	2'-2"	14"	
F2BD	6"	1'-5½"	6"	1'-4½"	7"	2'-3"	1½"	
F2B4	6"	1'-5½"	6"	1'-4½"	8"	2'-2"	14"	
F3	6"	1'-5½"	6"	1'-4½"	8"	2'-2"	14"	
F4	6"	1'-7"	6"	1'-6"	7"	2'-4"	1½"	
F4M	6"	1'-7"	6"	1'-6"	7"	2'-4"	1½"	
FGM	6"	2'-1"	6"	1'-8"	7"	1'-9"	1½"	
F7	6"	1'-9"	6"	1'-8"	8"	2'-6"	1½"	
F9	6"	1'-11"	6"	1'-10"	8"	2'-8"	1½"	
F11	6"	2'-1"	6"	2'-0"	8"	2'-10"	1½"	
F12	6"	1'-1"	6"	1'-1"	7½"	1'-10"	14"	
F15	6"	1'-7"	6"	1'-6"	10"	2'-4"	1½"	R=12"
F7U	6"	–	6"	1'-8"	8"	2'-6"	1½"	

PLAN F6M
Scale: None



DETAIL A (E16)
Scale: None



DETAIL B
Scale: None

Shoe Notes:

Material for shoes (exclusive of self-lubricating plates) shall b high strength, low alloy structural steel conforming to ASTM Specification A-588.

Top of masonry plates, bottom of rocker plates and top and bottom of sole plates shall be planed, straightened or otherwise treated to secure true level surfaces.

Contact surfaces noted on the plans with finish symbols shall be finished in accordance with the American Standards Association surface roughness requirement as defined in ASA B46.1-55, Surface Roughness, Waviness and Lay, Part I.

The plates comprising the expansion shoes shall be set so as to be truly centered under full dead load at a temperture of 60°F.

Concrete pads shall be formed integral with abutment or pier and not less than ⅛" or more than ¼" above finished elevation. Dress down pads by rubbing, grinding or as otherwise approved by the Engineer, to true level surfaces at the finished elevation.

Anchor bolt assemblies shall conform to A.S.T.M. A-307-66 and shall be hot-dip galvanized conforming to A.S.T.M. A-153-66.

Templates shall be used to accurately set the anchor bolts.

	BY	DATE
MADE	J.G.V.	1-74
CHECKED	T.E.M.	1-74
IN CHARGE	P.R.Y.	

NO.	REVISION	BY	DATE
1	Shoe Sched Rev. & Washer W1 added	P.R.Y.	6-19-74
2	Additional Shoe Detail Added	M.D.S.	10-14-74
3	Shoe ℄ Size	R.E.J.	11-12-74

4 As Built T.E.M. 6-77

AS BUILT

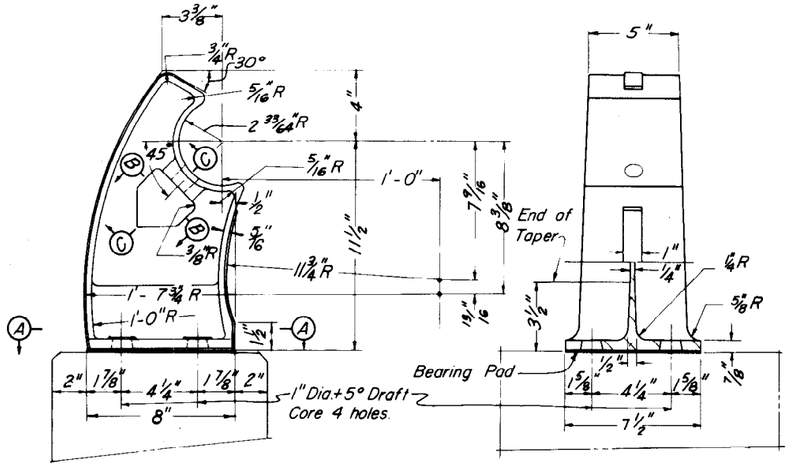
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STANDARD SHOE DETAILS

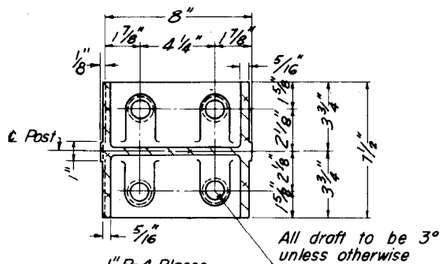
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: No Scale
CONTRACT NO.: 10
SHEET NO. 52 OF 7

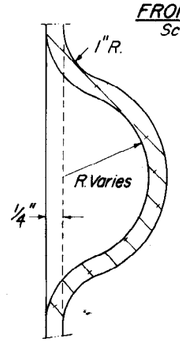
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
	DOWNTOWN EXPRESSWAY	261	265



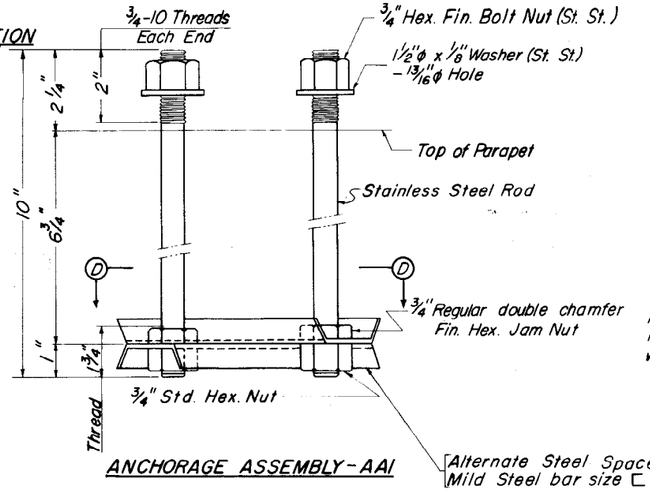
SIDE ELEVATION
Scale: 3"=1'-0"



SECTION A-A
Scale: 3"=1'-0"

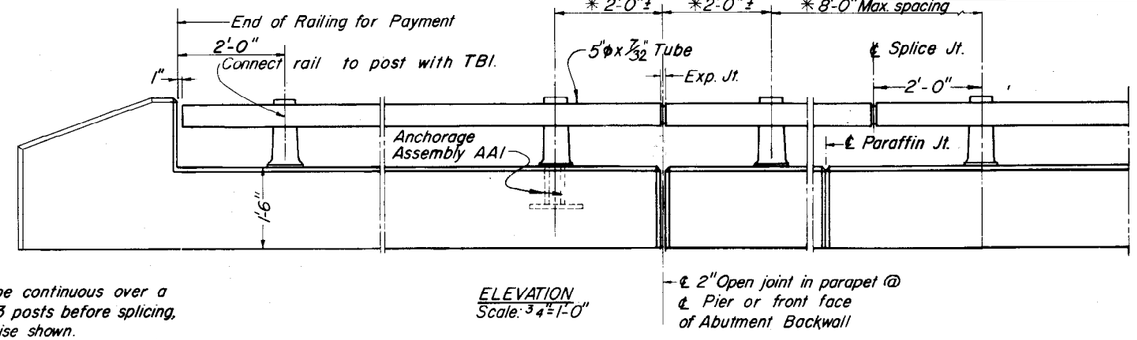


SECTION B-B



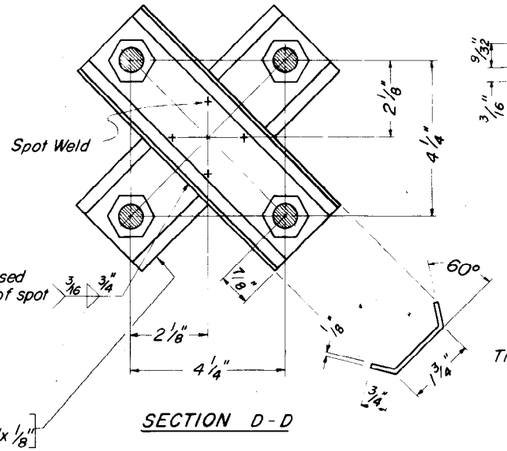
FRONT ELEVATION
Scale: 3"=1'-0"

ANCHORAGE ASSEMBLY-AAI

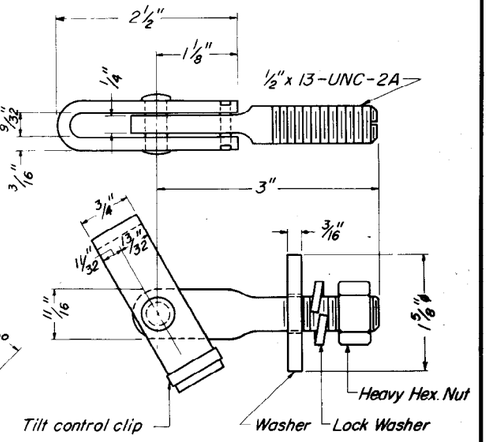


ELEVATION
Scale: 3/4"=1'-0"

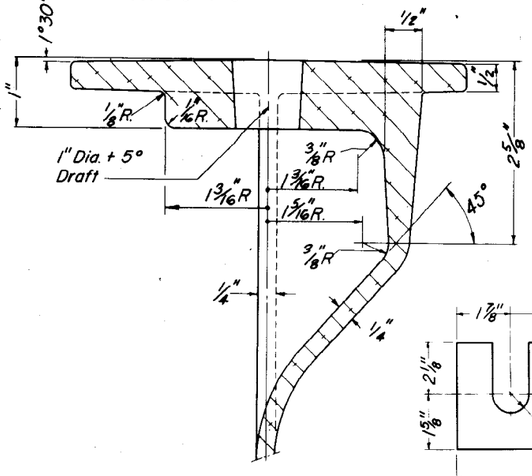
NOTES:
Rail to be continuous over a minimum of 3 posts before splicing, unless otherwise shown.
* Post spacing to be measured along inside face of parapet. See plans each bridge.



SECTION D-D

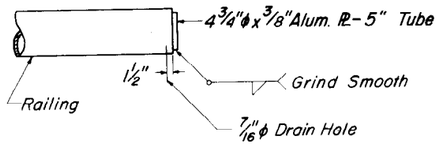


TOGGLE BOLT ASSEMBLY-TBI
TRAFFIC RAIL

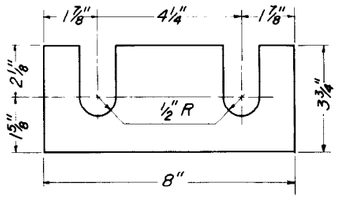


SECTION C-C
Scale: 1"=1"

AAI - Steel Spacer — ASTM A425, or A36 (As shown)
AAI { Nuts (Top) — ASTM A276, Type 304
Top Washers — Stainless Steel
Rods — ASTM A-276, Type 304 Annealed, Hot-finished
Nuts (Bottom) — ASTM A307
Threads on all rods may be rolled or cut.

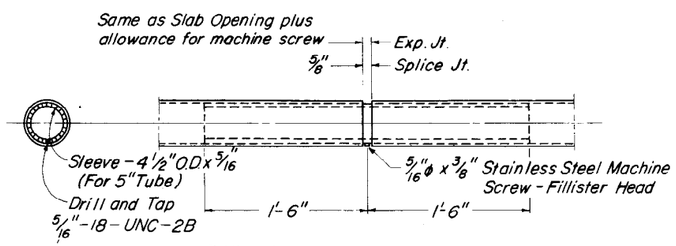


RAIL END CAP



SHIM DETAIL

Shims to be made from 1/16" or 1/8" material. Shims shall not project outside of post base.



RAIL SPLICE & EXP. JOINT

NOTES:
Posts shall be seated on neoprene bearing pads 1/16" minimum thickness, having a nominal durometer hardness of 70. Pads shall conform to post base dimensions.
Aluminum shims may be used for adjusting post alignment, maximum thickness of shim build-up not to exceed 1/8". Where more tilting of the post is required, the concrete area shall be ground down
Posts shall be cast aluminum.
Rail members shall be aluminum extruded tube.
Anchor bolts may be set normal to profile grade.
Bi-metallic anchor rods may be used as an alternate for the stainless steel rods. See Special Provisions.

Material for toggle bolt assembly TBI shall be carbon or stainless steel having a minimum elongation of 12%. Any non stainless component to be either galvanized to ASTM-A153 or cadmium plated to ASTM-A165, Type NS.
Required minimum tensile load to equal 9000 lbs. when in an open position and tested thru a 1"ϕ hole.

	BY	DATE				
MADE	A.B.P.	8-67				
CHECKED	A.J.S.	8-67	1	As Built	TEM	6-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

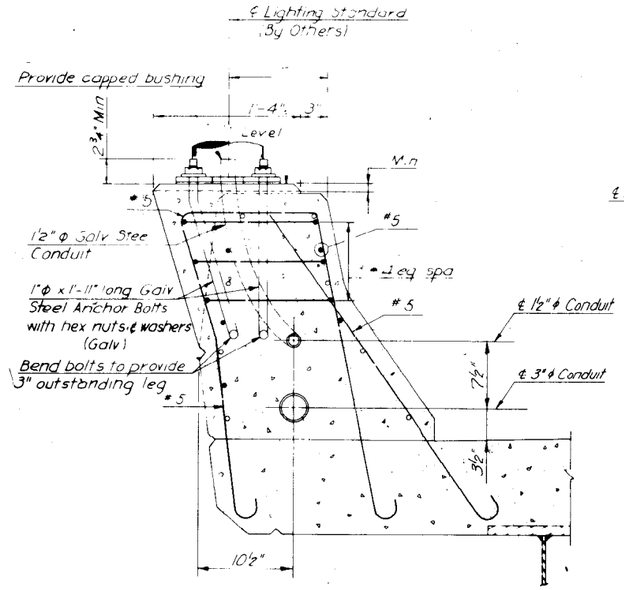
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STANDARD ALUMINUM RAILING DETAILS (I RAIL)

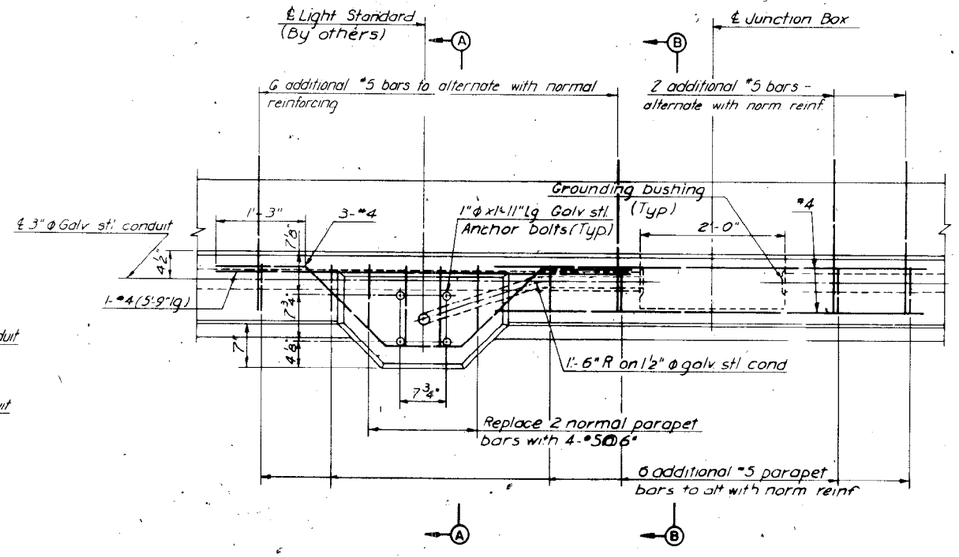
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 10
SHEET NO. S3 OF 7

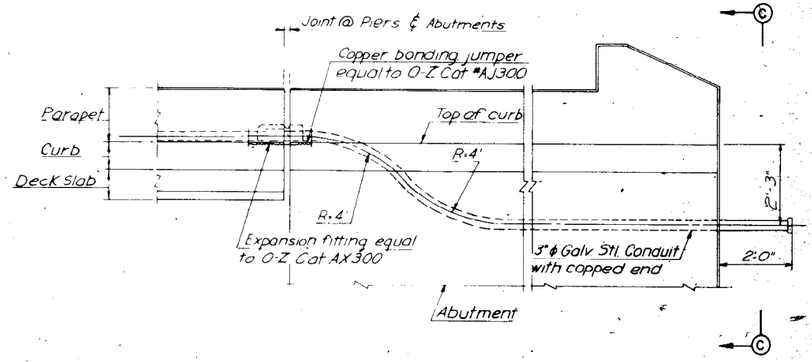
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL
10	DOWNTOWN EXPRESSWAY	262	265



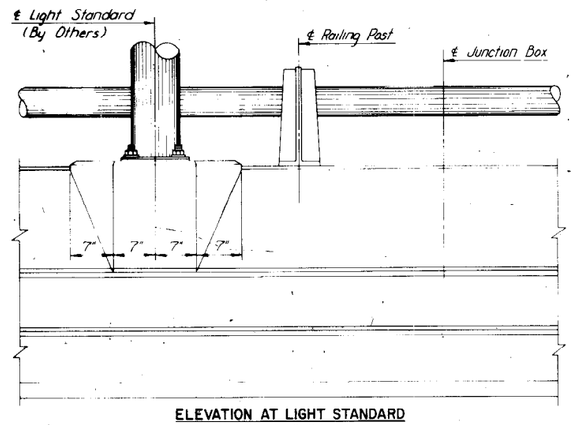
SECTION A-A
Scale ½" = 1'-0"



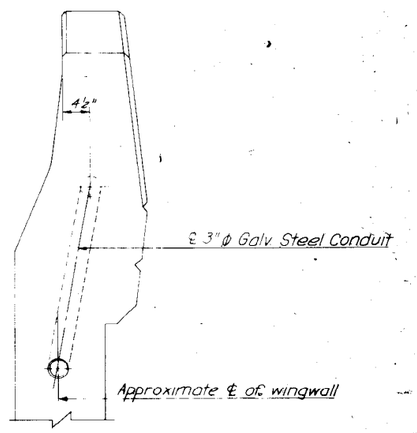
PLAN AT LIGHT STANDARD
Scale 1" = 1'-0"



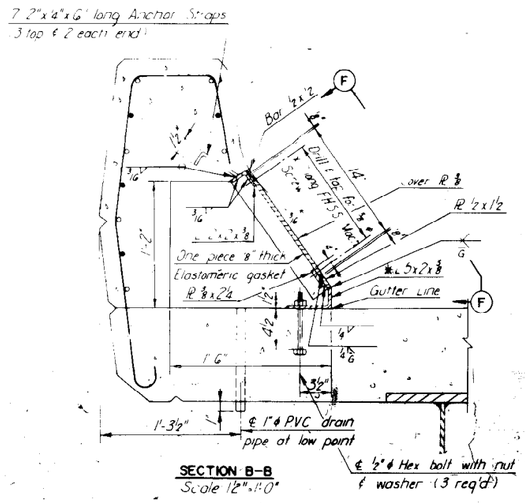
TYPICAL CONDUIT INSTALLATION DETAILS AT DECK JOINTS AND ABUTMENT WINGWALL
No Scale



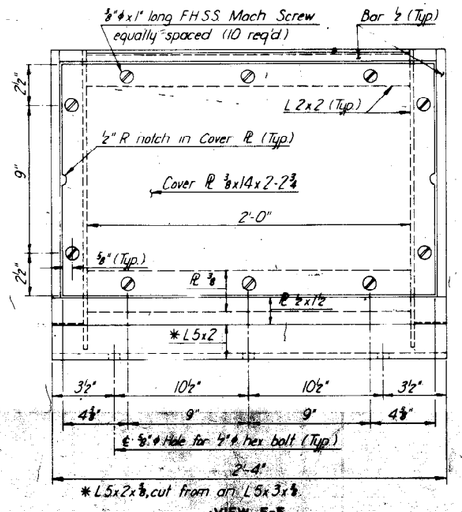
ELEVATION AT LIGHT STANDARD
Scale: 1" = 1'-0"



VIEW C-C
No Scale



SECTION B-B
Scale 1½" = 1'-0"



VIEW F-F
No Scale

NOTES:

All conduits shall be terminated in Junction Boxes with grounding bushings equal to O-Z type IGB

Anchor bolt assemblies shall conform to ASTM A307 and shall be hot dip galv after fabrication in accordance with ASTM A153.

Junction Box and cover shall be hot galvanized after fabrication in accord with ASTM A123.

Only additional or replacement reinf is shown on this sheet For normal reinf see individual bridge Cross Section and Deck Plan sheets

	BY	DATE				
MADE	DLA	3-68				
CHECKED	PRY	3-68	1	As Built	TEM	6-77
IN CHARGE PRY			NO	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTH...
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

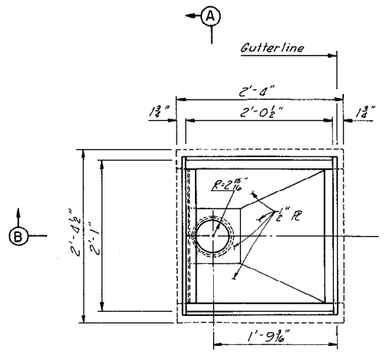
STANDARD ELECTRICAL DETAILS (BRIDGES CARRYING EXP SYSTEM)

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

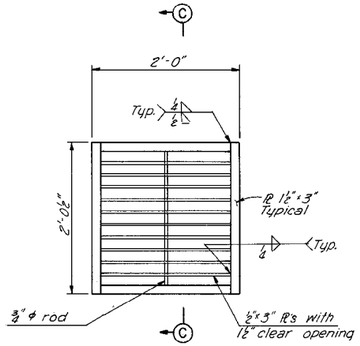
SCALE:
CONTRACT 10
SHEET 7

AS BUILT

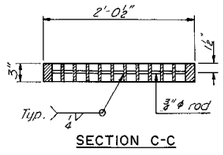
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	263 A	265



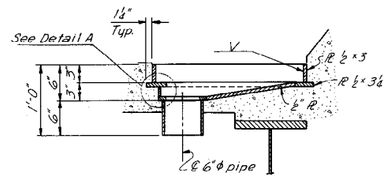
PLAN



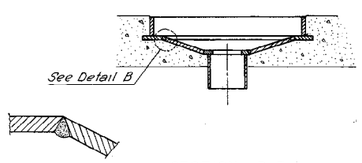
GRATE
(Optional)



SECTION C-C

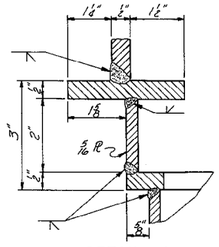


SECTION A-A



SECTION B-B

DETAIL B
Typical for bottom section of scupper



DETAIL A

Notes:
Material for scupper and grate shall be ASTM-A36.
For additional drainage details sheets 55 and 56.
Scupper and grate shall be galvanized after fabrication in accordance with ASTM-A123.
Welded grate shown is optional with cast grate shown on Drawing 55.
Bends may be substituted for welds where desired.

ALTERNATE TYPE A SCUPPER DETAILS

	BY	DATE				
MADE	DWB	2-28-75	2	As Built	TEM	6-77
CHECKED	MJK	2-28-75	1	New Sheet Added	DWB	9-28-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

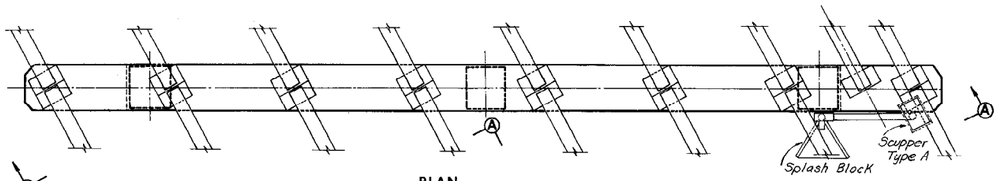
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DRAINAGE DETAILS

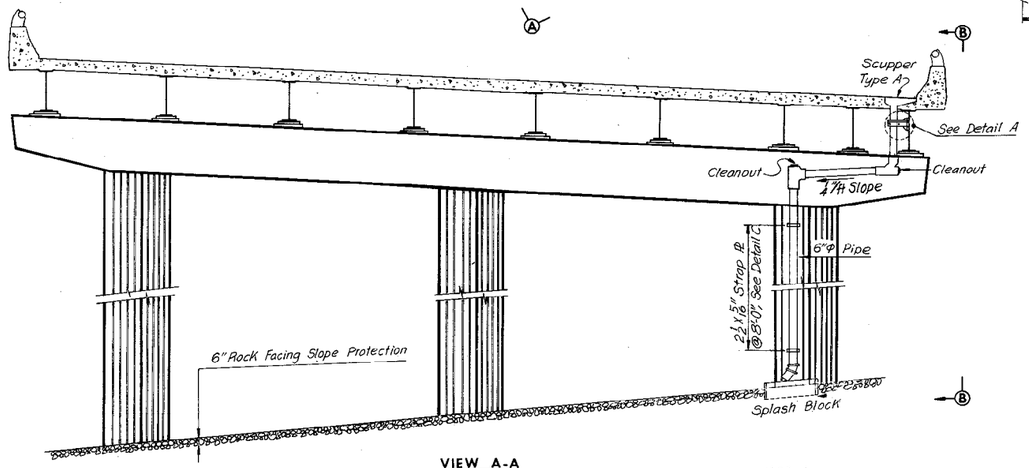
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE:
CONTRACT NO. 10
SHEET NO. S5A OF 7

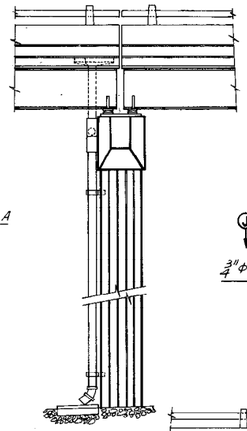
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	263	265



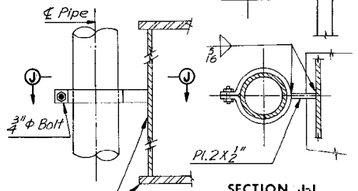
PLAN



VIEW A-A
ELEVATION
SUPPORT TYPE 1
Scale : 3/16"=1'-0"

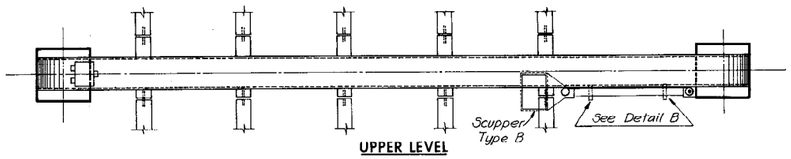


VIEW B-B
Scale : 3/16"=1'-0"

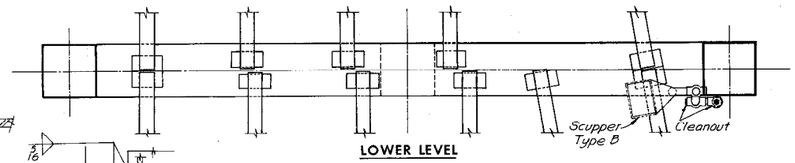


DETAIL D
Scale : 1"=1'-0"

SECTION J-J
Scale : 1"=1'-0"



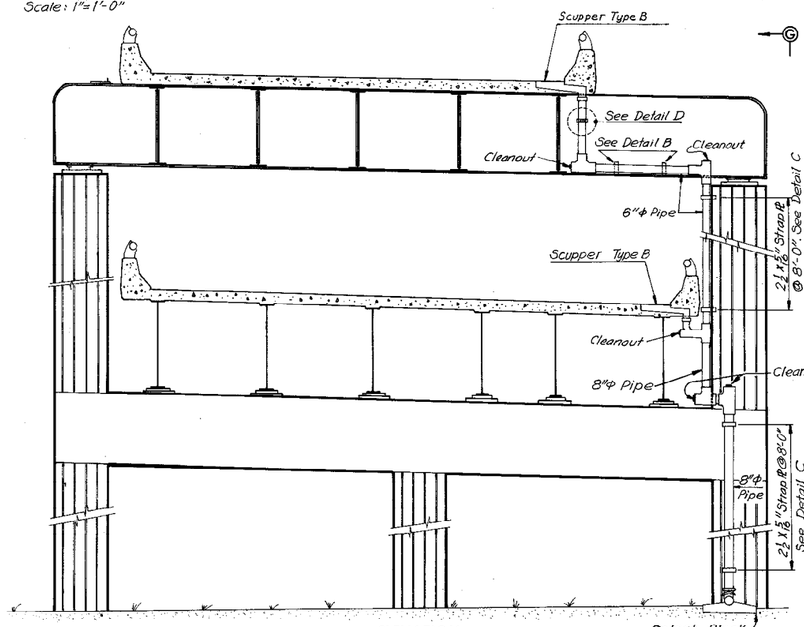
UPPER LEVEL



LOWER LEVEL

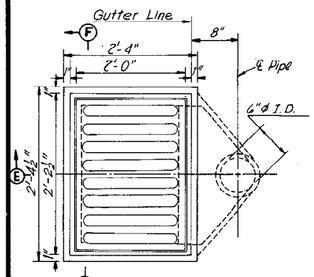
PLAN

Note:
Remove existing scuppers at widening portions
Also remove enough concrete around these scuppers
to provide required bond length (about 2'-0").

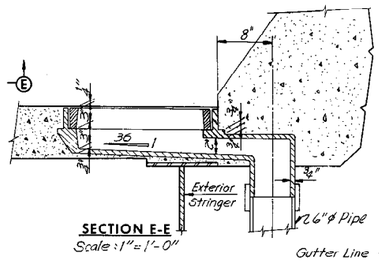


ELEVATION

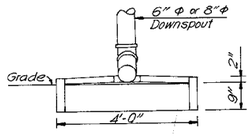
SUPPORT TYPE 2
Scale : 3/16"=1'-0"



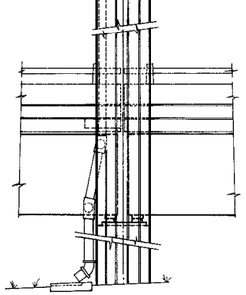
SCUPPER DETAIL TYPE B
Scale : 1"=1'-0"
Note: For dimensions not given, see Scupper Detail, Type A.



SECTION E-E
Scale : 1"=1'-0"

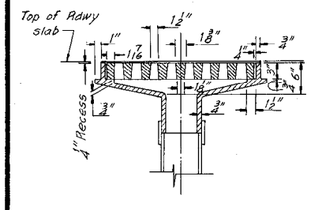


SPLASH BLOCK DETAIL
Scale : 1"=1'-0"

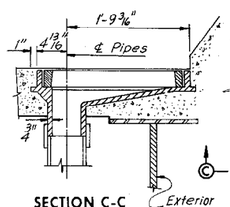


VIEW H-H
Scale : 1"=1'-0"

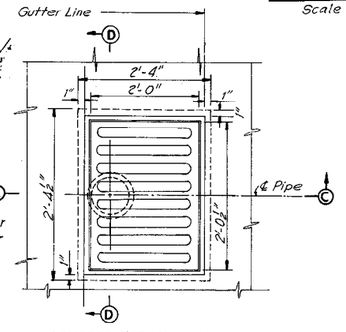
VIEW G-G
Scale : 3/16"=1'-0"



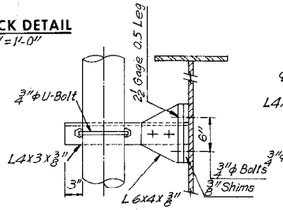
SECTION D-D
Scale : 1"=1'-0"

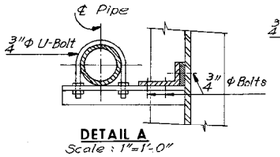


SECTION C-C
Scale : 1"=1'-0"

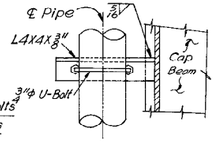


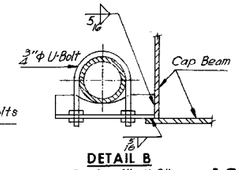
SCUPPER DETAIL TYPE A
Scale : 1"=1'-0"



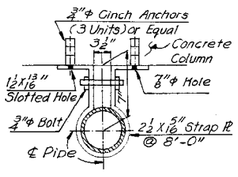


DETAIL A
Scale : 1"=1'-0"





DETAIL B
Scale : 1"=1'-0"



DETAIL C
Scale : 1"=1'-0"

Note:
Where existing scuppers are to be removed, concrete shall be removed 2'-0" minimum from the edges of scuppers.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.S.H.	10-10-69	2	As Built	TEM	6-77
CHECKED				Parapet Changed	PRMS	4-19-76
IN CHARGE						

AS BUILT

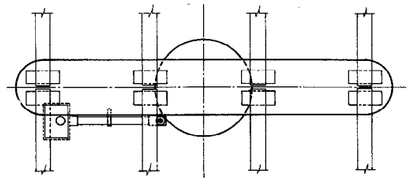
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STANDARD DRAINAGE DETAILS

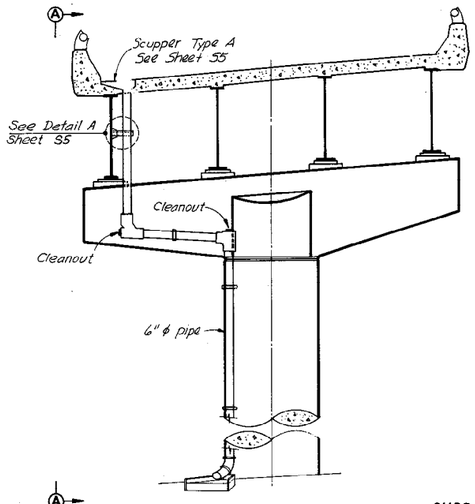
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 55 OF 7

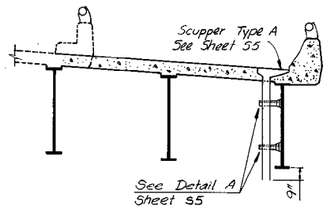
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	264	265



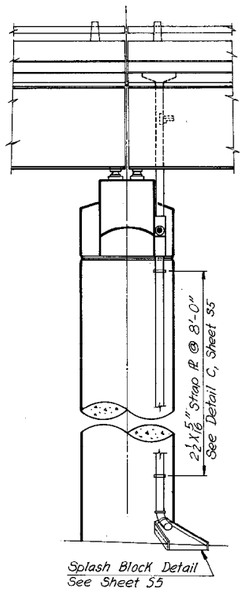
PLAN



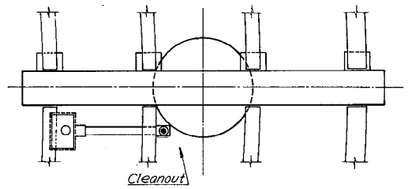
ELEVATION



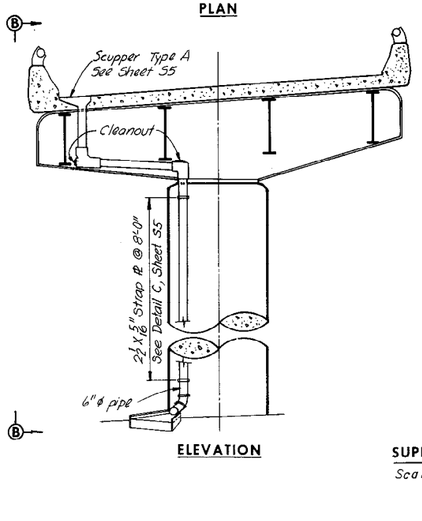
SUPPORT TYPE 6
Scale: $\frac{3}{16}$"=1'-0"



VIEW A-A

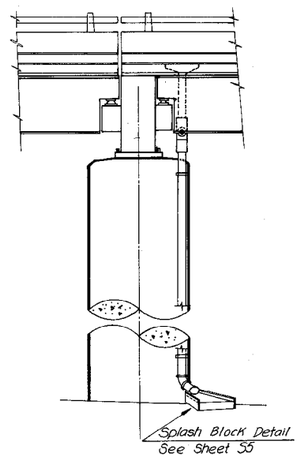


PLAN

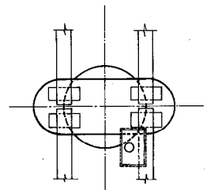


ELEVATION

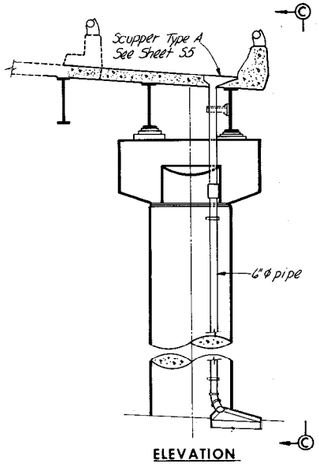
SUPPORT TYPE 4
Scale: $\frac{3}{16}$"=1'-0"



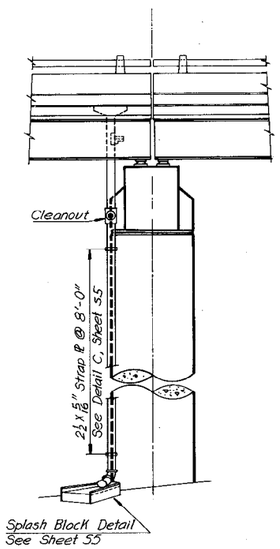
VIEW B-B



PLAN

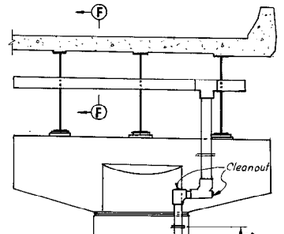


ELEVATION



VIEW C-C

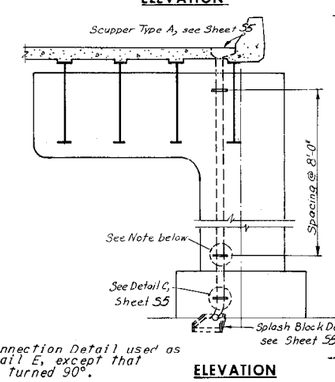
SUPPORT TYPE 5
Scale: $\frac{3}{16}$"=1'-0"



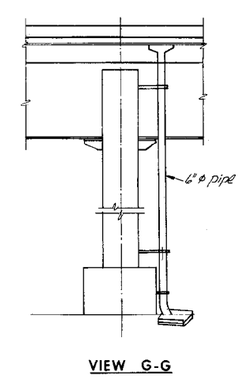
SECTION F-F
Scale: 1"=1'-0"

ELEVATION
Scale: $\frac{3}{16}$"=1'-0"

Note: Same Connection Detail used as shown in Detail E, except that ST4WF15.5 is turned 90°.

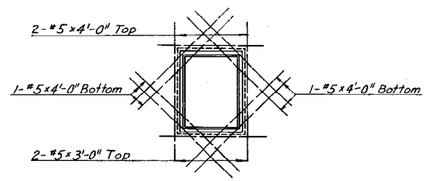


ELEVATION



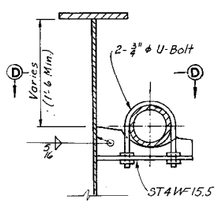
VIEW G-G

SUPPORT TYPE 5
Scale: $\frac{3}{16}$"=1'-0"

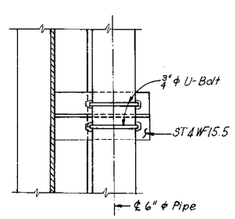


DETAIL OF REINFORCING STEEL AT CAST SCUPPER
No Scale

Note:
Bend bottom and toe slab bars at Cast Scuppers where interference occurs.
Weight of Reinforcing Bars at Scupper: 48 lbs.

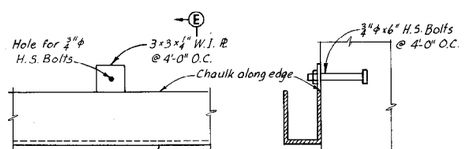


DETAIL E
Scale: 1"=1'-0"



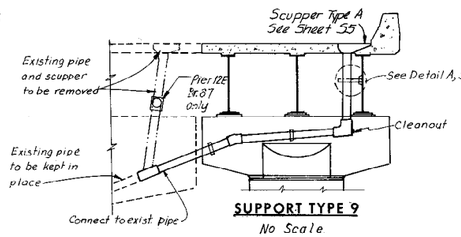
SECTION D-D
Scale: 1"=1'-0"

Note:
For Details below top of upper column, see Support Type 2, Sheet 55.



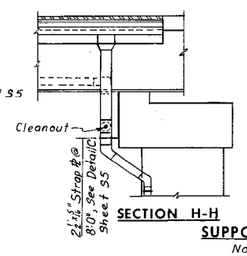
DETAIL F
Scale: 1½"=1'-0"

SECTION E-E
Scale: 1½"=1'-0"

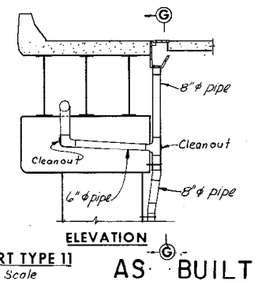


SUPPORT TYPE 9
No Scale

SUPPORT TYPE 8



SECTION H-H



ELEVATION

SUPPORT TYPE 11
No Scale

SUPPORT TYPE 10
Scale: ½" =1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	SCC	1.29.69	2	As Built	TEM	6-77
CHECKED	G.S.H.	2-13-69				
IN CHARGE						

Parapet Changed P.R.M.C. 1-19-71

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STANDARD DRAINAGE DETAILS

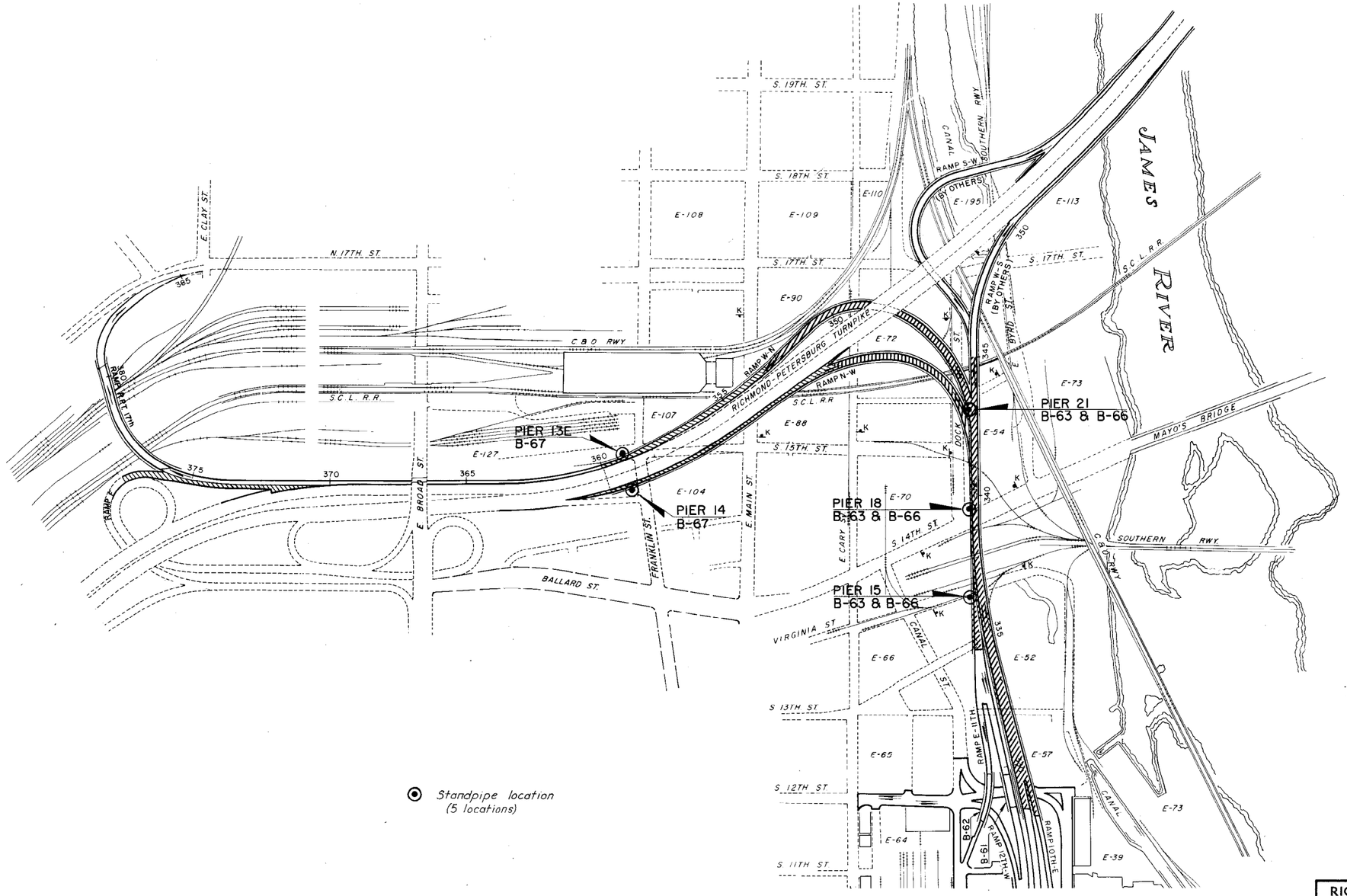
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. S6 OF 7

Contract C-10
Bridge Fire Protection Dry Standpipe System

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	265A	



◉ Standpipe location (5 locations)

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.E.M.	11-75				
CHECKED	C.C.J.	11-75				
IN CHARGE J.P.F.						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
[redacted]WN EXPRESSWAY

BRIDGE FIRE PROTECTION DRY STANDPIPE SYSTEM

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"= 200'
CONTRACT NO.: C-10
SHEET NO. 1 OF 5

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
		265 B	

GENERAL NOTES FOR DRY STANDPIPE SYSTEM:

1. The Standpipe System shall be fabricated from 4½" O.D. Black Steel Pipe and shall conform to ASTM Specification A53-73, Schedule 80, Grade A. All welded joints shall be full penetration butt welds and shall comply with 1973 A.W.S. Specifications.

2. a. All 60° bends shall be cut from 90° bends. All bends shall conform to the specifications for Black Steel Pipe. All bends shall be long radius or full flow type bends
   b. Couplings shall conform to Victaulic Standard Coupling Style 77 with Grade H gasket for steel pipe, or approved equal.
   c. Pipe hangers shall be fabricated from Mild Carbon Steel ASTM Specification A36. Bolts shall conform to ASTM Specification A325. Pipe hangers shall be welded per plan details and in accordance with the 1973 AWS Specifications.

3. The Standpipe System shall be painted in accordance with the Contract Supplemental Specifications Section 414 Painting of Metal in Structure.

   Section 414.02 shall be modified to read;

   3rd Coat - The exterior coat shall be DuPont Dulux Metal Protective Patina Green, No. 1025-341, or approved equal. Except as follows, The first 8 feet of pipe at the ground level end shall be painted a reflective Silver-White Alert Series 14-40 as manufactured by Cataphote Division, Fero Corp., or approved equal.

4. As each Dry Standpipe System is completed for operation it shall be tested as a wet system at a minimum of 300 psi static pressure for a period of not less than 30 min. If failure occurs the necessary repairs will be made and the testing procedure shall be repeated until the system as a unit is proven sound to the satisfaction of the engineer. After testing and approval by the engineer each system shall be drained, valves closed, caps and plugs replaced and hand tightened. The sill cock located under the siamese fixture shall be left in an open position and keys turned over to the Chief, Bureau of Fire, City of Richmond.

5. Fire Department Connection Fixtures.

   a. Each Standpipe System shall have one 4"x2½"x2½" Double Clapper Siamese Connection, at the ground level end, Powhatan Model No. 21-132 "Y" Type cast brass, or approved equal. Branding shall be marked "Standpipe".

   b. Each Double Clapper Siamese fixture shall come equipped with a ¾" sill cock to be located on the underneath side of the fixture, Powhatan Model No. 23-221 cast brass, or approved equal.

   c. As noted on the plans, each Standpipe System shall have one or more Roof Manifolds noted as either "Y" Type, two way, 4"x2½"x2½" Powhatan Model No. 20-363 cast brass or approved equal or "90°" Type, two way, 4"x2½"x2½" Powhatan Model No. 20-365 cast brass, or approved equal.

   d. Each fixture supplied shall be furnished complete with the necessary caps, plugs and attachment chains.

   e. All Fire Department Connections shall be threaded with the City of Richmond Fire Department standard thread.

   f. Roof Manifolds shall be supplied with Underwriters Approved Valves Powhatan Model No. 18-157 cast brass, or approved equal.

   g. All fire department fixtures and their accessories shall be rated for a minimum working pressure of 300 psi.

PIER NO.	4½" ϕ O.D. STEEL PIPE	45° OR 60° ELBOWS	90° ELBOWS	TEE CONNECTIONS	PIPE HANGERS	COUPLINGS	"Y" TYPE ROOF MANIFOLD	"90°" TYPE ROOF MANIFOLD	DOUBLE CLAPPER SIAMESE	BID QUANTITY
	L.F.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.	LUMP SUM
15	84		3	1	14	2	1	1	1	
18	72	2 - 45°	1	1	12	2	1	1	1	
21	120	2 - 45°	3	1	20	2	1	1	1	
13E	36	2 - 60°	1		7	2	1		1	
14	25	2 - 45°	1		6	2	1		1	
TOTAL	337	8	9	3	59	10	5	3	5	1

DESIGNED						
DRAWN	T.E.M.	11-75				
CHECKED	C.C.J.	11-75				
IN CHARGE J.P.F.			NO.	REVISION	BY	DATE

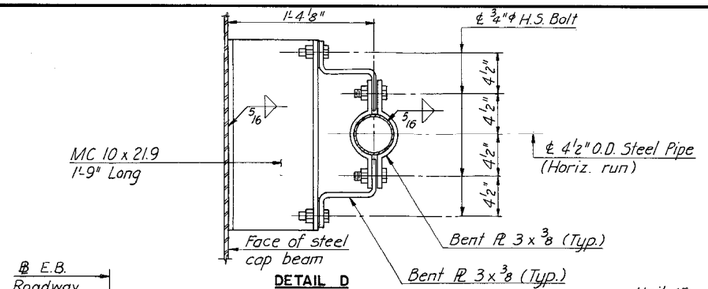
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE FIRE PROTECTION DRY STANDPIPE SYSTEM

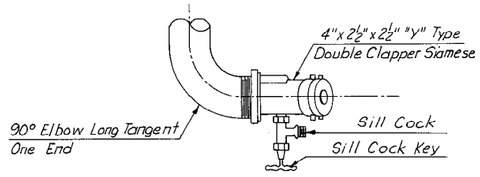
SCALE None
DATE
CONTRACT 10
SHEET 2 OF 5

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

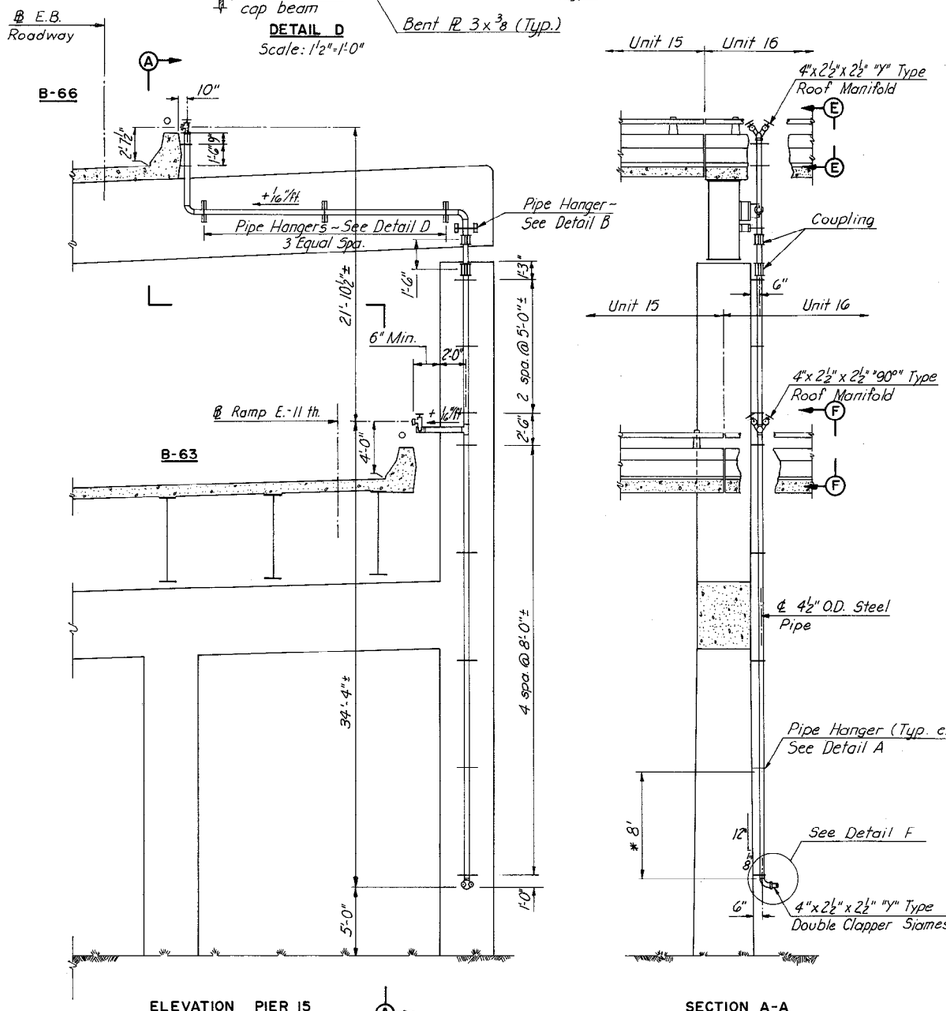
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
		265 C	



DETAIL D
Scale: 1'2"=1'0"



DETAIL F
Scale: 1'2"=1'0"

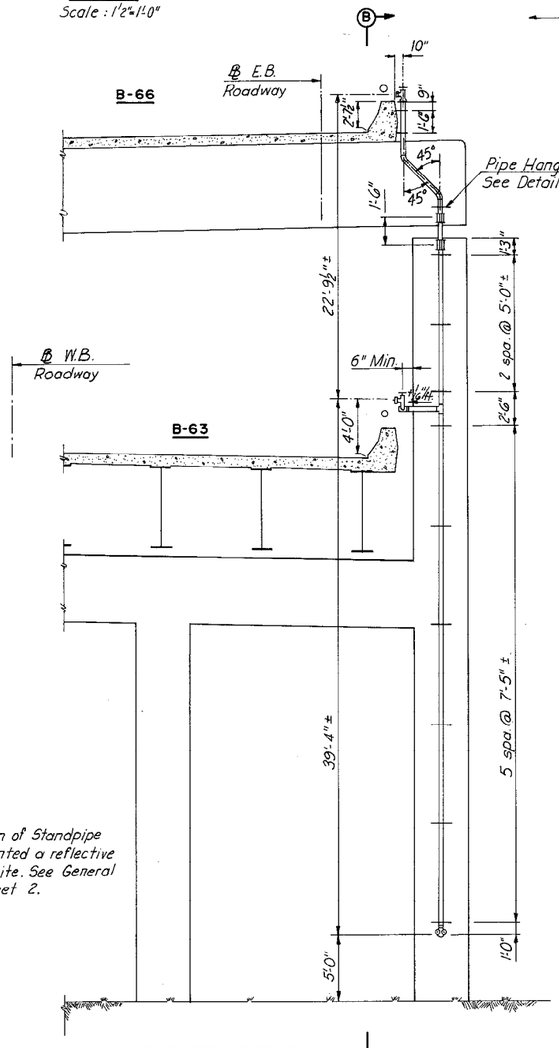


ELEVATION PIER 15
(LOOKING BACK STATION)
Scale: 3/16"=1'-0"

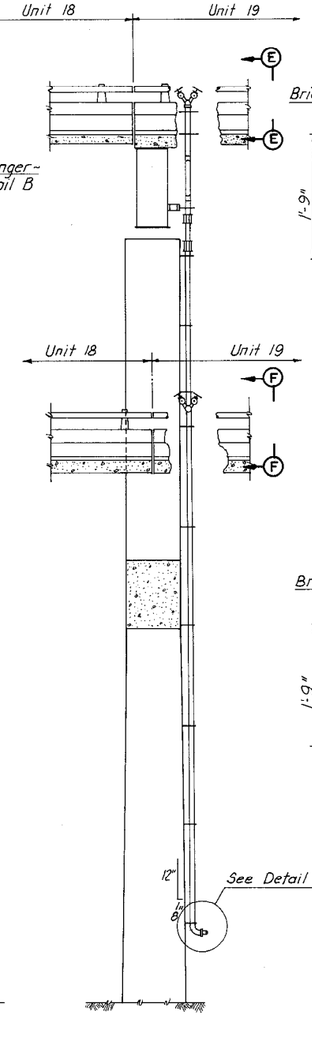
SECTION A-A
Scale: 3/16"=1'-0"

* Note:
Portion of Standpipe to be painted a reflective silver-white. See General Notes Sheet 2.

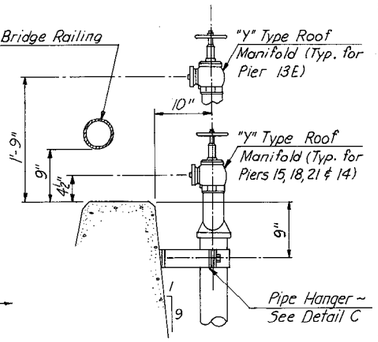
NOTES:
For General Notes see Sh. 2.
For Details A, B & C, see Sh. 4.



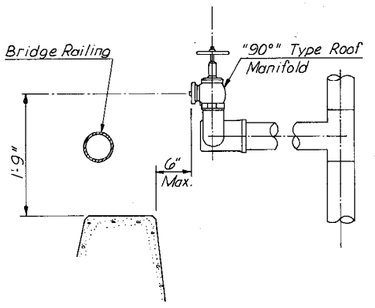
ELEVATION PIER 18
(LOOKING BACK STATION)
Scale: 3/16"=1'-0"



SECTION B-B
Scale: 3/16"=1'-0"



SECTION E-E
Scale 1" = 1'-0"



SECTION F-F
Scale 1" = 1'-0"

CROSS-STREETS
VIRGINIA ST. & CANAL ST.

CROSS-STREETS
14th. & DOCK

NOTE:
For Details and Dimensions not shown at Pier 18, see Pier 15.

DESIGNED						
DRAWN	T.E.M.	11-75				
CHECKED	C.C.J.	11-75				
IN CHARGE	J.P.F.		NO.	REVISION	BY	DATE

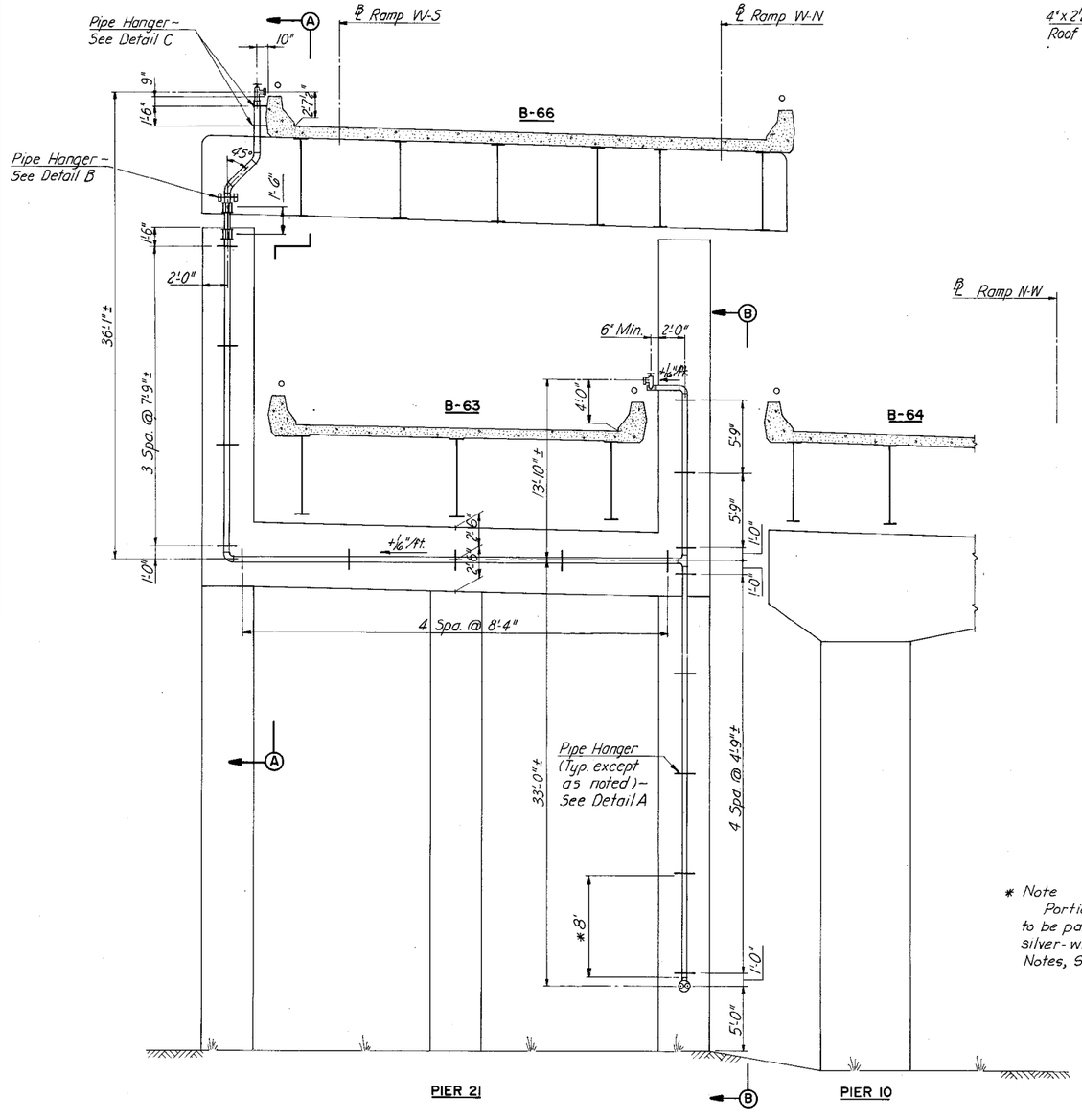
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE FIRE PROTECTION DRY STANDPIPE SYSTEM

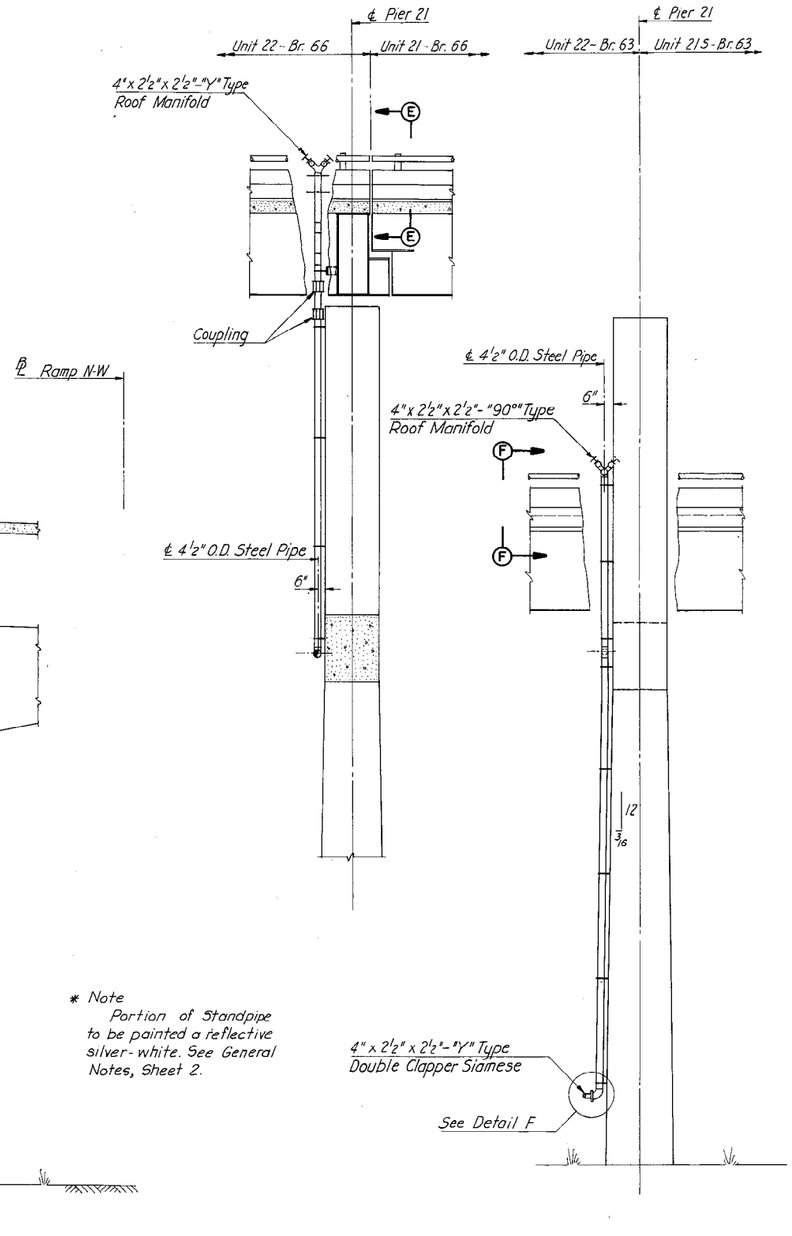
SCALE As Shown
DATE
CONTRACT 10
SHEET 3 OF 5

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
		265 D	



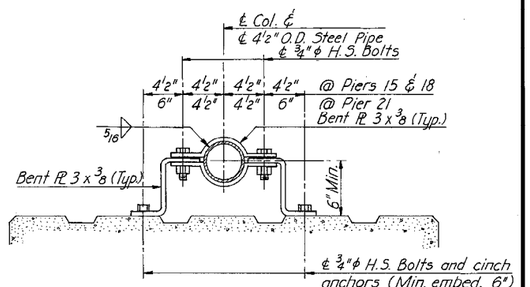
ELEVATION
(LOOKING BACK STATION)
Scale: 3/16"=1'-0"



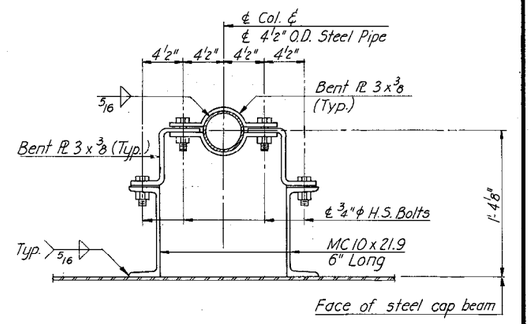
* Note
Portion of Standpipe to be painted a reflective silver-white. See General Notes, Sheet 2.

SECTION A-A
Scale: 3/16"=1'-0"

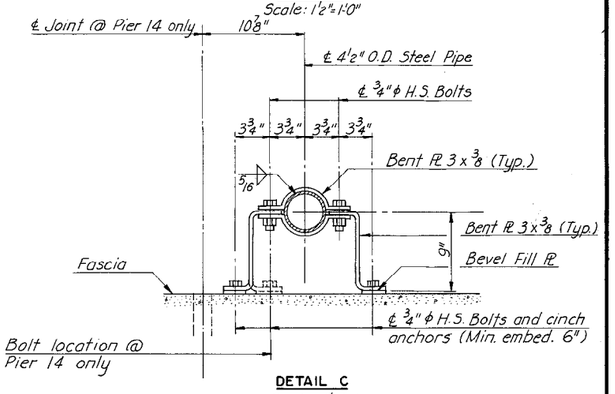
VIEW B-B
Scale: 3/16"=1'-0"



DETAIL A
Scale: 1½"=1'0"



DETAIL B
Scale: 1½"=1'-0"



DETAIL C
Scale: 1½"=1'-0"

CROSS-STREETS
S.16th. ST. & DOCK ST.

NOTES:
For General Notes, see Sh. 2.
For Sections E-E & F-F, see Sh. 3.

DESIGNED						
DRAWN	J.B.P.	11-75				
CHECKED						
IN CHARGE J.P.F.			NO.	REVISION	BY	DATE

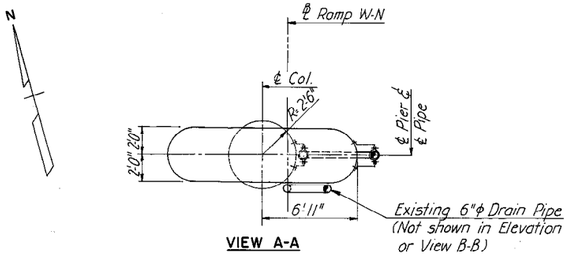
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE FIRE PROTECTION DRY STANDPIPE SYSTEM

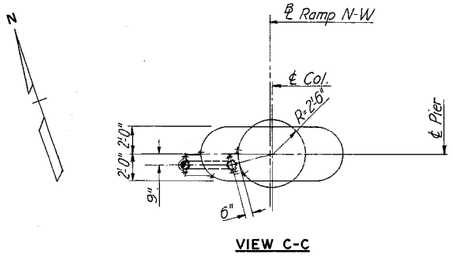
SCALE As Shown	CONTRACT 10	SHEET 4 OF 5
DATE		

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

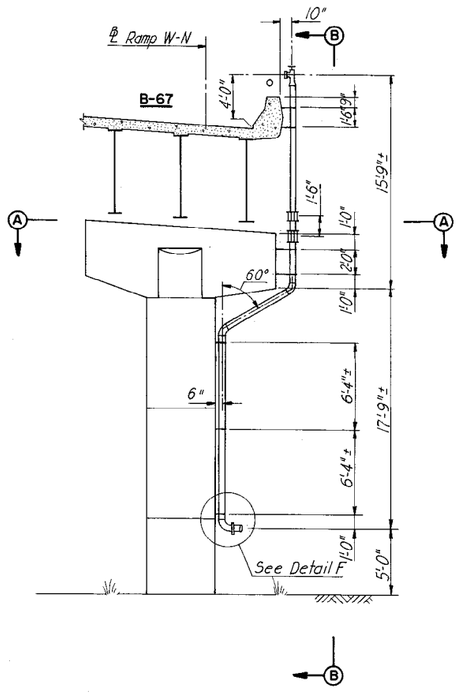
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
		265E	



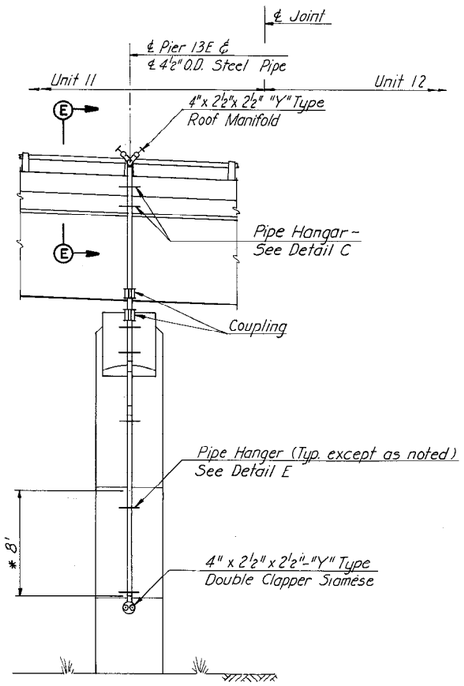
VIEW A-A



VIEW C-C

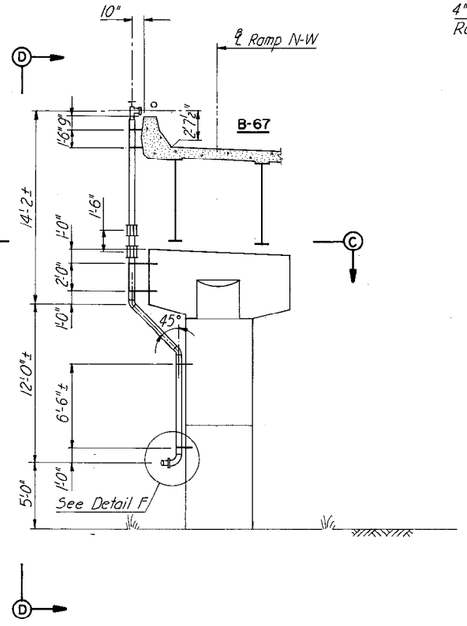


ELEVATION

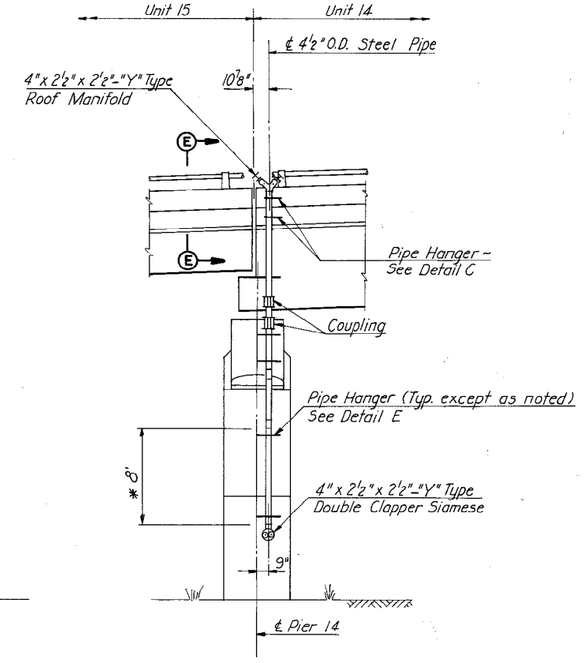


VIEW B-B

* Note
Portion of Standpipe to be painted a reflective silver-white. See General Notes, Sheet 2.



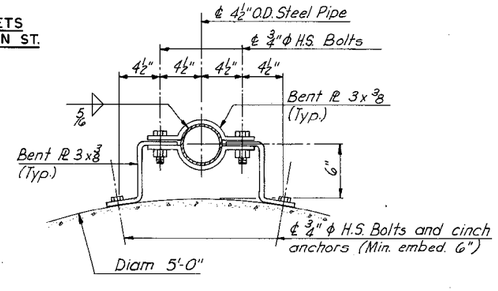
ELEVATION



VIEW D-D

PIER 13E
Scale: 3/16"=1'-0"

CROSS-STREETS
15th & FRANKLIN ST.



DETAIL E
Scale: 1½"=1'-0"

PIER 14
(LOOKING BACK STATION)
Scale: 3/16"=1'-0"

CROSS-STREETS
15th & FRANKLIN ST.

NOTES:
For General Notes, see Sh. 2.
For Section E-E & Detail F, see Sh. 3.
For Detail C, see Sh. 4.

DESIGNED						
DRAWN	J.B.P.	11-75				
CHECKED	C.C.J.	11-75				
IN CHARGE J.P.F.			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE FIRE PROTECTION DRY STANDPIPE SYSTEM

SCALE As Shown
DATE
CONTRACT 10
SHEET 5 OF 5

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

Bridge 8

(Powhite Parkway - VA State Rte. 76 over James River, Kanawha Canal and CSX Railroad)

Record Set Plans

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4	BRIDGE LAYOUT, GENERAL NOTES AND ESTIMATE OF QUANTITIES
5	PROFILES AND PAVEMENT ELEVATIONS
6	SOUTH ABUTMENT
7	NORTH ABUTMENT
8	ABUTMENT DETAILS
9	PIER 1
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36	DRAINAGE SCUPPERS
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47-53	BORING LOGS

LIMITED ACCESS HIGHWAY

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	1	53

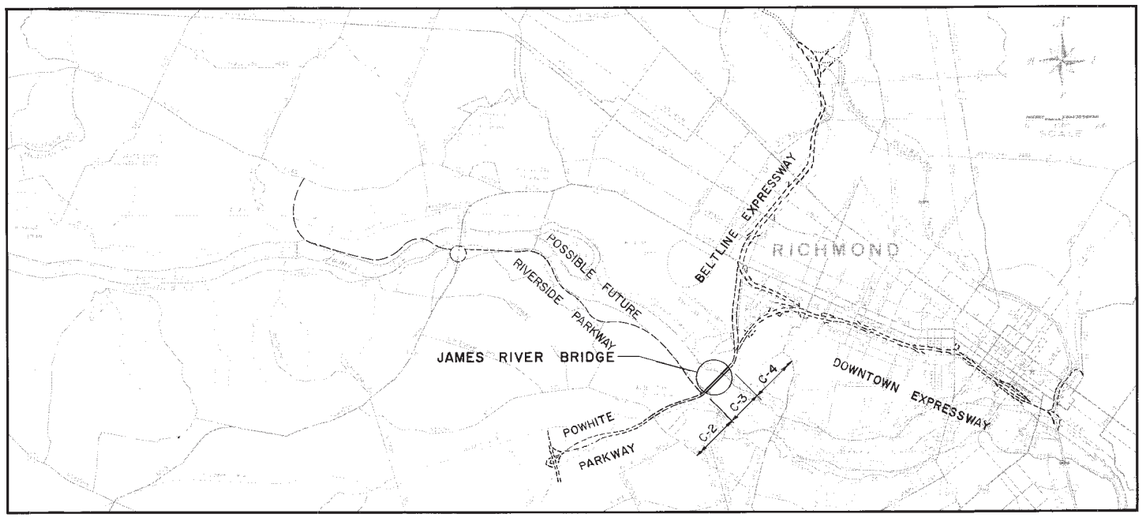
RICHMOND METROPOLITAN AUTHORITY

PLAN AND PROFILE OF PROPOSED

RICHMOND EXPRESSWAY SYSTEM

CHESTERFIELD COUNTY
CITY OF RICHMOND

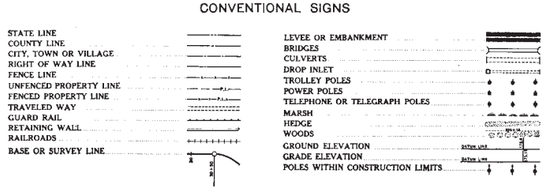
JAMES RIVER BRIDGE



CONTRACT C-3

BRIDGE B-8

CONVENTIONAL SIGNS



⚠ Index Revised J.G.V. 2-20-71

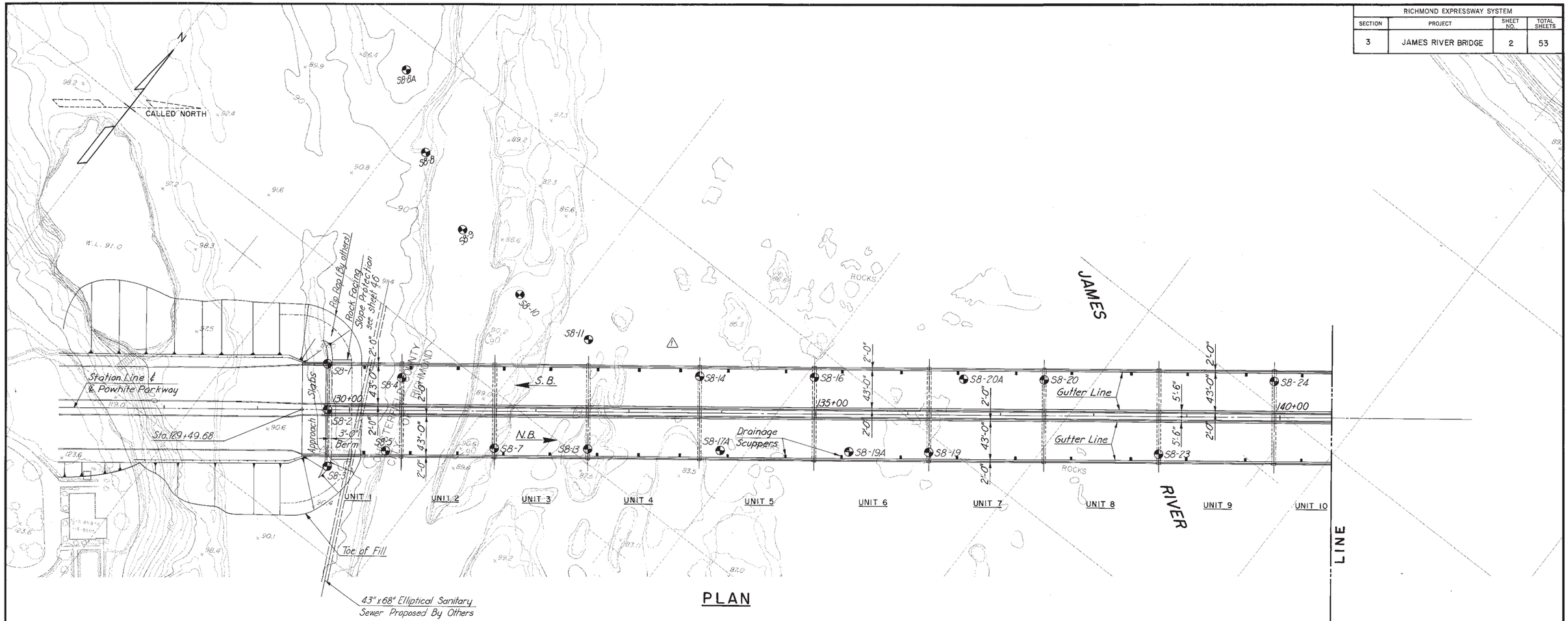
SUBMITTED BY	
Date	
1-22-71 Date	John P. Fowler IV — HOWARD, NEEDLES, TAMMEN & BERGENDOFF general consultant

RECOMMENDED BY	
Date	
1-23-71 Date	GENERAL MANAGER, RICHMOND METROPOLITAN AUTHORITY

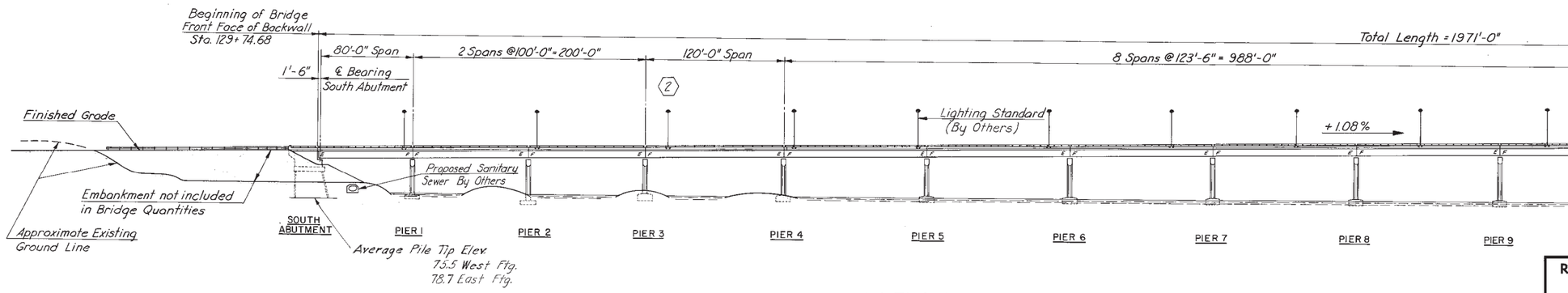
APPROVED BY	
1-23-71 Date	CHAIRMAN, RICHMOND METROPOLITAN AUTHORITY

Plans Revised			
Sheet No.	Date	Sheet No.	Date
1-6,9-16,28,29	2-20-71		
32-38,41,43,46	2-20-71		
1,2,3,17,37,	3-9-71		
38,39,40	3-9-71		
1, 4,35,36, 44	4-5-71		
21	9-3-71		
23	4-12-72		
45	9-12-72		

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	2	53



PLAN



ELEVATION

△

CURVE DATA / SUMMARY																
CURVE NO.	Δ	D	R	T	L	BACK TANGENT BEARING	FORWARD TANGENT BEARING	BEGIN CURVE	COORDINATES NORTH	COORDINATES EAST	P.I.	COORDINATES NORTH	COORDINATES EAST	END CURVE	COORDINATES NORTH	COORDINATES EAST
1	8°00'00"	10°00'00"	572.96'	40.06'	80.00'	S52°46'05"W	S60°46'05"W	P.C. 10+00.00	52,690.89	50,936.00	10+40.06	52,666.65	50,904.10	P.C.C. 10+80.00	52,647.09	50,869.14
2	61°13'55.5"	33°22'40.4"	310.00'	183.46'	331.30'	S60°46'05"W	N57°59'54.0"W	P.C.C. 10+80.00	52,647.09	50,869.14	12+63.45	52,357.50	50,709.05	P.C.C. 14+11.30	52,654.72	50,553.48
3	30°00'00"	10°00'00"	572.96'	153.52'	300.00'	N57°59'54.0"W	N27°59'54.0"W	P.C.C. 14+11.30	52,654.72	50,553.48	15+64.82	52,736.08	50,423.28	P.T. 17+11.30	52,811.64	50,351.21

	BY	DATE
MADE	HBW	8-67
CHECKED	FXH	2-68
IN CHARGE	FXH	

NO.	REVISION	BY	DATE
3	AS BUILT	JRC	12-72
②	Light Std. Location	J.G.V.	3/9/71
①	Remove Ramp Taper	H.B.W.	2/20/71

NOTES:
For Bridge Layout and General Notes see sheet no. 4.
For Profiles see sheet no. 5.
Indicates 2½" ϕ Cased Hole Boring.

AS BUILT

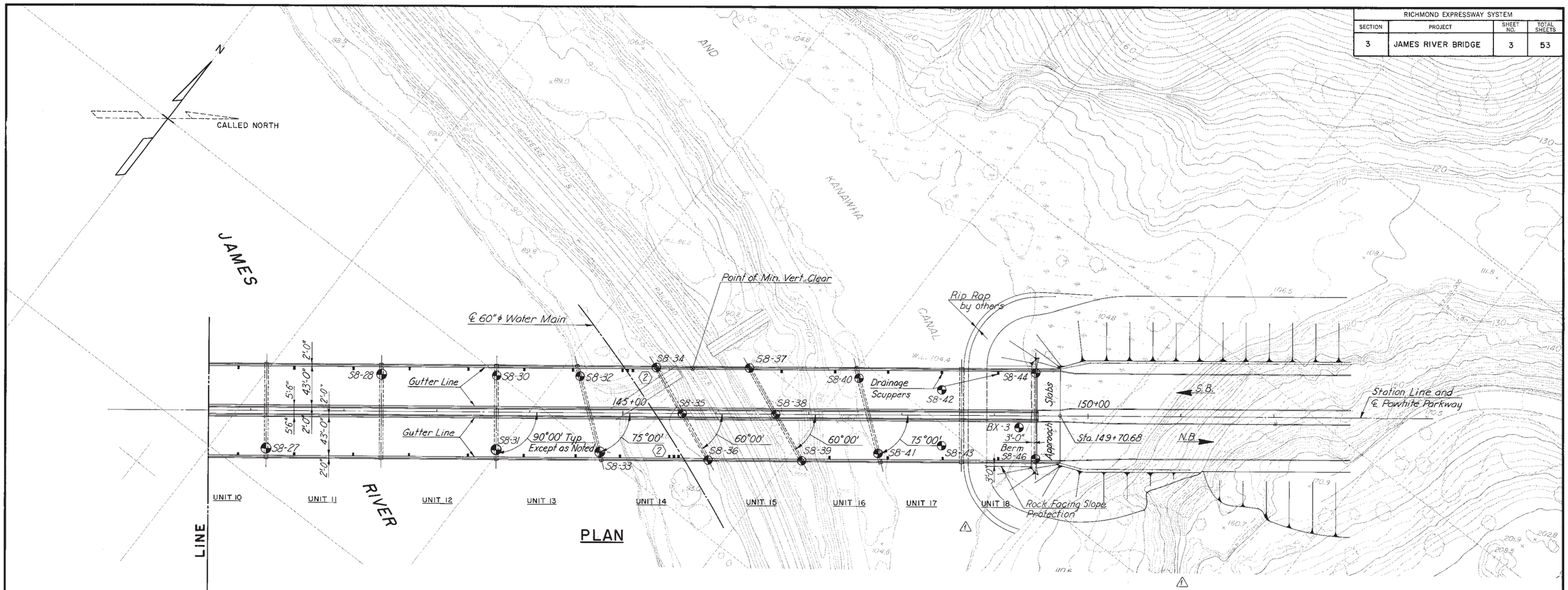
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 50'
CONTRACT NO.: C-3
SHEET NO. 2 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	3	53



NOTES:

For Bridge Layout and General Notes see sheet no. 4.

For Profiles see sheet no. 5.

Indicates 2½" ϕ Cased Hole Boring.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	HBW	8-67	3	AS BUILT	JRC	12-72
CHECKED	FXH	2-68	②	Scupper Location	J.G.V.	3/9/71
IN CHARGE	FXH		⚠	Elim. Disposal Area Add Foot Path	E.V.R.	2/20/71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

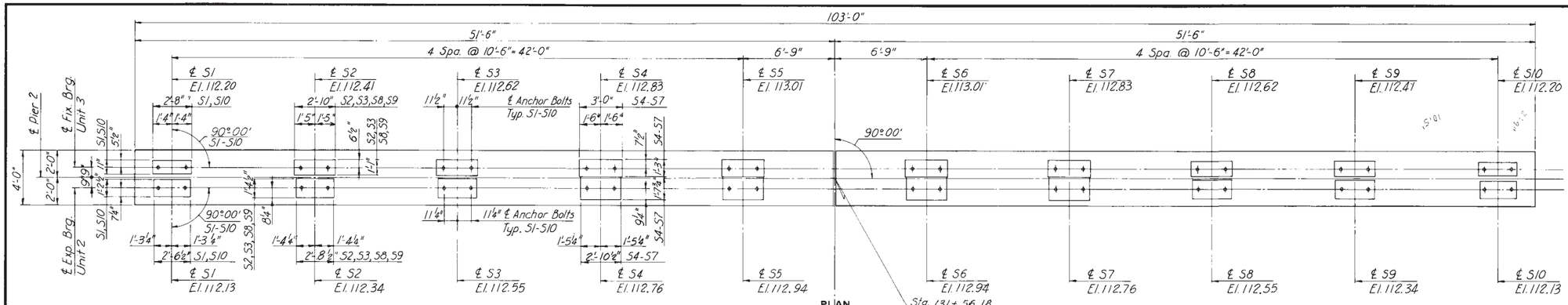
JAMES RIVER BRIDGE

GENERAL PLAN AND ELEVATION

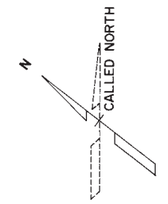
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

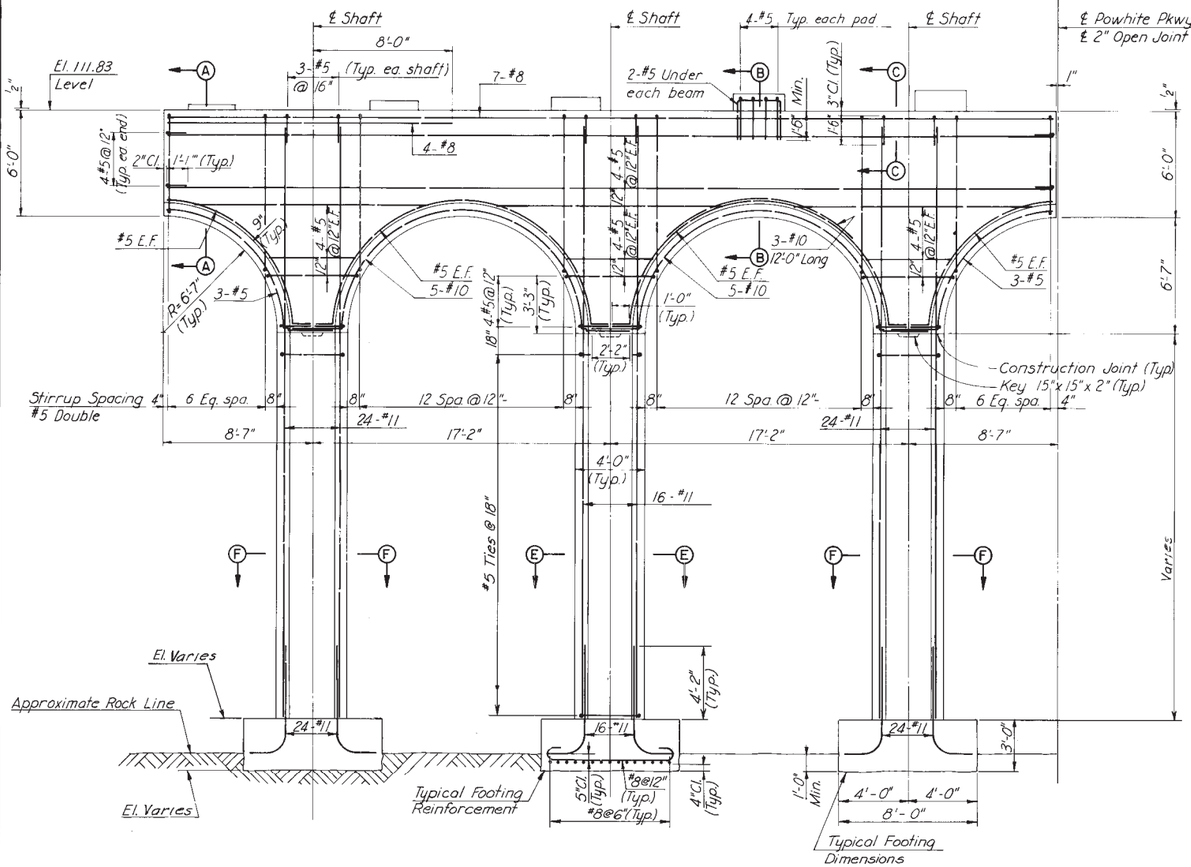
SCALE: 1" = 50'
CONTRACT NO.: C-3
SHEET NO. 3 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	10	53



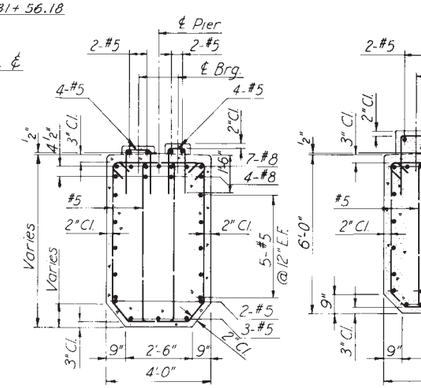
PLAN
Scale: ¼"=1'-0"



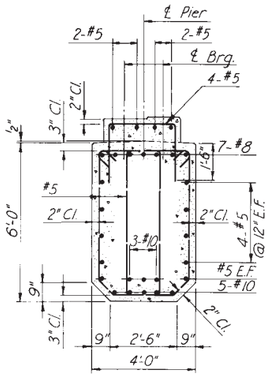


HALF ELEVATION
Scale: ¼"=1'-0"

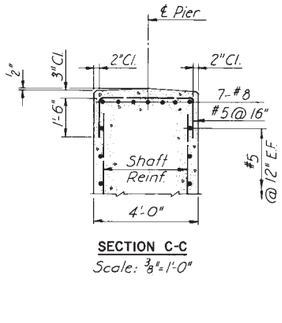
Note:
Pier symmetrical about ℄ Powhite Pkwy.



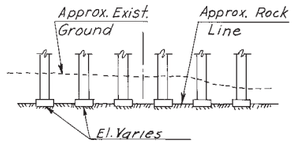
SECTION A-A
Scale: ⅜"=1'-0"



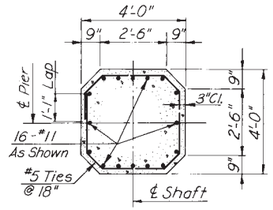
SECTION B-B
Scale: ⅜"=1'-0"



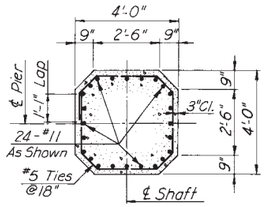
SECTION C-C
Scale: ⅜"=1'-0"



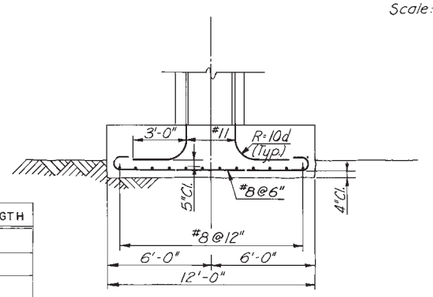
ELEVATION
Scale: 1"=30'-0"



SECTION E-E
Scale: ⅜"=1'-0"



SECTION F-F
Scale: ⅜"=1'-0"



FOOTING END VIEW
Scale: ¼"=1'-0"

FOOTING NO.	TOP ELEV.	AVE. BOTTOM ELEV.	STEM LENGTH
2 LW	82.81	78.95	16.44
2 CW	84.21	80.62	15.04
2 RW	81.24	77.77	18.01
2 LE	81.81	78.30	17.44
2 CE	81.17	77.33	18.08
2 RE	80.36	76.84	18.89

NOTES:

AS BUILT

Pier foundations are designed for an allowable bearing pressure of 10 Tons/S.F.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	L.B.P.	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	2-68	1	Complete	H.B.W.	2/20/71
IN CHARGE	FXH					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

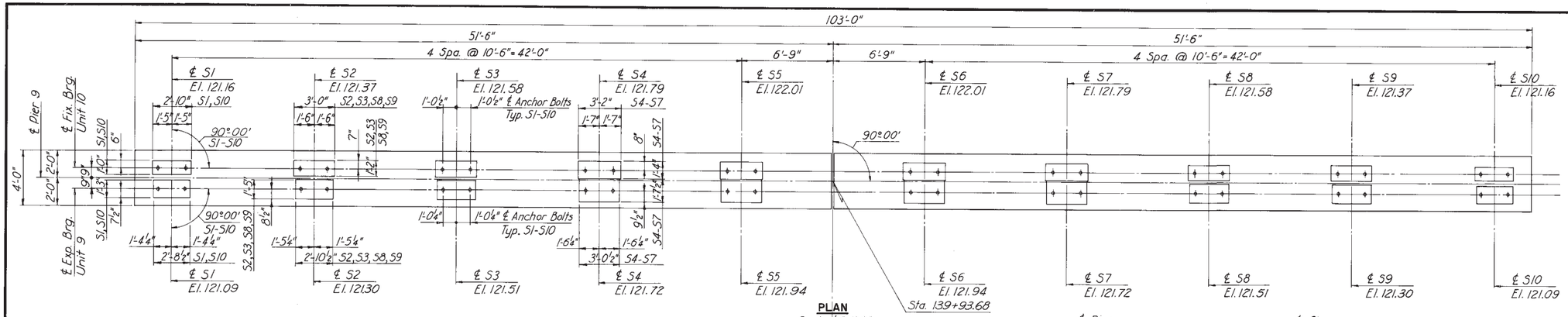
JAMES RIVER BRIDGE

PIER 2

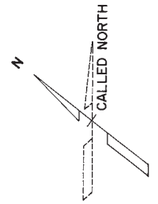
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

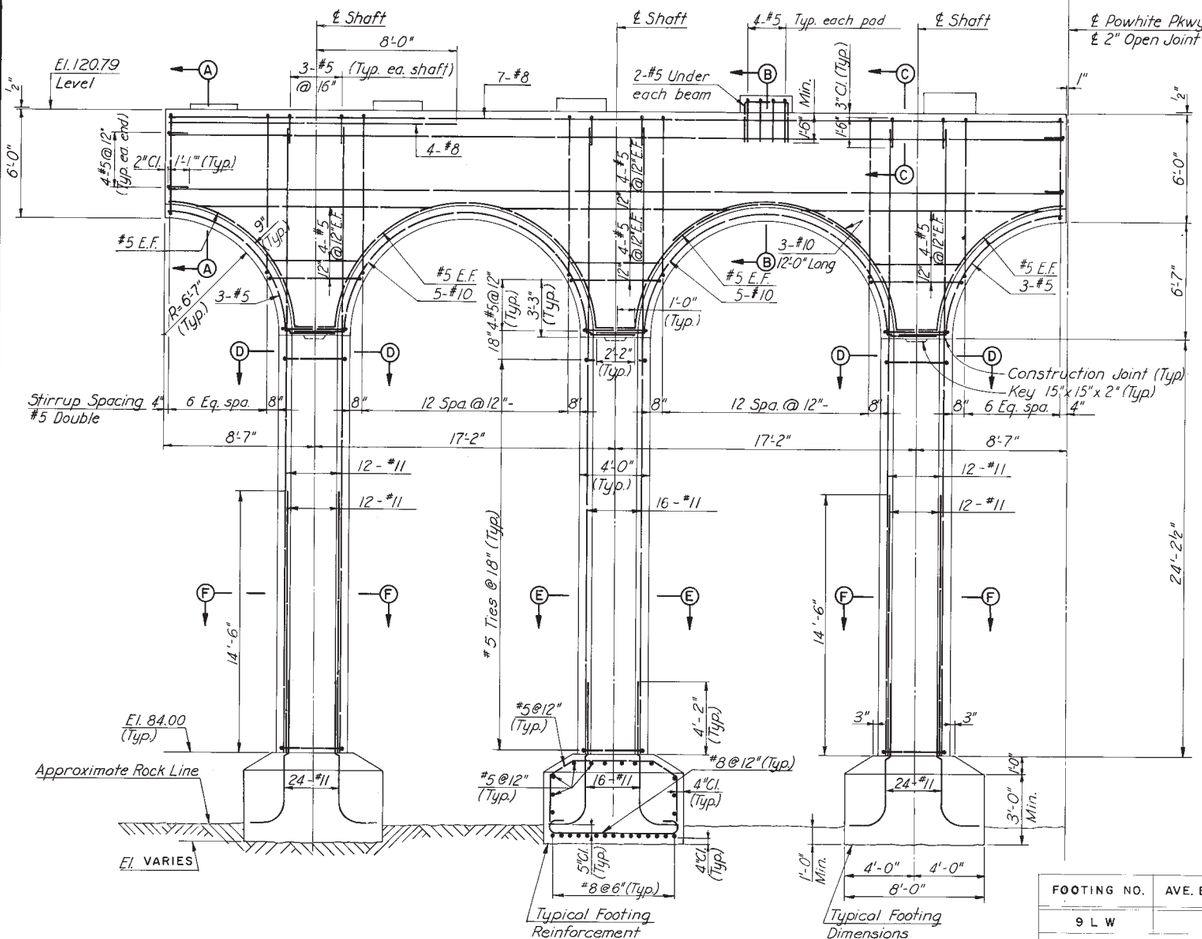
SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 10 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	19	53



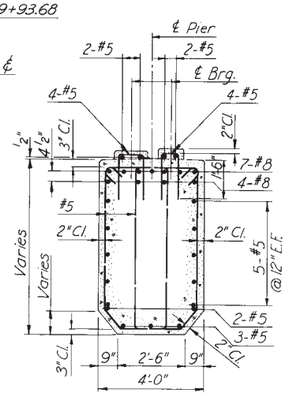
PLAN
Scale: 1/4"=1'-0"



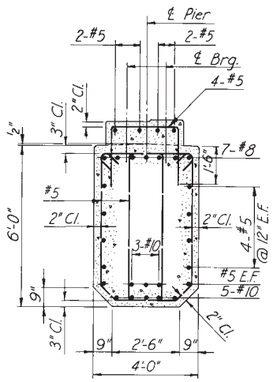


HALF ELEVATION
Scale: 1/4"=1'-0"

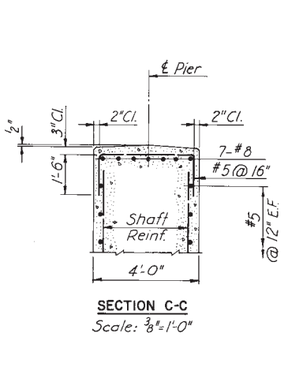
Note:
Pier symmetrical about ℄ Powhite Pkwy.



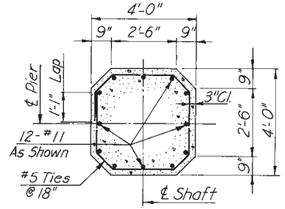
SECTION A-A
Scale: 3/8"=1'-0"



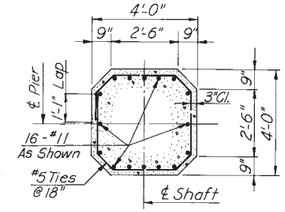
SECTION B-B
Scale: 3/8"=1'-0"



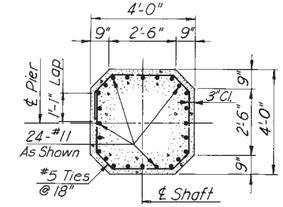
SECTION C-C
Scale: 3/8"=1'-0"



SECTION D-D
Scale: 3/8"=1'-0"



SECTION E-E
Scale: 3/8"=1'-0"



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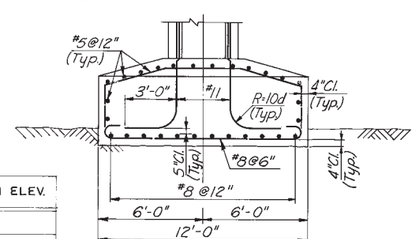
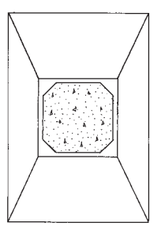


FOOTING END VIEW
Scale: 1/4"=1'-0"



FOOTING PLAN
Scale: 1/4"=1'-0"

FOOTING NO.	AVE. BOTTOM ELEV.
9 L W	79.1
9 C W	79.3
9 R W	79.0
9 L E	77.2
9 C E	77.7
9 R E	78.4

NOTES:

Pier foundations are designed for an allowable bearing pressure of 10 Tons/S.F.

	BY	DATE				
MADE	HBW	7-67				
CHECKED	FXH	2-68	1	AS BUILT	JRC	12-72
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

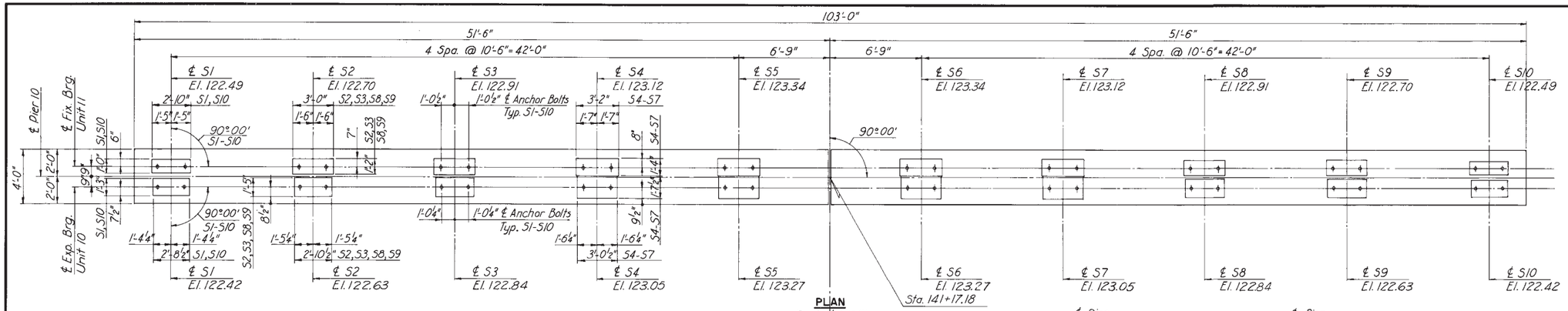
JAMES RIVER BRIDGE

PIER 9

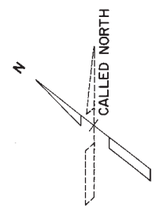
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

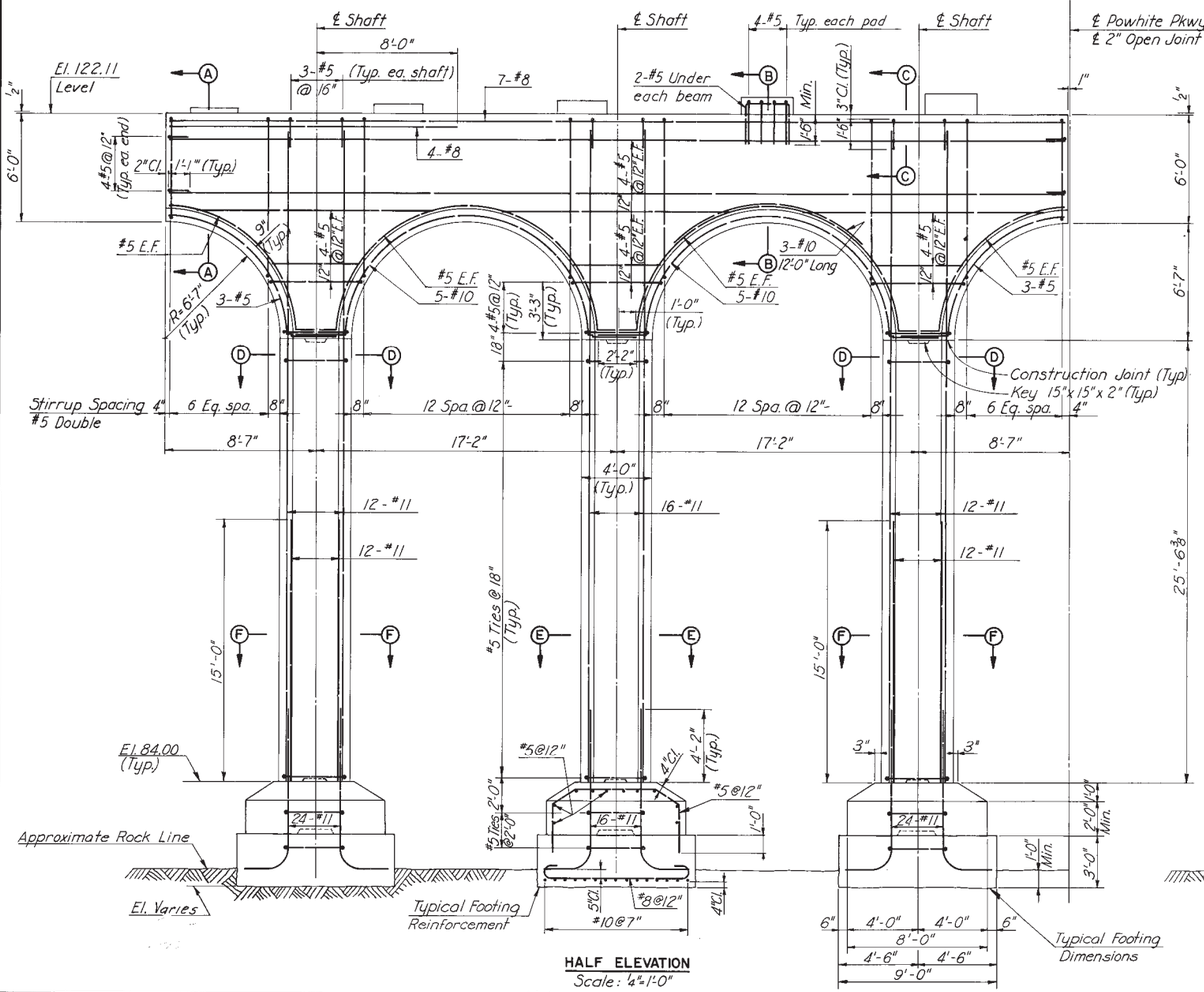
SCALE: AS SHOWN
CONTRACT NO: C-3
SHEET NO. 19 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	20	53



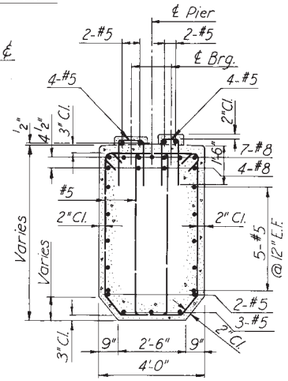
PLAN
Scale: 1/4"=1'-0"



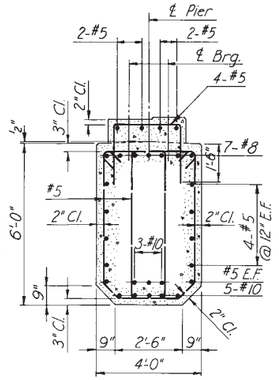


HALF ELEVATION
Scale: 1/4"=1'-0"

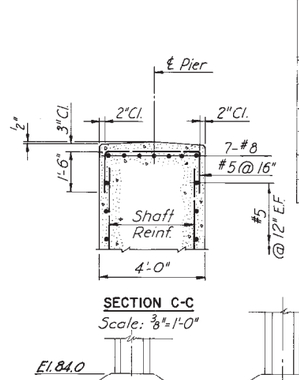
Note:
Pier symmetrical about ℄ Powhite Pkwy.



SECTION A-A
Scale: 3/8"=1'-0"

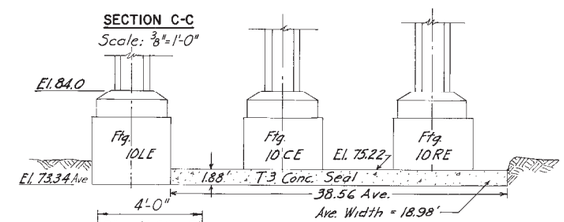


SECTION B-B
Scale: 3/8"=1'-0"

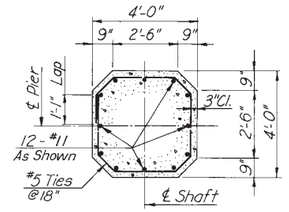


SECTION C-C
Scale: 3/8"=1'-0"

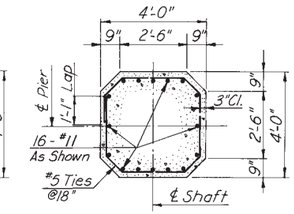
FOOTING NO.	AVE. BOTTOM ELEV.
10LW	77.78
10CW	76.95
10RW	76.24
10LE	73.34
10CE	See Below
10RE	" "



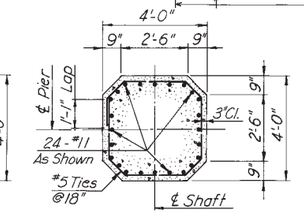
FOOTING EAST SIDE ONLY
Scale 1/8" = 1'



SECTION D-D
Scale: 3/8"=1'-0"



SECTION E-E
Scale: 3/8"=1'-0"

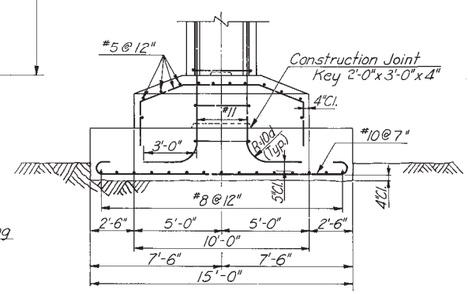


SECTION F-F
Scale: 3/8"=1'-0"

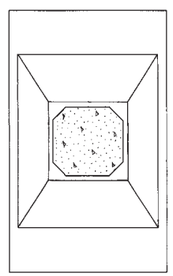
AS BUILT

NOTES:

Pier foundations are designed for an allowable bearing pressure of 5 Tons/S.F.



FOOTING END VIEW
Scale: 1/4"=1'-0"



FOOTING PLAN
Scale: 1/4"=1'-0"

	BY	DATE				
MADE	HBW	7-67				
CHECKED	FXH	2-68	1	AS BUILT	JRC	12-72
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

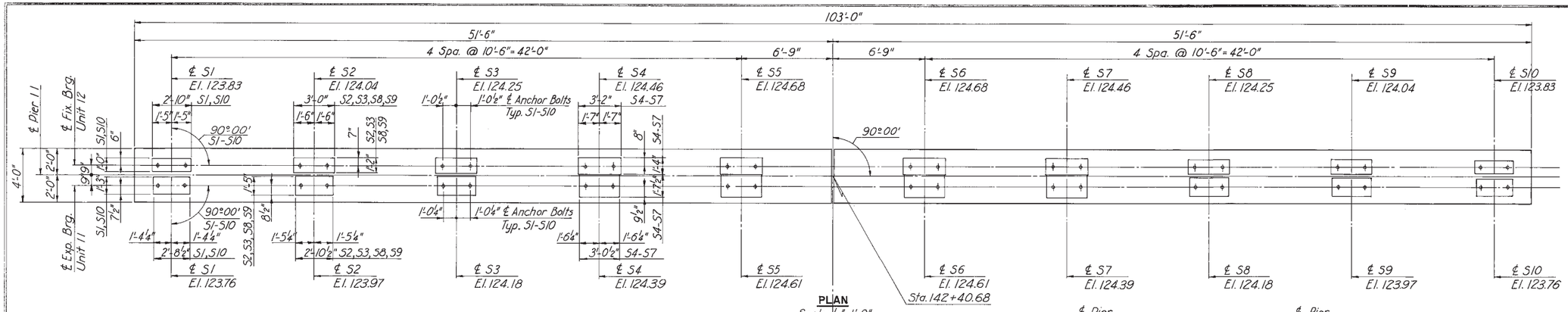
JAMES RIVER BRIDGE

PIER 10

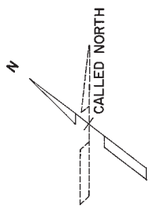
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

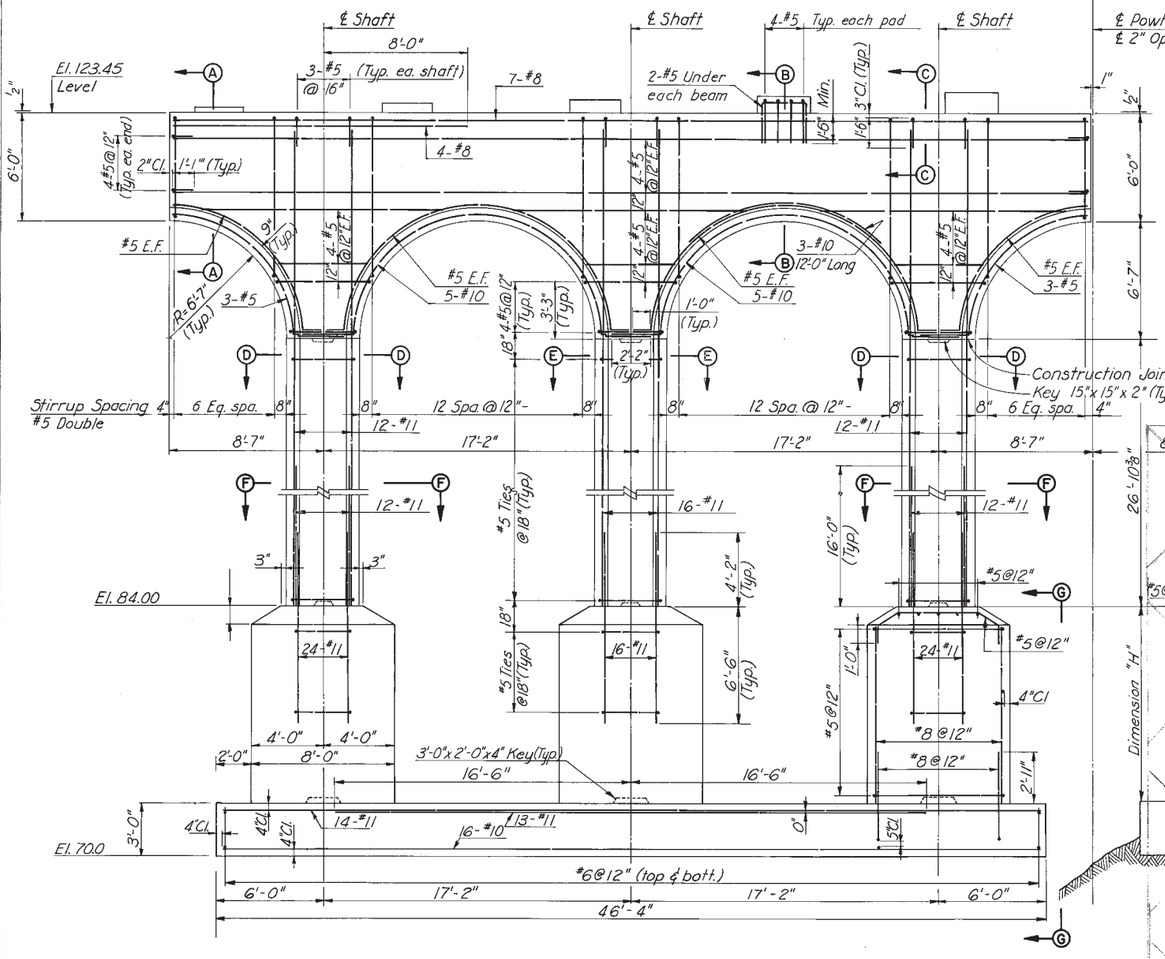
SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 20 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	21	53



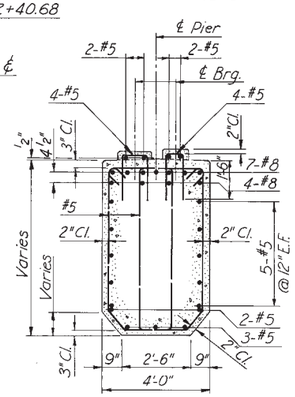
PLAN
Scale: 1/4"=1'-0"



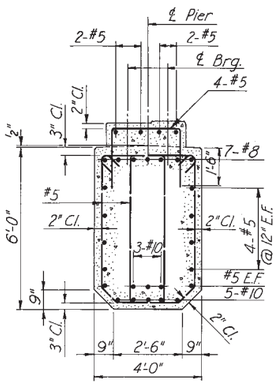


ELEVATION
Scale: 1/4"=1'-0"

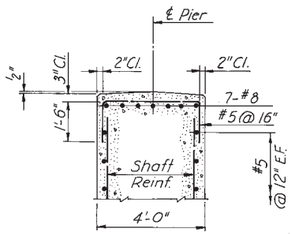
Note:
Pier symmetrical about ℄ Powhite Pkwy. except as shown.



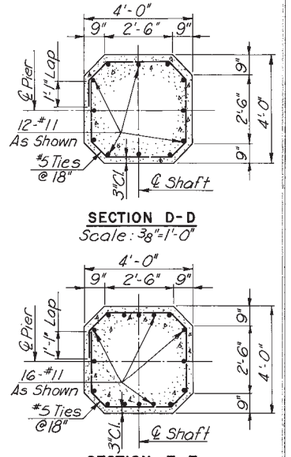
SECTION A-A
Scale: 3/8"=1'-0"



SECTION B-B
Scale: 3/8"=1'-0"

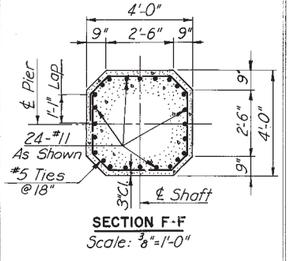


SECTION C-C
Scale: 3/8"=1'-0"

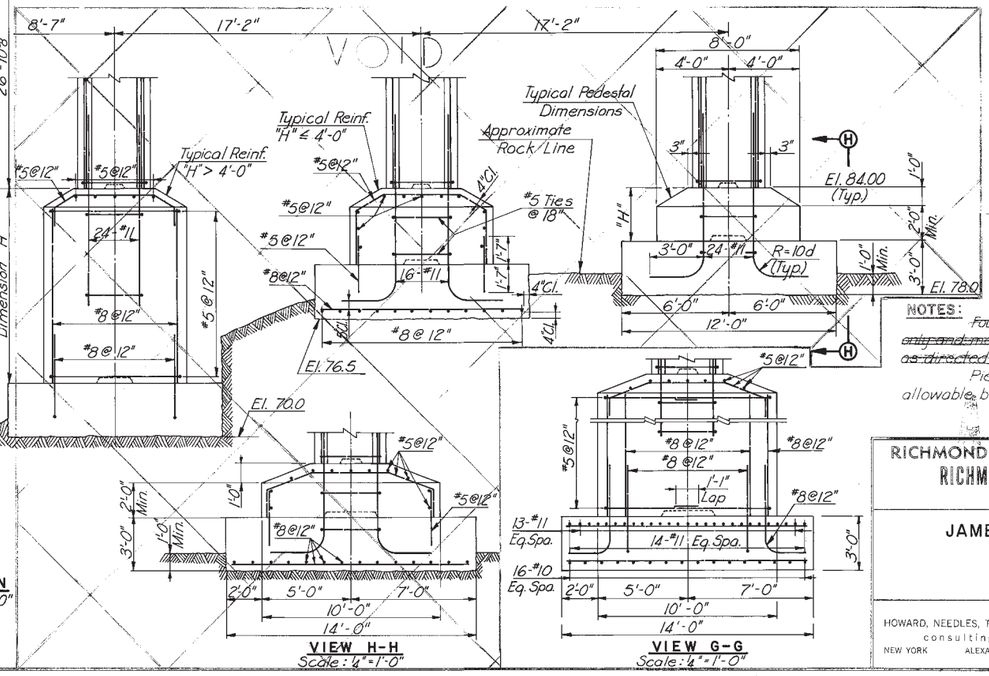


SECTION D-D
Scale: 3/8"=1'-0"

SECTION E-E
Scale: 3/8"=1'-0"



SECTION F-F
Scale: 3/8"=1'-0"



VIEW H-H
Scale: 1/4"=1'-0"

VIEW G-G
Scale: 1/4"=1'-0"

NOTES:
~~Foundation elevations are approximate only and may be varied to suit field conditions as directed by the Engineer.~~
Pier foundations are designed for an allowable bearing pressure of 3.5 Tons/S.F.

	BY	DATE				
MADE	L.B.P.	7-67	2	AS BUILT	JRC	12-72
CHECKED	F.X.H.	2-68	1	Elim. Sheet Pilg. & Ftg	JRC	9-3-71
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

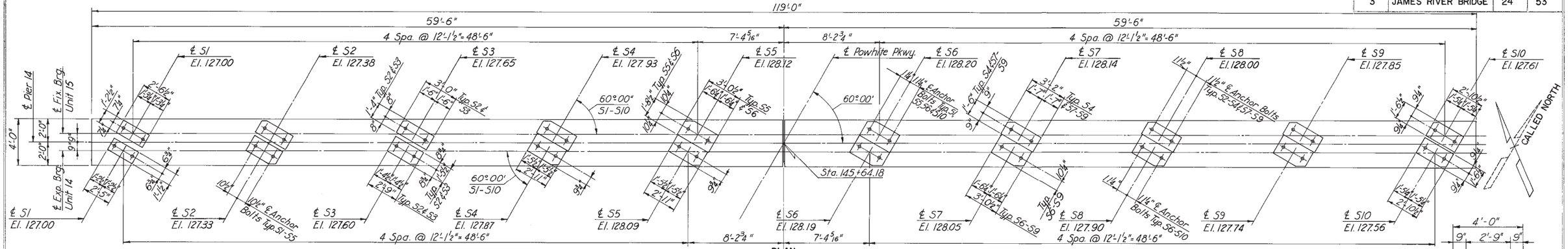
JAMES RIVER BRIDGE

PIER 11

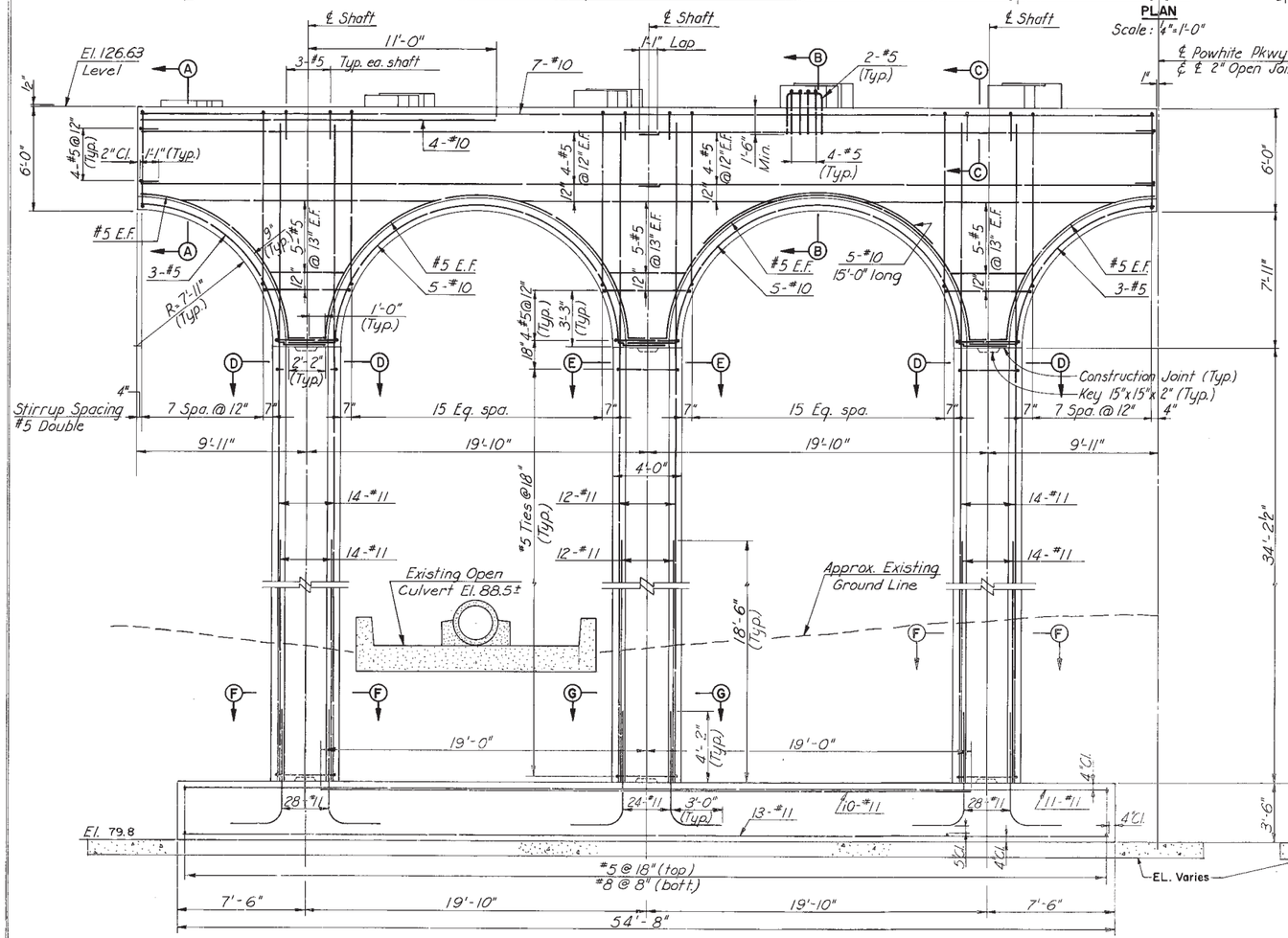
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO. C-3
SHEET NO. 21 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	24	53

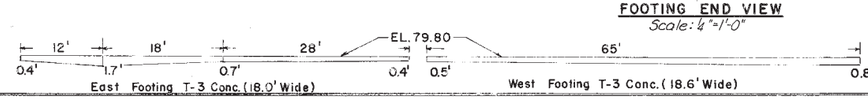


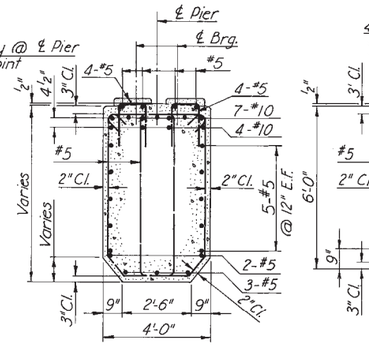
PLAN
Scale: 1/16"=1'-0"



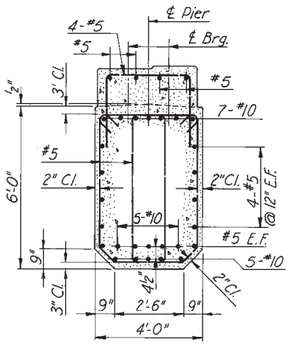
HALF ELEVATION
Scale: 1/16"=1'-0"

Note: Pier symmetrical about ℄ 2" open joint.

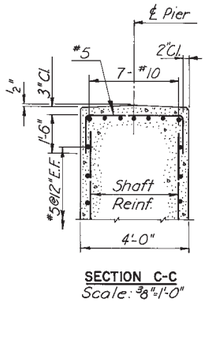




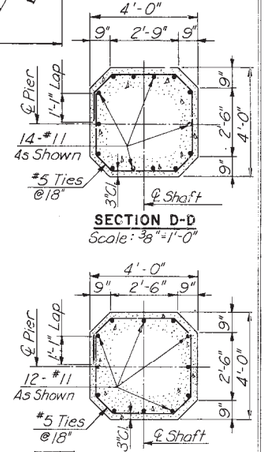
SECTION A-A
Scale: 3/8"=1'-0"



SECTION B-B
Scale: 3/8"=1'-0"

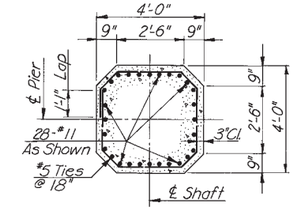


SECTION C-C
Scale: 3/8"=1'-0"

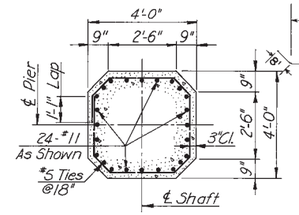


SECTION D-D
Scale: 3/8"=1'-0"

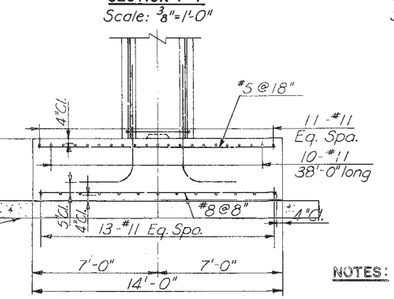
SECTION E-E
Scale: 3/8"=1'-0"



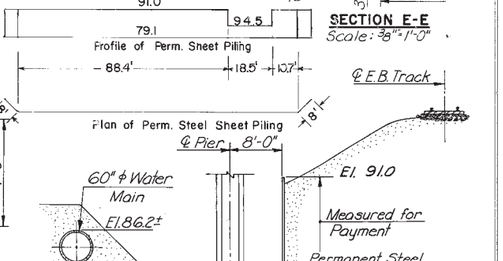
SECTION F-F
Scale: 3/8"=1'-0"



SECTION G-G
Scale: 3/8"=1'-0"



FOOTING END VIEW
Scale: 1/16"=1'-0"



Note: Sheet Piling not on south side of Pier.

END ELEVATION
NOT TO SCALE

NOTES:

Pier foundations are designed for an allowable bearing pressure of 3½ Tons/S.F.

	BY	DATE				
MADE	L.B.P.	7-67				
CHECKED	F.X.H.	3-68	1	AS BUILT	JRC	12-72
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

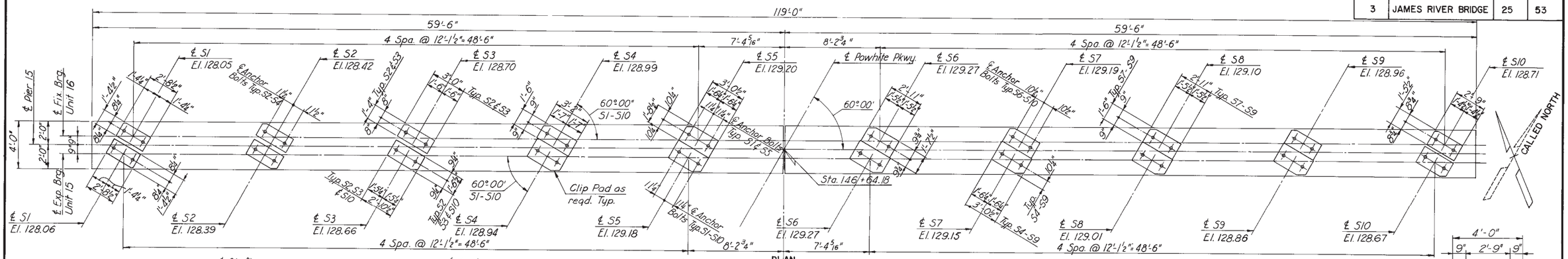
JAMES RIVER BRIDGE

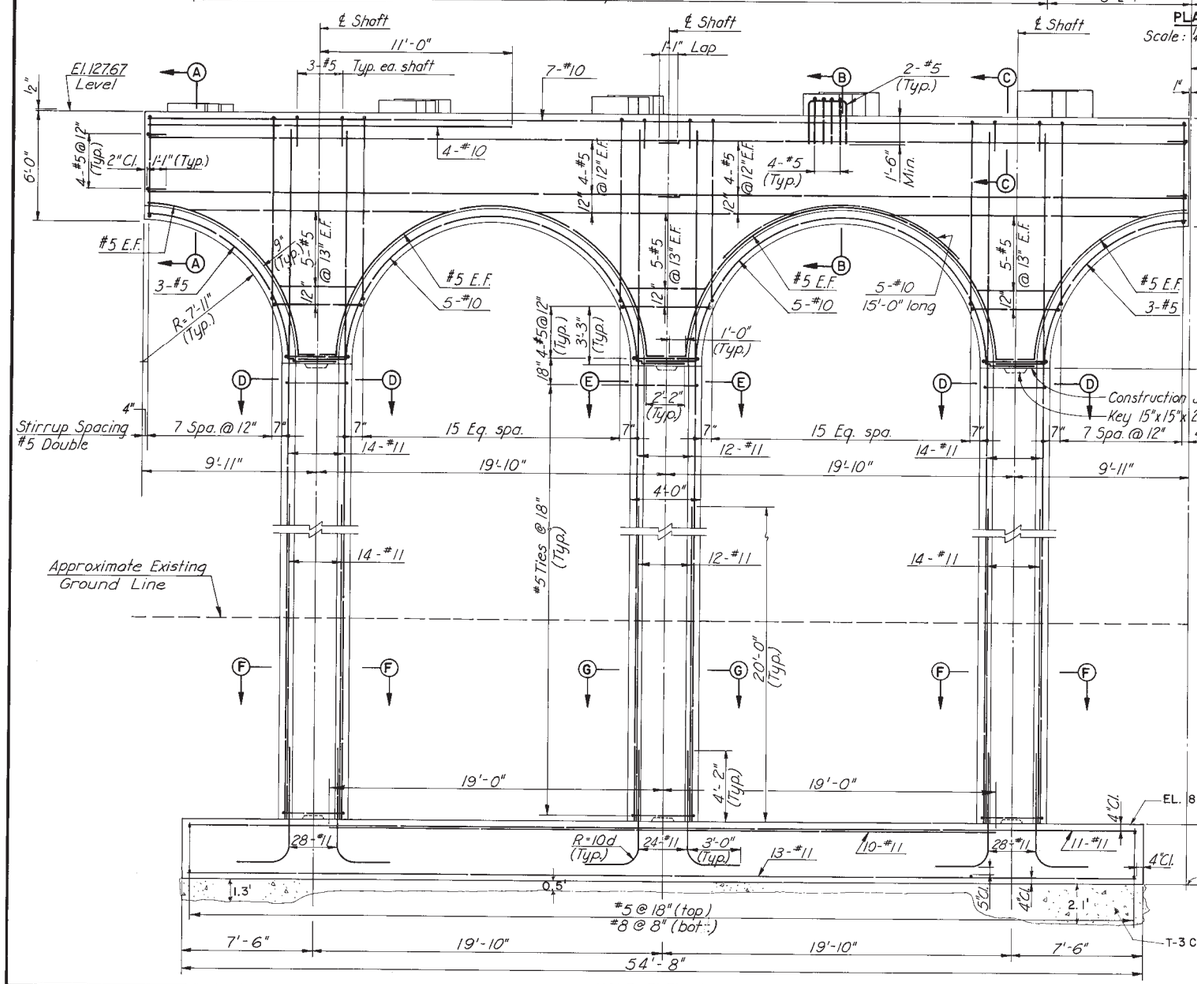
PIER 14

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO: C-3
SHEET NO. 24 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	25	53

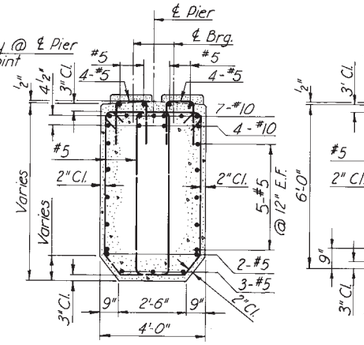




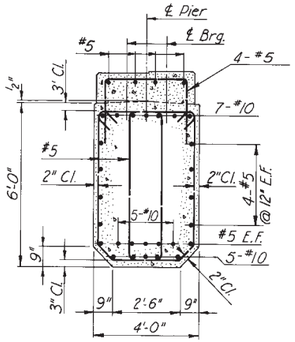
HALF ELEVATION
Scale: ¼"=1'-0"

Note:
Pier symmetrical about ℄ 2" open joint.

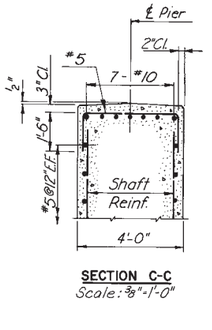
PLAN
Scale: ¼"=1'-0"



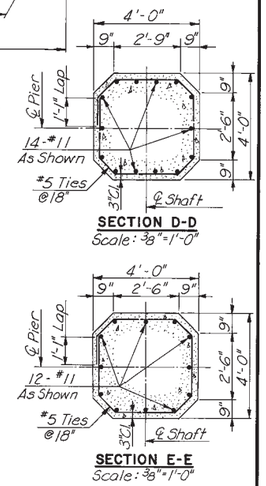
SECTION A-A
Scale: ⅜"=1'-0"



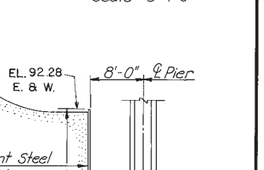
SECTION B-B
Scale: ⅜"=1'-0"



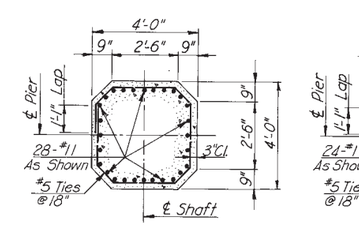
SECTION C-C
Scale: ⅜"=1'-0"



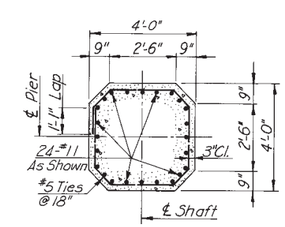
SECTION D-D
Scale: ⅜"=1'-0"



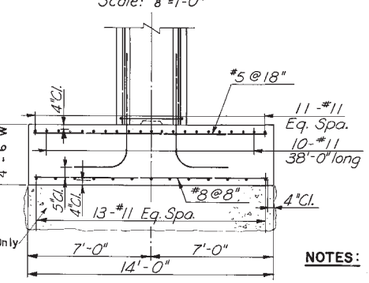
SECTION E-E
Scale: ⅜"=1'-0"



SECTION F-F
Scale: ⅜"=1'-0"



SECTION G-G
Scale: ⅜"=1'-0"



FOOTING END VIEW
Scale: 4"=1'-0"

NOTES:

Pier foundations are designed for an allowable bearing pressure of 3½ Tons/S.F.

END ELEVATION
Scale: 3/32"=1'-0"

	BY	DATE				
MADE	HBW	7-67				
CHECKED	FXH	3-68	1	AS BUILT	JRC	12-72
IN CHARGE	FXH		NO.	REVISION	BY	DATE

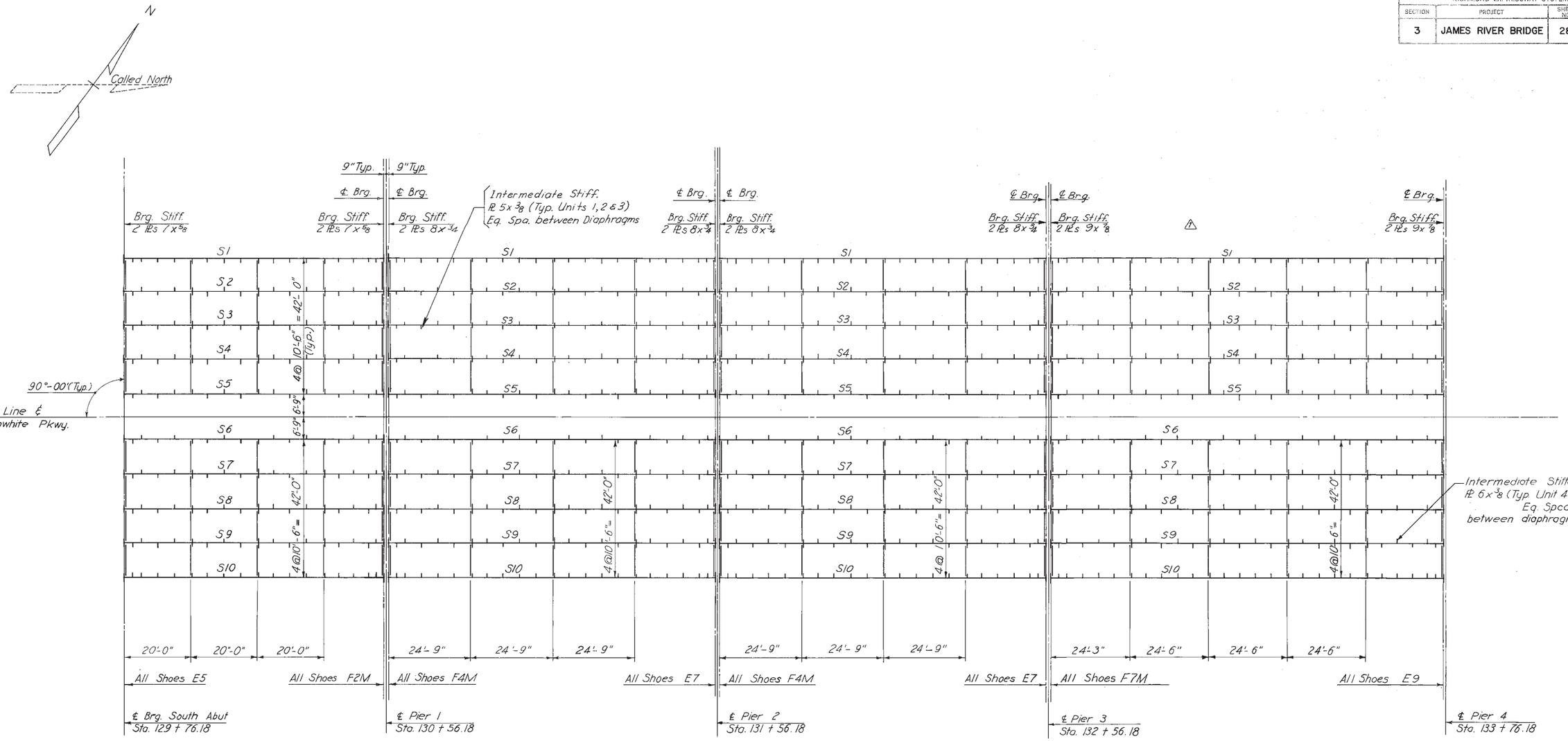
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE
PIER 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

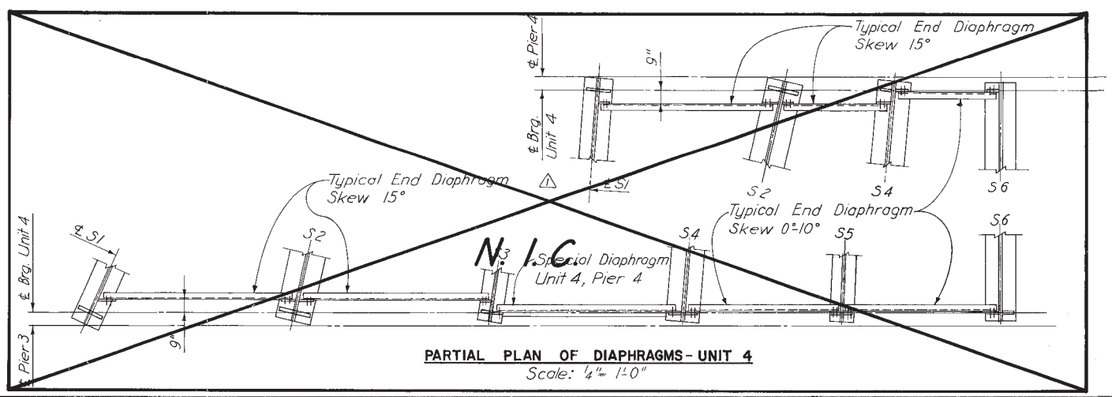
SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 25 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	28	53



STRINGER LENGTHS (c to c Bearing)					
Unit	Stringer	Length	Unit	Stringer	Length
1	S1-S10	79'-3"	3	S1-S10	98'-6"
2	S1-S10	98'-6"	4	S1-S10	118'-6"

⚠



PARTIAL PLAN OF DIAPHRAGMS - UNIT 4
Scale: 1/4" = 1'-0"

	BY	DATE				
MADE	EVR	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	8-67	⚠1	Remove Ramp Taper	H.B.W.	2/20/71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

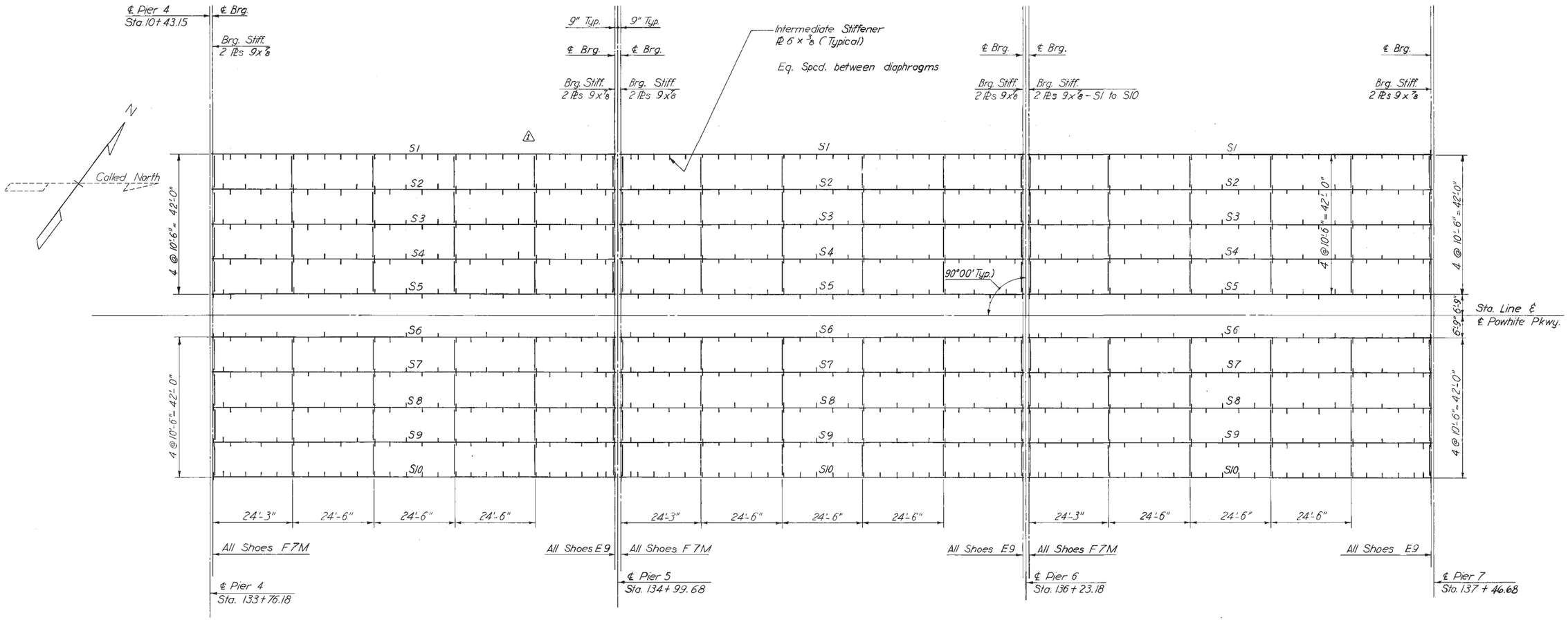
JAMES RIVER BRIDGE

FRAMING PLAN UNITS 1, 2, 3 & 4

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

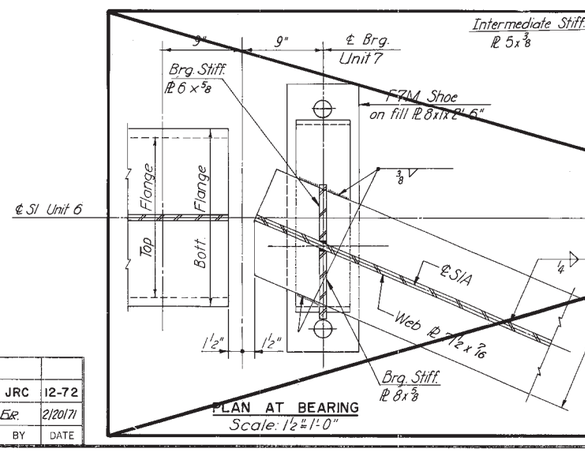
SCALE: 1"=15' (Unless Noted)
CONTRACT NO.: C-3
SHEET NO. 28 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	29	53



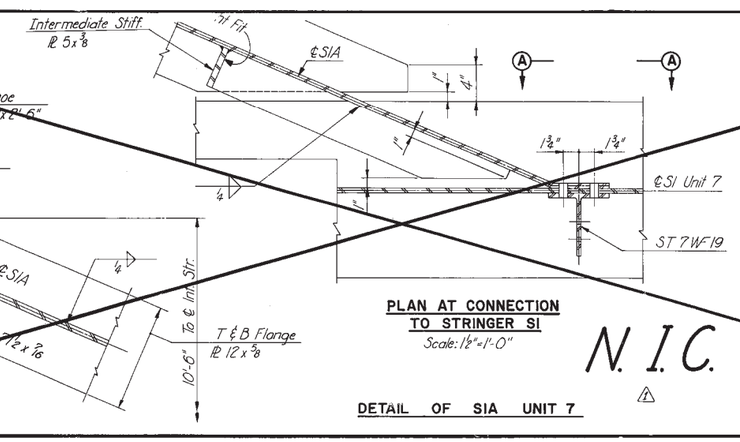
STRINGER LENGTHS (C.C. Bearing)		
Unit	Stringer	Length
5-12	S1-S10	122-0"

UNIT 5



PLAN AT BEARING
Scale: 1½"=1'-0"

UNIT 6

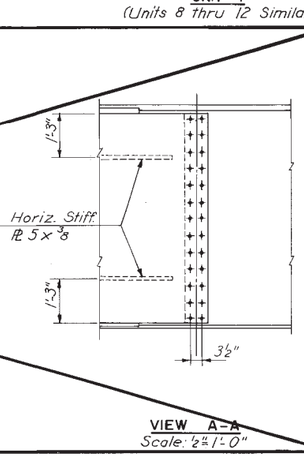


PLAN AT CONNECTION TO STRINGER S1
Scale: 1½"=1'-0"

N.I.C.

DETAIL OF S1A UNIT 7

UNIT 7
(Units 8 thru 12 Similar)



VIEW A-A
Scale: ½"=1'-0"

	BY	DATE				
MADE	EVR	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	8-67	1	Removed Ramp Widening	ESR	2/20/71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

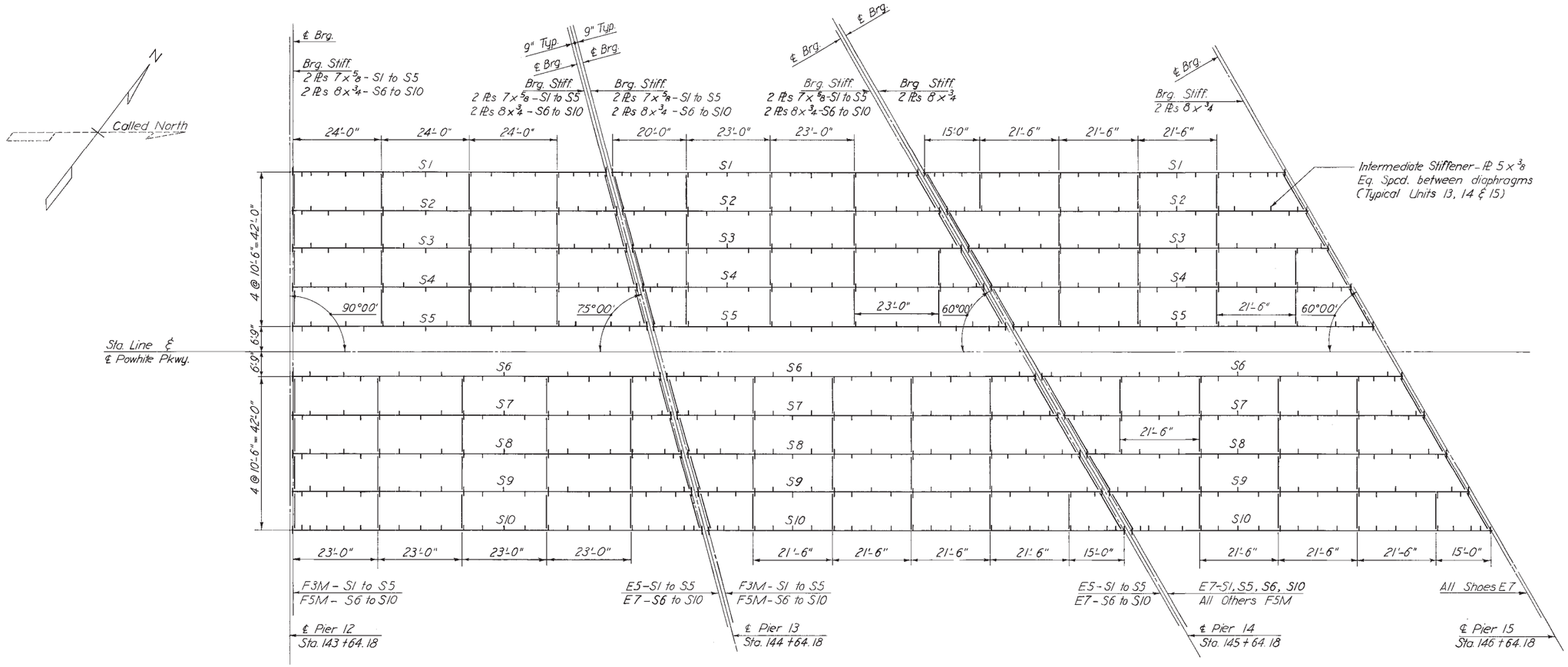
JAMES RIVER BRIDGE

FRAMING PLAN UNITS 5 THRU 12

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=15' (Unless Noted)
CONTRACT NO.: C-3
SHEET NO. 29 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	30	53



UNIT 13 UNIT 14 UNIT 15

STRINGER LENGTHS
(c to c Bearing)

Unit	Stringer	Length	Unit	Stringer	Length	Unit	Stringer	Length
13	S1	85'-4 15/16"	13 (cont'd)	S8	105'-10 7/8"	14 (cont'd)	S5	96'-3 1/4"
	S2	88'-2 11/16"		S9	108'-8 11/16"		S6	100'-5 3/8"
	S3	91'-0 7/16"		S10	111'-6 7/16"		S7	103'-8 5/16"
	S4	93'-10 3/16"	14	S1	83'-3 5/16"		S8	106'-11 5/16"
	S5	96'-8"		S2	85'-6 1/4"		S9	110'-2 5/16"
	S6	100'-3 3/8"		S3	89'-9 1/4"		S10	113'-5 5/16"
	S7	103'-1 1/8"		S4	93'-0 1/4"	15	S1 - S10	98'-3 3/16"

	BY	DATE
MADE	EVR	7-67
CHECKED	FXH	8-67
IN CHARGE	FXH	

NO.	REVISION	BY	DATE
1	AS BUILT	JRC	12-72

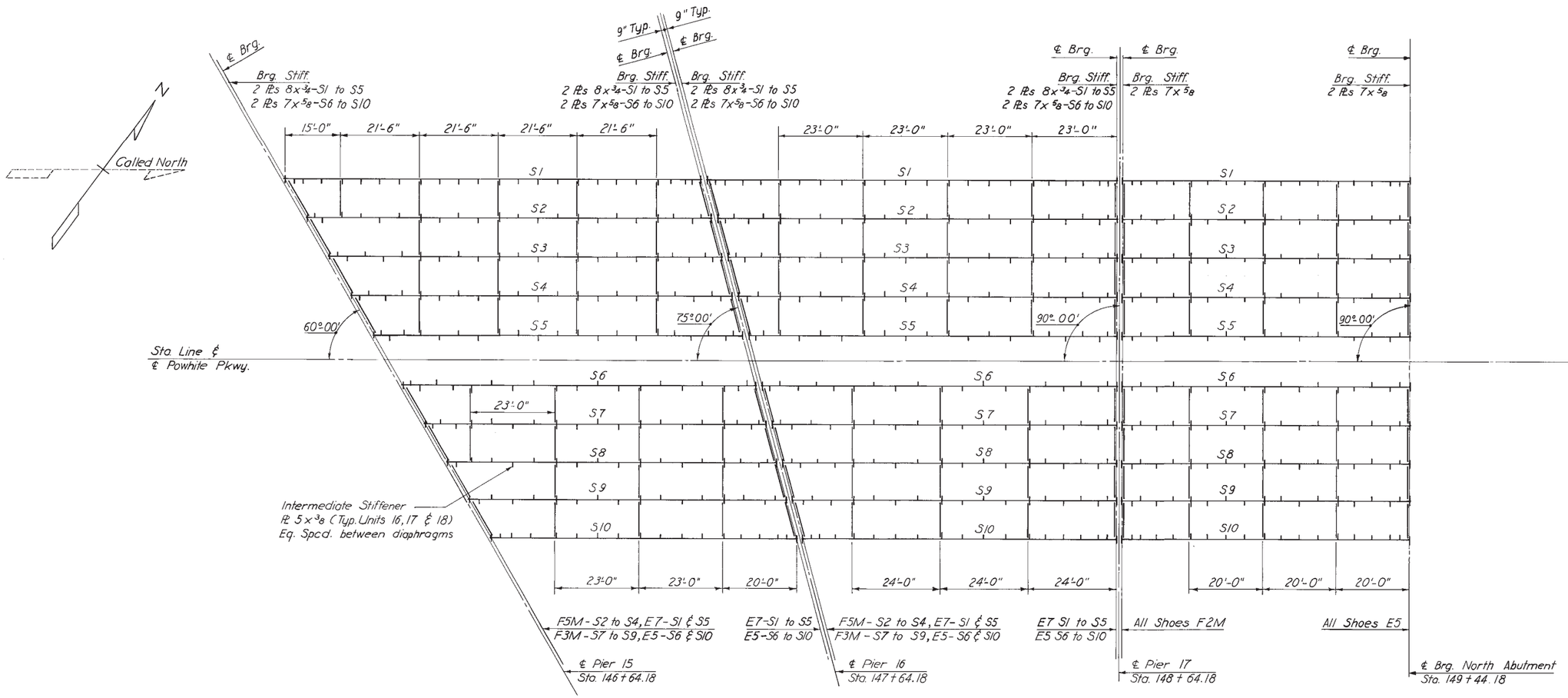
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE
FRAMING PLAN UNITS 13, 14 & 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 15'-0"
CONTRACT NO.: C-3
SHEET NO. 30 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	31	53



STRINGER LENGTHS
(c to c Bearing)

Unit	Stringer	Length	Unit	Stringer	Length	Unit	Stringer	Length
16	S1	113'-5 5/16"	16 (cont'd)	S8	89'-9¼"	17 (cont'd)	S5	100'-3⅜"
	S2	110'-2 5/16"		S9	85'-6¼"		S6	96'-8"
	S3	106'-11 5/16"		S10	83'-3 5/16"		S7	93'-10 3/16"
	S4	103'-8 5/16"	17	S1	111'-6 7/16"		S8	91'-0 7/16"
	S5	100'-5⅜"		S2	108'-8 11/16"		S9	88'-2 11/16"
	S6	96'-3¼"		S3	105'-10⅞"		S10	85'-4 15/16"
	S7	93'-0¼"		S4	103'-1⅛"	18	S1-S10	79'-3"

	BY	DATE				
MADE	EVR	7-67				
CHECKED	FXH	8-67	1	AS BUILT	JRC	12-72
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

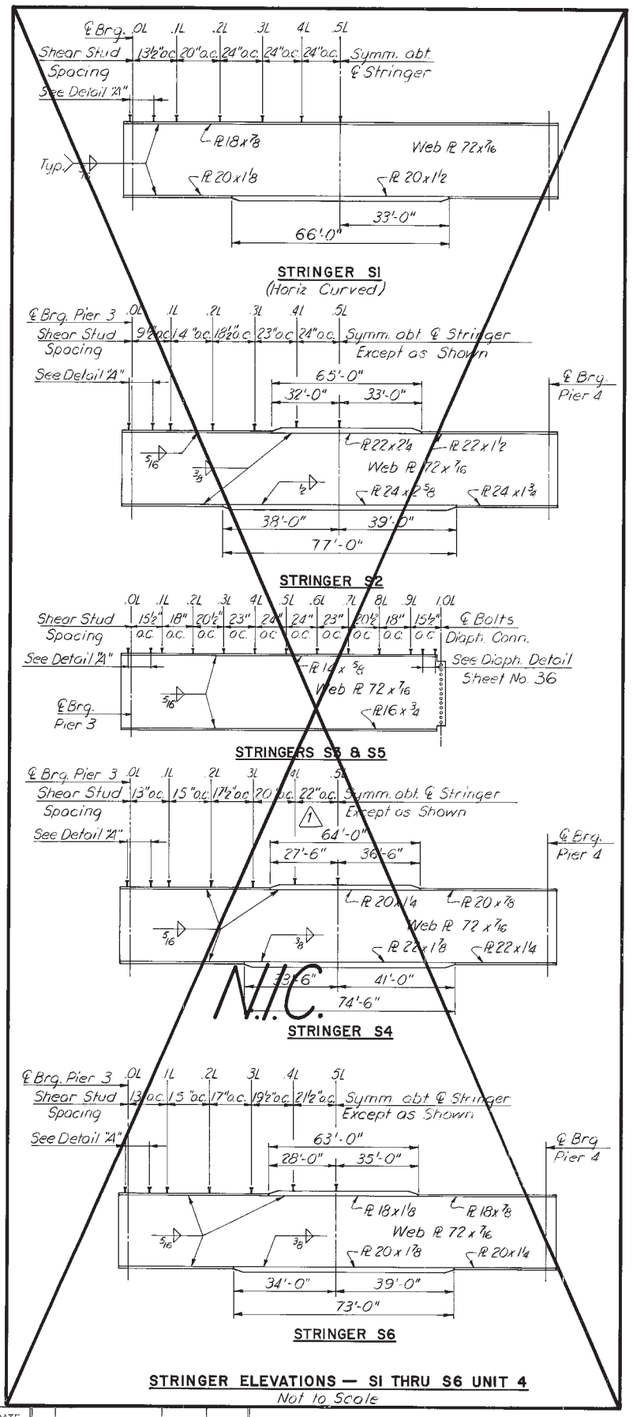
JAMES RIVER BRIDGE

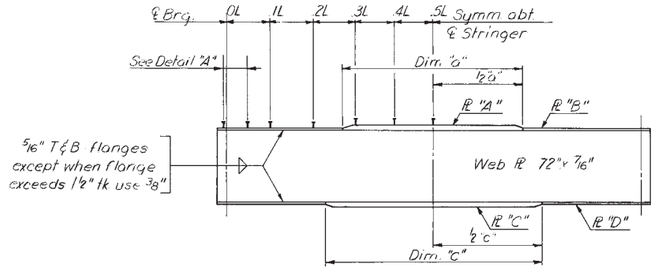
FRAMING PLAN UNITS 16,17 & 18

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

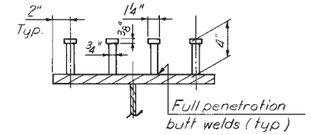
SCALE: 1" = 15'-0"
CONTRACT NO.: C-3
SHEET NO. 31 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	32	53

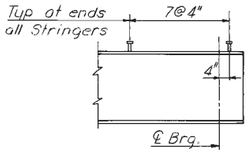




TYPICAL STRINGER ELEVATION
Not to Scale



SHEAR STUD DETAIL
Not to Scale



DETAIL "A"
Not to Scale

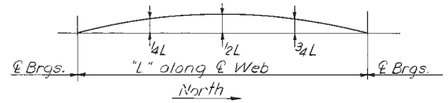
SHEAR STUD NOTE:

Capacity = 3400lbs. per stud.

The contractor may, if he elects, use three ⅞" diameter studs of the same longitudinal spacing in lieu of four ¾" diameter studs shown.

Stud rows shall be placed parallel to the main deck reinforcing.

Shear stud spacing shown is maximum spacing.



CAMBER DIAGRAM

NOTE TO FABRICATOR:

Stringers fabricated with an upward camber amounting to (see table). This will provide approximate compensation for deflection under full dead load.

STRINGER SCHEDULE

UNIT	STRINGER	R."A"	Dim."a"	R."B"	R."C"	Dim."c"	R."D"	SHEAR STUD SPACING .0L-.1L	.1L-.2L	.2L-.3L	.3L-.4L	.4L-.5L
1	S5&S6	14 x ⅝	F. L.	—	16 x ⅞	F. L.	—	12"	13½"	16"	18½"	20½"
	S1-S4,S7-S10	14 x ⅝	F. L.	—	16 x 1	40'-6"	16 x ¾	11½"	13½"	15½"	18"	20"
2	~~———~~	~~16 x ⅜~~	~~F. L.~~	~~———~~	~~10 x 1⅛~~	~~54'-0"~~	~~10 x ⅜~~	~~13½"~~	~~15½"~~	~~19½"~~	~~24"~~	~~24"~~
	~~———~~	~~16 x ⅜~~	~~F. L.~~	~~———~~	~~18 x 1⅛~~	~~52'-6"~~	~~18 x ⅜~~	~~13½"~~	~~16"~~	~~19½"~~	~~24"~~	~~24"~~
	S5 & S6	16 x ¾	F. L.	—	18 x 1⅜	60'-6"	18 x ⅜	12"	14"	18"	22"	24"
	S1-S4,S7-S10	16 x ¾	F. L.	—	18 x 1½	58'-6"	18 x 1	12"	14"	16"	19"	21"
3	~~———~~	~~16 x ¾~~	~~F. L.~~	~~———~~	~~18 x 1¾~~	~~56'-6"~~	~~18 x ⅜~~	~~13"~~	~~15"~~	~~17½"~~	~~20½"~~	~~22½"~~
⚠1	S5 & S6	16 x ¾	F. L.	—	18 x 1⅜	60'-6"	18 x ⅜	12"	14"	18"	22"	24"
	S1-S4,S7-S10	16 x ¾	F. L.	—	18 x 1½	58'-6"	18 x 1	12"	14"	16"	19"	21"
4	See Elevations Dwg. Sheet											
	S1-S4,S7-S10	18 x 1½	62'-0"	18 x ⅞	20 x 1⅞	74'-6"	20 x 1¼	12½"	14½"	17½"	21"	23"
	S5 & S6	18 x 1½	59'-0"	18 x ⅞	20 x 1⅞	71'-0"	20 x 1¼	12½"	14½"	18½"	23½"	24"
5	~~———~~	~~18 x 1½~~	~~60'-0"~~	~~18 x ⅞~~	~~20 x 1⅞~~	~~72'-0"~~	~~20 x 1½~~	~~13½"~~	~~15½"~~	~~20"~~	~~24"~~	~~24"~~
	~~———~~	~~18 x 1~~	~~F. L.~~	~~—~~	~~20 x 1⅜~~	~~75'-0"~~	~~20 x 1⅜~~	~~14½"~~	~~16½"~~	~~20½"~~	~~23½"~~	~~24"~~
	S5&S6	18 x 1¼	66'-0"	18 x ⅞	20 x 2	73'-0"	20 x 1⅜	12½"	14½"	17½"	24"	24"
	S1-S4,S7-S10	18 x 1⅜	68'-6"	18 x ⅞	20 x 2	75'-6"	20 x 1⅜	12½"	14½"	17½"	21½"	23½"
6	S5&S6	18 x 1¼	66'-0"	18 x ⅞	20 x 2	73'-0"	20 x 1⅜	12½"	14½"	17½"	24"	24"
	S1-S4,S7-S10	18 x 1⅜	68'-6"	18 x ⅞	20 x 2	75'-6"	20 x 1⅜	12½"	14½"	17½"	21½"	23½"
7 Thru 12	S1-S4,S7-S10	18 x 1⅜	68'-6"	18 x ⅞	20 x 2	75'-6"	20 x 1⅜	12½"	14½"	17½"	21½"	23½"
	S5&S6	18 x 1¼	66'-0"	16 x ⅞	20 x 2	73'-0"	20 x 1⅜	12½"	14½"	17½"	24"	24"
13 ℄ 14	S1	14 x ⅝	F. L.	—	16 x 1⅛	51'-0"	16 x ¾	11½"	13"	15½"	18"	20"
	S2	14 x ⅝	F. L.	—	16 x 1¼	51'-0"	16 x ⅞	11½"	13½"	15½"	18"	20"
	S3	14 x ⅝	F. L.	—	16 x 1⅜	55'-6"	16 x ⅞	11½"	13½"	16½"	18½"	20"
	S4	14 x ⅝	F. L.	—	16 x 1½	55'-6"	16 x 1	12"	13½"	15½"	18½"	20"
	S5	14 x ¾	F. L.	—	16 x 1½	57'-0"	16 x 1	12"	14"	16½"	21"	24"
	S6	16 x ¾	F. L.	—	18 x 1⅜	62'-6"	18 x ⅞	12"	14"	17½"	22"	24"
	S7	16 x ⅞	F. L.	—	18 x 1⅝	61'-0"	18 x 1⅛	12"	14"	16"	19½"	21"
	S8	16 x 1	51'-0"	16 x ¾	18 x 1⅜	67'-0"	18 x 1¼	12"	14"	17"	19½"	21½"
	S9	16 x 1	57'-0"	16 x ¾	18 x 1⅞	67'-0"	18 x 1¼	12"	14"	17"	20"	22"
	S10	16 x 1⅛	63'-6"	16 x ¾	18 x 2	68'-6"	18 x 1⅜	12½"	14"	16½"	20½"	22½"
15	S1-S4,S7-S10	16 x ¾	F. L.	—	16 x 1½	58'-6"	16 x 1	12"	14"	16"	19"	21"
	S5&S6	16 x ¾	F. L.	—	18 x 1⅜	60'-6"	16 x ⅞	12"	14"	18"	22"	24"
16 ℄ 17	S1	16 x 1⅛	63'-6"	16 x ¾	16 x 2	68'-6"	18 x 1⅜	12½"	14"	16½"	20½"	22½"
	S2	16 x 1	57'-0"	16 x ¾	18 x 1⅞	67'-0"	18 x 1¼	12"	14"	17"	20"	22"
	S3	16 x 1	51'-0"	16 x ¾	18 x 1⅜	66'-6"	18 x 1⅛	12"	14"	17"	19½"	21½"
	S4	16 x ⅞	F. L.	—	18 x 1⅜	61'-0"	18 x 1½	12"	14"	16"	19½"	21"
	S5	16 x ¾	F. L.	—	18 x 1⅜	62'-6"	18 x ⅞	12"	14"	17½"	22"	24"
	S6	14 x ¾	F. L.	—	16 x 1½	57'-0"	16 x 1	12"	14"	16½"	21"	24"
	S7	14 x ⅝	F. L.	—	16 x 1½	55'-6"	16 x 1	12"	13½"	15½"	18½"	20"
	S8	14 x ⅝	F. L.	—	16 x 1⅜	55'-6"	16 x ⅞	11½"	13½"	16½"	18½"	20"
	S9	14 x ⅝	F. L.	—	16 x 1¼	51'-0"	16 x ⅞	11½"	13½"	15½"	18"	20"
	S10	14 x ⅝	F. L.	—	16 x 1⅛	51'-0"	16 x ¾	11½"	13"	15½"	18"	20"
18	S1-S4,S7-S10	14 x ⅝	F. L.	—	16 x 1	40'-6"	16 x ¾	11½"	13½"	15½"	18"	20"
	S5&S6	14 x ⅜	F. L.	—	16 x ⅞	F. L.	—	12"	13½"	16"	18½"	20½"

CAMBER SCHEDULE

UNIT	STRINGER	4 & 3¾	½	UNIT	STRINGER	4 & 3¾	½
1	S1 - S10	¾"	1"	13 ℄ 14	S6	1⅜"	1⅞"
2	~~———~~	~~1¼"~~	~~1¾"~~		S7	1½"	2⅛"
	~~———~~	~~1½"~~	~~1⅝"~~		S8	1⅝"	2¼"
	S1 - S10	1⅜"	1¾"		S9	1⅝"	2¼"
3	~~———~~	~~1¼"~~	~~1¾"~~		S10	1⅞"	2½"
⚠1	S1 - S10	1⅜"	1⅞"	15	S1 - S10	1⅜"	1½"
4	S1 - S10	2"	2¾"	16 ℄ 17	S1	1⅞"	2½"
5	S5&S6	2⅛"	3"		S2	1¾"	2⅜"
	S1-S4,S7-S10	2⅛"	2⅞"		S3	1⅝"	2¼"
6	S5&S6	2⅛"	3"		S4	1½"	2⅛"
	S1-S4,S7-S10	2⅛"	2⅞"		S5	1⅜"	1⅞"
7 Thru 12	S1-S4,S7-S10	2⅛"	2⅞"	17	S6&S7	1¼"	1¾"
	S5&S6	2⅛"	3"		S8	1⅛"	1½"
13 ℄ 14	S1	⅞"	1⅛"		S9	1"	1⅜"
	S2	1"	1⅜"		S10	⅞"	1⅛"
	S3	1⅛"	1½"	18	S1 - S10	¾"	1"
	S4&S5	1¼"	1¾"				

NOTES:

For General Notes see sheet no. 4.
For Joint Details see sheet no. 35.
For Shoe Details see sheet no. 34.
Scupper locations shown on Deck Plans. For Scupper Details see sheet no. 36.
For stringer lengths see Framing Plans.

AS BUILT

	BY	DATE				
MADE	HBW	7-67	2	AS BUILT	JRC	12-72
CHECKED	FXH	8-67	⚠	Remove Ramp Taper Strg.	H.B.W.	2/20/71
IN CHARGE	FXH		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

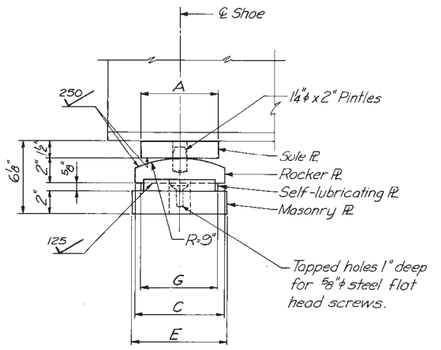
JAMES RIVER BRIDGE

STRUCTURAL STEEL DETAILS

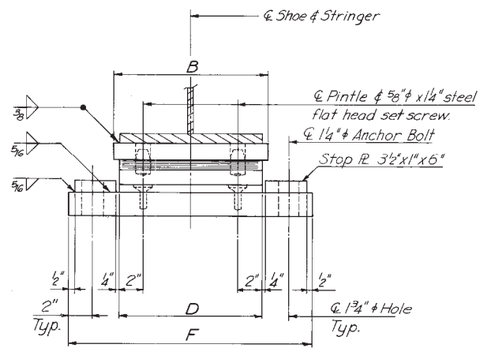
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 32 OF 53

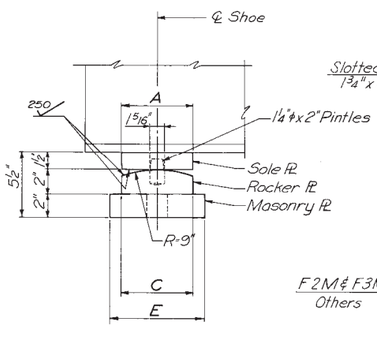
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	34	53



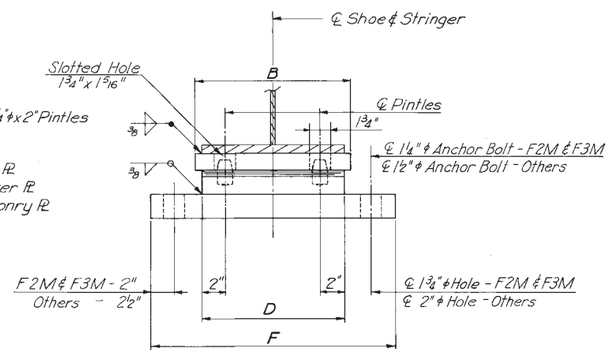
SIDE ELEVATION



END ELEVATION

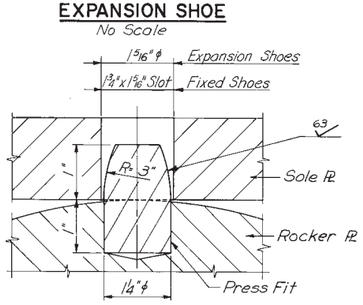


SIDE ELEVATION

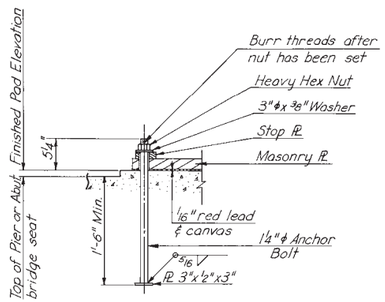


END ELEVATION

EXPANSION SHOE
No Scale

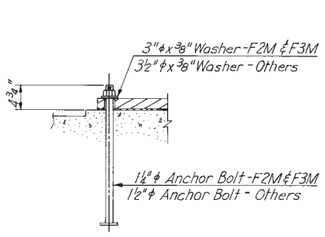


PINTLE DETAIL
Scale: ¾"=1"



EXPANSION SHOE

ANCHOR BOLT DETAIL
No Scale



FIXED SHOE

Note:
Anchor Bolt for Fixed Shoes same as Anchor Bolt for Exp. Shoes except as shown.

FIXED SHOE
No Scale

Shoe Notes:

Top of masonry plates, bottom of rocker plates and top and bottom of sole plates planed, straightened or otherwise treated to secure true level surfaces.

Contact surfaces noted on the plans with finish symbols shall be finished in accordance with the American National Standards Institute surface roughness requirement, as defined in ASA B46.1 Surface Roughness, Waviness and Lay, Part I.

The plates comprising the expansion shoes shall be set so as to be truly centered under full dead load at a temperture of 68°F.

Concrete pads shall be formed integral with abutment or pier and not less than ⅛" or more than ¼" above finished elevation. Dress down pads by rubbing, grinding or as otherwise approved by the Engineer, to true level surfaces at the finished elevation.

Anchor bolt assemblies shall conform to A.S.T.M. A-307 and shall be hot-dip galvanized conforming to A.S.T.M. A-153.

Templates shall be used to accurately set the anchor bolts.

Material for shoes (exclusive of self-lubricating plates) shall be high strength low alloy structural steel conforming to A.S.T.M. Specification A-588.

Material for self-lubricating plates shall be Leaded Tin Bronze conforming to A.S.T.M. Specification B22, alloy D modified to the extent that 1.5 to 2.5 percent lead is allowable.

Shoes shall be included with structural steel item for payment.

SHOE DIMENSIONS

EXPANSION SHOES	A	B	C	D	E	F	G
E4	6"	1'-5½"	9"	1'-4½"	9½"	2'-1"	6"
E5	6"	1'-5½"	9"	1'-4½"	9½"	2'-1"	7"
E6	6"	1'-7"	9"	1'-6"	9½"	2'-2½"	6"
E7	6"	1'-7"	9½"	1'-6"	10½"	2'-2½"	7½"
E8	6"	1'-9"	9"	1'-8"	9½"	2'-4½"	6½"
E9	6"	1'-9"	10"	1'-8"	11"	2'-4½"	7½"
E11	6"	1'-11"	10"	1'-10"	11"	2'-6½"	7½"
E12	6"	2'-1"	9"	2'-0"	9½"	2'-8½"	6½"
E14	6"	2'-1"	1'-0"	2'-0"	11"	2'-8½"	9½"

FIXED SHOES	A	B	C	D	E	F
F2M	6"	1'-5½"	6"	1'-4½"	7"	2'-1"
F3M	6"	1'-5½"	6"	1'-4½"	8"	2'-1"
F4M	6"	1'-7"	6"	1'-6"	7"	2'-4"
F5M	6"	1'-7"	6"	1'-6"	8"	2'-4"
F6M	6"	1'-9"	6"	1'-8"	7"	2'-6"
F7M	6"	1'-9"	6"	1'-8"	8"	2'-6"
F8M	6"	1'-11"	6"	1'-10"	8"	2'-8"
F10M	6"	2'-1"	6"	2'-0"	7"	2'-10"

	BY	DATE
MADE	HBW	5-67
CHECKED	FXH	8-67
IN CHARGE	FXH	

NO.	REVISION	BY	DATE
2	AS BUILT	JRC	12-72
1	Delete Shoes.	H.B.W.	2/20/71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

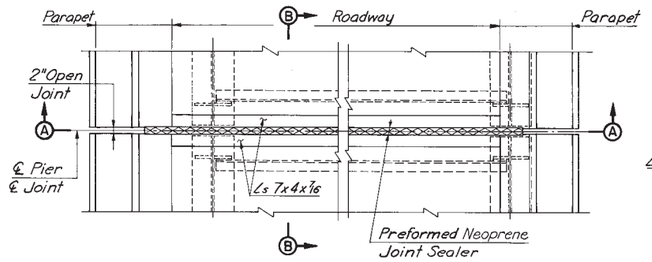
JAMES RIVER BRIDGE

SHOES

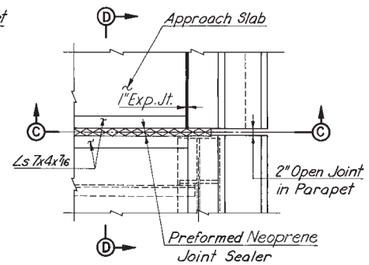
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO: C-3
SHEET NO. 34 OF 53

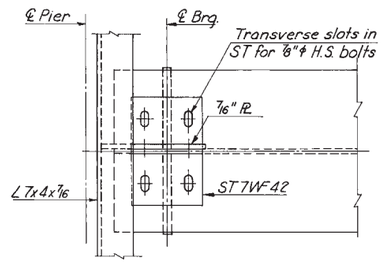
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	35	53



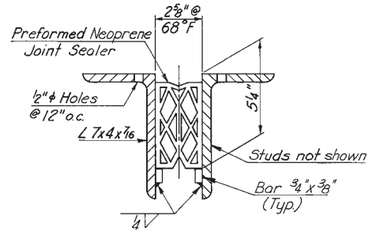
PLAN AT PIER
Scale: 1/2"=1'-0"



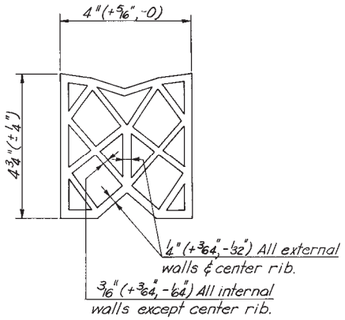
PLAN AT ABUTMENT
Scale: 1/2"=1'-0"



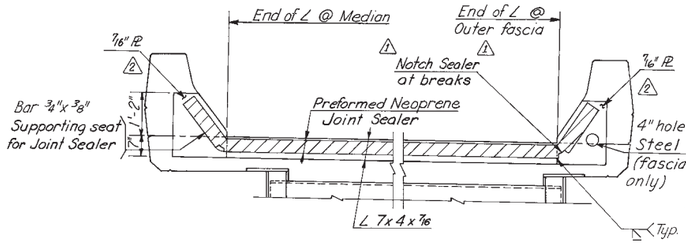
PLAN - 90°



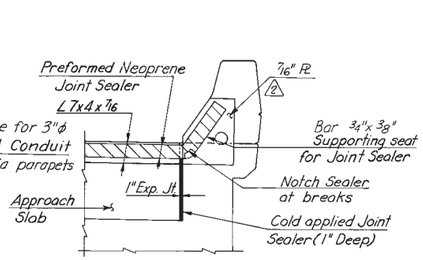
DETAIL "A"
Scale: 3"=1'-0"



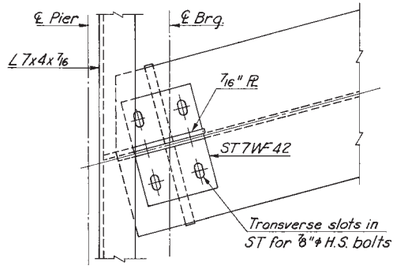
PREFORMED NEOPRENE JOINT SEALER
No Scale



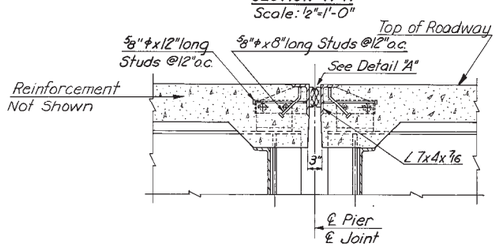
SECTION A-A
Scale: 1/2"=1'-0"



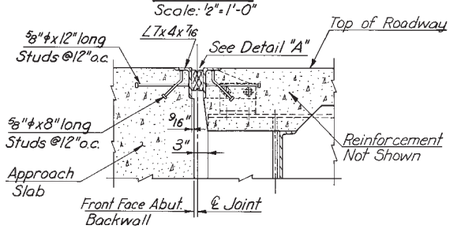
SECTION C-C
Scale: 1/2"=1'-0"



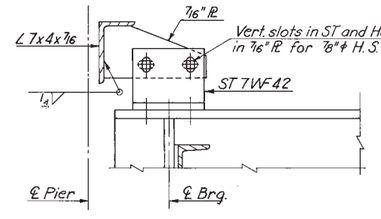
PLAN - SKEW



SECTION B-B
Scale: 3/4"=1'-0"

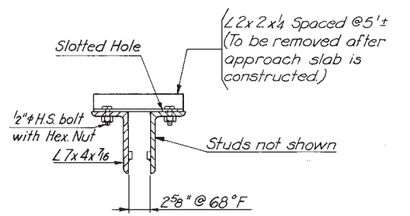


SECTION D-D
Scale: 3/4"=1'-0"



SECTION

ANGLE SUPPORT DETAILS
Scale: 1 1/2"=1'-0"



ANGLE SUPPORT AT ABUTMENT JOINTS
Scale: 1 1/2"=1'-0"

NOTES:

The size of the joint opening indicated on the plans is for a temperature of 68°F. Actual joint openings take into account the temperature at the time of construction.

Joint angles set to provide the specified opening after the concrete deck for the unit has been placed to 5 feet from the joint. The concrete deck for a distance of 5 feet on either side of the joint placed and finished after final adjustment and bolting of the joint supports completed.

Joint openings in the parapet accurately formed and constructed to smooth, straight lines. 2

Attachment of the studs to the joint angle made by full penetration butt welds.

Joint angles, studs and supports furnished and installed under the [redacted] Item "Structural Steel." 2

No separate payment made for furnishing and installing preformed neoprene joint sealers, but the cost thereof included in the price bid for "Concrete, Class A4."

	BY	DATE	NO.	REVISION	BY	DATE
MADE	HBW	10-67	3	AS BUILT	JRC	12-72
CHECKED	FXH	11-67	2	Armored Jt. & Notes.	S.K.L.	4/5/71
IN CHARGE	FXH		1	Note	EE.	2/20/71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

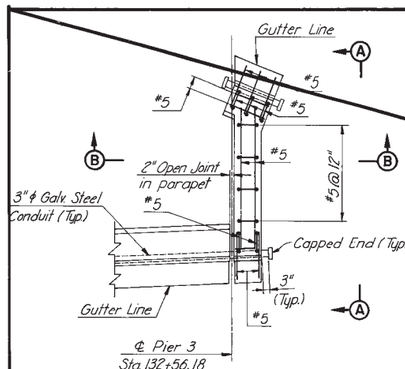
JAMES RIVER BRIDGE

JOINT DETAILS

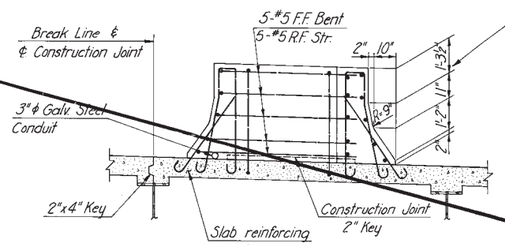
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 35 OF 53

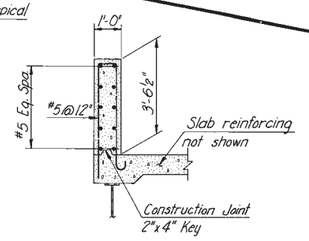
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	37	53



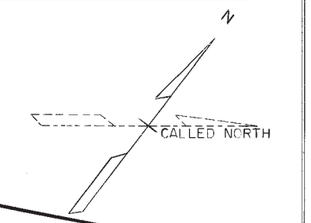
NOSE DETAIL
Scale: $\frac{3}{8}$"=1'-0"

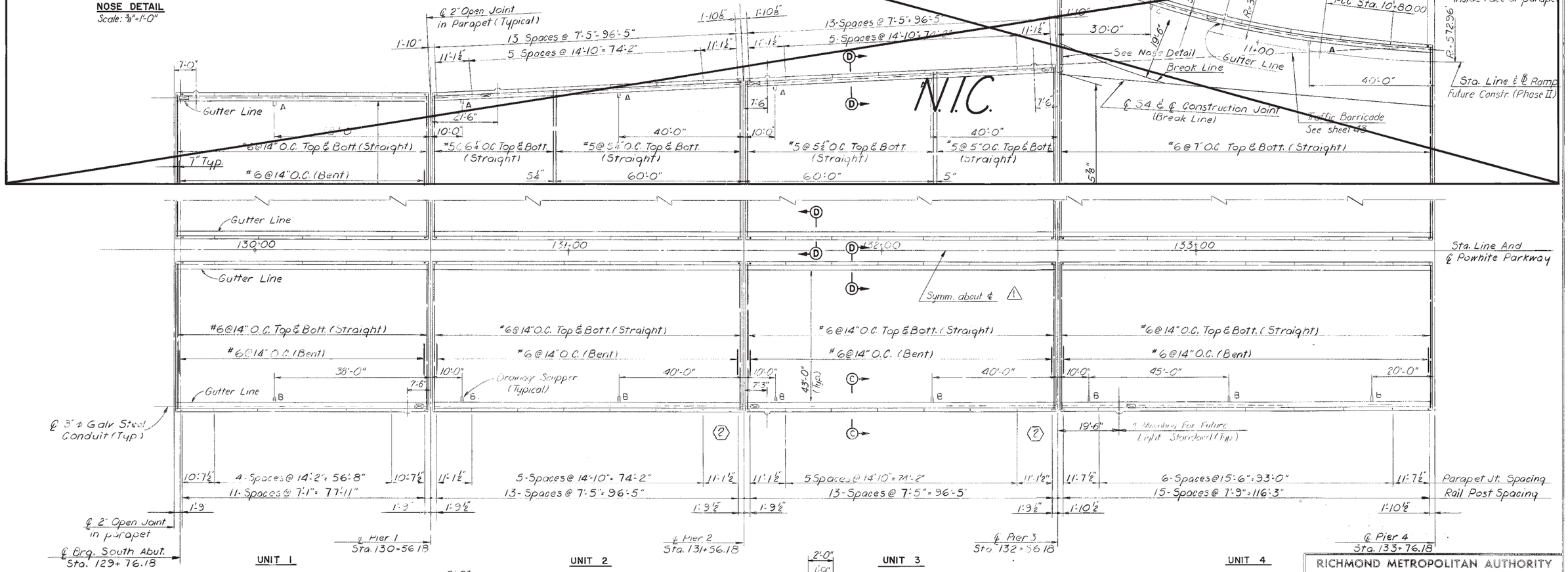


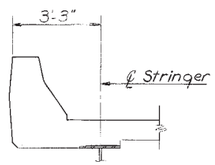
SECTION A-A
Scale: $\frac{3}{8}$"=1'-0"



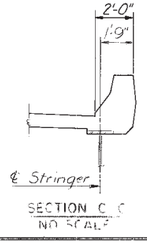
SECTION B-B
Scale: $\frac{3}{8}$"=1'-0"







SECTION D-D
NO SCALE



SECTION C-C
NO SCALE

	BY	DATE
MADE	D.E.K.	7-67
CHECKED	H.B.W.	9-67
IN CHARGE	F.X.H.	

NO.	REVISION	BY	DATE
3	AS BUILT	JRC	12-72
②	Light Std Location	J.G.V.	3/9/71
⚠1	Remove Ramp Taper	J.G.V.	2/20-71

Notes:
For General Notes see Sheet No. 4.
For Longitudinal Reinforcement, additional reinforcement at Deck Joints, additional Details and Cross Section see Sheet No. 41.
For Details of Mounting For Future Lighting Standard see Sheet No. 44.
For Joint Details see Sheet No. 35.
For Scupper Details see Sheet No. 36.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

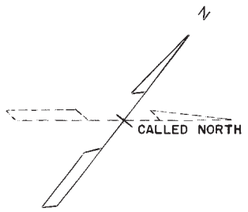
JAMES RIVER BRIDGE

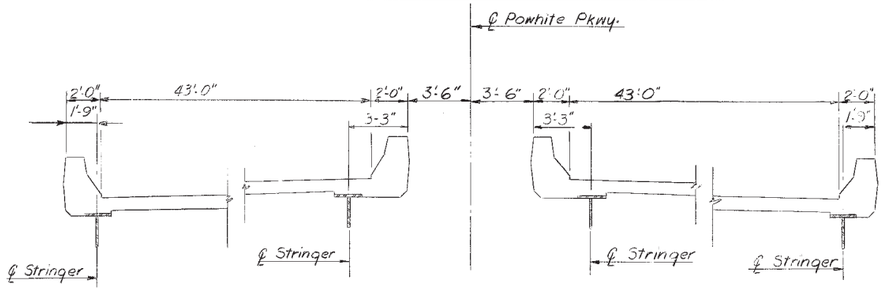
DECK PLAN - UNITS 1,2,3 & 4

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=15' UNLESS NOTED
CONTRACT NO.: C-3
SHEET NO. 37 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	38	53

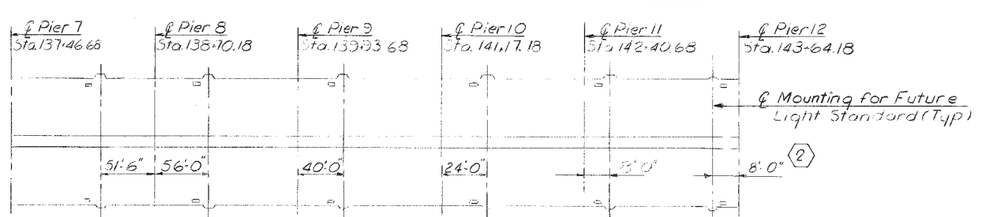




TYPICAL SECTION
LOOKING NORTH
NO SCALE

UNIT 5 UNIT 6

UNIT 7
SCUPPER LOCATIONS AND REINFORCEMENT FOR UNITS 8 THRU 12 SIMILAR TO UNIT 7



UNIT 8 UNIT 9 UNIT 10 UNIT 11 UNIT 12

LIGHTING STANDARD LOCATIONS FOR UNITS 8 THRU 12
NO SCALE

Notes:
For Notes see Sheet No. 37

AS BUILT

	BY	DATE
MADE	D.E.K.	7-67
CHECKED	H.B.W.	9-67
IN CHARGE	F.X.H.	

NO.	REVISION	BY	DATE
3	AS BUILT	JRC	12-72
②	Light Std. Location	J.G.V.	3/9/71
①	Remove Ramp Widening	J.G.V.	2-20-71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

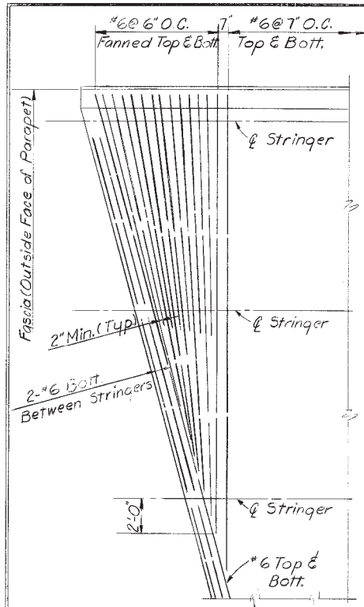
JAMES RIVER BRIDGE

DECK PLAN-UNITS 5 THRU 12

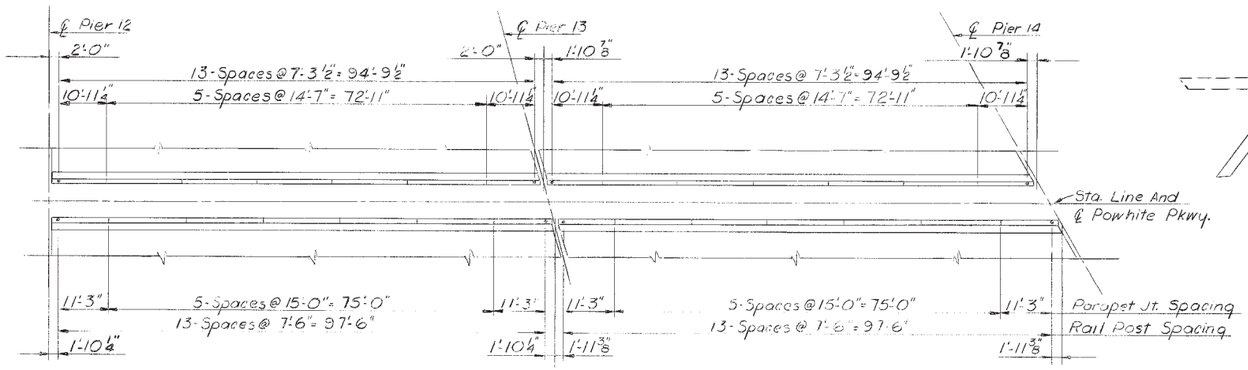
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=15' UNLESS NOTED
CONTRACT NO: C-3
SHEET NO. 38 OF 53

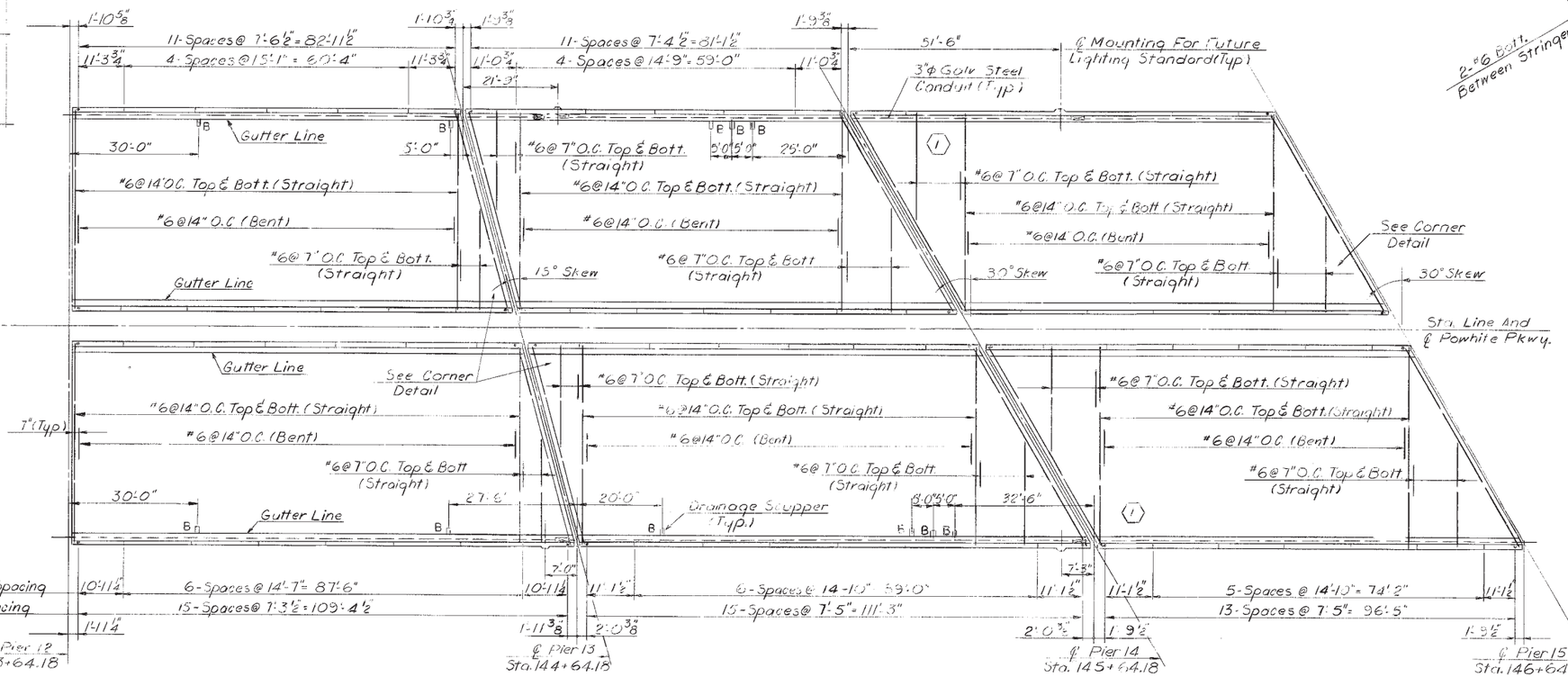
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	39	53

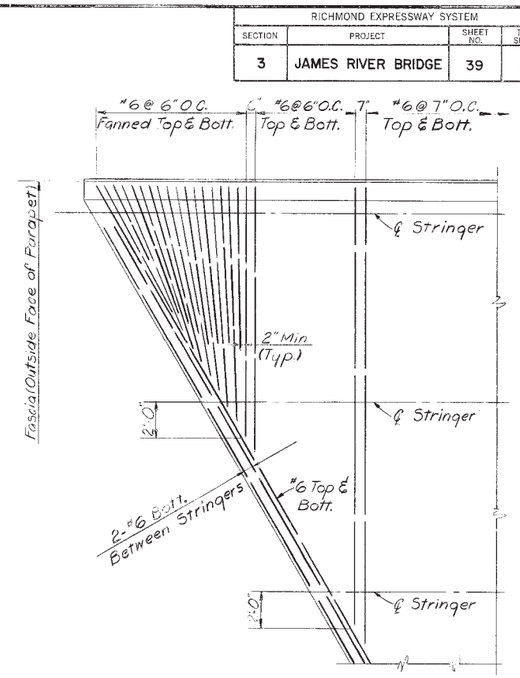


CORNER DETAIL
15° SKEW
Scale: 1/4"=1'-0"



RAIL POST & JOINT SPACING AT MEDIAN



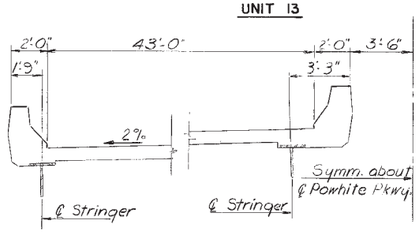


CORNER DETAIL
30° SKEW
Scale: 1/4"=1'-0"

UNIT 13

UNIT 14

UNIT 15



TYPICAL SECTION
LOOKING NORTH
NO SCALE

Notes:
For Notes See Sheet No. 37

	BY	DATE	NO.	REVISION	BY	DATE
MADE	D.E.K.	7-67	2	AS BUILT	JRC	12-72
CHECKED	H.B.W.	9-67	1	Light Std. & Scupper Location	J.G.V.	3/9/71
IN CHARGE	F.X.H.					

As Built

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

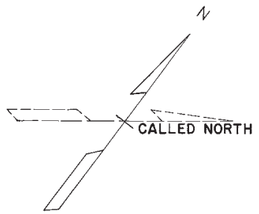
JAMES RIVER BRIDGE

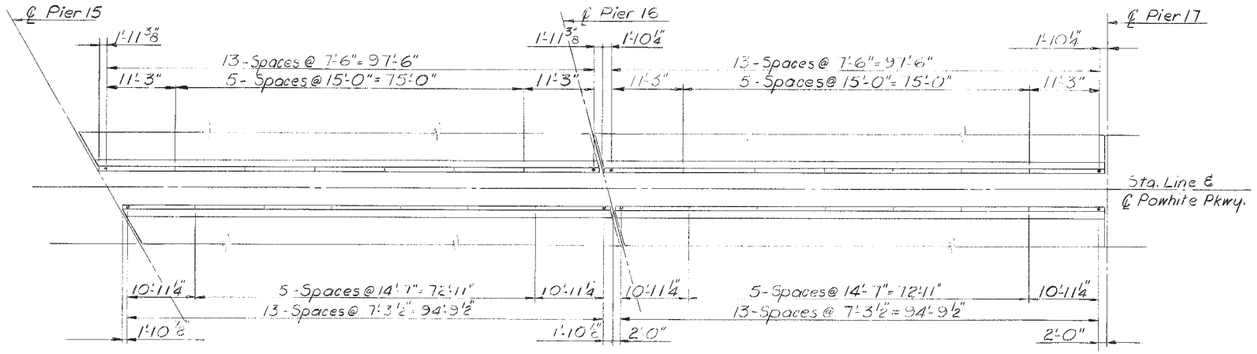
DECK PLAN - UNITS 13, 14 & 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

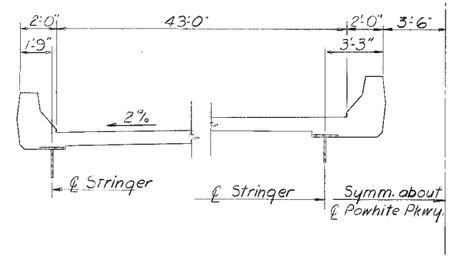
SCALE: 1"=15' UNLESS NOTED
CONTRACT NO.: C-3
SHEET NO. 39 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	40	53

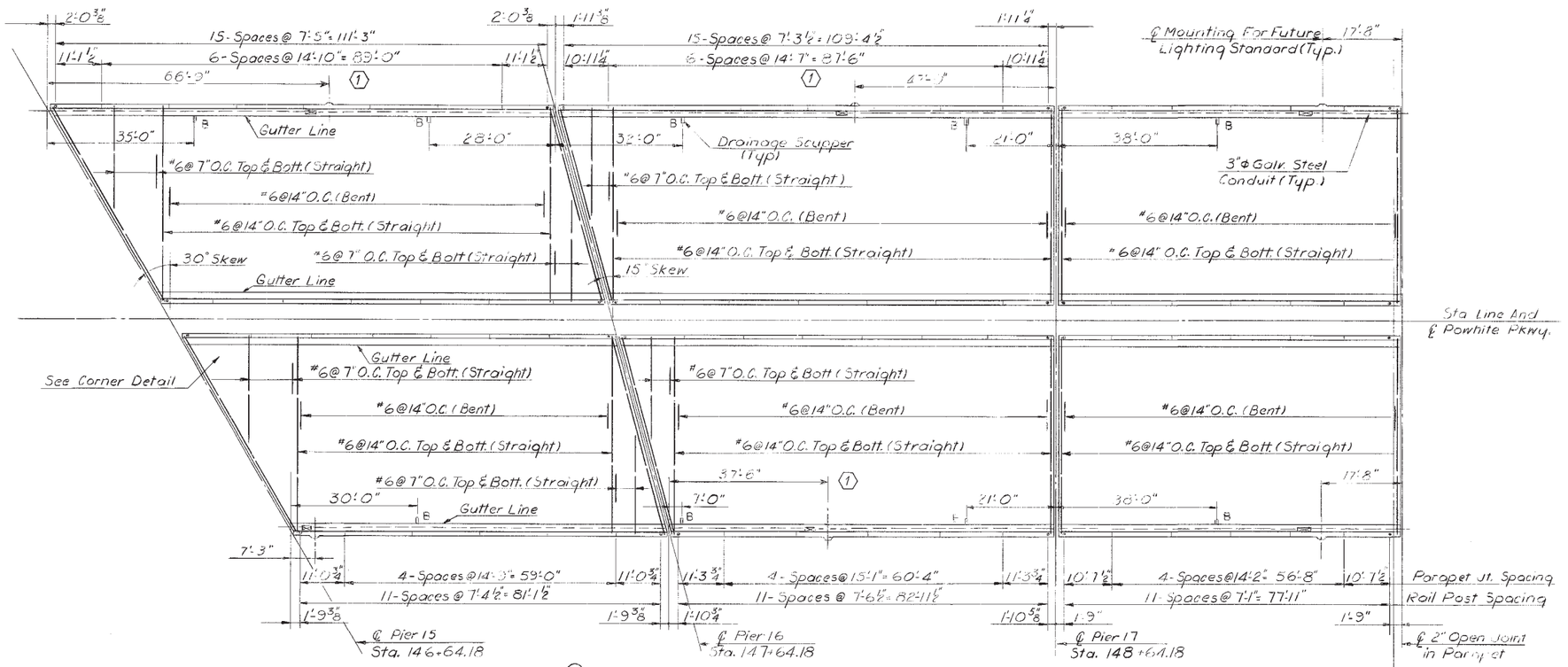




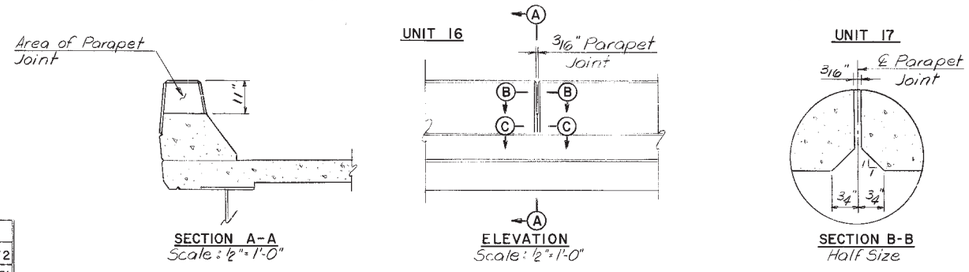
RAIL POST & JOINT SPACING AT MEDIAN



TYPICAL SECTION
SCALE: 1/4" = 1'-0"



UNIT 16 UNIT 17 UNIT 18



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

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

SECTION B-B
Half Size

SECTION C-C
Half Size

PARAPET JOINT DETAILS

Notes:
For Notes See Sheet No. 37
For Corner Details See Sheet No. 39

	BY	DATE
MADE	DE.K.	7-67
CHECKED	H.B.W.	9-67
IN CHARGE	F.X.H.	

NO.	REVISION	BY	DATE
2	AS BUILT	JRC	12-72
1	Light Std. Location	H.B.W.	3/9/71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

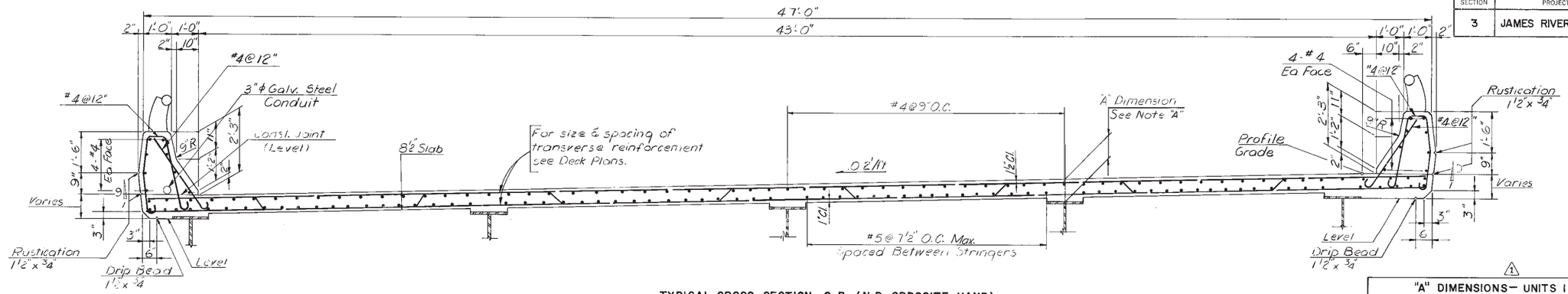
JAMES RIVER BRIDGE

DECK PLAN - UNITS 16, 17 & 18

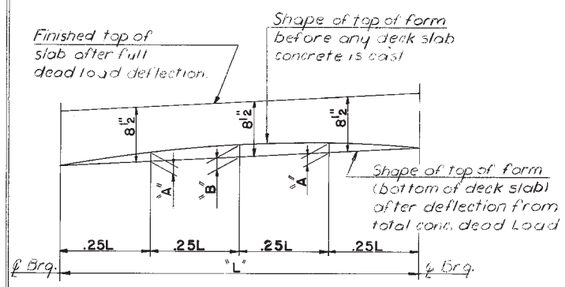
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=15' UNLESS NOTED
CONTRACT NO.: C-3
SHEET NO. 40 OF 53

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	41	53



TYPICAL CROSS SECTION S.B. (N.B. OPPOSITE HAND)
SCALE: ½ "= 1'-0"
⚠1



DEAD LOAD DEFLECTION DIAGRAM
NO SCALE

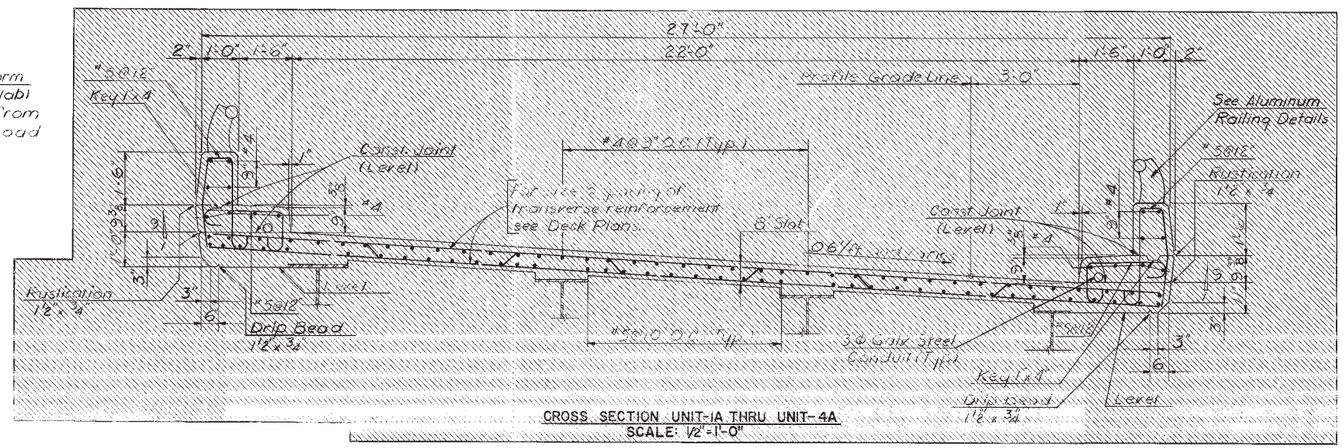
NOTE TO CONTRACTOR

The deflections noted are those anticipated to occur in the stringer upon placement of the total concrete dead load. In practice the stringers, in place, are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided for by adjusting forms to vary the thickness of the concrete between the bottom of the slab & the top of stringer, without alteration of the slab thickness.

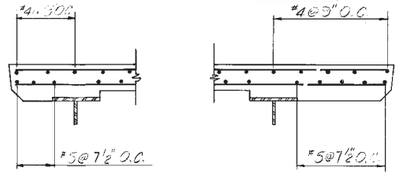
⚠1

DEFLECTION SCHEDULE

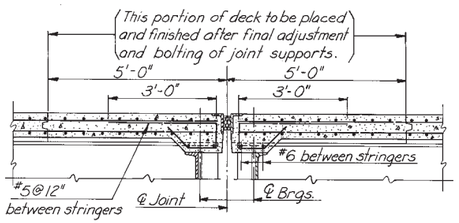
UNIT	STRINGER	A	B	UNIT	STRINGER	A	B	UNIT	STRINGER	A	B
1	S1-S10	5/8"	7/8"	7-12	S1-S10	1 5/8"	2¼"		S1	1 3/8"	2"
2	~~S1-S6~~	~~1"~~	~~1 3/8"~~		S1	¾"	1"		S2	1 3/8"	1 ⅛"
	S1-S10	1⅛"	1½"		S2	⅞"	1⅛"		S3	1¼"	1 ¾"
3	~~S1-S6~~	~~1"~~	~~1 3/8"~~		S3	⅞"	1¼"		S4	1¼"	1 5/8"
	S1-S10	1⅛"	1½"		S4	1"	1 3/8"		S5	1⅛"	1 5/8"
4	~~S1~~	~~1 5/8"~~	~~2¼"~~	13 & 14	S5	1"	1½"	16 & 17	S6	1"	1½"
	~~S2&S4~~	~~1 3/8"~~	~~2 1/8"~~		S6	1⅛"	1 5/8"		S7	1"	1 3/8"
	~~S3&S5~~	~~1"~~	~~1 3/4"~~		S7	1¼"	1 5/8"		S8	⅞"	1¼"
	~~S6~~	~~1½"~~	~~2¼"~~		S8	1¼"	1 3/4"		S9	⅞"	1⅛"
	S1-S10	1½"	2⅛"		S9	1 3/8"	1 ⅞"		S10	¾"	1"
5	S1-S10	1 5/8"	2¼"		S10	1 3/8"	2"	18	S1-S10	5/8"	⅞"
6	S1-S10	1 5/8"	2¼"	15	S1-S10	1⅛"	1½"				



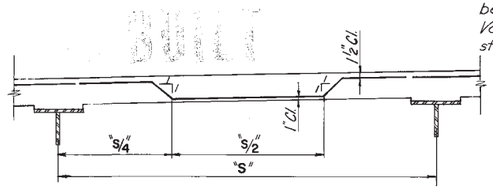
CROSS SECTION UNIT-1A THRU UNIT-4A
SCALE: ½"=1'-0"



LONGITUDINAL REINFORCEMENT AT FASCIA



TYPICAL SECTION AT JOINT



TYPICAL BENT BAR DETAIL

Notes:
For Notes see Sheet No. 37.
All Bar clearances to conc. face are 2" unless noted

"A" DIMENSIONS— UNITS 1 THRU 18			
UNIT 1		UNIT 7	
S5 & S6	10⅜"	~~S1A~~	~~10⅜"~~
S1-S4 & S7-S10	9¾"	S2-S4 & S7-S9	10¼"
UNIT 2 & 3		S5 & S6	10⅛"
S5 & S6	10¼"	S1 & S10	10½"
S1-S4 & S7-S10	9¾"	UNIT 8 THRU 12	
UNIT 4		S2-S4 & S7-S9	10¼"
~~S1(AT PIER 3)~~	~~10"~~	S5 & S6	10⅛"
~~S1(AT PIER 4)~~	~~10⅛"~~	S1 & S10	10½"
~~S2~~	~~11"~~	UNIT 13 & 14	
~~S3~~	~~10"~~	S1	10¾"
~~S4~~	~~10½"~~	S2, S3, S4 & S7	9¾"
~~S5~~	~~9¾"~~	S5 & S6	10¼"
~~S6~~	~~10"~~	S8 & S9	10"
S1-S10	10⅛"	S10	10½"
UNIT 5		UNIT 15	
~~S1~~	~~10⅛"~~	S2-S4 & S7-S9	9¾"
~~S2~~	~~9¾"~~	S5 & S6	10¼"
~~S3-S6~~	~~9¾"~~	S1 & S10	10½"
S5 & S6	10⅛"	UNIT 16 & 17	
S2-S4 & S7-S9	10¼"	S1	10½"
S1 & S10	10½"	S2 & S3	10"
		S4, S7, S8 & S9	9¾"
UNIT 6		S5 & S6	10¼"
S5 & S6	10⅛"	S10	10¾"
S2-S4 & S7-S9	10¼"	UNIT 18	
S1 & S10	10½"	S2-S4 & S7-S9	9¾"
		S5 & S6	10⅜"
		S1 & S10	10¾"

"A" DIMENSIONS— UNITS 1A THRU 4A			
UNIT 1A		UNIT 4A	
S1, S2 & S3	9½"	S1 (AT PIER 3A)	9½"
S4	10"	S1 (AT PIER 3)	10"
UNITS 2A & 3A		S2 & S3	9½"
S1, S2 & S3	9½"	S4	10"
S4	9¾"		

Note "A"
"A" Dimension is given at the intersection of the ℄ Stringer and ℄ Bearing. Dimension shown is measured from top of top flange to construction joint for Fascia Stringers with 1'-9" overhang (see deck plan) and from top of top flange to top of deck for all other stringers. This dimension may vary between bearings due to change in top flange thickness or Variation in Camber, except that no portion of the stringer flange may fall within the slab.

	BY	DATE
MADE	D.E.K.	7-67
CHECKED	H.B.W.	9-67
IN CHARGE	F.X.H.	

NO.	REVISION	BY	DATE
2	AS BUILT	JRC	12-72
⚠	X-Sections & Deflections	BE	2/20/73

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE

DECK DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=2'-0" UNLESS NOTED
CONTRACT NO.: C.-3
SHEET NO. 41 OF 53

LIMITED ACCESS HIGHWAY

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	1	106

RICHMOND METROPOLITAN AUTHORITY

RICHMOND EXPRESSWAY SYSTEM

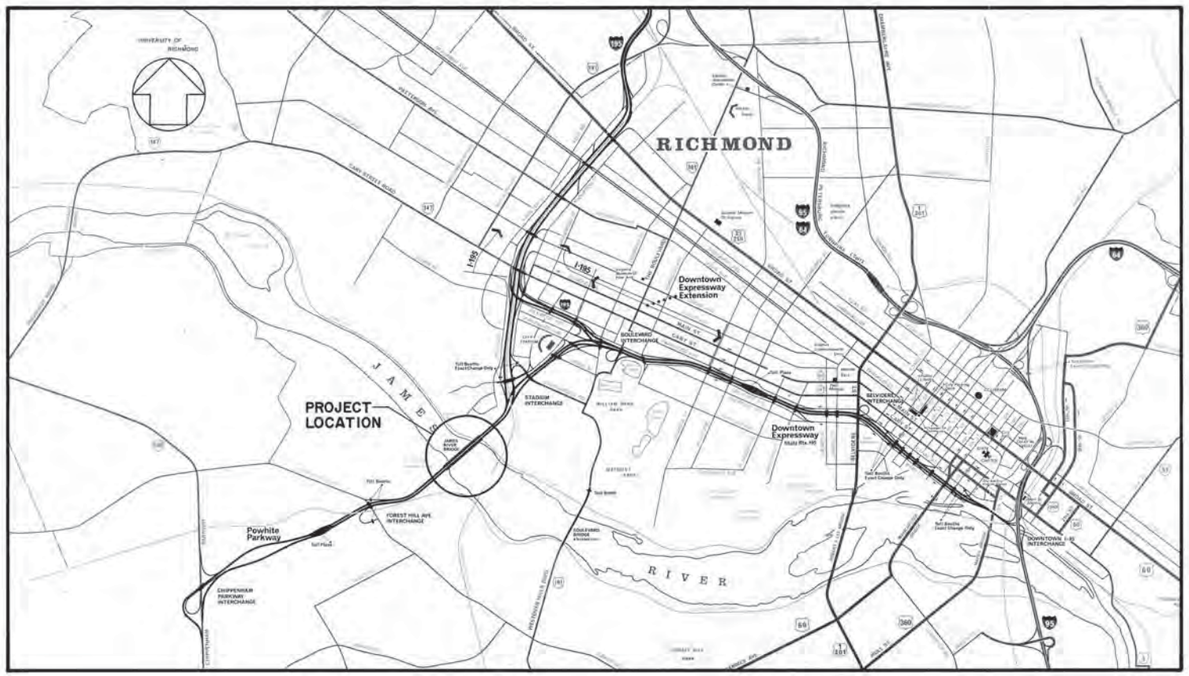
PROPOSED WIDENING

JAMES RIVER BRIDGE

REVISED BY

DESIGNED BY

INDEX OF SHEETS



CONVENTIONAL SIGNS

STATE LINE	LEVEE OR EMBANKMENT
COUNTY LINE	BRIDGES
CITY, TOWN OR VILLAGE	CULVERTS
RIGHT OF WAY LINE	DROP INLET
FENCE LINE	TROLLEY POLES
UNFENCED PROPERTY LINE	POWER POLES
FENCED PROPERTY LINE	TELEPHONE OR TELEGRAPH POLES
TRAVELED WAY	MARSH
GUARD RAIL	HEDGE
RETAINING WALL	WOODS
RAILROADS	GROUND ELEVATION
BASE OR SURVEY LINE	GRADE ELEVATION
	POLES WITHIN CONSTRUCTION LIMITS

CONTRACT C-13

COMMONWEALTH OF VIRGINIA
DANIEL J. APPEL
CIVIL ENGINEER
No. 2437
CERTIFIED PROFESSIONAL ENGINEER

SUBMITTED BY	
Date	
3-16-87	
Date	HOWARD, NEEDLES, TAMMEN & BERGENDOFF general consultant

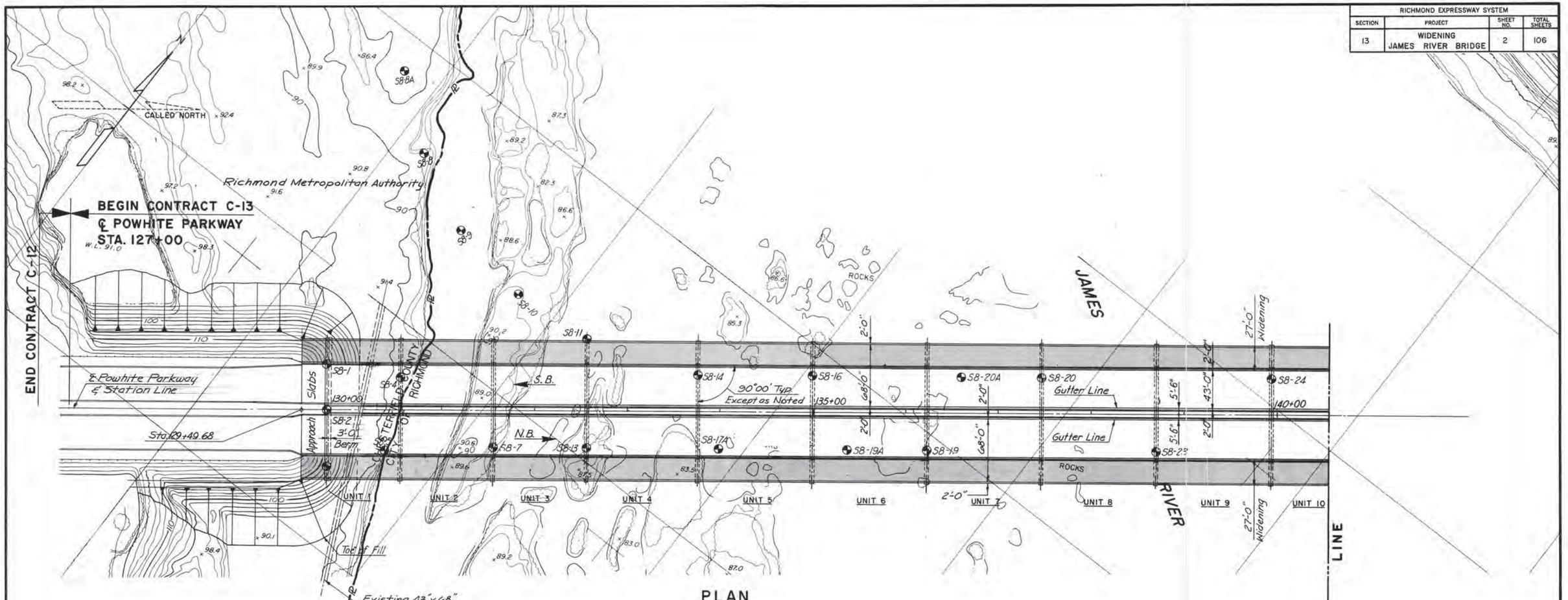
RECOMMENDED BY	
Date	
3-29-87	
Date	GENERAL MANAGER, RICHMOND METROPOLITAN AUTHORITY

APPROVED BY	
3-29-87	
Date	CHAIRMAN, RICHMOND METROPOLITAN AUTHORITY

Plans Revised			
Sheet No.	Date	Sheet No.	Date

AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	2	106



	BY	DATE	NO.	REVISION	BY	DATE
MADE	A.L.C.	3-87		As Built	TEM	3-89
CHECKED	T.F.P.	3-87	⚠	Property Line	A.L.C	4-87
IN CHARGE	S.R.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: 1" - 50'
CONTRACT NO.: C-13
SHEET NO. 2 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	3	106

CALLED NORTH

CSX Transportation

CHESAPEAKE AND OHIO RAILROAD

KANAWHA CANAL

Robert & Bessie B. Carter

Fitzgerald Bemiss

John C. & Elizabeth M. Hogan

Elizabeth S. Block

Jack Carsino

C. Merle Luck Jr.

END CONTRACT C-13
℄ POWHITE PARKWAY
STA. 151+50.0

BEGIN CONTRACT C-14

Temporary Construction Easement

Point of Min. Vert. Clear.

24.5'± Min. Horiz. Cl.

39.5' Min. Horiz. Cl.

150'-0"

Richmond Metropolitan Authority

℄ Existing 60" Water Main

27'-0" Widening

2'-0"

5'-6"

68'-0"

2'-0"

Gutter Line

S8-27 S8-28 S8-30 S8-31 S8-32 S8-33 S8-34 S8-35 S8-36 S8-37 S8-38 S8-39 S8-40 S8-41 S8-42 S8-43 S8-44

90°00' Typ. Except as Noted

75°00' 60°00' 60°00' 75°00'

145+00 150+00

S.B. N.B.

℄ Powhite Parkway & Station Line

Sta. 149+70.68

BX-3 3'-0" Berm S8-46

Approach Slabs

UNIT 10 UNIT 11 UNIT 12 UNIT 13 UNIT 14 UNIT 15 UNIT 16 UNIT 17 UNIT 18

28.5' Min. Horiz. Cl.

43.5' Min. Horiz. Cl.

MATCH LINE

JAMES RIVER

PLAN

Total Length = 1971'-0"

8 Spans @ 123'-6" = 988'-0"

5 Spans @ 100'-0" = 500'-0"

End of Bridge
Front Face of Backwall
Sta. 149+45.68

80'-0" Span

℄ Bearing North Abutment

1'-6"

Finished Grade

+1.08 %

Lighting Standard (Typ)

23'-2" Vert. Clear

℄ Tracks

PIER 10 PIER 11 PIER 12 PIER 13 PIER 14 PIER 15 PIER 16 PIER 17 NORTH ABUTMENT

ELEVATION

	BY	DATE
MADE	ALC	3-87
CHECKED	TFP	3-87
IN CHARGE	S.R.	

As Built TEM 3-89

NO.	REVISION	BY	DATE
3	Added Horiz. Cl.	EJM	7-87
2	Vert. Clear	ALC	5-87
1	Property Line	ALC	4-87

AS BUILT

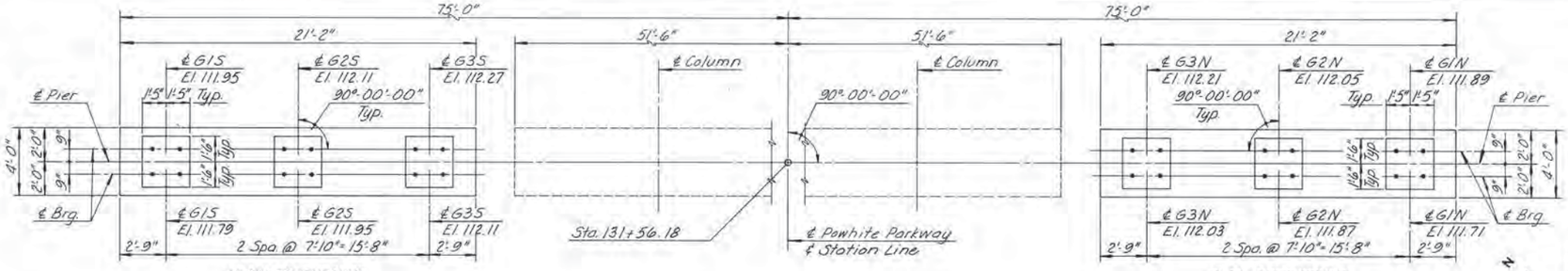
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

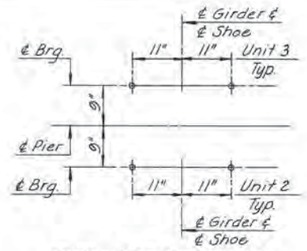
SCALE: 1" = 50'
CONTRACT NO.: C-13
SHEET NO. 3 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	13	106

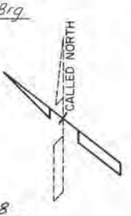


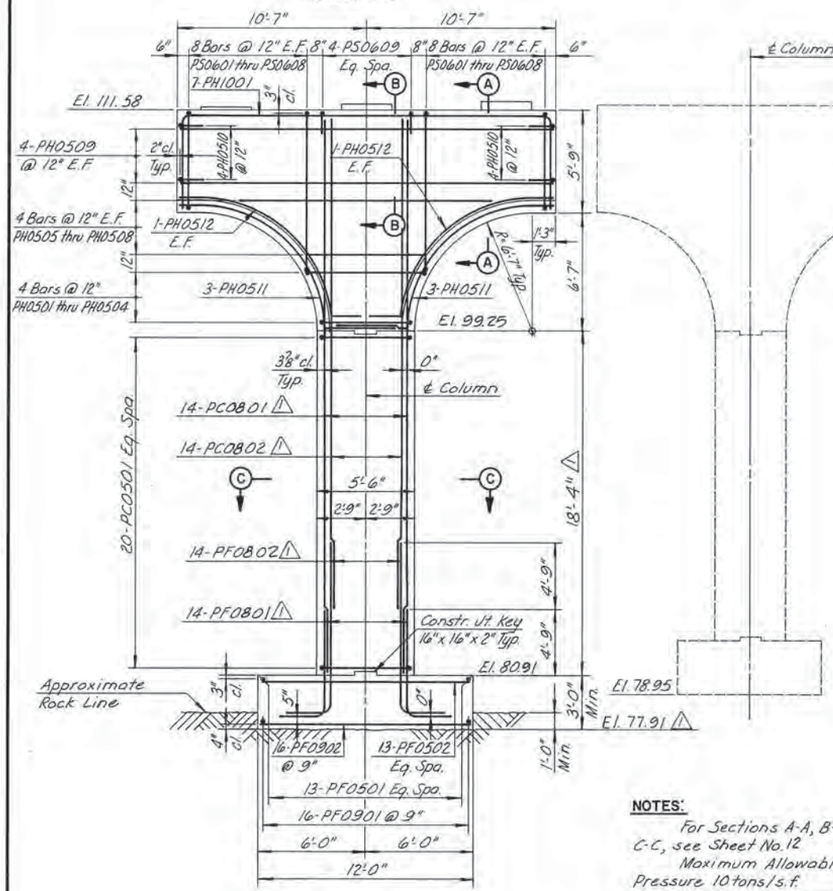
PLAN - SOUTHBOUND
Scale: 1/4"=1'-0"

PLAN - NORTHBOUND
Scale: 1/4"=1'-0"



ANCHOR BOLT SETTING PLAN
No Scale





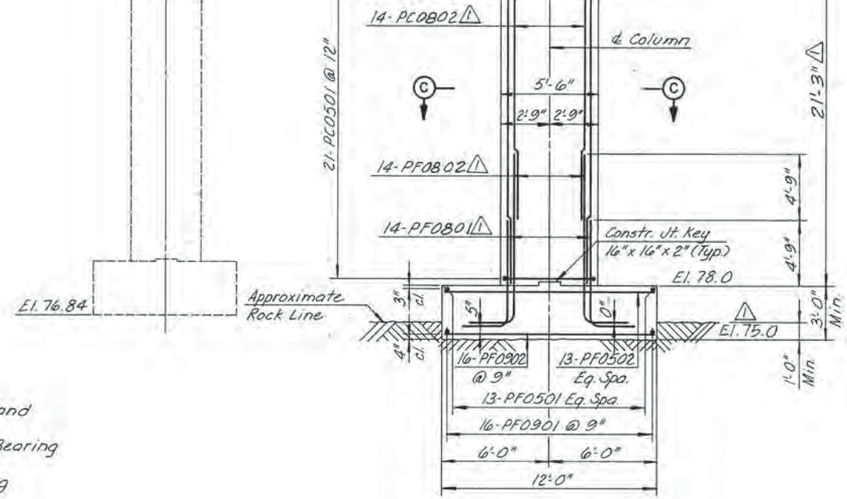
ELEVATION - SOUTHBOUND
Scale: 1/4"=1'-0"

NOTES:

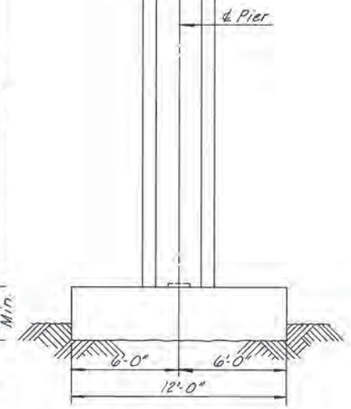
For Sections A-A, B-B and C-C, see Sheet No. 12

Maximum Allowable Bearing Pressure 10 tons/s.f.

Actual Design Bearing Pressure 4.8 tons/s.f.



ELEVATION - NORTHBOUND
Scale: 1/4"=1'-0"



TYPICAL END VIEW
Scale: 1/4"=1'-0"

	BY	DATE
MADE	EJM	2-87
CHECKED	T.F.P	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
1	As Built	TEM	3-89

AS BUILT

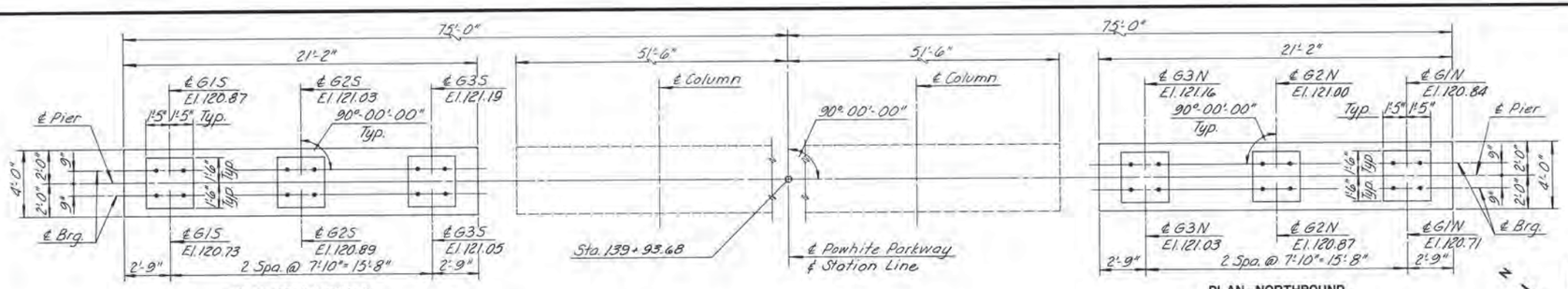
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER 2 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

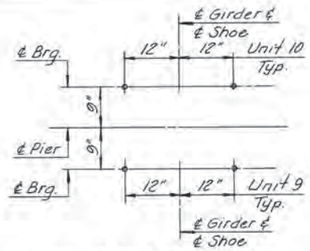
SCALE: AS SHOWN
CONTRACT NO: C-13
SHEET NO. 13 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	20	106

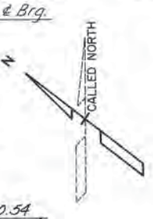


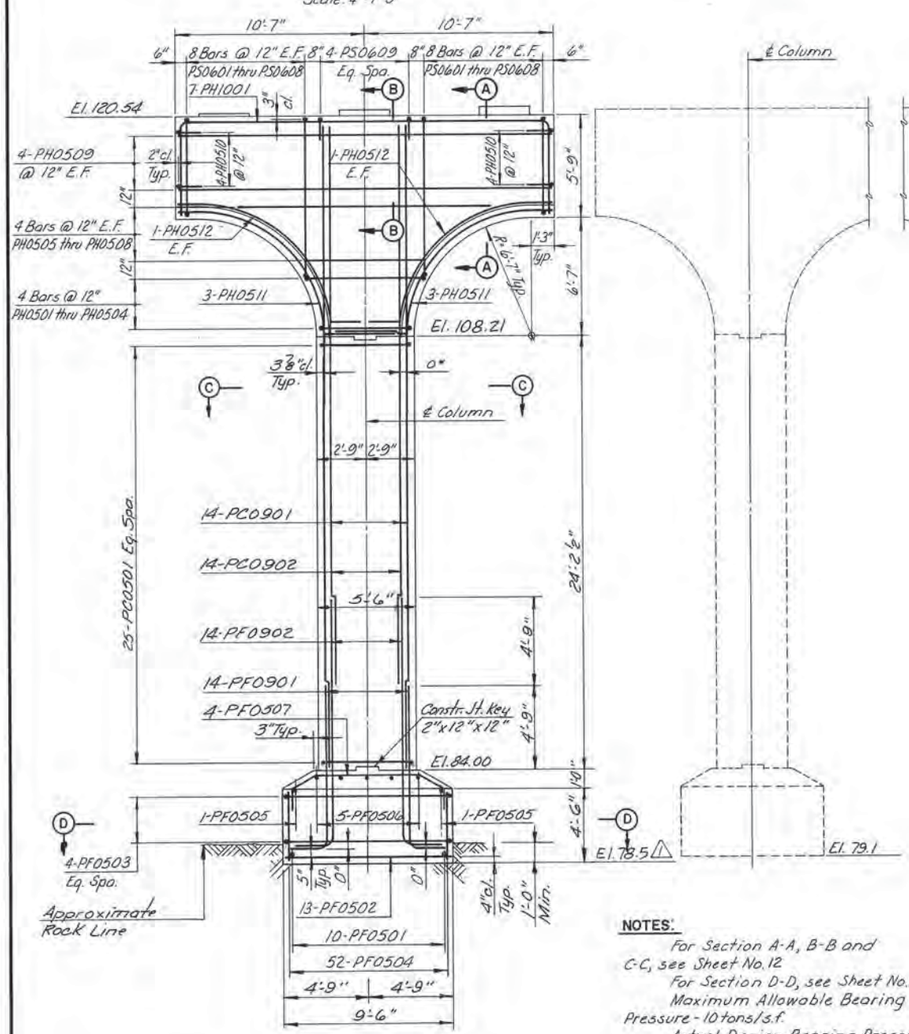
PLAN - SOUTHBOUND
Scale: 1/4" = 1'-0"

PLAN - NORTHBOUND
Scale: 1/4" = 1'-0"

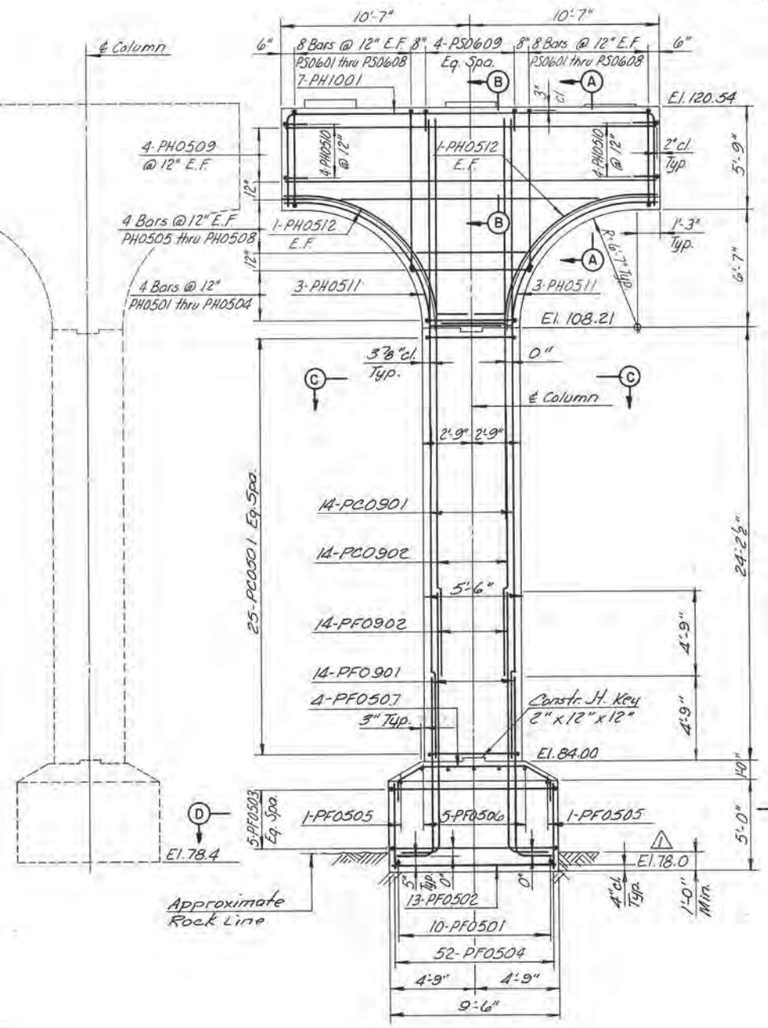


ANCHOR BOLT SETTING PLAN
No Scale

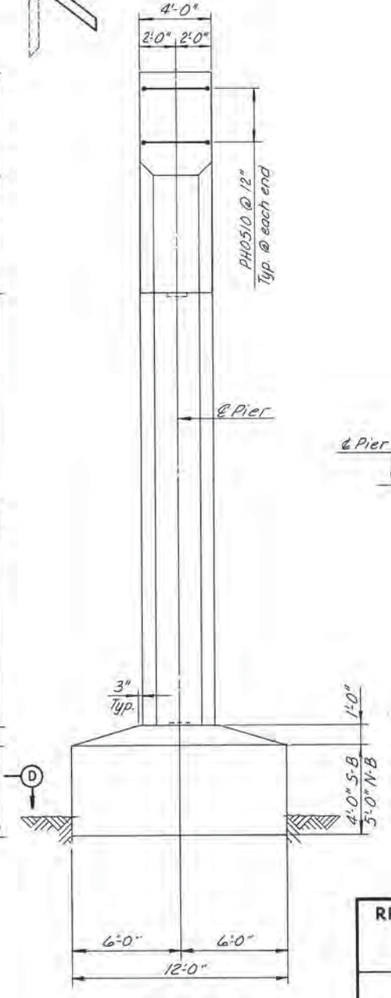




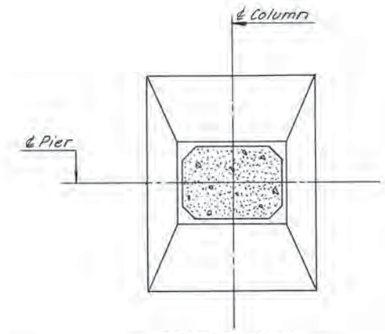
ELEVATION - SOUTHBOUND
Scale: 1/4" = 1'-0"



ELEVATION - NORTHBOUND
Scale: 1/4" = 1'-0"



TYPICAL END VIEW
Scale: 1/4" = 1'-0"



FOOTING PLAN
Scale: 1/4" = 1'-0"

NOTES:

For Section A-A, B-B and C-C, see Sheet No. 12

For Section D-D, see Sheet No. 14

Maximum Allowable Bearing Pressure - 10 tons/s.f.

Actual Design Bearing Pressure -
Southbound 7.9 tons/s.f.
Northbound 8.3 tons/s.f.

	BY	DATE
MADE	TAL	3-87
CHECKED	T.F.R.	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
1	As Built	TEM	3-89

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

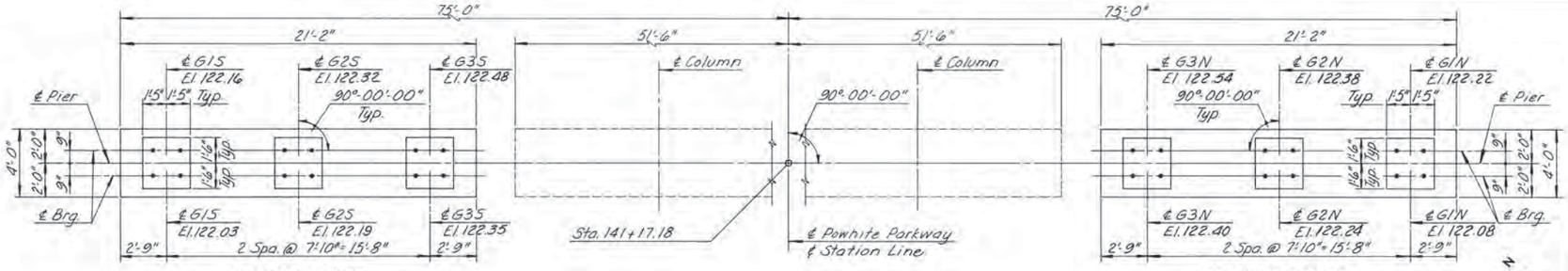
PIER 9 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE AS SHOWN
CONTRACT NO. C-13
SHEET NO. 20 OF 106

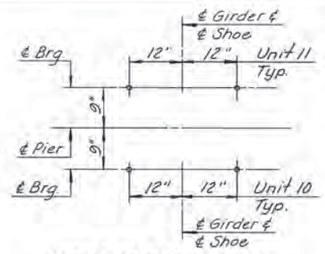
AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	21	106

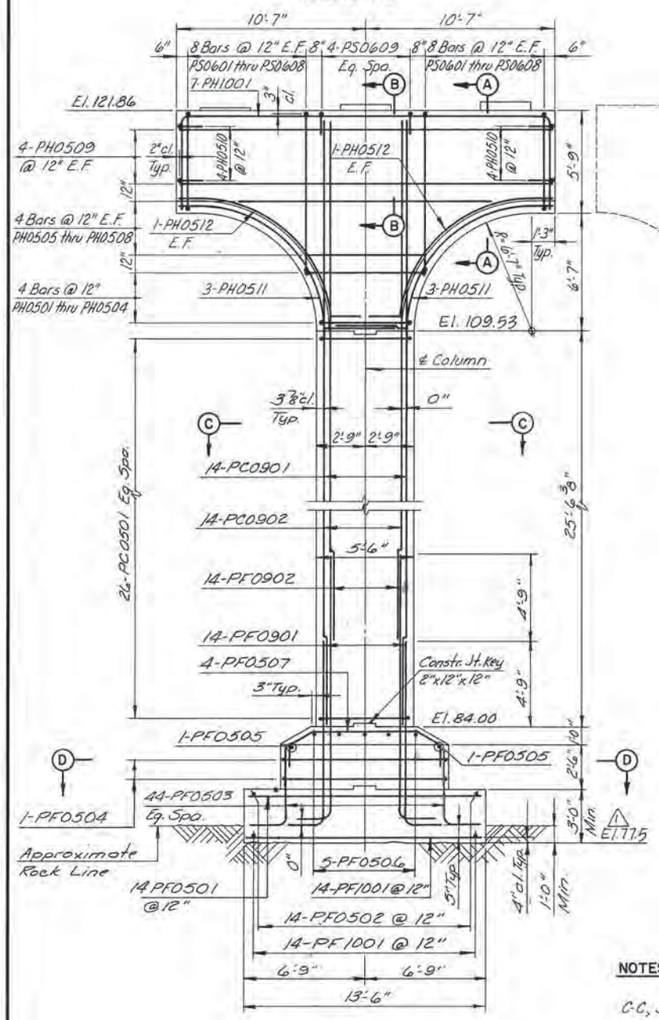


PLAN - SOUTHBOUND
Scale: 1/4" = 1'-0"

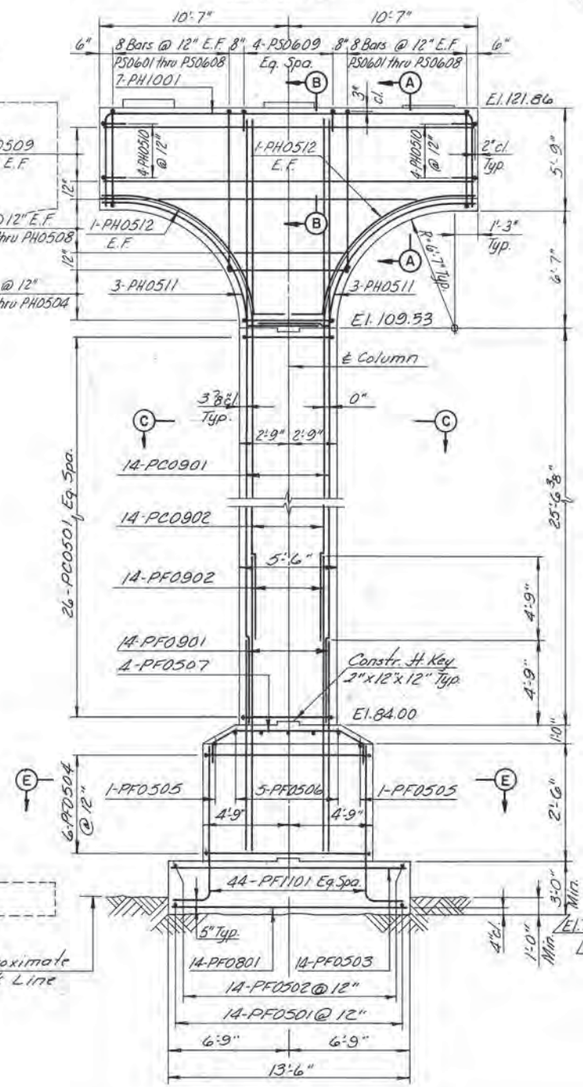
PLAN - NORTHBOUND
Scale: 1/4" = 1'-0"



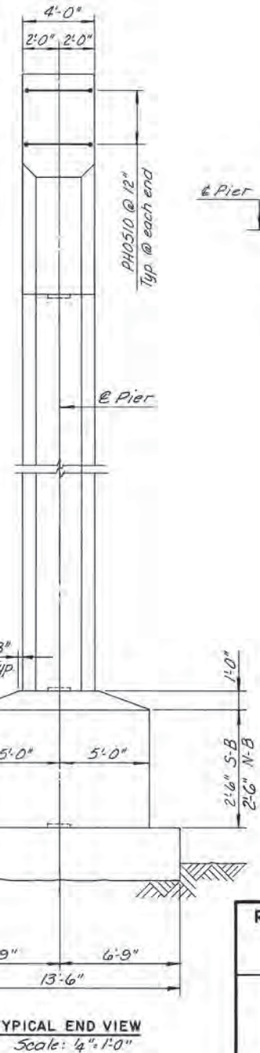
ANCHOR BOLT SETTING PLAN
No Scale



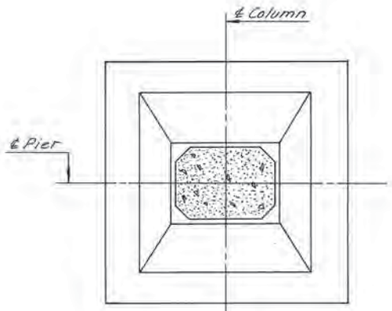
ELEVATION - SOUTHBOUND
Scale: 1/4" = 1'-0"



ELEVATION - NORTHBOUND
Scale: 1/4" = 1'-0"



TYPICAL END VIEW
Scale: 1/4" = 1'-0"



FOOTING PLAN
Scale: 1/4" = 1'-0"

NOTES:
For Sections A-A, B-B and C-C, see Sheet No. 12
For Section D-D, see Sheet No. 14
For Section E-E, see Sheet No. 16
Maximum Allowable Bearing Pressure - 5 tons/s.f.
Actual Design Bearing Pressure - Southbound 4.5 tons/s.f.
Northbound 4.5 tons/s.f.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.A.L	3-87				
CHECKED	T.F.P	3-87	1	As Built	TEM	3-89
IN CHARGE	S.P.					

AS BUILT

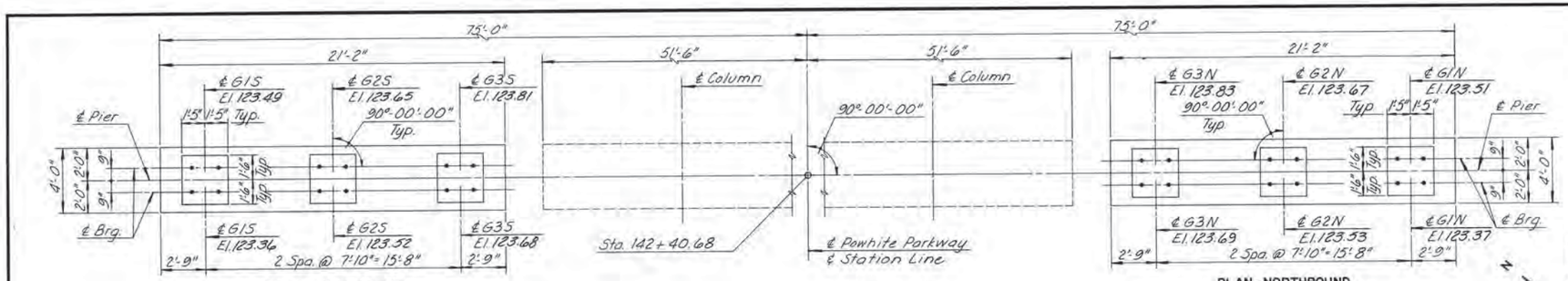
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER 10 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

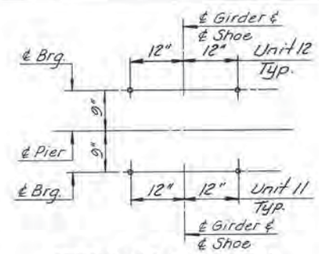
SCALE AS SHOWN
CONTRACT NO. C-13
SHEET NO 21 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	22	106



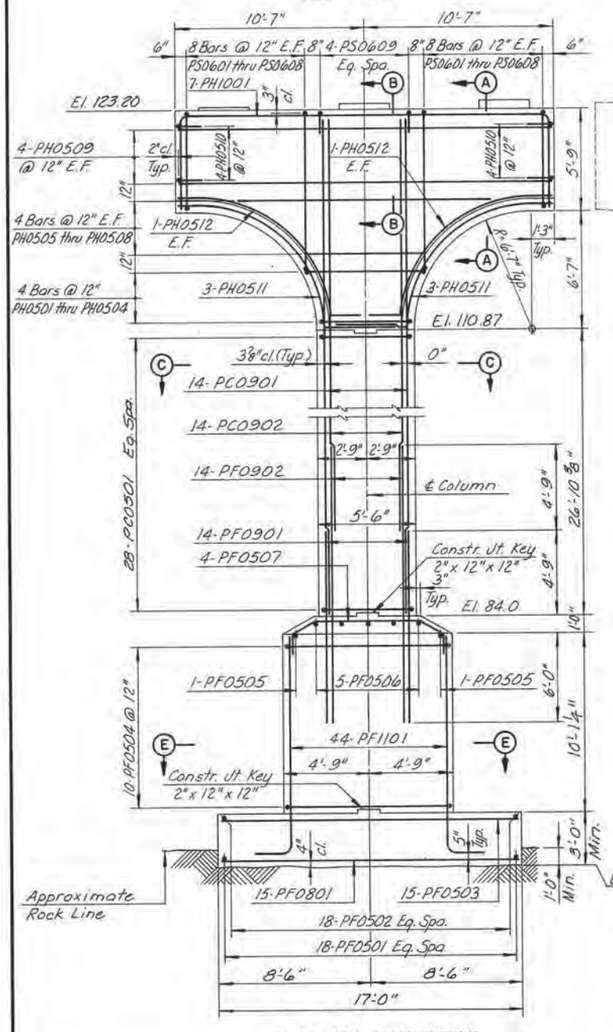
PLAN - SOUTHBOUND
Scale: 4" = 1'-0"

PLAN - NORTHBOUND
Scale: 4" = 1'-0"

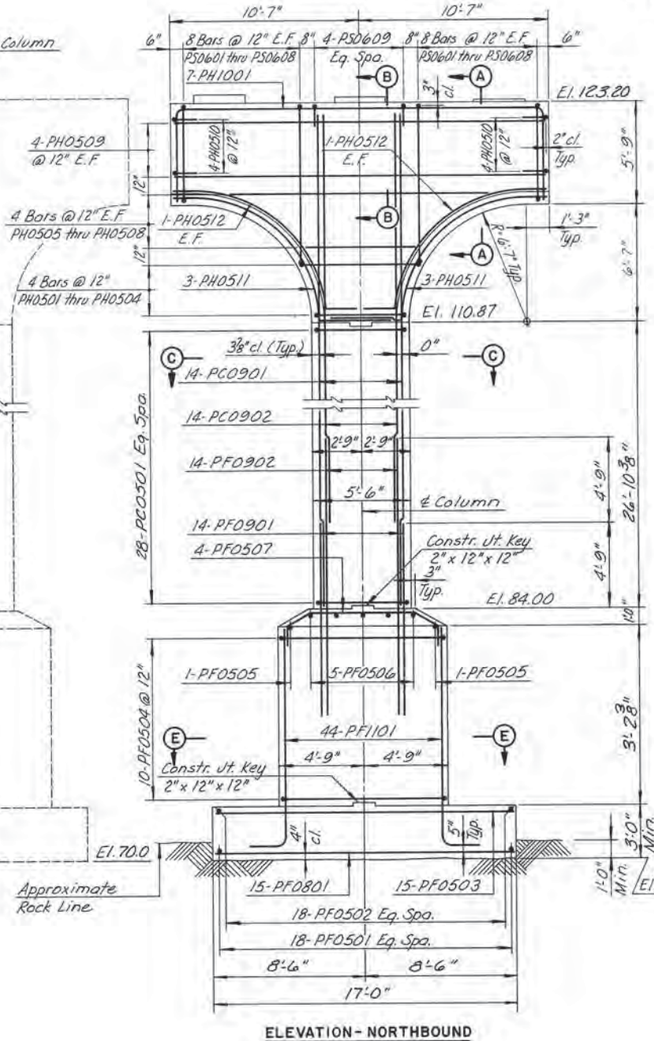


ANCHOR BOLT SETTING PLAN
No Scale

CALLED NORTH

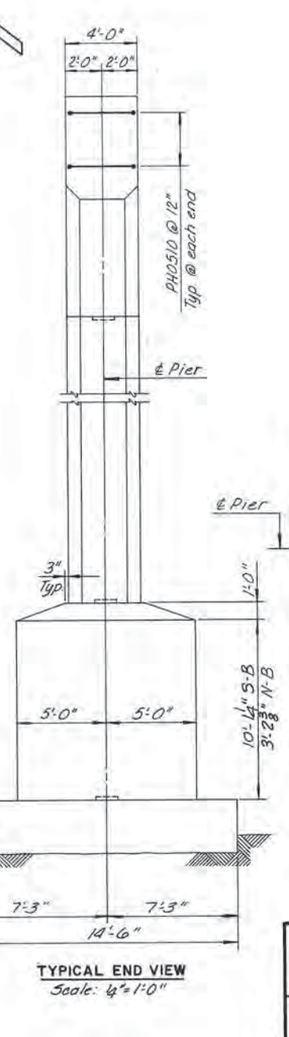


ELEVATION - SOUTHBOUND
Scale: 4" = 1'-0"

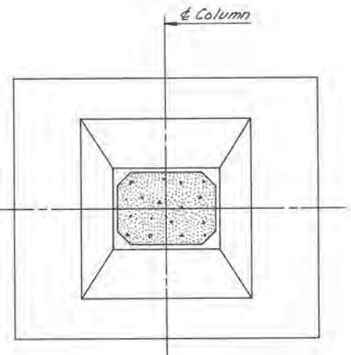


ELEVATION - NORTHBOUND
Scale: 4" = 1'-0"

NOTES:
For Sections A-A, B-B and C-C, see Sheet No. 12
For Section E-E, see Sheet No. 16
Maximum Allowable Bearing Pressure - 3.5 tons/s.f.
Actual Design Bearing Pressure - 3.3 tons/s.f.



TYPICAL END VIEW
Scale: 4" = 1'-0"



FOOTING PLAN
Scale: 4" = 1'-0"

	BY	DATE				
MADE	LJM	3-87				
CHECKED	T.F.P	3-87	1	As Built	TEM	3-89
IN CHARGE	S.R.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

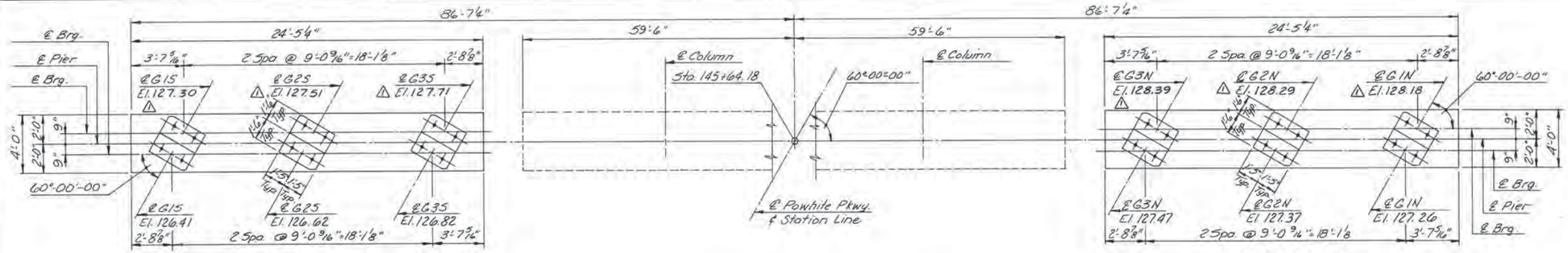
PIER II DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 22 OF 106

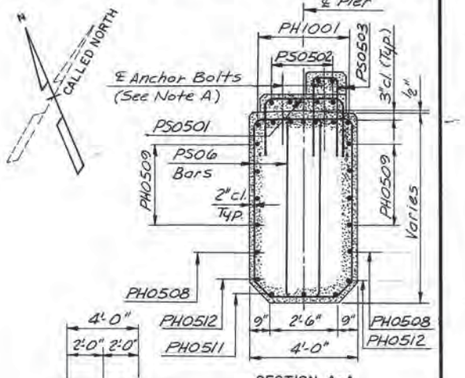
AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	25	106

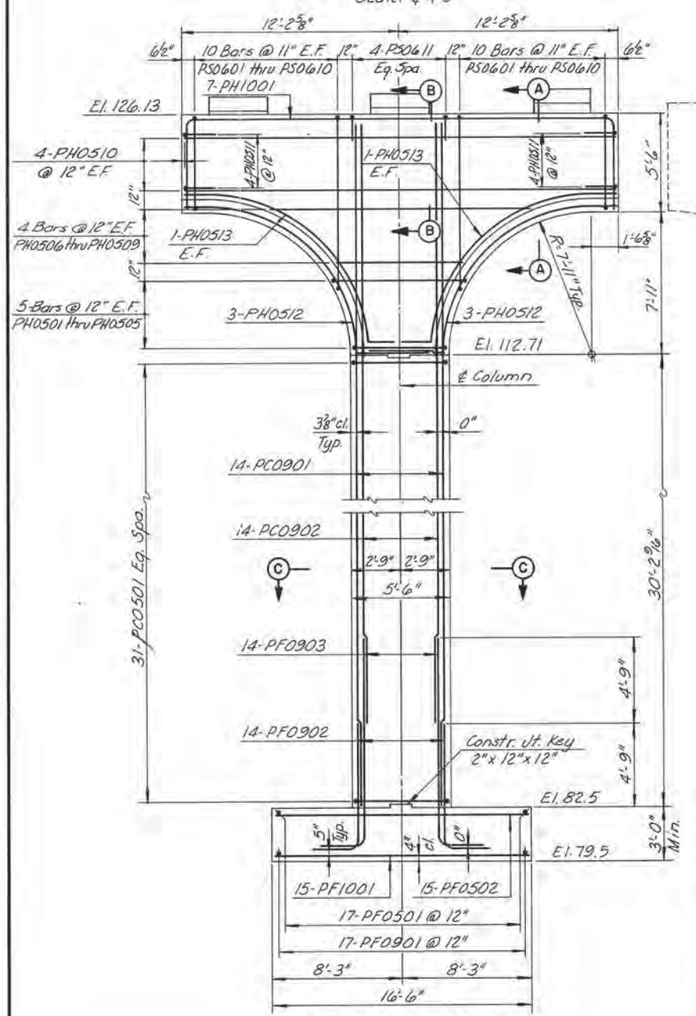


PLAN - SOUTHBOUND
Scale: 4"=1'-0"

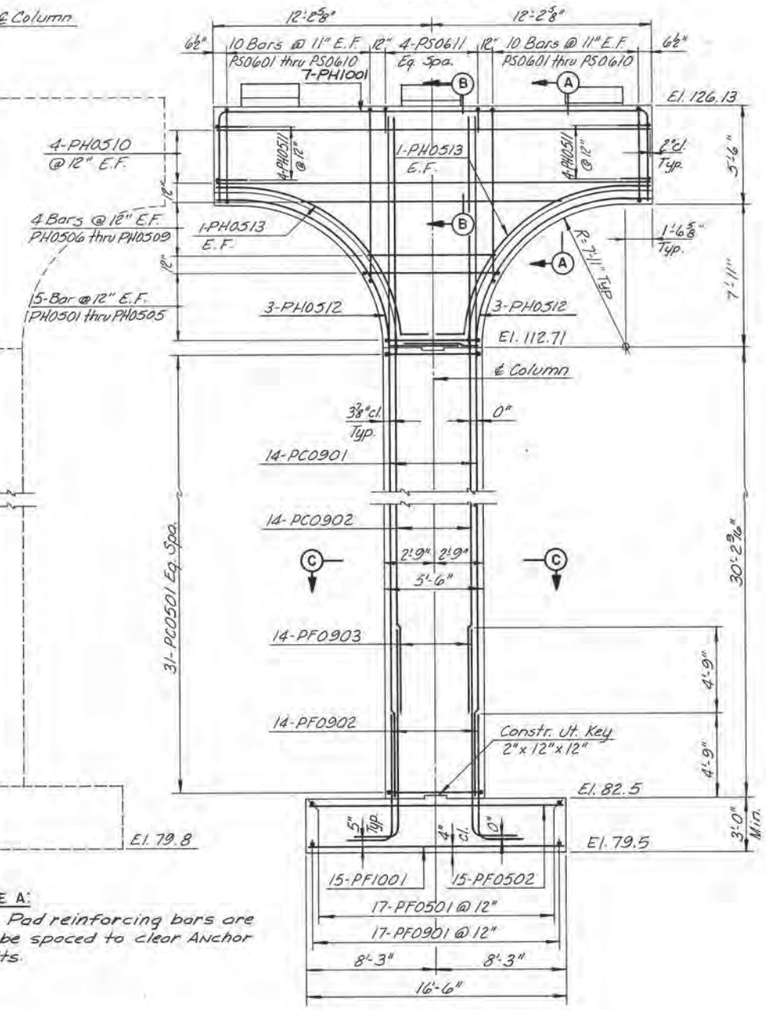
PLAN - NORTHBOUND
Scale: 4"=1'-0"



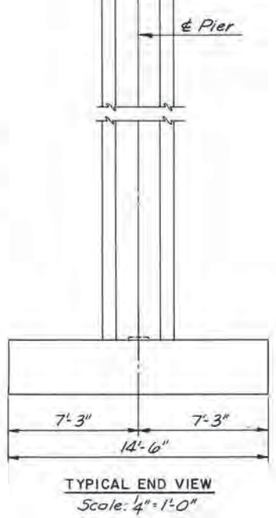
SECTION A-A
Scale: ⅜"=1'-0"
⚠



ELEVATION - SOUTHBOUND
Scale: ¼"=1'-0"



ELEVATION - NORTHBOUND
Scale: ¼"=1'-0"



TYPICAL END VIEW
Scale: ¼"=1'-0"

NOTES:

⚠ For Sections B-B and C-C see Sheet No. 12
For Anchor Bolt Setting Plan, see Sheet No. 29
For Steel Sheet Piling requirements, see Sheet No. 29
Maximum Allowable Bearing Pressure - 3.5 tons/s.f.
Actual Design Bearing Pressure - Southbound - 3.3 tons/s.f.
Northbound - 3.0 tons/s.f.

⚠ NOTE A:
Pad reinforcing bars are to be spaced to clear Anchor Bolts.

	BY	DATE
MADE	EUM	2-87
CHECKED	T.F.P.	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
⚠	As Built	TEM	3-89
⚠	EL. & Plans Added Sect. A-A	ALC	5-87

AS BUILT

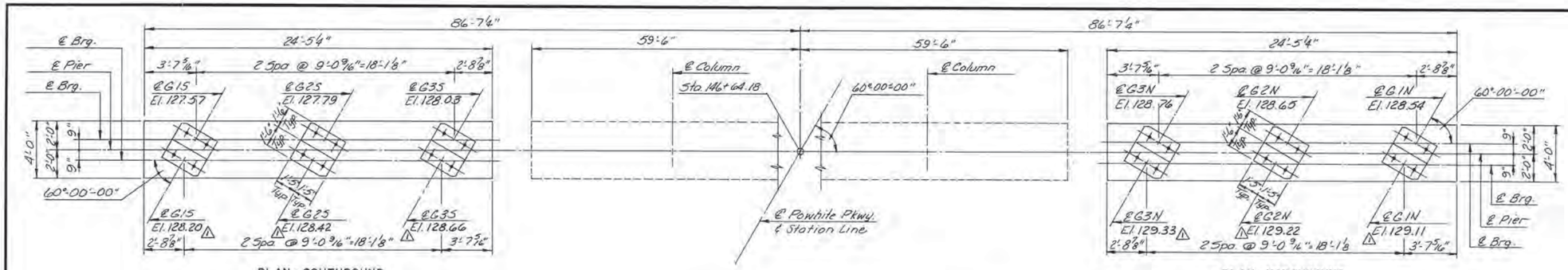
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER 14 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

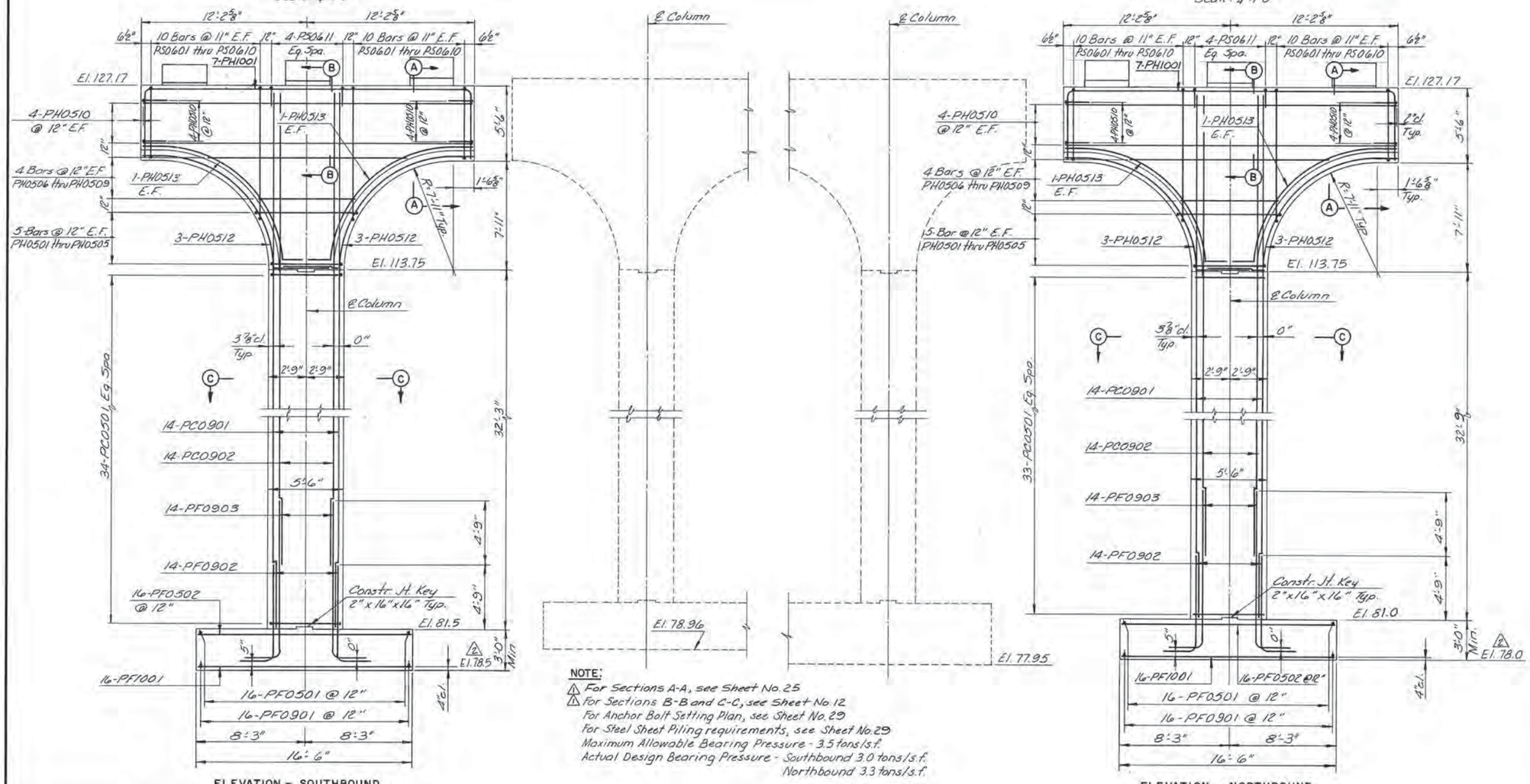
SCALE: AS SHOWN
CONTRACT NO. C-13
SHEET NO. 25 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	26	106



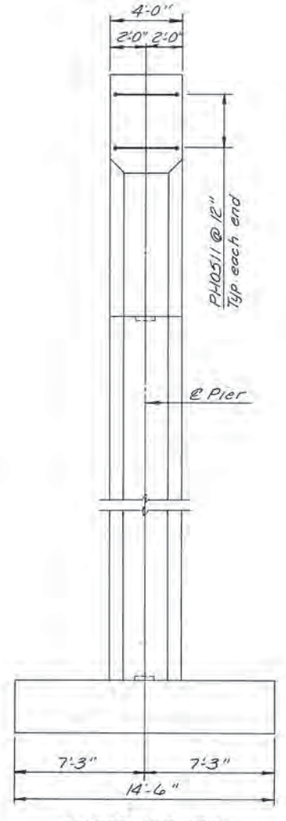
PLAN - SOUTHBOUND
Scale: 4"=1'-0"

PLAN - NORTHBOUND
Scale: 4"=1'-0"



ELEVATION - SOUTHBOUND
Scale: 4"=1'-0"

ELEVATION - NORTHBOUND
Scale: 4"=1'-0"



TYPICAL END VIEW
Scale: 4"=1'-0"

NOTE:
⚠ For Sections A-A, see Sheet No. 25
⚠ For Sections B-B and C-C, see Sheet No. 12
For Anchor Bolt Setting Plan, see Sheet No. 29
For Steel Sheet Piling requirements, see Sheet No. 29
Maximum Allowable Bearing Pressure - 3.5 tons/s.f.
Actual Design Bearing Pressure - Southbound 3.0 tons/s.f.
Northbound 3.3 tons/s.f.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.A.L.	3-86	2	As Built	TEM	3-89
CHECKED	T.R.P.	3-87	1	Note and EL. & Plan	ALC	5-87
IN CHARGE	S.R.					

AS BUILT

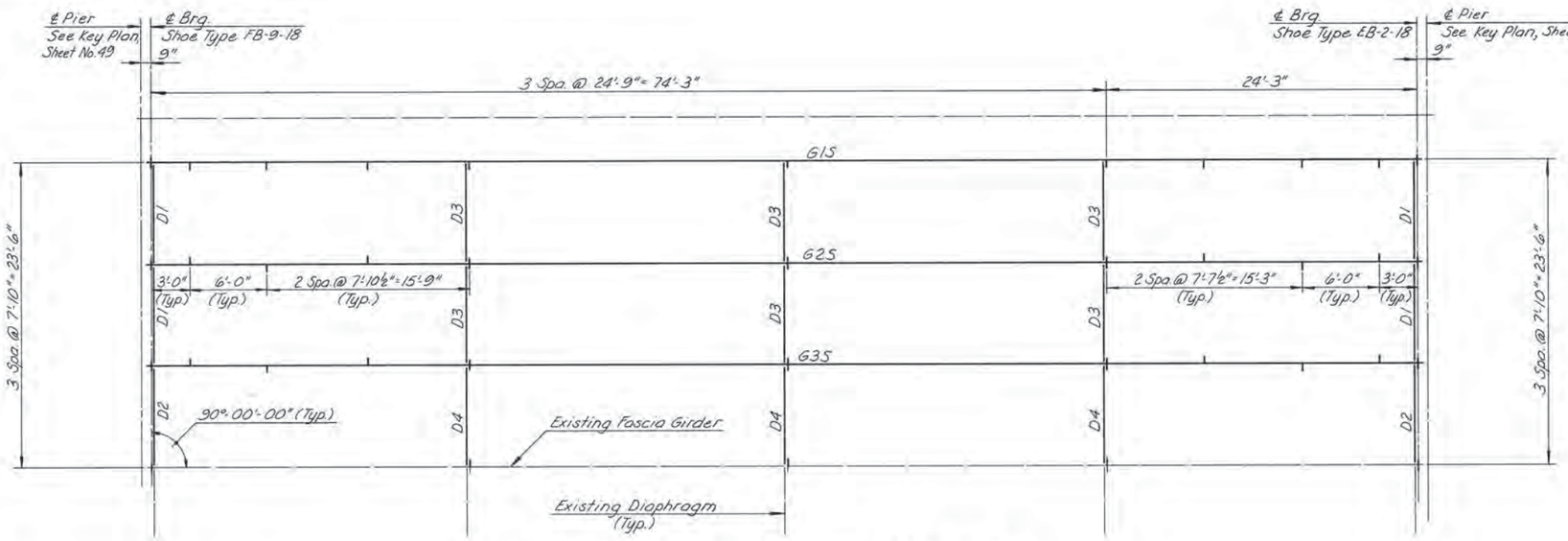
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

PIER 15 DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

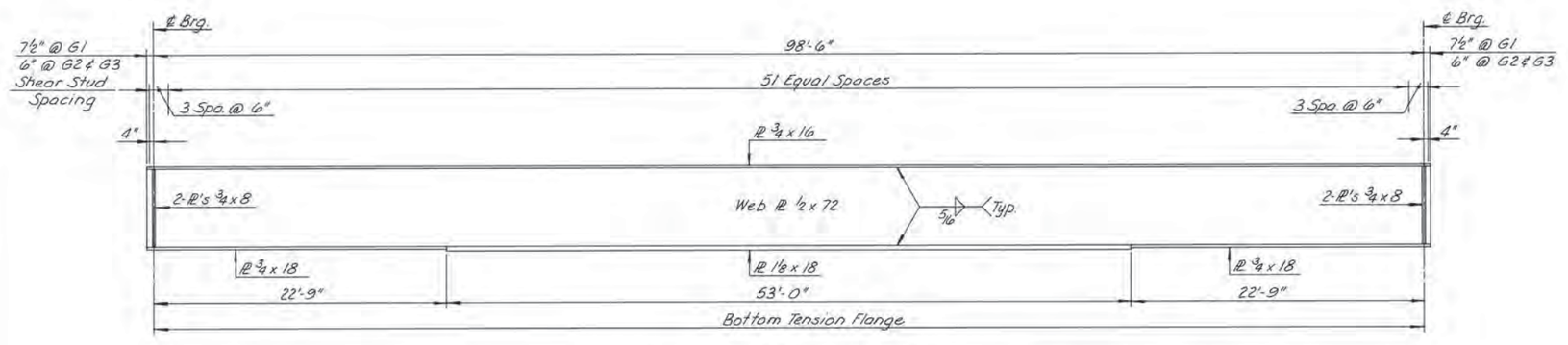
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 26 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	31	106



FRAMING PLAN - UNITS 2 & 3 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION - UNITS 2 & 3 SOUTHBOUND & NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

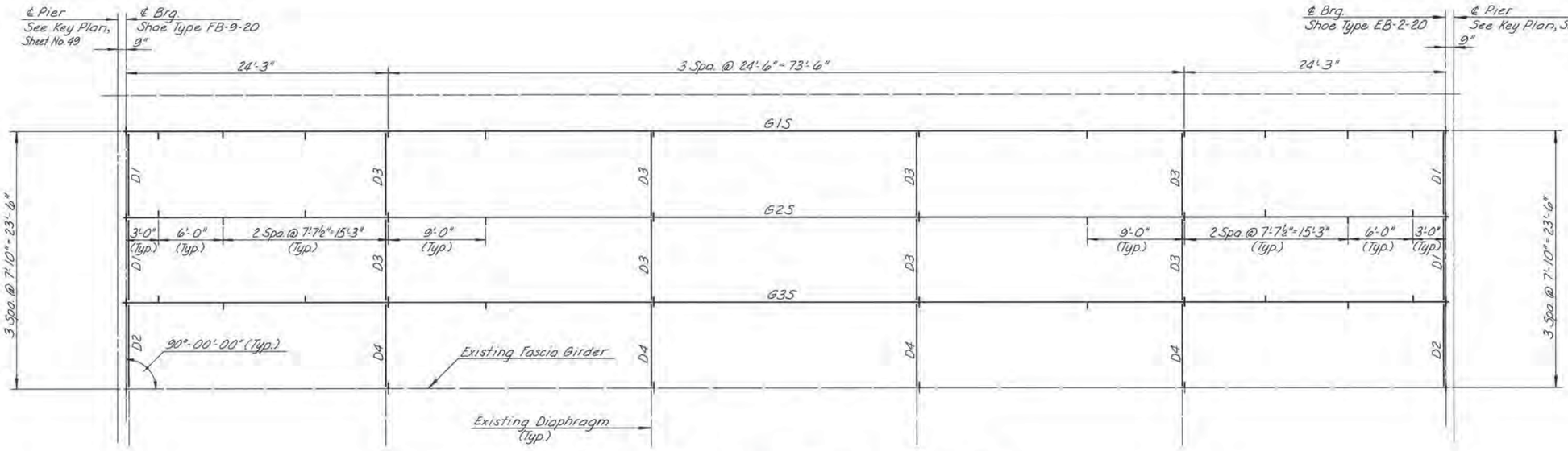
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNITS 2 & 3 SOUTHBOUND & NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

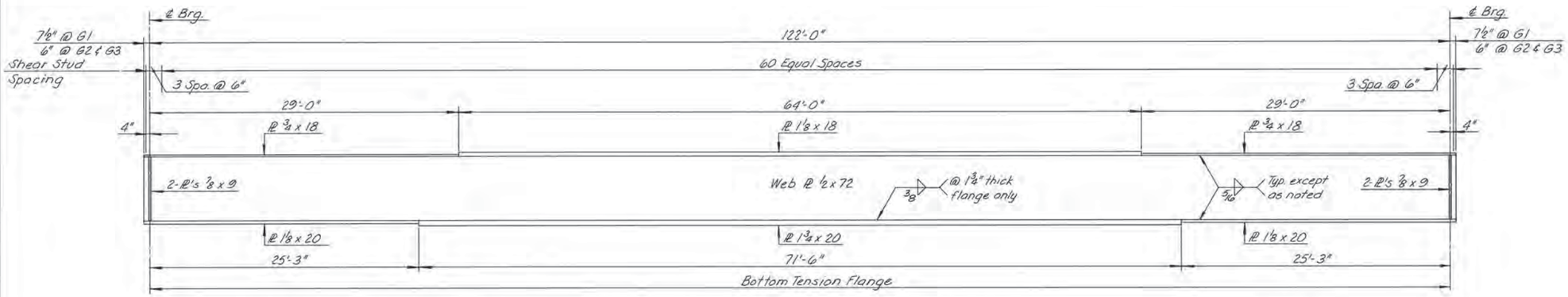
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 31 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	33	106



NOTE:
For Steel Details, see Sheet No. 45.

FRAMING PLAN - UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"



GIRDER ELEVATION - UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

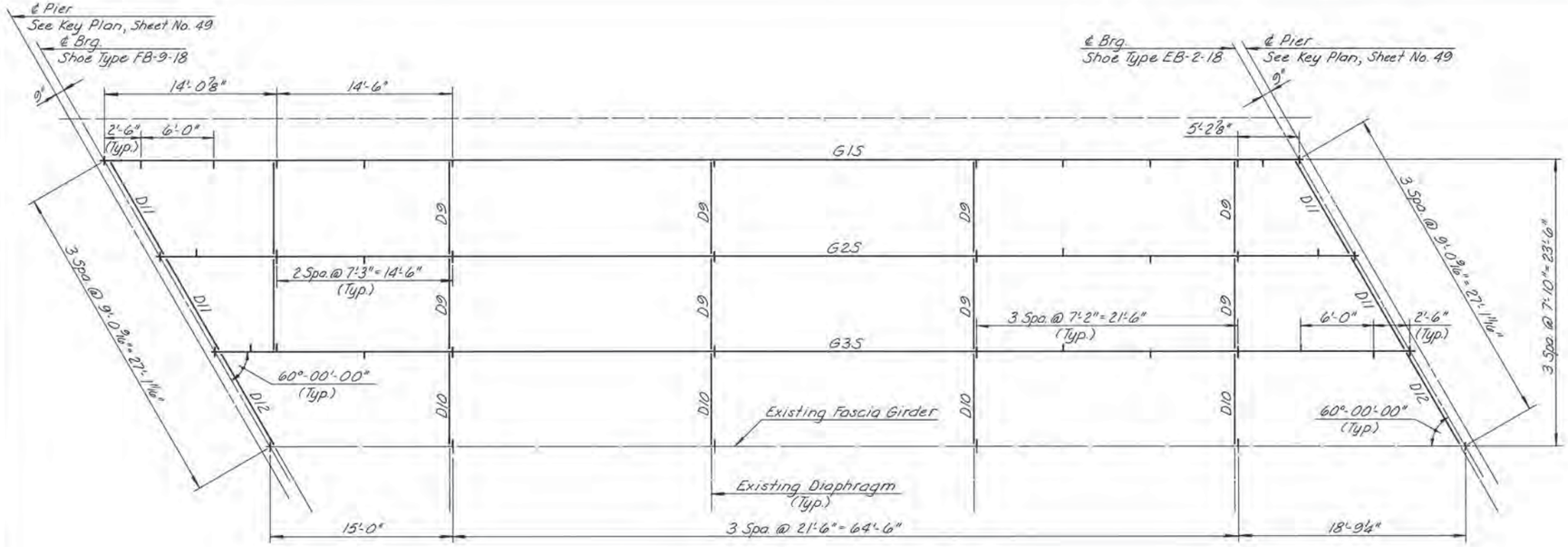
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

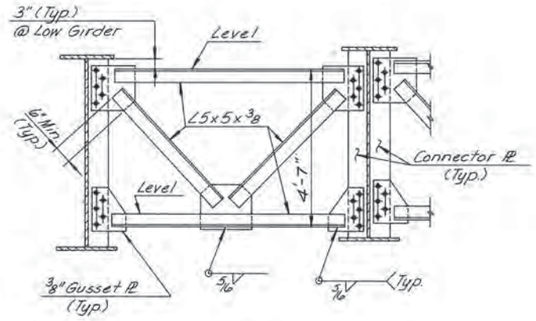
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 33 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	38	106

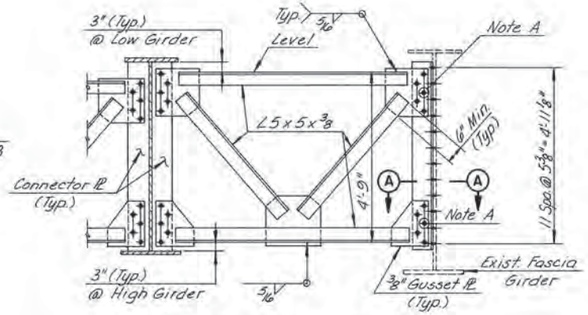


⚠ **FRAMING PLAN-UNIT 15 SOUTHBOUND**
Scale: 3/16" = 1'-0"

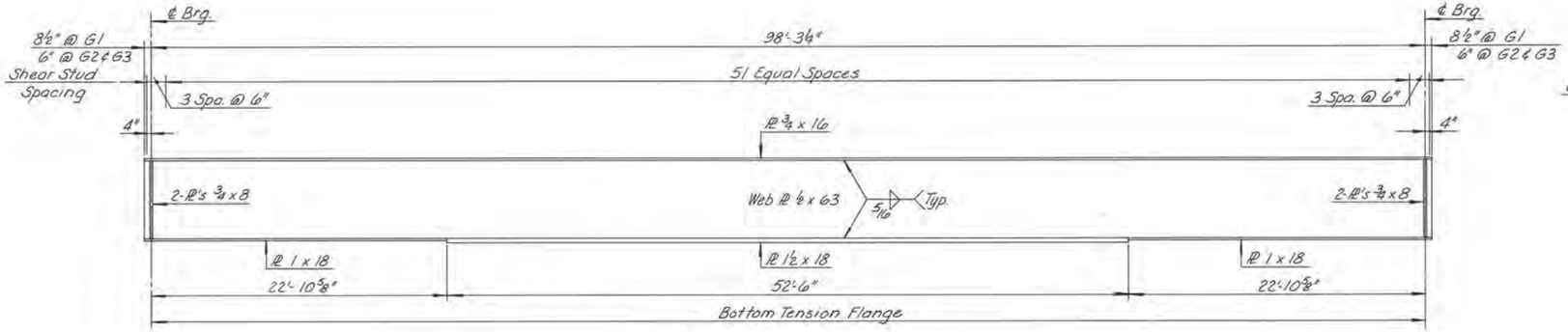
NOTE:
For Section A-A, see Sheet No. 45.
For Diaphragms 11 & 12, see Sheet No. 39.
For Additional Steel Details, see Sheet No. 45.



⚠ **INTERMEDIATE DIAPHRAGM D9**
Scale: ½" = 1'-0"



⚠ **INTERMEDIATE DIAPHRAGM D10**
Scale: ½" = 1'-0"



⚠ **GIRDER ELEVATION-UNIT 15 SOUTHBOUND**
Scale: 3/16" = 1'-0"

	BY	DATE				
MADE	EJM	1-87		As Built	TEM	3-89
CHECKED	TFP	3-87	⚠	DIAPHRAGM & GIRDER REV.	EJM	5-87
IN CHARGE	SR		NO.	REVISION	BY	DATE

AS BUILT

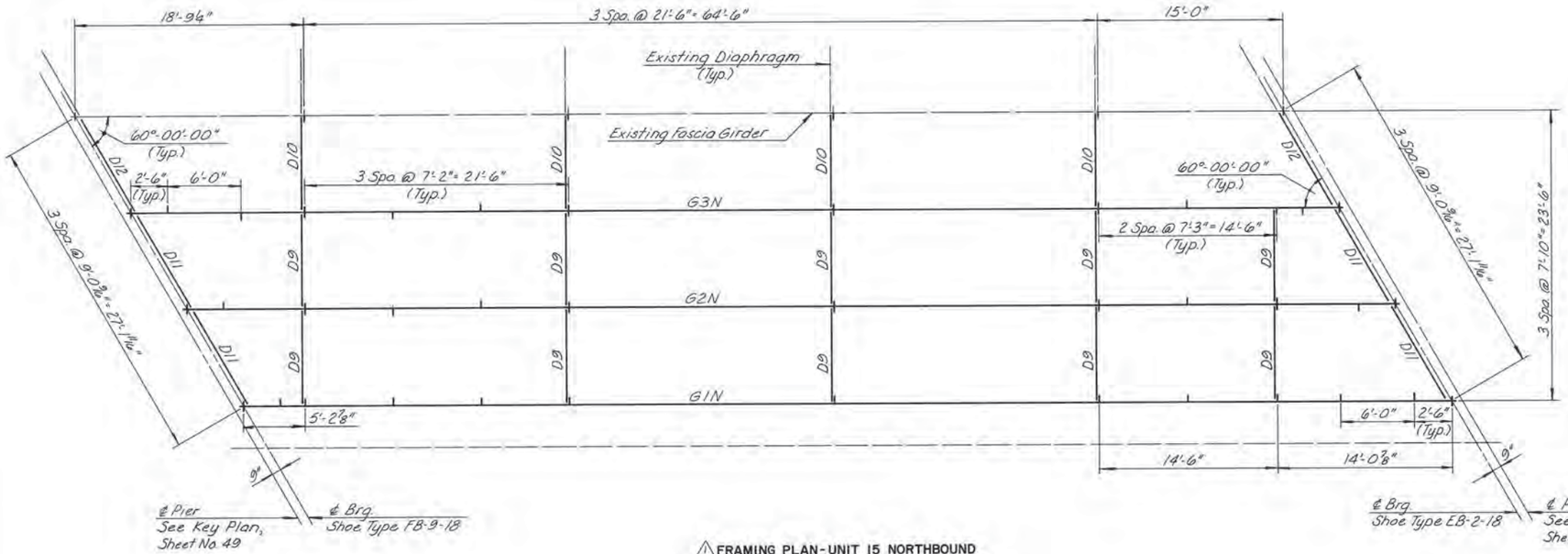
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 15 SOUTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

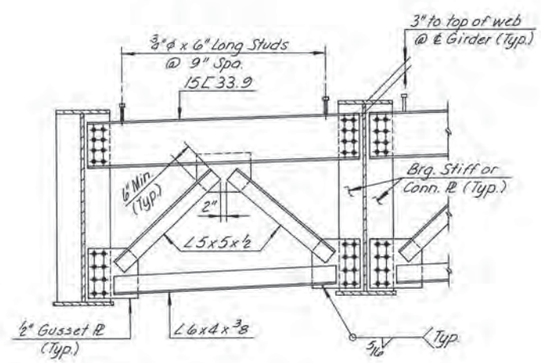
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 38 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	39	106

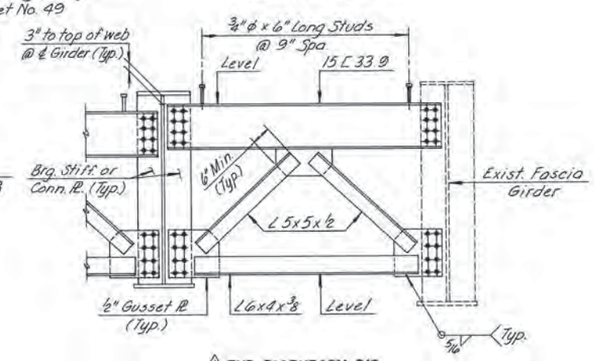


⚠ FRAMING PLAN - UNIT 15 NORTHBOUND
Scale: 3/16" = 1'-0"

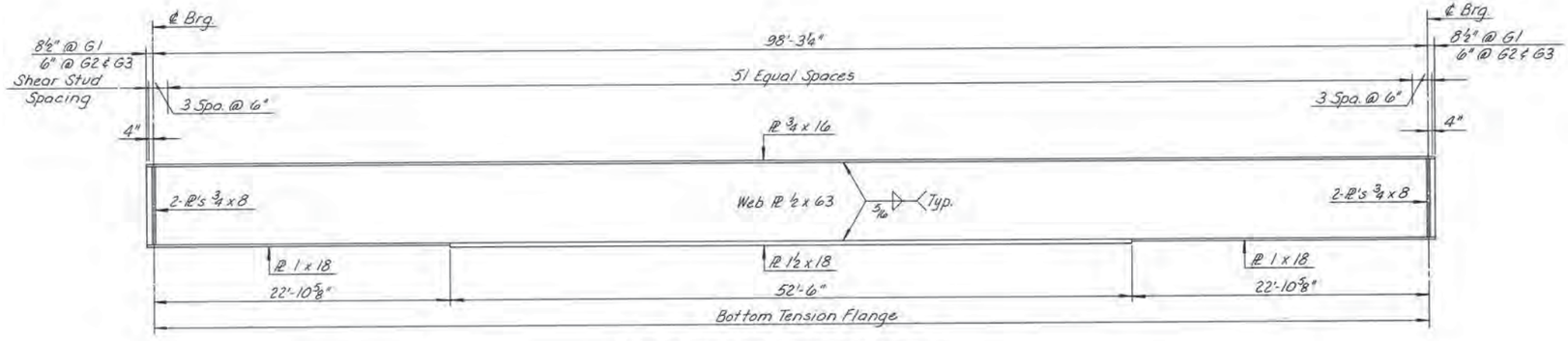
NOTE:
For Steel Details, see Sheet No. 45.



⚠ END DIAPHRAGM D11
Scale: ½" = 1'-0"



⚠ END DIAPHRAGM D12
Scale: ½" = 1'-0"



⚠ GIRDER ELEVATION - UNIT 15 NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE
MADE	EJM	1-87
CHECKED	TFP	3-87
IN CHARGE	SR	

NO.	REVISION	BY	DATE
⚠	Rev. Diaph. & Girder	EJM	5-87

AS BUILT

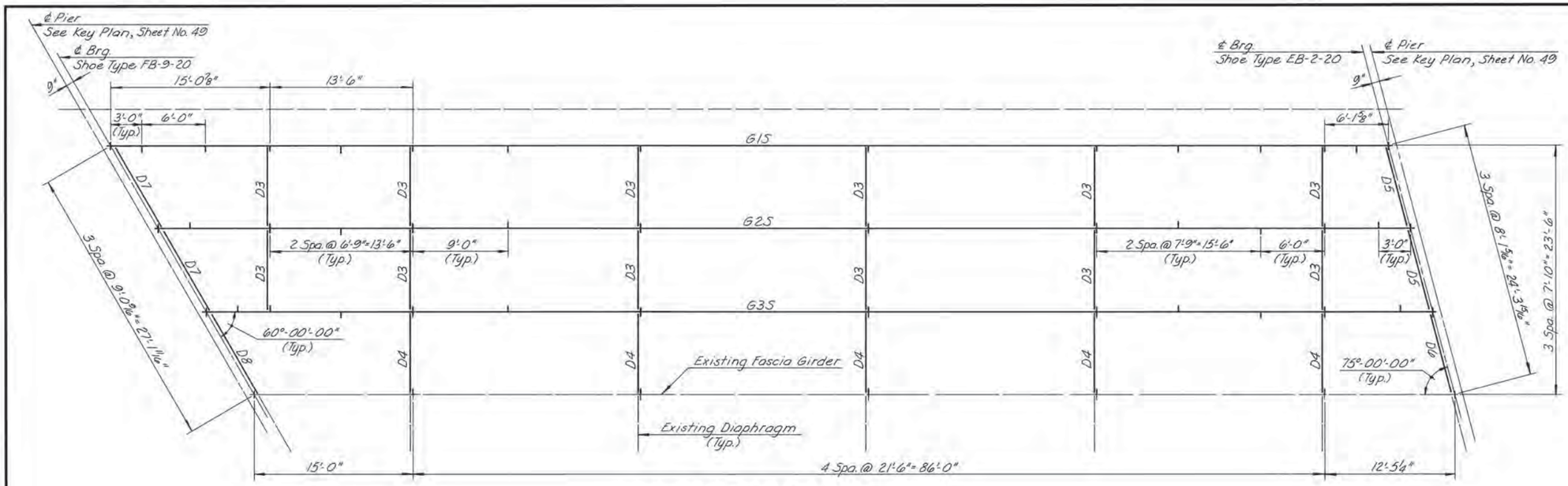
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 15 NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

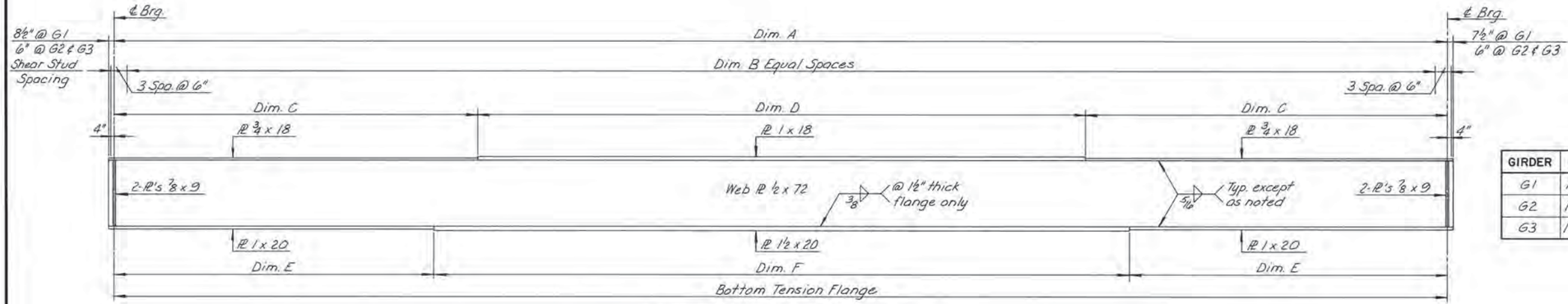
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 39 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	40	106



FRAMING PLAN - UNIT 16 SOUTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER ELEVATION - UNIT 16 SOUTHBOUND
Scale: 3/16" = 1'-0"

GIRDER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F
G1	120'-8½"	60	32'-10¼"	55'-0"	26'-1¼"	68'-6"
G2	118'-3½"	59	30'-10¾"	56'-6"	26'-7⅞"	65'-0"
G3	115'-10⅜"	58	31'-11⅜"	52'-0"	24'-8⅜"	66'-6"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

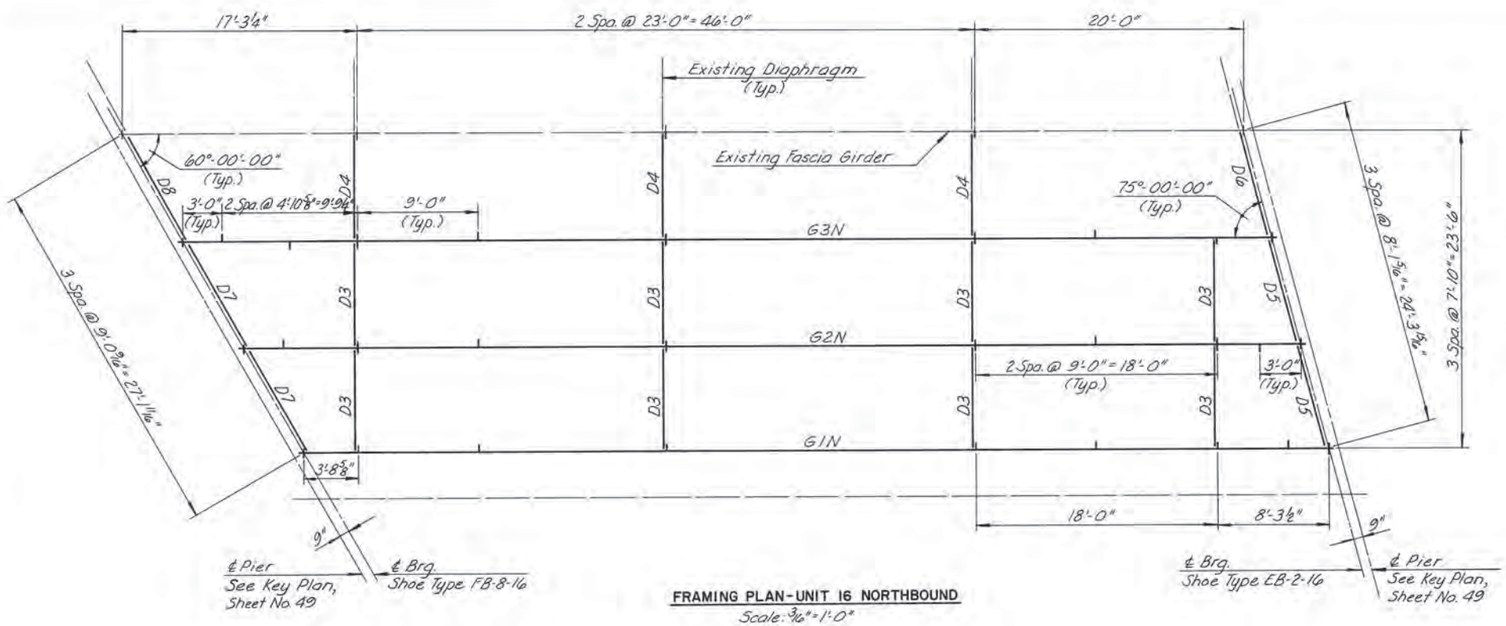
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 16 SOUTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

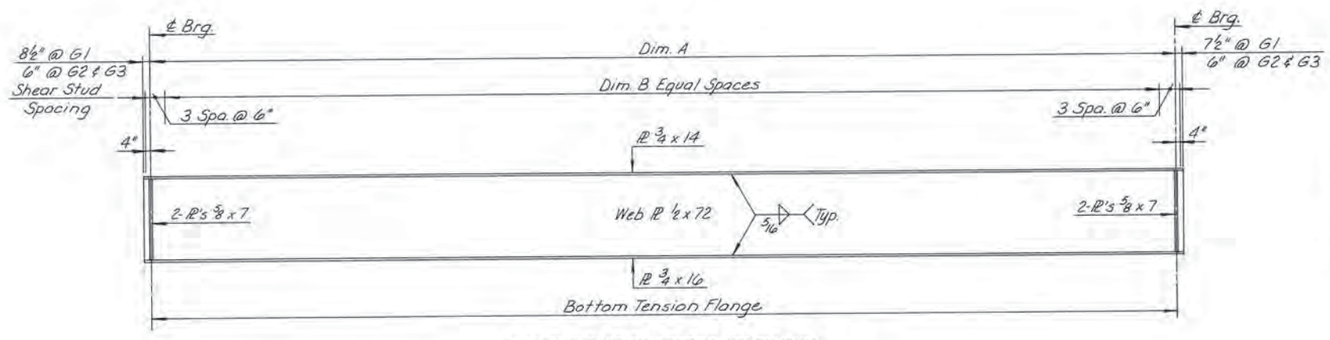
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 40 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	41	106



FRAMING PLAN - UNIT 16 NORTHBOUND
Scale: 3/16" = 1'-0"

NOTE:
For Steel Details, see Sheet No. 45.



GIRDER	DIM. A	DIM. B
G1	76'-0"	43
G2	78'-5⅛"	44
G3	80'-10¼"	46

GIRDER ELEVATION - UNIT 16 NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EJM	1-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	SR					

AS BUILT

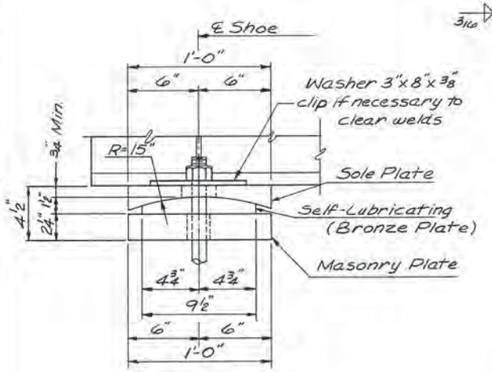
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

FRAMING PLAN & GIRDER ELEVATION
UNIT 16 NORTHBOUND

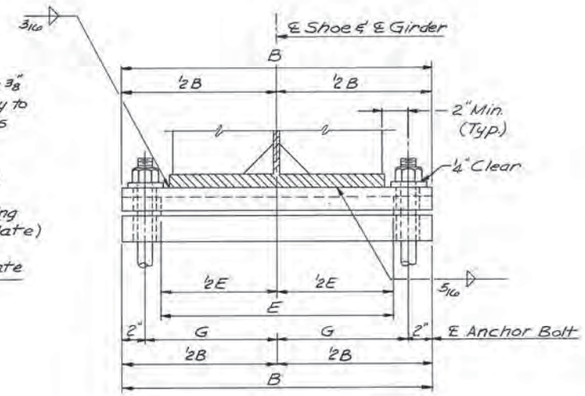
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO. C-13
SHEET NO. 41 OF 106

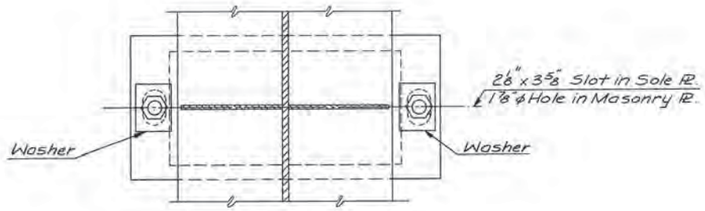
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	46	106



SIDE ELEVATION



END ELEVATION

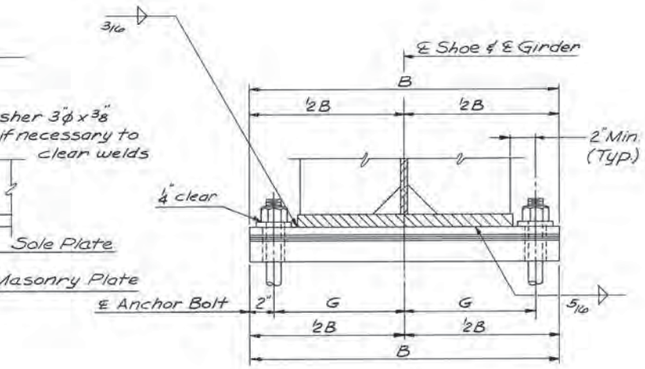


PLAN

EXPANSION SHOE EB-2
No Scale

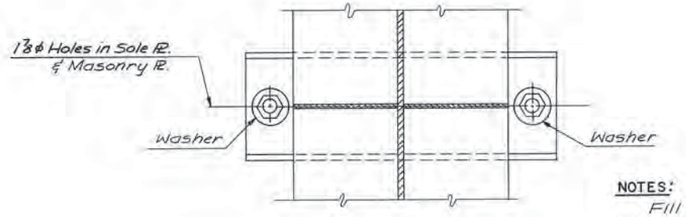
EXPANSION SHOES													
SHOE TYPE	NO. REQ'D	A	B	C	D	E	F	G	H	J	L		
EB-2-16	24		2'-0"			1'-5½"		10"			1'-7"		
EB-2-18	18		2'-2"			1'-7½"		11"			1'-7"		
EB-2-20	66		2'-4"			1'-9½"		1'-0"			1'-7"		

FIXED SHOES													
SHOE TYPE	NO. REQ'D	A	B	C	D	E	F	G	H	J	L		
FB-8-16	24		2'-0"				8"	10"	1½"	2¾"	1'-2"		
FB-9-18	18		2'-2"				9"	11"	1¾"	4½"	1'-2¾"		
FB-9-20	66		2'-4"				9"	1'-0"	1¾"	4½"	1'-2¾"		



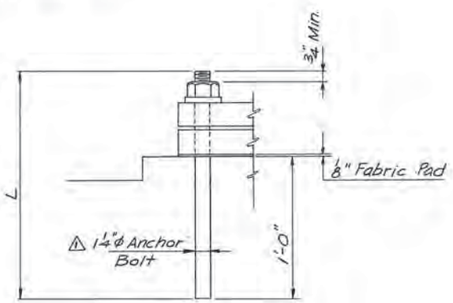
SIDE ELEVATION

END ELEVATION



PLAN

FIXED SHOE
No Scale



ANCHOR BOLT DETAIL
No Scale

NOTES:

Fill slots and holes in masonry plate around anchor bolts with a nonhardening caulking compound or elastic joint sealer.

For expansion bearing, bevel sole plate to match grade.

Steel in bearing may be ASTM A36, A572, Grade 50, or A588 and shall be painted. Surface of sole plate and masonry plate in contact with bronze plates shall not be painted, but coated with multipurpose grease before shipment. Prior to assembly in place these surfaces shall be thoroughly coated with additional antioxidant lubricant furnished by the manufacturer.

Radius may be machined to compensate for grade.

Bearing shall be set so that at 68°F, it is at the midpoint of its movement.

For Expansion bearing, 15° Radius tolerances:
Sole Plate -.0" +.01"
Bronze Plate -.01" +.0"

	BY	DATE
MADE	A.L.C.	2-87
CHECKED	T.F.P.	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
	As Built	TEM	3-89
⚠	1¼"ϕ Anchor Bolt	ALC	4-87

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

SHOE DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 46 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	48	106

	STATION	EL."A"	EL."B"
℄ S. Abut	129+76.18	117.15	117.65
	129+83.51	117.22	117.72
	129+91.58	117.28	117.78
	129+99.66	117.38	117.88
	130+07.73	117.49	117.99
	130+15.81	117.61	118.11
	130+23.88	117.68	118.18
	130+31.96	117.77	118.27
	130+40.03	117.89	118.39
	130+48.11	117.97	118.47
℄ Pier 1	130+56.18	118.05	118.55
	130+66.18	118.11	118.61
	130+76.18	118.24	118.74
	130+86.18	118.35	118.85
	130+96.18	118.45	118.95
	131+06.18	118.56	119.06
	131+16.18	118.63	119.13
	131+26.18	118.76	119.26
	131+36.18	118.89	119.39
	131+46.18	119.01	119.51
℄ Pier 2	131+56.18	119.64	119.64
	131+66.18	119.22	119.72
	131+76.18	119.34	119.84
	131+86.18	119.46	119.96
	131+96.18	119.54	120.04
	132+06.18	119.63	120.13
	132+16.18	119.71	120.21
	132+26.18	119.83	120.33
	132+36.18	119.93	120.43
	132+46.18	120.03	120.53
℄ Pier 3	132+56.18	120.14	120.64

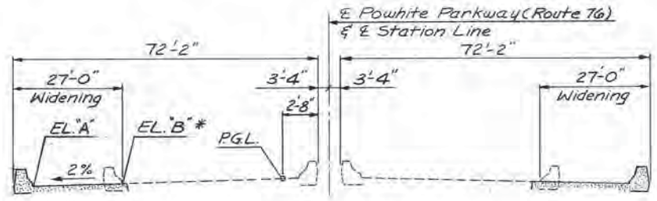
	STATION	EL."A"	EL."B"
℄ Pier 3	132+56.18	120.14	120.64
	132+68.18	120.24	120.74
	132+80.18	120.36	120.86
	132+92.18	120.52	121.02
	133+04.18	120.65	121.15
	133+16.18	120.78	121.28
	133+28.18	120.93	121.43
	133+40.18	121.03	121.53
	133+52.18	121.18	121.68
	133+64.18	121.28	121.78
℄ Pier 4	133+76.18	121.43	121.93
	133+88.53	121.56	122.06
	134+00.88	121.69	122.19
	134+13.23	121.82	122.32
	134+25.58	121.99	122.49
	134+37.93	122.15	122.65
	134+50.28	122.22	122.75
	134+62.63	122.36	122.86
	134+74.98	122.52	123.02
	134+87.33	122.67	123.17
℄ Pier 5	134+99.68	122.80	123.30
	135+12.03	122.91	123.41
	135+24.38	123.03	123.53
	135+36.73	123.19	123.69
	135+48.08	123.31	123.81
	135+61.43	123.41	123.91
	135+73.78	123.58	124.08
	135+86.13	123.71	124.21
	135+98.48	123.86	124.36
	136+10.83	123.97	124.47
℄ Pier 6	136+23.18	124.10	124.60

	STATION	EL."A"	EL."B"
℄ Pier 6	136+23.18	124.10	124.60
	136+35.53	124.25	124.75
	136+47.88	124.39	124.89
	136+60.23	124.53	125.03
	136+72.58	124.68	125.18
	136+84.93	124.78	125.28
	136+97.28	124.92	125.42
	137+09.63	125.02	125.52
	137+21.98	125.18	125.68
	137+34.33	125.30	125.80
℄ Pier 7	137+46.68	125.45	125.95
	137+59.03	125.59	126.09
	137+71.38	125.70	126.20
	137+83.73	125.86	126.36
	137+96.08	126.01	126.51
	138+08.43	126.15	126.65
	138+20.78	126.28	126.78
	138+33.13	126.39	126.89
	138+45.48	126.52	127.02
	138+57.83	126.64	127.14
℄ Pier 8	138+70.18	126.77	127.27
	138+82.53	126.89	127.39
	138+94.88	127.03	127.53
	139+07.23	127.17	127.67
	139+19.58	127.30	127.80
	139+31.93	127.44	127.94
	139+44.28	127.56	128.06
	139+56.63	127.72	128.22
	139+68.98	127.85	128.35
	139+81.33	128.01	128.51
℄ Pier 9	139+93.68	128.11	128.61

	STATION	EL."A"	EL."B"
℄ Pier 9	139+93.68	128.11	128.61
	140+06.03	128.20	128.70
	140+18.38	128.33	128.83
	140+30.73	128.48	128.98
	140+43.08	128.64	129.14
	140+55.43	128.73	129.23
	140+67.78	128.90	129.40
	140+80.13	129.02	129.52
	140+92.48	129.12	129.62
	141+04.83	129.16	129.76
℄ Pier 10	141+17.18	129.41	129.91
	141+29.53	129.52	130.02
	141+41.88	129.63	130.13
	141+54.23	129.79	130.29
	141+66.58	129.90	130.40
	141+78.93	130.03	130.53
	141+91.28	130.18	130.68
	142+03.63	130.32	130.82
	142+15.98	130.45	130.95
	142+28.33	130.58	131.08
℄ Pier 11	142+40.68	130.74	131.24
	142+53.03	130.87	131.37
	142+65.38	131.03	131.53
	142+77.73	131.15	131.65
	142+90.08	131.27	131.77
	143+02.43	131.41	131.91
	143+14.78	131.56	132.06
	143+27.13	131.69	132.19
	143+39.48	131.80	132.30
	143+51.83	131.97	132.47
℄ Pier 12	143+64.18	132.09	132.59

	STATION	EL."A"	EL."B"
℄ Pier 12	143+64.18	132.09	132.59
	143+72.88	132.20	132.70
	143+81.58	132.26	132.76
	143+90.28	132.36	132.86
	143+98.98	132.45	132.95
	144+07.68	132.52	133.02
	144+16.38	132.63	133.13
	144+25.08	132.72	133.22
	144+33.78	132.85	133.35
	144+42.48	132.96	133.46
℄ Pier 13	144+51.18	133.04	133.54
	144+59.68	133.11	133.61
	144+68.18	133.20	133.70
	144+76.68	133.31	133.81
	144+85.18	133.37	133.87
	144+93.68	133.45	133.95
	145+02.18	133.55	134.05
	145+10.68	133.62	134.12
	145+19.18	133.72	134.22
	145+27.68	133.82	134.32
℄ Pier 14	145+36.18	133.89	134.39
	145+46.18	134.02	134.52
	145+56.18	134.09	134.59
	145+66.18	134.19	134.69
	145+76.18	134.31	134.81
	145+86.18	134.42	134.92
	145+96.18	134.53	135.03
	146+06.18	134.63	135.13
	146+16.18	134.74	135.24
	146+26.18	134.85	135.35
℄ Pier 15	146+36.18	135.04	135.54

	STATION	EL."A"	EL."B"
℄ Pier 15	146+36.18	135.04	135.54
	146+47.68	135.16	135.66
	146+59.18	135.27	135.77
	146+70.68	135.34	135.84
	146+82.18	135.52	136.02
	146+93.68	135.62	136.12
	147+05.18	135.77	136.27
	147+16.68	135.88	136.38
	147+28.18	136.02	136.52
	147+39.68	136.17	136.67
℄ Pier 16	147+51.18	136.27	136.77
	147+62.48	136.38	136.88
	147+73.78	136.50	137.00
	147+85.08	136.61	137.11
	147+96.38	136.75	137.25
	148+07.68	136.87	137.37
	148+18.98	137.00	137.50
	148+30.28	137.10	137.60
	148+41.58	137.25	137.75
	148+52.88	137.38	137.88
℄ Pier 17	148+64.18	137.46	137.96
	148+72.26	137.51	138.01
	148+80.33	137.59	138.09
	148+88.41	137.66	138.16
	148+96.48	137.74	138.24
	149+04.56	137.82	138.32
	149+12.63	137.92	138.42
	149+20.71	138.00	138.50
	149+28.78	138.10	138.60
	149+36.86	138.18	138.68
℄ N. Abut	149+44.18	138.29	138.79



SOUTHBOUND ROADWAY

NORTHBOUND ROADWAY

* Existing deck elevations

NOTES:

Elevations of existing deck are from field survey. Horizontal and vertial dimensions are based on As-Built Plans and included with this set of plans as Reference Plans. It shall be the Contractor's responsibility to verify all pertinent elevations and dimensions of the existing structure prior to construction and the fabrication of any Structural Steel.

The contractors attention is directed to the approximate locations of utilities as shown on the General Plan and Elevation.

The contractor shall submit to the engineer for approval, drawings for protection and maintenance of service of utilities, located in the areas adjacent to new footing to be constructed.

	BY	DATE	NO	REVISION	BY	DATE
MADE	ALC	2-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK SLAB ELEVATION
SOUTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: NO SCALE
CONTRACT NO: C-13
SHEET NO. 48 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	49	106

	STATION	EL."C"	EL."D"
℄ S. Abut	129+76.18	117.10	117.60
	129+83.51	117.19	117.69
	129+91.58	117.27	117.77
	129+99.66	117.35	117.85
	130+07.73	117.43	117.93
	130+15.81	117.53	118.03
	130+23.88	117.64	118.14
	130+31.96	117.68	118.18
	130+40.03	117.80	118.30
	130+48.11	117.89	118.39
℄ Pier 1	130+56.18	117.95	118.45
	130+66.18	118.06	118.56
	130+76.18	118.19	118.69
	130+86.18	118.29	118.79
	130+96.18	118.37	118.87
	131+06.18	118.49	118.99
	131+16.18	118.60	119.10
	131+26.18	118.72	119.22
	131+36.18	118.85	119.35
	131+46.18	118.94	119.44
℄ Pier 2	131+56.18	119.06	119.56
	131+66.18	119.21	119.71
	131+76.18	119.27	119.77
	131+86.18	119.36	119.86
	131+96.18	119.46	119.96
	132+06.18	119.58	120.08
	132+16.18	119.72	120.22
	132+26.18	119.78	120.28
	132+36.18	119.87	120.37
	132+46.18	119.99	120.49
℄ Pier 3	132+56.18	120.12	120.62

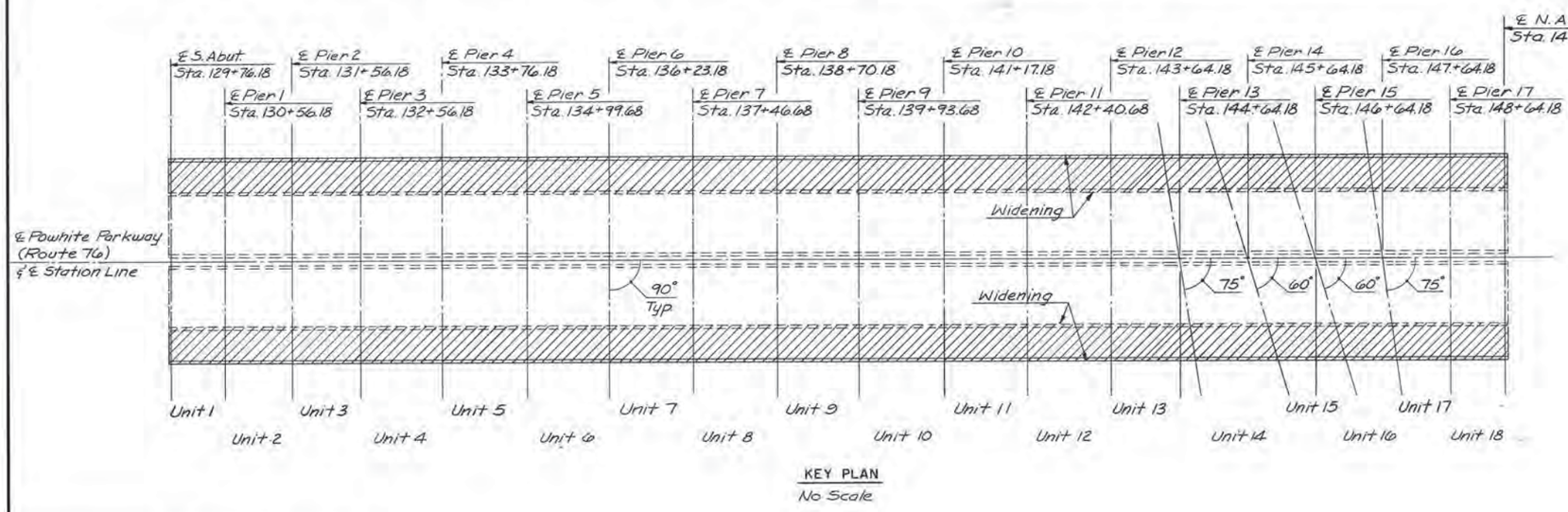
	STATION	EL."C"	EL."D"
℄ Pier 3	132+56.18	120.12	120.62
	132+68.18	120.24	120.74
	132+80.18	120.37	120.87
	132+92.18	120.51	121.01
	133+04.18	120.61	121.11
	133+16.18	120.73	121.23
	133+28.18	120.87	121.37
	133+40.18	121.01	121.51
	133+52.18	121.15	121.65
	133+64.18	121.29	121.79
℄ Pier 4	133+76.18	121.46	121.96
	133+88.53	121.59	122.09
	134+00.88	121.76	122.26
	134+13.23	121.85	122.35
	134+25.58	122.03	122.53
	134+37.93	122.13	122.63
	134+50.28	122.23	122.73
	134+62.63	122.41	122.91
	134+74.98	122.52	123.02
	134+87.33	122.65	123.15
℄ Pier 5	134+99.68	122.76	123.26
	135+12.03	122.93	123.43
	135+24.38	123.06	123.56
	135+36.73	123.21	123.71
	135+48.08	123.35	123.85
	135+61.43	123.52	124.02
	135+73.78	123.63	124.13
	135+86.13	123.72	124.22
	135+98.48	123.90	124.40
	136+10.83	123.99	124.49
℄ Pier 6	136+23.18	124.12	124.62

	STATION	EL."C"	EL."D"
℄ Pier 6	136+23.18	124.12	124.62
	136+35.53	124.27	124.77
	136+47.88	124.43	124.93
	136+60.23	124.56	125.06
	136+72.58	124.73	125.23
	136+84.93	124.85	125.35
	136+97.28	124.99	125.49
	137+09.63	125.09	125.59
	137+21.98	125.24	125.74
	137+34.33	125.34	125.84
℄ Pier 7	137+46.68	125.45	125.95
	137+59.03	125.62	126.12
	137+71.38	125.73	126.23
	137+83.73	125.89	126.39
	137+96.08	126.06	126.56
	138+08.43	126.19	126.69
	138+20.78	126.32	126.82
	138+33.13	126.47	126.97
	138+45.48	126.60	127.10
	138+57.83	126.70	127.20
℄ Pier 8	138+70.18	126.79	127.29
	138+82.53	126.91	127.41
	138+94.88	127.09	127.59
	139+07.23	127.25	127.75
	139+19.58	127.34	127.84
	139+31.93	127.50	128.00
	139+44.28	127.63	128.13
	139+56.63	127.73	128.23
	139+68.98	127.88	128.38
	139+81.33	127.98	128.48
℄ Pier 9	139+93.68	128.09	128.59

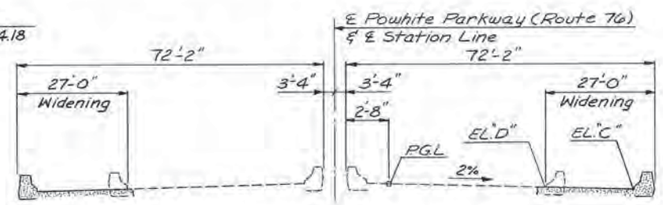
	STATION	EL."C"	EL."D"
℄ Pier 9	139+93.68	128.09	128.59
	140+06.03	128.25	128.75
	140+18.38	128.41	128.91
	140+30.73	128.54	129.04
	140+43.08	128.69	129.19
	140+55.43	128.83	129.33
	140+67.78	128.95	129.45
	140+80.13	129.06	129.56
	140+92.48	129.16	129.66
	141+04.83	129.26	129.76
℄ Pier 10	141+17.18	129.46	129.96
	141+29.53	129.61	130.11
	141+41.88	129.74	130.24
	141+54.23	129.88	130.38
	141+66.58	130.01	130.51
	141+78.93	130.12	130.62
	141+91.28	130.24	130.74
	142+03.63	130.38	130.88
	142+15.98	130.54	131.04
	142+28.33	130.64	131.14
℄ Pier 11	142+40.68	130.75	131.25
	142+53.03	130.90	131.40
	142+65.38	131.01	131.51
	142+77.73	131.14	131.64
	142+90.08	131.31	131.81
	143+02.43	131.44	131.94
	143+14.78	131.58	132.08
	143+27.13	131.70	132.20
	143+39.48	131.83	132.33
	143+51.83	131.98	132.48
℄ Pier 12	143+64.18	132.10	132.60

	STATION	EL."C"	EL."D"
℄ Pier 12	143+64.18	132.10	132.60
	143+75.48	132.21	132.71
	143+86.78	132.36	132.86
	143+98.08	132.47	132.97
	144+09.38	132.58	133.08
	144+20.68	132.72	133.22
	144+31.98	132.83	133.33
	144+43.28	132.94	133.44
	144+54.58	133.08	133.58
	144+65.88	133.19	133.69
℄ Pier 13	144+77.18	133.28	133.78
	144+88.68	133.39	133.89
	145+00.18	133.52	134.02
	145+11.68	133.63	134.13
	145+23.18	133.75	134.25
	145+34.68	133.87	134.37
	145+46.18	133.99	134.49
	145+57.68	134.13	134.63
	145+69.18	134.26	134.76
	145+80.68	134.37	134.87
℄ Pier 14	145+92.18	134.47	134.97
	146+02.18	134.60	135.10
	146+12.18	134.71	135.21
	146+22.18	134.81	135.31
	146+32.18	134.89	135.39
	146+42.18	135.02	135.52
	146+52.18	135.14	135.64
	146+62.18	135.24	135.74
	146+72.18	135.36	135.86
	146+82.18	135.45	135.95
℄ Pier 15	146+92.18	135.56	136.06

	STATION	EL."C"	EL."D"
℄ Pier 15	146+92.18	135.56	136.06
	147+00.68	135.66	136.16
	147+09.18	135.76	136.26
	147+17.68	135.86	136.36
	147+26.18	135.97	136.47
	147+34.68	136.05	136.55
	147+43.18	136.13	136.63
	147+51.68	136.24	136.74
	147+60.18	136.35	136.85
	147+68.68	136.44	136.94
℄ Pier 16	147+77.10	136.54	137.04
	147+85.88	136.60	137.10
	147+94.58	136.68	137.18
	148+03.28	136.79	137.29
	148+11.98	137.87	137.37
	148+20.68	137.00	137.50
	148+29.38	137.07	137.57
	148+38.08	137.17	137.67
	148+46.78	137.27	137.77
	148+55.48	137.35	137.85
℄ Pier 17	148+64.18	137.41	137.91
	148+72.26	137.52	138.02
	148+80.33	137.58	138.08
	148+88.41	137.66	138.16
	148+96.48	137.75	138.25
	149+04.56	137.82	138.32
	149+12.63	137.93	138.43
	149+20.71	138.01	138.51
	149+28.78	138.10	138.60
	149+36.86	138.18	138.68
℄ N. Abut	149+44.18	138.27	138.77



KEY PLAN
No Scale



	BY	DATE
MADE	A.L.C.	2-87
CHECKED	TFP	3-87
IN CHARGE	S.R.	

NO	REVISION	BY	DATE
	As Built	TEM	3-89

AS BUILT

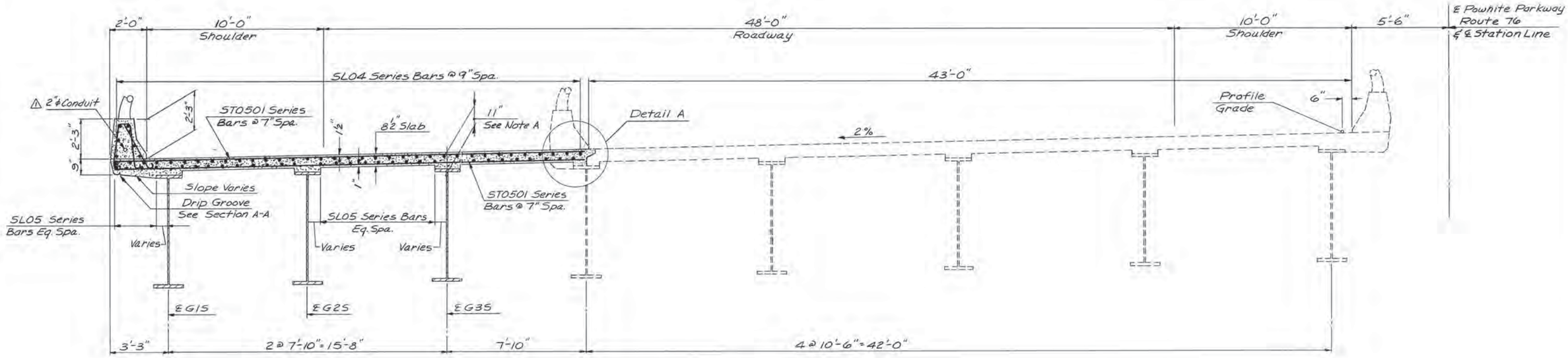
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK SLAB ELEVATION
NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: NO SCALE
CONTRACT NO: C-13
SHEET NO. 49 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	50	106



TYPICAL SECTION
(SOUTHBOUND SHOWN)
Scale: 3/8" = 1'-0"

NOTE A:

Dimension shown is measured from top of web to top of slab at the intersection of the centerline of bearing and the centerline of girder.

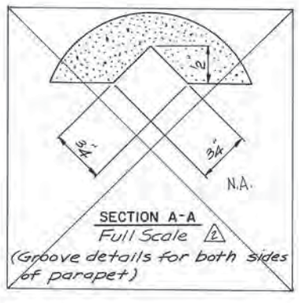
This dimension may be varied between bearings as required to compensate for variations in camber, except that no portion of the girder flange may fall within the slab.

NOTES:

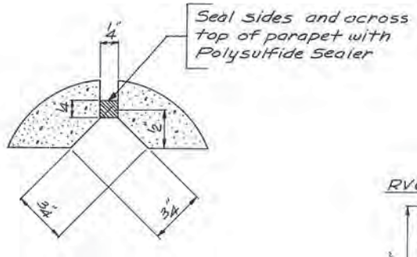
All bevels for concrete on this sheet shall be 3/4". Rounded edges with 1" radius may be used in lieu of bevels along top of parapet.

For groove location, see Deck Plan Sheets.

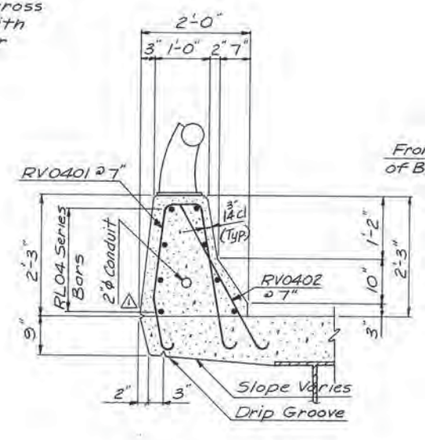
Precast Parapet shall not be used on this structure.



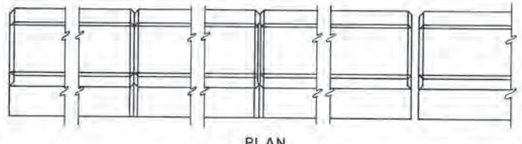
SECTION A-A
Full Scale ⚠2
(Groove details for both sides of parapet)



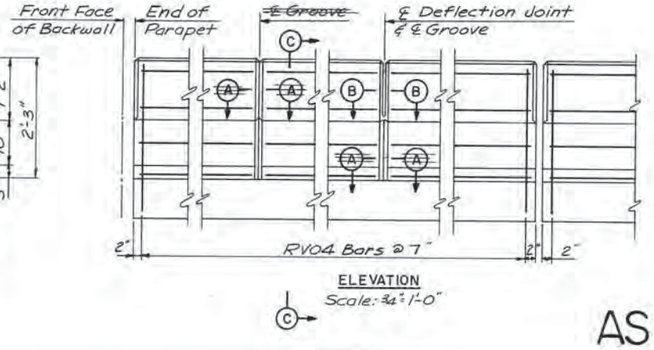
SECTION B-B
Full Scale
(Deflection Joint detail for both sides of parapet)



SECTION C-C
Scale: 3/4" = 1'-0"



PLAN
Scale: 3/4" = 1'-0"



ELEVATION
Scale: 3/4" = 1'-0"

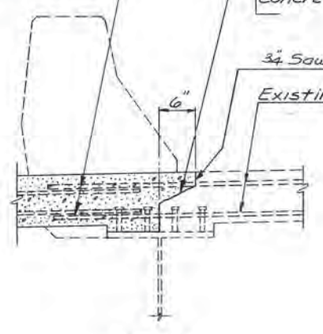
Exisiting No.5 transverse steel top & bottom to remain inplace and be cleaned of any concrete

Coat edge of existing slab with Type EP-4 epoxy immediately preceding placement of new concrete (Typ.)

¾" Saw Cut

Existing Reinforcing

6"



DETAIL A

	BY	DATE				
MADE	A.L.C.	3-87	⚠2	As Built	TEM	3-89
CHECKED	T.F.P.	3-87	⚠1	2" Conduit	ALC	4-87
IN CHARGE	S.R.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

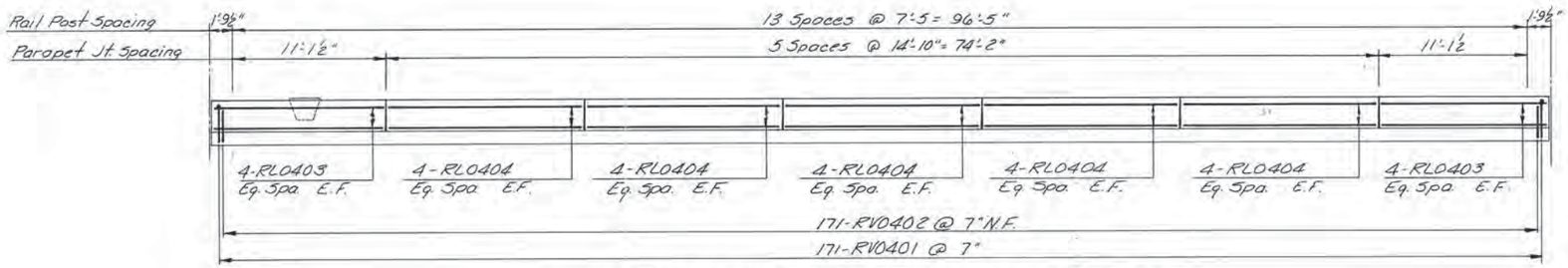
TYPICAL CROSS SECTION AND PARAPET DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

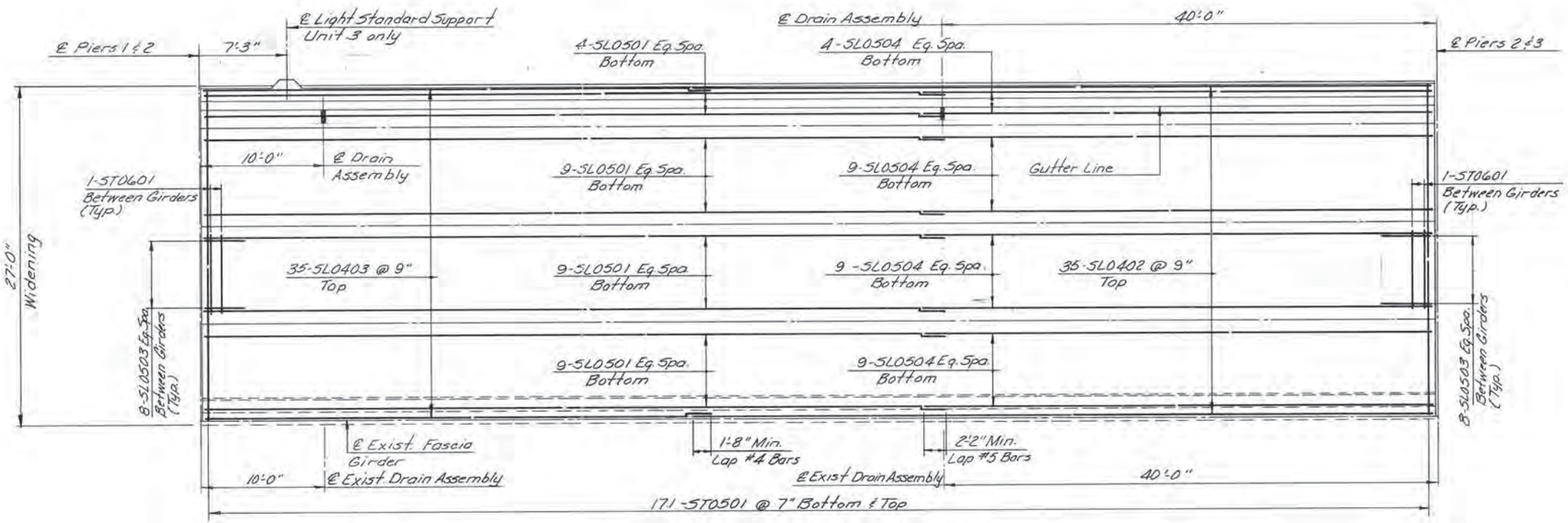
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 50 OF 106

AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	52	106



PARAPET ELEVATION – UNITS 2 & 3 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"



DECK PLAN – UNITS 2 & 3 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16" = 1'-0"

	BY	DATE
MADE	TAL	3-87
CHECKED	T.F.P.	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
	As Built	TEM	3-89

AS BUILT

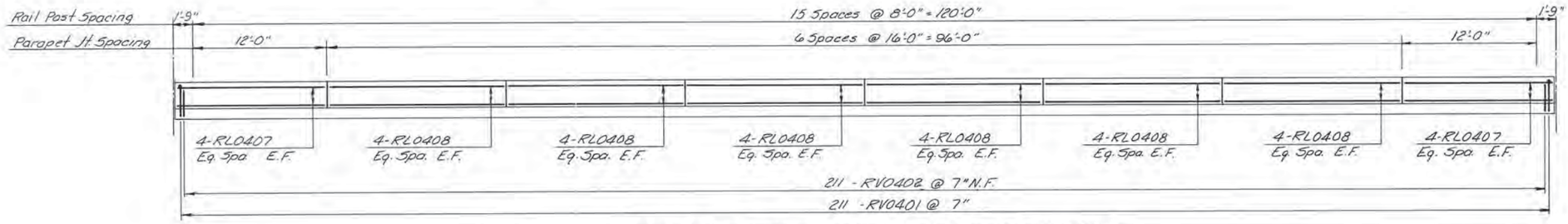
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN
UNITS 2 & 3 SOUTHBOUND & NORTHBOUND

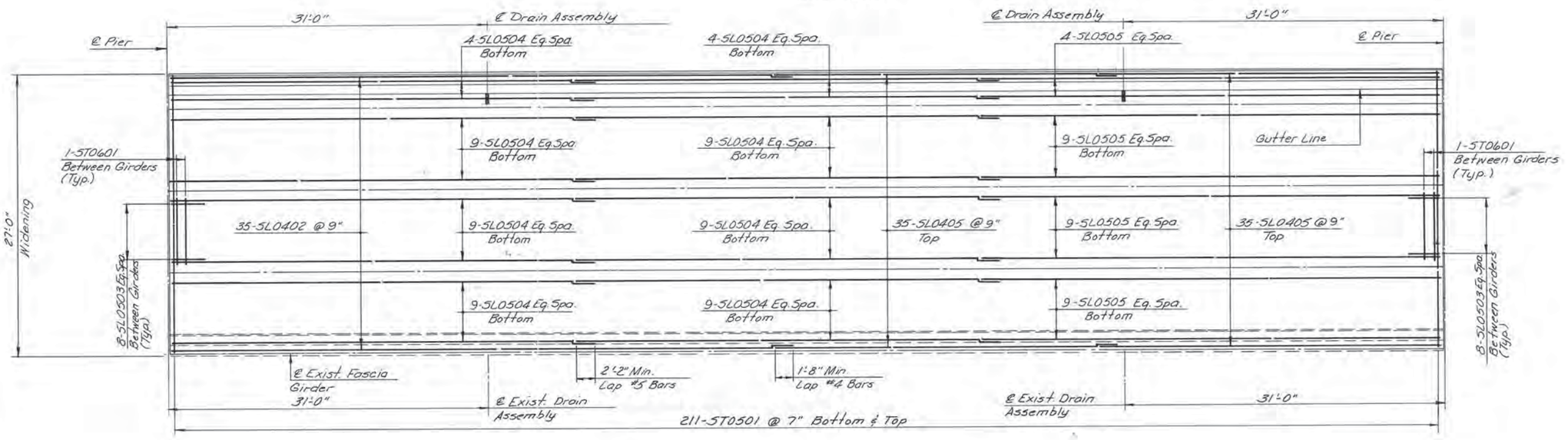
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 52 OF 106

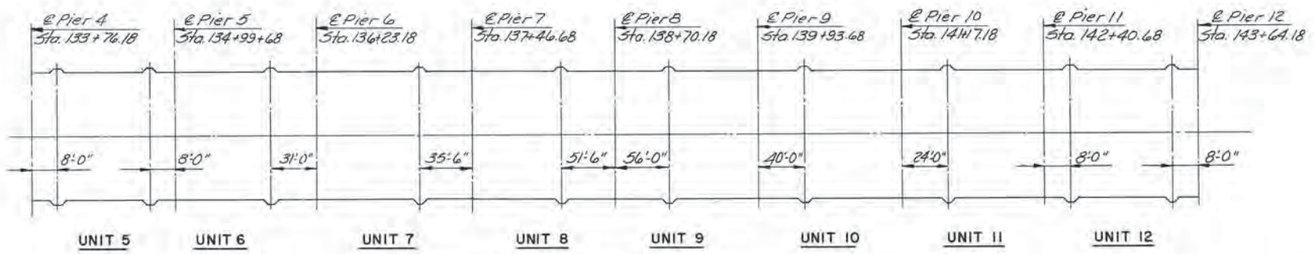
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	54	106



PARAPET ELEVATION - UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"



DECK PLAN - UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND
(SOUTHBOUND SHOWN)
Scale: 3/16"=1'-0"



LIGHTING STANDARD LOCATIONS FOR UNITS 5 THRU 12
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TRP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.					

AS BUILT

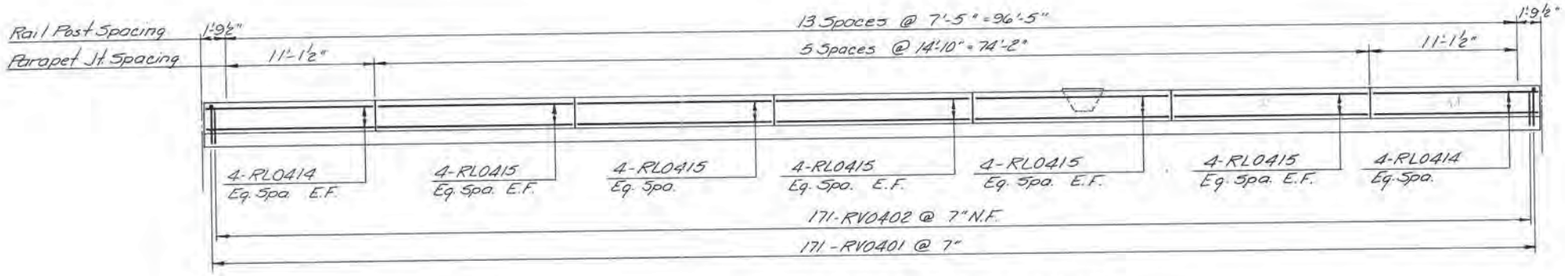
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN
UNITS 5 THRU 12 SOUTHBOUND & NORTHBOUND

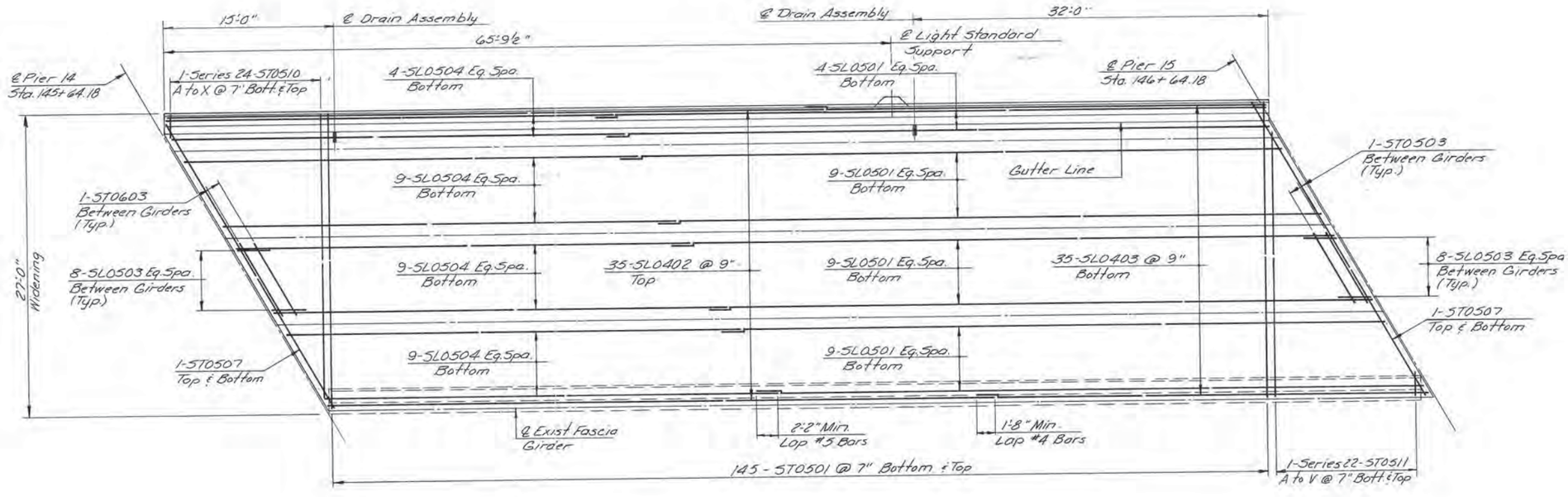
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 54 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	59	106



PARAPET ELEVATION – UNIT 15 SOUTHBOUND
Scale: 3/16" = 1'-0"



DECK PLAN – UNIT 15 SOUTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE
MADE	TAL	3-87
CHECKED	T.F.P.	3-87
IN CHARGE	S.R.	

NO.	REVISION	BY	DATE
	As Built	TEM	3-89

AS BUILT

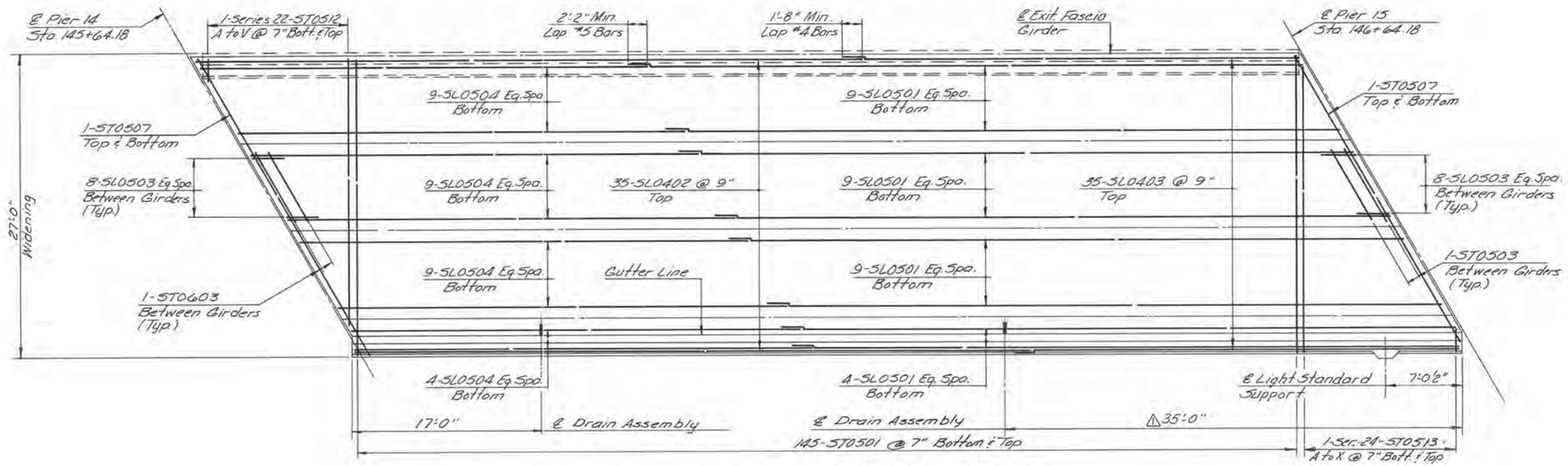
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 15 SOUTHBOUND

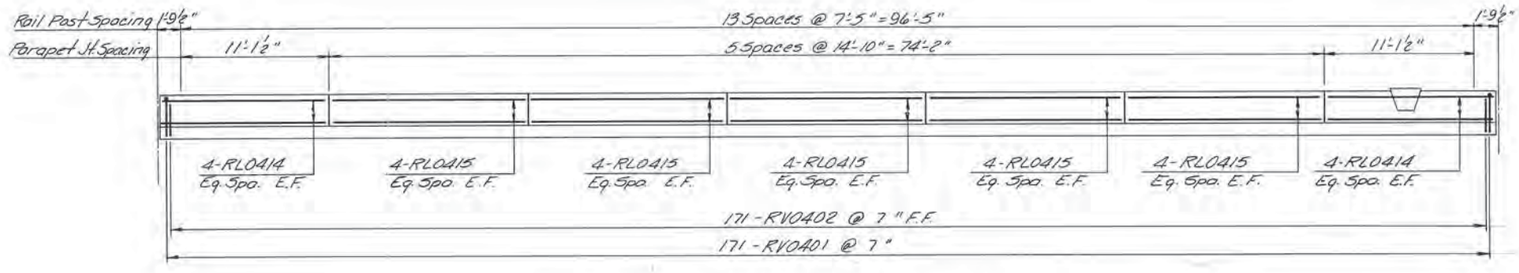
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO. C-13
SHEET NO. 59 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	60	106



DECK PLAN - UNIT 15 NORTHBOUND
Scale: 3/16"=1'-0"



PARAPET ELEVATION - UNIT 15 NORTHBOUND
Scale: 3/16"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87		As Built	TEM	3-89
CHECKED	TFP	3-87	△	Rel. Drain Assbly	EJM	7-87
IN CHARGE	S.R.					

AS BUILT

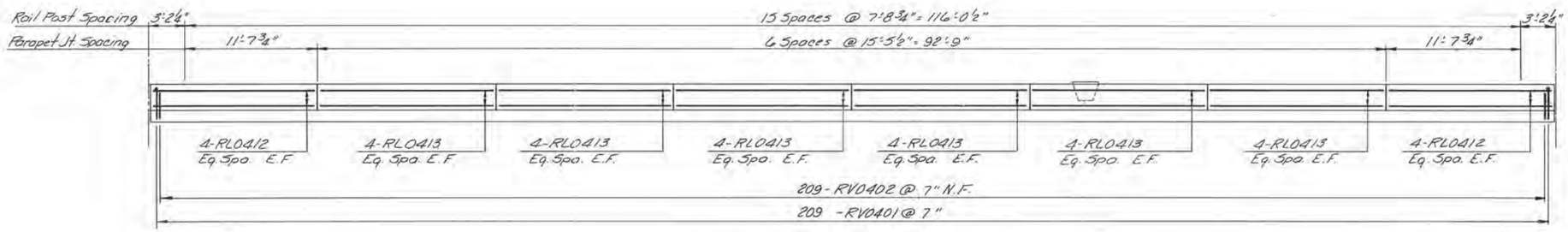
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 15 NORTHBOUND

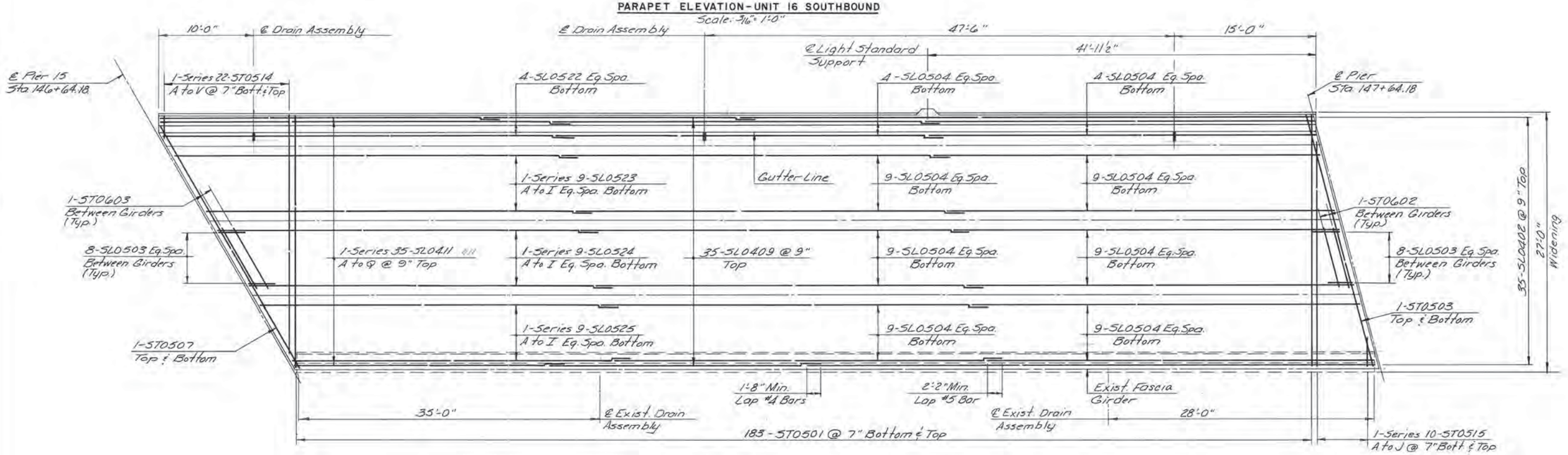
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 60 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	61	106



PARAPET ELEVATION - UNIT 16 SOUTHBOUND
Scale: 3/16" = 1'-0"



DECK PLAN - UNIT 16 SOUTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	3-87				
CHECKED	TRP	3-87		As Built	TEM	3-89
IN CHARGE S.R.						

AS BUILT

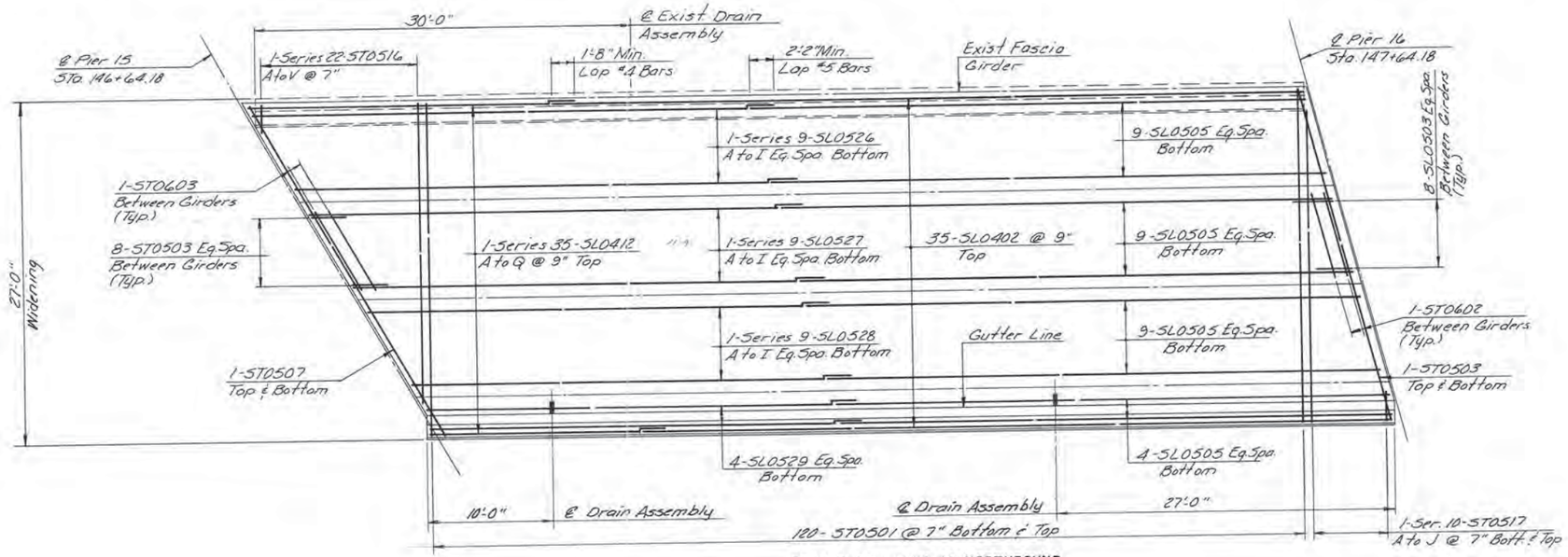
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 16 SOUTHBOUND

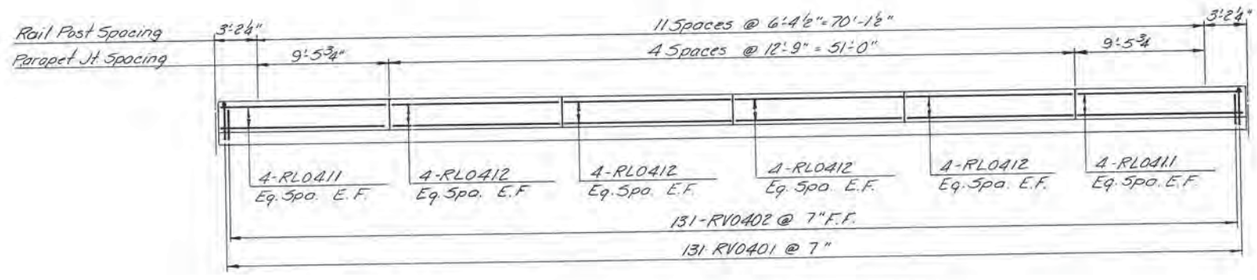
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO. C-13
SHEET NO. 61 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	62	106



DECK PLAN – UNIT 16 NORTHBOUND
Scale: 3/16" = 1'-0"



PARAPET ELEVATION – UNIT 16 NORTHBOUND
Scale: 3/16" = 1'-0"

	BY	DATE				
MADE	TAL	3-87				
CHECKED	TFP	3-87		As Built	TEM	3-89
IN CHARGE	S.R.		NO.	REVISION	BY	DATE

AS BUILT

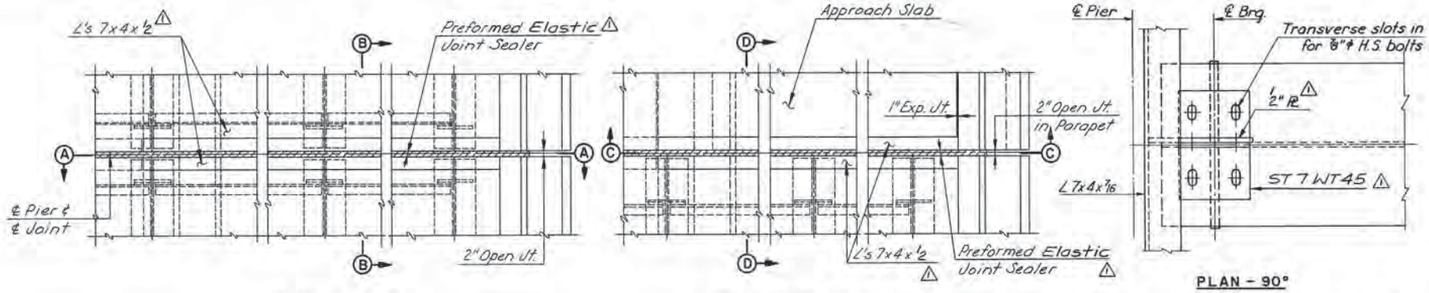
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DECK PLAN - UNIT 16 NORTHBOUND

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 62 OF 106

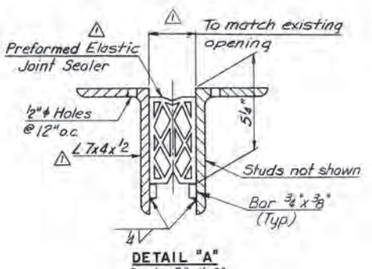
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	69	106



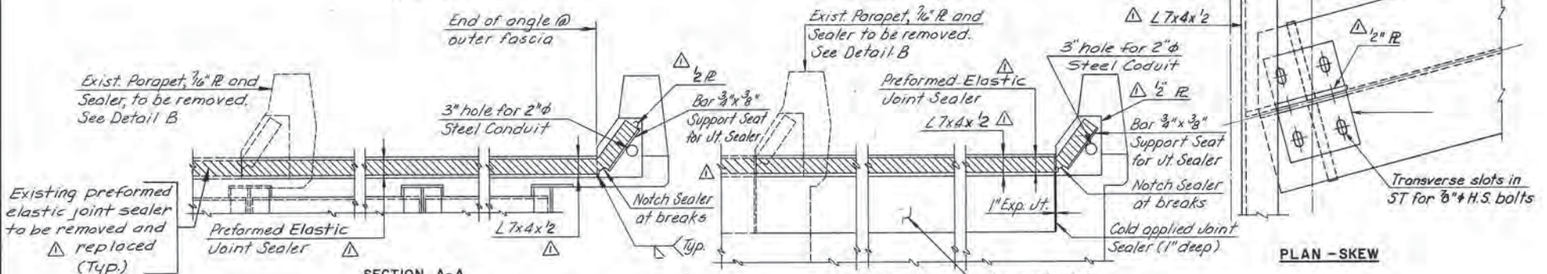
PLAN AT PIER
Scale: ½"=1'-0"

PLAN AT ABUTMENT
Scale: ½"=1'-0"

PLAN - 90°



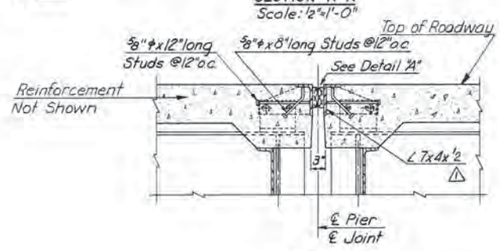
DETAIL "A"
Scale: 3"=1'-0"



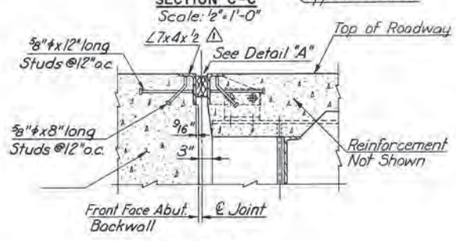
SECTION A-A
Scale: ½"=1'-0"

PLAN - SKEW

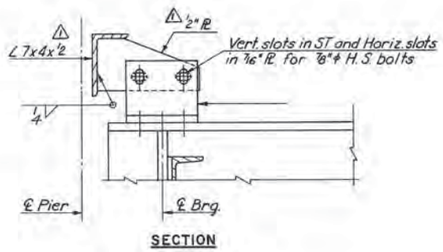
SECTION C-C
Scale: ½"=1'-0"



SECTION B-B
Scale: ¾"=1'-0"

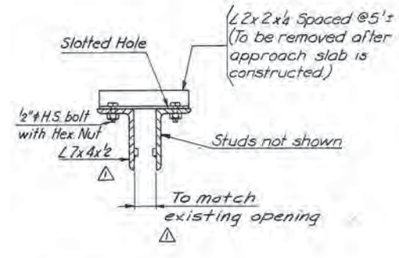


SECTION D-D
Scale: ¾"=1'-0"

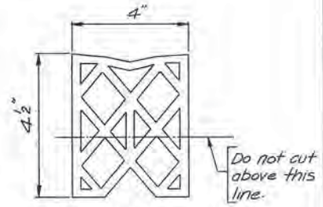


SECTION

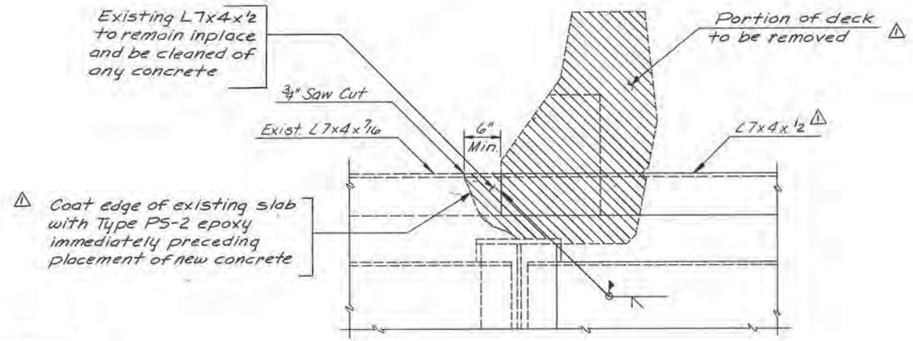
ANGLE SUPPORT DETAILS
Scale: 1½"=1'-0"



ANGLE SUPPORT AT ABUTMENT JOINTS
Scale: 1½"=1'-0"



PREFORMED ELASTIC JOINT SEALER
No Scale △



DETAIL B
Scale: 1"=1'-0"

	BY	DATE				
MADE	EUM	3-87		As Built	TEM	3-89
CHECKED	TFP	3-87	△	Revisions	ALC	5-87
IN CHARGE	SR		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO. C-13
SHEET NO. 69 OF 106

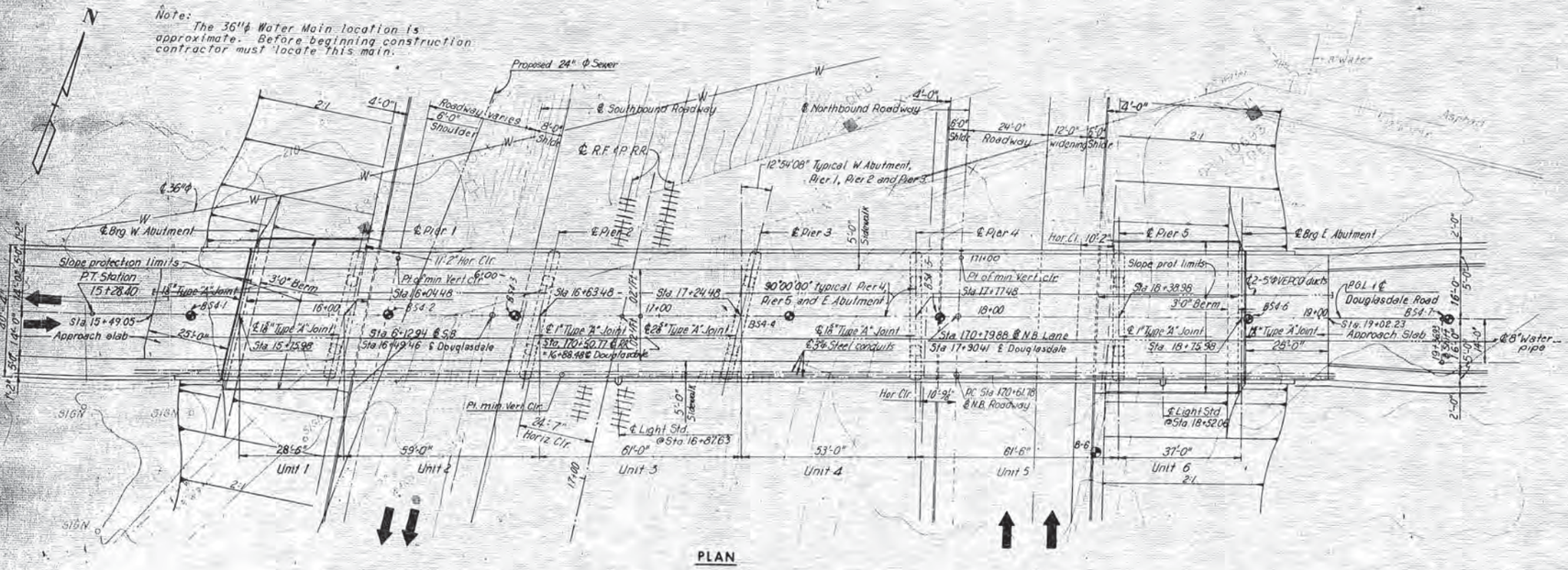
Bridge 13

(Douglasdale Road over I-195 Connector / Powhite Parkway - VA State Rte. 76 and CSX Railroad)

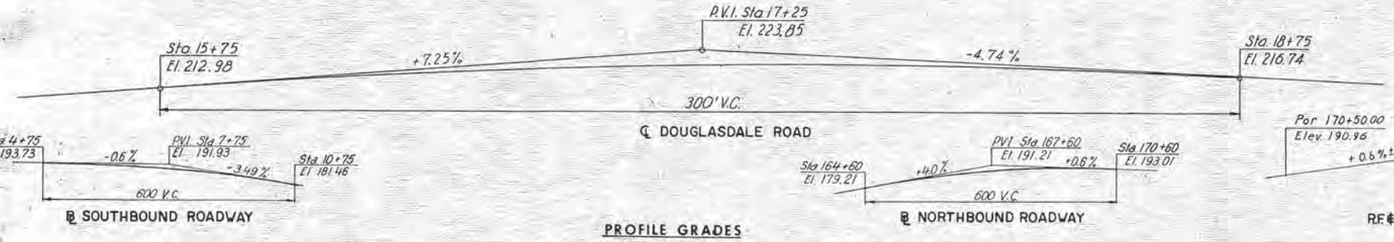
Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	118	153

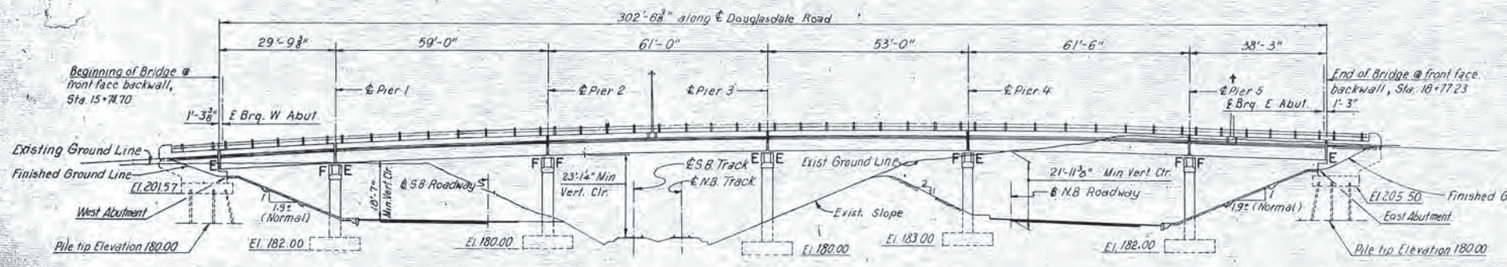
Note: The 36"ϕ Water Main location is approximate. Before beginning construction contractor must locate this main.

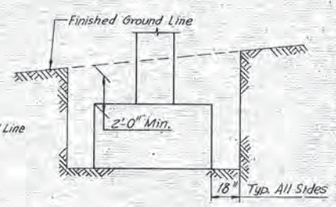


PLAN



PROFILE GRADES





LIMITS OF EXCAVATION

CURVE DATA

℄ Northbound Roadway
P.I. = Sta. 173+60.82
Δ = 17°47'52"
D = 3°00'00"
T = 299.04'
L = 593.26'
R = 1,909.86'

Note: Pile Tip Elevations shown estimated.

(a) Class A3, unless noted
(b) Class A4
* Frame and Cover only.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JV	3-4-68	3	Profile Grade	P.S.	4-8-71
CHECKED	MAA	3-6-68	2	General	J.G.V.	10-70
IN CHARGE	FKD		1	General Revisions	R.L.M.	3-1-68

ELEVATION

ESTIMATED QUANTITIES

	Struct. Excav. Cu. Yds.	Concrete (a) Cu. Yds.	Reinf. Steel lbs.	Str. Stl. Mild Curbon lbs.	Aluminum Railing (2-rails) Lin. Ft.	Porous Backfill Cu. Yds.	Under-drain 6" Dia. Pipe Lin. Ft.	Steel Piles 10BP42 Lin. Ft.	Con. Slab St. Prot. Sq. Yds.	Asphalt damp-proofing Sq. Yds.	Approach Slab Conc. (a) Cu. Yds.	Metal Conduit Lin. Ft. 2"Dia	Metal Conduit Lin. Ft. 3"Dia	Conduit 5"Dia VEP-40 Lin. Ft.	Water Main 8"Dia Lin. Ft.	*Junction Box Lbs
Superstructure	—	464.8(b)	87,170	333,000	650	—	—	—	—	—	—	7	914	704	358	360
West Abutment	130	80.0	13,500	—	—	5.2	50	307	193.3	21	40.4	—	—	—	—	—
Pier 1	185	65.1	10,220	—	—	—	—	—	—	—	—	—	—	—	—	—
Pier 2	119	67.5	11,120	—	—	—	—	—	—	—	—	—	—	—	—	—
Pier 3	204	67.9	11,400	—	—	—	—	—	—	—	—	—	—	—	—	—
Pier 4	171	66.4	10,740	—	—	—	—	—	—	—	—	—	—	—	—	—
Pier 5	156	66.6	10,690	—	—	—	—	—	—	—	—	—	—	—	—	—
East Abutment	126	77.5	13,100	—	—	4.8	49	358	239.7	25	39.4	—	—	—	—	—
TOTAL	1091	464.8(b) 491.0	167,940	333,000	650	10	99	665	433	52	79.8	7	914	704	358	360

GENERAL NOTES

ROADWAY: One 28'-0" clear roadway. Two 5'-0" sidewalks.

CAPACITY: Dead Load includes 15 lbs. per sq. ft. for future wearing surface.
Live Loads - HS20-44 loading.

SPECIFICATIONS:
GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970.
DESIGN: A.A.S.H.O. Standard Specifications for Highway Bridges 1961, modified by Special Design Provisions.
WELDING: 1969 Standard Specifications for Welded Highway and Railway Bridges of the American Welding Society.

CONTRACT SPECIAL PROVISIONS
Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM: City of Richmond

TEMPERATURE: The normal temperature referred to on the plan is 68°F. The temperature range for movement is 0°F to 120°F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be dry and special attention is called to Section 401.05 of General Specifications and to the Contract Special Provisions, concerning preparation of foundations for footings.

CONCRETE NOTES: Concrete in superstructure shall be Class A4. All other concrete shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, the use of low-slump concrete, and or other means shall be employed to prevent downgrade movement of newly placed slab concrete.
Finishing Concrete Surfaces: See the Standard Architectural Detail Sheets and the Contract Special Provisions for types and details.

All reinforcing steel shall conform to A.S.T.M. A615, Grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Specification A36 except as noted.
All field connections shall be made with high strength bolts. High strength bolts shall be ¾" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A 325.

BENCH MARK: A-16 Copperweld rod N.W. of R.R. Bridge on Douglasdale. Elev. 213.60

⊕ Boring, denotes 2½"ϕ Cased hole

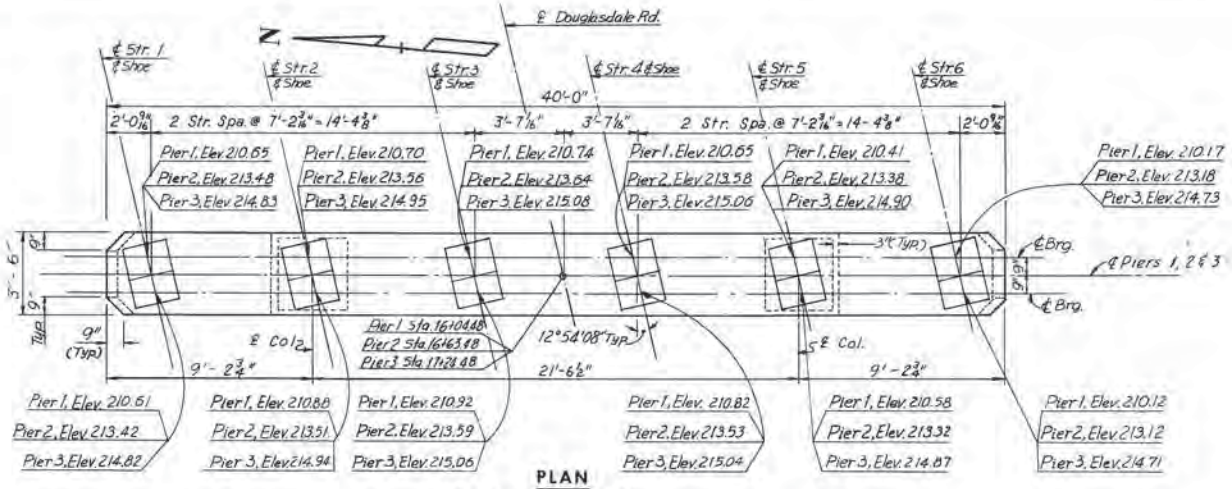
INDEX

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO 13
DOUGLASDALE ROAD OVER
BELTLINE EXPRESSWAY AND R.F.&P.R.R.
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

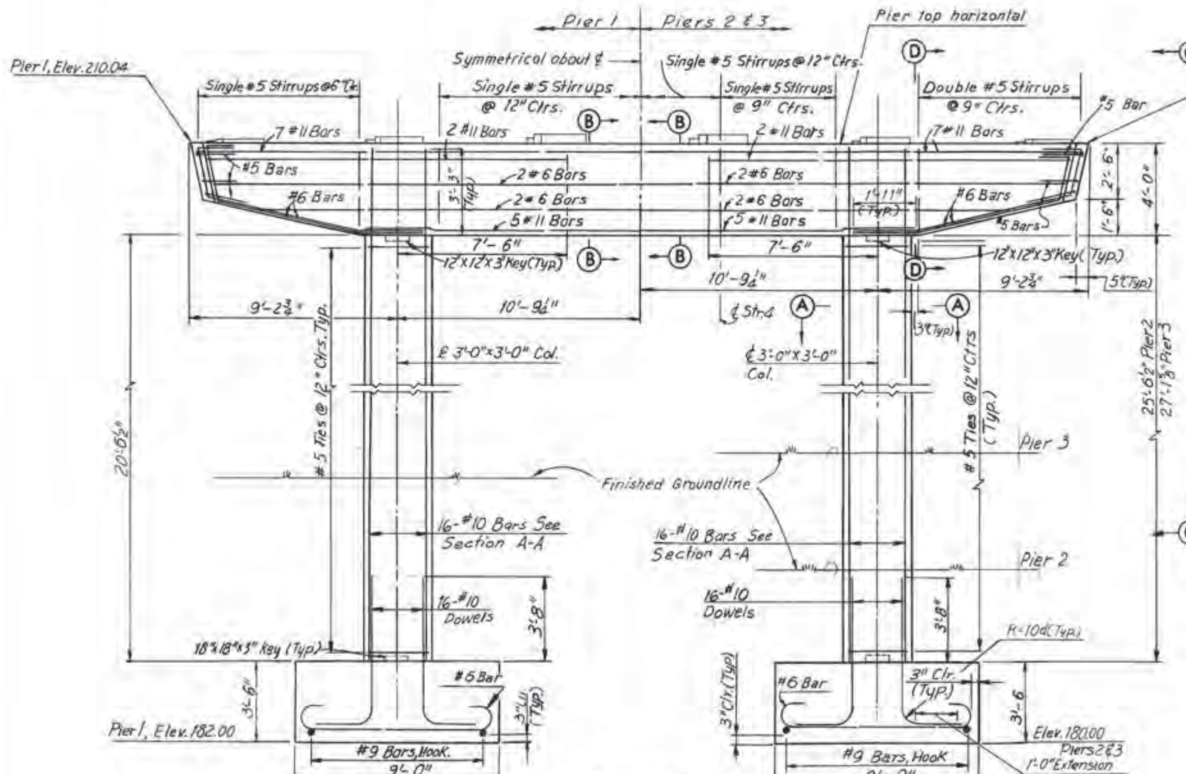
SCALE: 1"=20'
CONTRACT NO. 9
SHEET NO. 1 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	121	155



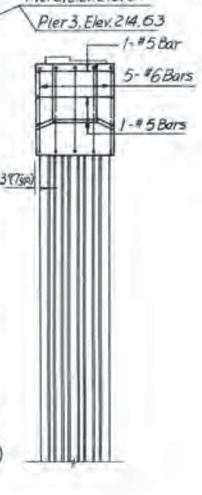
PLAN

Scale: 1/4" = 1'-0"

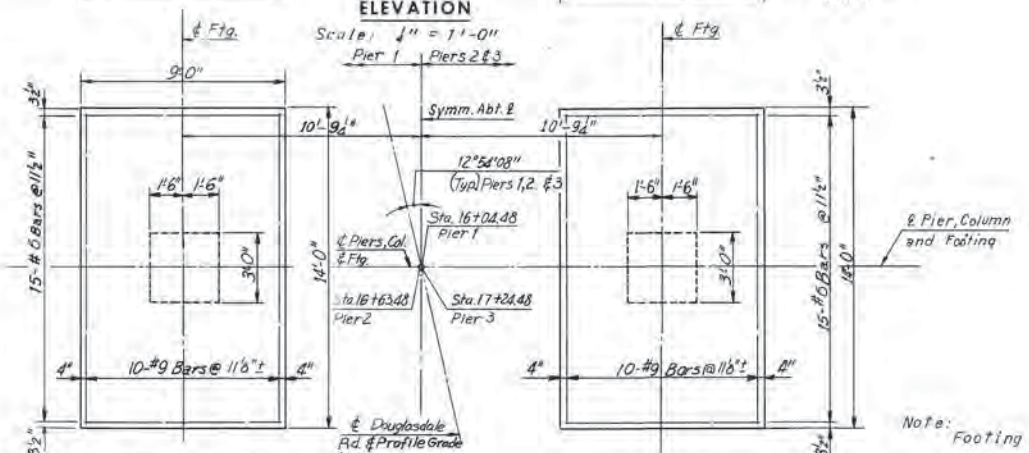


ELEVATION

Scale: 1/4" = 1'-0"



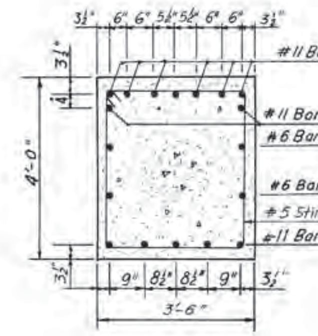
VIEW C-C



FOOTING PLAN

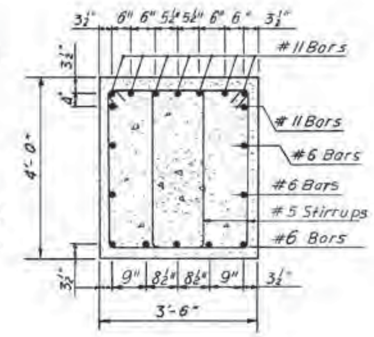
Scale: 1/4" = 1'-0"

Note:
Footing elevations are exact.



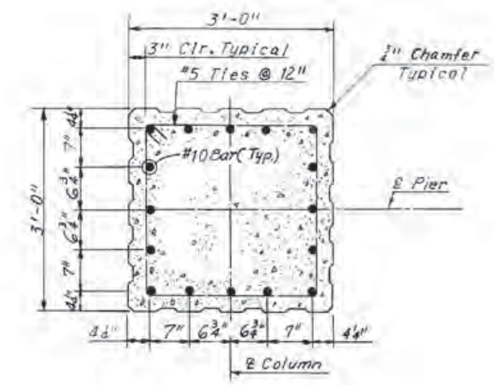
SECTION B-B

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



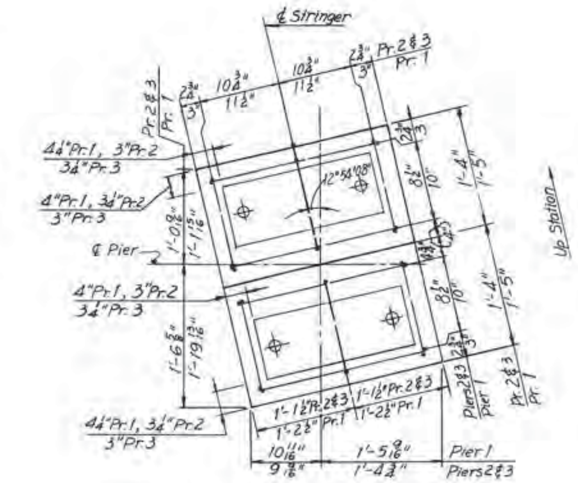
SECTION D-D

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



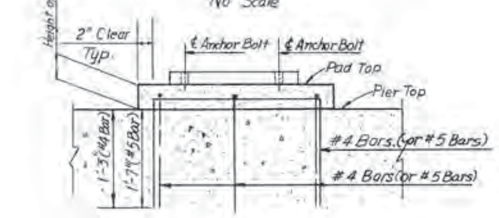
SECTION A-A

Scale: 1/4" = 1'-0"



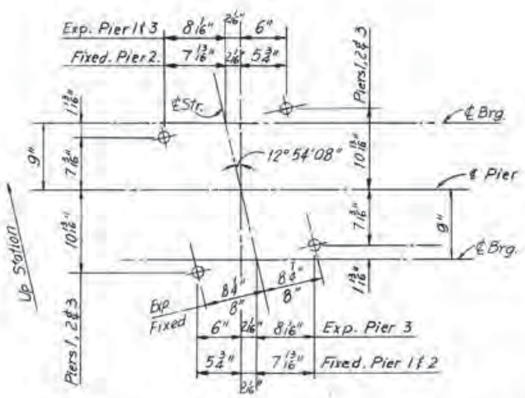
PLAN

No Scale



REINFORCED PAD DETAIL

No Scale



ANCHOR BOLT SETTING PLAN

No Scale

Note:
Pads with heights of 4" or less shall not be reinforced.
Pads with heights between 4" and 6" use # 4 bar.
Pads with heights between 8" and 12" use # 5 bar.

Notes:
For shoe details see Sheet S1.
For Framing Plan see Sheet 6.

AS BUILT

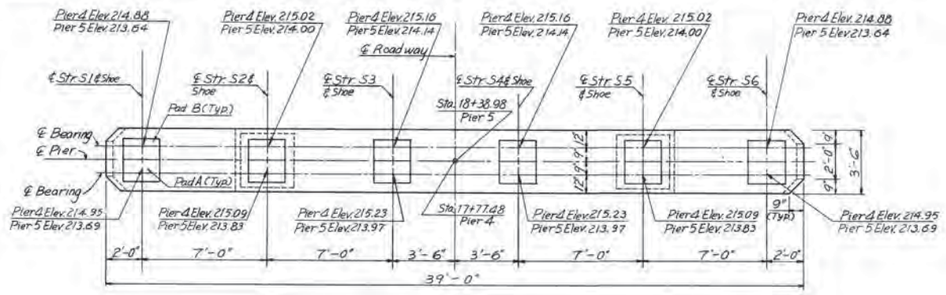
	BY	DATE	NO.	REVISION	BY	DATE
MADE	M.A.A	9-29-61	2	As Builts	R.H.	2-2-73
CHECKED	SSW	3-6-68	1	Profile Grade	P.S.	4-7-71
IN CHARGE	FKD					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO 13
DOUGLASDALE ROAD OVER
BELTLINE EXPRESSWAY AND R.F.&P.R.R.
PIERS 1, 2 AND 3

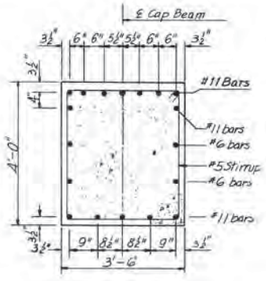
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 4 OF 12

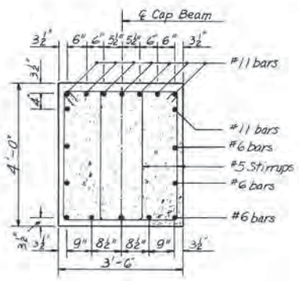
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	122	155



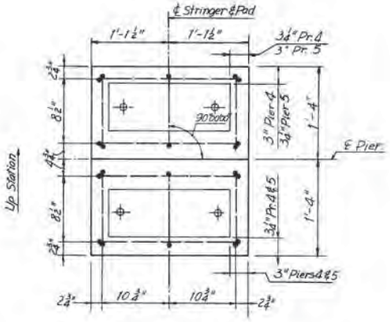
PLAN
Scale: 1" = 1'-0"



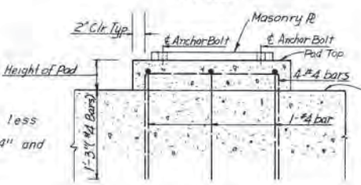
SECTION B-B
Scale: 1" = 1'-0"



SECTION D-D
Scale: 1" = 1'-0"

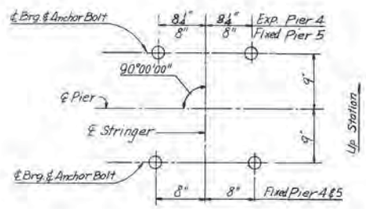


PLAN
No Scale

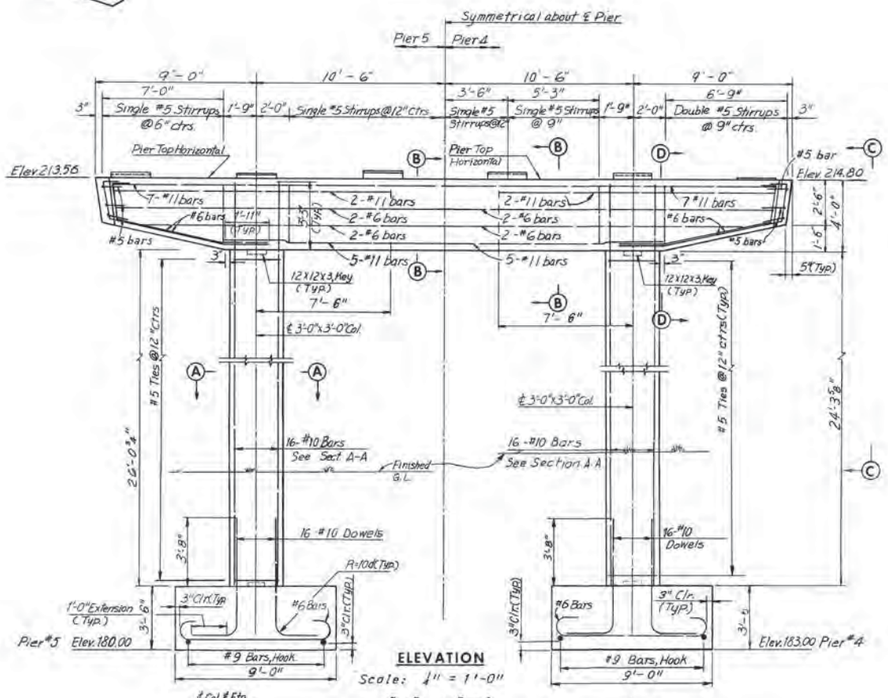


Note: Pads with heights of 4" or less shall not be reinforced. Pads with heights between 4" and 8" use #4 bar.

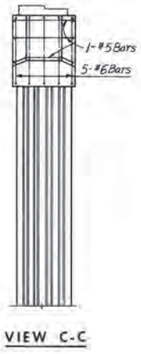
REINFORCED PAD DETAILS
No Scale



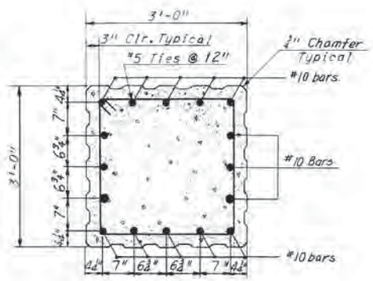
ANCHOR BOLT SETTING PLAN
No Scale



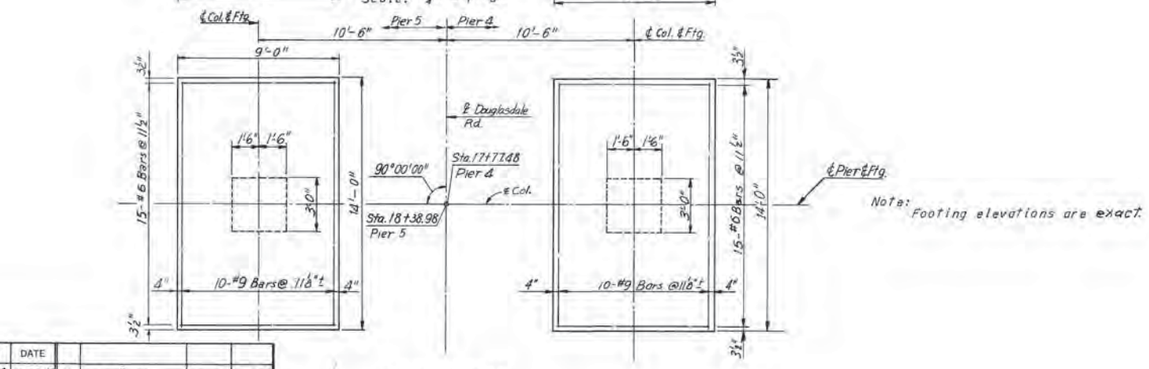
ELEVATION
Scale: 1" = 1'-0"



VIEW C-C



SECTION A-A
Scale: 1" = 1'-0"



FOOTING PLAN
Scale: 1" = 1'-0"

Note: Footing elevations are exact.

AS BUILT

Notes:
For shoe details see Sheet S1.
For Framing Plan see Sheet 6.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.C.C.	9-30-69	2	As Builts	R.H.	2-2-73
CHECKED	S.S.W.	2-1968	1	Profile Grade	P.S.	4-7-71
IN CHARGE	F.K.D.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

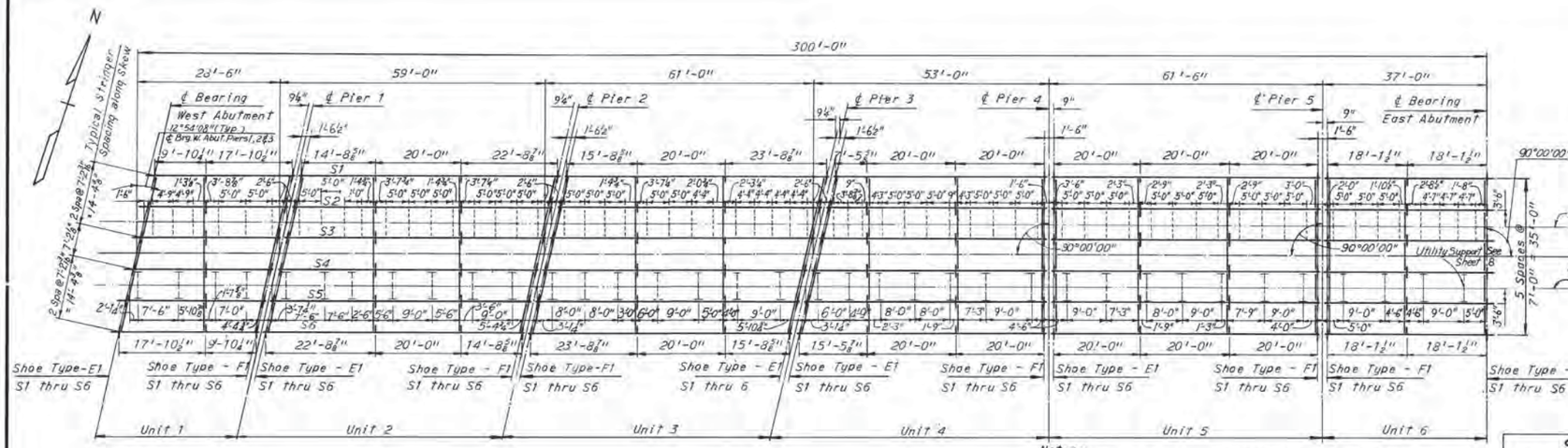
BRIDGE NO 13
DOUGLASDALE ROAD OVER
BELTLINE EXPRESSWAY AND R.F.&P.R.R.

PIERS 4 AND 5

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 4
SHEET NO: 5 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	123	155

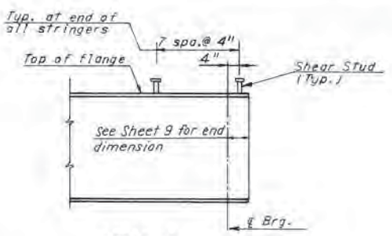


FRAMING PLAN

Scale: 1" = 15'-0"

Notes:
For Superstructure Quantities see Sheet 1.
For Framing details see Sheets 7 and 8.
For details of utility supports see Sheet 8.
For Joint Details see Sheet 9.
For standard details of 5"ϕ VEPCO ducts see Sheet S11.
For dimensions, and location of pipe sleeve for 8"ϕ Water pipe thru backwalls, see Abutment Plans Sheets 2 and 3.
For additional details of 8"ϕ Water Pipe see Sheet S10

SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E1	36	F1	36

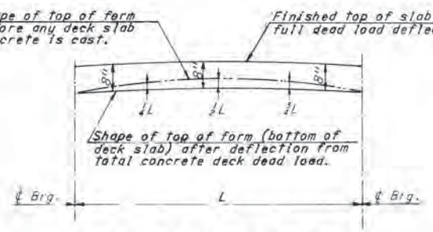


DETAIL A

No Scale

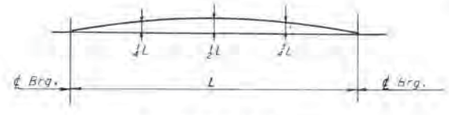
SHEAR STUD NOTE

Capacity = 3,400 lbs. per stud.
The contractor may, if he elects, use three ¾" diameter studs at the same longitudinal spacing in lieu of the four ¾" diameter studs shown.
Stud rows shall be placed parallel to the main deck reinforcing.
Shear stud spacing shown is maximum spacing.



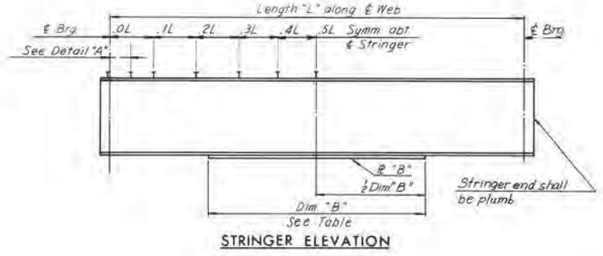
DEAD LOAD DEFLECTION DIAGRAM

No Scale

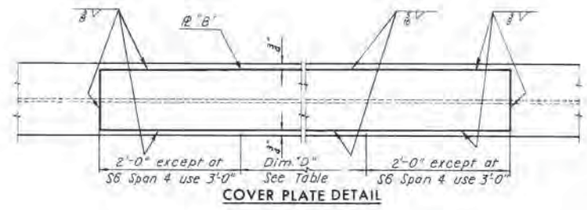


CAMBER DIAGRAM

No Scale



STRINGER ELEVATION

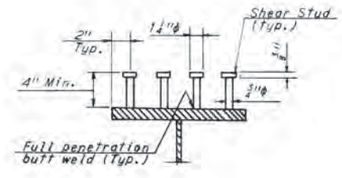


COVER PLATE DETAIL

* ... Spacing begins at the termination of 7 spaces at 4" ctrs.

DEAD LOAD DEFLECTION SCHEDULE												
	UNIT 1		UNIT 2		UNIT 3		UNIT 4		UNIT 5		UNIT 6	
STRINGER	¼L ¾L	½L	¼L ¾L	½L	¼L ¾L	½L	¼L ¾L	½L	¼L ¾L	½L	¼L ¾L	½L
S1	1/16"	1/8"	5/16"	13/16"	1/16"	1"	1/4"	7/8"	1/16"	1 1/16"	1/8"	3/16"
S2	1/16"	1/8"	3/16"	13/16"	1/16"	15/16"	1/8"	1"	1/16"	1"	1/16"	1/8"
S3	1/16"	1/8"	3/16"	13/16"	1/16"	15/16"	1/8"	1"	1/16"	1"	1/8"	1/8"
S4	1/16"	1/8"	3/16"	13/16"	1/16"	15/16"	1/8"	1"	1/16"	1"	1/8"	1/8"
S5	1/16"	1/8"	3/16"	13/16"	1/16"	15/16"	1/8"	1 1/16"	1/16"	1"	1/16"	1/8"
S6	1/16"	1/8"	1/16"	15/16"	1/16"	1"	1/16"	1 1/16"	1/16"	1 1/16"	1/16"	3/16"

STRINGER SCHEDULE												
UNIT	STRINGER	LENGTH "L"	STRINGER SIZE	℄ "B"	DIM. "B"	DIM. "D"	SHEAR STUD SPACING .0L-.1L *	.1L-.2L	.2L-.3L	.3L-.4L	.4L-.5L	CAMBER SCHEDULE ¼L	½L	¾L
1	S1 & S6	27'-8 1/2"	36WF135	—	—	—	9 1/2"	11"	13 1/2"	16 1/2"	22"	1/16"	1/16"	1/16"
	S2 & S5	27'-8 1/2"	33 WF 118	—	—	—	9 1/2"	11"	13 1/2"	16 1/2"	22"	1/16"	1/16"	1/16"
	S3 & S4	27'-8 1/2"	33 WF 118	—	—	—	9 1/2"	11"	13 1/2"	16 1/2"	22"	1/16"	1/16"	1/16"
2	S1 & S6	57'-5 1/2"	36 WF 135	10 1/2 x 3/4	43'-2"	39'-2"	8"	9 1/2"	11 1/2"	14"	18 1/2"	2 3/8"	3 1/16"	2 3/8"
	S2 & S5	57'-5 1/2"	36 WF 135	10 1/2 x 3/4	43'-2"	39'-2"	8"	9 1/2"	11 1/2"	14"	18 1/2"	2 3/8"	2 7/16"	2 3/8"
	S3 & S4	57'-5 1/2"	36 WF 135	10 1/2 x 3/4	43'-2"	39'-2"	8"	9 1/2"	11 1/2"	14"	18 1/2"	2 3/8"	2 7/16"	2 3/8"
3	S1 & S6	59'-5 1/2"	36 WF 135	10 1/2 x 3/4	44'-8"	40'-8"	8"	9 1/2"	11 1/2"	14"	18 1/2"	2 3/8"	3 1/16"	2 3/8"
	S2 & S5	59'-5 1/2"	36 WF 135	10 1/2 x 3/4	44'-8"	40'-8"	8"	9 1/2"	11 1/2"	14"	18 1/2"	2 3/8"	3 3/16"	2 3/8"
	S3 & S4	59'-5 1/2"	36 WF 135	10 1/2 x 3/4	44'-8"	40'-8"	8"	9 1/2"	11 1/2"	14"	18 1/2"	2 3/8"	3 1/16"	2 3/8"
4	S1	47'-5 1/2"	36 WF 135	10 1/2 x 1/2	35'-8"	31'-8"	8"	9"	11"	14"	18 1/2"	1 7/16"	1 7/16"	1 7/16"
	S2	49'-0 1/2"	36 WF 135	10 1/2 x 1/2	36'-10"	32'-10"	8"	9"	11"	14"	18 1/2"	1 7/16"	2"	1 7/16"
	S3	50'-8 1/2"	36 WF 135	10 1/2 x 5/8	38'-1"	34'-1"	8"	9"	11"	14"	18 1/2"	1 9/16"	2 1/16"	1 9/16"
	S4	52'-3 1/2"	36 WF 135	10 1/2 x 3/4	39'-3"	35'-3"	8"	9"	11"	14"	18 1/2"	1 5/8"	2 3/16"	1 5/8"
	S5	53'-10 1/2"	36 WF 135	10 1/2 x 3/4	40'-5"	36'-5"	8"	9"	11"	14"	18 1/2"	1 3/4"	2 5/16"	1 3/4"
	S6	55'-5 1/2"	36 WF 135	10 1/2 x 1	41'-8"	35'-8"	8"	9"	11"	14"	18 1/2"	1 15/16"	2 7/16"	1 15/16"
5	S1 & S6	60'-0"	36 WF 135	10 1/2 x 3/4	45'-0"	41'-0"	8"	9 1/2"	11 1/2"	14"	18 1/2"	2 3/8"	3 5/16"	2 3/8"
	S2 & S5	60'-0"	36 WF 135	10 1/2 x 3/4	45'-0"	41'-0"	8"	9 1/2"	11 1/2"	14"	18 1/2"	2 3/8"	3 1/4"	2 3/8"
	S3 & S4	60'-0"	36 WF 135	10 1/2 x 3/4	45'-0"	41'-0"	8"	9 1/2"	11 1/2"	14"	18 1/2"	2 3/8"	3 1/4"	2 3/8"
6	S1 & S6	36'-3"	36 WF 135	—	—	—	9 1/2"	11"	13 1/2"	16 1/2"	22"	1/4"	1/16"	1/4"
	S2 & S5	36'-3"	33 WF 118	—	—	—	9 1/2"	11"	13 1/2"	16 1/2"	22"	3/16"	1/16"	3/16"
	S3 & S4	36'-3"	33 WF 118	—	—	—	9 1/2"	11"	13 1/2"	16 1/2"	22"	3/16"	1/16"	3/16"



SHEAR STUD DETAIL

No Scale

AS BUILT

	BY	DATE
MADE	A.H.H	11-20-67
CHECKED	S.S.W.	2-8-68
IN CHARGE	F.K.D.	

NO.	REVISION	BY	DATE
4	As Builts	R.H.	2-2-73
3	Profile Grade	P.S.	4-7-71
2	General		10-70
1	General Revisions	M.H.H	3-12-68

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber diagram.
If stringers are not cambered distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber diagram, and with a minimum distance as shown in cross-section on Sheet 7.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

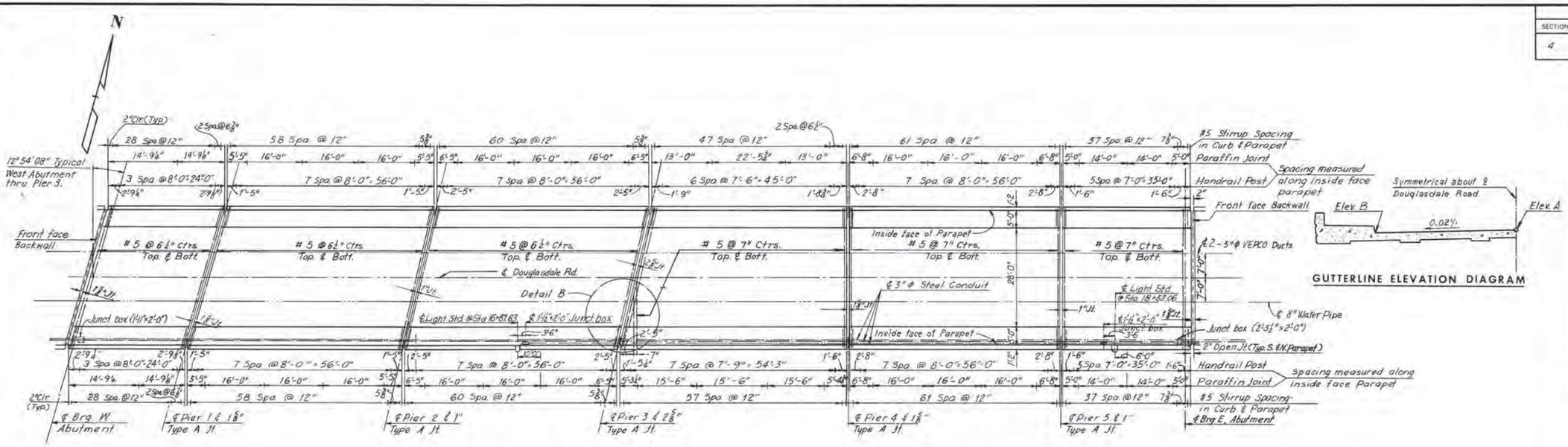
BRIDGE NO 13
DOUGLASDALE ROAD OVER
BELTLINE EXPRESSWAY AND R.F.&P.R.R.

FRAMING PLAN

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 4
SHEET NO. 6 OF 12

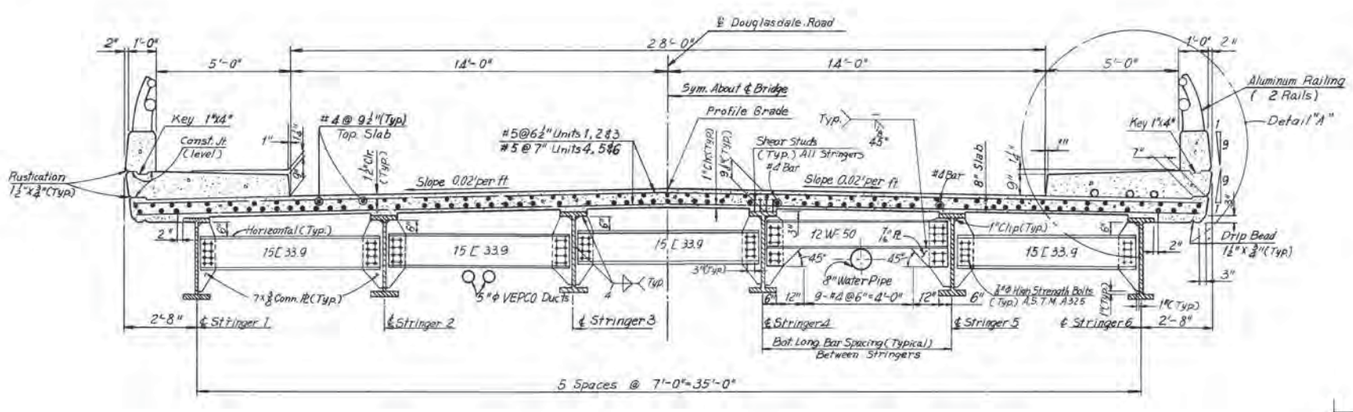
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	124	155



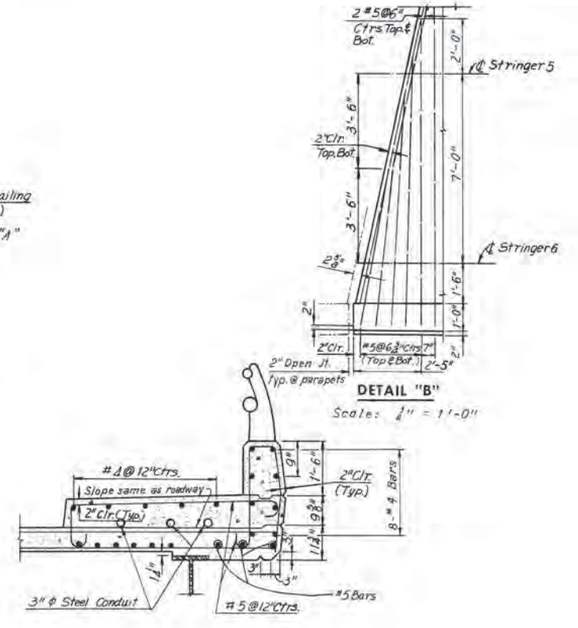
DECK PLAN
Scale: 1/16" = 1'-0"

Note:
For reinforcing steel at joints see Sheet 9 Joint details.

TABLE OF ELEVATIONS		
STATION	ELEV. A	ELEV. B
15+50.00	211.17	210.89
60.00	211.89	211.61
70.00	212.62	212.34
71.49	——	212.45
74.70	212.96	——
77.91	——	212.92
80.00	213.34	213.06
90.00	214.03	213.75
16+00.00	214.67	214.39
01.28	——	214.47
04.48	214.95	——
07.69	——	214.86
10.00	215.28	215.00
20.00	215.84	215.56
30.00	216.37	216.09
40.00	216.85	216.57
50.00	217.30	217.02
60.00	217.70	217.42
60.28	——	217.43
63.48	217.83	——
66.69	——	217.67
70.00	218.07	217.79
80.00	218.40	218.12
90.00	218.68	218.40
17+00.00	218.93	218.65
10.00	219.13	218.85
20.00	219.30	219.02
21.28	——	219.03
24.48	219.36	——
27.69	——	219.12
30.00	219.42	219.14
40.00	219.51	219.23
50.00	219.55	219.27
60.00	219.56	219.28
70.00	219.52	219.24
77.48	219.47	219.19
80.00	219.45	219.17
90.00	219.33	219.05
18+00.00	219.18	218.90
10.00	218.99	218.71
20.00	218.75	218.47
30.00	218.48	218.20
38.98	218.20	217.92
40.00	218.16	217.88
50.00	217.81	217.53
60.00	217.42	217.14
70.00	216.97	216.69
77.23	216.63	216.35
80.00	216.50	216.22
90.00	216.03	215.75
19+00.00	215.55	215.27



TYPICAL CROSS SECTION
INTERMEDIATE DIAPHRAGM
Scale: ¾"= 1'-0"



DETAIL "B"
Scale: ½" = 1'-0"

DETAIL "A"
Scale: ½" = 1'-0"

Notes:
For Superstructure Quantities see Sheet 1.
For Framing and Utility support details see Sheet 8.
For Joint details see Sheet 9.
For Lighting details see Sheet 54.
For details of transmission ducts see Sheet 54.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AHH	12-9-69	3	As Builts	R.H.	2-5-73
CHECKED	BSW	2-8-69	2	Profile Grade	L.B.P.	4-6-71
IN CHARGE	FKD		1	General Revisions	MHH	3-12-68

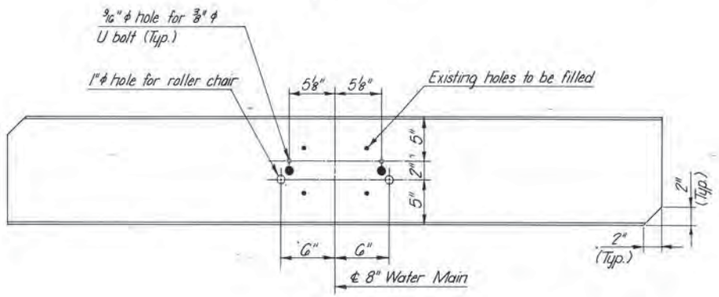
ASSBUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO 13
DOUGLASDALE ROAD OVER
BELTLINE EXPRESSWAY AND R.F.&P.R.R.
DECK PLAN

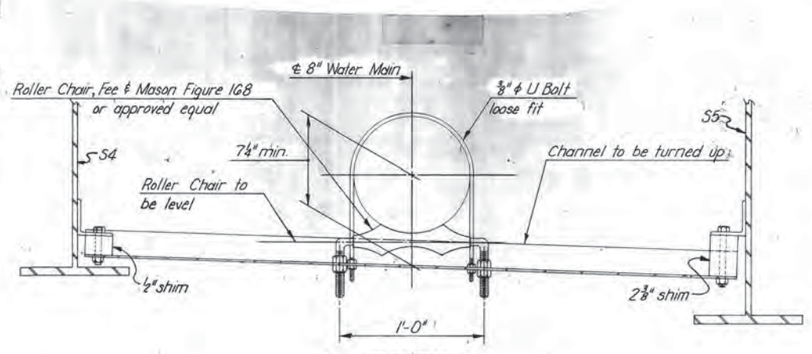
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE As Noted
CONTRACT NO. 4
SHEET NO. 7 OF 12

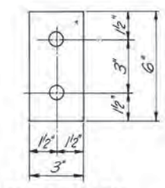
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	1 A5A	1



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



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



SHIM DETAIL
Scale: 3" = 1'-0"

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE						
CHECKED			1	AS BUILTS	RH	2-5-73
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

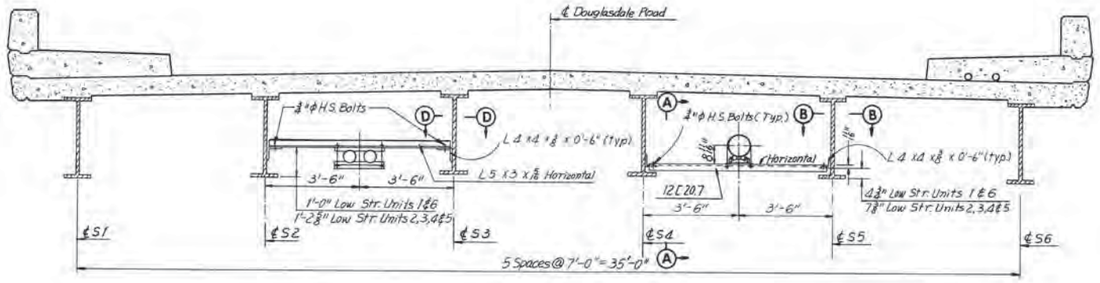
BRIDGE NO. 13
DOUGLASDALE ROAD OVER
BELTLINE EXPRESSWAY AND R.F. & P. R.R.
WATER MAIN SUPPORT DIAPHRAGMS
UNITS 1 & 6

SCALE: AS SHOWN
CONTRACT NO.: 4
SHEET NO. 8A OF 12

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

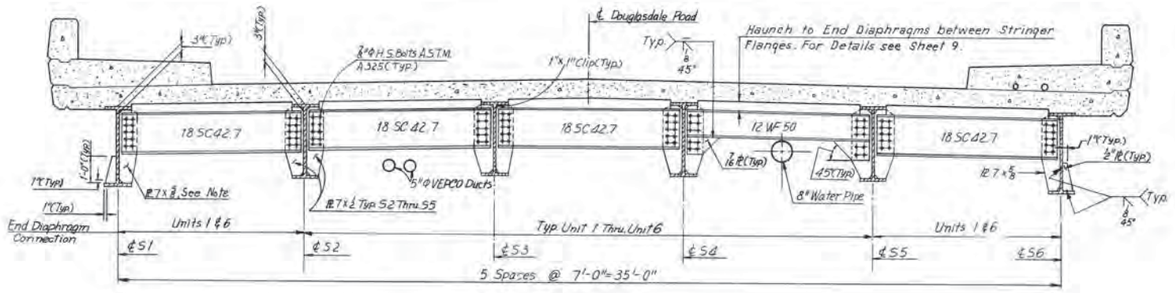
AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	125	155



UTILITY SUPPORTS
TYPICAL SECTION BETWEEN DIAPHRAGMS

Scale : ⅜" = 1'-0"

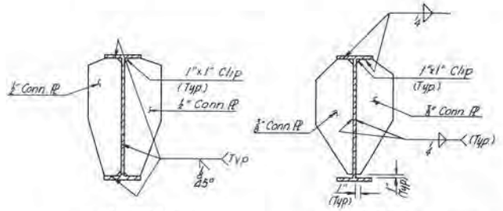


CROSS SECTION
END DIAPHRAGMS

Scale : ⅜" = 1'-0"

Note: For Intermediate diaphragms see Sheet 7.

Note: End diaphragms and connection plates shown above are typical for all units with the following exceptions:
7½" x ⅞" Bearing and connection plates on exterior stringers with 2 rows of 5 bolts as shown for Units 1 and 6, to be replaced by 10" x ⅞" plate with 3 rows of 5 bolts for Units 2 through 5, see Detail A below.

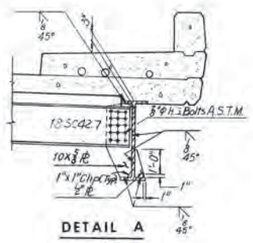


TYPICAL END DIAPHRAGM CONNECTOR PLATE INTERIOR STRINGER

No Scale

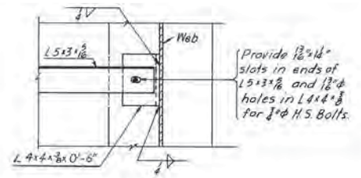
TYPICAL INTERMEDIATE DIAPHRAGM CONNECTOR PLATE

No Scale

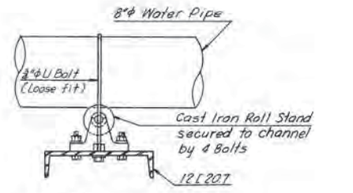


DETAIL A

Scale : ⅜" = 1'-0"
(Units 2 thru 5)

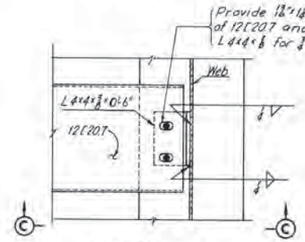


SECTION D-D
No Scale

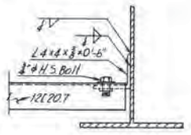


SECTION A-A
No Scale

Note:
Provide ⅜" Clr. between ¾" U Bolt and 8" ϕ Pipe.

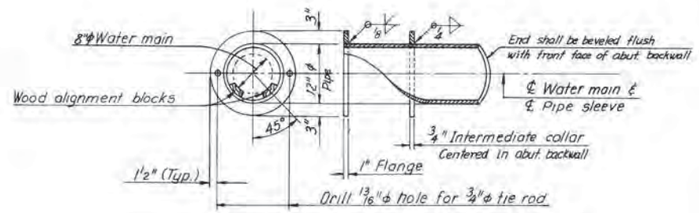


SECTION B-B
No Scale



SECTION C-C
No Scale

Note:
For spacing of Utility supports see Framing Plan Sheet 6.



Note: Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR WATER MAIN
No Scale

Note: For location and additional sleeve dimensions of 8"ϕ Water pipe see Abutment Plans Sheets 2 and 3.

	BY	DATE				
MADE	AMH	11-27-67	2	As Builts	RH	2-5-73
CHECKED	SSW	2-14-68	1	General Revisions	MHH	3-12-68
IN CHARGE	FKD		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO 13
DOUGLASDALE ROAD OVER BELTLINE EXPRESSWAY AND R.F.&P.R.R.
FRAMING DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 4
SHEET NO. 8 OF 12

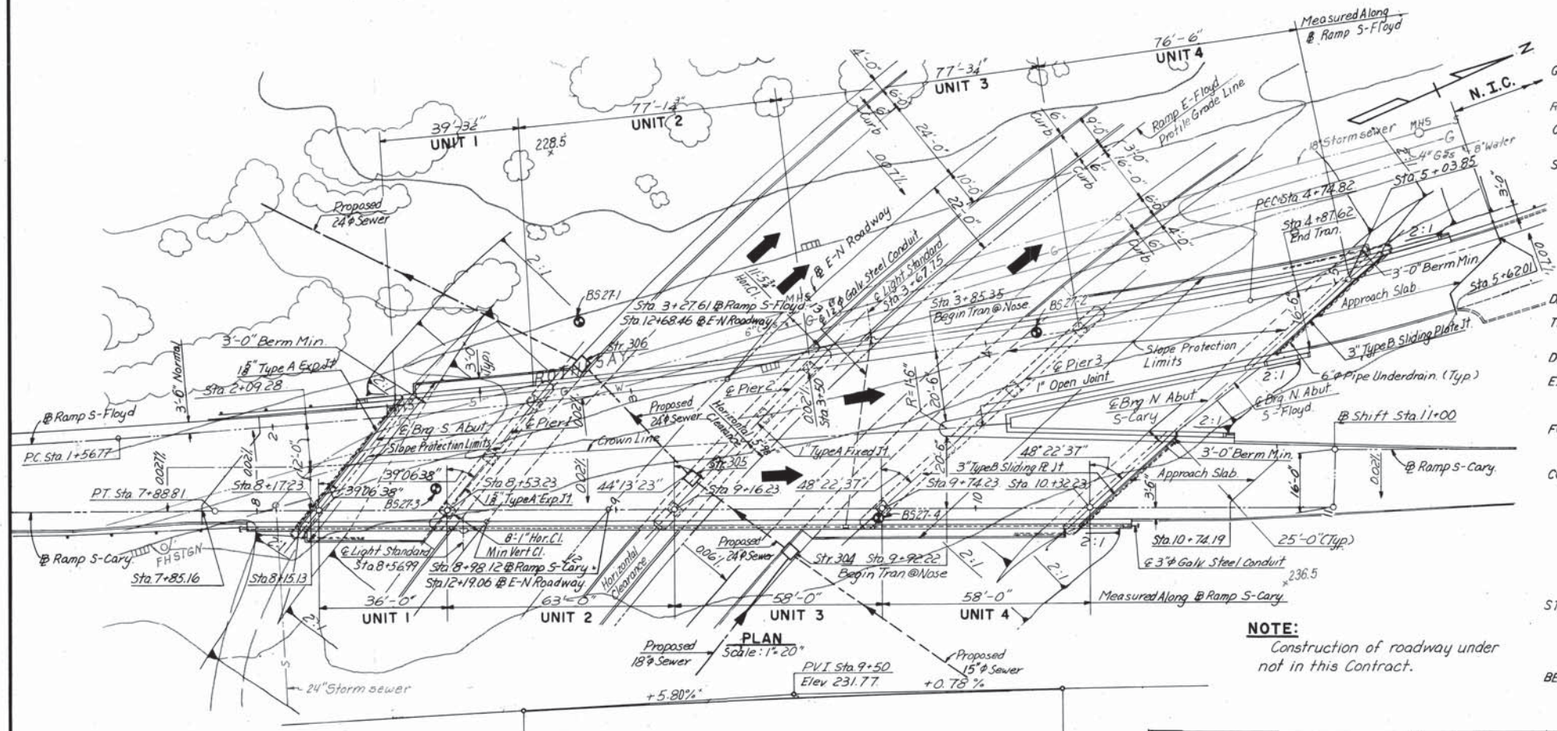
AS BUILT

Bridge 17

(Ramp from NB Powhite Parkway over NB I-195 to Cary Street and to Floyd Ave.)

Record Set Plans

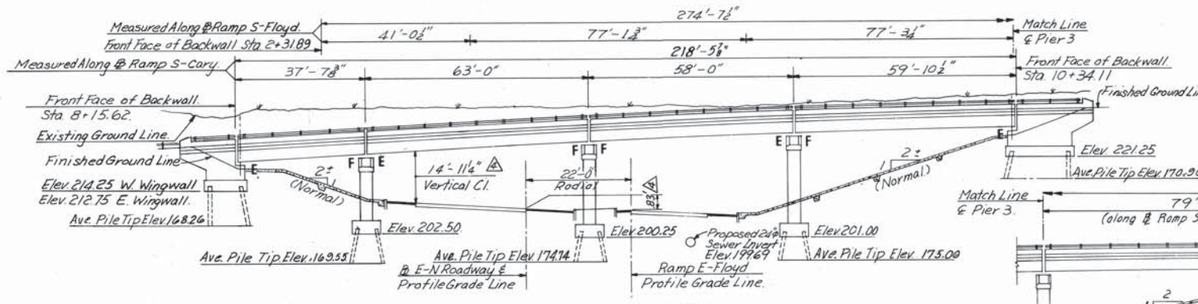
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	130	155



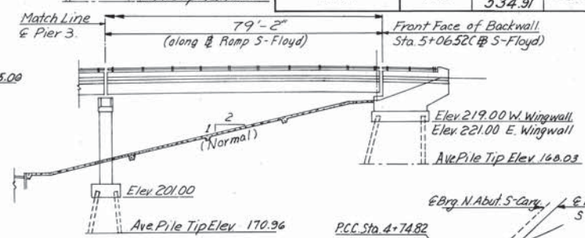
NOTE:
Construction of roadway under not in this Contract.

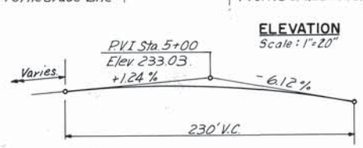
Boring, denotes 2½"ϕ Cased Hole

PROFILE GRADE ℄ RAMP S-CARY

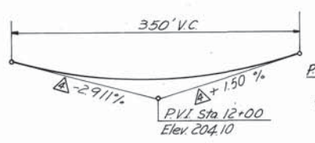


ELEVATION
Scale: 1"=20'

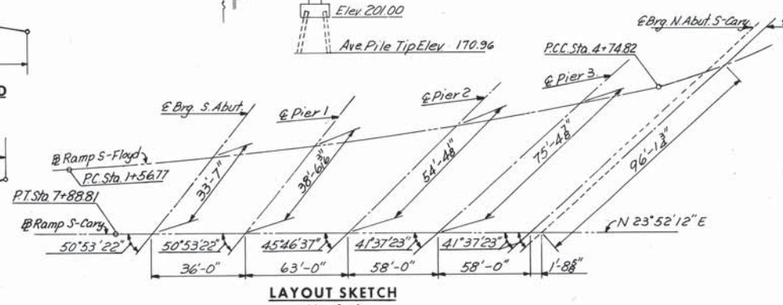




PROFILE GRADE ℄ RAMP S-FLOYD



PROFILE GRADE ℄ E-N ROADWAY



LAYOUT SKETCH
No Scale.

GENERAL NOTES

ROADWAY CAPACITY: Variable width of roadway.
Dead Load includes 15 lbs. per sq. ft. for future wearing surface.

SPECIFICATIONS:
GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970.
DESIGN: A.A.S.H.O. Standard Specifications for Highway Bridges 1961, modified by Special Design provisions.
WELDING: 1969 Standard Specifications for Welded Highway and Railway Bridges of the American Welding Society.

CONTRACT SPECIAL PROVISIONS
Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM: City of Richmond

TEMPERATURE: The normal temperature referred to on the plan is 68°F. The temperature range for movement is 0°F to 120°F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATIONS: Piles shall be driven to a minimum length corresponding to the approximate tip elevations shown on the Plans but in no case to less than a penetration affording the required safe bearing capacity noted on the Plans.

CONCRETE NOTES: Concrete in superstructure shall be Class A4. All other concrete shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, the use of low-slump concrete, and or other means shall be employed to prevent downgrade movement of newly placed slab concrete.

STEEL NOTES: All reinforcing steel shall conform to A.S.T.M. A-615, Grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted.
Structural steel shall conform to A.S.T.M. Specification A36 except as noted. All field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M Specification A-325.

BENCH MARK: A-25 Copperweld rod S.-side of Thompson St. and Cary Road. Elev. 236.59.

ESTIMATED QUANTITIES

Str. Stl. High Strength lbs. A588		Struct. Excav. Cu. Yds.	Concrete (a) Cu. Yds.	Reinf. Steel Lbs.	Str. Stl. Mild Carbon Lbs.	Aluminum railing (1-Rail) Lin. Ft.	Porous Backfill Cu. Yds.	Under-drain 6" Dia. Pipe Lin. Ft.	Con. Slab Sl. Prot. Sq. Yds.	Asphalt damp-proofing Sq. Yds.	Approach Slab Conc. (a) Cu. Yds.	Steel Piles 10BP42 Lin. Ft.	Parapet Junct. Box Complete Each	Metal Conduit 3" Dia. Lin. Ft.	Metal Conduit 1½" Dia. Lin. Ft.
11,561.2	Superstructure	–	395.98(b)	94,764	342,021.5	687	–	–	–	–	–	–	2	290	56
	South Abutment	179	87.81	26,326	–	–	7	68	–	31	62.91	654.3	–	–	–
	Pier 1	67	67.39	7,653	–	–	–	–	–	–	–	413.4	–	–	–
	Pier 2	90	99.35	12,167	–	–	–	–	–	–	–	432.1	–	–	–
	Pier 3	156	112.88	15,056	–	–	–	–	–	–	–	493.8	–	–	–
	N-Abut. S-Cary	143	79.26	21,016	–	–	5	56	–	25	52.85	621.7	–	–	–
	N-Abut. S-Floyd	180	88.22	29,400	–	–	6	80		28	73.48	802.1	–	–	–
	Total	815	395.98(b) 534.91	206,382	342,021.5	687	18	204	–	84	189.24	3,417.4	2	290	56

Estimated Quantities Notes:
(a) Class A3, unless noted
(b) Class A4

CURVE DATA

℄ RAMP S-CARY
P.I. = Sta. 3+96.91
Δ = 15°46'34"
D = 2°00'00"
T = 396.91'
L = 788.81'
R = 2864.79'

℄ RAMP S-FLOYD
P.I. = Sta. 3+15.96
Δ = 6°21'39"
D = 2°00'00"
T = 159.19'
L = 318.05'
R = 2864.79'

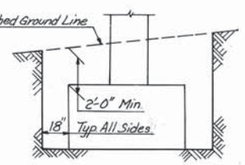
℄ RAMP S-FLOYD
P.I. = Sta. 5+60.34
Δ = 20°18'32"
D = 12°00'00"
T = 85.52'
L = 169.24'
R = 477.46'

℄ E-N ROADWAY
P.I. = Sta. 12+48.94
Δ = 59°15'01"
D = 7°30'00"
T = 434.42'
L = 790.00'
R = 763.94'

NO.	REVISION	BY	DATE
5	As Builts	R.H.	2-5-73
		BY	DATE
MADE		G.C.C.	1-2-68
CHECKED		L.J.R.	3-7-68
IN CHARGE		F.K.D.	
4	Profile Grade - ℄ E-N Rdwy.	L.B.P.	4-70
3	Parapet	E.V.R.	12-70
2	General	J.G.V.	10-70
1	General Revision	A.M.H.	5-13-68

AS BUILT

INDEX



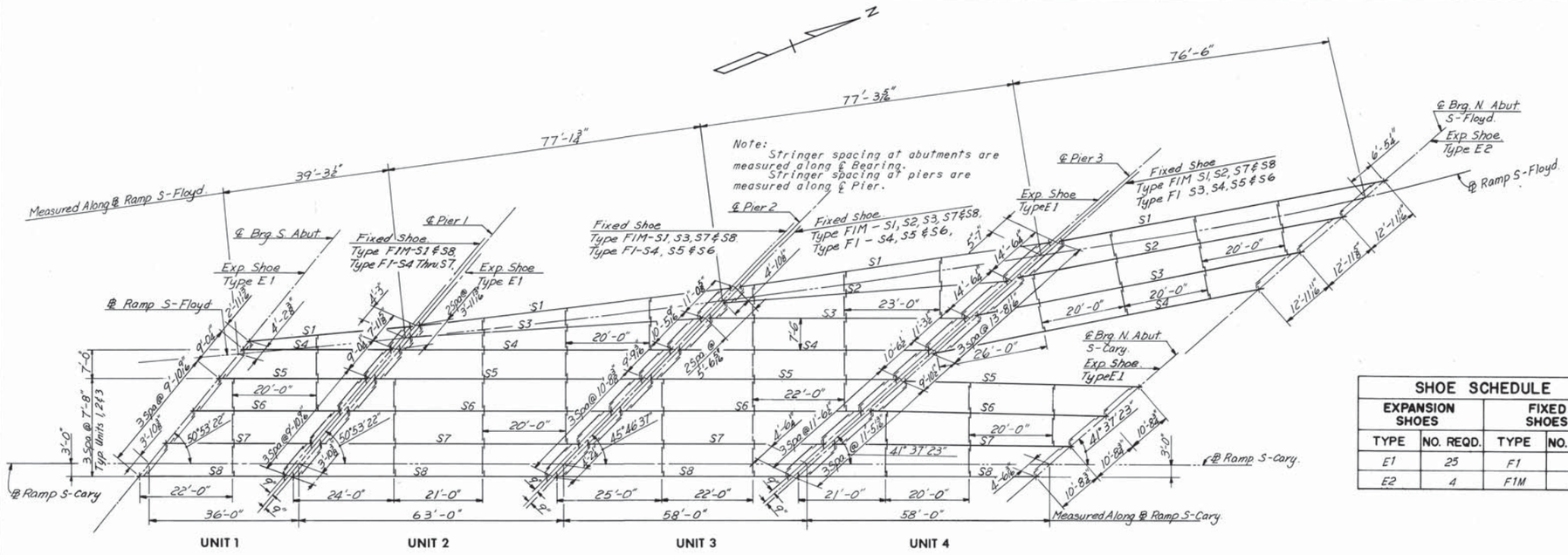
LIMITS OF STRUCTURE EXCAVATION

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 17
RAMP S-CARY OVER EAST-NORTH ROADWAY
GENERAL PLAN AND ELEVATION

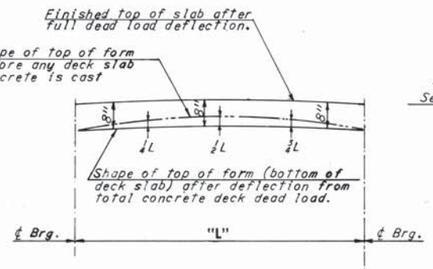
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 1 OF 14

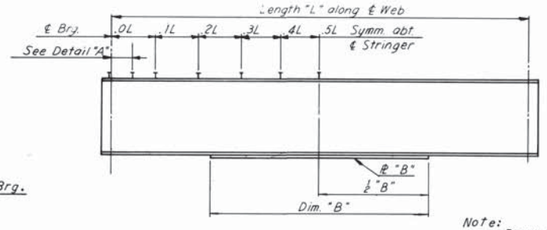
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	137	155



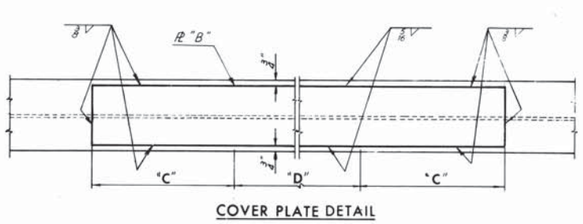
FRAMING PLAN
Scale 1" = 15'-0"



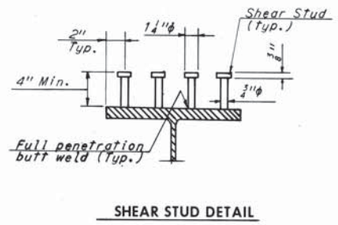
DEAD LOAD DEFLECTION DIAGRAM
No Scale



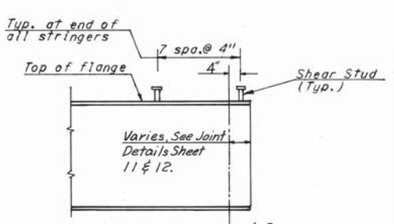
STRINGER ELEVATION



COVER PLATE DETAIL

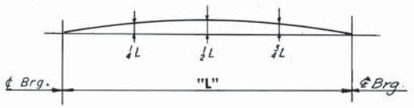


SHEAR STUD DETAIL
No Scale



DETAIL A
No Scale

Note: Beam Ends, Bearing Stiffeners and Diaphragm Connections shall be plumb.



CAMBER DIAGRAM
No Scale

NOTE TO FABRICATOR

Stringers shall be fabricated with an upward camber amounting to the tabulated value.

This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.

Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber diagram.

If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber diagram, and with a minimum distance as shown in cross-section on Sheet 9.

SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E1	25	F1	14
E2	4	F1M	15

AS BUILT

DEAD LOAD DEFLECTION SCHEDULE

	UNIT 1			UNIT 2			UNIT 3			UNIT 4		
STRINGER	¼L	½L	¾L	¼L	½L	¾L	¼L	½L	¾L	¼L	½L	¾L
S1	⅛"		⅛"	1⅛"	2⅛"	1⅛"	1⅛"	1 11/16"	1⅛"	1¼"	2⅞"	1¼"
S2	—	—	—	—	—	—	⅞"	1⅞"	⅞"	1¼"	2"	1¼"
S3	—	—	—	13/16"	1¼"	13/16"	¾"	1⅜"	¾"	1 5/16"	2 1/16"	1 5/16"
S4	3/16"	¼"	3/16"	13/16"	1¼"	13/16"	15/16"	1 1/16"	15/16"	1⅜"	2 1/16"	1⅜"
S5	3/16"	¼"	3/16"	¾"	1 1/16"	¾"	5/8"	15/16"	5/8"	½"	11/16"	½"
S6	3/16"	¼"	3/16"	15/16"	1⅛"	15/16"	⅞"	1⅛"	⅞"	½"	⅝"	½"
S7	3/16"	¼"	3/16"	5/8"	1 1/16"	5/8"	½"	13/16"	½"	½"	13/16"	½"
S8	1/16"	⅛"	1/16"	⅜"	⅝"	⅜"	¼"	⅜"	¼"	1/16"	⅜"	¼"

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer, without altering the slab thickness.

STRINGER SCHEDULE

UNIT	STRINGER	STRINGER LENGTH "L"	STRINGER SIZE	R B	DIM "B"	DIM "C"	DIM "D"	MAX SHEAR STUD SPACING .0L-.1L *	.1L-.2L	.2L-.3L	.3L-.4L	.4L-.5L	CAMBER SCHEDULE ¼L	½L	¾L
1	S1	38'-3 5/16"	36 WF 135	—	—	—	—	15½"	17"	20"	23"	24"	⅛"	¼"	3/16"
	S4-S7	35'-0 3/16"	30 WF 99	—	—	—	—	7½"	8½"	9½"	11½"	13½"	3/16"	3/16"	3/16"
	S8	35'-0 3/16"	36 WF 135	—	—	—	—	10½"	11½"	13"	15½"	18½"	⅛"	⅛"	⅛"
2	S1	75'-7 1/16"	36 WF 150	10¼ x ¾	57'-0"	2'-6"	52'-0"	11½"	13"	16"	19"	23½"	3/16"	5/16"	3/16"
	S3	70'-1 3/16"	36 WF 150	10¼ x ⅝	42'-0"	2'-0"	38'-0"	8"	9"	11"	13"	15½"	2 5/16"	4"	2 5/16"
	S4	65'-3 5/16"	36 WF 150	10¼ x ⅝	48'-0"	2'-0"	44'-0"	8"	9"	11"	13"	15½"	2 5/16"	3 3/16"	2 5/16"
	S5	64'-2 5/16"	36 WF 150	10¼ x ⅝	48'-0"	2'-0"	44'-0"	8"	9"	11"	13"	15½"	2 5/16"	3 3/16"	2 5/16"
	S6	62'-11 3/16"	36 WF 150	10¼ x ⅝	48'-0"	2'-0"	44'-0"	8"	9"	11"	13"	15½"	2 3/16"	3 1/16"	2 3/16"
	S7	61'-8 15/16"	36 WF 150	10¼ x ⅝	48'-0"	2'-0"	44'-0"	8"	9"	11"	13"	15½"	1 15/16"	2 13/16"	1 15/16"
	S8	60'-6 11/16"	36 WF 150	10¼ x ⅝	44'-0"	2'-0"	40'-0"	9"	10"	12"	14"	17"	1 11/16"	2 9/16"	1 11/16"
3	S1	75'-5 15/16"	36 WF 150	10¼ x 1	62'-0"	2'-6"	57'-0"	10"	11½"	14"	16½"	20"	3 1/16"	4 9/16"	3 1/16"
	S2	68'-1 13/16"	36 WF 150	10¼ x ⅝	54'-0"	2'-6"	49'-0"	8½"	10"	12½"	14½"	17½"	2 7/16"	2 9/16"	2 9/16"
	S3	61'-0 5/8"	36 WF 135	10¼ x ½	44'-0"	2'-0"	40'-0"	7"	8"	10"	12"	14½"	2"	2 5/16"	1½"
	S4	59'-11 3/16"	36 WF 135	10¼ x ½	44'-0"	2'-0"	40'-0"	7"	8"	10"	12"	14½"	2 1/16"	2 9/16"	1 13/16"
	S5	58'-10 7/16"	36 WF 135	10¼ x ½	44'-0"	2'-0"	40'-0"	7"	8"	10"	12"	14½"	2 3/16"	3 1/16"	2 1/16"
	S6	57'-8 11/16"	36 WF 135	10¼ x ½	44'-0"	2'-0"	40'-0"	7"	8"	10"	12"	14½"	1 15/16"	2 9/16"	1 15/16"
	S7	56'-6 15/16"	36 WF 135	10¼ x ½	44'-0"	2'-0"	40'-0"	7"	8"	10"	12"	14½"	1 13/16"	2 11/16"	1 13/16"
	S8	55'-4 13/16"	36 WF 150	—	—	—	—	9"	10½"	12"	14"	17"	1 11/16"	2 9/16"	1 11/16"
4	S1	75'-9 1/16"	36 WF 160	10¼ x 1⅛	65'-0"	3'-0"	59'-0"	8½"	9½"	12"	14½"	18"	3 3/16"	4 13/16"	3 1/16"
	S2	76'-4 11/16"	36 WF 160	10¼ x 1⅛	65'-0"	3'-0"	59'-0"	7½"	8½"	10½"	13"	16"	3 1/16"	4 13/16"	3 1/16"
	S3	77'-0 5/16"	36 WF 160	10¼ x 1⅛	65'-0"	3'-0"	59'-0"	7½"	8½"	10½"	13"	16"	3 5/16"	5 1/16"	4 1/16"
	S4	77'-8"	36 WF 160	10¼ x 1⅛	63'-0"	3'-0"	57'-0"	8½"	9½"	12"	14½"	18"	4"	5 1/16"	4"
	S5	55'-2 15/16"	36 WF 150	—	—	—	—	9"	10½"	12"	14"	17"	1 3/16"	1½"	15/16"
	S6	55'-9 3/16"	36 WF 135	10¼ x ½	44'-0"	2'-0"	40'-0"	7"	8"	10"	12"	14½"	1 9/16"	2"	1 ¼"
	S7	56'-3 7/16"	36 WF 135	10¼ x ½	44'-0"	2'-0"	40'-0"	7"	8"	10"	12"	14½"	1 3/16"	2 5/16"	1 5/16"
	S8	56'-10 7/16"	36 WF 150	—	—	—	—	9"	10½"	12"	14"	17"	1 15/16"	2 11/16"	1 15/16"

SHEAR STUD NOTE

Capacity = 3,400 lbs. per stud.

The contractor may, if he elects, use three ⅞" diameter studs at the same longitudinal spacing in lieu of the four ¾" diameter studs shown.

Stud rows shall be placed parallel to the main deck reinforcing.

Shear stud spacing shown is maximum spacing.

* Spacing begins at termination of 7 spaces @ 4" as shown in Detail A.

Note: For Superstructure Structural steel quantities see Sheet 1.
For Standard Shoe details see Sheet 51.
For Framing details see Sheet 9.
For Joint details see Sheets 11 and 12.
This sheet must be worked with sheets 2, 3, 4, 6, ℄ 7.

	BY	DATE
MADE	G.C.C.	11-3-67
CHECKED	AMH	2-26-68
IN CHARGE	FKD	

NO.	REVISION	BY	DATE
3	As Builts	R.H.	2-5-75
2	General	P.S.	10-70
1	General Revision	AMH	5-15-68

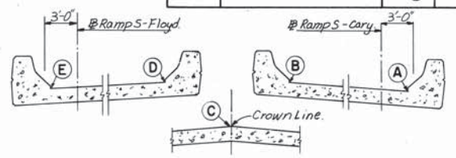
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

BRIDGE NO. 17
RAMP S-CARY OVER EAST-NORTH ROADWAY
FRAMING PLAN

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 8 OF 14

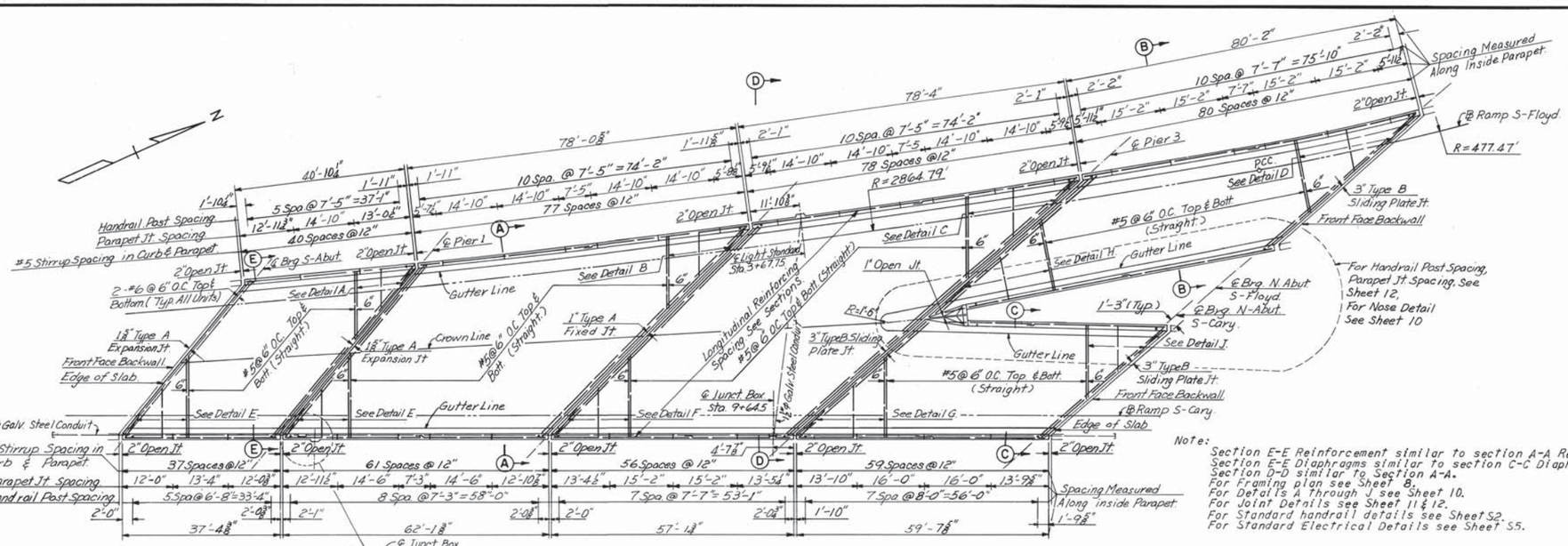
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	138	155



GUTTERLINE ELEVATION DIAGRAM
No Scale

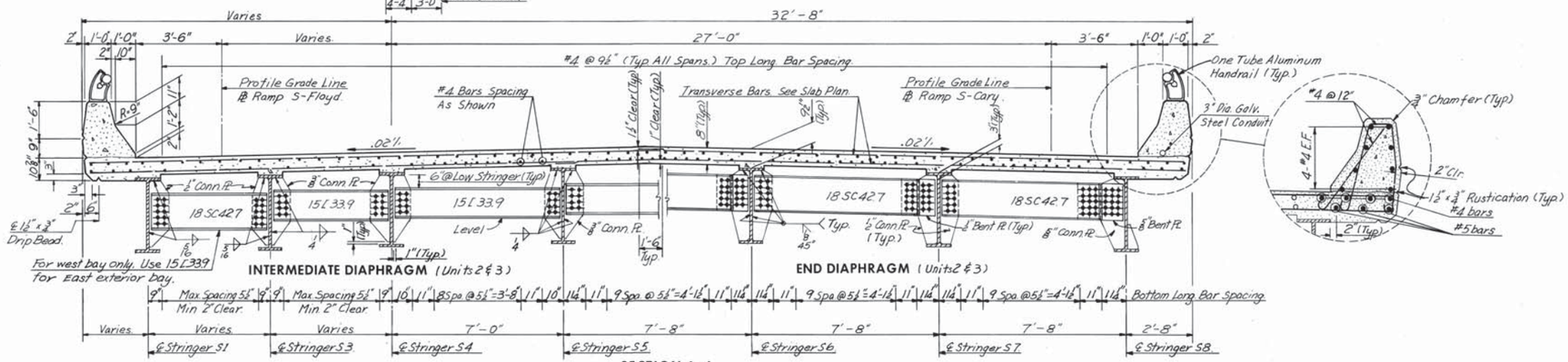
GUTTERLINE ELEVATIONS

STATION ℄ S-Cary	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E	STATION ℄ S-Floyd
8+00	223.00	-	223.31	-	223.02	1+94.25
8+10	223.58	-	223.89	-	223.59	2+04.18
8+12.77	223.73	-	-	-	-	-
8+20	224.16	-	224.48	-	224.16	2+14.13
8+30	224.74	-	225.07	-	224.75	2+24.10
8+40	225.32	-	225.66	-	225.33	2+34.07
-	-	-	-	-	225.41	2+35.31
8+50	225.90	-	226.25	-	225.92	2+44.03
8+50.38	225.93	-	-	-	-	-
8+60	226.48	-	226.84	-	226.50	2+53.99
8+70	227.06	-	227.43	-	227.08	2+63.95
8+80	227.64	-	228.02	-	227.66	2+73.91
-	-	-	-	-	227.80	2+76.45
8+90	228.18	-	228.58	-	228.21	2+83.86
9+00	228.70	-	229.10	-	228.72	2+93.81
9+10	229.18	-	229.59	-	229.20	3+03.76
9+12.83	229.31	-	-	-	-	-
9+20	229.62	-	230.05	-	229.65	3+13.70
9+30	230.03	-	230.47	-	230.06	3+23.63
9+40	230.41	-	230.86	-	230.44	3+33.57
9+50	230.76	-	231.22	-	230.78	3+43.49
9+60	231.07	-	231.55	-	231.06	3+53.42
-	-	-	-	-	231.08	3+54.53
9+70	231.35	-	231.84	-	231.24	3+63.33
9+70.29	231.36	-	-	-	-	-
9+80	231.60	-	232.09	-	231.37	3+73.25
9+90	231.81	-	232.32	-	231.47	3+83.15
9+92.22	-	232.33	-	232.31	-	3+85.35
9+97.17	-	232.42		232.39	231.53	3+90
-	-	-		232.51	-	3+96.70
10+00	231.99	232.46		232.54	231.61	4+00
10+10	232.13	232.60		232.66	231.66	4+10
10+20	232.24	232.71		232.74	231.68	4+20
10+30	232.32	323.78		232.79	231.65	4+30
10+30.18	232.33	-		-	231.65	4+32.86
10+40	232.40	232.86		232.80	231.60	4+40
10+50	232.48	232.93		232.78	231.52	4+50
10+55.27	-	232.96		232.72	231.41	4+60
10+60	232.56	233.00		232.64	231.27	4+70
10+70	232.64	233.08		232.53	-	4+77.68
10+80	232.71	233.14		232.48	231.10	4+80
				232.29	230.90	4+90
				232.07	230.67	5+00
				231.80	230.41	5+10
				-	230.31	5+13.34
				231.51	230.12	5+20
				231.19	229.80	5+30

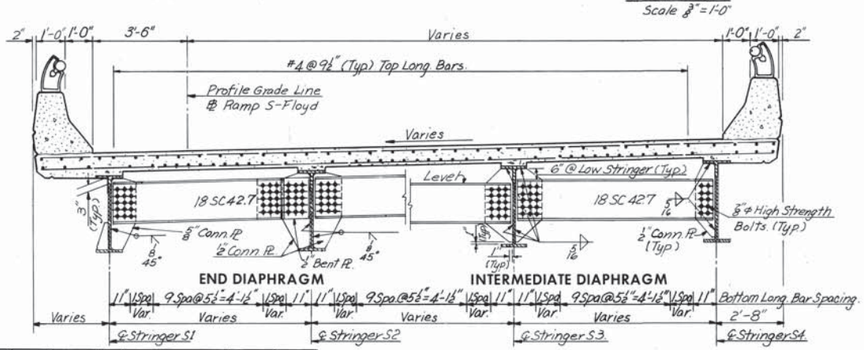


DECK PLAN
Scale 1"=15'-0"

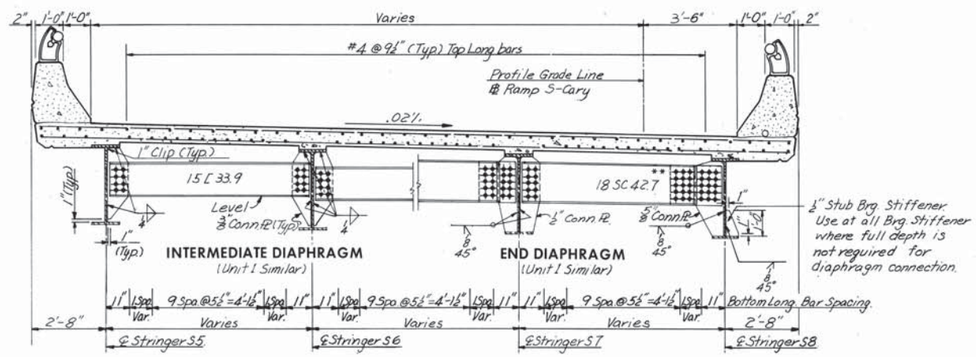
Note:
Section E-E Reinforcement similar to section A-A Reinforcement.
Section E-E Diaphragms similar to section C-C Diaphragms.
Section D-D similar to Section A-A.
For Framing plan see Sheet 8.
For Details A Through J see Sheet 10.
For Joint Details see Sheet 11 & 12.
For Standard handrail details see Sheet S2.
For Standard Electrical Details see Sheet S5.



SECTION A-A
Scale ⅜"=1'-0"



SECTION B-B
Scale ⅜"=1'-0"



SECTION C-C
Scale ⅜"=1'-0"

**For Unit 1 use two rows of bolts

½" Stub Brg. Stiffener. Use at all Brg. Stiffener where full depth is not required for diaphragm connection.

	BY	DATE
MADE	G.C.C.	11-23-67
CHECKED	A.M.H.	2-28-68
IN CHARGE	F.K.D.	

NO.	REVISION	BY	DATE
3	As Builts	R.H.	2-5-73
2	Parapet	J.G.V.	12-70
1	General Revision	A.M.H.	5-13-68

AS BUILT

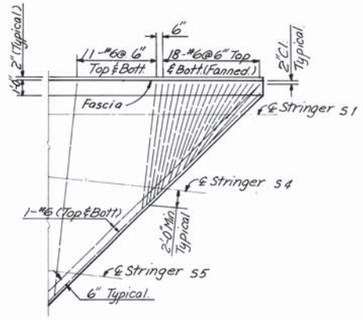
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

BRIDGE NO. 17
RAMP S-CARY OVER EAST-NORTH ROADWAY
DECK PLAN

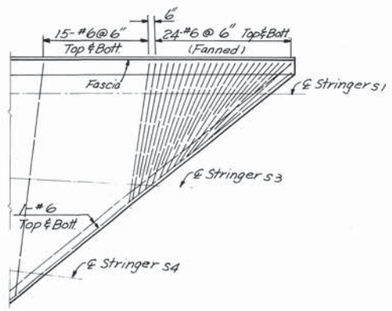
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 9 OF 14

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	139	155



DETAIL A
No Scale



DETAIL B
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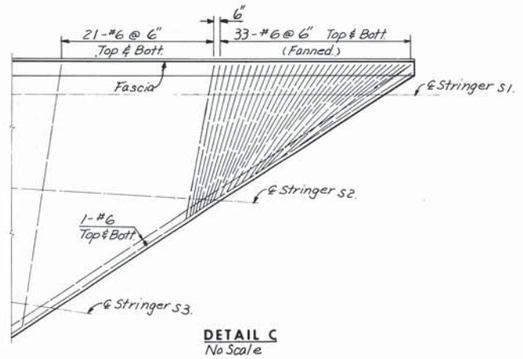
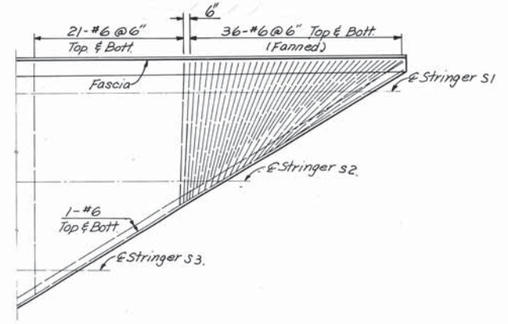


DETAIL C
No Scale



DETAIL D
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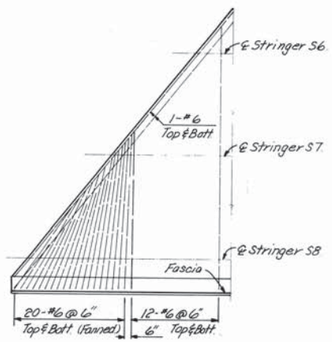
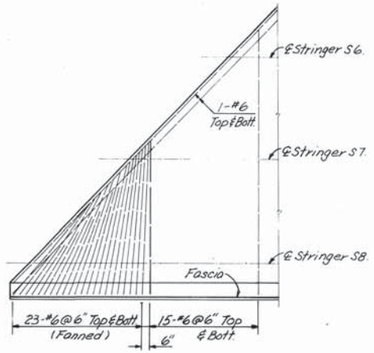
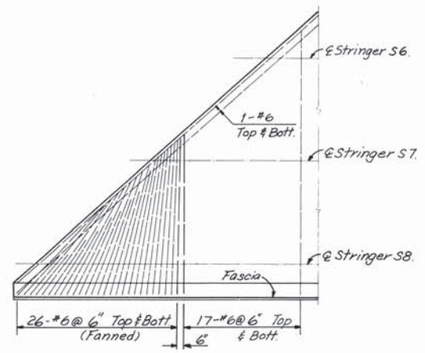


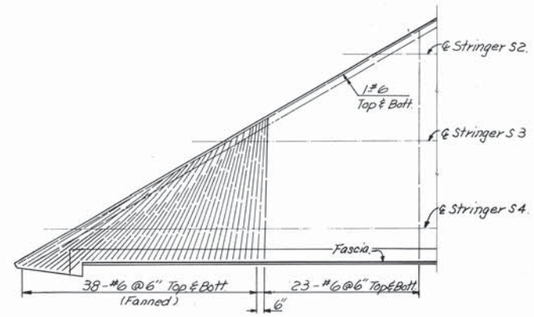
DETAIL E
No Scale



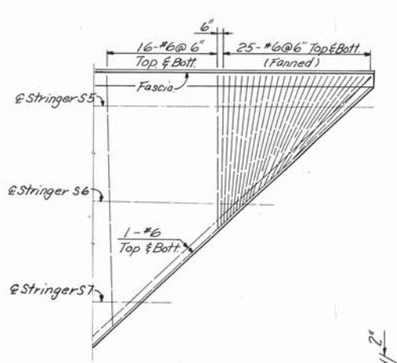
DETAIL F
No Scale



DETAIL G
No Scale

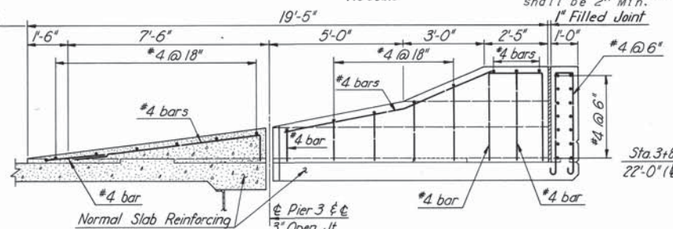


DETAIL H
No Scale

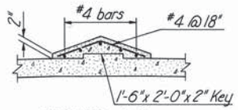


DETAIL J
No Scale

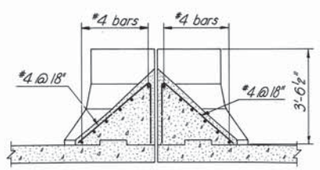
Note: Clearance between Fanned Reinforcing Steel shall be 2" Min.



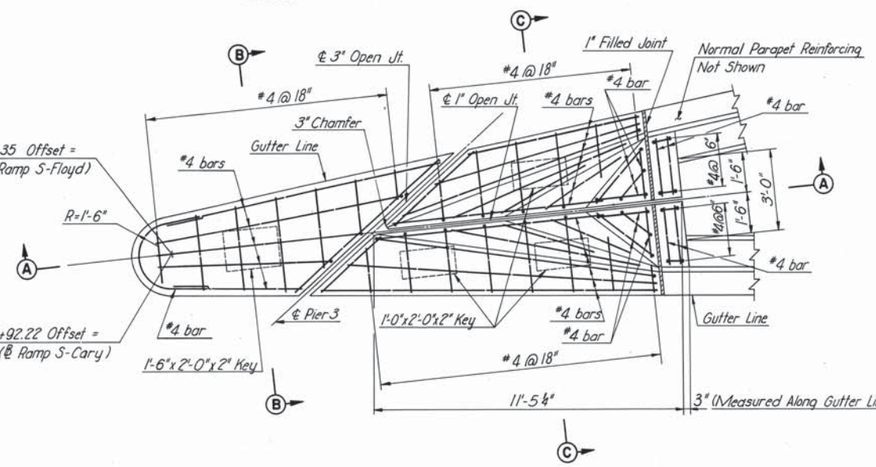
SECTION A-A
Scale: 3/8"=1'-0"



SECTION B-B
Scale: 3/8"=1'-0"



SECTION C-C
Scale: 3/8"=1'-0"



NOSE DETAIL
Scale: 3/8"=1'-0"

AS BUILT

Note:
For Joint details see Sheets 11 and 12
For Deck Plan see Sheet 9.
For Framing Plan see Sheet 8.
For location of Details see Sheet 9.

	BY	DATE
MADE	G.C.C.	12-15-67
CHECKED	S.S.W.	3-19-68
IN CHARGE	FKD	

NO.	REVISION	BY	DATE
1	As Built's	R.H.	2-5-73

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

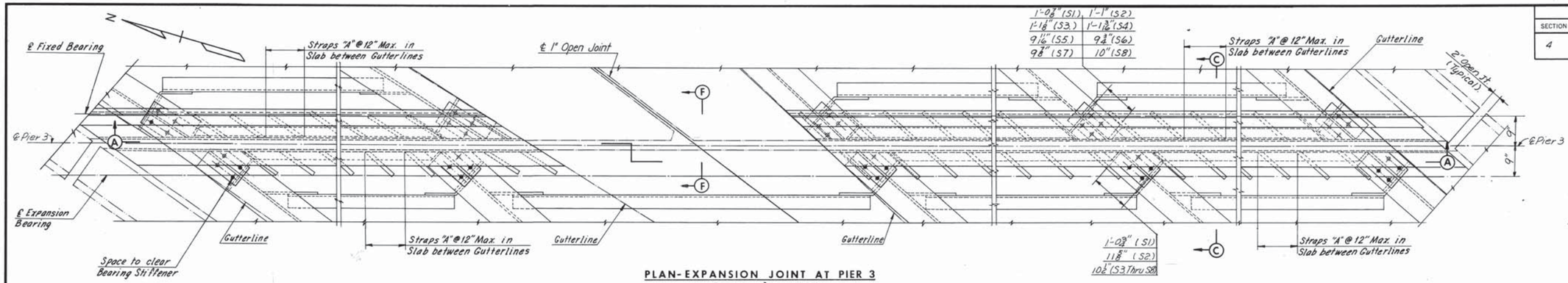
BRIDGE NO. 17
RAMP S-CARY OVER
EAST-NORTH ROADWAY

DECK DETAILS

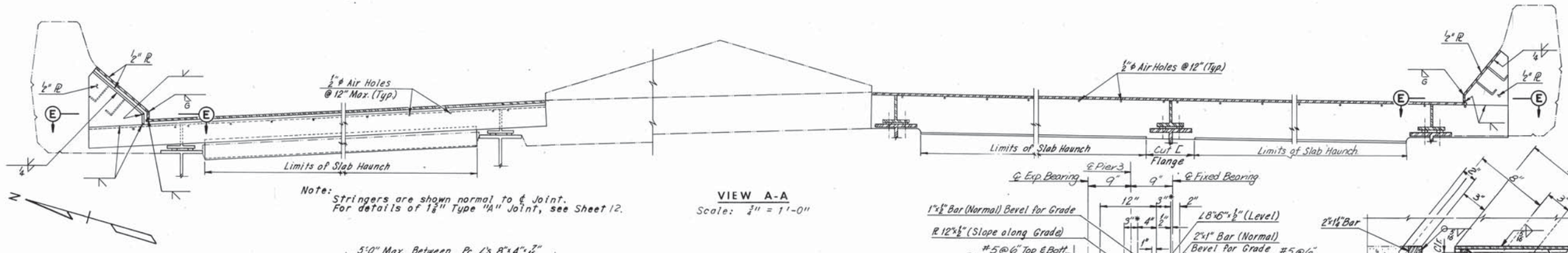
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 10 OF 14

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	140	155

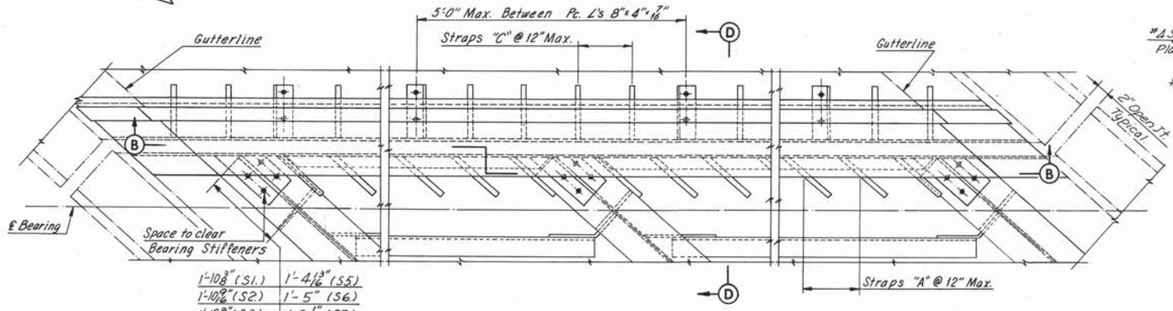


PLAN-EXPANSION JOINT AT PIER 3
Scale: ¾" = 1'-0"



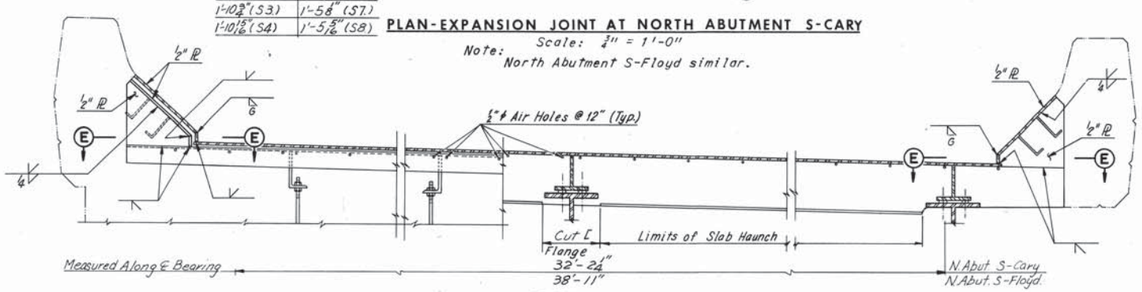
Note: Stringers are shown normal to ℄ Joint.
For details of 1⅛" Type "A" Joint, see Sheet 12.

VIEW A-A
Scale: ¾" = 1'-0"



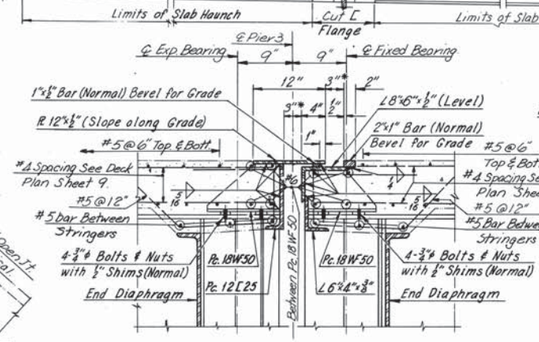
PLAN-EXPANSION JOINT AT NORTH ABUTMENT S-CARY
Scale: ¾" = 1'-0"

Note: North Abutment S-Floyd similar.



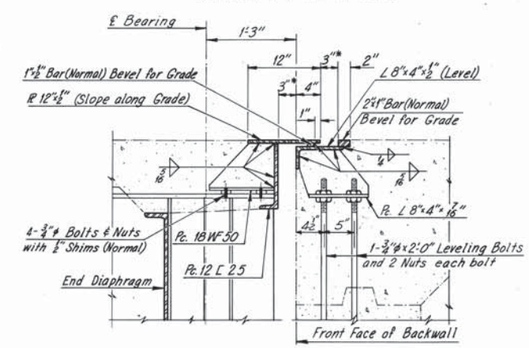
VIEW B-B
Scale: ¾" = 1'-0"

Note: View B-B shown for North Abutment S-Cary. North Abutment S-Floyd similar but opposite in cross-slope. Stringers are shown normal to ℄ Joint.



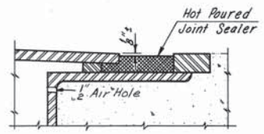
SECTION C-C
Scale: 1" = 1'-0"

Note: Dimensions with an asterisk (*) are at 68°F.



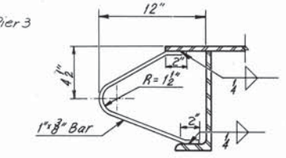
SECTION D-D
Scale: 1" = 1'-0"

SECTION E-E
Scale: 1½" = 1'-0"

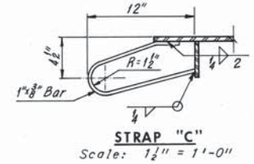


JOINT SEALER DETAIL
Scale: 3" = 1'-0"

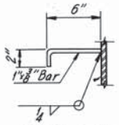
Note: Throughly clean joint and fill with Hot Poured Joint Sealer. Trowel into curb joint.



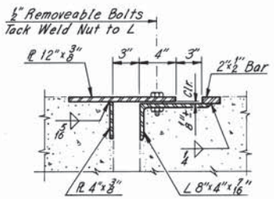
STRAP "A"
Scale: 1½" = 1'-0"



STRAP "C"
Scale: 1½" = 1'-0"



STRAP "D"
Scale: 1½" = 1'-0"



SECTION F-F
Scale: 1½" = 1'-0"

AS BUILT

Note: Work this sheet with Sheets 3, 4, 7, 8 & 9.

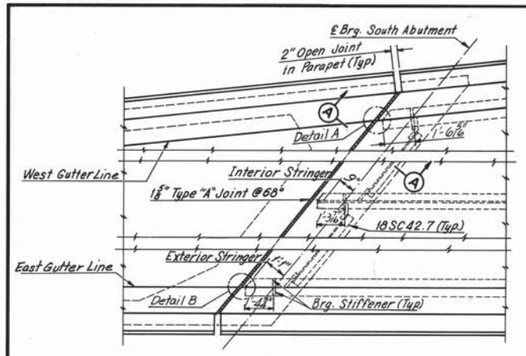
	BY	DATE				
MADE	D.E.S.	11-27-67	2	As Builts	R.H.	2-5-73
CHECKED	SSW	3-20-68	1	Parapet	J.G.V.	1-71
IN CHARGE	FKD		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 17
RAMP S-CARY OVER EAST-NORTH ROADWAY
JOINT DETAILS

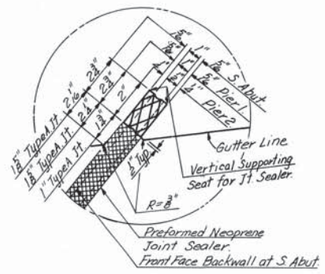
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 11 OF 14

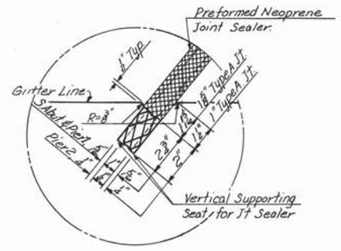
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET# NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	141	155



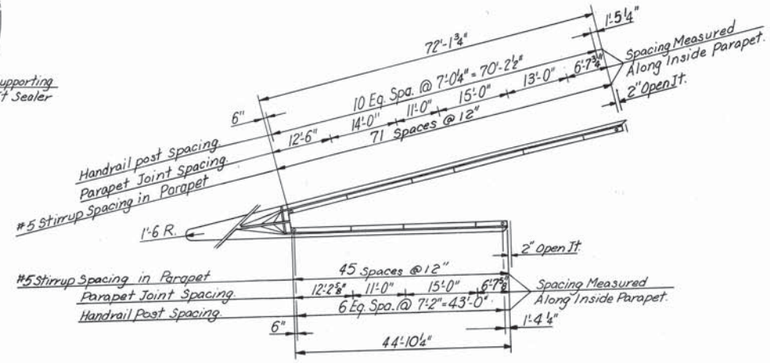
PLAN-JOINT AT SOUTH ABUTMENT
Scale: 1" = 1'-0"



DETAIL A
No Scale

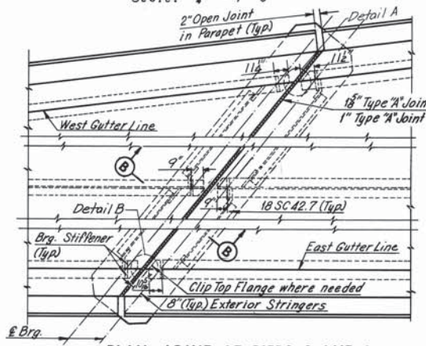


DETAIL B
No Scale

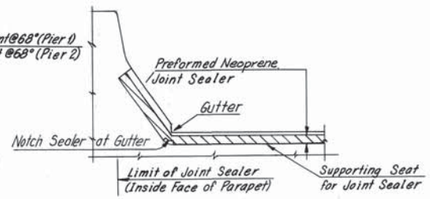


PARAPET DETAIL
Scale 1" = 1'-0"

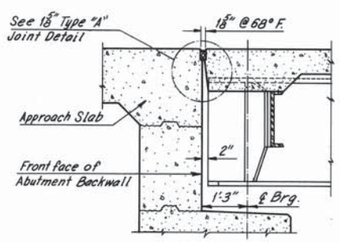
Note: For Nose Detail see Sheet 10.



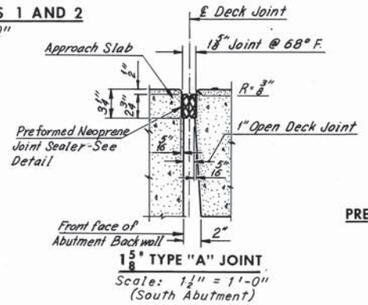
PLAN - JOINT AT PIERS 1 AND 2
Scale: 1" = 1'-0"



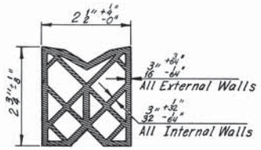
TREATMENT OF TYPE "A" JOINT AT GUTTER



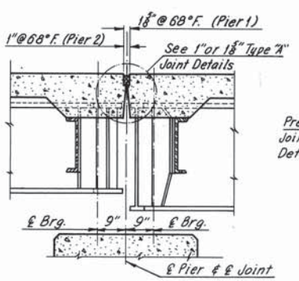
SECTION A-A
Scale: 1" = 1'-0"



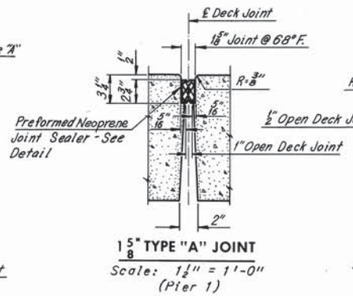
1⅝" TYPE "A" JOINT
Scale: 1½" = 1'-0"
(South Abutment)



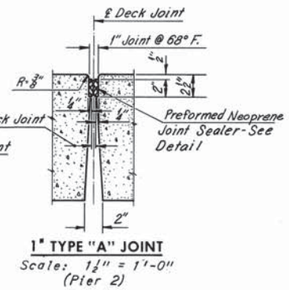
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half Size



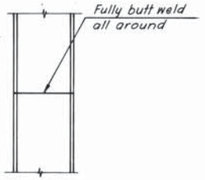
SECTION B-B
Scale: ½" = 1'-0"



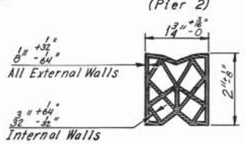
1⅝" TYPE "A" JOINT
Scale: 1½" = 1'-0"
(Pier 1)



1" TYPE "A" JOINT
Scale: 1½" = 1'-0"
(Pier 2)



DETAIL OF STEEL PILE SPLICE



PREFORMED NEOPRENE JOINT SEALER FOR 1" TYPE "A" JOINT
Scale: Half Size

Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	D.E.S.	3-21-68	3	As Builts	R.H	2-5-73
CHECKED	SSW	3-22-68	2	Parapet	J.G.V.	1-71
IN CHARGE	FKD		1	General	P.S.	10-70

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

BRIDGE NO. 17
RAMP S-CARY OVER
EAST-NORTH ROADWAY
JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

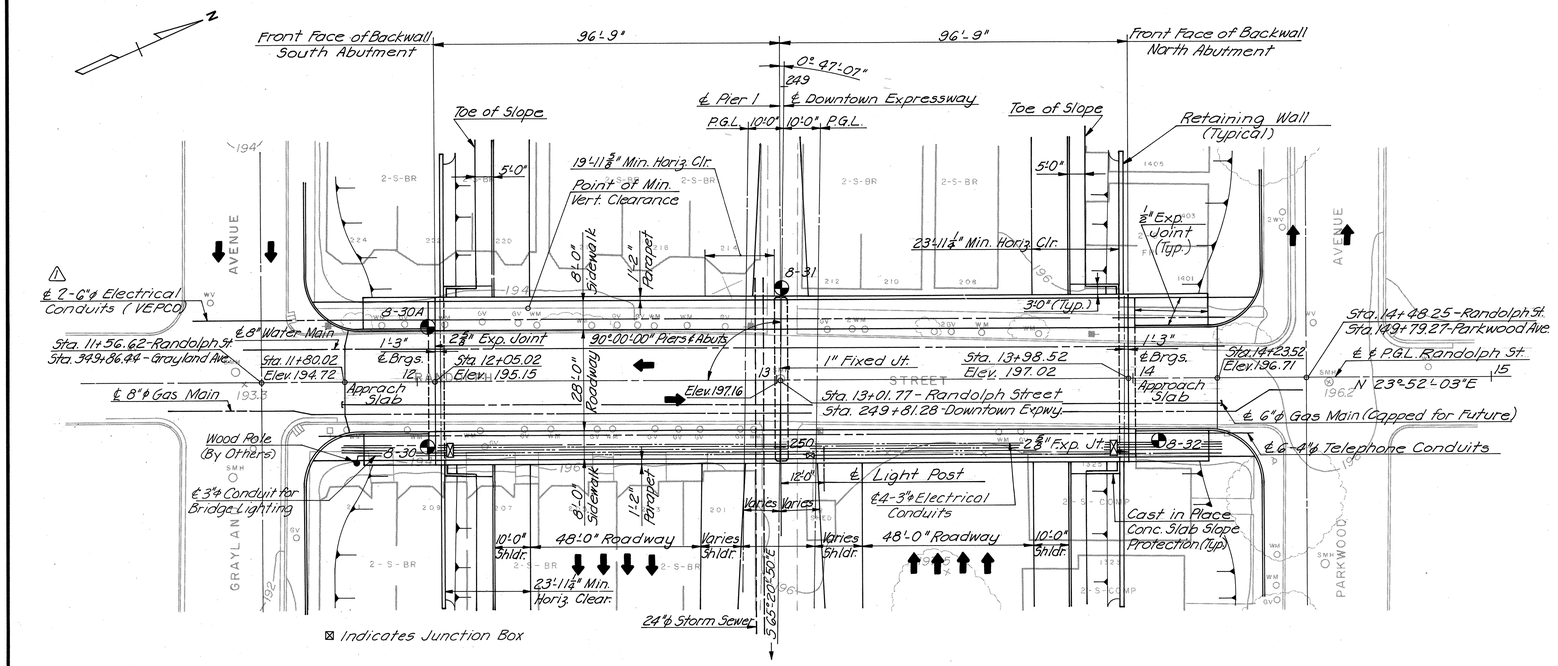
SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 12 OF 14

Bridge 47

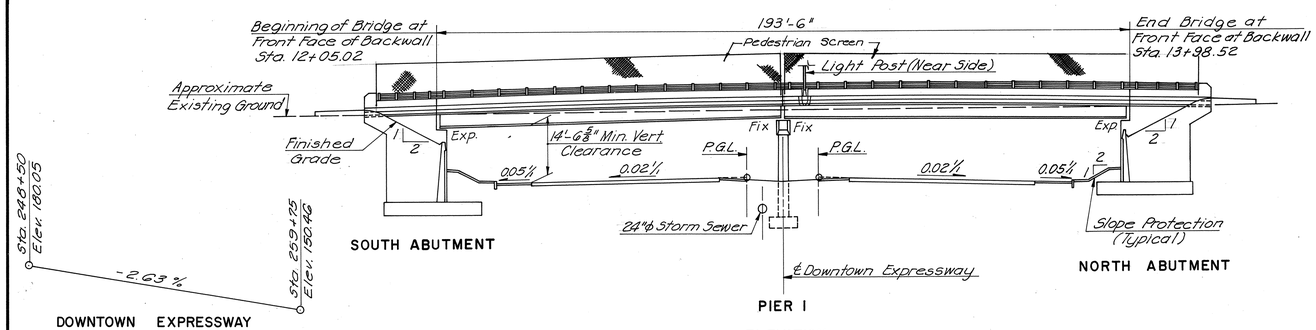
(Randolph Street over Downtown Expressway - Rte. 195)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	184	

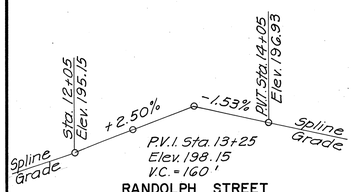


PLAN



ELEVATION

NOTES:
Top of Pavement Elevations at ends of deck along P.G.L. are given on plan; Remaining pavement elevations are given on Sheet 10.
◔ Indicates 2½"ϕ Cased Hole Boring.



RANDOLPH STREET
PROFILE DATA

	BY	DATE				
MADE	W.D.U.	8-67		AS BUILT	HMW	
CHECKED	W.E.O.	11-67	⚠	Rev. No. & Quantity VEPCO Conduits	DGT	1/12/74
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

GENERAL NOTES:

ROADWAY CAPACITY: One 28'-0" Clear roadway. Two 8'-0" sidewalks. Dead Load - Includes 15lbs. per sq. ft. for future wearing surface. Live Loads - HS20-44 loading and B.P.R. modified for military vehicles.

SPECIFICATIONS:
GENERAL - Virginia Department of Highway Road and Bridge Specifications 1970
DESIGN - AASHO. Standard Specifications for Highway Bridges, 1961 modified by Special Design Provisions.
WELDING - 1969 Standard Specifications for welded Highway and Railway Bridges of the American Welding Society.

CONTRACT SPECIAL PROVISIONS:
Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM: CITY OF RICHMOND

TEMPERATURE: The normal temperature referred to on the plan is 60°F. The temperature range for movements is 0°F. to 120°F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be kept dry and special attention is called to section 401.05 of the General Specifications, and to the Contract Special Provisions, concerning preparation of foundations for footings.

CONCRETE NOTES:
Concrete in superstructure shall be Class A4. All other concrete shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, the use of low slump concrete and/or other means shall be employed to prevent downgrade movement of newly placed slab concrete. (When gradient is over 2%)
Finishing concrete surfaces: See the Standard Architectural Detail Sheets and the Contract Special Provisions for types and details.

All reinforcing steel shall conform to ASTM A615 Grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Specification A36 except as noted.
All field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

BENCH MARK: C-32. Monument located in walk S.W. Corner Idlewood and S. Randolph Sts. Elev. 192.25.

INDEX	
No.	DESCRIPTION
1	General Plan and Elevation
2/3	South Abutment
4/5	North Abutment
6	Retaining Wall Details - North & South Abut's.
7	Pier Details
8	Framing Plan
9	Cross Section and Utility Details
10	Deck Plan and Joint Details
11	Approach Slab & Slope Protection Details.
12	Boring Logs
S1	Standard Shoe Details
S3	Standard Aluminum Railing Details.
S4	Standard Electrical Details
S7/S8	Standard Architectural Details
S10	Standard Elect. and Tele. Cond. Details
S11	Standard Utility Support details @ Abutment

ESTIMATED QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	REINFORCING STEEL LBS.	STRUCTURAL STEEL A36 LBS.	ALUMINUM BRIDGE RAILING L.F.	CONC. SLAB SLOPE PROTECTION S.Y.	ASPHALT DAMP-PROOFING S.Y.	6-INCH PIPE UNDERDRAIN L.F.	POROUS BACKFILL C.Y.	STONE BEDDING TON	GAS MAIN 8"ϕ L.F.	GAS MAIN 6"ϕ L.F.	WATER MAIN 8"ϕ L.F.	CONDUIT 6"ϕ VEPCO L.F.	CONDUIT 4"ϕ TELE. L.F.	PVC CONDUIT 3"ϕ L.F.	METAL CONDUIT 2"ϕ L.F.	PEDESTRIAN SCREEN L.F.
Superstructure		365.56		70,753	334,842.8	462						245.5	245.5	247	483⚠	1170	1225	4	462
South Abutment	1304.9		516.27	36,863			82	225	123	87.5	52.47								6
Pier 1	315.4		90.36	18,495							23.06								
North Abutment	950.7		389.44	28,117			82	216	124	67.5	38.57								6
Approach Slabs			78.3	16,951															
Total	2571	365.56	1074.37	171,179	334,842.8	462	164	441	247	155	114.10	245.5	245.5	247	483⚠	1170	1225	4	474

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 47
RANDOLPH STREET OVER DOWNTOWN EXPRESSWAY

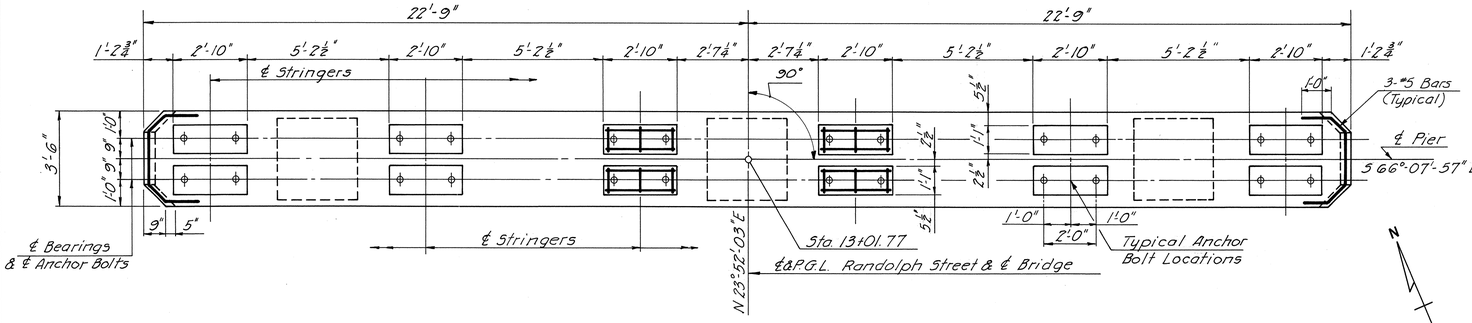
GENERAL PLAN AND ELEVATION

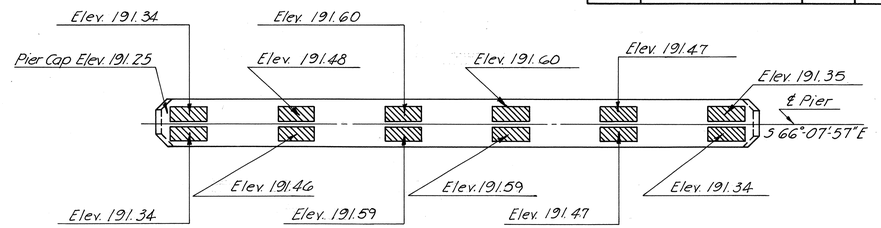
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1" = 20'
CONTRACT NO.: 8
SHEET NO. 1 OF 12

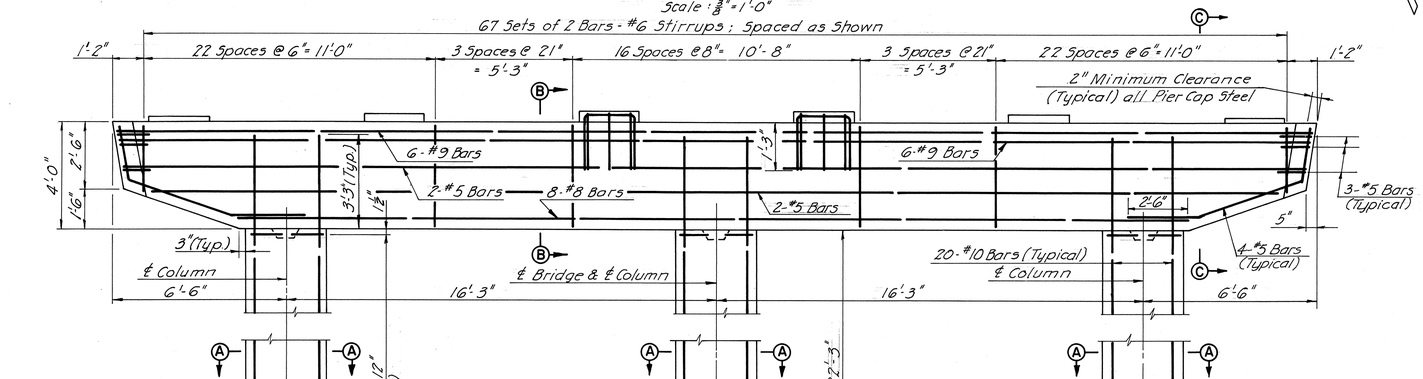
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	190	



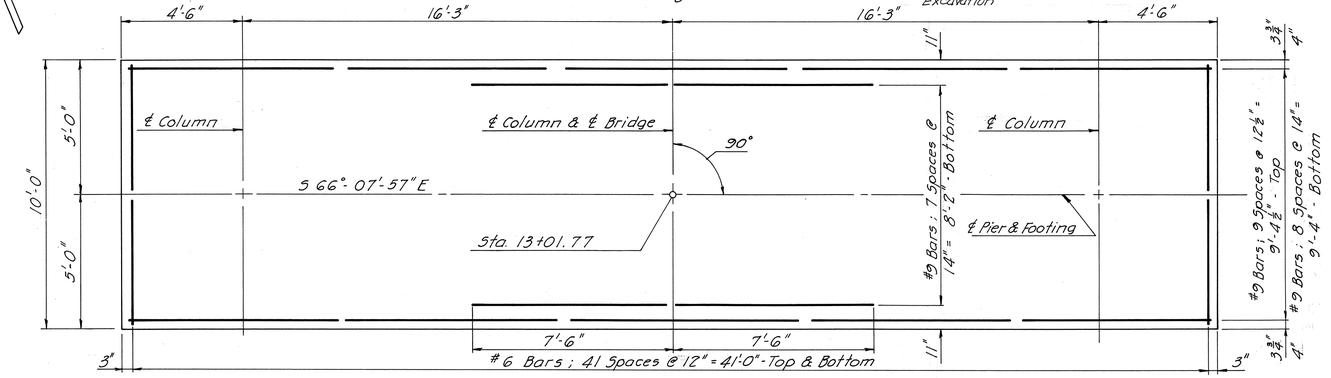


PAD ELEVATIONS
Scale: 1/16" = 1'-0"

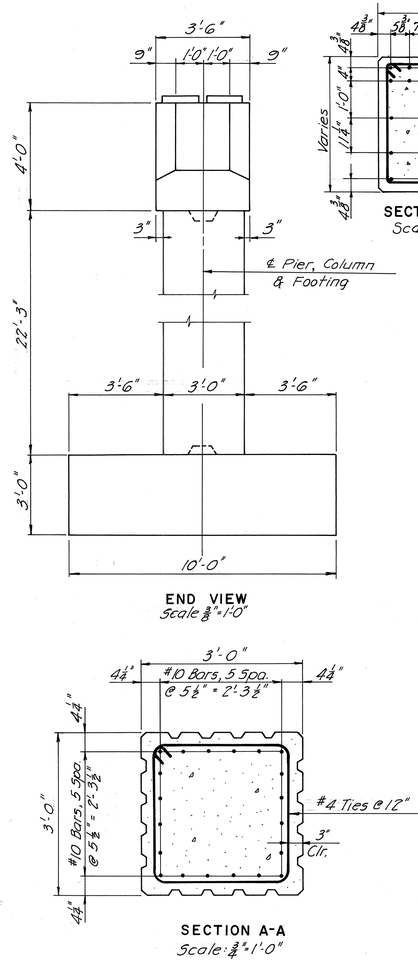
PLAN
Scale: 3/8" = 1'-0"



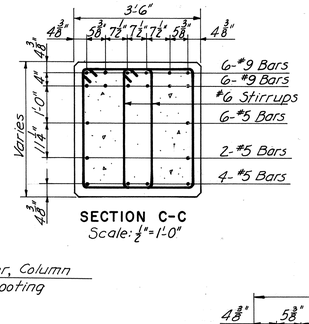
ELEVATION
Scale: 3/8" = 1'-0"



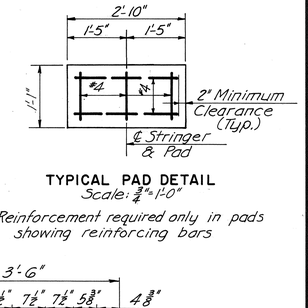
FOOTING PLAN
Scale: 3/8" = 1'-0"



END VIEW
Scale 3/8" = 1'-0"

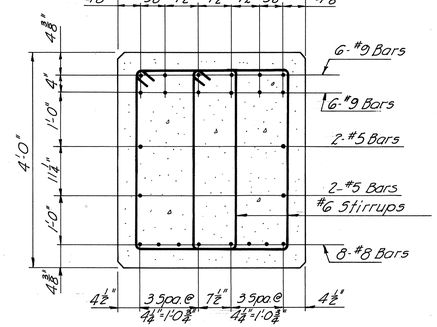


SECTION C-C
Scale: ½" = 1'-0"



TYPICAL PAD DETAIL
Scale: ½" = 1'-0"

Reinforcement required only in pads showing reinforcing bars



SECTION B-B
Scale: ¾" = 1'-0"

SECTION A-A
Scale: ¾" = 1'-0"

NOTES:
For Framing Plan Details, see Sheet 8.
For Bearing Details, see Sheet 51.
For General Notes, see Sheet 1.
For Architectural Treatment, see Sheet 87 to 89

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JMS	9-67				
CHECKED	WEO	9-67		AS BUILT	HMW	
IN CHARGE	W.E.O.					

FOUNDATION NOTE:
Foundation Elevations are approximate and may be varied to suit field conditions as directed by the Engineer. Vertical Column reinforcing shall not be cut until these elevations are established
Where elevations change by more than 2 feet, redesign will be required. Pier Foundation is designed for an allowable Bearing Pressure of 2½ Tons per square foot.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 47
RANDOLPH STREET OVER
DOWNTOWN EXPRESSWAY

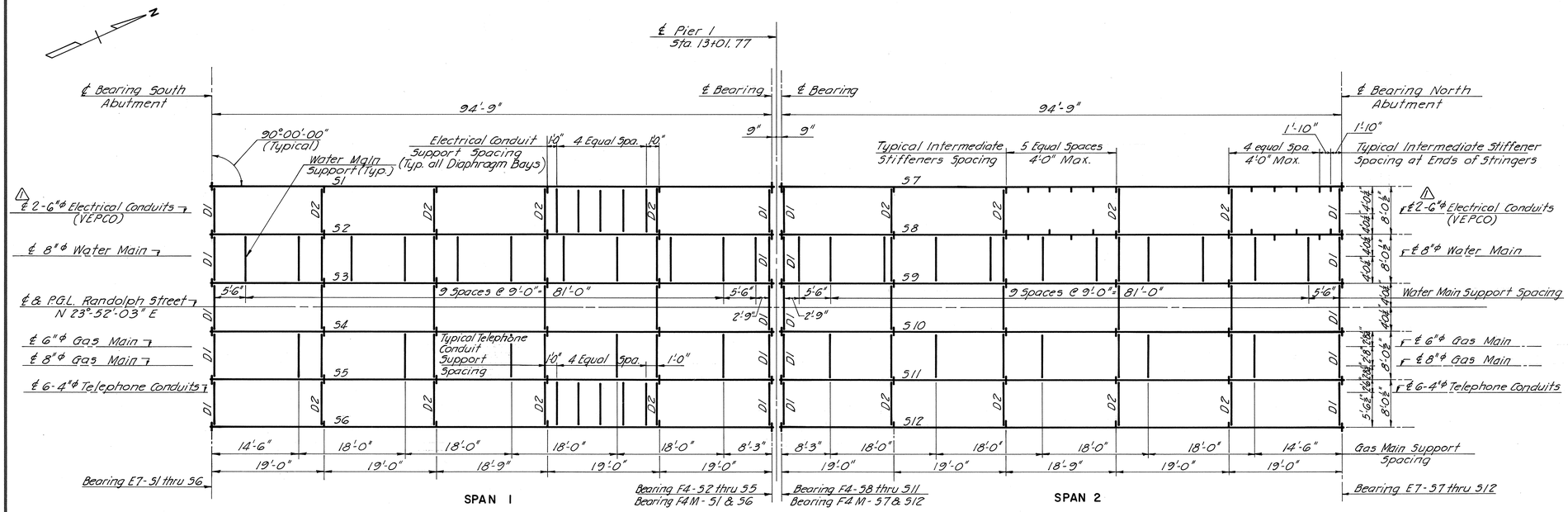
PIER DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 7 OF 12

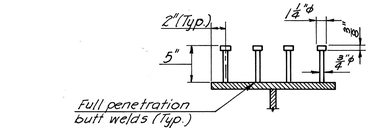
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	191	



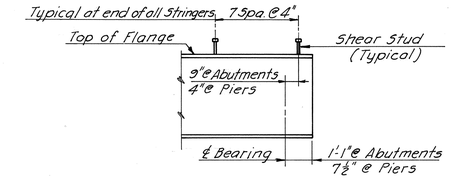
FRAMING PLAN
Scale: 1" = 10'-0"

NOTE:
All intermediate diaphragms are D3 unless otherwise noted. Intermediate Stiffeners shall be located on inside face of Stringers 51, 56, 57 & 512. They shall be placed on alternate sides along the remaining Stringers.

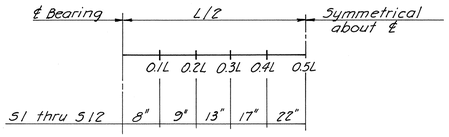
BEARING TYPE	No. REQUIRED
E7	12
F4	8
F4M	4



SHEAR STUD DETAIL
Scale: 1½" = 1'-0"

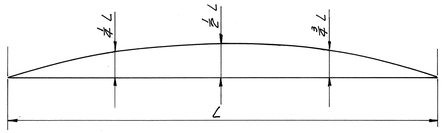


DETAIL "A"
No Scale



SHEAR STUD SPACING
No Scale
Shear Stud spacing shown is maximum

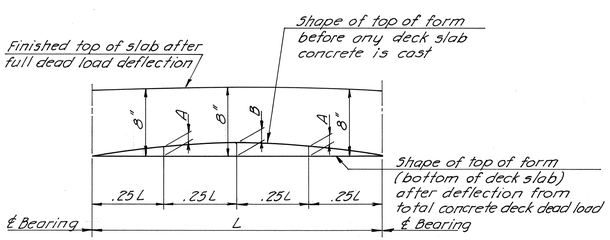
SHEAR STUD NOTES:
Capacity = 3400 lbs. per stud.
Three ⅞"ϕ Studs may be substituted at the same longitudinal spacing as shown for four ¾"ϕ Studs.
Stud rows to be placed perpendicular to ℄ Stringer.
For end condition, see "Detail "A"



CAMBER DIAGRAM

STRINGERS	¼ L	½ L	¾ L
51, 56	3"	4¾"	3 13/16"
52 thru 55	2 13/16"	4 9/16"	3 11/16"
57, 512	4 3/16"	5 ⅛"	4 3/16"
58 thru 511	4⅝"	5⅜"	4⅝"

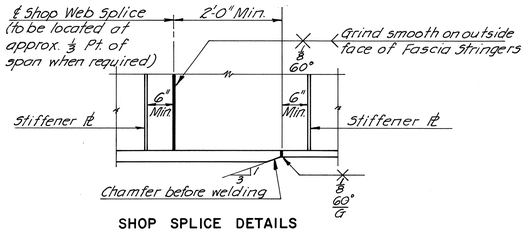
NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to (see table). This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.



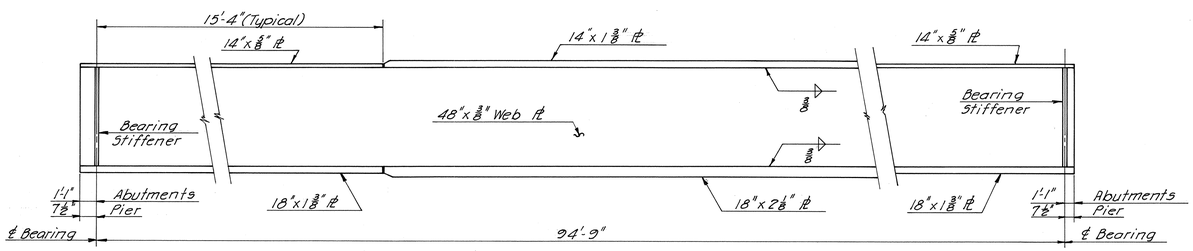
DEAD LOAD DEFLECTION DIAGRAM

STRINGERS	A	B
51, 56, 57, 512	1⅜"	1 15/16"
52 thru 55, 58 thru 511	1¼"	1¾"

NOTE TO CONTRACTOR:
The above deflections are those anticipated to occur in the stringer upon placement of the total concrete deck dead load. In practice the stringers in place, are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided for by adjusting forms to vary the thickness of the concrete bolster between the bottom of the slab and the top of the stringer, without alteration of the slab thickness.

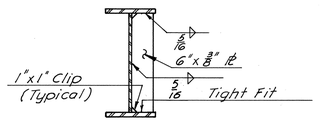


SHOP SPLICE DETAILS
No Scale

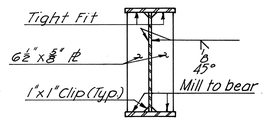


STRINGER DETAILS
No Scale

NOTES:
Structural Steel shall conform to A.S.T.M. Specifications A36 (latest revision).
For General Notes, see Sheet 1.
For Superstructure Cross Section, see Sheet 9.
For Diaphragm Details, see Sheet 9.
For Utility Support Details, see Sheet 9.
For Bearing Shoe Dimensions, see Standard Sheet 51.



INTERMEDIATE STIFFENER



BEARING STIFFENER

STIFFENER DETAILS
No Scale

	BY	DATE
MADE	FBC	7-67
CHECKED	WEO	9-67
IN CHARGE	WEO	

NO.	REVISION	BY	DATE
1	Rev. No. VEPCO Conduits	DGT	1-11-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 47
RANDOLPH STREET OVER
DOWNTOWN EXPRESSWAY

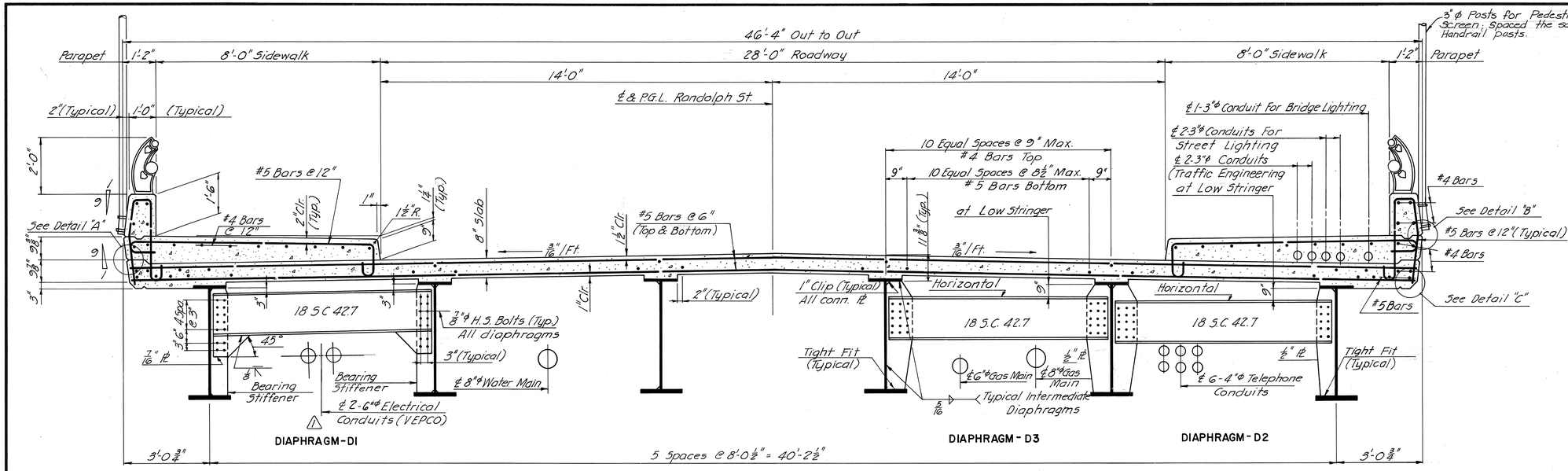
FRAMING PLAN

AMERICAN ENGINEERS
Richmond, Virginia

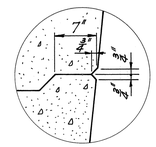
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 8 OF 12

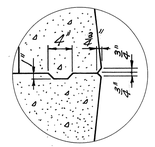
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	192	



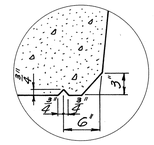
TYPICAL CROSS SECTION
Scale: ½"=1'-0"



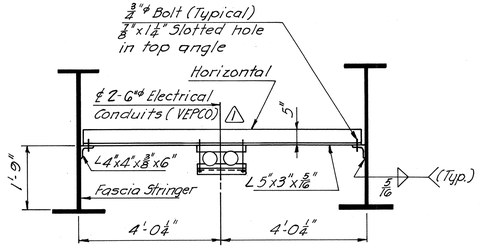
DETAIL "A"
Scale: 1"=1'-0"



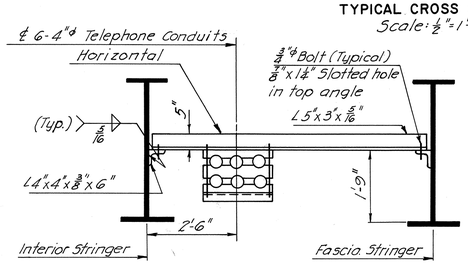
DETAIL "B"
Scale: 1"=1'-0"



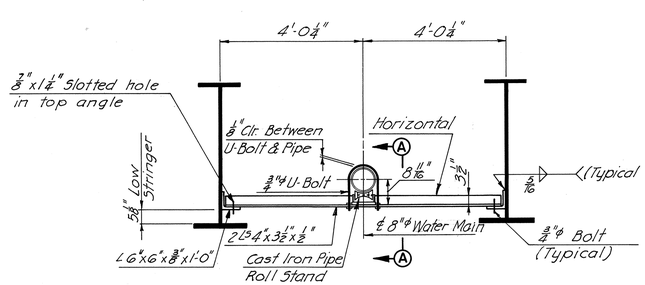
DETAIL "C"
Scale: 1"=1'-0"



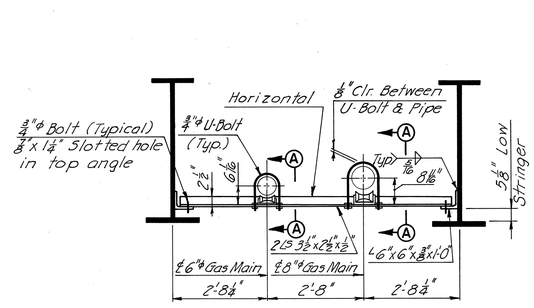
ELECTRICAL CONDUIT SUPPORT DETAILS
Scale: ½"=1'-0"



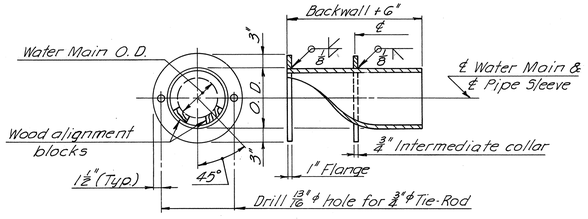
TELEPHONE CONDUIT SUPPORT DETAILS
Scale: ½"=1'-0"



WATER MAIN SUPPORT DETAILS
Scale: ½"=1'-0"

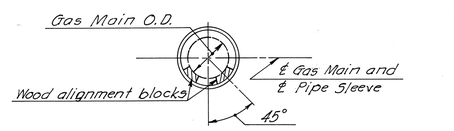


GAS MAIN SUPPORT DETAILS
Scale: ½"=1'-0"



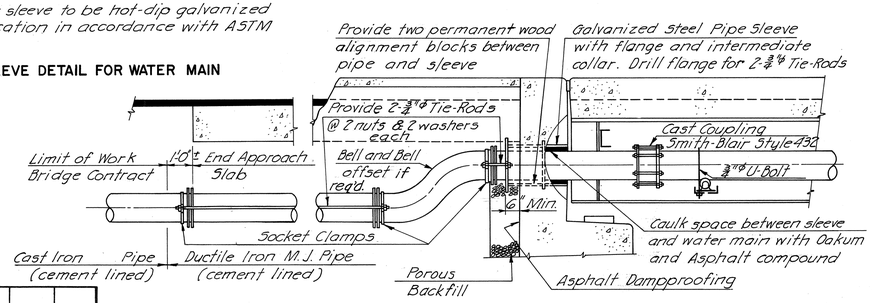
NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR WATER MAIN

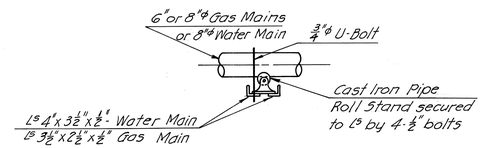


NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

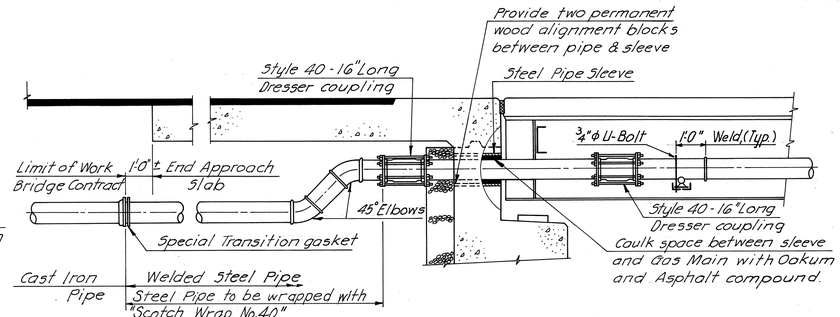
PIPE SLEEVE DETAIL FOR GAS MAIN



WATER MAIN DETAILS AT ABUTMENTS
Scale: ⅜"=1'-0"



SECTION A-A
No Scale



GAS MAIN DETAILS AT ABUTMENTS
Scale: ⅜"=1'-0"

NOTES:
For General Notes, see Sheet 1.
For Slab Plan, see Sheet 10.
For Framing Plan, see Sheet 8.
For Electrical Conduit Hanger Details, see Sheet S10.

	BY	DATE				
MADE	CFS	9-67		AS BUILT	HMW	
CHECKED	WEO	10-67	1	Rev. No. VEPCO Conduits	DGT	11-12-74
IN CHARGE	WEO		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B47
RANDOLPH STREET OVER
DOWNTOWN EXPRESSWAY

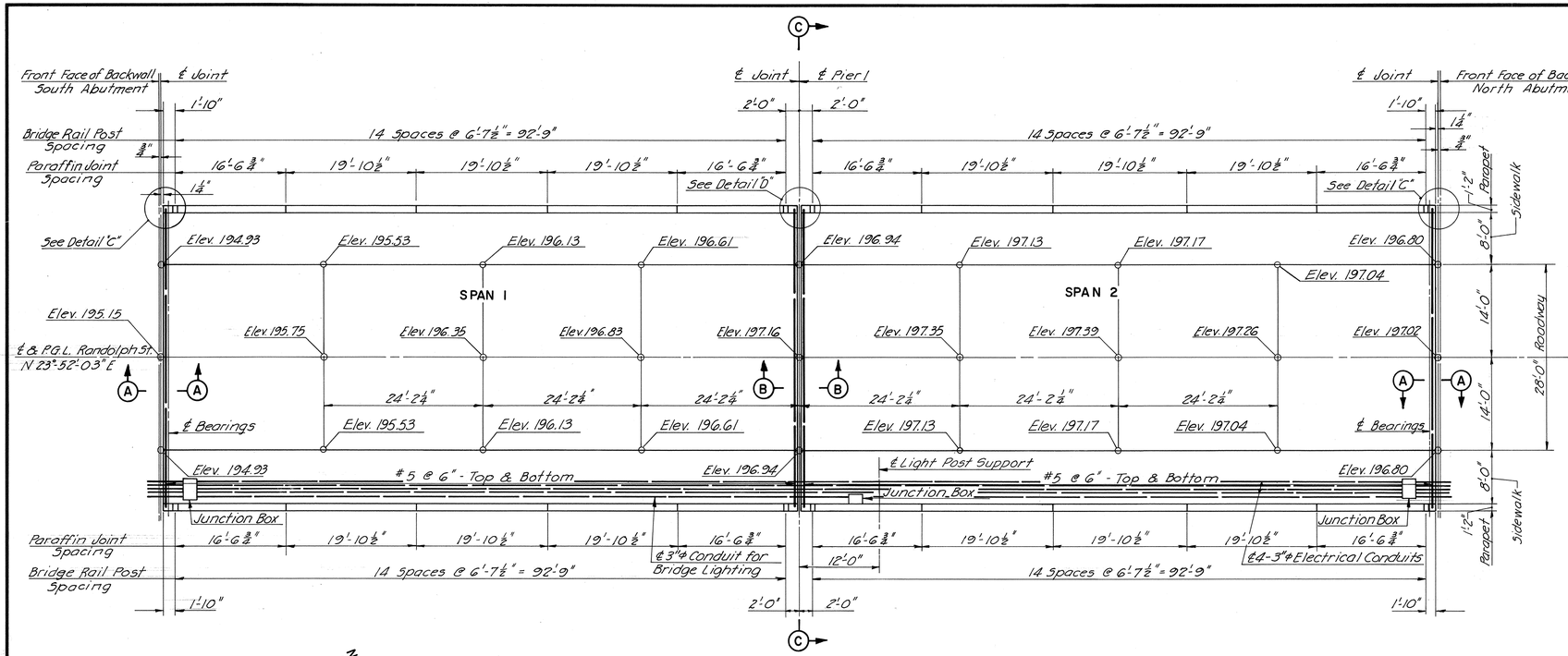
CROSS SECTION & UTILITY DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

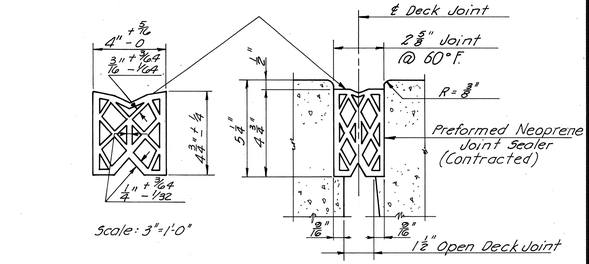
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 9 OF 12

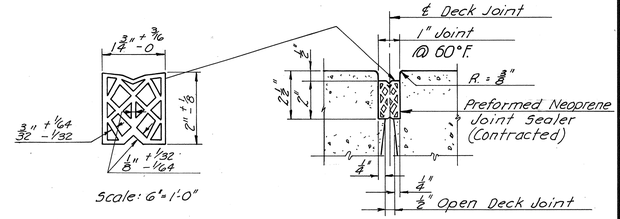
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	193	



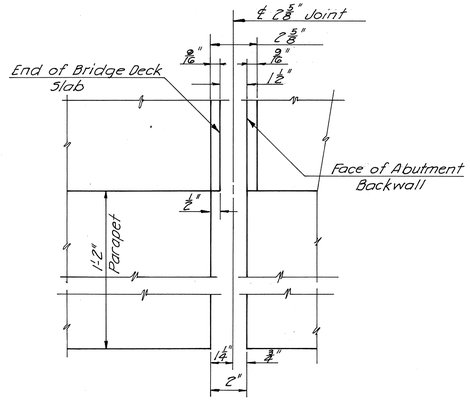
DECK PLAN
Scale: 1"=10'-0"



DETAIL "A"
Scale: 3"=1'-0"



DETAIL "B"
Scale: ½"=1'-0"



DETAIL "C"
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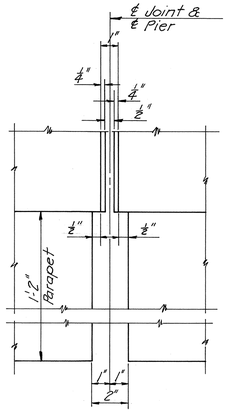
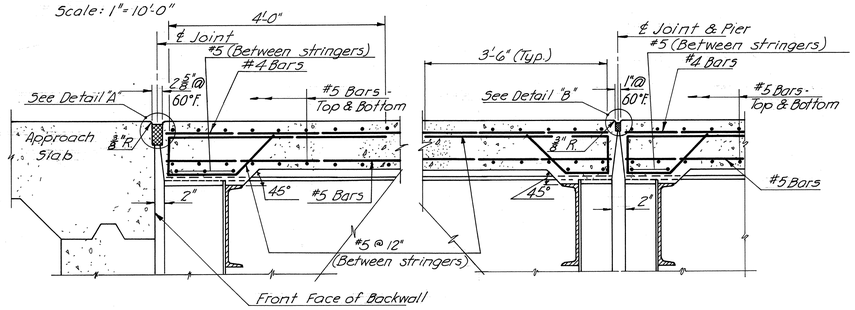


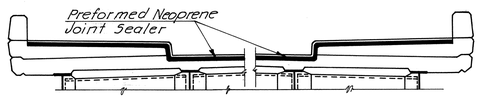
DETAIL "D"
Scale: 3"=1'-0"



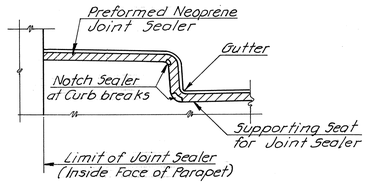
SECTION A-A
Scale: ¾"=1'-0"

SECTION B-B
Scale: ¾"=1'-0"

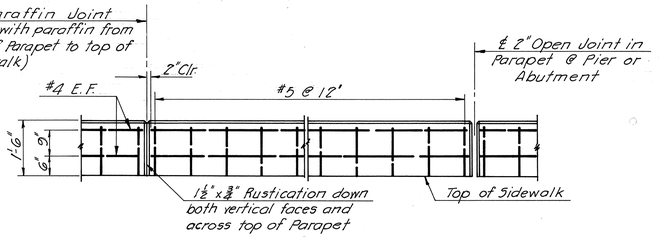
Note to Contractor:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.



SECTION C-C
Scale: ½"=1'-0"



TREATMENT OF JOINT AT CURB
No Scale



TYPICAL PARAPET ELEVATION
Scale: ½"=1'-0"

NOTES:
For Typical Deck Cross Section, see Sheet 9.
For Railing Details, see Sheet 53.
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 8.
For Light Post Support Details, see Sheet 54.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	R.P.R.	7-67				
CHECKED	W.E.O.	9-67				
IN CHARGE	W.E.O.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B47
RANDOLPH STREET OVER
DOWNTOWN EXPRESSWAY

DECK PLAN AND JOINT DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 10 OF 12

AS BUILT

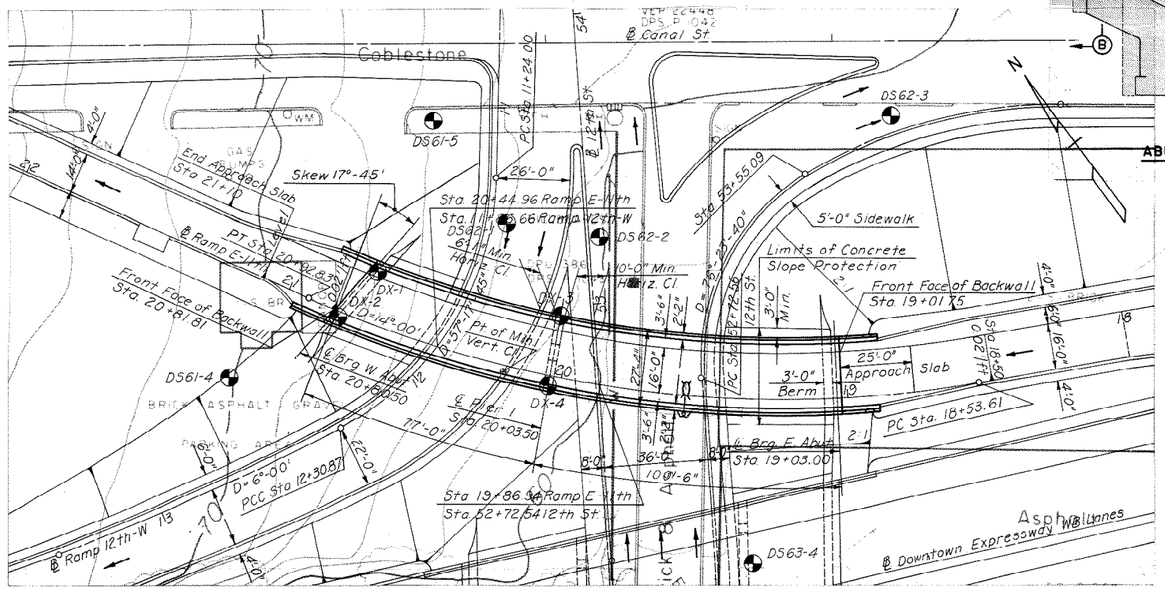
193

Bridge 62

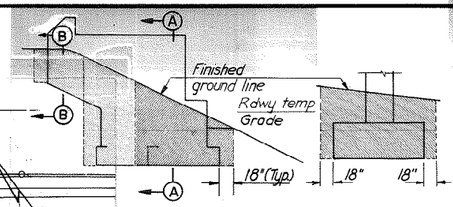
(Ramp from WB Downtown Expressway – Rte. 195 to Canal Street over 12th Street and the Ramp to WB Downtown Expressway)

Record Set Plans

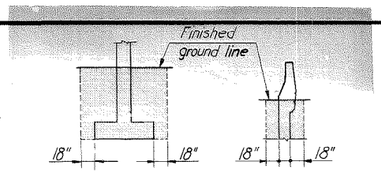
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	231	



PLAN
Scale: 1" = 25'



ABUTMENT

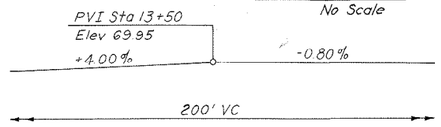


PIER

SECTION A-A

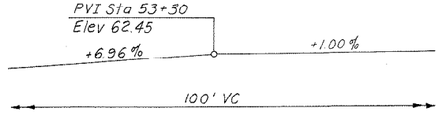
PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS

No Scale



PROFILE GRADE RAMP 12TH-W

No Scale



PROFILE GRADE 12TH ST

No Scale

SECTION B-B

GENERAL NOTES

ROADWAY: One 25'-0" face to face of rail.

CAPACITY: Dead Load-Includes 15 lbs. per sq. ft. for future wearing surface. Live Loads-HS20-44 loading and B.P.R. modified for military vehicles.

SPECIFICATIONS:
GENERAL-Virginia Department of Highway Road and Bridge Specifications, 1970.
DESIGN-A.A.S.H.O. Standard Specifications for Highway Bridges, 1961, modified by Special Design Provisions.
WELDING-1969 Standard Specifications for welded Highway and Railway Bridges of the American Welding Society.

CONTRACT SPECIAL PROVISIONS

Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM: CITY OF RICHMOND

TEMPERATURE: The normal temperature referred to on the plan is 60°F. The temperature range for movement is 0°F. to 120°F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be kept dry and special attention is called to Section 401.05 of the General Specifications and to the Contract Special Provisions concerning preparation of foundations for footings.

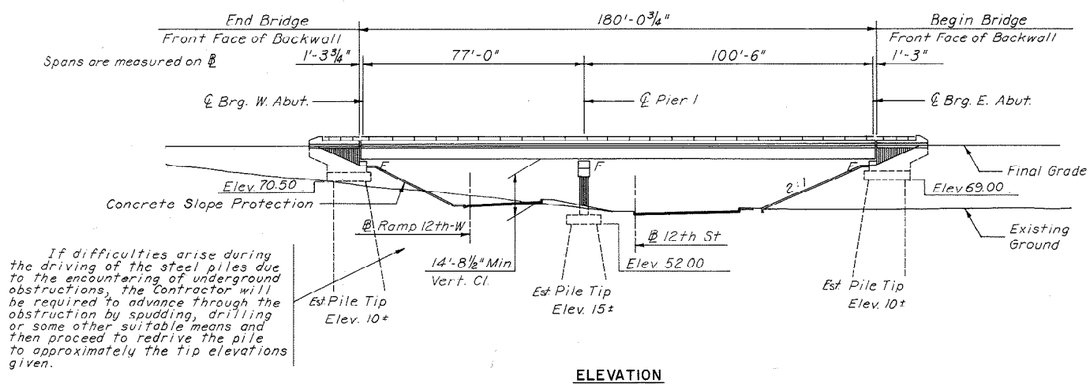
CONCRETE NOTES:
Concrete in superstructure shall be Class A4. All other concrete shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, the use of low-slump concrete, and or other means shall be employed to prevent downgrade movement of newly placed slab concrete. (When gradient is over 4%).

Finishing concrete surfaces: See the Standard Architectural Detail Sheets and the Contract Special Provisions for types and details.

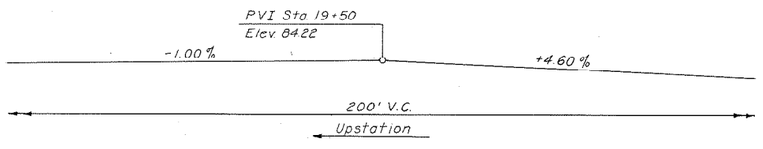
All reinforcing steel shall conform to ASTM A615 grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Specification A36 except as noted.

All Field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325. All shop welded web splices, flange splices and web to flange welds shall be made by the submerged arc process.



ELEVATION
Scale: 1"=25'



PROFILE RAMP E-11TH
No Scale

INDEX OF SHEETS

ESTIMATE OF QUANTITIES

	Structure Excavation C.Y.	Concrete Class A4 C.Y.	Concrete Class A3 Substruc. C.Y.	Concrete Class A3 App. Slab C.Y.	Reinforcing Steel Lbs.	Structural Steel A-36 Lbs.	Aluminum Br. Railing (1 Rail) L.F.	Porous Backfill C.Y.	Steel Piles 10BP42 L.F.	Conc. Slab Slope Prot. S.Y.	Asphalt Dampproof'g S.Y.	Underdrain 6"ø Pipe L.F.	Metal Conduit 3"ø L.F.
Superstructure		171.51			39,055	168,253	349						183
West Abutment	133		18.63		4,298		30	5	581.3	123.25	14	59	23.5
East Abutment	135		81.50		4,235		30	5	719.3	162.2	14	55	23.5
Pier 1	113		71.37		22,443				670.1				
Approach Slabs				49.82	11,682								
Total	381	171.51	231.50	49.82	81,713	168,253	409	10	1970.7	286.45	28	114	230

AS BUILT

	BY	DATE				
MADE	JLJ	11-67	2	As Built	TEM	7-77
CHECKED	LDL	1-68	1	Revised Light Location	TEM	9-74
IN CHARGE	PRY		NO.	REVISION	BY	DATE

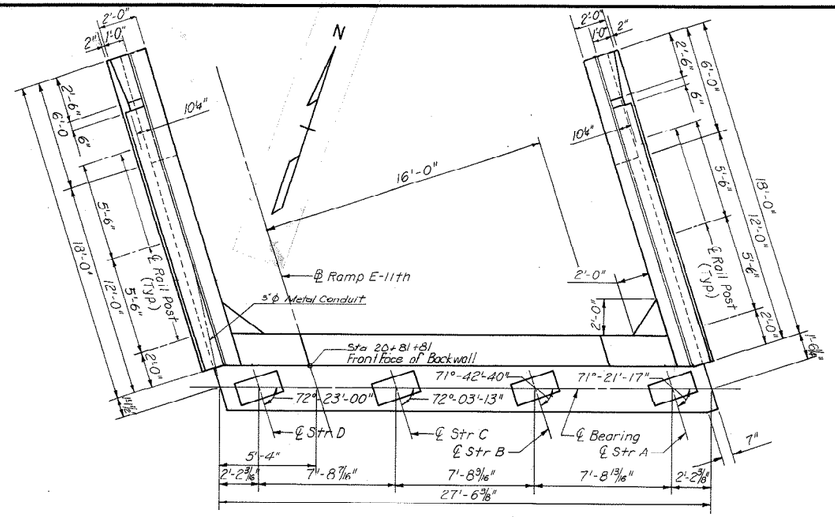
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 62
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST
GENERAL PLAN AND ELEVATION

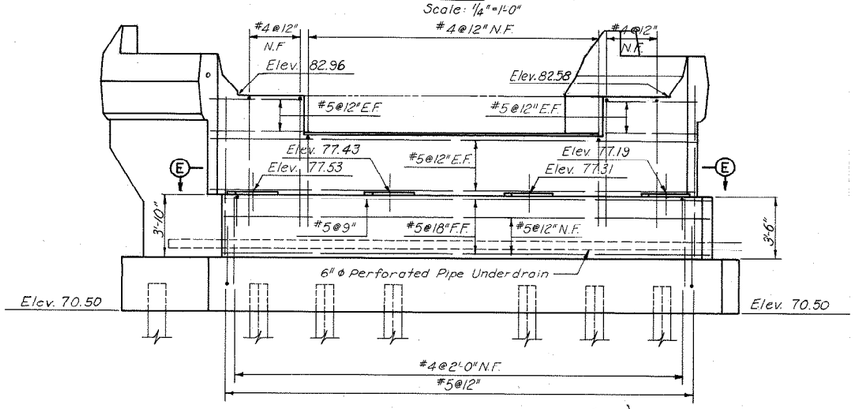
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 1 OF 11

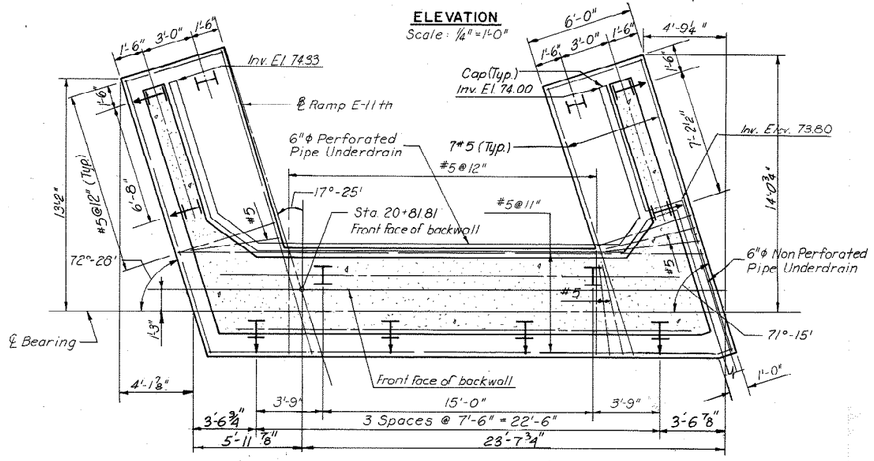
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	232	



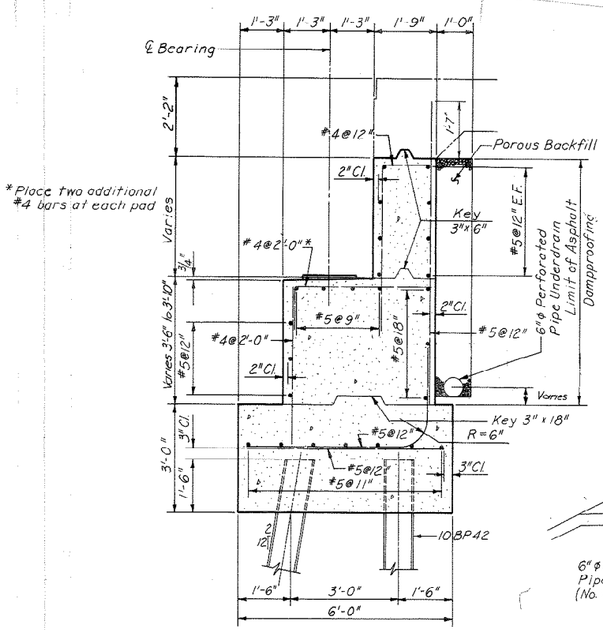
PLAN
Scale: 1/4"=1'-0"



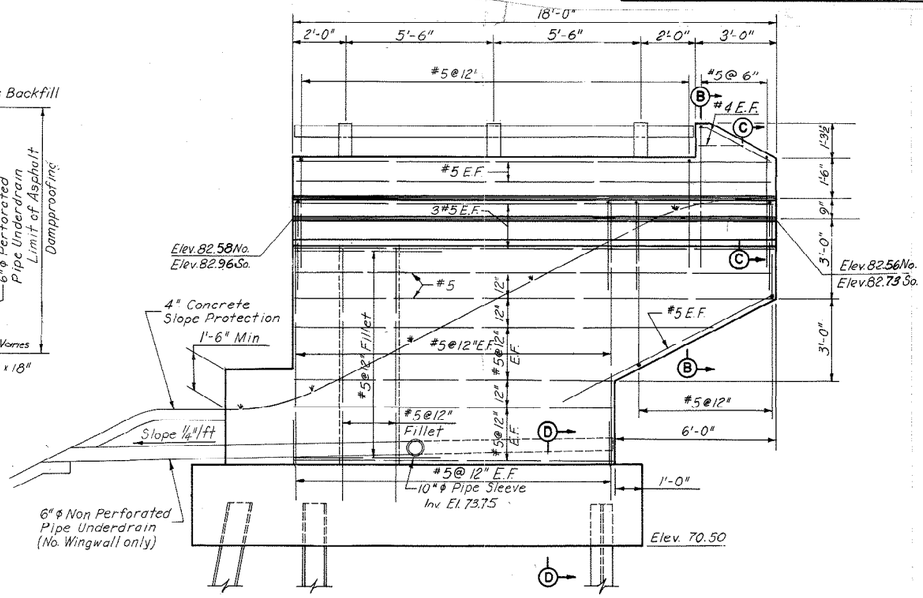
ELEVATION
Scale: 1/4"=1'-0"



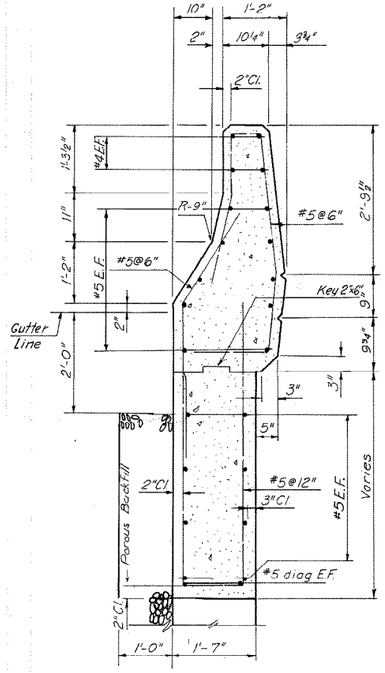
FOOTING PLAN
Scale: 1/4"=1'-0"



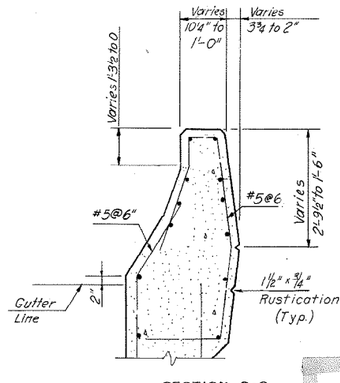
SECTION A-A
Scale: 1/2"=1'-0"



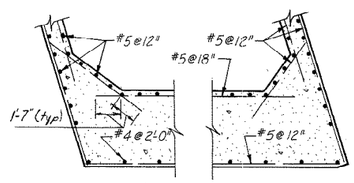
NORTH WINGWALL ELEVATION
Scale: 3/16"=1'-0"
South wingwall is similar except as noted or shown in Detail A and Plan



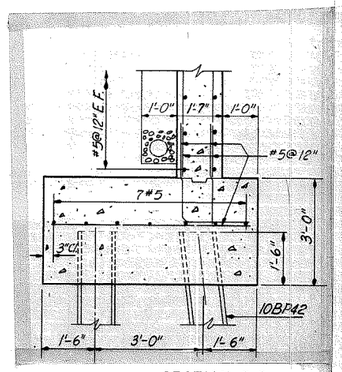
SECTION B-B
Scale: 3/4"=1'-0"



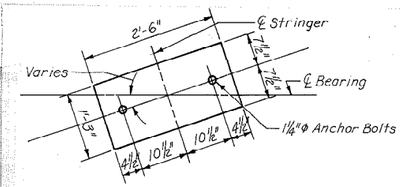
SECTION C-C
Scale: 3/4"=1'-0"



SECTION E-E
Scale: 1/4"=1'-0"



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



BEARING PAD DETAILS
Scale: 3/4"=1'-0"

Notes:
Footings should be founded at the elevations shown on the plans unless otherwise directed by the Engineer due to conditions at the site during construction. In such cases, the Engineer will determine the extent of redesign necessary and will advise the Contractor before construction begins.
If difficulties arise during the driving of the steel piles due to the encountering of underground obstructions, the Contractor will be required to advance through the obstruction by spudding, drilling or some other suitable means and then proceed to redrive the pile to approximately the tip elevations given.
All piles shall be 10 BP42 Steel Piles (Design Capacity = 45 tons)

	BY	DATE				
MADE	JLJ	1-68				
CHECKED	LDL	1-68	1	As Built	TEM	7-77
IN CHARGE PRY			NO.	REVISION	BY	OATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

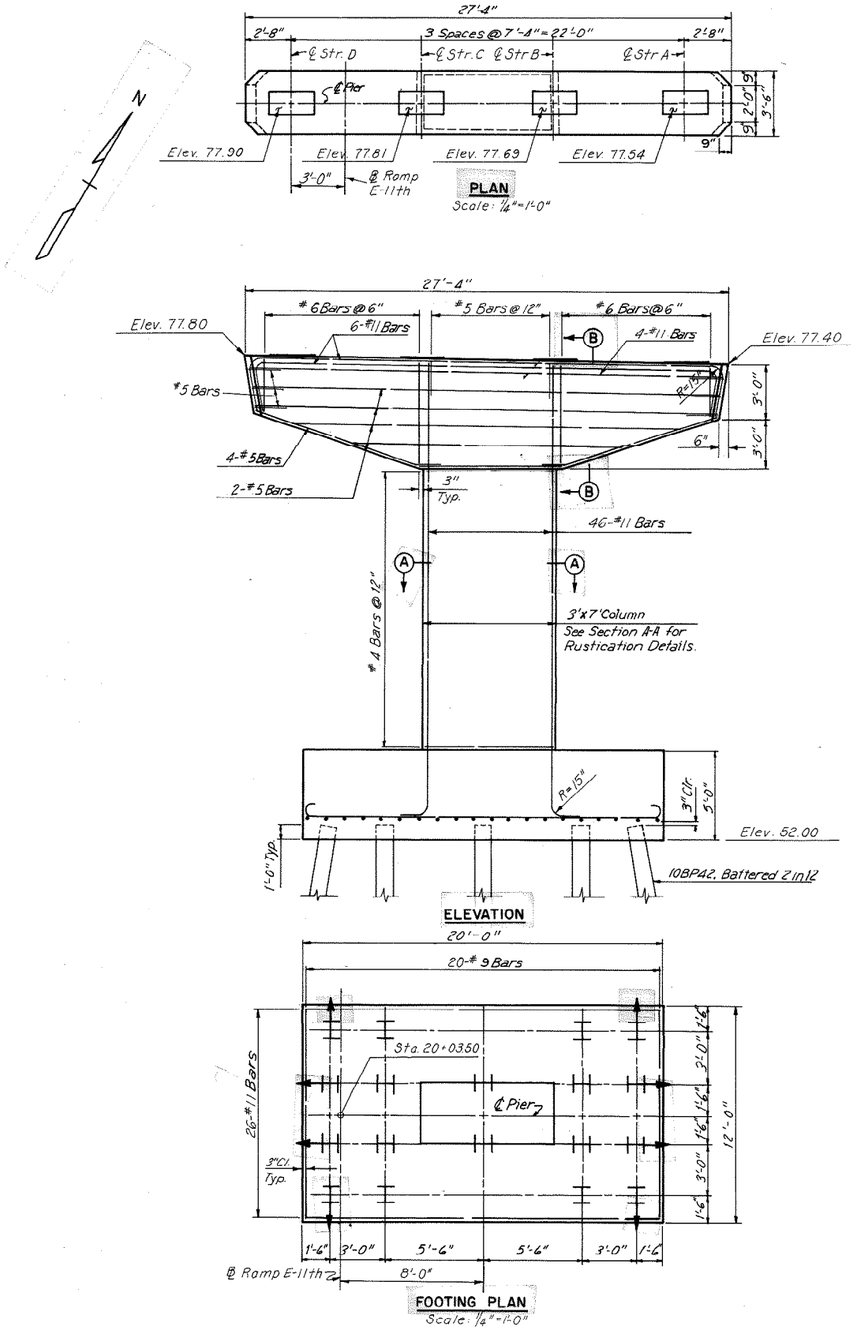
BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W
OVER 12TH ST.

WEST ABUTMENT

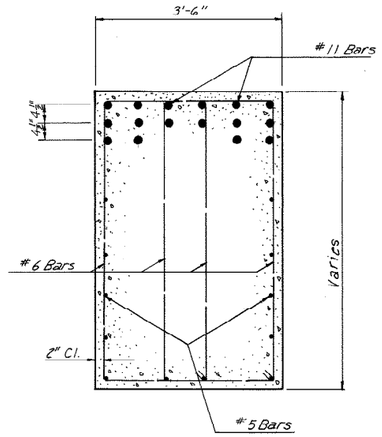
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 2 OF 11

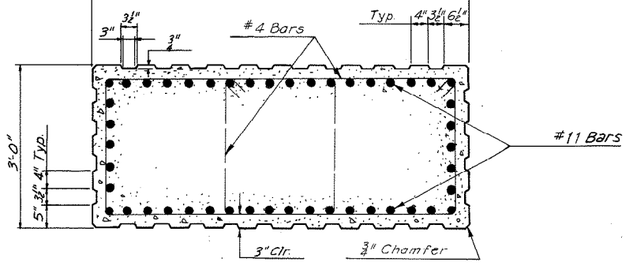
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	234	



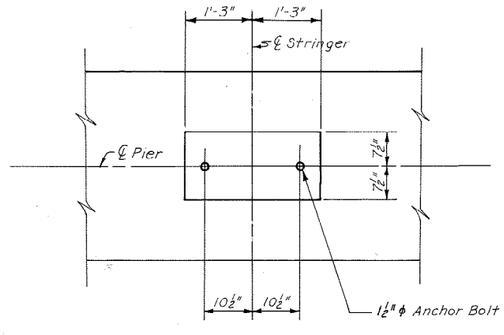
Note:
I indicates pile battered 2:12 in direction of arrow.



SECTION B–B
Scale: 3/4"=1'-0"



SECTION A–A
Scale: 3/4"=1'-0"



BEARING PAD DETAILS
Scale: 3/4"=1'-0"

Notes:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.
If difficulties arise during the driving of the steel piles due to the encountering of underground obstructions, the Contractor will be required to advance through the obstruction by spudding, drilling or some other suitablemeans and then proceed to redrive the pile to approximately the tip elevations given.

All piles shall be 10BP42 Steel Piles (Design Capacity = 45 tons)

	BY	DATE				
MADE	R.R.P.	1-3-68				
CHECKED	J.L.J.	1-68	1	As Built	TCM	7-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W
OVER 12TH ST.

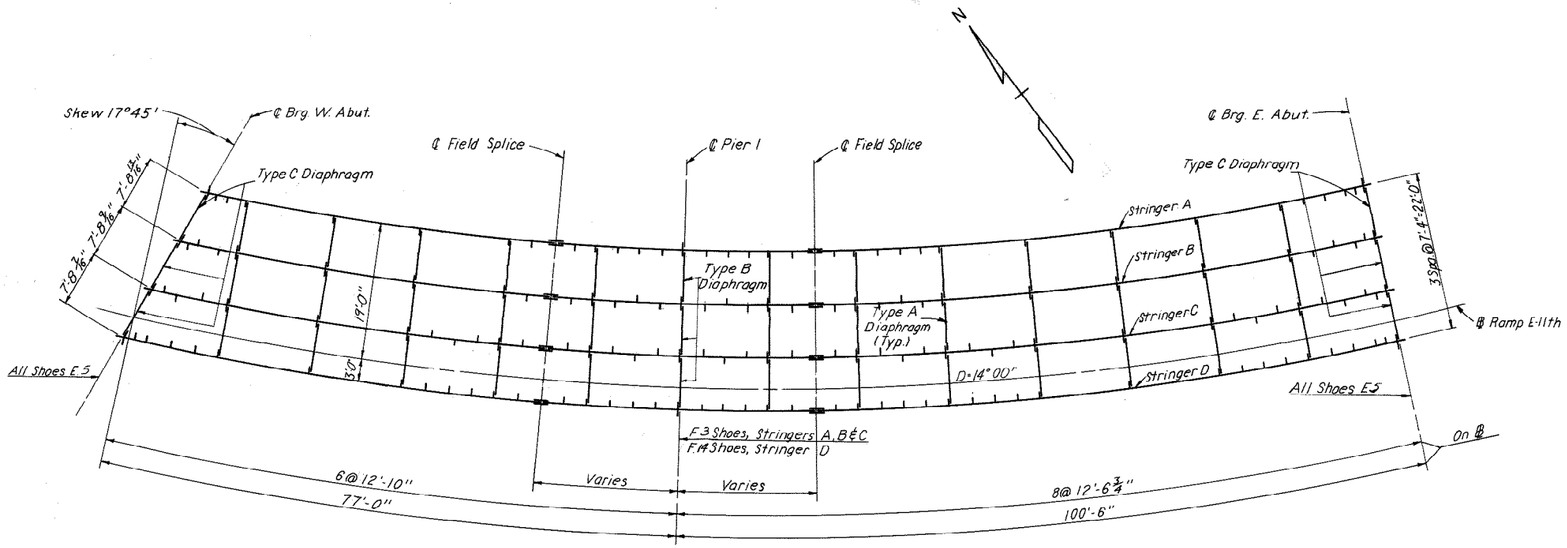
PIER 1

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 9
SHEET NO. 4 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	235	

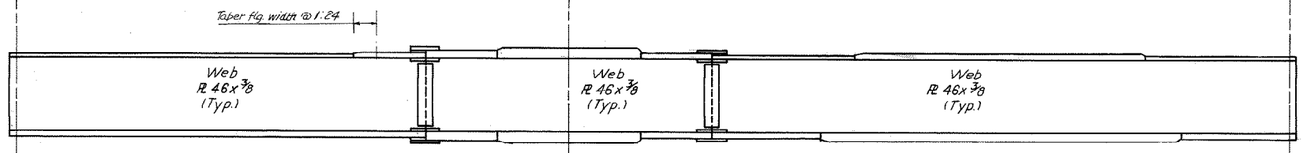
SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E5	8	F3	3
		F14	1



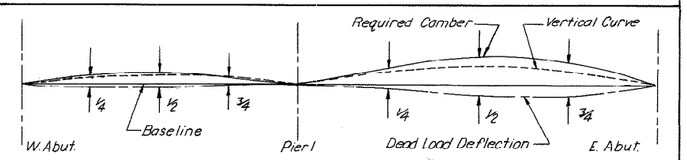
FRAMING PLAN
Scale 1"=10'

	Area A							Area B							Area A							
	0.0L-0.1L	0.0L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L	0.5L-0.6L	0.6L-0.7L	0.7L-0.8L	0.8L-0.9L	0.9L-1.0L	0.0L-0.1L	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L	0.5L-0.6L	0.6L-0.7L	0.7L-0.8L	0.8L-0.9L	0.9L-1.0L③	
Shear Stud Spacing	10"	13"	17"	24"	21"	15"	12"	15"	13"	12"	12"	13"	10"	12"	17"	24"	24"	17"	12"	9"	Stringer A
	10"	13"	17"	21"	24"	18"	14"	18"	16"	15"	15"	16"	12"	14"	18"	24"	24"	18"	14"	10"	Stringer B
	10"	12"	16"	20"	21"	16"	12"	15"	13"	13"	13"	15"	11"	14"	18"	24"	22"	17"	12"	10"	Stringer C
	8"	10"	14"	20"	18"	12"	10"	12"	10"	9"	9"	9"	7"	10"	14"	20"	20"	14"	9"	7"	Stringer D
Top Flange	PL 12 x ½ x 41'-3 5/16		PL 16x ¾ x 10'-0	PL 16x 1¼ x 8'-0	PL 16x 2 x 16'-0		PL 16x 1 x 8'-0														Stringer A
	PL 12 x ½ x 45'-0 ¾		PL 16x ¾ x 10'-0	PL 16x 1½ x 8'-0	PL 16x 2 x 16'-0		PL 16x 1 x 10'-0	PL 12 x ½ x 21'-0		PL 12 x 1 x 40'-0							PL 12 x ½ x 18'-7 7/8			Stringer B
	PL 12 x ½ x 46'-9 9/16		PL 16x ¾ x 10'-0	PL 16x 1½ x 10'-0	PL 16 x 2¼ x 16'-0		PL 16x 1 ¼ x 8'0	PL 12 x ¾ x 20'-0		PL 12 x 1 ¼ x 45'-0							PL 12 x ¾ x 18'-5 ¼			Stringer C
	PL 12 x ½ x 48'-6 5/16		PL 16x 1 x 10'-0	PL 16x 1¾ x 10'-0	PL 16 x 3 x 20'-0		PL 16x 1½ x 8'-0	PL 12 x 1 x 21'-0		PL 12 x 1 ⅜ x 44'-0							PL 12 x 1 x 18'-2 13/16			Stringer D
Bottom Flange	PL 16 x ¾ x 51'-3 5/16		PL 16x 1¼ x 8'-0		PL 16 x 2 x 16'-0		PL 16x 1 x 25'-0			PL 16x 1½ x 45'-0							PL 16x 1 x 17'-10				Stringer A
	PL 16 x ¾ x 55'-0 ¾		PL 16x 1½ x 8'-0		PL 16 x 2 x 16'-0		PL 16x 1 x 27'-0			PL 16x 1½ x 45'-0							PL 16x 1½ x 17'-7 7/8				Stringer B
	PL 16 x ¾ x 56'-9 9/16		PL 16x 1½ x 10'-0		PL 16 x 2½ x 16'-0		PL 16x 1¼ x 27'-0			PL 16x 2 x 47'-0							PL 16x 1 15/16 x 17'-3 5/8				Stringer C
	PL 16x 1 x 58'-6 5/16		PL 16x 1¾ x 10'-0		PL 16 x 3 x 20'-0		PL 16x 1½ x 22'-0			PL 16x 2 ¾ x 55'-0							PL 16x 1 ½ x 14'-2 7/8				Stringer D
Intermediate Stiffener Spacing (Between Diaphragms)	3 Spa. ①	No Stiffeners			4 Eq. Spa. ②	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa. ②	4 Eq. Spa.	No Stiffeners									5 Spa. ①	Stringer A
	4 Spa. ①	No Stiffeners			4 Eq. Spa. ②	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa. ②	4 Eq. Spa.	No Stiffeners									5 Spa. ①	Stringer B
	4 Spa. ①	No Stiffeners	4 Eq. Spa.	4 Eq. Spa. ②	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa. ②	4 Eq. Spa.	4 Eq. Spa.	No Stiffeners	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa.	No Stiffeners	4 Eq. Spa.	4 Eq. Spa.	5 Spa. ①	5 Spa. ①	Stringer C
	5 Spa. ①	No Stiffeners	4 Eq. Spa.	4 Eq. Spa. ②	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa. ②	4 Eq. Spa.	4 Eq. Spa.	No Stiffeners	4 Eq. Spa.	4 Eq. Spa.	4 Eq. Spa.	No Stiffeners	4 Eq. Spa.	4 Eq. Spa.	5 Spa. ①	5 Spa. ①	Stringer D
Diaphragm Spacing	6'-1 1/16"	5 Spa. @ abt. 12'-2 3/8" = 61'-2 1/4"						8 Spa. @ abt. 11'-11 3/4" = 95'-10"													Stringer A
	8'-8 1/16"	5 Spa. @ abt. 12'-5 5/8" = 62'-4 1/16"						8 Spa. @ abt. 12'-2 7/16" = 97'-7 5/8"													Stringer B
	11'-3 1/16"	5 Spa. @ abt. 12'-8 3/8" = 63'-5 7/8"						8 Spa. @ abt. 12'-5 5/8" = 99'-5 1/4"													Stringer C
	13'-10 1/16"	5 Spa. @ abt. 12'-11 1/8" = 64'-7 5/8"						8 Spa. @ abt. 12'-7 7/8" = 101'-2 13/16"													Stringer D
Spans	67'-3 15/16"							95'-10"													Stringer A
	71'-0 3/4"							97'-7 5/8"													Stringer B
	74'-9 9/16"							99'-5 1/4"													Stringer C
	78'-6 5/16"							101'-2 13/16"													Stringer D

GIRDER ELEVATION
No Scale

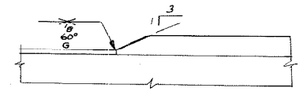


DEFLECTION AND CAMBER



STRINGER	ITEM	W. ABUT.	1/4	1/2	3/4	PIER 1	1/4	1/2	3/4	E. ABUT.
A	Steel	0	1/16	1/16	0	0	3/16	3/8	1/4	0
	Slab	0	3/16	1/8	0	0	5/8	1 1/16	2/8	0
	Curb and Parapet	0	1/16	1/16	-1/16	0	1/4	1/16	3/8	0
	Vertical Curve	0	15/16	1 5/8	1 3/16	0	3 3/16	4 1/4	3 3/16	0
	Required Camber	0	1 1/4	1 7/8	1 5/16	0	4 5/8	6 1/8	4 11/16	0
B	Steel	0	1/16	1/16	0	0	1/4	3/8	1/4	0
	Slab	0	3/16	1/8	0	0	3/4	1 5/16	1 1/16	0
	Curb and Parapet	0	0	0	0	0	0	1/16	0	0
	Vertical Curve	0	15/16	1 5/8	1 3/8	0	3 3/16	4 1/4	3 3/16	0
	Required Camber	0	1 3/16	1 13/16	1 3/8	0	4 3/16	6	4 1/2	0
C	Steel	0	1/16	1/16	0	0	3/16	3/8	1/4	0
	Slab	0	1/4	3/16	0	0	3/4	1 5/16	1 1/16	0
	Curb and Parapet	0	0	0	0	0	1/16	1/8	1/16	0
	Vertical Curve	0	15/16	1 11/16	1 7/16	0	3 3/16	4 1/4	3 3/16	0
	Required Camber	0	1 1/4	1 15/16	1 7/16	0	4 3/16	6 1/16	4 9/16	0
D	Steel	0	1/16	1/16	0	0	1/4	5/16	1/4	0
	Slab	0	1/4	3/16	0	0	5/8	1 1/8	7/8	0
	Curb and Parapet	0	1/8	1/8	0	0	5/16	9/16	7/16	0
	Vertical Curve	0	15/16	1 11/16	1 7/16	0	3 3/16	4 1/4	3 3/16	0
	Required Camber	0	1 3/8	2 1/16	1 7/16	0	4 3/8	6 1/4	4 3/4	0

The stringers shall be fabricated with an upward camber amounting to the tabulated values. These values are in inches. This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
The deflections anticipated to occur in the stringer upon placement of the total concrete deck dead load are equal to the sum of the values listed for "Slab" and "Curb and Parapet".
Deviations from exact camber of the stringers shall be provided for by adjusting forms to vary the thickness of the concrete bolster between the bottom of the slab and the top of the stringers.



SHOP FLANGE SPLICE DETAILS

① The first two spaces at the ends of the stringers shall be one-half of the remaining spaces.

② Stiffeners shall be relocated as required to clear web splice plates.

③ See Shear Stud Details At End Bearings.

	BY	DATE				
MADE	RDR	12-67				
CHECKED	JLJ	1-68	1	As Built	TEM	7-77
IN CHARGE PRY			NO.	REVISION	BY	DATE

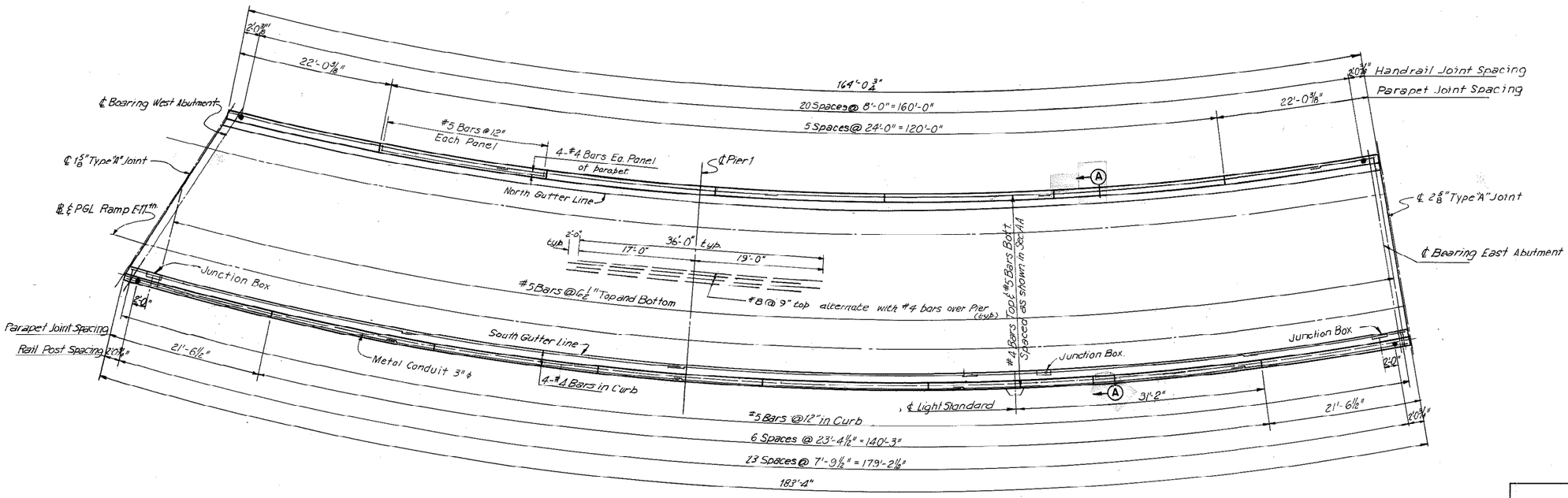
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W OVER 12TH ST.
STRINGERS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

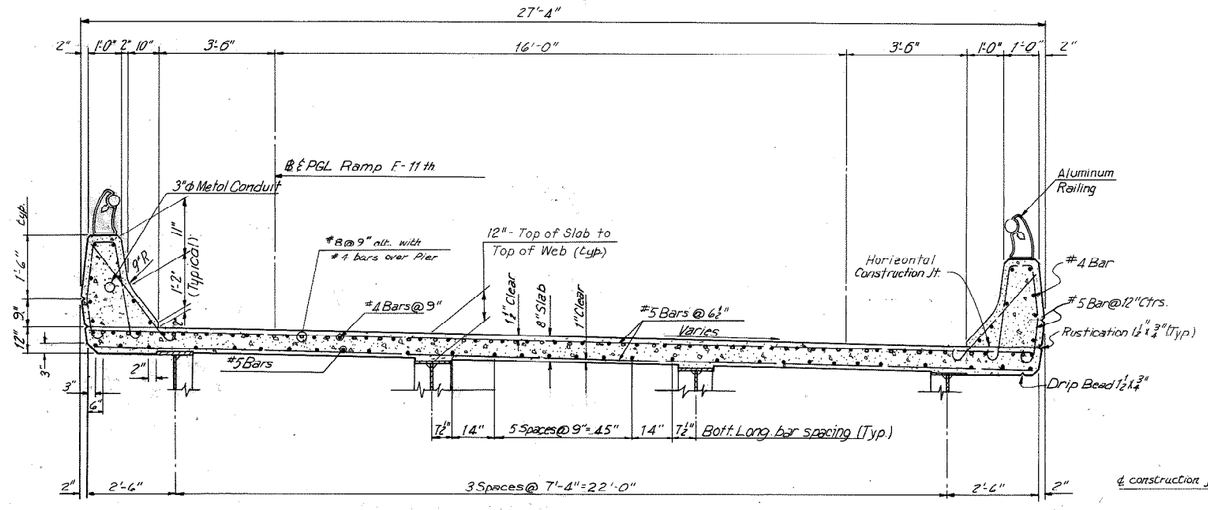
SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 5 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	237	

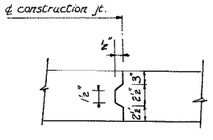


DECK PLAN
Scale 1/8"=1'-0"

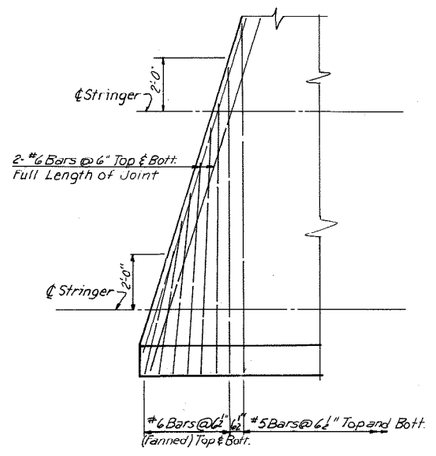
TABLE OF ELEVATIONS			
LOCATION	N. GUTTER	BASE LINE	S. GUTTER
℄ JT. W. ABUT	82.58	82.90	82.96
1/4 POINT	82.76	83.10	83.16
1/2 POINT	82.92	83.29	83.35
3/4 POINT	83.00	83.39	83.46
℄ PIER I	82.99	83.38	83.45
1/4 POINT	82.83	83.22	83.29
1/2 POINT	82.48	82.87	82.94
3/4 POINT	81.95	82.34	82.41
℄ JT. E. ABUT	81.23	81.63	81.70



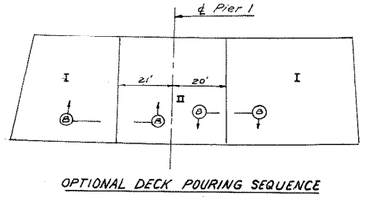
SECTION A-A
Scale 1/2"=1'-0"



SECTION B-B
no scale



ACUTE CORNER REINFORCING FOR DECK SLAB
Scale 3/8"=1'-0"



OPTIONAL DECK POURING SEQUENCE
no scale
I indicates first pour
II indicates second pour

Note:
Deck poured in one pour.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	RRP	12-20-67	2	As Built	TEM	7-77
CHECKED	JLJ	12-22-67	1	Revised Light Std. Locations	T.E.M.	9-74
IN CHARGE PRV						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

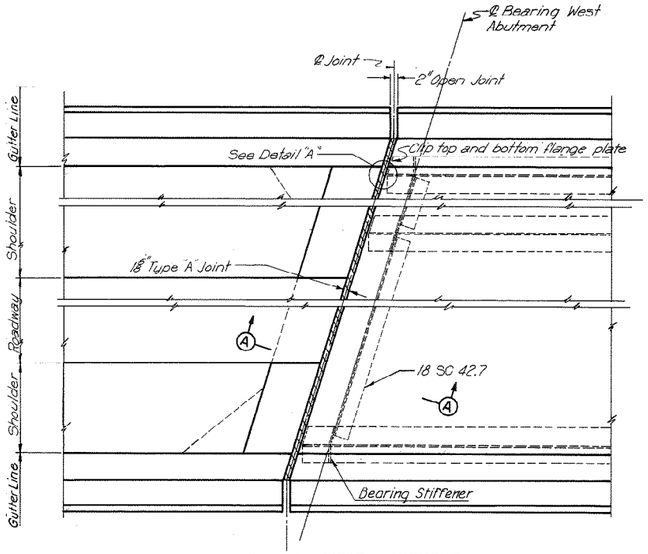
BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W OVER 12TH ST.

SLAB

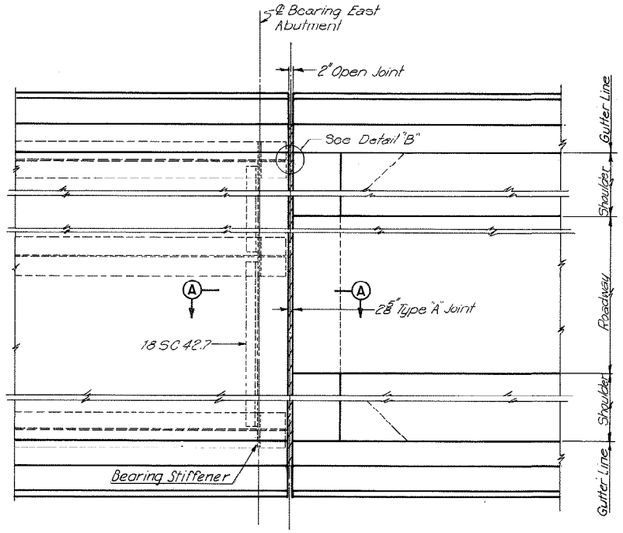
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 7 OF 11

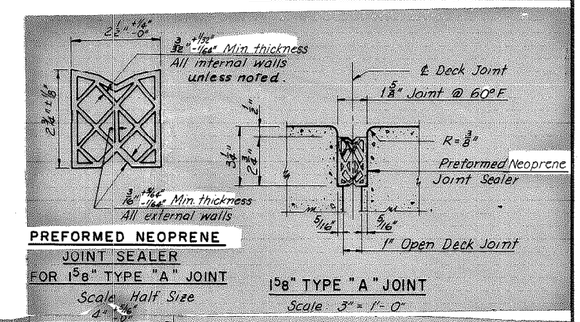
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	238	



PLAN-JOINT AT WEST ABUTMENT
No Scale

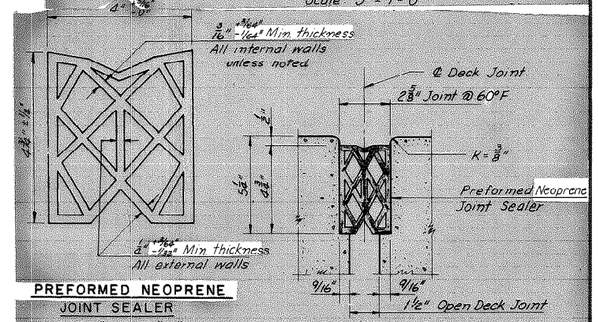


PLAN-JOINT AT EAST ABUTMENT
No Scale



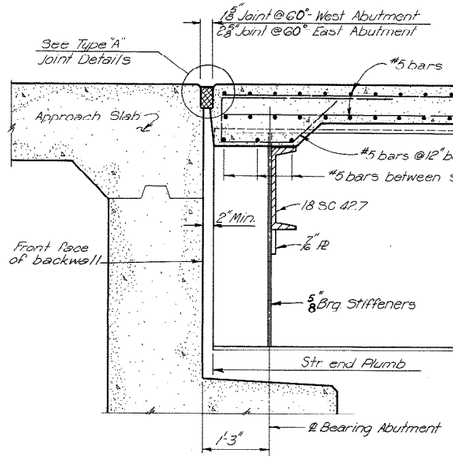
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half Size

1⅝" TYPE "A" JOINT
Scale 3" = 1'-0"

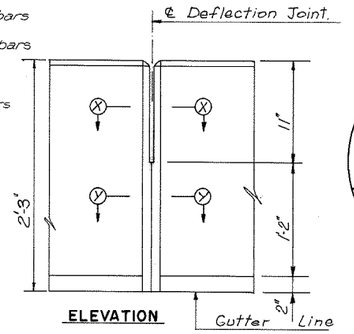


PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT
Scale: Half Size

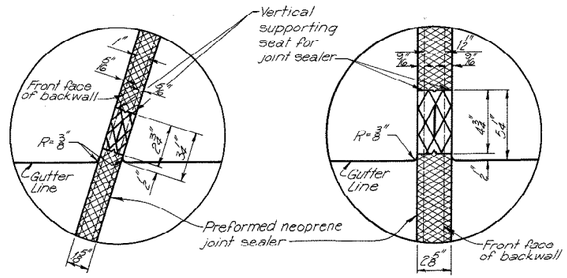
2⅝" TYPE "A" JOINT
Scale 3" = 1'-0"



SECTION A-A
Scale: 3/2"=1'-0"

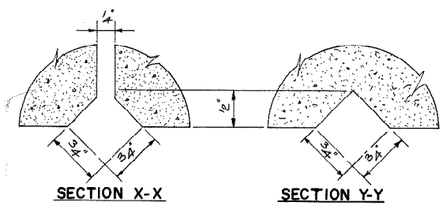


ELEVATION



DETAIL "A"
No Scale

DETAIL "B"
No Scale

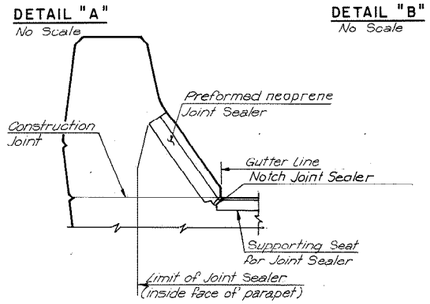


SECTION X-X

SECTION Y-Y

Note: Groove details are for both sides of parapet.

PARAPET DEFLECTION JOINT DETAILS



TREATMENT OF TYPE "A" JOINT AT GUTTER LINE
No Scale

NOTE TO CONTRACTOR:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	LDL	1-68	2	As Built	TEM	7-77
CHECKED	JLJ	1-68	⚠	PARAPET JOINT ADDED.	T.E.M	7-74
IN CHARGE	PRY					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

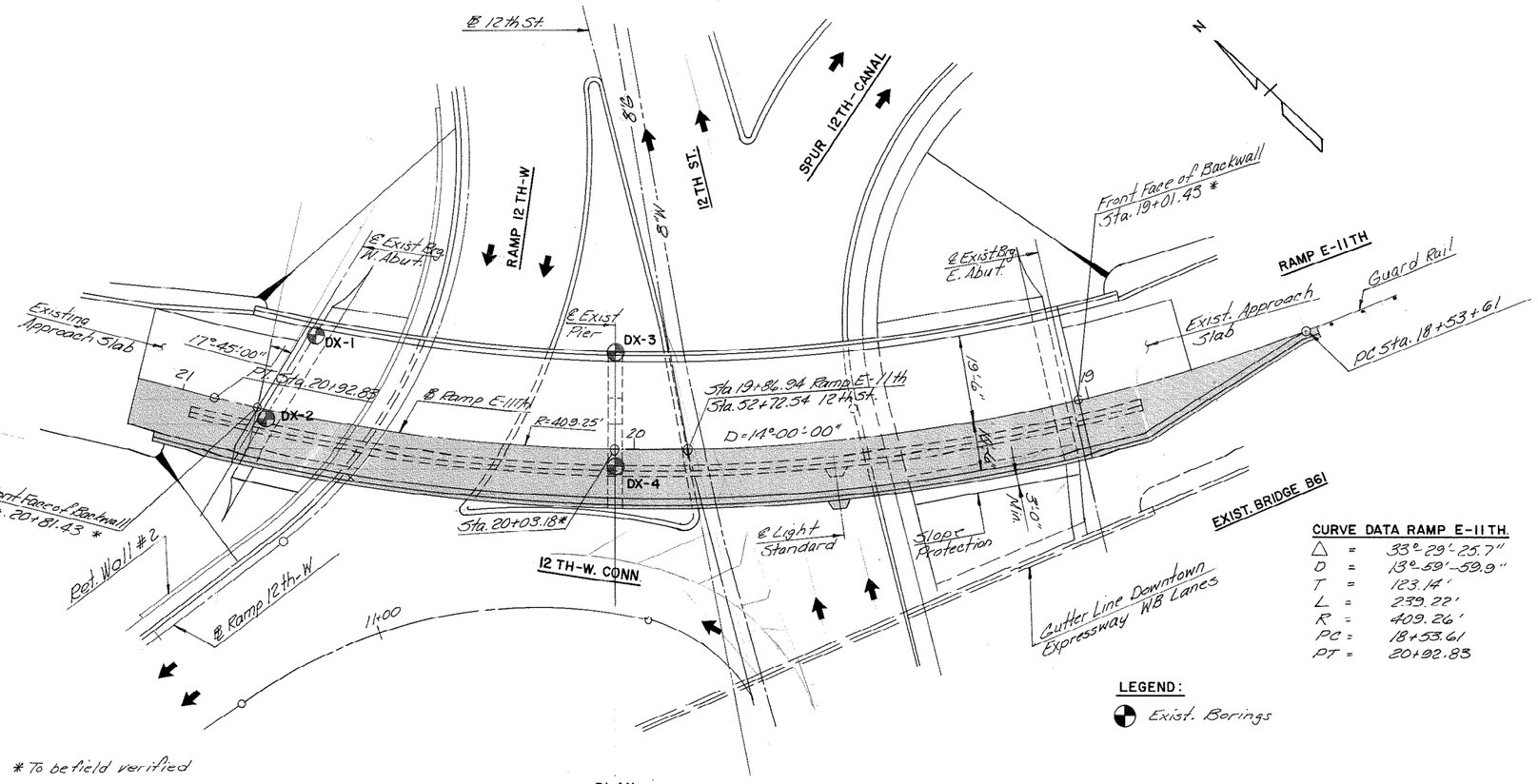
BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W OVER 12TH ST.

JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Shown
CONTRACT NO.: 9
SHEET NO. 8 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(1)	

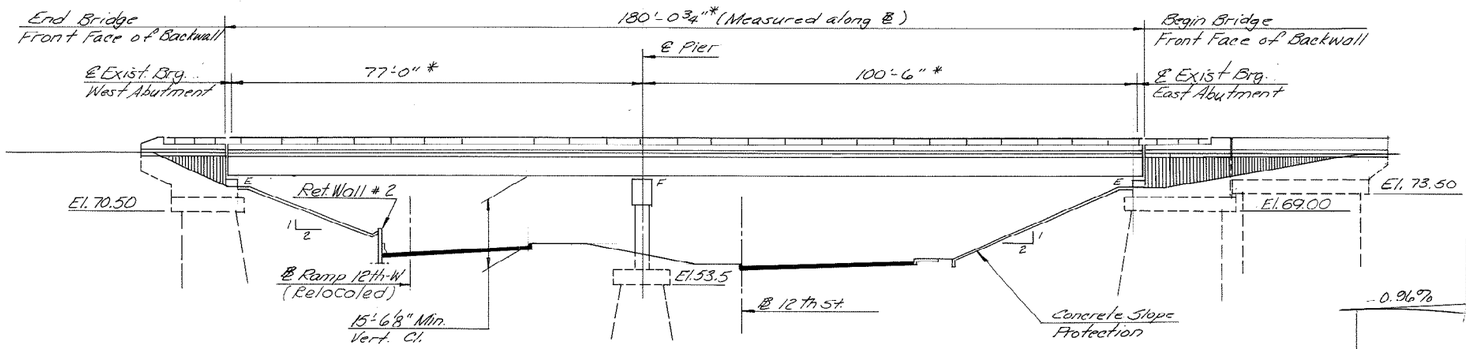


CURVE DATA RAMP E-11TH.		
△	=	33°-29'-25.7"
D	=	13°-59'-59.9"
T	=	123.14'
L	=	239.22'
R	=	409.26'
PC	=	18+53.61
PT	=	20+92.83

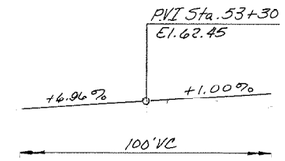
LEGEND:
Exist. Borings

* To be field verified

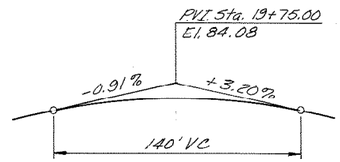
PLAN
Scale: 1"=15'



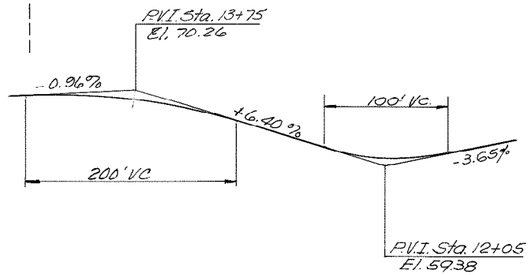
ELEVATION
Scale: 1"=15'



PROFILE GRADE 12TH. ST.
No Scale



PROFILE GRADE RAMP E-11 TH.
(WIDENING)
No Scale



PROFILE GRADE RAMP 12TH-W
(RELOCATED)
No Scale

GENERAL NOTES:

WIDTH: WIDENING OF 7'-0" TO THE SOUTH OF THE EXISTING STRUCTURE.

SPAN LAYOUT: 100.5'-77' CONTINUOUS STEEL PLATE GIRDER SPANS.

CAPACITY: HS20-44 LOADING AND ALTERNATE MILITARY LOADING. DESIGN LOADING INCLUDES 15 PSF FOR FUTURE WEARING SURFACE AND 20 PSF ALLOWANCE FOR CONSTRUCTION TOLERANCES AND CONSTRUCTION METHODS.

SPECIFICATIONS:

CONSTRUCTION: VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, 1987.

DESIGN: AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1989, INCLUDING INTERIM SPECIFICATIONS, 1990 AND VDOT MODIFICATIONS.

STANDARDS: VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE STANDARDS, 1989.

ALL DIMENSIONS ARE MEASURED HORIZONTALLY AND VERTICALLY UNLESS OTHERWISE SPECIFIED.

THESE PLANS ARE INCOMPLETE UNLESS ACCOMPANIED BY THE SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS INCLUDED IN THE CONTRACT DOCUMENTS.

THE USE OF STAY-IN-PLACE FORMS WILL NOT BE PERMITTED.

ALL STRUCTURAL STEEL SHALL BE ASTM A36, EXCEPT AS NOTED.

CONCRETE IN SUPERSTRUCTURE SHALL BE CLASS A4. ALL OTHER CONCRETE SHALL BE CLASS A3.

DEFORMED REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60. ALL REINFORCING BAR DIMENSIONS ON THE DETAILED DRAWINGS ARE TO CENTERS OF BARS EXCEPT WHERE OTHERWISE NOTED AND ARE SUBJECT TO FABRICATION AND CONSTRUCTION TOLERANCES.

H-PILES HAVE A DESIGN CAPACITY OF 45 TONS PER PILE, AND SHALL BE DRIVEN TO REFUSAL.

PRIOR TO THE COMMENCEMENT OF ANY WORK THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURE AND REPORT TO THE ENGINEER ANY DISCREPANCIES BETWEEN FIELD MEASUREMENTS AND MEASUREMENT SHOWN ON THE CONTRACT PLANS.

THE CONTRACTOR SHALL COORDINATE CONSTRUCTION OF RETAINING WALL NO. 2 WITH THE BRIDGE B62 CONTRACTOR.

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 1 OF 31

14237-21-02

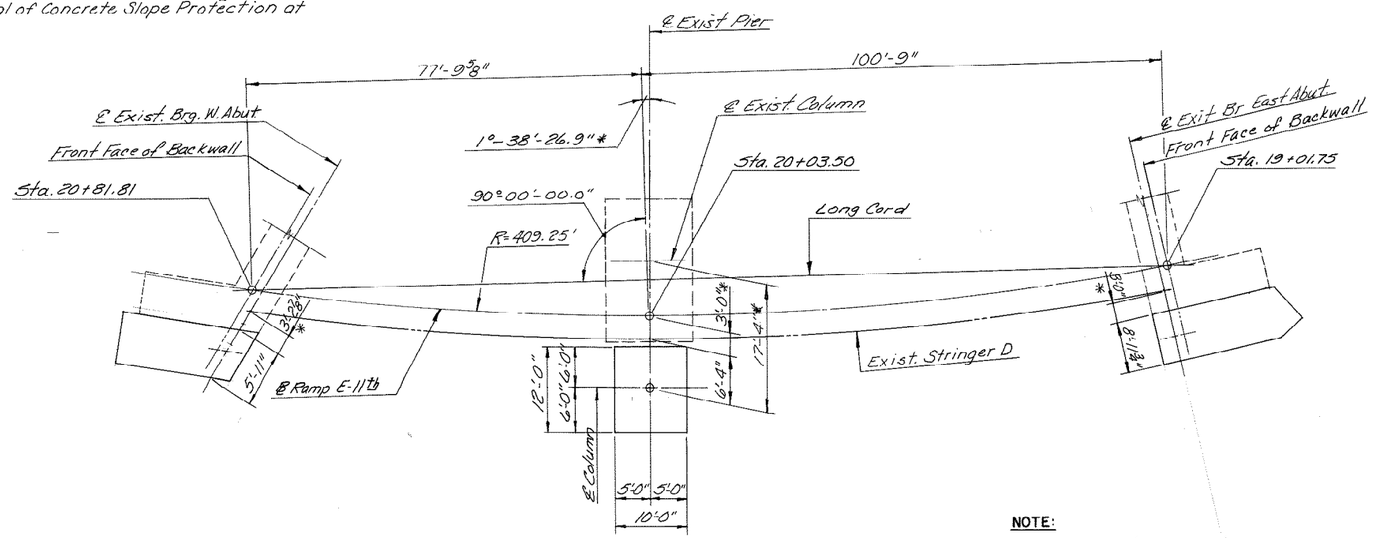
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6 (2)	

ESTIMATE OF QUANTITIES

	STRUCTURE EXCAVATION	STEEL PILES 10"	CONCRETE CLASS A3 SUBSTRUCTURE	CONCRETE CLASS A4 SUPERSTRUCTURE	CONCRETE CLASS A4 APPROACH SLABS	REINFORCING STEEL	EPOXY COATED REINFORCING STEEL	STRUCTURAL STEEL PLATE GIRDER	CONCRETE PARAPET	4" CONCRETE SLOPE PROTECTION	POROUS BACKFILL	6" DIA. PIPE UNDERDRAIN	REMOVE PORTION OF EXISTING STRUCTURE	EXPANSION JOINT REMOVAL	LATEX PORTLAND CEMENT CONCRETE	PREFORMED ELASTOMERIC 2" JOINT SEALER	DAMPPROOFING	REMOVE & RESET EXIT ALUMINUM BRIDGE RAILING (1 RAIL)
	C.Y.⊗	L.F	C.Y.	C.Y.	C.Y.	LBS.⊗	LBS.⊗	LBS.*	L.F.⊗	S.Y.⊗	C.Y.	L.F.	L.S.**	L.F.	C.Y.	L.F.⊗	S.Y.	L.F.
SUPERSTRUCTURE				60.2			16,593	65,960	185					58	9.4	71		188
WEST ABUT.	46	455	26.5			2,783			18	75	5	20					11	15
EAST ABUT.	141	970	66.6			6,180			58	42	13	60					38	11
PIER	51	335	24.3			2,952												
APPROACH SLAB					12.7	3,757												
TOTALS	238	1760	117.4	60.2	12.7	15,444	16,593	65,960	261	117	18	80	1	58	9.4	71	49	214

⊗ Denotes item to be paid for on basis of plan quantities in accordance with current VDOT Road & Bridge Specifications.
* Lump Sum - Includes 3501bs. for bearings.
** Includes Removal of Concrete Slope Protection at West Abutment.

INDEX



FOOTING LAYOUT
No Scale

NOTE:
The footing layout plan shall be used only for the purpose of locating the footing of Abutments and Pier.
* = Dimensions to be field verified.

	BY	DATE
MADE	TAC	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

AS BUILT

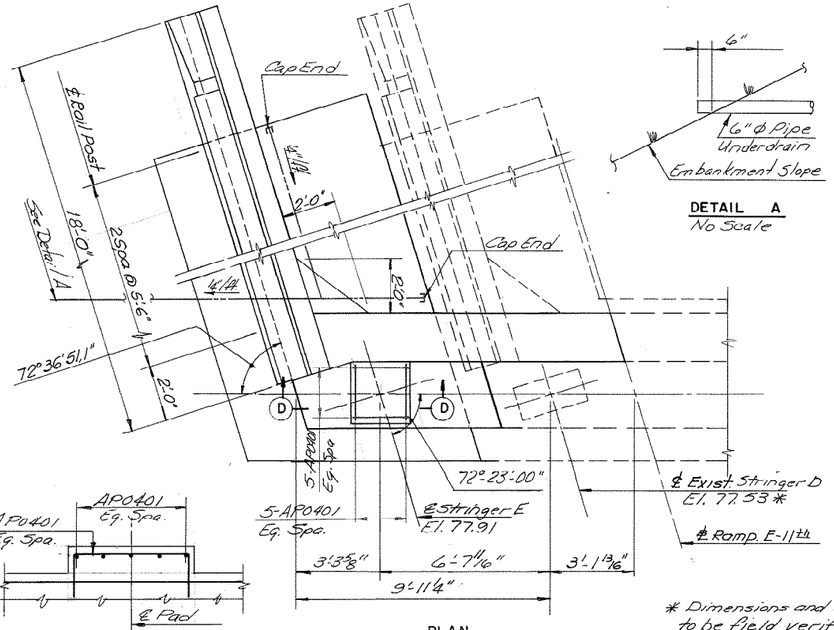
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
ESTIMATE OF QUANTITIES AND FOOTING LAYOUT PLAN

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 2 OF 31

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6 (6)	



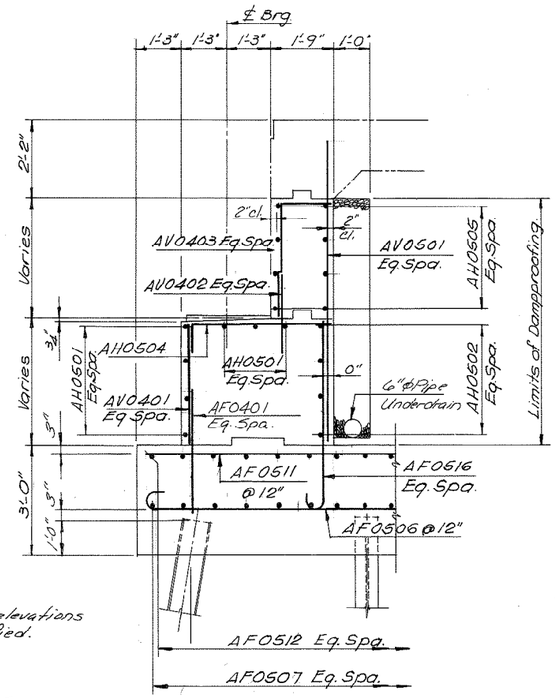
SECTION D-D
Scale: ¾"=1'-0"

PLAN
Scale: ⅜"=1'-0"

DETAIL A
No Scale

* Dimensions and elevations to be field verified.

LEGEND
F.F. = Each Face
N.F. = Near Face
F.F. = Far Face



SECTION A-A
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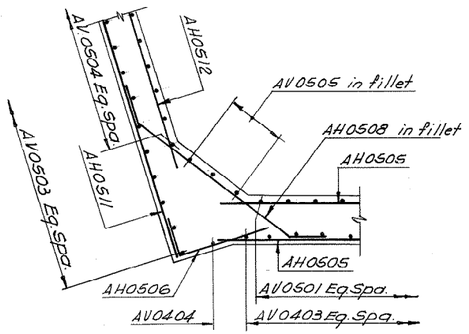
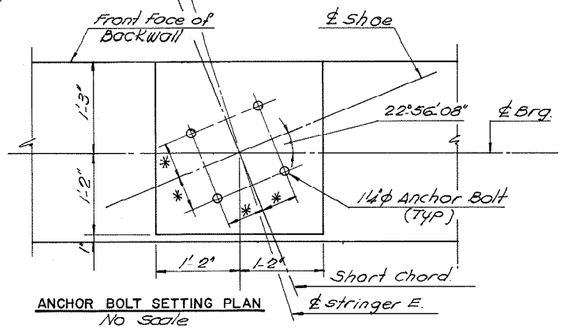
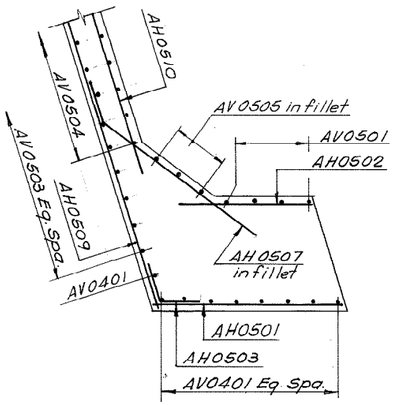


SECTION B-B
Scale: ⅜"=1'-0"

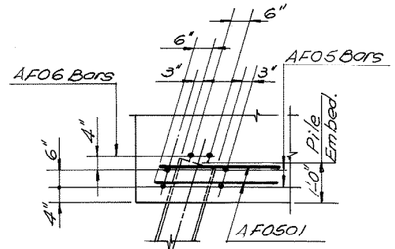


ANCHOR BOLT SETTING PLAN
No Scale

* Anchor Bolt Spacing to be furnished by manufactures of type PB Shoes.

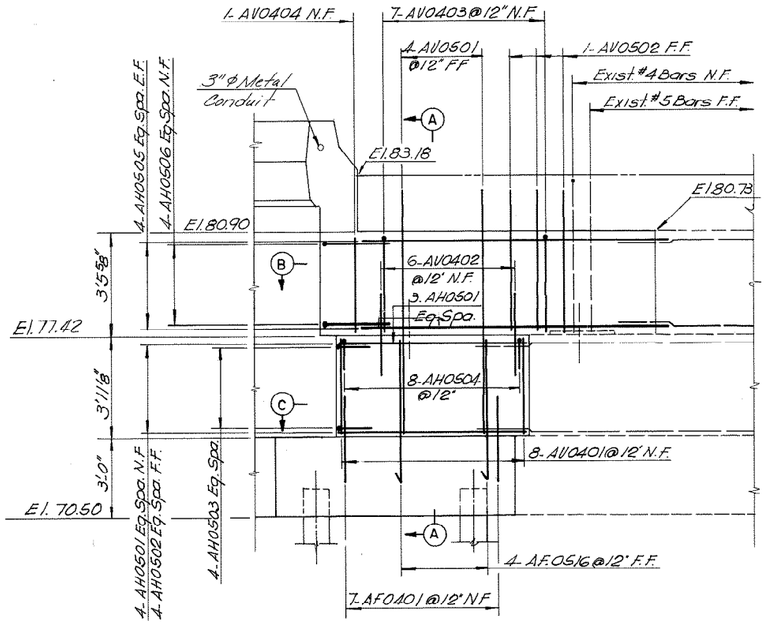


SECTION C-C
Scale: ⅜"=1'-0"

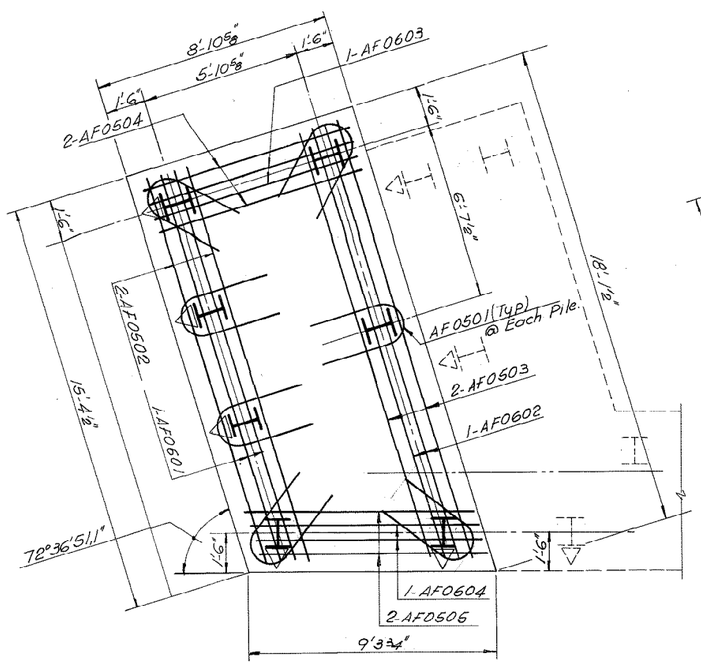


PILE REINFORCING DETAIL
Scale: ½"=1'-0"

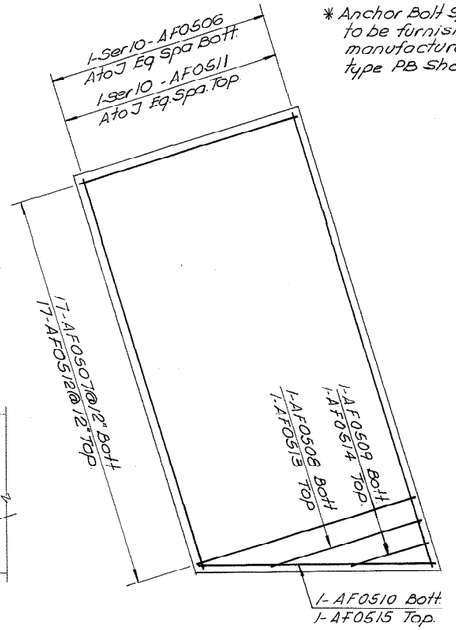
PILE NOTES
All piles shall be HP10 X 42.
I Indicates Vertical Piles.
I Indicates Piles battered 2:12 in the direction of the arrow.
I Indicates Exist. Vertical Piles
I Indicates Exist. Piles battered 2:12 in the direction of the arrow.



ELEVATION
Scale: ⅜"=1'-0"



FOOTING PLAN
Scale: ⅜"=1'-0"



FOOTING REINFORCING PLAN
Scale: ⅜"=1'-0"

AS BUILT

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

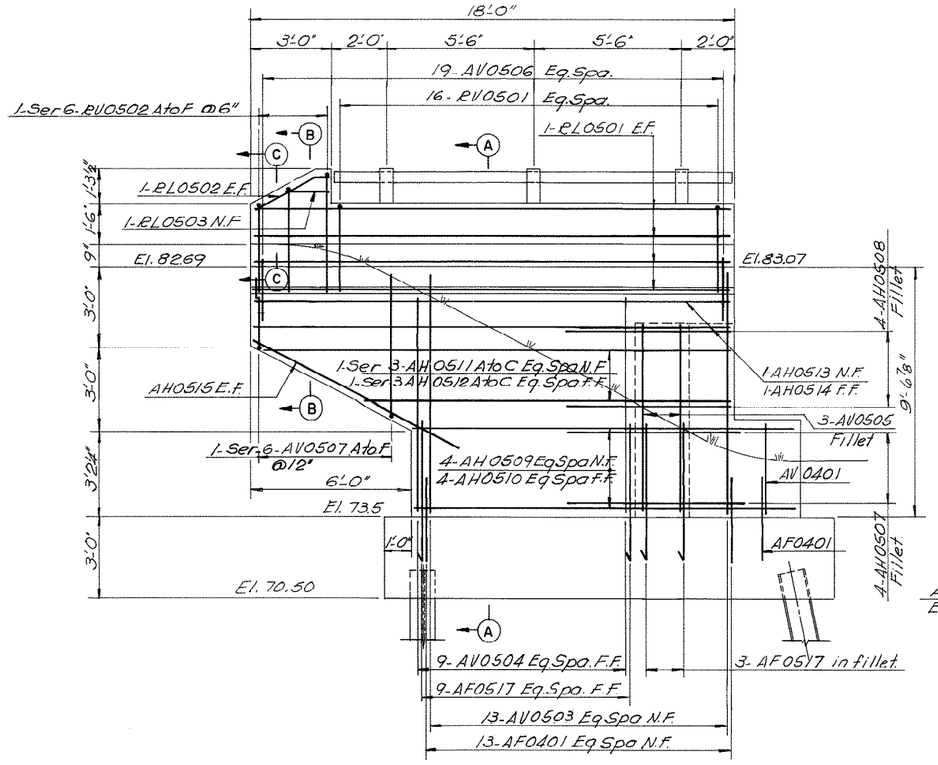
BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
WEST ABUTMENT

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

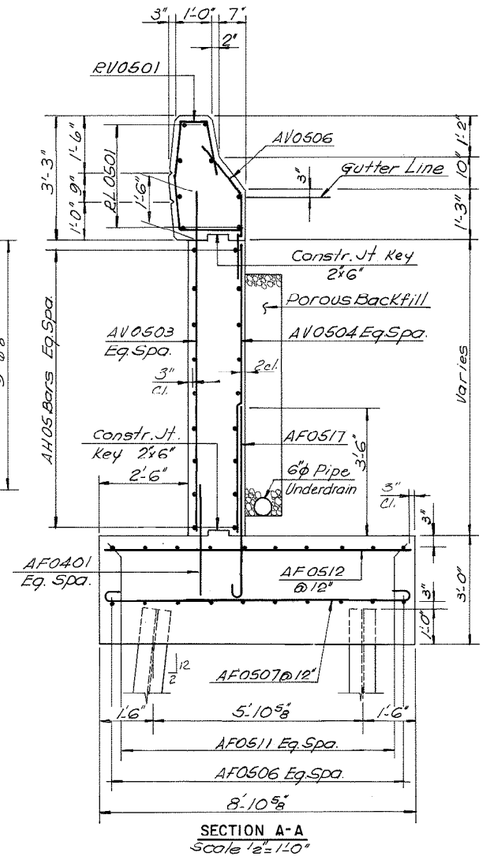
SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 6 OF 31

4.

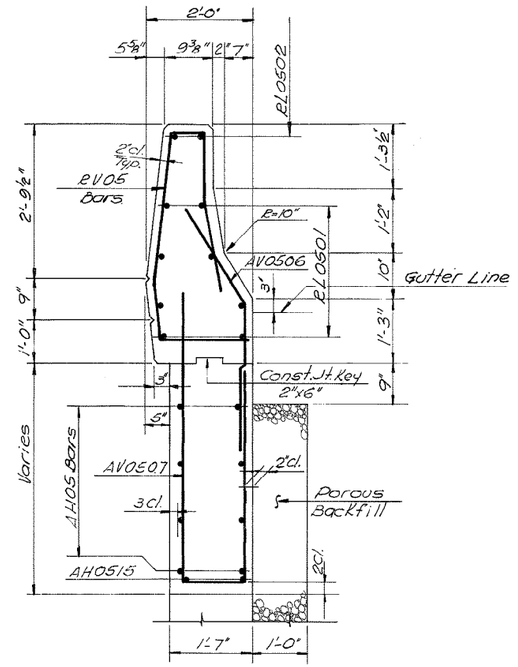
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(7)	



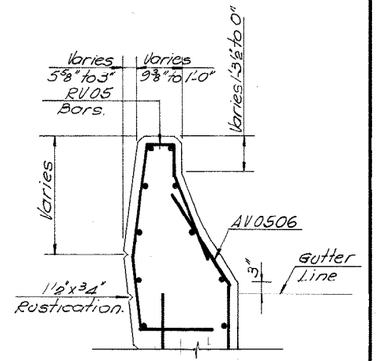
WINGWALL ELEVATION
Scale: 3/8"=1'-0"



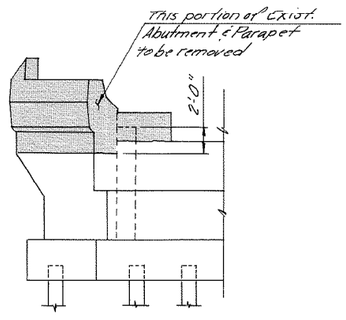
SECTION A-A
Scale 1/2"=1'-0"

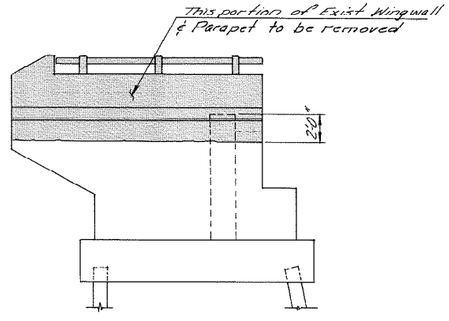


SECTION B-B
Scale: 3/4"=1'-0"



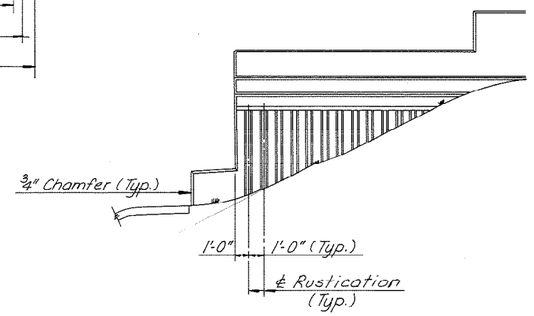
SECTION C-C
Scale: 3/4"=1'-0"



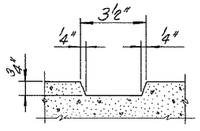


LIMITS OF REMOVAL
No Scale

LEGEND:
E.F. = Each Face
N.F. = Near Face
F.F. = Far Face



ARCHITECTURAL TREATMENT DETAILS
No Scale



TYPICAL RUSTICATION DETAIL
Scale: 3"=1'-0"

NOTE:
Rustications on abutment shall extend a minimum of 2'-0" below the finished ground line.

CONCRETE FINISH NOTES:
All exposed edges and corners having an internal angle of 90° or less shall have a 3/4" chamfer or fillet unless otherwise noted.

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	1/91
IN CHARGE	SR	

NO.	REVISION	BY	DATE

AS BUILT

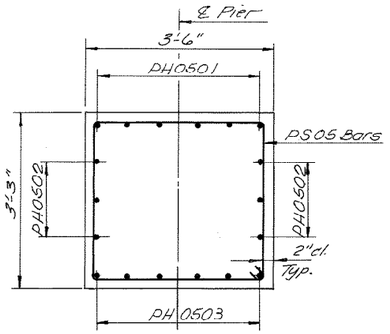
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
WEST ABUTMENT DETAIL

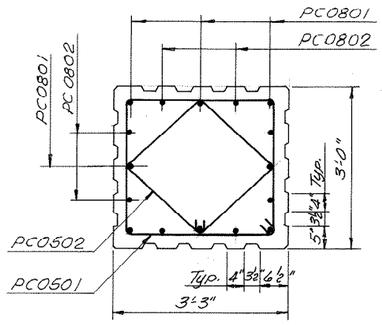
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 7 OF 31

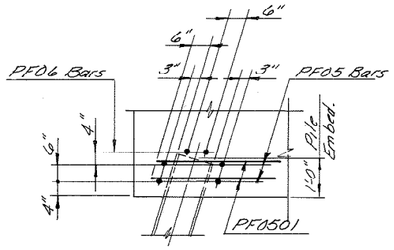
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(8)	



SECTION A-A
Scale: 3/4"=1'-0"

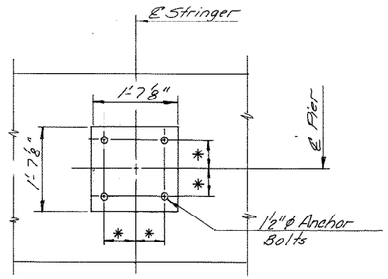


SECTION B-B
Scale: 3/4"=1'-0"

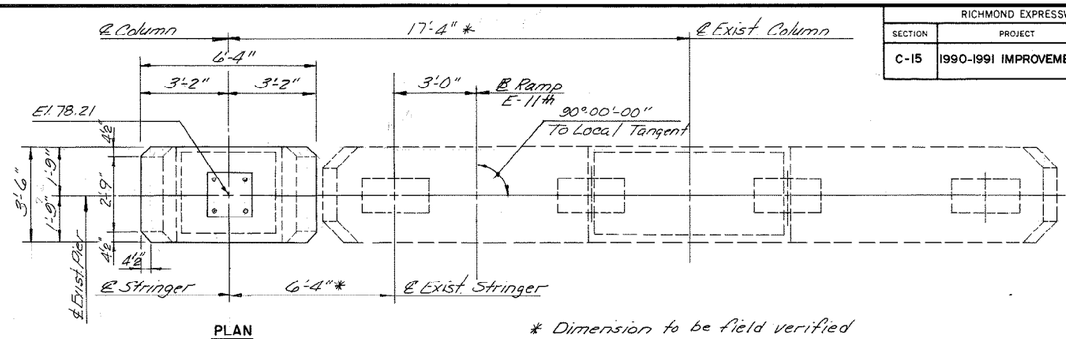


PILE REINFORCING DETAIL
Scale: 1/2"=1'-0"

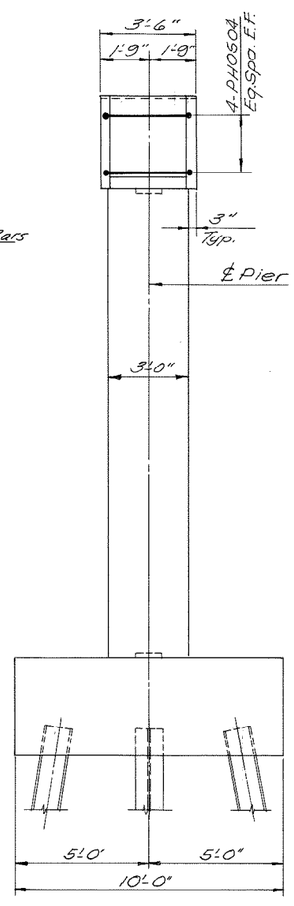
* Anchor Bolt spacing to be furnished by manufacture of Type PB Shoes.



BEARING PAD DETAIL
Scale: 3/4"=1'-0"

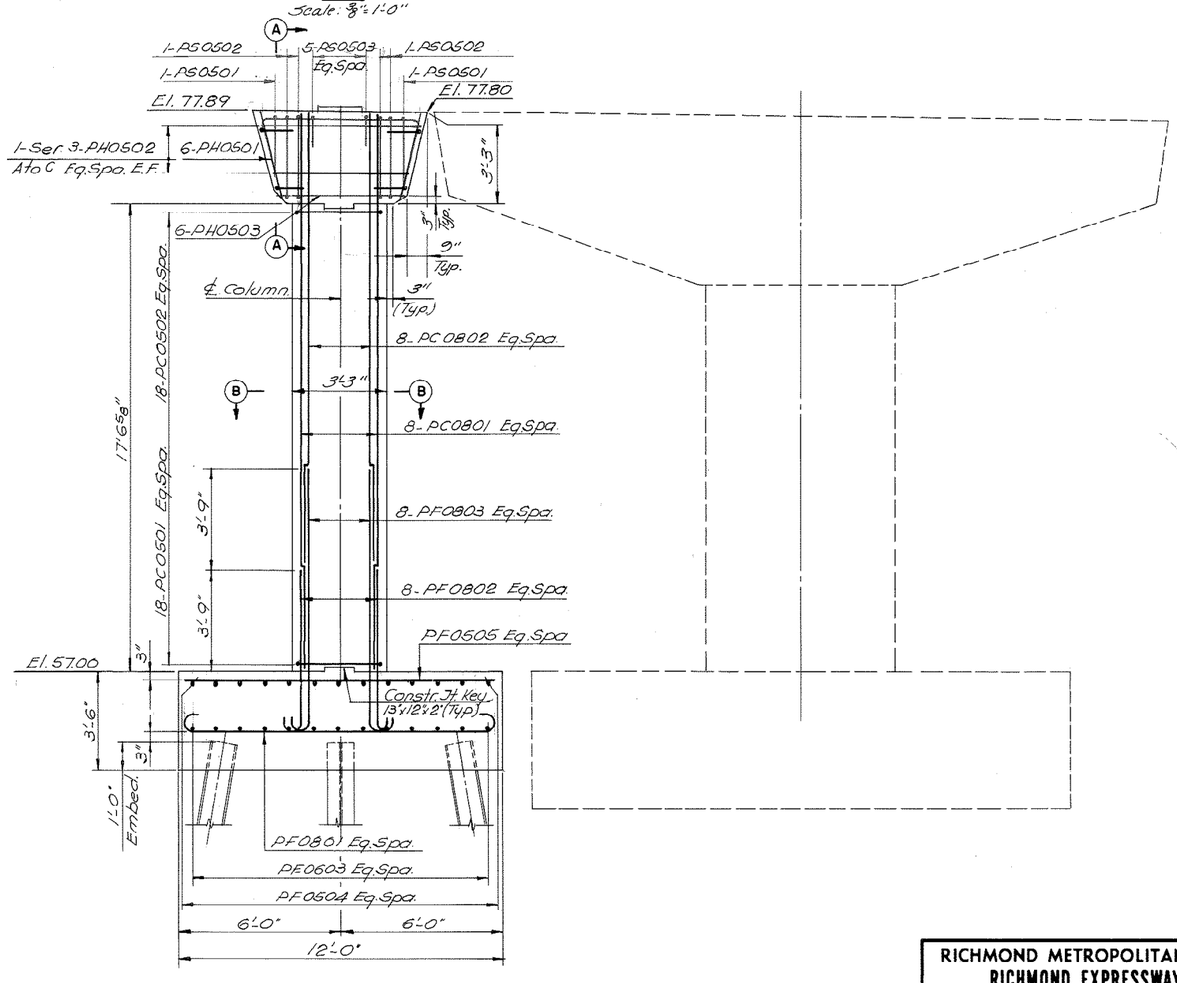


* Dimension to be field verified

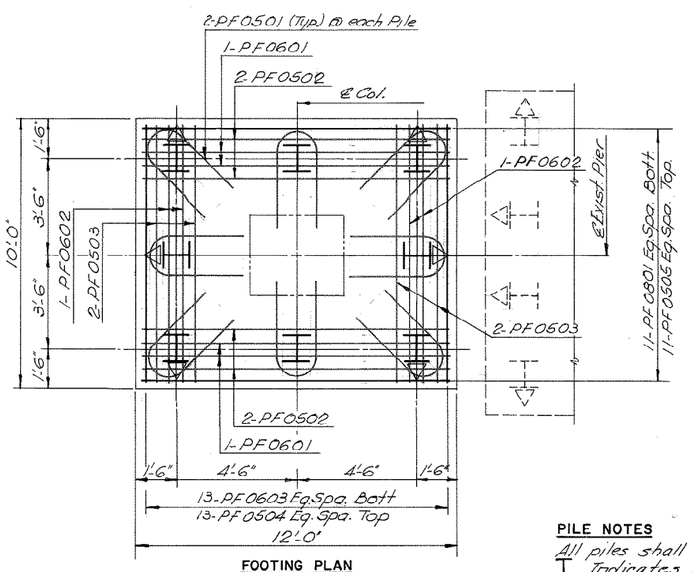


END VIEW
Scale: 3/8"=1'-0"

PLAN
Scale: 3/8"=1'-0"



ELEVATION
Scale: 3/8"=1'-0"



FOOTING PLAN
Scale: 3/8"=1'-0"

PILE NOTES

All piles shall be HP10 x 42.
Indicates Vertical Piles.
Indicates Piles battered 2:12 in the direction of the arrow.
Indicates Exist Vertical Piles
Indicates Exist. Piles battered 2:12 in the direction of the arrow.

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

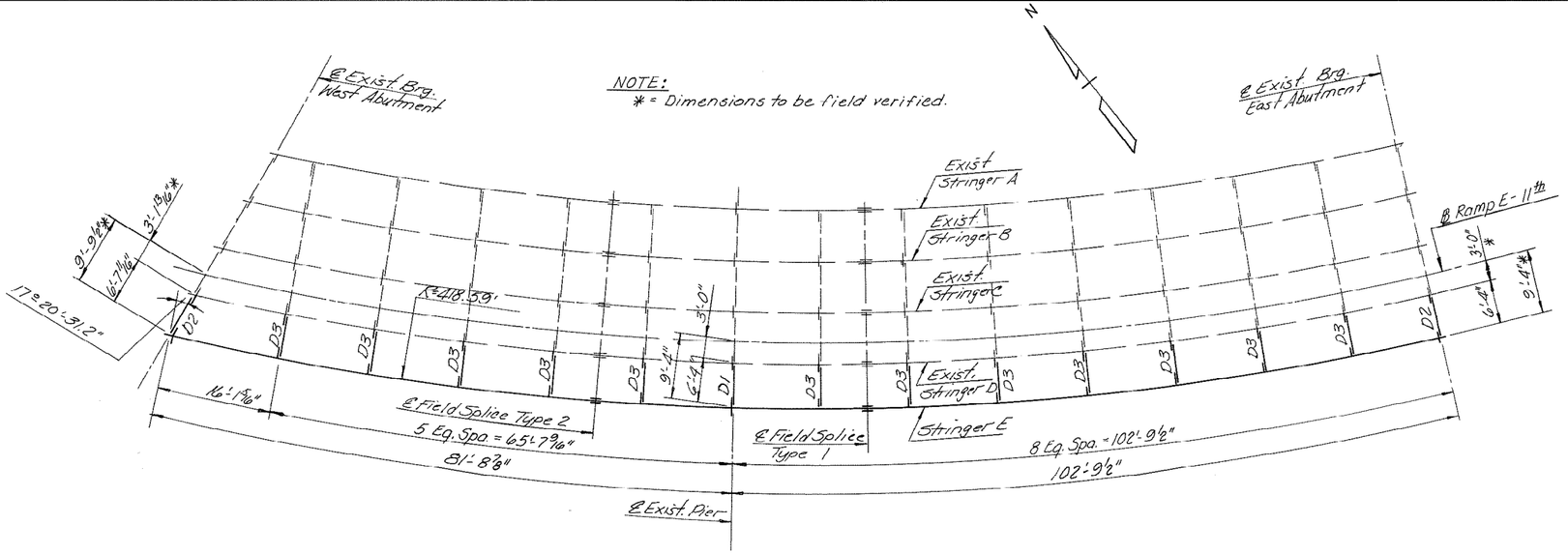
BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
PIER

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

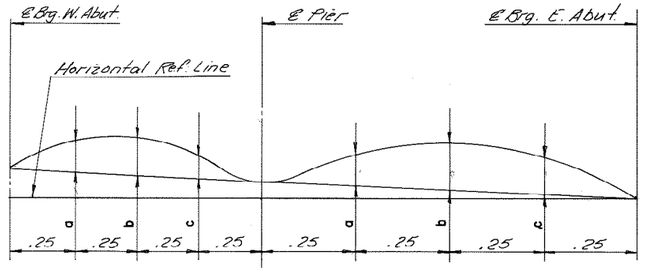
SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 8 OF 31

5.

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(9)	



FRAMING PLAN
Scale: 1" = 10'



CAMBER DIAGRAM
No Scale

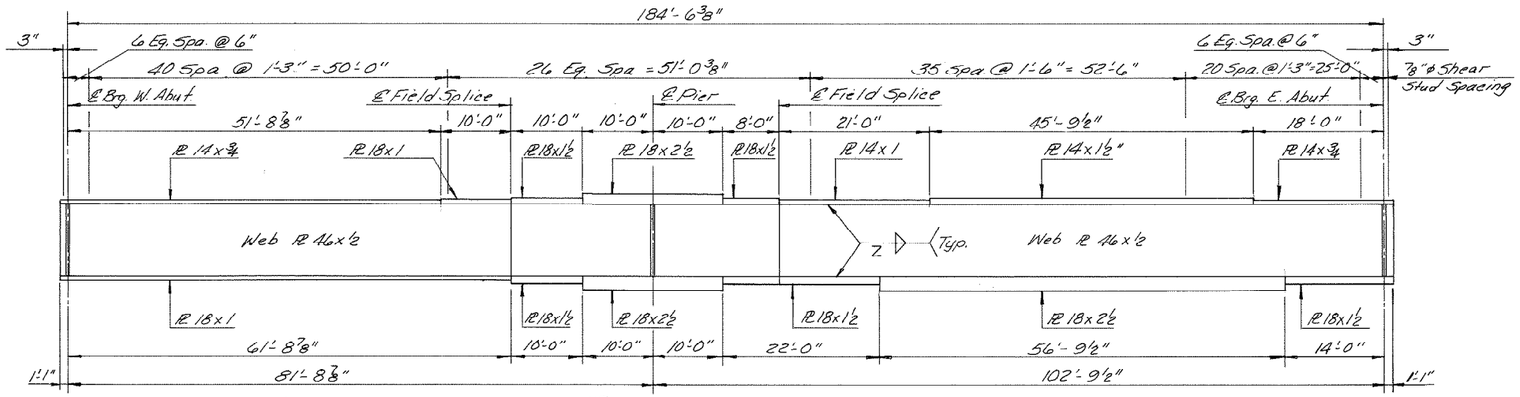
CAMBER SCHEDULE - STRINGER E

ITEM	W. ABUT	a	b	c	PIER	a	b	c	E. ABUT
△s	—	1/16"	1/16"	-1/16"	—	1/4	3/8	5/16	—
△s	—	1/4	3/16	1/16	—	1/2	1 1/16	7/8	—
△c	—	1/16	3/16	1/16	—	3/16	5/16	1/4	—
VC	—	3/4	1 1/2	1 7/16	—	3 5/16	4 7/16	3 5/16	—
Total	—	1 1/8	1 15/16	1 9/16	—	4 1/4	6 3/16	4 3/4	—

△s Camber due to dead load of steel.
△s Camber due to dead load of deck slab and bolster and 20 p.s.f. allowance for construction methods and construction tolerance.
△c Camber due to dead load of parapets.
VC Camber due to roadway vertical curve.
Dimensions are in inches.

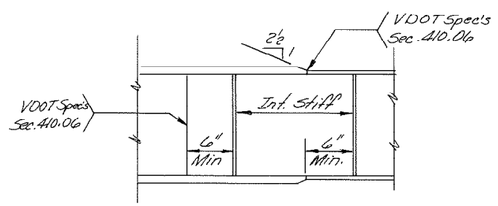
NOTE TO FABRICATOR

The girders shall be fabricated with an upward camber amounting to the sum of △s + △s + △c + VC. This will provide approximate compensation for deflection under full dead load for conformity with the finished grade.

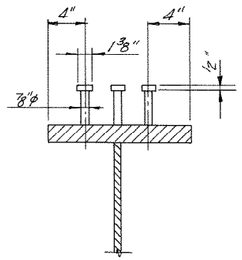


GIRDER ELEVATION
No Scale

FLANGE THICKNESS	Z
3/4" to 1 1/2"	5/16
1 3/8" to 2"	3/8



WELDED SPLICE DETAIL
No Scale



SHEAR STUD DETAIL
No Scale

AS BUILT

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	
IN CHARGE	SR	

NO.	REVISION	BY	DATE

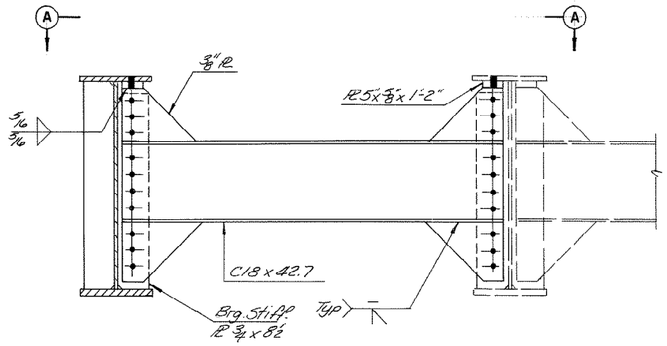
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
FRAMING PLAN AND GIRDER ELEVATION

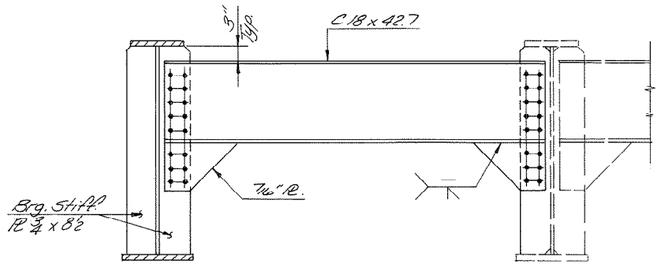
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: As Shown
CONTRACT NO. C-15
SHEET NO. 9 OF 31

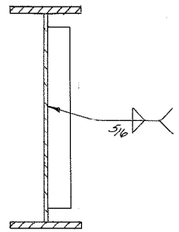
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6 (10)	



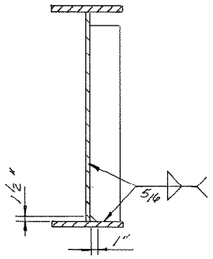
DIAPHRAGM D1
Scale: ¾"= 1'-0"



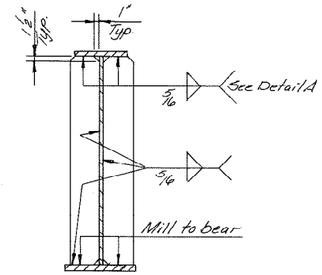
DIAPHRAGM D2
Scale: ¾"=1'-0"



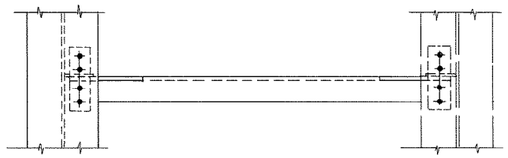
INTERMEDIATE DIAPHRAGM CONNECTOR DETAIL
Scale: ¾"= 1'-0"



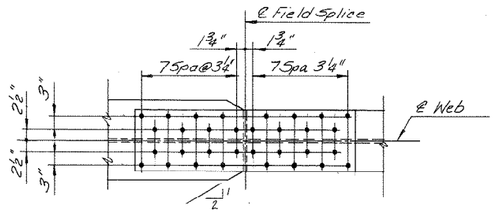
BEARING STIFFENER DETAIL AT PIER
Scale: ¾"=1'-0"



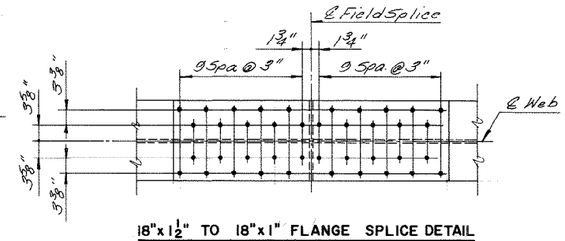
BEARING STIFFENER DETAIL
Scale: ¾"= 1'-0"



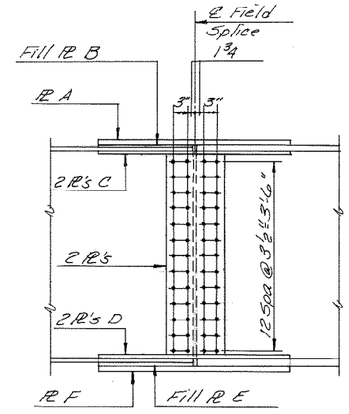
VIEW A-A
Scale: ¾"=1'-0"



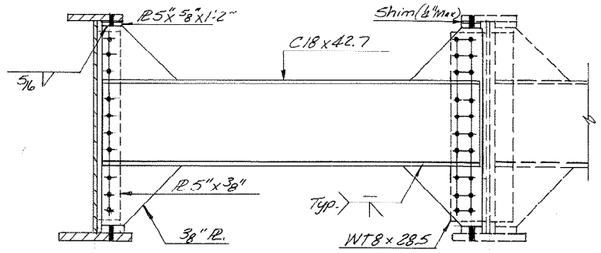
18"x 1½" TO 14"x 1" FLANGE SPLICE DETAIL



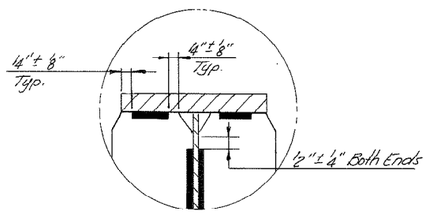
18"x 1½" TO 18"x 1" FLANGE SPLICE DETAIL
Scale: ¾"= 1'-0"



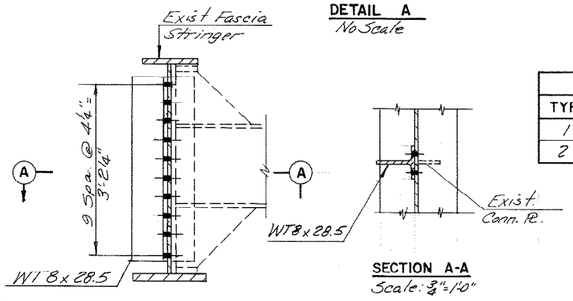
ELEVATION
Scale: ¾"=1'-0"



DIAPHRAGM D3
Scale: ¾"=1'-0"



DETAIL A
No Scale



TYPICAL DIAPHRAGM CONNECTION TO EXIST. FASCIA STRINGER
Scale: ¾"=1'-0"

SECTION A-A
Scale: ¾"=1'-0"

FIELD SPLICE DETAILS						
TYPE	PL A	FILL PL B	PL C	PL D	FILL PL E	PL F
1	¾"x 18"x 5'-1"	½"x 18"x 2'-6⅜"	⅜"x 8¼"x 5'-1"	⅜"x 8¼"x 5'-1"	½"x 18"x 2'-6⅜"	¾"x 18"x 5'-1"
2	¾"x 14"x 4'-4½"	½"x 14"x 2'-1⅝"	⅜"x 6¼"x 4'-4½"	½"x 8¼"x 7'-1"	———	⅝"x 18"x 7'-1"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAC	12/90				
CHECKED	BS	12/90				
IN CHARGE	SR					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

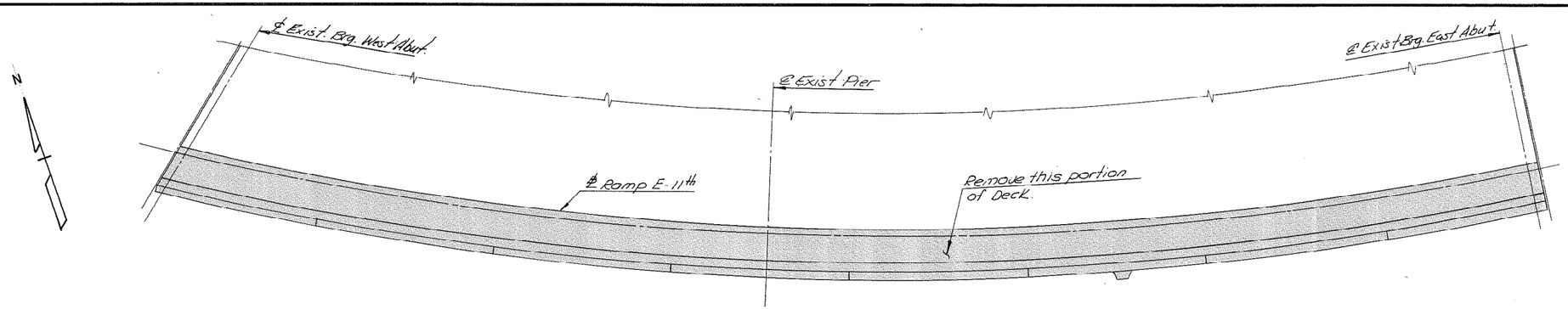
BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
DIAPHRAGM DETAILS AND FIELD SPLICE DETAIL

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 10 OF 31

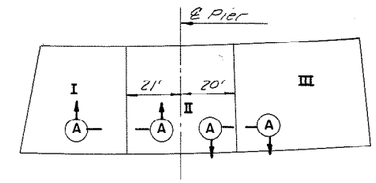
10.

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6 (11)	



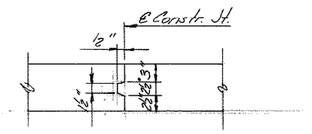
DECK REMOVAL
Scale: 1"=1'-0"

NOTE:
After removing the existing portion of concrete as shown, remove the longitudinal bars in that area. The existing transverse bars should be thoroughly cleaned and incorporated in the finished structure.

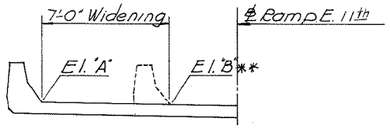


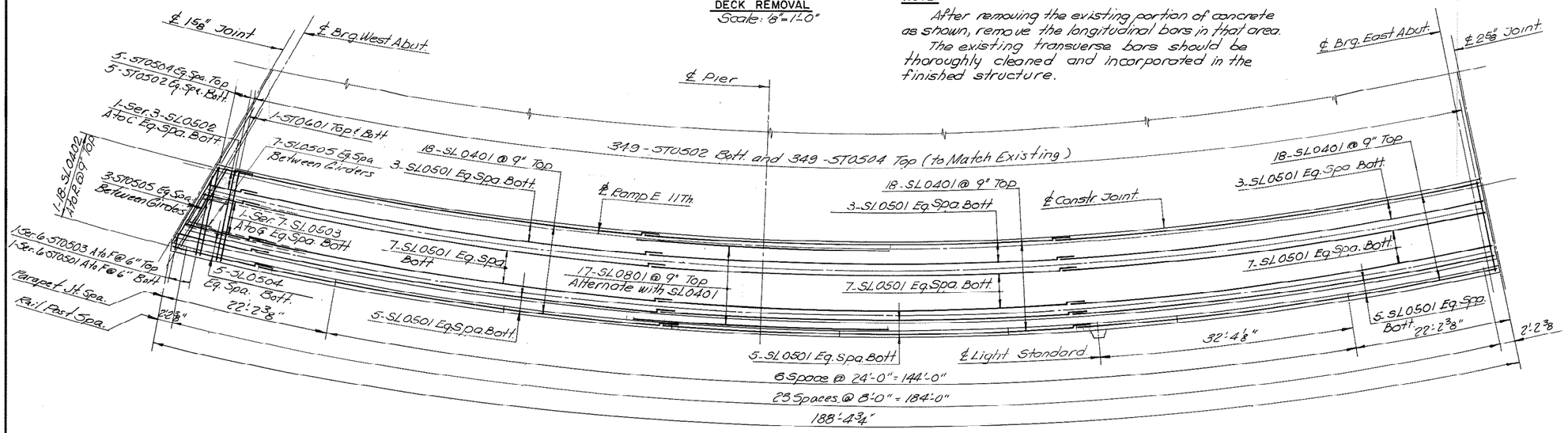
DECK POURING SEQUENCE
No Scale

NOTE:
The numbers shown indicate the order of concrete placement in deck sections.

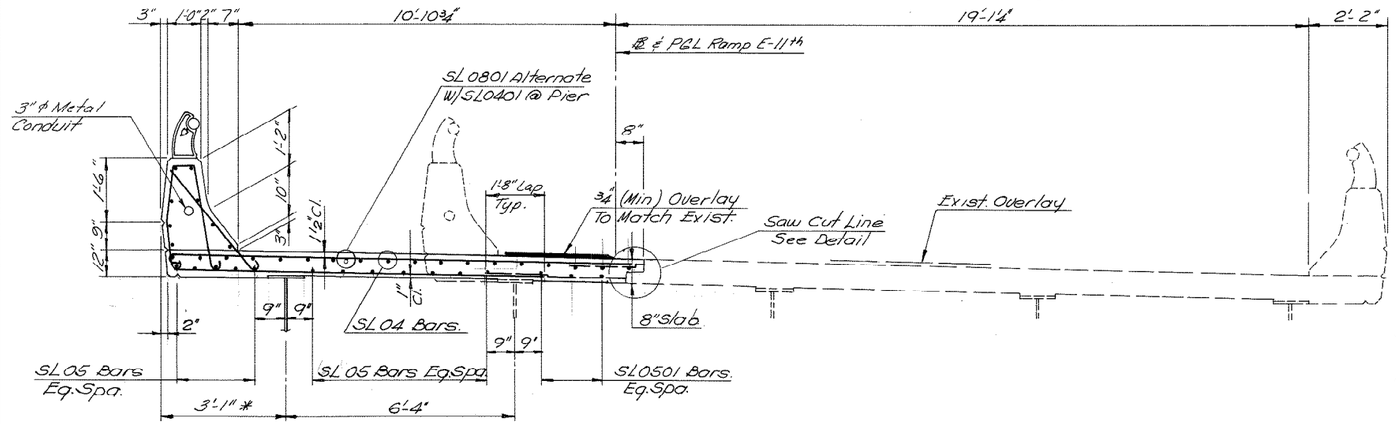


SECTION A-A
No Scale





PLAN
Scale: 1/8"=1'-0"



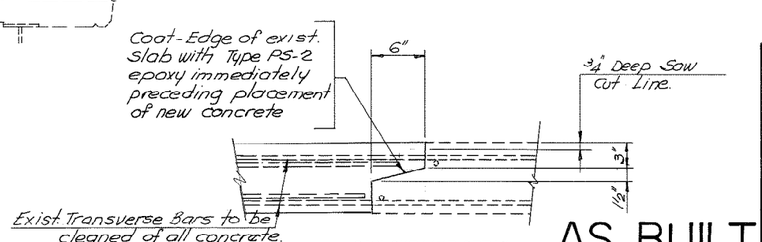
TYPICAL SECTION
Scale: 1/2"=1'-0"

* Dimensions to be field verified.

NOTE:
Elevations of existing deck are from field survey. Horizontal and Vertical dimensions are based on As-Built Plans and included with this set of plans as Reference Plans. It shall be the Contractor's responsibility to verify all pertinent elevations and dimensions of the existing structure prior to construction and the fabrication of any Structural Steel.

DECK SLAB ELEVATIONS		
STATION	El. "A"	El. "B"**
℄ Jt. W. Abut.	83.38	83.19
1/4 pt.	83.54	83.30
1/2 pt.	83.71	83.47
3/4 pt.	83.80	83.55
℄ Pier	83.79	83.64
1/4 pt	83.61	83.40
1/2 pt	83.26	83.03
3/4 pt	82.71	82.52
℄ Jt. E. Abut	81.98	81.86

** Existing deck elevations. Above elevations are to top of overlay



SAW CUT LINE DETAIL
Scale: 1 1/2"=1'-0"

AS BUILT

	BY	DATE
MADE	TAL	12/91
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

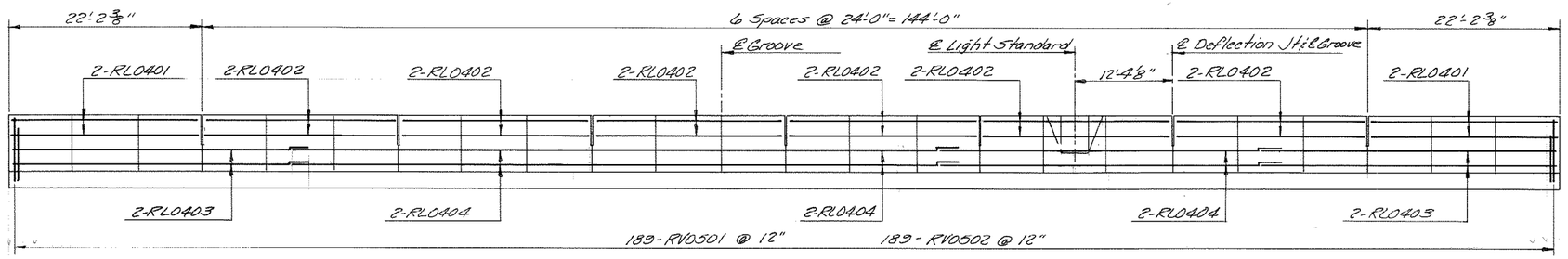
BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.

DECK PLAN AND TYPICAL SECTION

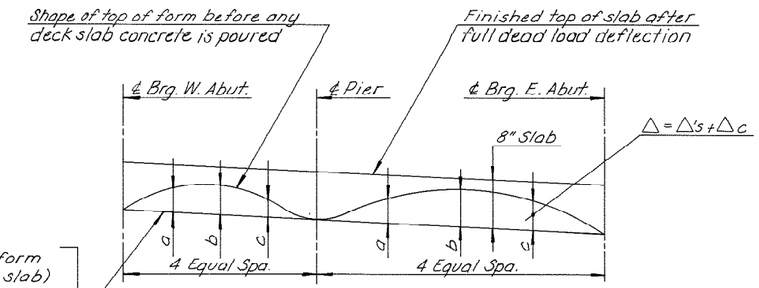
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 11 OF 31

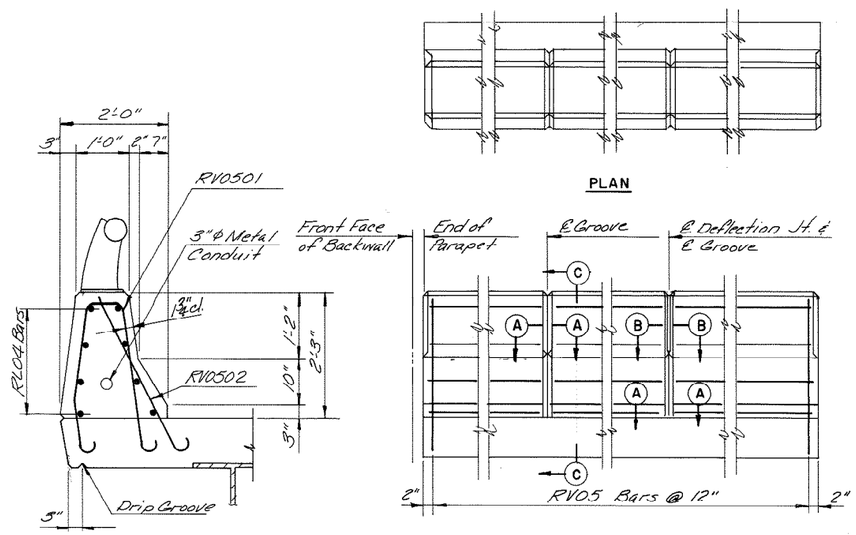
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(12)	



PARAPET ELEVATION
No Scale



DEAD LOAD DEFLECTION DIAGRAM
No Scale

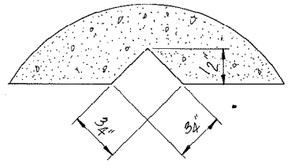


SECTION C-C

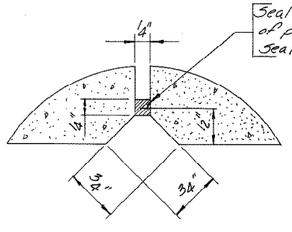
PLAN

ELEVATION

PARAPET DETAIL
Scale: 3/4" = 1'-0"



SECTION A-A
Full Scale
(Groove details for both sides of parapet.)



SECTION B-B
Full Scale
(Deflection Joint detail for both sides of parapet.)

DEFLECTION SCHEDULE										
STRINGER	ITEM	W.ABUT	a	b	c	PIER	a	b	c	E.ABUT
EXIST. D	△'s	—	0.21	0.15	0.05	—	0.59	1.07	0.88	—
	△c	—	0.05	0.05	0.01	—	0.14	0.25	0.19	—
	△	—	0.26	0.20	0.06	—	0.73	1.32	1.07	—

DEFLECTION SCHEDULE										
STRINGER	ITEM	W.ABUT	a	b	c	PIER	a	b	c	E.ABUT
E	△'s	—	0.23	0.19	0.03	—	0.54	1.05	0.89	—
	△c	—	0.06	0.06	0.01	—	0.16	0.30	0.23	—
	△	—	0.29	0.25	0.04	—	0.70	1.35	1.12	—

△s Deflection of girder from dead load of concrete deck slab and bolster and 20 p.s.f. allowance for construction tolerance and construction methods.
△c Deflection of girder from dead load (e.g. parapet) added after deck slab is cast.
Dimensions are in inches.

	BY	DATE
MADE	TAC	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

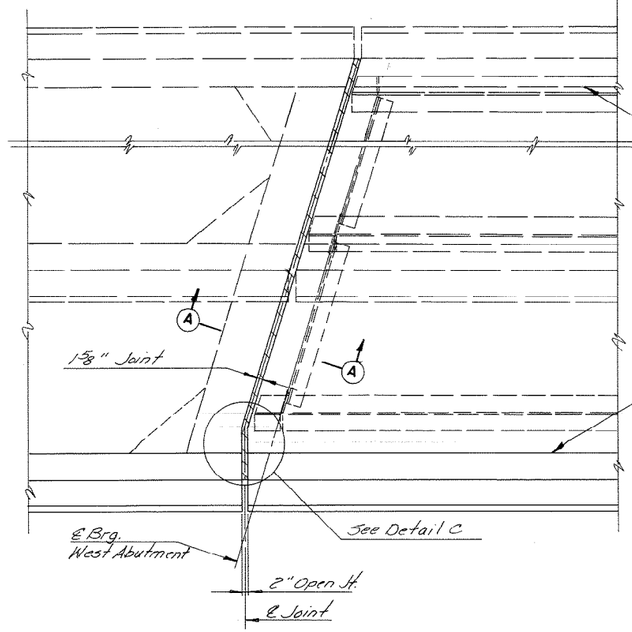
BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
PARAPET ELEVATION AND DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

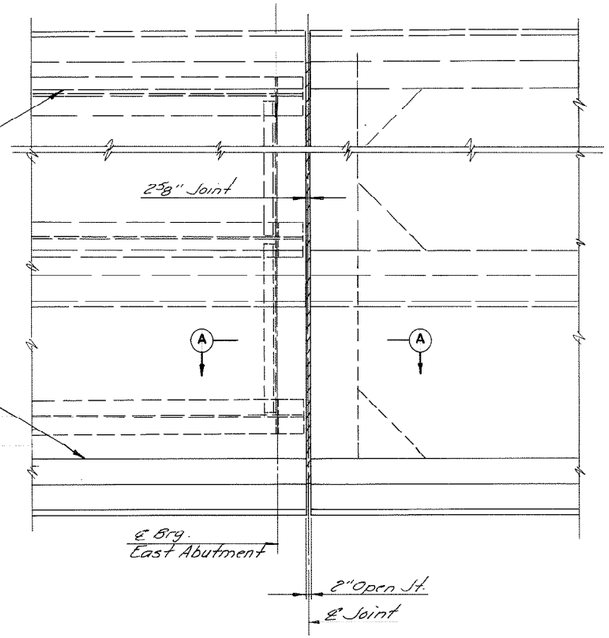
SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 12 OF 31

AS BUILT

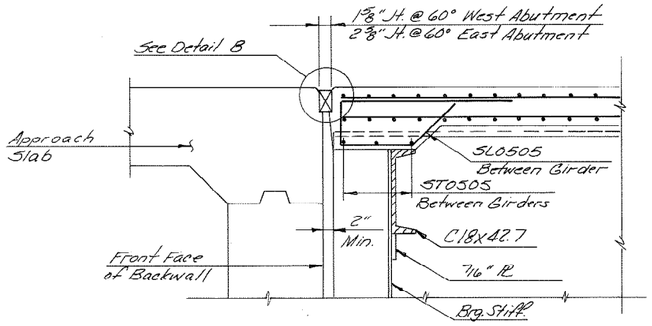
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(13)	



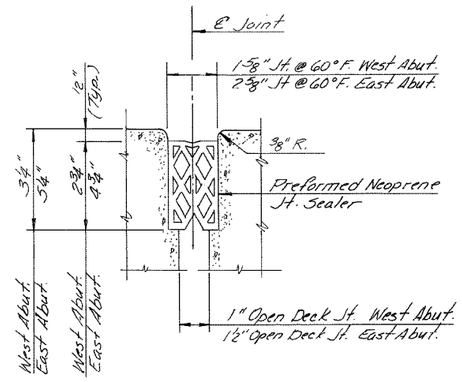
PLAN - JOINT AT WEST ABUTMENT
No Scale



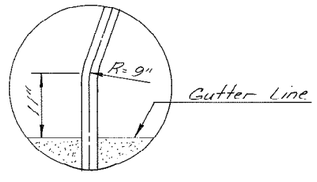
PLAN - JOINT AT EAST ABUTMENT
No Scale



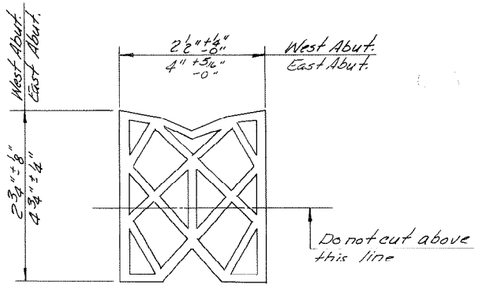
SECTION A - A
Scale: 3/4"=1'-0"



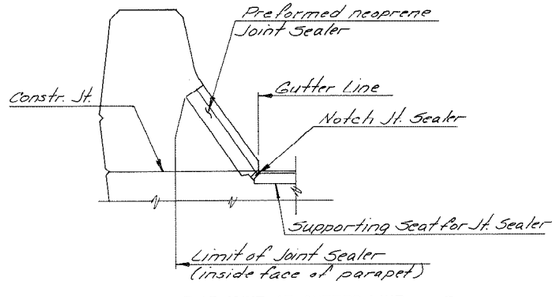
DETAIL B
No Scale



DETAIL C
Scale: 1"=1'-0"



PREFORMED NEOPRENE JOINT SEALER
No Scale



TREATMENT OF JOINT AT GUTTER LINE
No Scale

NOTE:

Existing preformed joint sealer at each Abutment to be completely removed. New continuous joint sealer shall be installed from gutter to gutter and up faces of parapet as shown. In damaged areas, joint edges on existing deck slab (R=3/8") shall be repaired.

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

AS BUILT

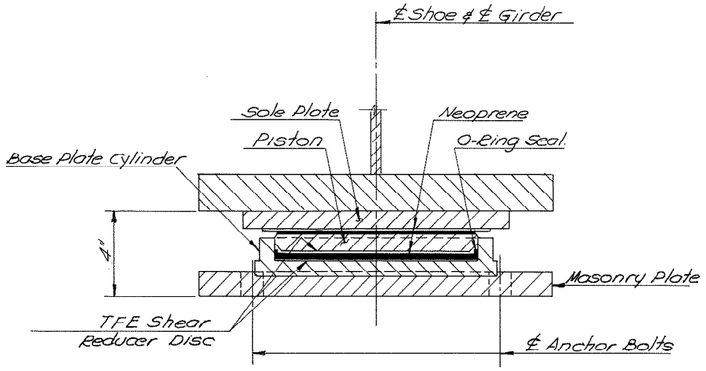
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
JOINT DETAILS

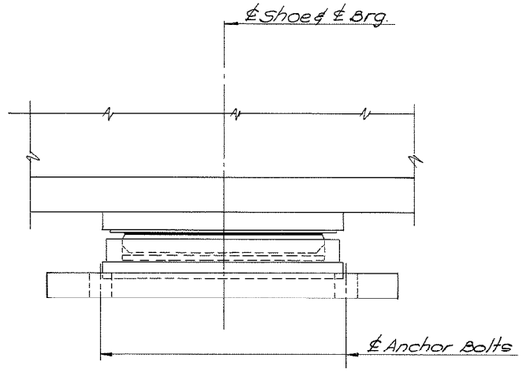
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 13 OF 31

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(15)	



TYPICAL SECTION



SIDE ELEVATION

EXPANSION SHOE TYPE PB-1

Scale: 3"=1'-0"

SHOE TYPE	LOCATION	DESIGN LOAD
PB-1	E. Abut.	80
PB-2	Pier	210
PB-1	W. Abut.	110

NOTE:

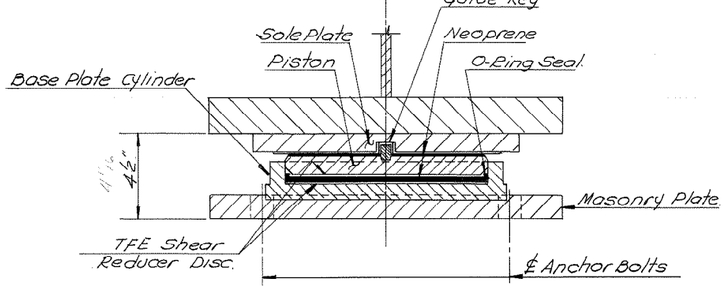
Pad elevations have been set using dimensions shown. Revision to pad elevations may be required based on depth of shoe as furnished by the fabricator for each location.

The guide key shall be designed for a lateral force of 15% of the Design Load.

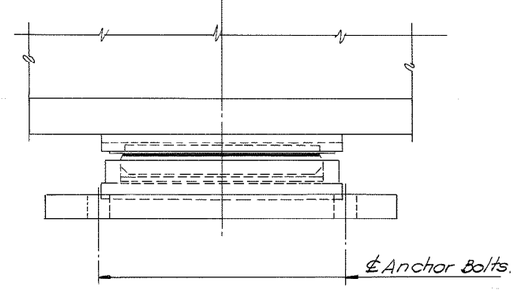
Total temperature movement equals 2 inch either direction.

The permissible rotation shall not be less than 2 degrees.

Structural steel in bearing shall be ASTM A36.



TYPICAL SECTION



SIDE ELEVATION

FIXED SHOE TYPE PB-2

Scale: 3½"=1'-0"

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
SHOE DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

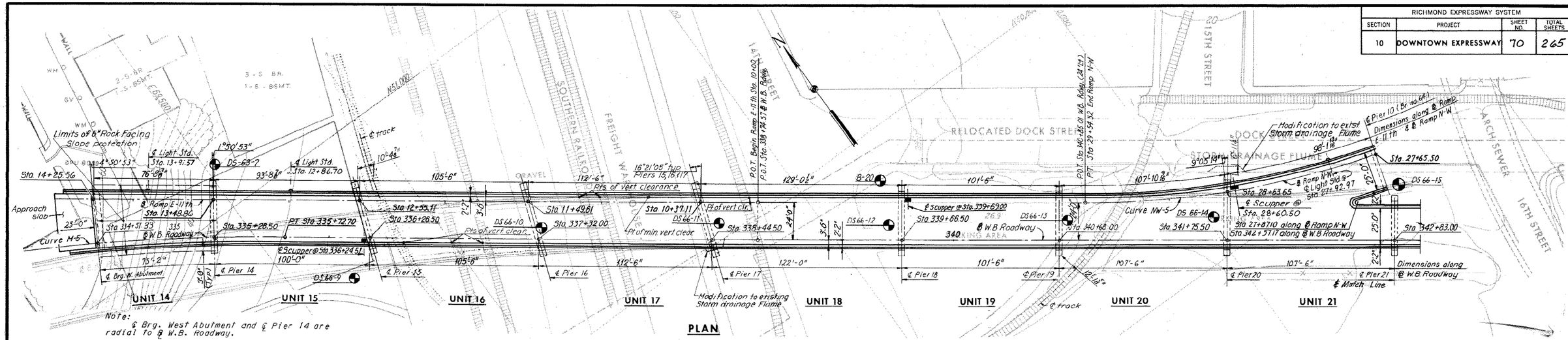
SCALE: As Shown
CONTRACT NO: C-15
SHEET NO. 15 OF 31

Bridge 63

(Westbound Downtown Expressway - Rte. 195 over Virginia Street, South 14th Street - US Rte. 360 and CSX Railroad)

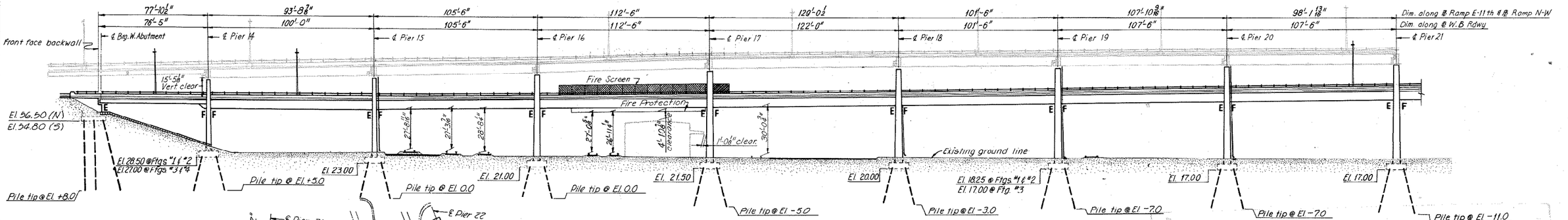
Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	70	265

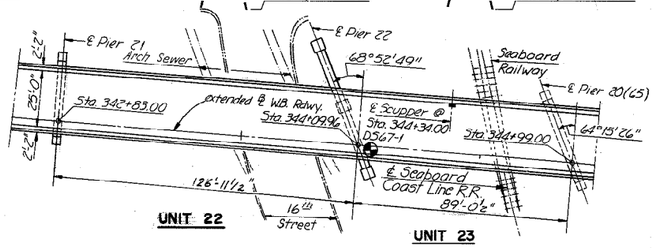


Note:
℄ Brg. West Abutment and ℄ Pier 14 are radial to ℄ W.B. Roadway.

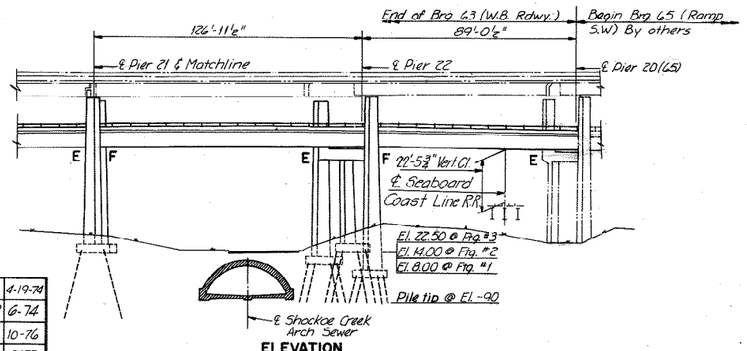
PLAN



ELEVATION



PLAN



ELEVATION

	BY	DATE
MADE	Y.C.P	1-9-69
CHECKED	J.D.	3-13-69
IN CHARGE	F.K.D.	

NO.	REVISION	BY	DATE
1	Joint Type & Rail-Road Name Added	PRMC	4-19-74
2	Seaboard & Coast Line Added To Elev.	K.D.P.	6-74
3	As Built	T.E.M.	10-76

℄ W.B. Roadway	
Curve: M-5	
P.I.	= Sta. 334+26.15
Δ	= 11°45'56"
D	= 4°00'
T	= 147.59'
L	= 294.14'
R	= 1432.40'

℄ Ramp N-W	
Curve NW-5	
P.I.	= Sta. 28+25.38
Δ	= 26°19'00"
D	= 10°00'
T	= 133.86'
L	= 263.00'
R	= 572.96'

HORIZONTAL CURVE DATA

Notes:
For Estimated quantities and General Notes see Sheet 2.
For Boring Logs see Sheets 26 thru 29.
For Layout of Pier 10(64) see Bridge No. 64 (Ramp N-W) Sheet 3.
◓ Indicates boring location.
Footing numbers (1,2, etc.) on each pier go from North to South.
For Profile Grade Data see Sheet 2.

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AS BUILT

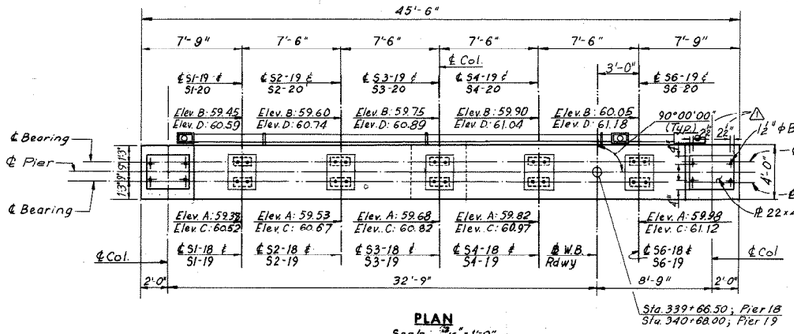
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 30'
CONTRACT NO. 10
SHEET NO. 1 OF 29

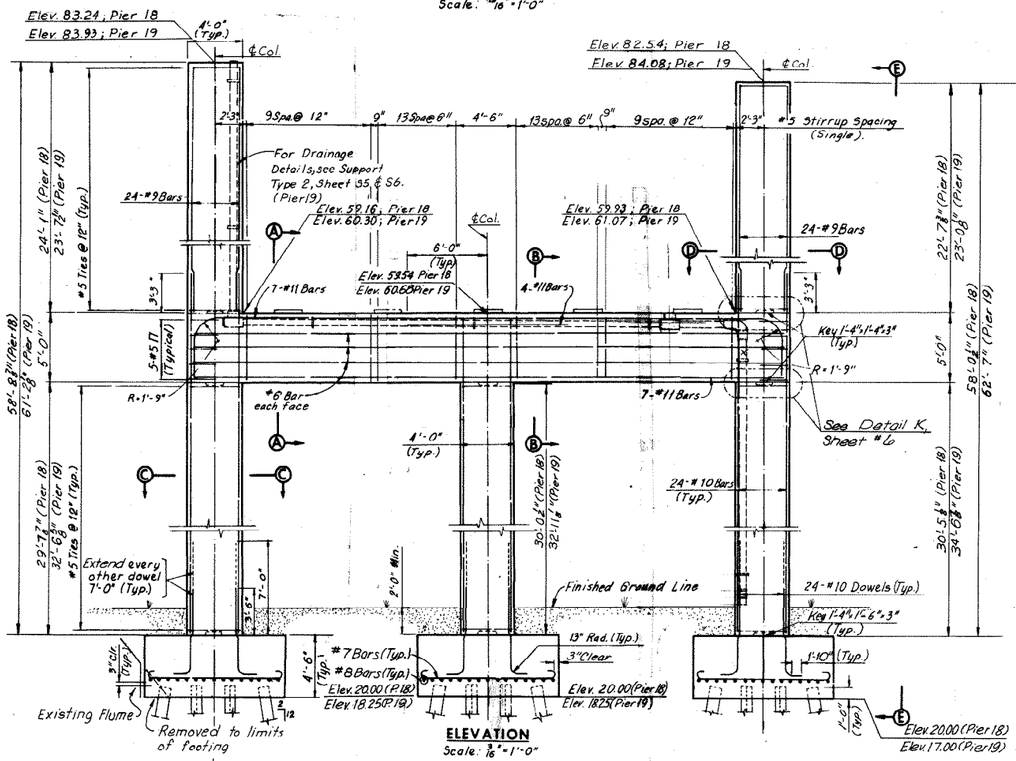
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	78	265



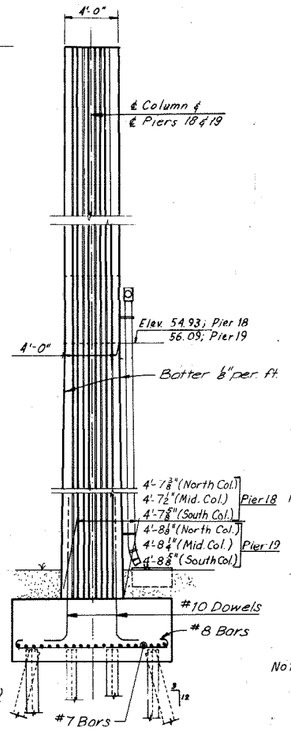
PLAN
Scale: 3/16" = 1'-0"

Note;
Elevations given in plan are elevations of top of pad and at ℄ Bearing.

Elevation A refers to ℄ Brg. Unit 18 @ Pier 18
Elevation B refers to ℄ Brg. Unit 19 @ Pier 18
Elevation C refers to ℄ Brg. Unit 19 @ Pier 19
Elevation D refers to ℄ Brg. Unit 20 @ Pier 19



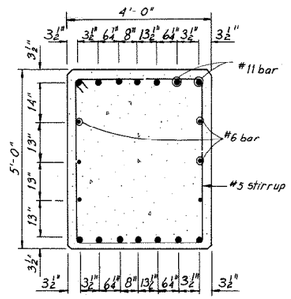
ELEVATION
Scale: 3/16" = 1'-0"



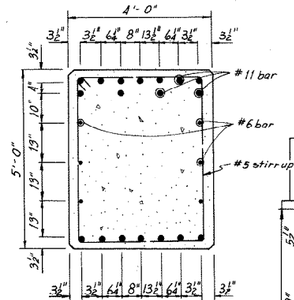
VIEW E-E
Scale: 3/16" = 1'-0"

Note:
All piles shall be 10BP42 Steel Piles (Design capacity = 45 tons).
Batter piles 3" or 2" per foot where shown.
For Shoe Details, see Sheets S1 and S2.
For Steel Pile Details, see Sheet 11.
Estimated Pile Tip elevations: -3.0 @ Pier 18, -7.0 @ Pier 19.
For architectural treatment of columns, see Sheet S7

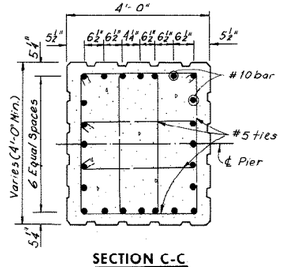
Note:
1) Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.
2) Flume modification at Pier 18 only.



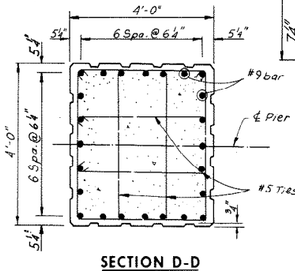
SECTION A-A
Scale 1/2" = 1'-0"



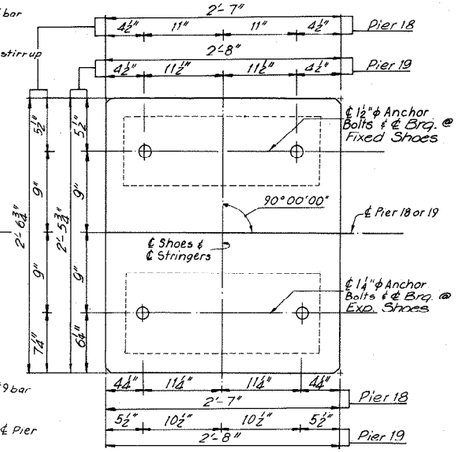
SECTION B-B
Scale 1/2" = 1'-0"



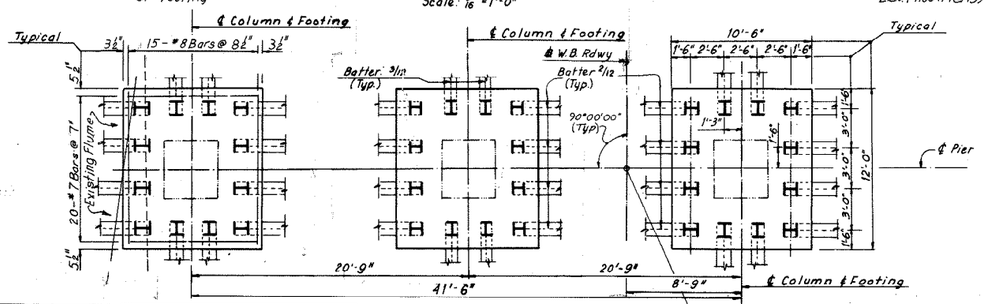
SECTION C-C
Scale: 1/2" = 1'-0"



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



PAD AND ANCHOR BOLT SETTING PLAN
No Scale



FOOTING PLAN
Scale: 3/16" = 1'-0"

Note:
Dimensions given in Footing Plan are measured at bottom of Footing.

	BY	DATE
MADE	C.E.B.	12-13-68
CHECKED	P.T.A.	01-24-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Anchor Bolt loc.	R.E.J.	11-13-74
2	As Built	T.E.M.	10-76

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
PIERS 18 AND 19

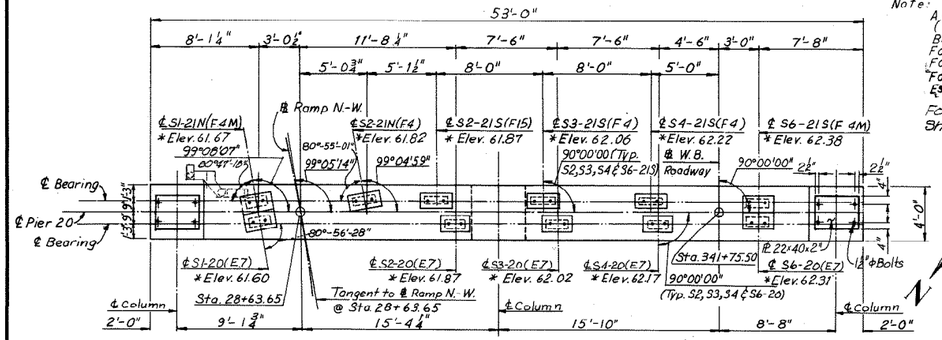
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 9 OF 29

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	79	265

Note:
All piles shall be 10BP42 Steel Piles (Design capacity = 45 tons).
Batter piles 3" or 2" per foot where shown.
For Standard Shoe details, see Sheets 51 & 52.
For Framing Plan see Sheet 14.
For Pile Tip Details, see Sheet 11.
Estimated Pile Tip Elevation -70

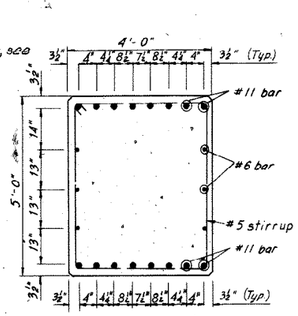
For architectural treatment of columns, see Sheet 57



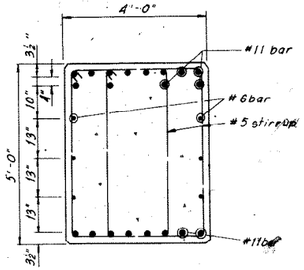
PLAN
Scale: ⅛"-1'-0"

Note:
Elevations denoted with an asterisk (*) are elevations at top of pad and at ℄ Bearing.

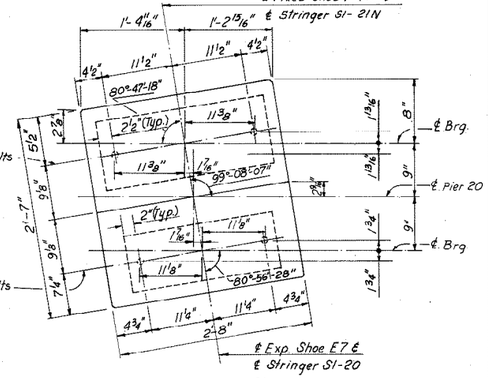
Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by The Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.



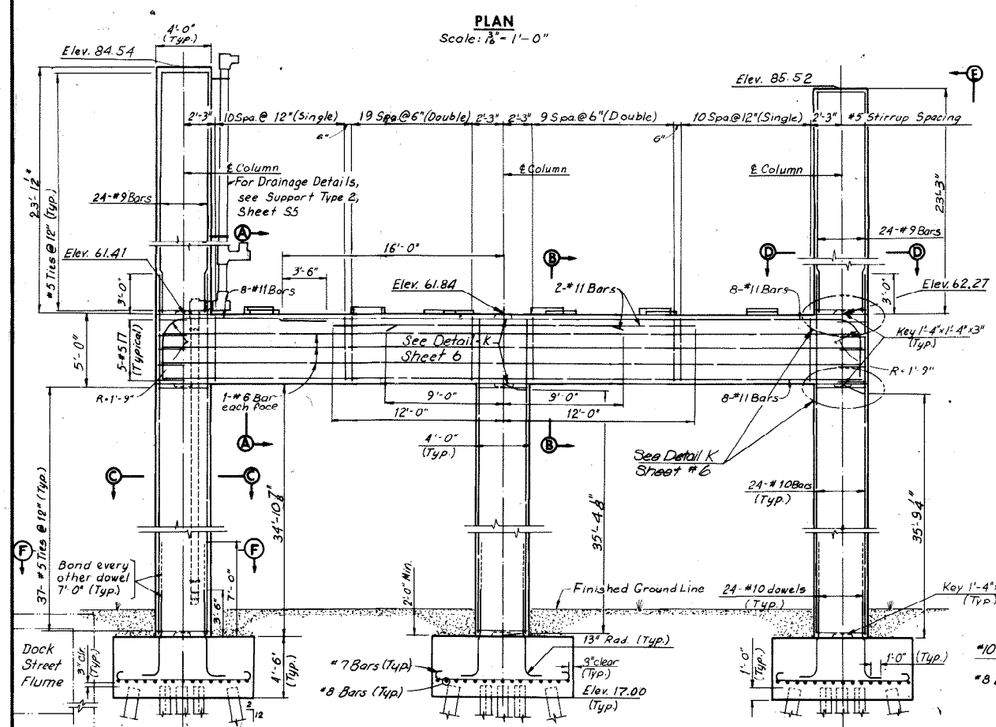
SECTION A-A
Scale: ½"-1'-0"



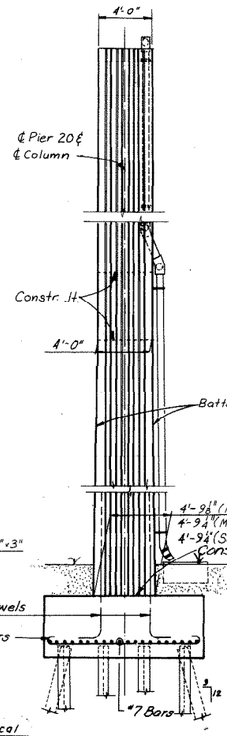
SECTION B-B
Scale: ½"-1'-0"



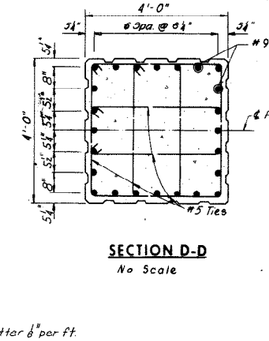
Stringers S1-20 and S1-21N



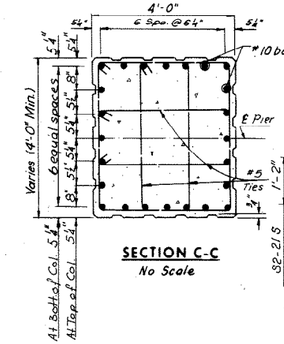
ELEVATION
Scale: ⅜"-1'-0"



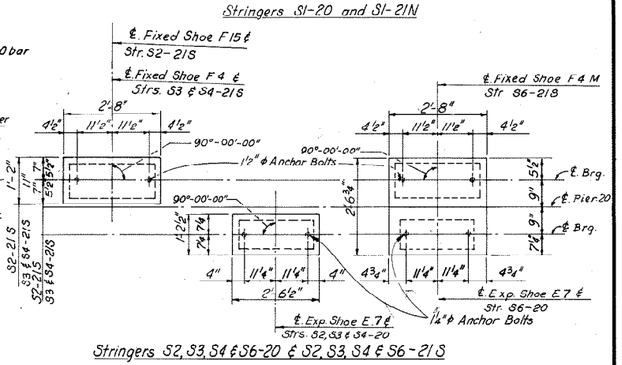
VIEW E-E
Scale: 3/16"-1'-0"



SECTION D-D
No Scale



SECTION C-C
No Scale

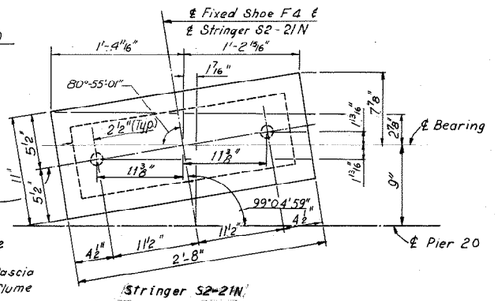


Stringers S2,S3,S4 & S6-20 & S2,S3,S4 & S6-21S

2¾"	2"	11¼"	11¼"	2"	2¾" Exp. Shoe E7 (S1 & S6-20)
2"	2"	11¼"	11¼"	2"	2" Exp. Shoe E7 (S2,S3,S4-20)
2"	2½"	11½"	11½"	2½"	2" Fixed Shoe F4M (S1-21N & S6-21S)
2"	2½"	11½"	11½"	2½"	2" Fixed Shoe F4 (S2-21N, S3,S4-21S)
2"	2½"	11½"	11½"	2½"	2" Fixed Shoe F15 (S2-21S)

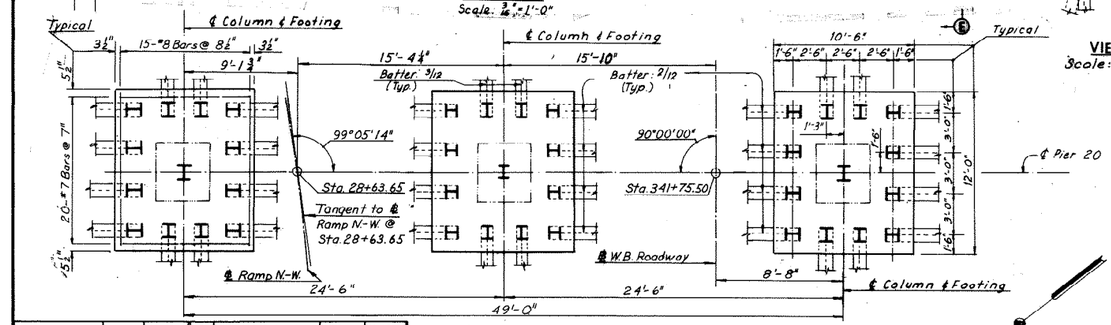
Masonry ℄
Top of Cap Beam
2" Min.
℄ Stringer
1" Min.

PAD ELEVATION VIEW
No Scale



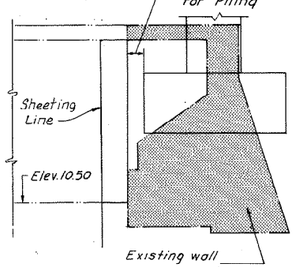
PAD AND ANCHOR BOLT SETTING PLAN
No Scale

Note:
Piles located within 10 ft. (horizontal distance) of Storm Drainage Flume shall be pre-bored to an Elevation 5 ft. below bottom of Flume.

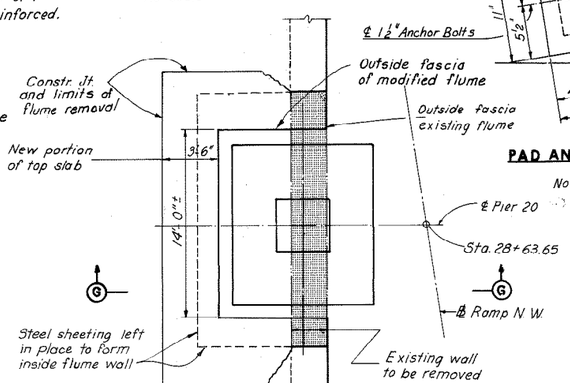


FOOTING PLAN
Scale: 3/16"-1'-0"

Note:
Dimensions given in Footing Plan are measured at bottom of footing.



SECTION G-G
No Scale



SECTION F-F
No Scale

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J. D.	12-3-68	2	Anchor Bolt loc. As Built	REG TEM	11-13-74 10-16
CHECKED	PTA	04-25-69				
IN CHARGE						

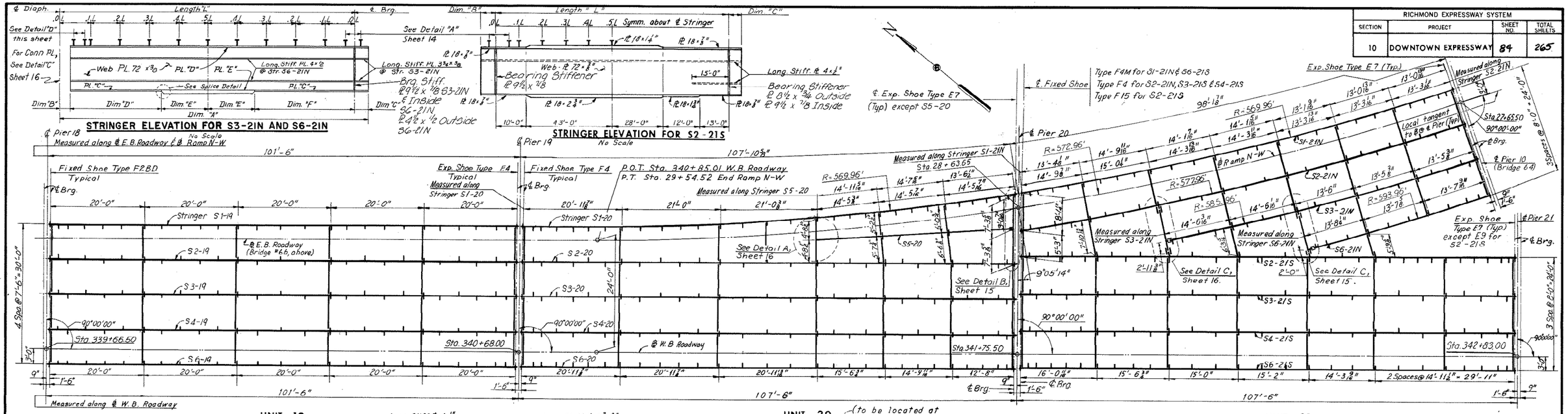
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

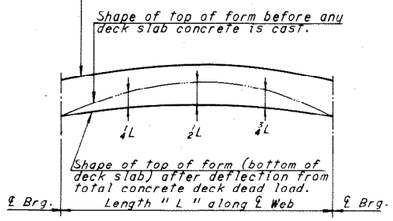
BRIDGE NO. 63
WESTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
PIER 20

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 10 OF 29

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	84	265



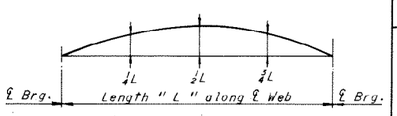


DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



CAMBER DIAGRAM

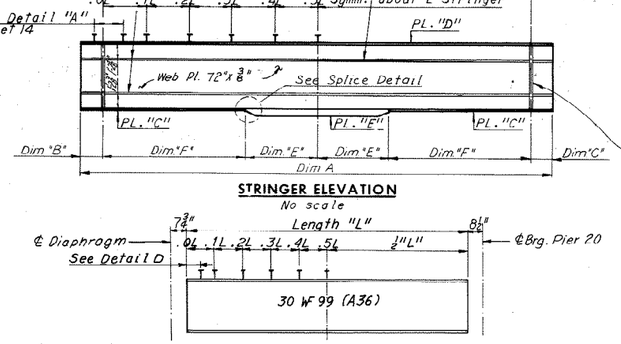
NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation conformity with finished grade.

Dimensions are in inches.

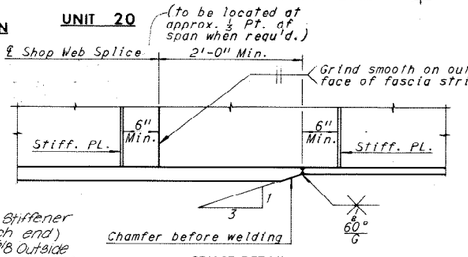
(-) Sign in camber denotes downward camber.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	GSH	07-31-68	2	As Built	TEM	10-76
CHECKED	PTA	10-23-68				
IN CHARGE						



FRAMING PLAN

Scale 1" = 10'-0"



Note:
All Steel shall be A36 unless otherwise shown.

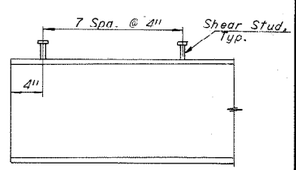
Exterior Stringer Longitudinal Stiffeners shall be located on the exterior face of the stringer.

Intermediate stiffener pls. 4" x 3/8" shall be equally spaced between diaphragms as shown. The first two stiffener spaces at the ends of stringers shall be one-half the normal spacing within the panel.

Note:
For web to flange weld sizes and longitudinal stiffener plate details see Sheet 14

SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E4	5	F2BD	5
		F4	8
E7	12	F4M	2
E9	1	F15	1



DETAIL D
No Scale

Note:
It may be necessary to increase Bearing Stiffener size to accommodate erection of end diaphragms.

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	PL. "C"	PL. "D"	PL. "E"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
19	S1-19	101'-4"	100'-0"	8"	8"	--	25'-0"	25'-0"	15x7/8"	15x3/4"	15x1 1/4"	14 1/2"	17"	20"	24"	24"
	S2-19	101'-2"	100'-0"	7"	7"	--	24'-0"	26'-0"	15x7/8"	15x3/4"	15x1 1/4"	16"	18"	21"	24"	24"
	S3-19	101'-2"	100'-0"	7"	7"	--	24'-0"	26'-0"	15x7/8"	15x3/4"	15x1 1/4"	16"	18"	21"	24"	24"
	S4-19	101'-2"	100'-0"	7"	7"	--	24'-0"	26'-0"	15x7/8"	15x3/4"	15x1 1/4"	16"	18"	21"	24"	24"
	S6-19	101'-4"	100'-0"	8"	8"	--	25'-0"	25'-0"	15x7/8"	15x3/4"	15x1 1/4"	14 1/2"	17"	20"	24"	24"
20	S1-20	107'-8 3/8"	106'-4 1/2"	8"	8 1/8"	--	34'-0"	19-2 1/4"	18x9/16"	18x3/4"	18x1 7/8"	12"	13 1/2"	17 1/8"	21 1/4"	24"
	S2-20	107'-2"	106'-0"	7"	7"	--	29'-6"	23'-6"	15x7/8"	15x3/4"	15x1 3/8"	15 1/2"	18"	21"	24"	24"
	S3-20	107'-2"	106'-0"	7"	7"	--	29'-6"	23'-6"	15x9/16"	15x3/4"	15x1 3/8"	15 1/2"	18"	21"	24"	24"
	S4-20	107'-2"	106'-0"	7"	7"	--	29'-6"	23'-6"	15x9/16"	15x3/4"	15x1 3/8"	15 1/2"	18"	21"	24"	24"
	S5-20	--	41'-9 1/4"	--	--	--	--	--	Stringer Size 30WF99			9"	10"	11"	13"	15"
	S6-20	107'-4"	106'-0"	8"	8"	--	28'-0"	25'-0"	15x1"	15x3/4"	15x1 1/2"	14 1/2"	17"	20"	24"	24"
21	S1-21N	96'-11 7/16"	95'-7 3/4"	8 1/8"	8"	--	33'-0"	14'-9 7/16"	18x7/8"	18x3/4"	18x1 1/4"	15"	17"	22"	24"	24"
	S2-21N	99'-5 11/16"	98'-3 5/8"	7 1/16"	7"	--	34'-0"	15'-1 13/16"	18x7/8"	18x3/4"	18x1 3/8"	12 1/2"	14"	17 1/2"	24"	24"
	S3-21N	69'-4 1/4"	69'-5"	7 3/4"	7"	10'-0 3/4"	24'-0"	10'-8 1/2"	12x5/8"	12x5/8"	12x1 3/8"	11"	12"	15"	17"	20 1/2"
	S6-21N	40'-11 7/16"	40'-11 7/16"	7 3/4"	8"	19'-10"	--	20'-5 11/16"	10x5/8"	10x5/8"	--	16"	18 1/2"	21"	24"	24"
	S2-21S	107'-4"	106'-0"	8"	8"	--	See Stringer Elevation for S2-21S				--	8"	8 1/2"	11"	16"	18"
	S3-21S	107'-2"	106'-0"	7"	7"	--	28'-6"	24'-6"	15x1"	15x3/4"	15x1 1/2"	15 1/2"	17"	20"	22 1/2"	24"
	S4-21S	107'-2"	106'-0"	7"	7"	--	28'-6"	24'-6"	15x1"	15x3/4"	15x1 1/2"	15 1/2"	17"	20"	22 1/2"	24"
	S6-21S	107'-4"	106'-0"	8"	8"	--	28'-6"	24'-6"	15x1"	15x3/4"	15x1 1/2"	14 1/2"	16 1/2"	19 1/2"	24"	24"

* Spacing begins at termination of 6 spaces @ 4".

DEAD LOAD DEFLECTION SCHEDULE

¼L	½L	¾L
1"	1 3/16"	1"
1"	1 3/16"	1"
1"	1 3/16"	1"
1"	1 3/16"	1"
1"	1 3/16"	1"
1 1/16"	1 7/16"	1 1/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1/16"	1/16"	0"
3/16"	1/16"	1/16"
1/16"	1/16"	1/16"
1/16"	1/16"	1/16"
1/16"	1/16"	1/16"

CAMBER SCHEDULE

¼L	½L	¾L
1 1/4"	1 3/16"	1 1/4"
1 1/4"	1 3/16"	1 1/4"
1 1/4"	1 3/16"	1 1/4"
1 1/4"	1 3/16"	1 1/4"
1 1/4"	1 3/16"	1 1/4"
1 1/16"	1 1/16"	1 1/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 3/16"	1 5/16"	1 3/16"
1 1/16"	1 3/16"	1 1/16"
1 1/16"	1 3/16"	1 1/16"
1 1/16"	1 3/16"	1 1/16"
1 1/16"	1 3/16"	1 1/16"
1 1/16"	1 3/16"	1 1/16"

Notes:
For Shoe details, see Sheets S1 & S2
For Diaphragm details, see Sheet 20.
For Superstructure steel quantities, see Sheet 2.
For additional framing details, see Sheet 16.
For Joint details, see Sheet 24.
For Shear Stud detail see Sheet 14.

AS BUILT

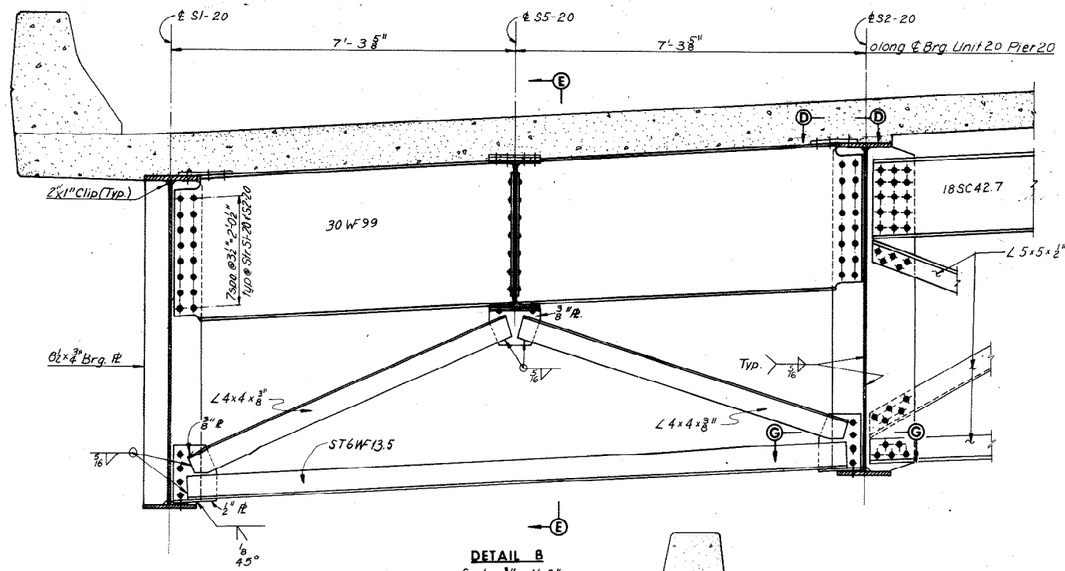
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

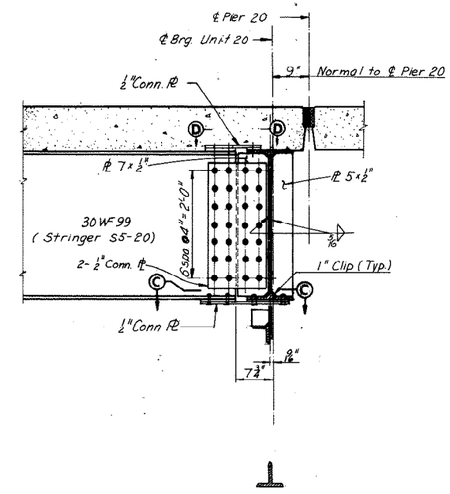
BRIDGE NO. 63
WESTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING PLAN—UNITS 19,20 AND 21

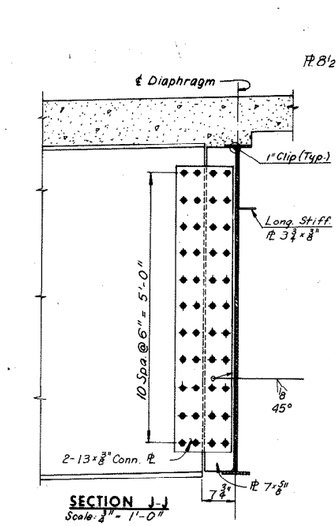
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

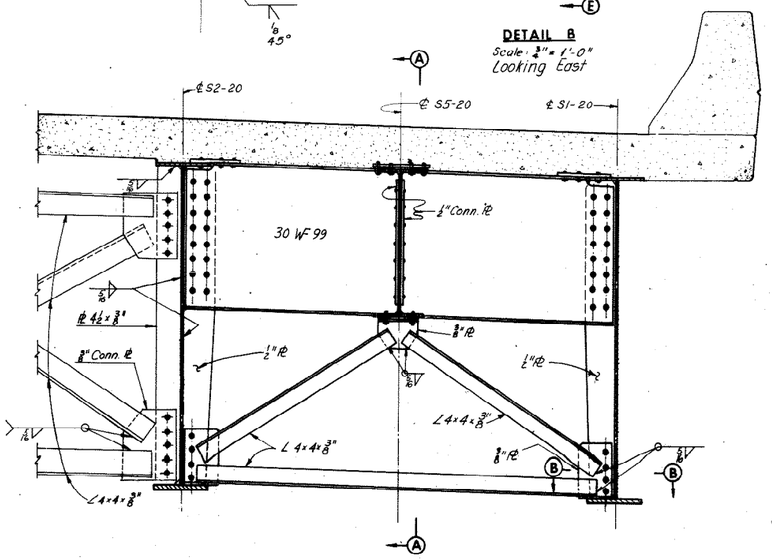
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 15 OF 29

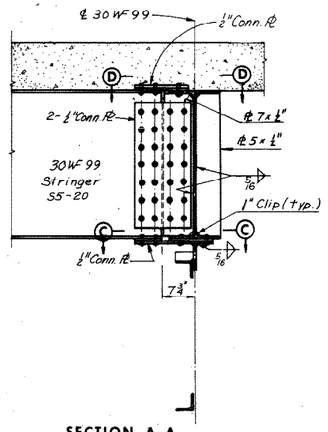
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	85	265

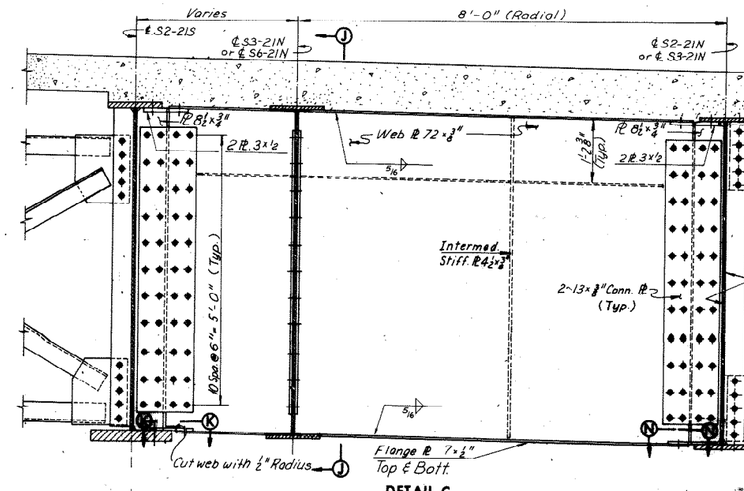


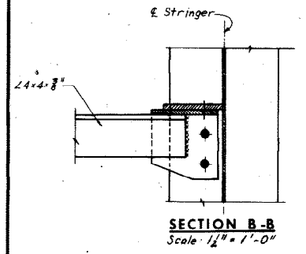


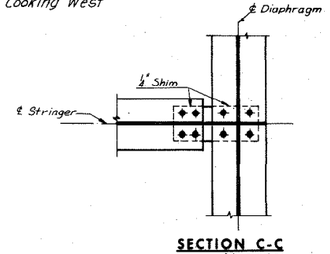


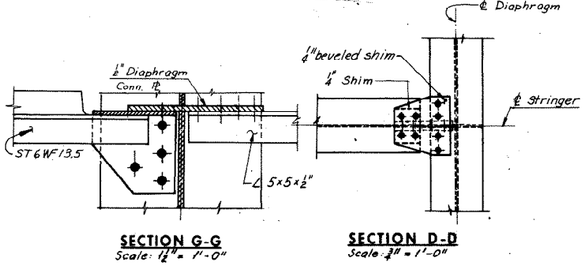












Section H-H similar

Note:
For location of Details A, B and C, see Framing Plan Units 20 and 21, Sheet 15.
All steel shall be A36 unless otherwise shown.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D.	12-18-68				
CHECKED	PTA	1-29-69	1	As Built	TEM	10-76
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS
UNITS 20 AND 21

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 16 OF 29

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	89	265

Notes:
For End Diaphragms at Pier 18, Unit 19, see Section A-A, Sheet 19.
For End Diaphragms at Pier 19, Units 19 & 20, see Section A-A, Sheet 19.
For End Diaphragms at Pier 20, Units 20 & 21, see Section A-A, Sheet 19. and for Detail "D" see Sheet 16.
For End Diaphragms at Pier 10, Unit 21N and Pier 21, Unit 21S, see Section C-C this Sheet.

Note:
Transverse dotted lines in Units 20 and 21 represent interior diaphragm at left end of stringers S5-20, S3-21N and S6-21N.
For location of diaphragms see Sheet 14.

Handrail Post spacing
Parapet Joint spacing
Along inside face of Parapet

℄ Pier 18 & 2⅝" Type A Jt.
12" Open Jt.
101'-4½"
21'-8¼"
3 Spaces @ 22'-6" = 67'-6"
13 Spaces @ 7'-6" = 97'-6"
1'-11¼"
12'-2¼"
3"ϕ Steel Conduit
2'-6" ℄ Scupper @ Sta. 339+69.00
28" Lt. (Typ.)
Stagger splices in alternate bars. (Typ.)
1'-3" Min. (Typ.)
#4 Bars Top & Bott. Typ. For Spacing See Section A-A, Sheet 19.
#5 Bars @ 6" Top & Bottom
90°00'00" Sta 339+66.50 along ℄ W.B. Roadway
Sta 340+68.00 along ℄ W.B. Roadway
31'-0"
40'-0"
12"
UNIT 19

℄ Pier 19 & 2⅝" Type A Jt.
12" Open Jt. (Typ.)
P.T. Sta 29+54.52 End ℄ Ramp N-W.
107'-9⅝"
3 Spaces @ 24'-0" = 72'-0"
13 Spaces @ 8'-0" = 104'-0"
3"ϕ Steel Conduit
21'-10½"
1'-10½"
9"+4 Bars @ 9½" (Top) 13"+4 Bars @ 6" (Bott.)
15"-#6 Bars @ 9½" (Top)
13"-#4 Bars @ 9½" (Top) 18"-#4 Bars @ 6" (Bott.)
Sta 28+63.65 ℄ Ramp N-W.
10'-0" 10'-0"
#5 Bars @ 6" Top & Bottom
90°00'00"
24'-0"
inside face parapet
P.O.T. Sta. 340+85.01 ℄ W.B. Roadway
℄ W.B. Roadway
27"+4 Bars @ 9½" (Top) for bottom reinf. see Section A-A Sheet 19.
16"+4 Bars @ 5½" (Bott.)
13"+4 Bars @ 9½" (Top)
28"
2'-2¾"
22'-0¼"
13 Spaces @ 7'-11" = 102'-11"
3 Spaces @ 23'-9" = 71'-3"
14'-1¼"
107'-4⅛"
12" Open Jt.
UNIT 20

℄ Pier 20 & 2⅝" Type A Jt.
12" Open Jt.
96'-6½"
3 Spaces @ 23'-0" = 69'-0"
12 Spaces @ 7'-8" = 92'-0"
13'-9¼"
2'-3¼"
3"ϕ Steel Conduit
inside face of parapet
℄ Scupper @ Sta. 28+60.50
17"-#4 Bars @ 9½" (Top) 23"-#4 Bars, Spacing see Section C-C (Bott.)
#4 bars top and bottom as shown in Section C-C
13"-#4 bars @ 9½" top & 16"-#4 bars @ 5½" bott.
20"-#6 bars @ 9½" top
24"-#5 bars fanned top/bott @ 6" along South ℄
10'-0" 10'-0"
2'-0" (Typ.)
For details of reinforcing in dotted area see Sheet 22.
147"-#5 Bars @ 5"
Top & Bott.
6"
37"-#5 Bars @ 6"
Top & Bott.
℄ Junction Box
℄ Light Std. @ Sta. 27+92.97
21'-5¾"
5'-3"
12" Open Jt.
℄ Pier 10 (Bridge 4-4) & 2⅝" Type A Jt.
2'-3¼"
℄ Ramp N-W Sta 27+65.50 along ℄ Ramp N-W
Radius = 572.96'
℄ Junction Box 90°00'00" (Top & Bott.)
61"-#5 Bars @ 6" (Top & Bott.) (measured along South ℄ 3"ϕ Steel Conduit
3"ϕ Steel Conduit Gutter Line
2'-0"
10'-0"
22'-0"
40'-0"
28"
℄ Pier 21 & 2⅝" Type A Jt.
12" Open Jt. (Typ.)
3"ϕ steel Conduit
Gutter Line
55"-#5 Bars @ 6" Top & Bott.
25'-0"
90°00'00"
Sta. 342+83.00 along ℄ W.B. Roadway
13 Spaces @ 7'-11" = 102'-11"
3 Spaces @ 23'-9" = 71'-3"
14'-1¼"
107'-4⅛"
UNIT 21

Sta. 27+87.10 ℄ Ramp N-W
Parapet Joint
Handrail Post
Concrete End Block
measured along inside face of parapet
11'-2⅝"
3 Spa. @ 16'-2" = 48'-6"
1'-11⅝"
12 spaces @ 4'-0" = 48'-0"
22'-4⅛"
11'-2½"
1'-11¾"
2'-0⅛"
12'-10⅜"
25'-7¼"
12" open Jt.
DECK PLAN
Scale 1"=10'-0"

Notes:
For Superstructure quantities, see Sheet 2.
For Framing plan, see Sheet 15
For Joint details, see Sheet 24
For Railing details, see Sheet 53.
For Standard Drainage Details, see Support Type 2 for Units 19 and 21, Sheet S5 & S6.

Note:
Intermediate Diaphragms shown in Section C-C can only be used where stringers are straight. For Intermediate Diaphragm Details for curved stringers, see Sheet 19.

Sta 342+57.17 ℄ W.B. Roadway
1'-2" 1'-0" 3'-6" Varies Varies
2"
℄ Ramp N-W
10¼" Typ. Varies
10⅜" Typ. to Top of Web
9"
9'-1'-6"
3"
L4x4x⅜"
L5x5x½"
Typ. ⅝"
3" Filler Pl.
3" Conn. ℄ (Typ.)
ST5WF10.5
For detail of long. stiffener, see Framing Plan, Sheet 15.
9" 9" 9" Max. 5½" Min. 2" Clr. 9" Tip. Bottom Long. Bar Spacing
2" 2'-6" Varies Varies
3 Spaces @ 1'-6" = 22'-6"
See SECTION A-A, Sheet 19.
Intermediate Diaphragms
SECTION B-B
Scale: ⅜" = 1'-0"

No Scale
1'-2" 1'-0"
25'-0"
3'-6" ℄ Ramp N-W ℄ Profile Grade Line
℄ W.B. Roadway Profile Grade Line
3'-6"
1'-0" 2" 10" 2"
Aluminum Railing, (Typ.) Details see Sheet 53
¾" Chamfer (Typ.)
2" Clr.
#4@12"
Rustication 1½"x¾" (Typ.)
#4
#5
Drip Bend 1½"x⅜" (Typ.)
Elev. F
Elev. F*
Elev. D
Elev. B
Elev. A
Elev. C*
Typ. Bottom Long. Bar Spacing 9½" 11" 10 Spa. @ 5½" 11" 9½"
10⅜" Typ. to Top of Web
#4@12"
#4 @ 9½"
#4 Bars. Typ. Spacing as shown Varies
8" Uniform Slab
Shear Studs
#5 @ 6" Top & Bottom
Construction Joint Horizontal (Typ.)
2'-1"-2'-11"
R=9"
6" Typ.
9" 1'-6"
3" 3" 3"
2"x1" Clip (Typ.)
18"C42.7
3" (Typ.)
L4x4x⅜" (Typ.)
L5x5x½"
#4½ x⅜" (Typ.)
⅜" Filler ℄ (Typ.)
Bearing Stiffener see Sheet 14
For detail of long. stiffener See Framing Plan, Sheet 15
1½"
4 Spa. @ 3" (Typ.)
6" Min. (Typ.)
⅜" Conn. ℄ (Typ.)
1" (Typ.)
Typ. Intermediate Diaphragms
Typ. End Diaphragm
3 Spaces @ 8'-0" = 24'-0"
2'-6" 2"
SECTION C-C
Scale: ⅜" = 1'-0"

Note: Elev. C* are elevations along south gutterline of Ramp N-W from ℄ Pier 10 (64) to Sta 27+87.10 @ ctr. of Nose.
Elev. F* are elevations along north gutterline of W.B. Roadway between Sta. 342+57.17 @ ctr. of Nose and Sta. 342+83.00 @ ℄ Pier 21.

	BY	DATE				
MADE	GSH	7-29-68				
CHECKED	KCT	10-18-68	1	As Built	TEM	10-76
IN CHARGE			NO.	REVISION	BY	DATE

ELEVATION TABLE

STATION ℄ W. B.	ELEV. A	ELEV. B	ELEV. F*	ELEV. D	ELEV. E
339+66.50	67.46	67.39	—	66.91	66.84
+70.00	67.49	67.42	—	66.94	66.87
+80.00	67.61	67.54	—	67.06	66.99
+90.00	67.72	67.65	—	67.17	67.10
340+00.00	67.83	67.76	—	67.28	67.21
+10.00	67.94	67.87	—	67.39	67.32
+20.00	68.05	67.98	—	67.50	67.43
+30.00	68.17	68.10	—	67.62	67.55
+40.00	68.28	68.21	—	67.73	67.66
+50.00	68.39	68.32	—	67.84	67.77
+60.00	68.50	68.43	—	67.95	67.88
+68.00	68.59	68.52	—	68.04	67.97
+70.00	68.61	68.54	—	68.06	67.99
+80.00	68.73	68.66	—	68.18	68.11
+85.01	68.78	68.71	—	68.23	68.16
+90.00	68.84	68.77	—	—	—
341+00.00	68.95	68.88	—	—	—
+10.00	69.06	68.99	—	—	—
+20.00	69.18	69.11	—	—	—
+30.00	69.29	69.22	—	—	—
+40.00	69.40	69.33	—	—	—
+50.00	69.51	69.44	—	—	—
+60.00	69.62	69.55	—	—	—
+70.00	69.73	69.66	—	—	—
+75.50	69.80	69.73	—		
+80.00	69.85	69.78	—		
+90.00	69.96	69.89	—		
342+00.00	70.07	70.00	—		
+10.00	70.18	70.11	—		
+20.00	70.29	70.22	—		
+30.00	70.41	70.34	—		
+40.00	70.52	70.45	—		
+50.00	70.63	70.56	—		
+57.17	70.71	70.64	70.21		
+60.00	70.74	70.67	70.24		
+70.00	70.85	70.78	70.35		
+80.00	70.97	70.90	70.47		
342+83.00	71.00	70.93	70.50		

ELEVATION TABLE

STATION ℄ Ramp N-W.	ELEV. D	ELEV. E	ELEV. C
29+54.52	68.23	—	—
+50.00	68.28	68.21	—
+40.00	68.39	68.32	—
+30.00	68.50	68.43	—
+20.00	68.60	68.53	—
+10.00	68.70	68.63	—
29+00.00	68.80	68.73	—
28+90.00	68.89	68.82	—
+80.00	68.98	68.91	—
+70.00	69.07	69.00	—
+63.65	69.12	—	—
+63.17	—	69.05	—
+60.00	69.15	69.08	—
+50.00	69.23	69.16	—
+40.00	69.30	69.23	—
+30.00	69.37	69.30	—
+20.00	69.44	69.37	—
+10.00	69.51	69.44	—
28+00.00	69.57	69.50	—
27+90.00	69.64	69.56	—
27+87.10	69.67	69.58	70.21
+80.00	69.74	69.64	70.34
+70.00	69.87	69.76	70.56
27+65.50	69.94	69.82	70.66

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

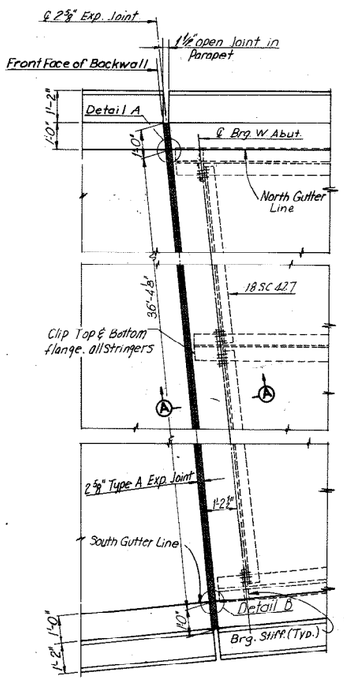
BRIDGE NO. 63
WESTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.

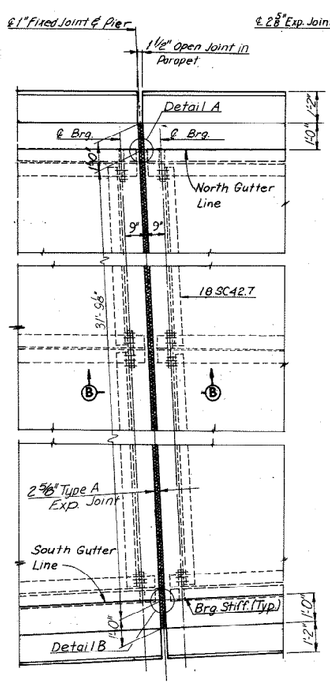
DECK PLAN — UNITS 19, 20 AND 21

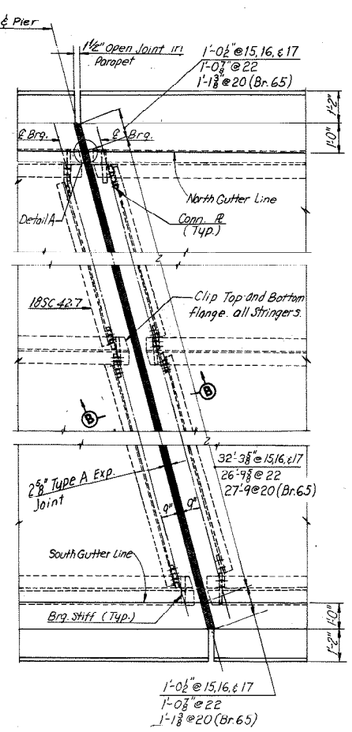
HOWARD, NEEOLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

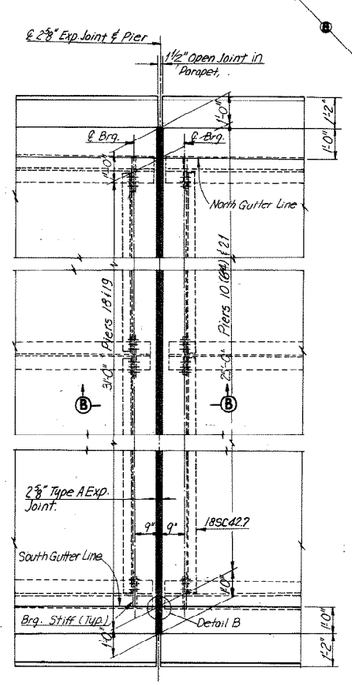
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 20 OF 29

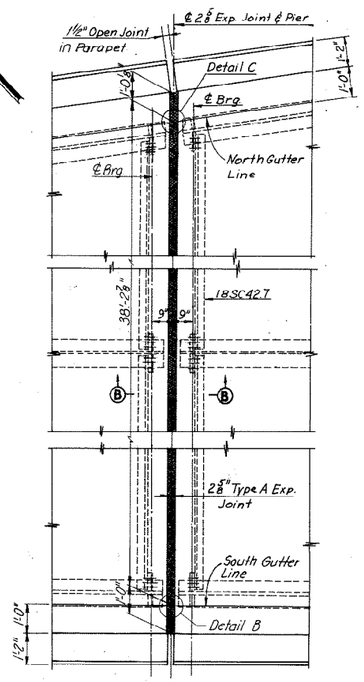
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	93	265

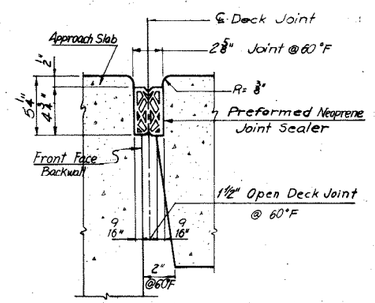












2⅝" TYPE "A" JOINT @ WEST ABUTMENT

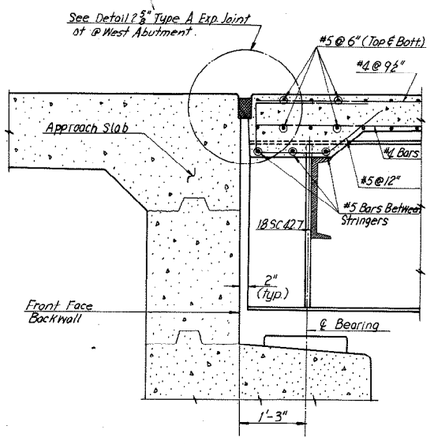
PLAN — JOINT AT WEST ABUTMENT
Scale : ⅜" = 1'-0"

PLAN — JOINT AT PIER 14
Scale : ⅜" = 1'-0"

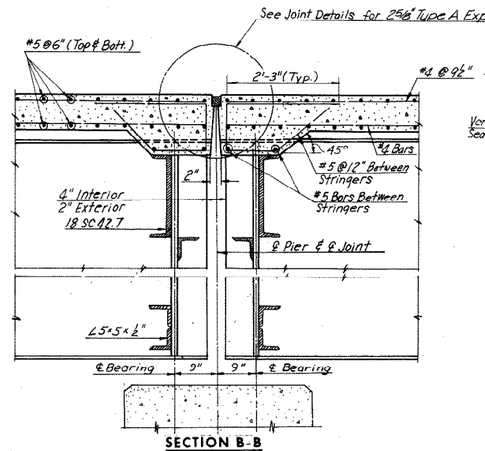
PLAN — JOINT AT PIERS 15, 16, 17, 22 AND 20 (BR. 65)

PLAN — JOINT AT PIERS 18, 19, 21 AND 10 (BR. 64)
Scale : ⅜" = 1'-0"

PLAN — JOINT AT PIER 20
Scale: ⅜" = 1'-0"



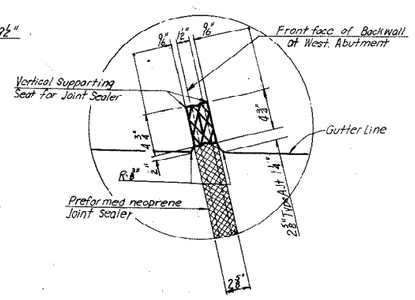
SECTION A-A
Scale : ¾" = 1'-0"



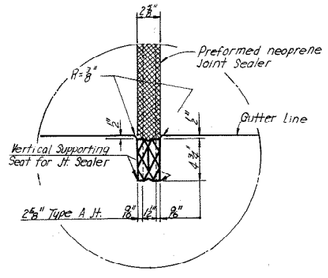
SECTION B-B
Scale: ¾" = 1'-0"

Note:
All horizontal dimensions of Sections shown above are normal to ℄ joint.

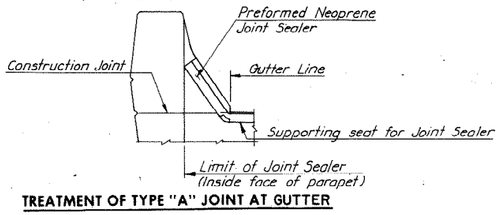
Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.



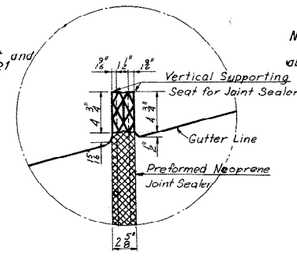
DETAIL A
No Scale
Typical for W. Abutment and Piers 14, 15, 16, 17 22, and 20 (Br. 65)



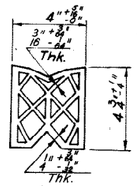
DETAIL B
No Scale
Typical for W. Abutment and Piers 14, 18, 19, 20, 21 and 10 (bridge 64).



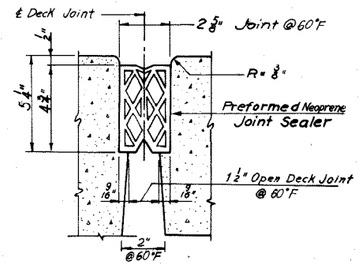
TREATMENT OF TYPE "A" JOINT AT GUTTER
No Scale



DETAIL C
No Scale
Typical for Pier 20.



PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT



2⅝" TYPE "A" JOINT EXPANSION JOINTS
No Scale

Note:
All horizontal dimensions shown above are normal to ℄ Joint.

	BY	DATE				
MADE	GSH	10-1-68				
CHECKED	J.D.	11-1968	1	As Built	TEM	10-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 24 OF 29

Bridge 64

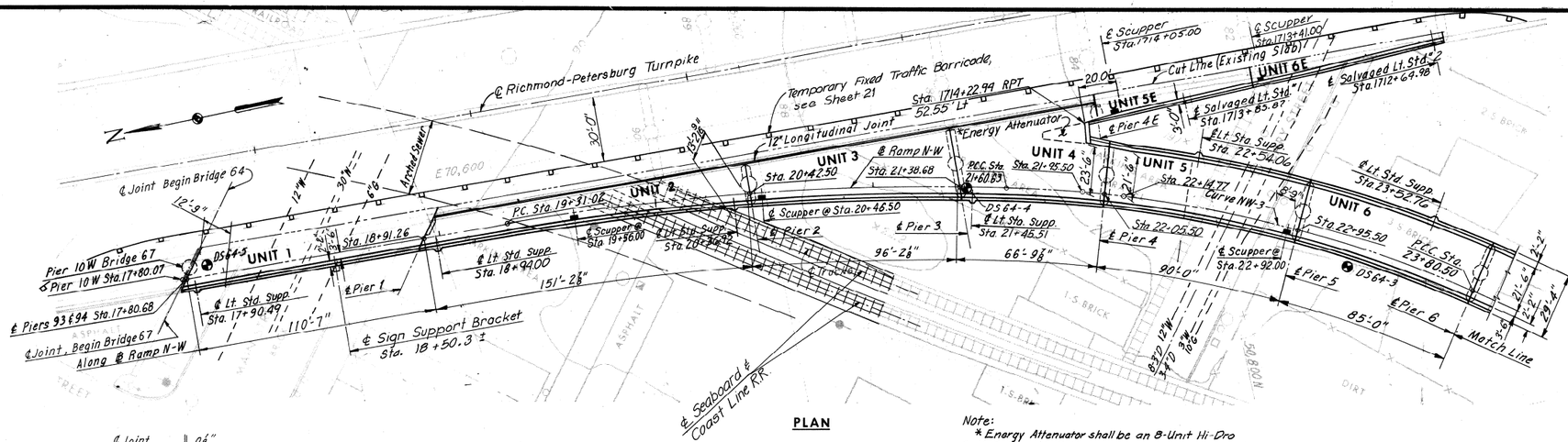
(Ramp From SB I-95 to Eastbound Downtown Expressway - Rte. 195 Over East Cary Street, Dock Street, and CSX Railroad)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	99	265

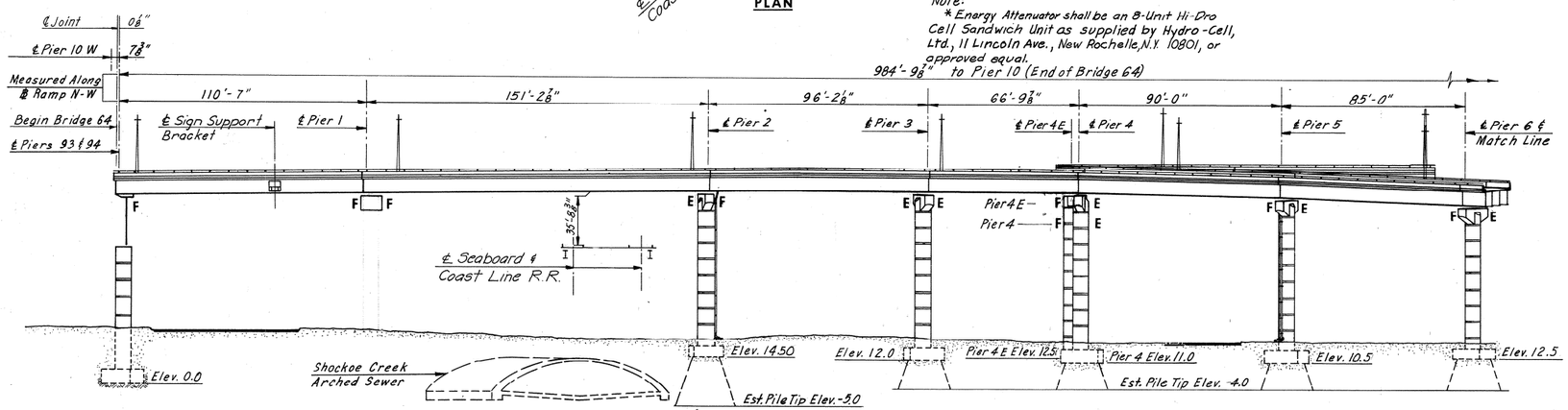
INDEX

Note:
For General Notes, see Sheet 2.
For Quantity Table, see Sheet 2.

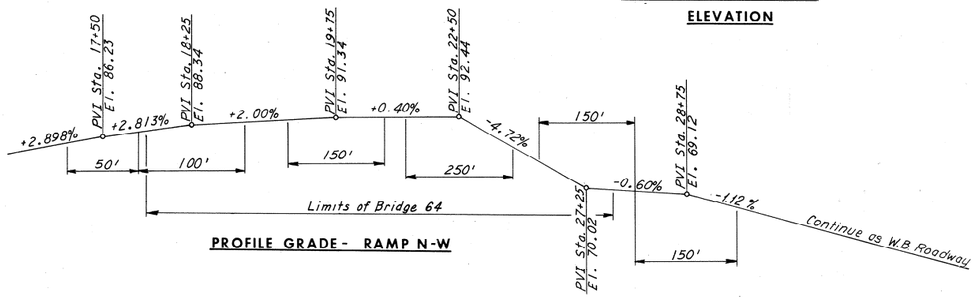


PLAN

Note:
*Energy Attenuator shall be an 8-Unit Hi-Dro Cell Sandwich Unit as supplied by Hydro-Cell, Ltd., 11 Lincoln Ave., New Rochelle, N.Y. 10801, or approved equal.



ELEVATION



PROFILE GRADE - RAMP N-W

HORIZONTAL CURVE DATA

℄ R. P. Turnpike

Curve: R.P.T.-1
P.I. = Sta. 1704+68.83
Δ = 15° 03' 56.2"
D = 1° 00' 00"
T = 757.65'
L = 1,506.56'
R = 5,729.58

Curve: R.P.T.-2
P.I. = Sta. 1723+07.01
Δ = 33° 21' 06.8"
D = 4° 00' 00"
T = 430.45'
L = 836.30'
R = 1,432.39'

℄ Ramp N-W

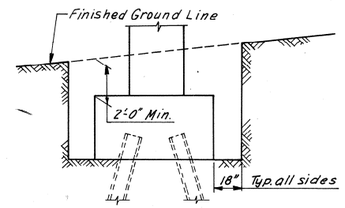
Curve: NW-1
P.I. = Sta. 13+42.50
Δ = 3° 51' 35.6"
D = 3° 51' 35.6"
T = 426.01'
L = 829.72'
R = 1,484.39

Curve: NW-2
P.I. = Sta. 20+46.21
Δ = 11° 28' 49.9"
D = 5° 00'
T = 115.19'
L = 229.61'
R = 1,145.92'

Curve: NW-3
P.I. = Sta 22+71.93
Δ = 21° 59' 14.9"
D = 10° 00' 00"
T = 111.31'
L = 219.88'
R = 572.96'

Curve: NW-4
P.I. = 25+55.02
Δ = 64° 48' 04"
D = 20° 50' 05.4"
T = 174.52'
L = 311.02'
R = 275.00'

Curve: NW-5
P.I. = Sta. 28+25.38
Δ = 26° 18' 00"
D = 10° 00' 00"
T = 133.86'
L = 263.00'
R = 572.96'



LIMITS OF STRUCTURE EXCAVATION
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	1-6-69	1	℄ Seaboard & Coast Line Add To Plant El	K.D.P.	6-74
CHECKED	G.C.C.	4-26-69	2	Sign Support Bracket & Sheet 12a added	L.B.P.	8-74
IN CHARGE			3	Added Sta.	REG	1-13-75
			4	As Built	TEM	6-77

AS BUILT

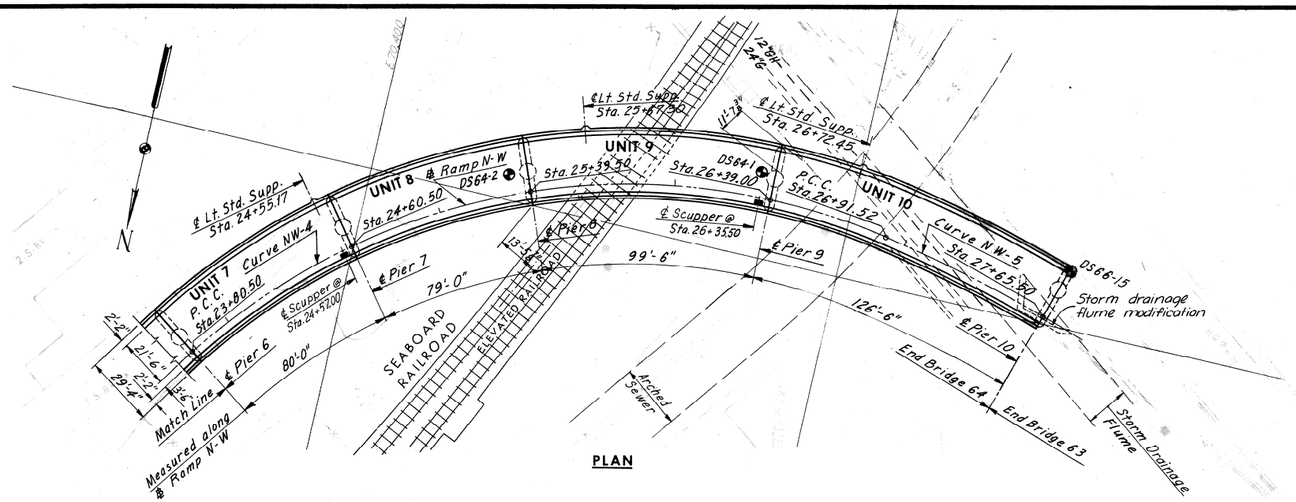
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

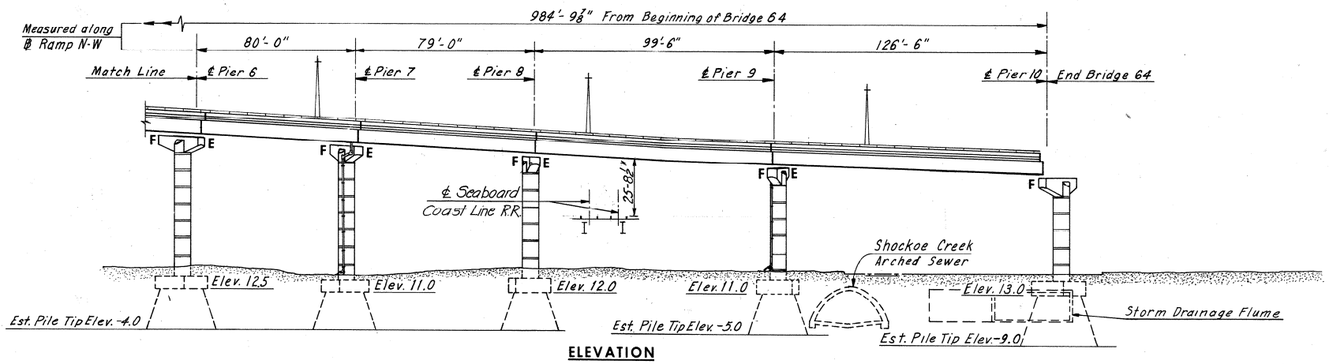
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 30'-0"
CONTRACT NO.: 10
SHEET NO. 1 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	100	265



PLAN



ELEVATION

ESTIMATED QUANTITIES

	Structure Excavation Cu. Yds.	Concrete (‡) Cu. Yds.	Reinforcing Steel Lbs.	Str. Steel Mild Carbon Lbs.	Str. Steel High Strength Lbs.	Aluminum Railing (1-Rail) Lin. Ft.	Steel Piles 10BP42 Lin. Ft.
Superstructure	--	1,023.8	213,790	768,100	413,900	1,600	---
Substructure	1,125	1,484.1	236,580	2,000	---	---	145
Total	1,125	2,507.9	450,370	770,100	413,900	1,600	145

	Steel Piles 12BP53 Lin. Ft.	Sheet Piling Lump Sum	Metal Conduit Lin. Ft.	Energy Attenuator 8-Unit Each	Bridge Drainage Metal Work Lbs.	Modifications to R.P. Turnpike Bridge Lump Sum	Modifications to Storm Drainage Flume Cu. Yds.
Superstructure	---	--	1,075	1	13,030	1	--
Substructure	3,035	1	--	--	--	-	116
Total	3,035	1	1,075	1	13,030	1	116

‡ All Concrete for Superstructure shall be Class A4 and for Substructure Class A3.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	1-13-69	1	Seaboard & Coast Line Add. To Plan(s)	K.D.P.	6-74
CHECKED	GCC	4-28-69	2	Str. Steel Quantity	R.B.H.	9-74
IN CHARGE			3	As Built	TEM	6-77

GENERAL NOTES:

ROADWAY: One variable width roadway transitioning from a widening of Southbound roadway of Richmond-Petersburg turnpike to a ramp with 25'-0" clear roadway connecting with W.B. Roodway (Br. 63).

CAPACITY: Dead load includes 15 lbs. per sq. ft. for future wearing surface. Live load. HS 20-44 loading and alternate mtlitary loading.

SPECIFICATIONS:
GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970.
DESIGN: A.A.S.H.O. Standard Specifications for Highway Bridges 1973, modified by Special Design provisions.
WELDING: 1972 Standard Specifications for Welded Highway and Railway Bridges of the American Welding Society.
CONTRACT SPECIAL PROVISIONS
Specifications and Contract Special Provisions referred to above are necessary to make these plans complete.

DATUM: City of Richmond

TEMPERATURE: The normal temperature referred to in the plans is 60°F. The temperature range for movement is 0° F. to 120° F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be dry and special attention is called to Section 401.05 of Standard Specifications and to the Contract Special Provisions, concerning preparation of foundations for footings.

CONCRETE NOTES: Concrete in superstructure shall be Class A 4. All other concrete shall be Class A 3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, The use of low-slump concrete, and orother means shall be employed to prevent downgrade movement of newly placed slab concrete. Finishing Concrete Surfaces: See Standard Architectural Detail Sheets and the Contract Special Provisions for types and details. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face To concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted. All reinforcing steel shall conform to ASTM A615 Grade 40.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Designations A36, A572 - Grade 50 and A588 as noted. See Special Provisions.
All field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

Note:
For Curve Data and Profile Grade, see Sheet 1.
For Layout Plan, see Sheet 3.

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 30'-0"
CONTRACT NO. 10
SHEET NO. 2 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	102	265

Bottom flange and web of beam to be cut to clear existing masonry plate. (see Detail B)

℄ Pier 1 Normal to Brg. Beam

1'-1⅛" 3'-7⅛" 1'-9⅞" 2'-11⅞"

4'-11" 5'-4½" 1'-8¼" 3'-8¼"

#6 Anchor hook into new concrete Along ℄ Bearing Beam

1'-3½"

Existing Stringer

℄ S1-2 (F&M Typ.)

℄ S2-2

℄ S3-2

3'-8⅞"

12" Typ

Remove existing Brace

For Details, see Detail A

Stiffener Pl. 4'x½"

R=1'-6"

R=1'-6"

Masonry Pl. 7'x1'-9" Weld to Brg. Beam

℄ Bearing Beam (30WF99)

Masonry Pl. 7'x1'-9" Weld to bearing beam

℄ FB13

Drainage Pipe Support Type 11

Existing FB13

Sta. 18+91.26

℄ Pier

℄ FB14

Existing FB14

Existing Concrete Pad

Extension FB14

54°29'00"

℄ R.P.T.

Sta. 17+17+28.137

Collar concrete placing sequence Constr. Jt.

℄ Existing Shoes

℄ S1-1

℄ Ramp N-W

℄ S2-1

5'-6⅜"

7'-10"

4'-1¾"

3'-8¼"

Along ℄ FB14

Fill with sealant

CAP PLAN PIER 1

Scale: ½"=1'-0"

℄ Stringer

**Nominal thickness

Cut Area

Typ.

℄ Bearing Beam 30WF99

Elevation at bott. of bott. flange at ℄ stringers.

Note: Cut both Masonry Pl and Rocker Pl of F&M Shoes to provide minimum ½" for welding the Masonry Pl to the Flange.

DETAIL A

Scale: 1½"=1'-0"

Bottom Flange of Bearing Beam

Saw cut chip to this line

9"±

1'-0"±

8½"±

54°29'00"

1'-2¾"±

Edge of Existing Masonry Pl.

℄ 30WF99

6"

1" Clr.

1" Clr.

℄ Pier 1 Normal to Bearing Beam

DETAIL B

Scale: 1½"=1'-0"

℄ Pier 1 & ℄ Existing Pier 92

℄ Bearing Beam (30WF99)

℄ FB14

℄ FB13

1'-1⅝" 1'-4⅝"

1'-6" 1'-6"

Top of Existing Col. 92

Mill to Bear (typ)

Pl. 1½"

Anchor Bolt @12" Clrs.

3" clr.

#6@10"

#6@12"±

#6@12"

#8

#6

Existing tie bars

Drip Bead ½"x¾"

Chip to expose existing tie bars

1" Sand cut around existing column

Remove 2"± concrete, apply epoxy and place new concrete

SECTION G-G

Scale: ⅜"=1'-0"

Note: 30WF99 Bearing Beam to be set level on a pad prepared as required for shoes. Provide 8-#6 anchors hook into new concrete.

Note: Dimensions given to tie the new structure to the existing are based on the drawings for the original construction. The Contractor shall therefore verify all necessary dimensions of existing structural work.

Note: Elevation 79.81 @ top of existing Pier 92 is based on the original construction plans. If Elevation established in field is found to exceed 79.81 the concrete surface on top of Pier 92 is to be chipped and finished as required for shoes. If below, the difference is to be added to the nominal thickness of bearing plates under the shoes. All elevations of existing steel structures are to be verified in field by contractor.

℄ S3-2 ℄ S2-2 ℄ S1-2

Bott. of S1-2, S2-2 & S3-2

Top of Brg. Beam

Typ

Pl. 10"x⅜"

3" R=2¼" 1'-6"

#6 Anchor

#6 Anchors @6"

Existing Column

30 WF 99

Level

Elev. 79.81±

4'-0"

9'-6" Diameter

7'-6" Diameter (Existing Column)

℄ Existing Column 92

VIEW F-F

Scale: ⅜"=1'-0"

Note to Fabricator: All Structural Steel for Pier 1 shall be A-36. Fabricate top of cap beam flat.

	BY	DATE			TEM	6-77
			4	As Built	REF	1-6-76
MADE	K.C.T.	3-16-69	3	Number of Girders	REF	12-30-74
CHECKED	Y.C.P	4-24-69	1	Note Change	TEM	5-74
IN CHARGE			NO.	REVISION	BY	DATE

℄ Column & ℄ Pier

Local tangent to ℄ @ ℄ Pier 2

℄ Ramp N-W

9'-1" 4'-3⅜" 5'-1⅝"

2'-2⅜" 4'-4½" 4'-9⅛" 2'-0⅛" 2'-8⅜" 2'-5"

2'-6½" 2'-3⅛" 3"

℄ S1-3 (F1 Typ.) ℄ S2-3 ℄ S4-3 ℄ S5-3

*Elev. 84.09

84°25'33"

Sta. 20+42.50

℄ Bearing

℄ Pier 2

℄ Bearing

*Elev. 83.90

*Elev. 84.60

*Elev. 84.44

*Elev. 84.27

4'-0"

9'-3"

*Elev. 84.40

*Elev. 84.15

℄ S1-2 (E12 Typ.) ℄ S2-2 ℄ S3-2

7"

2'-2⅜" 7'-0½" 6" 4'-1½" 2'-11⅞" 2'-2⅜"

18'-6"

CAP PLAN PIER 2

Scale: ¼"=1'-0"

* Elevation at top of concrete pad.

NOTE A

A construction joint will be permitted at a rustication near mid-height of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minimum of 3'-6". Splices shall be Staggered at least 3'-3" between adjacent bars.

℄ Column & ℄ Pier

1'-11" Typ

#11 Column Bars

#5 Stirrups

#5 Stirrups

#6 Ties

℄ Pier 2

#5 Ties

#6 Bar

#11 bar extend 4'-0" into cap beam

N

SECTION A-A

Scale: ¼"=1'-0"

4'-0"

3¾" 19 Spa. @4½"=3'-4½" 3¾"

3¾"

10-#11 Bars

#5 Stirrups

#6 Bars

1-#9 Bars

Varies

3¾" 3@13½"=3'-4½" 3¾"

SECTION B-B

Scale: ½"=1'-0"

D (Double) 1'-6" 4-#5@15" 10" B (Single) 5-#5@18" 14" E (Double) 1'-6" 4-#5@15"

Elev. 84.34

Elev. 84.00

Elev. 83.66 Extend 6-#11 each side 4'-0" into cap beam

10-#11

1-#6 Bars

2-#6 Ties

1-#6 Tie

1-#6 Tie

2-#6 Ties

4'-0"

4'-0"

5'-0" Min.

2-#6 Bars

Elev. 78.87

6-#5 Ties Each face

4-#9 Bars

9'-2"

Drainage Pipe Support Type 3

36-#11 Col. Bars

7'-0"ϕ

#5 Tie @ 12"

Optional Constr. Jt. permitted. See Note A.

60'-10½"

7'-0"

Finished Ground Line

2'-0" Min

3'-9"

36-#11 Dowels Stagger Spliced To Match Col. Bars

3'-6"x3'-6"x3" Key (Typ.)

#8 1'-0"

R=1'-9"

5'-0"

Elev. 14.50

12 BP 53 Piles, Batter 3 per 1'-0" as shown

VIEW E-E

Scale: ¼"=1'-0"

℄ Pier 2 & ℄ Column

℄ Brg.

1-#6 Tie

1-#6 bar

1-#6 Tie

1-#6 Tie

8'-0"

Rustication, see Detail

Rustication @ 8'-0"

RUSTICATION DETAIL

Full Scale

1'-7"

℄ Pier & ℄ Column

2" Clear

#5 Tie

#11 Bars equally spaced

℄ Column

SECTION C-C

Scale: ⅜"=1'-0"

E D B I J J A A ℄ Stringer

℄ 1¼"ϕ Anchor bolts

℄ Bearing H

℄ Pier 2

G F C 9"

d 2" Typ.

℄ 1¼"ϕ Anchor bolts

Masonry Pl

℄ Stringer

D E B

PAD AND ANCHOR BOLT SETTING PLAN

No Scale

DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN											
Pier	Stringer	∂	B	A	B	C	D	E	F	G	H	I	J
2	S1-3	—	90°00'00"	4½"	8"	0	12½"	12½"	5⅜"	5⅜"	11½"	25"	8"
	S2-3	—	90°00'00"	4½"	8"	0	12½"	12½"	5⅜"	5⅜"	11½"	25"	8"
	S4-3	—	83°42'49"	4½"	7⅝"	⅜"	13⅜"	11¼"	7"	4⅝"	11½"	25"	8"
	S5-3	—	82°00'00"	4½"	7⅝"	1⅜"	13⅜"	11⅝"	7⅝"	4"	11½"	25"	8"
	S1-2	90°00'00"	—	4"	14¼"	0	18½"	18½"	6⅜"	6⅜"	13½"	36½"	14½"
	S2-2	87°14'17"	—	4"	14⅜"	0	18½"	17⅞"	6⅞"	6"	13½"	36½"	14½"
	S3-2	84°26'56"	—	4"	14⅜"	1⅜"	18¾"	17⅝"	8½"	5¼"	13½"	36½"	14½"

Note: For Standard Shoe Details, see Sheets S1 & S2. For Framing Plan, see Sheets 12 & 13. For Steel and Concrete Quantities, see Sheet 2. All piles shall be 12BP53 Steel Pile. (Design Capacity = 57 Tons.) Estimated pile tip elevation, Pier 2 = -5.0 For Pile Details, see Sheet 7. For Details of Extension FB 14, See Sheet 18. For Standard Drainage Details, see Sheet 56.

4½" 10 Spa. @8½" 4½" Footing Reinforcement

1'-6" 3'-6" 3'-6" 3'-6" 1'-6" Pile Spacing @ Ramp N-W

4½" 1'-6"

18 Spa. @8½" 3'-6" 3'-6" 3'-6" 3'-6"

6" ℄ Footing ℄ Column

84°25'33"

Sta. 20+42.50

6'-9"

6'-9"

℄ 12BP53 piles

℄ Pier 2 & ℄ Footing

4'-9⅞"

4½" 1'-6"

6'-9" 6" 4'-3⅜" 1'-11⅝"

13'-6"

Local tangent to ℄ @ Sta. 20+42.50

FOOTING PLAN PIER 2

Scale: ¼"=1'-0"

FOOTING FOR PIER 2 IS ECCENTRIC AS SHOWN ON FOOTING PLAN

Varies (6 Max.) Varies

1'-6"

Varies

#5 Tie @12"

Varies 4'-0" Varies

3¾" 9 Spa. @4½"=3'-4½" 3¾"

3"

#11 Bars

#5 Stirrup

#5 Tie

#5 Col. Tie

1'-1" (Typ.)

#6 Bars

#9 Bars

#11 Column Bar

3¾" 3@13½"=3'-4½" 3¾"

SECTION D-D

Scale: ½"=1'-0"

AS BUILT

RICHMOND METROPOLITAN AUTHORITY

RICHMOND EXPRESSWAY SYSTEM

DOWNTOWN EXPRESSWAY

BRIDGE NO. 64

RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

PIERS 1 AND 2

HOWARD, NEEDLES, TAMMEN & BERGENDOFF

consulting engineers

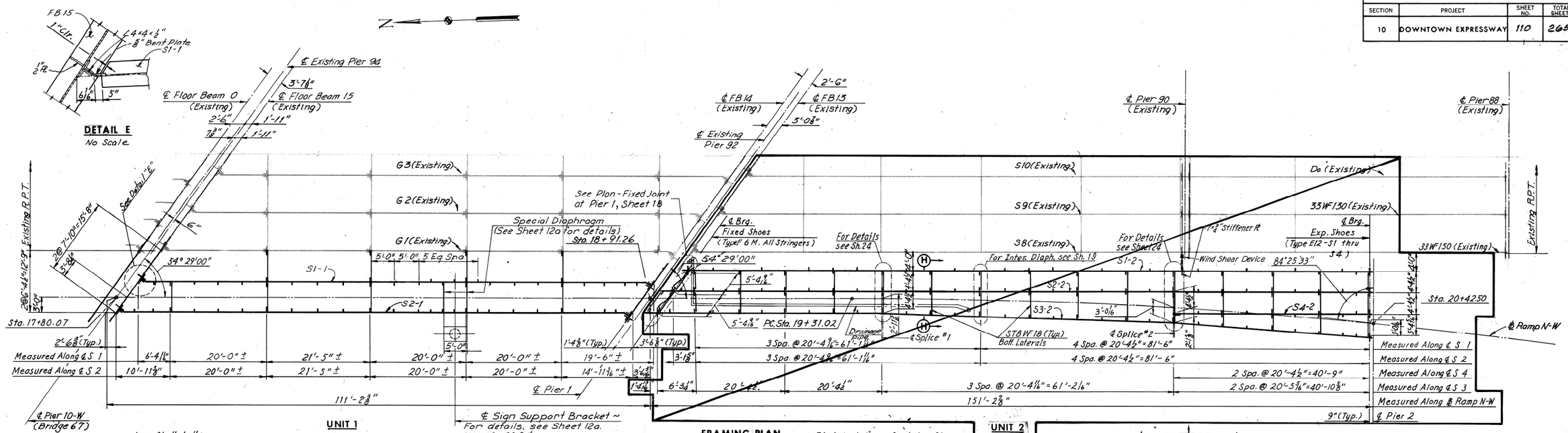
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted

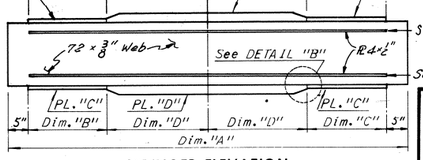
CONTRACT NO: 10

SHEET NO. 4 OF 28

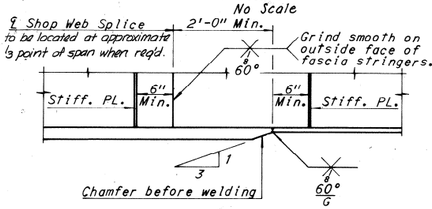
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	110	265



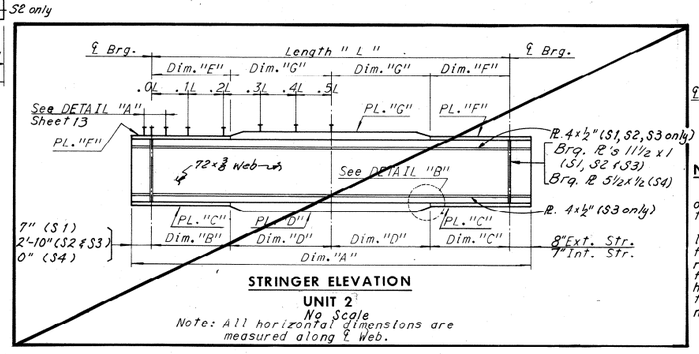
Note:
Dimensions shown on the plans for existing structural metal work are in accordance with drawings prepared for the original construction. The Contractor shall verify all necessary dimensions of existing structural metalwork prior to fabrication of new metalwork.
New Diaphragms are to match Existing Diaphragms, in Unit 1.



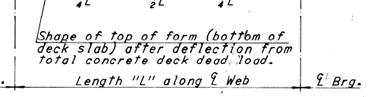
STRINGER ELEVATION
UNIT 1
No Scale



DETAIL "B"
No Scale



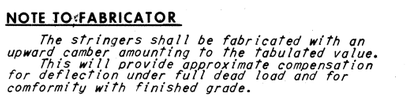
STRINGER ELEVATION
UNIT 2
No Scale
Note: All horizontal dimensions are measured along ℄ Web.



DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.
In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



CAMBER DIAGRAM

NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in Cross-Section on Sheet 17

⊕ Except as shown otherwise

Note:
Intermediate stiffener P.s 4½x⅜" shall be equally spaced between diaphragms ~~@ as shown~~. The first two stiffener spaced at the ends of stringers shall be one-half normal spacing within the panel.
It may be necessary to increase Bearing Stiffener size to accommodate erection of end diaphragm.

Note:
For Deck Plan, see Sheet 19.
For Joint Details, see Sheets 18 & 25
For Joint Details of Pier 10W, see Sheet 42, Bridge 67.
For Standard Shoe Details, see Sheet 51.
For Details of FB 14 and FB 15, see Sheet 18.
See Sheet 4 for special modifications of masonry plate, FBM @ Pier 1.
For Section H-H, see Sheet 19.
For Horizontal Stiffener Detail and Flange to Web Welds, see Sheet 15.

SHOE SCHEDULE			
EXPANSION SHOE		FIXED SHOE	
TYPE	NO. REQD.	TYPE	NO. REQD.
E 12	4	F 6 M	3

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL."C"	PL. "D"	PL."F"	PL. "G"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
1	S1-1	106'-3⅜"	105'-5⅞"	23'-0⅛"	23'-0"	29'-8⅜"	23'-0⅛"	23'-0"	29'-8⅜"	18x⅞"	18x1¼"	18x⅞"	18x1⅛"	—	—	—	—	—
	S2-1	106'-3⅜"	105'-5⅞"	23'-0⅛"	23'-0"	29'-8⅜"	23'-0⅛"	23'-0"	29'-8⅜"	18x⅞"	18x1¼"	18x⅞"	18x1¼"	—	—	—	—	—
2	~~S1-2~~	~~143'-9⅜"~~	~~143'-7⅛"~~	~~13'-0"~~	~~19'-7½"~~	~~52'-0"~~	—	—	~~71'-3⅜"~~	~~24x1½"~~	~~24x2½"~~	—	18x1"	24"	24"	24"	24"	24"
	S2-2	149'-2⅜"	145'-9⅜"	20'-0"	20'-9⅞"	52'-8"	—	—	72'-10⅛"	24x1½"	24x2½"	—	18x1"	24"	24"	24"	24"	24"
	S3-2	152'-6⅛"	149'-0⅝"	20'-0"	22'-0⅝"	53'-6"	—	—	~~74'-0⅞"~~	24x1½"	24x2½"	—	16x1"	24"	24"	24"	24"	24"
	S4-2	41'-4"	40'-0"	—	—	20'-4½"	—	—	20'-4½"	—	12x⅜"	—	12x⅝"	24"	24"	24"	24"	24"

DEAD LOAD DEFLECTION SCHEDULE		
¼L	½L	¾L
⅞"	1¼"	⅞"
⅞"	1¼"	⅞"
1⅜"	2"	1⅜"
2 9/16"	3 1/8"	2 9/16"
2 1/4"	3 1/8"	2 1/4"
0	1/16"	0

CAMBER SCHEDULE		
¼L	½L	¾L
2 3/16"	2 15/16"	2⅛"
2 3/16"	3"	2 3/16"
3 9/16"	5"	3 11/16"
4 3/4"	6 9/16"	4 7/8"
6 1/8"	8 7/16"	6 1/8"
11/16"	1/16"	1/16"

Note : * Spacing begins at termination of 6 spaces @ 4".
All steel shall be A36 unless otherwise shown.

Note: For revisions to Unit 2, see Sheet 12a.

	BY	DATE
MADE	Y.C.P	2-11-69
CHECKED	S.C.C.	4-24-69
IN CHARGE		

NO.	REVISION	BY	DATE
5	As Built	TEM	6-77
4	Pier Angle Chg.	RLJ	1-13-75
1	Note changed, added	PRMS	4-19-74
2	Sign Support Bracket & Intern. Diaph. Spa. added	L.N.B.	9-9-74
3	Unit 2 Deleted	L.N.B	10-1-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

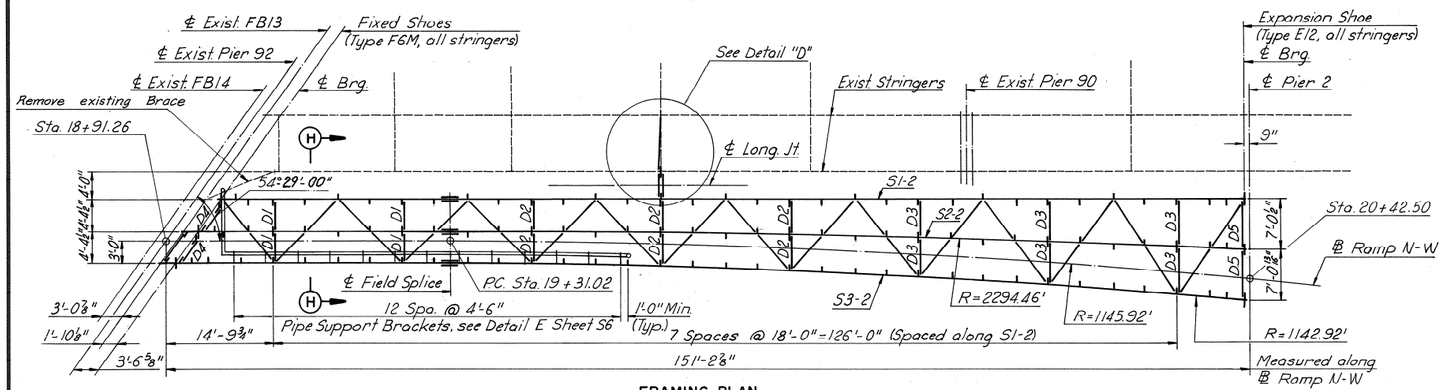
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

FRAMING PLAN - UNITS 1

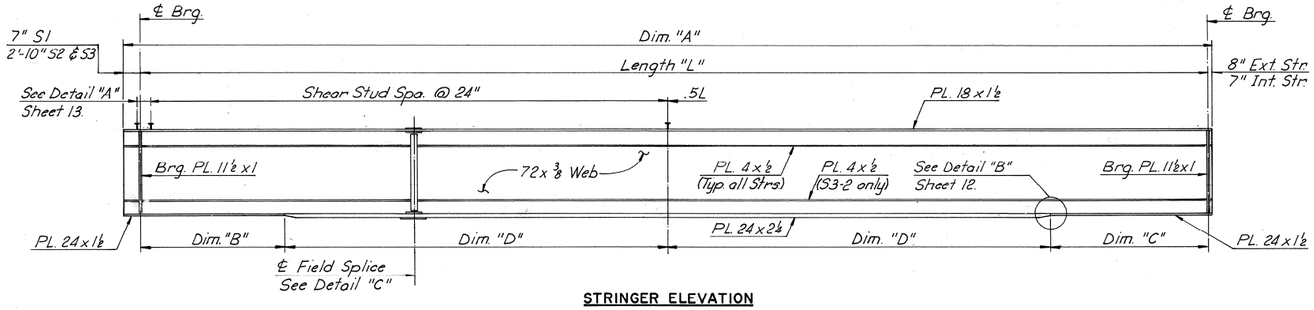
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 12 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	110b	265

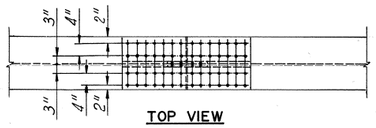


FRAMING PLAN
Scale: 1"=10'-0"

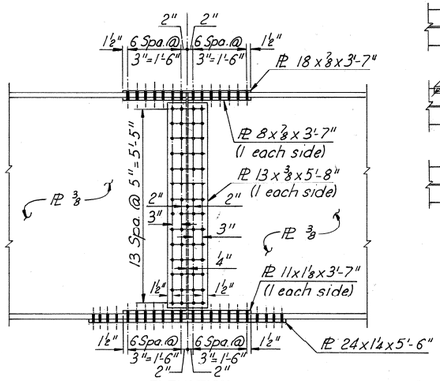


STRINGER ELEVATION
Scale: None

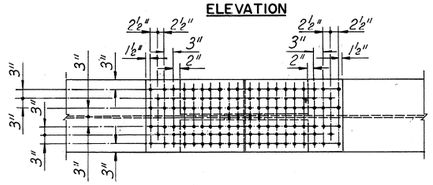
STRINGER SCHEDULE						DEAD LOAD DEFLECTION SCHEDULE						CAMBER SCHEDULE		
						DUE TO CONCRETE			DUE TO STEEL					
STRINGER	LENGTH "L"	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"	¼L	½L	¾L	¼L	½L	¾L	¼L	½L	¾L
S1-2	142'-7 11/16"	143'-9 13/16"	19'-0"	19'-7 11/16"	52'-0"	1 5/16"	1 15/16"	1 3/8"	3/4"	1 1/16"	3/4"	3 3/8"	4 5/8"	3 3/8"
S2-2	145'-9 3/8"	149'-2 3/8"	20'-0"	20'-9 3/8"	52'-6"	1 9/16"	2 1/4"	1 5/8"	3/8"	1 7/16"	7/8"	4 1/2"	6 1/4"	4 3/8"
S3-2	149'-1"	152'-6 15/16"	20'-0"	22'-1"	53'-6"	1 3/4"	2 1/2"	1 3/4"	15/16"	1 1/4"	15/16"	5 7/16"	7 1/2"	5 1/2"



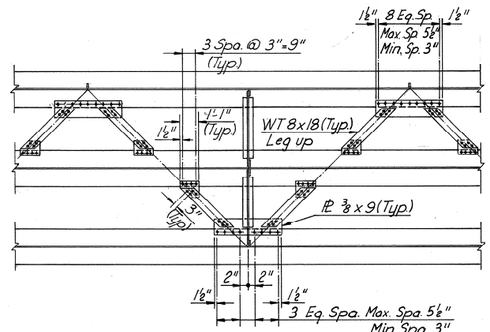
TOP VIEW



ELEVATION

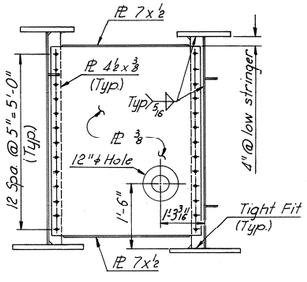


BOTTOM VIEW

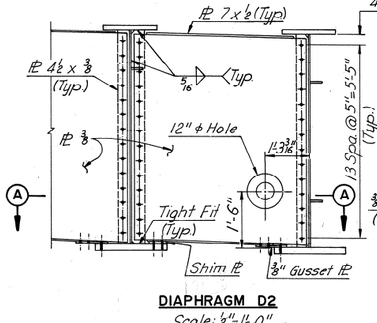


TYPICAL LATERAL BRACING
Scale: ¼"=1'-0"

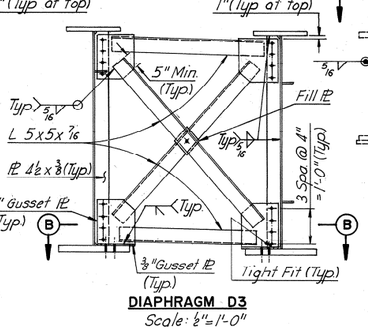
These holes to be shop sub-punched. Ream and connect in field after full dead load deflection has occurred.



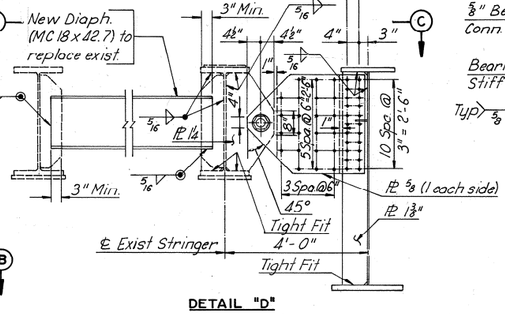
DIAPHRAGM D1
Scale: ½"=1'-0"



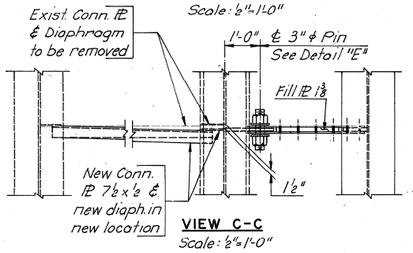
DIAPHRAGM D2
Scale: ½"=1'-0"



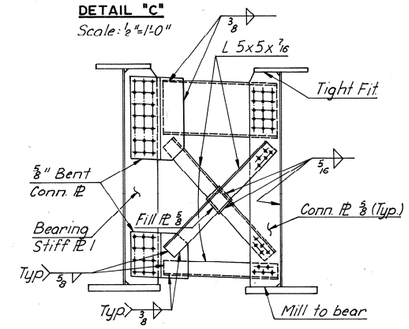
DIAPHRAGM D3
Scale: ½"=1'-0"



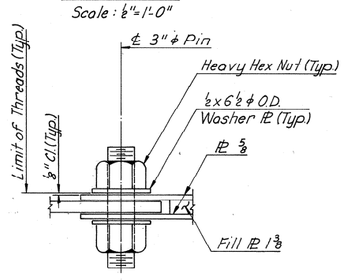
DETAIL "D"
Scale: ½"=1'-0"



VIEW C-C
Scale: ½"=1'-0"



DIAPHRAGM D4
Scale: ½"=1'-0"



DETAIL "E"
Scale: 1½"=1'-0"

NOTE: Spot weld nut to pin upon completion of assembly.

NOTE:
1. For Diophragm D5 use type shown as end diaphragm section B-B, Sheet 20.
2. For notes not shown, see Sheet 12.
3. For Section H-H see Sheet 19.

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

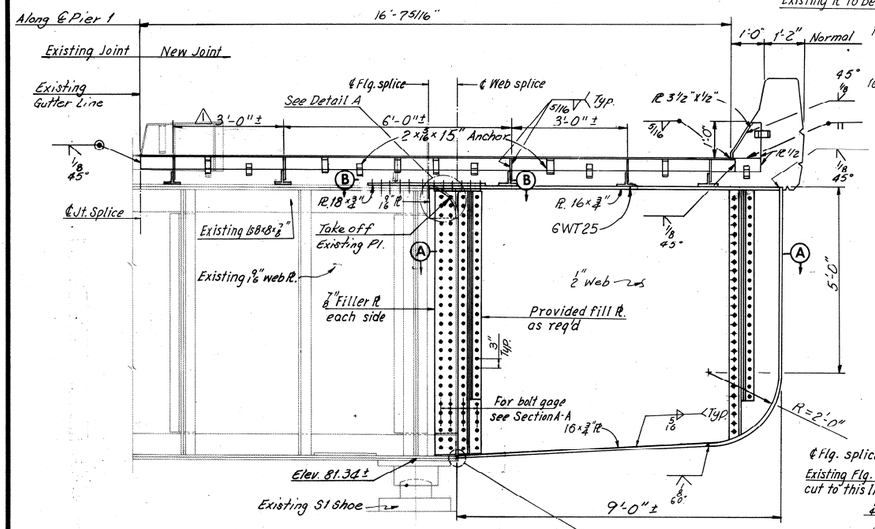
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
FRAMING PLAN - UNIT 2

SCALE AS NOTED
DATE
SHEET 12b OF 28

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

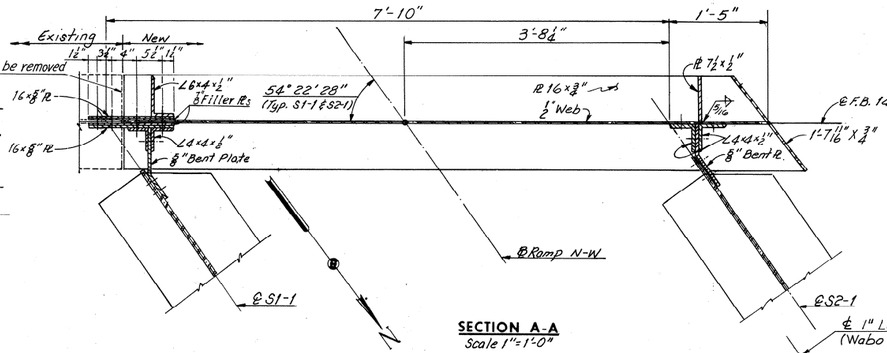
			NO.	REVISION	BY	DATE
DESIGNED			3	As Built	TEM	6-77
DRAWN	N.L.B.	10-7-74	2	Remove Brace & change angle	RBH	12-30-74
CHECKED	R.B.H.	11-4-74	1	New Sheet Added	N.L.B	10-7-74
IN CHARGE	P.R.Y.					

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10.	DOWNTOWN EXPRESSWAY	116	265

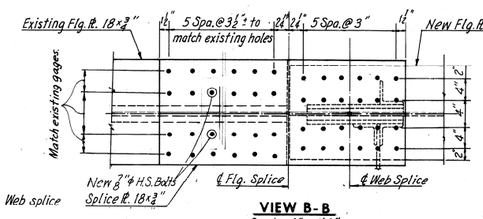


ELEVATION - FLOORBEAM 14
Scale ½"=1'-0"

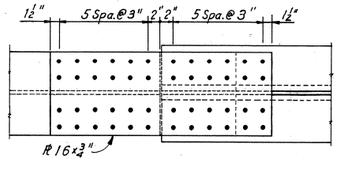
Bolts - ¾" ϕ H. S. Bolts, ASTM Spec. A-325 unless otherwise noted.



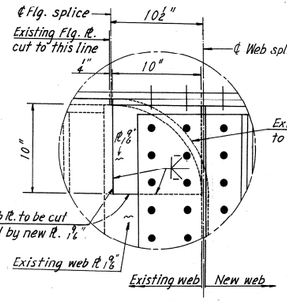
SECTION A-A
Scale 1"=1'-0"



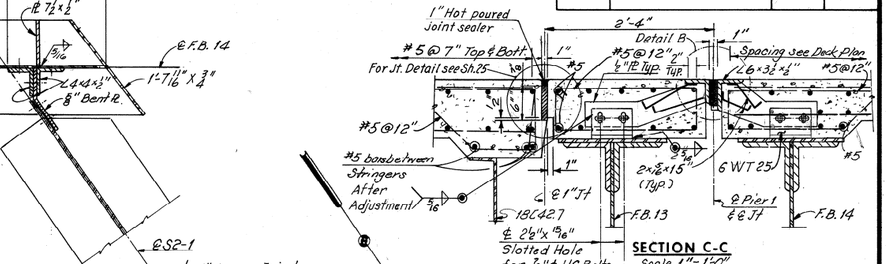
VIEW B-B
Scale 1"=1'-0"



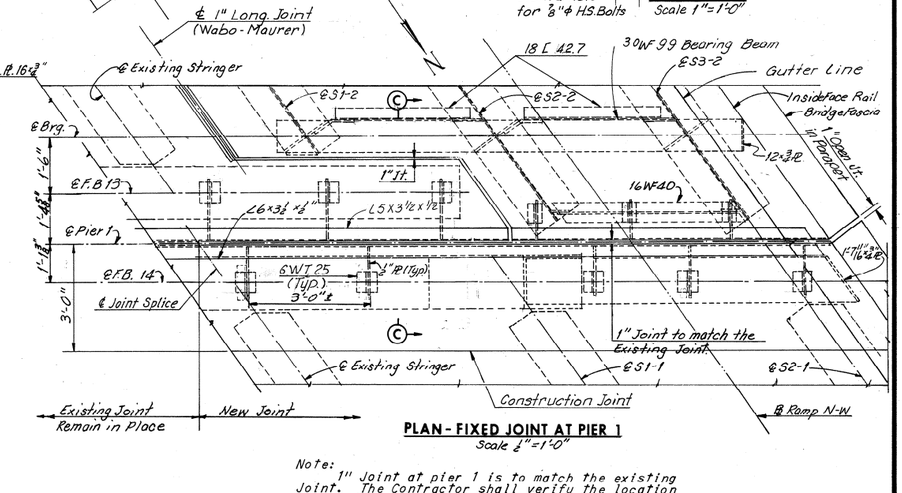
VIEW F-F
Scale: 1"=1'-0"



DETAIL A
Scale: 3"=1'-0"

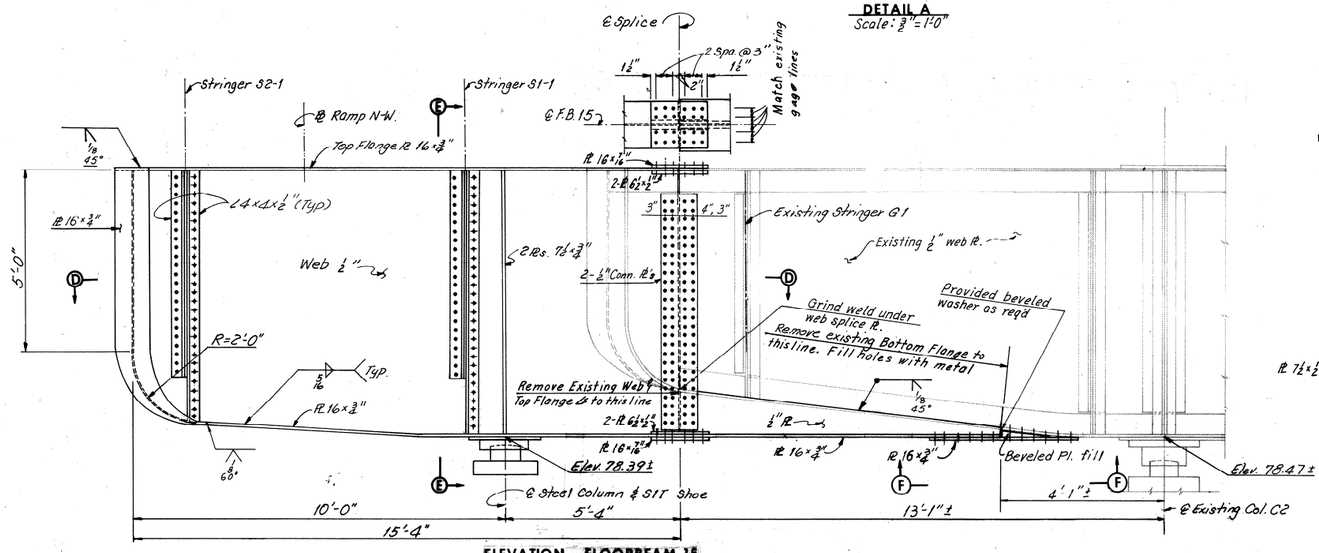


SECTION C-C
Scale 1"=1'-0"



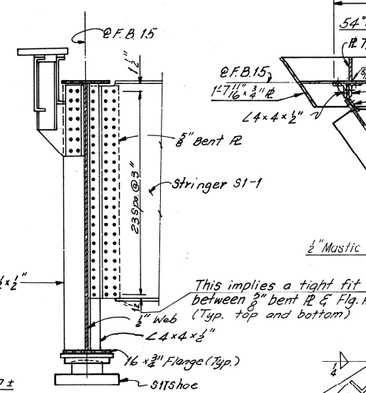
PLAN - FIXED JOINT AT PIER 1
Scale ½"=1'-0"

Note:
1" Joint at pier 1 is to match the existing Joint. The Contractor shall verify the location of Joint.

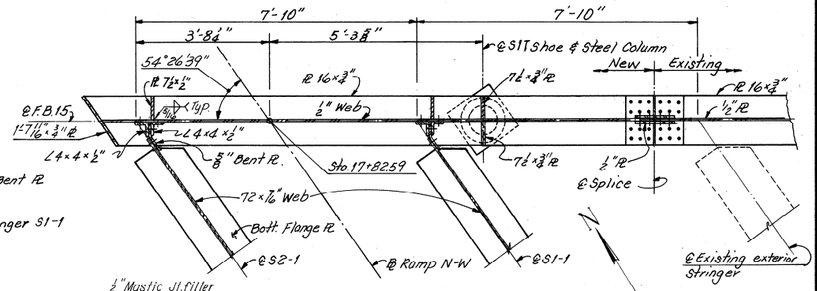


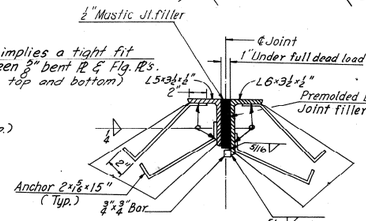
ELEVATION - FLOORBEAM 15
Scale ½"=1'-0"

Note:
Dimensions shown on the plans for existing structural metalwork are in accordance with drawings prepared for the original construction. The Contractor shall verify all necessary dimensions of existing structural metalwork prior to fabrication of new metalwork.



SECTION E-E
Scale ½"=1'-0"





SECTION D-D
Scale ½"=1'-0"

DETAIL B
No Scale

AS BUILT

Note:
For Joint Details at F.B. 15, see Sheet 42 Bridge 67.
For Framing plan, see Sheet 12.
For Steel Column Details, see Sheet 28 Bridge 67.
For SIT Shoe Details, see Sheet 47 Bridge 67.
All Elevations are to be verified by the Contractor.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.C.C.	3-1369	2	As Built	TEM	6-77
CHECKED	Y.C.P	4-25-69	⚠	Unit 2 End Diaph. @ Pier 1 revised L 3½ x 3½ x ½ Support Changed to L4 1/2 x	LBP	10-31-74
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

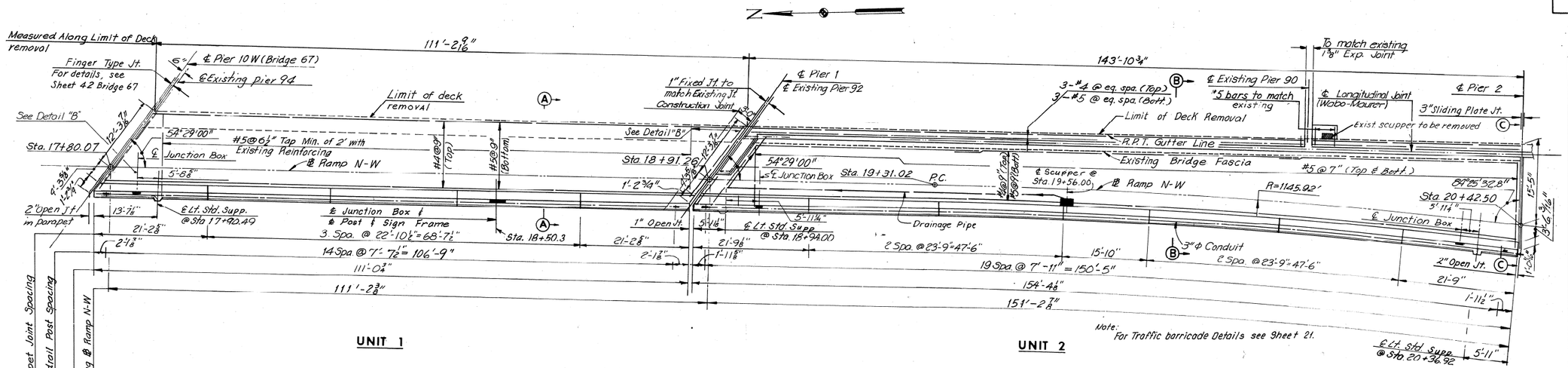
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

FRAMING DETAILS

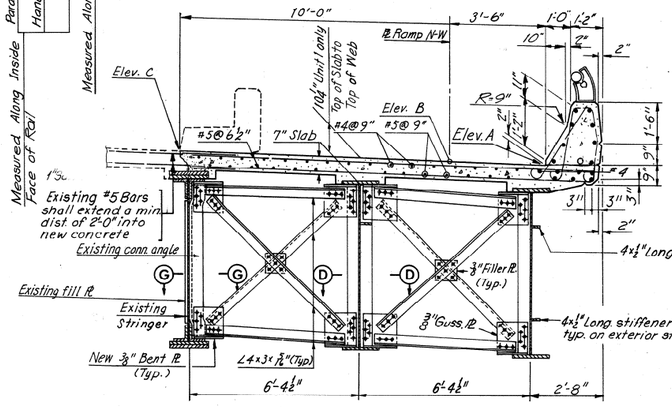
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 18 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	117	265

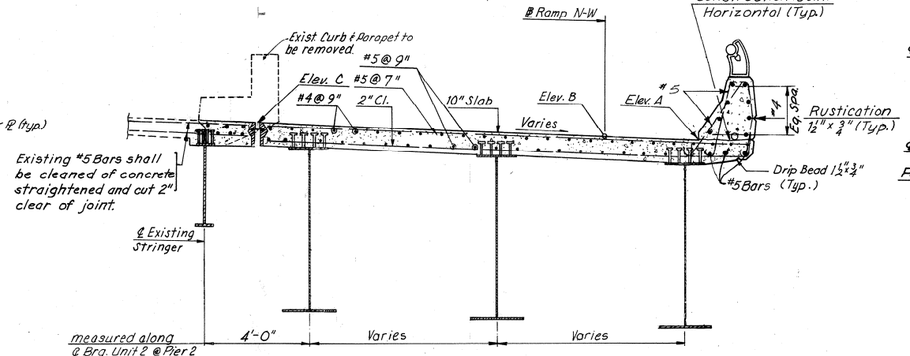


DECK PLAN
Scale: 1"=10'-0"

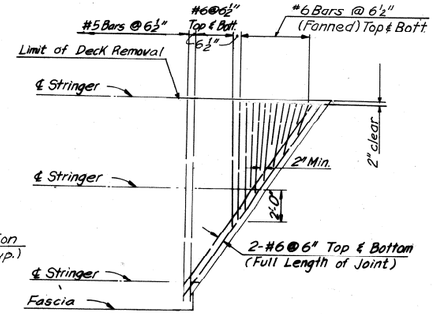


(Showing Intermediate Diaphragm)

SECTION A-A
Scale: 3/8"=1'-0"



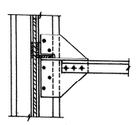
SECTION C-C
Scale 3/8"=1'-0"



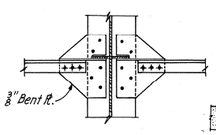
DETAIL B
Pier 1 shown Pier 10W similar.

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
17+77.57	87.11	"	"
17+30	87.17	87.07	86.78
17+80.07	"	87.07	"
17+87.21	"	"	87.00
17+90	87.44	87.35	87.07
18+00	87.70	87.61	87.35
18+10	87.95	87.87	87.63
18+20	88.19	88.12	87.90
18+30	88.42	88.36	88.15
18+40	88.66	88.59	88.40
18+50	88.88	88.81	88.64
18+60	89.09	89.03	88.87
18+70	89.29	89.24	89.10
18+80	89.49	89.44	89.32
18+88.75	89.65	"	"
18+90	89.67	89.64	89.57
18+91.26	"	89.66	"
18+98.42	"	"	89.72
19+00	89.87	89.84	89.78
19+10	90.06	90.03	89.98
19+20	90.23	90.22	90.18
19+30	90.40	90.39	90.37
19+40	90.56	90.55	90.54
19+50	90.71	90.71	90.71
19+60	90.84	90.85	90.88
19+70	90.95	90.98	91.04
19+80	91.05	91.10	91.20
19+90	91.15	91.21	91.35
20+00	91.24	91.31	91.49
20+10	91.31	91.39	91.64
20+20	91.38	91.47	91.77
20+30	91.43	91.54	91.91
20+40	91.47	91.59	92.04
20+41.28	-	-	92.06
20+42.50	-	91.60	-
20+42.84	91.49	" -	-

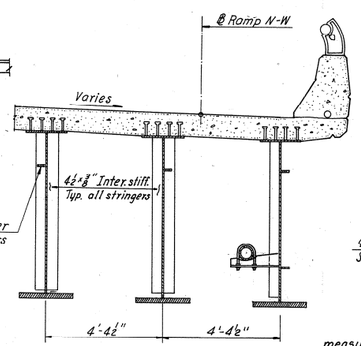
Elevations given in the Elevation Table may require adjustment in the field.



SECTION G-G
Scale: 1/2"=1'-0"

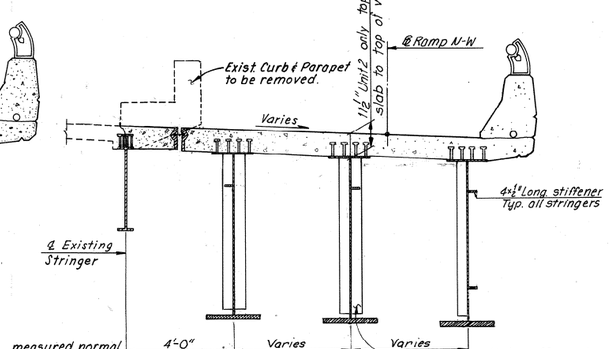


SECTION D-D
Scale: 1/2"=1'-0



SECTION H-H
Scale: 3/8"=1'-0"

For location of Section H-H, see Sheet 12b.



SECTION B-B
Scale: 3/8"=1'-0"

Notes:
For Joint Details, see Sheet 18, 25 and Sheet 42 Bridge 67.
Elevation C is to be confirmed by by contractor.
For Framing Plan, see Sheet 12.
For Steel and Concrete Quantities, see Sheet 2.
For Handrail Details, see Sheet 53.
For Lighting Details, see Sheet 54.
For Standard Drainage Details, see Support Type 11 Sheet 56.

	BY	DATE	NO.	REVISION	BY	DATE
			4	As Built	TEM	6-77
			3	Note for Table of Elevations	DWB	1-28-75
MADE	Y.C.P	2-12-69	2	Chg. of Pier Angle Added Junc. Box	REJ	1-13-75
CHECKED	SCC.	4-24-69	1	Deck Plan Sect. A-A, B-B, C-C, H-H, Det. B	TEM	10-31-74
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

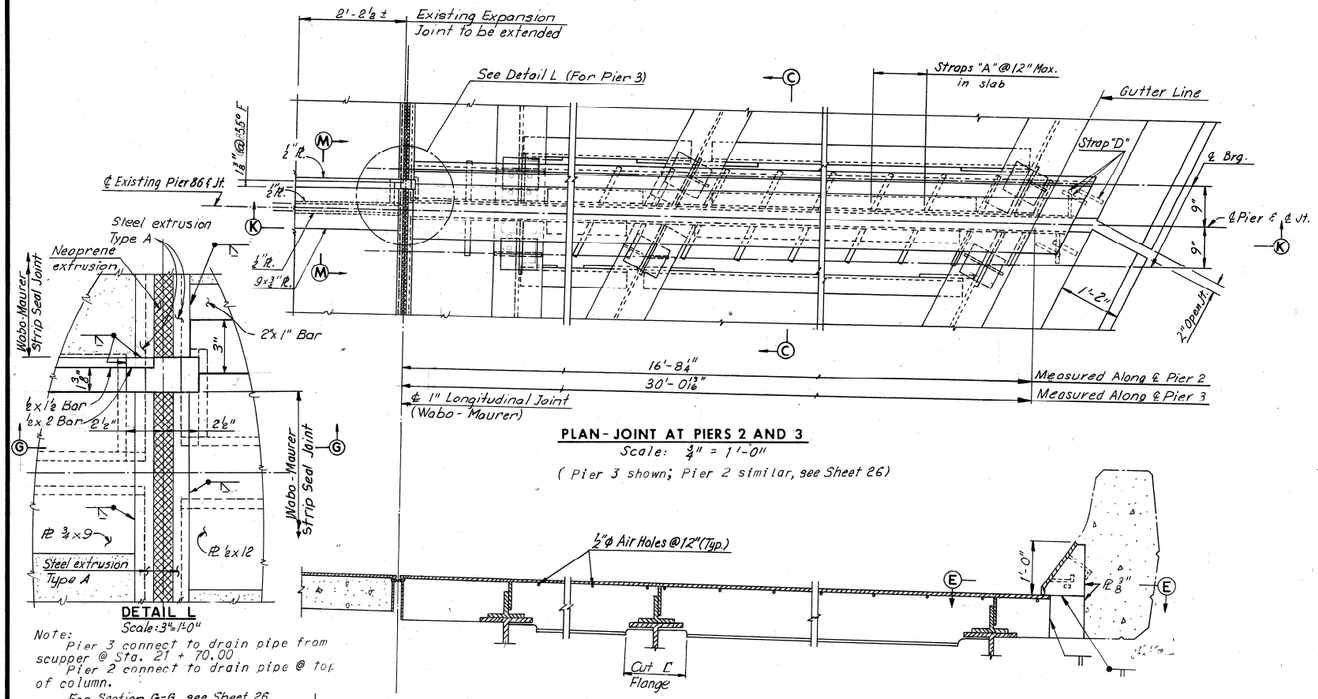
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
DECK PLAN UNITS 1 AND 2

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK · ALEXANDRIA · KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 19 OF 28

AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	123	265

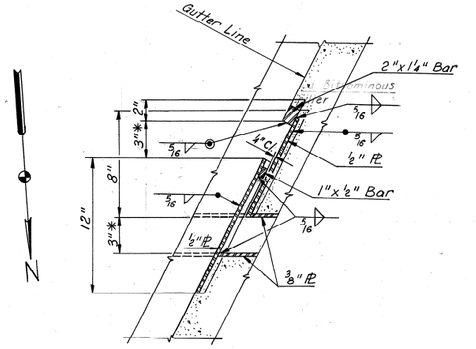


DETAIL L
Scale: 3"=1'-0"

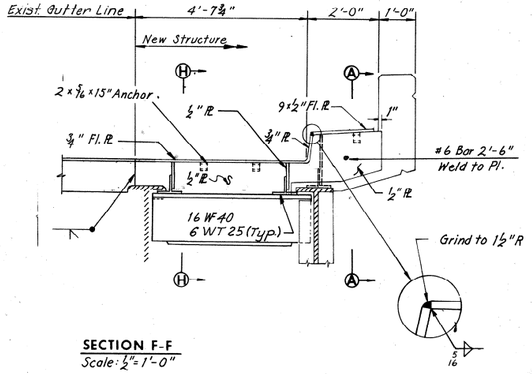
Note:
Pier 3 connect to drain pipe from scupper @ Sta. 21 + 70.00
Pier 2 connect to drain pipe @ top of column.
For Section G-G, see Sheet 26.

PLAN - JOINT AT PIERS 2 AND 3
Scale: ¾" = 1'-0"
(Pier 3 shown; Pier 2 similar, see Sheet 26)

SECTION K-K
Scale: ¾" = 1'-0"

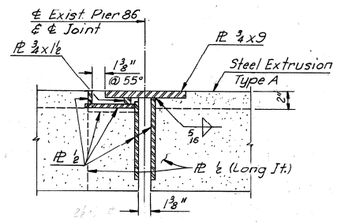


SECTION E-E
Scale: ½"=1'-0"

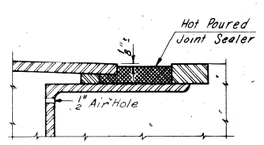


SECTION F-F
Scale: ½"=1'-0"

(For Location of Section F-F, See Sheet 26)

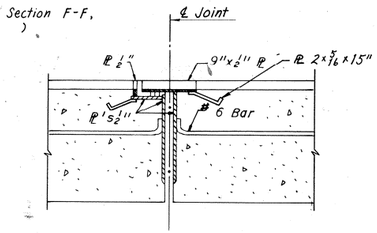


SECTION M-M
Scale: 1½"=1'-0"

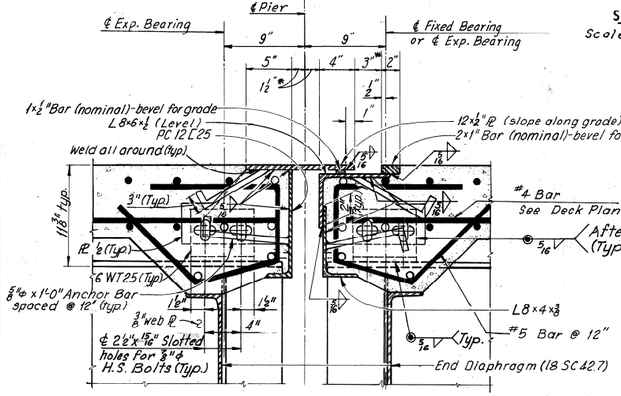


JOINT SEALER DETAIL
Scale: 3" = 1'-0"

Note:
Throughly clean joint and fill with Hot Poured Joint Sealer. Trowel into curb joint.



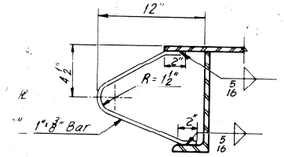
SECTION A-A
Scale: 1"=1'-0"



SECTION C-C
Scale: 1½"=1'-0"

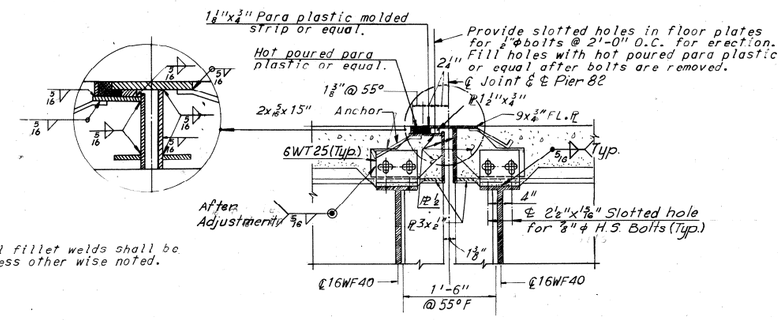
Section above is shown for Pier 3. Section thru Joint @ Pier 2 is similar except for End Diaphragm in Unit-2, which consists of a ⅜" web Pℓ and a 42½"x⅝" Fl. Pℓ instead of 18SC42.7 as shown above

LEGEND
- ● Denotes transverse #5 Bar spaced as shown on Sheets 19 and 20.
- ○ Denotes transverse #6 Bar between stringers.
- * Denotes dimension shown @ 60°F.

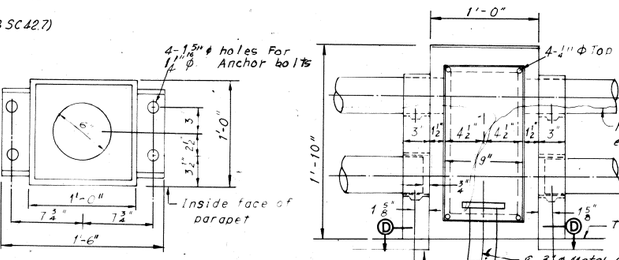


STRAP "A"
Scale: 1½" = 1'-0"

STRAP "D"
Scale: 1½" = 1'-0"

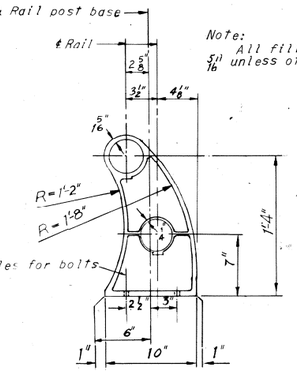


SECTION H-H
Scale: 1"=1'-0"



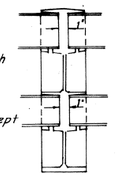
SECTION D-D
Scale: 1½"=1'-0"

DETAILS OF SALVAGED LIGHT STD. BASE
Scale: 1½"=1'-0"



SALVAGED RAIL POST
Scale: 1½"=1'-0"

Note:
All fillet welds shall be 5/16" unless other wise noted.



Hand tighten north set screws at joint

Provide joint at every other post except end post.

TYPICAL JOINT
No Scale

Note
All metal work in joints is to be included in Superstr. A36 Str. Steel.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	Y.C.P	3-20-69	2	As Built TEM G-77		
CHECKED	G.C.C.	4-21-69	1	Sect. G-G & Det A moved to Sh. 26. Long. ℓ changed to "Wabo-Maurer" Std'd ℓ.F. ℓ Supports changed to 6 WT 25	NLB	10-31-74
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

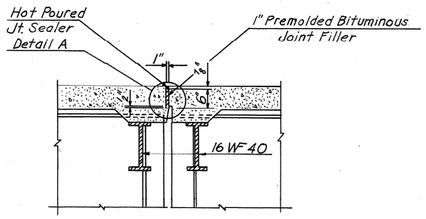
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 25 OF 28

AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	124	265

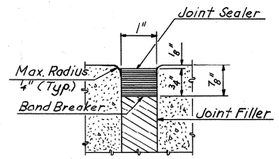
NOTES FOR FILLED JOINTS:

Joints shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free and water-free compressed air.

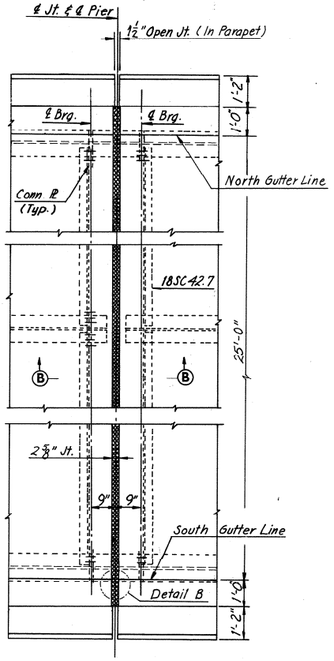


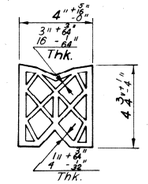
TYPICAL SECTION THRU 1" FIXED JOINT
Scale: ½"=1'-0"

Note:
Joint filler material and copper flashing to be included in price bid for Superstr. Concrete

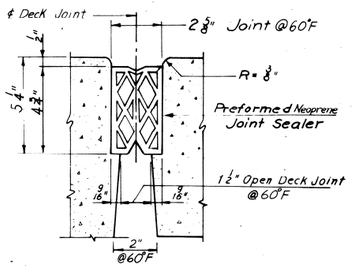


DETAIL A
No Scale



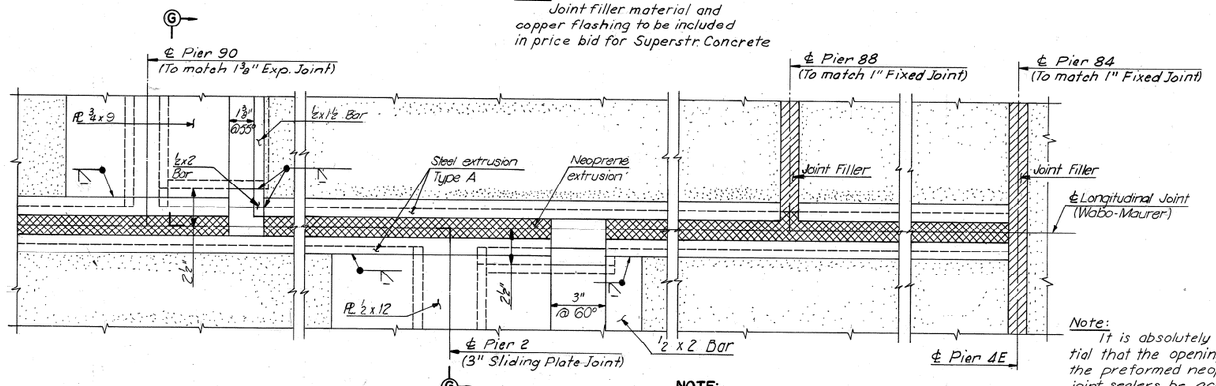


PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT



2⅝" TYPE "A" JOINT

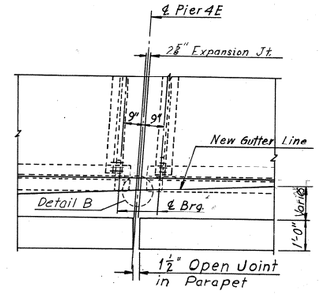
EXPANSION JOINT DETAILS



PLAN - LONGITUDINAL JOINT
Scale: 3"=1'-0"

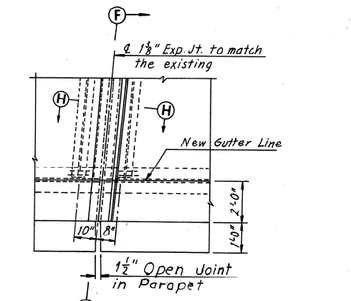
NOTE:
For Plan of Pier 3 & existing Pier 86, see Sheet 25.

Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.



PLAN - JOINT AT PIERS 4,5,6,7,8 AND 9
Scale: ⅛" = 1'-0"

PLAN - JOINT AT PIER 4E
Scale: ⅛"=1'-0"



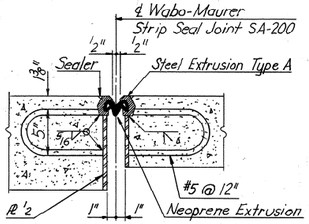
PLAN - JOINT AT EXISTING PIER 82
Scale: ⅛" = 1'-0"

(For Section F-F & Section H-H, See Sheet 25)

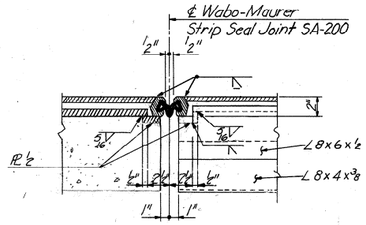
NOTES FOR WABO-MAURER JOINT:

Do not use steel extrusions as screed support.
Steel extrusion shall conform to ASTM A 36.
Structural steel shall conform to ASTM A 588.
Steel assembly shall be shop welded to convenient lengths and butt welded in the field to desired length. Joint shall conform to grade of deck slab.
Steel assembly shall be sandblasted in the shop prior to painting.
Steel assembly shall receive one shop coat of epoxy zinc paint.

Neoprene extrusion shall be roughened with a wire brush before bonding to steel extrusion with Bon Lastic Adhesive. Groove in steel extrusion to be blown out with oil-free and water-free compressed air prior to installation of Neoprene extrusion.
The Wabo-Maurer joint assembly shall be installed in accordance with manufacturer's recommended construction methods.

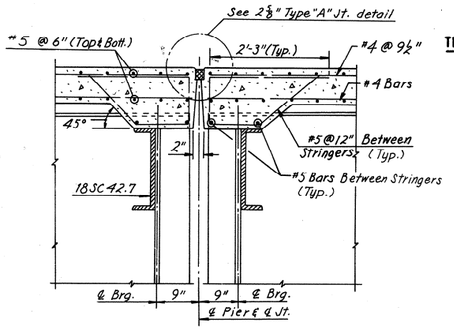


TYPICAL SECTION THRU WABO-MAURER JOINT
Scale: 1½"=1'-0"

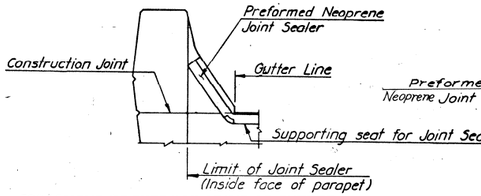


SECTION G-G
Scale: 1½"=1'-0"

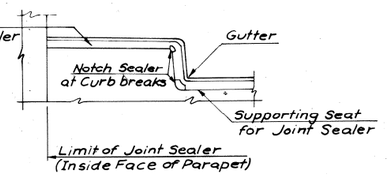
NOTE: Steel extrusion of Wabo-Maurer Joint to rest & Slide on PL ½.
For location of Sect. G-G, see Plan-Long. Joint above & Detail L, Sheet 25.



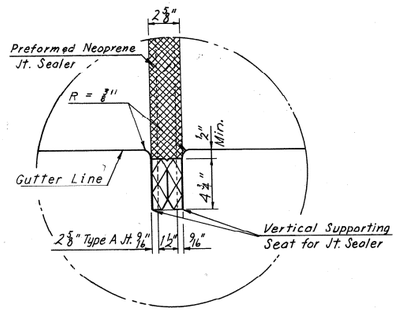
SECTION B-B
Scale: ¾"=1'-0"



TREATMENT OF TYPE "A" JOINT AT GUTTER
PIERS 4,5,6,7,8 AND 9
No Scale



TREATMENT OF TYPE "A" JOINT AT CURB
PIER 4E
No Scale



DETAIL B
No Scale

	BY	DATE
MADE	Y.C.P.	3-18-69
CHECKED	G.C.C.	4-21-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built Notes, Typ. Sect. thru Joint, Det. A, Typ. Sect. thru Wabo-Maurer joint, Sect. G-G add'd.	TEM	6-77
1		E.J.M.	10-31-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

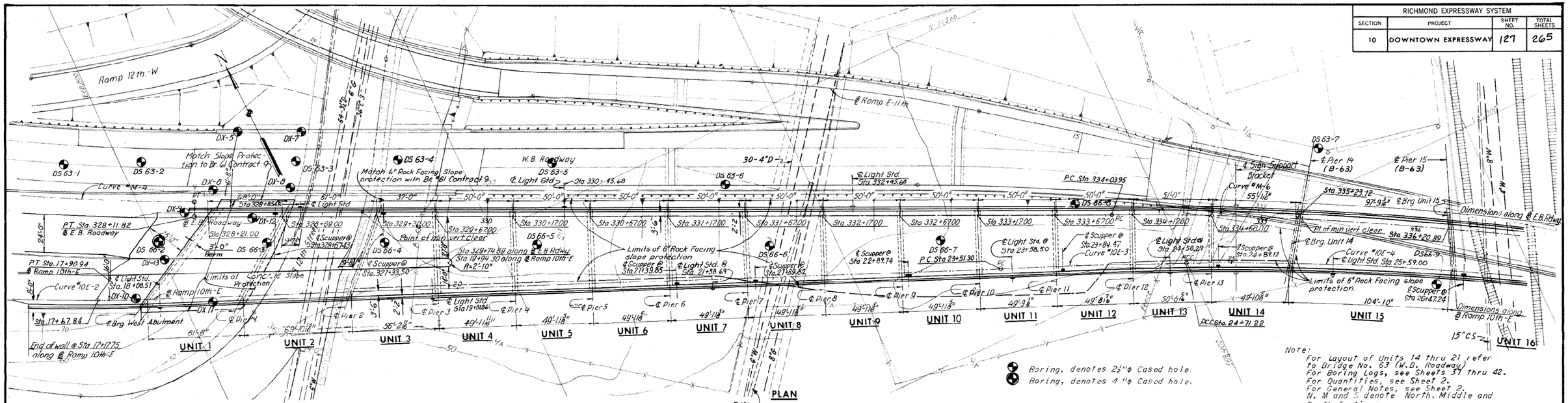
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 26 OF 28

Bridge 66

(Eastbound Downtown Expressway - Rte. 195
Over Virginia Street, South 14th Street, South 12th and CSX Railroad)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	127	265



PROFILE GRADE DATA

℄ Downtown Expressway Curve M-4	℄ E.B. Roadway Curve M-6	℄ Ramp W-N Curve WN-1
P.I. = 326+57.21	P.I. = 336+40.09	P.I. = 345+25.47
Δ = 12°25'03"	Δ = 11°45'56"	Δ = 64°53'49"
D = 4°00'	D = 2°30'	D = 11°27'33"
T = 155.83'	T = 236.14'	T = 317.90'
L = 310.44'	L = 470.62'	L = 566.33'
R = 1,432.40'	R = 2,291.83'	R = 500.00'

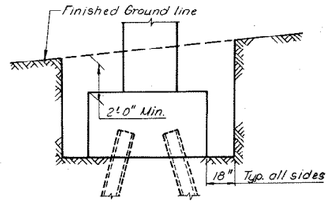
Curve: 10E-2	℄ Ramp 10th-E Curve: 10E-3	Curve: 10E-4
P.I. = 17+35.87	P.I. = 24+11.27	P.I. = 26+80.64
Δ = 6°29'42"	Δ = 1°11'57"	Δ = 12°30'55"
D = 6°00'	D = 1°00'	D = 3°00'
T = 54.18'	T = 59.97'	T = 209.42'
L = 108.25'	L = 119.93'	L = 417.18'
R = 954.93'	R = 5,729.58'	R = 1,909.86'

HORIZONTAL CURVE DATA

	BY	DATE
MADE	JV	9-12-68
CHECKED	GCC	5-26-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	As Built	TEM	8-76
2	Sign Support Bracket & Sh. 16A & 20A added.	R.B.H.	9-74
1	Footing elev. & piles, Piers 8, 9, 10, 11, 12 & 13	R.B.H.	8-74

INDEX



LIMITS OF STRUCTURE EXCAVATION
no scale

AS BUILT

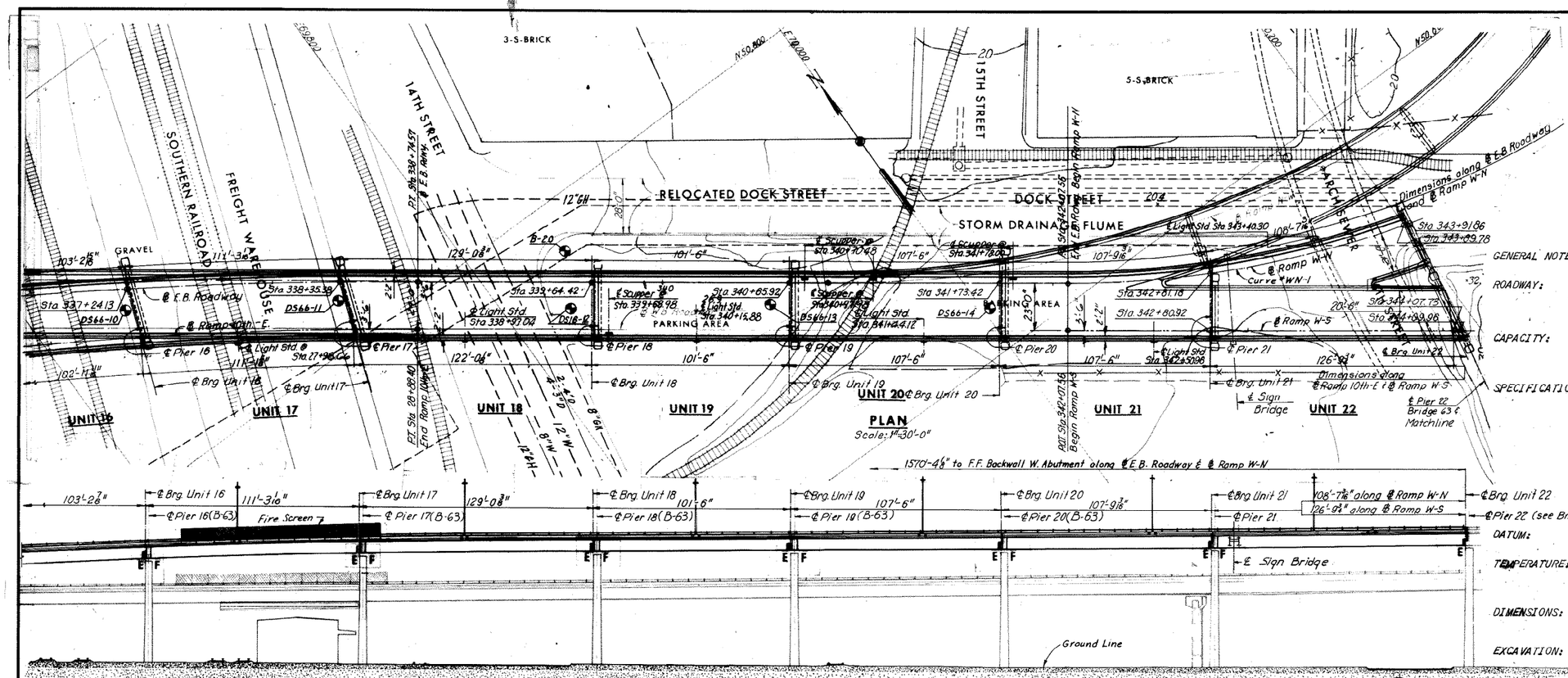
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'
CONTRACT NO.: 10
SHEET NO. 1 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	128	265



Notes:
For Vertical and Horizontal Curve Data see Sheet 1.
For Layout of Units 16 thru 22 refer to Bridge No. 63 (Westbound Roadway).

ESTIMATED QUANTITIES

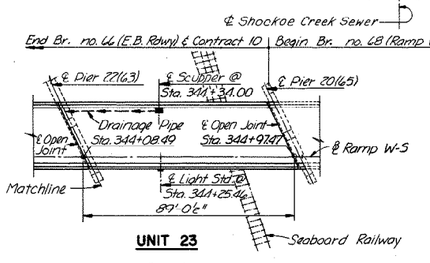
	Structure Excavation Cu. Yds.	Concrete (‡) Cu. Yds.	Reinforcing Steel Lbs.	Str. Steel Mild Carbon Lbs.	Str. Steel High Strength Lbs.	Aluminum Railing (1-Rail) Lin. Ft.	Porous Backfill Cu. Yds.	Underdrain 6"Dia. Pipe Lin. Ft.	Steel Piles 10BP42 Lin. Ft.
Superstructure	--	2,237.6	530,840	1,564,700	567,800	3,241	--	--	---
Substructure	1,835	1,256.6	155,030	---	----	84	34	150	9,410
Total	1,835	3,494.2 ‡	685,890	1,564,700	567,800	3,325	34	150	9,410

	Asphalt Damp-proofing Sq. Yds.	Approach Slab Concrete (‡) Cu. Yds.	Fire Screen Lin. Ft.	Approach Slab Reinforcing Steel (Lbs.)	Metal Conduit Lin. Ft.	Concrete Slope Protection Sq. Yds.	Bridge Drainage Metal Work Lbs.	Rock Facing Slope Prot. Sq. Yds.	Energy Attenuator B- Unit Each
Superstructure	--	--	210	---	2,214	--	11,870	--	1
Substructure	105	91.5	---	23,870	92	559	--	3,320	---
Total	105	91.5 ‡	210	23,870	2,306	559	11,870	3,320	1

‡ All Concrete for Superstructure shall be Class A4 and for Substructure Class A3.

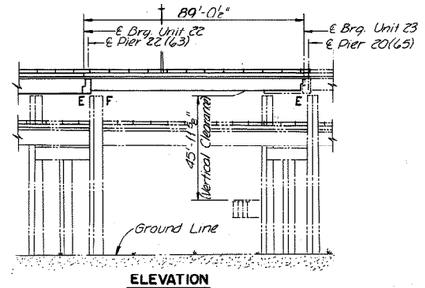
	BY	DATE
MADE	J.V.	1-9-69
CHECKED	G.C.C.	5-26-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Span Fixities & R.R. name added	PRMS.	4-19-76
2	Sign Bridge added & Struct. Str'l Qty.	R.B.H.	9-74
3	As Built	TEM	8-76



UNIT 23

PLAN



ELEVATION

GENERAL NOTES:

ROADWAY: One variable width roadway transitioning from E.B. Roadway Downtown Expressway and Ramp 10th-E into Ramps W-N and W-S (Bridges No. 67 and 68)

CAPACITY: Dead load includes 15 lbs. per sq. ft. for future wearing surface. Live load. HS 20-44 loading and alternate military loading.

SPECIFICATIONS:
GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970
DESIGN: A.A.S.H.O. Standard Specifications for Highway Bridges 1973 modified by Special Design provisions.
WELDING: 1972 Structural Welding Code of the American Welding Society

CONTRACT SPECIAL PROVISIONS
Specifications and Contract Special Provisions referred to above are necessary to make these plans complete

DATUM: City of Richmond

TEMPERATURE: The normal temperature referred to in the plans is 60°F. The temperature range for movement is 0°F to 120°F.

DIMENSIONS: All dimensions are measured horizontally and vertically unless otherwise noted.

EXCAVATION: Excavation below subgrade and cut slope template shall be classified as Structure Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be dry and special attention is called to Section 401.05 of General Specifications and to the Contract Special Provisions, concerning preparation of foundations for footings.

CONCRETE NOTES: Concrete in superstructure shall be Class A-4. All other concrete shall be Class A-3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, the use of low-slump concrete, and or other means shall be employed to prevent downgrade movement of newly placed slab concrete. Finishing Concrete Surfaces: See Standard Architectural Detail Sheets and the Contract Special Provisions for types and details. All reinforcing steel shall be deformed bars conforming to ASTM A615 Grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Designations A36, A572 - Grade 50 and A588 as noted. See Special Provisions.
All field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

AS BUILT

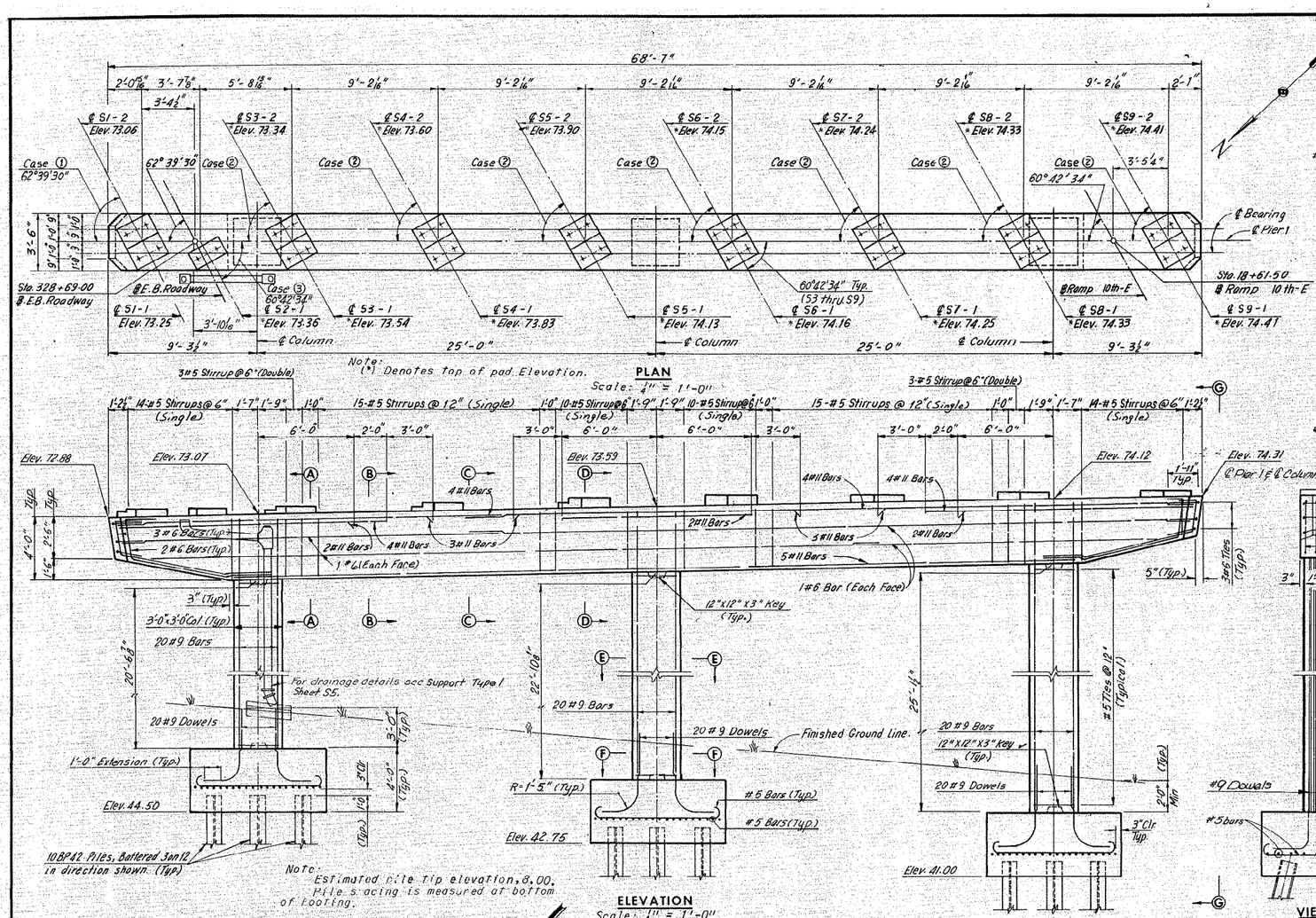
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 2 OF 46

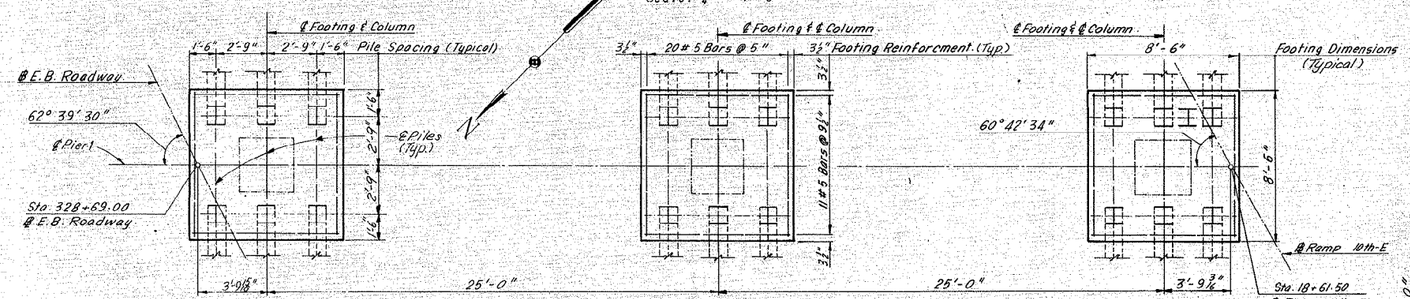
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	132	265



PLAN
Scale: 1/4" = 1'-0"

Note: Estimated pile tip elevation, 8.00. Pile scaling is measured at bottom of footing.

ELEVATION
Scale: 1/4" = 1'-0"

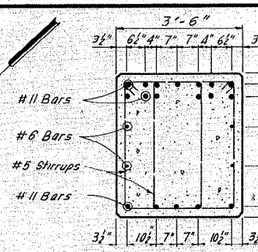


FOOTING PLAN
Scale: 1/4" = 1'-0"

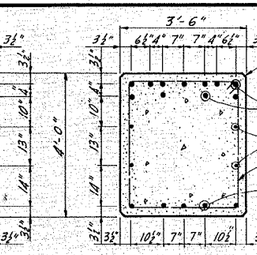
Note: For architectural treatment of columns, see Sheet 5f.

Note: Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

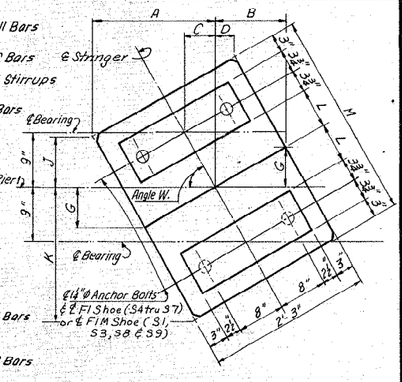
Note: All piles shall be 10BP42 Steel Piles (Design capacity = 45 tons). Batter all piles 3" per foot where shown. For Standard Shoe details, see Sheets S1and S2 For Framing Plan, see Sheet 1A. For Steel Pile Details, See Sheet 11

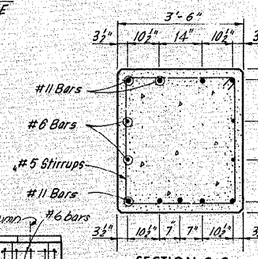


SECTION A-A
Scale: 1/2" = 1'-0"

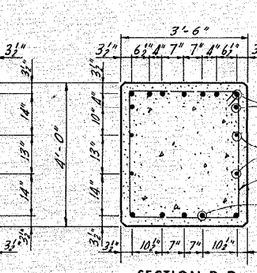


SECTION B-B
Scale: 1/2" = 1'-0"

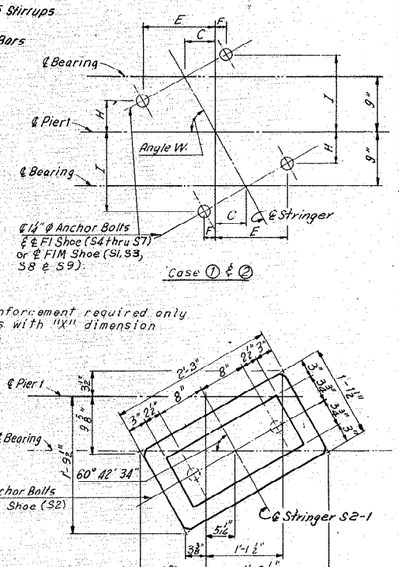


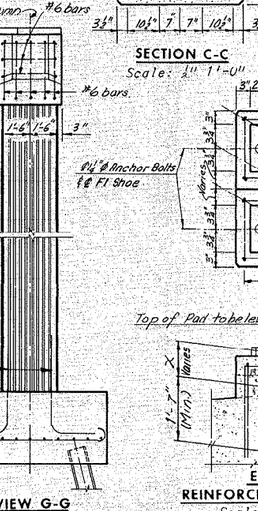


SECTION C-C
Scale: 1/2" = 1'-0"

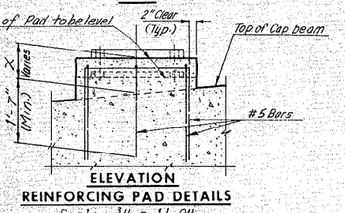


SECTION D-D
Scale: 1/2" = 1'-0"



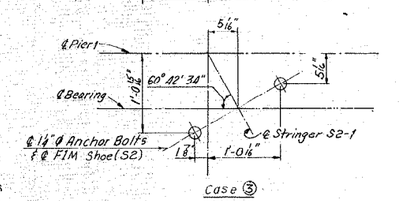


PLAN



ELEVATION
REINFORCING PAD DETAILS
Scale: 3/4" = 1'-0"

Note: Reinforcement required only for pads with "X" dimension over 4".

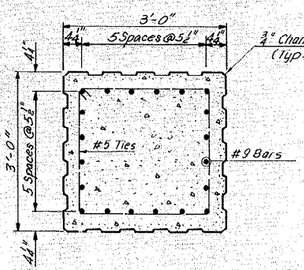


PAD AND ANCHOR BOLT SETTING PLAN
Scale: 1" = 1'-0"

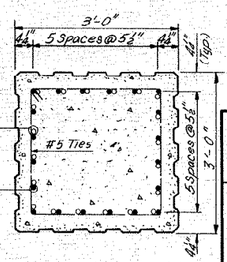
ANCHOR BOLT SETTING PLAN DIMENSIONS

Case	Angle W	A	B	C	D	E	F	G	H	I	J	K	L	M
1	62° 39' 30"	19 3/8	12	4 3/8	4 1/4	11 3/4	2 1/16	6 1/4	5 5/8	12 11/16	8 3/8	21 1/4	6 3/8	33 3/8
2	60° 42' 34"	20 1/8	11 3/4	5 1/4	3 3/8	12 1/16	1 3/8	6 3/8	5 1/16	12 13/16	8 3/8	21 1/4	6 3/8	34 1/4

Dimensions are in inches.



SECTION E-E
Scale: 3/4" = 1'-0"



SECTION F-F
Scale: 3/4" = 1'-0"

AS BUILT

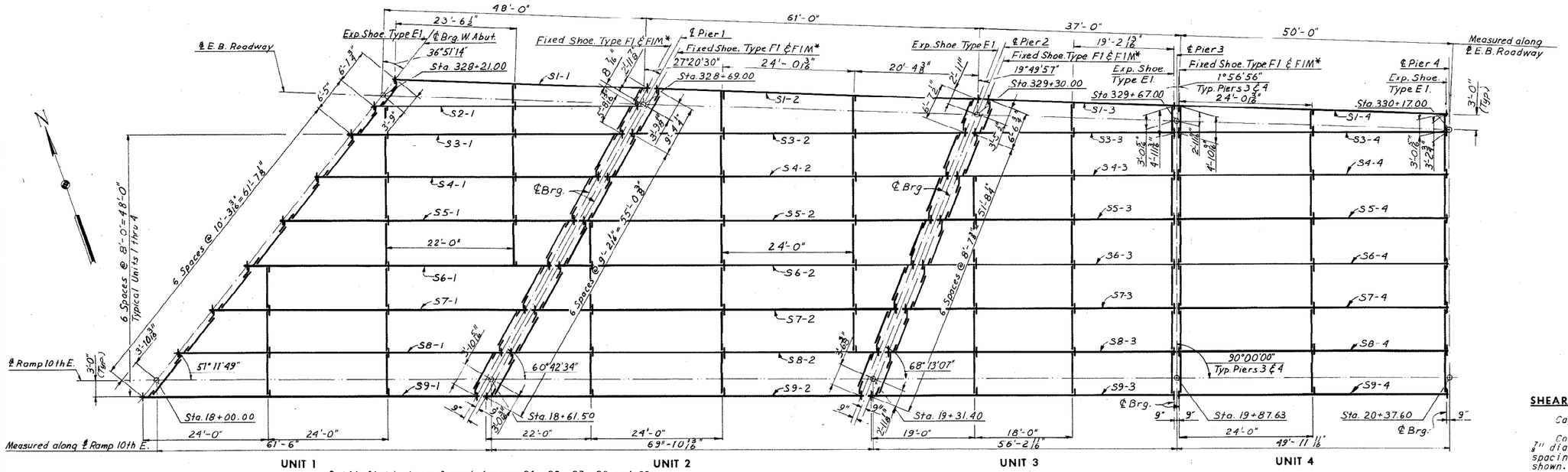
	BY	DATE				
MADE	MAA	7-31-68	2	As Built	TEM	8-76
CHECKED	RLM	8-1568	1	Dimensions	K.W.L.	10-14
IN CHARGE			NO.	REVISION	BY	DATE

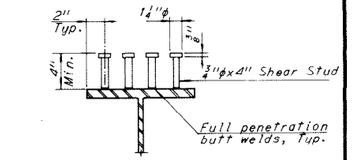
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

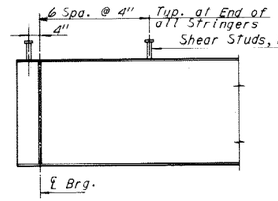
BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
PIER 1

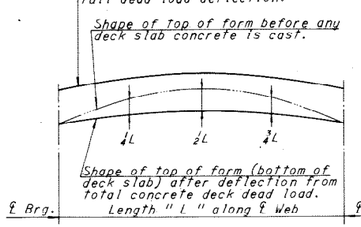
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

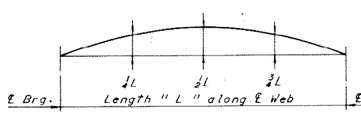
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 6 OF 46

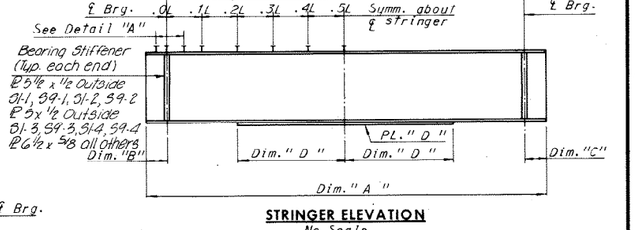


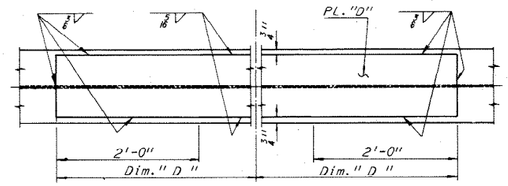












RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	140	265

* All fixed shoes for stringers S1, S2, S3, S8 and S9 @ Piers 1, 2 and 3 shall be of type F1M, all other fixed shoes to be of type F1.

FRAMING PLAN

Scale: 1" = 10'-0"

SHEAR STUD DETAIL

No Scale

DETAIL "A"

No Scale

SHEAR STUD NOTE

Capacity = 3,400 lbs. per stud.

Contractor may, if he elects, use three 7/8" diameter studs at the same longitudinal spacing in lieu of the four 3/4" diameter studs shown.

Stud rows shall be placed parallel to the main deck reinforcement.

STRINGER SCHEDULE

UNIT	STRINGER	STRINGER SIZE	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	PL."D"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L	DEAD LOAD DEFLECTION SCHEDULE 1/4L	1/2L	3/4L	CAMBER SCHEDULE 1/4L	1/2L	3/4L
1	S1-1	33 WF 118	48'-6 3/4"	46'-5 1/2"	1'-4 1/4"	9"	0	0	13"	14 1/2"	17"	20 1/2"	24"	1/4"	3/8"	1/4"	5/16"	1/2"	5/16"
	S2-1	33 WF 118	50'-6 1/2"	48'-5 13/16"	1'-4 11/16"	8"	0	0	12 1/2"	13 1/2"	16"	19"	23 1/2"	5/16"	7/16"	5/16"	3/8"	1/2"	3/8"
	S3-1	33 WF 118	51'-9 1/16"	49'-8 3/8"	1'-4 11/16"	8"	0	0	9"	10"	11 1/2"	13 1/2"	16 1/2"	3/8"	9/16"	3/8"	1/2"	11/16"	1/2"
	S4-1	33 WF 118	53'-8 3/8"	51'-7 11/16"	1'-4 11/16"	8"	19'-0"	10x1/2"	7 1/2"	8"	10"	11 1/2"	14"	1/2"	11/16"	1/2"	9/16"	13/16"	9/16"
	S5-1	33 WF 118	55'-7 3/4"	53'-7 1/16"	1'-4 11/16"	8"	21'-0"	10x5/8"	7 1/2"	8"	10"	11 1/2"	14"	9/16"	13/16"	9/16"	11/16"	15/16"	11/16"
	S6-1	36 WF 135	57'-7 1/8"	55'-6 7/16"	1'-4 11/16"	8"	21'-0"	10 1/2x5/8"	8"	8 1/2"	10 1/2"	12 1/2"	15"	5/8"	13/16"	5/8"	13/16"	1 3/16"	1"
	S7-1	36 WF 135	59'-6 7/16"	57'-5 3/4"	1'-4 11/16"	8"	21'-6"	10 1/2x5/8"	8"	8 1/2"	10 1/2"	12 1/2"	15"	5/8"	13/16"	5/8"	13/16"	1 1/8"	15/16"
	S8-1	36 WF 135	61'-5 3/4"	59'-5 1/16"	1'-4 11/16"	8"	22'-6"	10 1/2x3/4"	8"	8 1/2"	10 1/2"	12 1/2"	15"	11/16"	15/16"	11/16"	13/16"	1 3/16"	15/16"
	S9-1	36 WF 135	63'-6 5/16"	61'-4 7/16"	1'-4 11/16"	9 3/16"	24'-0"	10 1/2x3/4"	7"	8 1/2"	9 1/2"	11 1/2"	14 1/2"	11/16"	15/16"	11/16	7/8"	1 3/16"	7/8"
2	S1-2	36 WF 135	60'-4 3/16"	58'-10 11/16"	9"	8 1/2"	22'-0"	10 1/2x1/2"	8"	9 1/2"	11 1/2"	13 1/2"	17"	5/8"	13/16"	5/8"	3/4"	1"	3/4"
	S3-2	36 WF 135	62'-3 3/16"	60'-11 5/8"	8"	7 9/16"	22'-6"	10 1/2x5/8"	8 1/2"	9 1/2"	11 1/2"	13 1/2"	16 1/2"	3/4"	1"	11/16"	7/8"	1 3/16"	7/8"
	S4-2	36 WF 150	63'-6 11/16"	62'-3 1/8"	8"	7 9/16"	23'-3"	10 1/2x7/8"	8"	8 1/2"	11"	12 1/2"	15 1/2"	5/8"	7/8"	5/8"	13/16"	1 1/8"	13/16"
	S5-2	36 WF 150	64'-10 3/16"	63'-6 5/8"	8"	7 9/16"	24'-0"	10 1/2x7/8"	8"	8 1/2"	11"	12 1/2"	15 1/2"	11/16	1"	11/16"	7/8"	1 3/16"	7/8"
	S6-2	36 WF 150	66'-1 11/16"	64'-10 1/8"	8"	7 9/16"	25'-0"	10 1/2x1"	8"	8 1/2"	10 1/2"	12 1/2"	15 1/2"	1"	1 3/8"	1"	1 3/16"	1 5/8"	1 3/16"
	S7-2	36 WF 150	67'-5 3/16"	66'-1 5/8"	8"	7 9/16"	25'-9"	10 1/2x1"	8"	8 1/2"	11"	12 1/2"	15 1/2"	1"	1 3/8"	1"	1 7/8"	2 9/16"	1 7/8"
	S8-2	36 WF 150	68'-8 11/16"	67'-5 1/8"	8"	7 9/16"	26'-6"	10 1/2x1 1/8"	8"	8 1/2"	11"	12 1/2"	15 1/2"	7/8"	1 1/4"	7/8"	1 13/16"	2 1/2"	1 13/16"
	S9-2	36 WF 150	70'-2 3/8"	68'-8 9/16"	9 3/16"	8 5/8"	27'-0"	10 1/2x1 1/8"	7 1/2"	8 1/2"	11"	13 1/2"	16 1/2"	7/8"	1 1/4"	7/8"	1 7/8"	2 9/16"	1 7/8"
3	S1-3	30 WF 99	35'-7 11/16"	34'-3 3/16"	8 1/2"	8"	0	0	11"	12"	14"	16 1/2"	20 1/2"	1/8"	3/16"	1/8"	3/16"	1/4"	3/16"
	S3-3	30 WF 99	37'-10 13/16"	36'-8 1/4"	7 9/16"	7"	0	0	9"	10"	11 1/2"	13 1/2"	16"	3/16"	1/4"	3/16"	1/4"	5/16"	1/4"
	S4-3	30 WF 108	41'-1 1/8"	39'-10 9/16"	7 9/16"	7"	0	0	7 1/2"	8"	9"	10 1/2"	13"	1/4"	3/8"	1/4"	5/16"	7/16"	5/16"
	S5-3	30 WF 108	44'-3 1/2"	43'-0 15/16"	7 9/16"	7"	15'-0"	9x1/2"	7"	7 1/2"	9 1/2"	11"	13"	5/16"	7/16"	5/16"	3/8"	1/2"	3/8"
	S6-3	30 WF 108	47'-5 7/8"	46'-3 5/16"	7 9/16"	7"	17'-0"	9x1/2"	7"	7 1/2"	9"	11"	13"	1/2"	5/8"	1/2"	5/8"	13/16"	9/16"
	S7-3	30 WF 108	50'-8 1/4"	49'-5 11/16"	7 9/16"	7"	19'-3"	9x3/4"	7"	7 1/2"	9"	11"	13"	9/16"	13/16"	9/16"	3/4"	1"	11/16"
	S8-3	30 WF 108	53'-10 9/16"	52'-8"	7 9/16"	7"	21'-6"	9x1"	7"	7 1/2"	9 1/2"	11"	13"	5/8"	7/8"	5/8"	15/16"	1 3/16"	15/16"
	S9-3	30 WF 108	57'-3"	55'-10 3/8"	8 5/8"	8"	23'-3"	9x1 1/8"	7"	7 1/2"	9 1/2"	11 1/2"	14"	3/4"	1"	3/4"	1 1/16"	1 3/8"	1 1/16"
4	S1-4	30 WF 108	49'-10"	48'-6"	8"	8"	0	0	10 1/2"	11 1/2"	13 1/2"	16 1/2"	20 1/2"	7/16"	5/8"	7/16"	1/2"	3/4"	1/2"
	S3-4	30 WF 99	49'-7 5/8"	48'-5 5/8"	7"	7"	18'-0"	9x1/2"	8 1/2"	9 1/2"	11 1/2"	13 1/2"	16"	7/16"	5/8"	7/16"	9/16"	3/4"	9/16"
	S4-4	30 WF 108	49'-7 5/8"	48'-5 5/8"	7"	7"	18'-6"	9x3/4"	7"	7 1/2"	9 1/2"	11"	13"	1/2"	5/8"	1/2"	9/16"	3/4"	9/16"
	S5-4	30 WF 108	49'-7 5/8"	48'-5 5/8"	7"	7"	18'-6"	9x3/4"	7"	7 1/2"	9 1/2"	11"	13"	1/2"	5/8"	1/2"	9/16"	3/4"	9/16"
	S6-4	30 WF 108	49'-7 5/8"	48'-5 5/8"	7"	7"	18'-6"	9x3/4"	7"	7 1/2"	9 1/2"	11"	13"	1/2"	5/8"	1/2"	9/16"	3/4"	9/16"
	S7-4	30 WF 108	49'-7 5/8"	48'-5 5/8"	7"	7"	18'-6"	9x3/4"	7"	7 1/2"	9 1/2"	11"	13"	1/2"	5/8"	1/2"	9/16"	3/4"	9/16"
	S8-4	30 WF 108	49'-7 5/8"	48'-5 5/8"	7"	7"	18'-6"	9x3/4"	7"	7 1/2"	9 1/2"	11"	13"	1/2"	11/16"	1/2"	9/16"	13/16"	9/16"
	S9-4	30 WF 108	49'-9 5/8"	48'-5 5/8"	8"	8"	19'-0"	9x5/8"	7"	8"	9 1/2"	11 1/2"	14"	1/2"	11/16"	1/2"	9/16"	3/4"	9/16"

* Spacing begins at termination of 6 spaces @ 4".

Note: All steel shall be A36 unless otherwise denoted.

Notes:
For Diaphragm and Connection Details, see Sheet 26.
For Joint Details, see Sheet 37.
For Shoe Details, see Sheets S1 and S2
For angles between ℄ Piers and Stringers, see Sheets 3, 6, 7 & 8.
For Superstructure steel quantities, see Sheet 2.

DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.

CAMBER DIAGRAM

NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value.

This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.

Dimensions are in inches.

STRINGER ELEVATION

No Scale

COVER PLATE DETAIL

No Scale

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 28.

SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO.REQD.	TYPE	NO.REQD.
E1	33	F1	16
		F1M	17

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D.	8-6-68	2	As Built	TEM	8-76
CHECKED	J.V.	10-22-68	△1	Pier 1 & 2 Dim. Change	LBP	10-16-74
IN CHARGE						

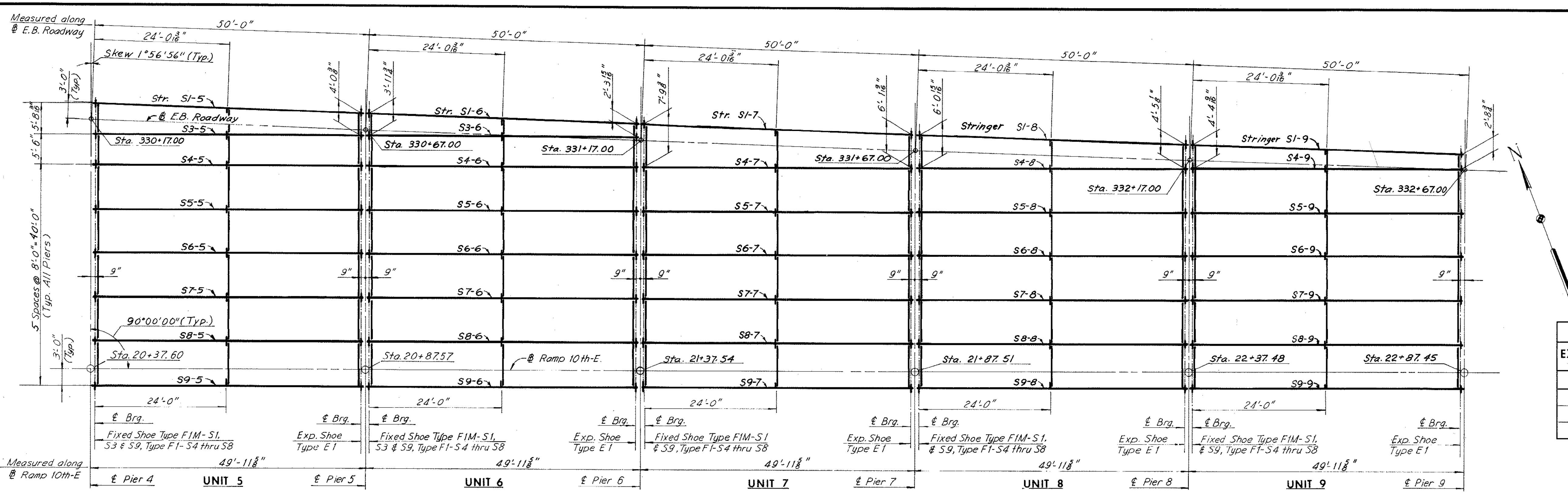
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING PLAN - UNITS 1,2,3 AND 4

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=10' Unless as shown
CONTRACT NO.: 10
SHEET NO. 14 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	141	265



FRAMING PLAN
Scale: 1" = 10'-0"

SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E1	37	F1	25
		F1M	12

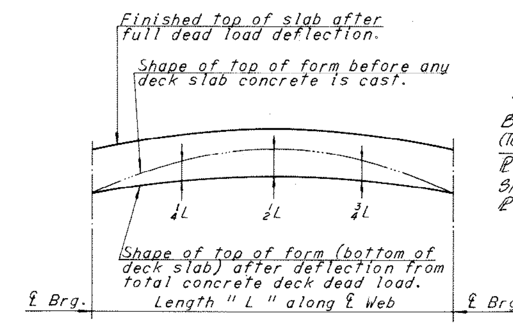
STRINGER SCHEDULE / **DEAD LOAD DEFLECTION SCHEDULE** / **CAMBER SCHEDULE**

UNIT	STRINGER	STRINGER SIZE	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	PL."D"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L	Dead Load Deflection ¼L	½L	¾L	Camber ¼L	½L	¾L
5	S1-5	30 WF 108	49'-10"	48'-6"	8"	8"	0	0	11"	11½"	13½"	16½"	20½"	½"	11/16"	½"	9/16"	¾"	9/16"
	S3-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	0	0	10"	11½"	13"	15½"	19"	7/16"	⅝"	7/16"	½"	¾"	½"
	S4-5	30 WF 99	49'-7⅝"	48'-5⅝"	7"	7"	18'-0"	9x⅝"	8"	9"	11"	12½"	15"	7/16"	9/16"	7/16"	½"	11/16"	½"
	S5-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-5	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-5	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-0"	9x⅝"	7½"	8"	9½"	11½"	14"	½"	11/16"	½"	9/16"	¾"	9/16"
6	S1-6	30 WF 99	49'-10"	48'-6"	8"	8"	0	0	13½"	15"	18"	22"	24"	½"	⅝"	½"	9/16"	¾"	9/16"
	S3-6	30 WF 99	49'-7⅝"	48'-5⅝"	7"	7"	0	0	11½"	12½"	14½"	17½"	21½"	7/16"	9/16"	7/16"	½"	11/16"	½"
	S4-6	30 WF 99	49'-7⅝"	48'-5⅝"	7"	7"	18'-0"	9x⅝"	8"	9"	11"	12½"	15"	7/16"	9/16"	7/16"	½"	11/16"	½"
	S5-6	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-6	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-6	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-6	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-6	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-0"	9x⅝"	7½"	8"	9½"	11½"	14"	½"	11/16"	½"	9/16"	¾"	9/16"
7	S1-7	30 WF 108	49'-10"	48'-6"	8"	8"	17'-6"	9x½"	8"	8½"	10½"	12½"	15½"	½"	⅝"	½"	9/16"	¾"	9/16"
	S4-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S5-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-7	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-7	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-0"	9x⅝"	7½"	8"	9½"	11½"	14"	½"	11/16"	½"	9/16"	¾"	9/16"
8	S1-8	30 WF 108	49'-10"	48'-6"	8"	8"	17'-6"	9x½"	9½"	10½"	13"	15½"	19½"	7/16"	⅝"	7/16"	9/16"	¾"	9/16"
	S4-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	8"	8½"	11"	13"	15½"	7/16"	⅝"	7/16"	½"	¾"	½"
	S5-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13½"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13½"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13½"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-8	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13½"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-8	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-6"	9x⅝"	7"	7½"	10"	12"	14½"	½"	11/16"	½"	9/16"	¾"	9/16"
9	S1-9	30 WF 99	49'-10"	48'-6"	8"	8"	0	0	14"	15"	18"	22"	24"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S4-9	30 WF 99	49'-7⅝"	48'-5⅝"	7"	7"	17'-0"	9x½"	9"	10"	12"	14"	17"	7/16"	⅝"	7/16"	9/16"	¾"	¾"
	S5-9	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S6-9	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18"-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S7-9	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	⅝"	½"	9/16"	¾"	9/16"
	S8-9	30 WF 108	49'-7⅝"	48'-5⅝"	7"	7"	18'-6"	9x¾"	7"	7½"	9½"	11"	13"	½"	11/16"	½"	9/16"	13/16"	9/16"
	S9-9	30 WF 108	49'-9⅝"	48'-5⅝"	8"	8"	19'-0"	9x⅝"	7½"	8"	9½"	11½"	14"	½"	11/16"	½"	9/16"	¾"	9/16"

* Spacing begins at termination of 6 spaces @ 4".

Note:
All steel shall be A36 unless denoted otherwise.

Notes:
For Diaphragm and Connection Details, see Sheet 29.
For Joint Details, see Sheet 37.
For Shoe Details, see Sheets 51 and 52
For Shear Stud Details, see Sheet 14.
For angles between ℄ Piers and Stringers, see Sheets 8, 9, 10 & 11.
For Superstructure steel quantities, see Sheet 2.

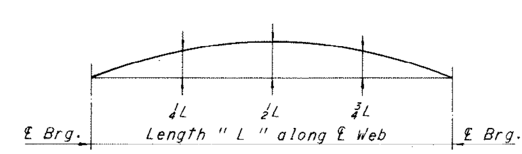


DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



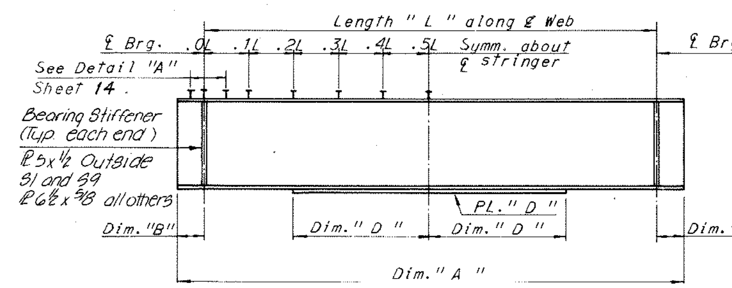
CAMBER DIAGRAM

NOTE TO FABRICATOR

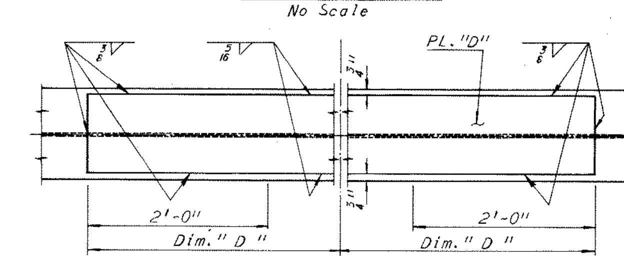
The stringers shall be fabricated with an upward camber amounting to the tabulated value.

This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

Dimensions are in inches.



STRINGER ELEVATION
No Scale



COVER PLATE DETAIL
No Scale

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.

If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 29.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	SHS	8-2-68				
CHECKED	JD	10-21-68	1	As Built	TEM	8-76
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

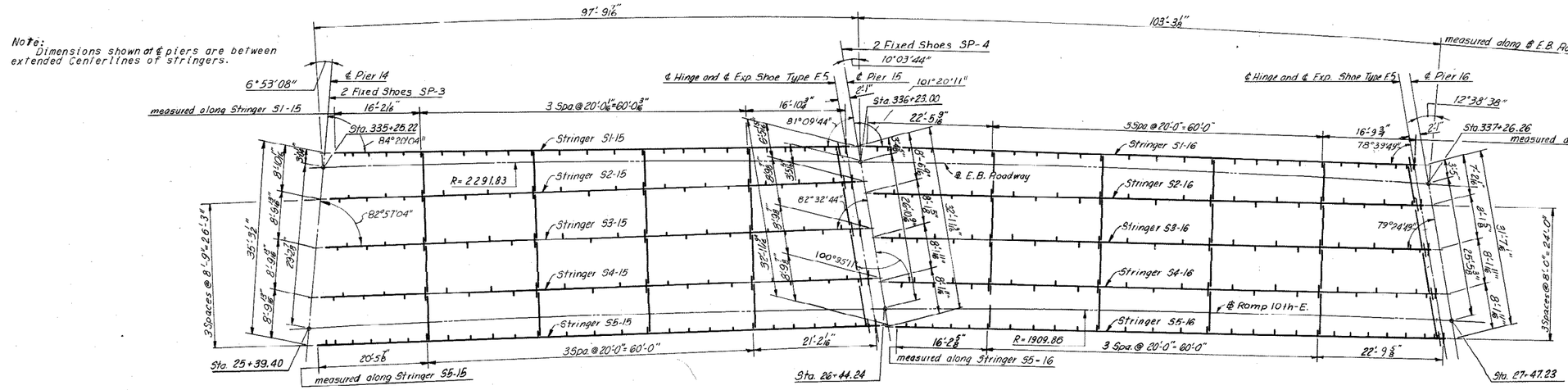
BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING PLAN - UNITS 5,6,7,8, AND 9

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=10' Unless as shown
CONTRACT NO.: 10
SHEET NO. 15 OF 46

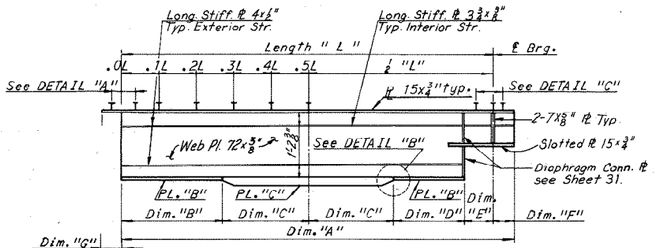
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	143	265

Note:
Dimensions shown at ℄ piers are between extended centerlines of stringers.

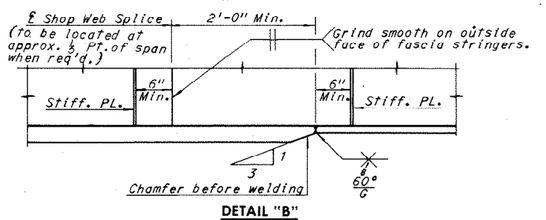


Note:
Stringers S2-15 thru S5-15 and Stringers S2-16 thru S5-16 are parallel.
Diaphragm spacing is shown along stringer length "L".

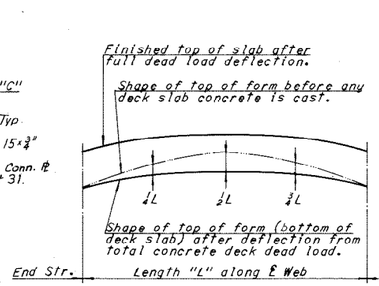
UNIT 15



STRINGER ELEVATION
No Scale



DETAIL "B"
No Scale



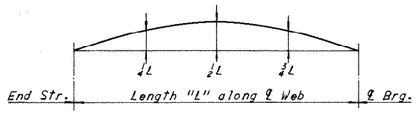
DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.
In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.

UNIT 16

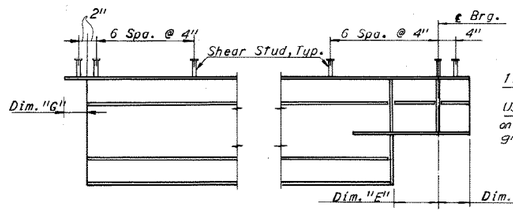
FRAMING PLAN
Scale: 1/32"=1'-0"



CAMBER DIAGRAM

NOTE TO FABRICATOR

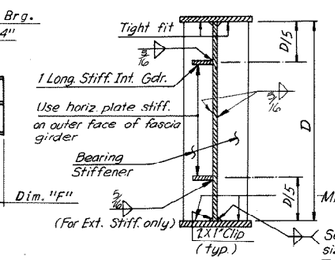
The stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
Dimensions are in inches.
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 31.



DETAIL "A"
No Scale

DETAIL "C"
No Scale

SHOE SCHEDULE			
FIXED SHOES		EXPANSION SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
SP-3	2	E5	10
SP-4	2		



WEB TO FLANGE WELDS AND LONGITUDINAL STIFFENER WELD DETAILS
No Scale

Note:
Web to flange weld size shall be determined by flange thickness as follows:

To 1 1/2" ..... 5/16" weld
over 1 1/2" to 2 1/4" ..... 3/8" weld

STRINGER SCHEDULE																		DEAD LOAD DEFLECTION SCHEDULE			CAMBER SCHEDULE		
UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL. "B"	PL. "C"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L		1/4L	1/2L	3/4L	1/4L	1/2L	3/4L
15	S1-15	93'- 8 1/4"	93'- 1"	23'-3 1/2"	23'-3"	22'-5 5/8"	10 1/4"	7 1/16"	6 9/16"	15x3/4"	15x1 1/4"	13 1/2"	15 1/2"	19"	24"	24"		1 5/16"	1 1/16"	1 5/16"	1 3/16"	1 13/16"	1 5/16"
	S2-15	95'- 6 3/4"	94'-11 15/16"	24'-5 7/16"	23'-0"	23'-7 7/16"	10 1/4"	7 1/16"	6 9/16"	15x3/4"	15x1 1/4"	14"	16"	18 1/2"	21 1/2"	23 1/2"		7/8"	1 1/16"	7/8"	1 1/2"	2"	1 1/2"
	S3-15	97'- 9 9/16"	97'- 2 1/2"	22'-1 1/2"	26'-6"	21'-3 3/16"	10 1/4"	7 1/16"	6 9/16"	15x3/4"	15x1 3/8"	14"	16"	18"	21"	22 1/2"		15/16"	1 1/16"	15/16"	1 5/16"	2 1/16"	1 5/16"
	S4-15	100'- 0 5/8"	99'- 5 1/4"	24'-2 3/8"	25'-6"	23'-4 3/8"	10 1/4"	7 1/16"	6 9/16"	15x1"	15x1 1/2"	14"	16"	18 1/2"	21"	23"		1"	1 1/16"	1"	1 11/16"	2 3/16"	1 5/16"
	S5-15	102'- 3"	101'- 7 7/16"	24'-4"	26'-6"	23'-5 3/16"	10 1/4"	7 1/16"	6 9/16"	15x1"	15x1 1/2"	13 1/2"	15 1/2"	18 1/2"	23"	24"		1 1/16"	1 1/16"	1 1/16"	1 3/4"	2 3/16"	1 5/16"
16	S1-16	99'-10 3/4"	99'- 3 5/16"	23'-7 3/16"	26'-0"	22'-9 1/16"	10 3/16"	7 1/16"	6 5/16"	15x7/8"	15x1 3/16"	14"	16"	19"	24"	24"		15/16"	1 1/16"	15/16"	1 3/16"	1 9/16"	1 3/16"
	S2-16	99'- 7 3/8"	99'- 0 1/4"	24'-6 1/16"	25'-0"	23'-7 1/16"	10 3/16"	7 1/16"	6 3/16"	15x7/8"	15x1 1/4"	15"	17"	19 1/2"	22 1/2"	24"		15/16"	1 1/16"	15/16"	1"	1 1/16"	1"
	S3-16	99'- 7 3/8"	99'- 0 1/4"	24'-0 1/16"	25'-6"	23'-1 13/16"	10 3/16"	7 1/16"	6 3/16"	15x7/8"	15x1 1/4"	15"	17"	19 1/2"	22 1/2"	24"		1"	1 1/16"	1"	1"	1 1/16"	1"
	S4-16	99'- 7 3/8"	99'- 0 1/4"	24'-0 1/16"	25'-6"	23'-1 15/16"	10 3/16"	7 1/16"	6 3/16"	15x7/8"	15x1 1/4"	15"	17"	19 1/2"	22 1/2"	24"		1"	1 1/16"	1"	1"	1 1/16"	1"
	S5-16	99'- 7 3/8"	99'- 0 1/4"	24'-0 1/16"	25'-6"	23'-1 15/16"	10 3/16"	7 1/16"	6 3/16"	15x7/8"	15x1 1/8"	14"	16 1/2"	19 1/2"	24"	24"		15/16"	1 1/16"	15/16"	15/16"	1 1/8"	15/16"

Note All structural steel in Units 15 and 16 is A36.

* Spacing begins at termination of 6 spaces @ 4"

Longitudinal stiffeners shall be located on the exterior face of the exterior Stringers.

Intermediate stiffener Pls. 4 1/2 x 3/8" shall be equally spaced between diaphragms as shown. The first two stiffener spaces at the ends of stringers shall be one-half the normal spacing within the panel.

Notes:
For Superstructure steel quantities, see Sheet 2.
For Joint Details, see Sheet 38.
For Shoe Details, see Sheets 51 and 52
For Diaphragm Details, see Sheet 31.
For Framing Details, see Sheet 22.
For Shear Stud Details, see Sheet 14.
For Angles between ℄ Piers and Stringers see Sheet 22.

	BY	DATE				
MADE	RLM	7-31-68				
CHECKED	PTA	11-4-68	1	As Built	TEM	8-7-68
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.

FRAMING PLAN - UNITS 15 AND 16

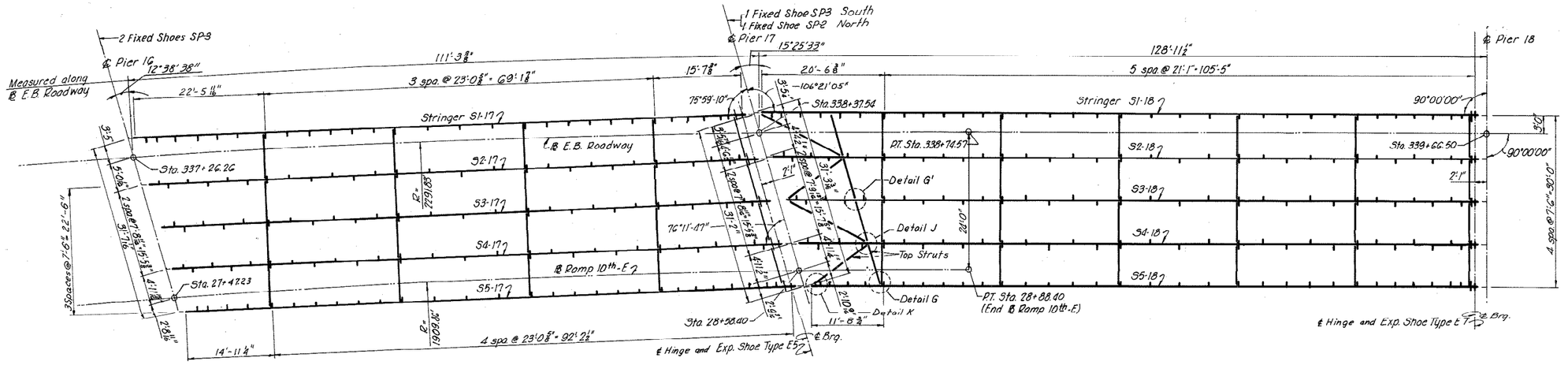
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK · ALEXANDRIA · KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 17 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	144	265

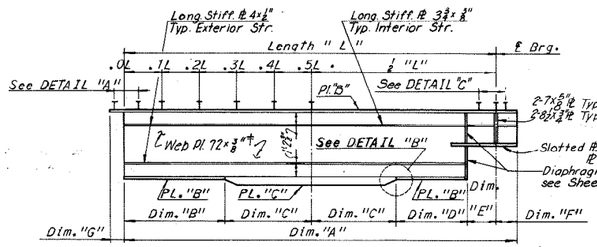
Note:
Stringers S2-17 thru S5-17 and Stringers S1-18 thru S5-18 are parallel.
Diaphragm spacing is shown along stringer length "L".

Dimensions shown at ℄ Piers are between extended center lines of stringers.

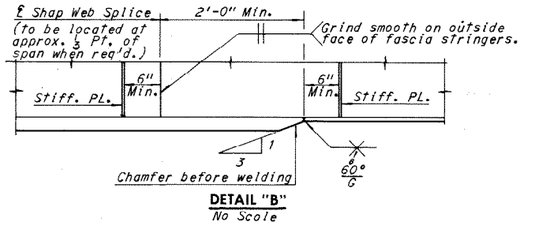


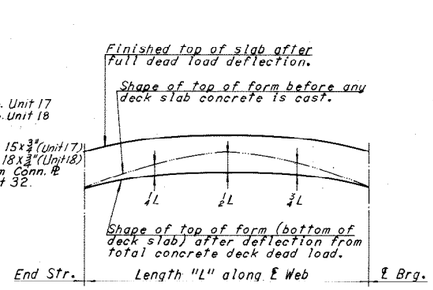
UNIT 17 **UNIT 18**

FRAMING PLAN
Scale: 1"=10'-0"



STRINGER ELEVATION
No Scale

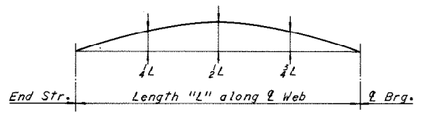




DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

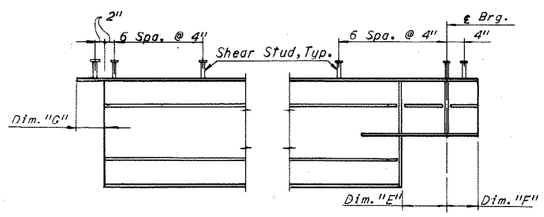
Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.
In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



CAMBER DIAGRAM

NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
Dimensions are in inches.
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 32.



DETAIL "A"
No Scale

DETAIL "C"
No Scale

Note:
For web to flange weld sizes and longitudinal stiffener plate details see Sheet 17.

SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E5	5	SP-2	1
E7	5	SP-3	3

Note:
Longitudinal stiffeners shall be located on the exterior face of the exterior Stringers.
Intermediate stiffener Pls. 4½x⅜" shall be equally spaced between diaphragms as shown. The first two stiffener spaces at the ends of stringers shall be one-half the normal spacing within the panel.
All steel shall be A36 unless otherwise noted.

Notes:
For Framing Details, see Sheet 22 and 23.
For Joint Details, see Sheet 38.
For Shoe Details, see Sheets S1 ; S2.
For Diaphragm Details, see Sheet 32.
For Superstructure steel quantities, see Sheet 2.
For Details G, G', J and K, see Sheet 27.
For Shear Stud Details, see Sheet 14.
For Angles between ℄ Piers and Stringers, see Sheets 22 & 23.

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL. "B"	PL. "C"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
17	S1-17	107'-10⅜"	107'-2⅝"	26'-7½"	27'-0"	25'-9⅛"	10⅜"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1¼"	13½"	15¼"	18½"	23"	24"
	S2-17	107'-9"	107'-1⅜"	28'-6⅞"	25'-0"	27'-8⅜"	10⅜"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1"	14½"	17"	19½"	22"	24"
	S3-17	107'-9"	107'-1⅜"	28'-6⅞"	25'-0"	27'-8⅜"	10⅜"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1"	14½"	17"	19½"	22"	24"
	S4-17	107'-9"	107'-1⅜"	28'-6⅞"	25'-0"	27'-8⅜"	10⅜"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1"	14½"	17"	19½"	22"	24"
	S5-17	107'-9"	107'-1⅜"	28'-0⅞"	25'-6"	27'-2⅜"	10⅜"	7¼"	6⅛"	‡ 15x⅜"	‡ 15x1¼"	14"	16"	19"	24"	24"
18	S1-18	126'-6⅜"	125'-11⅜"	30'-11⅛"	32'-0"	30'-1⅛"	10"	7"	6⅜"	‡ 18x⅜"	‡ 18x1¼"	14"	16½"	19½"	24"	24"
	S2-18	124'-4"	123'-9"	34'-10½"	27'-0"	34'-0½"	10"	7"	6⅜"	‡ 18x⅜"	‡ 18x1⅛"	16"	18½"	21½"	24"	24"
	S3-18	122'-1⅜"	121'-6⅜"	36'-3⅝"	24'-6"	35'-5⅛"	10"	7"	6⅜"	‡ 18x⅜"	‡ 18x1¼"	16"	18½"	21½"	23½"	24"
	S4-18	119'-11⅜"	119'-4⅜"	——	118'-6⅜"	——	10"	7"	6⅜"	‡ 18x⅜"	‡ 18x1	16"	18½"	21½"	23½"	24"
	S5-18	117'-8⅜"	117'-1¾"	37'-0⅞"	21'-6"	36'-2⅝"	10"	7"	6⅜"	‡ 18x⅜"	‡ 18x1⅛"	14½"	17"	20"	24"	24"

DEAD LOAD DEFLECTION SCHEDULE			CAMBER SCHEDULE		
¼L	½L	¾L	¼L	½L	¾L
1⅜"	2¼"	1⅝"	2"	2¾"	2⅛"
1⅜"	2¼"	1⅝"	1 1/16"	2⅝"	1⅝"
1⅜"	2¼"	1⅝"	1½"	2"	1⅜"
1⅜"	2¼"	1⅝"	1⅝"	1⅝"	1 1/16"
1⅜"	2⅜"	1⅝"	1"	1⅛"	¾"
2¼"	3¼"	2¼"	2 5/16"	4 1/16"	2 5/16"
2⅜"	2⅝"	2⅜"	2 1/16"	3⅛"	2¾"
2"	2¾"	2"	2⅜"	3⅛"	2⅝"
1⅞"	2⅝"	1⅞"	2⅛"	3⅛"	2⅛"
1¾"	2¾"	1¾"	2¼"	3⅜"	2⅝"

*Spacing begins at termination of 6 spaces @ 4".

‡ Denotes A572-Grade 50 steel for thickness of ¾" and under and A588 steel for thickness over ¾".

	BY	DATE				
MADE	FEO	8-20-68	2	As Built	TEM	8-76
CHECKED	PTA	4-25-69	1	Pier 17 Shoes	DWB	11/14/74
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

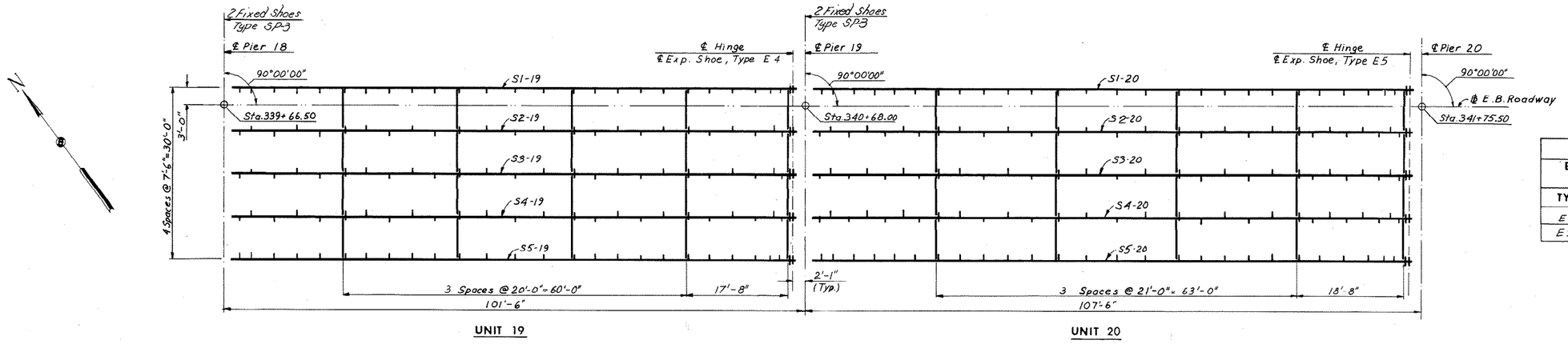
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING PLAN - UNITS 17 AND 18

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 18 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	145	265

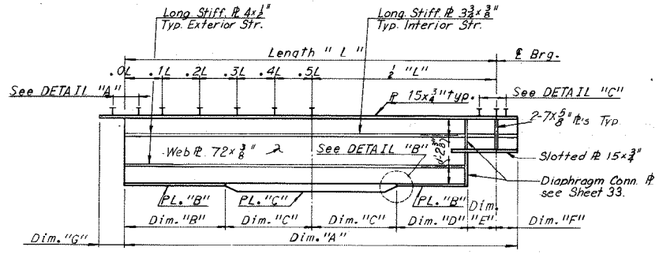


FRAMING PLAN
Scale: 1" = 10'-0"

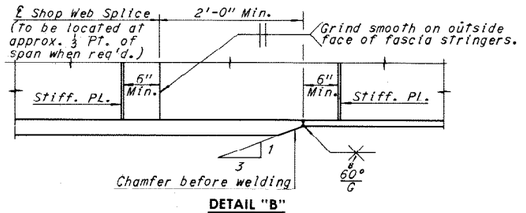
SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E4	5	SP-3	4
E5	5		

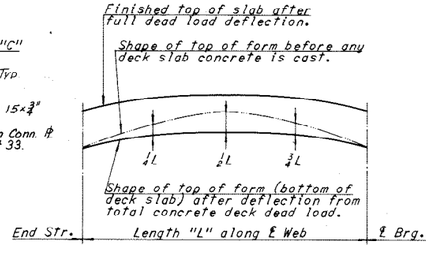
Note: For web to flange weld sizes and Longitudinal Stiffener Plate details see Sheet 17.



STRINGER ELEVATION
No Scale



DETAIL "B"
No Scale

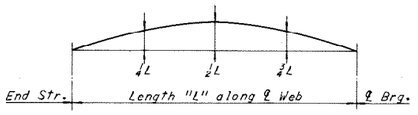


DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.



CAMBER DIAGRAM

NOTE TO FABRICATOR

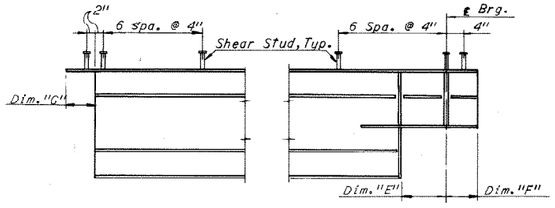
The stringers shall be fabricated with an upward camber amounting to the tabulated value.

This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.

Dimensions are in inches.

Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straighiness will be in the direction shown by the Camber Diagrum.

If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 33.



DETAIL "A"
No Scale

DETAIL "C"
No Scale

Note: Longitudinal stiffeners shall be located on the exterior face of the exterior Stringers.

Intermediate stiffener Pls. 4½ x 8" shall be equally spaced between diaphragms as shown. The first two stiffener spaces at the end of stringers shall be one-half the normal spacing within the panel.

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL. "B"	PL. "C"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
19	S1-19	98'-2¼"	97'-7¼"	23'-9⅝"	25'-0"	22'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	14½"	17"	20"	24"	24"
	S2-19	98'-2¼"	97'-7¼"	24'-9⅝"	24'-0"	23'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	16"	18"	21"	24"	24"
	S3-19	98'-2¼"	97'-7¼"	24'-9⅝"	24'-0"	23'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	16"	18"	21"	24"	24"
	S4-19	98'-2¼"	97'-7¼"	24'-9⅝"	24'-0"	23'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	16"	18"	21"	24"	24"
	S5-19	98'-2¼"	97'-7¼"	23'-9⅝"	25'-0"	22'-11⅝"	10"	7"	6¼"	15x⅞"	15x1¼"	14½"	17"	20"	24"	24"
20	S1-20	104'-2¼"	103'-7¼"	24'-3⅝"	27'-6"	23'-5⅝"	10"	7"	6¼"	15x1"	15x1½"	14½"	17"	20"	24"	24"
	S2-20	104'-2¼"	103'-7¼"	22'-3⅝"	29'-6"	21'-5⅝"	10"	7"	6¼"	15x⅞"	15x1⅜"	15½"	18"	21"	24"	24"
	S3-20	104'-2¼"	103'-7¼"	22'-3⅝"	29'-6"	21'-5⅝"	10"	7"	6¼"	15x⅞"	15x1⅜"	15½"	18"	21"	24"	24"
	S4-20	104'-2¼"	103'-7¼"	22'-3⅝"	29'-6"	21'-5⅝"	10"	7"	6¼"	15x⅞"	15x1⅜"	15½"	18"	21"	24"	24"
	S5-20	104'-2¼"	103'-7¼"	24'-3⅝"	27'-6"	23'-5⅝"	10"	7"	6¼"	15x1"	15x1½"	14½"	17"	20"	24"	24"

DEAD LOAD DEFLECTION SCHEDULE

¼L	½L	¾L
1"	1⅛"	1"
1"	1⅛"	1"
1"	1⅛"	1"
1"	1⅛"	1"
1"	1⅛"	1"
1⅛"	1⅛"	1⅛"
1⅛"	1⅛"	1⅛"
1⅛"	1⅛"	1⅛"
1⅛"	1⅛"	1⅛"
1⅛"	1⅛"	1⅛"

CAMBER SCHEDULE

¼L	½L	¾L
1¼"	1⅜"	1¼"
1¼"	1⅜"	1¼"
1¼"	1⅜"	1¼"
1¼"	1⅜"	1¼"
1¼"	1⅜"	1¼"
1/16"	2"	1⅝"
1⅛"	2¼"	1⅛"
1⅛"	2⅛"	1⅞"
1⅛"	2⅛"	1⅞"
1⅛"	2⅛"	1⅞"

* Spacing begins at termination of 6 spaces @ 4"

Note: All structural steel in Units 19 and 20 is A36.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D.	6-6-68				
CHECKED	PTA	11-4-68	1	As Built	TEM	8-76
IN CHARGE						

AS BUILT

Notes:
For Superstructure steel quantities, see Sheet 2.
For Diaphragm Details, see Sheet 33.
For Shoe Details, see Sheets St1S2
For Joint Details, see Sheet 38.
For Framing Details, see Sheet 23.
For Shear Stud Details, see Sheet 14.
For Angles between ℄ Piers and Stringers, see Sheet 23.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

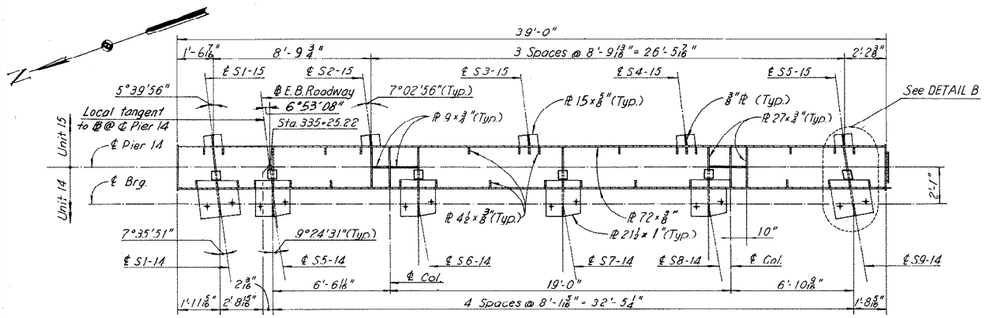
BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.

FRAMING PLAN - UNITS 19 AND 20

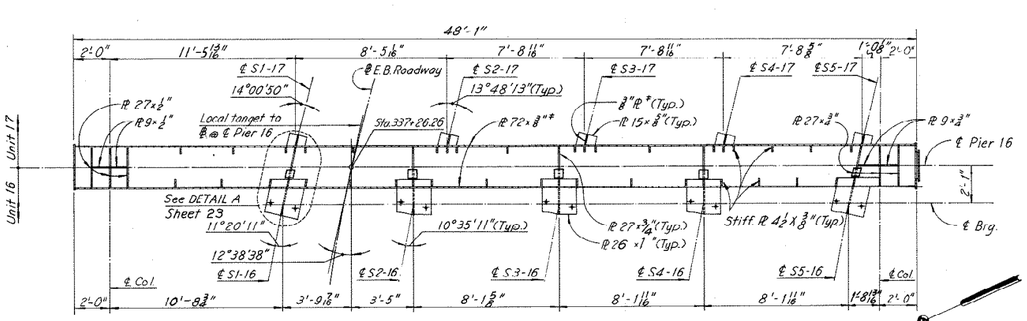
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 19 OF 46

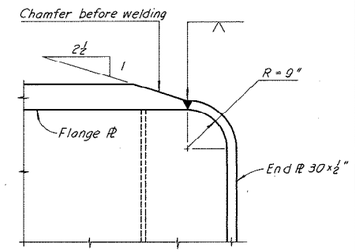
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	148	265



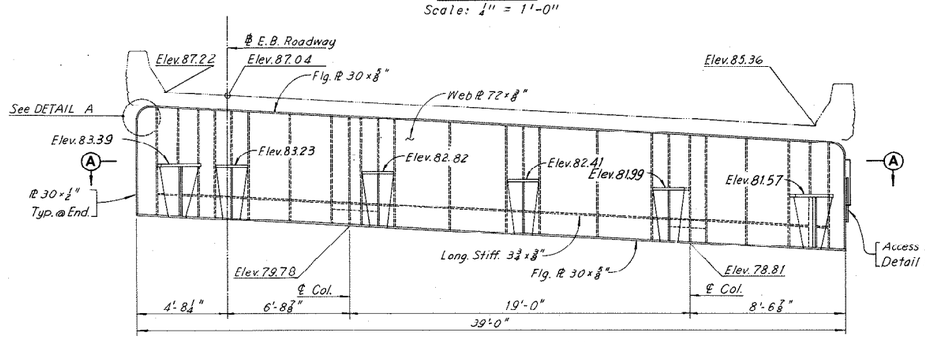
SECTION A-A
Scale: 1/4" = 1'-0"



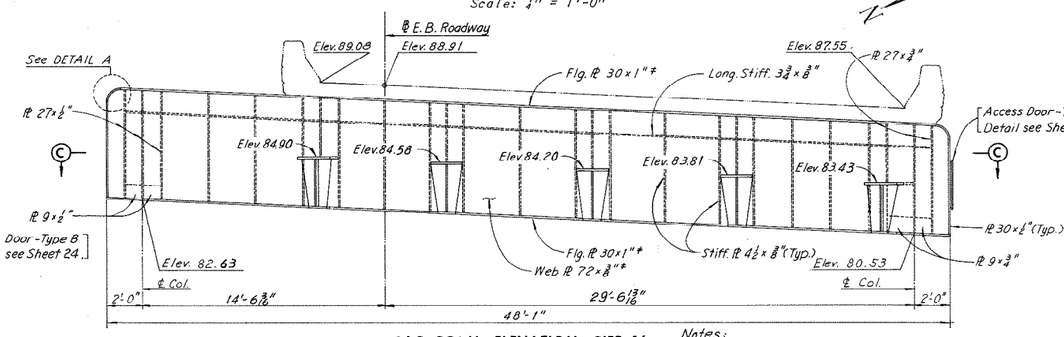
SECTION C-C
Scale: 1/4" = 1'-0"



DETAIL A
No Scale



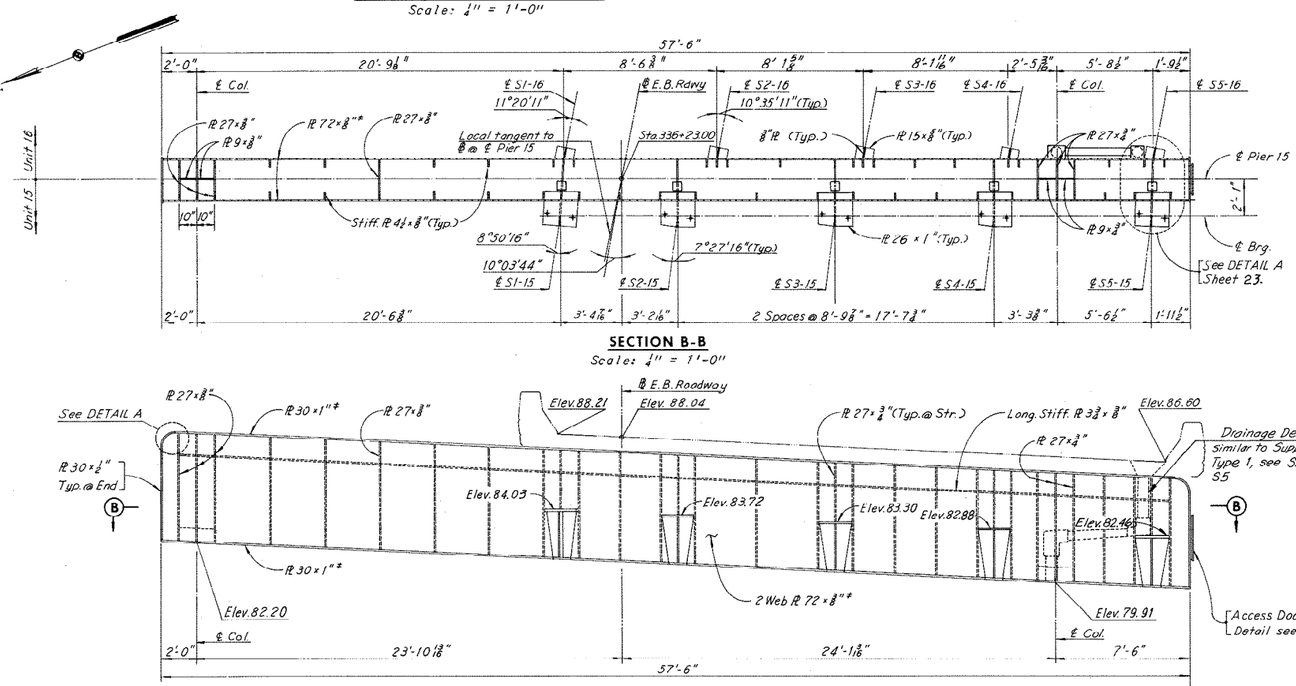
CAP BEAM ELEVATION - PIER 14
Scale: 1/4" = 1'-0"



CAP BEAM ELEVATION - PIER 16
Scale: 1/4" = 1'-0"

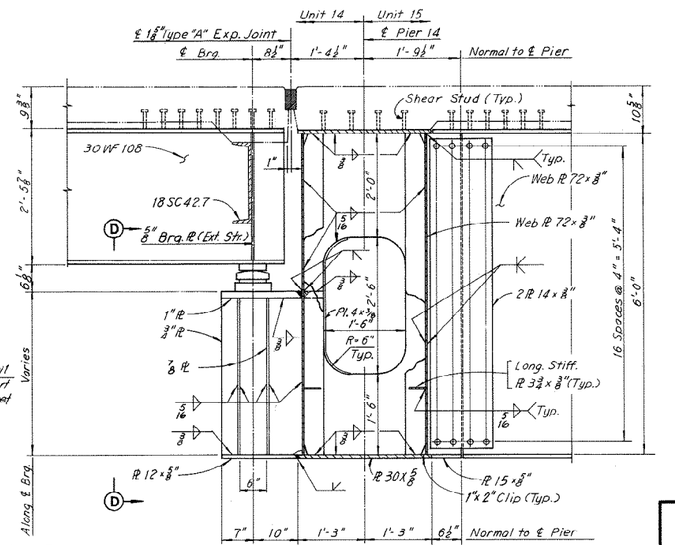
Notes:
For Framing Plans see: Sheet 16 for Unit 14, Sheet 17 for Units 15 & 16, Sheet 18 for Unit 17.

For Deck Plans see: Sheet 30 for Unit 14, Sheet 31 for Units 15 & 16, Sheet 32 for Unit 17.



SECTION B-B
Scale: 1/4" = 1'-0"

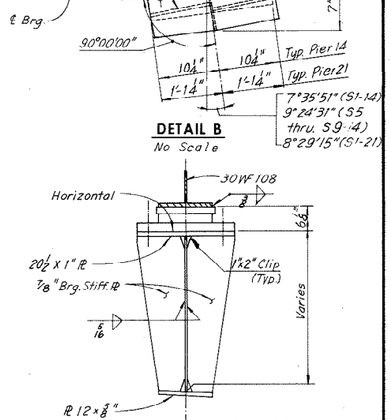
CAP BEAM ELEVATION - PIER 15
Scale: 1/4" = 1'-0"



TYPICAL SECTION - PIER 14
Scale: 3/4" = 1'-0"

Note: TYPICAL SECTION for Piers 15 and 16, see TYPICAL SECTION, Sheet 23.

Note: Shear studs are placed in rows, with four shear studs in each row. Rows are spaced at 24" centers within limits of concrete deck.



DETAIL B
No Scale

SECTION D-D
No Scale

	BY	DATE
MADE	M.H.H	12-7-68
CHECKED	J.D.	1-29-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Note changed	PRMS	4-19-71
2	As Built	TEM	8-76

Note:
All steel shall be A36 unless denoted otherwise.
* Denotes A572-Grade 50 steel for thickness of 3/4" and under and A588 steel for thickness over 3/4".

Provide Drain Holes at lower end of cap beam.
All elevations shown are final elevations.

AS BUILT

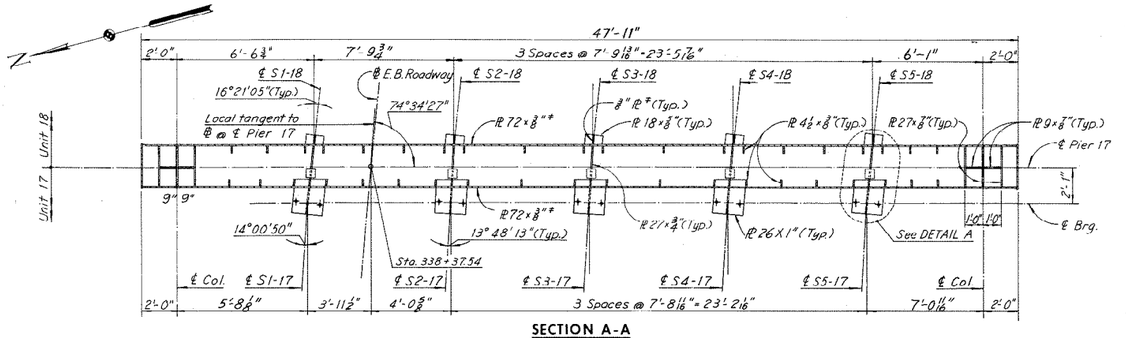
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS
PIERS 14, 15 AND 16

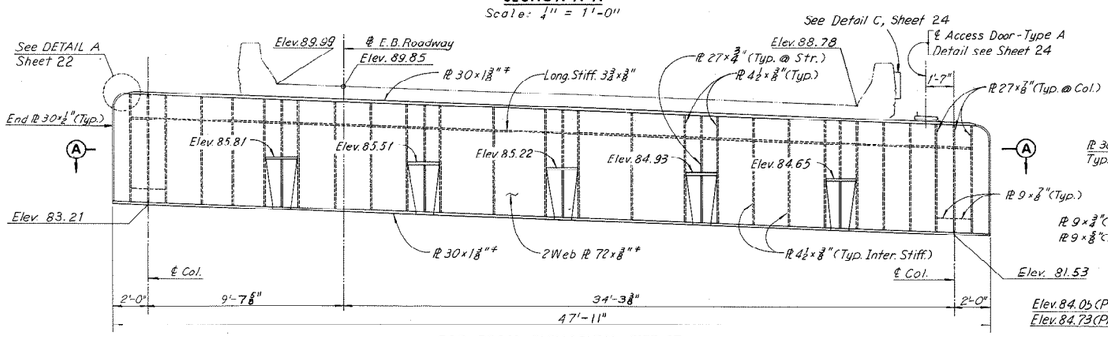
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 22 OF 46

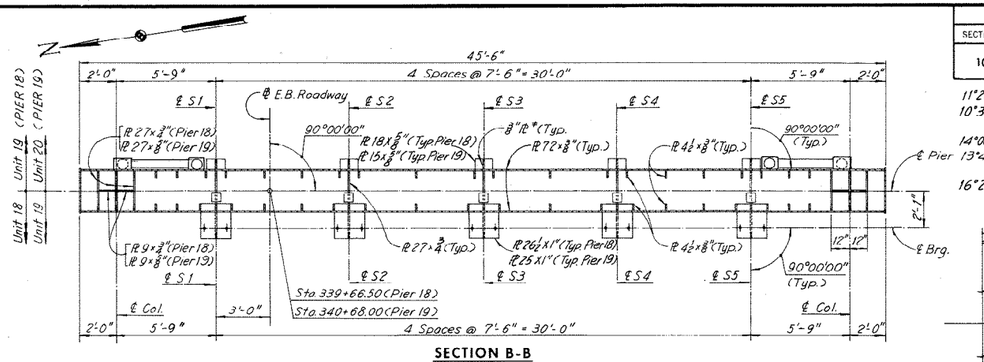
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	149	265



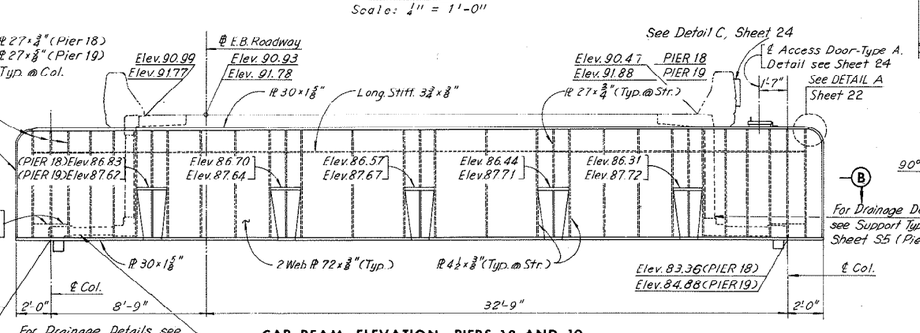
SECTION A-A
Scale: 1/4" = 1'-0"



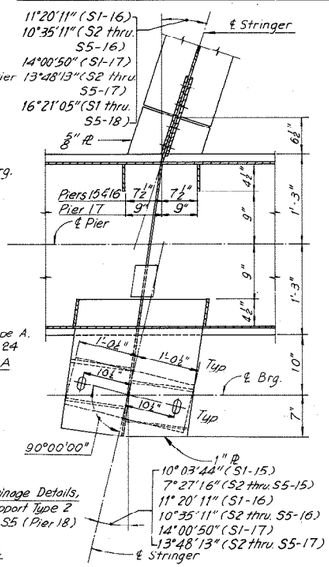
CAP BEAM ELEVATION - PIER 17
Scale: 1/4" = 1'-0"



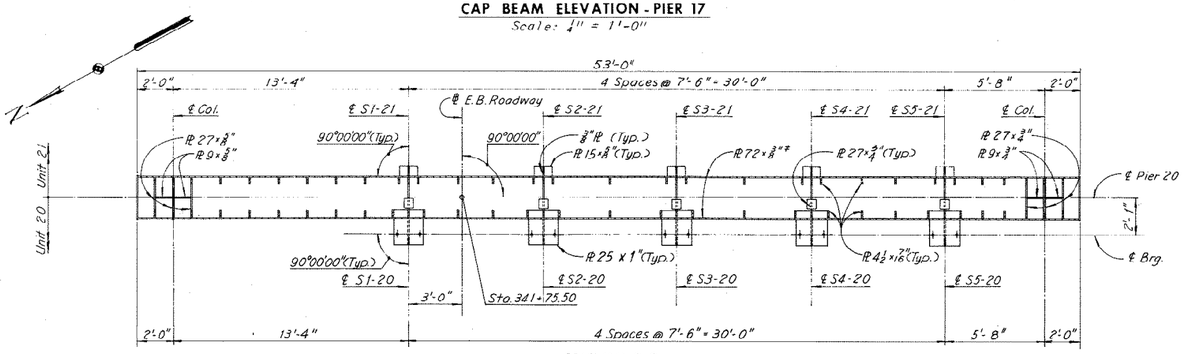
SECTION B-B
Scale: 1/4" = 1'-0"



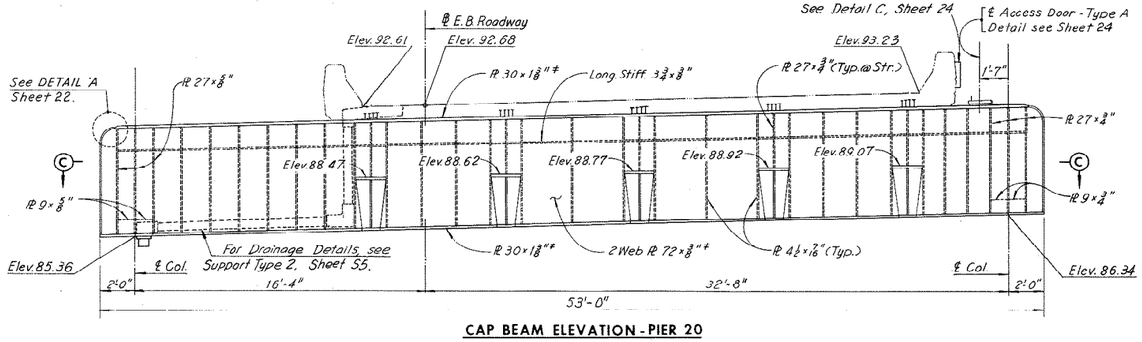
CAP BEAM ELEVATION - PIERS 18 AND 19
Scale: 1/4" = 1'-0"



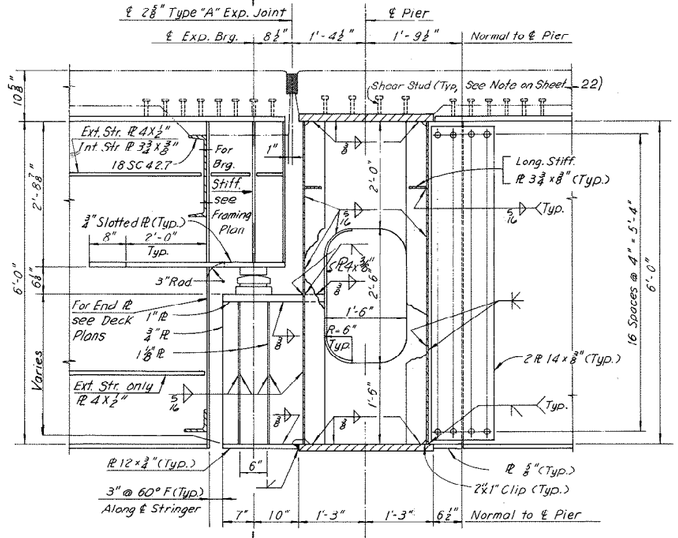
DETAIL A
No Scale



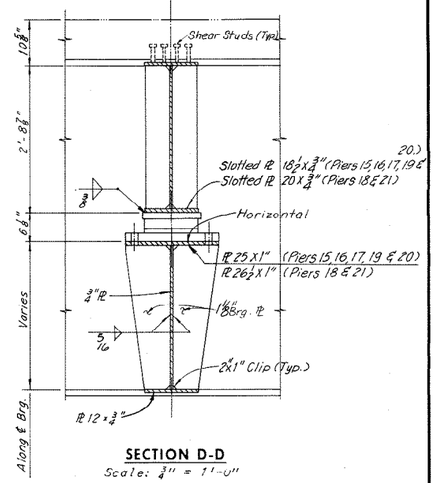
SECTION C-C
Scale: 1/4" = 1'-0"



CAP BEAM ELEVATION - PIER 20
Scale: 1/4" = 1'-0"



TYPICAL SECTION
Scale: 1/4" = 1'-0"



SECTION D-D
Scale: 3/4" = 1'-0"

Notes:
For Framing Plans see:
Sheet 18 for Units 17 & 18.
Sheet 19 for Units 19 & 20.
Sheet 20 for Units 21 & 22.
For Deck Plans see:
Sheet 32 for Units 17 & 18.
Sheet 33 for Units 19 & 20.
Sheet 34 for Units 21 & 22.

	BY	DATE				
MADE	M.H.H.	12-17-68				
CHECKED	J.D.	1-29-69	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

Note:
All steel shall be A36 unless denoted otherwise.
≠ Denotes A572-Grade 50 steel for thickness of 3/4" and under and A588 steel for thickness over 3/4".

Provide Drain Holes at lower end of cap beam.
All elevations shown are final elevations.

AS BUILT

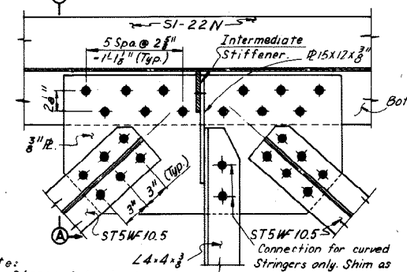
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS
PIERS 17, 18, 19 AND 20

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

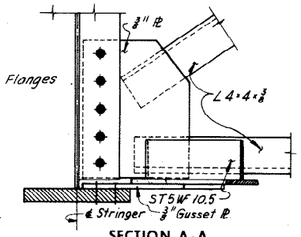
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 23 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	153	265

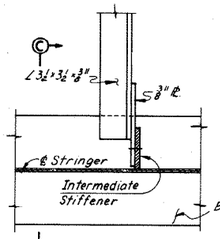


Note: Diagonal Angle in Intermediate Diaphragm is not shown.

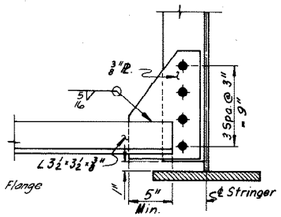
DETAIL A
Scale: 1/2" = 1'-0"
Detail A' Similar.



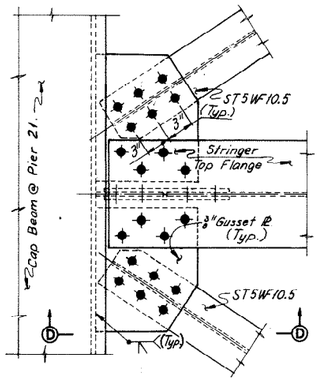
SECTION A-A
Scale: 1/2" = 1'-0"



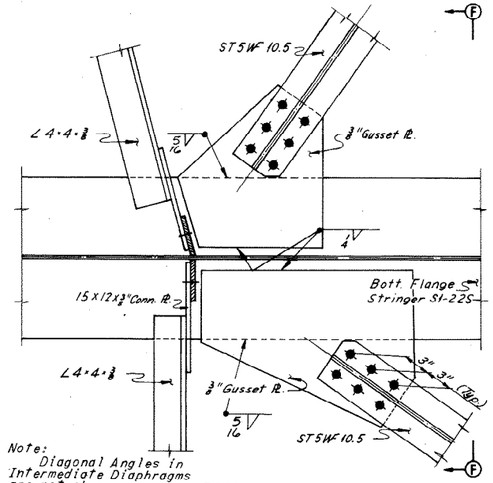
SECTION B
Scale: 1/2" = 1'-0"



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

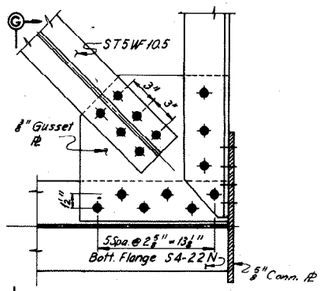


DETAIL C
Scale: 1/2" = 1'-0"

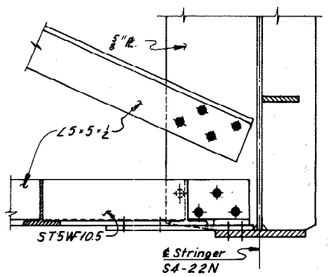


Note: Diagonal Angles in Intermediate Diaphragms are not shown.

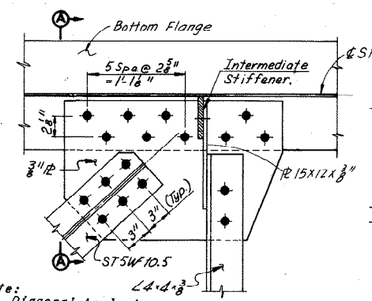
DETAIL E
Scale: 1/2" = 1'-0"



DETAIL F
Scale: 1/2" = 1'-0"

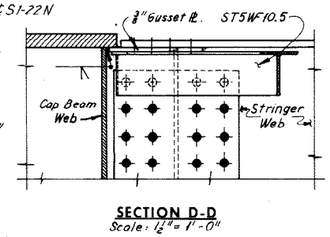


SECTION G-G
Scale: 1/2" = 1'-0"

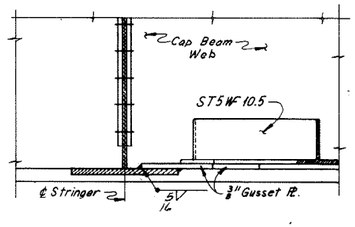


Note: Diagonal Angle in Intermediate Diaphragm is not shown.

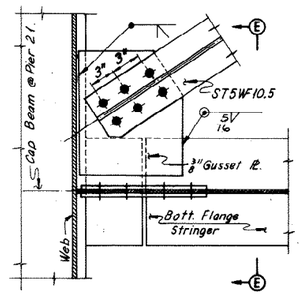
DETAIL M
Scale: 1/2" = 1'-0"



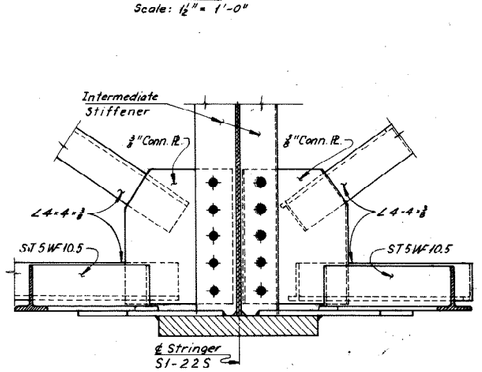
SECTION D-D
Scale: 1/2" = 1'-0"



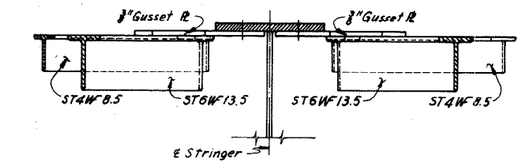
SECTION E-E
Scale: 1/2" = 1'-0"



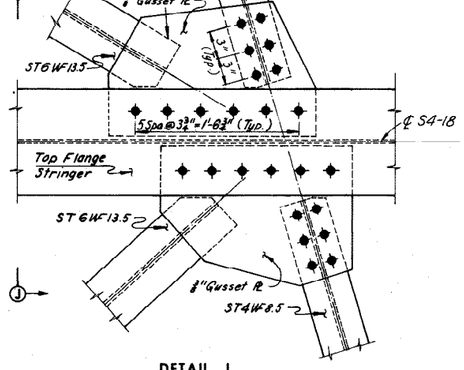
DETAIL D
Scale: 1/2" = 1'-0"



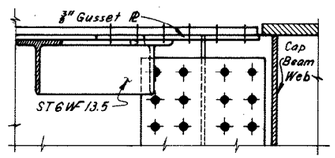
SECTION F-F
Scale: 1/2" = 1'-0"



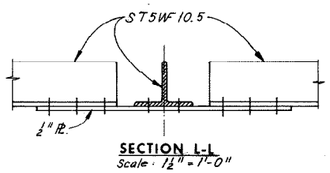
SECTION J-J
Scale: 1/2" = 1'-0"



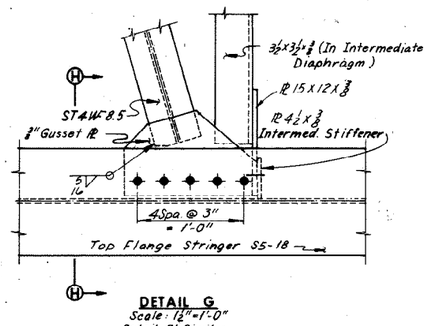
DETAIL J
Scale: 1/2" = 1'-0"
Detail J' Similar.



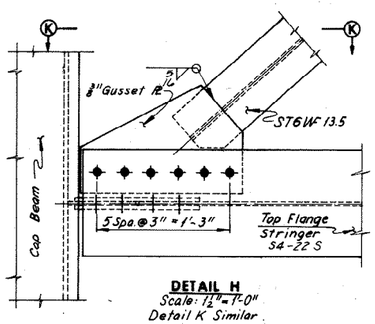
SECTION K-K
Scale: 1/2" = 1'-0"



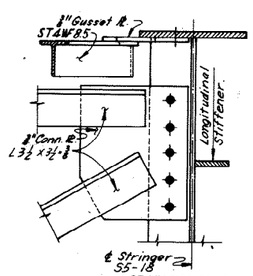
SECTION L-L
Scale: 1/2" = 1'-0"



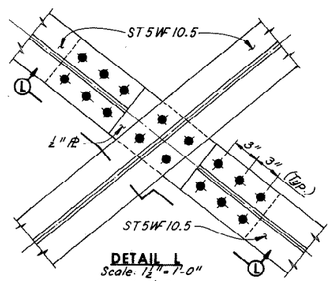
DETAIL G
Scale: 12"=1'-0"
Detail G' Similar.



DETAIL H
Scale: 1/2" = 1'-0"
Detail K' Similar.



SECTION H-H
Scale: 1/2" = 1'-0"



DETAIL L
Scale: 1/2" = 1'-0"
Detail L' Similar.

Note: For location of Details A, A', B, C, D, E, F, H, J', L, L' and M, see Sheet 20. For location of Details G, G', J and K, see Sheet 18.

	BY	DATE				
MADE	PTA	12-14-68				
CHECKED	AMH	2-10-69	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

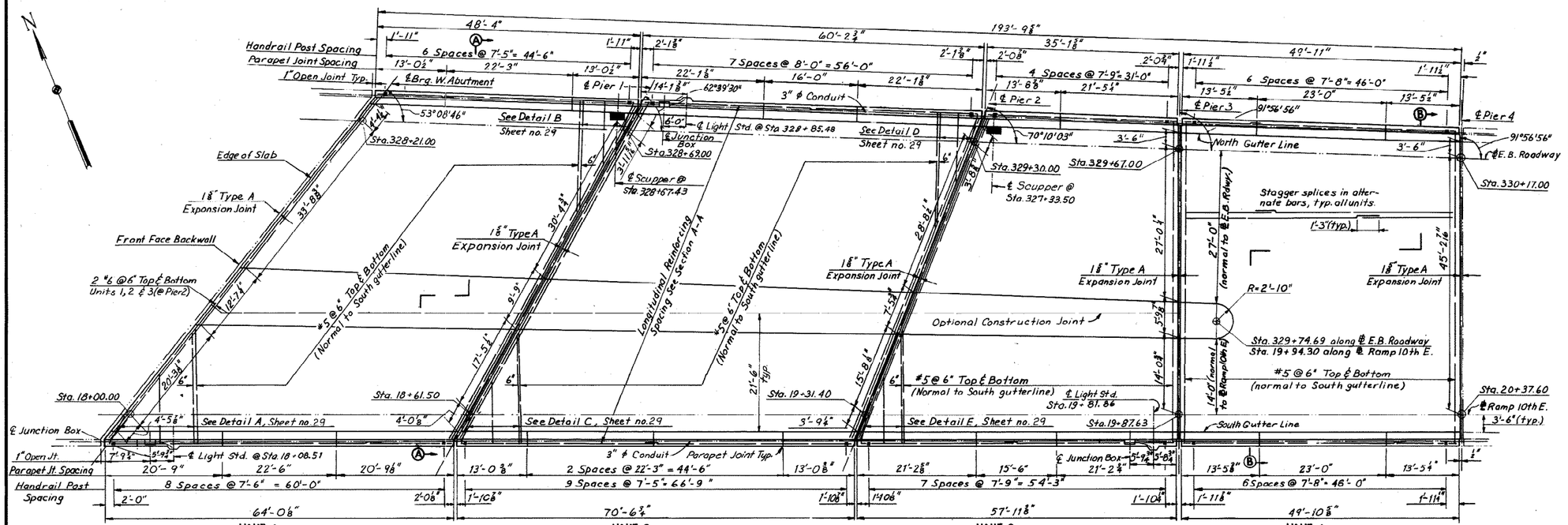
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
FRAMING DETAILS
UNITS 18, 21 AND 22

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 27 OF 46

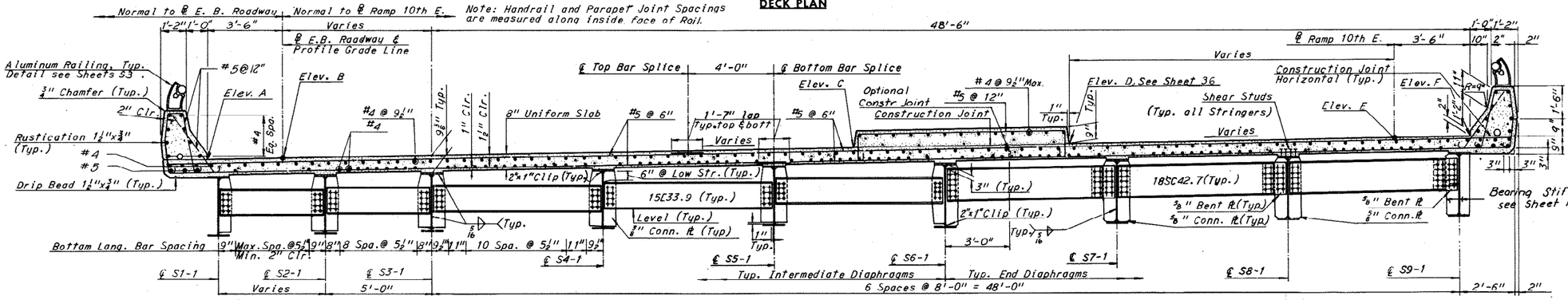
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	154	265



DECK PLAN

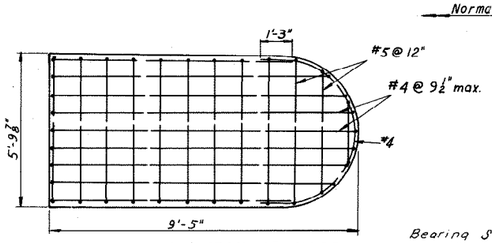
Normal to ℄ E. B. Roadway; Normal to ℄ Ramp 10th E.

Note: Handrail and Parapet Joint Spacings are measured along inside face of Rail.



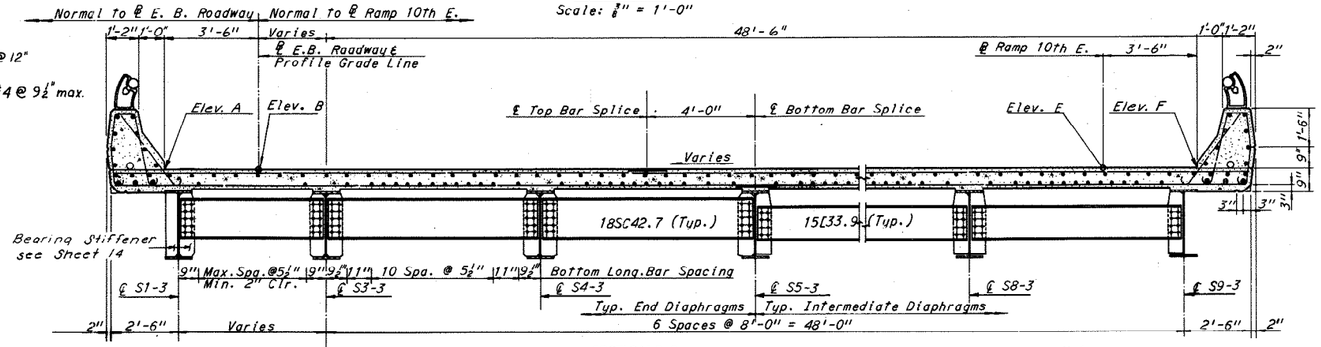
SECTION A-A

Scale: 3/8" = 1'-0"



REINFORCING DETAIL AT NOSE

Scale: 3/8" = 1'-0"



SECTION B-B

Scale: 3/8" = 1'-0"

Notes:
- For Joint Details, see Sheet 37
- For Framing Plan, see Sheet 14.
- For Handrail Details, see Sheet 53
- For Superstructure quantities, see Sheet 2.
- For Details A, B, C, D and E, see Sheet 29
- For Standard Drainage Details, see Support Type 1, Sheet S5 & S6.

Note: Transverse dimensions given in Sections A-A and B-B are normal to ℄ Ramp 10th-E.

ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C	ELEV. E	ELEV.
328+00.00	76.13	76.33	77.81	—	—
+00.00	—	—	77.81	—	—
+10.00	76.29	76.48	77.91	—	—
+20.00	76.44	76.63	78.00	—	—
+21.00	—	76.64	—	—	—
+23.62	76.50	—	—	—	—
+30.00	76.61	76.77	78.10	—	—
+40.00	76.76	76.92	78.19	—	—
+50.00	76.91	77.07	78.28	—	—
+55.04	—	—	78.33	—	—
+60.00	77.07	77.22	78.38	—	—
+69.00	—	77.35	—	—	—
+70.00	77.22	77.37	78.47	—	—
+70.81	77.25	—	—	—	—
+80.00	77.38	77.51	78.57	—	—
+90.00	77.53	77.66	78.66	—	—
329+00.00	77.68	77.81	78.75	—	—
+10.00	77.84	77.96	78.85	—	—
+20.00	77.99	78.11	78.94	—	—
+20.26	—	—	78.95	—	—
+30.00	78.16	78.25	79.04	—	—
+31.26	78.17	—	—	—	—
+40.00	78.31	78.40	79.13	—	—
+50.00	78.46	78.55	79.22	—	—
+60.00	78.62	78.70	79.32	—	—
+66.88	78.73	—	—	—	—
+67.00	—	78.80	—	—	—
+67.92	—	—	79.39	—	—
+70.00	78.77	78.85	79.41	—	—
+80.00	78.93	78.99	—	79.88	79.94
+90.00	79.08	79.14	—	79.93	79.99
330+00.00	79.23	79.29	—	79.98	80.03
+10.00	79.39	79.44	—	80.03	80.08
+16.88	79.51	—	—	—	—
+17.00	—	79.54	—	—	—
+18.54	—	—	—	80.08	—
+18.64	—	—	—	—	80.12
+20.00	79.54	79.59	—	80.08	80.13

Note: For Elevations along ℄ Ramp 10th East, see Sheet 33.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D	8-6-68	2	As Built	TEM.	8-76
CHECKED	J.V.	10-23-68				
IN CHARGE			1	Bar Space Added	PRMS	4-19-74

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

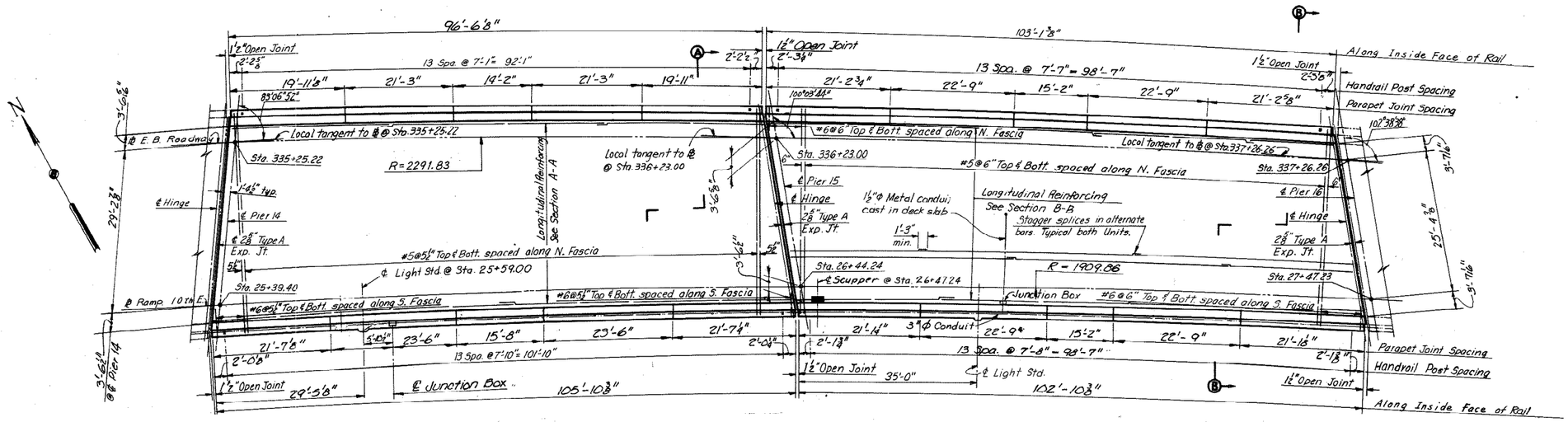
BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
DECK PLAN - UNITS 1,2,3 AND 4

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=10' Unless as shown
CONTRACT NO: 10
SHEET NO. 28 OF 46

AS BUILT

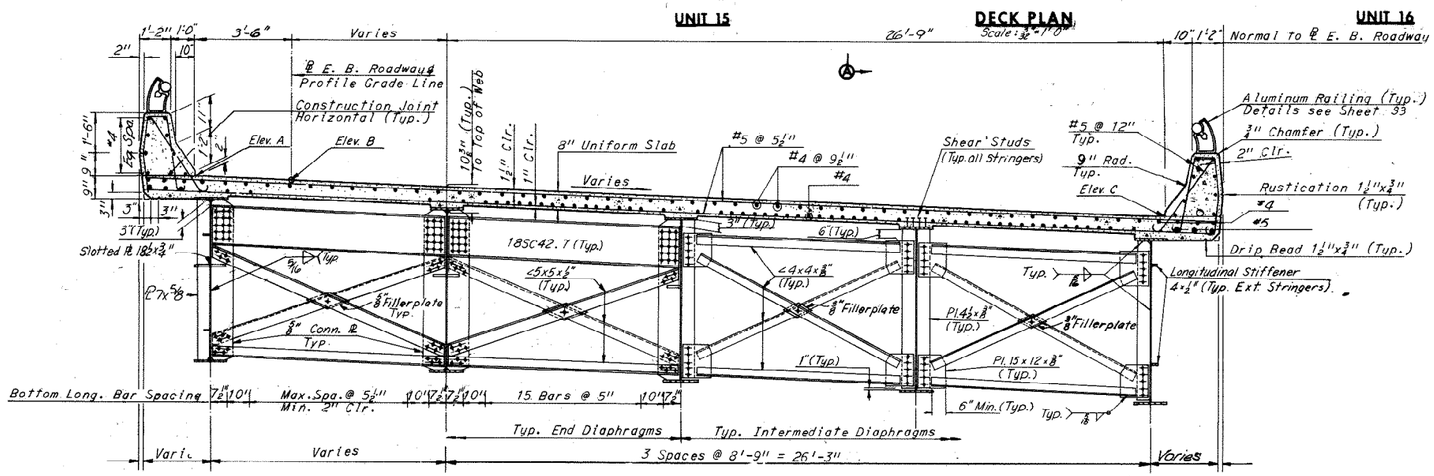
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	157	265



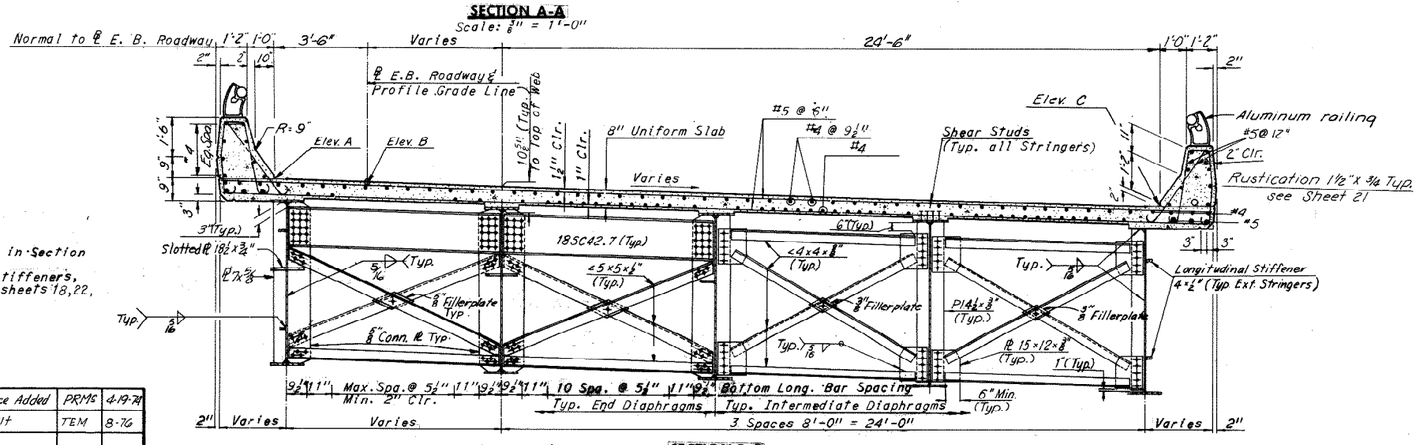
ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
335+10.00	87.01	86.84	85.20
+20.00	87.15	86.97	85.35
+21.29	—	—	85.36
+25.22	87.22	—	—
+30.00	87.18	87.11	85.50
+40.00	87.40	87.23	85.64
+50.00	87.53	87.35	85.76
+60.00	87.63	87.46	85.89
+70.00	87.74	87.57	86.01
+80.00	87.85	87.67	86.11
+90.00	87.93	87.76	86.23
336+00.00	88.02	87.85	86.33
+10.00	88.10	87.93	86.42
+20.00	88.19	88.02	86.52
+22.38	88.21	—	—
+23.00	—	88.04	—
+28.25	—	—	86.60
+30.00	88.27	88.10	86.61
+40.00	88.36	88.19	86.70
+50.00	88.44	88.27	86.80
+60.00	88.52	88.35	86.89
+70.00	88.61	88.44	86.98
+80.00	88.69	88.52	87.08
+90.00	88.78	88.61	87.17
337+00.00	88.86	88.69	87.26
+10.00	88.94	88.77	87.35
+20.00	89.03	88.86	87.44
+25.48	89.08	—	—
+26.26	—	88.91	—
+30.00	89.11	88.94	87.53
+32.60	—	—	87.55
337+40.00	89.20	89.03	87.62

DECK PLAN
Scale: 1/32" = 1'-0"



SECTION A-A
Scale: 3/8" = 1'-0"



SECTION B-B
Scale: 3/8" = 1'-0"

Notes:
For details not shown in Section B-B, see Section A-A.
For details of brg. stiffeners, long. stiffeners, see sheets 18, 22, and 23.

Notes:
For Joint Details, see Sheet 38.
For Framing Plan, see Sheet 17.
For Handrail Details, see Sheet 53
For Superstructure quantities, see Sheet 2.
For Standard Drainage Details, see Support Type 2 Sheet 55 & 56.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	RLM	8-6-68	2	As Built	TEM	8-76
CHECKED	SCC	10-21-68				
IN CHARGE						

AS BUILT

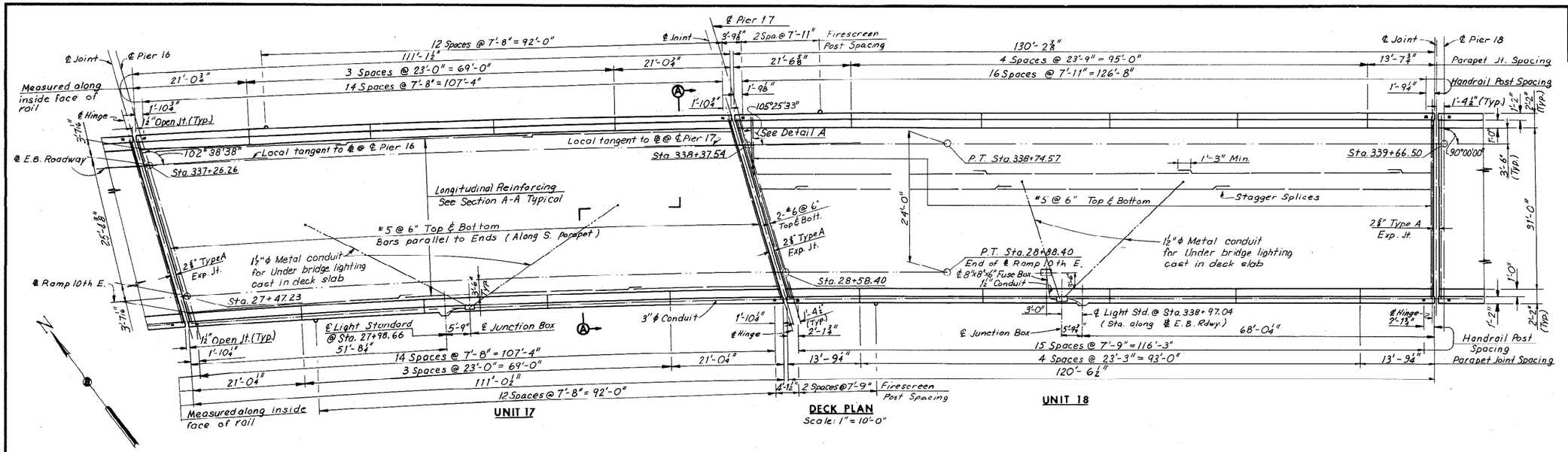
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
DECK PLAN - UNITS 15 AND 16

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

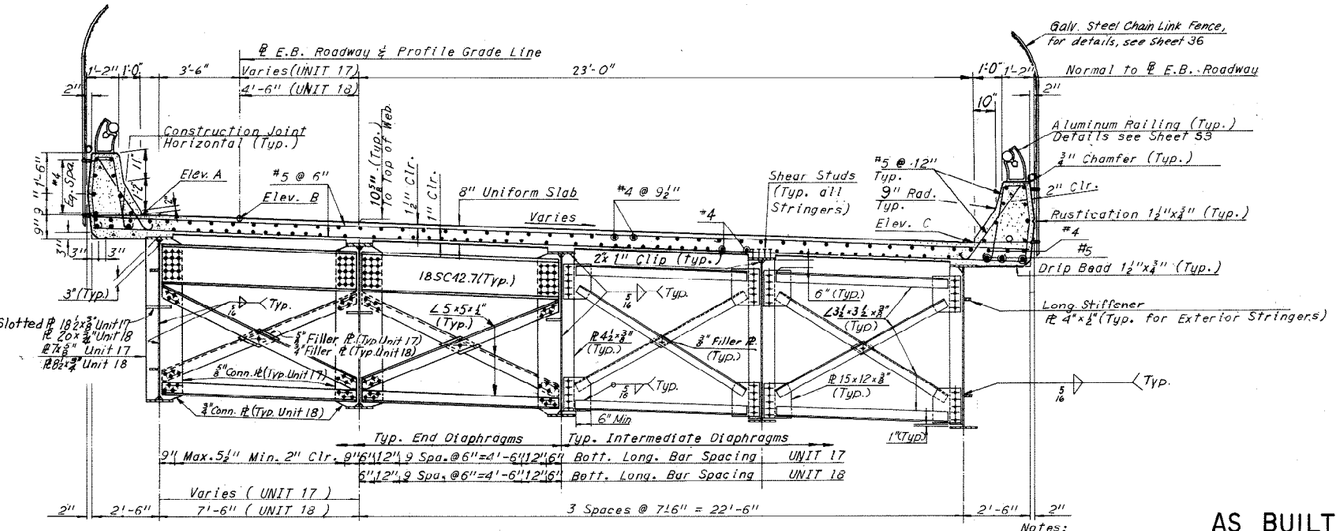
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 31 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	158	265

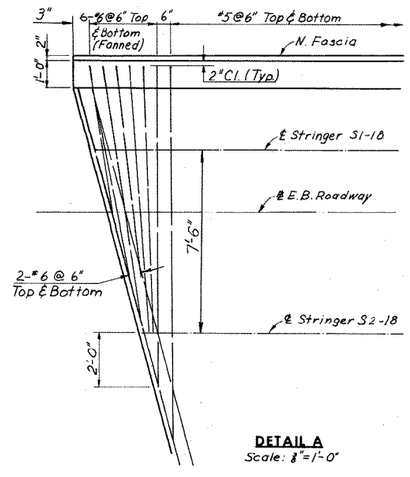


DECK PLAN
Scale: 1" = 10'-0"

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
337+20.00	89.03	88.86	87.44
+25.48	89.08	--	--
+26.26	--	88.91	--
+30.00	89.11	88.94	87.53
+32.60	--	--	87.55
+40.00	89.20	89.03	87.62
+50.00	89.28	89.11	87.71
+60.00	89.36	89.19	87.80
+70.00	89.45	89.28	87.89
+80.00	89.53	89.36	87.98
+90.00	89.62	89.45	88.07
338+00.00	89.70	89.53	88.18
+10.00	89.78	89.61	88.30
+20.00	89.86	89.70	88.43
+30.00	89.93	89.78	88.51
+36.58	89.99	--	--
+37.54	--	89.85	--
+40.00	90.01	89.87	88.71
+45.13	--	--	88.78
+50.00	90.09	89.95	88.85
+60.00	90.17	90.03	88.99
+70.00	90.25	90.12	89.13
+80.00	90.32	90.20	89.26
+90.00	90.40	90.29	89.40
339+00.00	90.48	90.37	89.54
+10.00	90.55	90.45	89.69
+20.00	90.63	90.54	89.83
+30.00	90.70	90.62	89.96
+40.00	90.78	90.71	90.10
+50.00	90.86	90.79	90.24
+60.00	90.94	90.87	90.38
+66.50	90.99	90.93	90.47
+70.00	91.02	90.96	90.52



SECTION A-A
Scale: ⅜" = 1'-0"



DETAIL A
Scale: ⅜"=1'-0"

Notes:

AS BUILT

For Joint Details, see Sheet 38.
For Framing Plan, see Sheet 18.
For Handrail Details, see Sheet 33
For Superstructure Quantities, see Sheet 2.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D.	8-9-68				
CHECKED	R.C.	10-18-68	1	As Built	TEM	8-76
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

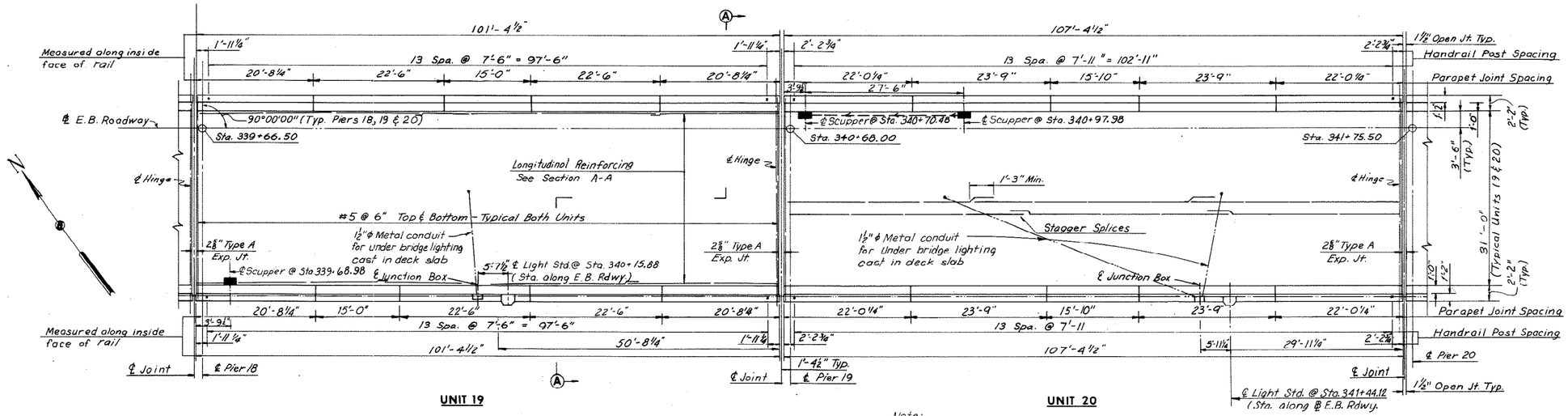
BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.

DECK PLAN – UNITS 17 AND 18

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE:
CONTRACT NO.: 10
SHEET NO. 32 OF 46

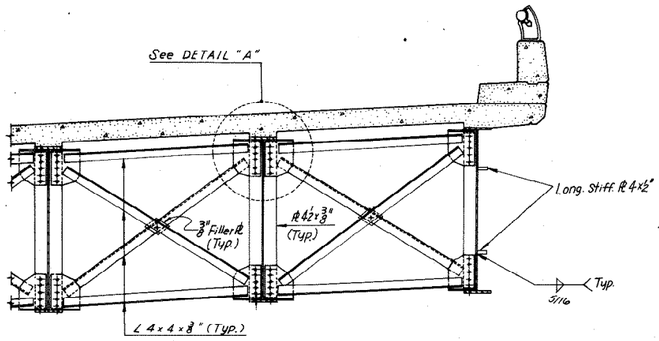
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	159	265



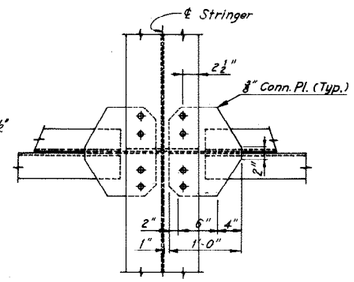
Note: for Standard Drainage details for Unit 19 see Support Type 2 Sheet 55 and for Unit 20 Support Type 7 Sheet 56.

ELEVATION TABLE

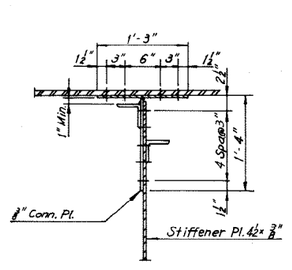
STATION	ELEV. A	ELEV. B	ELEV. C
339+60.00	90.94	90.87	90.38
+66.50	90.99	90.93	90.47
+70.00	91.02	90.96	90.52
+80.00	91.09	91.04	90.65
+90.00	91.17	91.13	90.79
340+00.00	91.24	91.21	90.94
+10.00	91.32	91.29	91.08
+20.00	91.40	91.38	91.22
+30.00	91.47	91.46	91.35
+40.00	91.55	91.55	91.49
+50.00	91.63	91.63	91.63
+60.00	91.71	91.71	91.77
+68.00	91.77	91.78	91.88
+70.00	91.79	91.80	91.91
+80.00	91.86	91.88	92.04
+90.00	91.94	91.97	92.18
341+00.00	92.02	92.05	92.32
+10.00	92.09	92.13	92.47
+20.00	92.17	92.22	92.61
+30.00	92.24	92.30	92.74
+40.00	92.32	92.39	92.87
+50.00	92.40	92.47	92.99
+60.00	92.49	92.55	93.09
+70.00	92.57	92.64	93.19
+75.50	92.61	92.68	93.23
+80.00	92.65	92.72	93.27



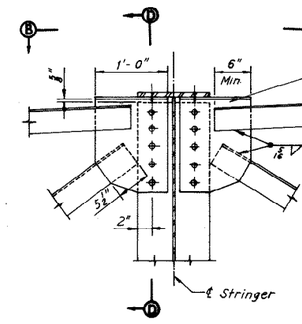
INTERMEDIATE DIAPHRAGM
Scale: ⅜"=1'-0"



VIEW B-B
Scale: 1"=1'-0"



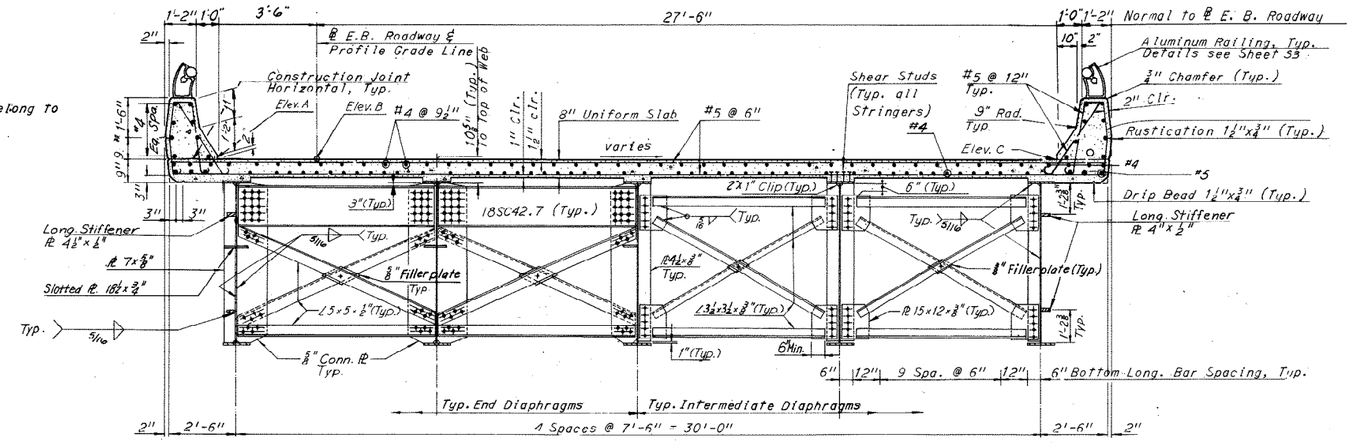
SECTION D-D
Scale: "=1'-0"



DETAIL A
Scale: 1" = 1'-0"

Note: Intermediate Diaphragm Details belong to Units 21 and 22, see Sheet 34

Note: For details of brg. stiffeners, see sheets 19 & 23



SECTION A-A
Scale: ⅜" = 1'-0"

Notes:
For Joint Details, see Sheet 38
For Framing Plan, see Sheet 19.
For Handrail Details, see Sheet 53
For Superstructure quantities, see Sheet 2.

	BY	DATE				
MADE	SHS	8-2-68				
CHECKED	R. C.	10-18-68	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

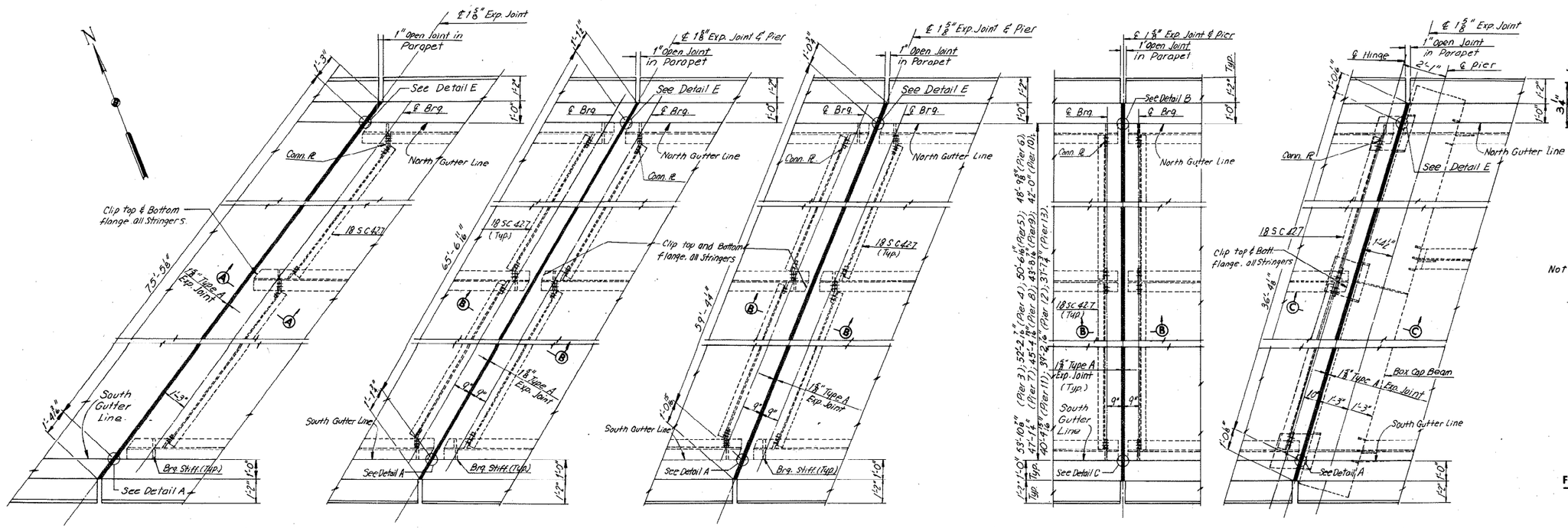
BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.

DECK PLAN-UNITS 19 AND 20

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 33 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	163	265



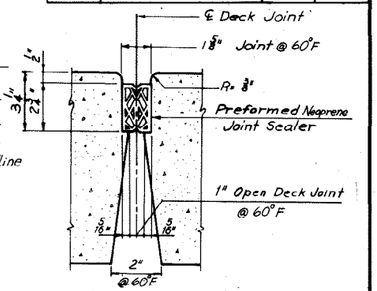
PLAN — JOINT AT WEST ABUTMENT
Scale: ⅜" = 1'-0"

PLAN — JOINT AT PIER 1
Scale: ⅜" = 1'-0"

PLAN — JOINT AT PIER 2
Scale: ⅜" = 1'-0"

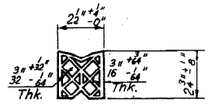
PLAN — JOINT AT PIERS 3 THRU. 13
Scale: ⅜" = 1'-0"

PLAN — JOINT AT PIER 14
Scale: ⅜" = 1'-0"



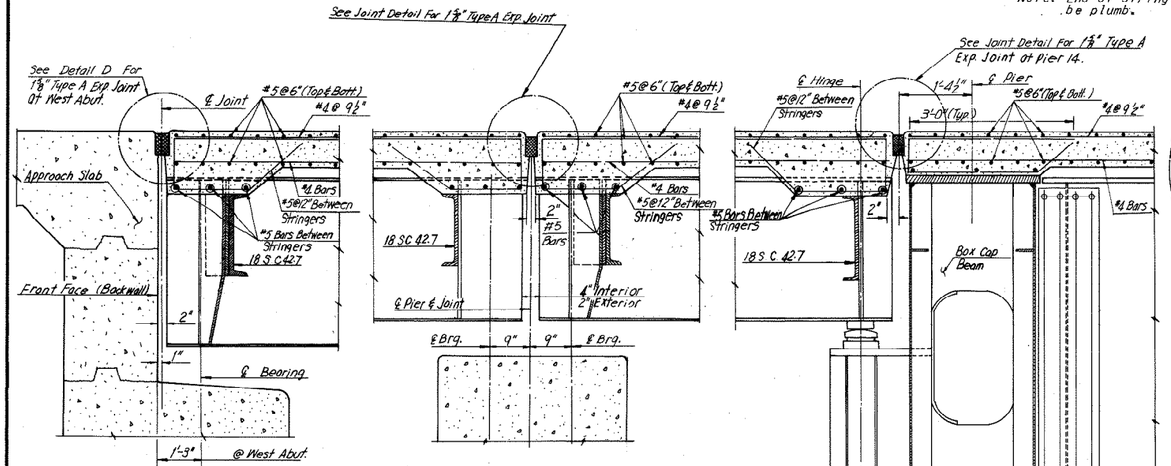
1⅝" TYPE "A" EXPANSION JOINT

Note: For Joint Detail @ Abutment see Detail D.



PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" EXPANSION JOINT

Note: End of stringers and connection ℞'s shall be plumb.



SECTION A-A
Scale: ¾" = 1'-0"

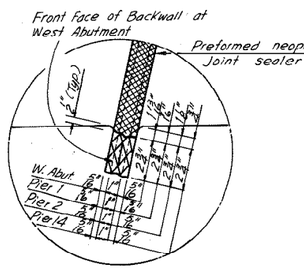
SECTION B-B
Scale: ¾" = 1'-0"

SECTION C-C
Scale: ¾" = 1'-0"

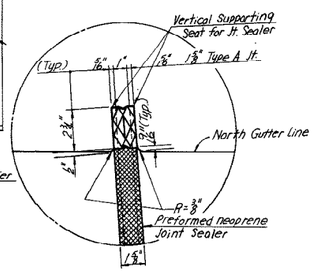
Note: All horizontal dimensions of Sections shown above are normal to ℄ joint and pier.

Note: For details of bearing stiffeners, see Deck Plan Sheets 28,29, & 30.

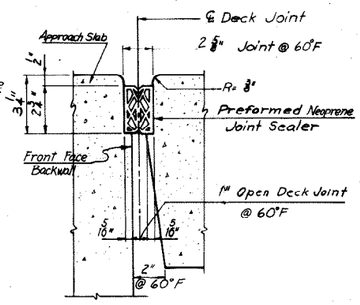
Note: It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of construction.



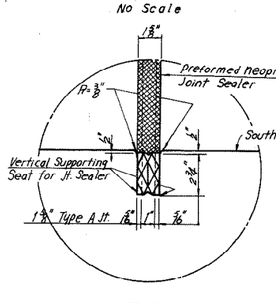
DETAIL A
No Scale



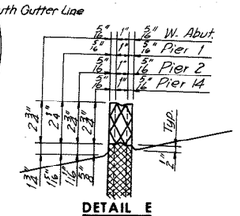
DETAIL B
No Scale
Typical for Piers 3 thru. 13.



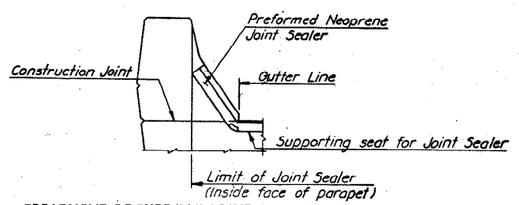
DETAIL D
No Scale



DETAIL C
No Scale
Typical for Piers 3 thru. 13



DETAIL E
No Scale



TREATMENT OF TYPE "A" JOINT AT GUTTER

AS BUILT

	BY	DATE				
MADE	G.S.H.	10-10-68				
CHECKED	C.E.B	2-5-69	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

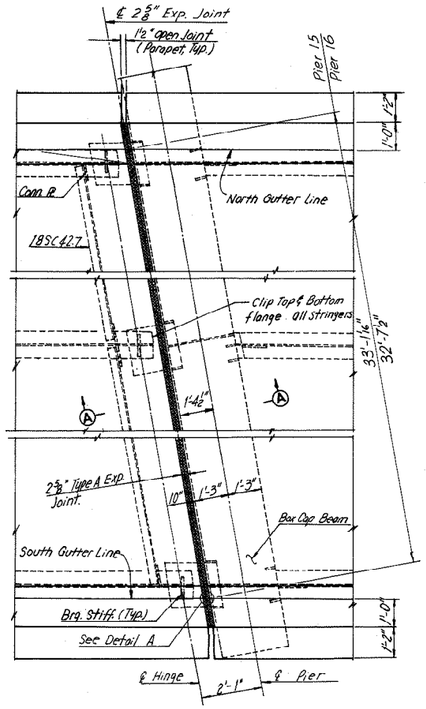
BRIDGE NO. 66
EASTBOUND ROADWAY O\
12TH ST. - R.R. TRACKS AND 161

JOINT DETAILS

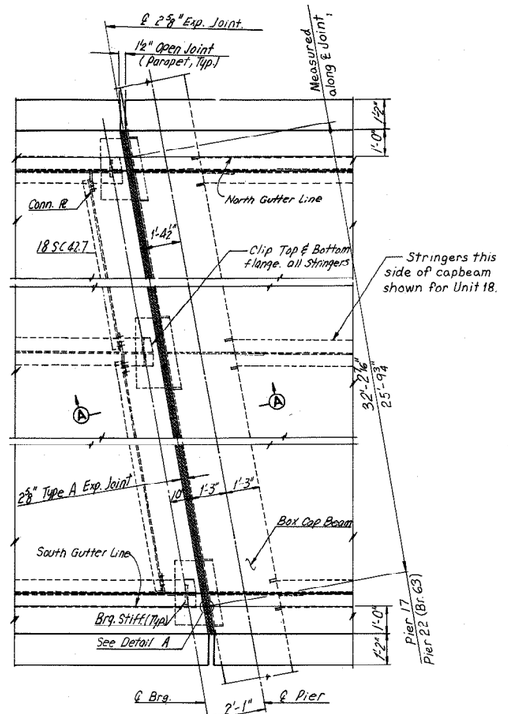
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 37 OF 46

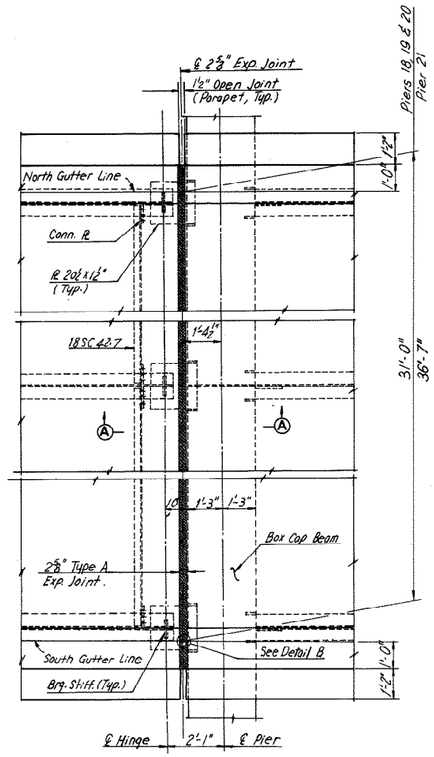
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	164	265



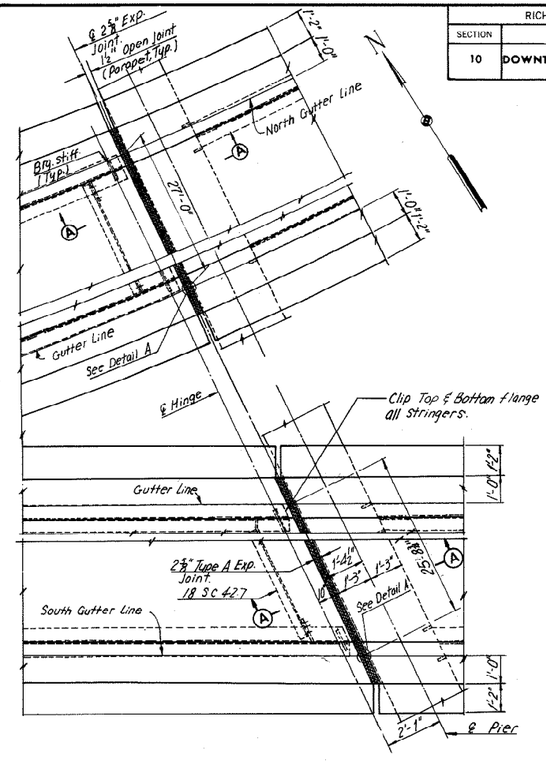
PLAN — JOINT AT PIERS 15 AND 16
Scale ⅜" = 1'-0"



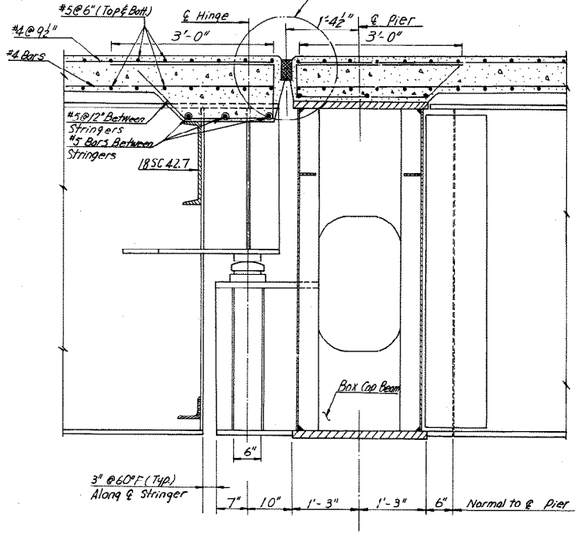
PLAN — JOINT AT PIER 17 AND PIER 22 (BR. 63)
Scale ⅜" = 1'-0"



PLAN — JOINT AT PIERS 18 19 ,20 AND 21 (BRIDGE 63)
Scale ⅜" = 1'-0"



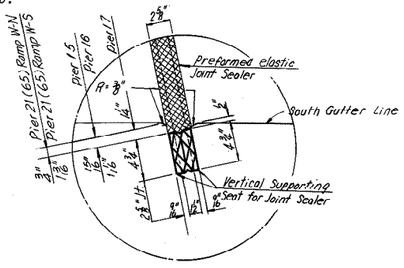
PLAN — JOINT AT PIER 22 (BRIDGE 63)
Scale ⅜" = 1'-0"



SECTION A-A
Scale ⅜" = 1'-0"

Note:
All horizontal dimensions of Section shown above are normal to ℄ joint and pier.

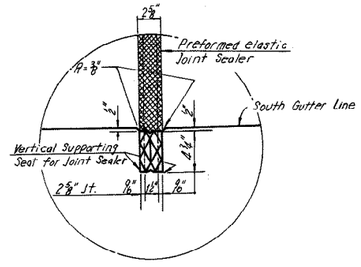
Note:
End of stringers and connection R's shall be plumb.



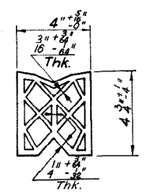
DETAIL A
No Scale
Typical for Piers 15 thru. 17 & Pier 21 (Br. 65)

Note:
For details of bearing stiffeners, see Framing Plan Sheets 17 thru 21.

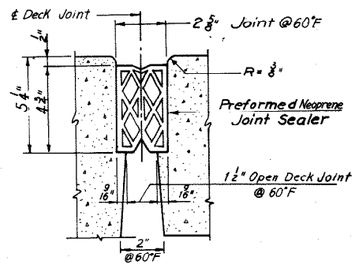
Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of ends of the slab and for the temperature at the time of construction.



DETAIL B
No Scale
Typical for Piers 18 thru 20 & Pier 21 (Br. 63.)

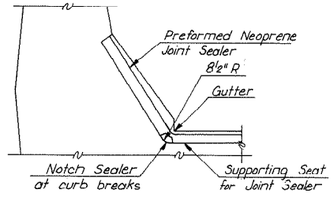


PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" EXPANSION JOINT
No Scale



2⅝" TYPE "A" EXPANSION JOINT
No Scale

Note:
All horizontal dimensions shown above are normal to ℄ Joint.



TREATMENT OF TYPE "A" JOINT AT CURB
No Scale

	BY	DATE				
MADE	G.S.H.	10-15-68				
CHECKED	C.E.B.	2-5-69	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

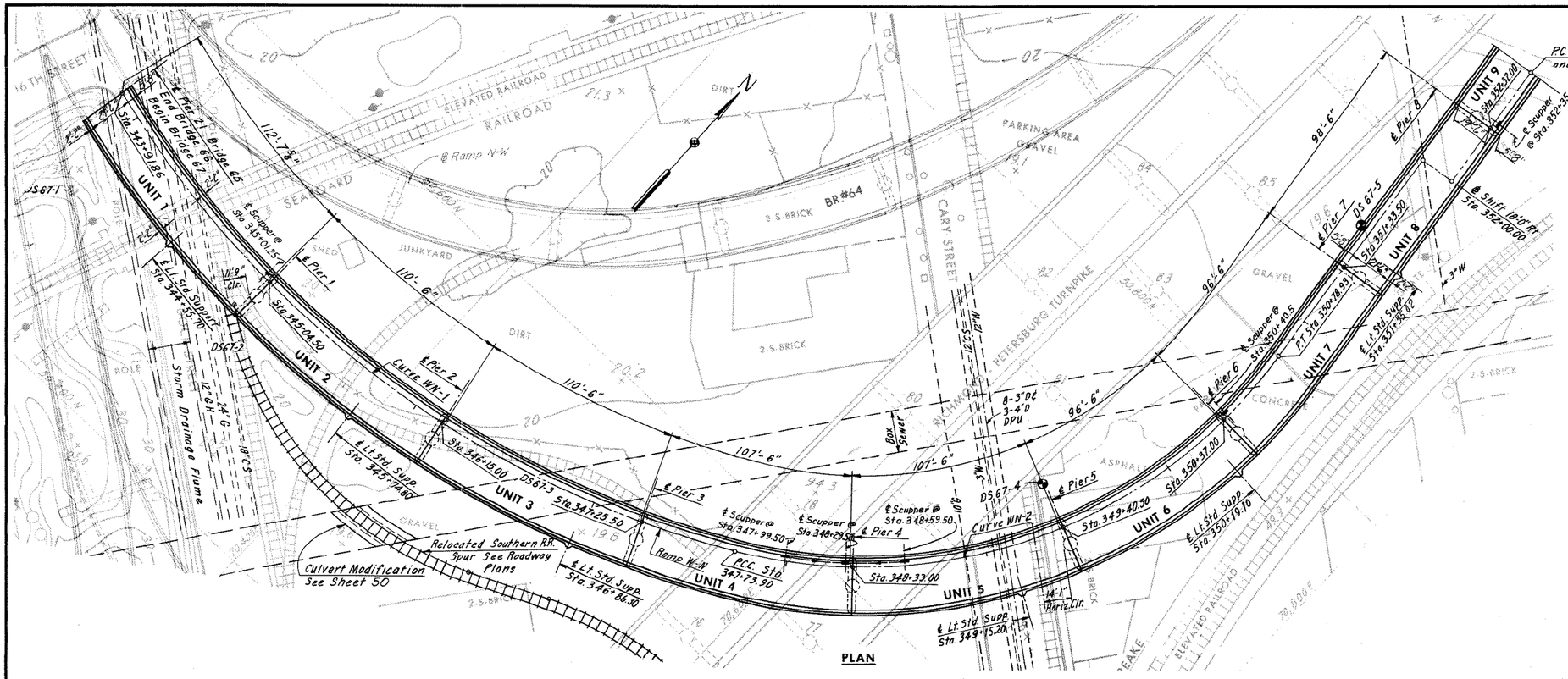
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 38 OF 46

Bridge 67

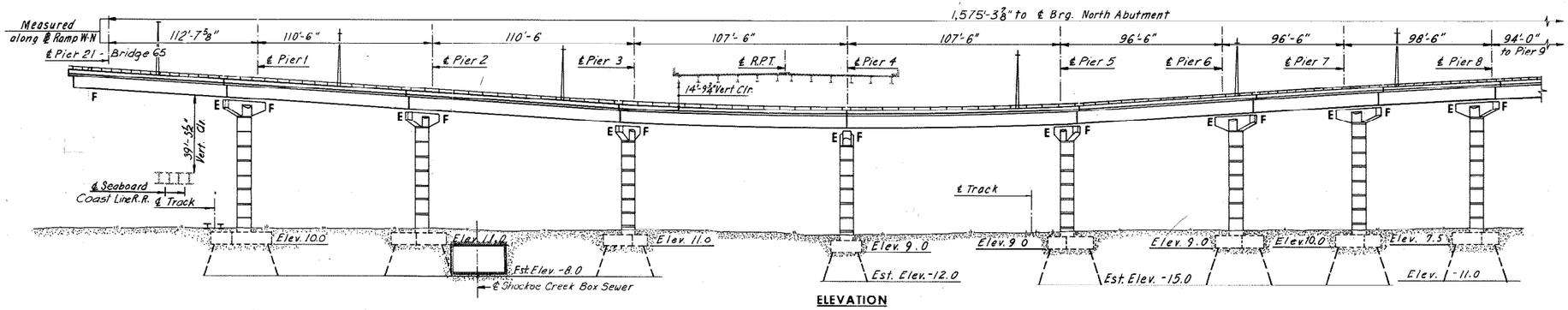
(Ramp from Eastbound Downtown Expressway - Rte. 195 to Northbound I-95 Over Dock Street, East Cary Street, East Main Street and CSX Railroad)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	173	265



PLAN



ELEVATION

INDEX

Note:
For General Notes, see Sheet 4.
For Quantity Table, see Sheet 3

CURVE DATA

℄ R.P.T.

Curve: R.P.T.-1
P.I. = Sta. 1704+68.83
Δ = 15°03'56"
D = 1°00'
T = 757.65'
L = 1,506.56'
R = 5,729.58

Curve: R.P.T.-2
P.I. = Sta. 1723+07.01
Δ = 33°27'07"
D = 4°00'
T = 430.45'
L = 836.30'
R = 1,432.39'

℄ Ramp W-N

Curve: WN-1
P.I. = Sta. 345+25.47
Δ = 64°53'49"
D = 11°27'33"
T = 317.90'
L = 566.33'
R = 500.00

Curve: WN-2
P.I. = Sta. 349+47.64
Δ = 68°32'15"
D = 22°28'08"
T = 173.75'
L = 305.03'
R = 255.00'

Curve: WN-3
P.I. = Sta. 353+19.15
Δ = 6°23'54"
D = 6°00'
T = 53.38'
L = 106.64'
R = 954.93'

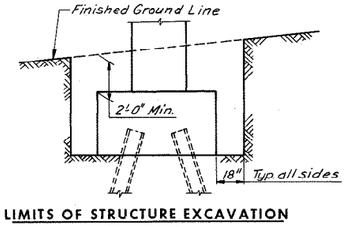
Curve: WN-4
P.I. = Sta 355+39.85
Δ = 5°01'11"
D = 1°30'
T = 167.43'
L = 334.65'
R = 3,819.72'

Curve: WN-5
P.I. = Sta. 358+17.39
Δ = 13°10'51"
D = 6°00'
T = 110.33'
L = 219.68'
R = 954.93'

Curve: WN-6
P.I. = Sta. 361+67.68
Δ = 19° 35' 06"
D = 4° 09' 03"
T = 238.25'
L = 471.85'
R = 1,380.39'

℄ Ramp N-W

Curve: NW-1
P.I. = Sta. 13+42.50
Δ = 32° 01' 34"
D = 3° 51' 36"
T = 426.01'
L = 829.72'
R = 1,484.39



LIMITS OF STRUCTURE EXCAVATION
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	3-5-69	3	As Built	TEM	6-77
CHECKED	KCT	5-12-69	2	Light Sta. Location Unit 3	JLK	6-6-75
IN CHARGE			1	Sheets 47 & 48 added	LBP	3-5-75

AS BUILT

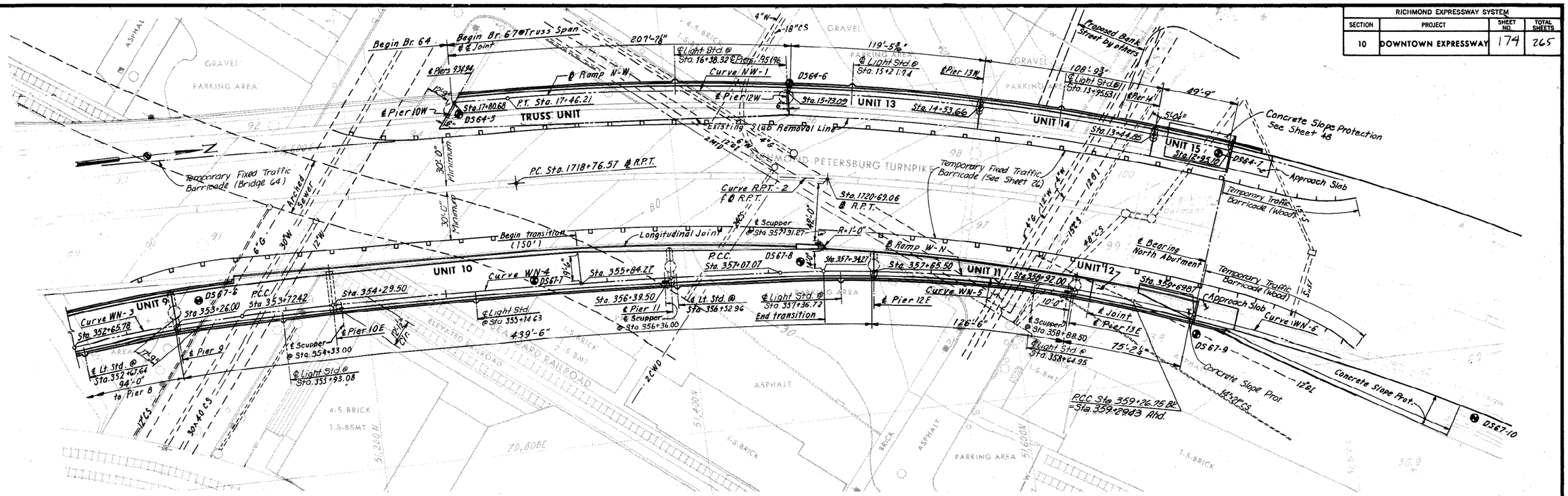
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

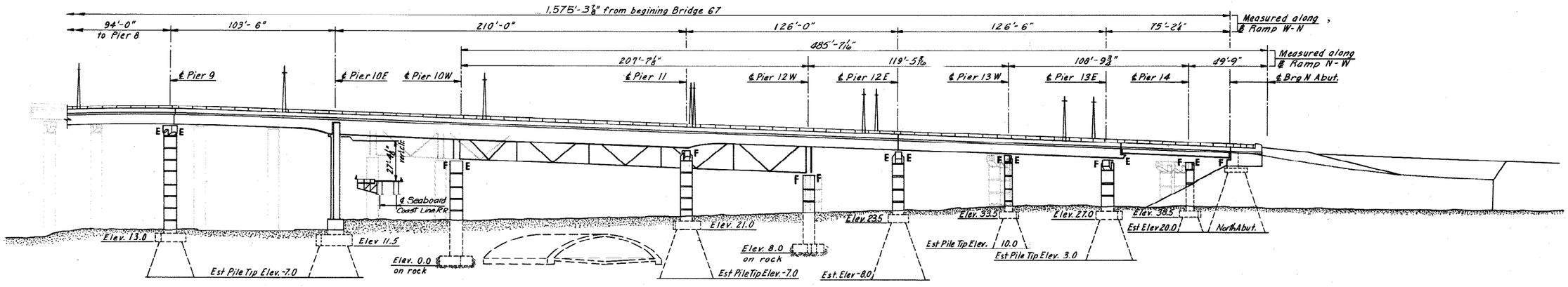
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 30'-0"
CONTRACT NO.: 10
SHEET NO. 1 OF 54

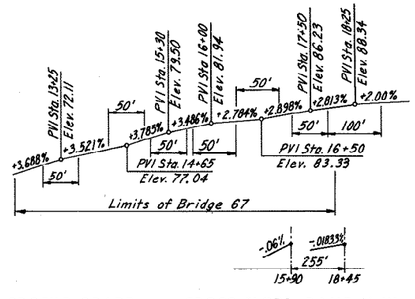
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	174	265



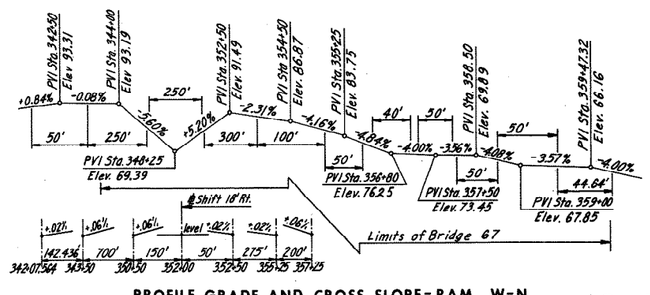
PLAN
Scale: 1"=30'-0"



ELEVATION
Scale: 1"=30'-0"



PROFILE GRADE CROSS SLOPE - RAMP N-W



PROFILE GRADE AND CROSS SLOPE - RAM W-N

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	12-30-68	2	'As Built	TEM	6-77
CHECKED	KCT	5-12-69	⚠	Revised Piers 9 & 11 Sta. & Seam Length	DMB	12-8-75
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

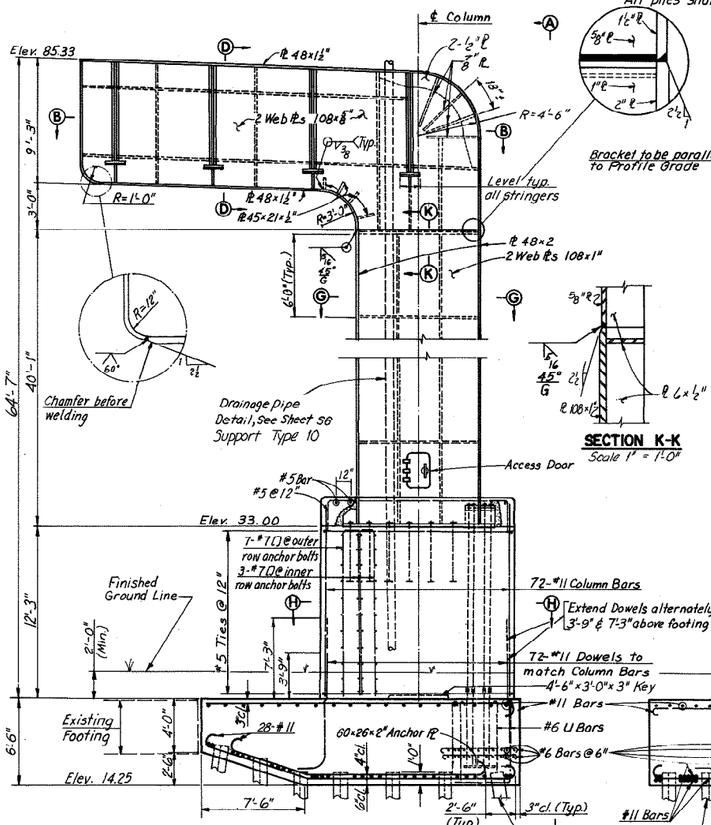
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 2 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	183	265

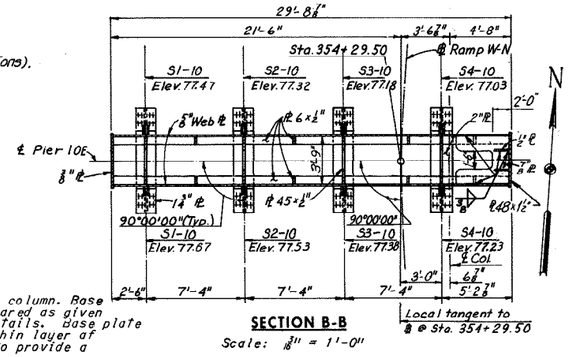
Note:
All steel shall be A36 except otherwise shown.
Pile Tip Elev. -7.00
Batter exterior piles 2" per foot in direction shown.
All piles shall be 12BP53 Steel Piles (Design Cap. = 57 Tons).



ELEVATION
Scale: 3/16" = 1'-0"

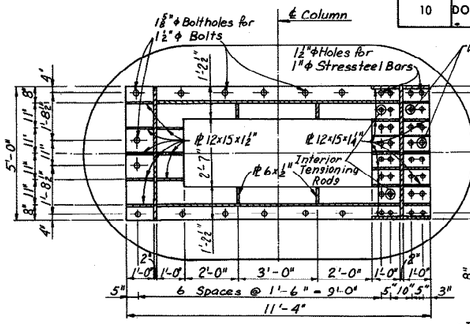
VIEW A-A
Scale: 3/16" = 1'-0"

SECTION K-K
Scale 1" = 1'-0"

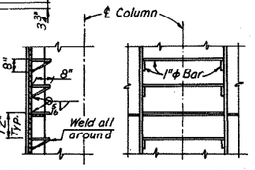


SECTION B-B
Scale: 3/32" = 1'-0"

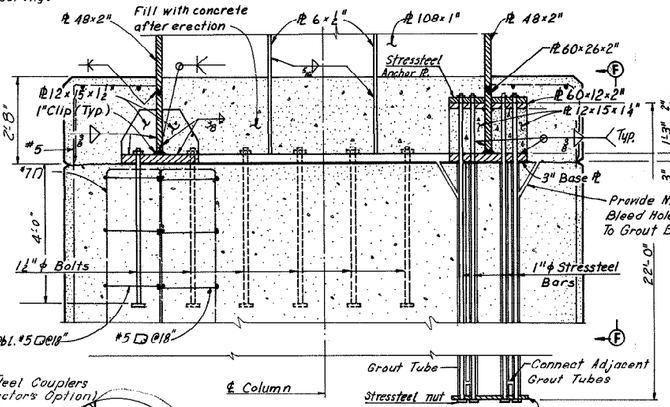
Note:
Concrete under column. Base plate shall be prepared as given in standard shoe details. Base plate shall be set on a thin layer of dry cement powder to provide a uniform bearing.



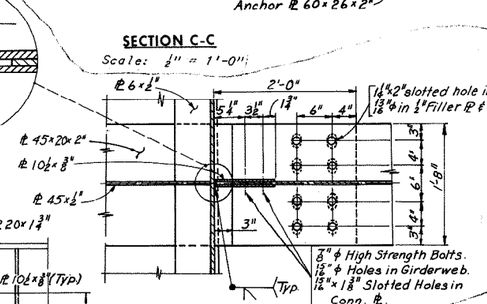
PLAN OF COLUMN BASE PLATE
Scale: 3/8" = 1'-0"



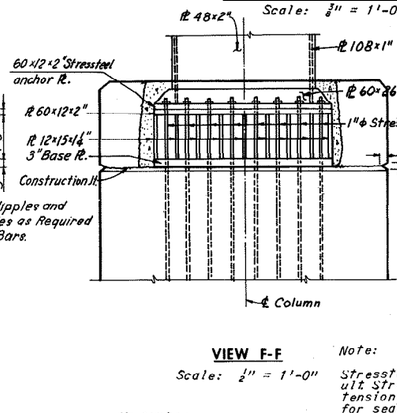
SECTION E-E SECTION J-J
Scale: 3/8"=1'-0"



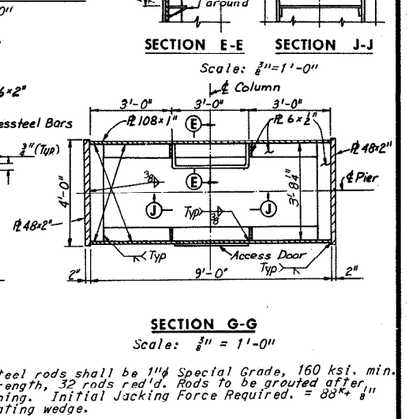
SECTION C-C
Scale: ½" = 1'-0"



SECTION 1-1
Scale: 1"=1'-0"



VIEW F-F
Scale: ½" = 1'-0"



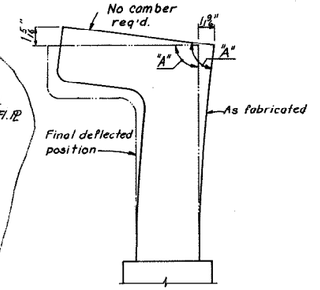
SECTION G-G
Scale: 3/8" = 1'-0"

Note:
Stressteel rods shall be 1"ϕ Special Grade, 160 ksi. min. ult Strength, 32 rods req'd. Rods to be grouted after tensioning. Initial Jacking Force Required. = 88^k @ 1" for sealing wedge.

Rods shall be tensioned as outlined in the construction sequence. Rods need not be tensioned in pairs, However, tensioning shall proceed outward from the centerline of Pier 10.

Rods of the first group shall be checked in the same sequence as initial tensioning, checking shall continue until two successive 1"ϕ rods checked have a tension of at least 80^k.

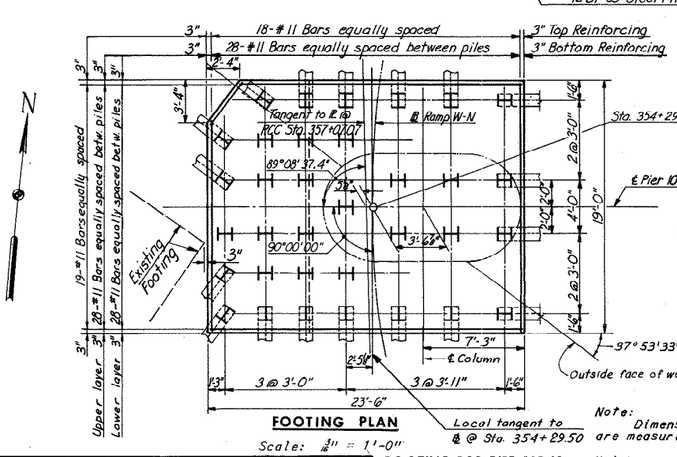
The contractor is cautioned against nicking the stress rods and he shall follow the manufacturers recommended handling procedures The contractor shall provide adequate safety measures. The contractor shall submit his proposed construction procedures to the engineer for approval.



CAMBERING OF COLUMN
No Scale

GENERAL CONSTRUCTION SEQUENCE:

1. Construct footing and pedestal including 32-1"ϕ stressteel bars.
2. Erect column and capbeam. Tighten down nuts on 1¼"ϕ anchor bolts. Stress 12 interior tensioning rods.
3. Erect structural steel superstructure in such a manner that load eccentricity on the column is kept at a minimum.
4. Stress 12 exterior tensioning rods.
5. Place concrete deck.
6. Stress remaining 8 tensioning rods.
7. Check tension on initial group of rods.
8. Cutoff rod extension. Fill column base with concrete, grout and encase base and anchorage with concrete.

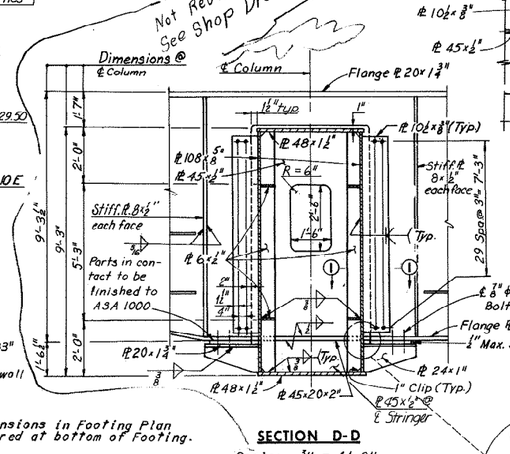


FOOTING PLAN
Scale: 3/32" = 1'-0"

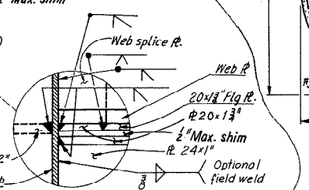
FOOTING FOR PIER 10E IS ECCENTRIC AS SHOWN ON FOOTING PLAN

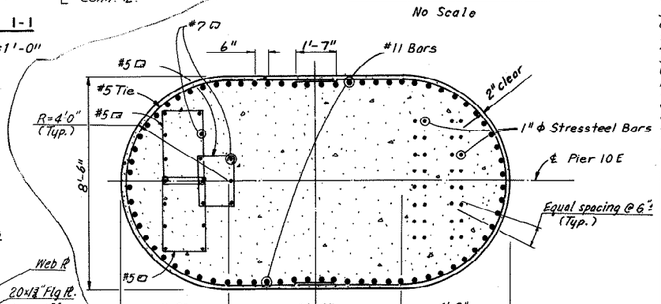
Note:
Dimensions in Footing Plan are measured at bottom of Footing.

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.



SECTION D-D
Scale: ⅜" = 1'-0"





SECTION H-H
Scale: ⅜" = 1'-0"

	BY	DATE
MADE	J.D.	3-11-69
CHECKED	PTA	4-24-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	As Built	TEM	6-77
2	Fig. Plan & Elev. Changed	R.B.P.	7-23-75
1	Changed Dim. Sect. H-H Elev. Sect. B-B	RKJ	1-24-75

AS BUILT

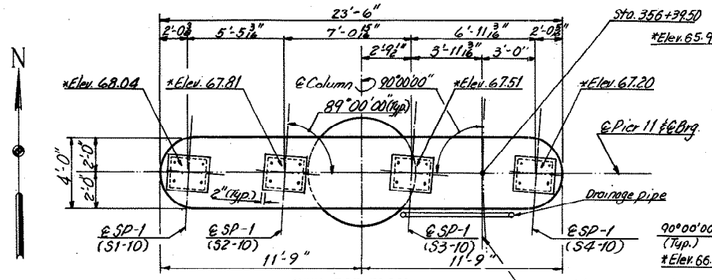
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
PIER 10 E

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

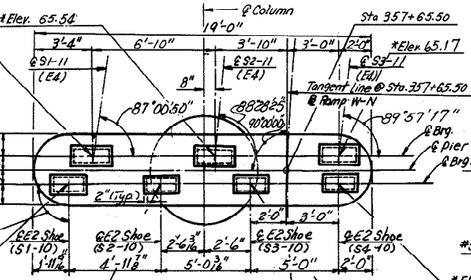
SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 11 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	184	265

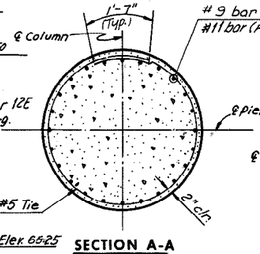


PIER CAP PLAN
Scale : 1/4" = 1'-0"

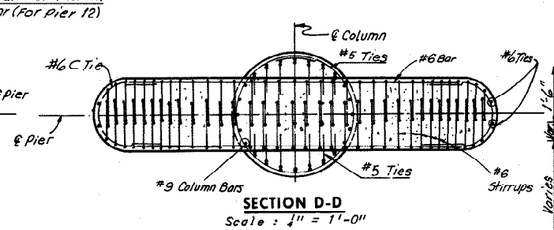
* Denoted top elevations of pad.



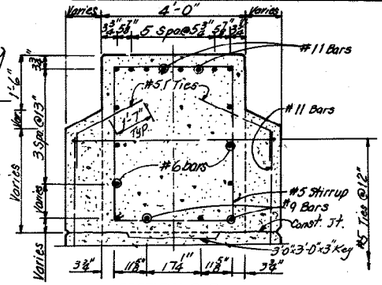
PIER CAP PLAN
Scale : 1/4" = 1'-0"



SECTION A-A
Scale : 3/8" = 1'-0"

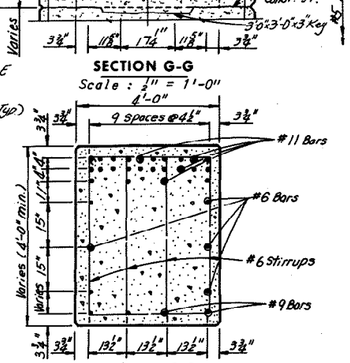


SECTION D-D
Scale : 1/4" = 1'-0"

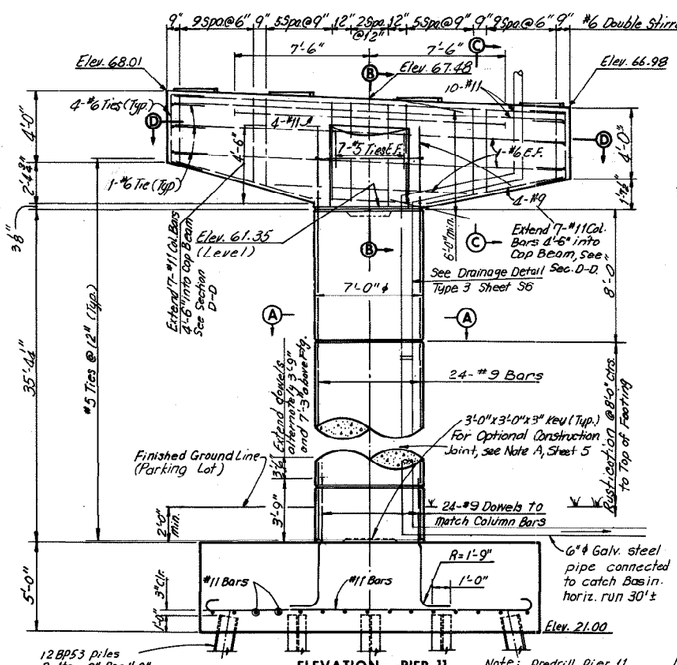


SECTION G-G
Scale : 1/2" = 1'-0"

SECTION E-E
Scale : 1/4" = 1'-0"

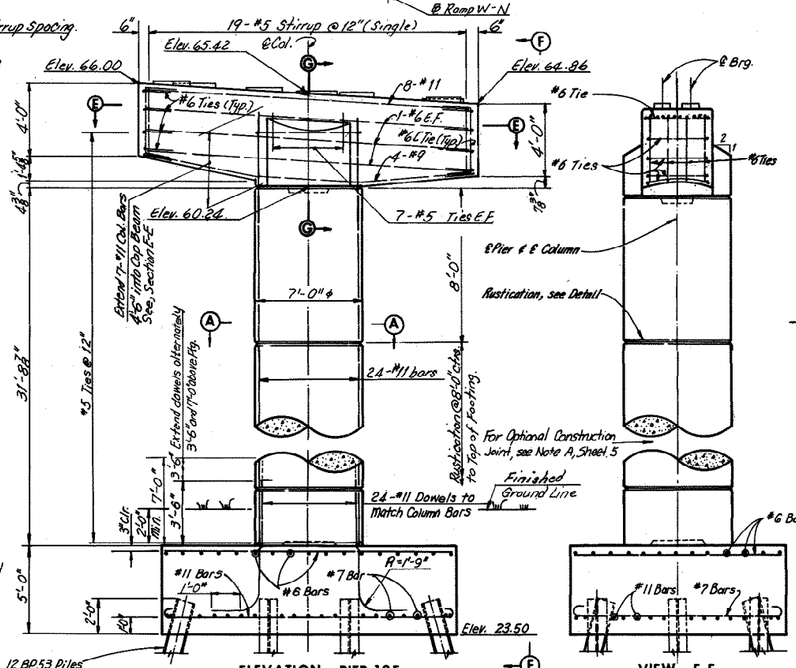


SECTION C-C
Scale : 1/2" = 1'-0"



ELEVATION—PIER 11
Scale : 1/4" = 1'-0"

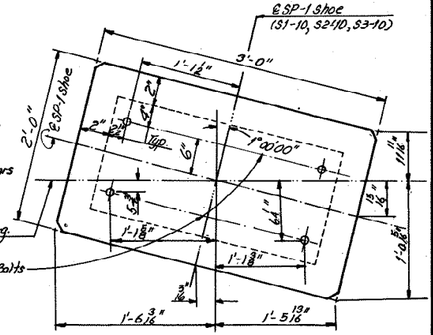
Note: Predrill Pier 11 all Piles to Elev. 5'-0" below P.L. Arch Sewer



ELEVATION—PIER 12E
Scale : 1/4" = 1'-0"

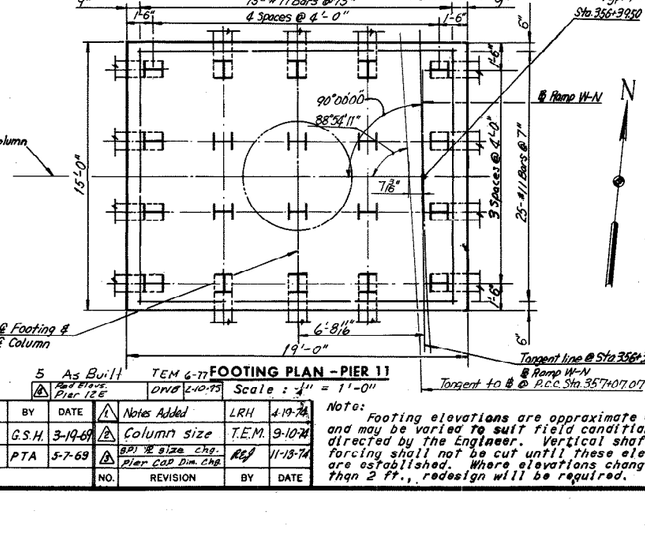
VIEW F-F
Scale : 1/4" = 1'-0"

SECTION B-B
Scale: 1/4" = 1'-0"

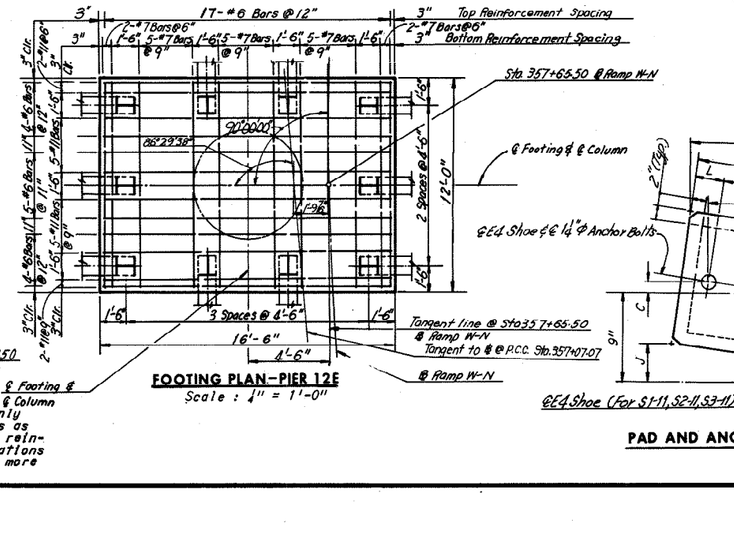


PAD AND ANCHOR BOLT SETTING PLAN
No Scale

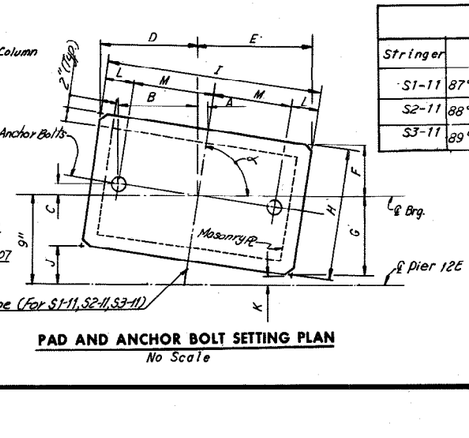
Notes:
For Standard Shoe Details, see Sheets S1 and S2
For Framing Plan, see Sheets 26 and 27
For Quantities of Steel and Concrete, see Sheet 2
All piles shall be 12BP53 Steel piles
(Design Capacity = 57 Tons)
Estimated pile tip elevation: Pier 11 = -5.0 ft.
Pier 12E = -8.0 ft.



FOOTING PLAN—PIER 11
Scale : 1/4" = 1'-0"



FOOTING PLAN—PIER 12E
Scale : 1/4" = 1'-0"



PAD AND ANCHOR BOLT SETTING PLAN
No Scale

DIMENSIONS FOR PAD AND ANCHOR BOLT SETTING PLAN

Stringer	∝	A	B	C	D	E	F	G	H	I	J	K	L	M
S1-11	87°00'50"	⅜"	10½"	⅜"	1'-2⅜"	1'-2⅜"	5½"	7"	1'-0½"	2'-5"	3½"	2"	4"	10½"
S2-11	88°28'25"	⅛"	10½"	¼"	1'-2⅛"	1'-2⅛"	5⅞"	6⅞"	1'-0½"	2'-5"	3½"	2⅜"	4"	10½"
S3-11	89°57'17"	0"	10½"	0"	1'-2½"	1'-2½"	6¼"	6¼"	1'-0½"	2'-5"	2⅜"	2⅜"	4"	10½"

	BY	DATE
MADE	G.S.H.	3-19-69
CHECKED	PTA	5-7-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Notes Added	LRH	4-19-74
2	Column size	T.E.M.	9-10-74
3	BP1 'R' size chg. Pier Cap Dim. Chg.	REV	11-13-74

5 As Built TEM 6-77
4 Pad Elevs. Pier 12E DWD 2-10-75

Note: Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

AS BUILT

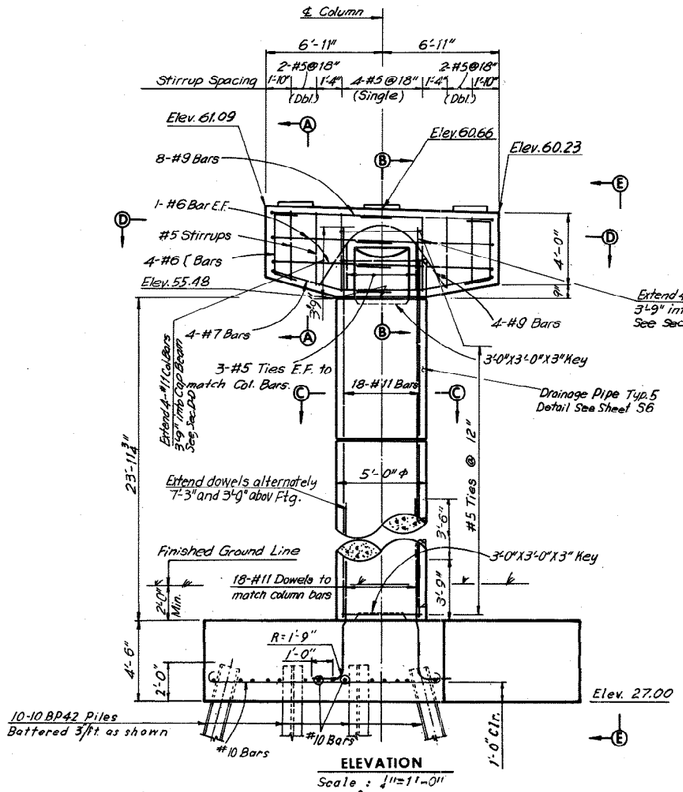
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
PIERS 11 AND 12E

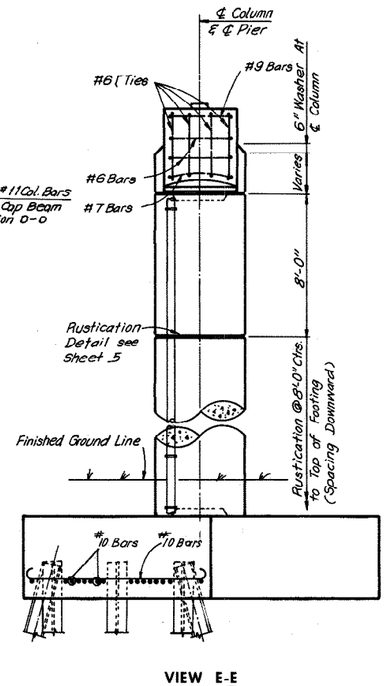
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS Noted
CONTRACT NO.: 10
SHEET NO. 12 OF 54

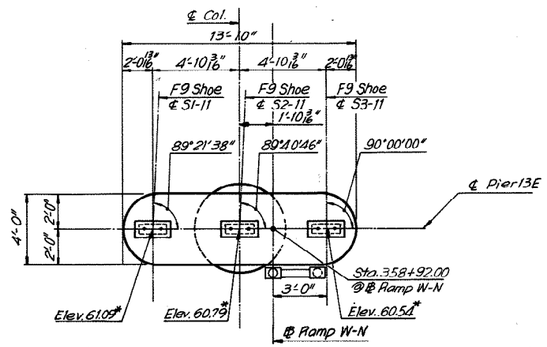
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	185	265



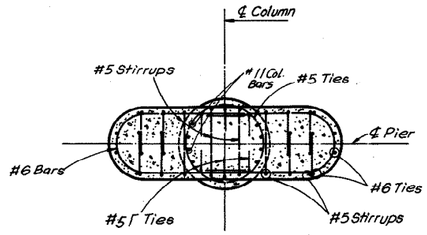
ELEVATION
Scale : 1/4"=1'-0"



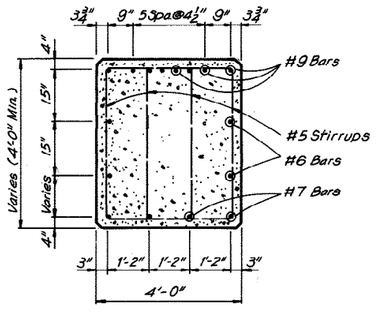
VIEW E-E
Scale : 1/4"=1'-0"



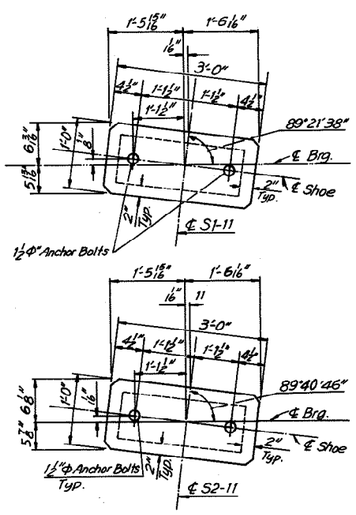
PLAN
Scale : 1/4"=1'-0"
*Denotes Elevations of Top Pad.



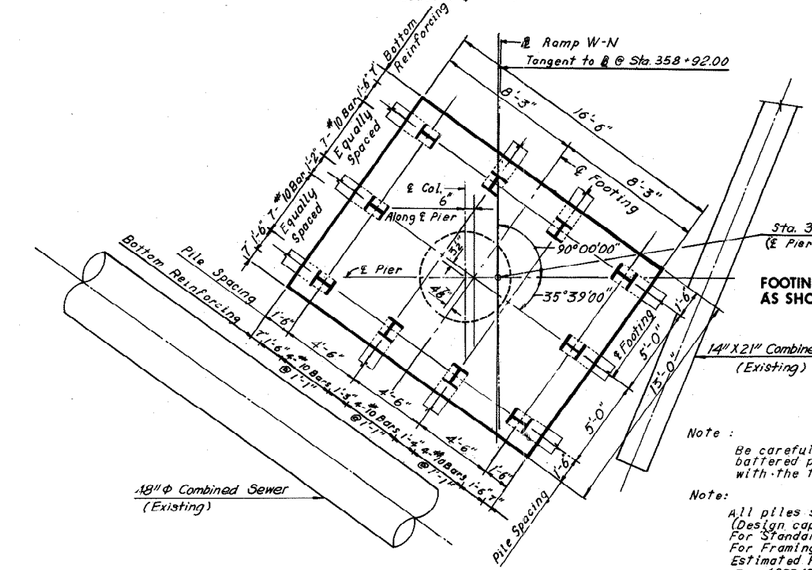
SECTION D-D
Scale : 1/4"=1'-0"



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



PAD AND ANCHOR BOLT SETTING PLAN
No Scale



FOOTING PLAN
Scale : 1/4"=1'-0"

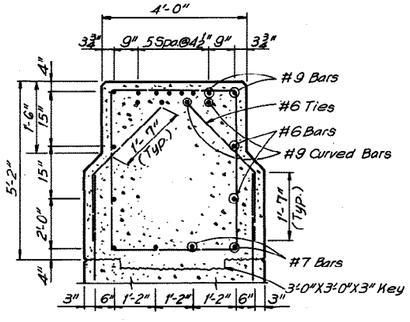
FOOTING FOR PIER 13E IS ECCENTRIC AS SHOWN ON FOOTING PLAN

14" X 21" Combined Sewer (Existing)

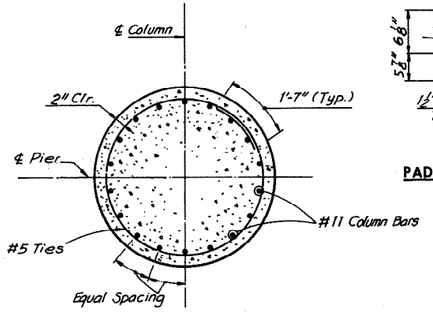
Note :
Be careful to avoid interference of battered piles and footing excavations with the two existing combined sewers.

Note:
All piles shall be 10BP42 Steel Piles (Design capacity = 45 tons.)
For Standard Shoe Details, see Sheet
For Framing Plans, see Sheets 26 & 27.
Estimated Pile tip elevation. 30
For 10BP42 Steel Piles details, see Sheet 5.

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft. redesign will be required.



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



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

	BY	DATE	NO.	REVISION	BY	DATE
MADE	SCC	2.19.69	2	As Built	TEM	6-77
CHECKED	GSH	2.19.69	1	Pad Elevations	D.W.S	2-10-75
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

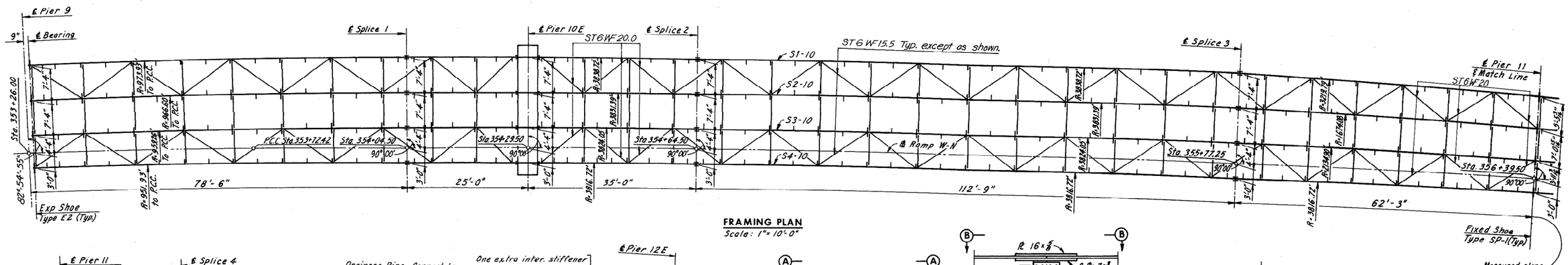
PIER 13E

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

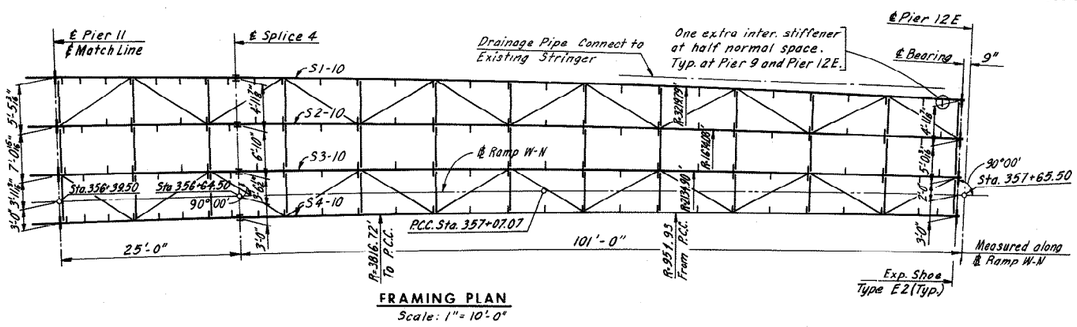
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 13 OF 54

SHOE SCHEDULE			
EXP. SHOE		FIXED SHOE	
TYPE	NO.	TYPE	NO.
E2	8	SP-1	4

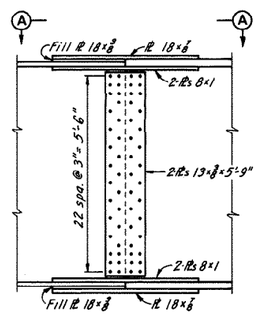
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	196	265



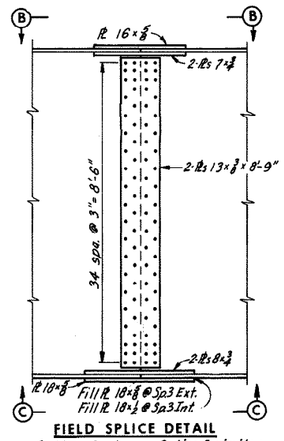
FRAMING PLAN
Scale: 1"= 10'-0"



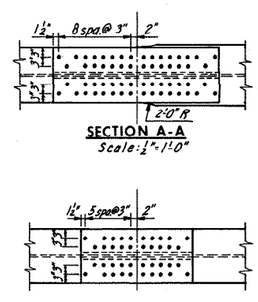
FRAMING PLAN
Scale: 1"= 10'-0"



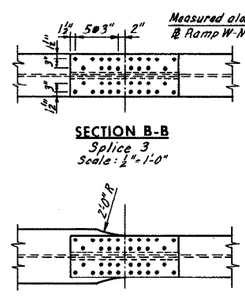
FIELD SPLICE DETAIL
Splice 1 Shown : Splice 4 similar
Scale: ½"=1'-0"



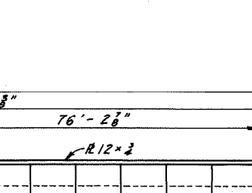
FIELD SPLICE DETAIL
Splice 2 shown; Splice 3 similar
Scale: ½"= 1'-0"



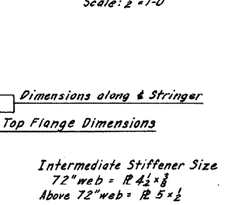
SECTION A-A
Scale: ½"= 1'-0"



SECTION B-B
Splice 3
Scale: ½"= 1'-0"

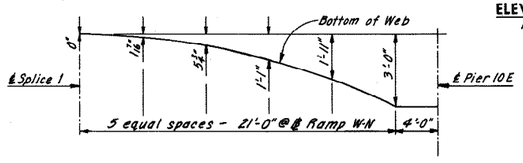


SECTION C-C
Scale: ½"= 1'-0"

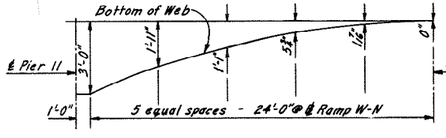


SECTION B-B
Splice 2
Scale: ½"= 1'-0"

ELEVATION S1-10
No Scale



HAUNCH DETAIL
No Scale



HAUNCH DETAIL
No Scale

Notes:
For Deck Plan, see Sheet 34.
For Shoe Details, see Sheet 52.
For Details of Intermediate Diaphragms, see Sheet 23.
For Details of End Diaphragms, see Section D-D Sheet 33.
For Details of Lateral Bracing, see Sheet 23.
All steel is A36 unless otherwise noted.
For Joint Details, see Sheet 49.
For Web to Flange Weld, see Note, Sheet 20.

	BY	DATE		NOTE ADDED	LRH	4-19-74
MADE	AMH	2-2869	2	As Built	TEM	6-77
CHECKED	JD	4-26-69				
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

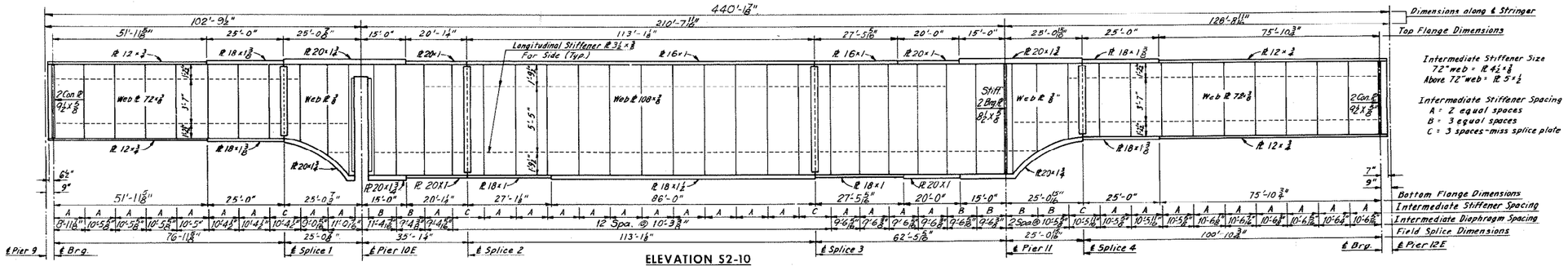
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
FRAMING PLAN - UNIT 10

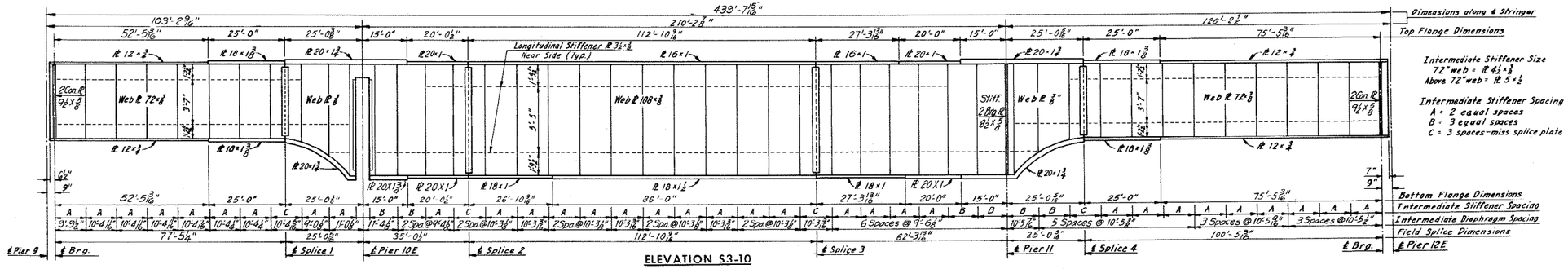
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 24 OF 54

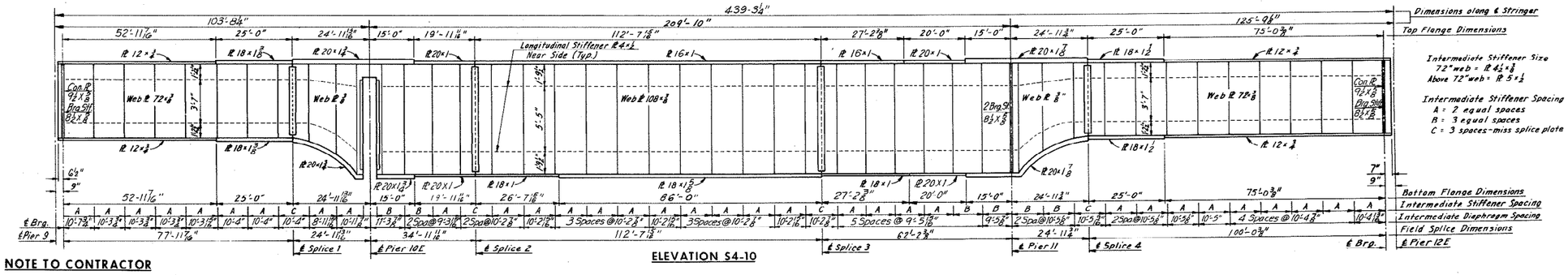
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	197	265



ELEVATION S2-10



ELEVATION S3-10



ELEVATION S4-10

STRINGER	ELEV. A	ELEV. B	ELEV. C	ELEV. D	ELEV. E	ELEV. F
S1-10	88.50	87.37	85.60	80.87	76.81	72.72
S2-10	88.35	87.23	85.46	80.65	76.57	72.42
S3-10	88.21	87.08	85.31	80.43	76.24	72.12
S4-10	88.06	86.93	85.16	80.20	75.93	71.82

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

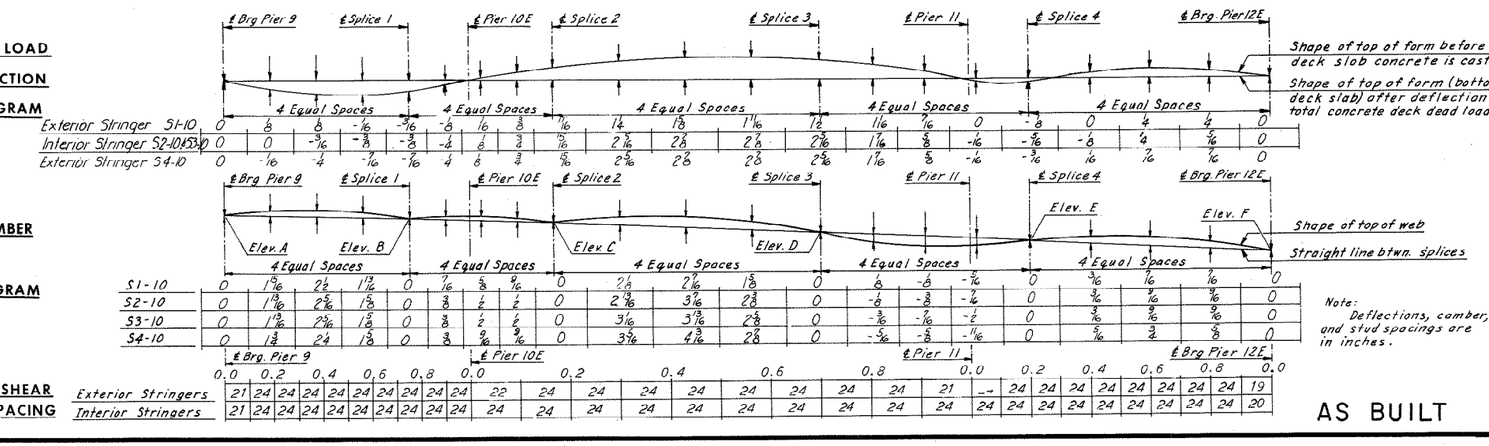
In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.

NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.

If stringers are not cambered distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in Cross-Section on Sheet



Note:
For Deck Plan, see Sheet 34.
All Steel shall be A36 unless otherwise noted.
For Details not shown, see Section D-D, sheet 11 and Detail C, sheet 33.
For Web to Flange Weld size, see Note, Sheet 20.

Note:
Deflections, camber, and stud spacings are in inches.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	2-28-69	2	As Built	TEM	6-77
CHECKED	JD	4-29-69				
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

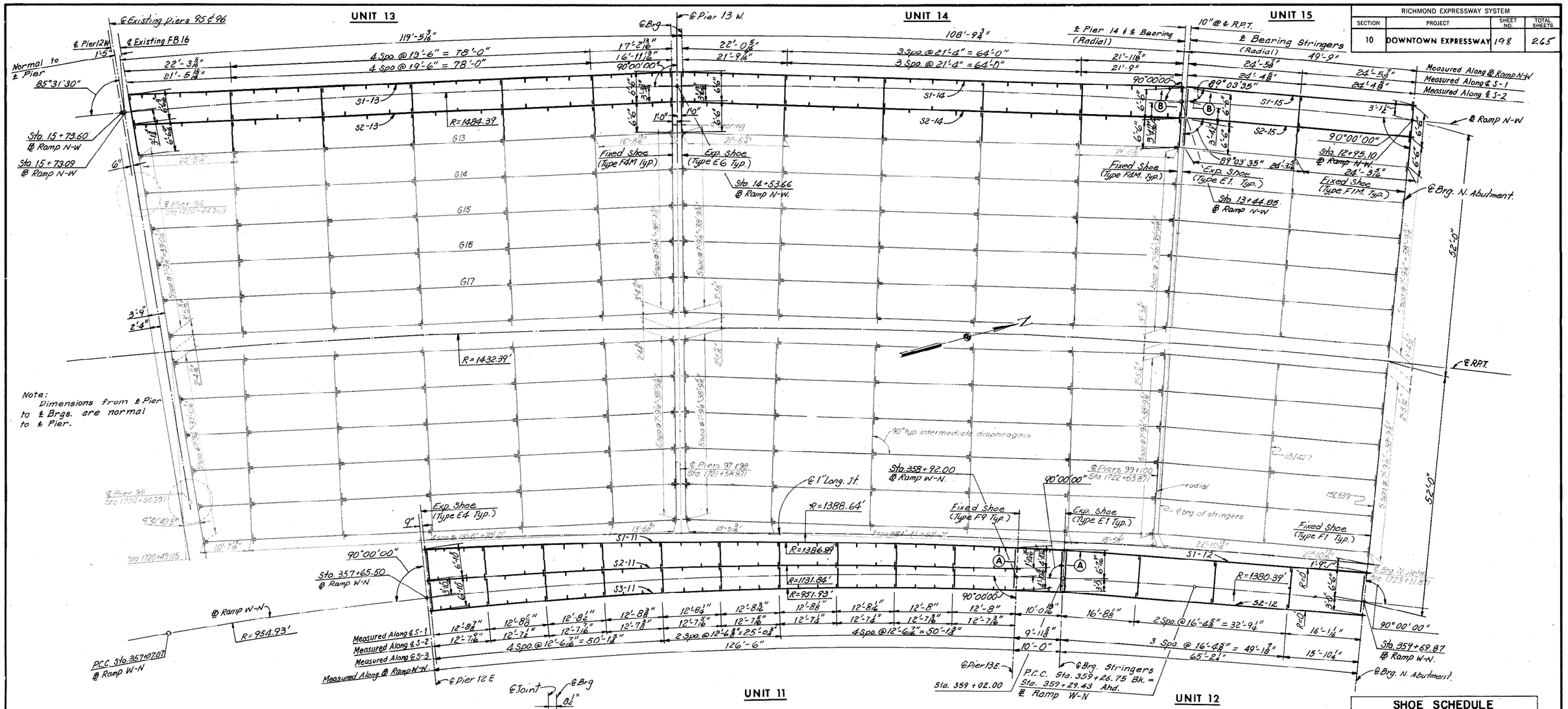
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

GIRDER ELEVATIONS - UNIT 10

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: No Scale
CONTRACT NO.: 10
SHEET NO. 25 OF 54

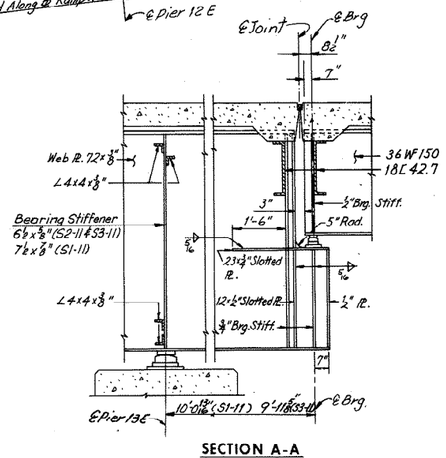
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	198	265



Note:
For Stringer Elevation, see Sheet 27.
For Stringer Schedule, see Sheet 27.
For Camber Schedule, see Sheet 27.
For FB 16 Details, see Sheet 28.
For Deck Plan, see Sheet 35.
For Shoe Details, see Sheets S1 & S2.

Note:
Dimensions shown on the plans for existing structural metalwork are in accordance with drawings prepared for the original construction. The Contractor shall verify all necessary dimensions of existing structural metalwork prior to fabrication of new metalwork.
New Diaphragms are to match Existing Diaphragms, in Units 13, 14 and 15.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	Y.C.P. Q.C.C.	2-24-69	1	Framing Revised Units 12, 13, 14, 15	RLJ	12-5-74
CHECKED	K.C.T.	4-2669	2	P.C.C. & WN	DWB	12-11-74
IN CHARGE			3	As Built	TEM	6-77



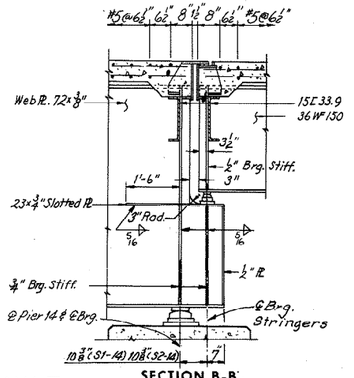
SECTION A-A
Scale: ½" = 1'-0"

UNIT 11

FRAMING PLAN
Scale: 1" = 10'-0"

Note:
Intermediate stiffener Pls. 4 x ⅜" shall be equally spaces between diaphragms as shown. The first two stiffener spaces at the end of stringers shall be one-half the normal spacing within the panel.

UNIT 12



SECTION B-B
Scale: ½" = 1'-0"

AS BUILT

SHOE SCHEDULE			
FIXED SHOES		EXPANSION SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
F1	2	E1	4
F1M	2	E4	3
F4M	4	E6	2
F9	3	-	-

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

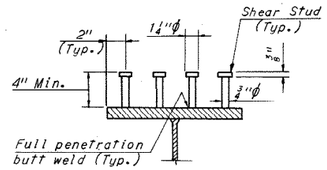
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

FRAMING PLAN – UNITS 11, 12, 13, 14 AND 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 26 OF 54

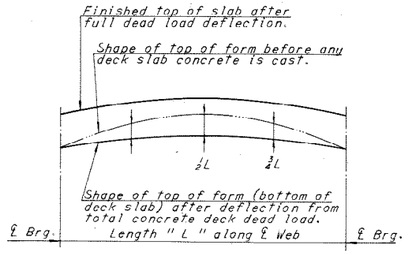
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	199	265



SHEAR STUD DETAIL
No Scale

SHEAR STUD NOTE

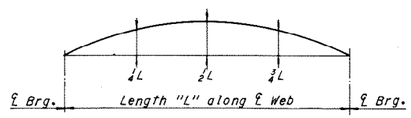
Capacity = 3,400 lbs. per stud.
The Contractor may, if he elects, use three ¾" diameter studs at the same longitudinal spacing in lieu of the four ¾" diameter studs shown.
Stud rows shall be placed parallel to the main deck reinforcing.
Shear stud spacing shown is maximum spacing.



DEAD LOAD DEFLECTION DIAGRAM

NOTE TO CONTRACTOR

Deflections given are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.
In practice, the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall be provided by adjusting forms to vary the thickness of the concrete haunch between the bottom of the slab and the top of stringer without altering the slab thickness.

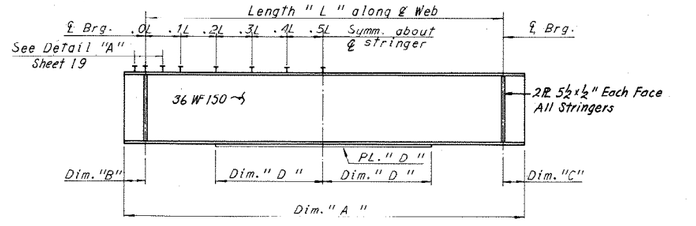


CAMBER DIAGRAM

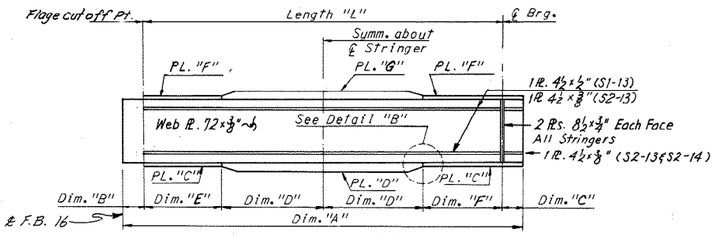
NOTE TO FABRICATOR

The stringers shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

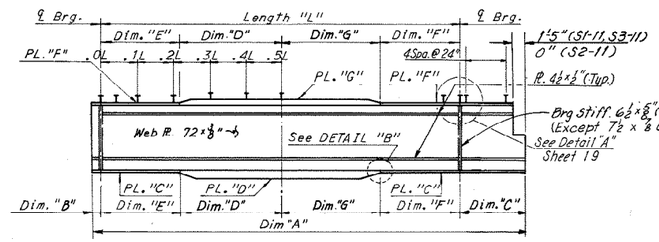
Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered, distance top of stringers to top of slab will vary along the stringer in accordonce with the offset dimensions shown in the Camber Diagram, and with minimum distonce as shown in Cross-Section on Sheet



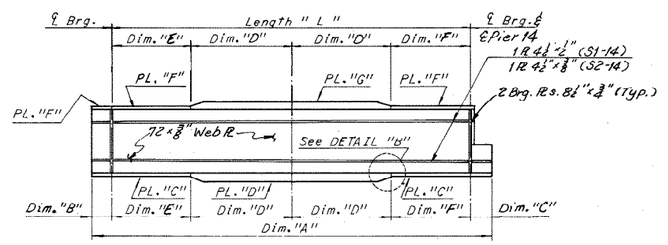
STRINGER ELEVATION
No Scale
(Unit 12 ℄ 15)



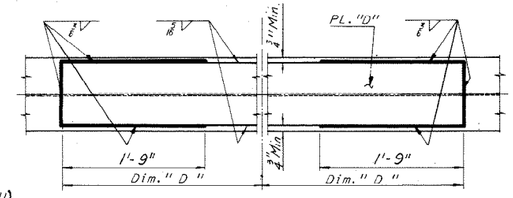
STRINGER ELEVATION
No Scale
(Unit 13)



STRINGER ELEVATION
No Scale
(Unit 11)

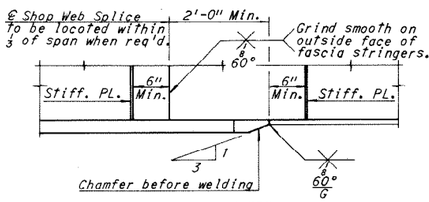


STRINGER ELEVATION
No Scale
(Unit 14)



COVER PLATE DETAIL
No Scale

Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered distance, top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in cross-section on Sheet 35 .



DETAIL "B"
No Scale
NOTE: Web to flange weld size see sheet 20.

STRINGER SCHEDULE

UNIT	STRINGER	Dim. "A"	LENGTH "L"	Dim. "B"	Dim. "C"	Dim. "D"	Dim. "E"	Dim. "F"	Dim. "G"	PL."C"	PL. "D"	PL."F"	PL. "G"	MAX. SHEAR STUD SPACING 0.0L-0.1L*	0.1L-0.2L	0.2L-0.3L	0.3L-0.4L	0.4L-0.5L
11	S1-11	133'-1 15/16"	126'-11"	7"	10'-7 15/16"	38'-0"	25'-5 5/16"	25'-5 1/4"	38'-0"	16'-1 9/16"	18 x 2"	12 x1"	16 x 1"	17"	19"	24"	24"	24"
	S2-11	127'-3 5/8"	126'-1 8/32"	7"	7"	31'-6"	31'-6 1/16"	31'-6 1/16"	31'-6"	14 x1½"	16 x 2"	12x1"	12 x1"	18"	20½"	24"	24"	24"
	S3-11	136'-5 1/2"	125'-4 1/16"	7"	10'-6 3/32"	37'-8"	25'-0 1/4"	18'-6 1/16"	44'-2"	14 x1"	14x2 "	12x1 1/2"	12x1"	.22"	24"	24"	24"	24"
12	S1-12	66'-9 7/16"	65'-6 1/16"	7"	8"	24'-0"	--	--	--	36WF150	10½x¾ "	-	-	8"	9"	11"	12½"	15"
	S3-12	66'-5 5/8"	65'-0 1/2"	7"	10"	23'-9"	--	--	--	36WF150	10½x¾ "	-	-	10"	11"	14½"	17½"	24"
13	S1-13	118'-4 5/16"	116'-7 1/16"	11"	10½"	37'-0"	21'-3 1/16"	21'-3 9/16"	-	18x1"	18x1⅛"	18x1"	18x1⅛"	-	-	-	-	-
	S2-13	117'-4 1/4"	115'-6 3/16"	11"	10½"	36'-0"	21'-9 3/16"	21'-9 3/16"	-	18x1"	18x1¼"	18x1"	18x1¼"	-	-	-	-	-
14	S1-14	110'-4 1/4"	108'-0 3/16"	10½"	1'-5 3/16"	35'-0"	19'-0 5/16"	19'-0 1/4"	-	18x1"	18x1¼"	18x1"	18x1¼"	-	-	-	-	-
	S2-14	109'-10 3/16"	107'-6 1/2"	10½"	1'-5 3/16"	35'-0"	18'-9 1/4"	18'-9 1/4"	-	18x⅞"	18x1⅛"	18x⅞"	18x1⅛"	-	-	-	-	-
15	S1-15	50'-1 1/4"	48'-11 3/16"	3½"	10"	--	--	--	--	36WF150	-	-	-	--	--	--	--	--
	S2-15	49'-8 11/16"	48'-9 3/16"	3½"	8"	--	--	--	--	36WF150	--	--	--	--	--	--	--	--

DEAD LOAD DEFLECTION SCHEDULE

¼L	½L	¾L
1 5/16	1 13/16	1 1/4
1 1/16	2 1/16	1 1/16
1 9/16	2 1/8	1 7/16
9/16	3/4	9/16
1 3/16	1 5/8	1 3/16
1 3/16	1 5/8	1 3/16
1	1 3/8	1
7/8	1 1/4	7/8
5/16	7/16	5/16
5/16	3/8	5/16

CAMBER SCHEDULE

¼L	½L	¾L
2 3/4	3 3/8	2 9/16
2 1/16	4 1/8	3 1/8
2 5/8	4	2 15/16
3/4	1	13/16
1	1 7/16	1 1/8
1 9/16	2 3/16	1 9/16
1 1/2	2 1/16	1 1/2
1	1 3/8	1
1 1/16	1 3/4	1 5/16
7/16	1/4	7/16	1/4	1 3/8	1/4
3/8	1/2	3/8
5/16	1/2	5/16

** Spacing begins at termination of 6 spaces @ 4".*

	BY	DATE				
			2	Framing Revised Units 12,13,14,15	RH	12-5-74
MADE	V.C.P. G.C.C.	2-26-69	1	As Built	TEM	G-77
CHECKED	K.C.T.	42869				
IN CHARGE			NO.	REVISION	BY	DATE

NOTE.
All steel shall be A36 unless otherwise shown.
Longitudinal stiffeners of exterior stringer shall be located on the exterior face of the stringer.

AS BUILT

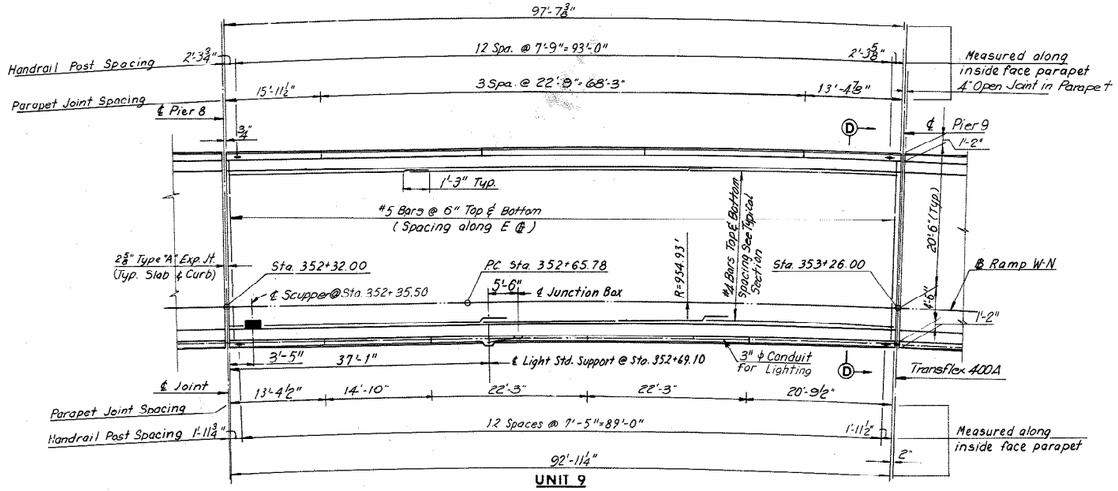
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
FRAMING PLAN - UNITS 11,12,13,14 AND 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: No Scale
CONTRACT NO.: 10
SHEET NO. 27 OF 54

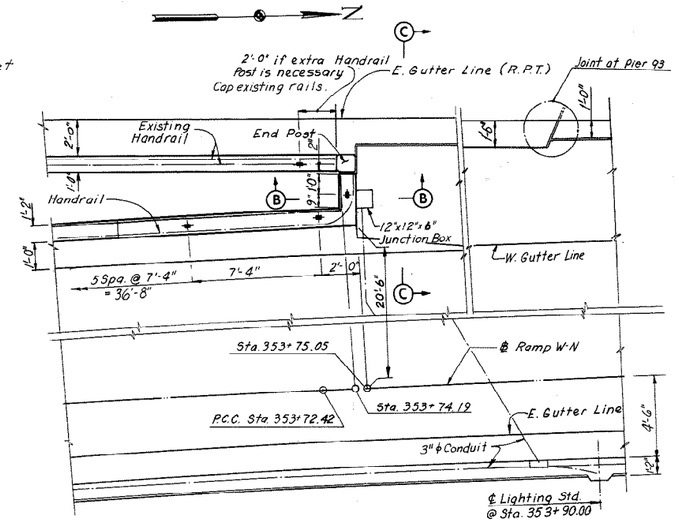
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	205	265



UNIT 9

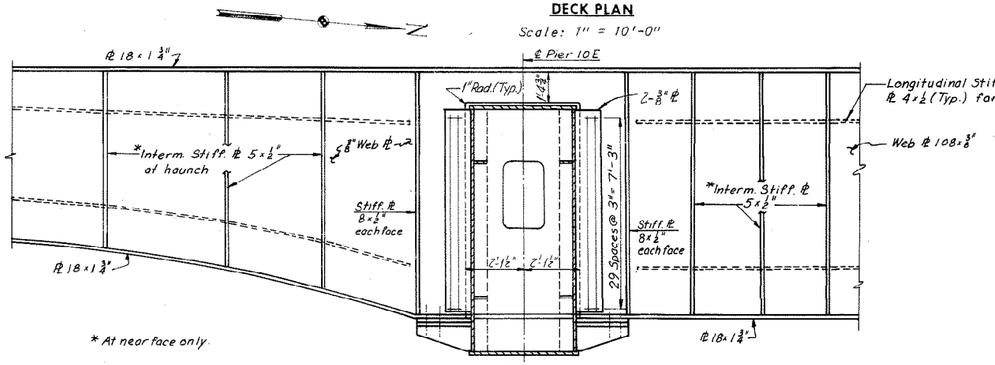
DECK PLAN

Scale: 1" = 10'-0"



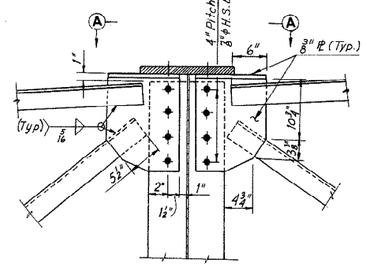
ELEVATION TABLE			
STATION	ELEV A	ELEV B	ELEV C
352+30.00	88.57	88.33	88.29
32.00	88.63	88.37	88.33
40.00	88.83	88.52	88.46
50.00	89.06	88.67	88.60
60.00	89.20	88.81	88.74
70.00	89.30	88.91	88.84
80.00	89.39	89.00	88.93
90.00	89.44	89.05	88.98
353+00.00	89.47	89.08	89.01
10.00	89.48	89.09	89.02
20.00	89.46	89.07	89.00
26.00	89.44	89.05	88.98
30.00	89.42	89.03	88.96

Note: Connect Lighting Conduit in existing structure with Junction Box at nose of new part of structure.



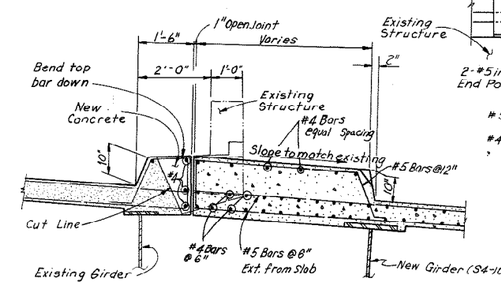
DETAIL C

Scale: 3/8"=1'-0"



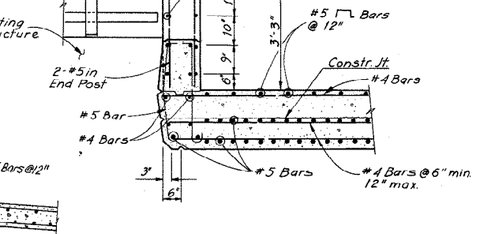
DETAIL A

Scale: 1" = 1'-0"



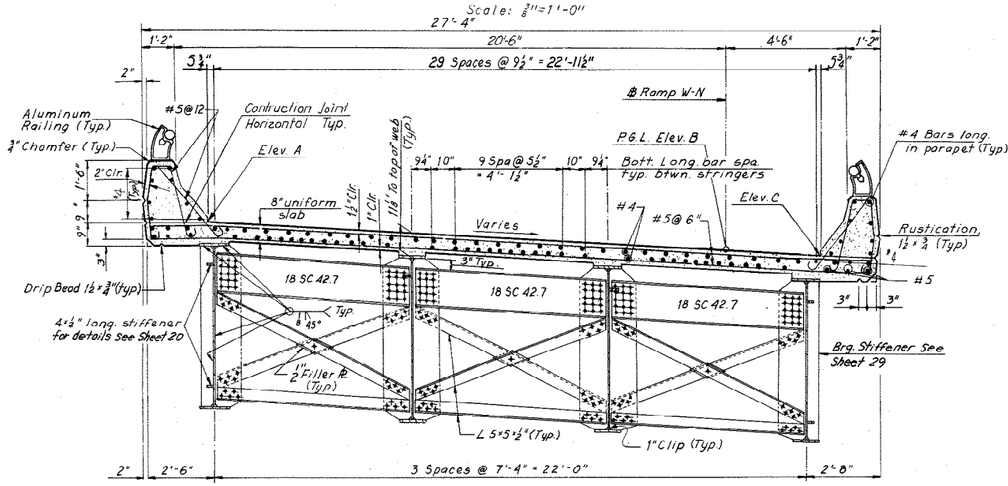
SECTION C-C

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



SECTION B-B

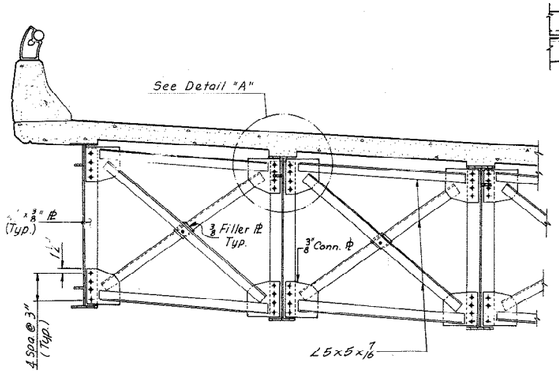
Scale: 1/2"=1'-0"



SECTION D-D — END DIAPHRAGM

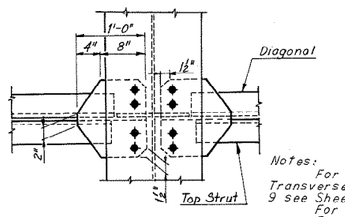
Scale: 3/8" = 1'-0"

Unit 9 shown, Unit 10 Diaphragm similar



INTERMEDIATE DIAPHRAGM-UNIT 9

Scale: 3/8"=1'-0"



VIEW A-A

Scale: 1"=1'-0"

Notes:
For Intermediate Diaphragm and Transverse Stiffener Spacing for Unit 9 see Sheet 23.
For Handrail Details see Sheet S3.
For Lighting Details see Sheet S4.
For Location of Detail B see Sheet 34.
For Standard Drainage Details see Support Type 3 Sheet S6.
For Location of Detail C see Stringer S1-10 Sheet 24.
For Typical Parapet Detail, see Sheet 29.

	BY	DATE				
MADE	C.E.B.	3-7-69	2	As Built	TEM	G-77
CHECKED	A.M.H.	4-21-69	1	Revised L size, Intermediate Diap. Unit 9	KHF	1-24-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
DECK PLAN AND SUPERSTRUCTURE DETAILS UNIT 9

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 33 OF 54

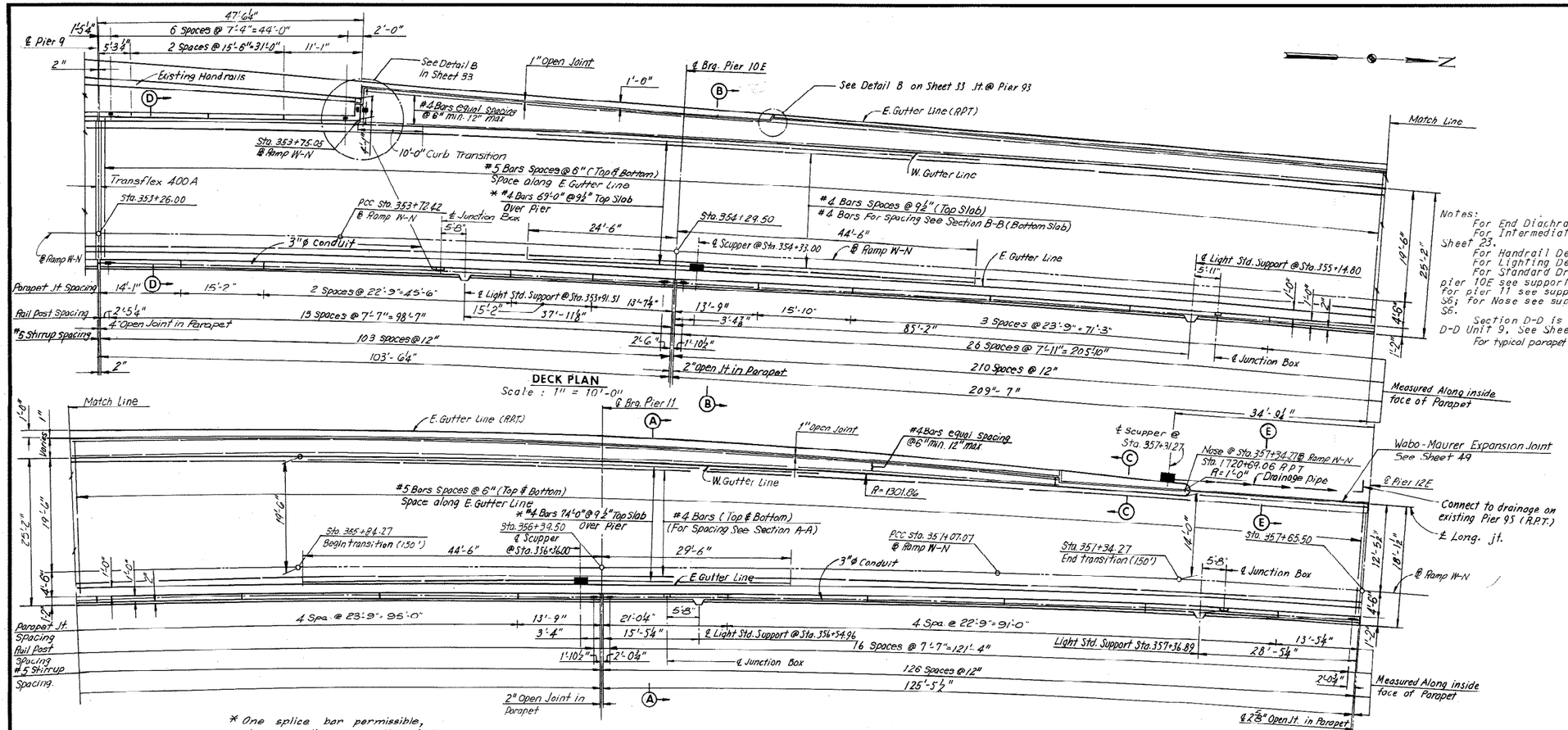
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	206	265

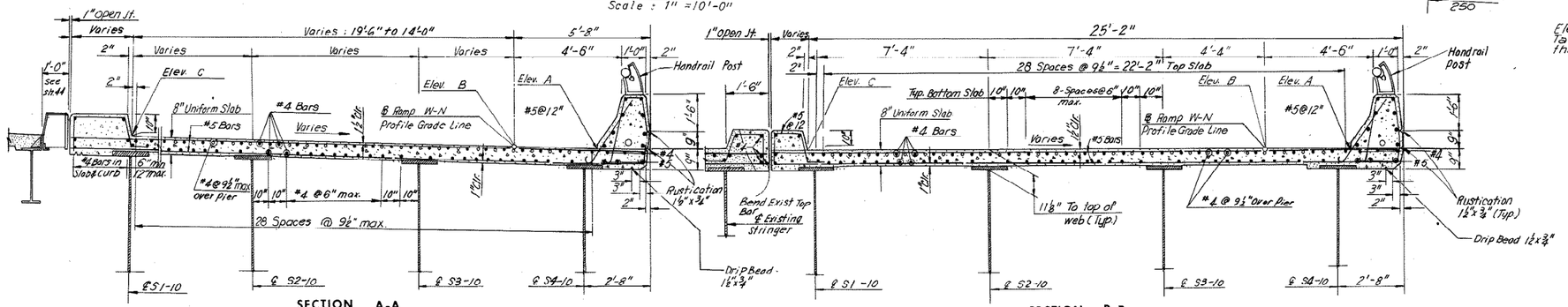
ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
353+26.00	88.98	89.05	89.43
+30.00	88.96	89.03	89.41
+40.00	88.89	88.96	89.34
+50.00	88.80	88.87	89.25
+60.00	88.68	88.75	89.13
+70.00	88.54	88.61	88.99
+80.00	88.37	88.44	88.82
+90.00	88.17	88.24	88.62
354+00.00	87.96	88.03	88.41
+10.00	87.72	87.79	88.17
+20.00	87.46	87.53	87.91
+29.50	87.19	87.26	87.64
+30.00	87.17	87.24	87.62
+40.00	86.88	86.95	87.33
+50.00	86.57	86.64	87.02
+60.00	86.24	86.31	86.69
+70.00	85.89	85.96	86.34
+80.00	85.52	85.59	85.97
+90.00	85.13	85.20	85.58
355+00.00	84.72	84.79	85.17
+10.00	84.30	84.37	84.75
+20.00	83.86	83.93	84.33
+30.00	83.41	83.48	83.90
+40.00	82.94	83.02	83.46
+50.00	82.45	82.54	83.02
+60.00	81.97	82.06	82.57
+70.00	81.48	81.57	82.12
+80.00	80.99	81.09	81.68
+90.00	80.49	80.61	81.23
356+00.00	80.00	80.12	80.77
+10.00	79.51	79.64	80.31
+20.00	79.02	79.15	79.85
+30.00	78.53	78.67	79.39
+39.50	78.06	78.21	78.95
+40.00	78.04	78.19	78.92
+50.00	77.55	77.70	78.46
+60.00	77.06	77.22	77.99
+70.00	76.58	76.74	77.53
+80.00	76.11	76.29	77.10
+90.00	75.67	75.86	76.68
357+00.00	75.25	75.45	76.28
+10.00	74.85	75.05	75.88
+20.00	74.44	74.65	75.48
+30.00	74.04	74.25	75.09
+40.00	73.65	73.86	—
+50.00	73.27	73.48	—
+60.00	72.89	73.10	—
+65.50	72.69	72.90	—

Elevations given in the Elevation Table may require adjustment in the field.

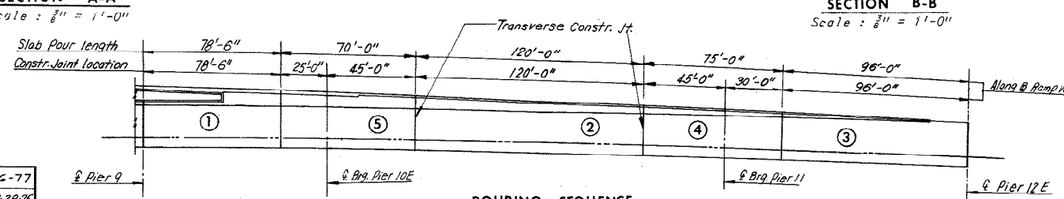
Notes:
For End Diaphragms see, Sheet 33.
For Intermediate Diaphragms see, Sheet 23.
For Handrail Details see, Sheet 53.
For Lighting Details see, Sheet 54.
For Standard Drainage Details for pier 10E see support Type 10, sheet S6; for pier 11 see support Type 5, Sheet S6; for Nose see support Type 9, Sheet S6.
Section D-D is similar to Section D-D Unit 9, See Sheet 33
For typical parapet Details, see Sheet 20.



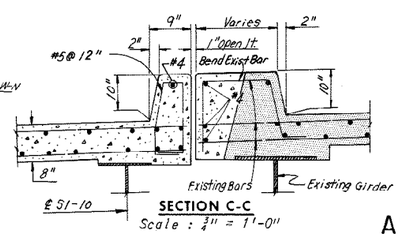


SECTION A-A
Scale : ⅜" = 1'-0"

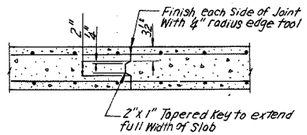
SECTION B-B
Scale : ⅜" = 1'-0"



POURING SEQUENCE
Scale : 1" = 40'-0"



SECTION C-C
Scale : ¾" = 1'-0"



TRANSVERSE CONSTRUCTION

JOINT DETAIL
No Scale

	BY	DATE				
			3	As Built	TEM	C-77
MADE	G.S.H	2-26-69	2	Note for Table of Elevations	DWB	1-28-75
CHECKED	AMH	4-23-69	1	Rev. length of bars. Rev. Road width	RSJ	1-24-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

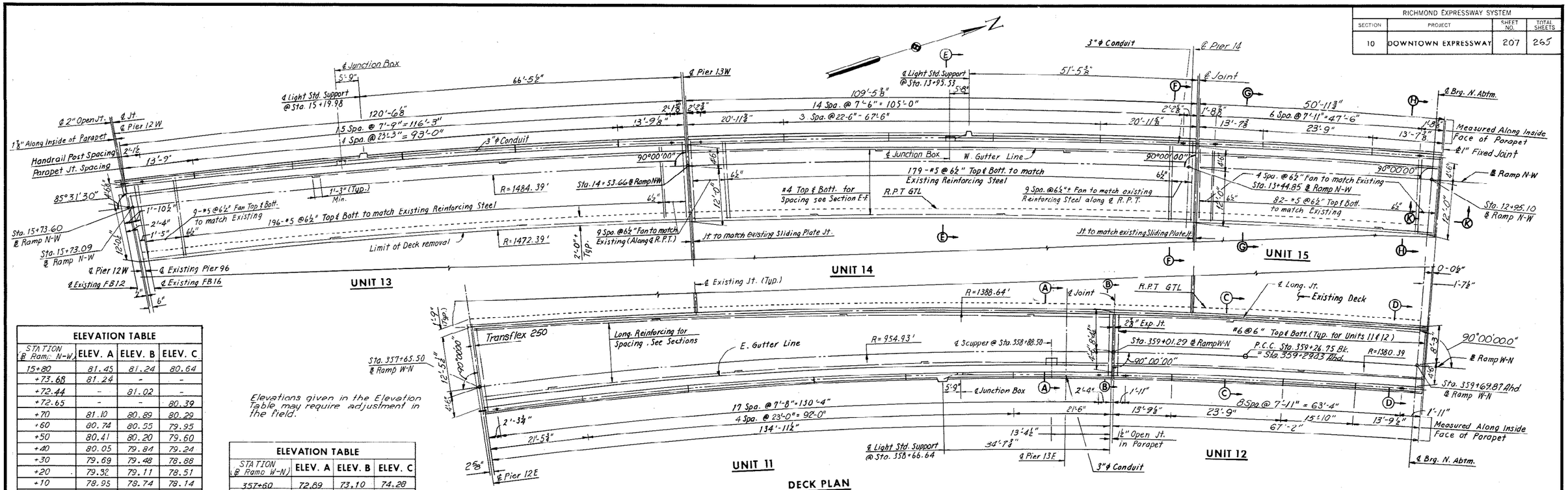
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

DECK PLAN — UNIT 10

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 34 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	207	265

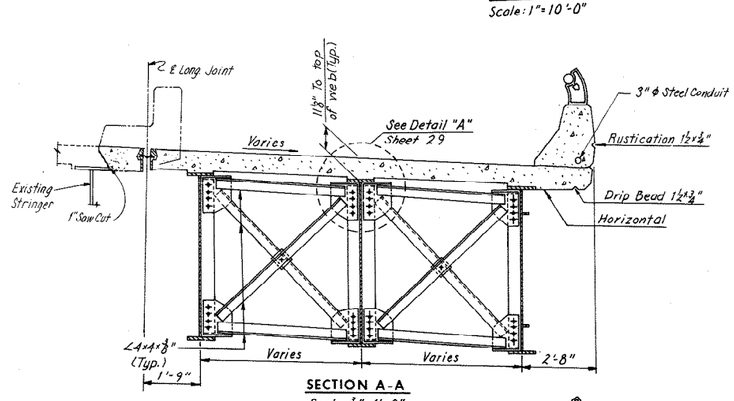


DECK PLAN
Scale: 1" = 10'-0"

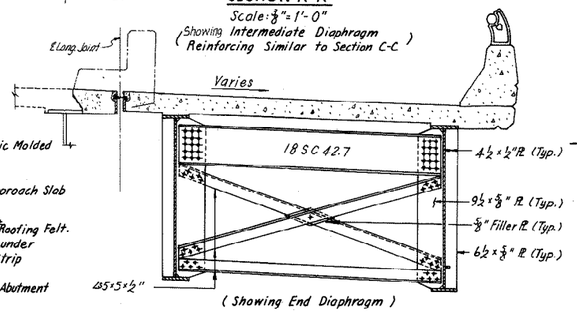
ELEVATION TABLE			
STATION (℄ Ramp N-W)	ELEV. A	ELEV. B	ELEV. C
15+80	81.45	81.24	80.64
+73.68	81.24	-	-
+72.44	-	81.02	-
+72.65	-	-	80.39
+70	81.10	80.89	80.29
+60	80.74	80.55	79.95
+50	80.41	80.20	79.60
+40	80.05	79.84	79.24
+30	79.69	79.48	78.88
+20	79.32	79.11	78.51
+10	78.95	78.74	78.14
15+00	78.57	78.36	77.76
14+90	78.20	77.99	77.39
+80	77.82	77.61	77.01
+70	77.45	77.24	76.64
+60	77.08	76.87	76.27
+53.40	76.85	76.64	76.04
+50	76.72	76.51	75.91
+40	76.37	76.16	75.56
+30	76.02	75.81	75.21
+20	75.67	75.46	74.86
+10	75.31	75.10	74.50
14+00	74.96	74.75	74.15
13+90	74.61	74.40	73.80
+80	74.26	74.05	73.45
+70	73.91	73.70	73.10
+60	73.55	73.34	72.14
+50	73.20	72.99	72.39
+44.61	73.01	72.80	72.20
+40	72.85	72.64	72.04
+30	72.49	72.28	71.68
+20	72.13	71.92	71.32
+10	71.77	71.56	70.96
13+00	71.40	71.19	70.59
12+92.81	71.12	70.91	70.31

ELEVATION TABLE			
STATION (℄ Ramp W-N)	ELEV. A	ELEV. B	ELEV. C
357+60	72.89	73.10	74.28
+65.50	72.69	72.90	73.65
+70	72.53	72.74	73.48
+80	72.17	72.38	73.09
+90	71.82	72.03	72.70
358+00	71.46	71.67	72.32
+10	71.10	71.31	71.94
+20	70.75	70.96	71.56
+30	70.39	70.60	71.19
+40	70.02	70.23	70.80
+50	69.65	69.86	70.41
+60	69.26	69.47	70.01
+70	68.86	69.07	69.60
+80	68.46	68.67	69.18
+90	68.05	68.27	68.78
+92	67.98	68.19	68.70
359+00	67.67	67.88	68.38
+02.00	67.60	67.81	68.31
+10	67.24	67.50	68.00
+20	66.93	67.14	67.63
+30	66.57	66.78	67.27
+40	66.20	66.41	66.91
+50	65.82	66.03	66.53
+60	65.44	65.65	66.14
+69.39	65.06	65.27	65.78
+70	65.04	65.25	65.75

Note:
For Sections E-E, F-F, G-G and H-H, see Sheet 47.
For Framing Plan, see Sheet 26.
For Joint Details, see Sheet 48 and 49.
Elevation C is to be confirmed by Contractor.
For Handrail Details, see Sheet 53.
For Typical Parapet Details, see Sheet 29.

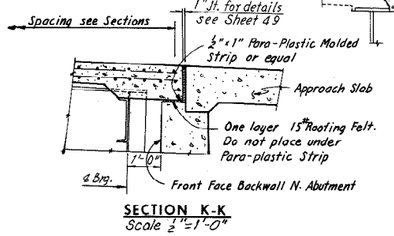


SECTION A-A
Scale: ⅜" = 1'-0"

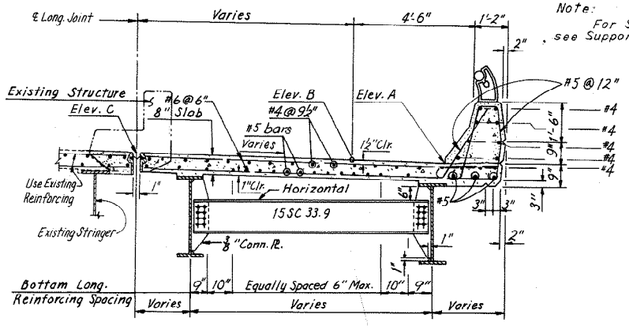


(Showing Intermediate Diaphragm Reinforcing Similar to Section C-C)
(Showing End Diaphragm)

SECTION B-B
Scale: ⅜" = 1'-0"



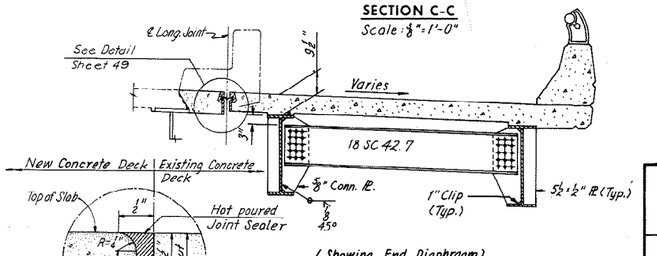
SECTION K-K
Scale 2" = 1'-0"



(Showing Intermediate Diaphragm)

Note:
For Standard Drainage Details for Unit 11, see Support Type 3 Sheet 36,

SECTION C-C
Scale: ⅜" = 1'-0"



(Showing End Diaphragm)

SECTION D-D
Scale: ⅜" = 1'-0"

DETAIL C
Full Scale

NOTE:
For the proposed joint details between the existing and the new slab, see Detail C.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	V.C.P. G.C.C.	2-27-69	3	As Built	TEM	6-77
CHECKED	K.C.T.	5-1-69	2	Note for Table of Elevations	DWB	1-28-75
IN CHARGE			1	Piers 4 Abutment Sta. Change	DWB	1-17-75

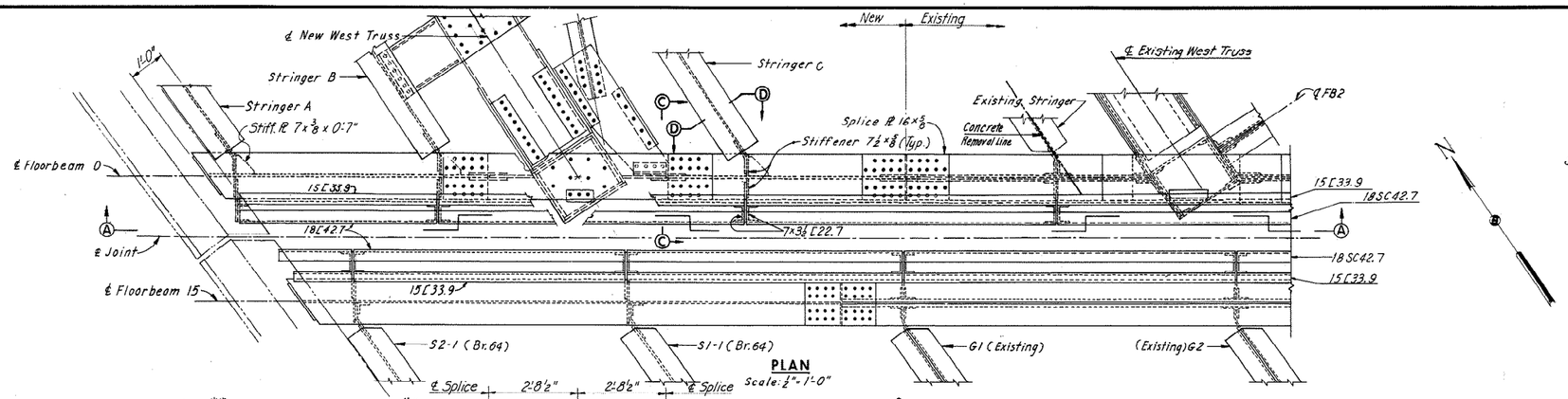
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
DECK PLAN-UNITS 11, 12, 13, 14 AND 15

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 35 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	214	265



LEGEND:

* Elevations of top of stringers and top of Floorbeam extended at ℄ Truss are taken at ℄ Floorbeam 0.

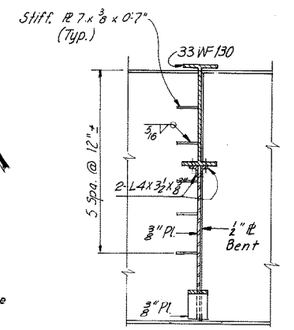
** Denotes Radial Dimension

Δ Dimensions are to projected ℄ Stringer at ℄ Floorbeam. Connection - Stiffener Plate shall be located by the Fabricator.

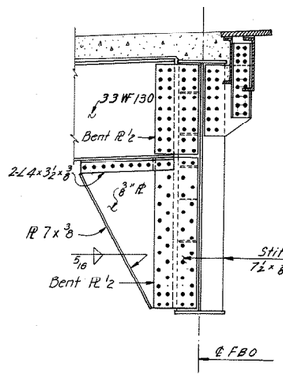
PLAN
Scale: ½"-1'-0"

SECTION A-A
ELEVATION-FLOORBEAM 0
Scale : ½" = 1'-0"

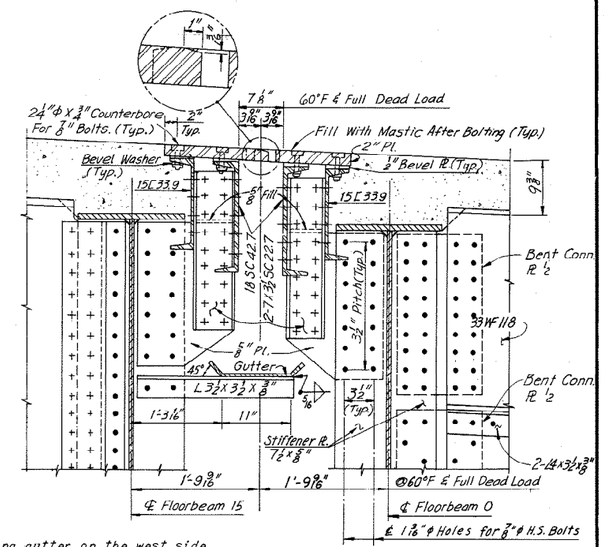
Note: Expansion plates and curb plates are omitted from Plan. For Elevation of Floorbeam 15, see Bridge 64 Sheet 18.



SECTION D-D
Scale: ½"= 1'-0"

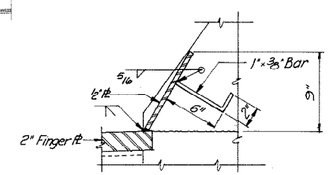


SECTION C-C
Scale: ½"=1'-0"

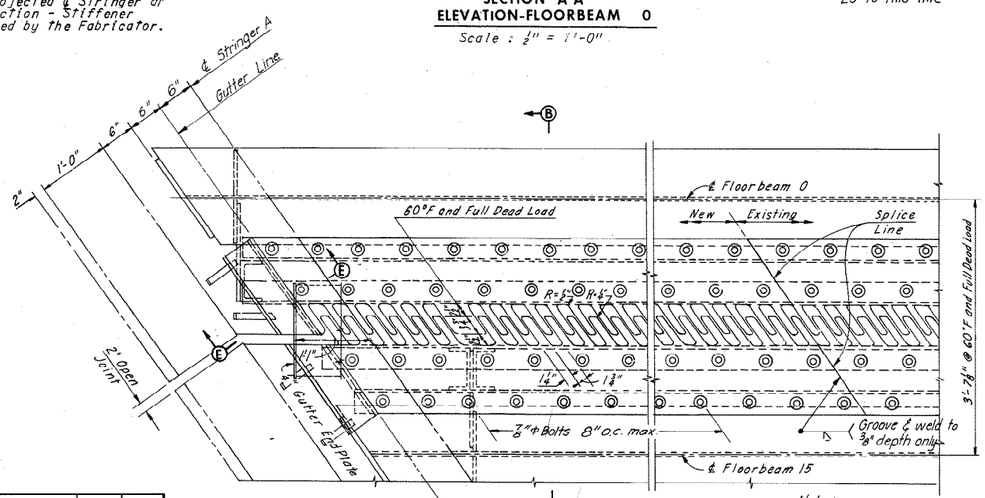


Note: Cut existing gutter on the west side of the existing stringer and set the new gutter into the existing gutter. Bolt the two together with existing bolts. Provide an 8" lap.

SECTION B-B
Scale: 1"=1'-0"

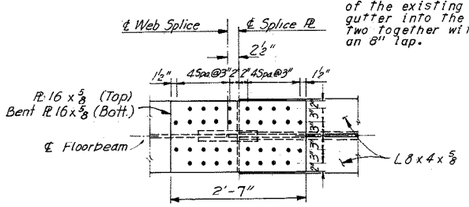


SECTION E-E
Scale : 1½"=1'-0"



PART PLAN OF EXPANSION DEVICE
Scale: 1" = 1'-0"

Note: Cut existing finger plate as close to the existing gutter line as possible. New plate shall be provided long ℄ cut to exact length after existing plate is cut.



VIEW F-F
Scale : ¾"=1'-0"
bottom Splice Similar

	BY	DATE
MADE	J.B.P. & J.D.C.	1-75
CHECKED		
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built	TEM	6-77
1	New sheet added	J.B.P.	2-7-75

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
FLOORBEAM 0 AND JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
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