APPENDIX
MR-2017

RECORD DRAWINGS

RMTA BRIDGES Boulevard, 4, 6, 8S, 8N, 9S, 9N, 10S, 10N, 17, 36, 61, 63, 64, 65, 66, 67 & 68

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

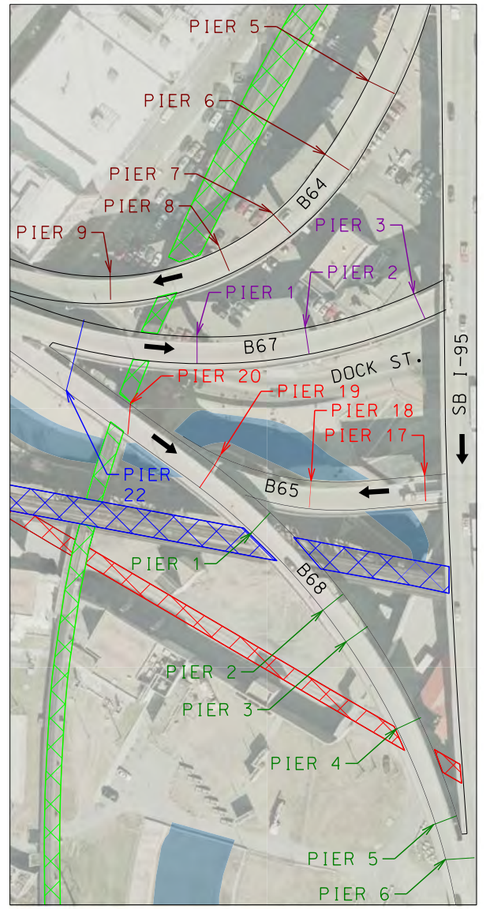
RMTA

System Map


RICHMOND EXPRESSWAY SYSTEM
Scale:
0 1000 2000 3000ft.
48 - Bridge Number
RMTA Facilities Shown in Red
RMTA
RICHMOND METROPOLITAN TRANSPORTATION AUTHORITY
RICHMOND
JOSEPH BRYAN PARK
Toll Booths
BRYAN PARK INTERCHANGE
LABURNUM AVE.
NORTH AVE.
WESTWOOD AVE.
BROOKLAND PARK BLVD.
OVERBROOK RD.
NORTH AVE.
BROOK RD.
CHAMBERLAYNE AVE.
Visitor Information Center
The Diamond
UNIVERSITY OF RICHMOND
THREE CHOPT RD.
LIBBIE AVE.
BROAD ST.
MONUMENT AVE.
PATTERSON AVE.
GROVE AVE.
CARY STREET ROAD
COMMONWEALTH AVE.
MALVERN AVE.
HAMILTON ST.
KENT RD.
THOMPSON ST.
NANSEMOND ST.
SHEPPARD ST.
THE BOULEVARD
ROBINSON AVE.
HERMITAGE RD.
RICHMOND PETERSBURG TURNPIKE
LOMBARDY
BROOK RD.
Science Museum Of Virginia
VIRGINIA UNION UNIVERSITY
Virginia Museum Of Fine Arts
I-195
Downtown Expressway Extension
ELWOOD RD
FLOYD AVE.
GROVE AVE
MAIN ST
CARY ST
PARKWOOD AVE.
PATTERSON AVE.
MONUMENT AVE
PARK AVE
BROAD ST.
CLAY ST
MARSHALL ST
LEIGH ST
SEABOARD COAST LINE
MECHANICSVILLE
Virginia Commonwealth University
FRANKLIN ST
ADAMS ST
Public Library
COLISEUM
Toll Booths
FAIRFIELD AVE.
MOSBY ST.
NINE MILE RD.
CARRINGTON ST.
25TH ST.
17th ST.
18th ST.
City Hall
Med. Col. Of Va. (VCU)
STATE CAPITOL
Shockoe Slip Historic District
Chamber of Commerce
State Penetentiary
MARSHALL ST.
BROAD ST.
CLAY ST.
MAIN ST. STATION
DOWNTOWN I-95 INTERCHANGE
JAMES RIVER BRIDGE
Chimborazo Park
SOUTHERN RAILWAY
HUGUENOT BRIDGE
HUGUENOT ROAD
RIVERSIDE DR.
Williams Island
DOVER RD.
(C. & O. RY.)
JAMES
RIVER
Section Two Connection To I-195
PORTLAND PL.
IDLEWOOD AVE.
MAPLEWOOD AVE.
CITY STADIUM
BOULEVARD INTERCHANGE
GRANT RD.
Toll Booths
STADIUM INTERCHANGE
DOUGLASDALE RD.
R. F. & P. R.R.
Water Works
WILLIAM BYRD PARK
Connection to Downtown Expressway
Section Three
MAYMONT PARK
Toll Plaza
Section One
WILLOW OAKS
COUNTRY CLUB
POWHITE BRIDGE OVER THE JAMES RIVER
FOREST HILL AVE.
Toll Booths
FOREST HILL AVE. INTERCHANGE
Powhite Parkway State Rte 76
Toll Plaza (SB)
Toll Plaza (NB)
(SOUTHERN RAILWAY)
PARKWAY
CHIPPENHAM
CHIPPENHAM PARKWAY INTERCHANGE
Powhite Parkway Extension (VDOT Toll Road)
BLILELY RD.
JAHNKE RD.
SEABOARD COAST LINE
CSX RAILWAY
WESTOVER HILLS BLVD.
BOULEVARD BRIDGE 7500# Limit
Toll Plaza
GRAYLAND AVE.
IDLEWOOD AVE.
LAKEVIEW AVE.
MEADOW ST.
ALLEN AVE.
RANDOLPH ST.
HARRISON ST.
CHERRY ST.
LAUREL ST.
BELVIDERE
Monroe Park
The Mosque
Downtown Expressway State Rte. 195
COLORADO AVE.
MT. CALVARY CEMETERY
HOLLYWOOD CEMETERY
RIVERVIEW CEMETERY
Section Four Downtown Expressway
Toll Booths
CANAL ST
BYRD ST
ROBERT E. LEE BRIDGE
MANCHESTER BRIDGE
MAYOS BRIDGE
(C & O RY.)
CSX RAILWAY
NORFOLK SOUTHERN
(SOUTHERN RAILWAY)
FOREST HILL PARK
SEMMES AVE.
FOREST HILL AVE
HULL ST.
COMMERCE RD.
MAURY ST.
4 5 6 8 9 10 11 12 13 17 36 37 46 47 48 49 50 51 52 54 55 56 57 58 60 61 62 63 64 65 66 67 68

RMTA DTE, I-95 Ramps Pier Location Exhibit

INSERT 1



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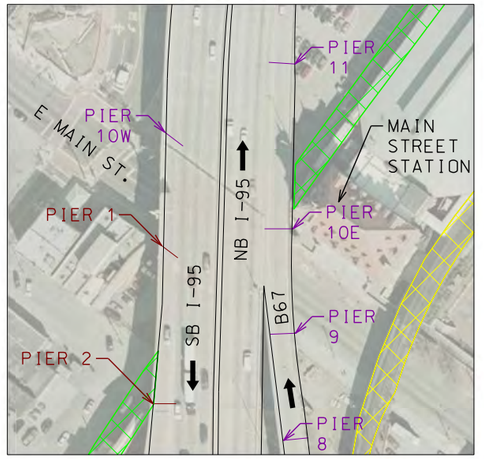

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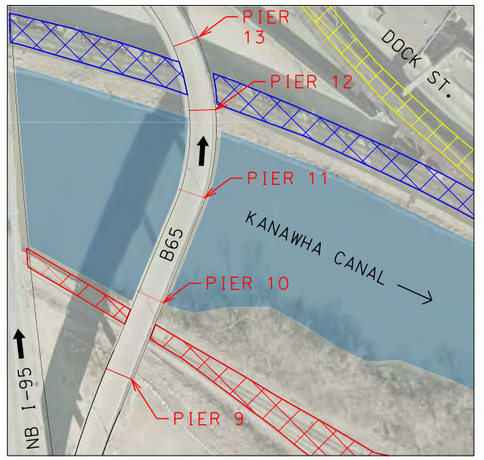


LEGEND:
- BRIDGE 63
- BRIDGE 64
- BRIDGE 65
- BRIDGE 66
- BRIDGE 67
- BRIDGE 68
- N&S RAILROAD
- CSX RAILROAD
- CSX RAILROAD
- CSX RAILROAD

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

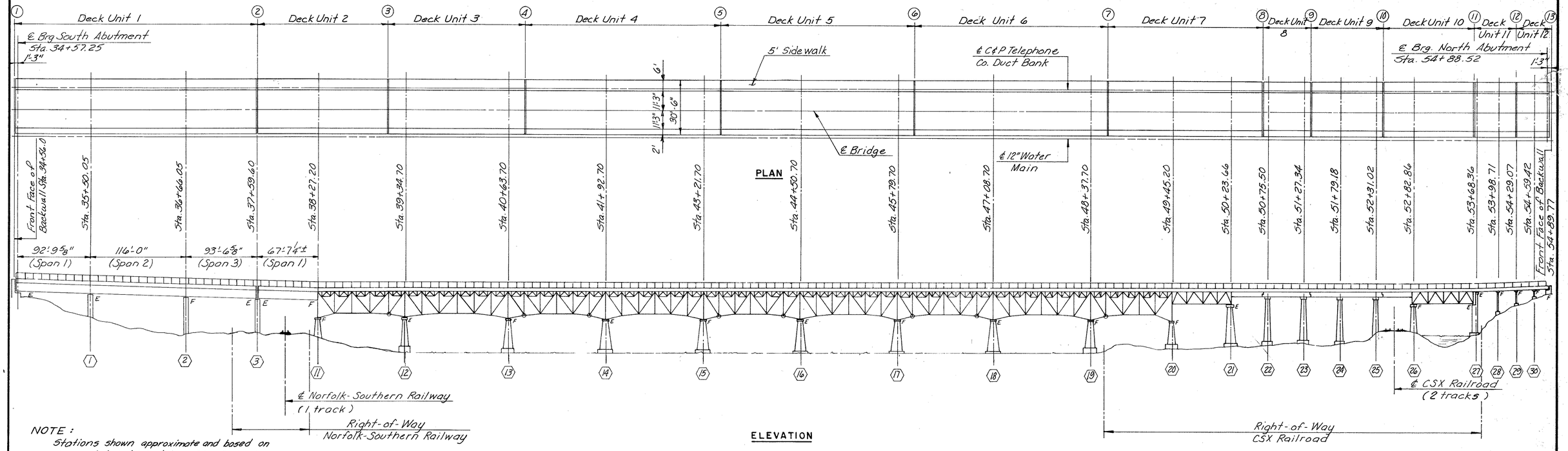
Pier Map-DR2016.dgn
3/4/2016

Boulevard Bridge

(VA State Rte. 161 – Westover Hills Blvd.)

Record Set Plans

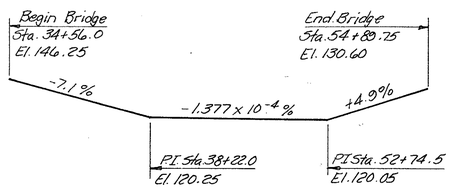
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-17B	Boulevard Bridge Rehab	35(1)	



PLAN

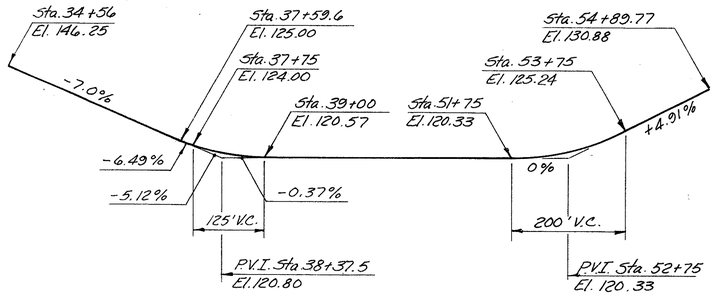
ELEVATION

NOTE :
Stations shown approximate and based on surveyed deck joint station. The Contractor is to verify all pertinent dimensions and elevations prior to the fabrication of any structural steel.



APPROXIMATE EXISTING PROFILE GRADE

Profile grade shown is based on surveyed elevation along the ℄ of the existing bridge.
The contractor is to verify all elevations prior to construction.



PROPOSED PROFILE GRADE

INDEX

LEGEND:
(1) Joint Number
⟨1⟩ Pier Number

NOTE:

LOAD RESTRICTIONS ARE CURRENTLY IN EFFECT ON THE EXISTING BRIDGE. CONSTRUCTION EQUIPMENT WEIGHING IN EXCESS OF 8 TONS SHOULD NOT BE PERMITTED ON THE BRIDGE.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	H.H.	2-92				
CHECKED	T.E.M	3-92				
IN CHARGE						

RECORD DRAWING

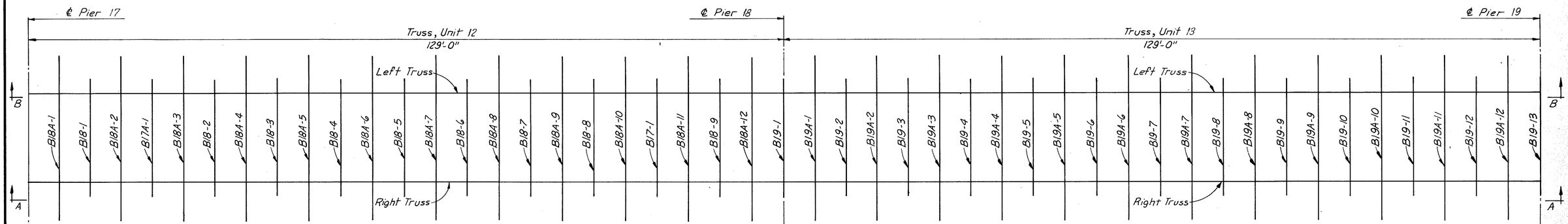
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BOULEVARD BRIDGE REHABILITATION
DECK REPLACEMENT
GENERAL PLAN, ELEVATIONS AND INDEX

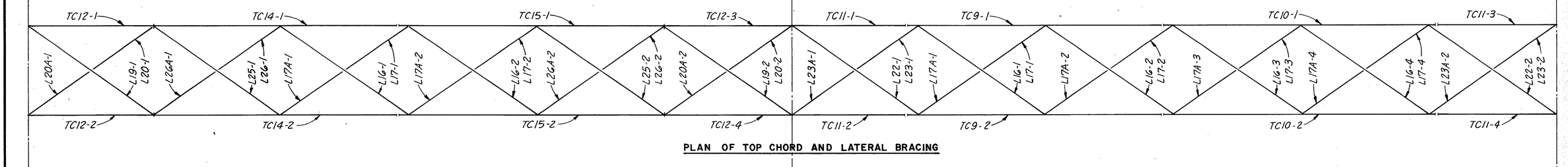
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: No. Scale
CONTRACT NO.: C-17B
SHEET NO. 1 OF 38

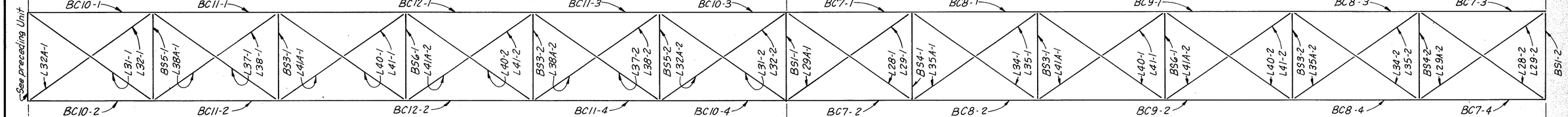
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS



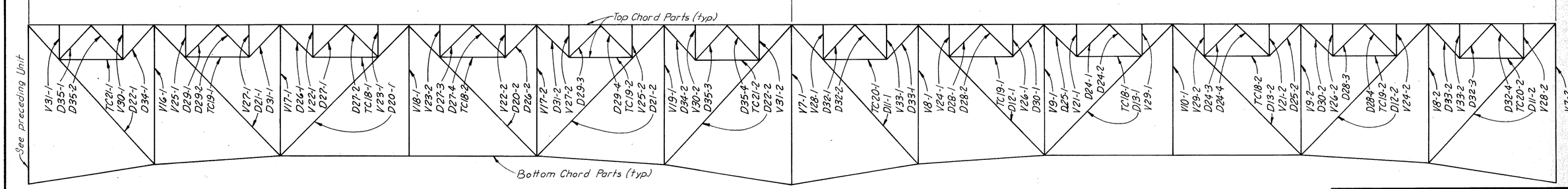
PLAN OF FLOOR BEAMS AND TRUSS



PLAN OF TOP CHORD AND LATERAL BRACING



PLAN OF BOTTOM CHORD, DIAPHRAGMS AND LATERAL BRACING



VIEW A-A

Note:
View B-B is similar to View A-A. Parts appearing in the left Truss (except those shown on the Plans of the Top and Bottom Chords) are indicated, in the table, with an L following the part identification.

Notes:
For Typical Floor Beam Detail, see Layout Units 1 thru 5.
For Typical Diaphragm Details and Elevations, see Layout Unit 14.
For Truss Details see, Typical Truss Detail Sheet.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.E.M.	2-72				
CHECKED	H.B.W.	3-72				
IN CHARGE	P.R.V.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

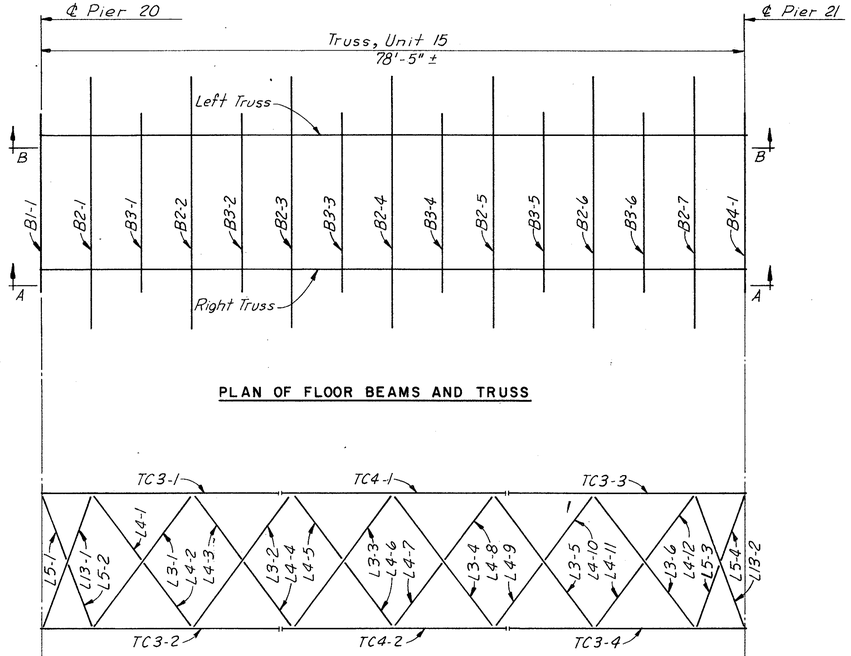
BOULEVARD BRIDGE OVER JAMES RIVER

LAYOUT UNITS 12 & 13

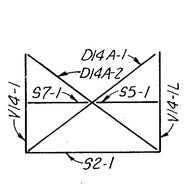
SCALE: No Scale
CONTRACT NO.:
SHEET NO. 20 OF ____

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS

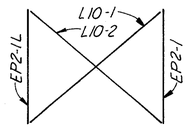


PLAN OF FLOOR BEAMS AND TRUSS

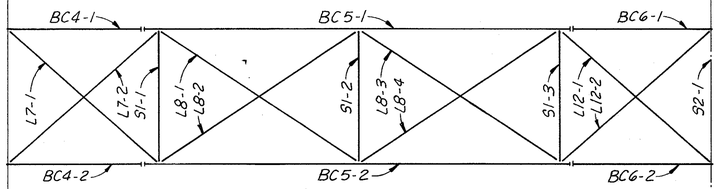


VIEW C-C

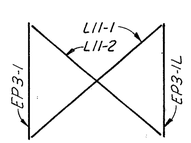
PLAN OF TOP CHORD AND LATERAL BRACING



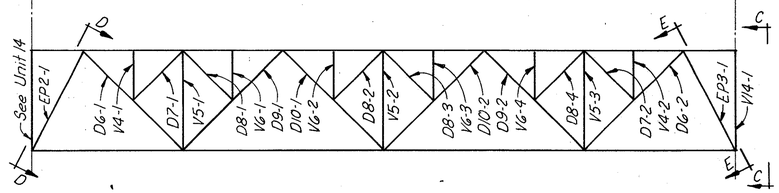
VIEW D-D



PLAN OF BOTTOM CHORD, DIAPHRAGMS AND LATERAL BRACING

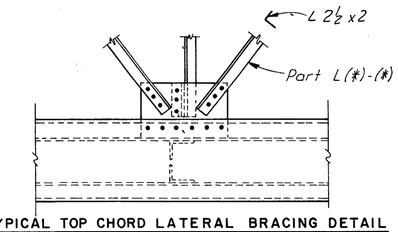


VIEW E-E



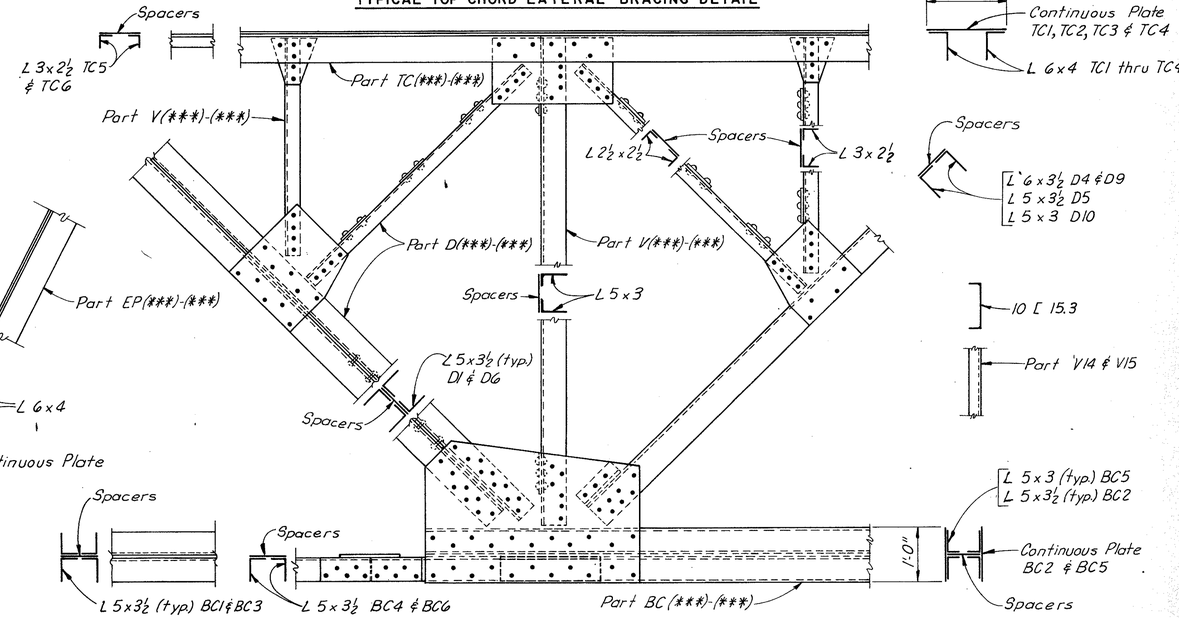
VIEW A-A

Notes:
For Typical Floor Beam Detail, see Layout Units 1 thru 5.
For Typical Diaphragm Details see Layout Units 21 thru 23.



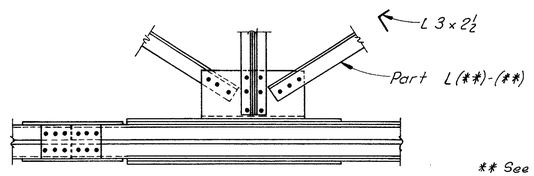
TYPICAL TOP CHORD LATERAL BRACING DETAIL

* See Plan of Top Chord and Lateral Bracing for identification.



*** See View A-A for identification.

TYPICAL TRUSS DETAIL UNIT 15 AND 21



** See Plan of Bottom Chord, Diaphragms and Lateral Bracing for identification

TYPICAL BOTTOM CHORD LATERAL BRACING DETAIL

Note:
View B-B is similar to View A-A. Parts appearing in the Left Truss (except those shown on the Plans of the Top and Bottom Chords) are indicated, in the table, with an L following the part identification.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.E.M	2-72				
CHECKED	H.B.W.	3-72				
IN CHARGE	P.R.Y.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BOULEVARD BRIDGE OVER JAMES RIVER

LAYOUT UNIT 15

SCALE: No Scale
CONTRACT NO.:
SHEET NO. 21 OF

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

Shop Note: Work This Dwg. with Dwg. #20

SHIPMENT E

REQUIRED LIST		
No	Description	Mark
8	Verticals as shown	V7R
8	" opp hand	V7L
16	"	V8
8	"	V10
16	Diagonals	D11
16	"	D12
16	"	D13
8	Bottom Chords as shown	BC7R
8	" " opp hand	BC7L
8	" " as shown	BC8R
8	" " opp hand	BC8L
8	" "	BC9
8	Verticals as shown	V9R
8	" opp hand	V9L

GENERAL NOTES:

Material
Specifications
Rivets ¾ ⌀
Holes 13/16 ⌀ unless noted
Reaming
Shop Paint 1 Ct Red Lead & Oil
Field Paint
Erection
Field Conn's
Inspection

For General Notes See Sheet #1

Material on Shop Bills 73 #14

Atlantic Bridge Co Cont. # 406

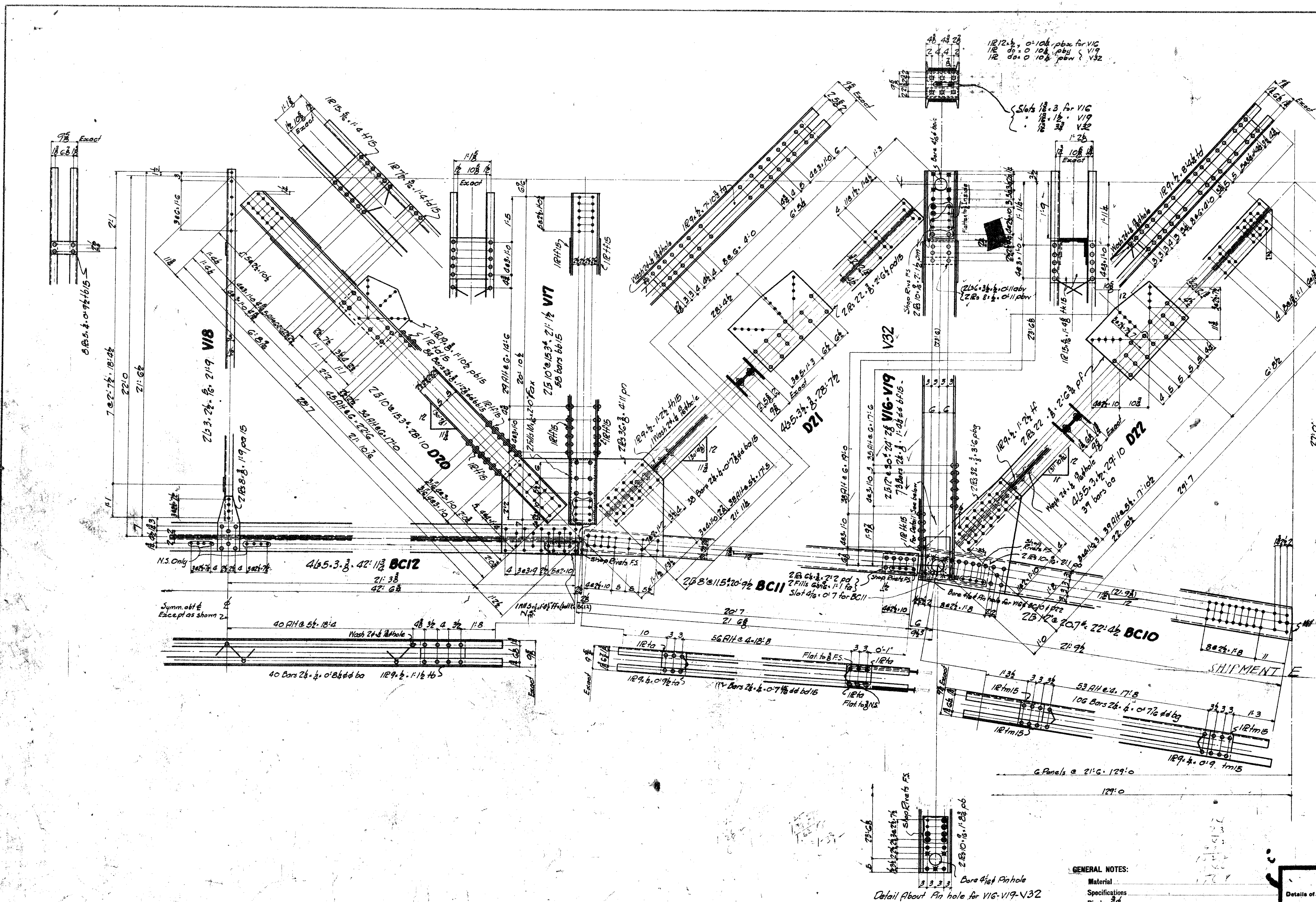
CONTRACT V 5585

Details of Cantilever Trusses

For Bridge over James River
Location Richmond, Va.
Owner Atlantic Bridge Co

Virginia Bridge and Iron Co.
ROANOKE, VA.

To be fabricated at the Roanoke plant
Made by J.M.H. Traced by 1/22/24
In charge of Moore Checked by C.G.T. 4-7-24
Revised Field " by
Scale ¼ in. = 1 ft. Sheet No. 15



REQUIRED LIST		
No	Description	Mark
10	Vertical Posts	V18
10	" " as shown	V17R
4	" " as shown	V16R
4	" " opp hand	V16L
3	" " as shown	V19R
3	" " opp hand	V19L
20	Diagonals	D20
16	"	D21
16	"	D22
10	Bottom Chords	BC12
8	" as shown	BC11R
8	" opp hand	BC11L
8	" as shown	BC10R
8	" opp hand	BC10L
1	Vertical Post as shown	V32R
1	opp hand	V32L
10	Verticals Post opp hand	V17L

GENERAL NOTES:

- Material
- Specifications
- Rivets ¾ϕ
- Holes 13/16ϕ unless noted
- Reaming
- Shop Paint 1 Ct. Red Lead & Oil.
- Field Paint
- Erection
- Field Conn's
- Inspection

For General Notes See Sheet 1

Material on Shop Bills 45 46 47

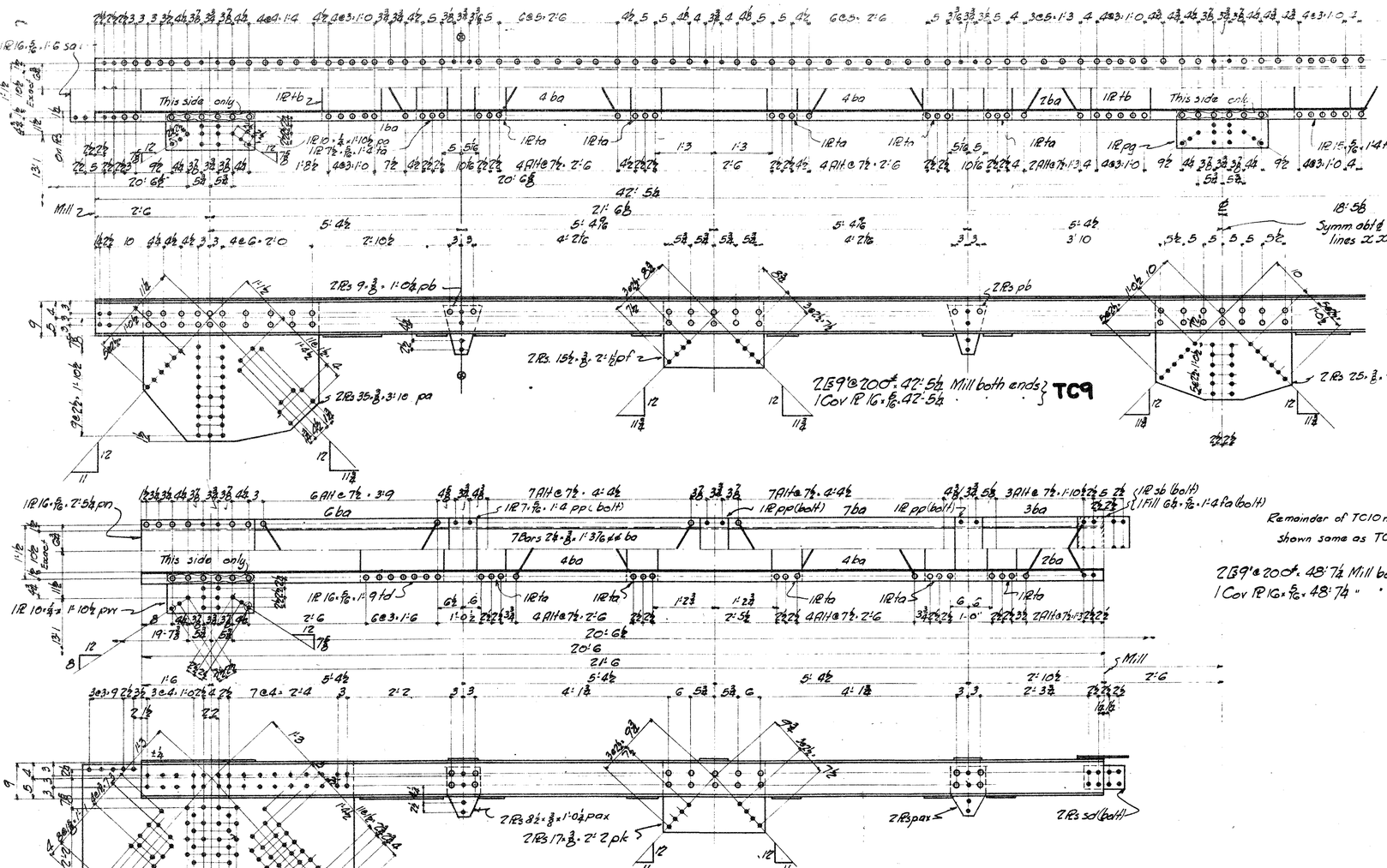
Atlantic Bridge Co. Cont. #A400

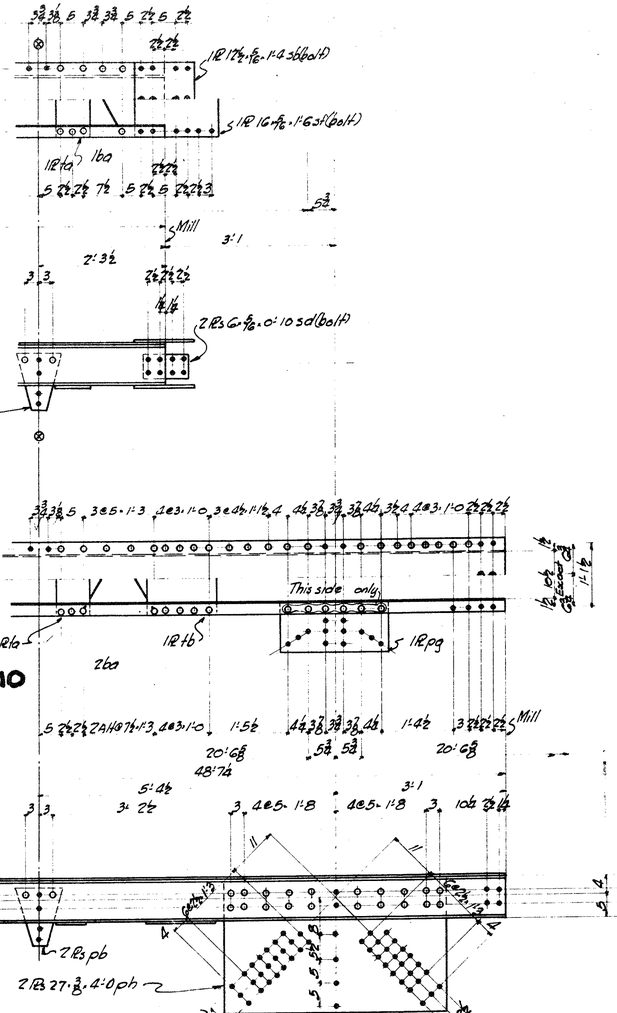
CONTRACT V 5585

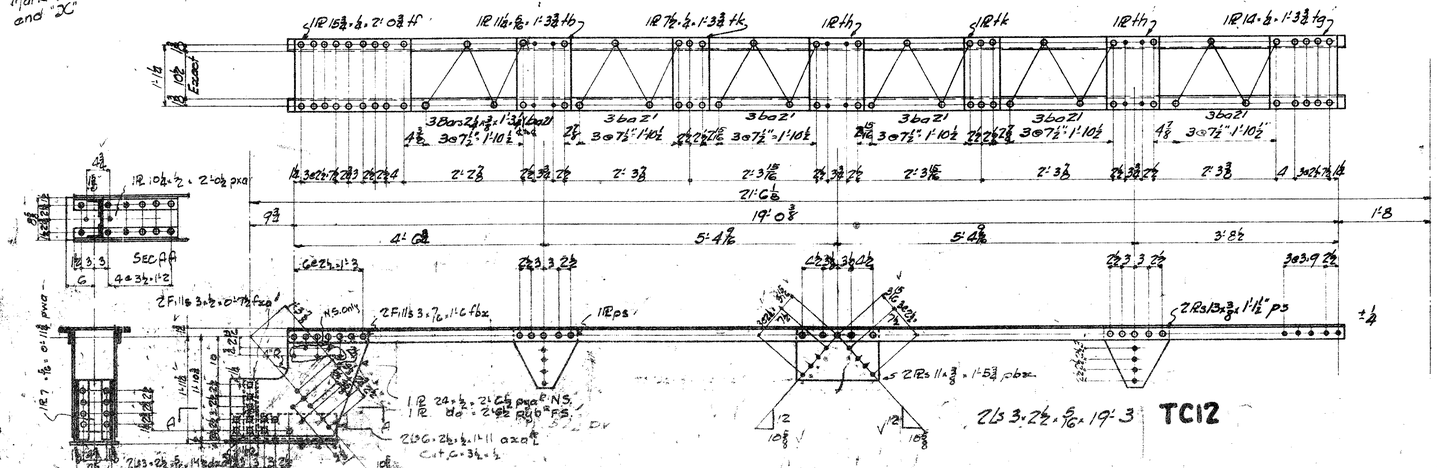
Details of Bottom Chord & Web Members for Suspended Trusses
For Bridge over James River
Location Richmond, Va.
Owner Atlantic Bridge Co.

VIRGINIA BRIDGE AND IRON CO.
ROANOKE, VA.

To be fabricated at Roanoke Plant
Made by J.M.H. Traced by
In charge of Moore Checked by G.I.
Revised Fld Ch'k'g by
Scale 1 in. = 1 Ft. Sheet No. 16 of







Shop Note: Work this Dwg. with Dwg. "15

REQUIRED LIST		
No	Description	Mark
4	Top Chords as shown	TC9R
4	" opp hand	TC9L
4	" as shown	TC10R
4	" opp hand	TC10L
8	" as shown	TC11R
8	" opp hand	TC11L
8	" as shown	TC12R
8	" opp hand	TC12L

GENERAL NOTES:

Material
Specifications
Rivets ⅞ ϕ
Holes 13/16 ϕ unless noted
Reaming
Shop Paint 1 Ct. Red Leod & oil
Field Paint
Erection
Field Conn's
Inspection

For General Notes see Sheet 1-2

Material on Shop Bills

Atlantic Bridge Co. Cont. 4400

CONTRACT V 5585

Details of Top Chord Sections

For Bridge over James River

Location Richmond, Va.

Owner Atlantic Bridge Co.

VIRGINIA BRIDGE AND IRON CO.
ROANOKE, VA.

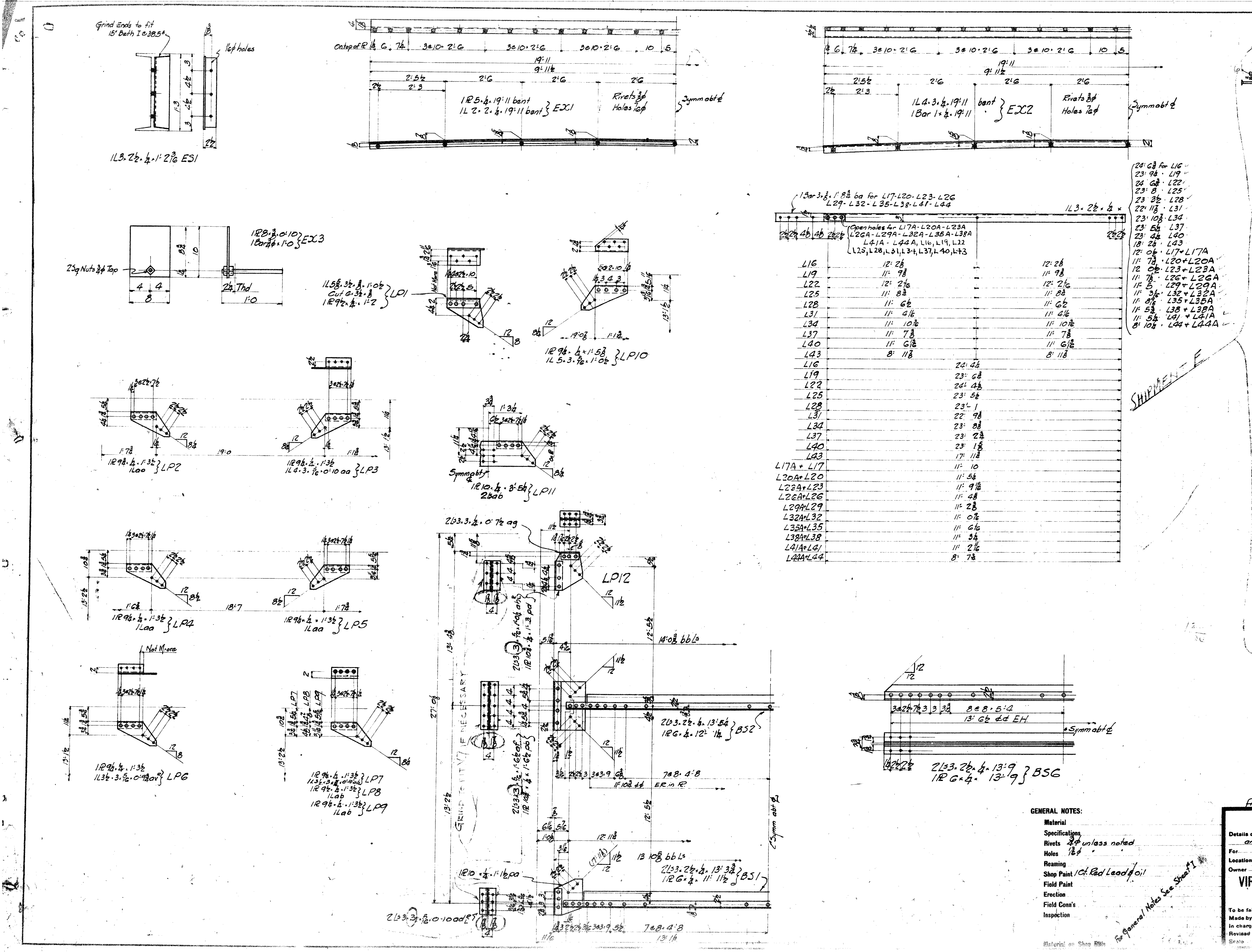
To be fabricated at Roanoke plant

Made by J.M.H. Traced by

In charge of Moore Checked by C.G.F. 9-2-24

Revised F'd Ch'g's by

Scale in. = 1 Ft. Sheet No. 20 of



REQUIRED LIST

No	Description	Mark
60	Stiffeners	ES1
6	Expansion Plates	EX1
6	" Slides	EX2
24	" Plates	EX3
204	Anchors ¾φ × 0'5 ctsk hd	AB4
8	Lateral Plates as shown	LP1R
8	" opp hand	LP1L
8	" as shown	LP2R
8	" opp hand	LP2L
8	" as shown	LP3R
8	" opp hand	LP3L
8	" as shown	LP4R
8	" opp hand	LP4L
8	" as shown	LP5R
8	" opp hand	LP5L
16	" as shown	LP6R
16	" opp hand	LP6L
10	" as shown	LP7R
10	" opp hand	LP7L
8	" as shown	LP8R
8	" opp hand	LP8L
2	" as shown	LP9R
2	" opp hand	LP9L
18	" as shown	LP10R
18	" opp hand	LP10L
18	" as shown	LP11
	"	
8	Bottom Struts	BS1
8	Struts	BS2
16	Lateral Plates	LP12
26	Laterals	L16
26	"	L17
8	"	L19
8	"	L20
8	"	L22
8	"	L23
10	"	L25
10	"	L26
8	"	L28
8	"	L29
8	"	L31
8	"	L32
8	"	L34
8	"	L35
10	"	L37
10	"	L38
18	"	L40
18	"	L41
16	"	L43
16	"	L44
9	Struts	BS6
26	Laterals	L17A
8	"	L20A
8	"	L23A
10	"	L26A
8	"	L29A
8	"	L32A
8	"	L35A
10	"	L38A
18	"	L41A
16	"	L44A

GENERAL NOTES:

- Material
- Specifications
- Rivets ¾φ unless noted
- Holes 13/16φ "
- Reaming
- Shop Paint 1 Ct. Red Lead & oil
- Field Paint
- Erection
- Field Conn's
- Inspection

For General Notes See Sheet #1

Material on Shop Bills

Atlantic Bridge Co Cont A400

CONTRACT V 5585

Details of Expansion Plates etc, Laterals and Lateral Plates
For Bridge over James River
Location Richmond, Va.
Owner Atlantic Bridge Co

VIRGINIA BRIDGE AND IRON CO.
ROANOKE, VA.

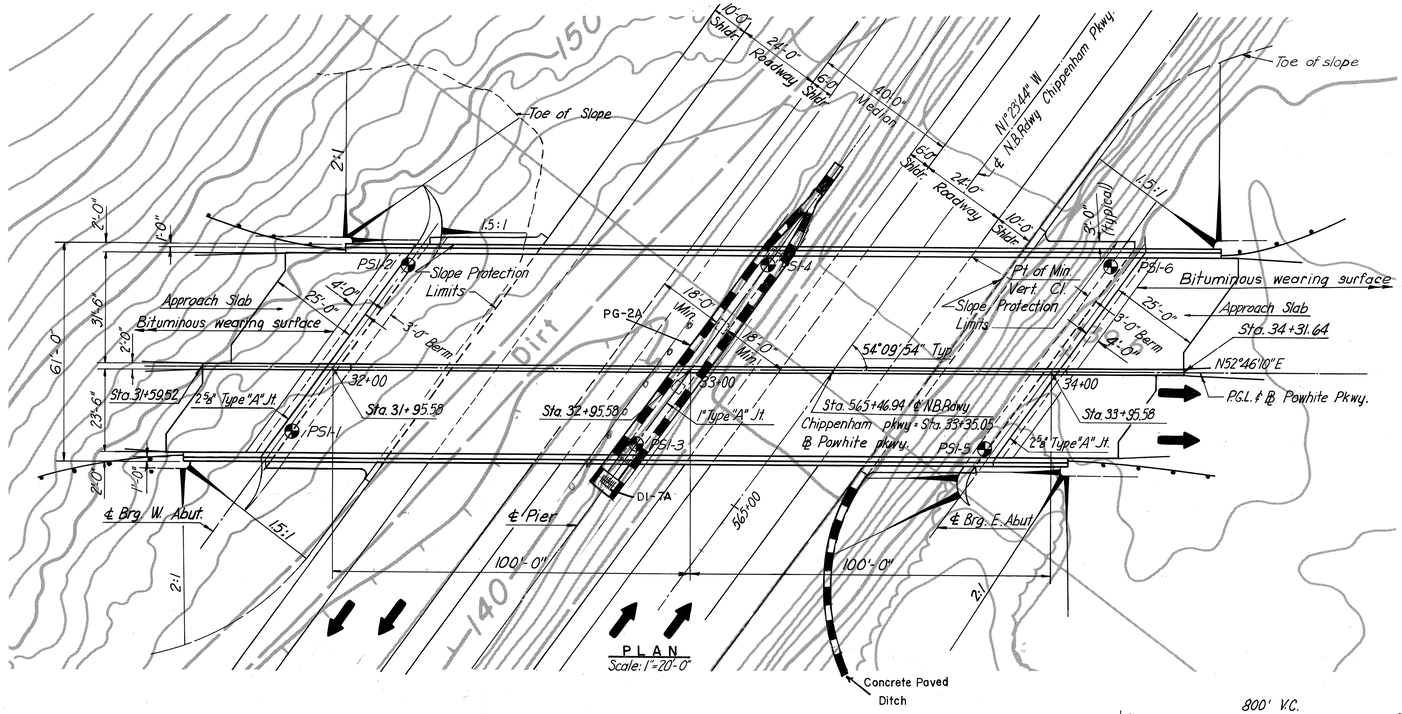
To be fabricated at Roanoke plant
Made by JMH Traced by
In charge of Moore Checked by
Revised Fld Ch'k'd by
Scale in. = 1 Ft. Sheet No. 22

Bridge 4

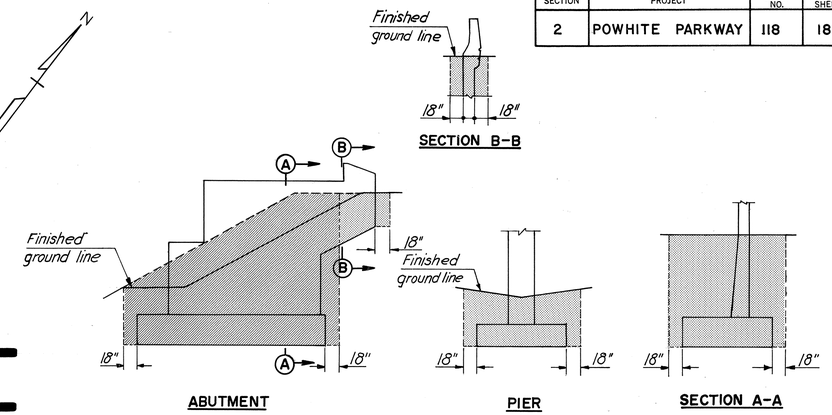
(SB Powhite Parkway Over Chippenham Parkway)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	118	188

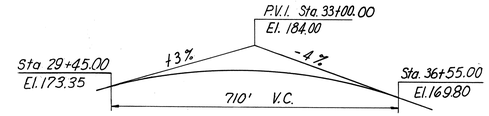


PLAN
Scale: 1"=20'-0"

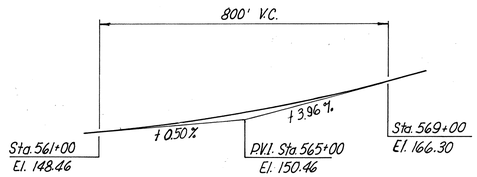


PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale

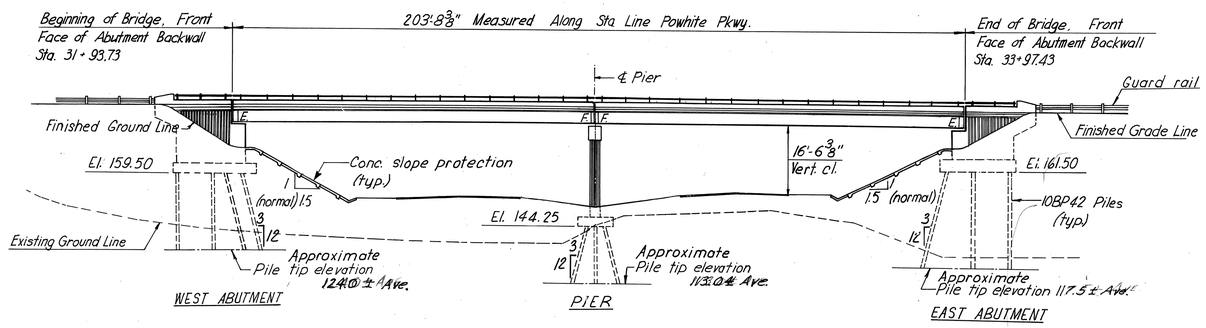
INDEX	
NO.	DESCRIPTION
1.	General Plan and Elevation
2.	General Notes and Quantities
3.	West Abutment
4.	East Abutment
5.	Abutment Details (1)
6.	Abutment Details (2)
7.	Pier Details
8.	Framing Plan
9.	Cross Section
10.	Deck Plans
11.	Joint Details
12.	Approach Slab and Slope Protection
13.	Boring Logs
14.	Boring Logs
S1.	Standard Shoe Details
S2.	Standard Aluminum Railing Details
S7.	Standard Architectural Details



PROFILE GRADE DATA
POWHITE PKWY.
No Scale



PROFILE GRADE DATA
CHIPPENHAM PKWY.
No Scale



ELEVATION
Scale: 1"=20'-0"

BORINGS: ⊕ Indicates location of 2½"ϕ cased hole boring.

BENCH MARKS: See Reference Ties and Field Control Data sheet in highway plans.
F-30 (Copper Weld Rod) Elevation 218.82
G-11 (Copper Weld Rod) Elevation 150.10

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.E.M.	9-1967	3	As Built	JRC	3-73
CHECKED	D.S.B.	3-27-68	2	Parapet	J.G.V.	12-70
IN CHARGE	PRY		1	Dimension	T.E.M.	5-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

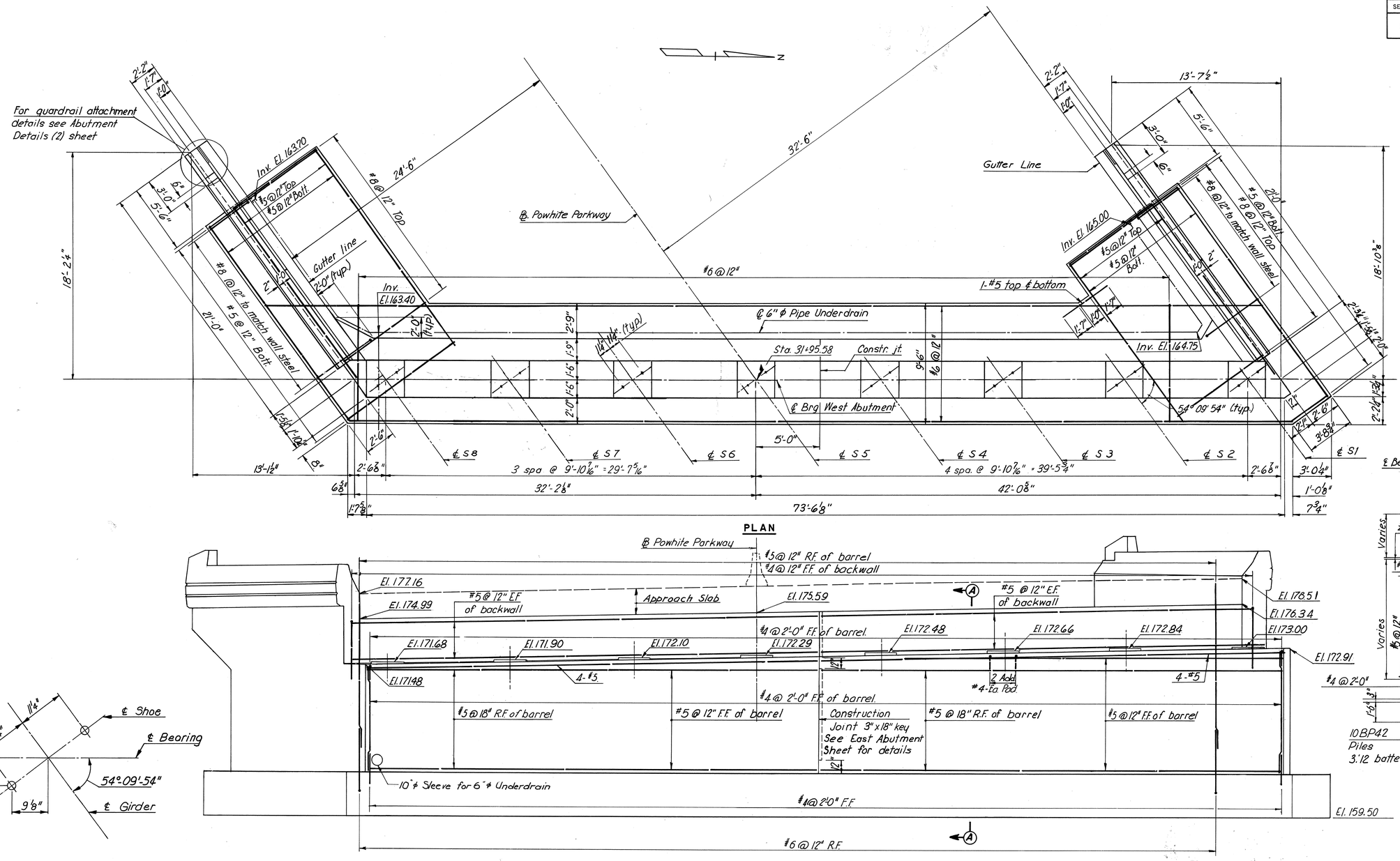
POWHITE PARKWAY OVER CHIPPENHAM PARKWAY
BRIDGE B-04

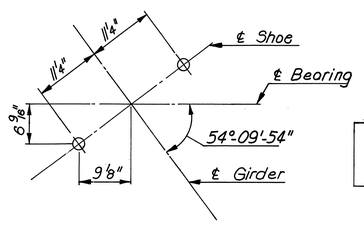
GENERAL PLAN & ELEVATION

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

SCALE: AS SHOWN
CONTRACT NO.: C-2
SHEET NO. 1 OF 14

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	120	188





BOLT SETTING PLAN
No Scale

SECTION A-A

ELEVATION

NOTES:
For anchor bolts and treatment of pads, see Standard Shoe Details sheet.
For architectural treatment of abutment wingwalls, see Standard Architectural Details sheets.

LEGEND:
F.F. denotes Front Face
R.F. denotes Rear Face
E.F. denotes Each Face

FOUNDATION NOTES:
Footings shall be founded at the elevation 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.
All piles shall be 10BP42 Steel Piles (Design Capacity = 45 tons).
For Pile Plan see Abutment Details (2), Sheet No. 6.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.S.K.	8/1/47.	2	As Built	JRC	3-73
CHECKED	T.E.M.	10/23/67	1	Parapet	EVR	12-70
IN CHARGE	PRY					

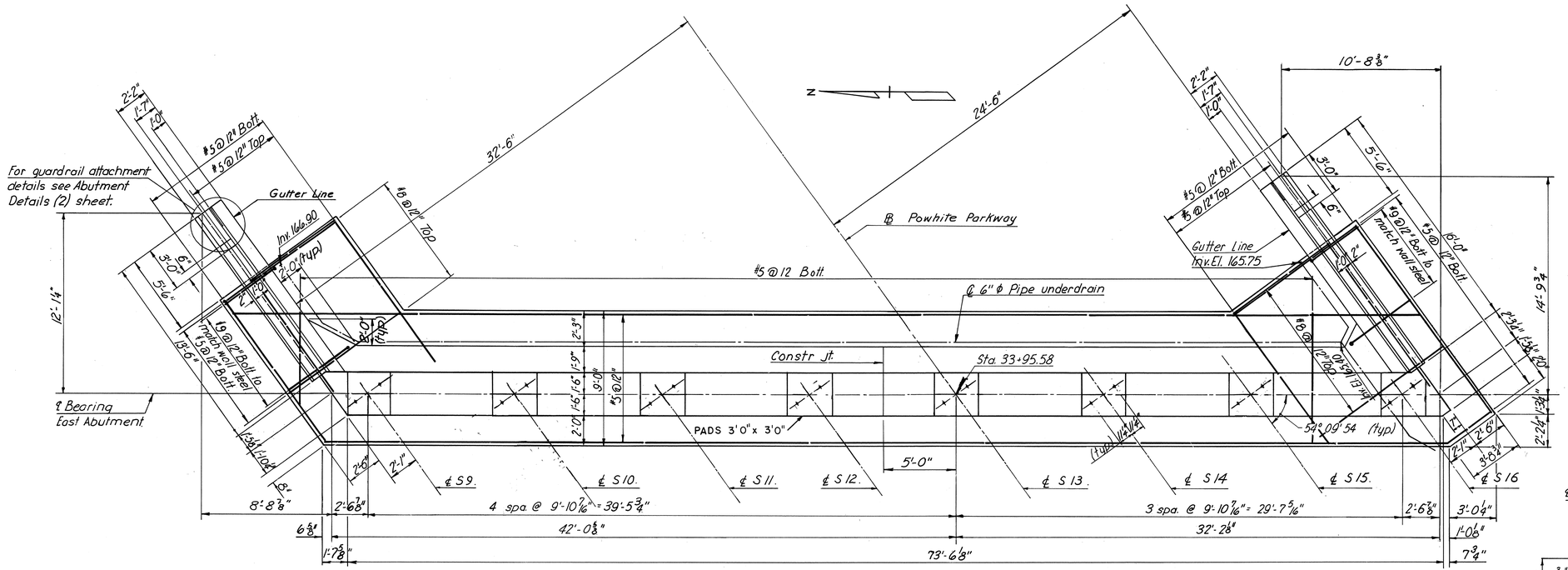
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

POWHITE PARKWAY OVER CHIPPENHAM PARKWAY
BRIDGE B-04
WEST ABUTMENT

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

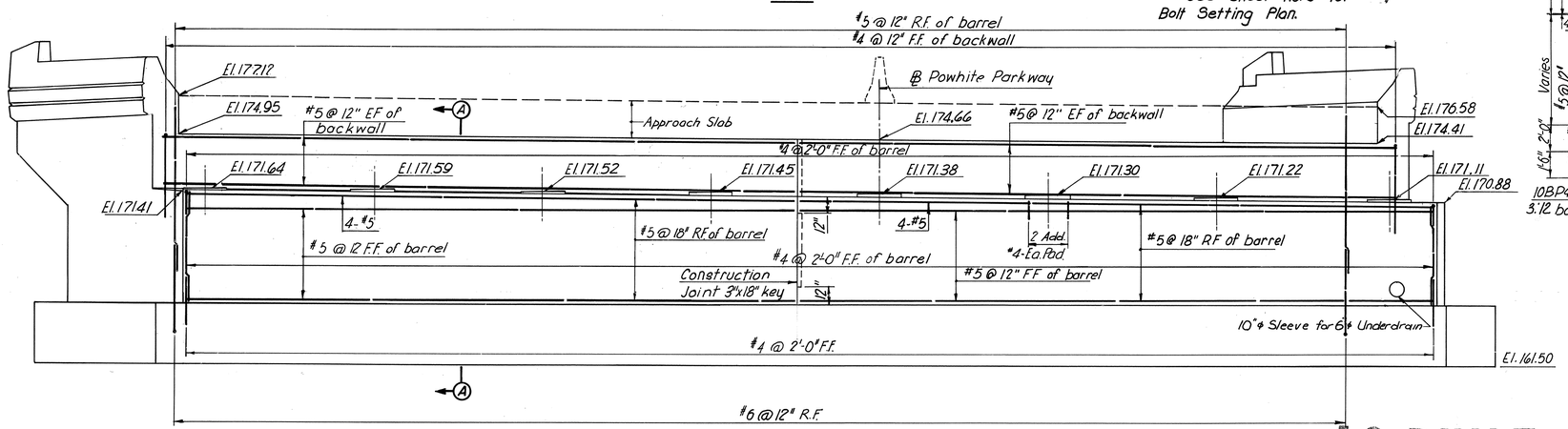
SCALE: 1/4" = 1'-0"
CONTRACT NO.: 2
SHEET NO. 3 OF 14

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	121	188

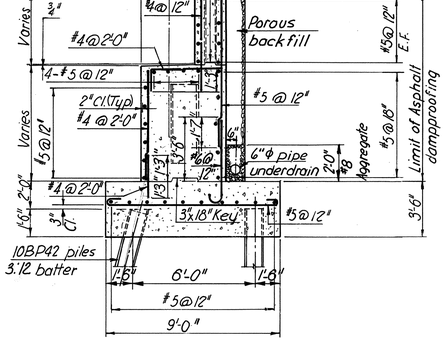


PLAN

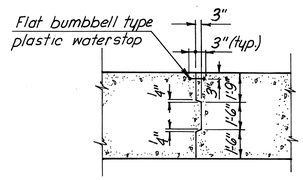
Note:
See Sheet No. 3 for Bolt Setting Plan.



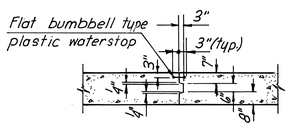
ELEVATION



SECTION A-A



TYPICAL CONSTRUCTION JOINT DETAIL THRU ABUTMENT BARREL



TYPICAL CONSTRUCTION JOINT DETAIL THRU ABUTMENT BACKWALL

AS BUILT

NOTES:
For anchor bolts and treatment of pads, see Standard Shoe Details sheet.
For architectural treatment of abutment wingwalls, see Standard Architectural Details sheets.

LEGEND:
F.F. denotes Front Face
R.F. denotes Rear Face
E.F. denotes Each Face

For Pile Plan see Abutment Details, Sheet No. 6.

FOUNDATION NOTES:
Footings shall be founded at the elevation 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.
All piles shall be 10BP42 Steel Piles (Design Capacity = 45 tons).

	BY	DATE				
MADE	F.S.K.	7/67	2	As Built	JRC	3-73
CHECKED	T.E.M.	10-25-67	1	Parapet	J.G.V	12-70
IN CHARGE	PRY		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

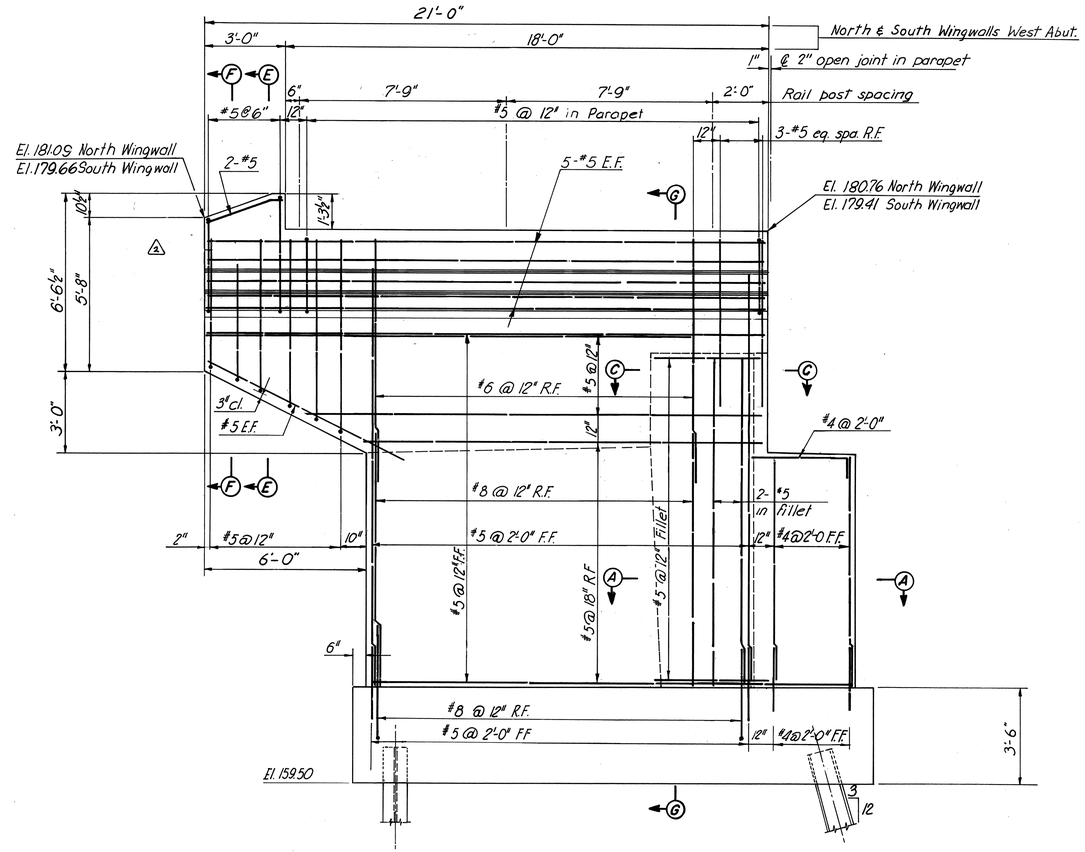
POWHITE PARKWAY OVER CHIPPENHAM PARKWAY
BRIDGE B-04

EAST ABUTMENT

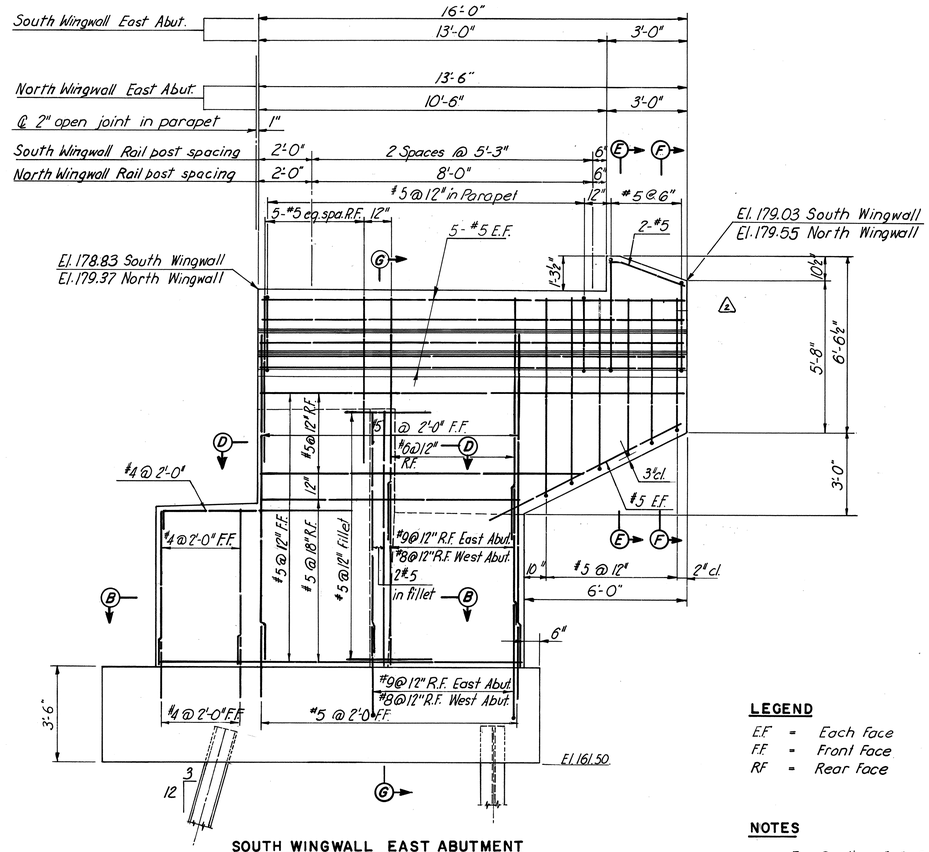
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1/4" = 1'-0"
CONTRACT NO.: 2
SHEET NO. 4 OF 14

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	122	188



SOUTH WINGWALL WEST ABUTMENT
(North Wingwall similar)



SOUTH WINGWALL EAST ABUTMENT
(North Wingwall similar except where noted)

LEGEND

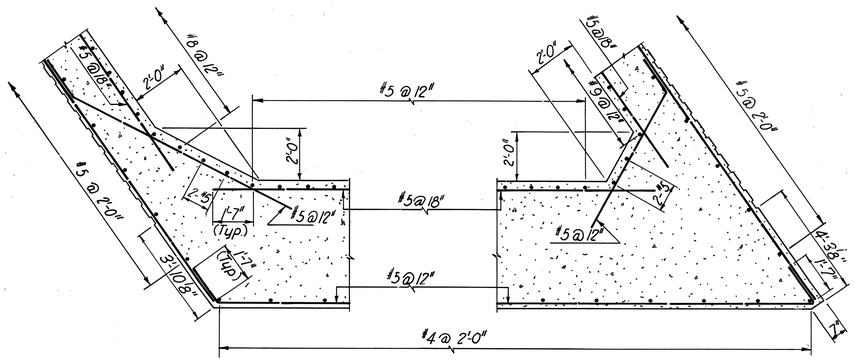
EF = Each Face
FF = Front Face
RF = Rear Face

NOTES

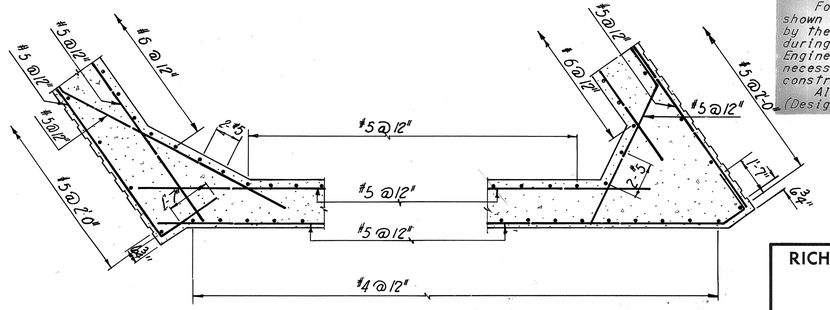
For Section E-E, Section F-F and Section G-G see next sheet.
For Guardrail Attachment Details see Abutment Details (2) sheet.

FOUNDATION NOTES:

Footings shall be founded at the elevation 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.
All piles shall be 10BP42 Steel Piles (Design Capacity = 45 tons).



SECTION A–A **SECTION B–B**



SECTION C–C **SECTION D–D**

	BY	DATE				
			3	As Built	JRC	3-73
MADE	T.S.K.	8/67	2	Reinf. Bars	TEM	8-71
CHECKED	T.E.M.	10-27-67	1	Parapet	J.G.V.	12-70
IN CHARGE	PRY		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

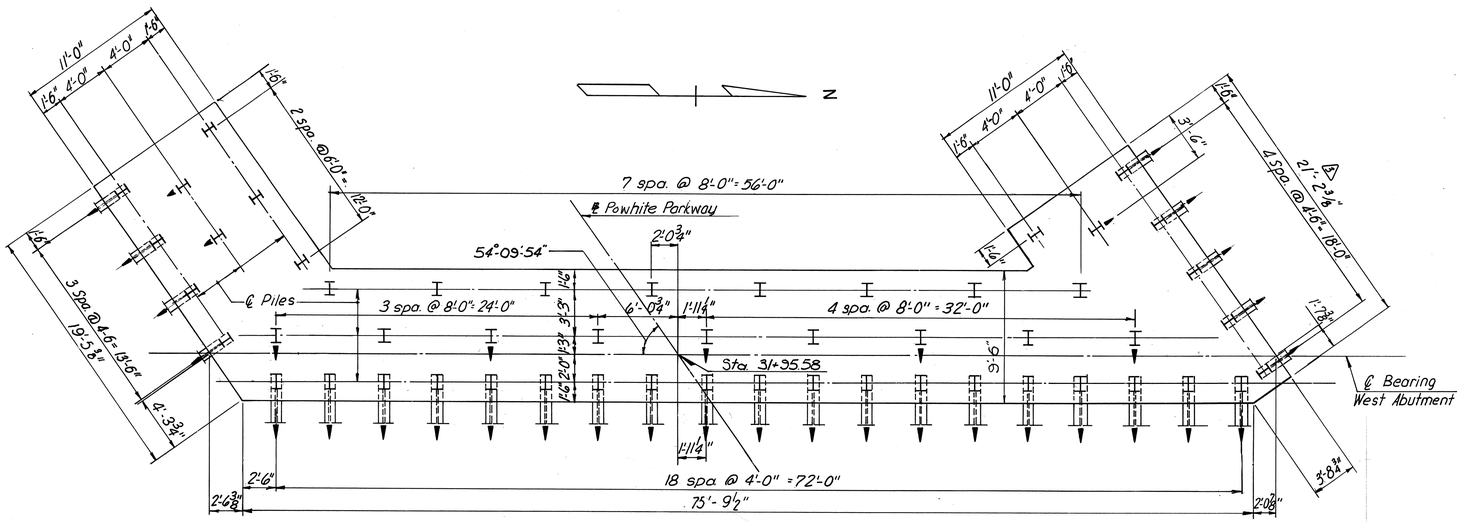
POWHITE PARKWAY OVER CHIPPENHAM PARKWAY
BRIDGE B-04

ABUTMENT DETAILS (1)

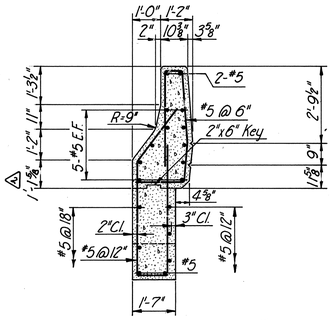
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 3/8" = 1'-0"
CONTRACT NO.: 2
SHEET NO. 5 OF 14

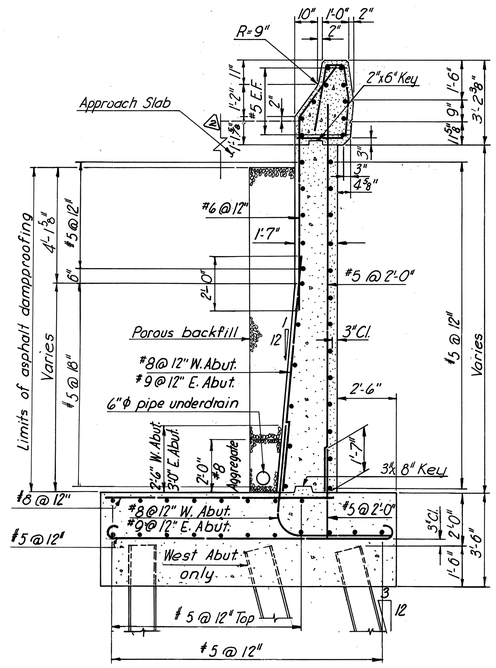
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	123	188

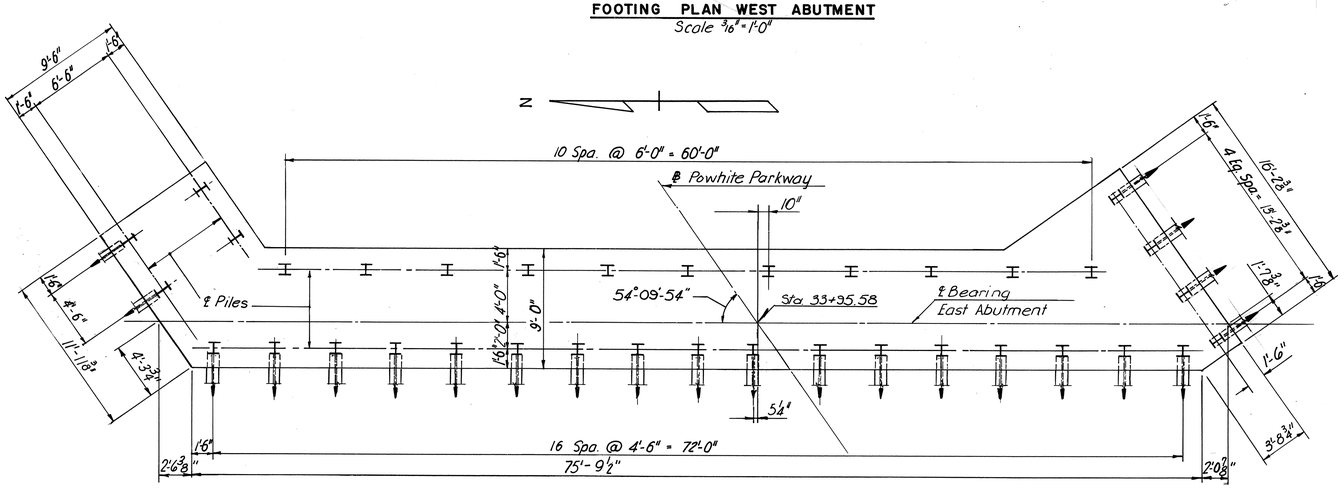


FOOTING PLAN WEST ABUTMENT
Scale 3/16" = 1'-0"

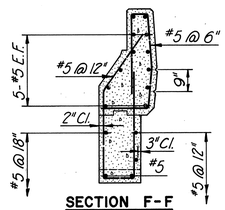


SECTION E-E
Scale: 3/8" = 1'-0"

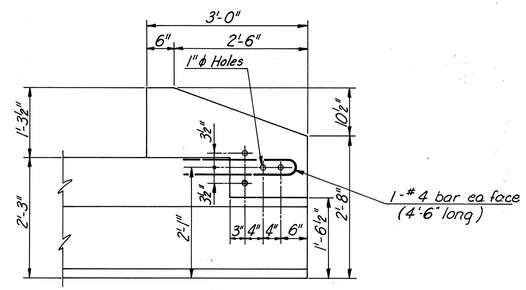




FOOTING PLAN EAST ABUTMENT
Scale 1/16" = 1'-0"



SECTION F-F
Scale: 3/8" = 1'-0"
(For dimensions not shown see Section E-E.)



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

GUARDRAIL ATTACHMENT DETAILS

Notes:
Pile dimensions are given at bottom of footing.
For location of Sections t-t, f-f and g-g see preceeding sheet.
Arrows indicate direction of 3 in 12 batter piles.

FOUNDATION NOTES:
Footings shall be founded at the elevation 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.
All piles shall be 10BP42 Steel Piles (Design Capacity = 45 tons).

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	E.F.	10-23-67	3	As Built	JRC	3-73
CHECKED	T.E.M.	11-2-67	2	Parapet Dim.	T.E.M	8-71
IN CHARGE	PRY		1	Parapet	J.G.V.	12-70

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

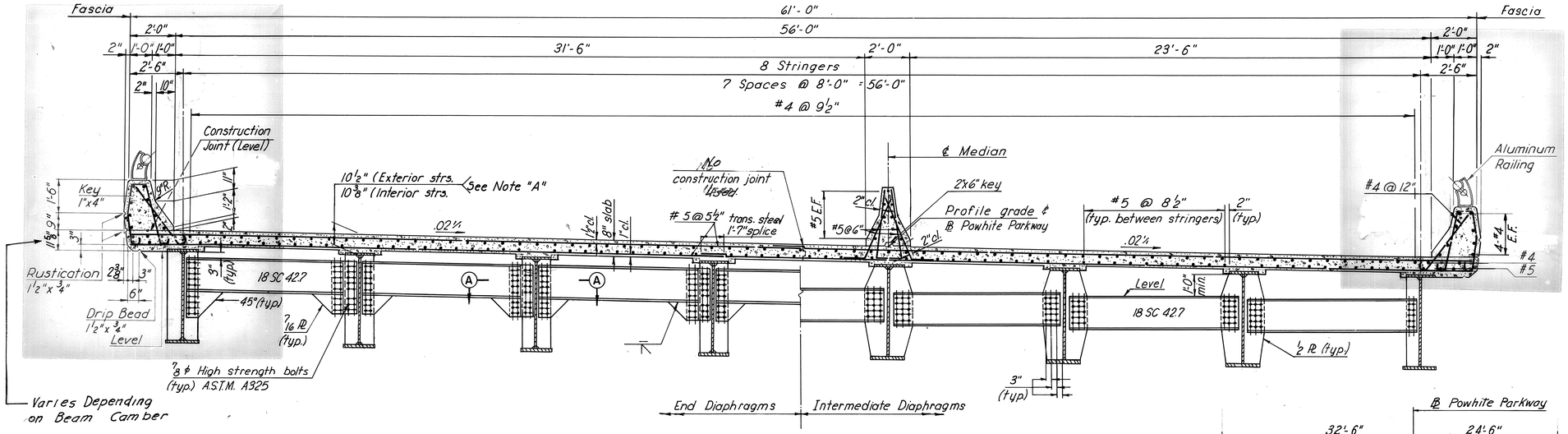
POWHITE PARKWAY OVER CHIPPENHAM PARKWAY
BRIDGE B-04

ABUTMENT DETAILS (2)

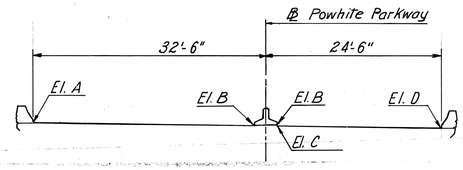
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 6 OF 14

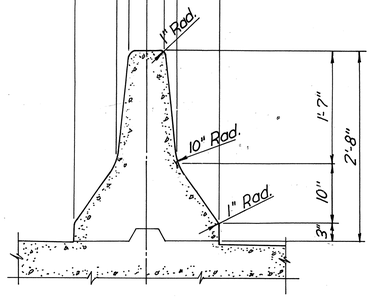
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	126	188



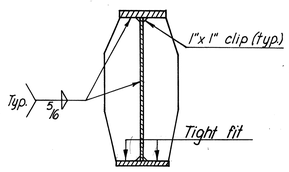
TYPICAL CROSS SECTION
Scale 3/8" = 1'-0"



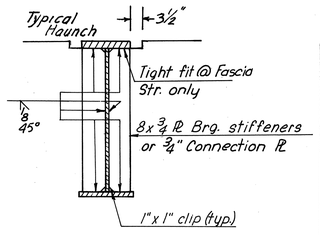
NOTE "A":
Dimension shown is measured from top of web to top of slab at the intersection of the centerline of stringer and the centerline of bearing. This dimension may be varied between bearings as required to care for variation in camber, except that no portion of the stringer flange may fall within the 8" slab.



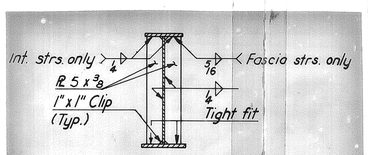
TYPICAL MEDIAN SECTION
Scale 1"=1'-0"



INTERIOR DIAPHRAGM CONNECTION PLATE
Scale ½"=1'-0"

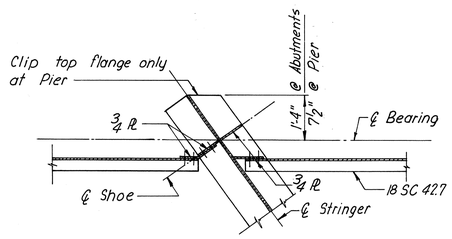


END DIAPHRAGM CONNECTION PLATE AND/OR BEARING STIFFENERS



Note: Stiffener shall be welded to compression flange and have a tight fit to the tension flange.

INTERMEDIATE STIFFENER DETAIL



SECTION A-A
Scale ½"=1'-0"

GUTTER LINE ELEVATION

STATION	EL. A	EL. B	EL. C	EL. D
31+60.00	178.17	177.54	177.50	177.03
70.00	178.25	177.62	177.58	177.11
76.04	——	——	——	177.16
80.00	178.33	177.70	177.66	177.19
90.00	178.39	177.76	177.72	177.25
93.01	——	——	177.73	——
94.45	——	177.78	——	——
32+00.00	178.44	177.81	177.77	177.30
10.00	178.49	177.86	177.82	177.35
17.20	178.51	——	——	——
20.00	178.52	177.89	177.85	177.38
30.00	178.55	177.92	177.88	177.41
40.00	178.56	177.93	177.89	177.42
50.00	178.56	177.93	177.89	177.42
60.00	178.56	177.93	177.89	177.42
70.00	178.54	177.91	177.87	177.40
77.89	——	——	——	177.39
80.00	178.52	177.89	177.85	177.38
90.00	178.48	177.85	177.81	177.34
94.86	——	——	177.79	——
96.30	——	177.83	——	——
33+00.00	178.44	177.81	177.77	177.30
10.00	178.38	177.75	177.71	177.24
19.05	178.33	——	——	——
20.00	178.32	177.69	177.65	177.18
30.00	178.24	177.61	177.57	177.10
40.00	178.16	177.53	177.49	177.02
50.00	178.06	177.43	177.39	176.92
60.00	177.96	177.33	177.29	176.82
70.00	177.85	177.22	177.18	176.71
79.74	——	——	——	176.58
80.00	177.72	177.09	177.05	176.58
90.00	177.59	176.96	176.92	176.45
96.71	——	——	176.83	——
98.51	——	176.85	——	——
34+00.00	177.45	176.82	176.78	176.31
10.00	177.29	176.66	176.62	176.15
20.00	177.13	176.50	176.46	175.99
20.90	177.12	——	——	——
30.00	176.95	176.32	176.28	175.81

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.E.M.	9-21-67	2	As Built	JRC	3-73
CHECKED	D.E.K.	10-67	1	Parapet	EVR	12-70
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

POWHITE PARKWAY OVER CHIPPENHAM PARKWAY
BRIDGE B-04
CROSS SECTION

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

SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 9 OF 14

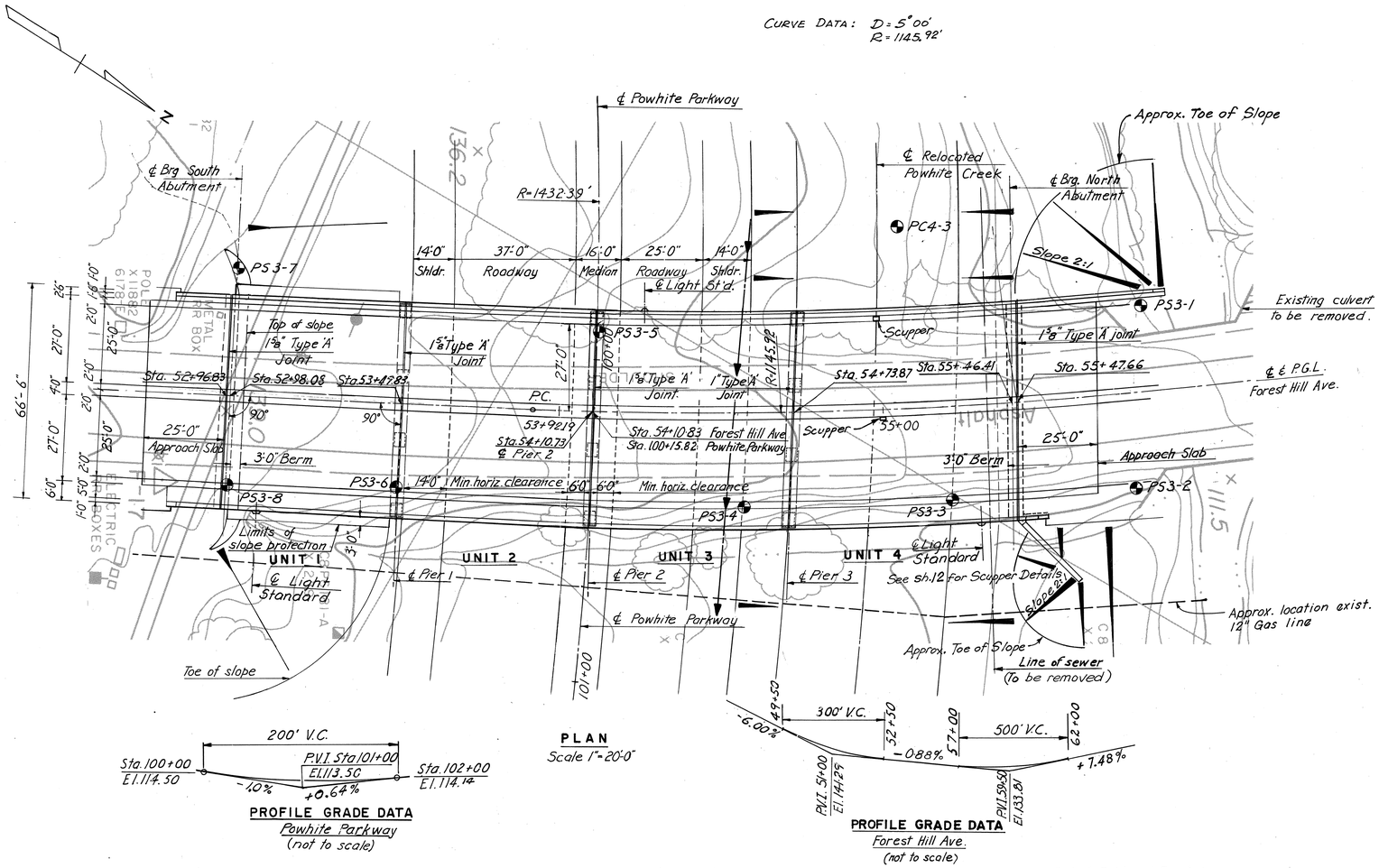
Bridge 6

(Forest Hill Avenue over Powhite Parkway)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	151	188

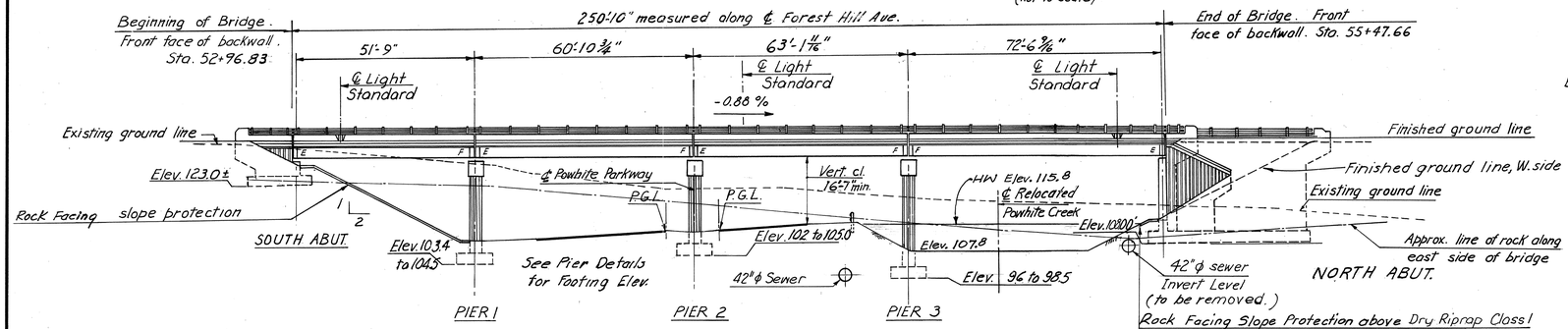
CURVE DATA: D = 5°00'
R = 1145.92'



PLAN
Scale 1"=20'-0"

PROFILE GRADE DATA
Powhite Parkway
(not to scale)

PROFILE GRADE DATA
Forest Hill Ave.
(not to scale)



ELEVATION
Scale 1"=20'-0"

GENERAL NOTES:

ROADWAY: Two 27'-0" Clear roadways. One 5'-0" sidewalk. One 1'-6" curb.

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 Highways 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 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 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. (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 A.S.T.M. A615, Grade 40. All reinf. bar dimensions on the detailed drawings are to be to the 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 7/8" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

BENCH MARK: See Reference Ties and Field Control Data sheet in highway plans.
F-17 (Copper Weld Rod) Elevation 139.03
F-18 (Copper Weld Rod) Elevation 141.18

BORINGS: ◓ Indicates location of 2½"ϕ cased hole boring.

AS BUILT

INDEX					
NO.	DESCRIPTION				
1	General Plan and Elevation	7	Pier 1 Details	16	Utility Support Det. At Bridge Abut.
2	Quantities and Misc. Details	8	Pier 2 & 3 Details	17	Approach Slab and Slope Pro. Det.
3	South Abutment Details	9	Framing Plan	18	Boring Logs
4	North Abutment Details	10	Typ. Transverse Section	S1	Standard Shoe Details
5	North Abutment Details (1)	11	Deck Plans	S3	Standard Alum. Rail. Det. (2 Rail)
6	North Abutment Details (2)	12	Scupper Details	S7	Standard Architectural Details
		13	Electrical Detail	S8	Standard Architectural Details
		14	Joint Details		
		15	Conduit Installation Details		

	BY	DATE
MADE	JLN	2-68
CHECKED	THN	2-68
IN CHARGE	RHW	

NO.	REVISION	BY	DATE
1	As Built	JRC	3-73

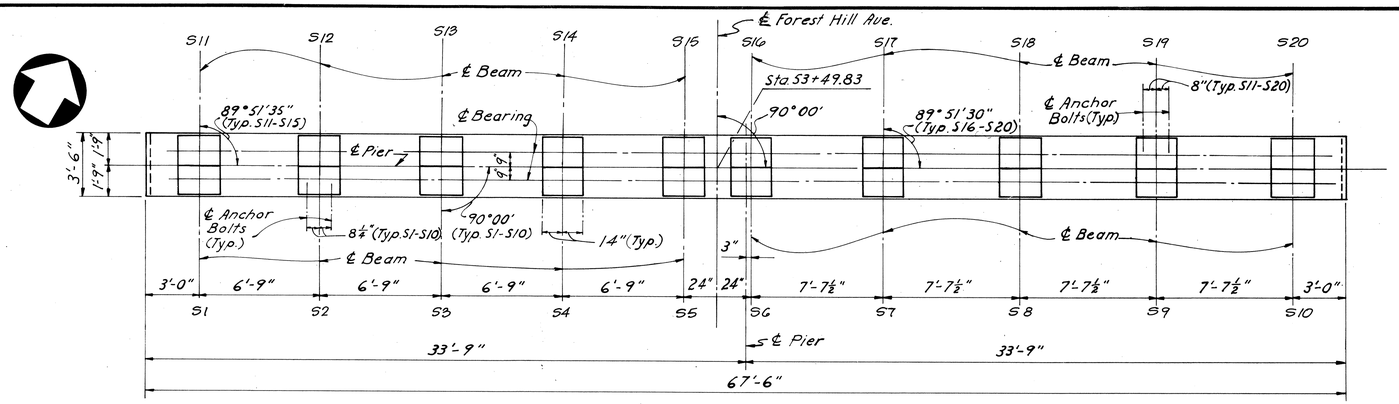
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
GENERAL PLAN & ELEVATION

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

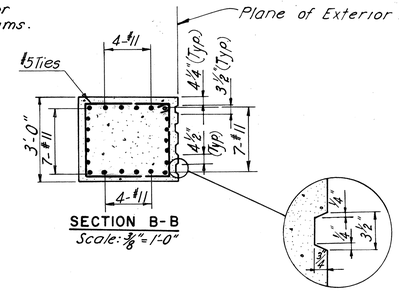
SCALE: AS SHOWN
CONTRACT NO.: C-2
SHEET NO. 1 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	157	188



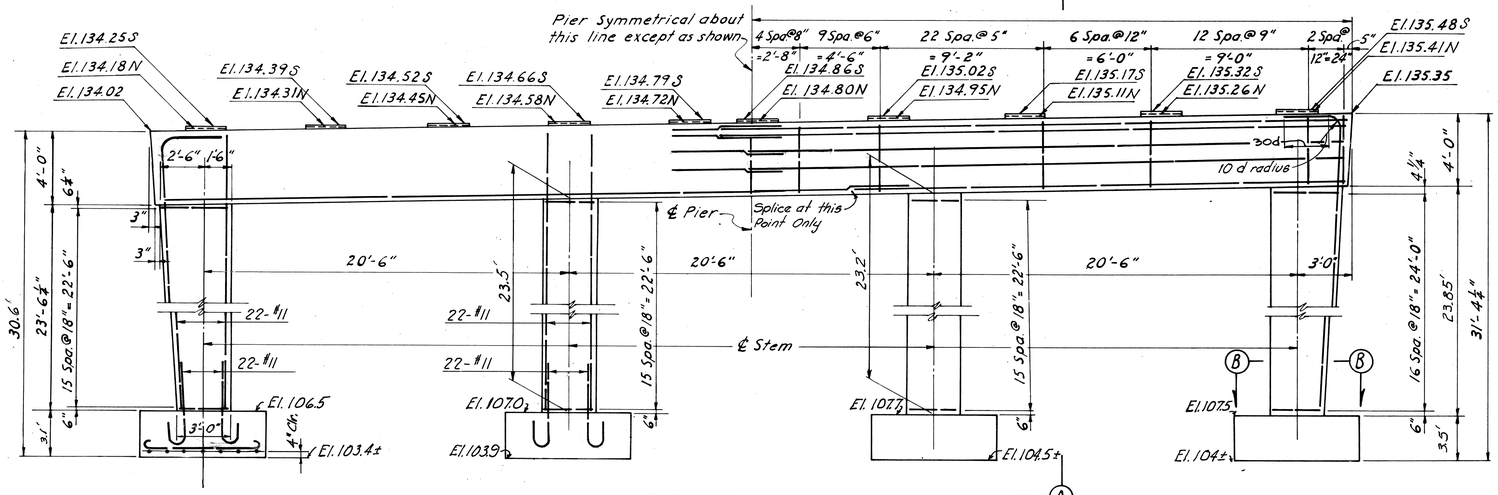
PLAN
Scale: ¼"=1'-0"

NOTE :
See sh. 2 for Anchor Bolt Setting Diagrams.

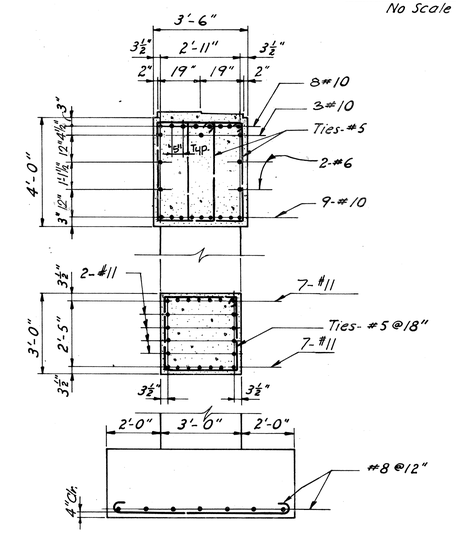


SECTION B-B
Scale: ⅜"=1'-0"

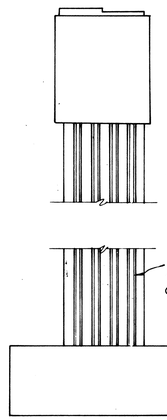
RUSTICATION DETAILS
No Scale



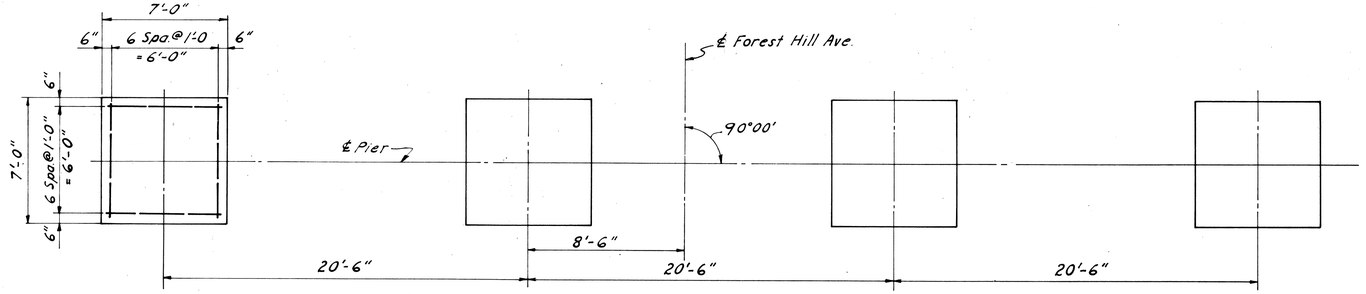
ELEVATION - PIER
Scale: ¼"=1'-0"



SECTION A-A
Scale: ⅜"=1'-0"



END ELEVATION
Scale: ⅜"=1'-0"



FOOTING PLAN
Scale: ¼"=1'-0"

NOTE: All pier 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.

	BY	DATE				
MADE	JLN	2-68				
CHECKED	THN	2-68	1	As Built	JRC	3-73
IN CHARGE	RHW		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

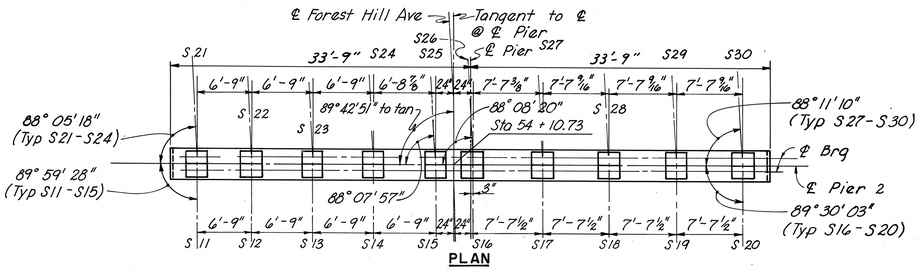
FOREST HILL AVENUE OVER POWHITE PARKWAY
BRIDGE B-06
PIER I DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

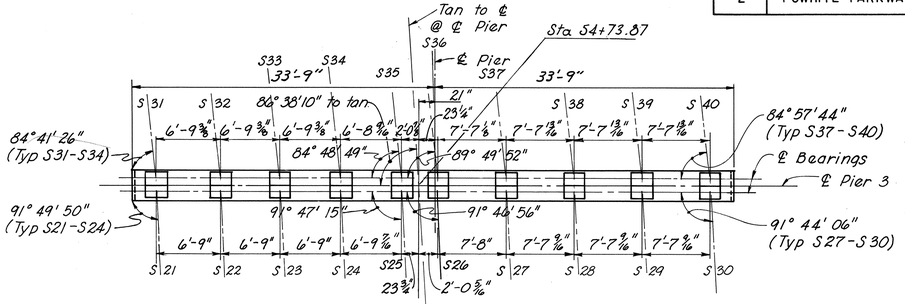
SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 7 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	158	188

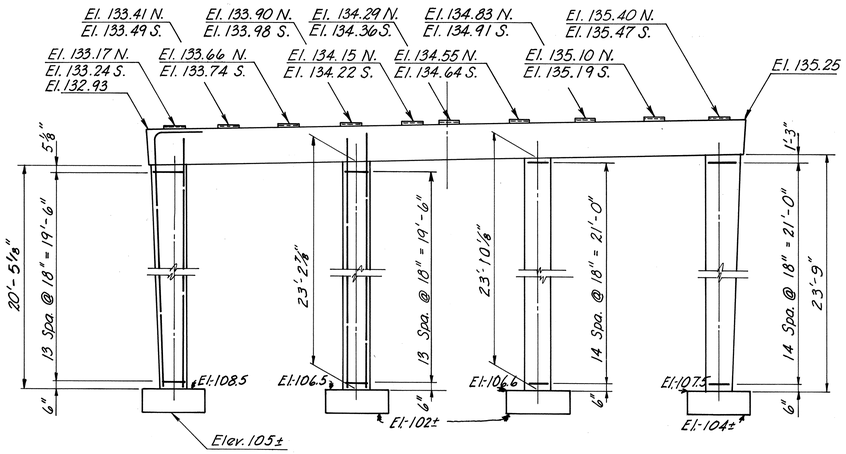


PLAN

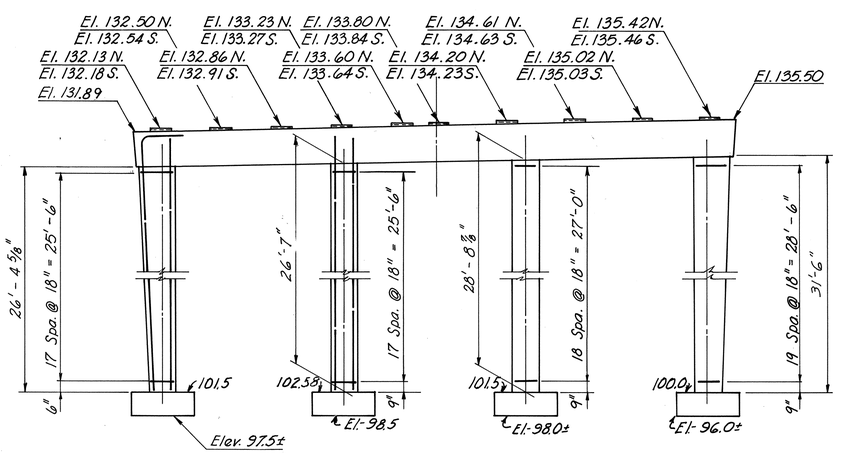
NOTE :
See sh. 2 for Anchor Bolt Setting Diagrams.



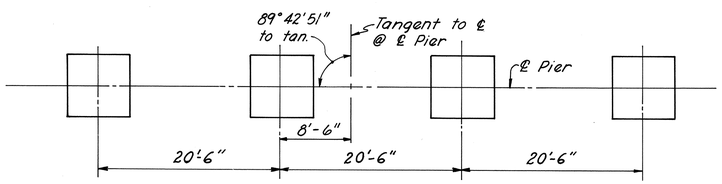
PLAN



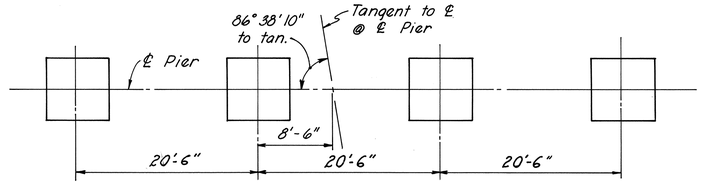
ELEVATION - PIER 2



ELEVATION - PIER 3



FOOTING PLAN



FOOTING PLAN

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JLN	2-68				
CHECKED	THN	2-68	1	As Built	JRC	3-73
IN CHARGE	RHW					

Note: For dimensions, reinforcement and details not shown, see Pier 1, Sheet 7

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

FOREST HILL AVENUE OVER
POWHITE PARKWAY
BRIDGE B-06

PIERS 2 & 3 DETAILS

HAYES, SEAY, MATTERN & MATTERN
Associate Engineers

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1/8" = 1'-0"
CONTRACT NO.: 2
SHEET NO. 8 OF 18

Bridge 8

(Powhite Parkway “Rte. 76” Over James River, Kanawha Canal and CSX RR)

Record Set Plans

LIMITED ACCESS HIGHWAY

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

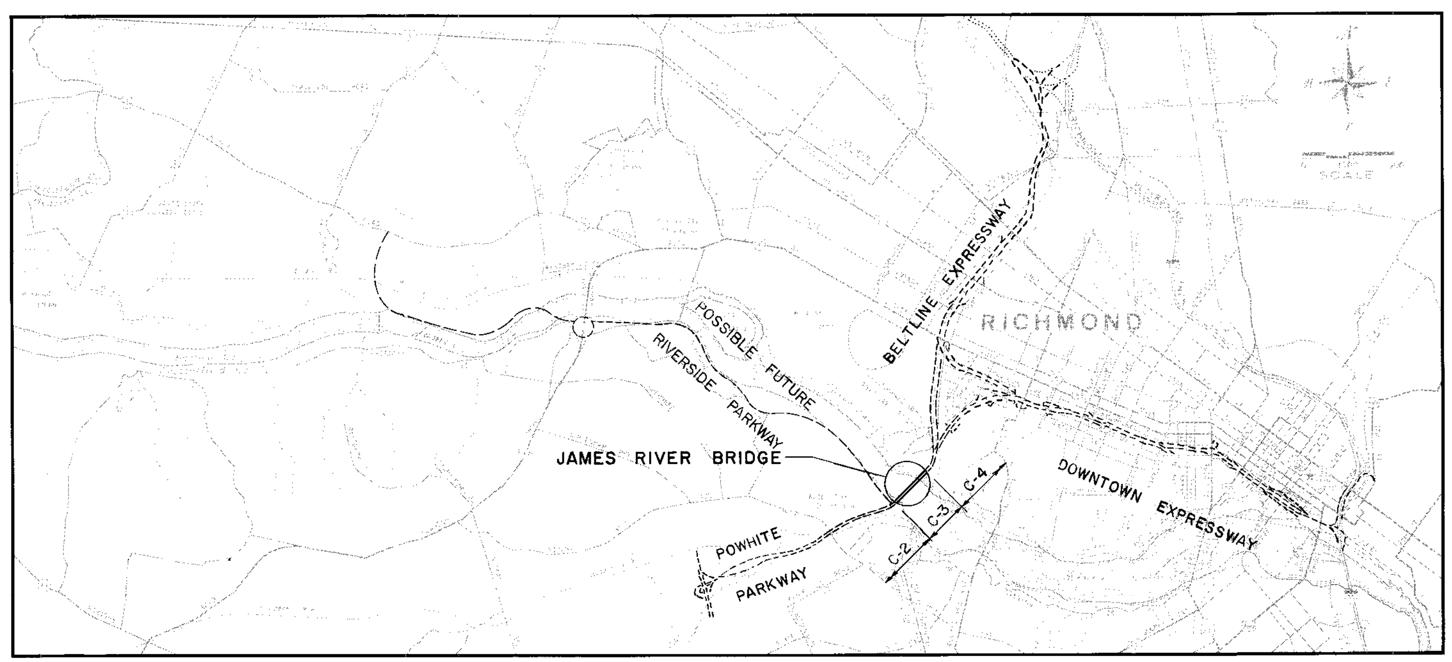
RICHMOND METROPOLITAN AUTHORITY

PLAN AND PROFILE OF PROPOSED

RICHMOND EXPRESSWAY SYSTEM

CHESTERFIELD COUNTY
CITY OF RICHMOND

JAMES RIVER BRIDGE



CONTRACT C-3

BRIDGE B-8

INDEX OF SHEETS

SUBMITTED BY

Date
1-22-71 John P. Fowler III
Date
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
general consultant

RECOMMENDED BY

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

APPROVED BY

1-22-71 Chas. A. ...
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		

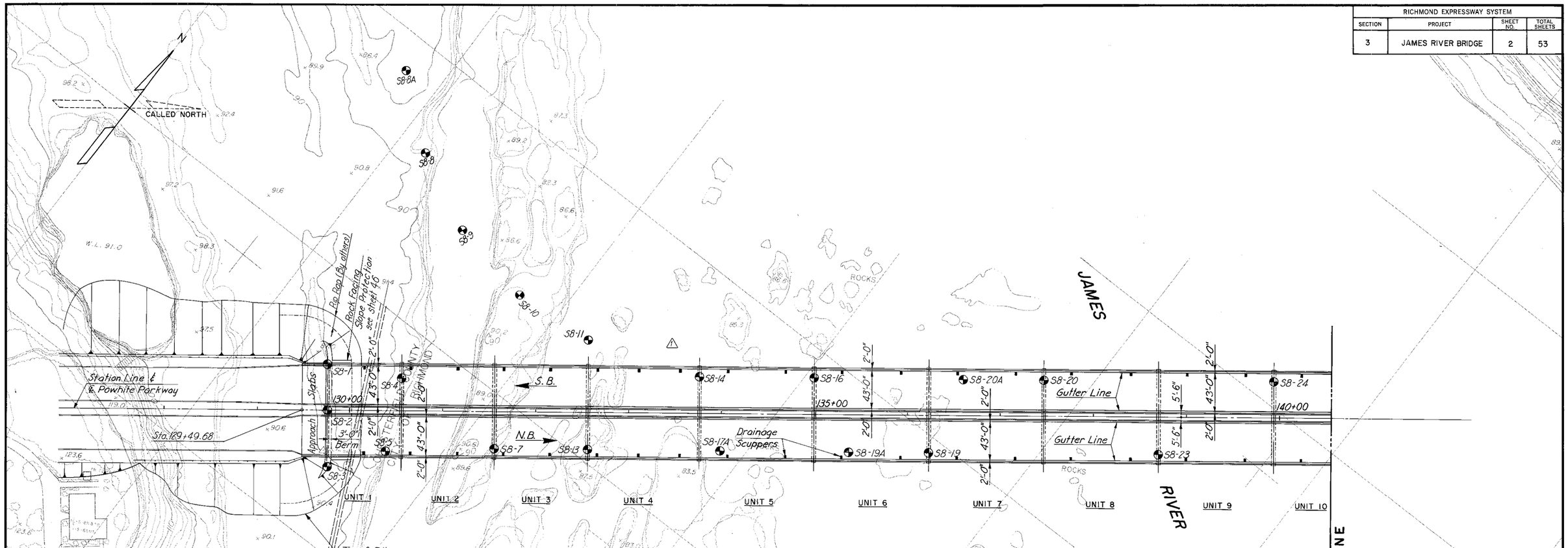
CONVENTIONAL SIGNS

STATE LINE
COUNTY LINE
CITY, TOWN OR VILLAGE
RIGHT OF WAY LINE
FENCE LINE
UNFENCED PROPERTY LINE
FENCED PROPERTY LINE
TRAVELED WAY
GUARD RAIL
RETAINING WALL
RAILROADS
BASE OR SURVEY LINE

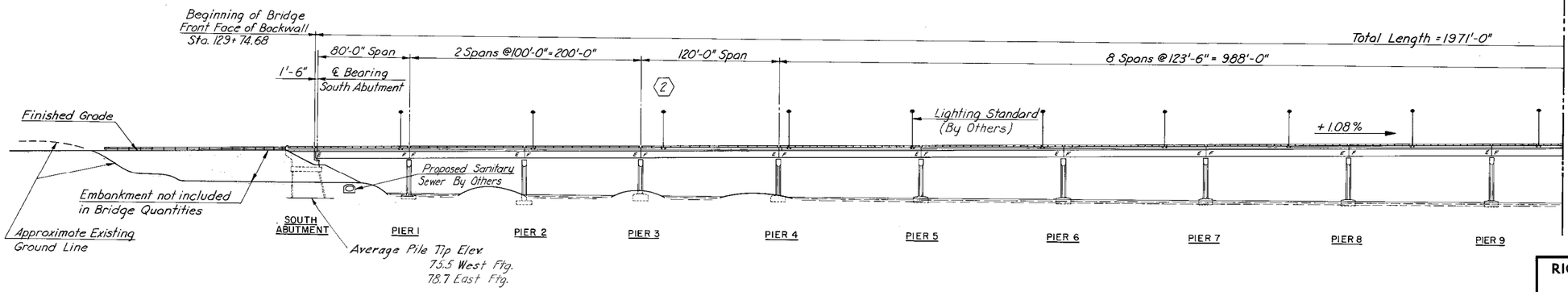
LEVEE OR EMBANKMENT
BRIDGES
CULVERTS
DROP INLET
TROLLEY POLES
POWER POLES
TELEPHONE OR TELEGRAPH POLES
MARSH
HEDGE
WOODS
GROUND ELEVATION
GRADE ELEVATION
POLES WITHIN CONSTRUCTION LIMITS

⚠ Index Revised J.G.V. 2-20-71

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



PLAN



ELEVATION

△1

CURVE DATA SUMMARY																
CURVE NO.	△	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°46'10.5"W	S60°46'10.5"W	P.C. 10+00.00	~~52,636.89~~	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'	~~183.45'~~	331.30'	S60°46'10.5"W	N57°59'54.0"W	P.C.C. 10+80.00	52,647.09	50,869.14	12+63.45	~~52,551.50~~	~~50,709.05~~	P.C.C. 14+11.30	52,654.72	50,553.48
3	~~30°20'06"~~	~~10°00'00"~~	572.96'	153.52'	300.00'	N57°59'54.0"W	N 27°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

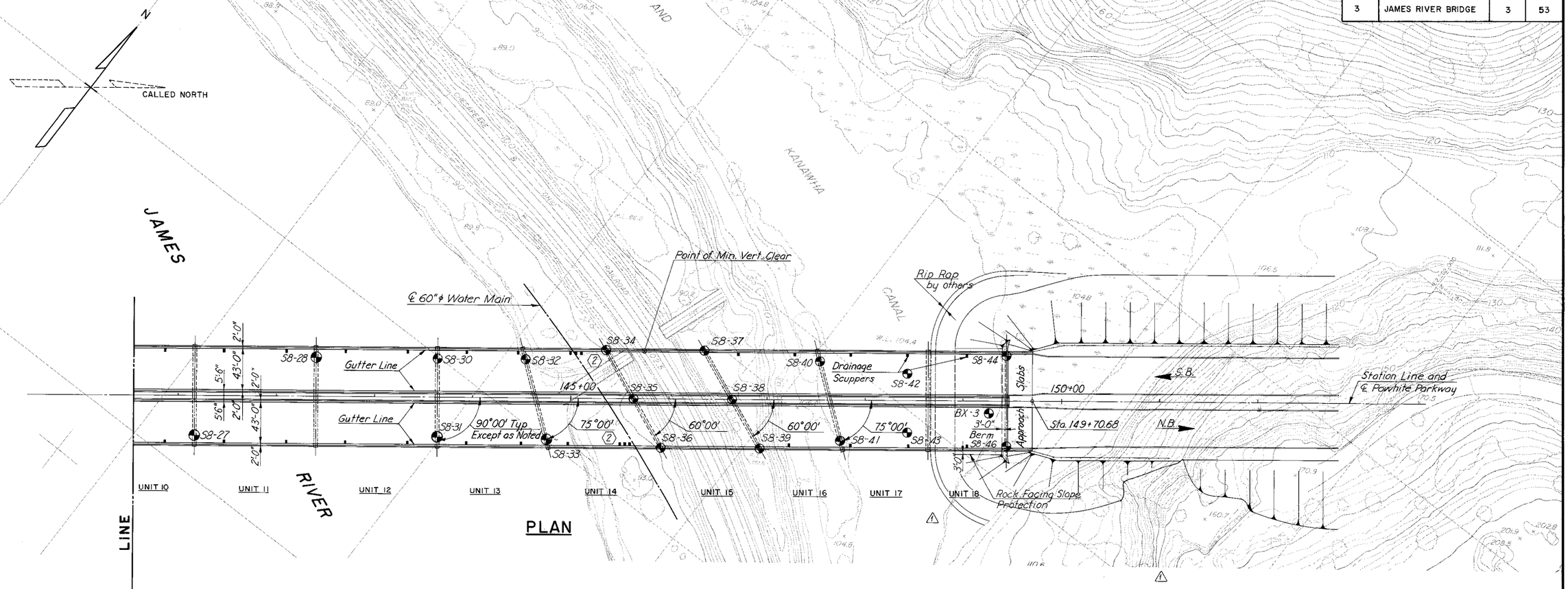
JAMES RIVER BRIDGE

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

NO.	REVISION	BY	DATE
3	AS BUILT	JRC	12-72
②	Scupper Location	J.G.V.	3/9/71
⚠	Elim. Disposal Area Add Foot Path	E.V.R.	2/20/71

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE

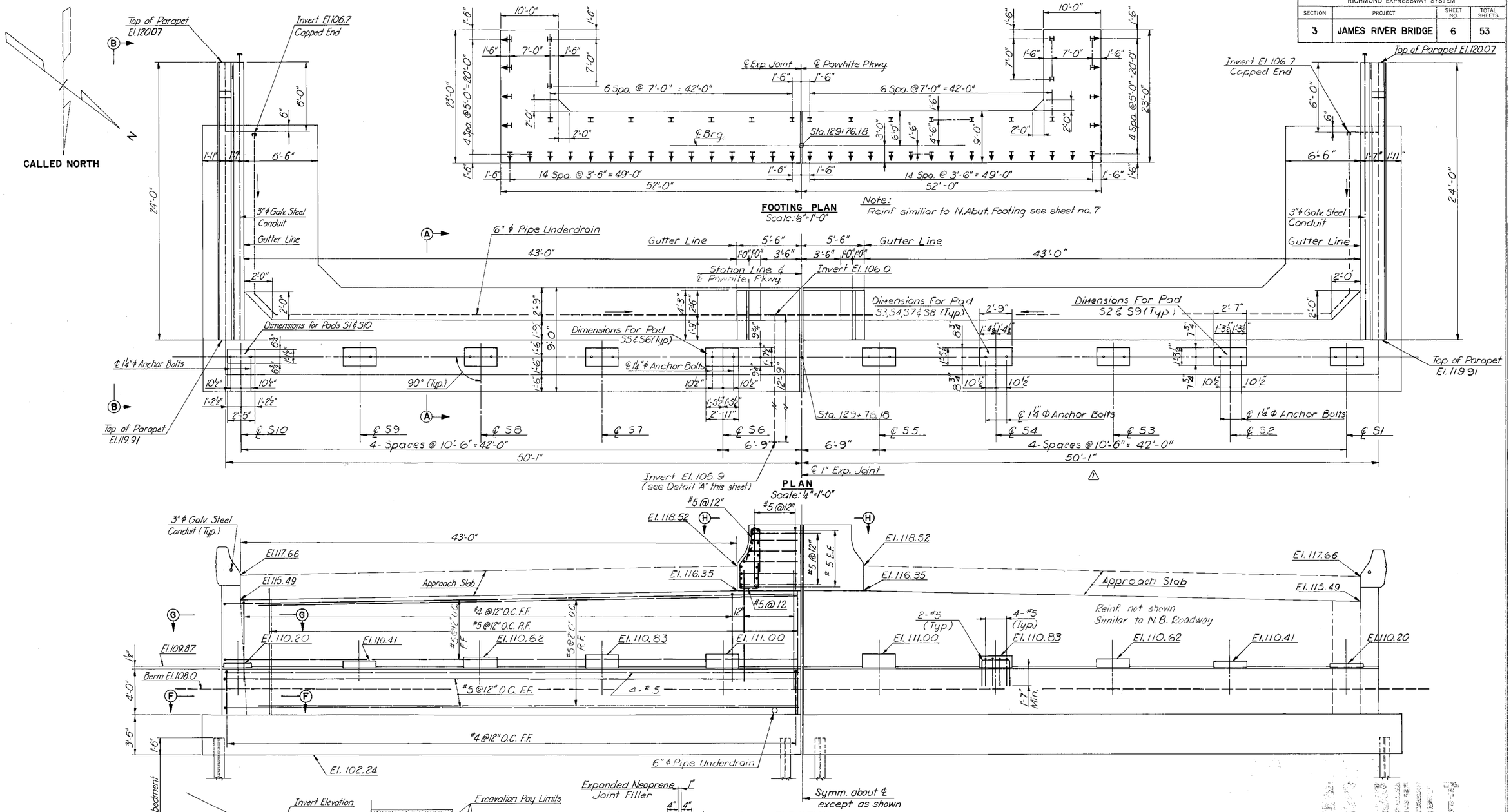
GENERAL PLAN AND ELEVATION

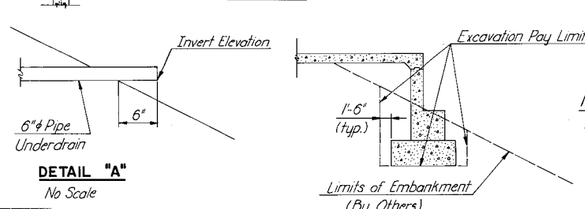
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

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	6	53

CALLED NORTH





NOTES:

View B-B and Sections G-G & F-F opposite hand for West Wingwall.
For Views B-B & H-H see sheet no.8
For Sections A-A, F-F & G-G see sheet no.8
For Pile Details and Pile Notes see sheet no.7

	BY	DATE				
MADE	D.E.K.	7-67	2	AS BUILT	JRC	12-72
CHECKED	H.B.W.	12-67	⚠	Stringer Spa.	H.B.W.	2/20/71
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE

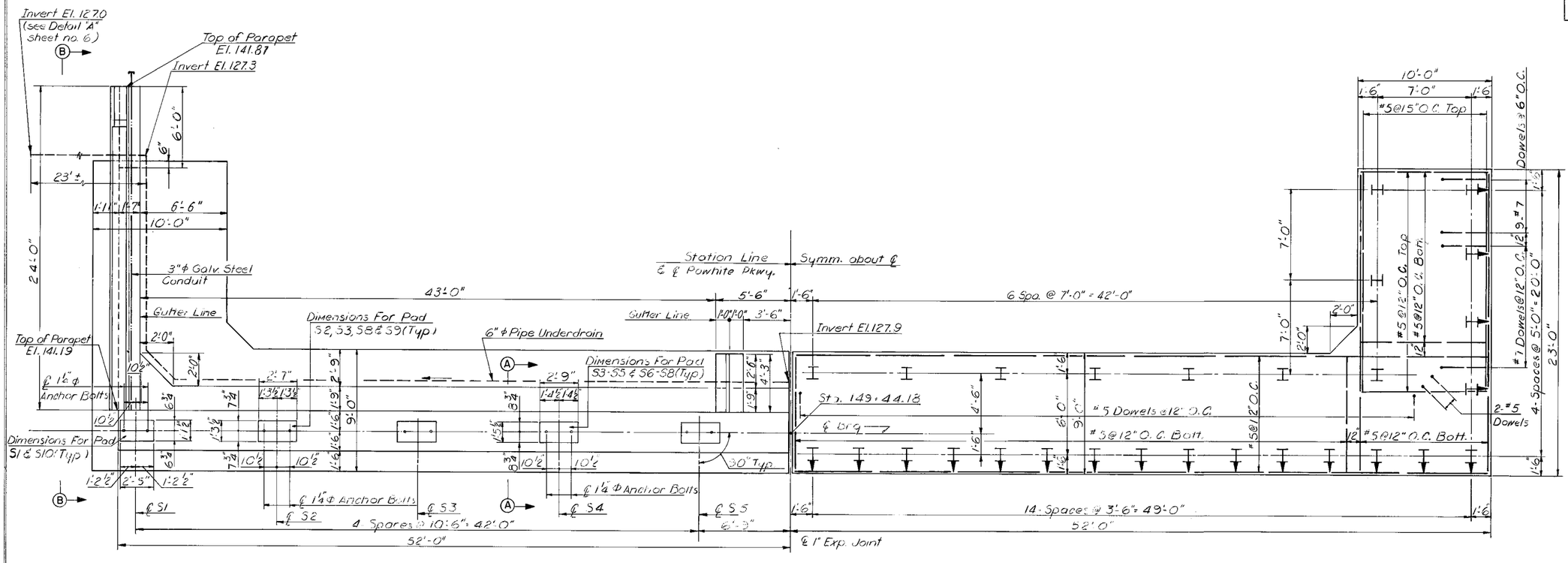
SOUTH ABUTMENT

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

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 6 OF 53

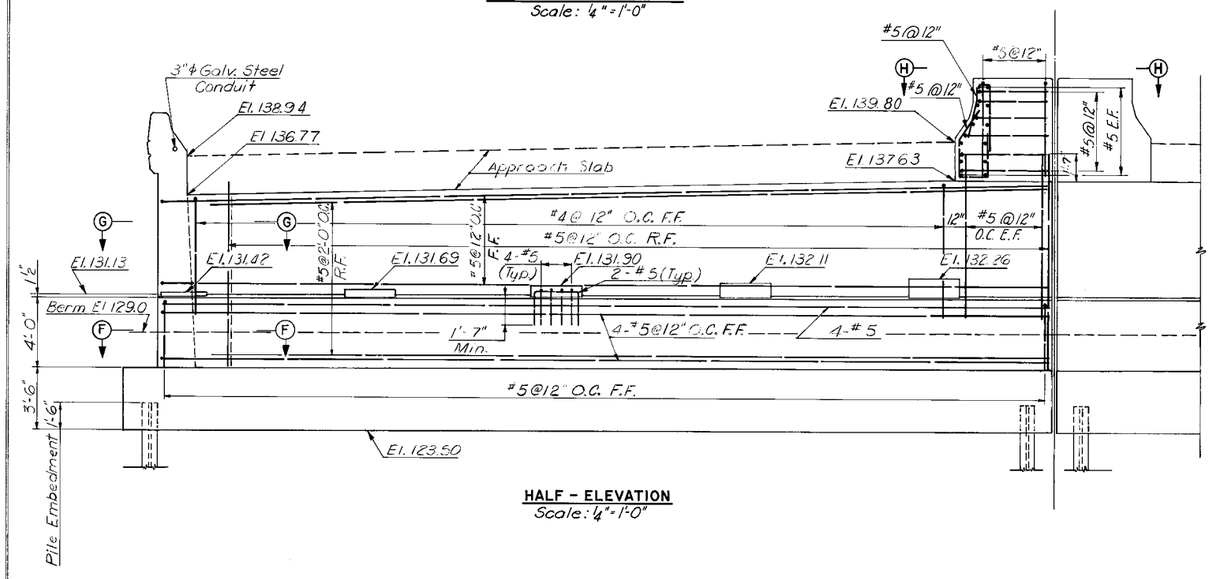
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	7	53

CALLED NORTH

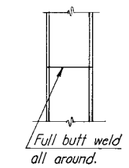


HALF – ABUTMENT PLAN
Scale: ¼" = 1'-0"

HALF – FOOTING PLAN
Scale: ¼" = 1'-0"



HALF – ELEVATION
Scale: ¼" = 1'-0"



PILE SPLICE

NOTES:

For Views B-B & H-H see sheet no. 8.
For Sections A-A, F-F & G-G see sheet no. 8.

For Expansion Joint Detail see sheet no. 6.

PILE NOTES:

All piles are 45 ton capacity 10BP42 steel piles.
Indicates piles battered 3:12 in direction of arrow.
Indicates vertical piles.
Jetting of piles not be permitted.
Estimated pile tip

South Abut. - Average Elev. Pile Tip - 75.5 West Ftg. - 78.7 East F.
North Abut. - Average Elev. Pile Tip - 68.0 West Ftg. - 58.7 East F.

	BY	DATE				
MADE	D.E.K.	7-67				
CHECKED	H.B.W.	11-67	1	AS BUILT	JRC	12-72
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

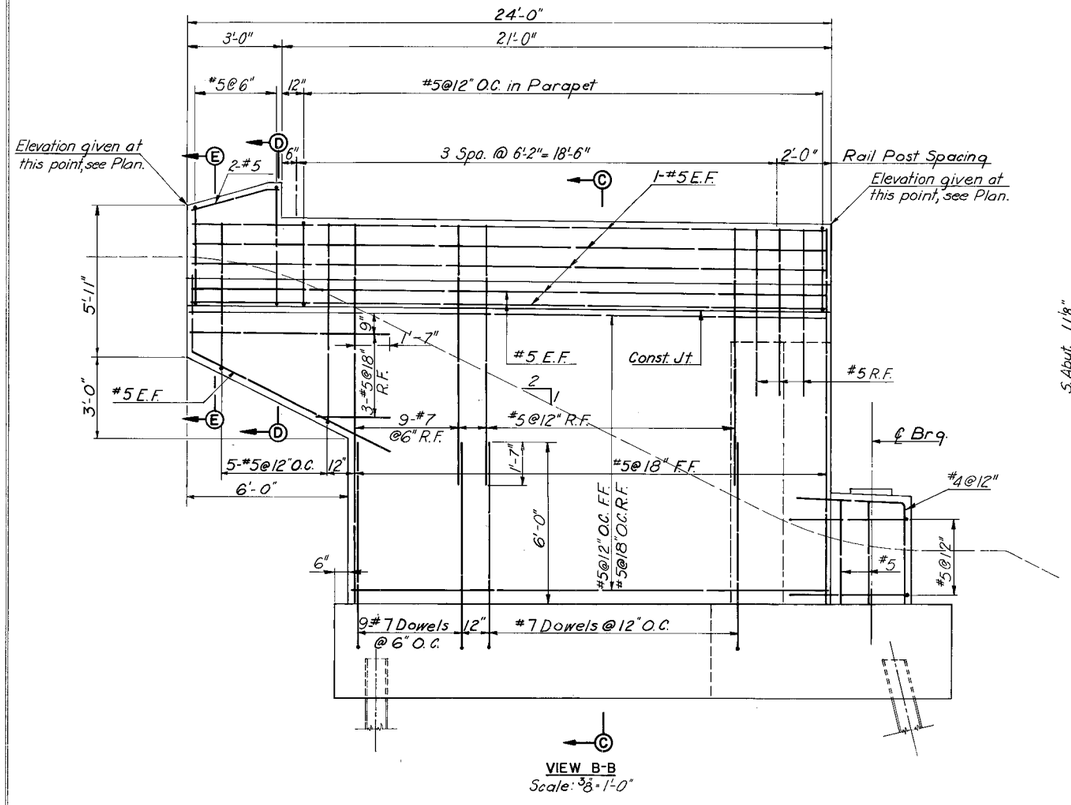
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE
NORTH ABUTMENT

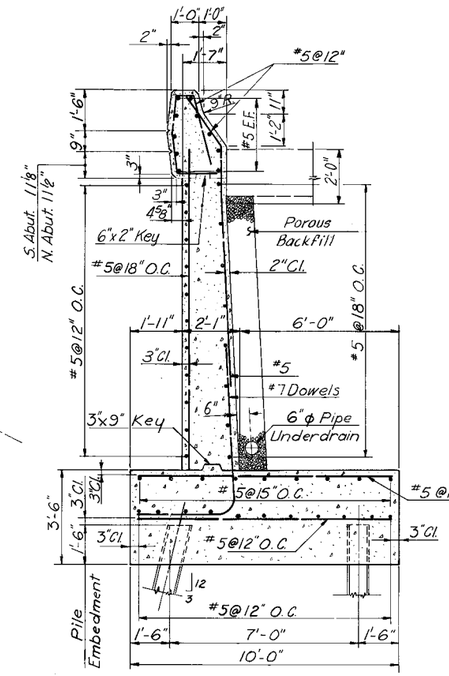
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 7 OF 53

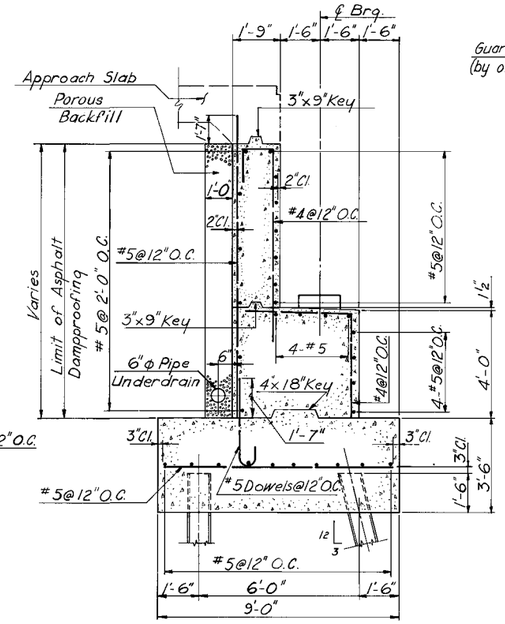
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
3	JAMES RIVER BRIDGE	8	53



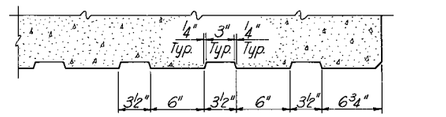
VIEW B-B
Scale: 3/8"=1'-0"



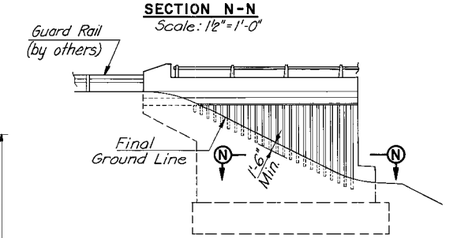
SECTION C-C
Scale: 3/8"=1'-0"



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

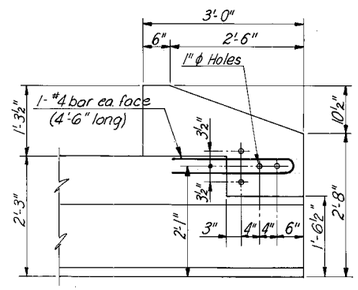


SECTION N-N
Scale: 1/2"=1'-0"

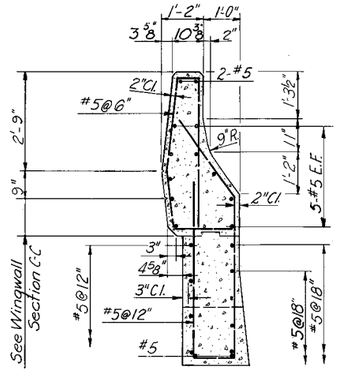


ELEVATION
Scale: 1/8"=1'-0"

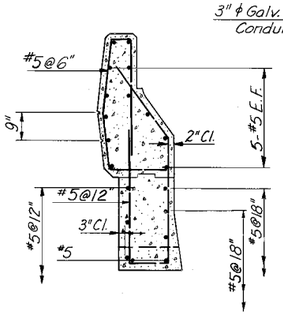
WINGWALL RUSTICATION DETAILS



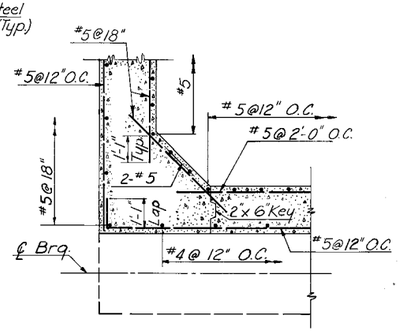
ELEVATION
Scale: 3/4"=1'-0"



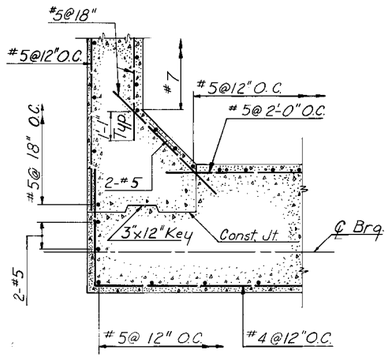
SECTION D-D
Scale: 1/2"=1'-0"



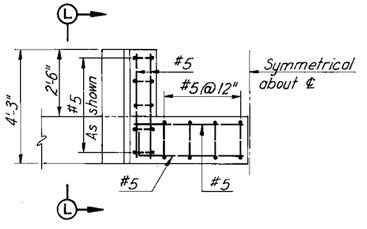
SECTION E-E
Scale: 1/2"=1'-0"
(For dimensions not shown see Section D-D.)



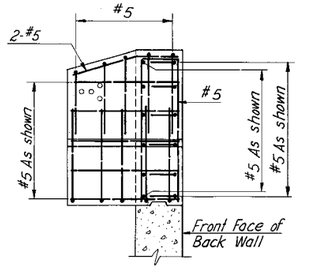
SECTION G-G
Scale: 3/8"=1'-0"



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



VIEW H-H
Scale: 3/8"=1'-0"



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

	BY	DATE				
MADE	D.E.K.	7-67				
CHECKED	H.B.W.	12-67	1	AS BUILT	JRC	12-72
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

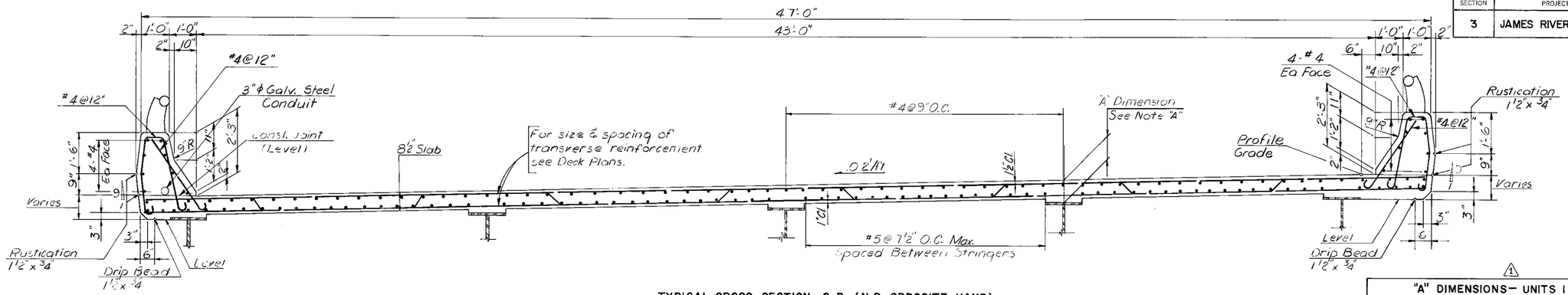
JAMES RIVER BRIDGE

ABUTMENT DETAILS

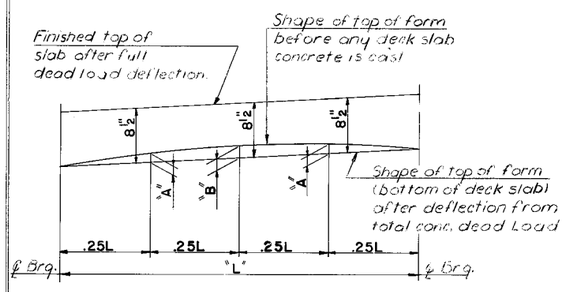
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: C-3
SHEET NO. 8 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"



DEAD LOAD DEFLECTION DIAGRAM
NO SCALE

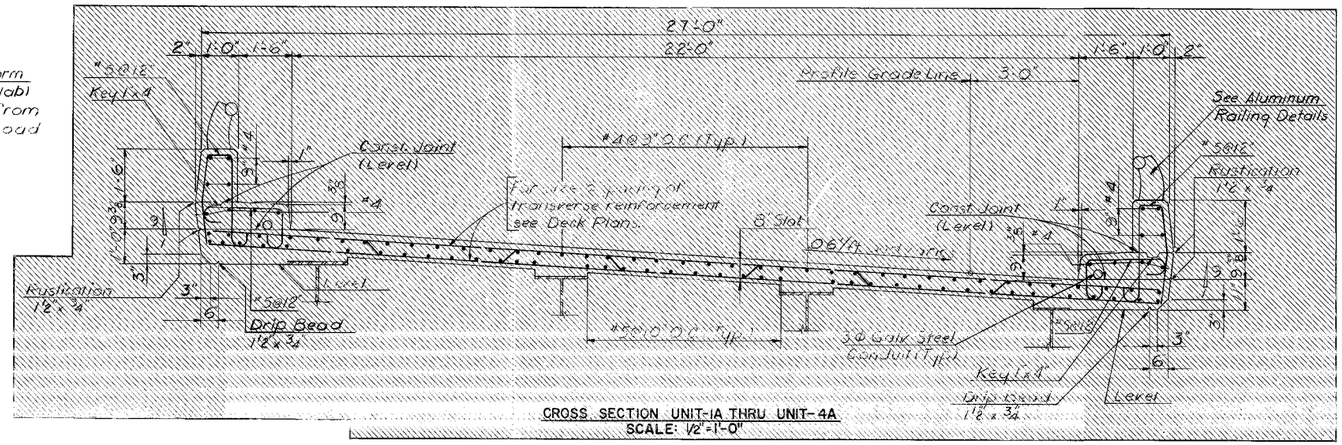
NOTE TO CONTRACTOR

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 haunch 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 7/8"
	S1-S10	1⅛"	1½"		S2	7/8"	1⅛"		S3	1¼"	1 3/4"
3	~~S1-S6~~	~~1"~~	~~1 3/8"~~		S3	7/8"	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"~~	~~2⅛"~~		S6	1⅛"	1 5/8"		S7	1"	1 3/8"
	~~S3&S5~~	~~1½"~~	~~2 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 7/8"		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"				



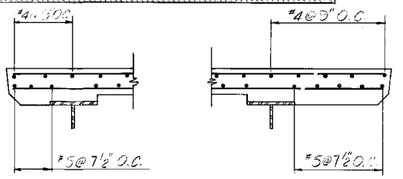
CROSS SECTION UNIT-1A THRU UNIT-4A
SCALE: ½"=1'-0"

"A" DIMENSIONS— UNITS 1 THRU 18			
UNIT 1		UNIT 7	
S5 & S6	10 3/8"	~~S1A~~	~~10 3/8"~~
S1-S4 & S7-S10	9 3/4"	S2-S4 & S7-S9	10¼"
UNIT 2 & 3		S5 & S6	10⅛"
S5 & S6	10¼"	S1 & S10	10½"
S1-S4 & S7-S10	9 3/4"	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	10 3/4"
~~S4~~	~~10¼"~~	S2, S3, S4 & S7	9 3/4"
~~S5~~	~~9 3/4"~~	S5 & S6	10¼"
~~S6~~	~~10"~~	S8 & S9	10"
S1-S10	10⅛"	S10	10½"
UNIT 5		UNIT 15	
~~S1~~	~~10⅛"~~	S2-S4 & S7-S9	9 3/4"
~~S2~~	~~9 3/4"~~	S5 & S6	10¼"
~~S3-S6~~	~~9 3/4"~~	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	9 3/4"
UNIT 6		S5 & S6	10¼"
S5 & S6	10⅛"	S10	10 3/4"
S2-S4 & S7-S9	10¼"	UNIT 18	
S1 & S10	10½"	S2-S4 & S7-S9	9 3/4"
		S5 & S6	10 3/8"
		S1 & S10	10 3/4"

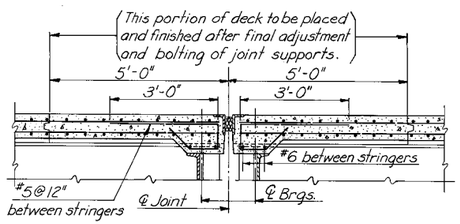
"A" DIMENSIONS— UNITS 1A THRU 4A			
UNIT 1A		UNIT 4A	
S1, S2 & S3	9½"	S1 (AT PIER 3A)	9½"
S4	10"	S1 (AT PIER 3)	10¼"
UNITS 2A & 3A		S2 & S3	9½"
S1, S2 & S3	9½"	S4	10"
S4	9¾"		

Note "A"

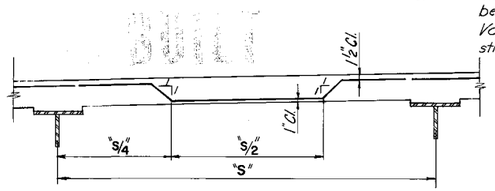
"A" Dimension is given at the intersection of the ℄ Stringer and ℄ Bearing. Dimension shown is measured from top of top flange to construction joint for Fascia Stringers with 1'-3" overhang (see deck plan) and from top of top flange to top of deck for all other stringers. This dimension may vary between 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.



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.

	BY	DATE				
MADE	D.E.K.	7-67	2	AS BUILT	JRC	12-72
CHECKED	H.B.W.	9-67	⚠1	X-Sections & Deflections	EJR	2/20/71
IN CHARGE	F.X.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

JAMES RIVER BRIDGE

DECK DETAILS

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

SCALE: 1"=1'-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

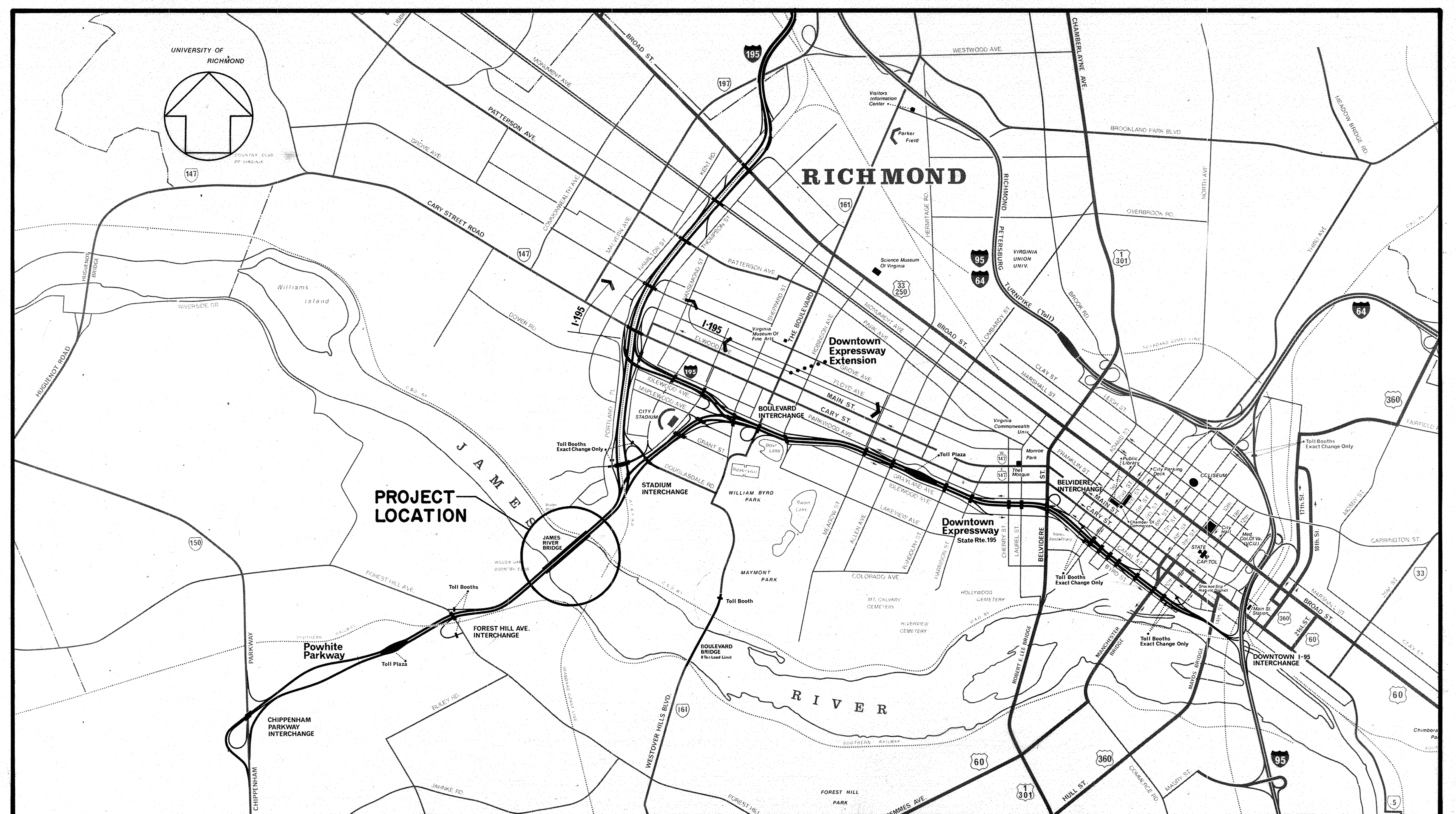
RICHMOND EXPRESSWAY SYSTEM

PROPOSED WIDENING

JAMES RIVER BRIDGE

INDEX OF SHEETS

SHEET NO.	TITLE
1	COVER SHEET
2-3	GENERAL PLAN AND ELEVATION
4	GENERAL NOTES AND ESTIMATED QUANTITIES
5-7	SOUTH ABUTMENT DETAILS
8-10	NORTH ABUTMENT DETAILS
11	FLARED TERMINAL WALL DETAILS
12-28	PIER DETAILS
29	MISCELLANEOUS SUBSTRUCTURE DETAILS
30-44	FRAMING PLANS
45	STEEL DETAILS
46	SHOE DETAILS
47	CAMBER DIAGRAMS AND SCHEDULE
48-49	DECK SLAB ELEVATIONS
50	TYPICAL CROSS SECTION AND PARAPET DETAILS
51-65	DECK PLANS
66-67	LIGHTING STANDARD AND ELECTRICAL DETAILS
68	DEAD LOAD DEFLECTION DIAGRAM AND SCHEDULE
69	JOINT DETAILS
70	DRAIN ASSEMBLY DETAILS
71	ALUMINUM RAILING DETAILS
72-89	BAR LIST
90	BAR BENDS
91	SLOPE PROTECTION
92	APPROACH SLAB DETAILS
93-99	BORING LOGS
100	CONSTRUCTION SEQUENCE AND METHOD
101	MAINTENANCE AND PROTECTION OF TRAFFIC
102	PARTIAL EMBANKMENT PLAN
103	TYPICAL ROADWAY SECTION
104-105	EMBANKMENT CROSS SECTION
106	EROSION CONTROL



DESIGNED BY ....

REVISED BY ....

CONVENTIONAL SIGNS

- STATE LINE
- COUNTY LINE
- CITY, TOWN OR VILLAGE
- RIGHT OF WAY LINE
- FENCE LINE
- UNFENCED PROPERTY LINE
- FENCED PROPERTY LINE
- TRAVELED WAY
- GUARD RAIL
- RETAINING WALL
- RAILROADS
- BASE OR SURVEY LINE
- LEVEE OR EMBANKMENT
- BRIDGES
- CULVERTS
- DROP INLET
- TROLLEY POLES
- POWER POLES
- TELEPHONE OR TELEGRAPH POLES
- MARSH
- HEDGE
- WOODS
- GROUND ELEVATION
- 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	
3-24-87 Date	HOWARD, NEEDLES, TAMMEN & BERGENDOFF general consultant

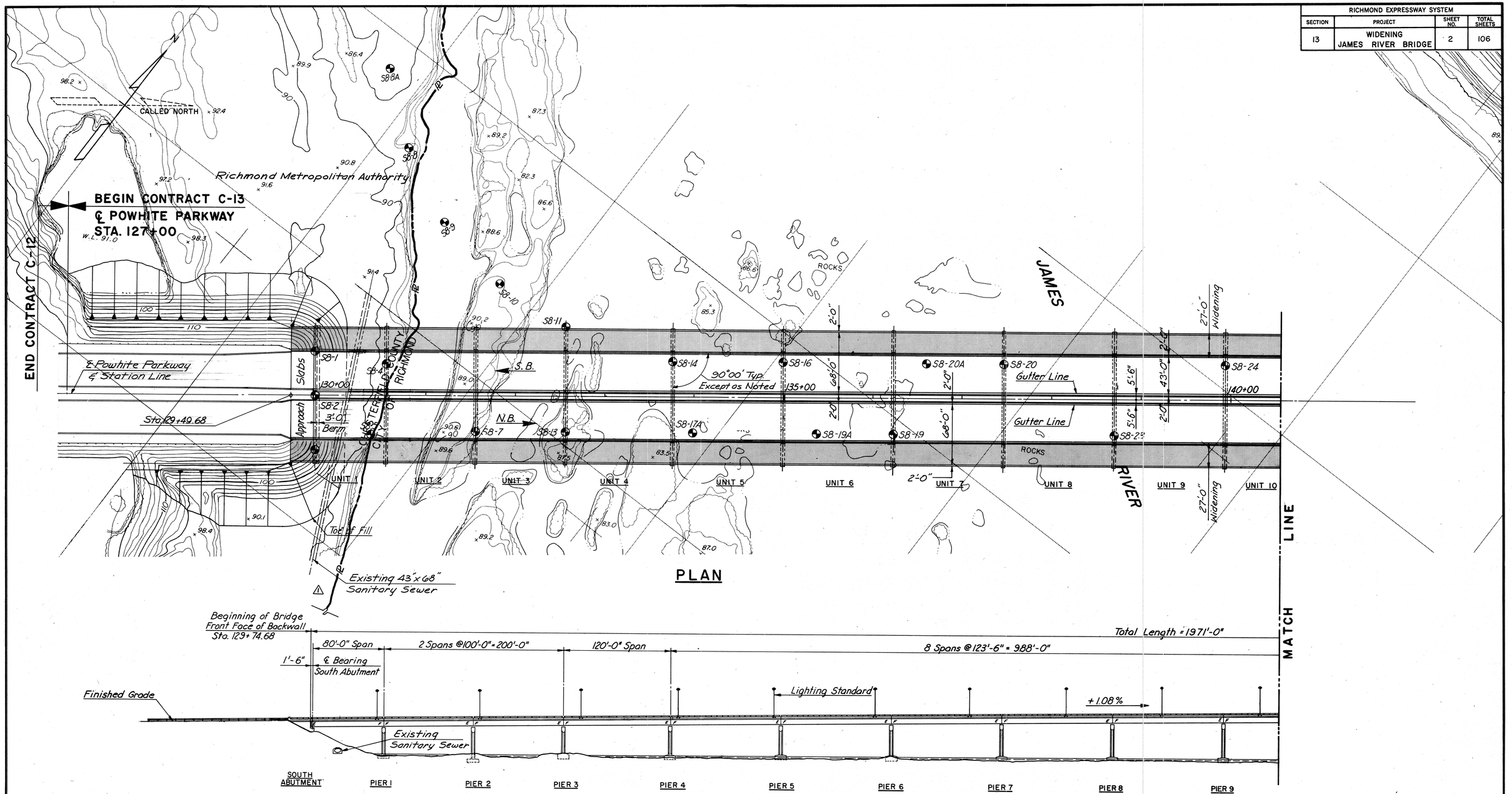
RECOMMENDED BY	
Date	
3-29-87 Date	GENERAL MANAGER, RICHMOND METROPOLITAN AUTHORITY

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	1	Property Line	ALC	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

N

CALLED NORTH

JAMES RIVER

MATCH LINE

CHESAPEAKE AND OHIO

KANAWHA CANAL

CSX Transportation

RAILROAD

Robert & Bessie B. Carter

Fitzgerald Bemiss

John C. & Elizabeth M. Hogan

Elizabeth S. Brock

Jack Cahsino

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.

Richmond Metropolitan Authority

℄ Existing 60" Water Main

24.5'± Min. Horiz. Cl.

39.5' Min. Horiz. Cl.

150'-0"

27'-0" Widening

2'-0"

5'-6"

68'-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

W.L. 104.4

W.L. 90.3

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

Approach Slabs

S.B.

N.B.

℄ Powhite Parkway ℄ Station Line

Sta. 149+70.68

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.

CSX Transportation

Temporary Construction Easement

C. Merle Luck Jr.

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

As Built TEM 3-89

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

NO.	REVISION	BY	DATE
2	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

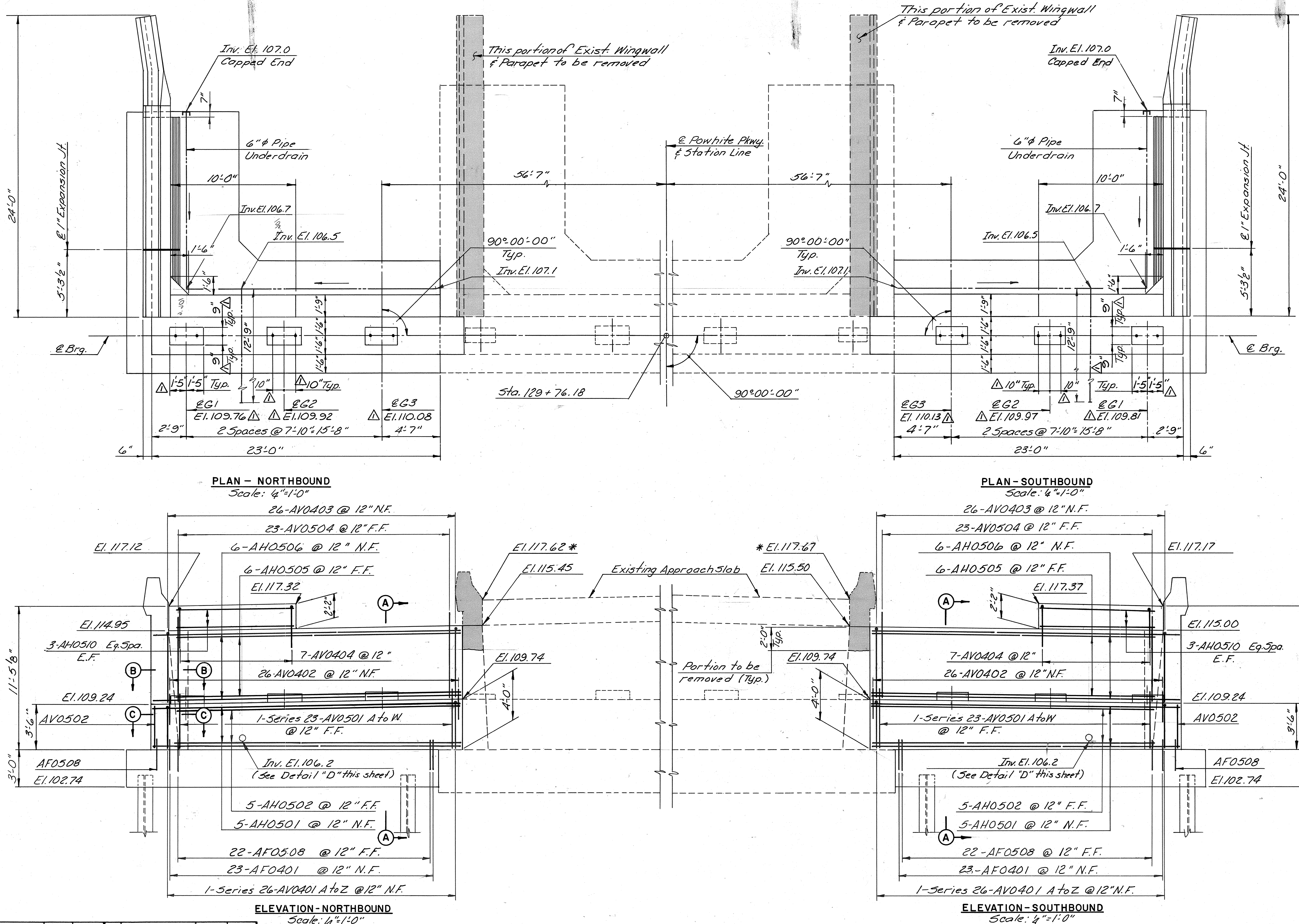
GENERAL PLAN AND ELEVATION

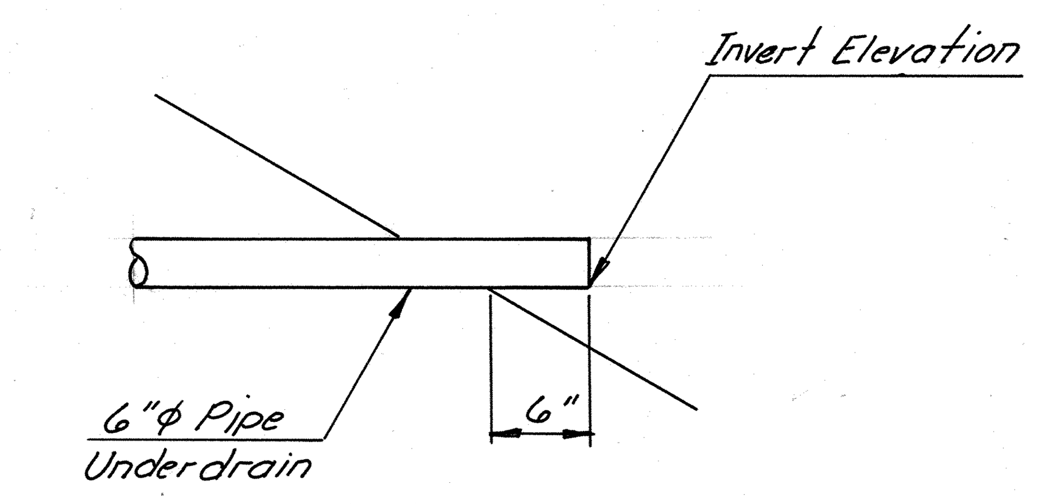
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

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	5	106

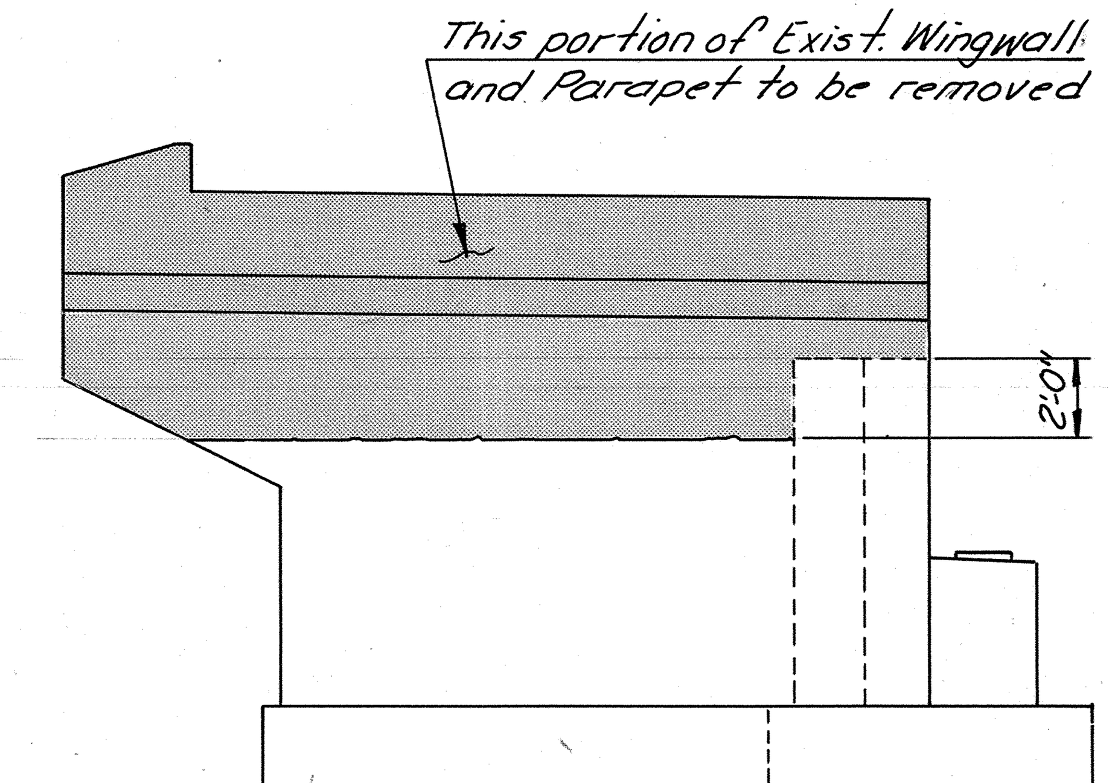
* Field survey elevations.





DETAIL "D"
No Scale

LEGEND:
E.F. = Each Face
F.F. = Far Face
N.F. = Near Face



LIMITS OF REMOVAL
No Scale

NOTE:
For Sections A-A, B-B, and C-C see Sheet No. 6

	BY	DATE				
MADE	TAL	1-87		As Built	TEM	3-89
CHECKED	T.F.P.	3-87	△	Rev. Anchor Bolt	ALC	6-87
IN CHARGE S.R.			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

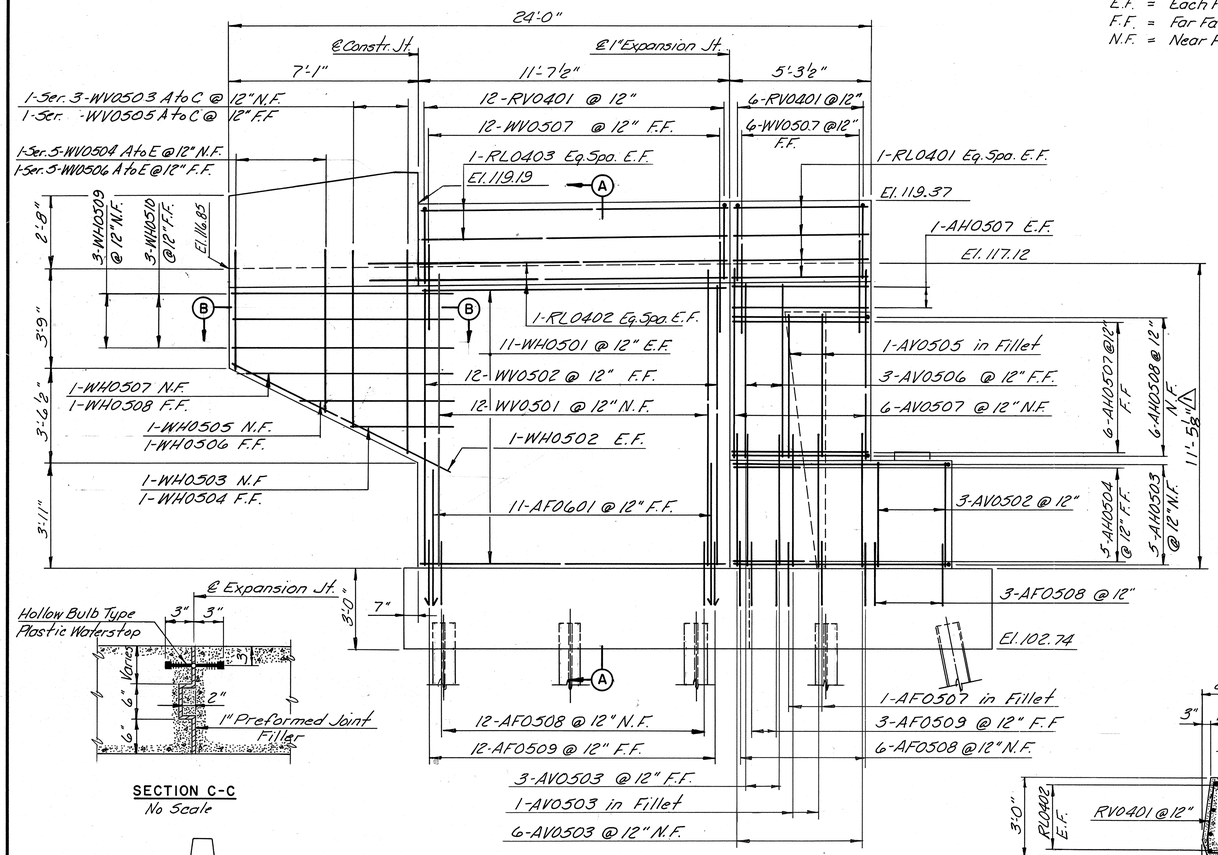
SOUTH ABUTMENT PLAN AND ELEVATION

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

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 5 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	7	106

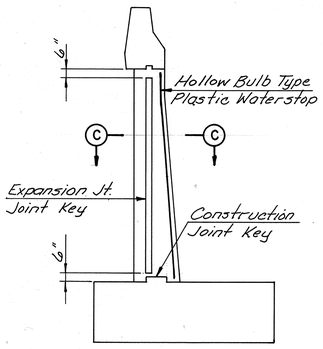
LEGEND:
E.F. = Each Face
F.F. = Far Face
N.F. = Near Face



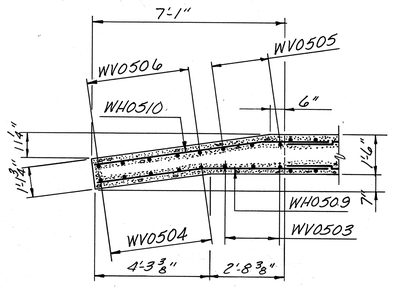
ELEVATION - SOUTHEAST WINGWALL
Scale: ⅜"=1'-0"

ELEVATION - SOUTHWEST WINGWALL
Scale: ⅜"=1'-0"

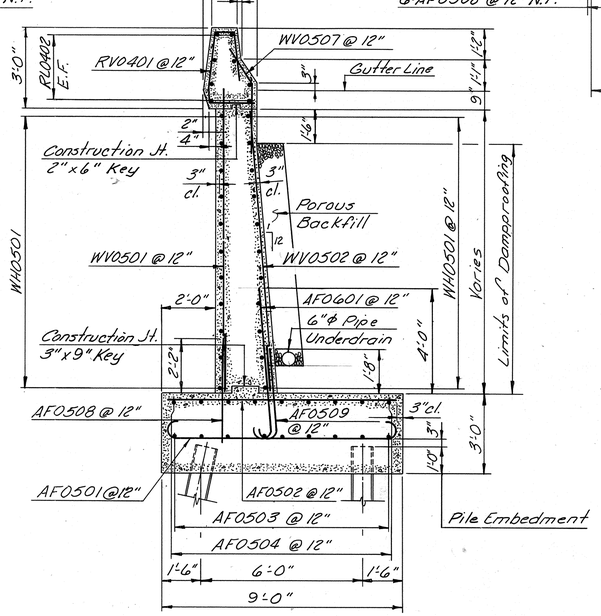
SECTION C-C
No Scale



EXPANSION JOINT DETAIL
No Scale



SECTION B-B
Scale: ⅜"=1'-0"



SECTION A-A
Scale: ⅜"=1'-0"

NOTE:
For wingwall rustication details see Sheet No. 29

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

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

N32V6

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

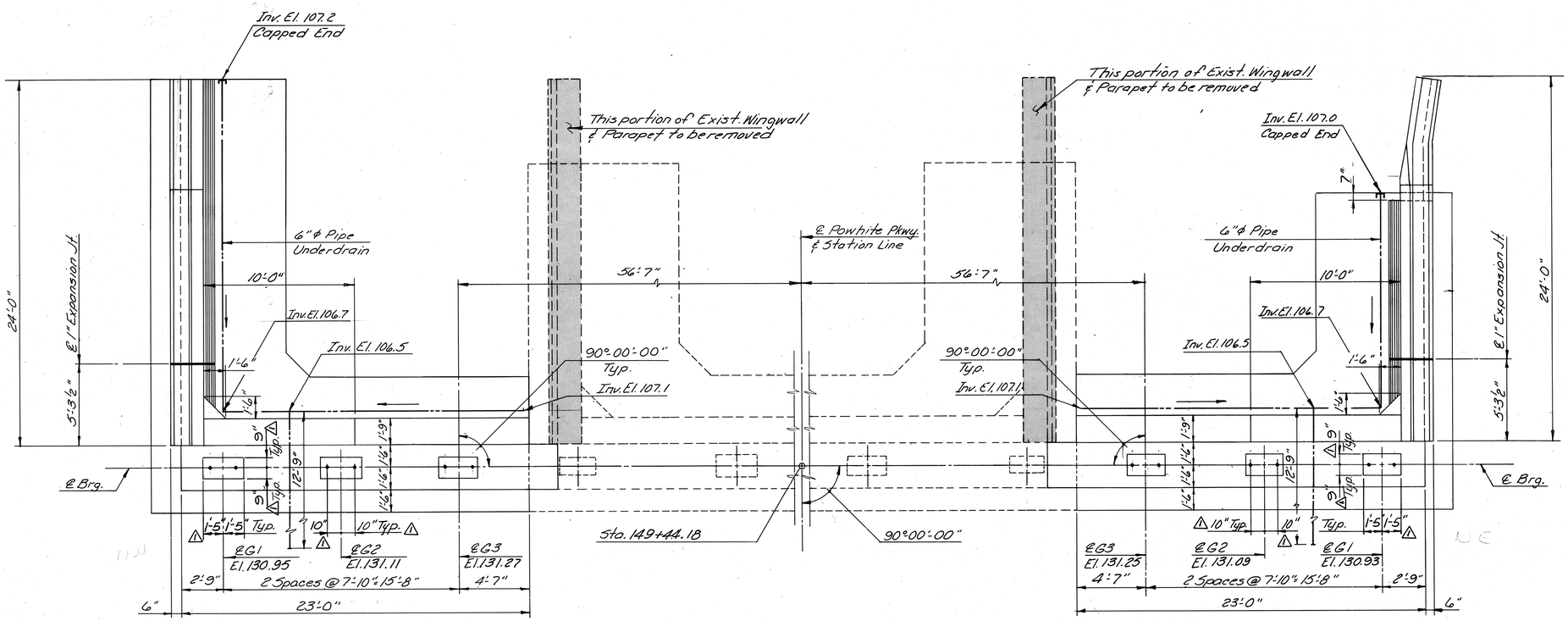
SOUTH ABUTMENT WINGWALLS

AS BUILT

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

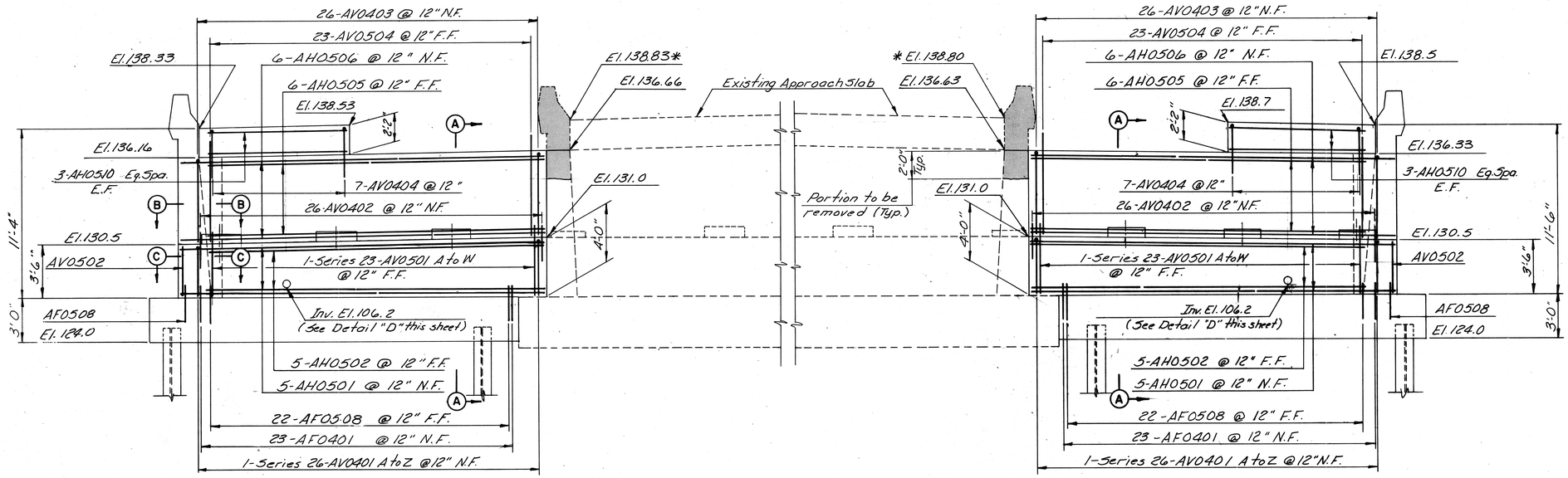
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 7 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	8	106



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

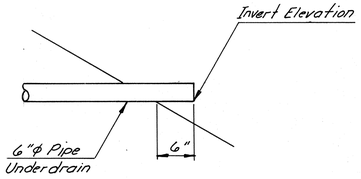
PLAN - NORTHBOUND
Scale: 4"=1'-0"



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

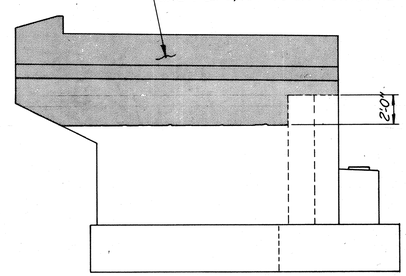
ELEVATION - NORTHBOUND
Scale: 4"=1'-0"

* Field survey elevations.



DETAIL "D"
No Scale

LEGEND:
E.F. = Each Face
F.F. = Far Face
N.F. = Near Face



LIMITS OF REMOVAL
No Scale

NOTE:
For Sections A-A, B-B, and C-C see Sheet No. 9

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	1-87		As Built	TEM	3-89
CHECKED	TFP	3-87	1	Rev. Anchor Bolt	ALC	6-87
IN CHARGE	S.R.					

N83W0

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

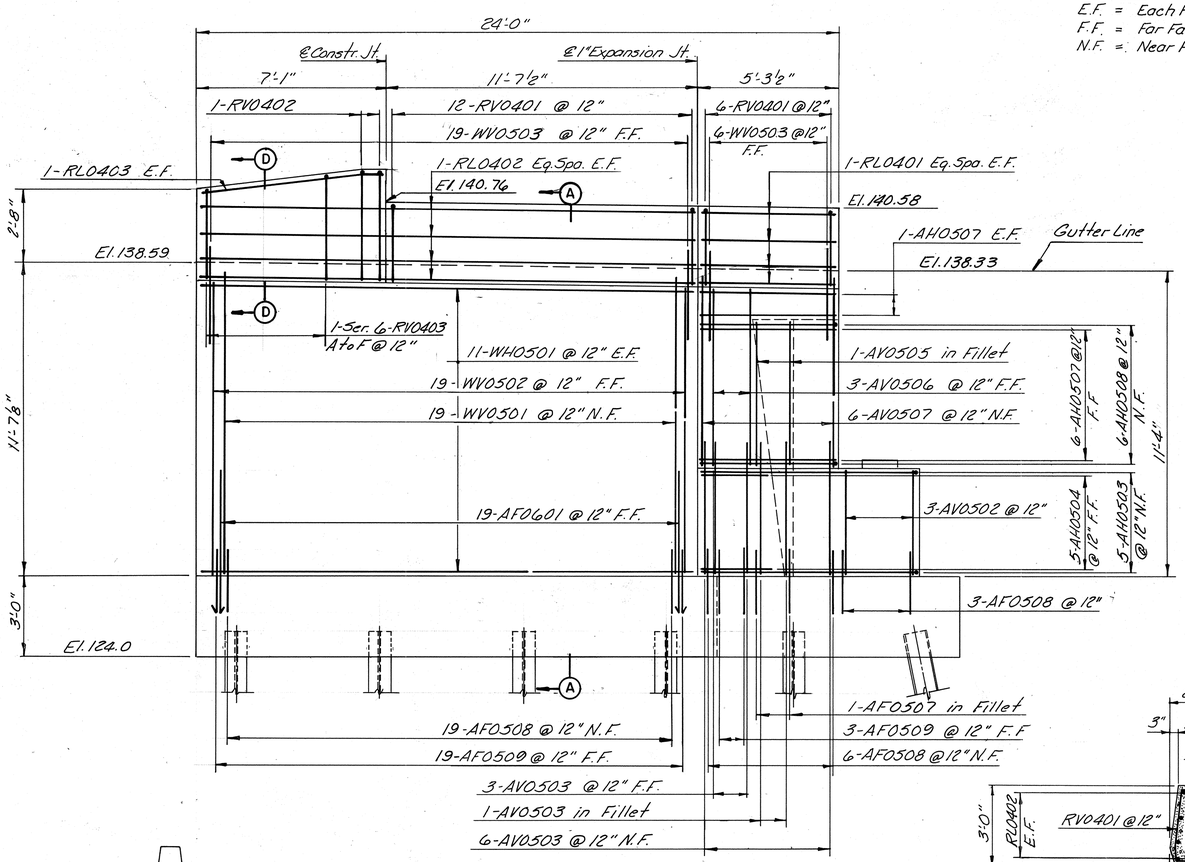
NORTH ABUTMENT PLAN AND ELEVATION

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

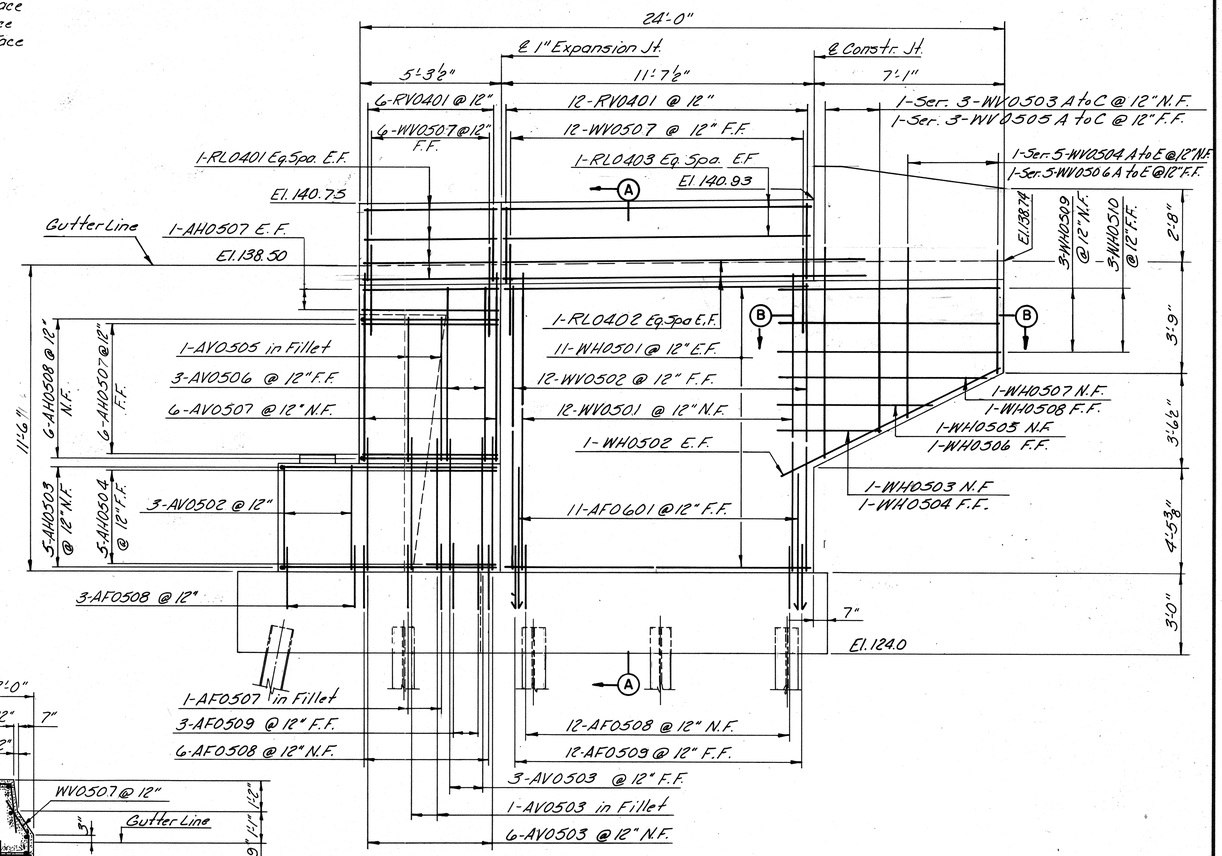
SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 8 OF 106

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	10	106

LEGEND:
E.F. = Each Face
F.F. = Far Face
N.F. = Near Face

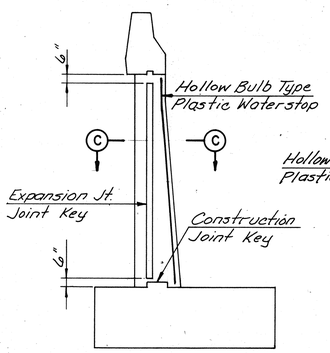


ELEVATION - NORTHWEST WINGWALL
Scale: 3/8" = 1'-0"

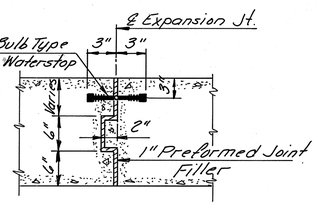


ELEVATION - NORTHEAST WINGWALL
Scale: 3/8" = 1'-0"

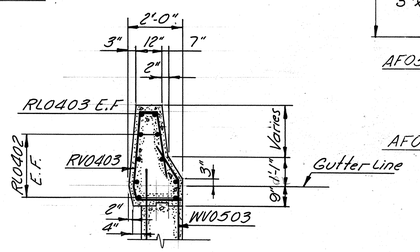
NOTE:
For wingwall rustication details see Sheet No. 29



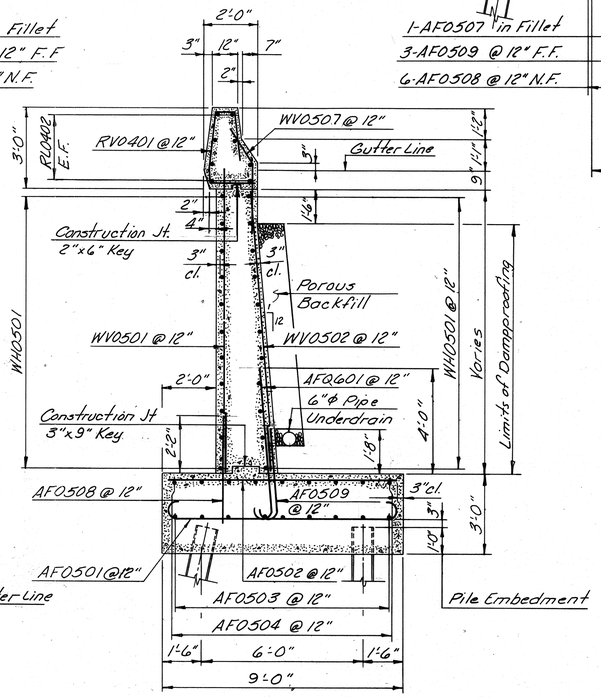
EXPANSION JOINT DETAIL
No Scale



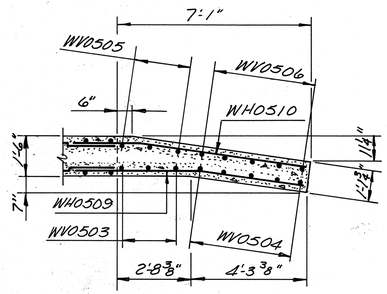
SECTION C-C



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



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



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

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

NO.	REVISION	BY	DATE
	As Built	TEM	3-89

AS BUILT

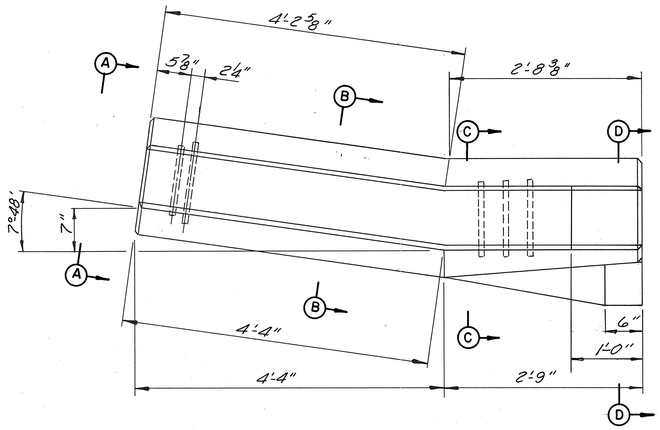
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

NORTH ABUTMENT WINGWALLS

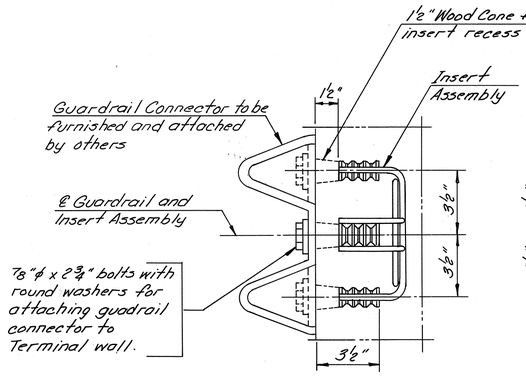
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: AS SHOWN
CONTRACT NO.: C-13
SHEET NO. 10 OF 106

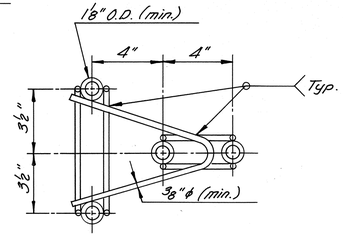
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
13	WIDENING JAMES RIVER BRIDGE	11	106



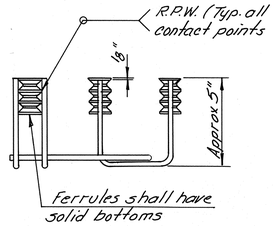
PLAN
Scale: 1"=1'-0"



END VIEW
Scale: 3"=1'-0"



ELEVATION
Scale: 3"=1'-0"



PLAN
Scale: 3"=1'-0"

NOTES:

Alternate Insert Assembly
The alternate insert assembly may be used in lieu of 1" ϕ holes detailed for guardrail attachment.
Ferrules shall be made from steel meeting the requirments of ASTM A108, Grade 12L14.
Bolts and washers shall be galvanized.
At the contractors option, stainless steel bolts and washers may be used as an alternate for ⅞"ϕ x 2¾" galvanized bolts and washers. They shall conform to or exceed the mechanical requirements of ASTM A307.
Wire struts shown in the inserts assembly shall have a minimum tensile strength of 100,000 p.s.i..
The insert assembly shall be assembled in the shop. Bolt threads may be recut as necessary to insure fit.
The cost of the insert assembly unit consisting of the insert assembly and 4 - ⅞"ϕ x 2¾" bolts with washers complete in place shall be included in the unit price bid for abutment concrete.

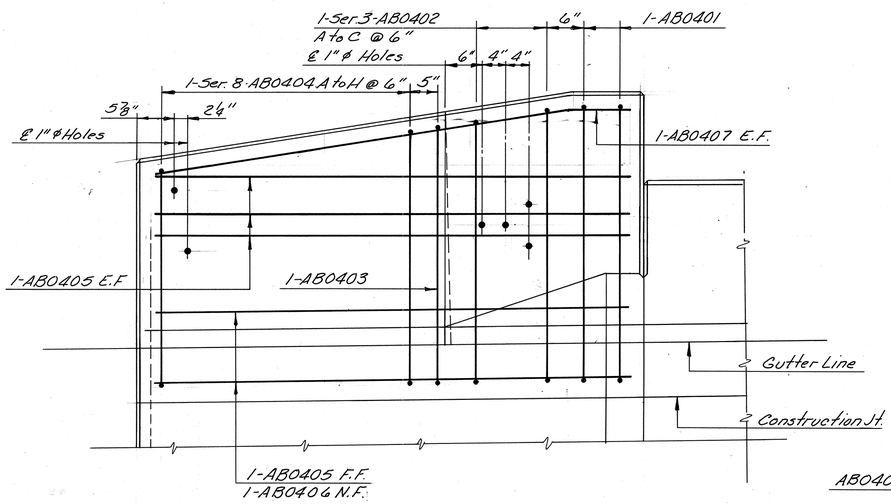
NOTES:

Each terminal wall shall be cast as one piece.
For details of wingwall below construction joint, see Abutment Detail sheet.
Terminal walls are detailed to take guardrail attachment GR-1N5.
All bevels for concrete on this sheet shall be ¾". Rounded edges with 1" radius may be used in lieu of bevels along top of terminal wall.
The contractor at his option, may substitute Concrete Class A4 for Concrete Class A3 at no additional cost in accordance with Section 219 of V.D.O.T. specifications.

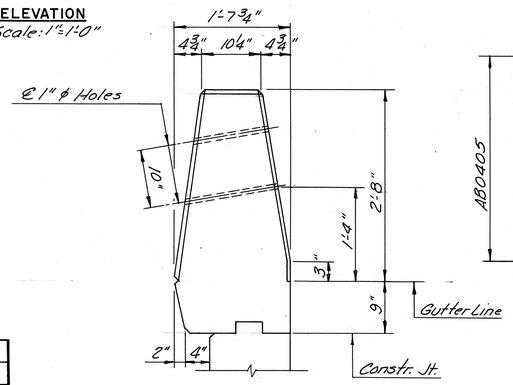
⚠

MARK	NO.	LENGTH	TYPE	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	DIM. F	REMARKS
AB0401	2	8-9	11	2-8	0-6¼	3-4	0-4	0-1½	1-6½	
AB0402	3	8-8	11	2-8	0-6¼	3-3	0-4	0-1½	1-5½	1 Each
A to C		8-5	11	2-8	0-6¼	3-2	0-4	0-1½	1-4½	A to C
AB0403	1	8-2	11	2-5	0-6¼	3-1	0-4	0-1½	1-2¾	
AB0404	8	7-8	11	2-4	0-6¼	3-0	0-4	0-1½	1-2¾	1 Each
A to H		7-5	11	2-3	0-6¼	2-6	0-4	0-1½	1-2¾	A to H
AB0405	8	6-7	6	4-1	2-6	2-5¾	0-4½			
AB0406	2	6-9	6	6-4	0-3	0-3	0-1			
AB0407	2	6-9	6	4-0	2-5½	2-5⅜	0-4			

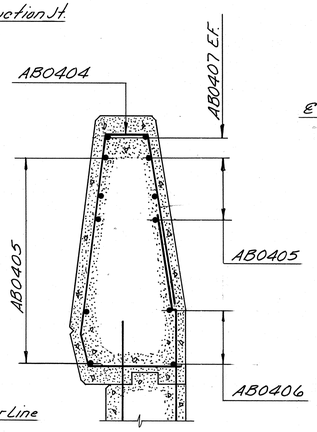
Bar List is for 1 Terminal Wall, 3 Required



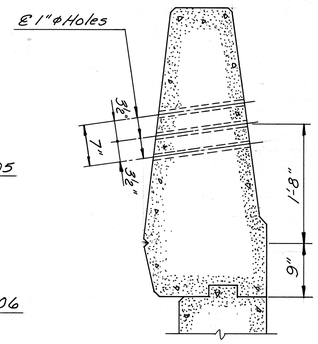
ELEVATION
Scale: 1"=1'-0"



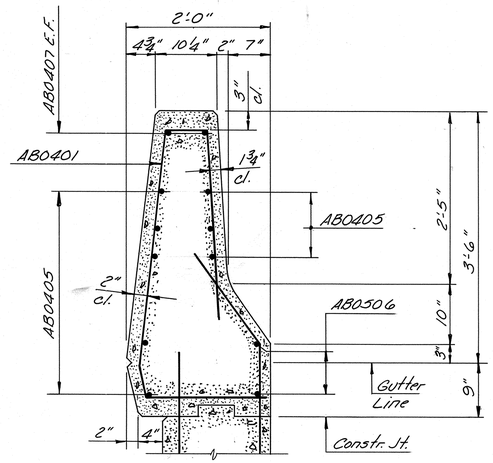
VIEW A-A
Scale: 1"=1'-0"



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



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



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

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

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

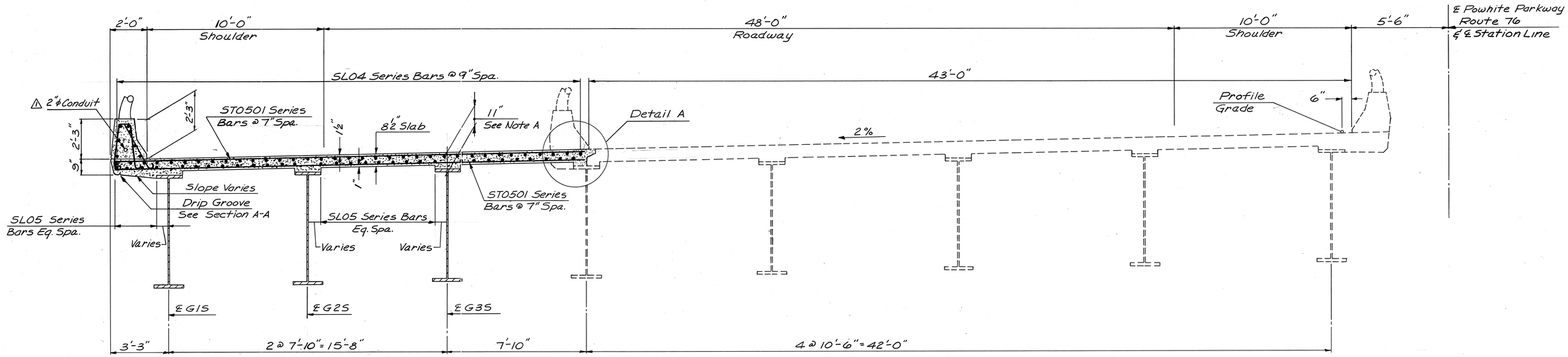
FLARED TERMINAL WALL DETAILS

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

SCALE: NO SCALE
CONTRACT NO.: C-13
SHEET NO. 11 OF 106

N2590

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.

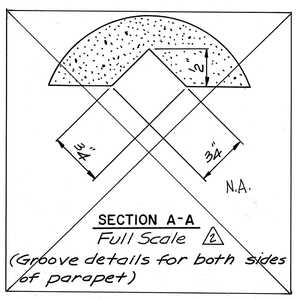
This dimension may be varied between bearings as required to compensate for variations in camber, except that no portion of the girder flange may fall within the slab.

NOTES:

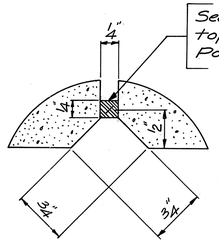
All bevels for concrete on this sheet shall be ¾". Rounded edges with 1" radius may be used in lieu of bevels along top of parapet.

For groove location, see Deck Plan Sheets.

Precast Parapet shall not be used on this structure.

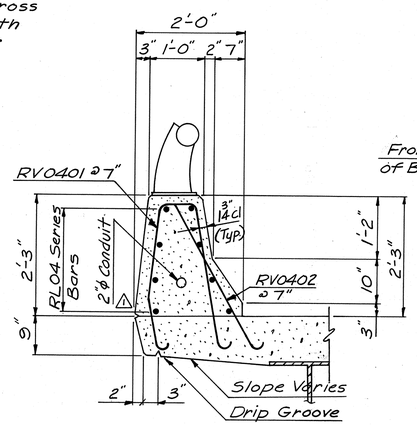


SECTION A-A
Full Scale ⚠2
(Groove details for both sides of parapet)

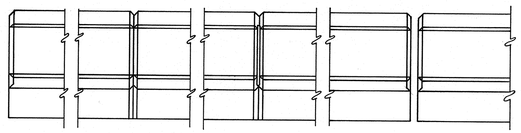


Seal sides and across top of parapet with Polysulfide Sealer

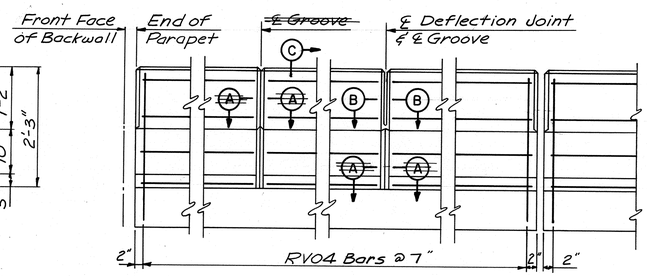
SECTION B-B
Full Scale
(Deflection Joint detail for both sides of parapet)



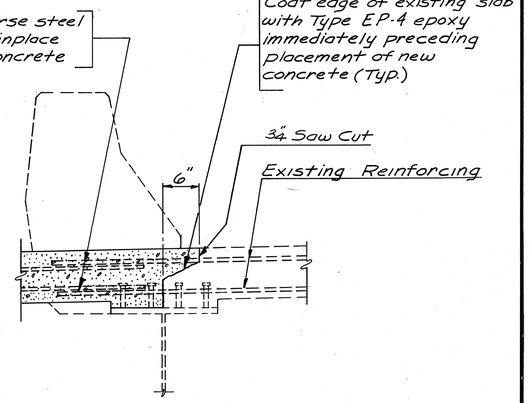
SECTION C-C
Scale: 3/4" = 1'-0"



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



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



DETAIL A

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

NO.	REVISION	BY	DATE
⚠2	As Built	TEM	3-89
⚠1	2" Conduit	ALC	4-87

N287W5

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

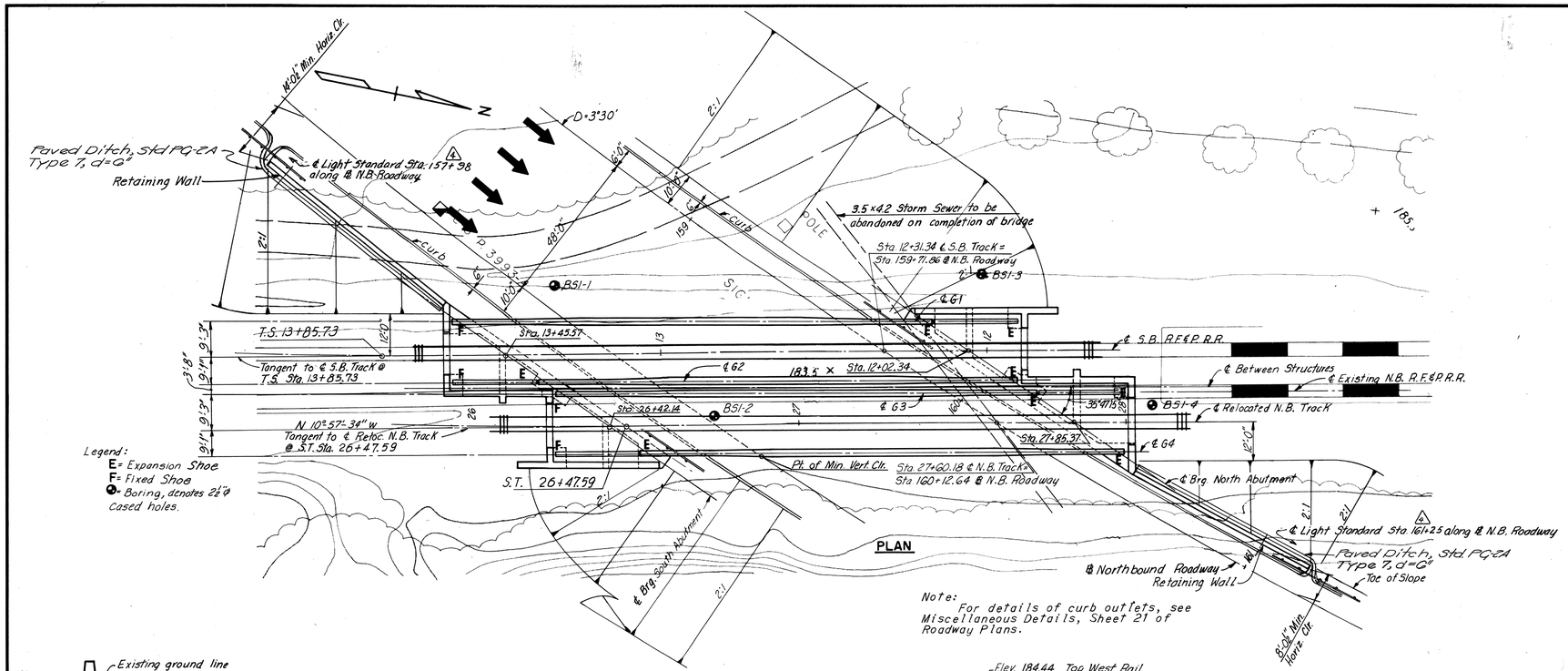
AS BUILT

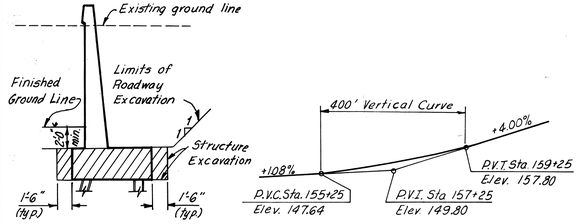
Bridge 9S & 9N

(Northbound & Southbound CSX RR over Northbound Powhite Parkway “Rte. 76”)

Record Set Plans

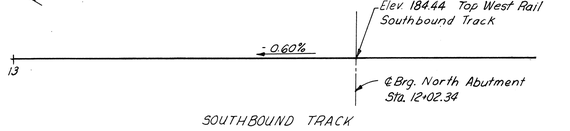
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	94	155



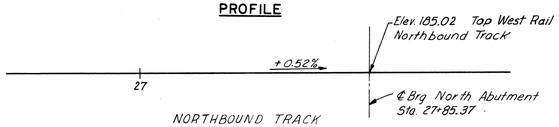


LIMITS OF EXCAVATION
No Scale

NORTHBOUND ROADWAY
PROFILE



SOUTHBOUND TRACK
PROFILE



NORTHBOUND TRACK
PROFILE

GENERAL NOTES

STRUCTURE: Dual structures with one welded steel girder span and one rolled beam at each approach. Distance ℄-℄ Girders of 18'-4" with 1'-6" min. clear between structures.

CAPACITY: Live Loads - Cooper E-80 with 50% impact

SPECIFICATIONS: GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970 and Contract Special Specifications. DESIGN: A.R.E.A. 1966 for Steel Railway Bridges, for Fixed Spans not exceeding 400 feet in length. 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.

FOUNDATION: **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: All concrete shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted.
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 bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Specification A-36 and A-588.
All Field Connections shall be made with high strength bolts or rivets. High strength bolts and rivets shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

BENCH MARK: A-15 Copperweld rod on bridge on Blue Shingles Road Elev. 204.73.

ESTIMATED QUANTITIES

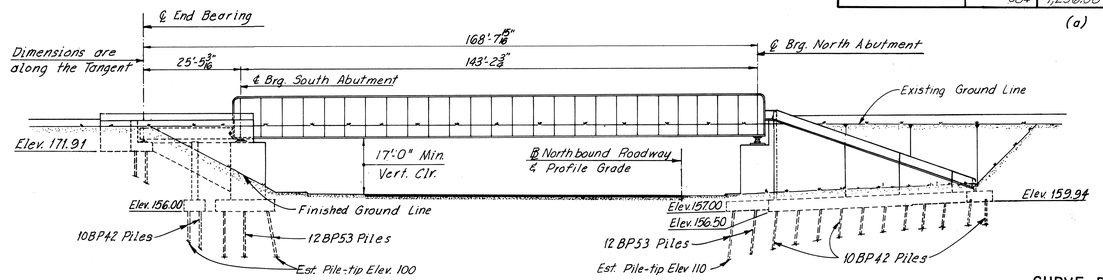
	Struct. Excav. Cu. Yds.	Concrete (a) Cu. Yds.	Reinf. Steel Lbs.	Struc. Steel (Lbs.) Mild Carbon	Struc. Steel (Lbs.) High Strength	Porous Backfill Cu. Yds.	Underdrain 6" Dia. Pipe Lin. Ft.	Steel piles 10BP42 Lin. Ft.	Steel piles 12BP53 Lin. Ft.	Asphalt damp-proofing Sq. Yds.	4" Asphalt Plank Sq. Ft.	1" Butyl Rubber Waterproofing Square	Bridge Drainage Metalwork Lbs.
Superstructure				855,568.2	280,976.7						7498	75	
North Abutment	286	598.82	65,027			64	129	1,858.4	2,993.0	183			
South Abutment	298	657.26	76,926			75	136	982.8	2,030.4	207			2,691
TOTAL	584	1,256.08	141,953	855,568.2	280,976.7	139	265	2,841.2	5,023.4	390	7498	75	2,691

(a) Class A3

INDEX

	BY	DATE
MADE	RLM	12-2-67
CHECKED	JEH	4-11-68
IN CHARGE	FKD	

NO.	REVISION	BY	DATE
5	As Built	JRC	3-73
4	Revise Ltg. Std.	JRC	9-71
3	Profile Grade	P.S.	4-12-71
2	General	J.G.V.	10-70
1	General Checking	AMH	5-13-68



ELEVATION

CURVE DATA

℄ Southbound Track	℄ Northbound Roadway	℄ Reloc. Northbound Track
T.S. = Sta. 13+85.73	P.I. = Sta. 156+91.30	C.S. = Sta. 23+97.59
S.C. = Sta. 16+41.73	Δ = 37°59'54"	S.T. = Sta. 26+47.59
Ls = 256.00'	D = 3°30'00"	Ls = 250.00'
θs = 5°40'49"	T = 563.64'	θs = 4°22'30"
Xc = 255.75'	L = 1085.66'	Xc = 249.85'
Yc = 8.45'	R = 1637.02'	Yc = 6.36'
L.T. = 170.75'		L.T. = 166.72'
S.T. = 85.41'		S.T. = 83.38'
L.C. = 255.89'		L.C. = 249.94'

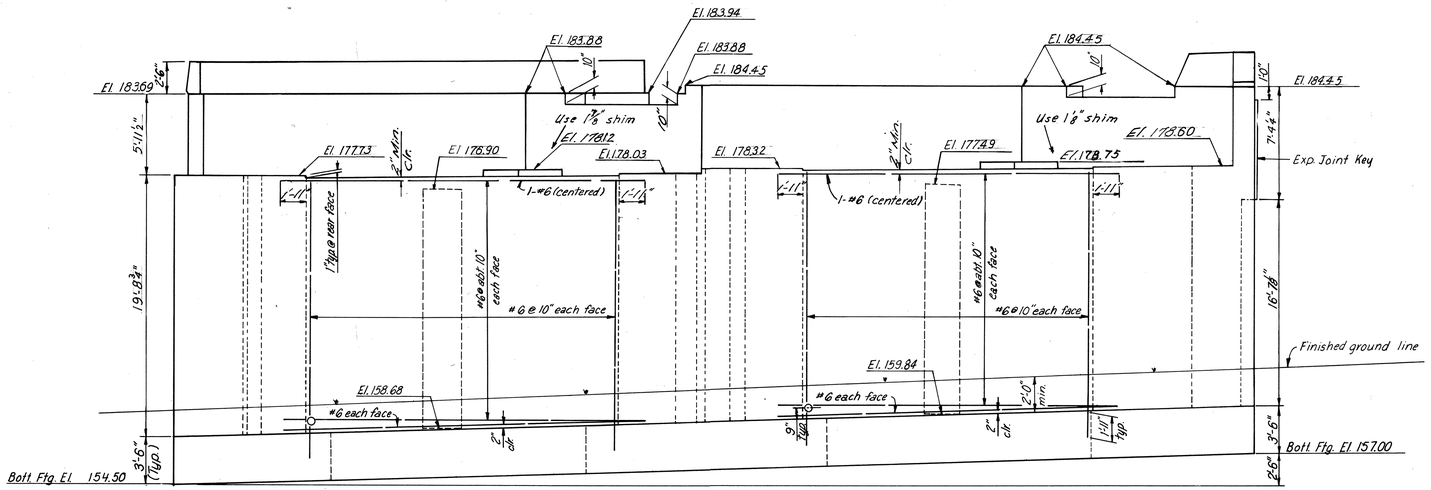
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER
NORTHBOUND ROADWAY
GENERAL PLAN AND ELEVATION

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

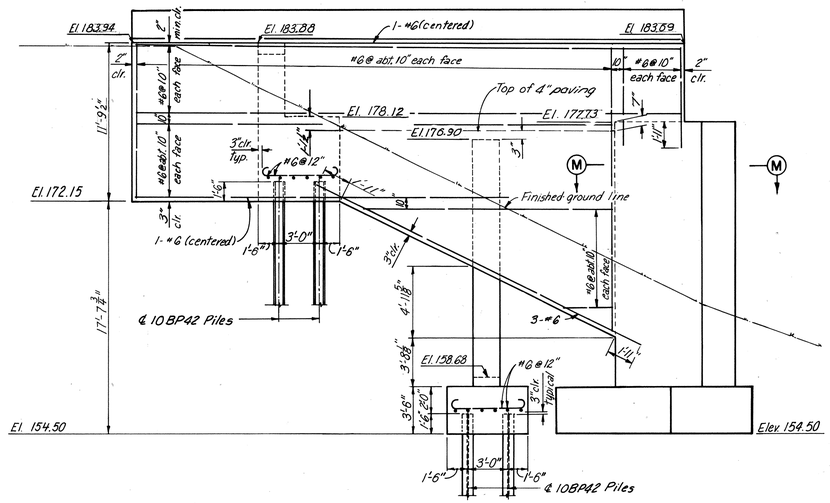
SCALE: 1"=20' unless noted
CONTRACT NO.: 4
SHEET NO. 1 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	95	155



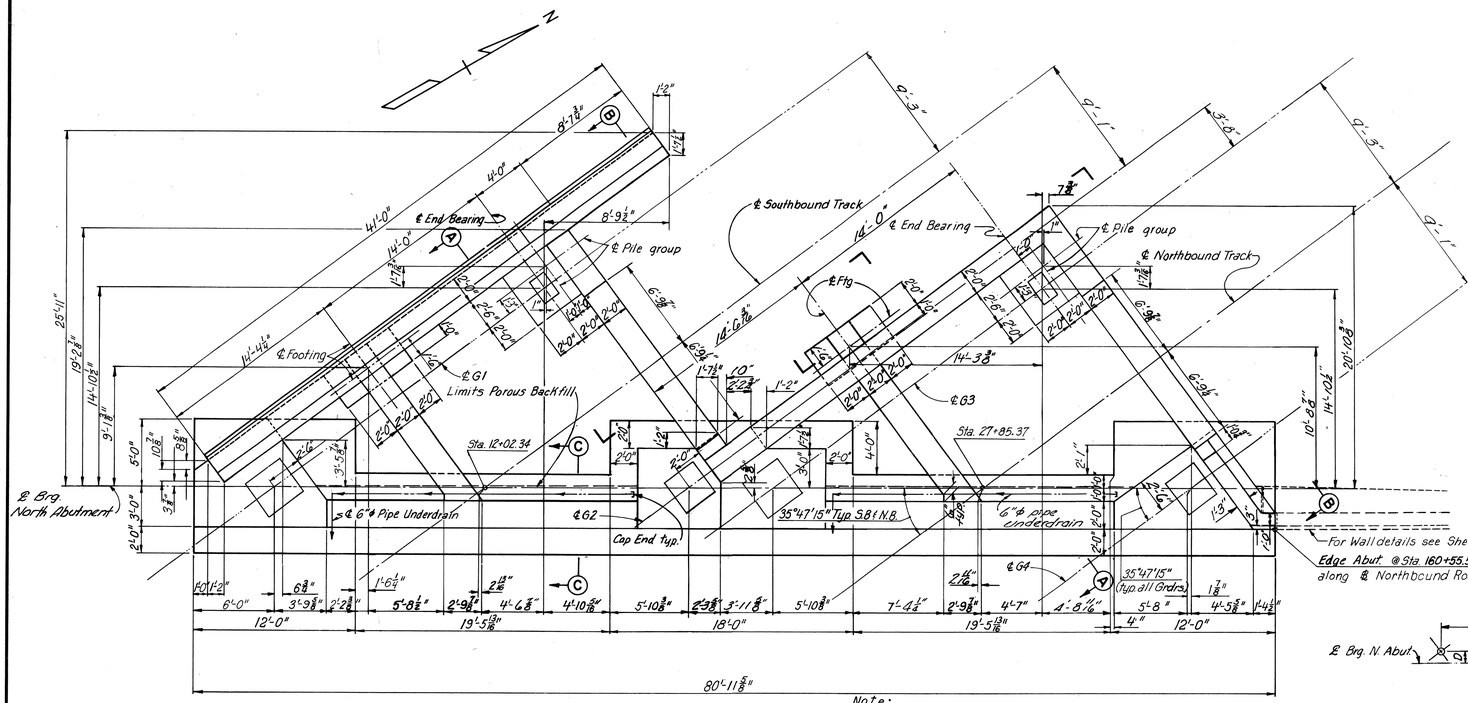
ELEVATION
Scale ⅜"=1'-0"

Note:
Piles not shown in Elevation. For location, see Footing Plan.
Concrete pavement over backfill is level.



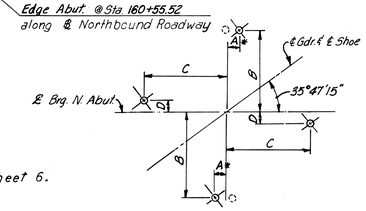
WEST WINGWALL ELEVATION
Scale ⅜"=1'-0"

Note: Piles not shown in front footing. For location of piles, see Footing Plan.



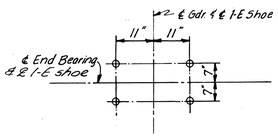
PLAN
Scale 3/16"=1'-0"

Note:
For Sections A-A, B-B, C-C, and M-M, see Sheet 6.
For Reinforcing not shown, see Abutment Details, Sheet 6.
For Drainage Details, see Sheet 10.
Reinforcing to be shifted to miss underdrain.
6" Dia. Underdrain to be sloped at 4"/ft. towards outlet in front wall.



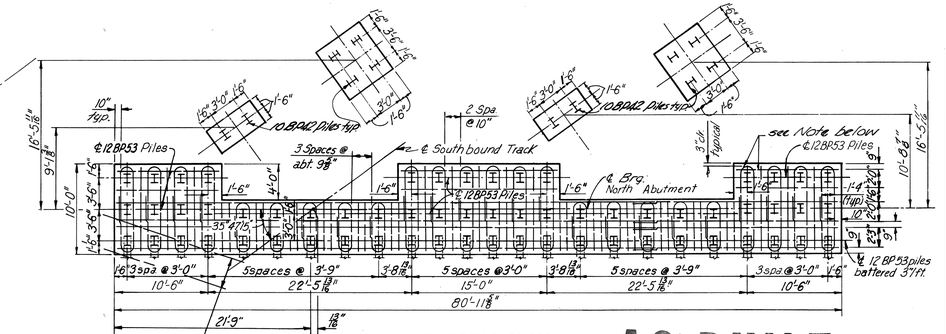
ANCHOR BOLT SETTING PLAN
No Scale

	A	B	C	D
1-EL SHOE	3¾"	1'-1 1/16"	1'-1 1/16"	3¾"
2-E SHOE	11"	1'-7 7/16"	1'-6 1/16"	11"



ANCHOR BOLT SETTING PLAN
No Scale

*Anchor Bolt for 2-E Shoe lies on other side of dimension line as shown by dotted circle. This will also put dimension A on other side of dimension line.



FOOTING PLAN
Scale ⅛"=1'-0"

AS BUILT

Note:
Stirrups around piles have a radius of 8" for the bends and a lap of 2'-6".
Reinforcing shown is typical for both top and bottom. All footing bars are # 8 bars.

Note:
6" Dia. Pipe Underdrain going thru front wall of Abutment, is to connect with tee to Std. UD-1 under N.B. Roadway. See Roadway Plans.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	RLM	2-7-68	3	As Built	JRC	3-73
CHECKED	AMH	5-10-68	2	Profile Grade	P.S.	4-12-71
IN CHARGE	FKD		1	General Checking	AMH	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER NORTHBOUND ROADWAY
NORTH ABUTMENT

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

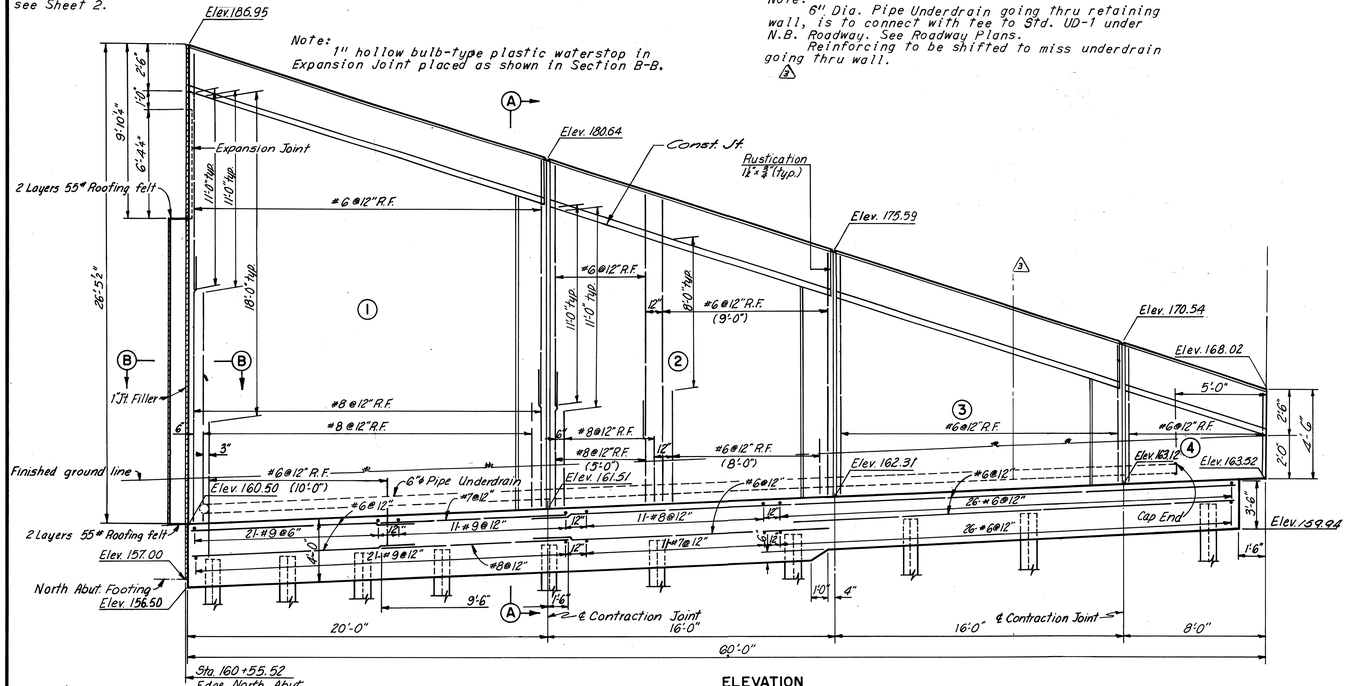
SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 2 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	96	155

Note: For North Abutment, see Sheet 2.

Note: 1" hollow bulb-type plastic waterstop in Expansion Joint placed as shown in Section B-B.

Note: 6" Dia. Pipe Underdrain going thru retaining wall, is to connect with Tee to Std. UD-1 under N.B. Roadway. See Roadway Plans. Reinforcing to be shifted to miss underdrain going thru wall.

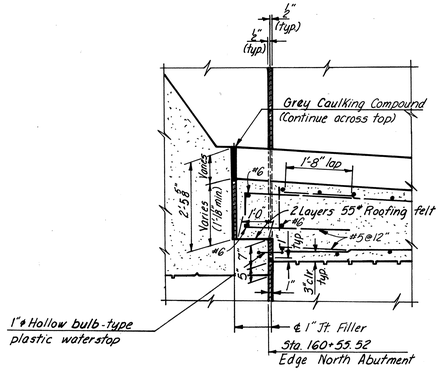


ELEVATION

Scale: ¼"=1'-0"

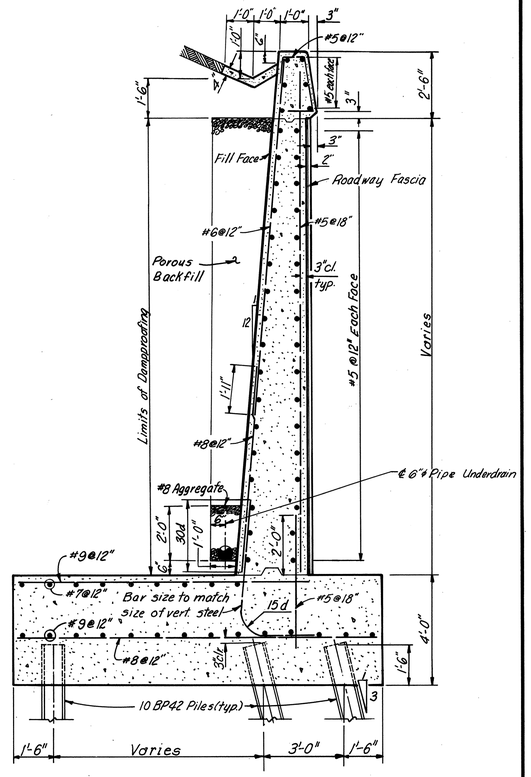
Legend:
R.F. denotes Rear Face.

Note:
Longitudinal footing bars have the following splice lengths:
#6 Bar = 1'-11"
#8 Bar = 2'-6"
#9 Bar = 2'-10"
Dowel bars not shown. See Section A-A for shape and spacing.



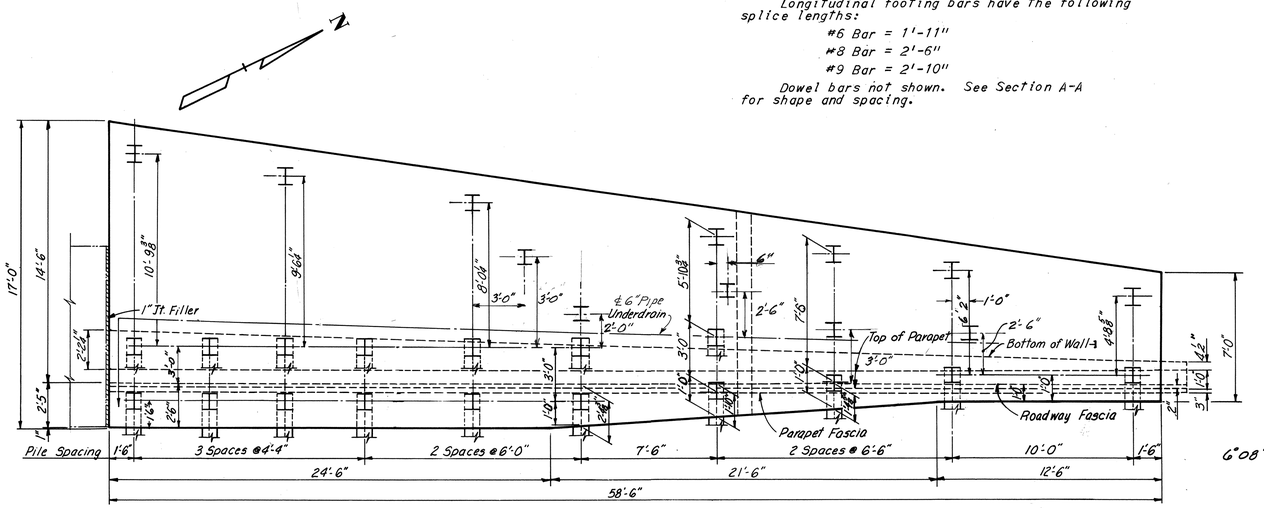
SECTION B-B

Scale: ½"=1'-0"



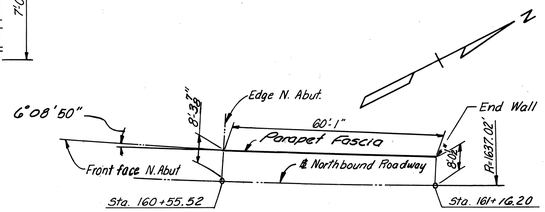
SECTION A-A

Scale: ¾"=1'-0"



FOOTING PLAN

Scale: ¼"=1'-0"



WALL LAYOUT PLAN

No Scale

	BY	DATE
MADE	PLM	2-16-68
CHECKED	JWC	4-2-68
IN CHARGE	FKD	

NO.	REVISION	BY	DATE
4	As Built	JRC	3-73
3	Revise Ltg. Std.	JRC	9-71
2	Profile Grade	P.S.	4-12-71
1	General Checking	AMH	5-13-68

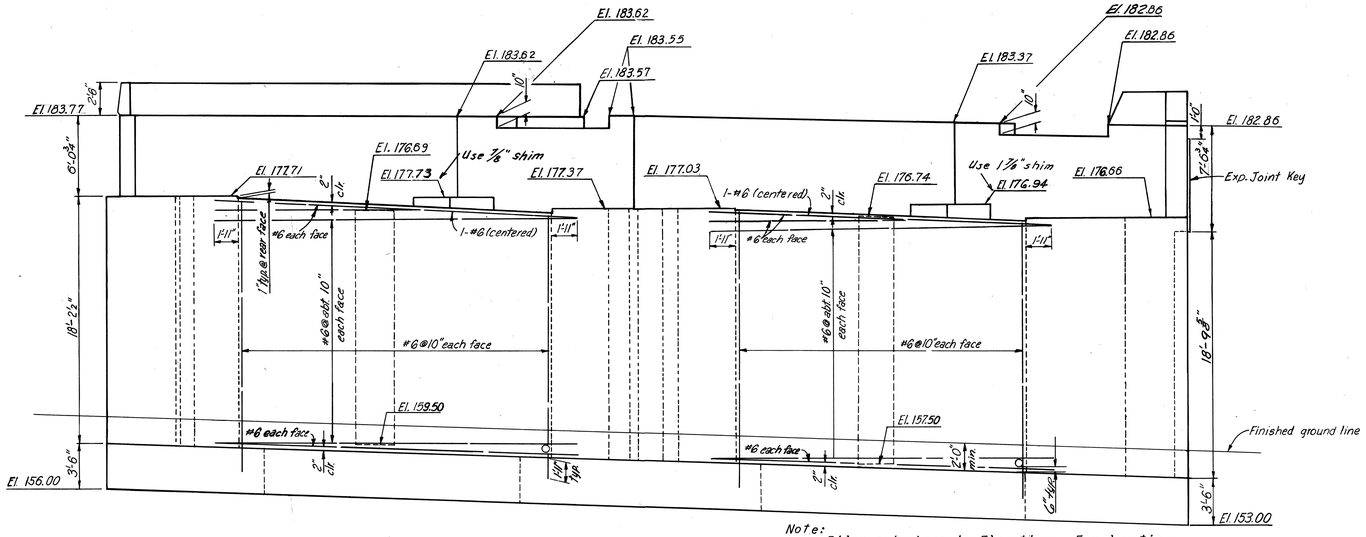
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER
NORTHBOUND ROADWAY
NORTH ABUTMENT RETAINING WALL

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

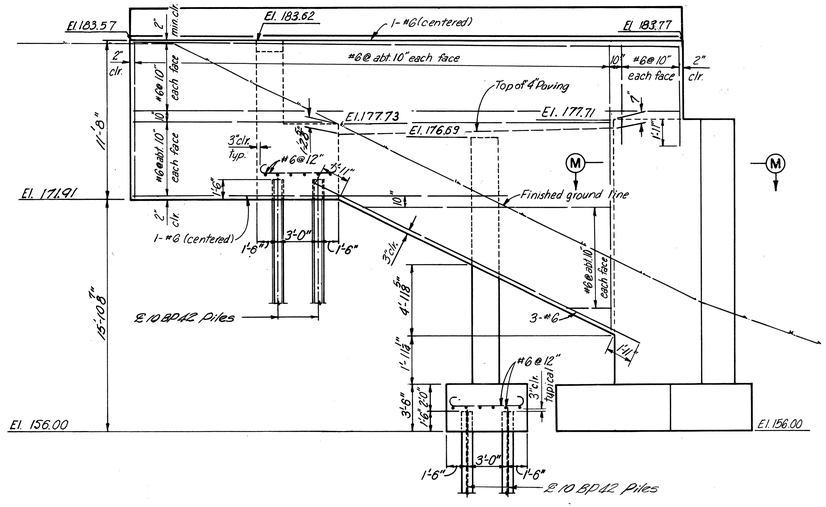
SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 3 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	97	155



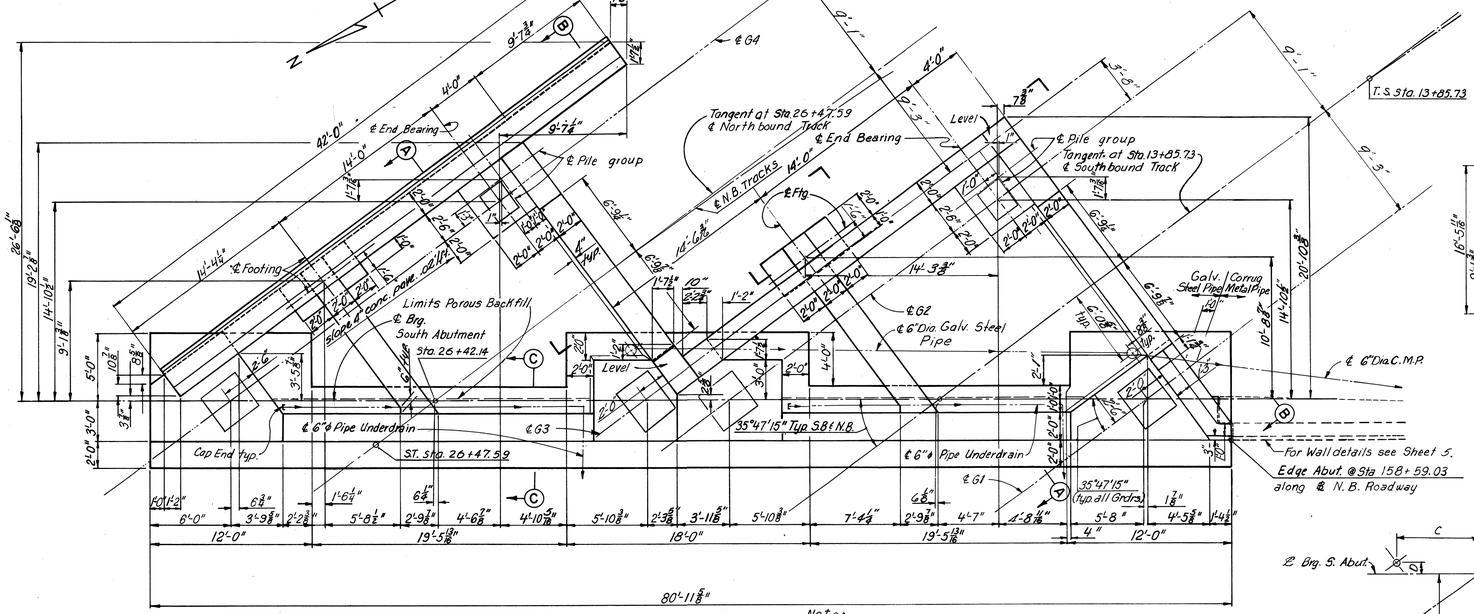
Note: Piles not shown in Elevation. For location, see Footing Plan.

ELEVATION
No Scale

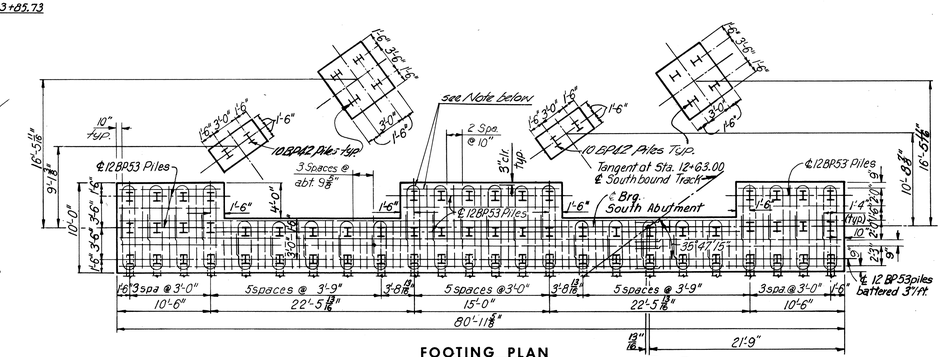


EAST WINGWALL ELEVATION
Scale 3/16" = 1'-0"

Note: Piles not shown in front footing. For location of piles, see Footing Plan.



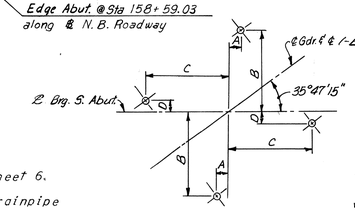
PLAN
Scale 3/16" = 1'-0"



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

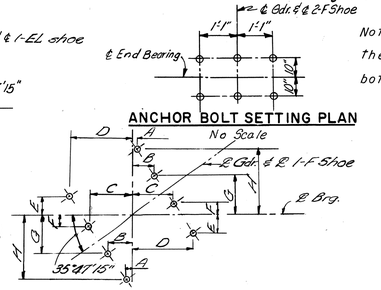
AS BUILT

Note: Stirrups around piles have a radius of 8" for the bends and a lap of 2'-6".
Reinforcing shown is typical for both top and bottom. All footing bars are #8 bars.



ANCHOR BOLT SETTING PLAN
No Scale

	A	B	C	D	E	F	G	H
1-EL Shoe	3 3/4"	1'-1 1/16"	1'-1 1/16"	3 3/4"	—	—	—	—
1-F Shoe	1 3/16"	7 1/16"	1'-2 1/16"	1'-7 7/16"	5 5/8"	2 3/4"	1'-0 7/16"	1'-8 3/16"



ANCHOR BOLT SETTING PLAN
No Scale

Note: Payment for 6" Dia. C.M.P. and attachment of 6" Dia. C.M.P. to Paved Ditch is incidental to unit price bid for Paved Ditch, Std PC-2A. For details of connection of 6" Dia. C.M.P. to Paved Ditch, see Sheet 7.

Note: For Sections A-A, B-B, C-C, and M-M, see Sheet 6. For Reinforcing not shown, see Abutment Details, Sheet 6. For Drainage Details, see Sheet 9. Reinforcing to be shifted to miss underdrain and drainpipe going thru walls. 6" Dia. Underdrain to be sloped at 1/4"/ft. towards outlet in front wall.

Note: 6" Dia. Pipe Underdrai. going thru front wall of Abutment, is to connect with tee to Std. UD-1 under N.B. Roadway. See Roadway Plans.

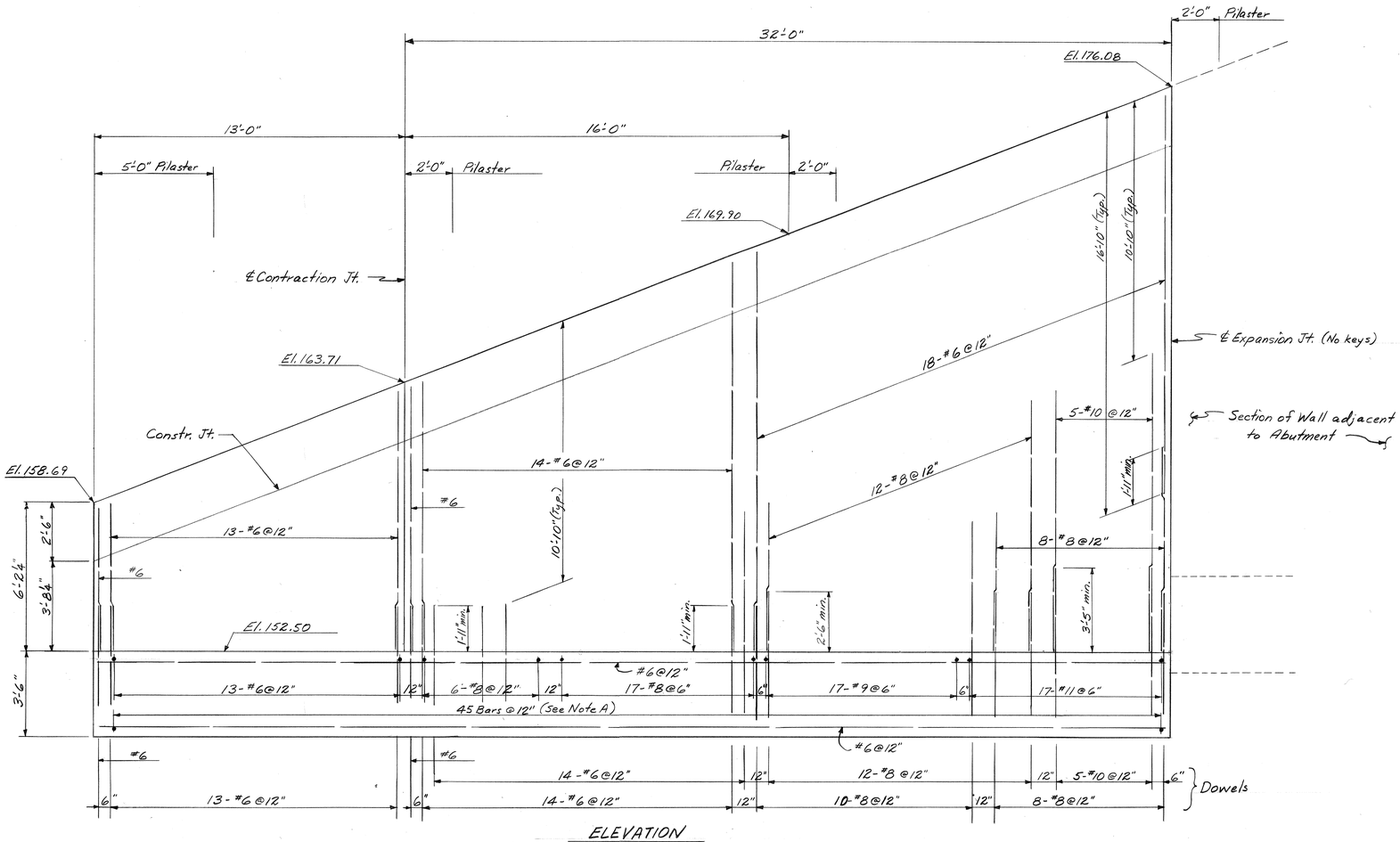
	BY	DATE				
			3	As Built	JRC	3-73
MADE	RLM	2-21-68	2	Profile Grade	P.S.	4-12-71
CHECKED	AMH	5-9-68	1	General Checking	AMH	5-13-68
IN CHARGE	FKD		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER NORTHBOUND ROADWAY
SOUTH ABUTMENT

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

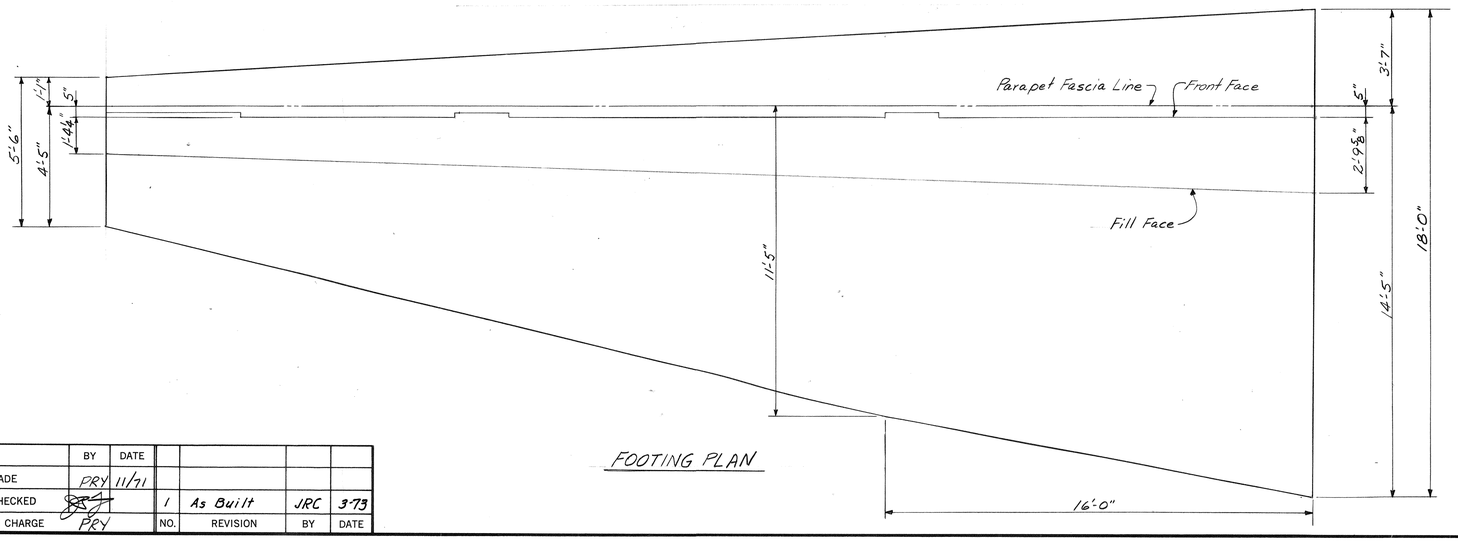
SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 4 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXP.	98A	155

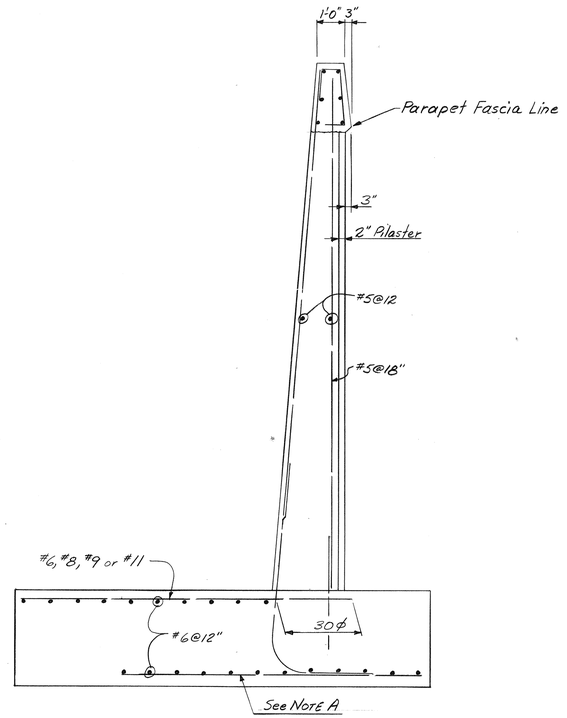


ELEVATION

All stem reinforcing and dowels shown for fill face.



FOOTING PLAN



TYPICAL SECTION

Note:
Horizontal stem steel, parapet bars and front face vertical bars & dowels are same as original except for increased quantity and/or length due to increased stem height.

Note A:
Use original transverse footing steel to the maximum extent possible. Place steel forward into the toe leaving the lower rear of the footing unreinforced if necessary. At the low end of the wall, salvage the longer original #6 top bars for use in the bottom as required.

AS BUILT

	BY	DATE					
MADE	PRY	11/71					
CHECKED			1	As Built	JRC	3-73	
IN CHARGE	PRY		NO.	REVISION	BY	DATE	

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

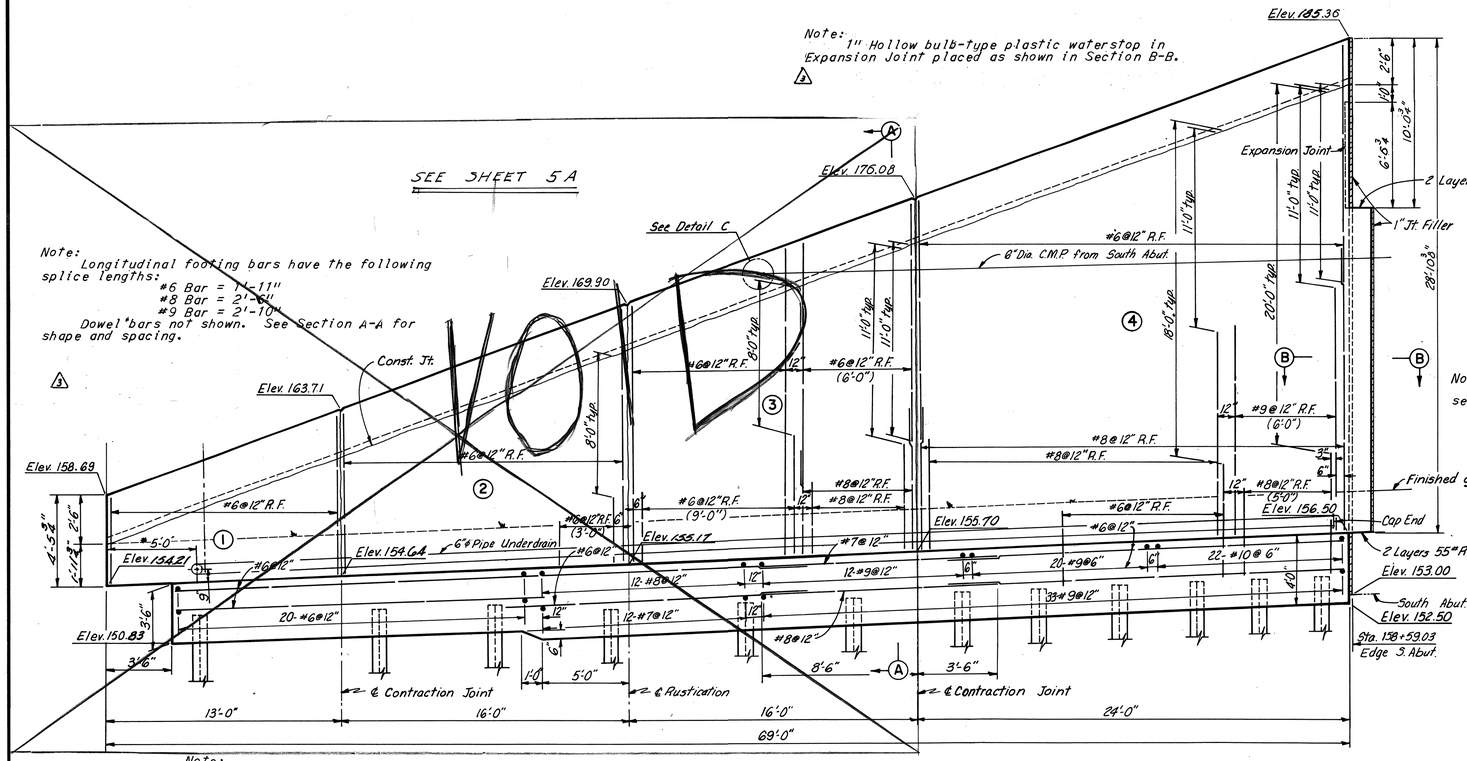
BRIDGE No. 9
R.F.&P.R.R. OVER NORTHBOUND ROADWAY
REVISED PORTION
SOUTH ABUTMENT RETAINING WALL

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

SCALE: 3/8"=1'-0"
CONTRACT NO.: 4
SHEET NO. 5A OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	98	155

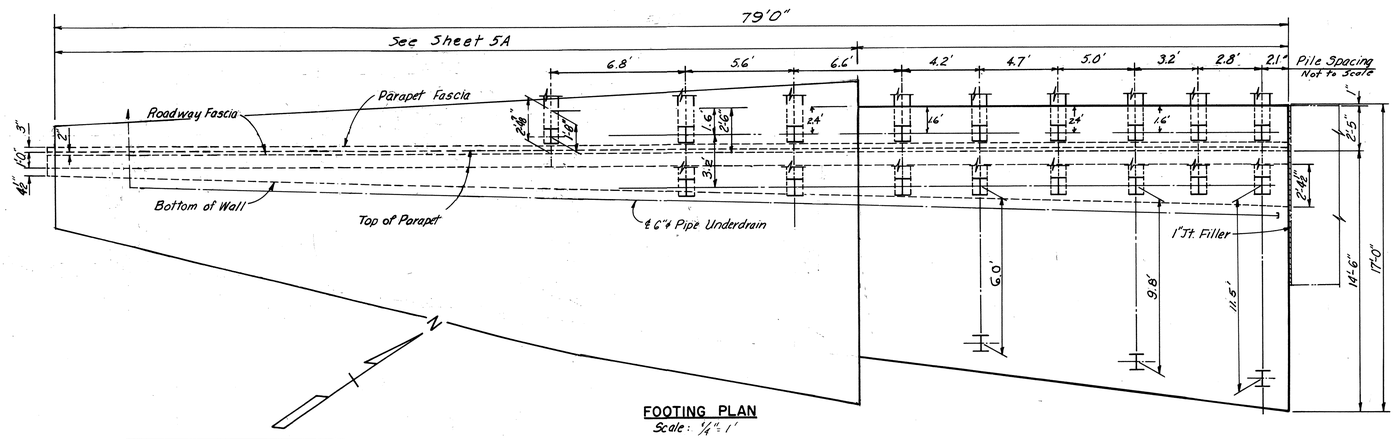
Note:
For detail of connection of 6" Dia. C.M.P. to Concrete V-Gutter, see Detail C.



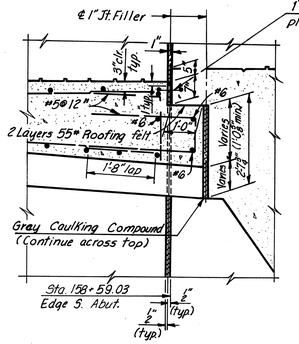
ELEVATION
Scale: 1/4"=1'-0"

Note: 6" Dia. Pipe Underdrain going thru retaining wall, is to connect with tee to Std. UD-1 under N.B. Roadway. See Roadway Plans. Reinforcing to be shifted to miss underdrain going thru wall.

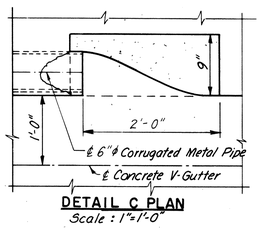
Legend: R.F. denotes Fill Face.



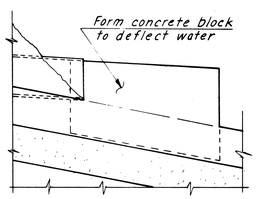
FOOTING PLAN
Scale: 1/4"=1'



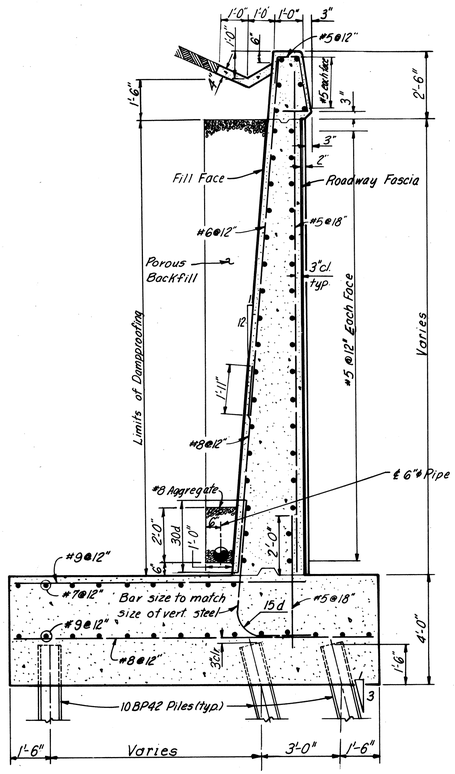
SECTION B-B
Scale: 1/2"=1'-0"



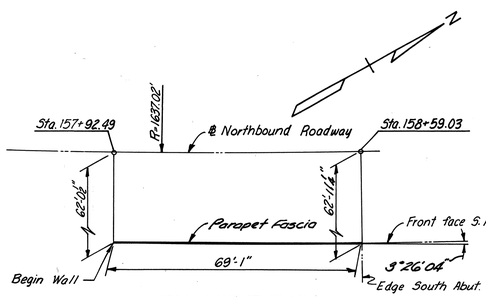
DETAIL C PLAN
Scale: 1"=1'-0"



DETAIL C ELEVATION
South Abutment Drainage
Scale: 1" = 1'-0"



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



WALL LAYOUT PLAN
No Scale

	BY	DATE
MADE	RLM	2-19-68
CHECKED	AJC	4-2-68
IN CHARGE	FKD	

NO.	REVISION	BY	DATE
4	As Built	JRC	3-73
3	Revised Lt. Std.	JRC	9-71
2	Profile Grade	P.S.	4-12-71
1	General Revision	AMH	5-13-68

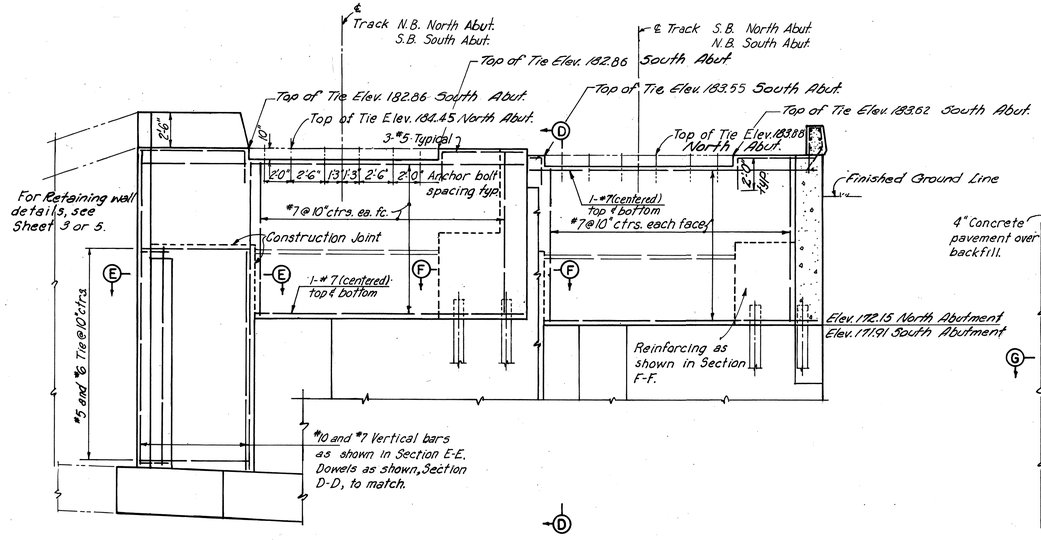
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER
NORTHBOUND ROADWAY
SOUTH ABUTMENT RETAINING WALL

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

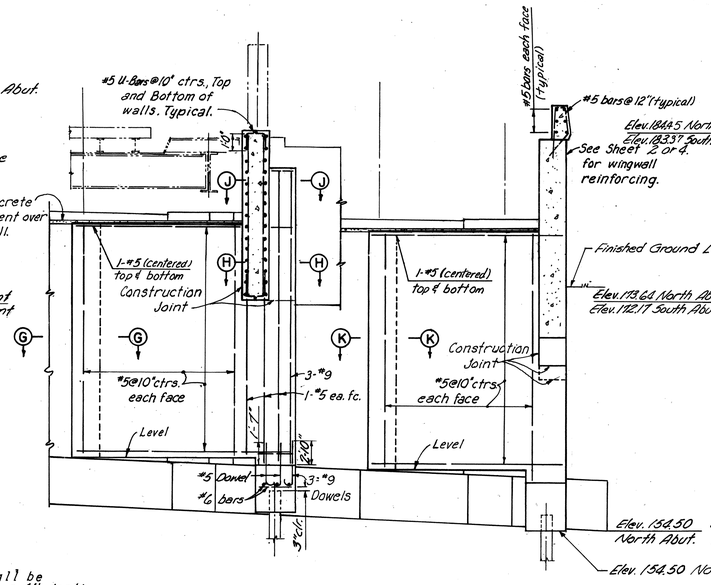
SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 5 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	99	155

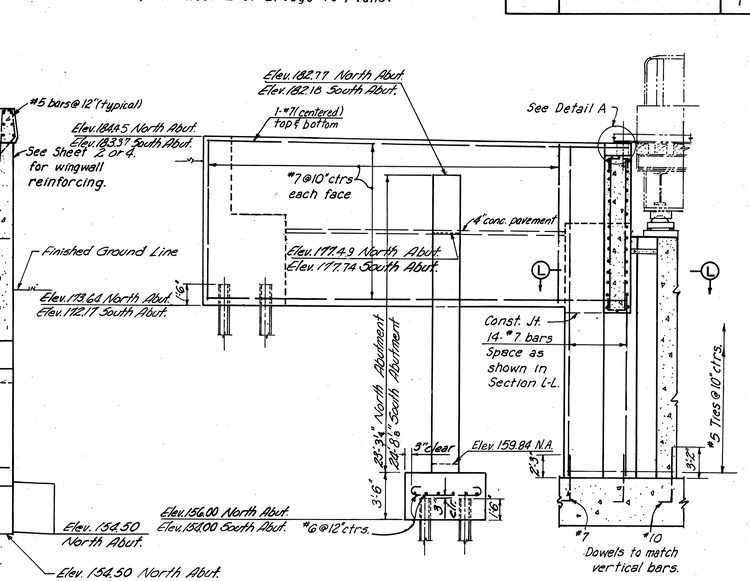


SECTION B–B
Scale: $\frac{3}{16}$"=1'-0"
For location, see Sheet 2 or 4.

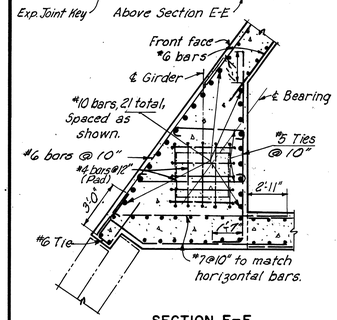
Note:
Paving shown within limits of abutment shall be 4" thick of preformed joint filler, sealed with a 1" depth of hot applied joint Sealer, shall be installed between paving and abutment walls. Preformed joint sealer shall be bituminous type conforming to AASHO M213.
Paving will be paid for as "Concrete, Class A3, Substructures and Walls."



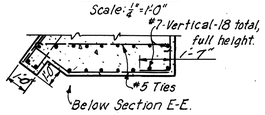
SECTION A–A
Scale: $\frac{3}{16}$"=1'-0"
For location see Sheet 2 or 4.

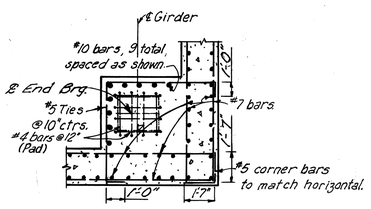


SECTION D–D
Scale: $\frac{3}{16}$"=1'-0"

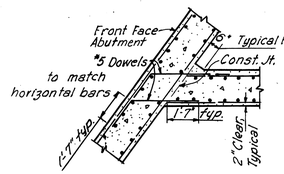


SECTION E–E
Scale: $\frac{1}{4}$"=1'-0"

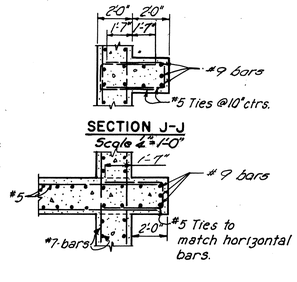




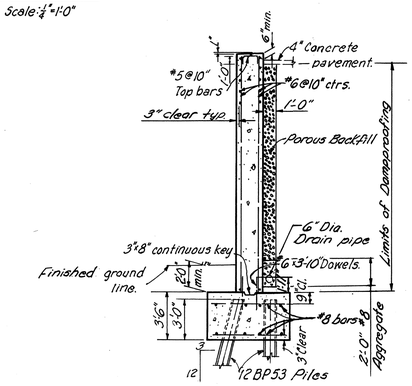
SECTION F–F
Scale: $\frac{1}{4}$"=1'-0"



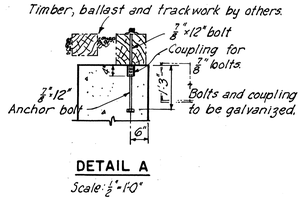
SECTION G–G
SECTION K–K
Scale: $\frac{1}{4}$"=1'-0"



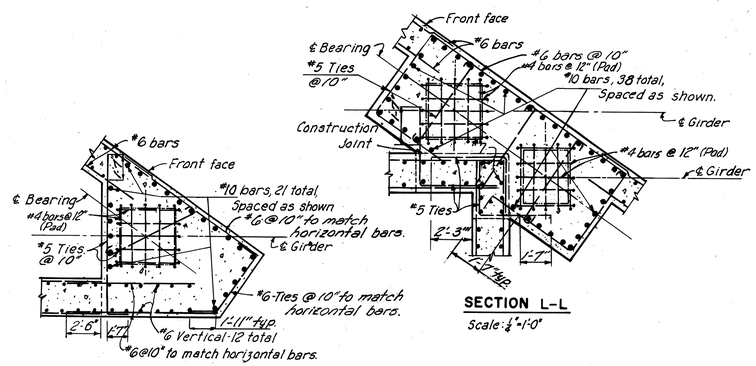
SECTION H–H
Scale: $\frac{1}{4}$"=1'-0"



SECTION C–C
Scale: $\frac{3}{16}$"=1'-0"
For location, see Sheet 2 or 4.



DETAIL A
Scale: $\frac{1}{4}$"=1'-0"



SECTION L–L
Scale: $\frac{1}{4}$"=1'-0"

SECTION M–M
Scale: $\frac{1}{4}$"=1'-0"
For location, see Sheet 2 or 4.

Note:
Sections shown are for North Abutment, South Abutment similiar.
#4 Bars @ 12" shown in Sections E-E, F-F, L-L, and M-M, are to be U-shaped bars with 1'-6" legs.

AS BUILT

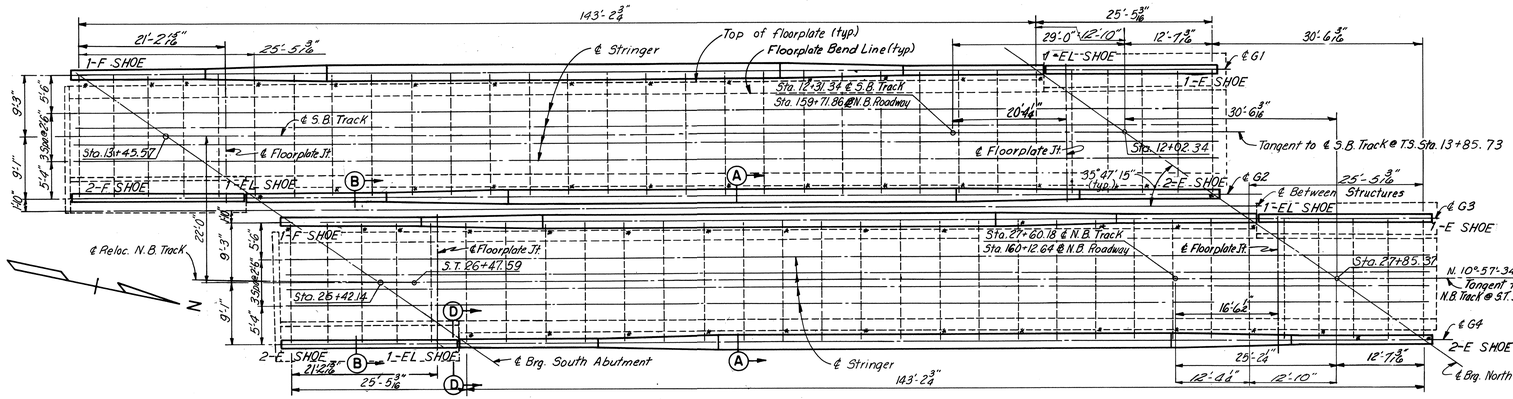
	BY	DATE	NO.	REVISION	BY	DATE
MADE	RGF	2-15-68	3	As Built	JRC	3-73
CHECKED	RLM	4-19-68	2	Profile Grade	P.S.	4-15-71
IN CHARGE	F K D		1	General Checking	AMH	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER NORTHBOUND ROADWAY
ABUTMENT DETAILS

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

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

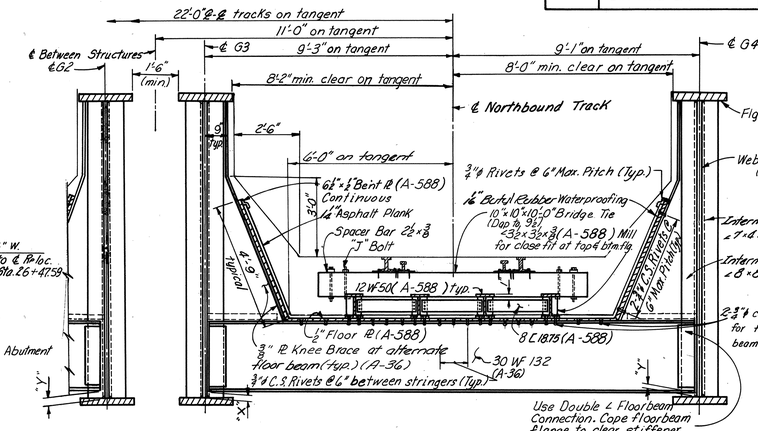
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	100	155



*---Denotes Knee Brace Location.

FRAMING PLAN

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



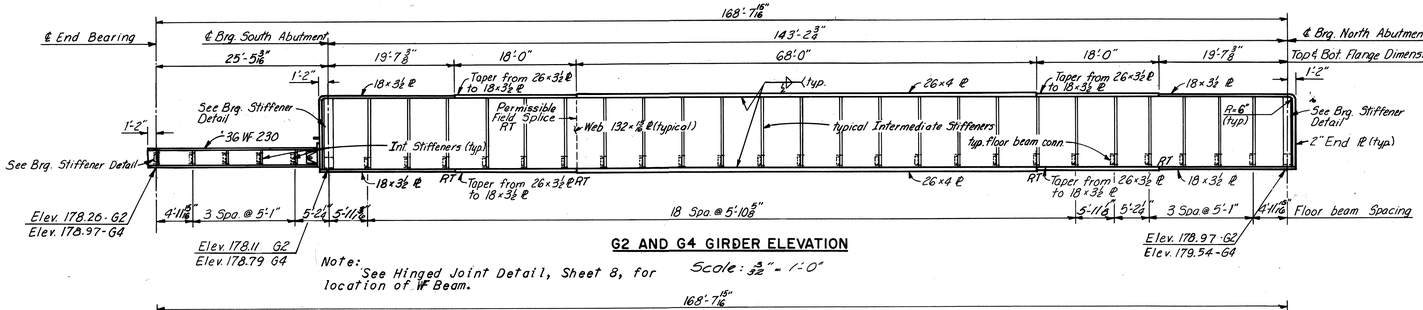
Note:
Floorplate connected to stringers by 2 rows of 3/4" Dia. countersunk rivets at 6" maximum pitch.
⚠ All riveted conections shown hereon may, at the contractors option, be replaced by high strength bolt connections

SECTION A-A

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

Note:
Ties, track, and fasteners are to be furnished and installed by others.

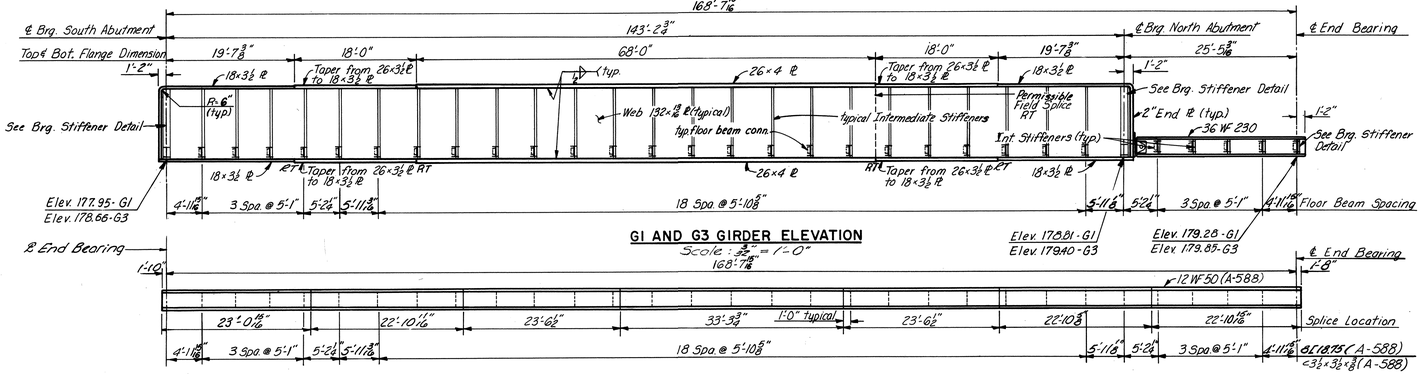
Note:
Asphalt plank shall be recessed to receive flange of 12 WF 50 stringers.



G2 AND G4 GIRDER ELEVATION

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

Note: See Hinged Joint Detail, Sheet 8, for location of WF Beam.



G1 AND G3 GIRDER ELEVATION

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

TYPICAL STRINGER DETAIL

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

FLOOR BEAM LOCATION TABLE

SOUTHBOUND TRACK

	G1	G2
DISTANCE	DIMENSION "X"	DIMENSION "Y"
0	2 3/4"	3"
4'-11 15/16"	2 3/4"	3"
10'-0 15/16"	2 3/4"	3"
15'-1 7/8"	2 3/4"	3"
20'-2 15/16"	2 3/4"	3"
25'-3 7/8"	3"	3"
31'-4 3/4"	3"	3"
37'-2 15/16"	3"	3"
43'-1 3/4"	3"	3"
49'-0 3/4"	3"	3"
54'-10 15/16"	3"	3"
60'-9 1/2"	3"	3"
66'-8 1/16"	3"	3"
72'-6 11/16"	3"	3"
78'-5 5/8"	3"	3"
84'-3 15/16"	3"	3"
90'-2 9/16"	3"	3"
96'-1 1/8"	3"	3"
101'-11 15/16"	3"	3"
107'-10 7/16"	3"	3"
113'-9 1/16"	3"	3"
119'-7 11/16"	3"	3"
125'-6 5/16"	3"	3"
131'-4 15/16"	3"	3"
137'-3 9/16"	3"	3"
143'-2 3/4"	3"	3"
148'-5"	3"	2 3/4"
153'-6"	3"	2 3/4"
158'-7"	3"	2 3/4"
163'-8"	3"	2 3/4"
168'-7 15/16"	3"	2 3/4"

FLOOR BEAM LOCATION TABLE

NORTHBOUND TRACK

	G3	G4
DISTANCE	DIMENSION "X"	DIMENSION "Y"
0	2 9/16"	3 7/16"
4'-11 15/16"	2 11/16"	3 1/4"
10'-0 15/16"	2 13/16"	3 1/16"
15'-1 7/8"	2 15/16"	2 7/8"
20'-2 15/16"	3"	3"
25'-3 7/8"	3"	3"
31'-4 3/4"	3"	3"
37'-2 15/16"	3"	3"
43'-1 3/4"	3"	3"
49'-0 3/4"	3"	3"
54'-10 7/16"	3"	3"
60'-9 1/2"	3"	3"
66'-8 1/16"	3"	3"
72'-6 5/8"	3"	3"
78'-5 5/8"	3"	3"
84'-4"	3"	3"
90'-2 5/8"	3"	3"
96'-1 1/4"	3"	3"
101'-11 7/16"	3"	3"
107'-10 1/2"	3"	3"
113'-9 1/4"	3"	3"
119'-7 1/16"	3"	3"
125'-6 5/8"	3"	3"
131'-5"	3"	3"
137'-3 3/8"	3"	3"
143'-2 1/4"	3"	3"
148'-1"	2 3/4"	3"
153'-1" 6"	2 3/4"	3"
158'-1" 7"	2 5/8"	3"
163'-1" 8"	2 3/4"	3"
168'-1" 7 15/16"	2 3/4"	3"

RADIOGRAPHIC INSPECTION NOTE:
An "RT" shown on elevation views indicates radiographic inspection of adjacent flange and web, flange, or web welds in accordance with the Special Provisions.

Note:
Welded Girders are to be cambered to compensate for full anticipated dead load, see Sheet 9.

Notes:
For Shoe Details, see Sheet 10.
For Dead Load Deflections, see Sheet 9.
For Superstructure Details, see Sheets 8 and 9.
For Sections B-B, and D-D, see Sheet 9.

Note:
One butt welded shop splice will be permitted in each 26"x4" flange plate; details of splice shall be similar to that shown for Field Flange Splice, sheet 8. A maximum of 3 web splices including web splice at "Permissible Field Splice", will be permitted; detail of shop web splice shall be similar to that shown for Field Flange Splice, Sheet 8, except that web opening is not required and web splice shall not be located within 2'-0" of a shop flange splice.

Notes - Southbound Track:
Distances shown in Floor Beam Table are measured from north to south, starting at the extreme north floor beam.
Dimensions "X" and "Y" shown in Floor Beam Table for G1 and G2 are measured from top of bottom flange for Plate Girder section and from bottom of WF Beam section.

Elevations shown on Girder Elevations are at bottom of bottom flange for Plate Girder section and for WF Beam section.

Notes - Northbound Track:
Distances shown in Floor Beam Table are measured from south to north, starting at the extreme south floor beam.
Dimenstons "X" and "Y" shown in Floor Beam Table for G3 and G4 are measured from top of bottom flange for Plate Girder section and from bottom of WF Beam section.

Elevations shown on Girder Elevations are at bottom of bottom flange for Plate Girder section and for WF section.

	BY	DATE	NO.	REVISION	BY	DATE
			4	As Built	JRC	3-73
MADE	RLM	12-1967	⚠3	Addendum 3 Amendment 3	Ede.	4-12-71
CHECKED	JEH	4-9-68	2	Profile Grade	Ede.	4-12-71
IN CHARGE	FKD		1	General Checking	AMH	5-13-68

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 9
R.F.&P.R.R. OVER NORTHBOUND ROADWAY
FRAMING PLAN

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

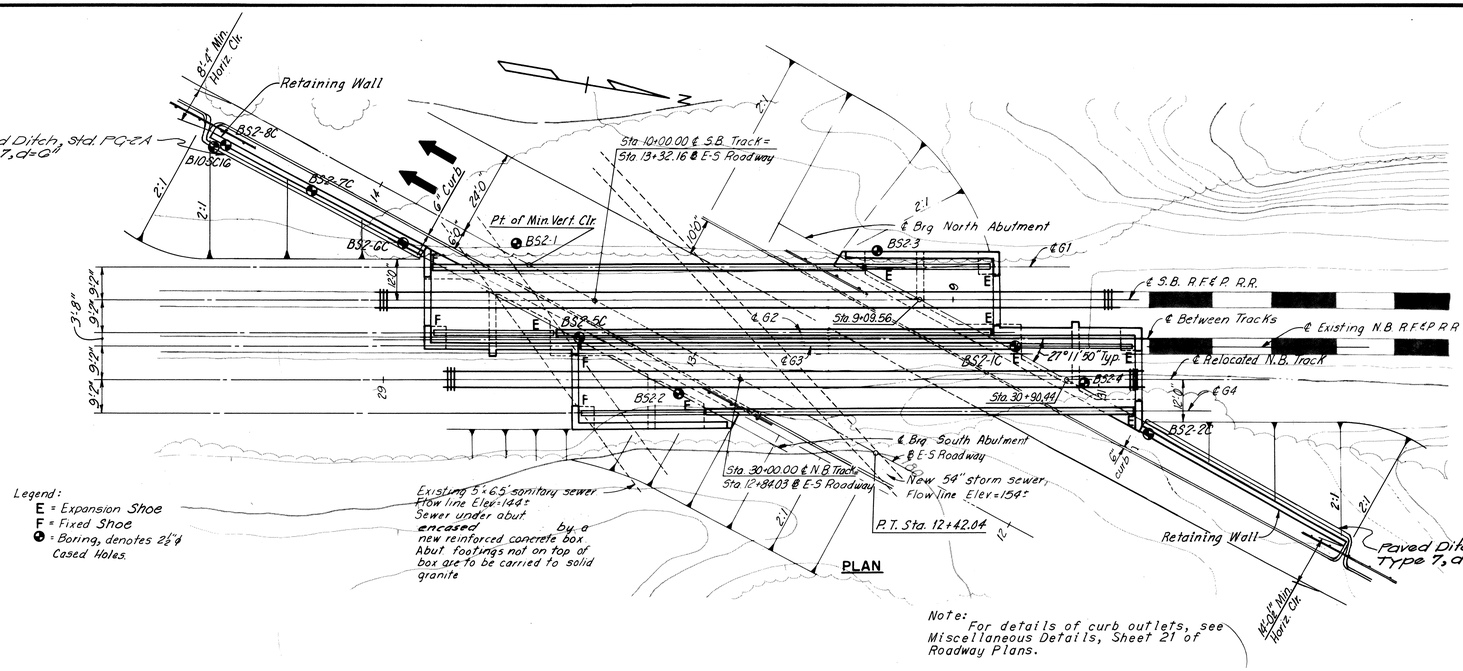
SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 7 OF 12

Bridge 10S & 10N

(Northbound & Southbound CSX RR over Southbound DTE Connector “Rte. 146”)

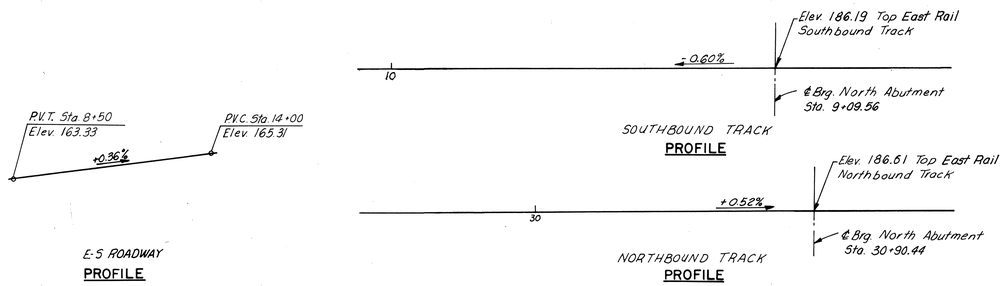
Record Set Plans

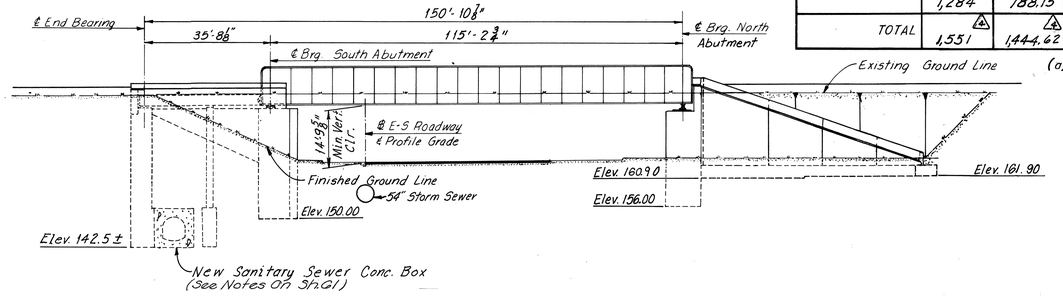
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	106	155



Legend:
E = Expansion Shoe
F = Fixed Shoe
● = Boring, denotes 2½" ϕ Cased Holes.

Note: For details of curb outlets, see Miscellaneous Details, Sheet 21 of Roadway Plans.





ELEVATION

INDEX

NO.	REVISION	BY	DATE
5	As Built	JRC	3-73
4	Wingwall Changes	F.L.G.	2-24-72
3	Profile Grade	P.S.	4-12-71
2	General	J.G.V.	10-70
1	General Checking	A.M.H.	5-13-68

	BY	DATE
MADE	RLM	12-5-67
CHECKED	JEH	4-9-68
IN CHARGE	FKD	

GENERAL NOTES

STRUCTURE: Dual structures with one welded steel girder span and one rolled beam at each approach. Distance ℄-℄ Girders of 18'-4" with 1'-6" min. clear between structures.

CAPACITY: Live Loads - Cooper E-80 with 50% impact.

SPECIFICATIONS: GENERAL: Virginia Department of Highway Road and Bridge Specifications 1970 and Contract Special Specifications. DESIGN: A.R.E.A. 1966 for Steel Railway Bridges, for Fixed Spans not exceeding 400 feet in length. 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.

FOUNDATION: 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: All concrete shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted.
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 bar unless otherwise noted.

STEEL NOTES: Structural steel shall conform to A.S.T.M. Specification A-36 and A-588. All Field Connections shall be made with high strength bolts or rivets. High strength bolts and rivets shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

BENCH MARK: A-15 Copperweld rod on bridge on Blue Shingles Road Elev. 204.73.

4 **FOUNDATION:** 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.

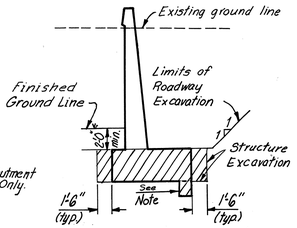
ESTIMATED QUANTITIES 5

	Struct. Excav. Cu. Yds.	Concrete (a) Cu. Yds.	Reinf. Steel Lbs.	Steel Piles 10HP42 Lin. Ft.		Porous Backfill Cu. Yds.	Under-drain 6" Pipe Lin. Ft.	Struct. Steel (Lbs.) Mild Carbon	Struct. Steel (Lbs.) High Strength	Asphalt damp-proofing Sq. Yds.	1" Asphalt Plank Sq. Ft.	¼" Butyl Rubber Waterproofing Square	Bridge Drainage Metalwork Lbs.
Superstructure								674,692.2	251,107.1		6,756	68	
North Abutment	4 267	4 656.47	4 75,346			66	167			242			
South Abutment	4 1,284	4 788.15	4 91,072	4 794.9		62	163			231			3,080
TOTAL	4 1,551	4 1,444.62	4 166,418	4 794.9		128	330	674,692.2	251,107.1	473	6,756	68	3,080

(a) Class A3

CURVE DATA

℄ E-5 Roadway
P.I. = Sta. 6+43.88
Δ = 37°15'41"
D = 3°00'00"
T = 643.88'
L = 1242.04'
R = 1909.86'



Note: North Abutment Wingwall Only.

LIMITS OF EXCAVATION 4
No Scale

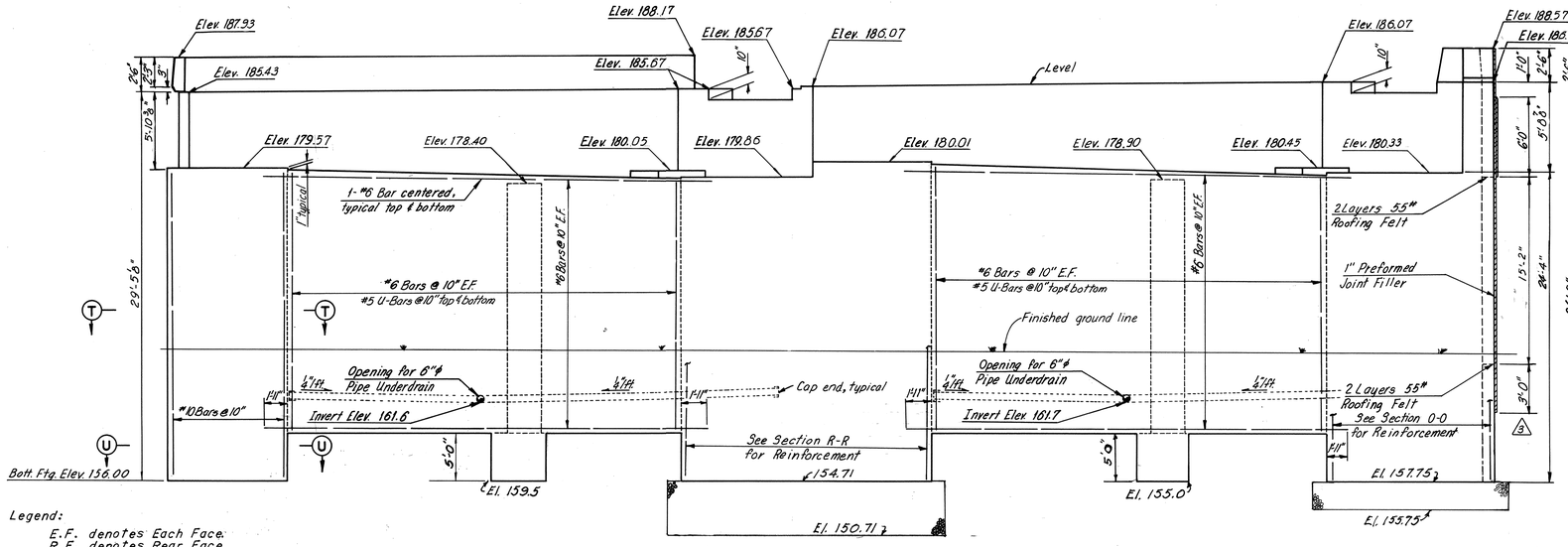
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
GENERAL PLAN AND ELEVATION

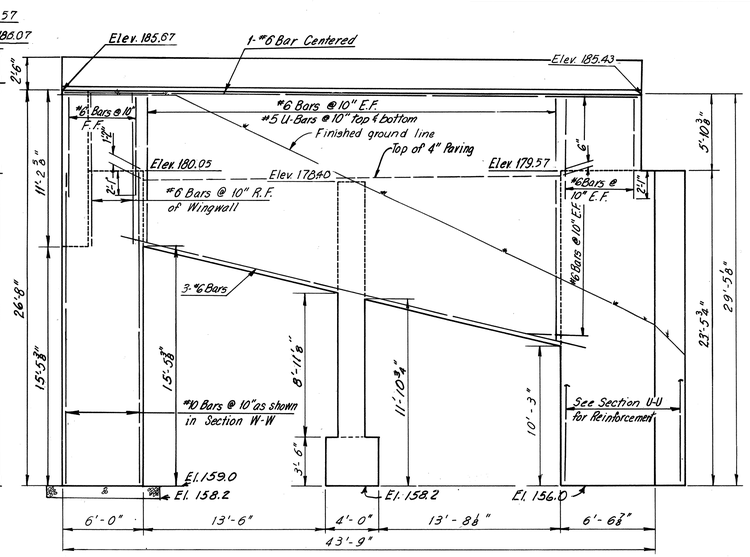
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=20' unless noted
CONTRACT NO.: 4
SHEET NO. 1 OF 12

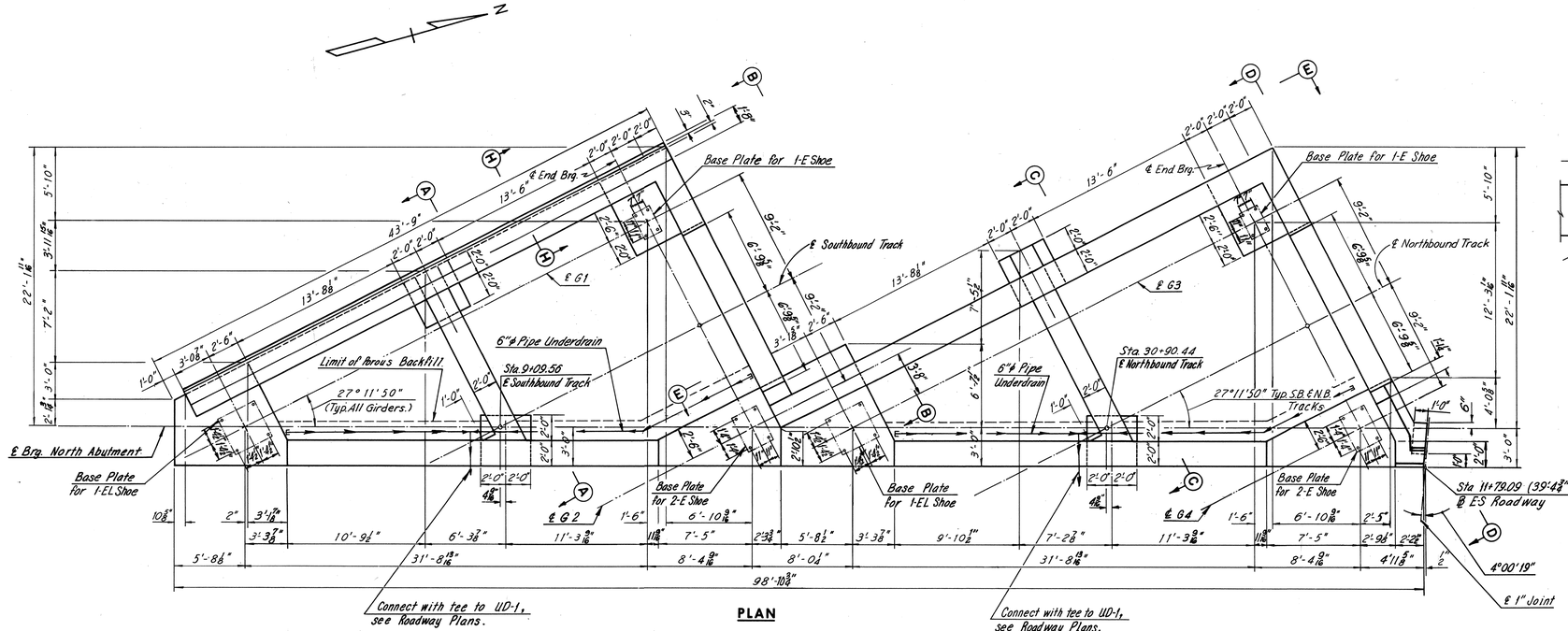
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	107	155



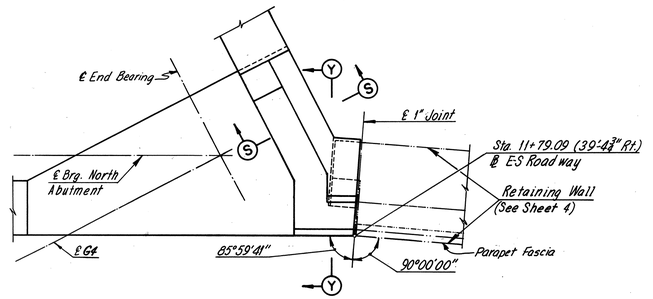
ELEVATION



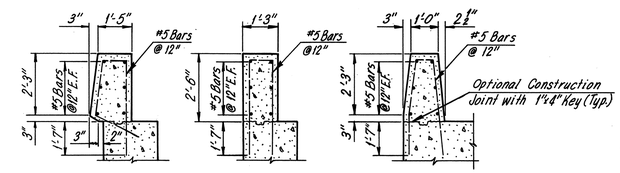
WEST WINGWALL ELEVATION



PLAN



DETAIL AT 1" JOINT



SECTION H-H **SECTION S-S** **SECTION Y-Y**

	BY	DATE
MADE	D.E.S.	3-7-68
CHECKED	R.L.M	4-30-68
IN CHARGE	F.K.D	

NO.	REVISION	BY	DATE
4	As Built	J.R.C.	3-73
3	Wall Ftg. Elev.	J.G.V.	2.23.72
2	Profile Grade	R.S.	4-15-71
1	General Checking	A.M.H	5-13-68

AS BUILT

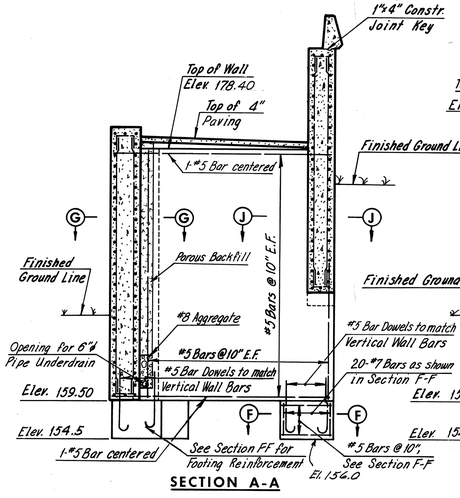
Note:
For Sections, see Sheet 3.
Reinforcing to be shifted to miss underdrain going thru walls.

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER EAST-SOUTH ROADWAY
NORTH ABUTMENT

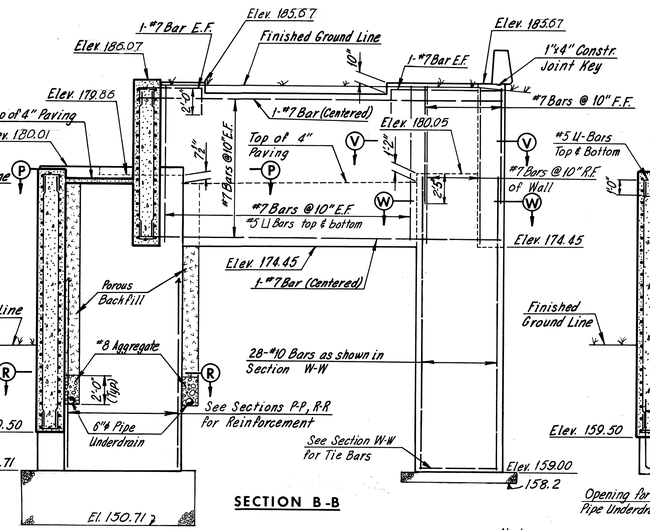
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: No Scale
CONTRACT NO.: 4
SHEET NO. 2 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	108	155



SECTION A-A



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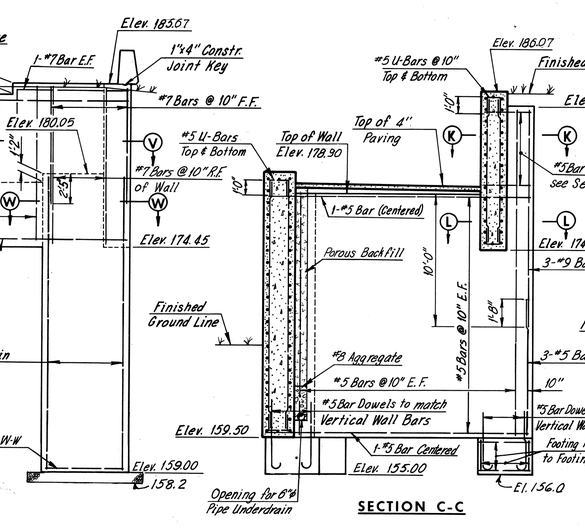
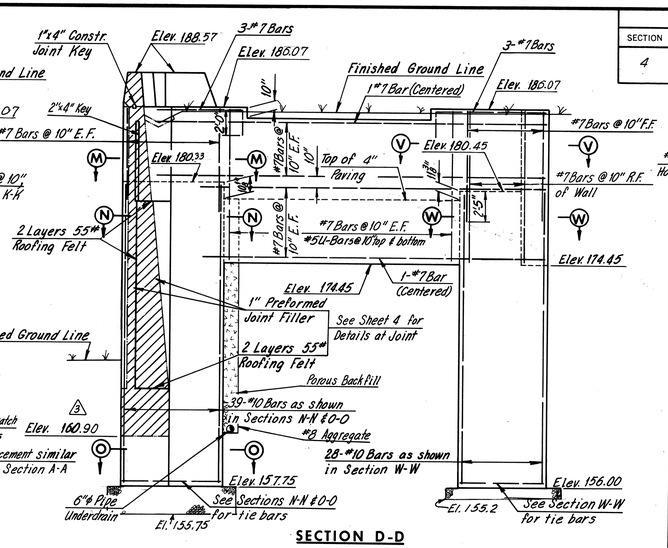
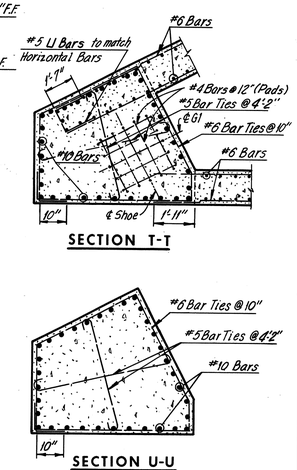


SECTION C-C



SECTION D-D



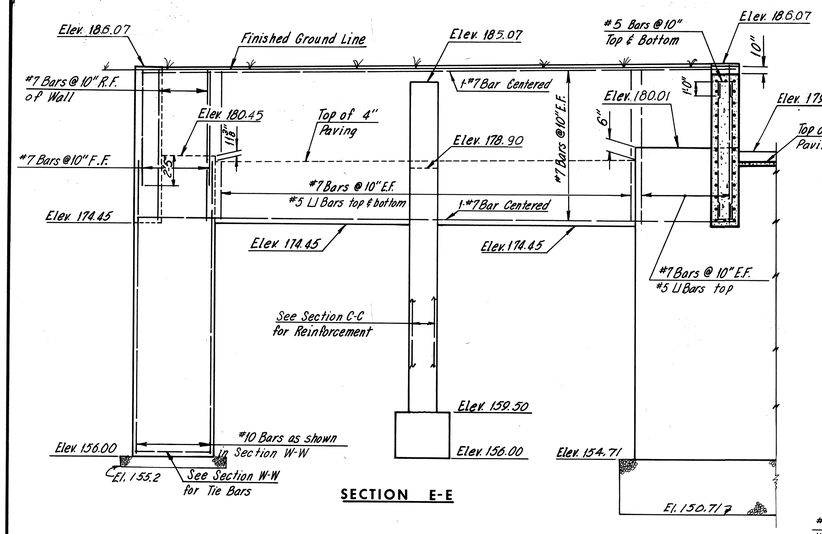
SECTION T-T

SECTION U-U

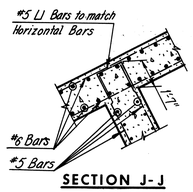
Note:
#5 U-Bars to be placed @ 10" ctrs. between footings in Section A-A and Section C-C.

Note:
Dampproofing to be applied between wall and porous backfill, from bottom of 4" concrete paving to bottom of wall.

Note:
#4 Bars @ 12" shown in Sections M-M, P-P, T-T, and W-W, are to be U-Shaped Bars with 1'-6" legs.



SECTION E-E



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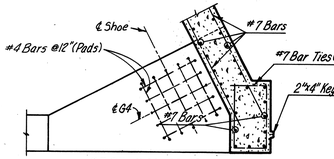
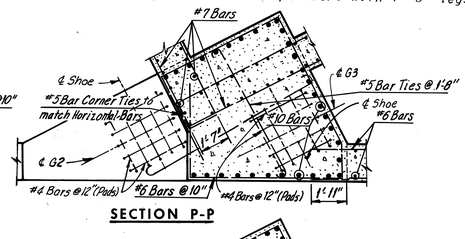


SECTION M-M



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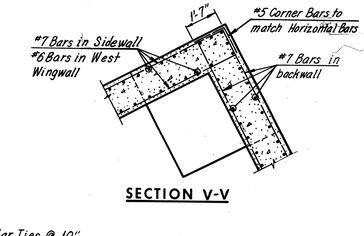
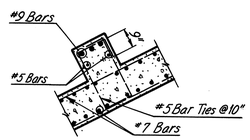


SECTION V-V



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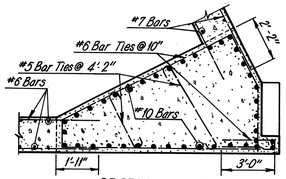

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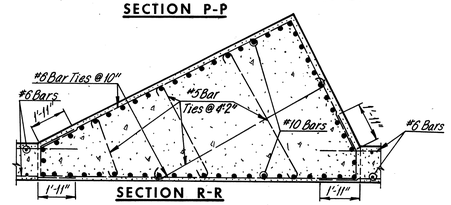
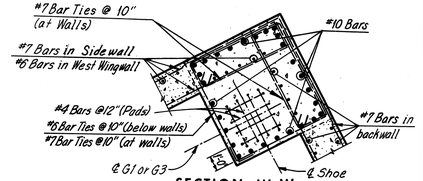
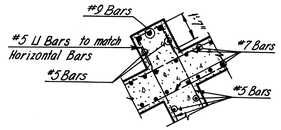


SECTION R-R



SECTION W-W



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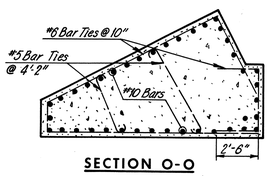
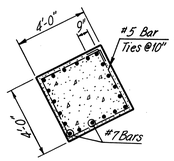
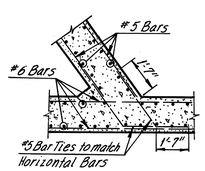


SECTION O-O



SECTION F-F



SECTION G-G

AS BUILT

Legend:
E.F. denotes Each Face
F.F. denotes Front Face
R.F. denotes Rear Face

Notes:
Paving shown within limits of abutment shall be 4" thick.
1/2" preformed joint filler, sealed with a 1" depth of hot applied joint sealer, shall be installed between paving and abutment walls. Preformed joint filler shall be bituminous type conforming to AASHO M213.
Paving will be paid for as "Concrete, Class A3, Substructures and Walls."
For Location of sections A-A, B-B, C-C, D-D, E-E, T-T and U-U, see Sheet 2.

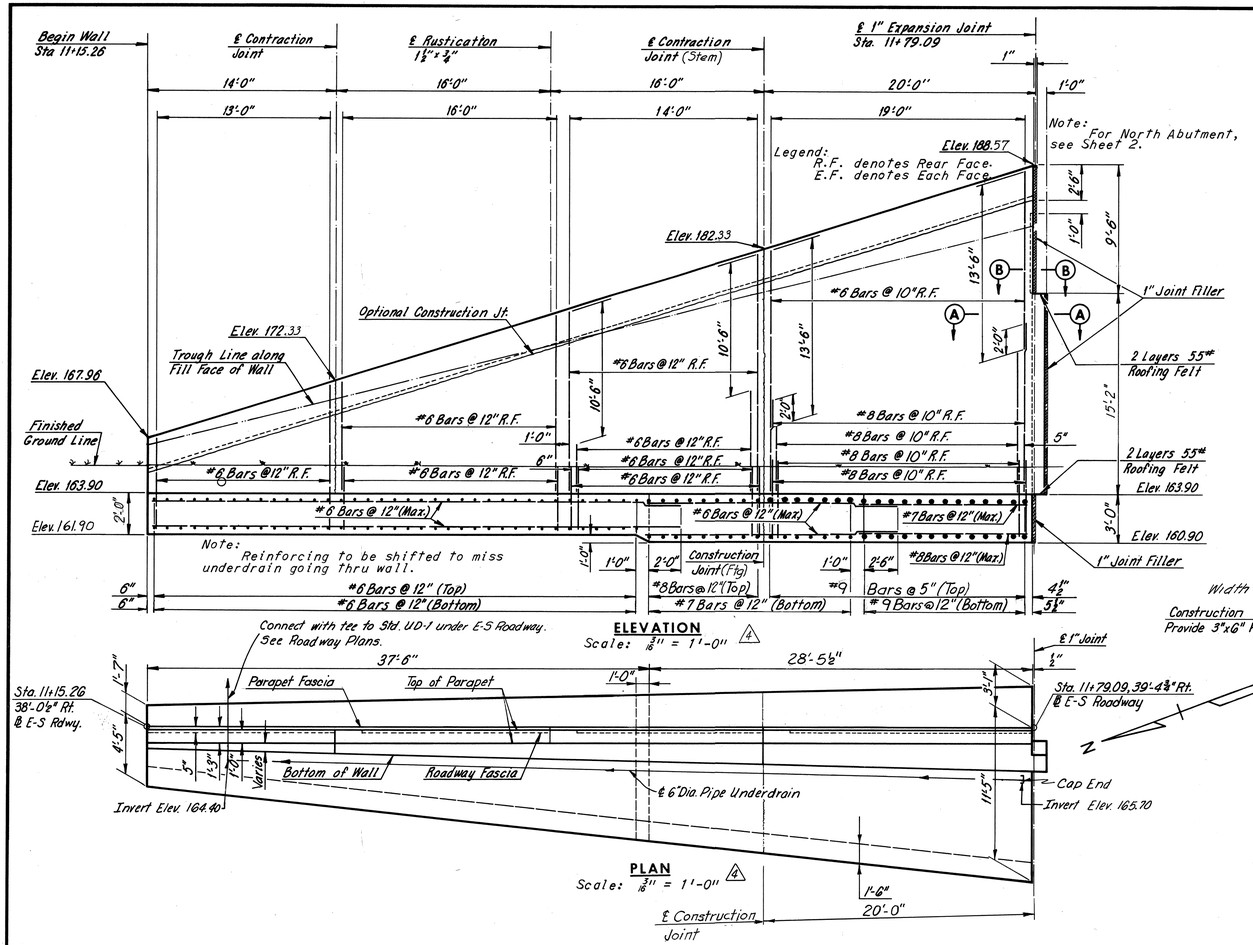
	BY	DATE	NO.	REVISION	BY	DATE
			4	As Built	JRC	3-73
MADE	D.E.S.	3-8-68	3	Wall Ftg. Elev.	J.G.V.	2-23-72
CHECKED	R.L.M.	4-30-68	2	Profile Grade	P.S.	4-15-71
IN CHARGE	F.K.D.		1	General Checking	A.M.H.	5-13-68

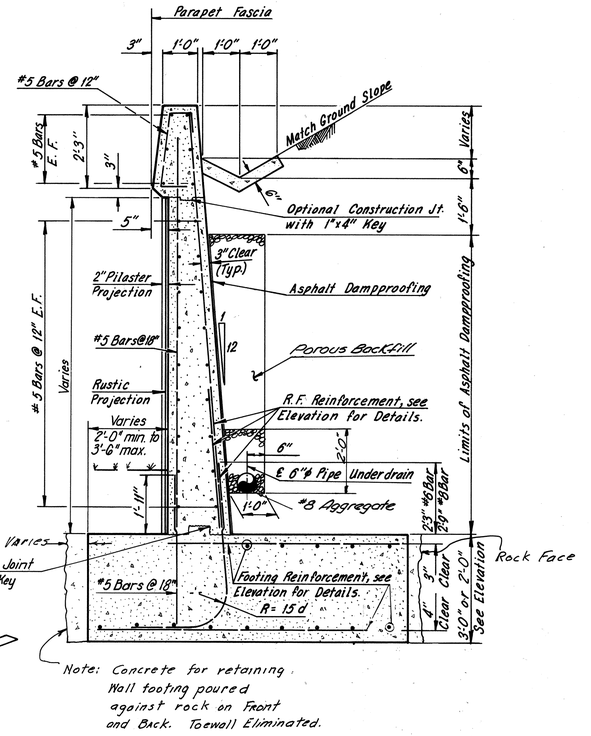
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
NORTH ABUTMENT DETAILS

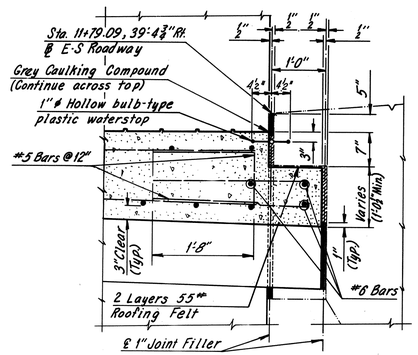
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: No Scale
CONTRACT NO.: 4
SHEET NO. 3 OF 12

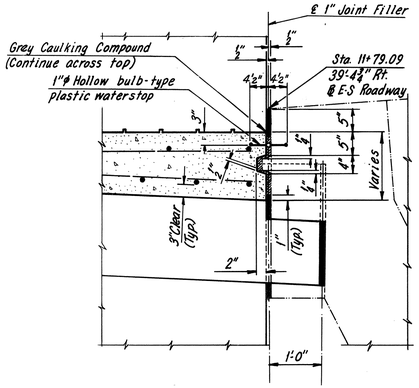
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	109	155







SECTION A-A
Scale: ¾" = 1'-0"



SECTION B-B
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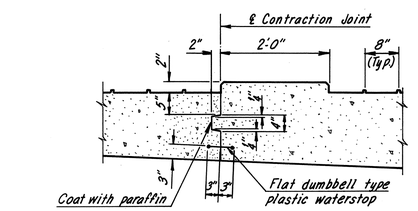
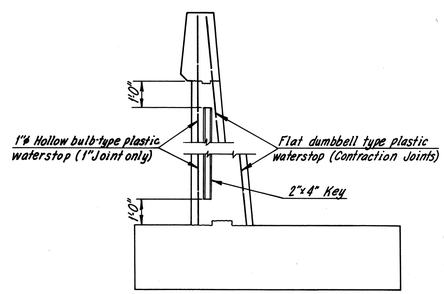


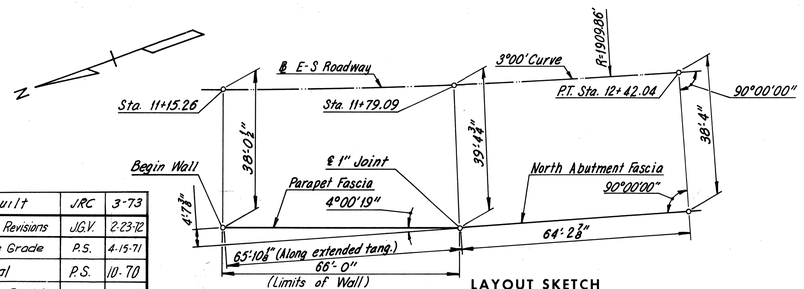
CONTRACTION JOINT DETAIL
Scale: ¾" = 1'-0"

AS BUILT

TYPICAL SECTION 4
No Scale



PLASTIC WATERSTOP DETAIL
No Scale



LAYOUT SKETCH
No Scale

	BY	DATE
MADE	D.E.S.	2-14-68
CHECKED	H.J.C.	4-1-68
IN CHARGE	FKD	

NO.	REVISION	BY	DATE
5	As Built	JRC	3-73
4	Footing Revisions	J.G.V.	2-23-72
3	Profile Grade	P.S.	4-15-71
2	General	P.S.	10-70
1	General Revisions	A.M.H.	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
NORTH ABUTMENT RETAINING WALL

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	110	155

Legend:
E.F. denotes Each Face.
R.F. denotes Rear Face.
F.F. denotes Front Face.

Note:
1. Payment for 6"⌀ C.M.P. and attachment of 6"⌀ C.M.P. to Paved Ditch is incidental to unit price bid for Paved Ditch, Std. PG-2A
2. For Sections, see Sheet 6.

Notes:
For Sections, see Sheet 6.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
			4	As Built	JRC	3-73
			3	Wall Dimension	J.G.V.	2-11-72
MADE	D.E.S.	2-28-68	2	Profile Grade	P.S.	4-15-71
CHECKED	RLM	5-1-68	1	General Checking	AMH	5-13-68
IN CHARGE	FKD					

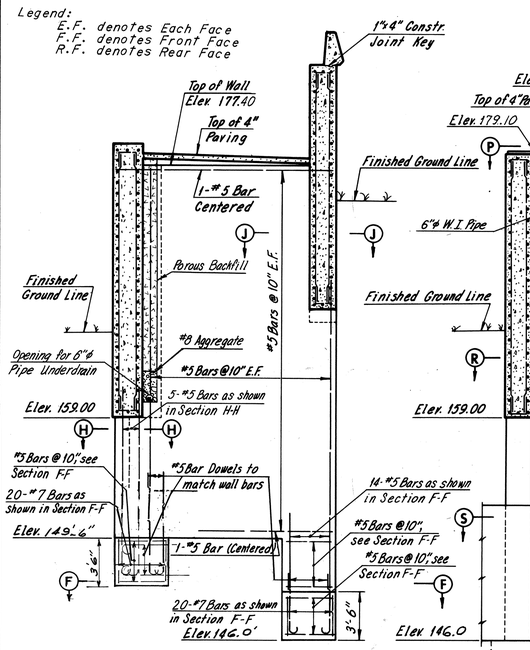
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
SOUTH ABUTMENT

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

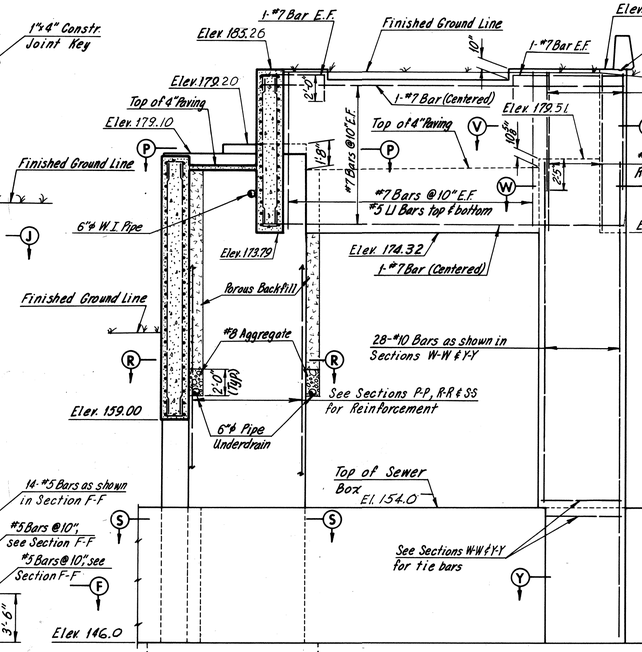
SCALE: No Scale
CONTRACT NO.: 4
SHEET NO. 5 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	111	155

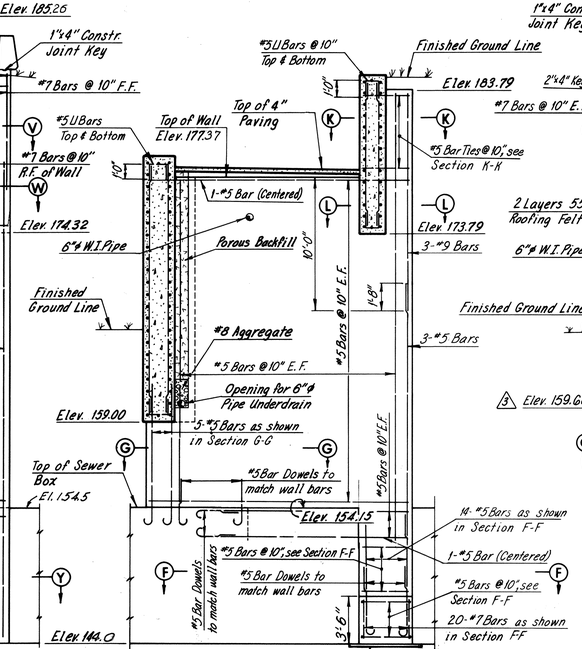
Legend:
E.F. denotes Each Face
F.F. denotes Front Face
R.F. denotes Rear Face



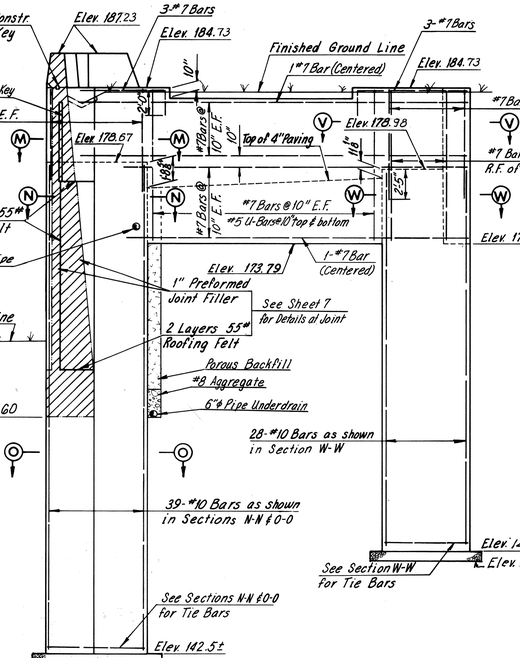
SECTION A-A



SECTION B-B

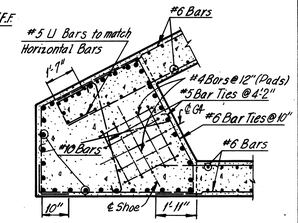


SECTION C-C

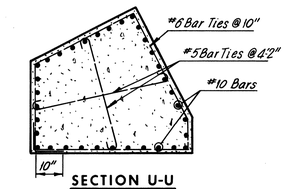


SECTION D-D

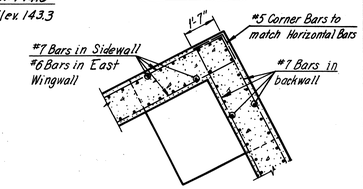
Note:
#4 Bars @ 12" shown in Sections M-M, P-P, T-T, and W-W, are to be U-Shaped Bars with 1'-6" legs.



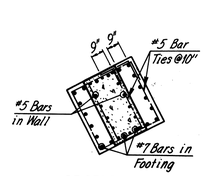
SECTION T-T



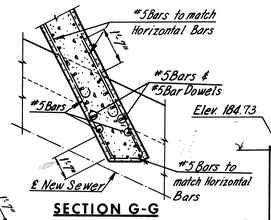
SECTION U-U



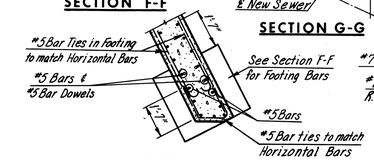
SECTION V-V



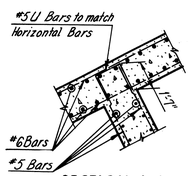
SECTION F-F



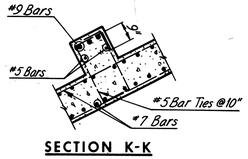
SECTION G-G



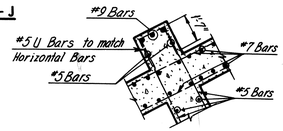
SECTION H-H



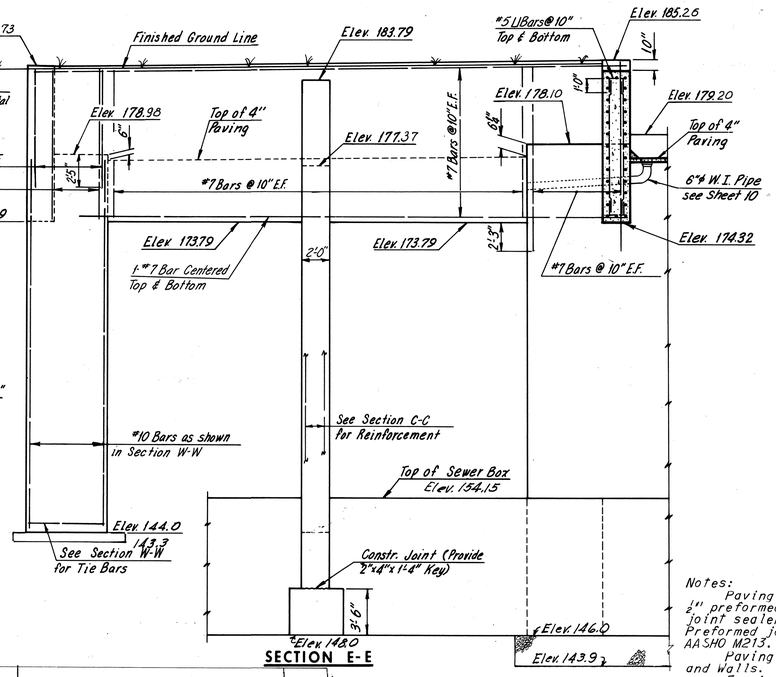
SECTION J-J



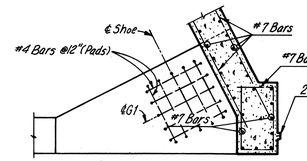
SECTION K-K



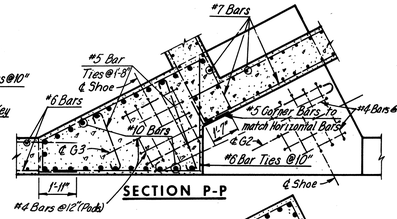
SECTION L-L



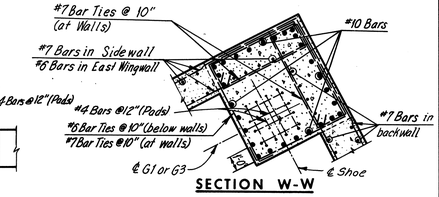
SECTION E-E



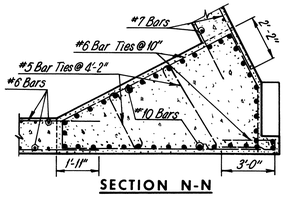
SECTION M-M



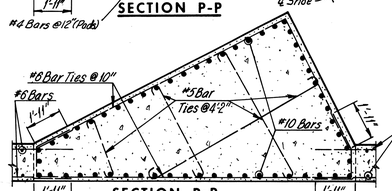
SECTION P-P



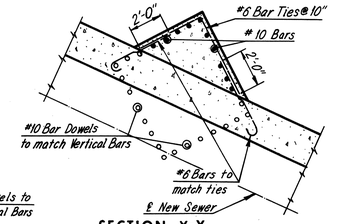
SECTION W-W



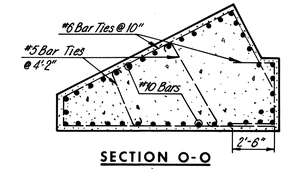
SECTION N-N



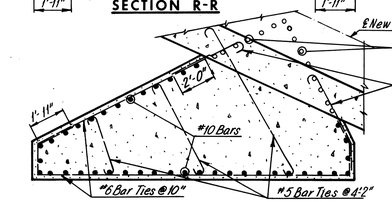
SECTION R-R



SECTION Y-Y



SECTION O-O



SECTION S-S

Note:
Dampproofing to be applied between wall and porous backfill, from bottom of 4" concrete paving to bottom of wall.

Note:
#5 U-Bars to be placed @ 10" ctrs. between footings in Section A-A and Section C-C.

Notes:
Paving shown within limits of abutment shall be 4" thick.
½" preformed joint filler, sealed with a 1" depth of hot applied joint sealer, shall be installed between paving and abutment walls. Preformed joint filler shall be bituminous type conforming to AASHO M213.
Paving will be paid for as "Concrete, Class A3, Substructures and Walls."
For Location of sections A-A, B-B, C-C, D-D, E-E, T-T and U-U, see Sheet 5.

AS BUILT

	BY	DATE
MADE	D.E.S.	3-7-68
CHECKED	R.L.M	5-1-68
IN CHARGE	F.K.D	

NO.	REVISION	BY	DATE
3	Wall Elevation	J.G.V.	2-11-72
2	Profile Grade	P.S.	4-15-71
1	General Checking	A.M.H	5-13-68

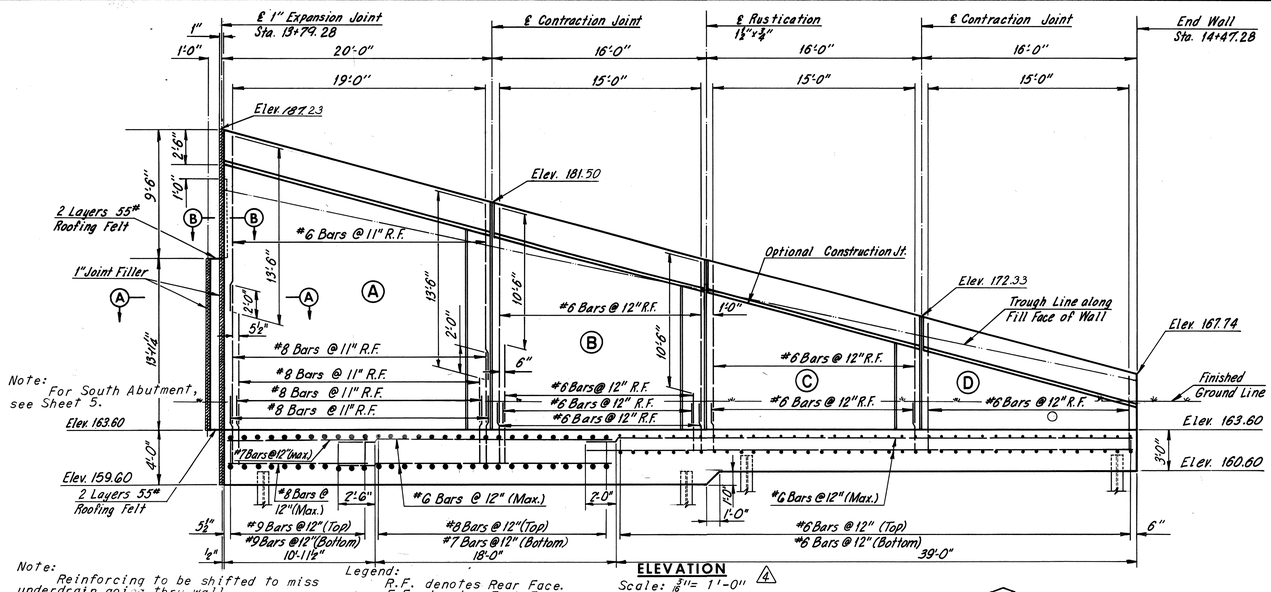
NO	DATE	REVISION	BY
4	3-7-73	As Built	J.R.C

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
SOUTH ABUTMENT DETAILS

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

SCALE: No Scale
CONTRACT NO.: 4
SHEET NO. 6 OF 12

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	112	155



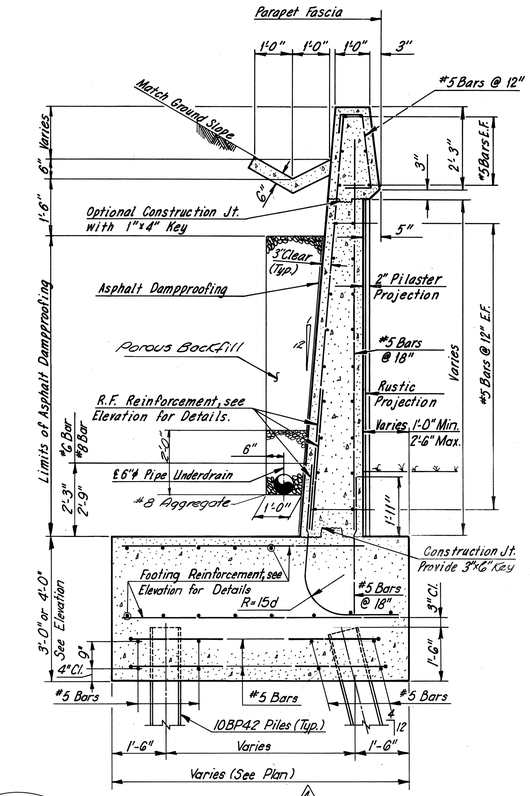
Note: For South Abutment, see Sheet 5.

Note: Reinforcing to be shifted to miss underdrain going thru wall.

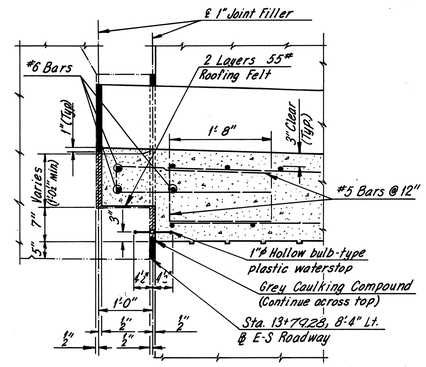
Legend: R.F. denotes Rear Face. E.F. denotes Each Face.

ELEVATION 4
Scale: 3/16" = 1'-0"

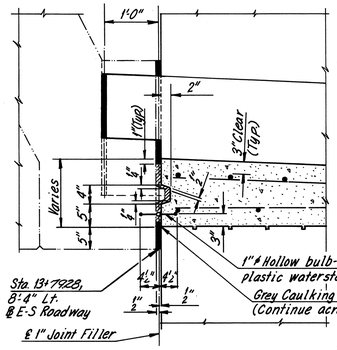
Note: For detail of connection of 6" Dia. C.M.P. to Concrete V-Gutter, see Detail C.



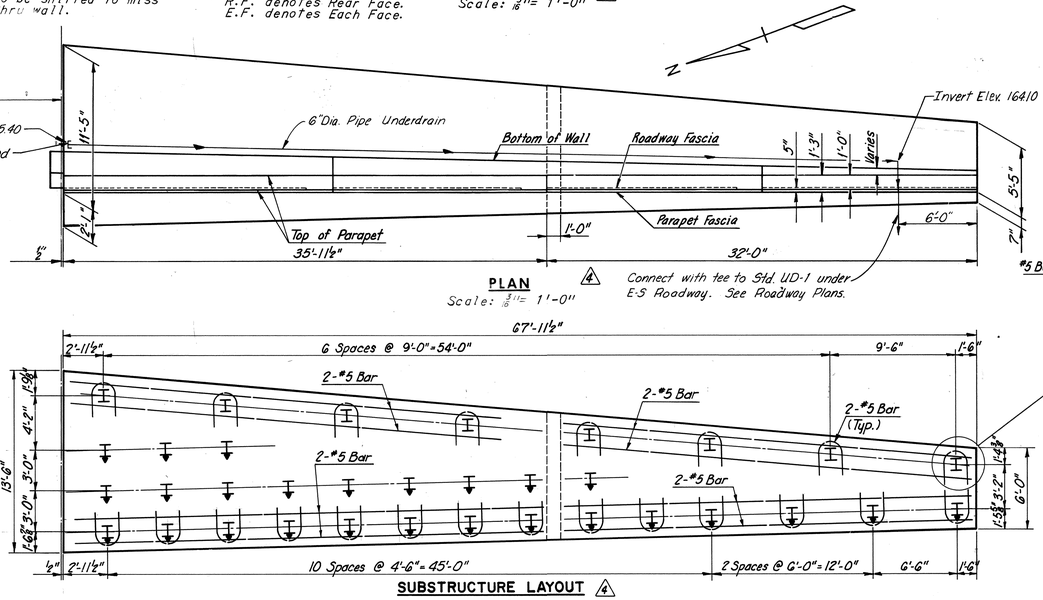
TYPICAL SECTION 4
No Scale



SECTION A-A
Scale: ¾" = 1'-0"



SECTION B-B
Scale: ¾" = 1'-0"

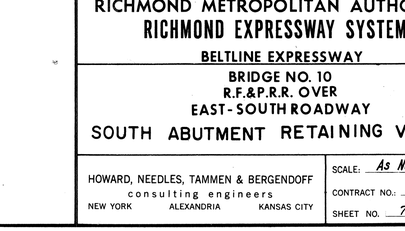


PLAN 4
Scale: 3/16" = 1'-0"

Connect with tee to Std. UD-1 under E-S Roadway. See Roadway Plans.

SUBSTRUCTURE LAYOUT 4
Scale: 3/16" = 1'-0"

PLASTIC WATERSTOP DETAIL
No Scale

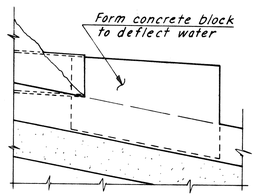


CONTRACTION JOINT DETAIL
Scal 3/4" = 1'-0"

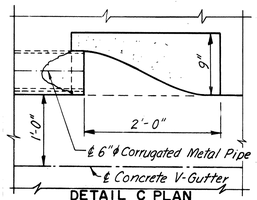
LAYOUT SKETCH
Scale: 1" = 20'-0"

NOTES: 4
All Piles 10BP42 steel piles (design capacity = 45 tons)
Jetting not permitted.
Number of Piles = 34.

Denotes 4:12 batter in direction of arrow.
Denotes vertical pile.



DETAIL C ELEVATION
South Abutment Drainage
Scale: .1" = 1'-0"



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

AS BUILT

	BY	DATE
MADE	D.E.S.	2-20-68
CHECKED	A.J.C.	4-1-68
IN CHARGE	F.K.D.	

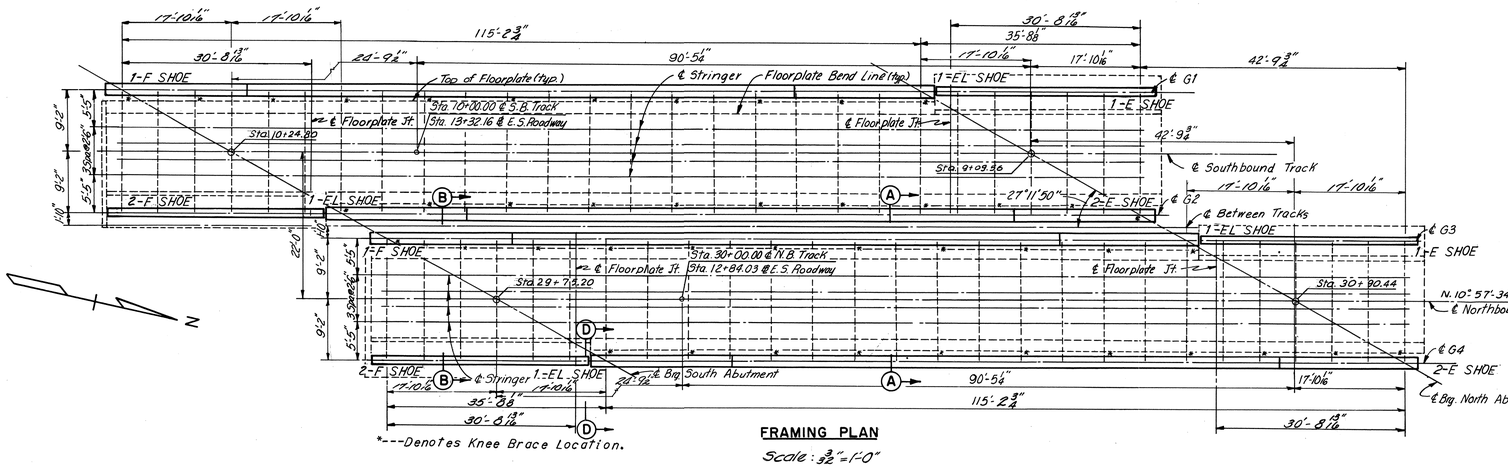
NO.	REVISION	BY	DATE
5	As Built	JRC	3-73
4	Footing Revision	J.G.V.	2-11-72
3	Profile Grade	P.S.	4-15-71
2	General	P.S.	7-70
1	General Revisions	A.M.H.	5-13-68

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER EAST-SOUTH ROADWAY
SOUTH ABUTMENT RETAINING WALL

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

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

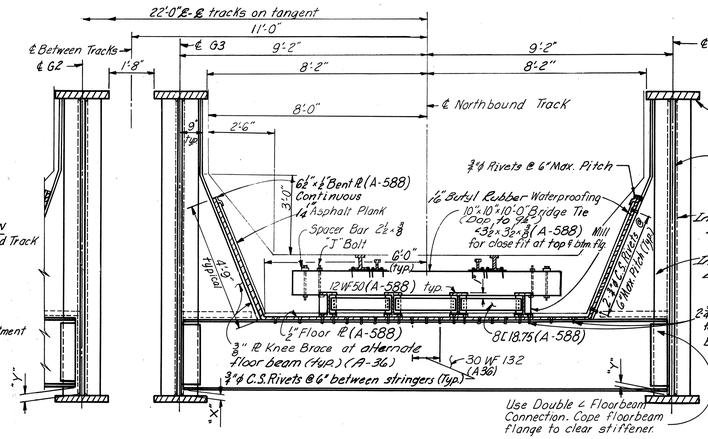
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	113	155



FRAMING PLAN

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

Note: Asphalt plank shall be recessed to receive flange of 12 WF 50 stringers.

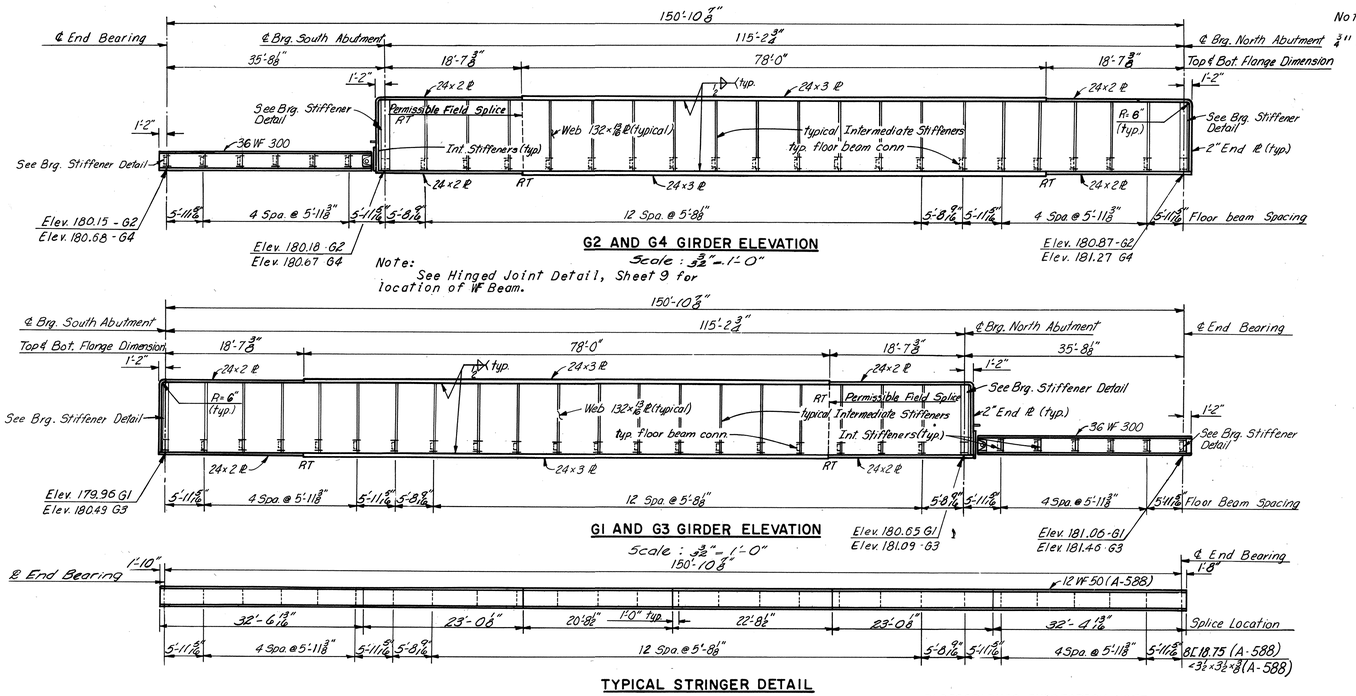


SECTION A-A

Scale: ⅜" = 1'-0"

Note: Floorplate connected to stringers by two rows of ¾" Dia. countersunk rivets at 6" maximum pitch.

Note: Ties, track, and fasteners are to be furnished and installed by others.



G2 AND G4 GIRDER ELEVATION

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

Note: See Hinged Joint Detail, Sheet 9 for location of WF Beam.

G1 AND G3 GIRDER ELEVATION

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

TYPICAL STRINGER DETAIL

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

Note: Welded Girders are to be cambered to compensate for full anticipated dead load, see Sheet 10.

RADIOGRAPHIC INSPECTION NOTE
An "RT" shown on elevation views indicates radiographic inspection of adjacent flange and web, flange, or web welds in accordance with the Special Provisions.

Notes:
For Shoe Details, see Sheet 11.
For Dead Load Deflections, see Sheet 10.
For Superstructure Details, see Sheets 9 and 10.
For Sections B-B, and D-D, see Sheet 10.

Note: One butt welded shop splice will be permitted in each 24" x 3" flange plate; details of splice shall be similar to that shown for Field Flange Splice, sheet 9. A maximum of 2 web splices including web splice at "Permissible Field Splice", will be permitted; detail of shop web splice shall be similar to that shown for Field Flange Splice, sheet 9, except that web opening is not required and web splice shall not be located within 2'-0" of a shop flange splice.

NO.	REVISION	BY	DATE
4	As Built	IRC	3-73
3	Addendum 3 Amendment 3	Ee.	4-12-71
2	Profile Grade	Ee.	4-12-71
1	General Checking	AMH	5-13-68

	BY	DATE
MADE	RLM	12-14-67
CHECKED	JEH	4-10-68
IN CHARGE	FKD	

FLOOR BEAM LOCATION TABLE

SOUTHBOUND TRACK

DISTANCE	G1 DIMENSION "X"	G2 DIMENSION "Y"
0	2 3/4"	3"
5'-11 5/16"	2 3/4"	3"
11'-10 11/16"	2 3/4"	3"
17'-10 1/16"	2 3/4"	3"
23'-9 7/16"	2 3/4"	3"
29'-8 13/16"	2 3/4"	3"
35'-8 1/16"	3"	3"
41'-4 11/16"	3"	3"
47'-0 13/16"	3"	3"
52'-8 15/16"	3"	3"
58'-5 1/16"	3"	3"
64'-1 3/16"	3"	3"
69'-9 5/16"	3"	3"
75'-5 7/16"	3"	3"
81'-1 3/16"	3"	3"
86'-9 11/16"	3"	3"
92'-5 13/16"	3"	3"
98'-1 15/16"	3"	3
103'-10 1/16"	3"	3"
109'-6 3/16"	3"	3"
115'-2 3/4"	3"	3"
121'-2 1/16"	3"	2 3/4"
127'-1 7/16"	3	2 3/4"
133'-0 13/16"	3"	2 3/4"
139'-0 3/16"	3"	2 3/4"
144'-11 3/16"	3	2 3/4"
150'-10 7/16"	3"	2 3/4"

FLOOR BEAM LOCATION TABLE

NORTHBOUND TRACK

DISTANCE	G3 DIMENSION "X"	G4 DIMENSION "Y"
0	3"	2 3/4"
5'-11 5/16"	3"	2 3/4"
11'-10 11/16"	3"	2 3/4"
17'-10 1/16"	3"	2 3/4"
23'-9 7/16"	3"	2 3/4"
29'-8 13/16"	3"	2 3/4"
35'-8 1/16"	3"	3"
41'-4 11/16"	3"	3"
47'-0 13/16"	3"	3"
52'-8 15/16"	3"	3"
58'-5 1/16"	3"	3"
64'-1 3/16"	3"	3"
69'-9 5/16"	3"	3"
75'-5 7/16"	3"	3"
81 -1 3/16"	3"	3"
86'-9 11/16"	3"	3"
92'-5 13/16"	3"	3"
98'-1 15/16"	3"	3"
103'-10 1/16"	3"	3"
109'-6 3/16"	3"	3"
115'-2 3/4"	3"	3"
121'-2 1/16"	3"	2 3/4"
127'-1 7/16"	3"	2 3/4"
133 -0 13/16"	3"	2 3/4"
139'-0 3/16"	3"	2 3/4"
144'-11 3/16"	3"	2 3/4"
150'-10 7/16"	3"	2 3/4"

Notes - Southbound Track:
Distances shown in Floor Beam Table are measured from north to south, starting at the extreme north floor beam.
Dimensions "X" and "Y" shown in Floor Beam Table for G1 and G2 are measured from top of bottom flange for Plate Girder section and from bottom of WF Beam section.
Elevations shown on Girder Elevations are at bottom of bottom flange for Plate Girder Section and for WF Beam section.

Notes - Northbound Track:
Distances shown in Floor Beam Table are measured from south to north, starting at the extreme south floor beam.
Dimensions "X" and "Y" shown in Floor Beam Table for G3 and G4 are measured from top of bottom flange for Plate Girder section and from bottom of WF Beam section.
Elevations shown on Girder Elevations are at bottom of bottom flange for Plate Girder section and for WF Beam section.

Note: △3 All riveted conections shown hereon may, at the contractors option, be replaced by high strength bolt connections

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 10
R.F.&P.R.R. OVER
EAST-SOUTH ROADWAY
FRAMING PLAN

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

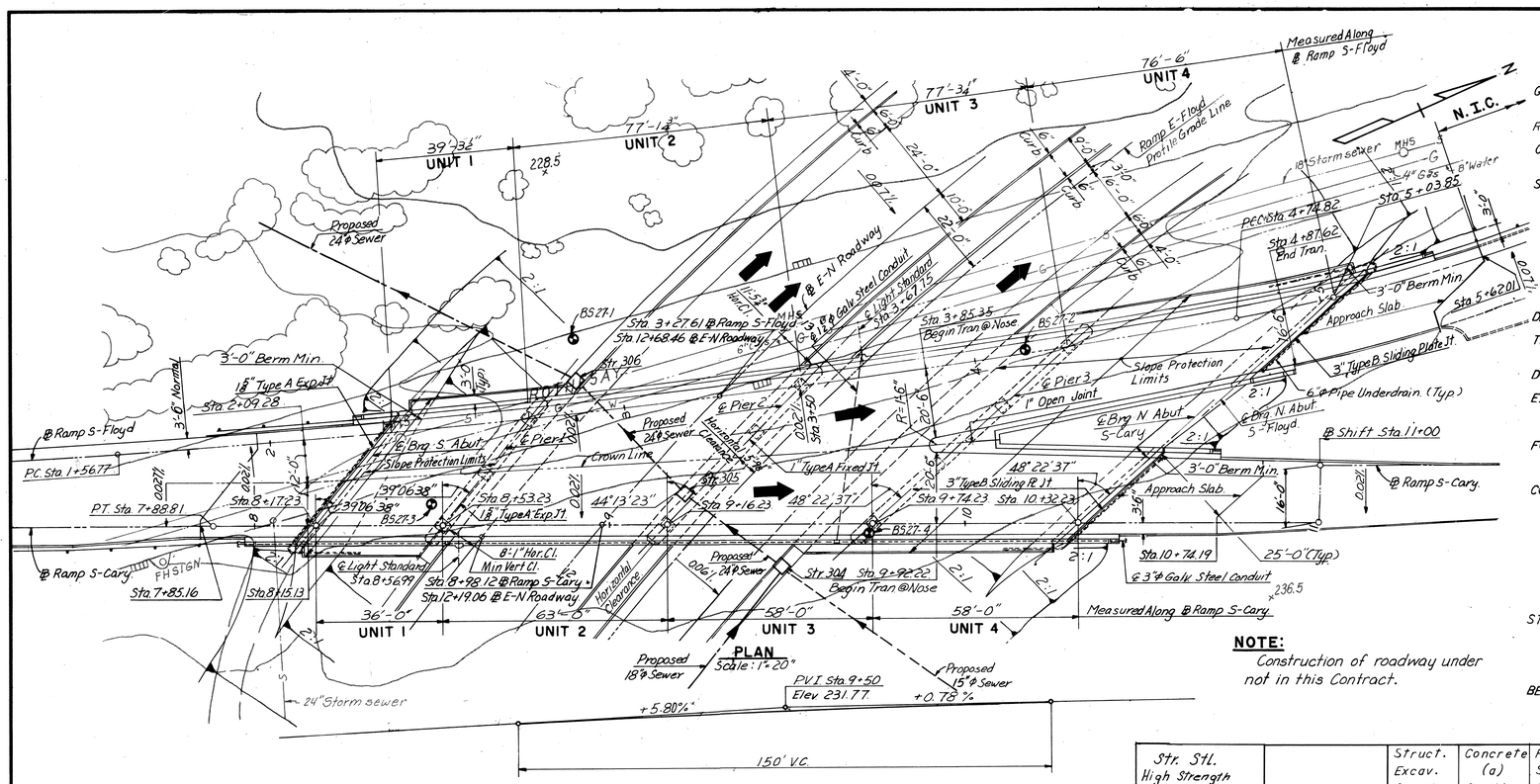
SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 8 OF 12

Bridge 17

(Ramp from NB Powhite Parkway “Rte. 76”/NB I-195 Connector over I-195 to Cary Street and Ramp from Northbound I-195 to Floyd Avenue)

Record Set Plans

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



GENERAL NOTES

ROADWAY — Variable width of roadway.

CAPACITY: — 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.

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.

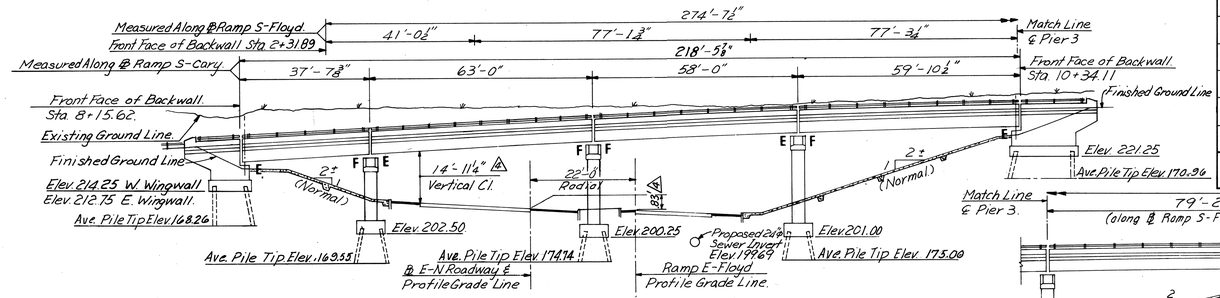
STEEL NOTES: — Structural steel shall conform to A.S.T.M. Specification A36 except as noted. All field connections shall be made with high strength bolts. High strength bolts shall be ⅞" diameter unless otherwise noted and shall conform to A.S.T.M Specification A-325.

BENCH MARK: — A-25 Copperweld rod S. side of Thompson St. and Cary Road. Elev. 256.59.

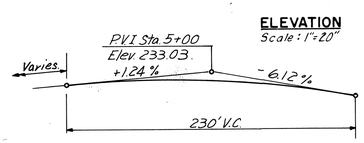
ESTIMATED QUANTITIES

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	23,400	–	–	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

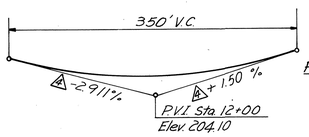
Estimated Quantities Notes:
(a) Class A3, unless noted
(b) Class A4



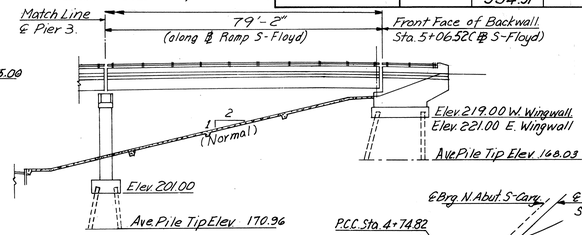
ELEVATION
Scale: 1"=20'

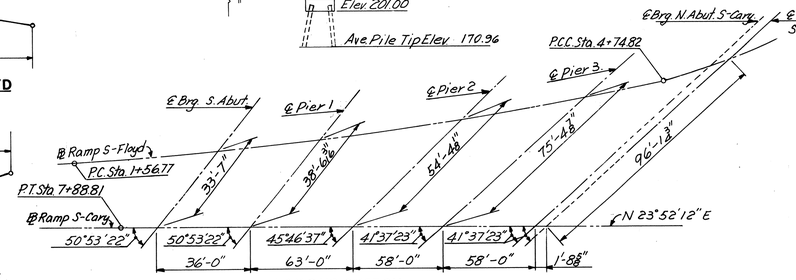


PROFILE GRADE ℄ RAMP S-FLOYD



PROFILE GRADE ℄ E-N ROADWAY





LAYOUT SKETCH
No Scale

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'

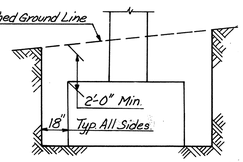
℄ RAMP S-FLOYD

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



LIMITS OF STRUCTURE EXCAVATION

AS BUILT

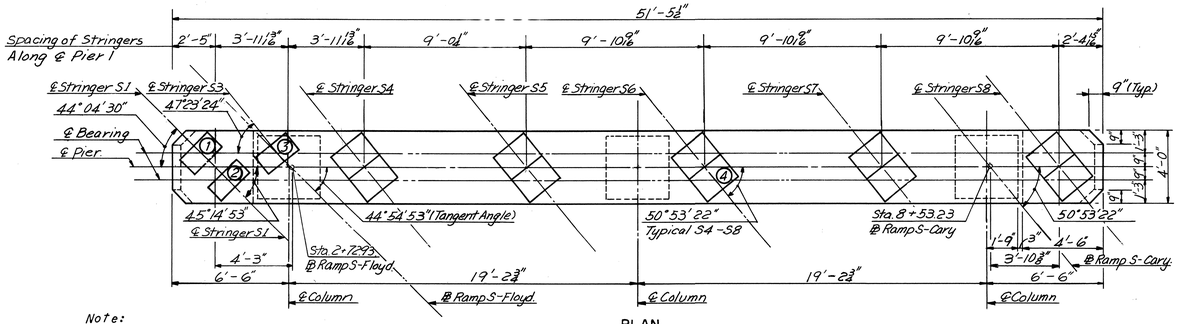
INDEX

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

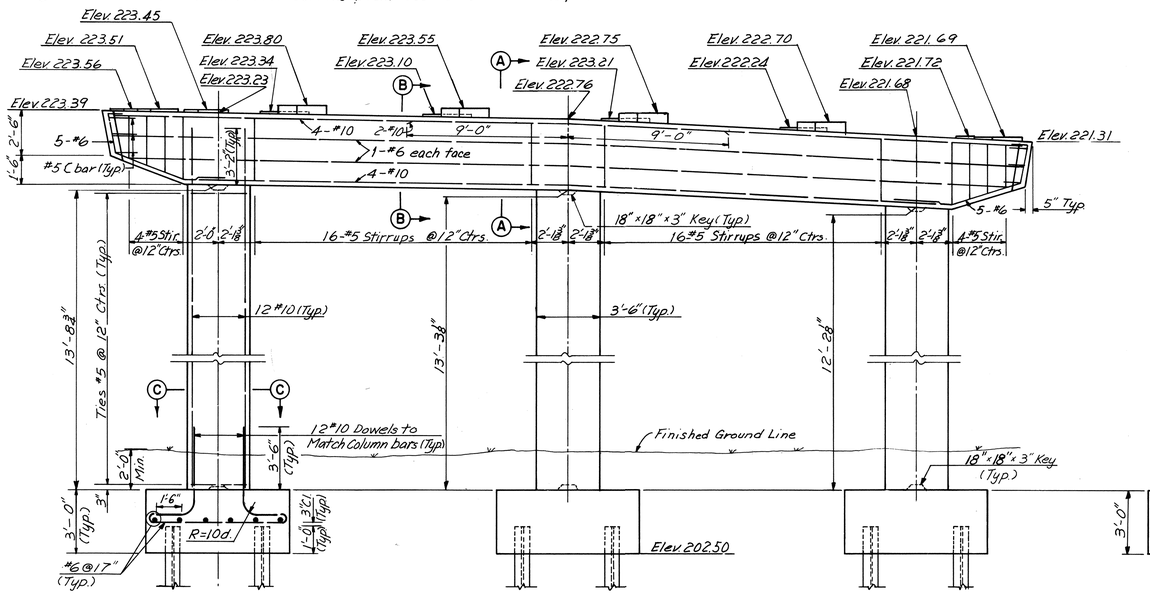
SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 1 OF 14

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	135	155

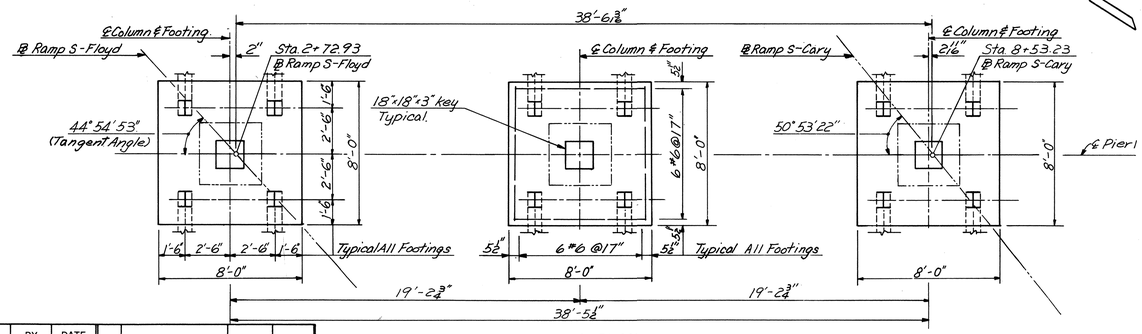


Note:
③ Indicates case of Anchor bolt setting plan, see table.

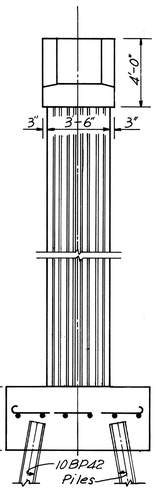
PLAN
Scale 1" = 1'-0"

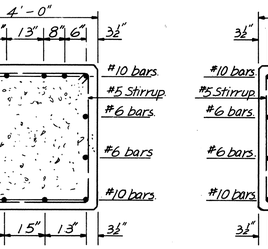


ELEVATION
Scale 1" = 1'-0"

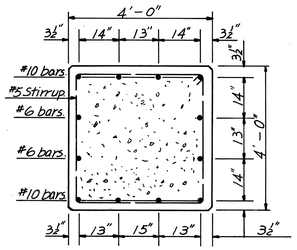


FOOTING PLAN
Scale 1" = 1'-0"





SECTION A–A
Scale ½" = 1'-0"



SECTION B–B
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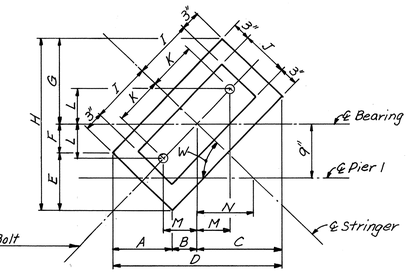
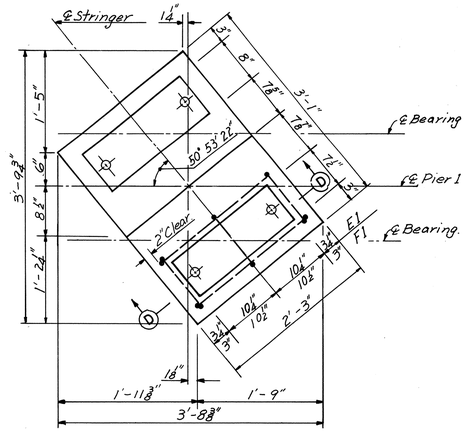
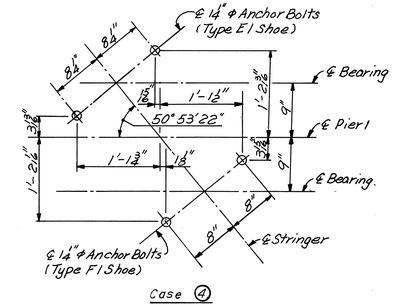






Case ①, ② & ③

Case ④

ANCHOR BOLT SETTING PLAN DIMENSIONS

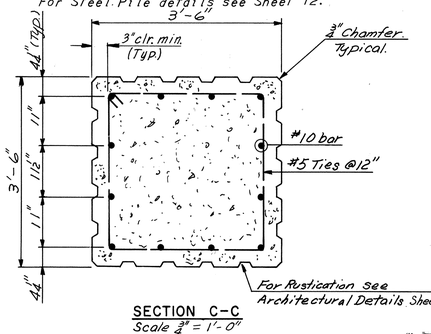
Case	Angle W	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	44°04'30"	10	4¼	14¼	28½	9¾	4⅝	14⅜	28¾	10¼	8	8¼	5 5/16	5¾	9 3/16
2	45°14'53"	9½	2⅜	14⅜	28¾	9⅝	4⅝	14¼	28½	10⅛	7½	8	5⅜	5 1/16	8 15/16
3	47°23'24"	9½	5	14½	29	10¼	3 7/16	14⅝	28¼	10¼	8	8¼	5 3/16	6 1/16	8¼

(Dimensions are in inches)

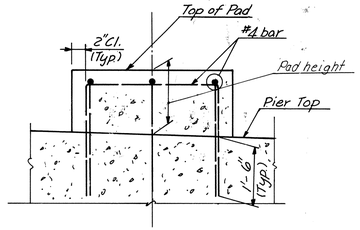
ANCHOR BOLT SETTING PLAN
No Scale

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 2" per foot where shown.
For Standard Shoe details see Sheet S1.
For Framing Plan see Sheet 3.
For Steel Pile details see Sheet 12.



SECTION C–C
Scale ¾" = 1'-0"



SECTION D–D
No Scale

Note:
No reinforcing steel required for pad height less than 4".

AS BUILT

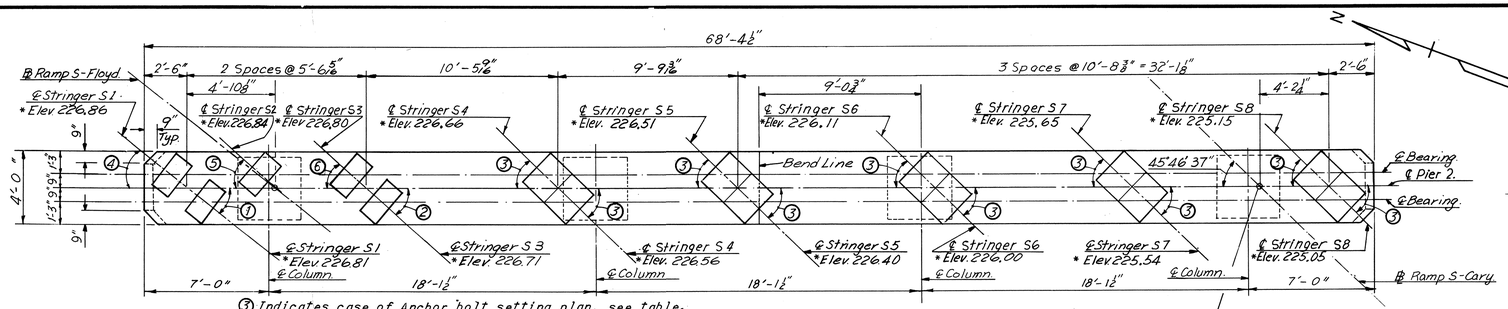
	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.C.C	11-3-67	2	As Builts	R.H.	2-5-73
CHECKED	AMH	3-7-68	1	General Revision	RLM	5-15-68
IN CHARGE	FKD					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY
BRIDGE NO. 17
RAMP S-CARY OVER EAST-NORTH ROADWAY
PIER 1

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

SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 6 OF 14

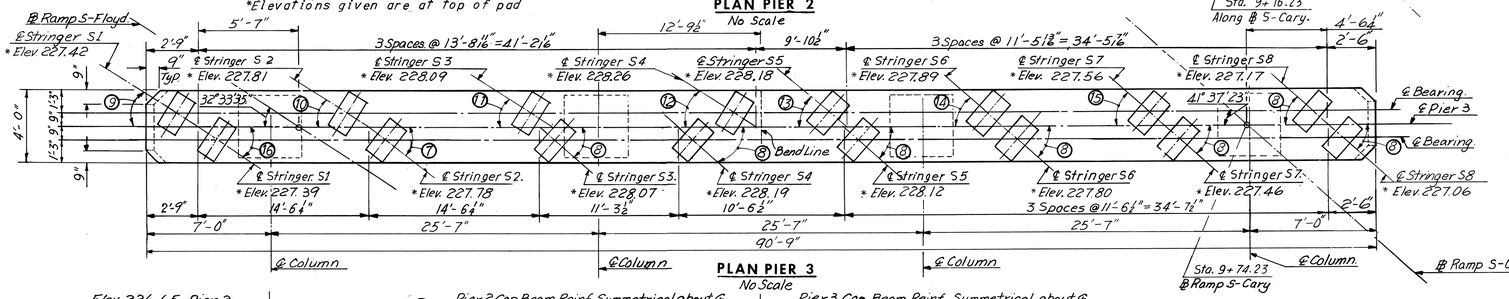
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	136	155



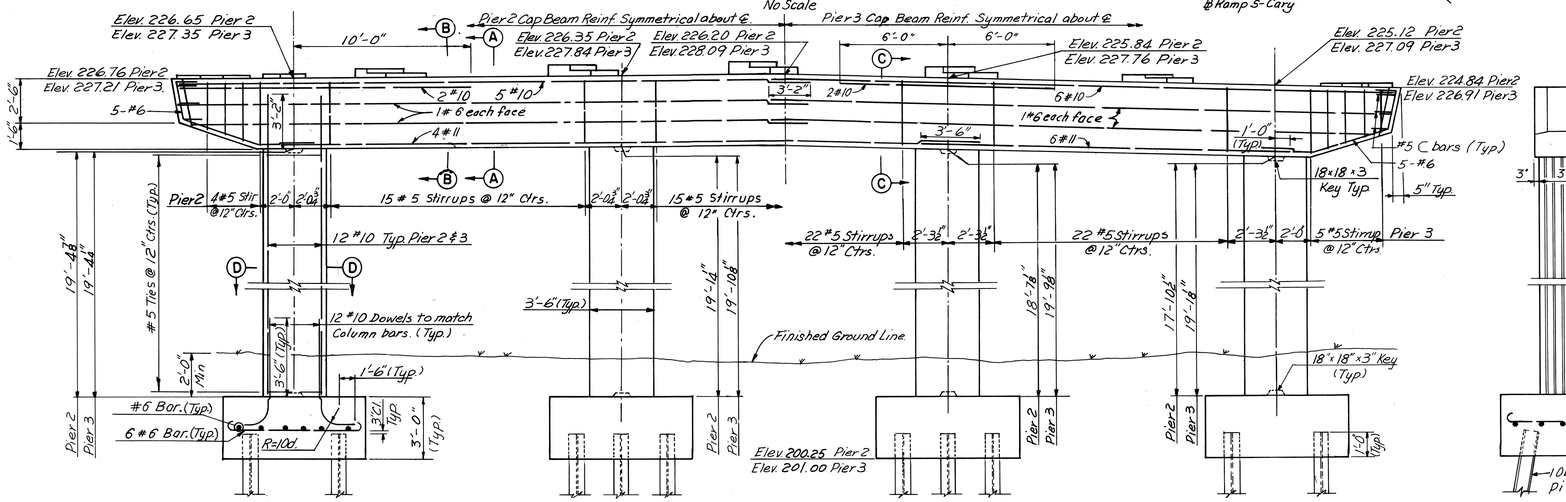
③ Indicates case of Anchor bolt setting plan, see table.

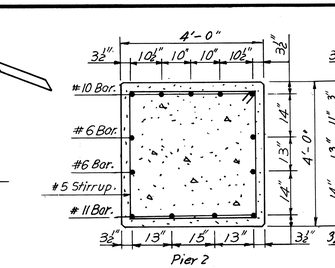
*Elevations given are at top of pad

PLAN PIER 2
No Scale

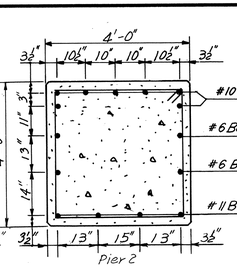


PLAN PIER 3
No Scale

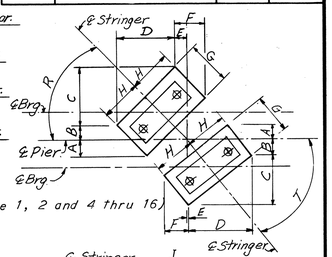


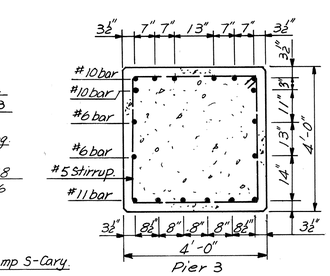


SECTION A-A
Scale ½"=1'-0"



SECTION B-B
Scale ½"=1'-0"





SECTION C-C
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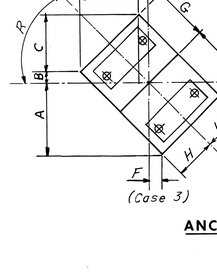
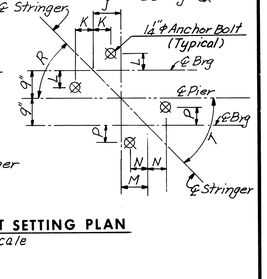




ANCHOR BOLT SETTING PLAN
No Scale

ANCHOR BOLT SETTING PLAN DIMENSIONS

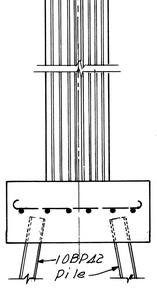
Case	Angle R	Angle T	A	B	C	D	E	F	G	H	J	K	L	M	N	P
1	-	38°57'45"	5⅜	2⅜	20⅜	17	7⅛	10½	13½	13½	-	-	-	11⅛	5	6¼
2	-	42°16'39"	5½	3⅜	20	18⅛	5⅜	10	13⅜	13½	-	-	-	9⅛	5⅜	5⅝
3	45°46'37"	45°46'37"	23½	4⅜	18⅛	19⅜	3⅜	3⅜	19½	13½	8⅜	5⅜	5⅝	3⅜	5⅜	5⅝
4	37°24'05"	-	5⅛	2⅜	21½	16⅜	8⅛	10⅜	13½	13½	11⅜	4⅛	6⅜	-	-	
5	41°08'52"	-	5⅜	3½	20⅜	17⅛	6½	10⅛	13½	13½	10⅜	5¼	6	-	-	-
6	45°46'37"	-	5¼	4⅜	18⅛	19⅜	3⅜	9⅜	13½	13½	8⅜	5⅜	5⅝	-	-	-
7	-	36°59'38"	5¾	2⅝	21⅛	16	9⅜	11⅛	14	13¾	-	-	-	11⅝	4⅝	6⅜
8	41°37'23"	41°37'23"	5⅜	3⅜	20⅜	17⅛	6¼	10½	14	13½	10⅛	5⅜	6	10⅛	5½	5⅝
9	30°54'54"	-	6	0⅞	23⅛	13⅞	13⅞	11⅜	13½	13½	15	4⅜	6⅜	-	-	-
10	30°37'47"	-	6	0⅜	23¼	13¾	14⅛	11⅜	13½	13½	15	4⅛	6⅜	-	-	-
11	30°20'58"	-	6	0⅛	23⅛	13⅜	14⅜	11⅜	13½	13½	15⅛	4⅛	6⅜	-	-	-
12	30°04'26"	-	6⅛	0⅝	23⅜	13½	14½	11⅜	13½	13½	15⅜	4	6⅝	-	-	-
13	42°09'02"	-	5½	3½	20	18⅛	5⅜	10	13½	13½	9⅛	5⅜	5⅝	-	-	-
14	42°37'53"	-	5½	3⅜	19⅜	18½	5⅜	9⅜	13½	13½	9⅜	5⅛	5⅜	-	-	-
15	42°07'21"	-	5½	3½	20	18⅛	5⅜	10	13½	13½	9⅝	5⅜	5⅝	-	-	-
16	-	33°14'51"	5⅞	1¾	22⅜	14½	12⅜	11¾	14	13¼	-	-	-	13¾	4½	6⅞

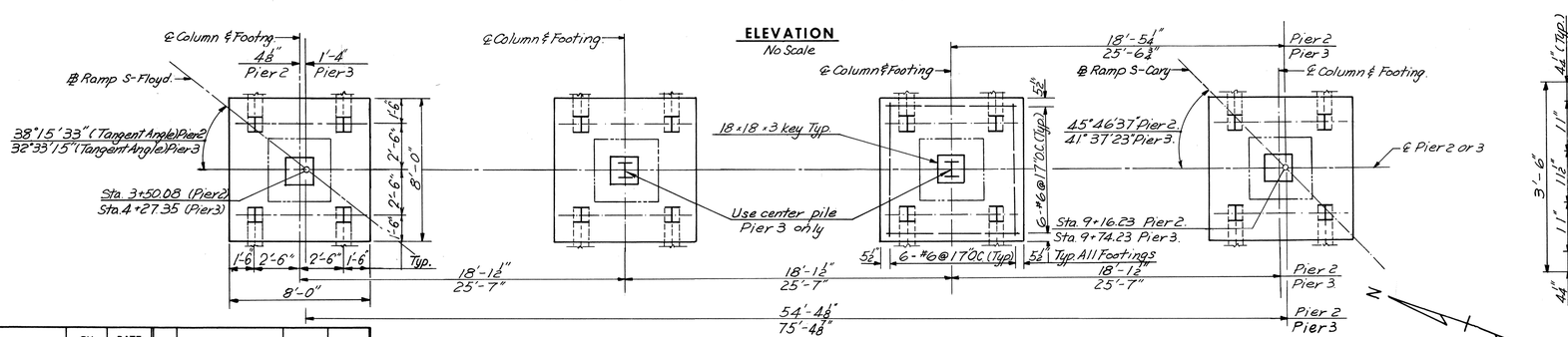
(Dimensions are in inches)

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.

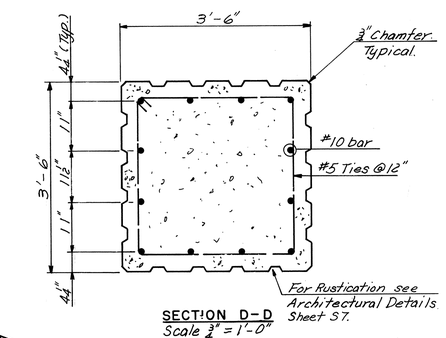
AS BUILT

Note:
All piles shall be 10BP42 Steel Piles (Design capacity = 45 tons).
Batter all piles 2" per foot where shown.
For Standard Shoe details see Sheet S1.
For Framing Plan see Sheet 8.





FOOTING PLAN
No Scale



SECTION D-D
Scale ½"=1'-0"

	BY	DATE				
MADE	M.A.A. G.C.C.	11-1-67				
CHECKED	AMH	3-7-68	1	As Builts	R.H.	2-5-73
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
PIERS 2 AND 3

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

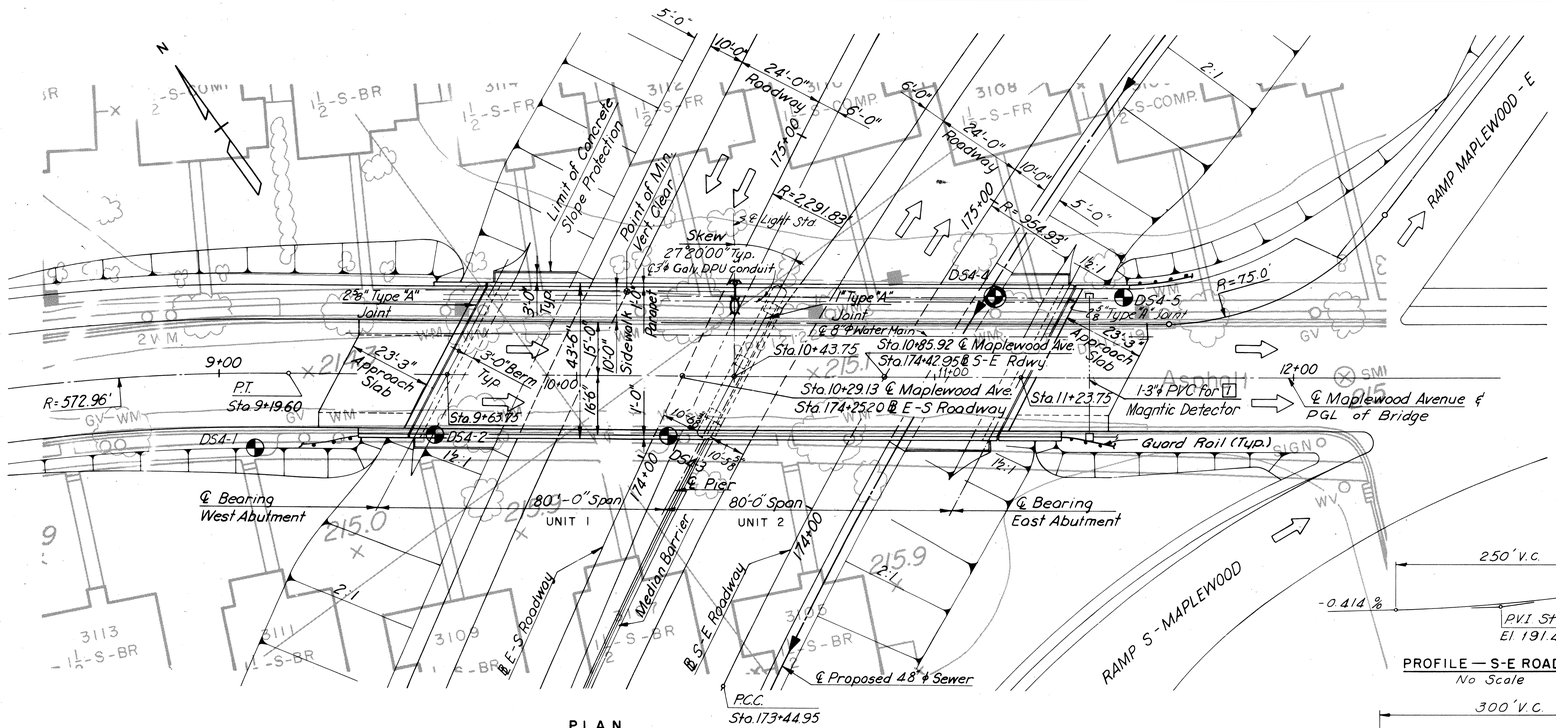
SCALE: As noted
CONTRACT NO.: 4
SHEET NO. 7 OF 14

Bridge 36

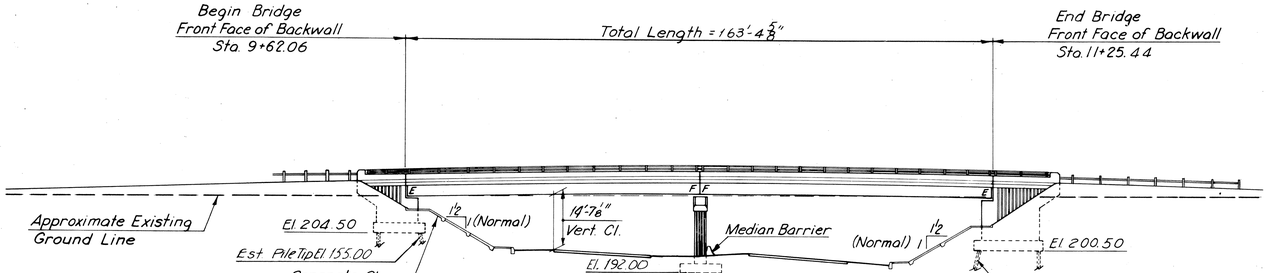
(Maplewood Avenue over DTE Connector)

Record Set Plans

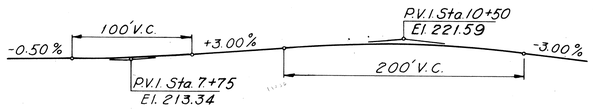
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	96	



PLAN

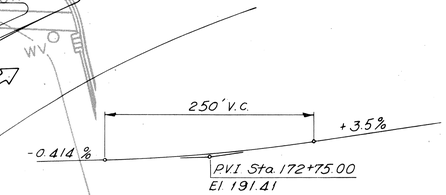


ELEVATION

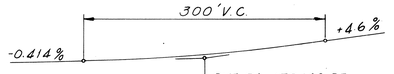


PROFILE - MAPLEWOOD AVENUE
No Scale

Note:
The cost of furnishing and installing 2"ϕ and 3"ϕ galvanized steel conduit shall be included in the bid price for the item "Metal Conduit."



PROFILE — S-E ROADWAY
No Scale



PROFILE — E-S ROADWAY
No Scale

INDEX	
NO.	DESCRIPTION
1	GENERAL PLAN AND ELEVATION
2	WEST ABUTMENT
3	EAST ABUTMENT
4	ABUTMENT DETAILS
5	PIER
6	FRAMING PLAN
7	DECK PLAN AND CROSS SECTION
8	JOINT DETAILS
9	APPROACH SLAB & SLOPE PROTECTION DETAILS
10	BORING LOGS
S1	STANDARD SHOE DETAILS
S3	STANDARD ALUMINUM RAILING DETAILS (2 RAILS)
S4	STANDARD ELECTRICAL DETAILS
S7 TO S9	STANDARD ARCHITECTURAL DETAILS
S11	STANDARD GAS AND WATER MAIN SUPPORT DETAILS
S13	LIMITS OF EXCAVATION AND BACKFILL

GENERAL NOTES

ROADWAY: 36'-1" Face of rail to edge of sidewalk.

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 Highwau Bridges, 1969 and 1970-72 Interim Specifications, 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 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. Found. mat'l. shall be kept dry & special attn. is called to Sec. 401.05 of the Gen. Specs. & to the Contract Special Prov. concerning preparation of found. for ftgs.

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 be intermediate grade. 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-11. Copper Weld Rod, South side of Maplewood Ave. at Belmont Ave. Elev. 215.37.

Indicates 2½" ϕ cased hole boring.

Indicates 4" ϕ cased hole boring.

ESTIMATE OF QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	CONCRETE CLASS A3 APPR. SLABS C.Y.	STRUCTURAL STEEL LBS.	ALUMINUM BR. RAILING (2 RAIL) L.F.	POROUS BACKFILL C.Y.	REINFORCING STEEL LBS	STEEL PILES 10 BP 42 L.F.	CONC. SLAB SLOPE PROT. S.Y.	ASPHALT DAMPPROOFING S.Y.	UNDERDRAIN 6"ϕ PIPE L.F.	WATER MAIN 8"ϕ L.F.	METAL CONDUIT L.F.	3"ϕ [1] PVC CONDUIT L.F.
SUPERSTRUCTURE		276.2			270,749	327		53,067							
WEST ABUTMENT	218.6		143.0			23	12.3	7,081	864.2	150.2	57	57			
EAST ABUTMENT	454.0		215.0			31.4	43	13,320	1,291.4	133.1	107	60			
PIER	131.4		82.7					12,264	480.2						
APPROACH SLABS				86				22,420							
TOTAL	804.0	276.2	440.7	86	270,749	381.4	55.3	108,152	2635.8	283.3	164	117	213	1,176	34

	BY	DATE				
MADE	LCC	1-3-68	2	As Built	T.E.M.	9-75
CHECKED	TCY	9-12-68	1	Add PVC Cond.	TEM	1-31-74
IN CHARGE	RGC		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

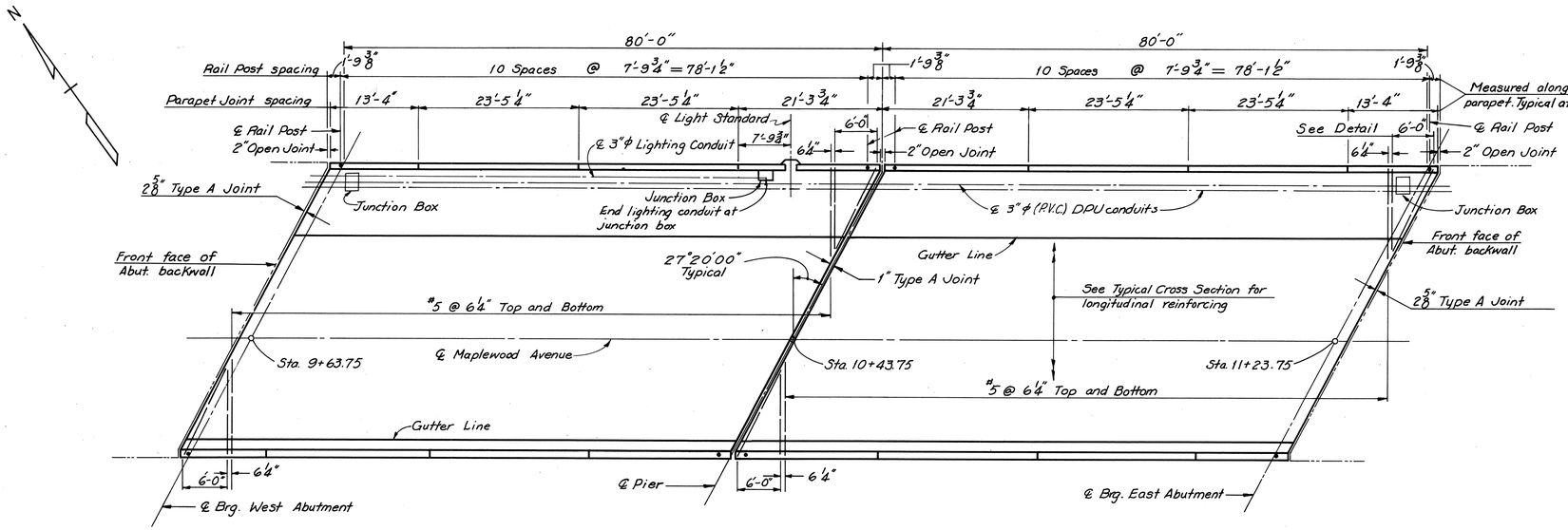
BRIDGE NO. 36
MAPLEWOOD AVENUE OVER
DOWNTOWN EXPRESSWAY
GENERAL PLAN AND ELEVATION

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

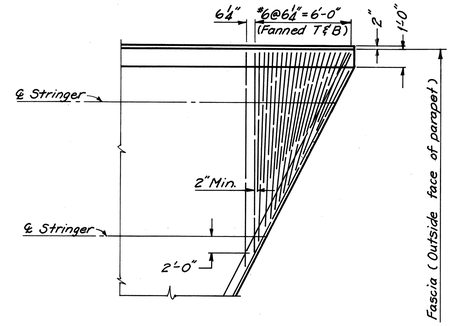
SCALE: 1"= 20' UNLESS NOTED
CONTRACT NO.: 7
SHEET NO. 1 OF 10

96

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	102	



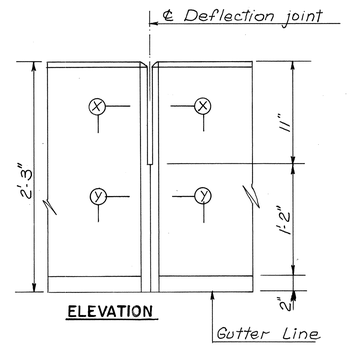
DECK PLAN
1" = 10'



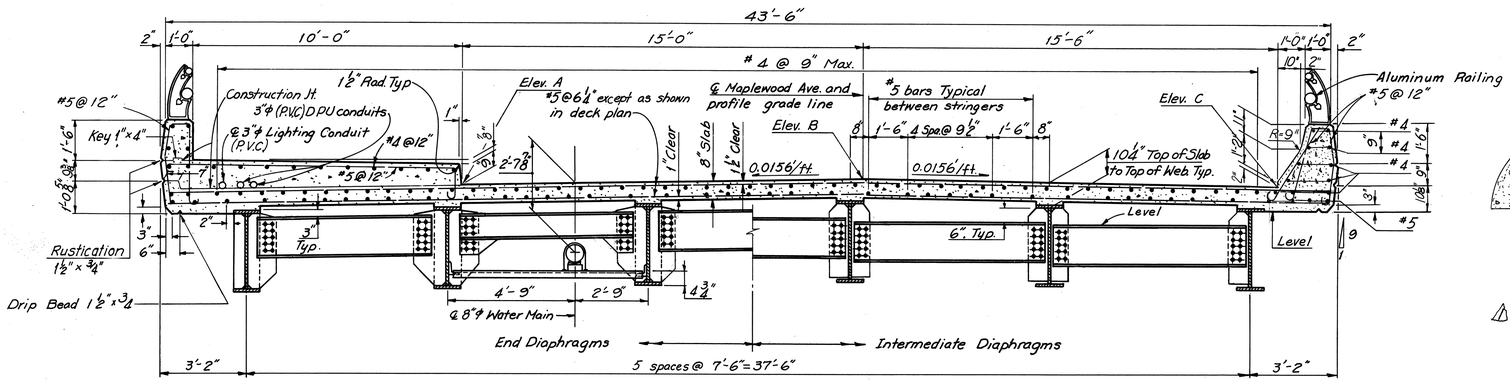
TYPICAL ACUTE CORNER REINFORCING DETAIL
No Scale

3 Junction Boxes

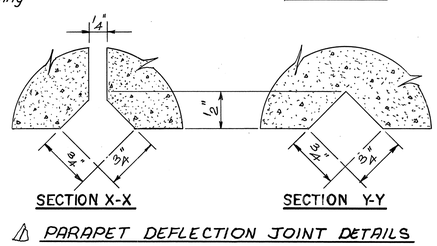
2 each 2'-0" x 1'-11"
1 each 2'-0" x 1'-1 1/2"



ROADWAY ELEVATIONS			
LOCATION	ELEV. A	ELEV. B	ELEV. C
Front Face W. Abut. Bkwall	218.89	218.93	218.47
1/4 Point	219.32	219.41	219.00
1/2 Point	219.62	219.76	219.40
3/4 Point	219.80	219.98	219.67
Center Line Pier	219.86	220.08	219.82
1/4 Point	219.78	220.06	219.84
1/2 Point	219.59	219.91	219.74
3/4 Point	219.27	219.64	219.51
Front Face E. Abut. Bkwall	218.82	219.24	219.16



TYPICAL CROSS SECTION
3/8" = 1'-0"



⚠ PARAPET DEFLECTION JOINT DETAILS

Notes:
Minimum splice length for #4 bar is 1'-3" and #5 bar is 1'-7".
For details of water main support, see Standard Gas and Water Main Support Details Sheet S11.
For Lighting details and DPU conduit details, see Standard Electrical Details (Bridge Carrying City Street) Sheet 34.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	LCC	11-14-67	2	As Built	TEM	9-75
CHECKED	A.TM	2-9-68	1	PARAPET JOINT ADDED.	T.E.M.	7.74
IN CHARGE	R. G. C.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 36
MAPLEWOOD AVENUE OVER
DOWNTOWN EXPRESSWAY

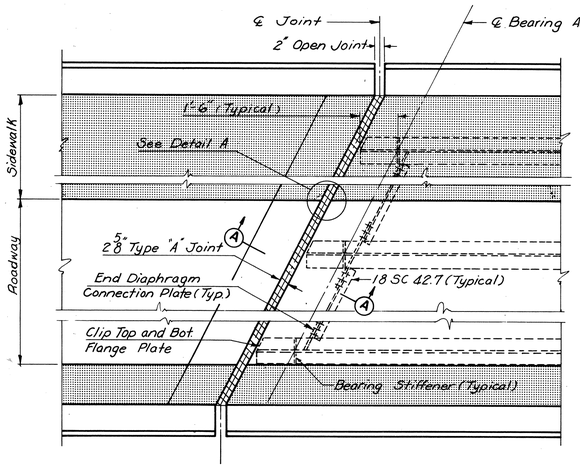
DECK PLAN AND CROSS SECTION

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

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

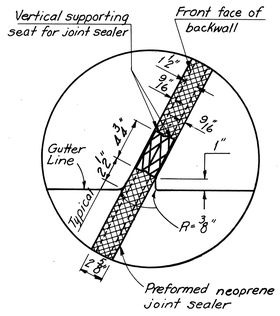
102

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
7	DOWNTOWN EXPRESSWAY	103	

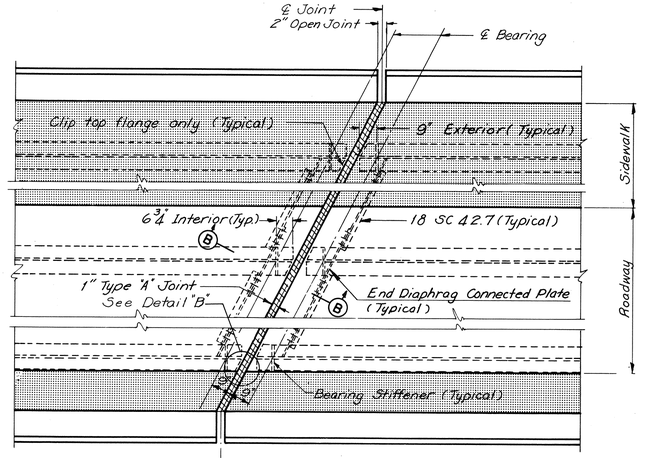


Note: Joint at East Abutment is similar to the one at West Abutment.

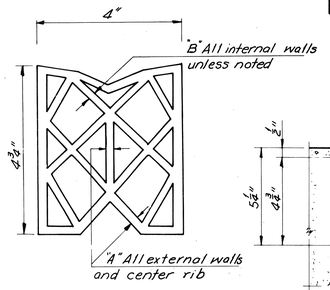
PLAN-JOINT AT WEST ABUTMENT
No Scale



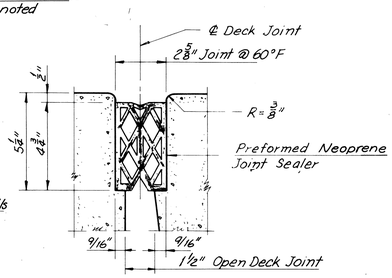
DETAIL "A"
No Scale



PLAN-JOINT AT PIER
No Scale

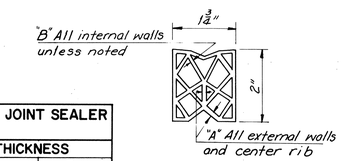


PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT
Scale: Half Size

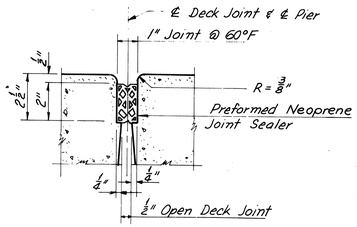


2⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"

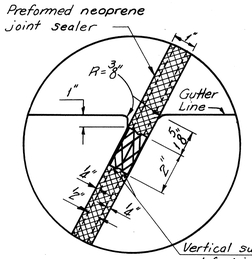
PREFORMED NEOPRENE JOINT SEALER TOLERANCES				
WIDTH	HEIGHT	THICKNESS A	THICKNESS B	
1¾" +3/16 -0"	2" ± ⅛"	1" +1/32 -1/64	3/32" +1/64 -1/32	
4" +5/16 -0"	4¾" ± ¼"	¼" +1/64 -1/32	3/16" +1/64 -1/64	



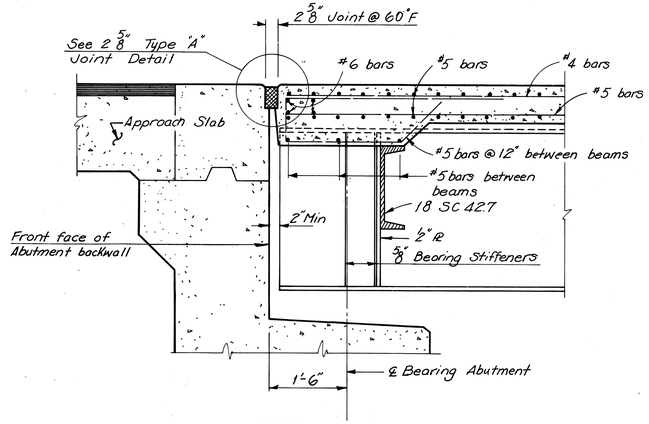
PREFORMED NEOPRENE JOINT SEALER FOR 1" TYPE "A" JOINT
Scale: Half Size



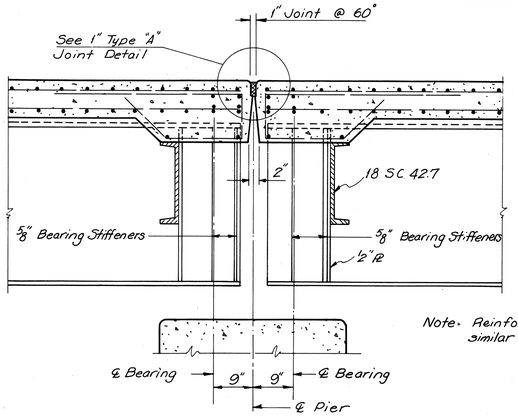
1" TYPE "A" JOINT
Scale: 3" = 1'-0"



DETAIL "B"
No Scale

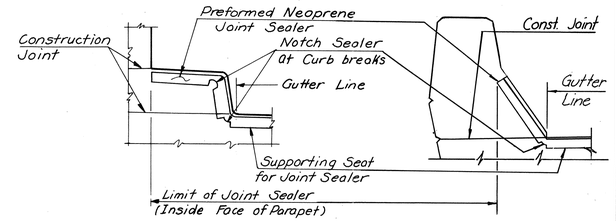


SECTION A-A
Scale: ¾" = 1'-0"



SECTION B-B
Scale: ¾" = 1'-0"

Note. Reinforcing steels are similar to "Section A-A.



TREATMENT OF TYPE "A" JOINT AT CURB
No Scale

TREATMENT OF TYPE "A" AT G M PARAPET
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 of the time of construction.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	LCC	12-5-67				
CHECKED	A.M.	1-22-68		As Built		
IN CHARGE	R. G. C.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 36
MAPLEWOOD AVENUE OVER
DOWNTOWN EXPRESSWAY
JOINT DETAILS

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

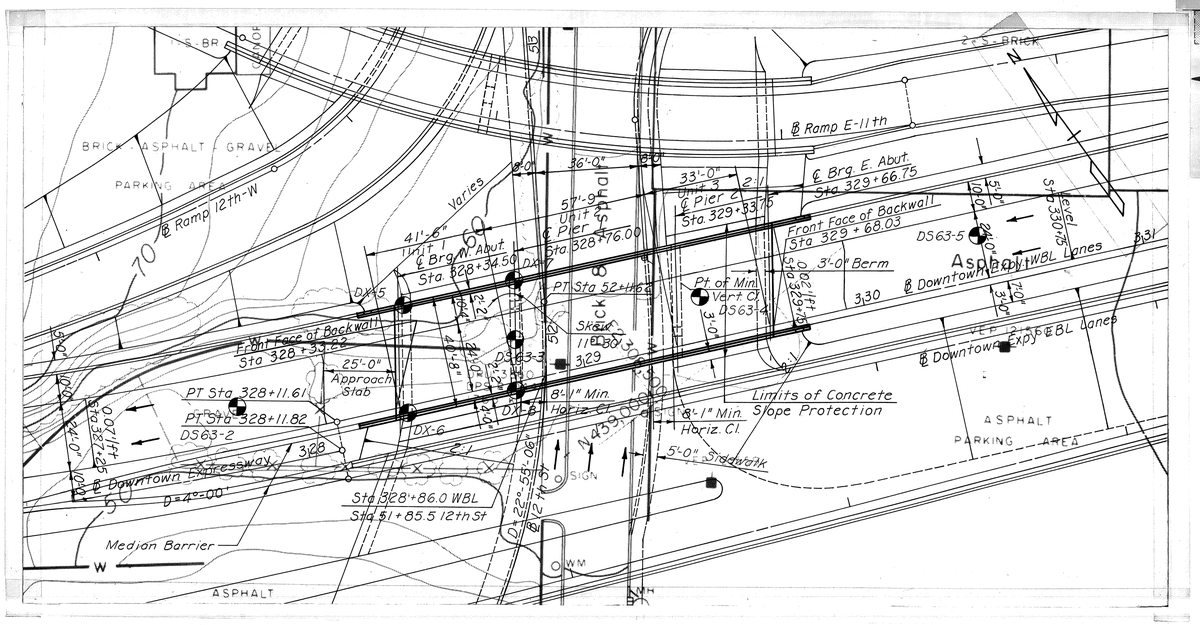
SCALE: As Noted
CONTRACT NO.: 7
SHEET NO. 8 OF 10

Bridge 61

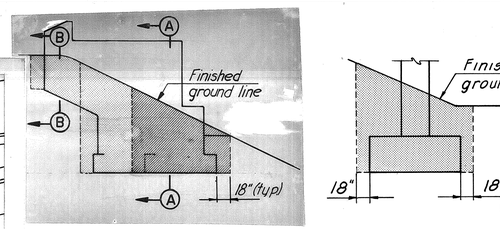
(Westbound Downtown Expressway “Rte. 195” over South 12th Street)

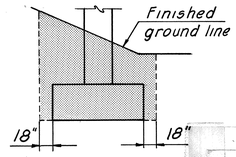
Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
5	DOWNTOWN EXPRESSWAY	221	



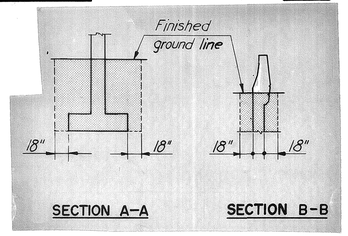
PLAN
Scale: 1" = 25'



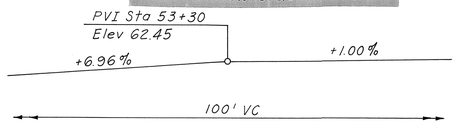


ABUTMENTS

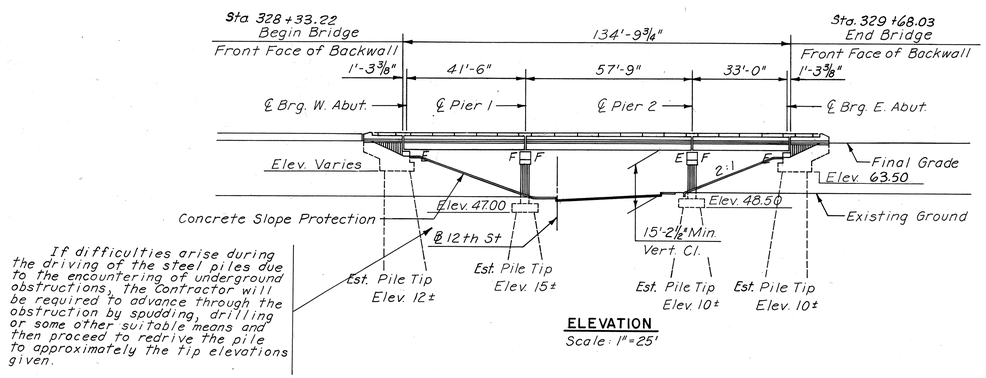
PIERS



PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale

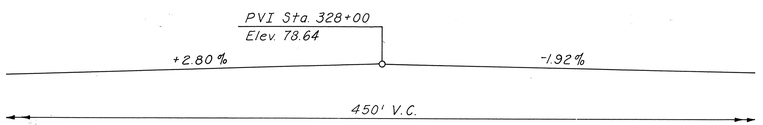


PROFILE GRADE 12TH ST
No Scale



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.

ELEVATION
Scale: 1" = 25'



PROFILE DOWNTOWN EXPRESSWAY WESTBOUND LANES
No Scale

INDEX OF SHEETS

GENERAL NOTES

ROADWAY: One 38'-4" 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 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.

FINAL 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"ϕ Pipe L.F.	Metal Conduit 3"ϕ L.F.
Superstructure		177.6			42,588	114,823	269						135
West Abutment	141		82.57		4,319		24	7	747.8	229.4	20	61	19
East Abutment	141		88.15		4,483		24	7	765.9	203.8	20	61	19
Pier 1	64.27		51.38		5,051				333.0				
Pier 2	56.80		50.24		4,916				362.8				
Approach Slabs				68.08	15,248								
Total	403.07	177.6	272.34	68.08	76,605	114,823	317	14	2,209.5	433.2	40	122	173

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JLJ	11-67	2	As Built	TEM	7-77
CHECKED	JDL	1-68	1	Light deleted	T.E.M.	9-74
IN CHARGE	P.R. Yeager					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

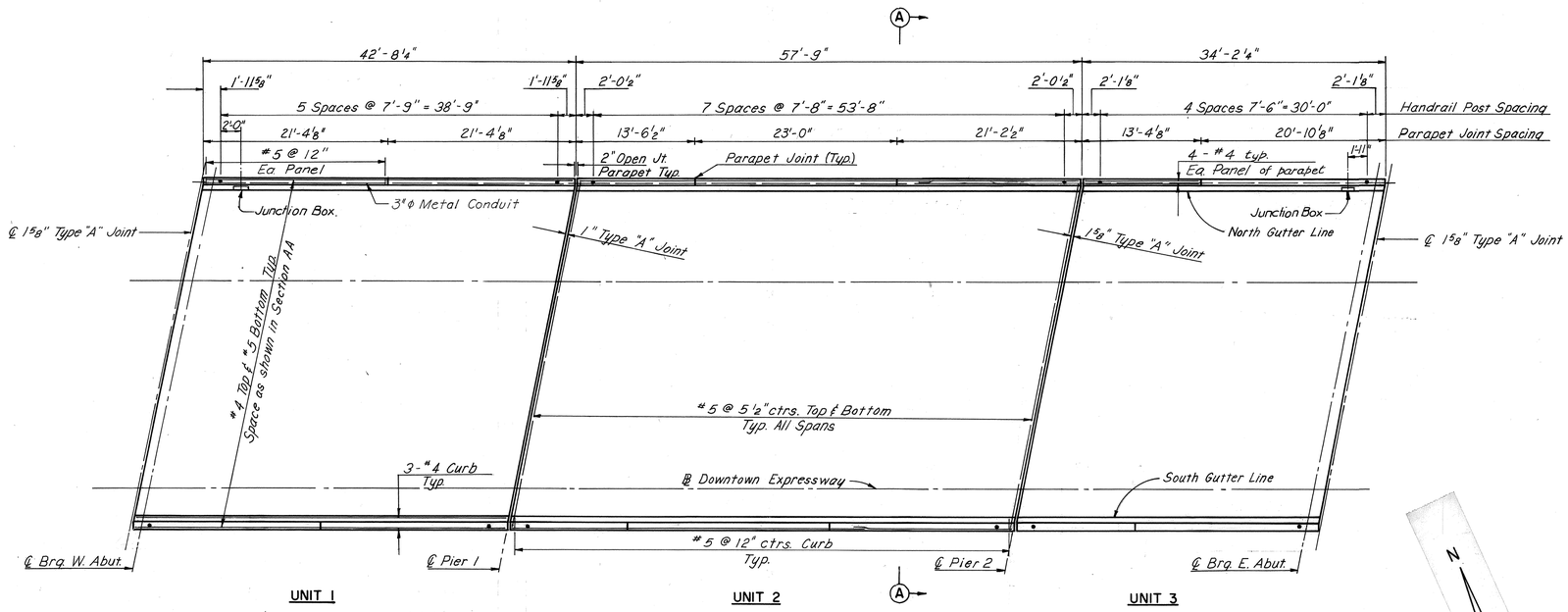
BRIDGE NO. 61
DOWNTOWN EXPRESSWAY WESTBOUND LANES
OVER 12TH ST
GENERAL PLAN AND ELEVATION

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

SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 1 OF 10

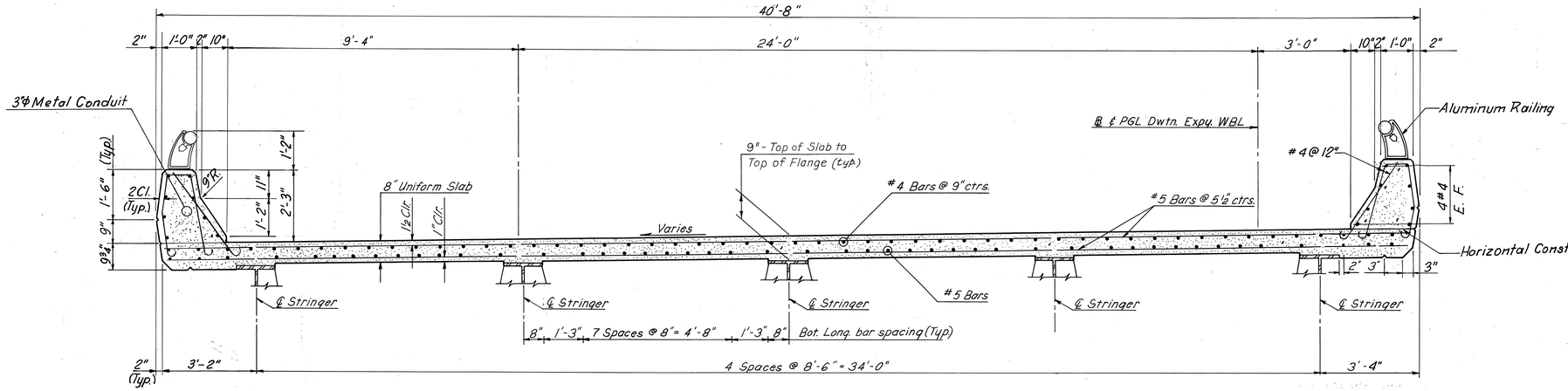
221

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	226	

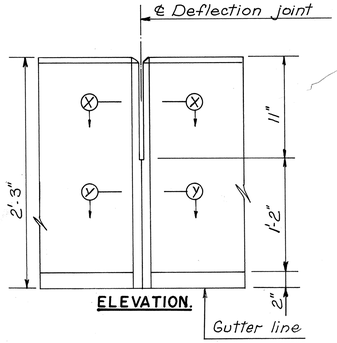


SLAB PLAN
Scale ⅛"=1'-0"

TABLE OF ELEVATIONS			
LOCATION	N. GUTTER	BASE LINE	S. GUTTER
℄ Jt. Abut.	74.51	76.07	76.22
¼ Point	74.58	76.08	76.22
½ Point	74.63	76.07	76.20
¾ Point	74.68	76.05	76.18
℄ Jt. Pier 1	74.71	76.02	76.14
¼ Point	74.73	75.95	76.07
½ Point	74.73	75.87	75.98
¾ Point	74.71	75.76	75.86
℄ Jt. Pier 2	74.67	75.64	75.73
¼ Point	74.64	75.55	75.64
½ Point	74.59	75.46	75.54
¾ Point	74.54	75.35	75.43
℄ Jt. Abut.	74.48	75.24	75.32



SECTION A A
Scale ½"=1'-0"



Note: Groove details are for both sides of parapet.

PARAPET DEFLECTION JOINT DETAILS

	BY	DATE
MADE	GDH	12-67
CHECKED	JLJ	12-67
IN CHARGE	P.R.V.	

NO.	REVISION	BY	DATE
3	As Built	TEM	7-77
2	Light deleted, Junc. Box's added	T.E.M.	9-74
1	PARAPET JOINT ADDED.	T.E.M.	7-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 61
DOWNTOWN EXPRESSWAY WESTBOUND LANES OVER 12TH ST.

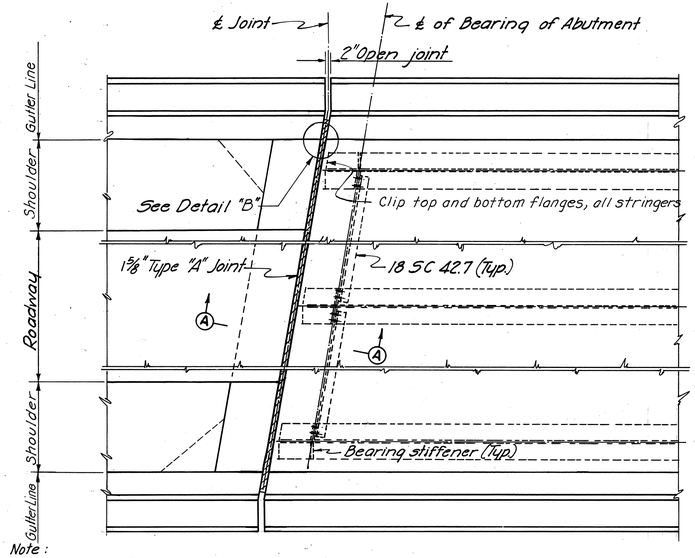
SLAB

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

SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 6 OF 10

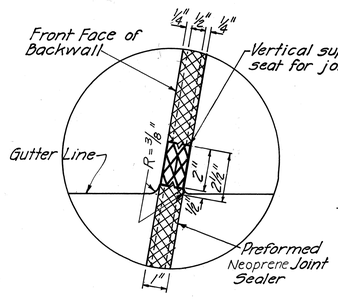
226

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	227	

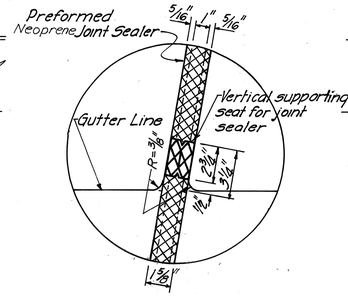


Note:
Joint at East Abutment is similar.

PLAN-JOINT AT WEST ABUTMENT
No Scale



DETAIL "A"
No Scale



DETAIL "B"
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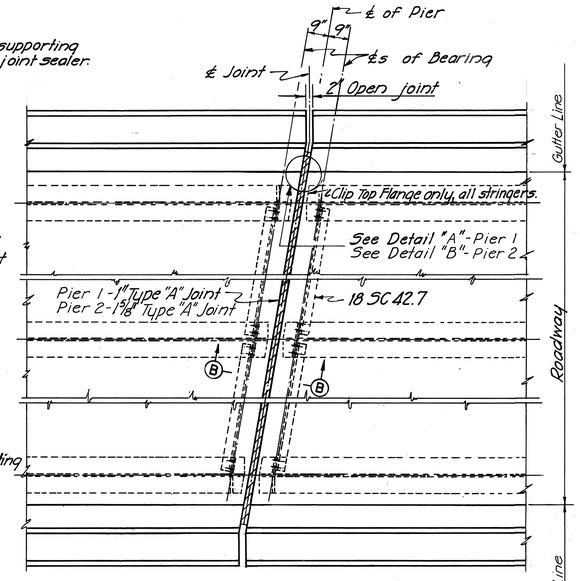
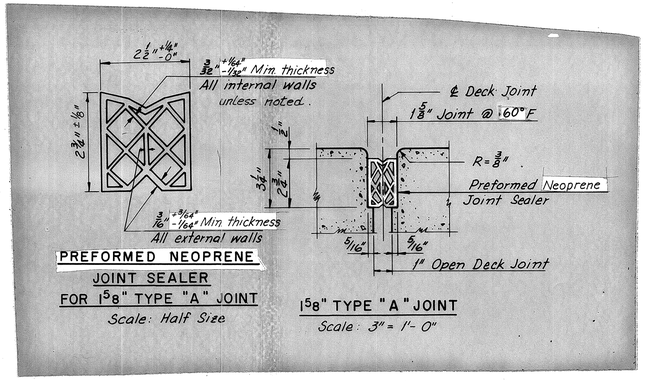
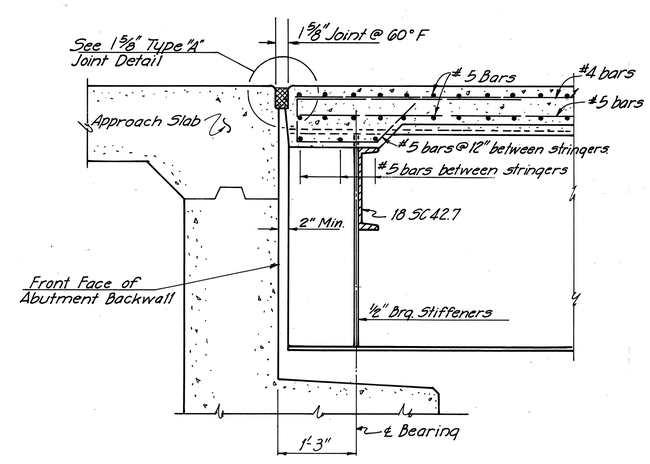


PLAN-JOINT AT PIER
No Scale

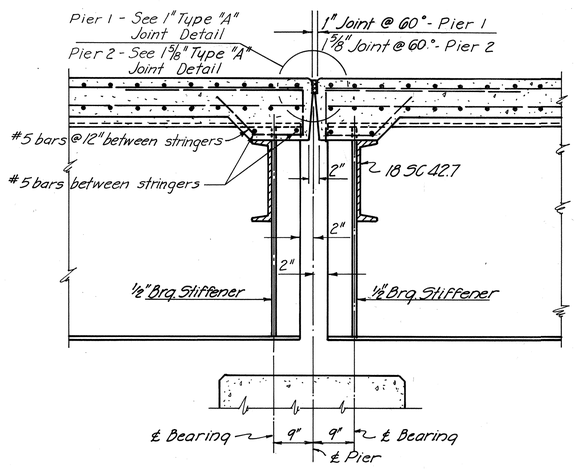


PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half Size

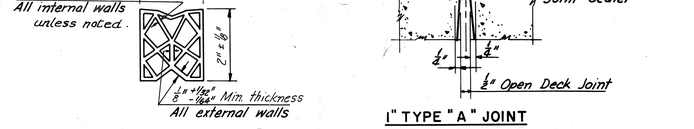
1⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"



SECTION A-A
Scale: ¾" = 1'-0"

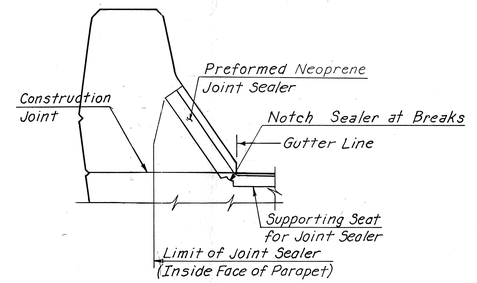


SECTION B-B
Scale: ¾" = 1'-0"



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

1" TYPE "A" JOINT
Scale: 3" = 1'-0"



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	JLJ	1-68				
CHECKED	LDL	1-68	1	As Built	TEM	7-77
IN CHARGE	ARV					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 61
DOWNTOWN EXPRESSWAY WESTBOUND LANES OVER 12TH ST.
JOINT DETAILS

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

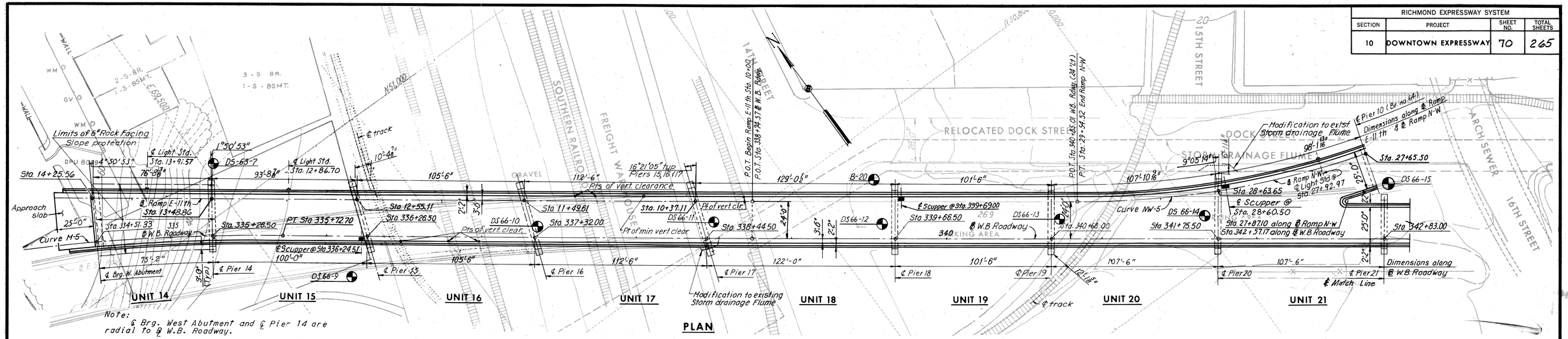
SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 7 OF 10

Bridge 63

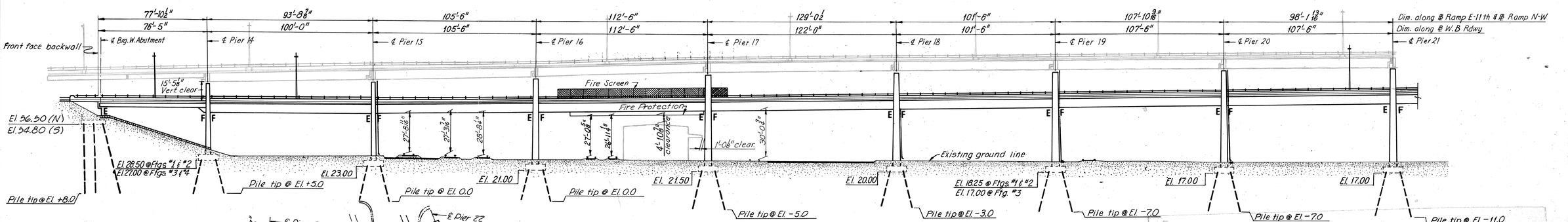
(Westbound Downtown Expressway “Rte. 195” over Virginia Street and South 14th Street “US Rte. 360”)

Record Set Plans

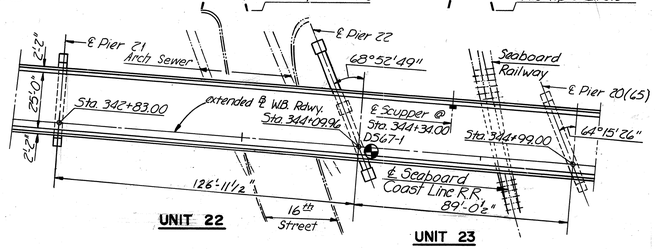
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	70	265



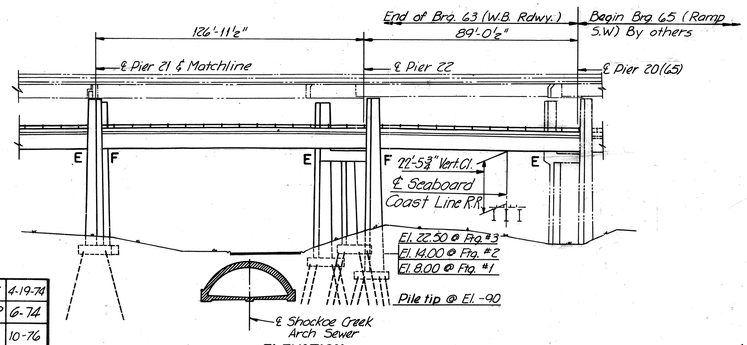
PLAN



ELEVATION



PLAN



ELEVATION

	BY	DATE
MADE	Y.C.P	1-9-69
CHECKED	J.D.	3-13-69
IN CHARGE	FKD	

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	TEM	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°18'00"
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.

INDEX

AS BUILT

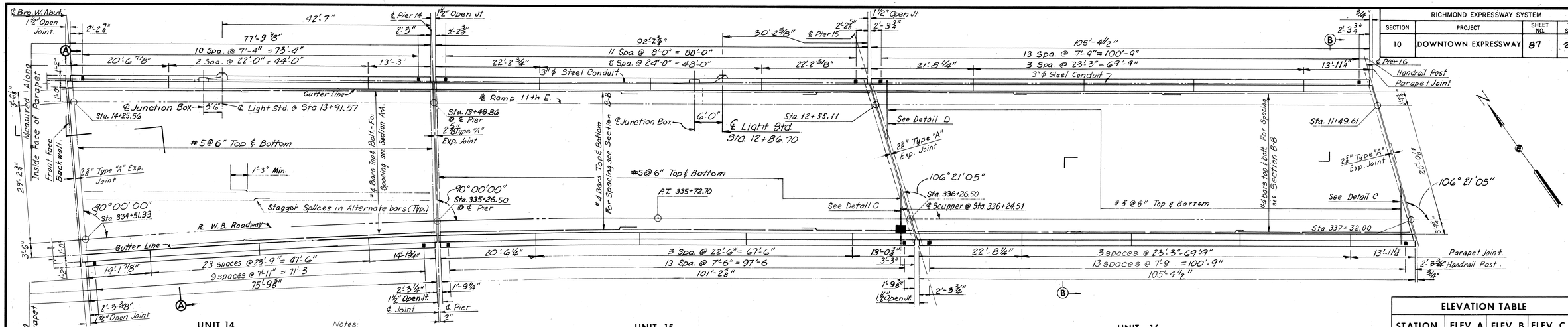
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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	87	265



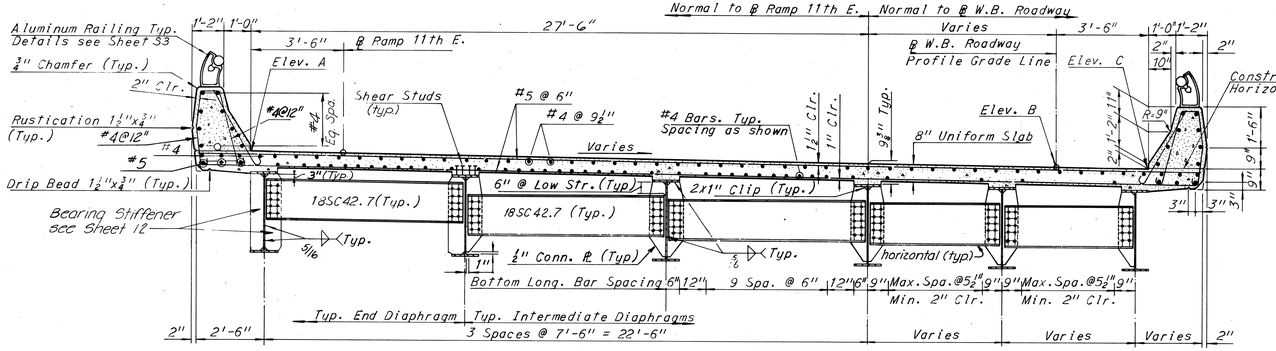
UNIT 14

UNIT 15

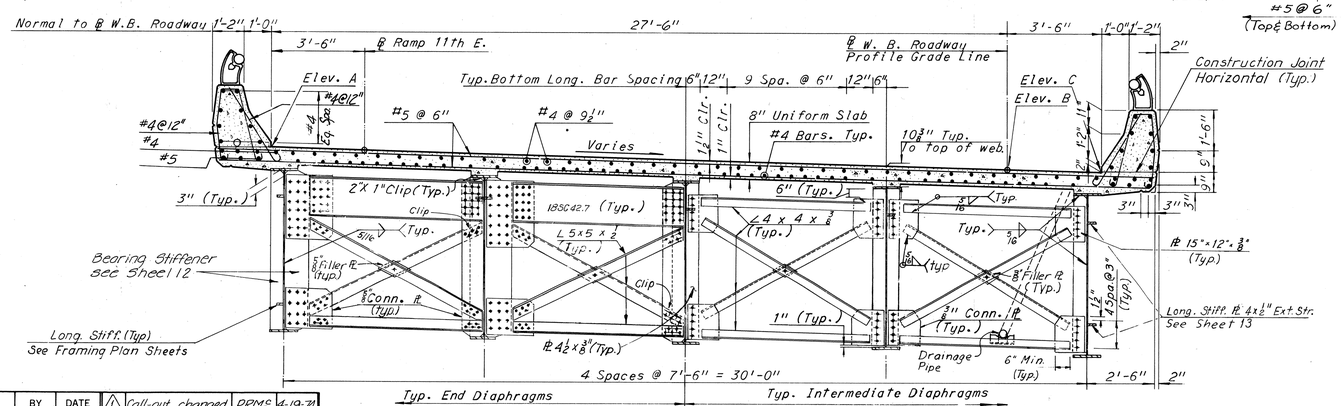
UNIT 16

Notes:
For End Diaphragms at Abutment, see Section A-A this Sheet.
For End Diaphragms at Pier 14, Units 14 & 15, see Section A-A Sheet 19.
For End Diaphragms at Pier 15, Units 15 & 16, see Section B-B this Sheet.
For End Diaphragms at Pier 16, Unit 16, see Section B-B this Sheet.

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



SECTION A-A
Scale: ⅜" = 1'-0"



SECTION B-B
Scale: ⅜" = 1'-0"

DETAIL C
Scale: 1" = 2'-0"

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

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
334+50.00	68.13	66.16	65.95
+51.50	68.10	66.13	65.92
+60.00	67.89	65.97	65.76
+70.00	67.65	65.78	65.57
+80.00	67.42	65.58	65.37
+90.00	67.17	65.39	65.18
335+00.00	66.92	65.20	64.99
+10.00	66.67	65.02	64.81
+20.00	66.43	64.85	64.65
+26.50	66.28	64.74	64.55
+30.00	66.20	64.69	64.50
+40.00	65.99	64.55	64.37
+50.00	65.78	64.43	64.26
+60.00	65.61	64.32	64.16
+70.00	65.46	64.23	64.07
+80.00	65.32	64.15	64.00
+90.00	65.20	64.09	63.95
336+00.00	65.09	64.04	63.91
+10.00	65.00	64.01	63.88
+18.58	64.93	---	---
+20.00	64.92	63.99	63.87
+26.50	---	63.99	---
+27.38	---	---	63.87
+30.00	64.86	63.99	63.87
+40.00	64.81	64.00	63.90
+50.00	64.78	64.03	63.94
+60.00	64.76	64.07	63.99
+70.00	64.76	64.13	64.05
+80.00	64.79	64.21	64.13
+90.00	64.81	64.30	64.23
337+00.00	64.85	64.40	64.34
+10.00	64.91	64.51	64.46
+20.00	64.97	64.62	64.58
+24.08	64.96	---	---
+30.00	65.00	64.74	64.71
+32.00	---	64.76	---
+32.88	---	---	64.74
+40.00	65.05	64.85	64.83

Notes:
For Superstructure quantities, see Sheet 2.
For Framing plan, see Sheet 13.
For Joint details, see Sheet 24.
For Railing details, see Sheet 53.
For Standard Drainage Details, see Support Type 2 Sheet S5 & S6

	BY	DATE				
MADE	SHS	8-2-68	2	As Built	TEM	10-76
CHECKED	R.C.	10-23-68				
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

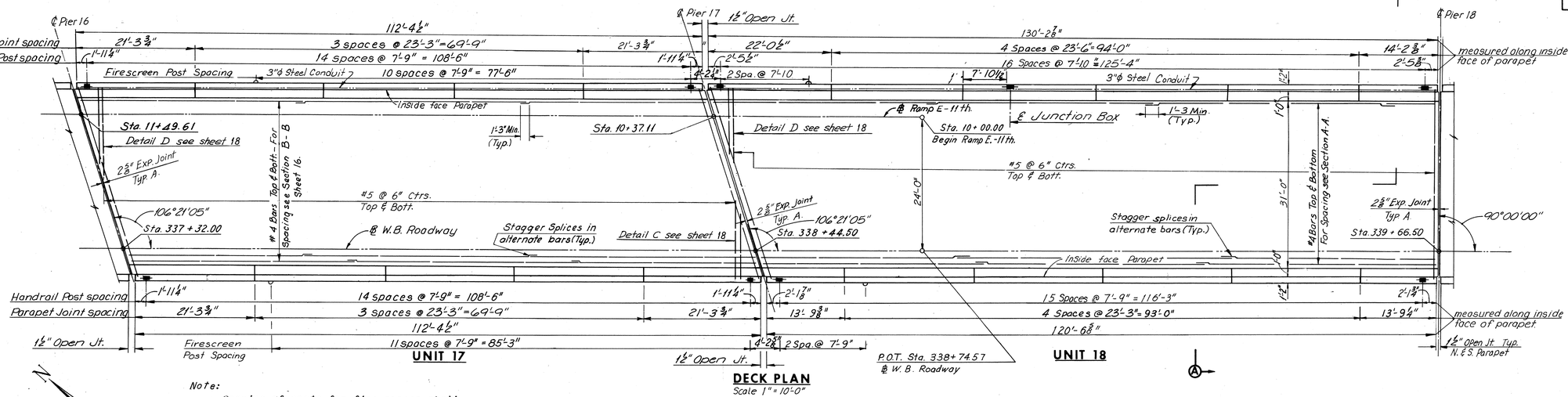
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 63
WESTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
DECK PLAN - UNITS 14, 15, AND 16

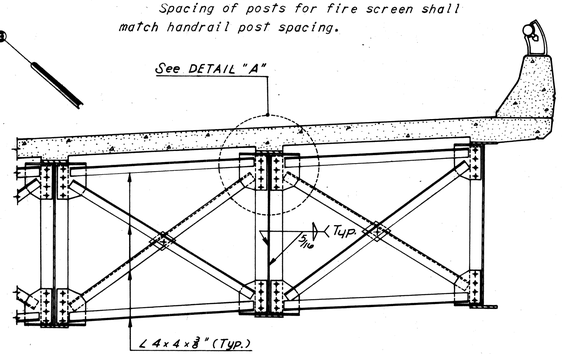
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE:
CONTRACT NO.: 10
SHEET NO. 18 OF 29

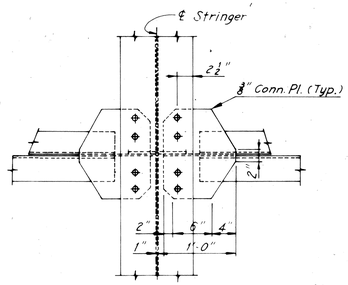
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	88	265



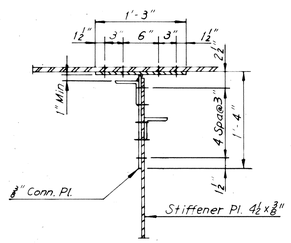
Note:
Spacing of posts for fire screen shall match handrail post spacing.



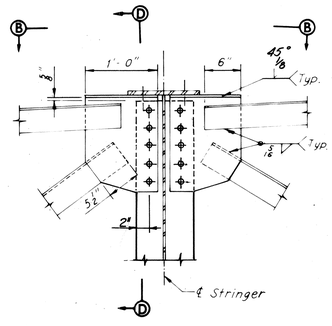
INTERMEDIATE DIAPHRAGM
Scale: ⅜"=1'-0"



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

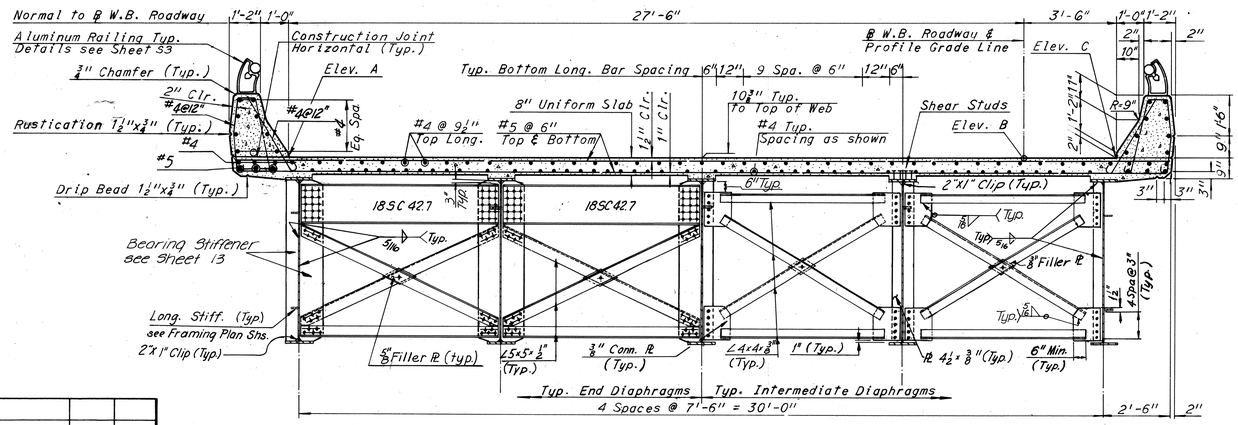


SECTION D-D
Scale: 1"=1'-0"



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

INTERMEDIATE DIAPHRAGM DETAILS



SECTION A-A
Scale: ⅜" = 1'-0"

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
337+24.08	64.97	—	—
+30.00	65.01	64.74	64.71
+32.00	—	64.76	—
+32.88	—	—	64.75
+40.00	65.05	64.85	64.83
+50.00	65.11	64.96	64.94
+60.00	65.16	65.07	65.06
+70.00	65.22	65.18	65.18
+80.00	65.27	65.30	65.30
+90.00	65.33	65.41	65.42
338+00.00	65.38	65.52	65.54
+10.00	65.44	65.63	65.65
+20.00	65.49	65.74	65.78
+30.00	65.55	65.86	65.90
+40.00	65.61	65.97	66.02
+44.50	—	66.02	—
+50.00	65.66	66.08	66.13
+60.00	65.73	66.19	66.25
+70.00	65.80	66.30	66.37
+80.00	65.89	66.42	66.49
+90.00	65.98	66.53	66.60
339+00.00	66.09	66.64	66.71
+10.00	66.20	66.75	66.82
+20.00	66.31	66.86	66.93
+30.00	66.43	66.98	67.05
+40.00	66.54	67.09	67.16
+50.00	66.65	67.20	67.27
+60.00	66.76	67.31	67.38
+66.50	—	67.39	—

Notes:
For End Diaphragms at Pier 16, Unit 17, see Section B-B Sheet 18
For End Diaphragms at Pier 17, Units 17 & 18, see Section B-B Sheet 18
For End Diaphragms at Pier 18, Unit 18, see Section A-A, this Sheet.

Note:
Intermediate Diaphragm Details shown, are for Units 22 and 23 and curved stringers only in Units 20 and 21.
Flange Conn. PL as shown above is also to be used in bays where only one of the two stringers is curved.
For Units 20 and 21 see sheet 15 for Framing Plan and sheet 20 for Deck Plan.
For Units 22 and 23 see Sheet 17 for Framing Plan and Sheet 21 for Deck Plan.

Notes:
For Superstructure quantities, see Sheet 2.
For Framing plan, see Sheet 14.
For Joint details, see Sheet 24.
For Railing details, see Sheet 53.

	BY	DATE
MADE	GSH	08-01-68
CHECKED	SCC	10-21-68
IN CHARGE		

NO.	REVISION	BY	DATE
1	As Built	TEM	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.
DECK PLAN UNITS 17 AND 18

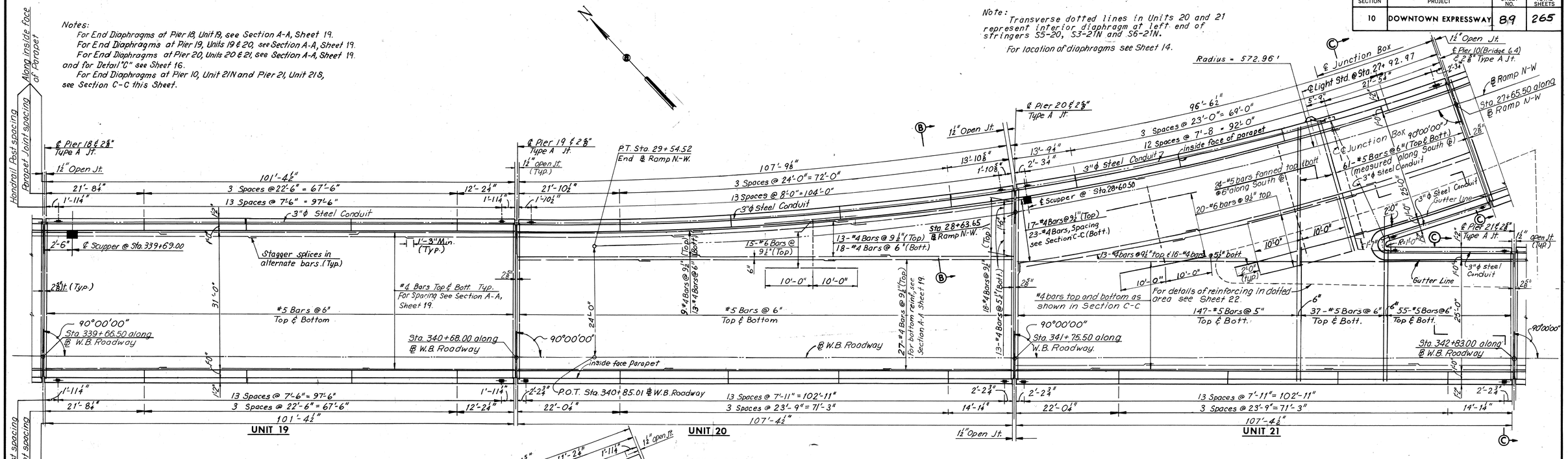
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

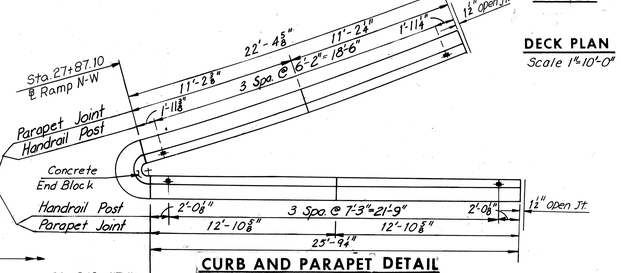
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 19 OF 29

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 "O" 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.



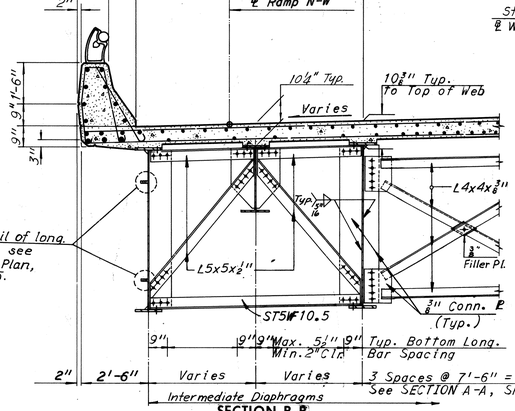


DECK PLAN
Scale 1" = 10'-0"

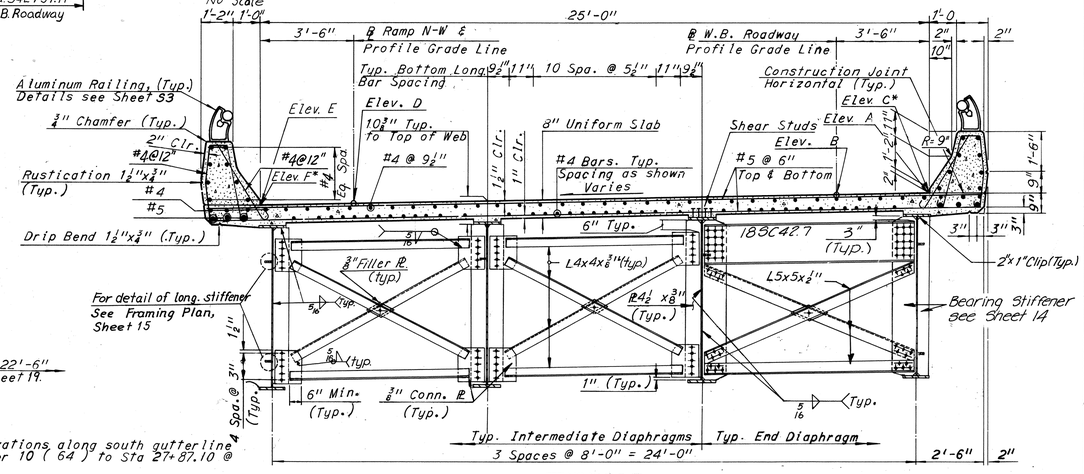
Notes:
For Superstructure quantities, see Sheet 2.
For Framing plan, see Sheet 15
For Joint details, see Sheet 24
For Railing details, see Sheet 53.
For Standard Drainage Details, see Support Type 2 for Units 19 and 21, Sheet S5 & S6.

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.

CURB AND PARAPET DETAIL
NO Scale



SECTION B-B
Scale: ⅜" = 1'-0"



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

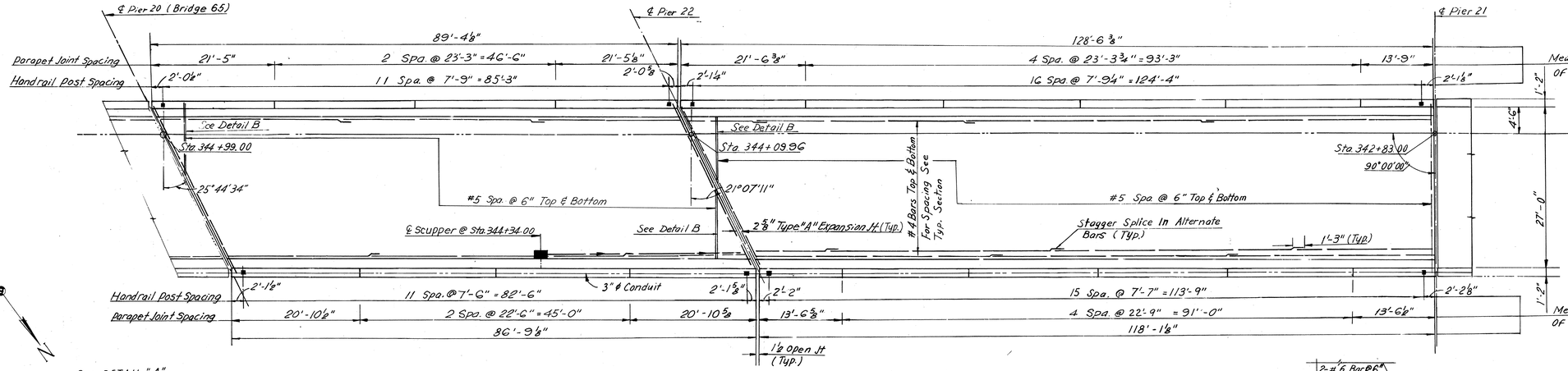
BRIDGE NO. 63
WESTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.

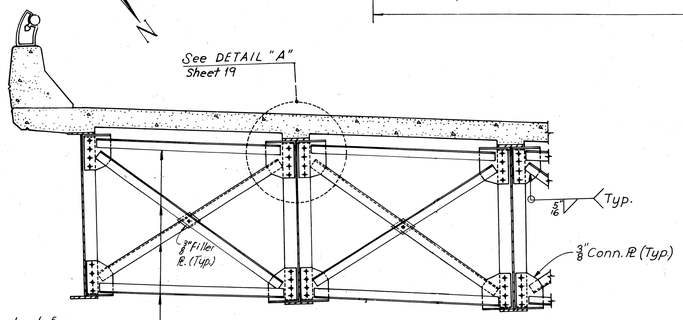
DECK PLAN — UNITS 19, 20 AND 21

HOWARD, NEEDLES, 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	90	265



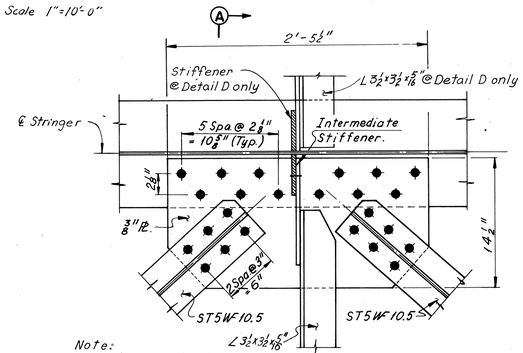


INTERMEDIATE DIAPHRAGM
Scale: ⅜"=1'-0"

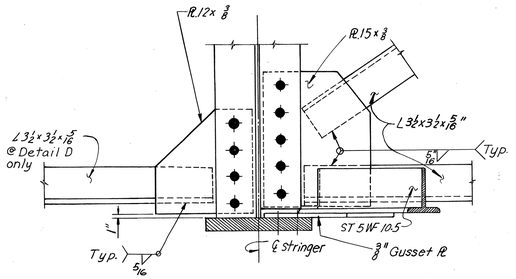
UNIT 23

UNIT 22

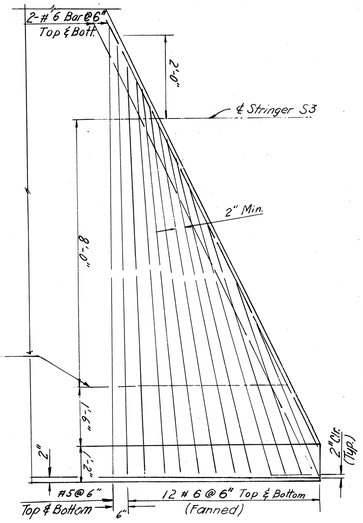
DECK PLAN
Scale 1"=10'-0"



DETAIL C
Scale: 1½" = 1'-0"
Detail D similar except as shown above.

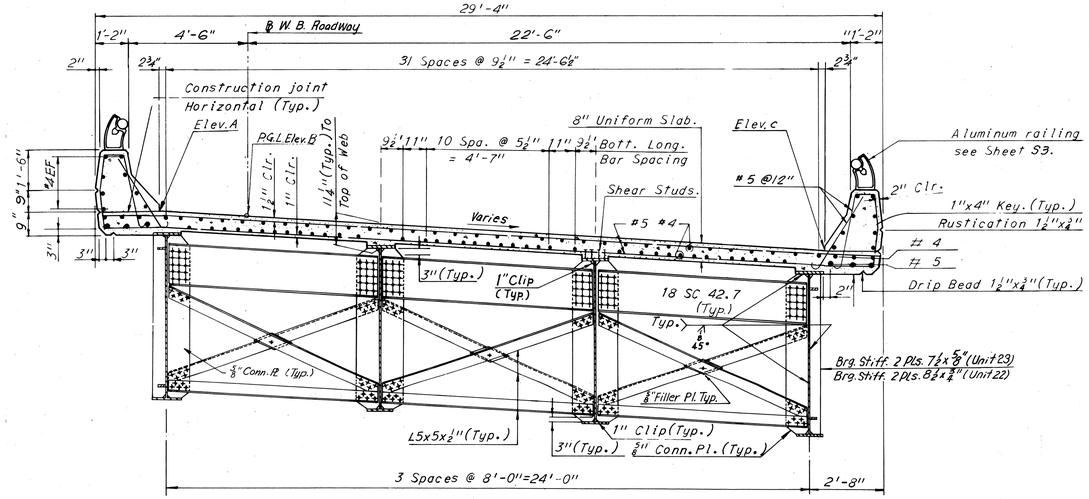


SECTION A-A



DETAIL B
No Scale

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
345+00.69	72.02	—	—
345+00.00	72.02	71.89	71.07
344+99.00	—	71.90	—
344+90.00	72.10	72.97	71.23
344+88.63	—	—	71.25
344+80.00	72.16	72.06	71.40
344+70.00	72.23	72.14	71.55
344+60.00	72.29	72.20	71.68
344+50.00	72.33	72.25	71.81
344+40.00	72.35	72.27	71.83
344+30.00	72.35	72.28	71.85
344+20.00	72.34	72.27	71.84
344+11.31	72.31	—	—
344+10.00	72.30	72.23	71.80
344+09.96	—	72.23	—
344+00.00	72.25	72.18	71.75
344+01.66	—	—	71.76
343+90.00	72.18	72.11	71.68
343+80.00	72.08	72.01	71.58
343+70.00	71.97	71.90	71.47
343+60.00	71.86	71.79	71.36
343+50.00	71.75	71.68	71.25
343+40.00	71.64	71.57	71.14
343+30.00	71.53	71.46	71.03
343+20.00	71.41	71.34	70.91
343+10.00	71.30	71.23	70.80
343+00.00	71.19	71.12	70.69
342+90.00	71.08	71.01	70.58
342+83.00	71.00	70.93	70.50



TYPICAL SECTION
Scale: ⅜"=1'-0"

END DIAPHRAGM

Note:
For Standard Drainage Details for Unit 21 see Support Type 2 Sheet 55 & 56.

Notes:
For Framing Plan see Sheet 17.
For Joint Details, see Sheet 24.
For Quantities see Sheet 2.
For Handrail Details, see Sheet 53.

	BY	DATE				
MADE	R C	11-21-68				
CHECKED	Y.C.P	1-15-69	1	As Built	TEM	10-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

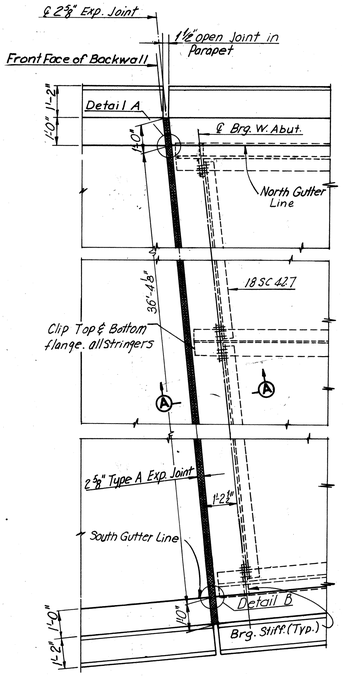
BRIDGE NO. 63
WESTBOUND ROADWAY OVER
12TH ST.-R.R. TRACKS AND 16TH ST.

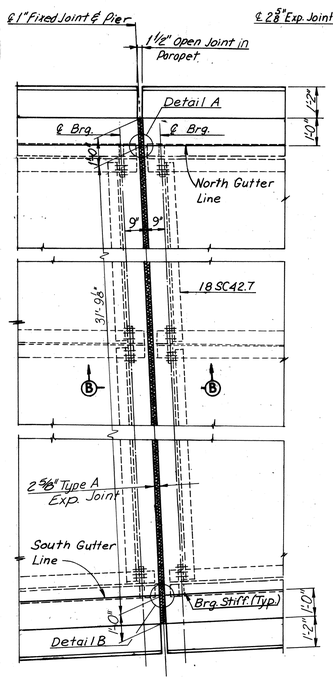
DECK PLAN UNITS 22 AND 23

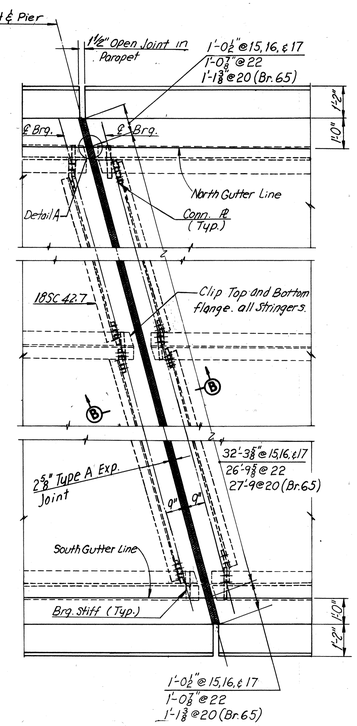
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

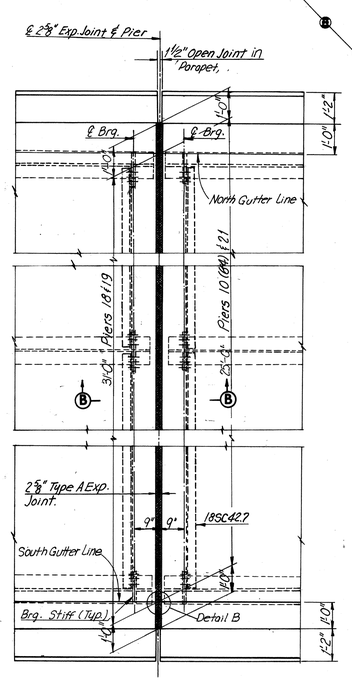
SCALE: As Noted
CONTRACT NO.: 10
SHEET 21 OF 29

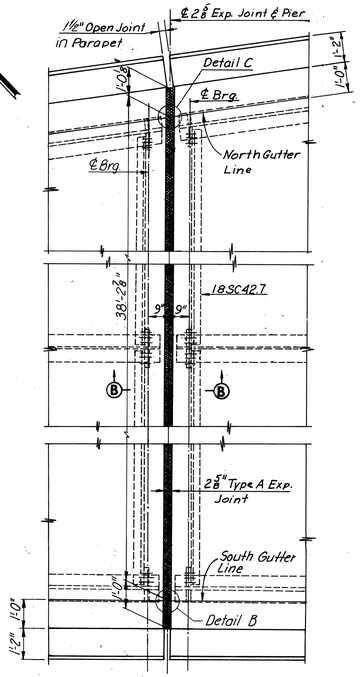
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	93	265

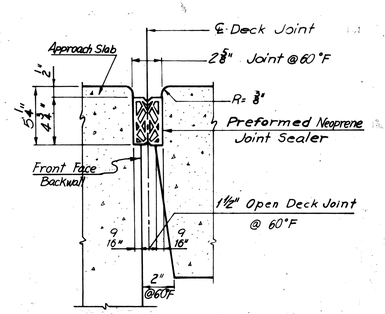












2⅝" TYPE "A" JOINT @ WEST ABUTMENT

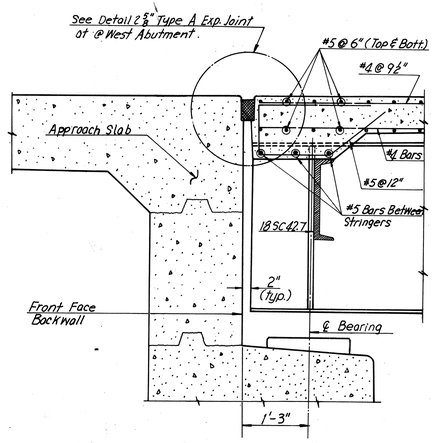
PLAN — JOINT AT WEST ABUTMENT
Scale : ⅜" = 1'-0"

PLAN — JOINT AT PIER 14
Scale : ⅜" = 1'-0"

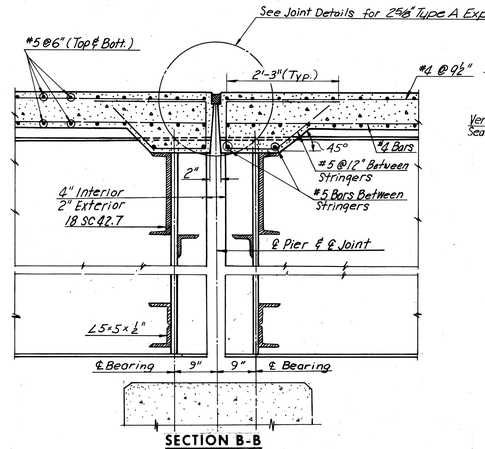
PLAN — JOINT AT PIERS 15, 16, 17, 22 AND 20 (BR. 65)

PLAN — JOINT AT PIERS 18, 19, 21 AND 10 (BR. 64)
Scale : ⅜" = 1'-0"

PLAN — JOINT AT PIER 20
Scale: ⅜" = 1'-0"



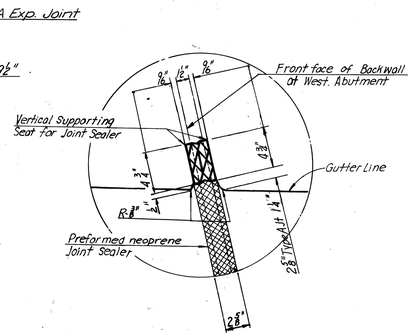
SECTION A-A
Scale : ¾" = 1'-0"



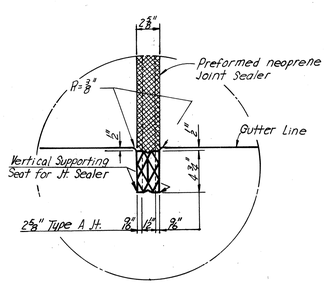
SECTION B-B
Scale: ¾" = 1'-0"

Note:
All horizontal dimensions of Sections shown above are normal to ℄ joint.

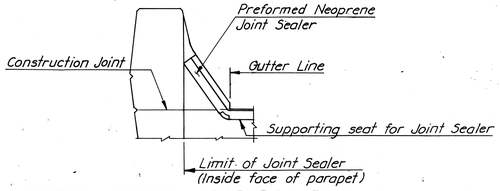
Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the Temperature at the time of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



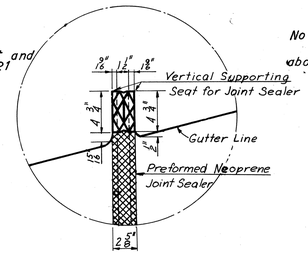
DETAIL A
No Scale
Typical for W. Abutment and Piers 14, 15, 16, 17 22, and 20 (Br. 65)



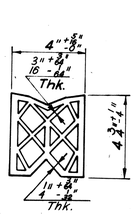
DETAIL B
No Scale
Typical for W. Abutment and Piers 14, 18, 19, 20, 21 and 10 (bridge 64).



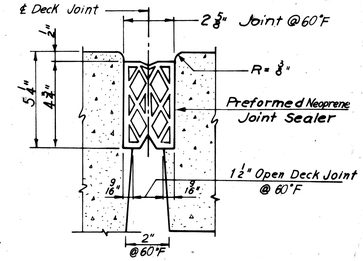
TREATMENT OF TYPE "A" JOINT AT GUTTER
No Scale



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

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

AS BUILT

Bridge 64

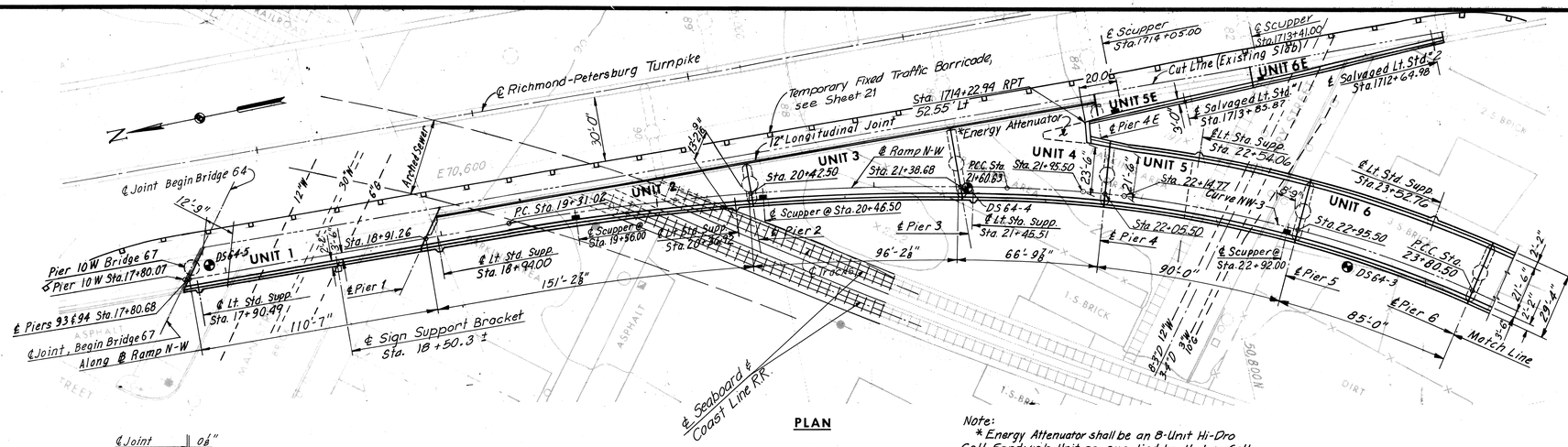
(Ramp from Southbound I-95 to Westbound Downtown Expressway “Rte. 195” over East Cary Street, Dock Street and CSX RR)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	99	265

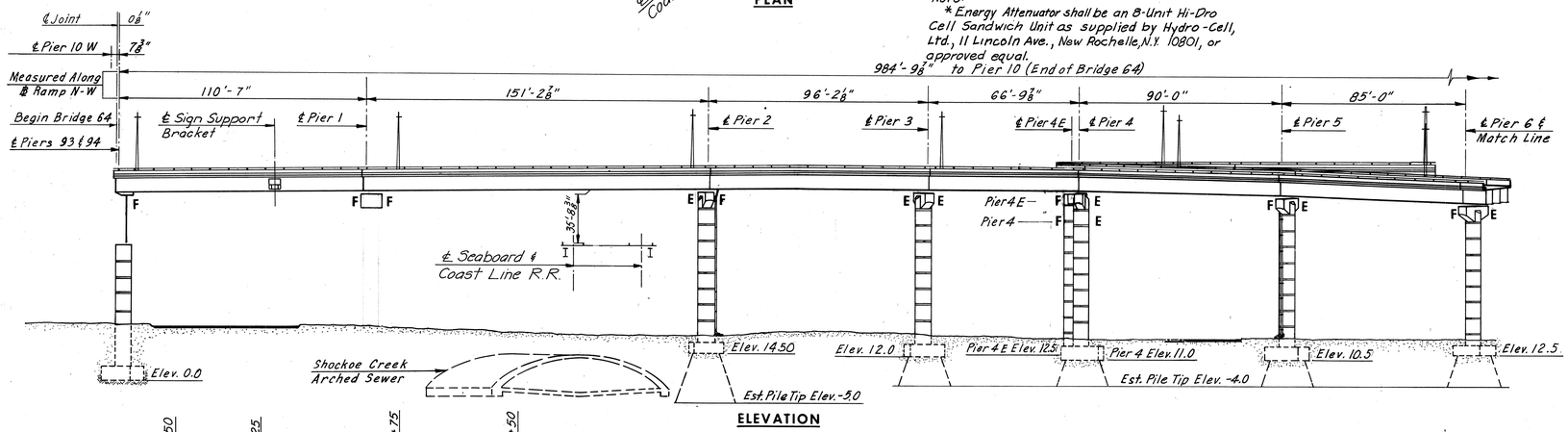
INDEX

Note:
For General Notes, see Sheet 2.
For Quantity Table, see Sheet 2.

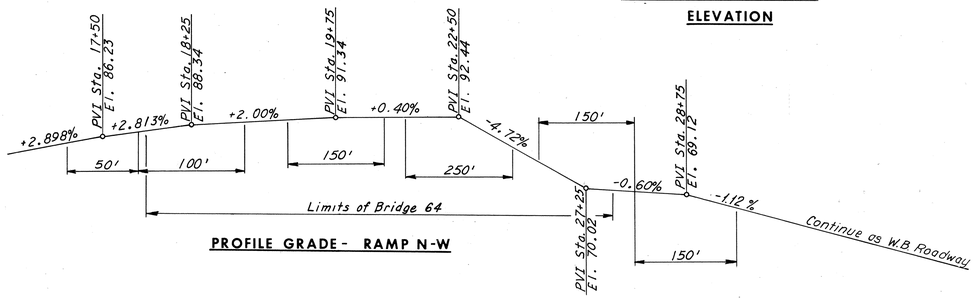


PLAN

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° 27' 06.8"
D = 4° 00' 00"
T = 430.45'
L = 836.30'
R = 1,432.39'

℄ Ramp N-W

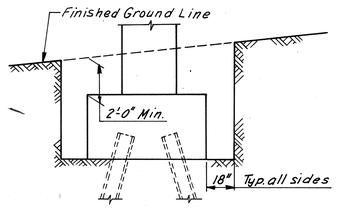
Curve: NW-1
P.I. = Sta. 13+42.50
Δ = 32° 01' 34"
D = 3° 51' 35.6"
T = 426.01'
L = 829.72'
R = 1,484.39

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° 43' 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
MADE	AMH	1-6-69
CHECKED	G.C.C.	4/26/69
IN CHARGE		

NO.	REVISION	BY	DATE
4	As Built	TEM	6-77
3	℄ Seaboard & Coast Line Add To Plant El.	K.D.P.	6-74
2	Sign Support Bracket & Sheet 12a added	L.B.P.	8-74
1	Added Sta.	REG	1-13-75

AS BUILT

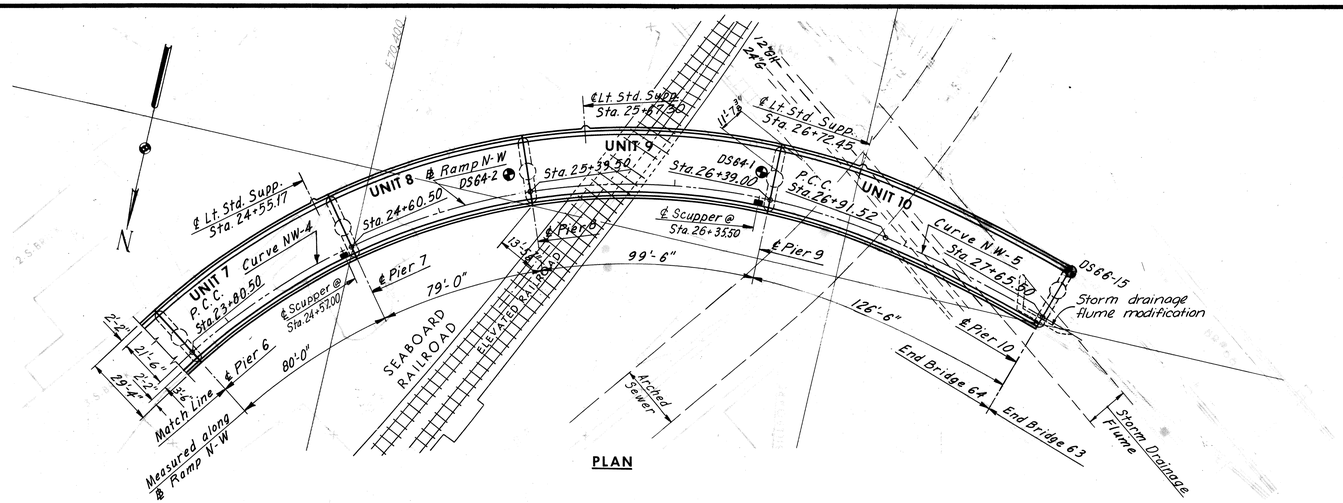
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

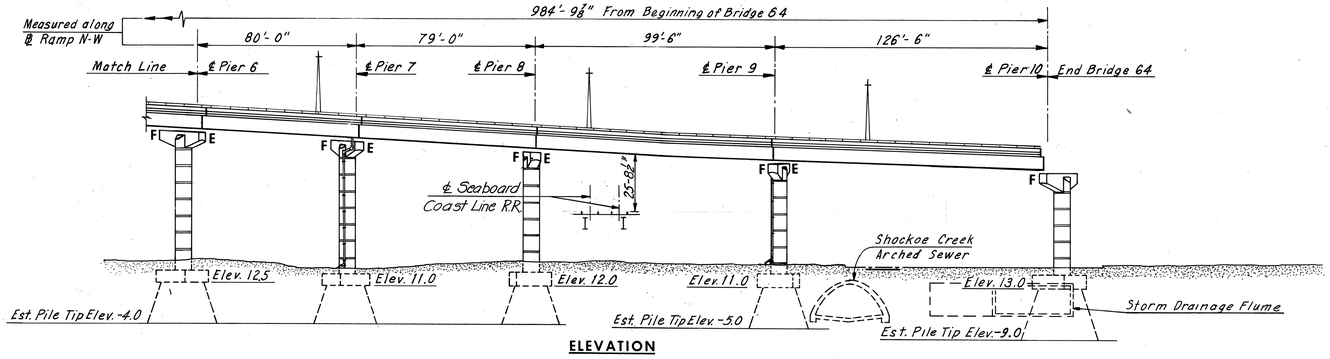
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

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





ESTIMATED QUANTITIES

	Structure Excavation Cu. Yds.	Concrete (‡) Cu. Yds.	Reinforcing Steel Lbs.	Str. Steel Mild Carbon Lbs.	Str. Steel High Strength Lbs.	Aluminum Railing (T-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 Sucerstructure shall be Class A4 and for Substructure Class A3.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	1-13-69	1	Seaboard Coast Line Adj. To Plantel	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. Roadway (Br. 63).

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 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

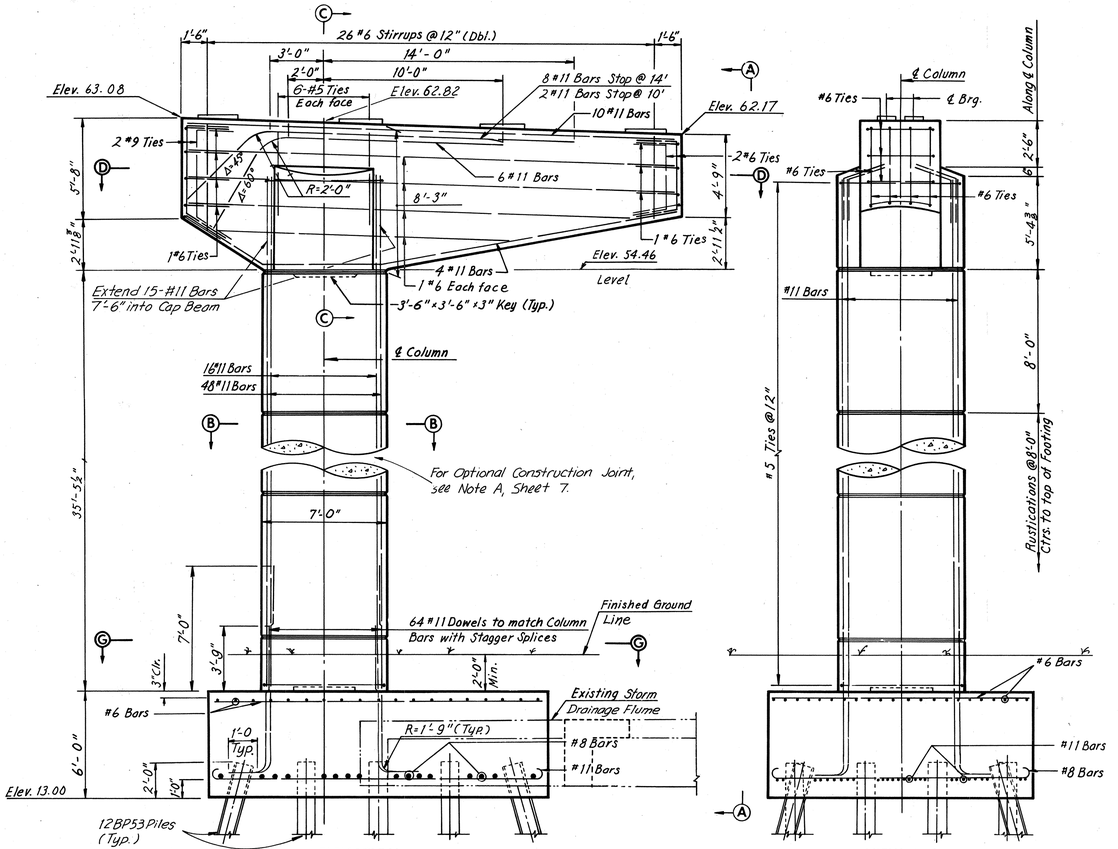
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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

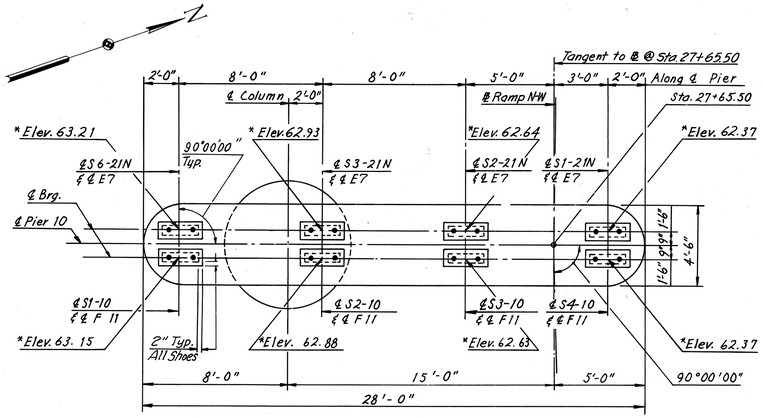
SCALE: 1" = 30'-0"
CONTRACT NO. 10
SHEET NO. 2 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	109	265

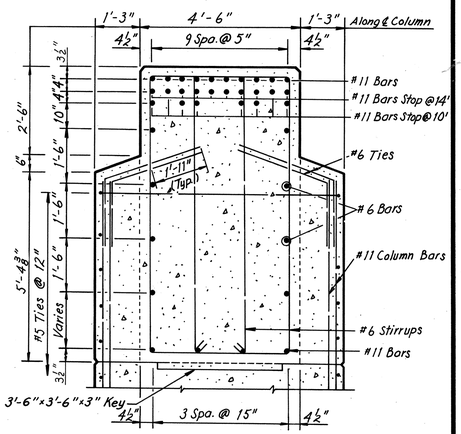


ELEVATION
Scale: ¼" = 1'-0"

VIEW A-A
Scale: ¼"=1'-0"



PLAN
Scale: ¼" = 1'-0"



SECTION C-C
Scale: ½"=1'-0"

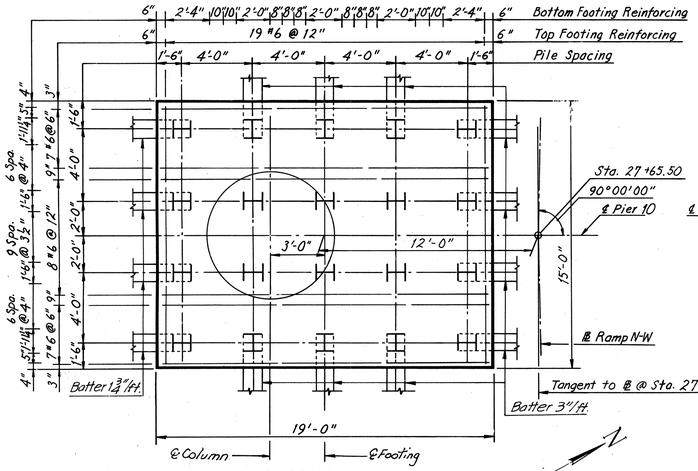
SECTION D-D
Scale: ¼" = 1'-0"

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.
# Denotes the top Pad Elevation.

Notes:
All piles shall be 12BP53 Steel Piles (Design Capacity= 57 tons)

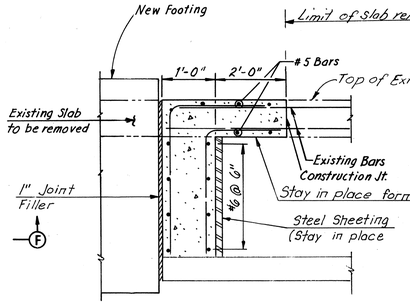
For Standard Shoe Details, see Sheet 31.
For Framing Plan, see Sheet 17.
Estimated Pile Tip Elevation is -9.0 feet.
For Rustication Details, see Sheet 9.
For 12BP53 Steel Pile Details, see Sheet 9.

Note:
Piles located within 10 ft. (horizontal distance) of Sturm Drinage Flume shall be pre-bored to an Elevation 5 ft. below bottom of sewer.

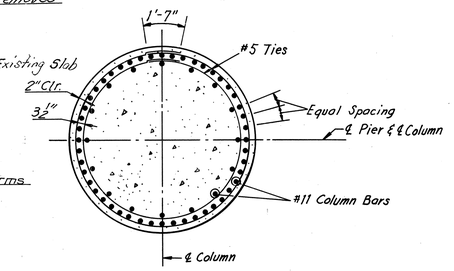


FOOTING PLAN
Scale: ¼" = 1'-0"

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



SECTION F-F
Scale: ½" = 1'-0"



SECTION B-B
Scale: ⅜" = 1'-0"

FOOTING FOR PIER 10 IS ECCENTRIC AS SHOWN ON FOOTING PLAN

	BY	DATE		Note Added	PRM^c	4-19-74
MADE	Y.C.P	3-10-69	2	As Built	TEM	G-77
CHECKED	K.C.T.	4-17-69				
IN CHARGE			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

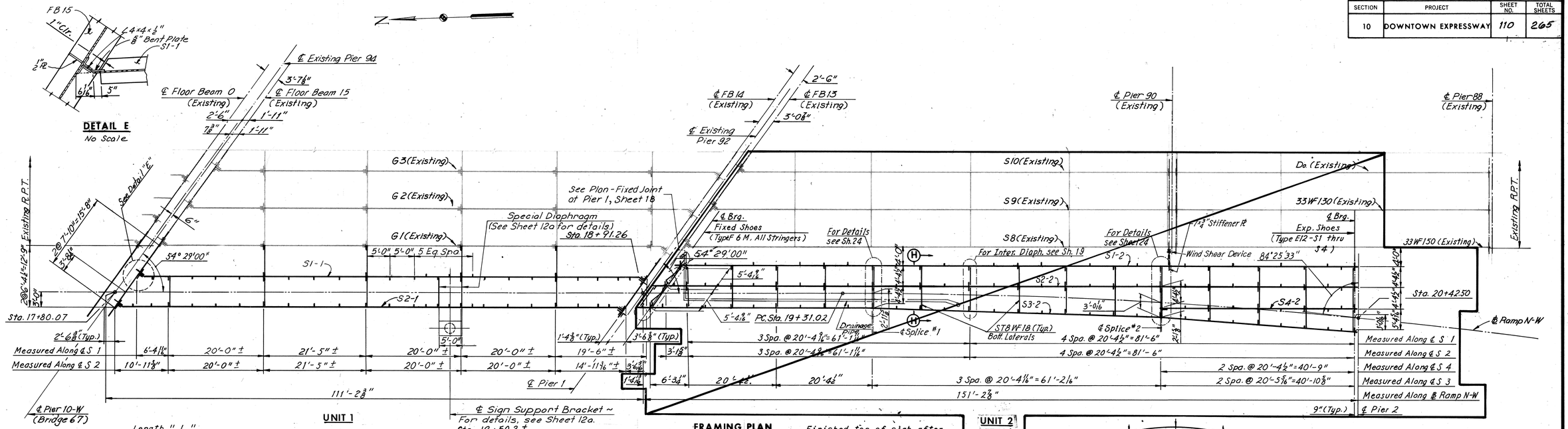
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIER 10

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

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 11 OF 28

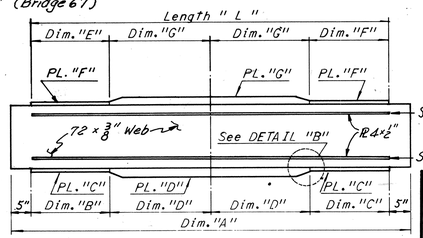
AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	110	265

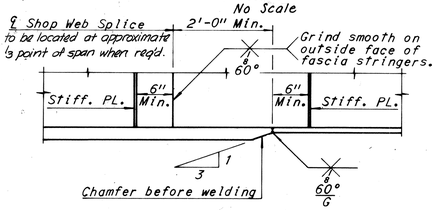


FRAMING PLAN
Scale: 1"=10'-0"

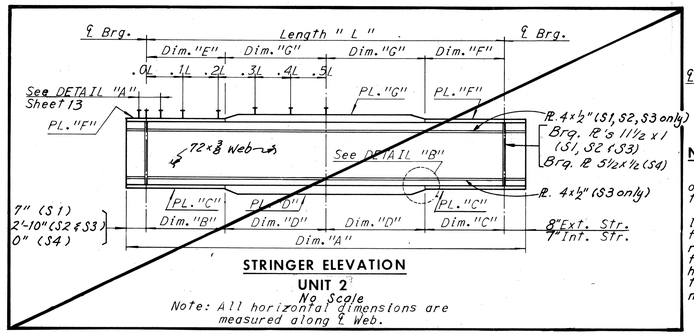
Note:
Dimensions shown on the plans for existing structural metalwork are in accordance with drawings prepared for the original construction. The Contractor shall verify all necessary dimensions of existing structural metalwork prior to fabrication of new metalwork.
New Diaphragms are to match Existing Diaphragms in Unit 1.



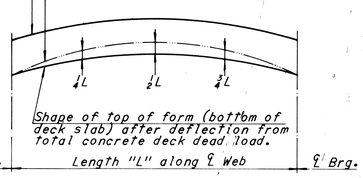
STRINGER ELEVATION
UNIT 1
No Scale



DETAIL "B"
No Scale



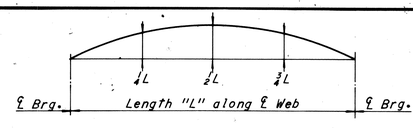
STRINGER ELEVATION
UNIT 2
No Scale
Note: All horizontal dimensions are measured along ℄ Web.



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 19

⊕ Except as shown otherwise.

Note:
Intermediate stiffener R.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 necessory 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, FFM @ 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'-5⅜"	23'-0⅛"	23'-0"	29'-8⅜"	23'-0⅛"	23'-0"	29'-8⅜"	18x⅞"	18x1⅛"	18x⅞"	18x1⅛"	—	—	—	—	—
	S2-1	106'-3⅜"	105'-5⅜"	23'-0⅛"	23'-0"	29'-8⅜"	23'-0⅛"	23'-0"	29'-8⅜"	18x⅞"	18x1¼"	18x⅞"	18x1¼"	—	—	—	—	—
2	S1-2	149'-2⅜"	148'-7⅜"	19'-0"	19'-7⅛"	52'-0"	—	—	71'-3⅞"	24x1½"	24x2½"	—	18x1"	24"	24"	24"	24"	24"
	S2-2	149'-2⅜"	145'-9⅜"	20'-0"	20'-9⅛"	52'-6"	—	—	72'-10⅛"	24x1½"	24x2½"	—	18x1"	24"	24"	24"	24"	24"
	S3-2	152'-6⅛"	149'-0⅜"	20'-0"	22'-0⅜"	53'-6"	—	—	74'-6⅛"	24x1½"	24x2½"	—	18x1"	24"	24"	24"	24"	24"
	S4-2	41'-4"	40'-9"	—	—	20'-4½"	—	—	20'-4½"	—	12x⅝"	—	12x⅝"	24"	24"	24"	24"	24"

DEAD LOAD DEFLECTION SCHEDULE

UNIT	¼L	½L	¾L
1	7/8"	1 1/4"	7/8"
	7/8"	1 1/4"	7/8"
2	1 3/8"	2"	1 3/8"
	1 13/16"	2 9/16"	1 13/16"
	2 1/4"	3 1/8"	2 1/4"

CAMBER SCHEDULE

UNIT	¼L	½L	¾L
1	2 3/16"	2 15/16"	2 1/8"
	2 31/16"	3"	2 31/16"
2	3 9/16"	5"	3 11/16"
	4 3/4"	6 11/16"	4 1/4"
	6 1/8"	8 7/16"	6 1/8"

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.

5 As Built TEM G-77

	BY	DATE	NO.	REVISION	BY	DATE
			4	Pier Angle Chg.	R&J	1-13-75
			1	Note changed, added	PRM &	4-19-74
MADE	Y.C.P	2-11-69	2	Sign Support Bracket & Intex. Diaph. Spa. added	L.N.B.	9-9-74
CHECKED	S.C.C.	4-24-69	3	Unit 2 Deleted	L.N.B	10-1-74
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

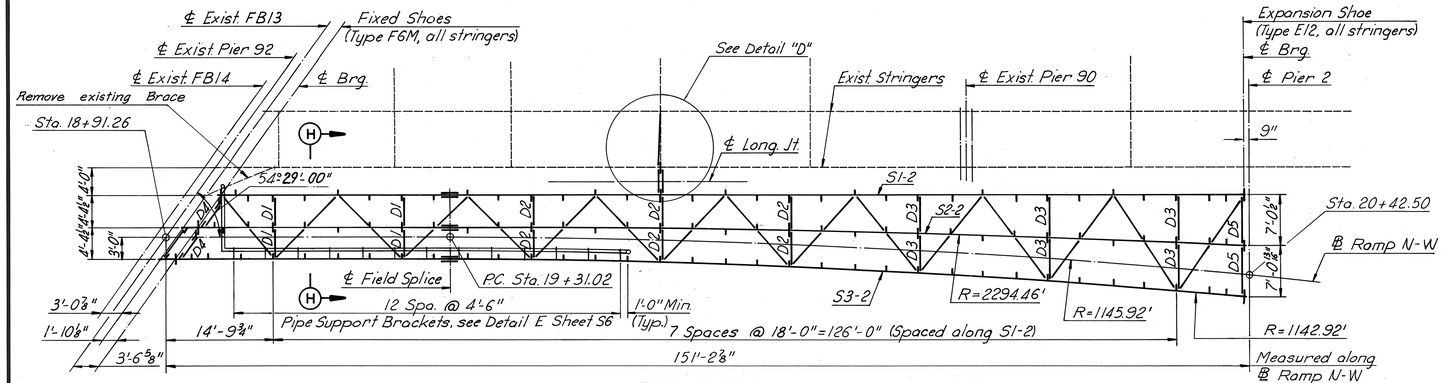
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

FRAMING PLAN - UNITS 1

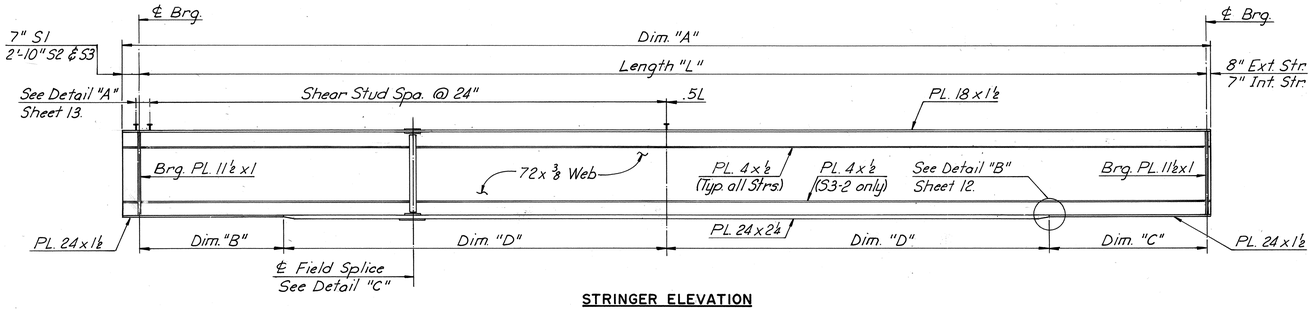
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

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

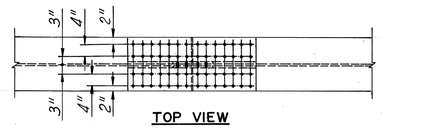


FRAMING PLAN
Scale: 1"=10'-0"

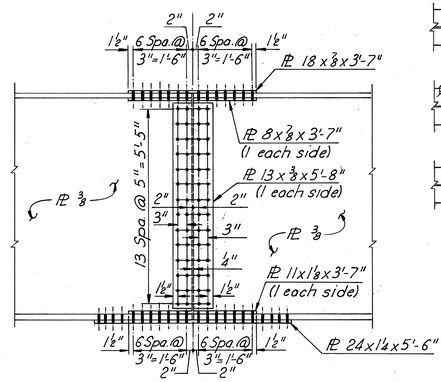


STRINGER ELEVATION
Scale: None

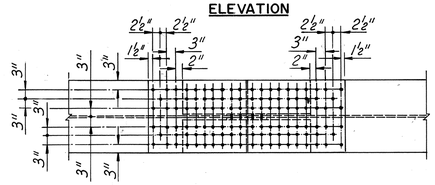
STRINGER SCHEDULE						DEAD LOAD DEFLECTION SCHEDULE						CAMBER SCHEDULE		
						DUE TO CONCRETE			DUE TO STEEL					
STRINGER	LENGTH "L"	DIM. "A"	DIM. "B"	DIM. "C"	DIM. "D"	1/4L	1/2L	3/4L	1/4L	1/2L	3/4L	1/4L	1/2L	3/4L
S1-2	142'-7 11/16"	143'-9 7/16"	19'-0"	19'-7 11/16"	52'-0"	1 5/16"	1 15/16"	1 3/8"	3/4"	1 1/16"	3/4"	3 3/8"	4 5/8"	3 7/16"
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"	7/8"	1 3/16"	7/8"	4 1/2"	6 1/4"	4 5/8"
S3-2	149'-1"	152'-6 15/16"	20'-0"	22'-1"	53'-6"	1 3/4"	2 1/2"	1 3/4"	1 5/16"	1 1/4"	1 5/16"	5 1/16"	7 1/2"	5 1/2"



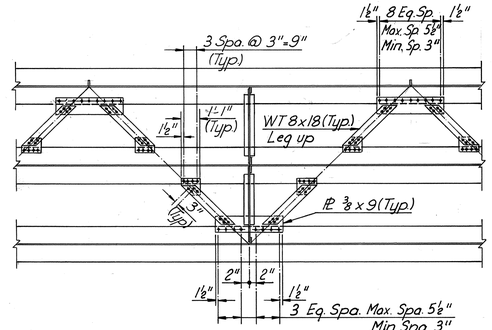
TOP VIEW



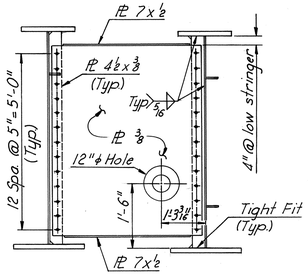
ELEVATION



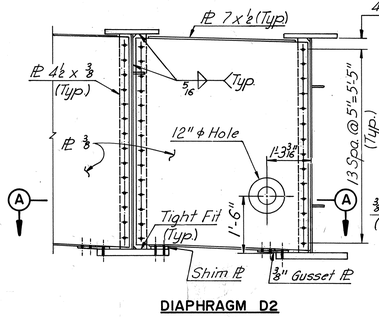
BOTTOM VIEW



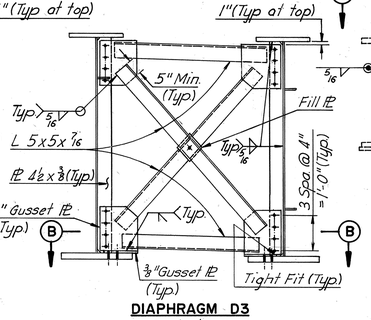
TYPICAL LATERAL BRACING
Scale: 1/4"=1'-0"



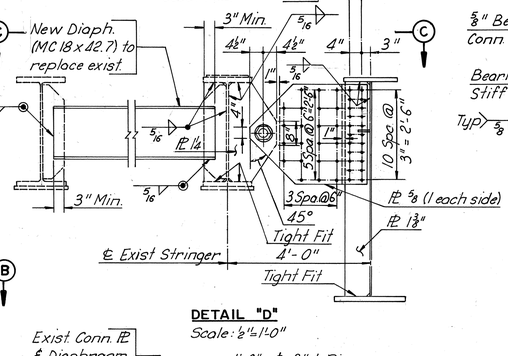
DIAPHRAGM D1
Scale: 1/2"=1'-0"



DIAPHRAGM D2
Scale: 1/2"=1'-0"

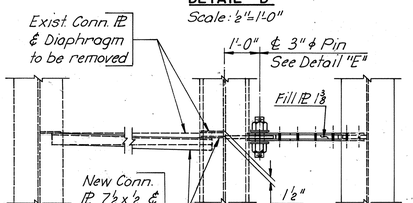


DIAPHRAGM D3
Scale: 1/2"=1'-0"

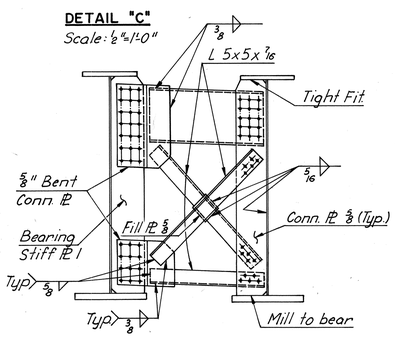


DETAIL "D"
Scale: 1/2"=1'-0"

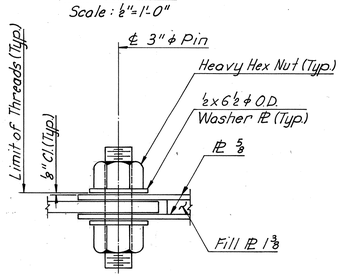
These holes to be shop sub-punched. Ream and connect in field after full dead load deflection has occurred.



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



DIAPHRAGM D4
Scale: 1/2"=1'-0"



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

NOTE: Spot weld nut to pin upon completion of assembly.

NOTE:
1. For Diaphrogm 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

DESIGNED			3	As Built	TEM	6-77
DRAWN	N.L.B.	10-7-74	2	Remove Brace & change angle	MM	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.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

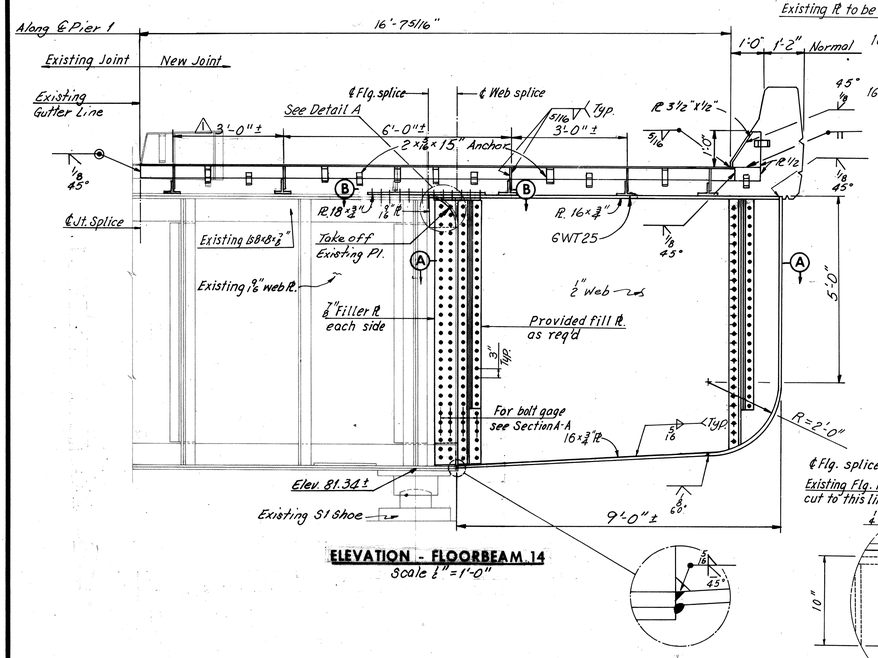
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

FRAMING PLAN - UNIT 2

SCALE AS NOTED
DATE
SHEET 12b OF 28

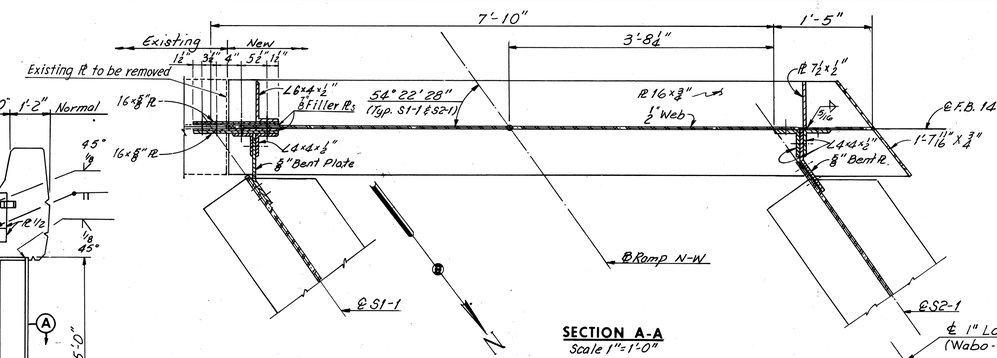
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10.	DOWNTOWN EXPRESSWAY	116	265

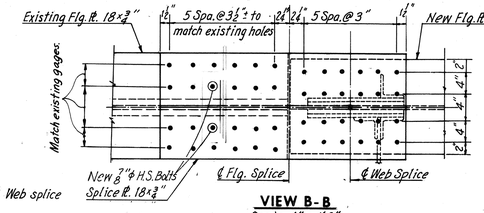


ELEVATION - FLOORBEAM 14
Scale 1"=1'-0"

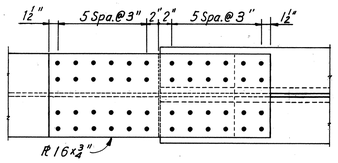
Bolts - 7/8" ϕ H. S. Bolts, ASTM Spec. A-325 unless otherwise noted.



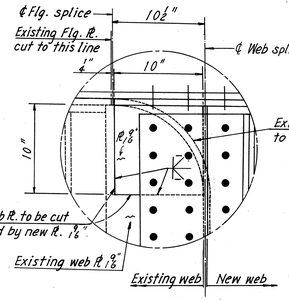
SECTION A-A
Scale 1"=1'-0"



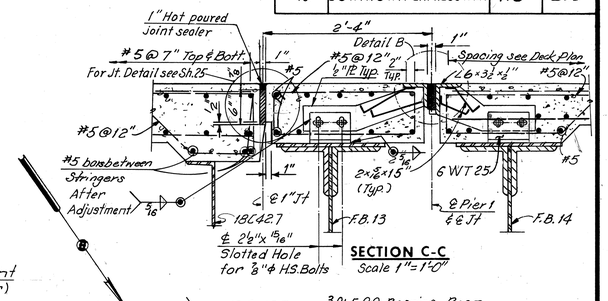
VIEW B-B
Scale 1"=1'-0"



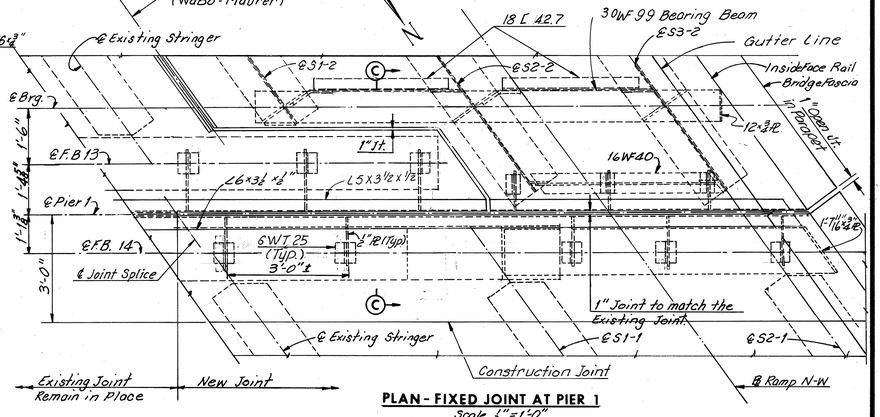
VIEW F-F
Scale: 1"=1'-0"



DETAIL A
Scale: 3/4"=1'-0"

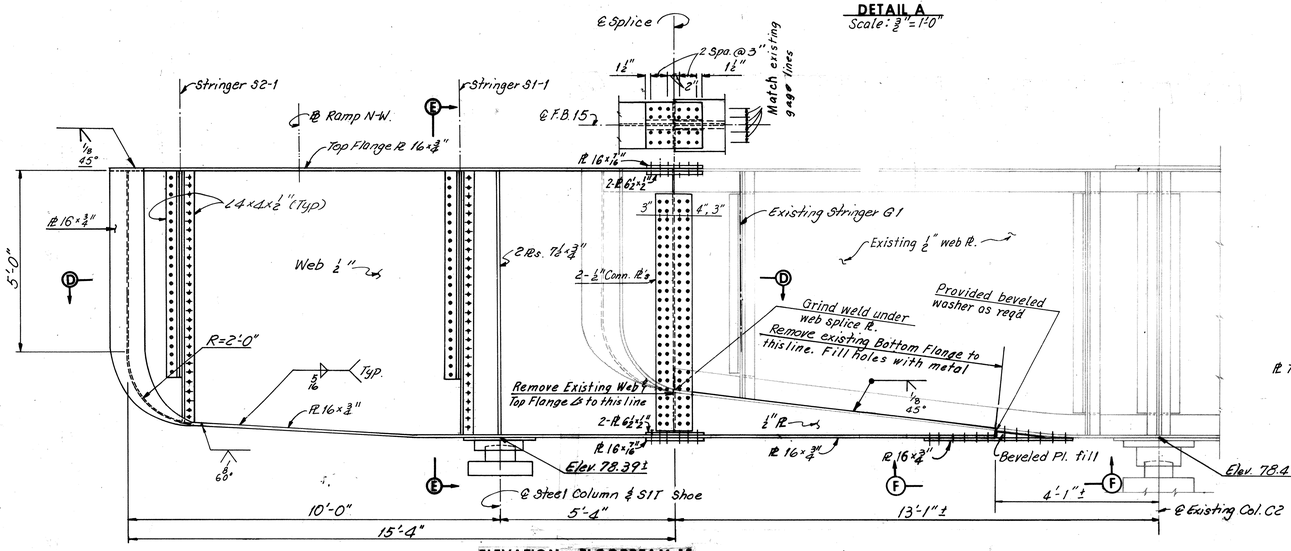


SECTION C-C
Scale 1"=1'-0"

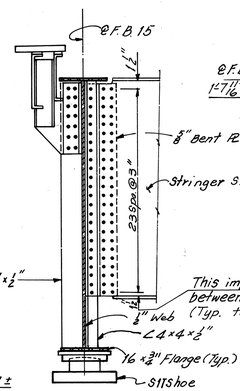


PLAN - FIXED JOINT AT PIER 1
Scale 1"=1'-0"

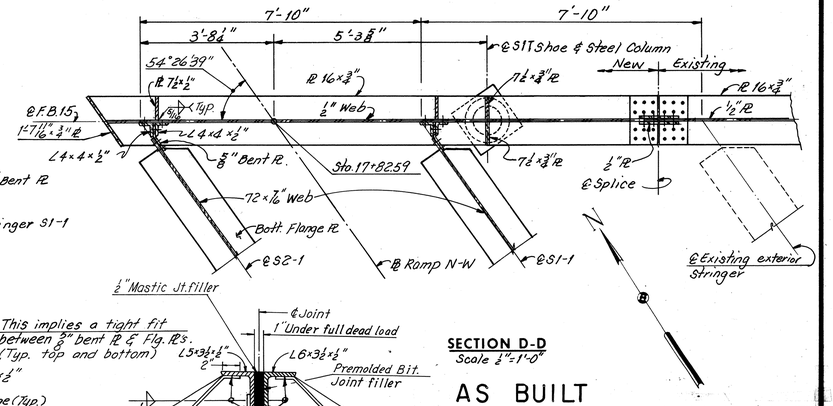
Note:
1" Joint at pier 1 is to match the existing Joint. The Contractor shall verify the location of Joint.



ELEVATION - FLOORBEAM 15
Scale 1/2"=1'-0"



SECTION E-E
Scale 1/2"=1'-0"



SECTION D-D
Scale 1/2"=1'-0"

DETAIL B
No Scale

AS BUILT

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.

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 S1T Shoe Details, see Sheet 47 Bridge 67.
All Elevations are to be verified by the Contractor.

	BY	DATE
MADE	G.C.C.	3-13-69
CHECKED	Y.C.P.	4-25-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built Unit 2" End Diaph. @ Pier 1 revised L 3 1/2 x 3 1/2 x 1/2 Support Changed to L6 x 3 1/2 x 1/2	TEM LBP	6-77 10-31-74

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

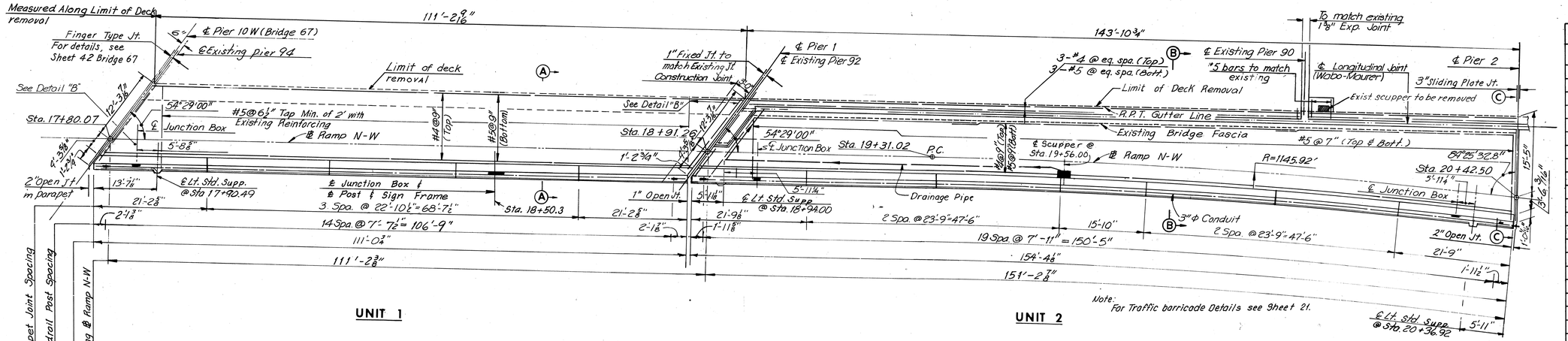
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

FRAMING DETAILS

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

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 18 OF 28

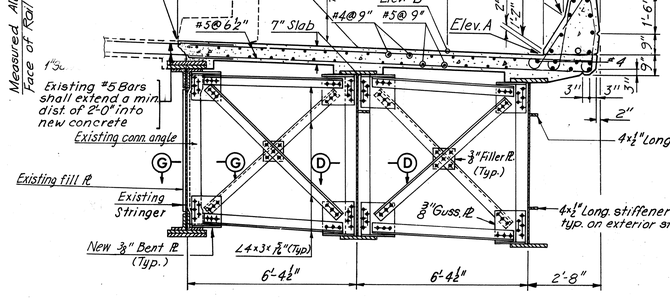
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	117	265



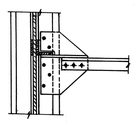
UNIT 1

UNIT 2

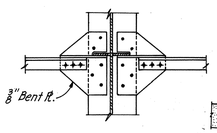
DECK PLAN
Scale: 1" = 10'-0"



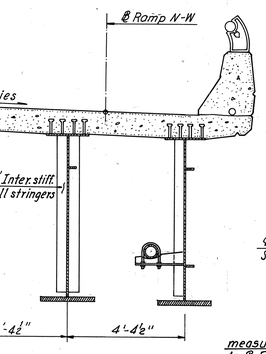
SECTION A-A
Scale: ⅜" = 1'-0"



SECTION G-G
Scale: ½" = 1'-0

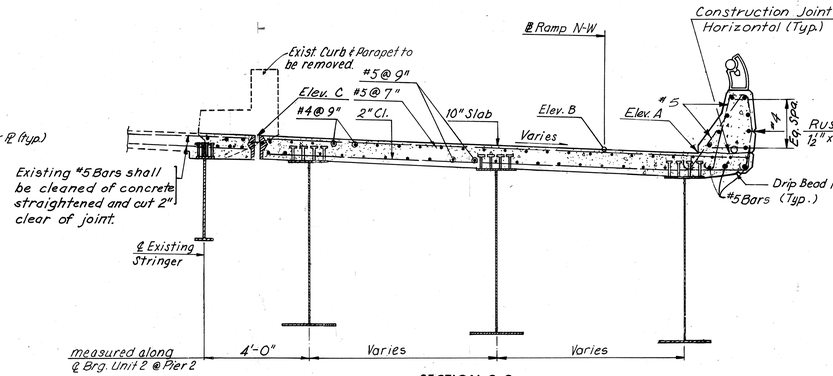


SECTION D-D
Scale: ½" = 1'-0

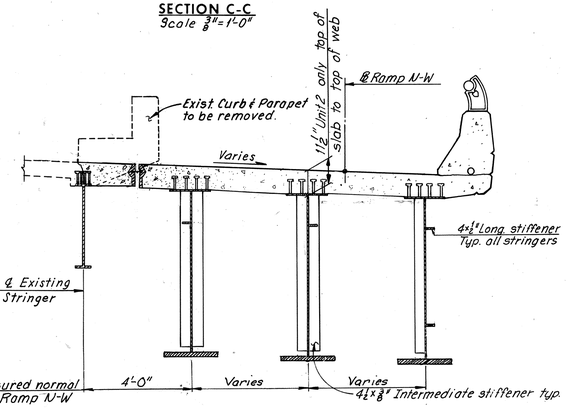


SECTION H-H
Scale: ⅜" = 1'-0"

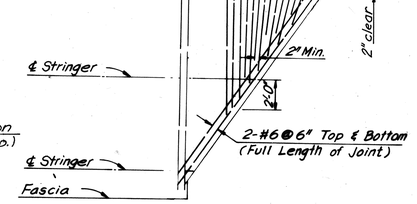
For location of Section H-H, see Sheet 12b.



SECTION C-C
Scale ⅜" = 1'-0"



SECTION B-B
Scale: ⅜" = 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+80	87.17	87.07	86.73
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	88.43	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.

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
MADE	Y.C.P	2-12-69	4	As Built	TEM	6-77
CHECKED	SCC.	4-24-69	3	Note for Table of Elevations	DWB	1-28-75
IN CHARGE			2	Chg. of Pier Angle Added Jun. Box	AEJ	1-13-75
			1	Deck Plan Sect A-A B,B,C-C,H-H, Det B	TEM	10-31-74

AS BUILT

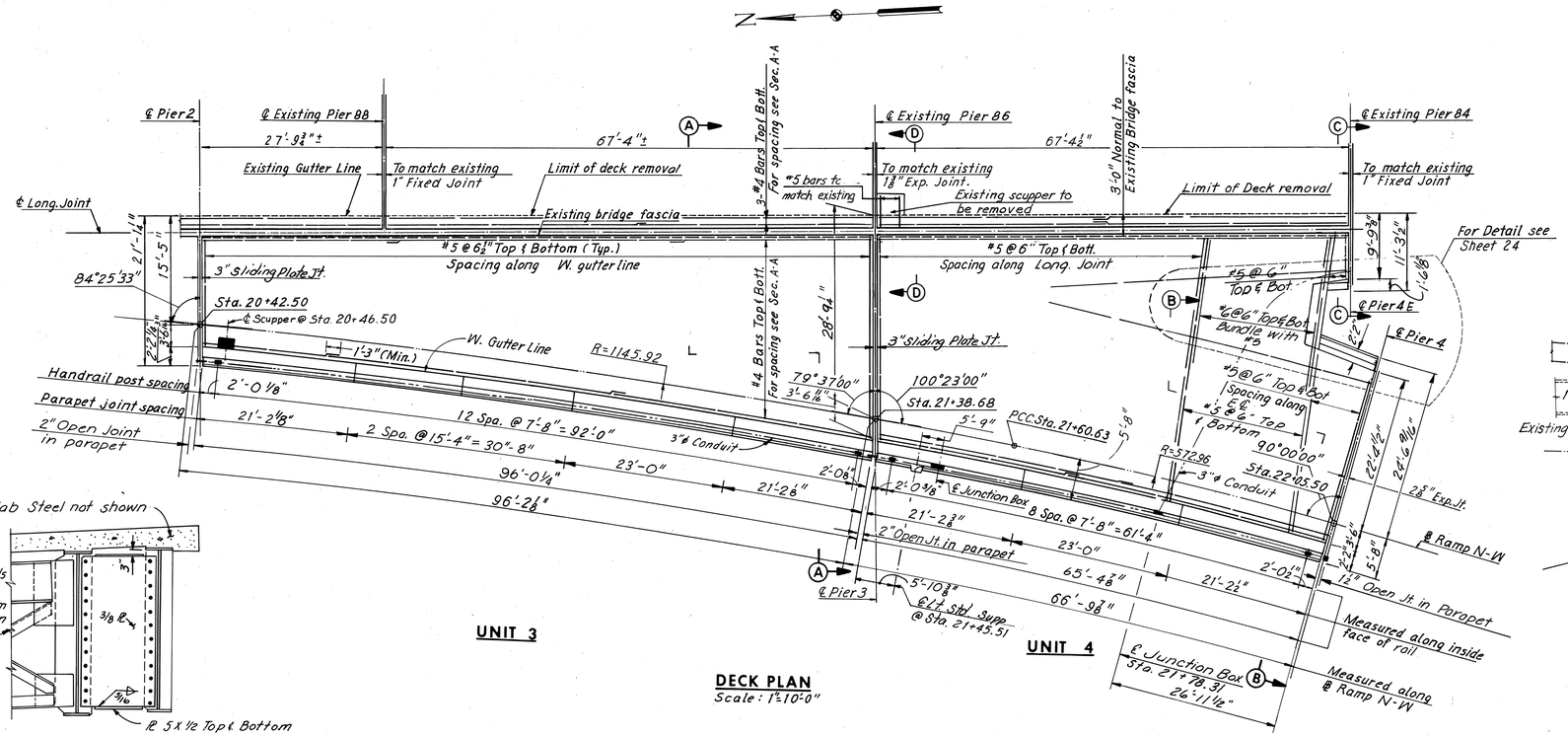
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
DECK PLAN UNITS 1 AND 2

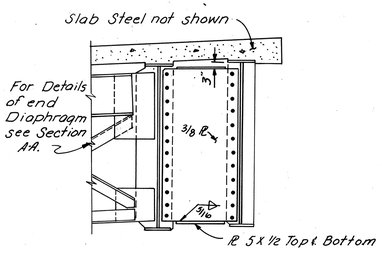
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK · ALEXANDRIA · KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 19 OF 28

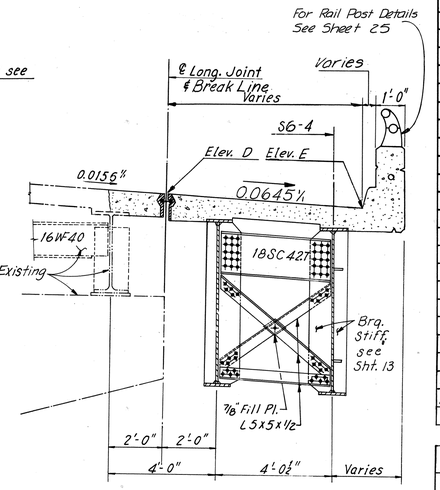
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	118	265



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



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



SECTION C-C
Scale: ⅜"=1'-0"

(For Reinforcing Steel see Section A-A Sheet 24)

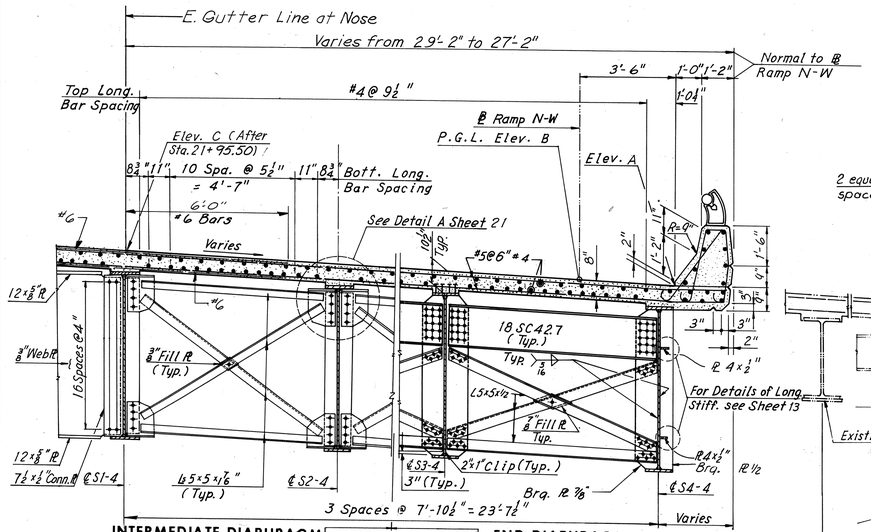
Elevations given in the Elevation Table may require adjustment in the field.

ELEVATION TABLE

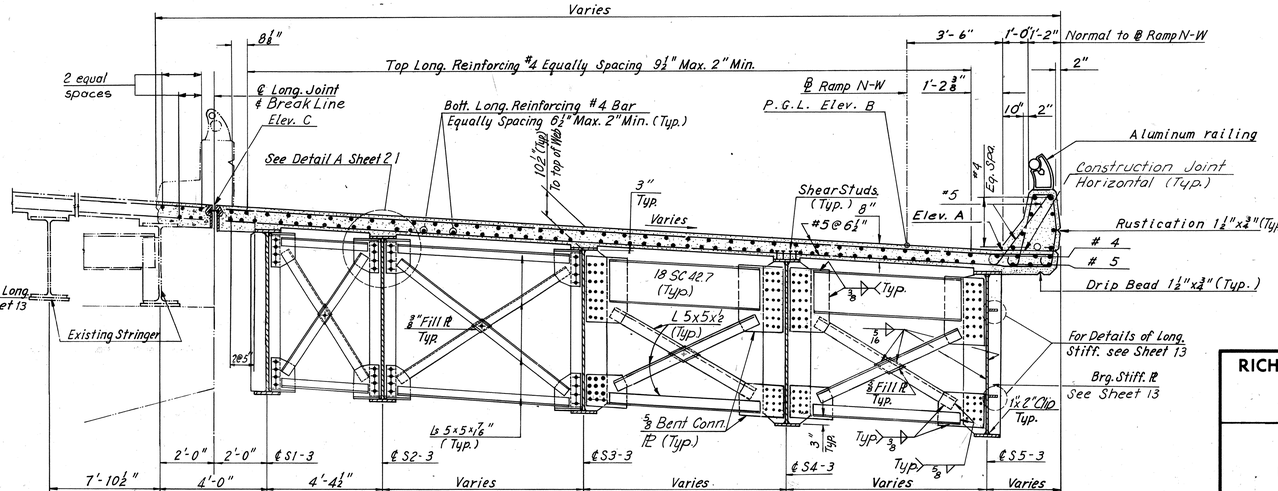
*STATION	ELEV. A	ELEV. B	ELEV. C
20+41.28	---	---	92.06
+42.50	---	91.61	---
+42.49	91.49	---	---
+50.00	91.49	91.64	92.21
+60.00	91.52	91.68	92.34
+70.00	91.54	91.72	92.52
+80.00	91.58	91.76	92.65
+90.00	91.61	91.80	92.80
21+00.00	91.64	91.84	93.00
+10.00	91.66	91.88	93.22
+20.00	91.70	91.92	93.38
+30.00	91.74	91.96	93.53
21+34.10	---	---	93.59
21+38.68	---	91.98	---
21+39.33	91.76	---	---
+40.00	91.76	91.98	93.67
+50.00	91.76	91.98	93.80
+60.00	91.73	91.95	93.92
+70.00	91.69	91.91	94.01
+80.00	91.63	91.85	94.09
+90.00	91.55	91.77	94.14
21+95.50	———	———	93.18
22+00.00	91.44	91.66	93.05
+05.50	91.39	91.60	92.91

GUTTER LINE ELEVATION

STATION	ELEV. D	ELEV. E	———
1714+22.95	94.22	93.73	———
1714+17.85	94.27	93.85	———



INTERMEDIATE DIAPHRAGM **SECTION B-B** **END DIAPHRAGM**
Scale: ⅜"=1'-0"



INTERMEDIATE DIAPHRAGM **END DIAPHRAGM**

SECTION A-A
Scale: ⅜"=1'-0"

Note:
For Standard Drainage Details for Unit 3 see Support Type 3, and for Nose see Support Type 9 (connect to existing Pier 86) Sheet S6.

Notes:
Elevation C is along W. edge of longitudinal joint before Sta. 21+60.00 and along W. Nose Gutter line after Sta. 21+60.00.
For elevation D and elevation E, see Section C-C.
For Joint Details, see Sheet 26.
For Framing Plan, see Sheet 13.
For Steel and Concrete Quantities, see Sheet 2.
For Handrail Details, see Sheet S3.
For Lighting Details, see Sheet S4.
For Superstructure details, see Sheet 24.
For Traffic Barricade Detail, see sheet 21.

* Station along ℄ Ramp N-W.

** Station along ℄ R.P.T..

	BY	DATE	NO.	REVISION	BY	DATE
MADE	K.C.T.	2-19-69	3	As Built	TEM	6-77
CHECKED	G.C.C.	4-17-69	1	Deck Elev. Table, Gutt. Line Elev. Table, Sect. A-A, Sect. B-B & Sect. CC	EJM	10-11-74
IN CHARGE			2	Note for Table of Elevations	DWB	1-28-75

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

DECK PLAN - UNITS 3 AND 4

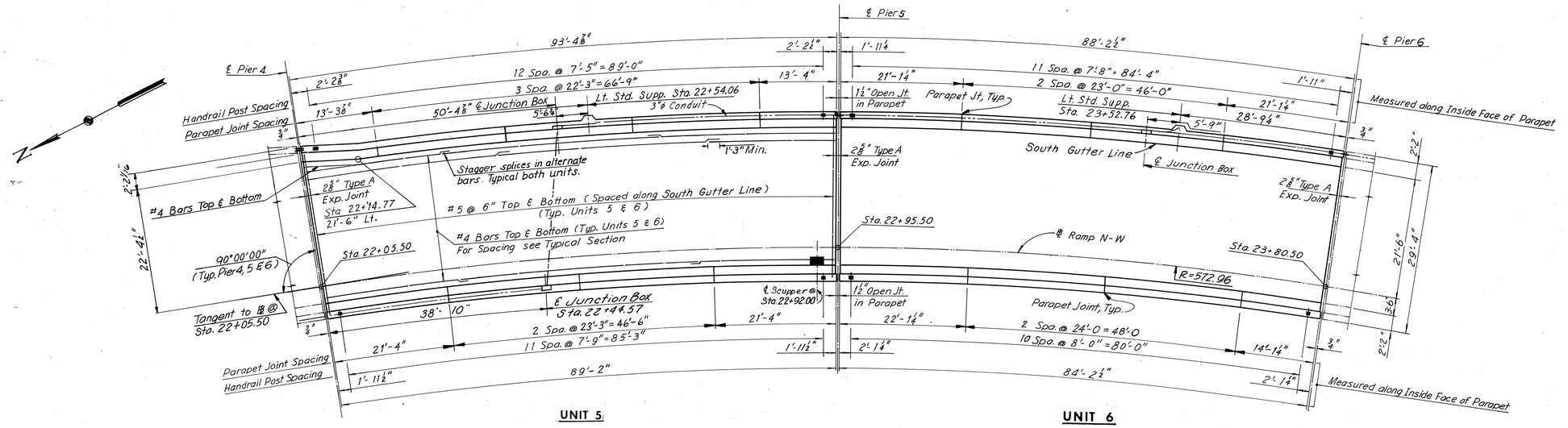
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 20 OF 28

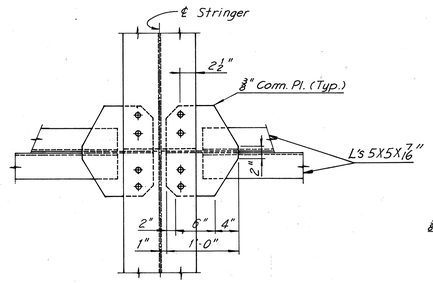
AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	119	265

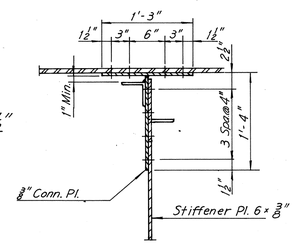
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
22+00.00	91.47	91.66	92.97
05.50	91.41	91.60	92.90
10.00	91.36	91.54	92.83
20.00	91.22	91.40	92.67
30.00	91.02	91.23	92.52
40.00	90.84	91.05	92.34
50.00	90.63	90.84	92.13
60.00	90.40	90.61	91.90
70.00	90.16	90.37	91.66
80.00	89.89	90.10	91.39
90.00	89.60	89.81	91.10
95.50	89.43	89.64	90.93
23+00.00	89.29	89.50	90.79
10.00	88.97	89.18	90.47
20.00	88.62	88.83	90.12
30.00	88.25	88.46	89.75
40.00	87.86	88.07	89.36
50.00	87.45	87.66	88.95
60.00	87.01	87.22	88.51
70.00	86.56	86.77	88.06
80.00	86.09	86.30	87.59
80.50	86.07	86.28	87.47
90.00	85.62	85.83	87.12



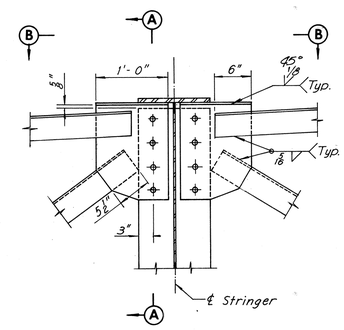
DECK PLAN
Scale: 1" = 10'-0"



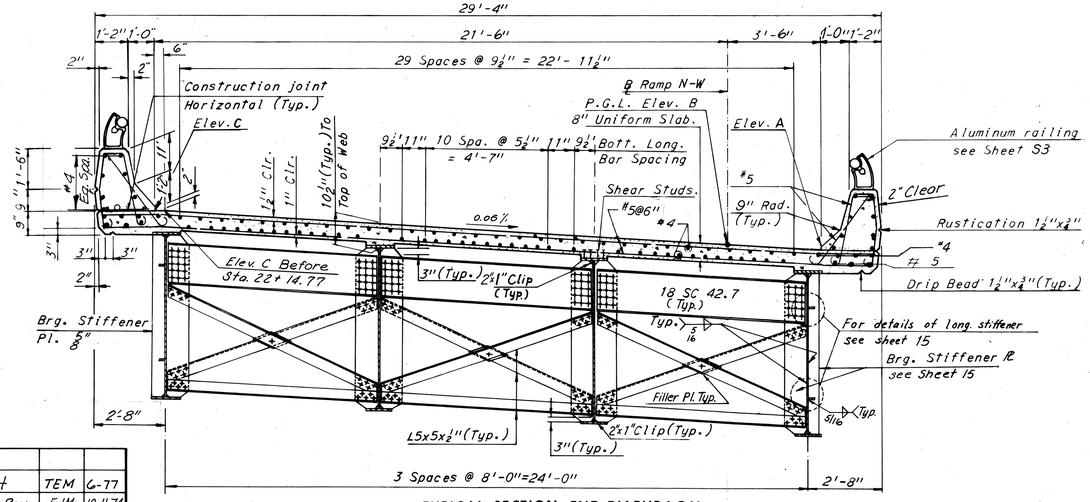
VIEW B-B
Scale: 1"=1'-0"



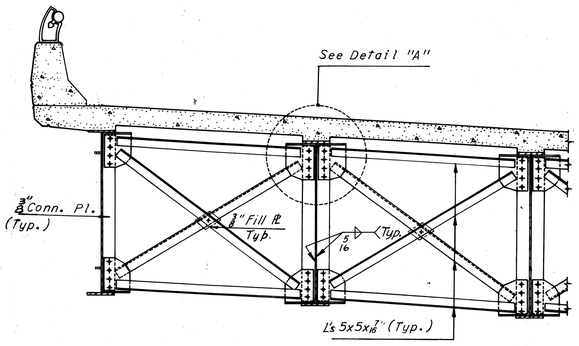
SECTION A-A
Scale: 1"=1'-0"



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



TYPICAL SECTION-END DIAPHRAGM
Scale: 3/8"=1'-0"



INTERMEDIATE DIAPHRAGM
Scale: 3/8" = 1'-0"

Notes:
For Joint Details, see Sheet 26.
For Framing Plan, see Sheet 15.
For Steel and Concrete Quantities, see Sheet 2.
For Handrail Details, see Sheet S3.
For Lighting Details, see Sheet S4.
For Standard Drainage Details, see Support Type 3 Sheet S6.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	MHH	9-4-68	2	As Built	TEM	6-77
CHECKED	R. C.	10-17-68	1	Deck Elev. Rev.	EJM	10-11-74
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

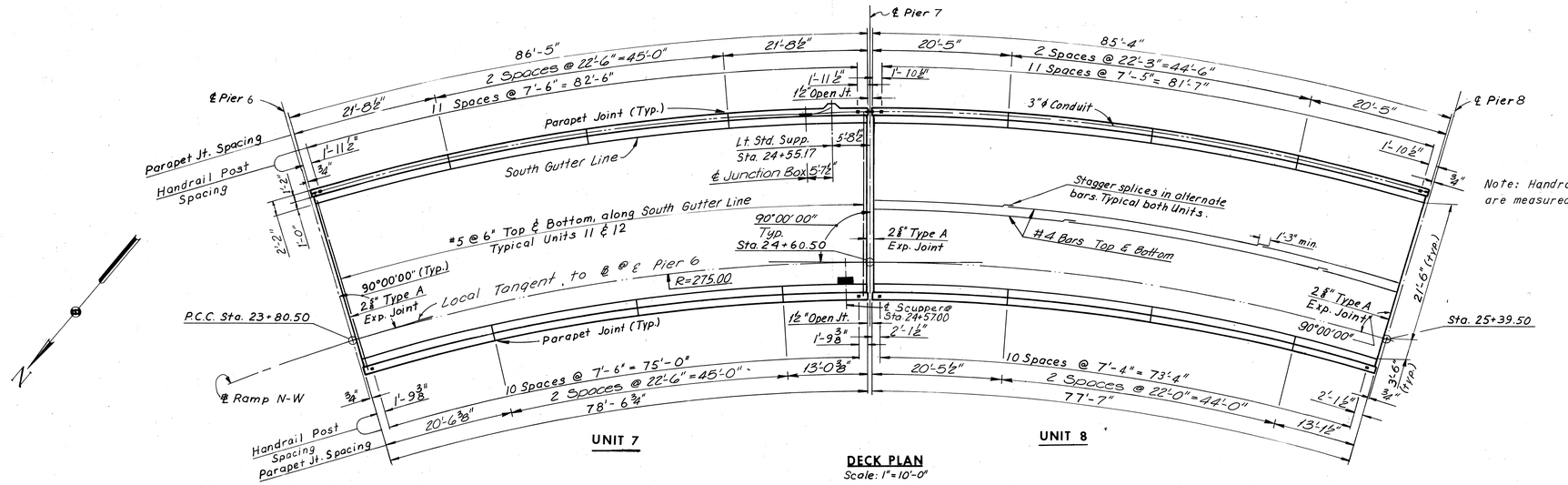
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
DECK PLAN-UNITS 5 AND 6

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

SCALE: As shown
CONTRACT NO.: 10
SHEET NO. 21 OF 28

AS BUILT

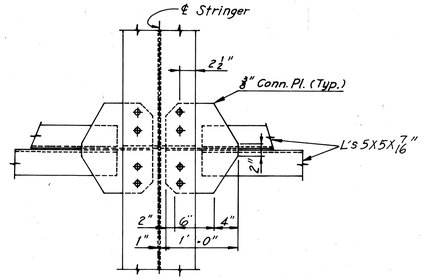
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	120	265



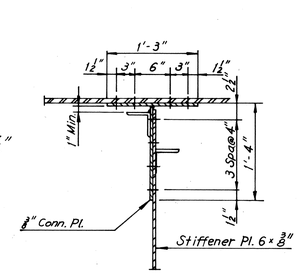
DECK PLAN
Scale: 1"=10'-0"

Note: Handrail and Parapet Joint Spacings are measured along inside face of parapet.

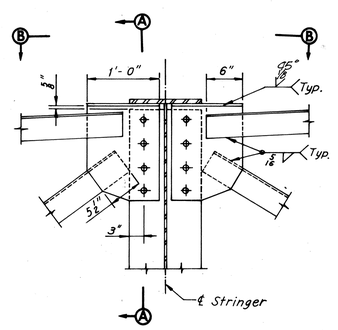
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
23+80.00	86.09	86.30	87.59
+80.50	86.07	86.28	87.57
+90.00	85.62	85.83	87.12
24+00.00	85.15	85.36	86.65
+10.00	84.68	84.89	86.18
+20.00	84.21	84.42	85.71
+30.00	83.73	83.94	85.23
+40.00	83.26	83.47	84.76
+50.00	82.79	83.00	84.29
+60.00	82.32	82.53	83.82
+60.50	82.29	82.50	83.79
+70.00	81.85	82.06	83.35
+80.00	81.37	81.58	82.87
+90.00	80.90	81.11	82.40
25+00.00	80.43	80.64	81.93
+10.00	79.96	80.17	81.46
+20.00	79.49	79.70	80.99
+30.00	79.01	79.22	80.51
+39.50	78.57	78.78	80.07
+40.00	78.54	78.75	80.04



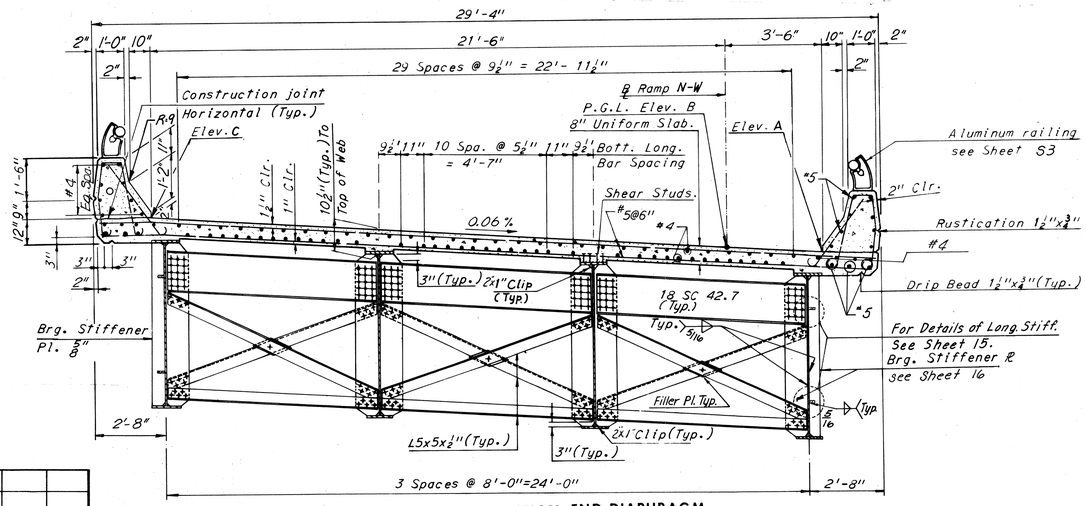
VIEW B-B
Scale: 1"=1'-0"



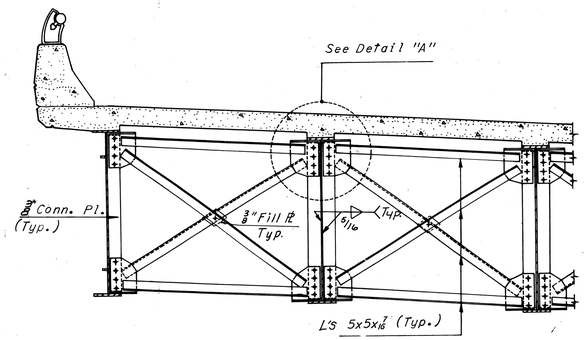
SECTION A-A
Scale: 1"=1'-0"



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



TYPICAL SECTION-END DIAPHRAGM
Scale: ⅜"=1'-0"



INTERMEDIATE DIAPHRAGM
Scale: ⅜"=1'-0"

Notes:
For Joint Details, see Sheet 26.
For Framing Plan, see Sheet 16.
For Steel and Concrete Quantities, see Sheet 2.
For Handrail Details, see Sheet S3.
For Lighting Details, see Sheet S4.
For Standard Drainage Details, see Support Type 3 Sheet S6.

	BY	DATE				
MADE	J.D.	8-20-68				
CHECKED	R.C.	10-17-68	1	As Built	TEM	6-77
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
DECK PLAN UNITS 7 AND 8

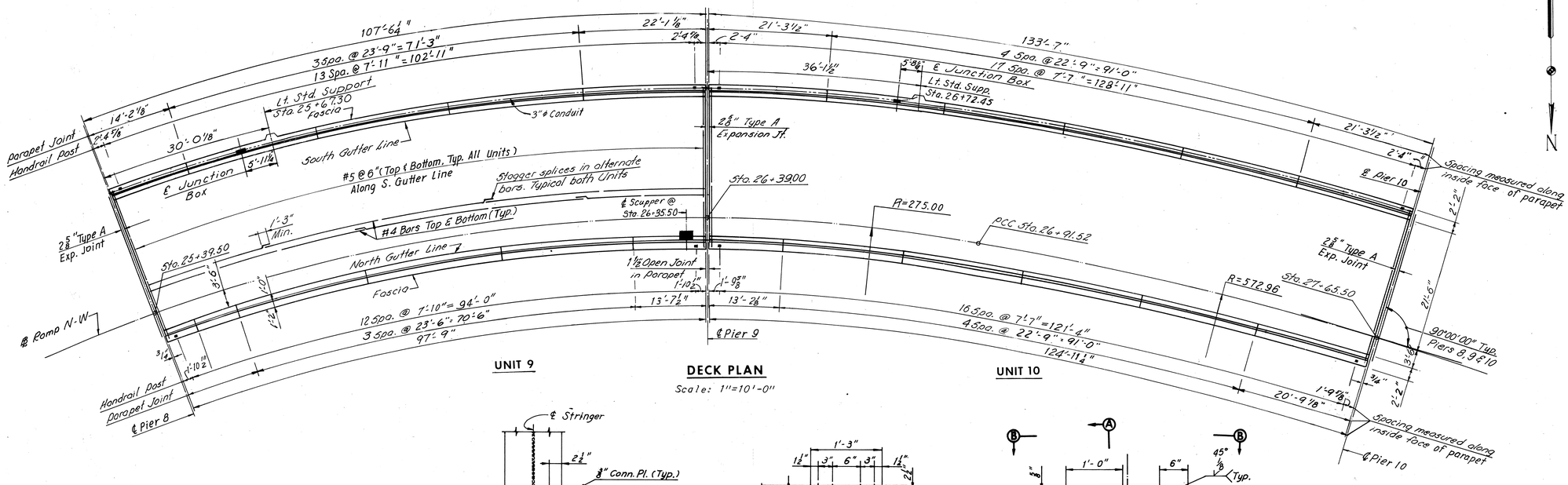
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

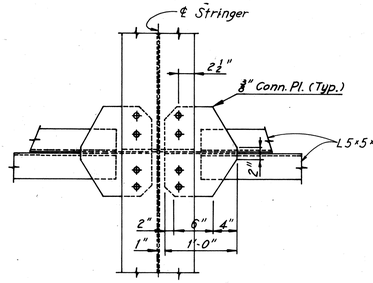
SCALE: As shown
CONTRACT NO. 10
SHEET NO. 22 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	121	265

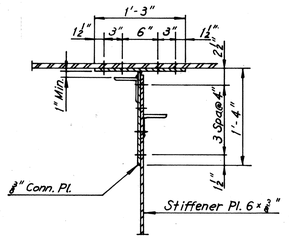
ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
25+30.00	79.01	79.22	80.51
25+39.50	78.57	78.78	80.07
25+40.00	78.54	78.75	80.04
25+50.00	78.07	78.28	79.57
25+60.00	77.60	77.81	79.10
25+70.00	77.13	77.34	78.63
25+80.00	76.65	76.86	78.15
25+90.00	76.18	76.39	77.68
26+00.00	75.71	75.92	77.21
26+10.00	75.24	75.45	76.74
26+20.00	74.77	74.98	76.27
26+30.00	74.29	74.50	75.79
26+39.00	73.87	**74.08**	**75.37**
26+40.00	**73.82**	**74.03**	**75.32**
26+50.00	73.35	73.56	74.85
26+60.00	72.89	73.10	74.39
26+70.00	72.46	72.67	73.96
26+80.00	72.06	72.27	73.56
26+90.00	71.68	71.89	73.18
27+00.00	71.33'	71.54	72.83
27+10.00	71.02'	71.22	72.43
27+20.00	70.75	70.93	72.05
27+30.00	70.49	70.66	71.69
27+40.00	70.27	70.42	71.37
27+50.00	70.07	70.21	71.07
27+60.00	69.90	70.03	70.40
27+65.50	69.82	69.94	70.67
27+70.00	69.76	69.87	70.56

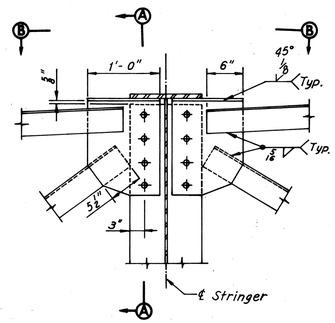




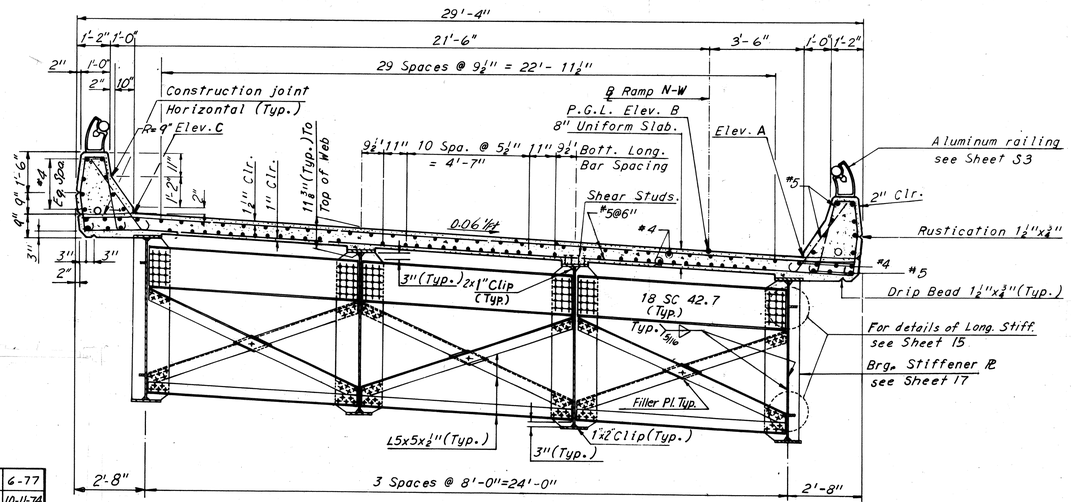
VIEW B-B
Scale: 1"=1'-0"



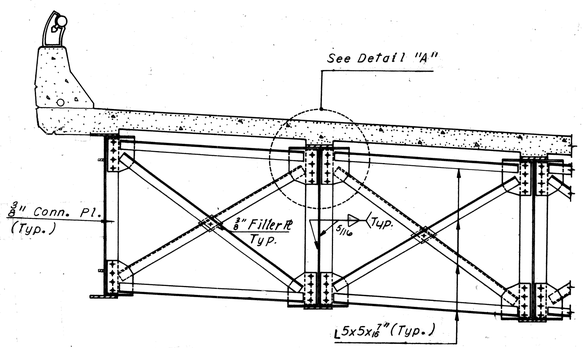
SECTION A-A
Scale: 1"=1'-0"



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



TYPICAL SECTION—END DIAPHRAGM
Scale: ⅜"=1'-0"



INTERMEDIATE DIAPHRAGM
Scale: ⅜"=1'-0"

Notes:
For Joint Details, see Sheet 26.
For Framing Plan, see Sheet 17.
For Steel and Concrete Quantities, see Sheet 2.
For Handrail Details, see Sheet S3.
For Lighting Details, see Sheet S4.
For Standard Drainage Details, see Support Type 3 Sheet S6.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	HJC	8-13-68	2	As Built	TEM	6-77
CHECKED	G.C.C.	4-1869	1	Changed Deck Elev.	EJM	10-11-74
IN CHARGE			1	Revised Fascia to Stringer Dimension	TEM	10-11-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

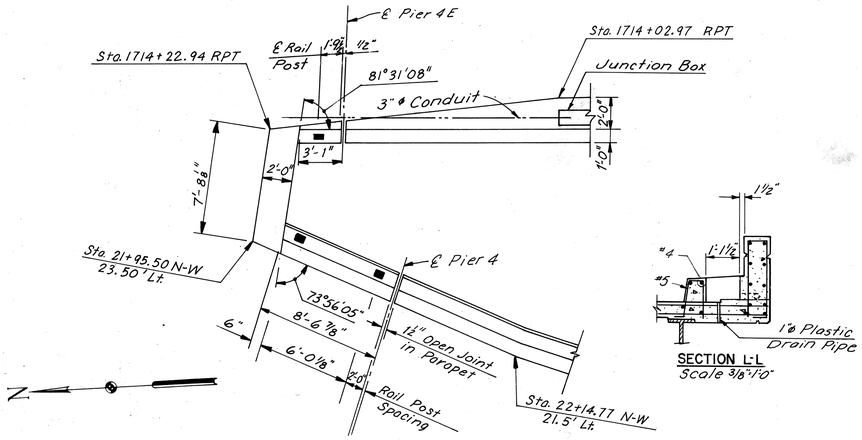
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

DECK PLAN - UNITS 9 AND 10

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

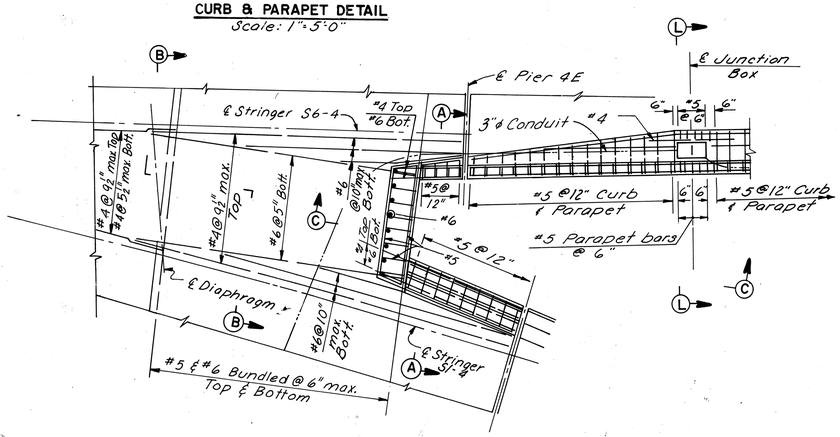
SCALE: As shown
CONTRACT NO.: 10
SHEET NO. 23 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	122	265

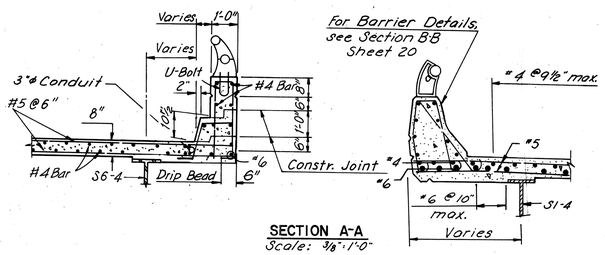


SECTION L-L
Scale 3/8"=1'-0"

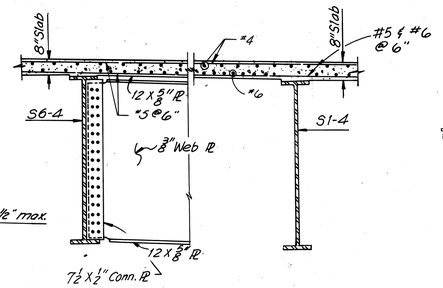
CURB & PARAPET DETAIL
Scale: 1"=5'-0"



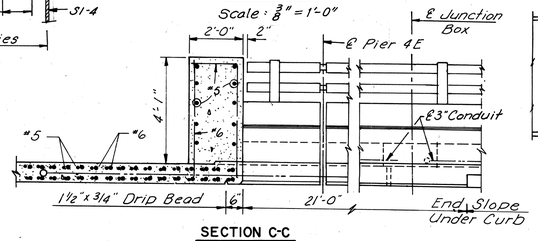
NOSE AND SLAB DETAIL
Scale: 1"=5'-0"



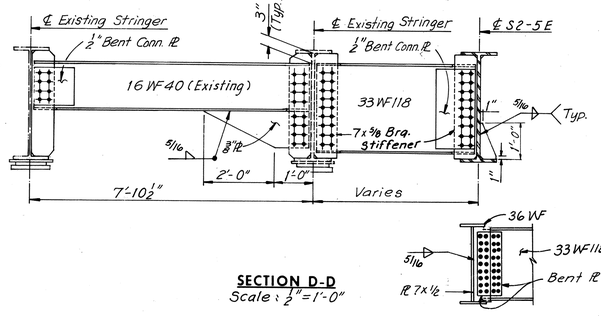
SECTION A-A
Scale: 3/8"=1'-0"



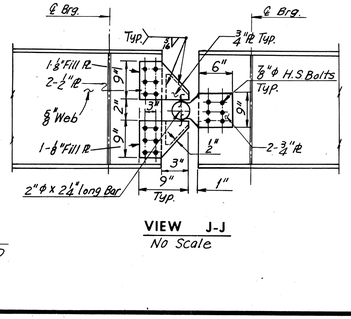
SECTION B-B
Scale: ⅜"=1'-0"



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

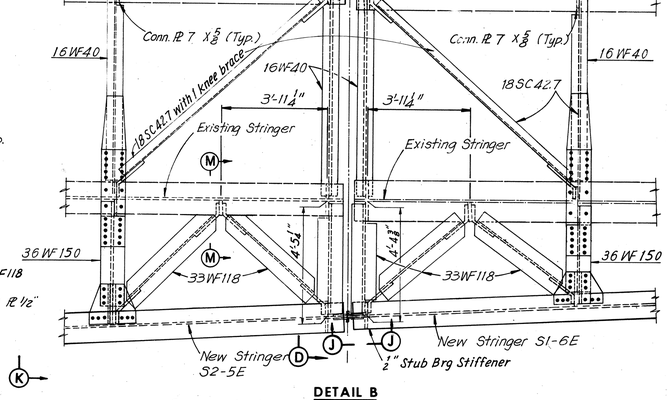


SECTION D-D
Scale: ½"=1'-0"

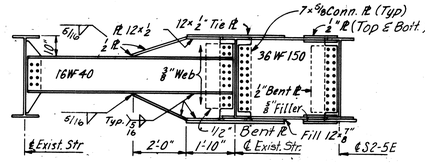


VIEW J-J
No Scale

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



DETAIL B
Scale: ⅜"=1'-0"



SECTION K-K
Scale: ⅜"=1'-0"

	BY	DATE				
MADE	SCC K.C.T.	2.28.69 3.24.69	2	As Built	TEM	6-77
CHECKED	G.C.C.	4-2169	⚠	Unit 2 Details Deleted	TEM	10-74
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

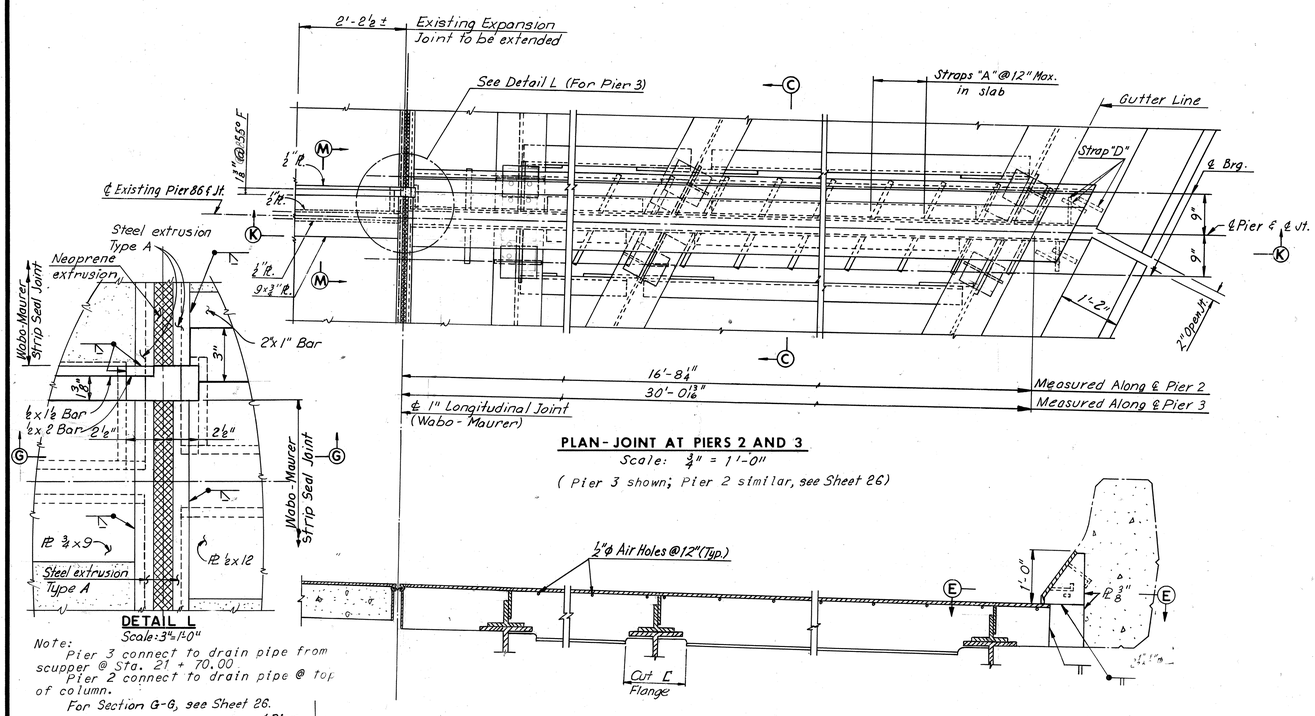
BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

SUPERSTRUCTURE DETAILS

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

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 24 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	123	265

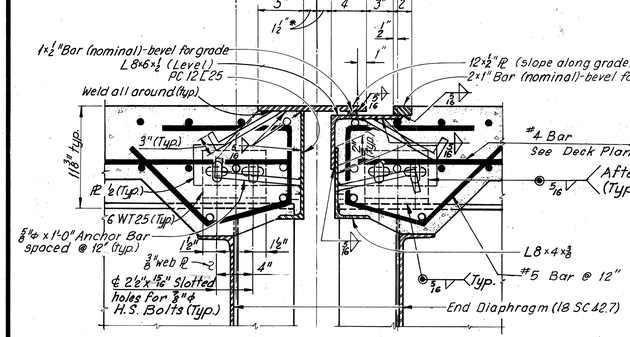


PLAN - JOINT AT PIERS 2 AND 3
Scale: ¾" = 1'-0"
(Pier 3 shown; Pier 2 similar, see Sheet 26)

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.

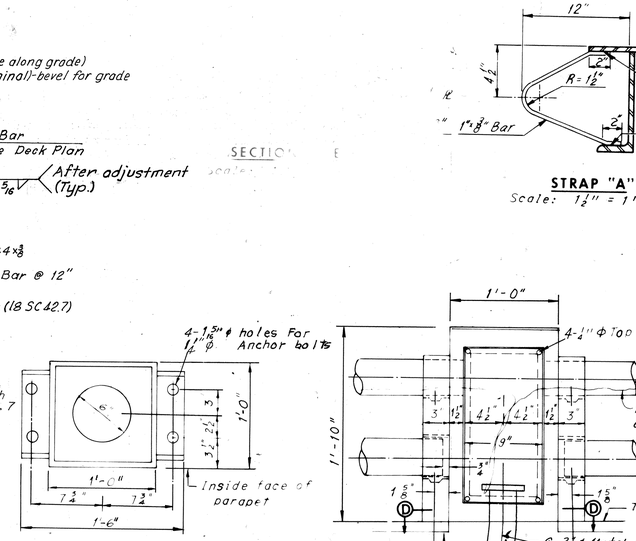
SECTION K-K
Scale: ¾" = 1'-0"



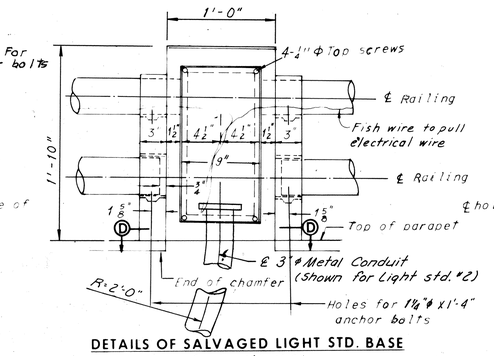
SECTION C-C
Scale: 1½"=1'-0"

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 ℄ and a 4½"x⅝" Fl. ℄ instead of 18SC42.7 as shown above

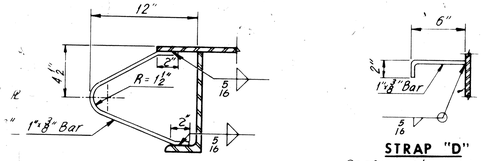
LEGEND
- ● Denotes transverse #5 Bar spaced as shown on Sheets 19 and 20.
- ○ Denotes transverse #6 Bar between stringers.
- ✱ Denotes dimension shown @ 60°F.



SECTION D-D
Scale: 1½"=1'-0"

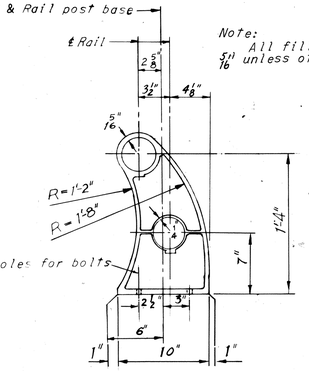


DETAILS OF SALVAGED LIGHT STD. BASE
Scale: 1½"=1'-0"



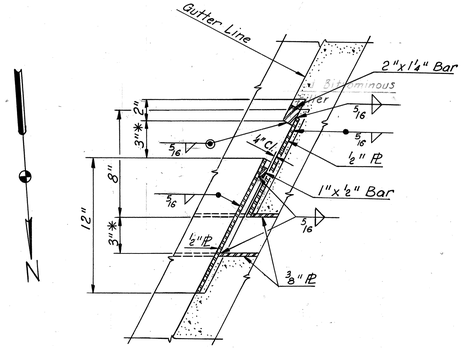
STRAP "A"
Scale: 1½" = 1'-0"

STRAP "D"
Scale: 1½" = 1'-0"

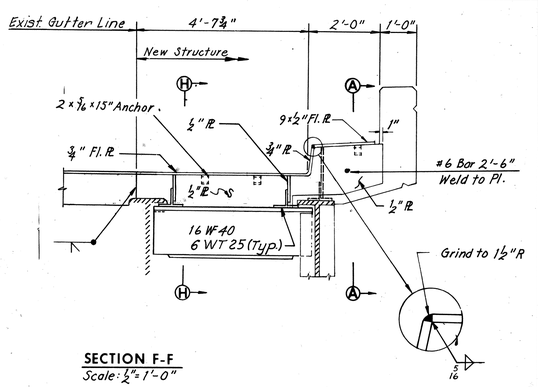


SALVAGED RAIL POST
Scale: 1½"=1'-0"

Note:
All fillet welds shall be 5/16" unless other wise noted.

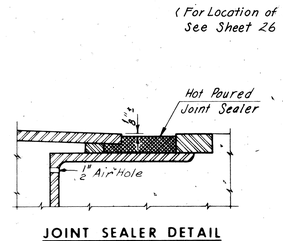


SECTION E-E
Scale: ½"=1'-0"



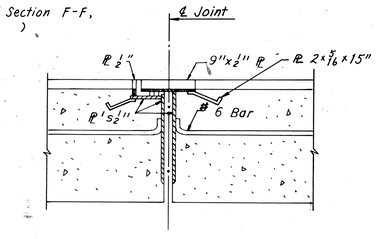
SECTION F-F
Scale: ½"=1'-0"

(For Location of Section F-F, See Sheet 26)

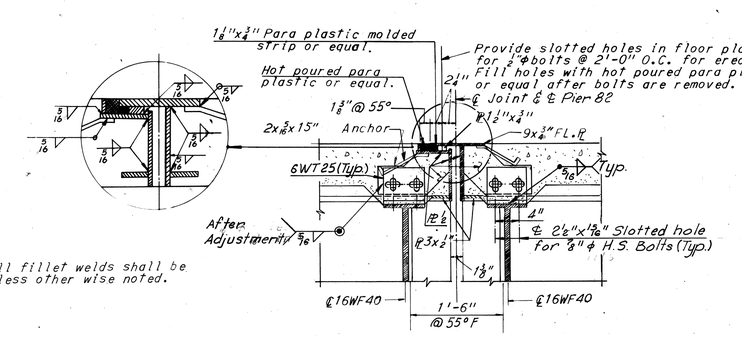


JOINT SEALER DETAIL
Scale: 3" = 1'-0"

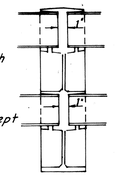
Note:
Throughly clean joint and fill with Hot Poured Joint Sealer. Trowel into curb joint.



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



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



TYPICAL JOINT
No Scale

Hand tighten north set screws at joint

Provide joint at every other post except end post.

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	Sect. G-G & Det. A moved to Sh. 26. Long. Jt. changed to Wabo-Maurer. Sld'g. PL at Supports changed to 6 WT 25.	NLB	10-31-74
CHECKED	C.C.C.	4-21-69				
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 64
RAMP N-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

JOINT DETAILS

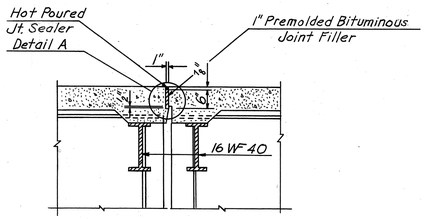
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO: 10
SHEET NO. 25 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	124	265

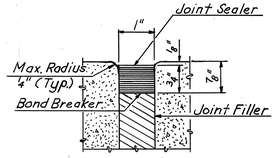
NOTES FOR FILLED JOINTS:

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.

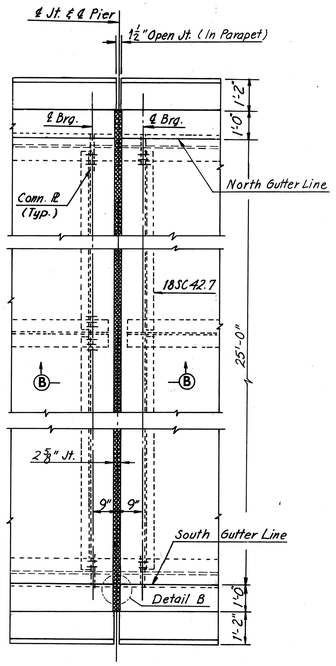


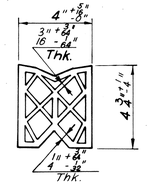
TYPICAL SECTION THRU 1" FIXED JOINT
Scale: 1½"=1'-0"

Note:
Joint filler material and copper flashing to be included in price bid for Superstr. Concrete

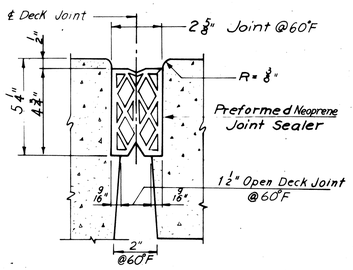


DETAIL A
No Scale



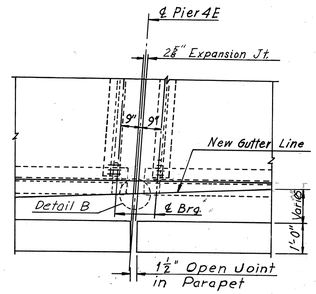


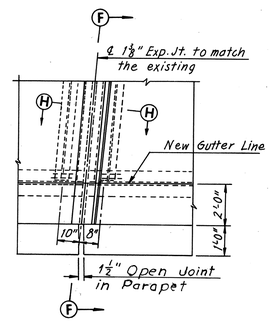
PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT

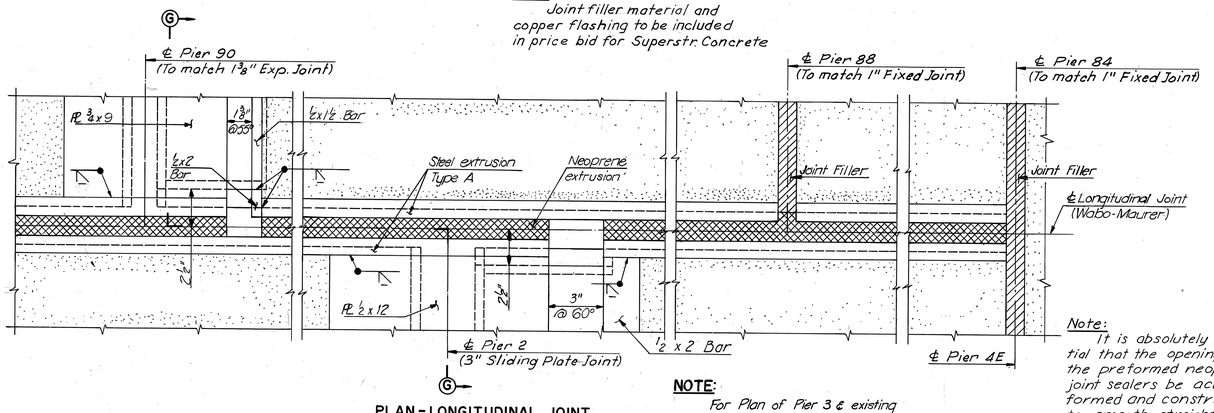


2⅝" TYPE "A" JOINT

EXPANSION JOINT DETAILS







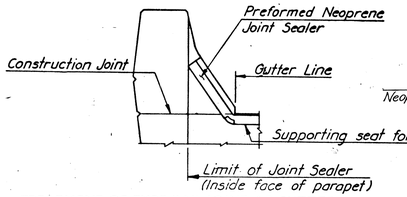
PLAN - LONGITUDINAL JOINT
Scale: 3"=1'-0"

NOTE:
For Plan of Pier 3 & existing Pier 86, see Sheet 25.

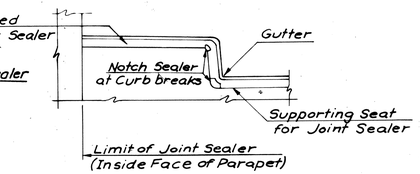
Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature at the time of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

PLAN - JOINT AT PIERS 4,5,6,7,8 AND 9
Scale: ⅜" = 1'-0"

PLAN - JOINT AT PIER 4E
Scale: ⅜" = 1'-0"



TREATMENT OF TYPE "A" JOINT AT GUTTER
PIERS 4,5,6,7,8 AND 9
No Scale



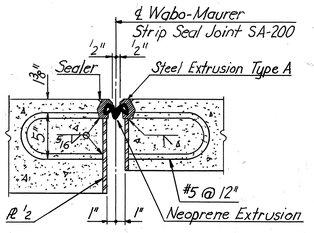
TREATMENT OF TYPE "A" JOINT AT CURB
PIER 4E
No Scale

PLAN - JOINT AT EXISTING PIER 82
Scale: ⅜" = 1'-0"
(For Section F-F & Section H-H, See Sheet 25)

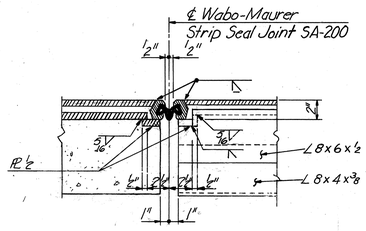
NOTES FOR WABO-MAURER JOINT:

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.

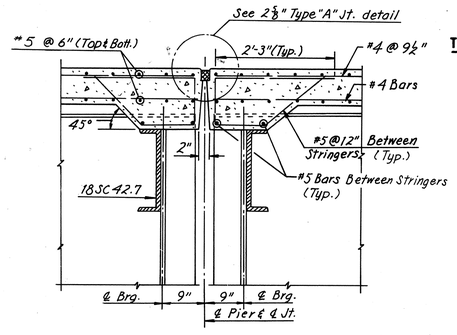


TYPICAL SECTION THRU WABO-MAURER JOINT
Scale: 1½"=1'-0"

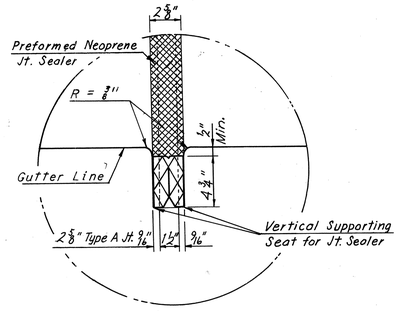


SECTION G-G
Scale: 1½"=1'-0"

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"



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. E-E Add.	TEM E.J.M.	G-77 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

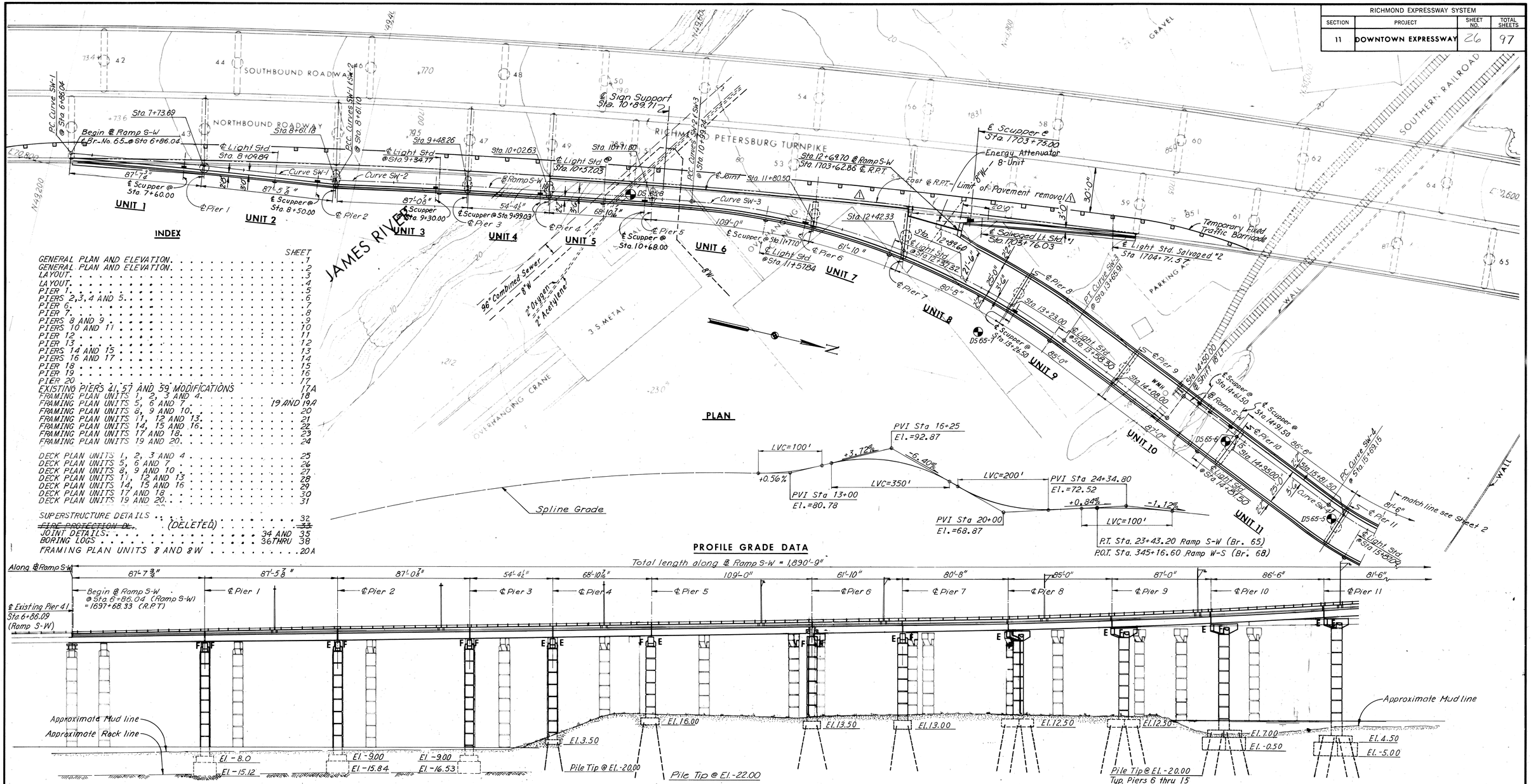
SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 26 OF 28

Bridge 65

(Ramp from Northbound I-95 to Westbound Downtown Expressway “Rte. 195” over NS RR and CSX RR)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	26	97



INDEX

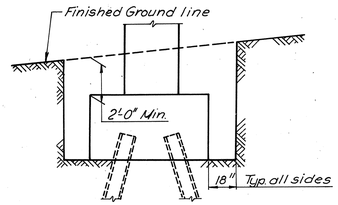
PROFILE GRADE DATA

Total length along ℄ Ramp S-W = 1,890'-9"

ELEVATION

Notes:
For General Plan and Elevation Units 12 thru 20 see Sheet 2.
For Layout of Ramp S-W, see Sheets 3 and 4.
For Estimated Quantities, see Sheet 4.
For Boring Logs, see Sheets 36 thru 38.
For General Notes, see Sheet 4.

Substructure Note: Footings for Piers 1, 2 and 3 shall be founded on concrete seals socketed 1'-0" into solid rock.



LIMITS OF STRUCTURE EXCAVATION

no scale

NO.	REVISION	BY	DATE
2	Sheet 20a Added	TEM	9-9-75
1	Profile Ramp W-S	TEM	9-8-75
	Limit of pavement removal & Sheet 17A added	G.B.P.	8-25-75

	BY	DATE
MADE	J.V. JLK	4-28-69 6-25-75
CHECKED	V.C.P. D.W.B	5-28-69 7-7-75
IN CHARGE		

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

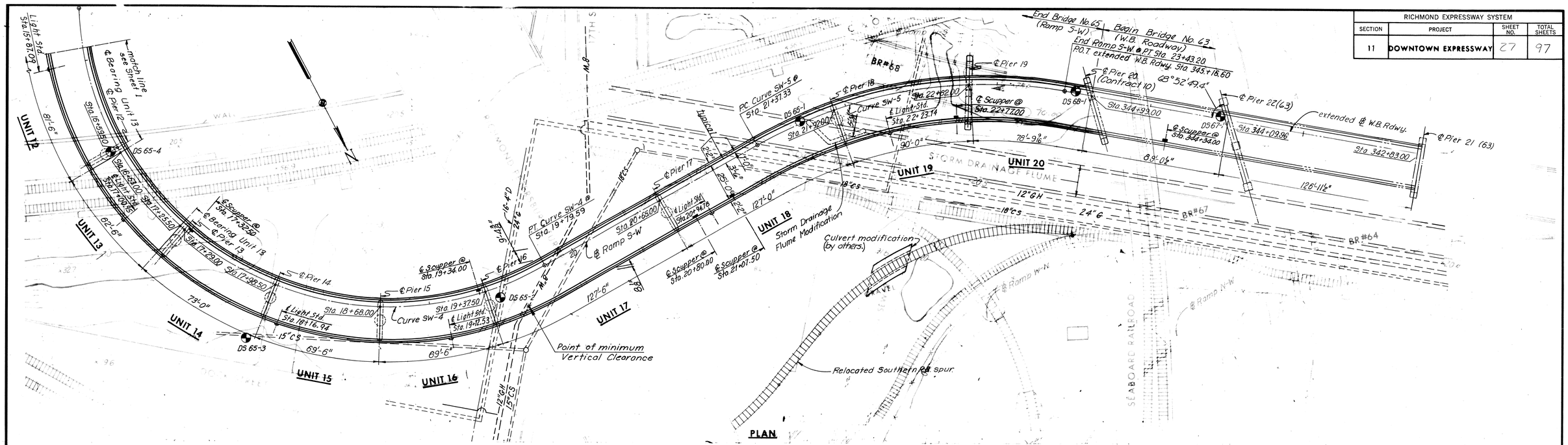
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

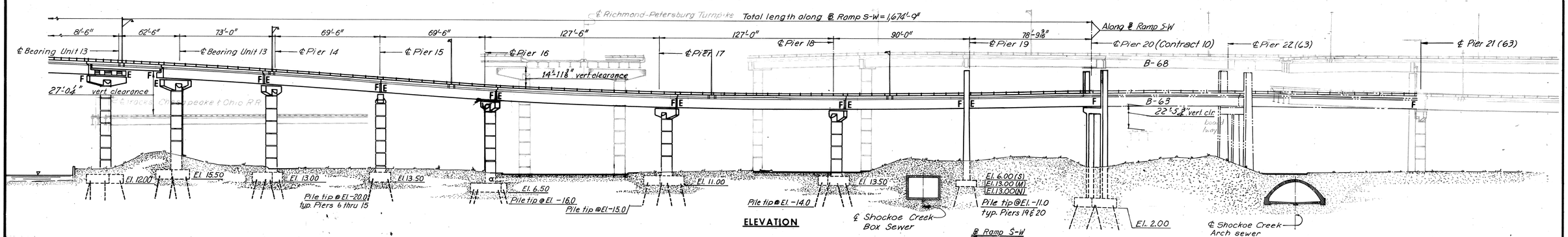
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'-0"
CONTRACT NO. 11
SHEET NO. 1 OF 38

26

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	27	97





ELEVATION

HORIZONTAL CURVE DATA

℄ Ramp S-W

Curve: SW-1
P.I. = Sta. 7+73.58
Δ = 1°45'02"
D = 1°00'
T = 87.53'
L = 175.05'
R = 5,729.58'

Curve: SW-2
P.I. = Sta. 9+80.19
Δ = 2°24'12"
D = 1°00'33"
T = 119.09'
L = 238.14'
R = 5,677.58'

Curve: SW-3
P.I. = Sta. 12+36.15
Δ = 32°00'00"
D = 12°00'
T = 136'91'
L = 266.67'
R = 477.47'

Curve: SW-4
P.I. = Sta. 18+95.05
Δ = 116°25'03"
D = 28°27'51"
T = 325.90'
L = 410.44'
R = 202.00'

Curve: SW-5
P.I. = Sta. 22+44.51
Δ = 39°19'04"
D = 19°05'55"
T = 107.17'
L = 205.87'
R = 300.00'

℄ Richmond-Petersburg Turnpike

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'

Notes:
For General Plan and Elevation Units 1 thru 11, see Sheet 1.
For Layout of Ramp S-W, see Sheets 3 and 4.
For Estimated Quantities, see Sheet 4.
For Boring Logs, see Sheets 34 thru 38.
For General Notes, see Sheet 4.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.V.	4-2-69				
CHECKED	Y.C.P.	5-28-69				
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

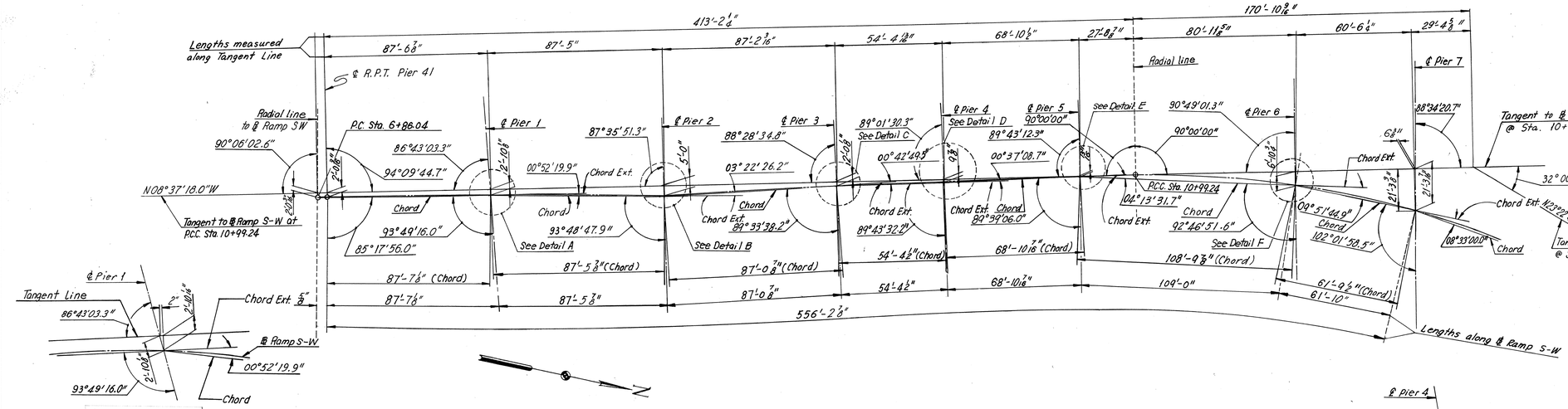
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

GENERAL PLAN AND ELEVATION

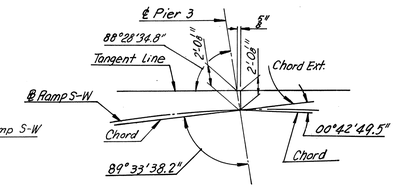
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'-0"
CONTRACT NO. 11
SHEET NO. 2 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	28	97



DETAIL A
No Scale



DETAIL C
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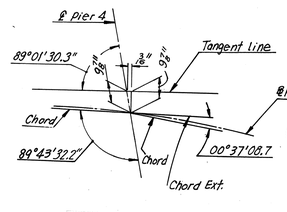

DETAIL D
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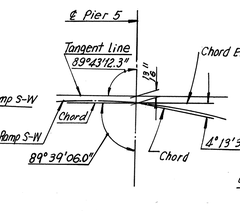

DETAIL E
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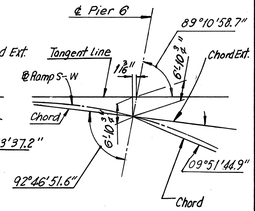

DETAIL F
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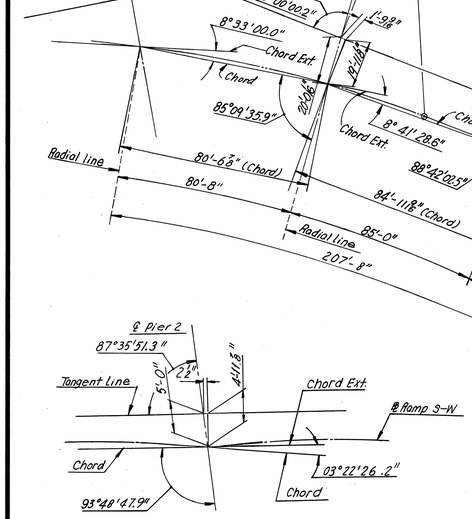
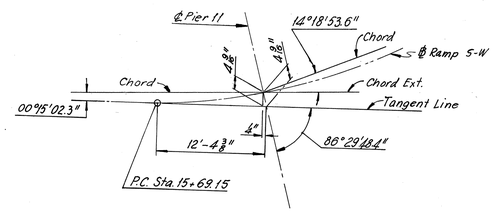


LAYOUT PLAN
Scale : 1"= 30'-0"

DETAIL B
No Scale



DETAIL H
No Scale

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM
RICHMOND-PETERSBURG TURNPIKE

LAYOUT

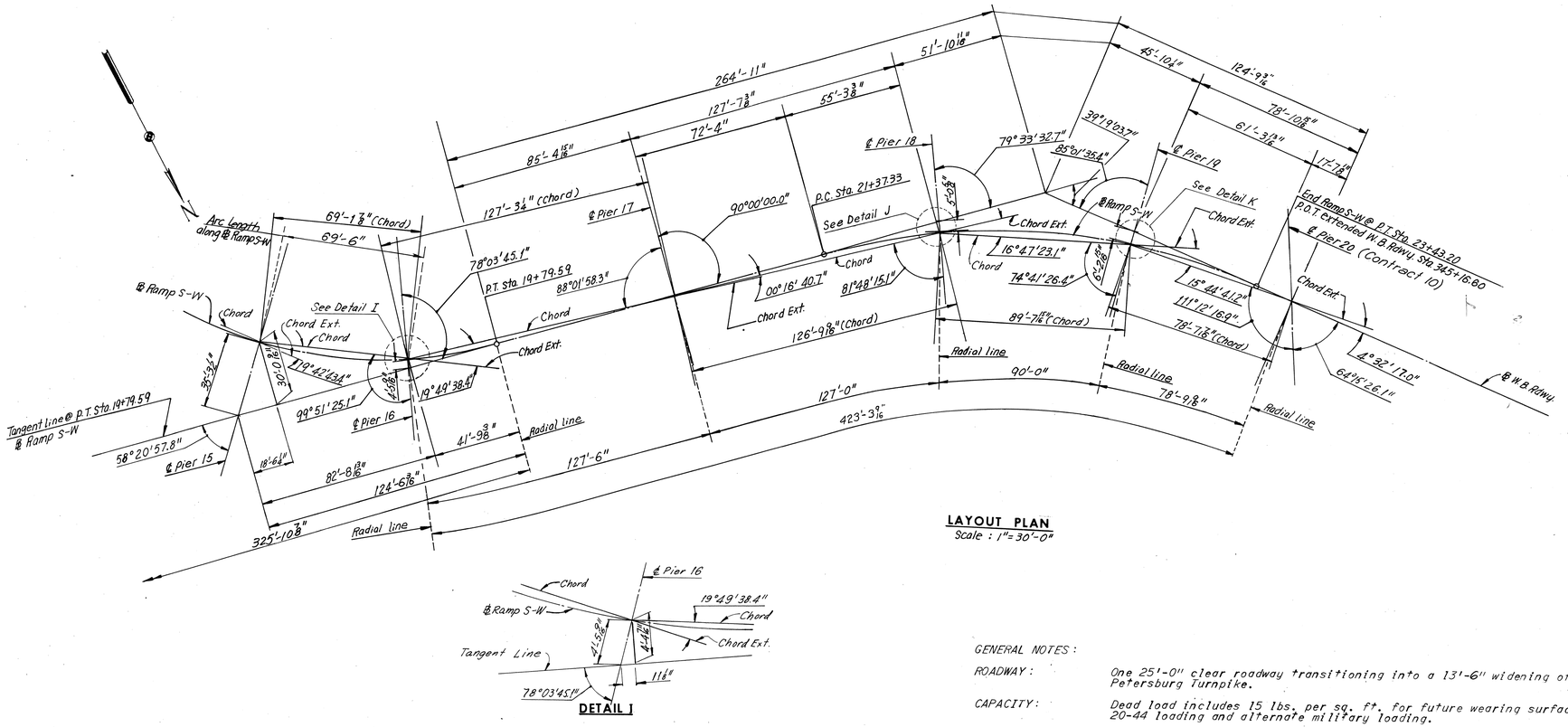
	BY	DATE
MADE	G.S.H.	3-28-69 & 4-23-75
CHECKED	K.C.T. Dwg.	5-7-69 7-7-75
IN CHARGE		

NO.	REVISION	BY	DATE

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

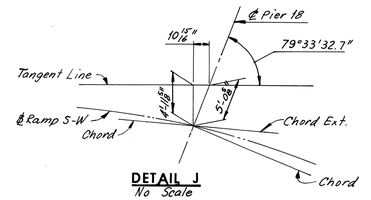
SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 3 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	29	97



LAYOUT PLAN
Scale : 1"=30'-0"

DETAIL I



DETAIL J
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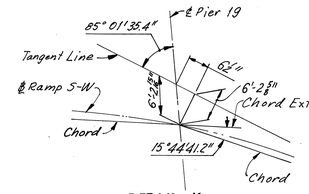


DETAIL K
No Scale

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.	Steel Piles 12BP53 Lin. Ft.
Superstructure	---	1454.8	340,730	1,074,600	476,400	2,820	---	---
Substructure	2,741 *	2,702.8	386,910	15,100	12,000	---	1,152	7,497
Total	2,741 *	4157.6 ‡	727,640	1,089,700	488,400	2,820	1,152	7,497

	Temporary Barricade Lin. Ft.	Tremie Concrete Class T3 Cu. Yds.	Metal Conduit Lin. Ft.	Energy Attenuator 8-Unit Each	Modifications to R.P. Turnpike Bridge Lump Sum	Bridge Drainage Metal Work Lbs.	Modifications to Storm Drain. Flume Cu. Yds.	Pipe Support @ Pier 16 Lump Sum
Superstructure		---	1800	1	1	19,960	---	---
Substructure		472.6	---	---	---	---	48	1
Total	840	472.6	1800	1	1	19,960	48	1

* Including 757 Cu. Yds. of "Underwater" Excavation for Piers 1, 2, 3, 10 and 11.

‡ All Concrete for Superstructure shall be Class A4 and for Substructure Class A3. Concrete for footing seals shall be Tremie Concrete Class T3 and is listed separately.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.S.H	3-28-69	3	Layout Dim. and ℄ at Pier 16	TEM	7-76
CHECKED	K.C.T.	5-7-69	2	Concrete & Strug. Steel Quan.	TEM	8-75
IN CHARGE			1	Conc. & Reinf. Quant.	TEM	9-7-76

GENERAL NOTES :

ROADWAY : One 25'-0" clear roadway transitioning into a 13'-6" widening of existing Richmond-Petersburg Turnpike.

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: Concrete in superstructure shall be Class A4. All other concrete shall be Class A3 except that footing seals shall be Tremie Concrete Class T3 as indicated on the detailed drawings. All exposed edges and corners shall have a 2" 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

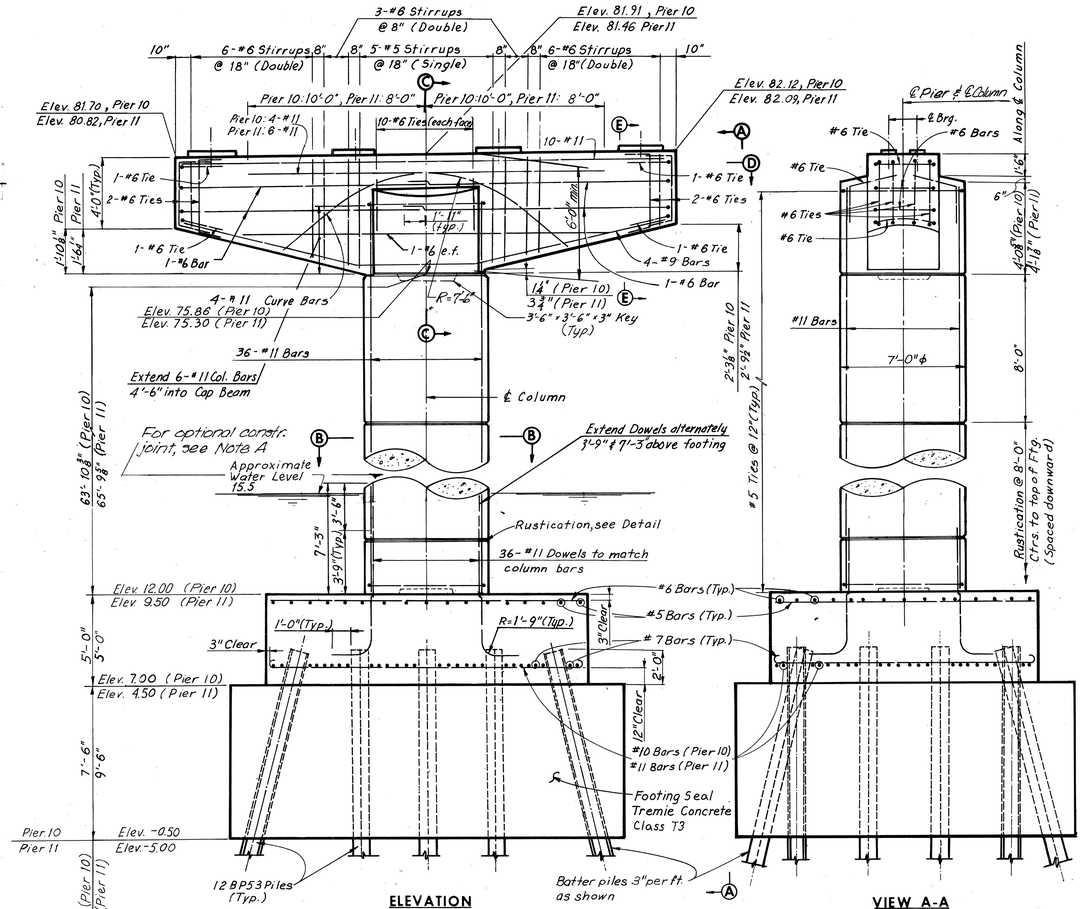
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
LAYOUT

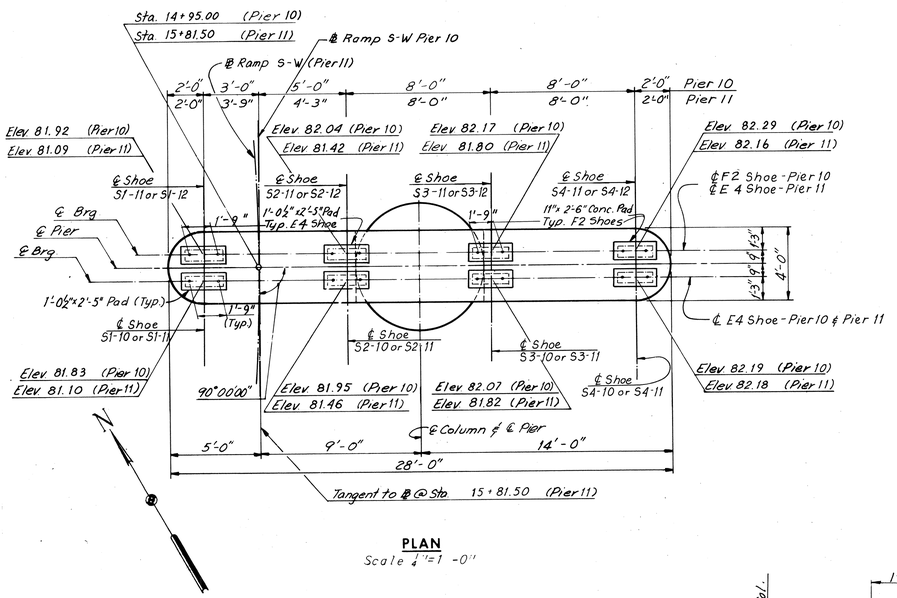
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 4 OF 38

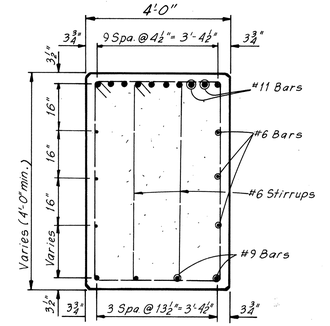
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	35	97



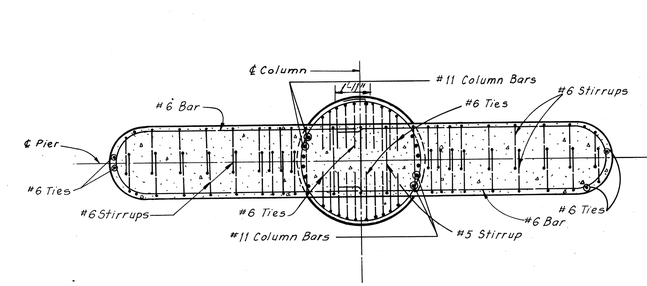
ELEVATION
Scale: 1/4" = 1'-0"



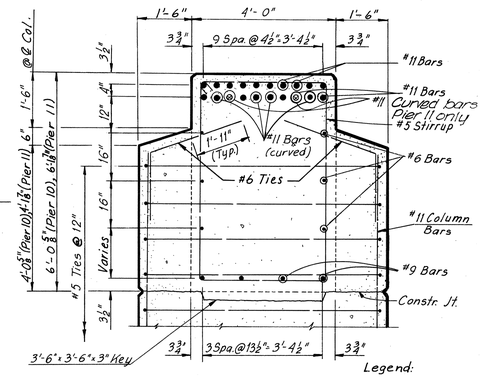
PLAN
Scale 1/4"=1'-0"



SECTION E-E
Scale 1/2"=1'-0"

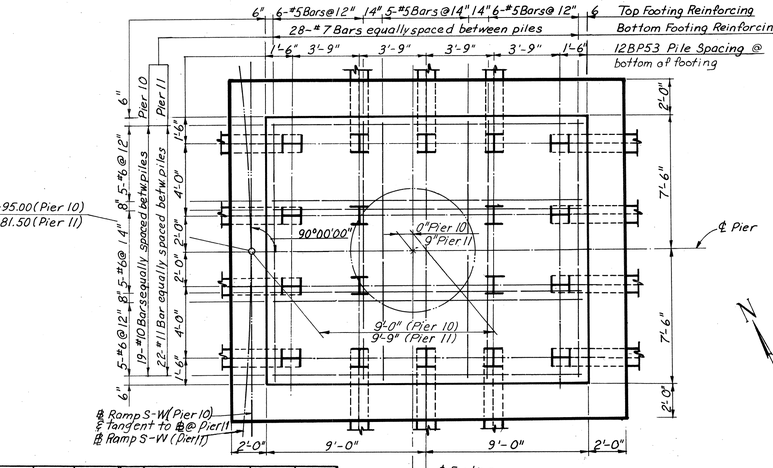


SECTION D-D
Scale: 1/4"= 1'-0"



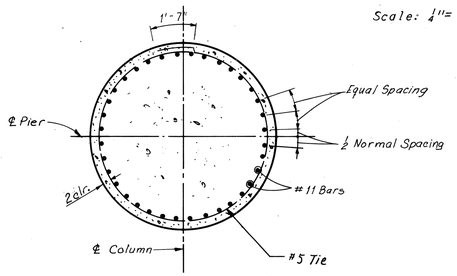
SECTION C-C
Scale: 1/2" = 1'-0"

Legend:
- Piers 10 & 11
- Pier 11 only

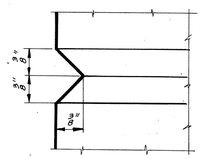


FOOTING PLAN
Scale: 1" = 1'-0"

FOOTING FOR PIER 11 IS ECCENTRIC AS SHOWN ON FOOTING PLAN



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



RUSTICATION DETAIL
Full Scale

Note:
Bottom reinforcement shown in View A-A is for Pier 11 only. Bottom reinforcement for pier 10 is similar except in size & number.

Note:
For layout of piers 10 and 11 See Sheet 3.
Pile dimensions given on Footing Plan are measured at bottom of Footing (Elev. 7.00 Pier 10 and Elev. 4.50 Pier 11).

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 of the splice shall be a minimum of 3'-6". Splices shall be staggered at least 3'-3" between adjacent bars.

Note:
Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcement shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

Notes:
All piles shall be 12BP53 Steel Piles (Design capacity = 57 tons).
Batter piles 3" per ft. as shown.
For Standard Shoe Details see Sheet S1 & S2.
For Framing Plans see Sheet 20 & 21.
Estimated Pile Tip elevation -20.0

AS BUILT

	BY	DATE
MADE	CEB/JD	12-18-68
CHECKED	GSH	1-24-69
IN CHARGE		

NO.	REVISION	BY	DATE

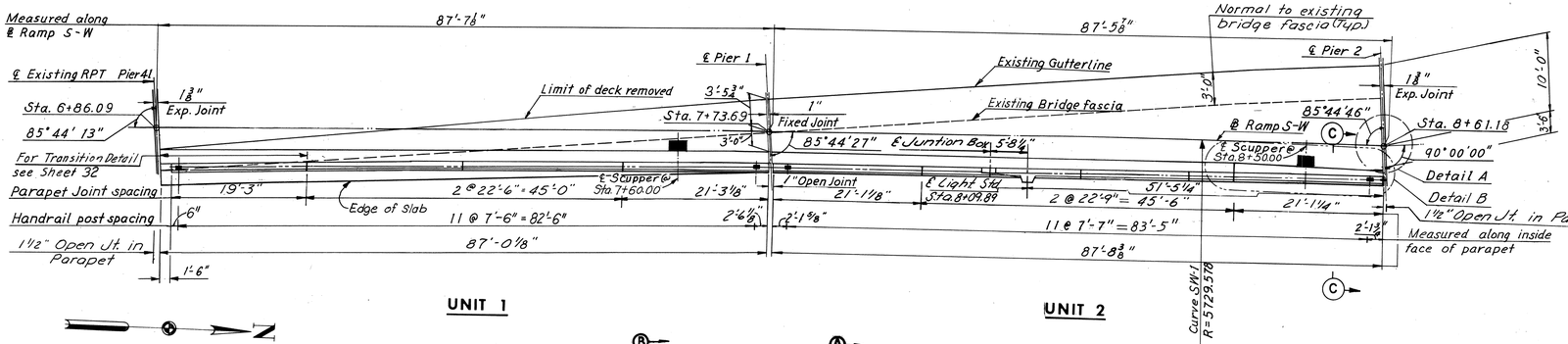
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

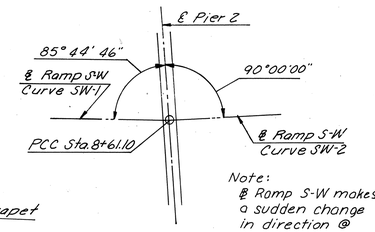
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
PIERS 10 AND 11

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

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 10 OF 38

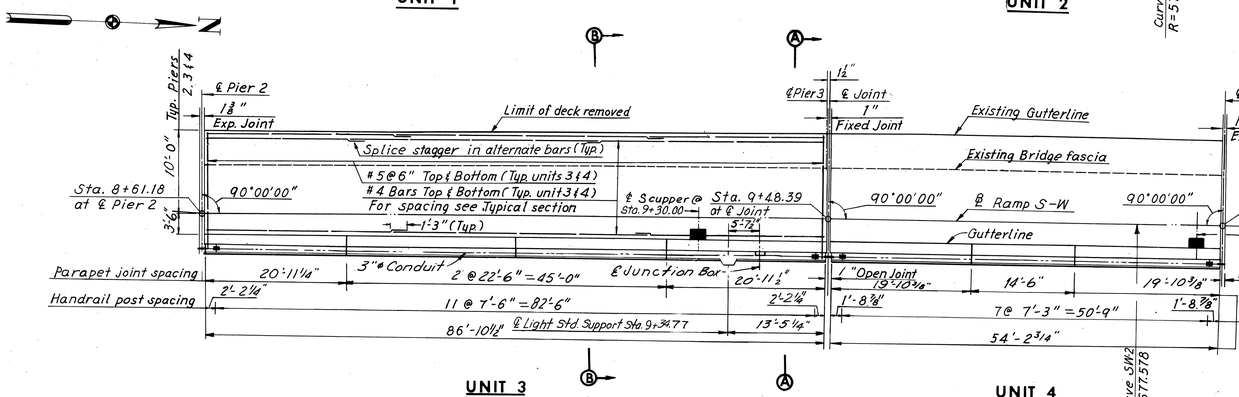
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	50	97



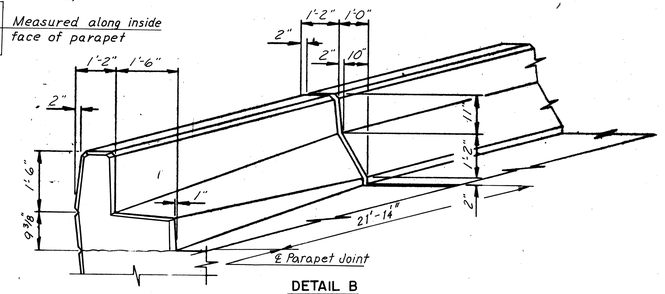


DETAIL A
No Scale

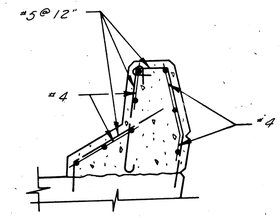
Note:
℄ Ramp S-W makes a sudden change in direction @ Sta. 8+61.10.



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



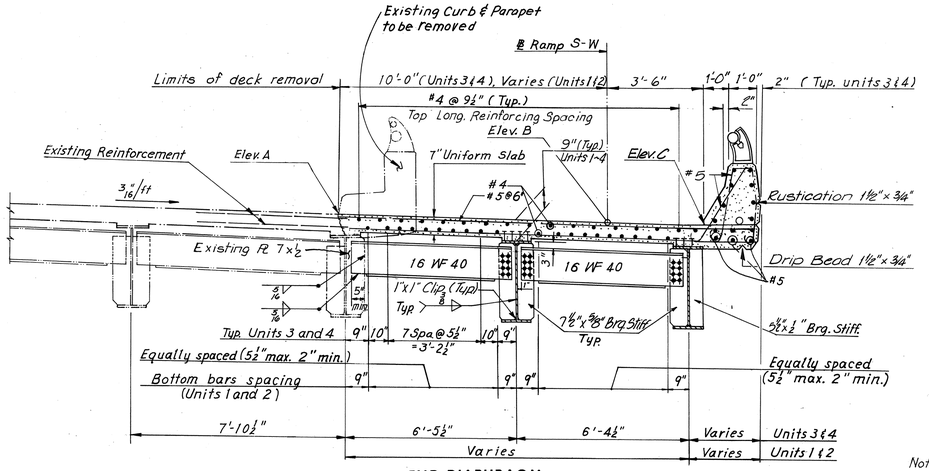
DETAIL B
No Scale



SECTION C-C
No Scale

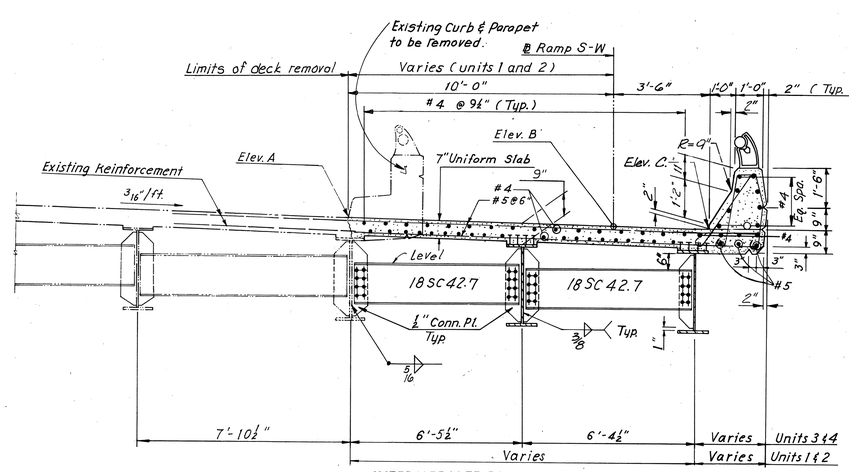
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
6+86.09	——	72.84	——
+90.00	——	72.90	72.85
7+00.00	——	73.05	73.00
+10.00	——	73.19	73.15
+20.00	——	73.35	73.30
+30.00	73.50	73.49	73.45
+40.00	73.66	73.64	73.60
+50.00	73.82	73.79	73.75
+60.00	73.98	73.94	73.89
+70.00	74.14	74.09	74.04
+73.69	74.20	74.15	74.10
+80.00	74.30	74.24	74.19
+90.00	74.46	74.39	74.34
8+00.00	74.62	74.54	74.49
+10.00	74.79	74.69	74.64
+20.00	74.95	74.84	74.79
+30.00	75.11	74.99	74.94
+40.00	75.27	75.15	75.09
+50.00	75.43	75.29	75.23
+60.00	75.59	75.44	75.39
+61.18	75.61	75.45	75.40
+70.00	75.75	75.60	75.54
+80.00	75.91	75.76	75.70
+90.00	76.08	75.92	75.86
9+00.00	76.24	76.08	76.02
+10.00	76.40	76.24	76.19
+20.00	76.56	76.40	76.35
+30.00	76.72	76.56	76.51
+40.00	76.88	76.73	76.67
+48.39	77.02	76.86	76.81
+50.00	77.04	76.89	76.83
+60.00	77.20	77.05	76.99
+70.00	77.37	77.21	77.15
+80.00	77.53	77.37	77.32
+90.00	77.69	77.53	77.48
10+00.00	77.85	77.69	77.64
+02.63	77.89	77.74	77.68

Note A:
Elev A from Sta 6+86.09 to 10+02.63 is given along the existing Gutter Line R.P.T. and is radial to the existing Base Line R.P.T. at the respective stations as given along the Base Line Ramp S-W. Cross Slope is radial to the Base Line R.P.T.
Elev A is to be field verified. Minor adjustments may be required.



END DIAPHRAGM

SECTION A-A
Scale: ⅜" = 1'-0"



INTERMEDIATE DIAPHRAGM

SECTION B-B
Scale: ⅜" = 1'-0"

Note:
Existing No. 5 transverse steel top and bottom to remain in place and be cleaned of concrete. Existing steel shall extend a minimum of 2'-0" into new concrete. Bottom reinforcing shall be straightened.

Note:
For Framing plan, see Sheet 18.
For Joint Details, see Sheet 18.
For Quantities, see Sheet 4
For Handrail Detail, see Sheet S3
Elev. A is to be confirmed by contractor.
Cross Slope in Units 1 and 2 should be normal to ℄ R.P.T.
For Drainage Details see Support Type 6 for Units 1, 2 and 3, and Support Type 5 for Unit 4, see Sheets S5 & S6

AS BUILT

	BY	DATE
MADE	KCT	11-2-68
	JLK	6-27-75
CHECKED	YCP	1-17-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	Deck Elev.	T.E.M.	9-8-75
1	limits of deck removal Sect A & B	T.E.M.	8-25-75

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

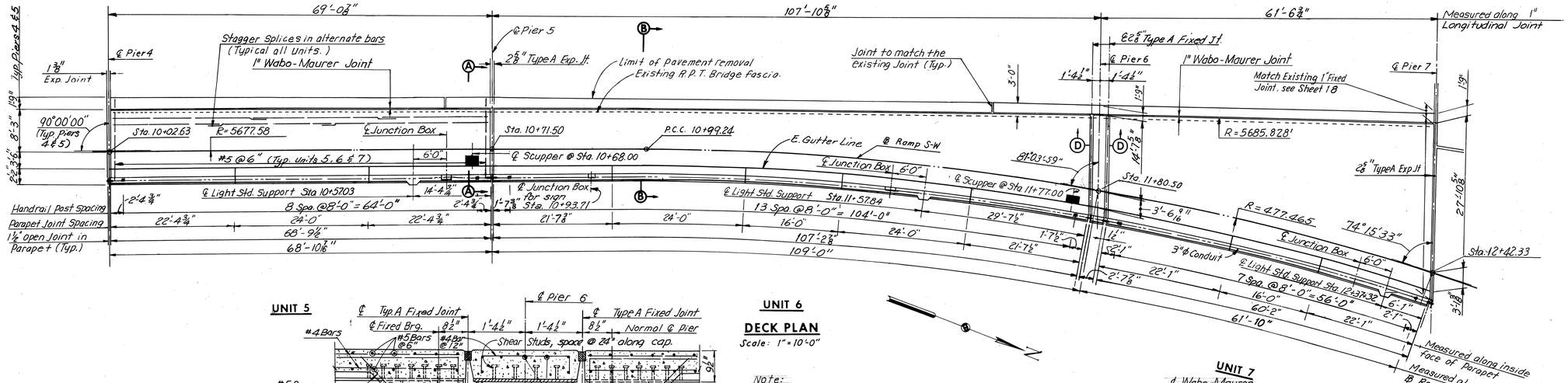
DECK PLAN UNITS 1,2,3 AND 4

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

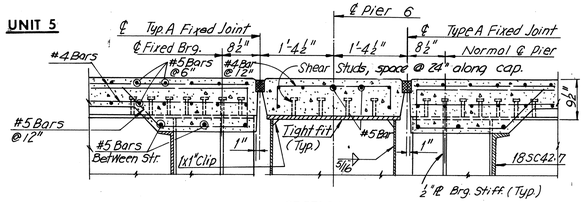
SCALE: As Noted
CONTRACT NO: 11
SHEET NO. 25 OF 38

50

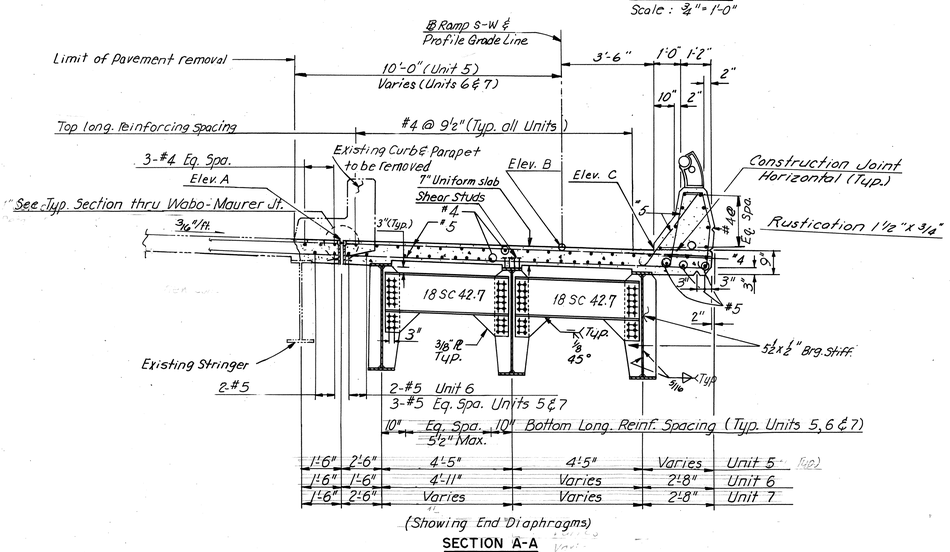
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	51	97



UNIT 5



SECTION D-D
Scale: ½" = 1'-0"



(Showing End Diaphragms)

SECTION A-A
Scale: ⅜" = 1'-0"

(Unit 5 shown, Units 6 & 7 similar)

UNIT 6

DECK PLAN

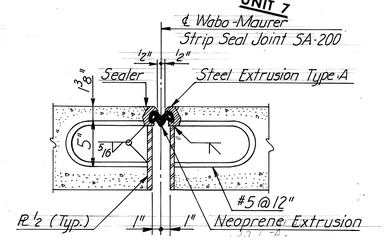
Scale: 1" = 10'-0"

Note:
For Drainage Details, see Support Type 9 for Unit 5, and Support Type 5 for Unit 6, see Sheets 55 & 56.
Elevations given in the Elevation Table may require adjustment in the field.

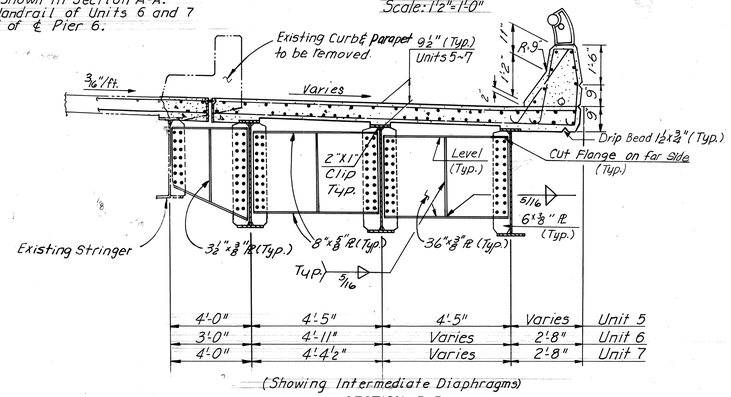
Note:
For Framing Plan, See Sheet 19.
For Joint Details, See Sheet 34 & 35.
For Quantities, See Sheet 4.
For Handrail Details, See Sheet 33.
Elev. A is to be confirmed by contractor.

Note:
Reinforcement in Curb and Parapet is same as shown in Section A-A.
Extend Handrail of Units 6 and 7 to within 1" of ℄ Pier 6.

UNIT 7



TYPICAL SECTION THRU WABO-MAURER JOINT
Scale: 1½" = 1'-0"



(Showing Intermediate Diaphragms)

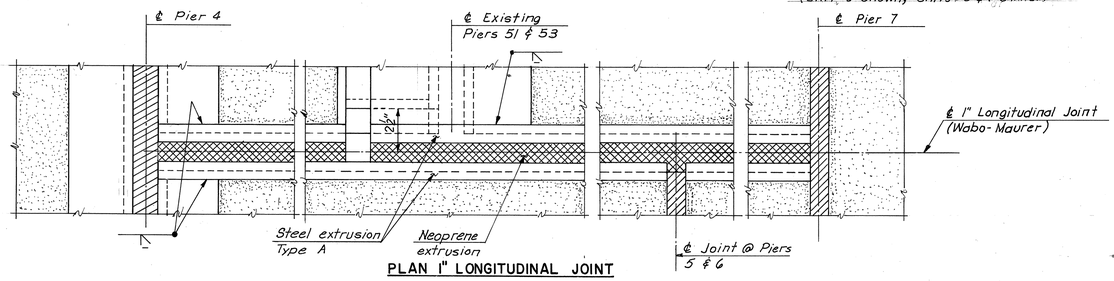
SECTION B-B
Scale: ⅜" = 1'-0"

(Unit 6 Shown, Units 5 & 7 similar)

Note A:
Elev. A from Sta. 10+02.63 to 12+42.33 is given along ℄ longitudinal joint and is radial to the existing Base Line R.P.T. at the respective stations as given along the Base Line Ramp S-W. Cross Slope is radial to the Base Line R.P.T.
Elev. A is to be field verified. Minor adjustments may be required.

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
10+02.63	77.83	77.74	77.68
+10	77.95	77.86	77.80
+20	78.12	77.02	77.96
+30	78.27	78.18	78.12
+40	78.44	78.34	78.29
+50	78.60	78.50	78.45
+60	78.76	78.66	78.61
+70	78.92	78.82	78.77
+71.50	78.94	78.85	78.80
+80	79.08	78.97	78.91
+90	79.24	79.11	79.04
11+00	79.40	79.24	79.16
+10	79.57	79.36	79.27
+20	79.73	79.47	79.36
+30	79.89	79.57	79.45
+40	80.05	79.66	79.53
+50	80.21	79.74	79.60
+60	80.37	79.82	79.68
+70	80.53	79.90	79.76
+79.11	80.67	79.97	79.83
+80	80.69	79.98	79.84
+80.50	80.70	79.98	79.84
+81.89	80.72	80.00	79.86
+90	80.86	80.06	79.92
12+00	81.01	80.14	80.00
+10	81.17	80.22	80.08
+20	81.33	80.29	80.15
+30	81.48	80.36	80.22
+40	81.64	80.43	80.29
+42.33	81.68	80.45	80.31

Notes for Wabo-Maurer Joint:
Do not use steel extrusions as screed support.
Steel extrusion shall conform to ASTM A36.
Structural steel shall conform to ASTM A588.
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 manufacturers recommended construction methods.



PLAN 1" LONGITUDINAL JOINT

	BY	DATE
MADE	G.C.C. J.L.K.	11-3-68 6-27-73
CHECKED	Y.C.P.	1-20-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	Deck Elev.	T.E.M.	5-76
2	Deck Elev. & Dim.	T.E.M.	9-8-75
1	Limit of pavement removal & 1" longit. joint revised, Det. A removed, & Wabo-Maurer Jt. added	C.B.P.	8-25-75

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

DECK PLAN UNITS 5, 6 AND 7

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

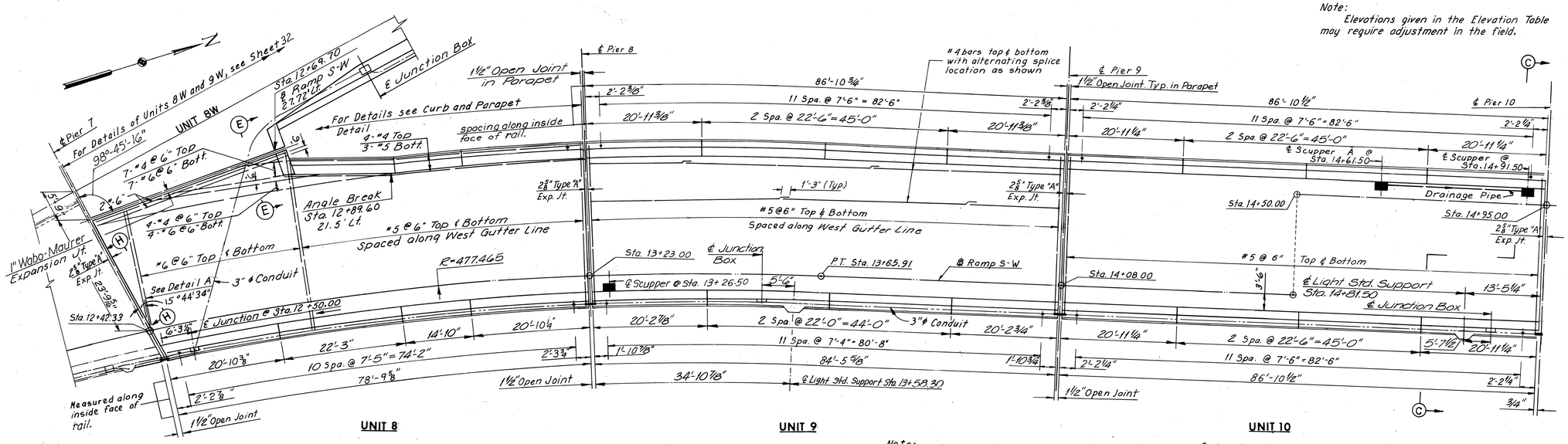
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 26 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	52	97

Note:
Elevations given in the Elevation Table may require adjustment in the field.

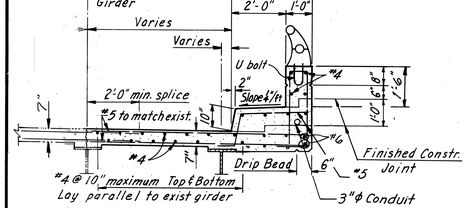
* Elev. given along ℄ of joint along lines radial to ℄ Ramp S-W

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
12+42.33	81.38	80.45	80.31
12+40	*81.53	—	—
12+50	*81.62	80.50	80.36
12+60	*81.72	80.57	80.43
12+70	*81.82	80.68	80.54
12+80	81.72	80.81	80.66
12+90	81.83	80.98	80.83
13+00	82.03	81.17	81.03
13+10	82.26	81.40	81.26
13+20	82.53	81.67	81.52
13+23	82.62	81.75	81.61
13+30	82.80	81.96	81.82
13+40	83.07	82.28	82.15
13+50	83.37	82.64	82.52
13+60	83.67	83.01	82.90
13+70	83.96	83.38	83.29
13+80	84.26	83.76	83.68
13+90	84.56	84.13	84.06
14+00	84.86	84.50	84.44
14+08	85.10	84.80	84.75
14+10	85.16	84.87	84.82
14+20	85.47	85.24	85.20
14+30	85.76	85.62	85.60
14+40	86.06	85.99	85.98
14+50	86.36	86.36	86.36
14+60	86.71	86.72	86.79
14+70	87.03	87.05	87.19
14+80	87.32	87.35	87.57
14+90	87.57	87.62	87.91
14+95	87.69	87.74	88.08

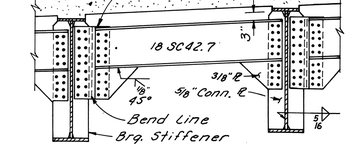


Note:
Piers 8, 9 and 10 are not skewed.

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

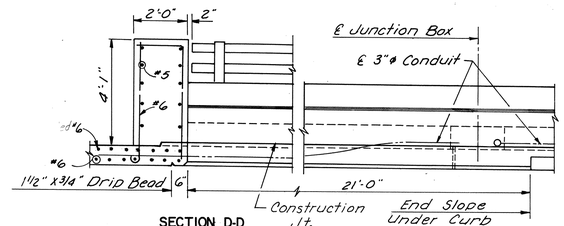


SECTION B-B
Scale: ⅜"=1'-0"

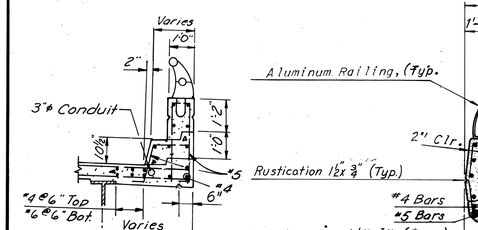


End Diaphragm Typical for South End Unit 8

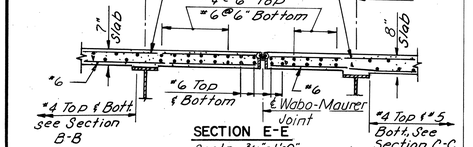
SECTION H-H
Scale: ⅜"=1'-0"



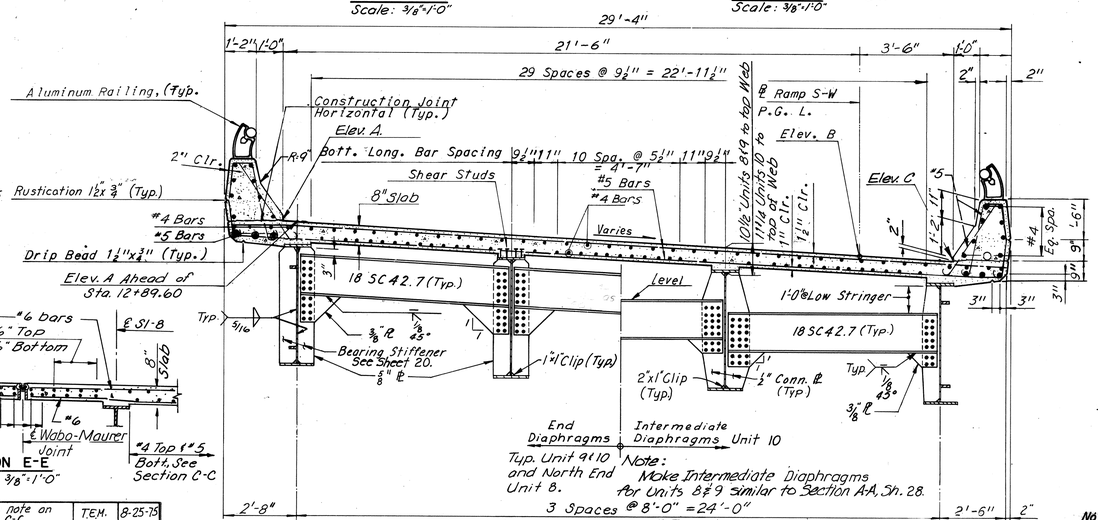
SECTION D-D
Scale: ⅜"=1'-0"



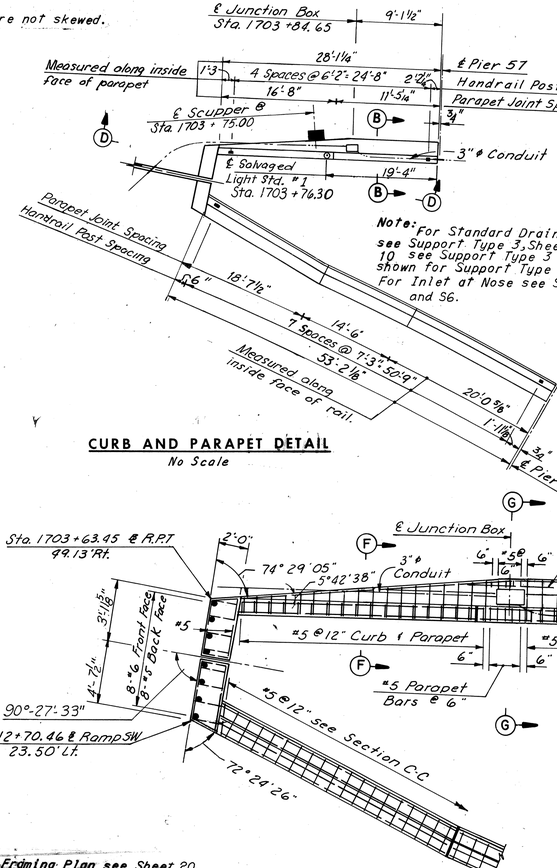
SECTION F-F
Scale ⅜"=1'-0"



SECTION E-E
Scale: ⅜"=1'-0"

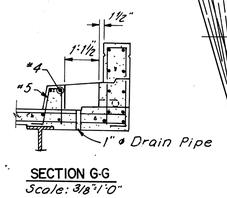


SECTION C-C
Scale: ⅜" = 1'-0"

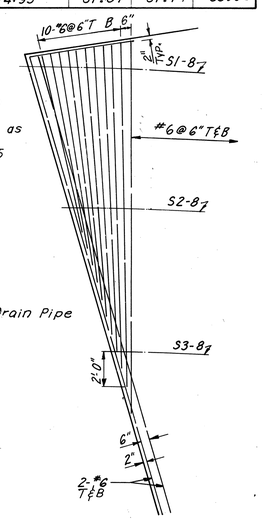


CURB AND PARAPET DETAIL
No Scale

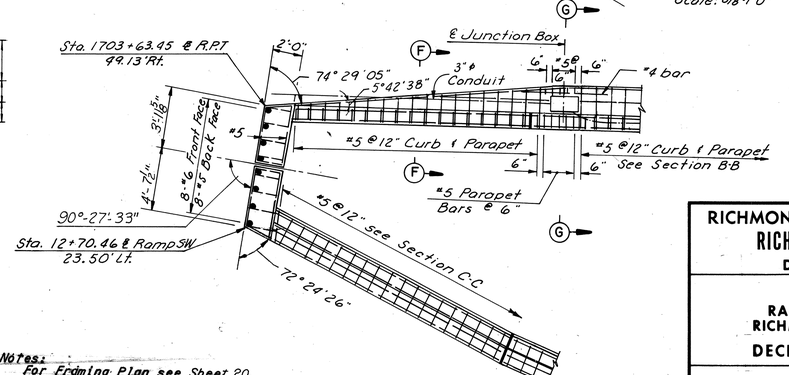
Note:
For Standard Drainage Details for Unit 9 see Support Type 3, Sheets 55 & 56 for Unit 10 see Support Type 3 (connect pipe from A as shown for Support Type 1, same Sheets) For Inlet at Nose see Support Type 9, Sheets 55 and 56.



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



DETAIL A
Scale ¼"=1'-0"



NOSE DETAIL
Scale: 1"=5'-0"

Notes:
For Framing Plan see Sheet 20.
For Joint Details, see Sheet 34 & 35.
For Quantities see Sheet 4.
For Handrail Details, see Sheet 58.

AS BUILT

	BY	DATE
MADE	C.E.B.	1-30-69
CHECKED	R.C.	4-22-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Diaph note on Sect C-C	T.E.M.	8-25-75
2	Limit of slab removal, longit. joint, slab thickness & #6 bundled bars rev.	J.B.P.	8-25-75
3	Section B-B	TEM	11-76
4	Joint Location	PRY	10-76
5	Deck Elev.	T.E.M.	9-8-75

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

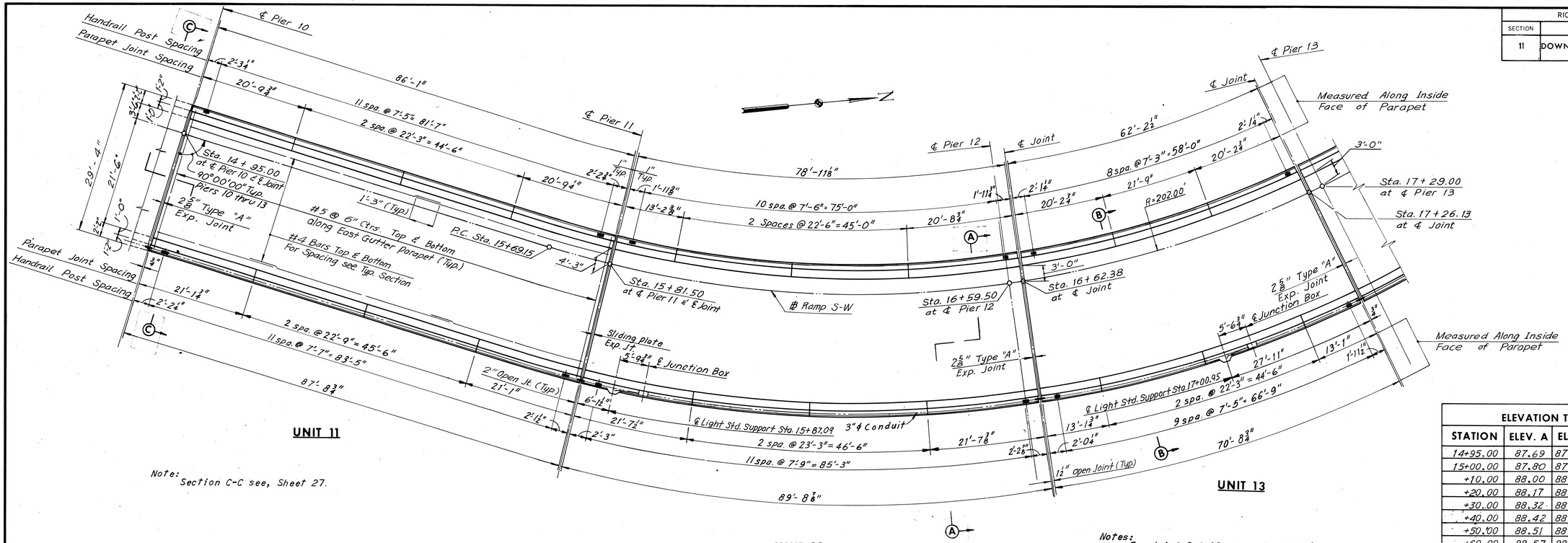
DECK PLAN UNITS 8, 9 AND 10

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

SCALE: As Noted
CONTRACT NO 11
SHEET NO 27 OF 38

52

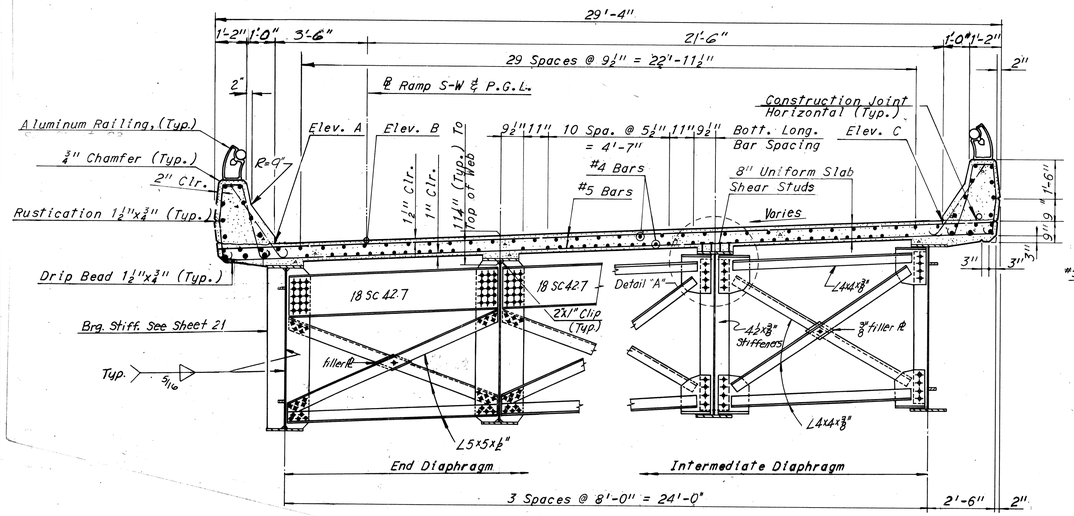
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	53	97



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

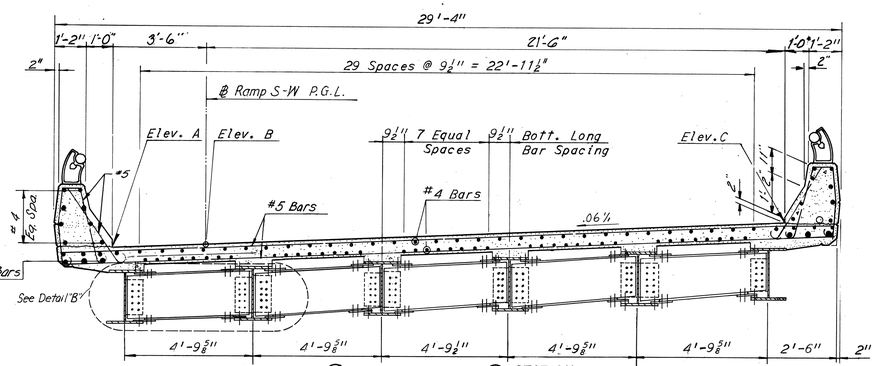
Notes:
For Joint Details, see Sheet 34 & 35.
For Framing Plan, see Sheet 21.
For Steel and Concrete Quantities, see Sheet 4.
For Handrail Details, see Sheet S3.
For Lighting Details, see Sheet S4.
For Standard Drainage Details, see Support Type 6, Sheets 55 & 56.
For Superstructure details, see Sheet 32.

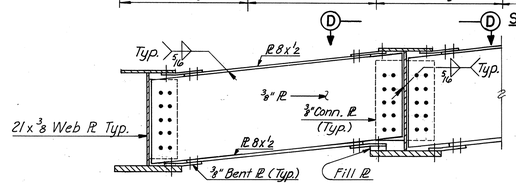
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
14+95.00	87.69	87.74	88.07
15+00.00	87.80	87.86	88.23
+10.00	88.00	88.07	88.51
+20.00	88.17	88.26	88.77
+30.00	88.32	88.41	89.00
+40.00	88.42	88.54	89.20
+50.00	88.51	88.63	89.37
+60.00	88.57	88.70	89.51
+70.00	88.60	88.74	89.63
+80.00	88.60	88.75	89.71
+81.50	88.60	88.75	89.72
+90.00	88.57	88.73	89.76
16+00.00	88.50	88.69	89.80
+10.00	88.42	88.61	89.79
+20.00	88.31	88.51	89.73
+30.00	88.17	88.37	89.63
+40.00	88.00	88.21	89.49
+50.00	87.81	88.02	89.31
+59.50		87.81	
+60.00	87.59	87.80	89.09
+62.38	87.53	87.74	89.03
+70.00	87.34	87.55	88.84
+80.00	87.06	87.27	88.56
+90.00	86.75	86.96	88.25
17+00.00	86.41	86.62	87.91
+10.00	86.05	86.26	87.55
+20.00	85.65	85.86	87.15
+26.12	85.40	85.61	86.90
+29.00		85.49	



SECTION A-A
Scale: ⅜" = 1'-0"

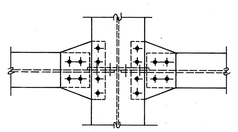
Note: For Detail A, See Sheet 31.





SECTION B-B
Scale: ⅜"=1'-0"

DETAIL B
Scale: ¾"=1'-0"



VIEW D-D
Scale: ¾"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	SCC	10-31-68				
CHECKED	G.S.H.	1-14-69	1	Detail 'B' & View D-D revised	A.B.P.	8-25-76
IN CHARGE						

AS BUILT

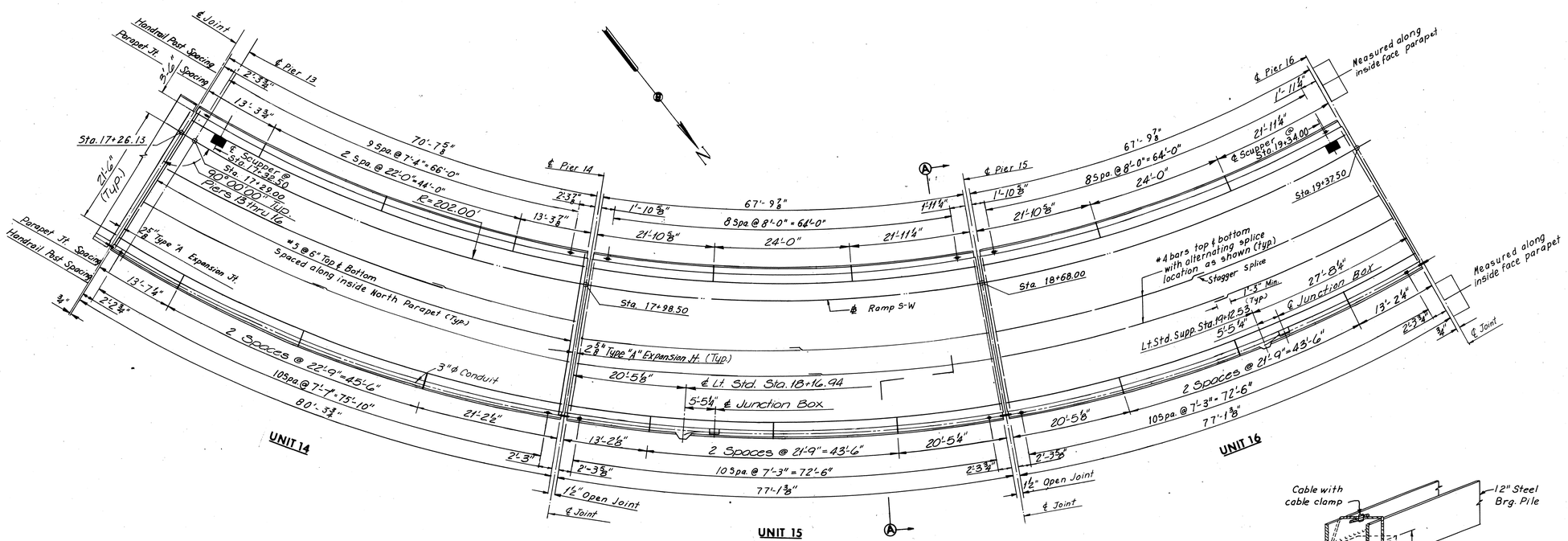
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
DECK PLAN UNITS 11 12 AND 13

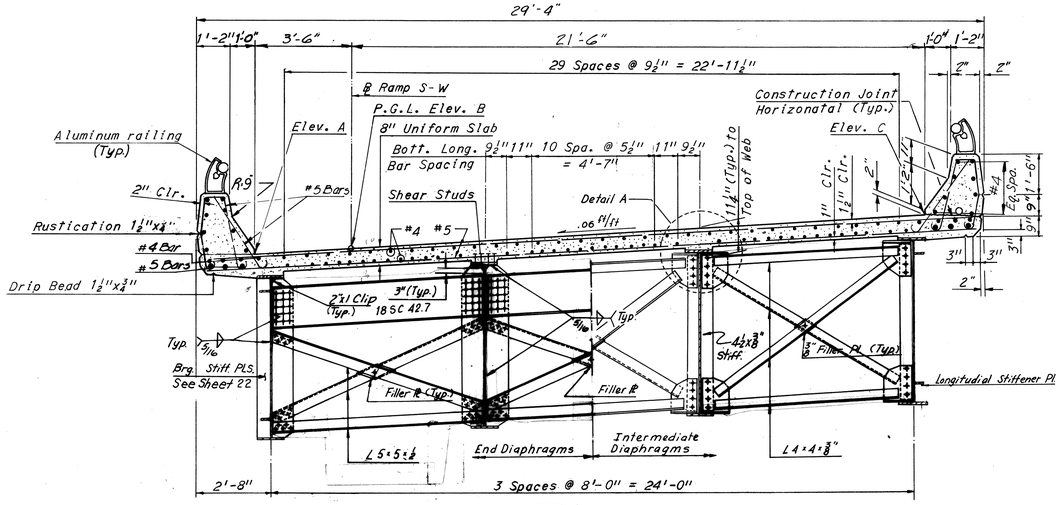
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE:
CONTRACT NO. 11
SHEET NO. 28 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	54	97

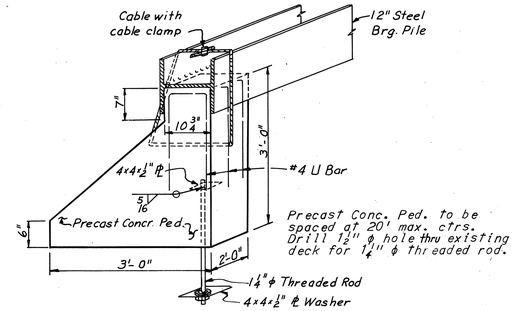


DECK PLAN
Scale: 1" = 10'-0"



SECTION A-A
Scale: ⅜" = 1'-0"

Note:
For Detail A, see Sheet 31.



PROPOSED TEMPORARY FIXED TRAFFIC BARRICADE

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
17+29.00	85.28	85.49	86.78
+30.00	85.23	85.44	86.73
+40.00	84.78	84.99	86.28
+50.00	84.30	84.51	85.80
+60.00	83.74	84.00	85.29
+70.00	83.25	83.46	84.75
+80.00	82.68	82.89	84.18
+90.00	82.09	82.30	83.59
+98.50	81.56	81.77	83.06
18+00.00	81.46	81.67	82.96
+10.00	80.82	81.03	82.82
+20.00	80.18	80.39	81.68
+30.00	79.54	79.75	81.04
+40.00	78.90	79.11	80.40
+50.00	78.26	78.47	79.74
+60.00	77.62	77.83	79.12
+68.00	77.11	77.32	78.61
+70.00	76.98	77.19	78.48
+80.00	76.36	76.57	77.86
+90.00	75.75	75.96	77.25
19+00.00	75.12	75.33	76.62
19+10.00	74.52	74.72	75.93
19+20.00	73.93	74.12	75.24
19+30.00	73.37	73.54	74.57
19+37.50	72.98	73.13	74.09

Notes:
For Framing Plan see Sheet 22
For Joint Details, see Sheet 34 & 35
For Quantities see Sheet 4
For Handrail Details, see Sheet 53.

Note: For Standard Drainage Details for Units 14 and 16, see Support Type 3 Sheets 55 & 56.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	C.E.B.	12-10-68				
CHECKED	Y.C.P	1-15-69				
IN CHARGE						

AS BUILT

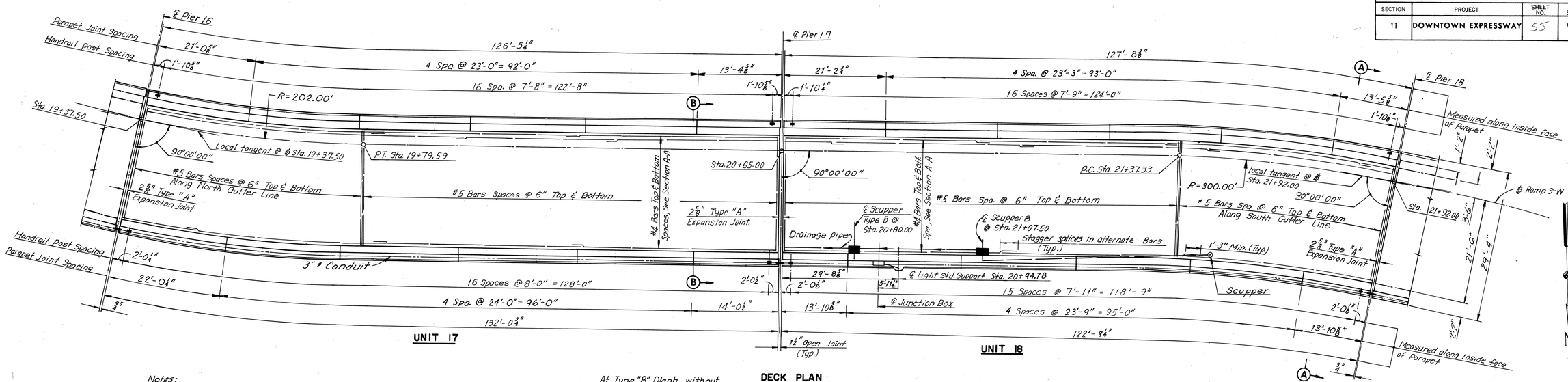
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
DECK PLAN UNITS 14,15 AND 16

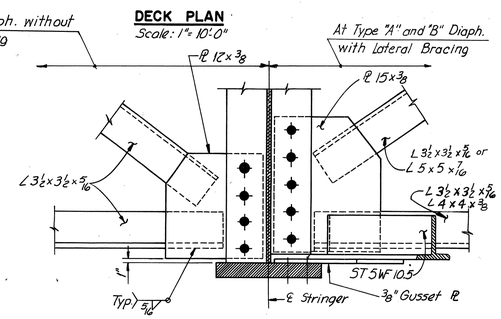
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 29 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	55	97

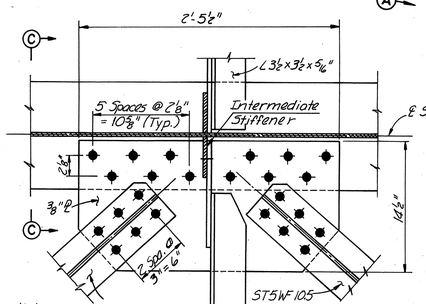


Notes:
For Framing Plan see Sheet 23.
For Joint Details, see Sheet 35.
For Quantities, see Sheet 4.
For Handrail Details see Sheet 53.
For Standard Drainage Details for Unit 18, see Support Type 3, Sheets 55 & 56 (connect pipe from A to pipe from B as shown for Support Type 7).



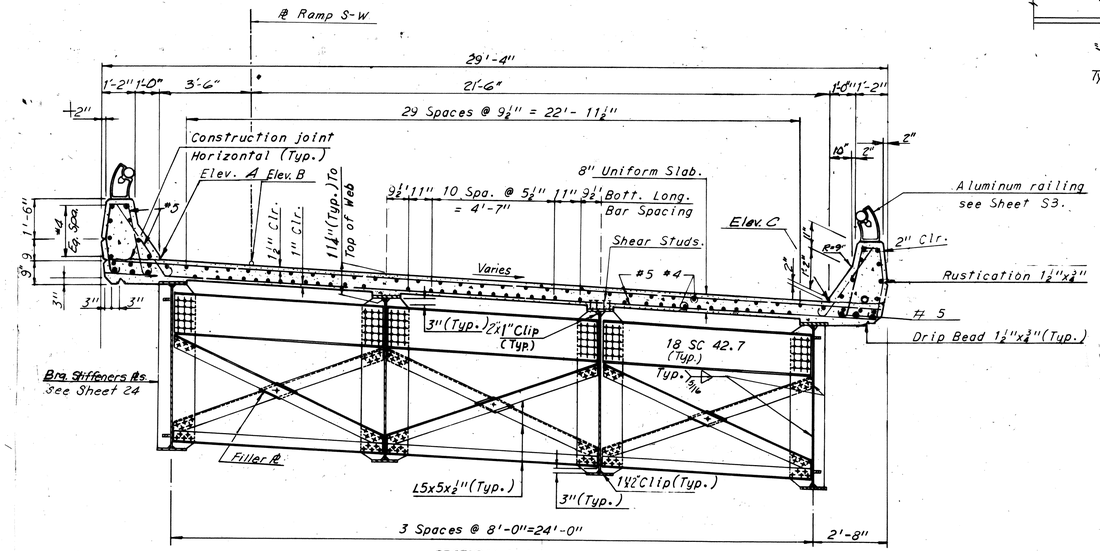
DECK PLAN
Scale: 1"=10'-0"

SECTION C-C
Scale: 1½"=1'-0"



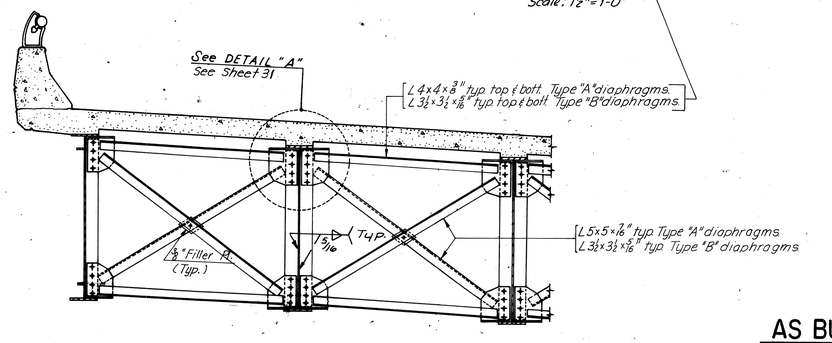
Note: Diagonal Angle in Intermediate Diaphragm is not shown.

DETAIL C
Scale: 1½"=1'-0"



SECTION A-A
Scale: ¾"=1'-0"
END DIAPHRAGM

Note:
For location of End diaphragms See Sheet 23.



SECTION B-B

INTERMEDIATE DIAPHRAGM
Scale: ¾"=1'-0"

Note:
For location of Intermediate diaphragms Types "A" and "B" see Sheet 23.

ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
19+37.50	72.98	73.13	74.09
+40.00	72.85	73.00	73.94
+50.00	72.38	72.52	73.38
+60.00	71.95	72.08	72.86
+70.00	71.56	71.68	72.37
+80.00	71.21	71.31	71.97
+90.00	70.89	70.98	71.49
20+00.00	70.61	70.68	71.11
+10.00	70.36	70.42	70.77
+20.00	70.15	70.20	70.46
+30.00	69.98	70.01	70.18
+40.00	69.85	69.86	69.94
+50.00	69.74	69.74	69.74
+60.00	69.68	69.66	69.56
+65.00	69.66	69.64	69.48
+70.00	69.65	69.62	69.42
+80.00	69.67	69.61	69.30
+90.00	69.71	69.64	69.23
21+00.00	69.79	69.71	69.20
+10.00	69.89	69.79	69.18
+20.00	70.00	69.88	69.15
+30.00	70.10	69.96	69.13
+40.00	70.19	70.05	69.12
+50.00	70.29	70.13	69.10
+60.00	70.40	70.21	69.07
+70.00	70.50	70.30	69.06
+80.00	70.59	70.38	69.09
+90.00	70.68	70.47	69.18
+92.00	70.70	70.49	69.20

AS BUILT

	BY	DATE
MADE	R.C.	11.18.68
CHECKED	Y.C.P.	1-14-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Diaph.	TEM	3-76

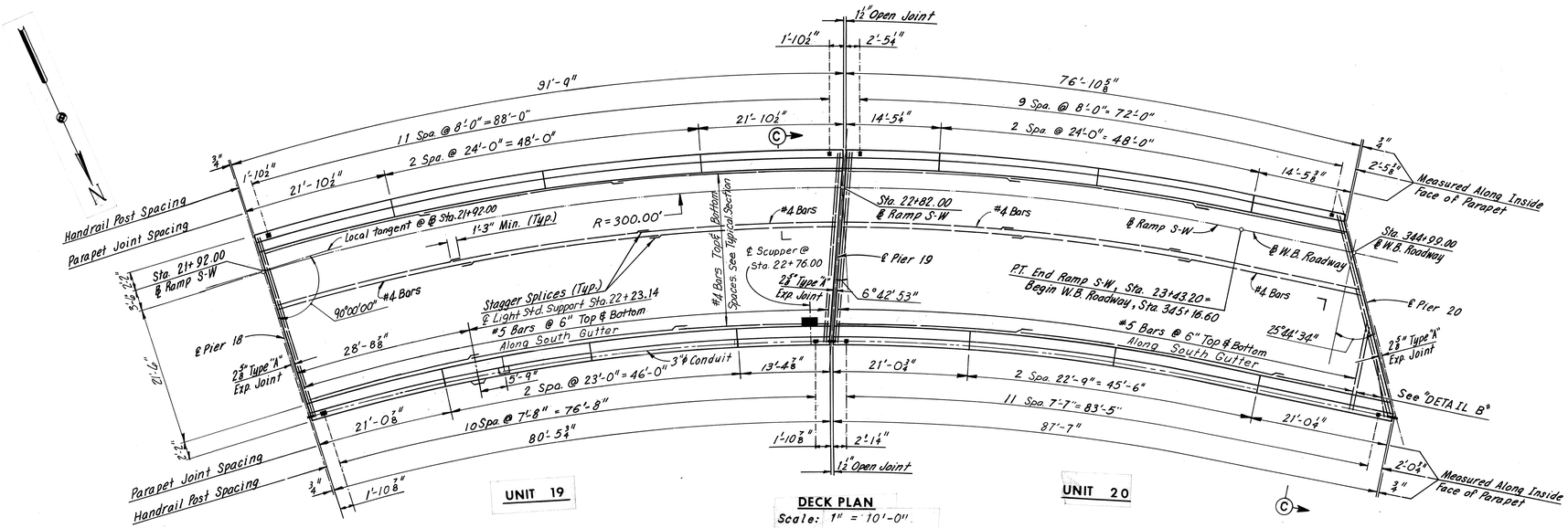
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
DECK PLAN UNITS 17 AND 18

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

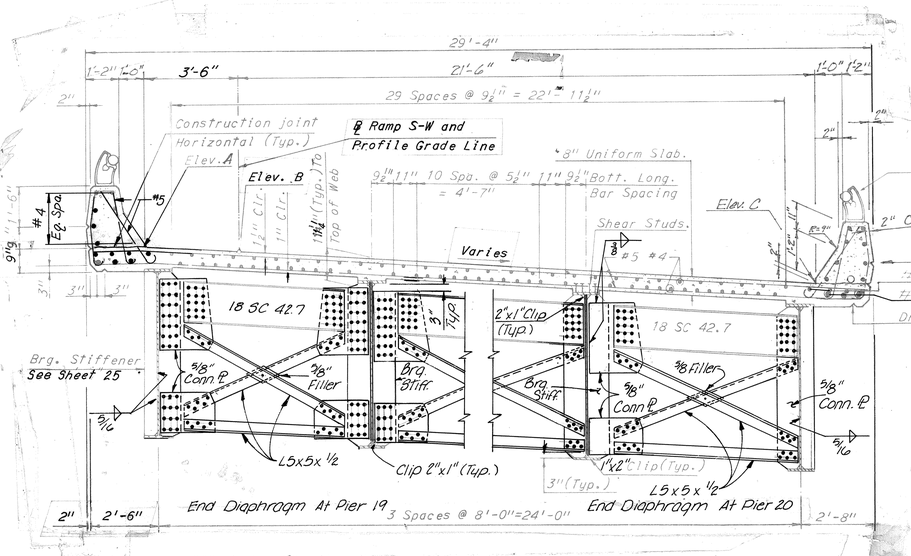
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 30 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	56	97

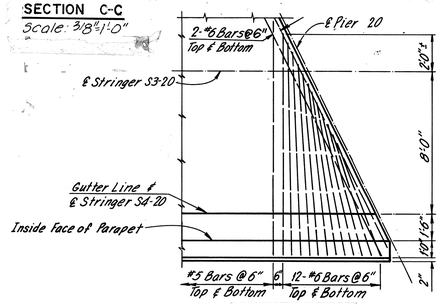


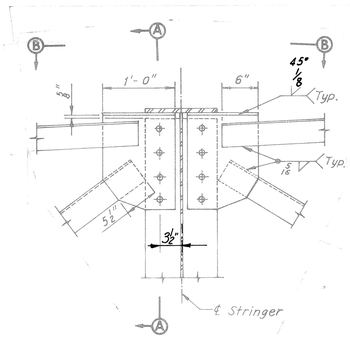
ELEVATION TABLE

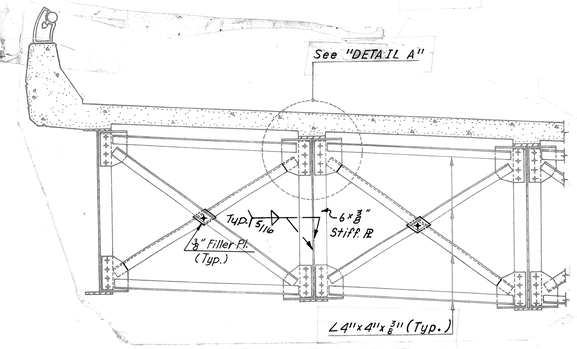
STATION	ELEV. A	ELEV. B	ELEV. C
21+92.00	70.70	70.49	69.26
22+00.00	70.76	70.55	69.32
+10.00	70.84	70.63	69.40
+20.00	70.93	70.72	69.49
+30.00	71.01	70.80	69.57
+40.00	71.09	70.88	69.65
+50.00	71.18	70.97	69.74
+60.00	71.26	71.05	69.82
+70.00	71.35	71.14	69.91
22+79.34	——	——	69.99
+80.00	71.43	71.22	69.99
+82.00	——	71.24	——
22+82.35	71.45	——	——
+90.00	71.51	71.30	70.07
23+00.00	71.60	71.39	70.14
+10.00	71.67	71.47	70.32
+20.00	71.74	71.56	70.48
+30.00	71.81	71.64	70.59
+40.00	71.88	71.72	70.75
23+43.20	71.90	71.75	70.80
345+16.60	71.90	71.75	70.80
345+10.00	71.95	71.81	70.91
345+00.45	72.02	——	——
345+00.00	72.03	71.89	71.07
344+99.00	——	71.90	——
344+88.87	——	——	71.25

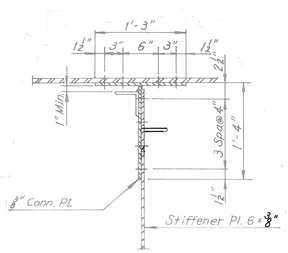


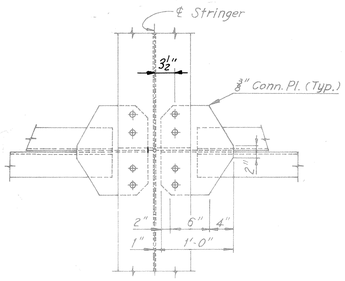
Note:
For details of end diaphragm at Pier 18 see Section A-A, Sheet 32.











Notes:
For Framing Plan see Sheet 24
For Joint Details, see Sheet 37 & 38
For Quantities see Sheet 4
For Handrail Details, see Sheet S3.

Note:
For Standard Drainage Details for Unit 20 see Support Type 2 Sheet S5.

	BY	DATE				
MADE	D.E.S.					
CHECKED	Y.C.P	1-14-69	1	Dim. Det. A View B-B Diaph. Conn. Pier 20	T.E.M	8-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

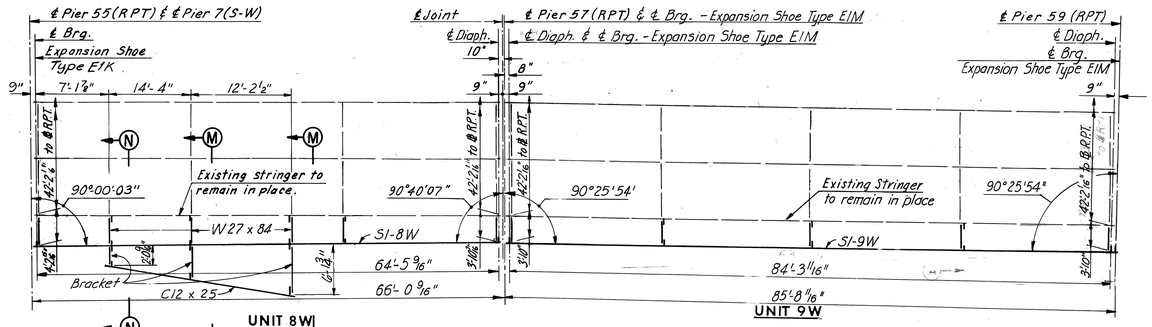
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE

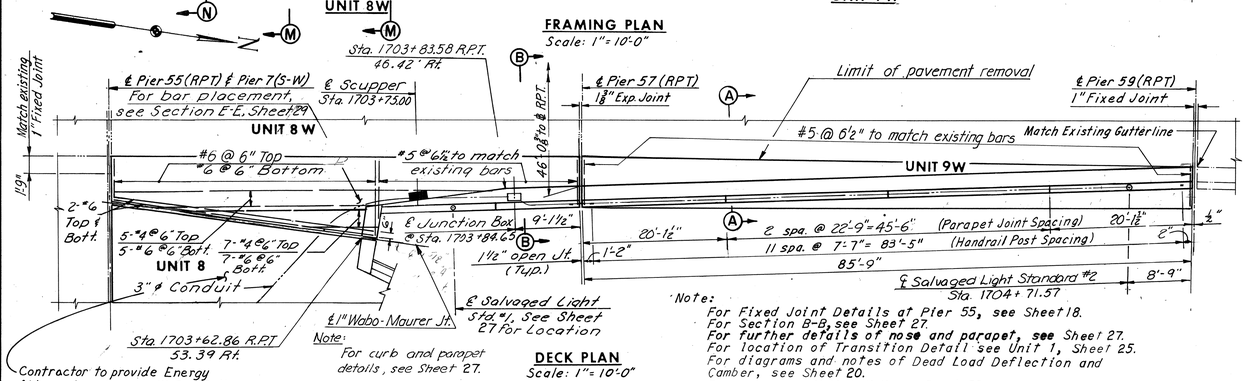
DECK PLAN - UNITS 19 AND 20

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

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 31 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION NO.	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	57	97

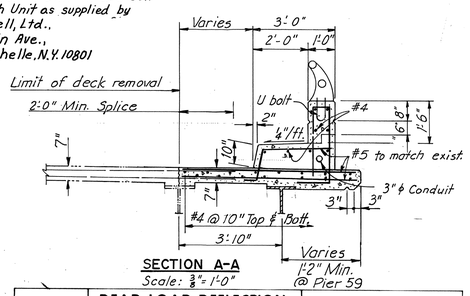




Note: For curb and parapet details, see Sheet 27.

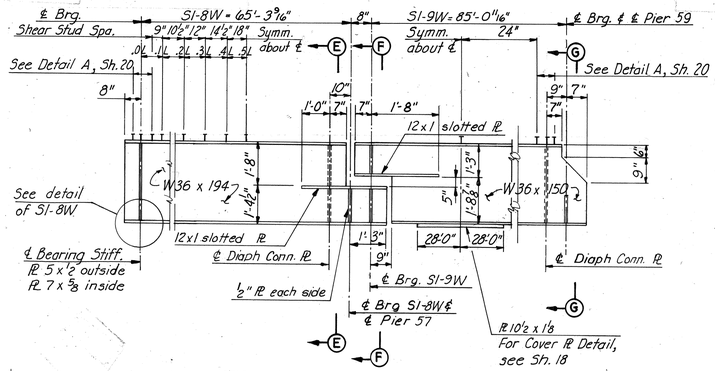
DECK PLAN
Scale: 1"=10'-0"

Note:
For Fixed Joint Details at Pier 55, see Sheet 18.
For Section B-B, see Sheet 27.
For further details of nose and parapet, see Sheet 27.
For location of Transition Detail see Unit 1, Sheet 25.
For diagrams and notes of Dead Load Deflection and Camber, see Sheet 20.
For Sections M-M & N-N see Sheet 20a.

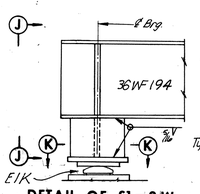


SECTION A-A
Scale: ¾"=1'-0"

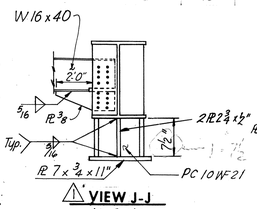
	DEAD LOAD DEFLECTION SCHEDULE			CAMBER SCHEDULE		
STRINGER	¼L	½L	¾L	¼L	½L	¾L
SI-8W	1 3/16"	1 7/16"	1 3/16"	1⅛"	1 7/16"	1"
SI-9W	1½"	1¾"	1½"	2"	2¼"	2"



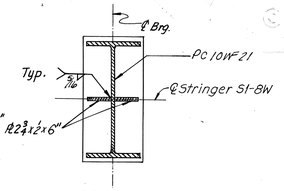
STRINGER ELEVATION SI-8W & SI-9W
No Scale



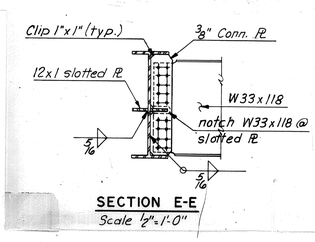
DETAIL OF SI-8W
No Scale



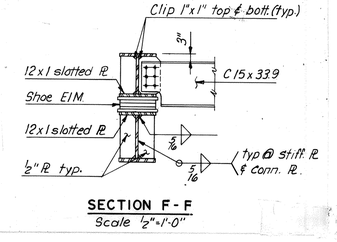
VIEW J-J
No Scale



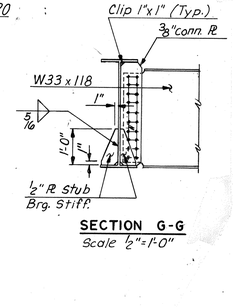
SECTION K-K
No Scale



SECTION E-E
Scale ½"=1'-0"



SECTION F-F
Scale ½"=1'-0"

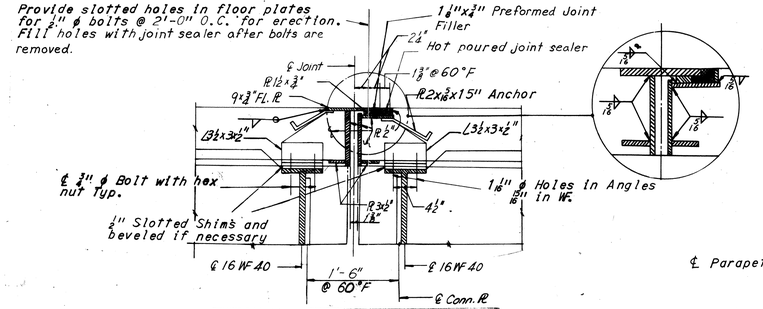


SECTION G-G
Scale ½"=1'-0"

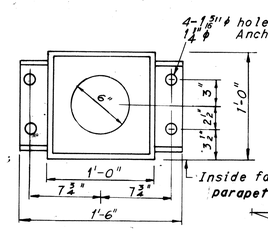
BY	DATE
MADE	AMH 2-19-69
CHECKED	RCT 5-8-69
IN CHARGE	

NO.	REVISION	BY	DATE
4	Bracket Dimensions	P.R.Y.	10-76
3	Dimensions Added	T.E.M.	9-9-75
2	Angle @ Pier 7	T.E.M.	9-5-75
1	Major revisions	A.B.P.	8-25-75

Provide slotted holes in floor plates for ½" ϕ bolts @ 2'-0" O.C. for erection. Fill holes with joint sealer after bolts are removed.

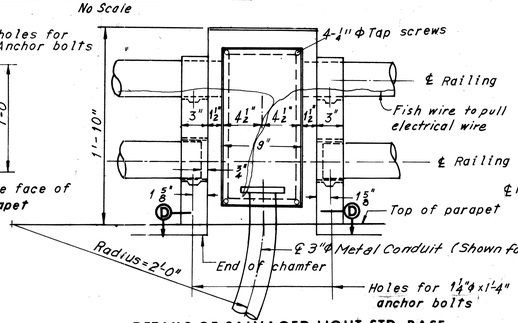


EXPANSION JOINT DETAIL - PIER 57
No Scale



SECTION D-D
Scale: 1½"=1'-0"

SHOE SCHEDULE	
EXPANSION SHOES	
TYPE	NO. REQD.
EIM	3
EIK	1

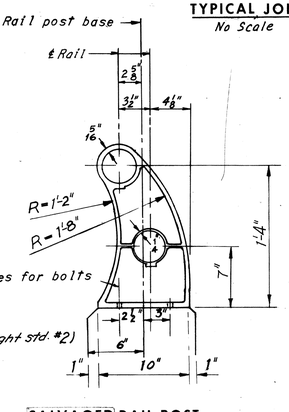


DETAILS OF SALVAGED LIGHT STD. BASE
Scale: 1½"=1'-0"

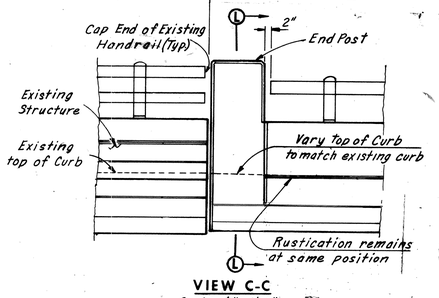
Hand tighten north set screws at joint

Provide joint at every other post except end post.

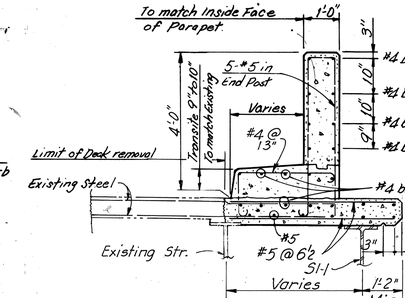
TYPICAL JOINT
No Scale



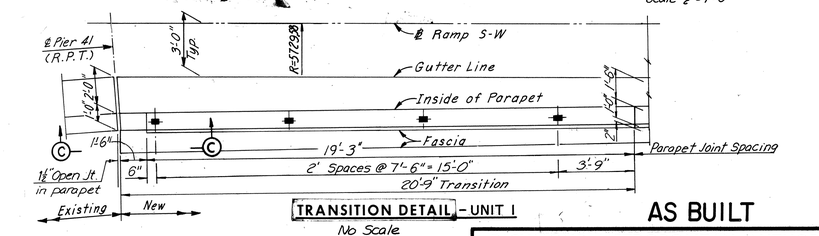
SALVAGED RAIL POST
Scale: 1½"=1'-0"



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



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



TRANSITION DETAIL - UNIT 1
No Scale

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 preparation of shop drawings for new metalwork.
New Diaphragms are to match Existing Diaphragms unless otherwise shown.

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

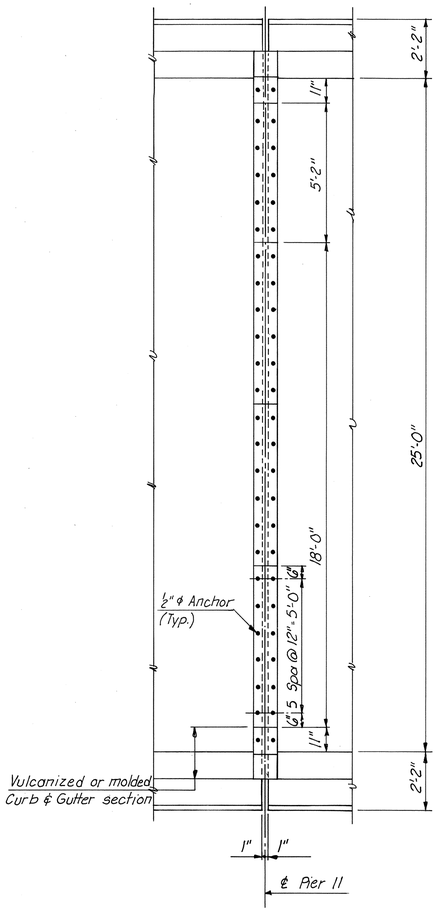
BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
SUPERSTRUCTURE DETAILS

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

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 32 OF 38

57

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO	TOTAL SHEETS
		59A	



PLAN

NOTE

Plan is shown for Transflex 200A. Onflex 25 is similar except as noted under Notes Onflex 25.

NOTES

*Dimension shown is at 60° F. For Dim. "W", "X" and "Y" adjustment due to temparture change, see Adjustment Schedule.

Reinforced Elastomeric Expansion Dam, Transflex type 200A or Onflex type 25, to be installed in accordance with the manufacturer's specifications. The manufacturer's representative shall be present during installation.

Shop drawings, showing complete details and dimensions of the dam and other pertinent information for installation of a practical leakproof joint, shall be prepared in accordance with these specifications. Review of shop drawings by the Engineer shall be required prior to installation of the expansion dam.

TRANSFLE 200A

Curb and gutter sections shall be a one piece molded section or shall be pre-assembled by the manufacturer and all joints therein vulcanized.

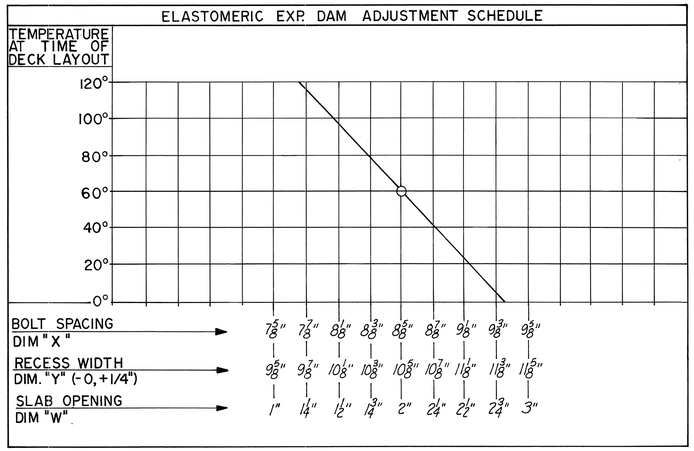
Units of the dam shall have tongue and groove joints at the ends of all units to provide for a positive leakproof connection between adjacent units.

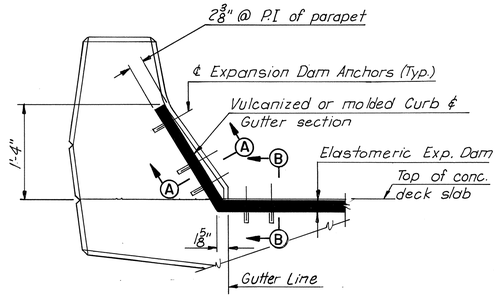
ONFLEX 25

Elastomeric membrane shall be one piece premolded unit extending full length of the aluminum extrusion.

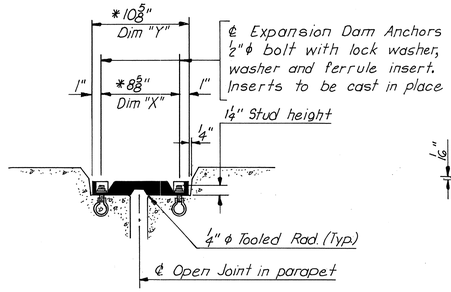
Aluminum extrusions to be continuous with mitered and welded joints at the gutter lines.

ELASTOMERIC EXP. DAM ADJUSTMENT SCHEDULE

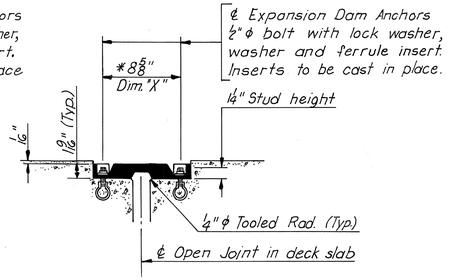




TYPICAL SECTION ALONG ℄ JOINT

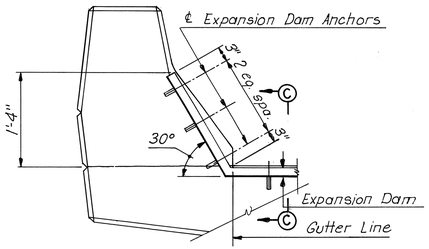


SECTION A-A

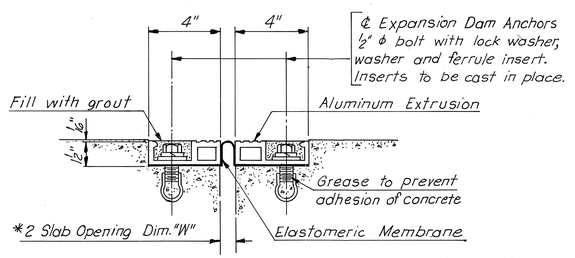


SECTION B-B

TRANSFLEX 200A JOINT DETAILS



TYPICAL SECTION ALONG ℄ JOINT



SECTION C-C

ONFLEX 25 JOINT DETAILS

DESIGNED						
DRAWN	TEM	9-30-76				
CHECKED			1	New Sheet '	TEM	9-30-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

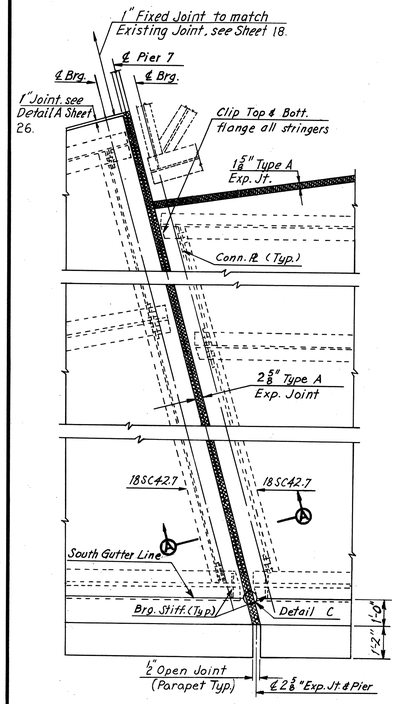
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM
RICHMOND-PETERSBURG TURNPIKE
JOINT DETAILS - PIER II

SCALE _____
DATE _____
SHEET 34A OF ____

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

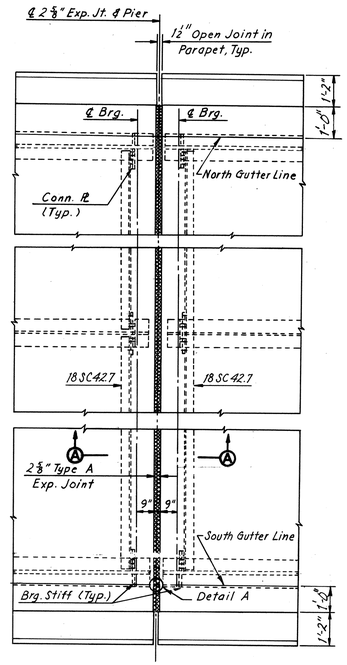
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	59	97



PLAN — JOINT AT PIER 7

Scale : ⅜"= 1'-0"

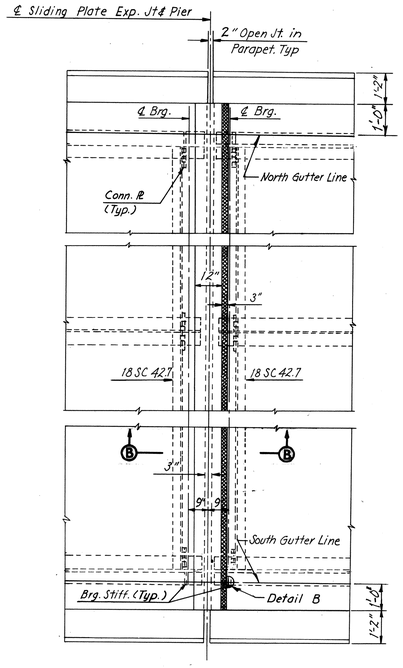
Note :
For Detail C, See Sheet 35.



PLAN — JOINT AT PIERS 8, 9, 10, 17 AND 18

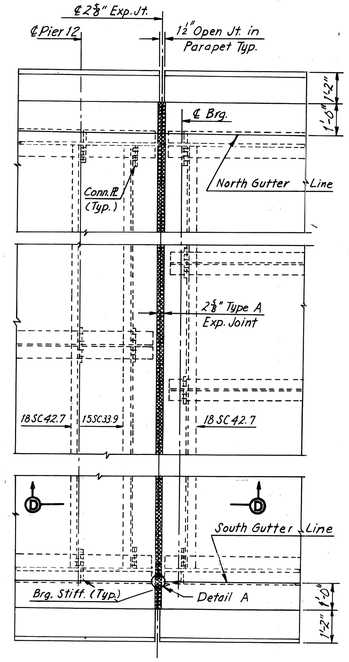
Scale : ⅜"= 1'-0"

(Piers 4 and 5 similar)



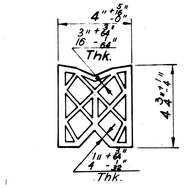
PLAN — JOINT AT PIER 11

Scale : ⅜"= 1'-0"

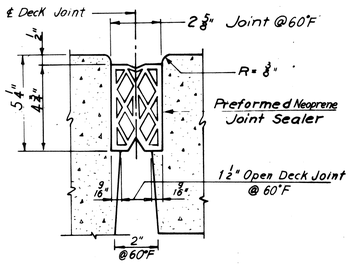


PLAN — JOINT AT PIER 12

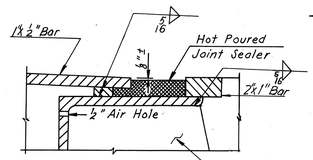
Scale : ⅜"= 1'-0"



PREFORMED NEOPRENE JOINT SEALER FOR 2 5/8" TYPE "A" JOINT

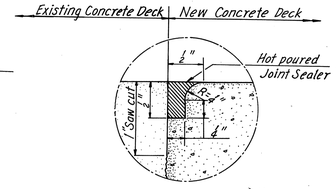


2 5/8" TYPE "A" JOINT



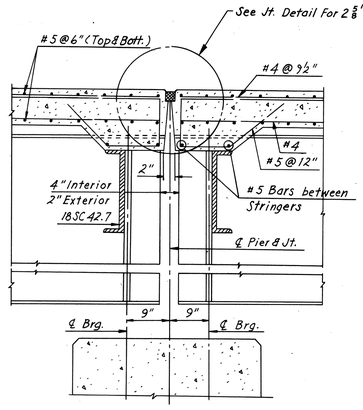
DETAIL B

Scale : 3"=1'-0"



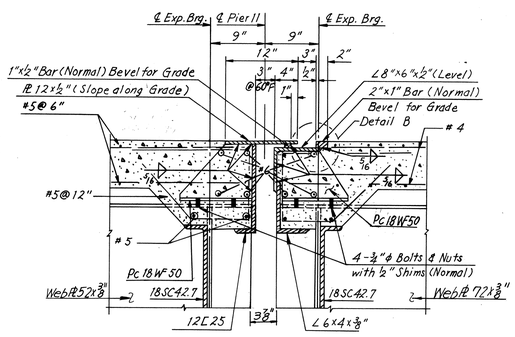
DETAIL D

Full Scale



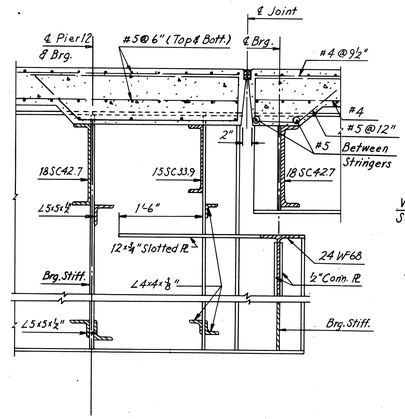
SECTION A-A

Scale : ¼"=1'-0"



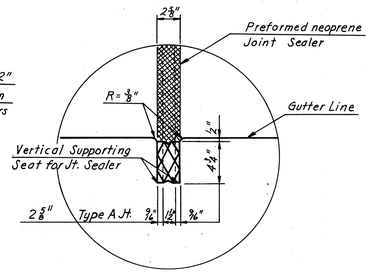
SECTION B-B

Scale : 1"= 1'-0"



SECTION D-D

Scale : ⅜"= 1'-0"



DETAIL A

No Scale

For Piers 17 and 18 see Section C-C, Sheet 35.

Note:
All horizontal dimensions 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.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	Y.C.P	12-18-68				
CHECKED	G.S.H.	1-29-69				
IN CHARGE						

AS BUILT

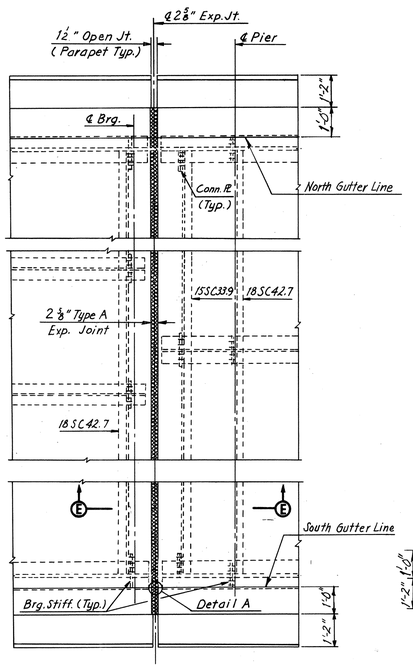
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
JOINT DETAILS

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

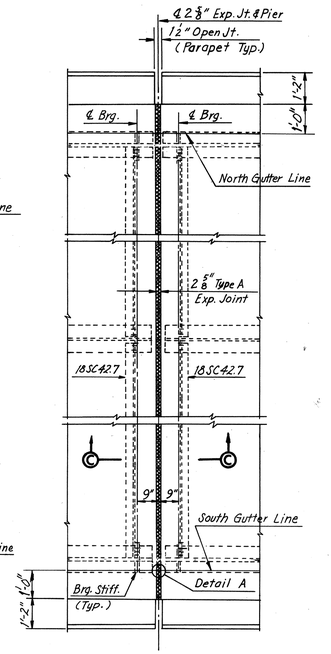
SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 34 OF 38

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	60	97



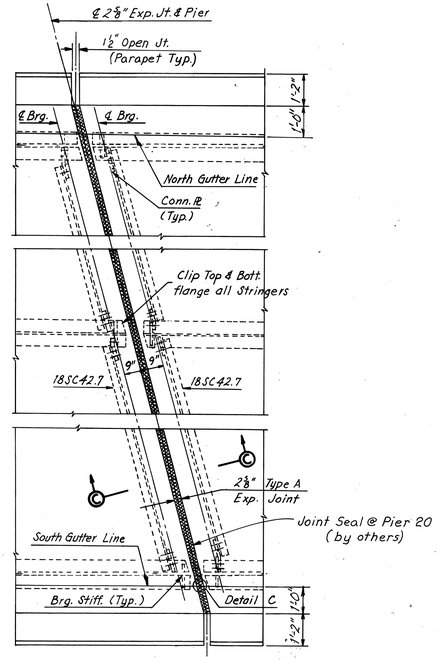
PLAN — JOINT AT PIER 13

Scale: ⅜" = 1'-0"



PLAN — JOINT AT PIERS 14, 15 AND 16

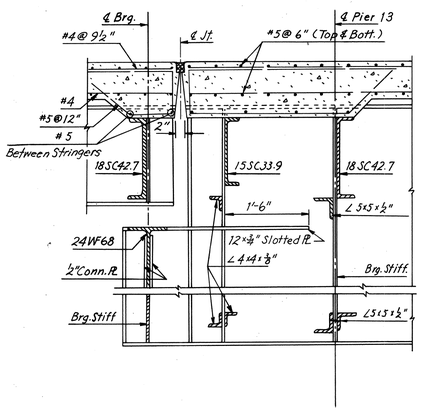
Scale: ⅜" = 1'-0"



PLAN — JOINT AT PIERS 19 AND 20

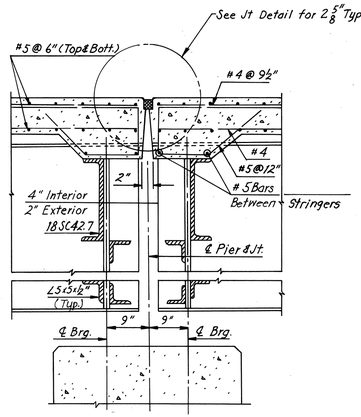
Scale: ⅜" = 1'-0"

Note: For Detail A, See Sheet 34



SECTION E-E

Scale ⅛" = 1'-0"

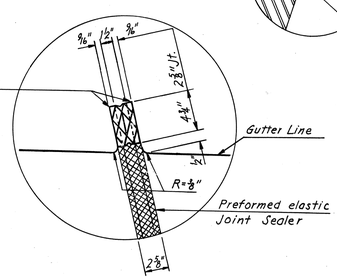


SECTION C-C

Scale ½" = 1'-0"

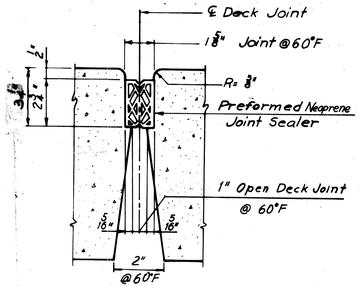
Note: All horizontal dimension of sections shown above are normal to ℄ joint and pier.

Notes: For Details of bearing stiffeners and connection plates, see Framing Plan Sheets.
For End Diaphragms, See Cross Sections-Deck Plan Sheets.

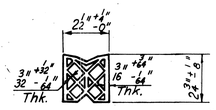


DETAIL C

No Scale

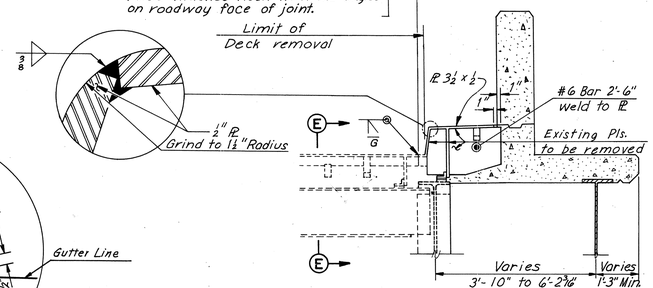


1⅝" TYPE "A" JOINT



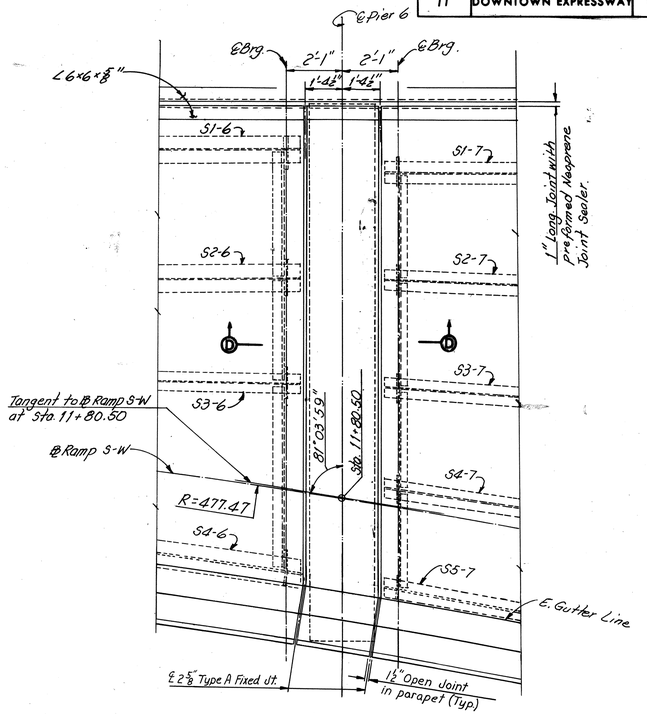
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT

Curb portion of existing expansion joints is to be removed beyond the curbline an amount sufficient for performance of single bevel groove weld between existing and new pair of L's 4 x 3½ x ½". The weld is to be finished flush with the angles on roadway face of joint.



EXPANSION JOINT AT EXISTING PIER 41

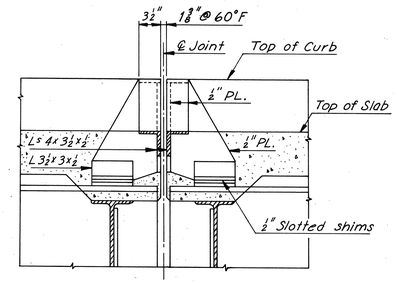
Scale: ½" = 1'-0"



PLAN – JOINT AT PIER 6

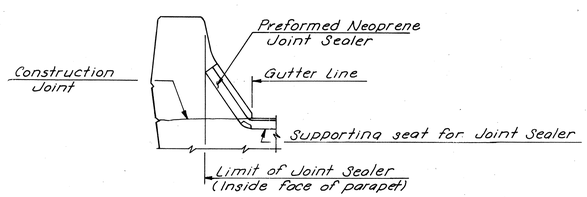
Scale ⅜" = 1'-0"

Note: For Section D-D, see Sheet 7 & 26.



SECTION E-E

Scale: 1" = 1'-0"



TREATMENT OF TYPE "A" JOINT AT GUTTER

No Scale

Note: All horizontal dimensions shown above are normal to ℄ Joint.

	BY	DATE				
MADE	Y.C.P	12-18-68				
CHECKED	G.S.H.	1-28-69	⚠	Revised Exp. Jt. at Pier 41	TEM	9-9-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 65
RAMP S-W CONNECTION FROM RICHMOND-PETERSBURG TURNPIKE
JOINT DETAILS

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

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 35 OF 38

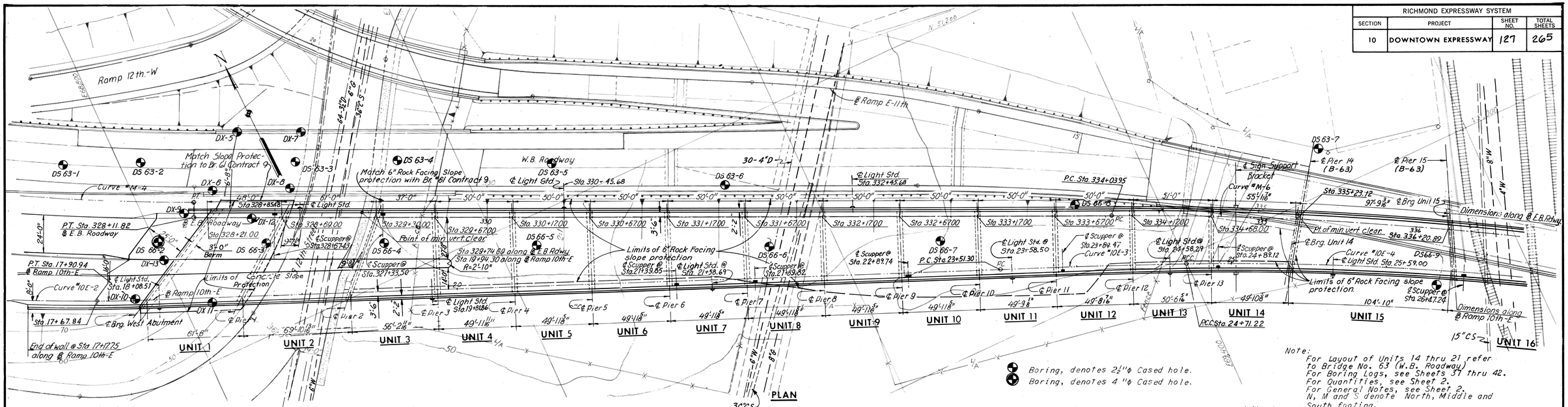
60

Bridge 66

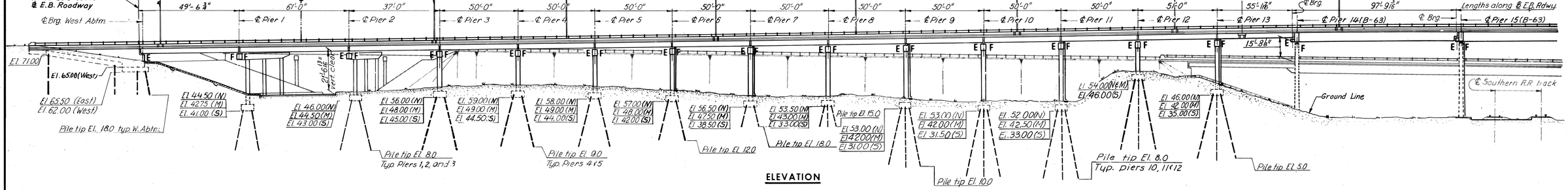
(Eastbound Downtown Expressway “Rte. 195” over Virginia Street and South 14th Street)

Record Set Plans

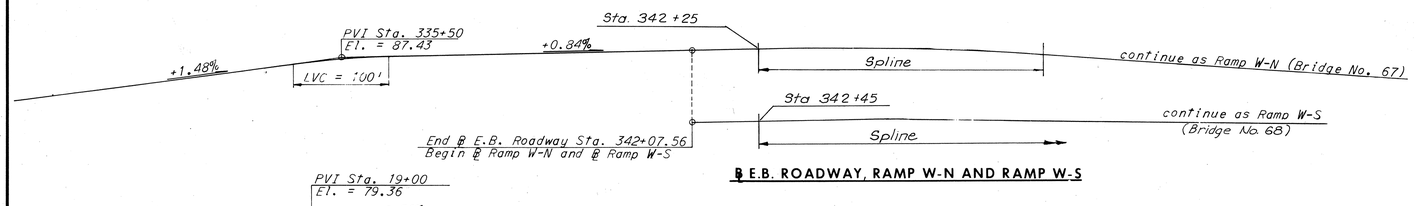
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	127	265



Note:
For Layout of Units 14 thru 21 refer to Bridge No. 63 (W.B. Roadway)
For Boring Logs, see Sheets 37 thru 42.
For Quantities, see Sheet 2.
For General Notes, see Sheet 2.
N, M and S denote North, Middle and South footing.



ELEVATION



℄ E.B. ROADWAY, RAMP W-N AND RAMP W-S

℄ RAMP 10TH-E.

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'

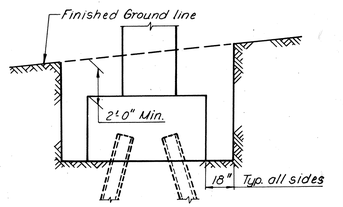
Curve: 10E-2		℄ Ramp 10th-E Curve: 10E-3		Curve: 10E-4	
P.I.	= 17+36.87	P.I.	= 24+11.27	P.I.	= 26+80.64
Δ	= 6°29'42"	Δ	= 1°11'57"	Δ	= 12°30'55"
D	= 6°00'	D	= 1°00'	D	= 3°00'
T	= 54.18'	T	= 59.97'	T	= 209.42'
L	= 108.25	L	= 119.93'	L	= 417.18'
R	= 954.93'	R	= 5,729.58'	R	= 1,909.86'

HORIZONTAL CURVE DATA

	BY	DATE
MADE	J.V.	9-12-68
CHECKED	G.C.C.	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

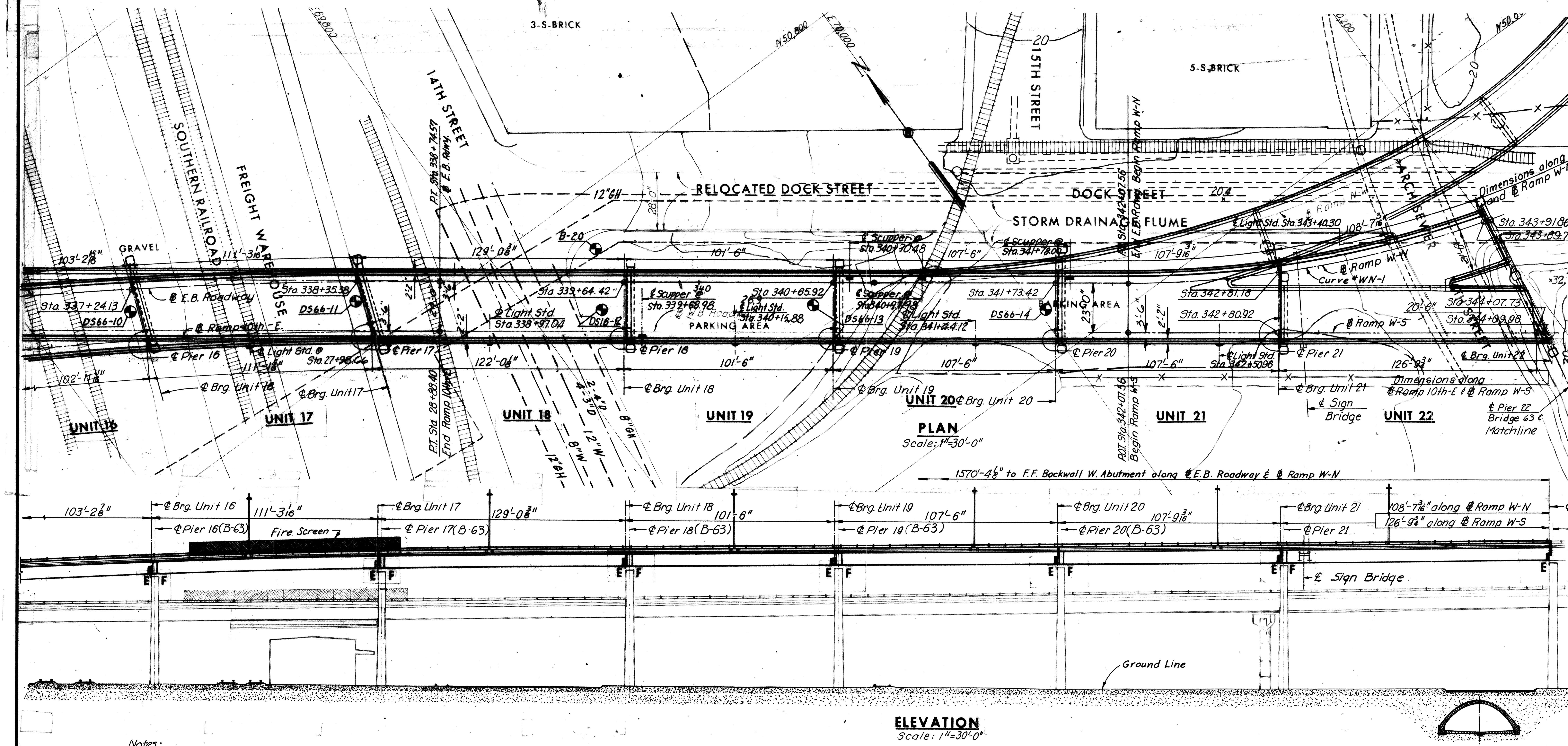
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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 14 thru 22 refer to Bridge No. 63 (Westbound Roadway).

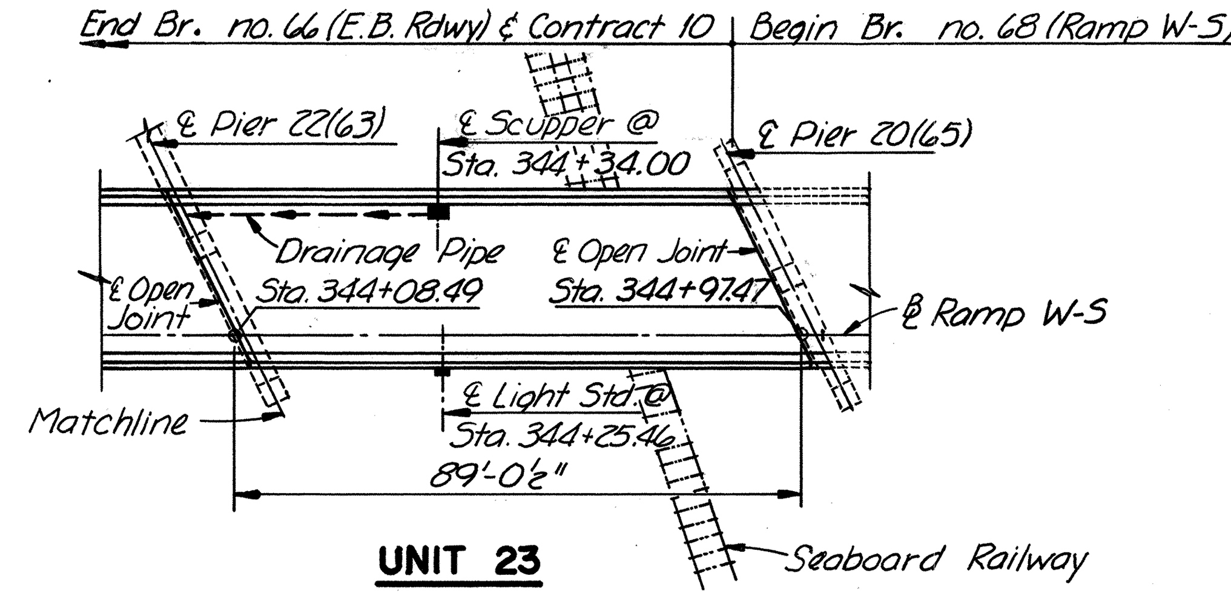
ESTIMATED QUANTITIES

	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	530,860	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 8- 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

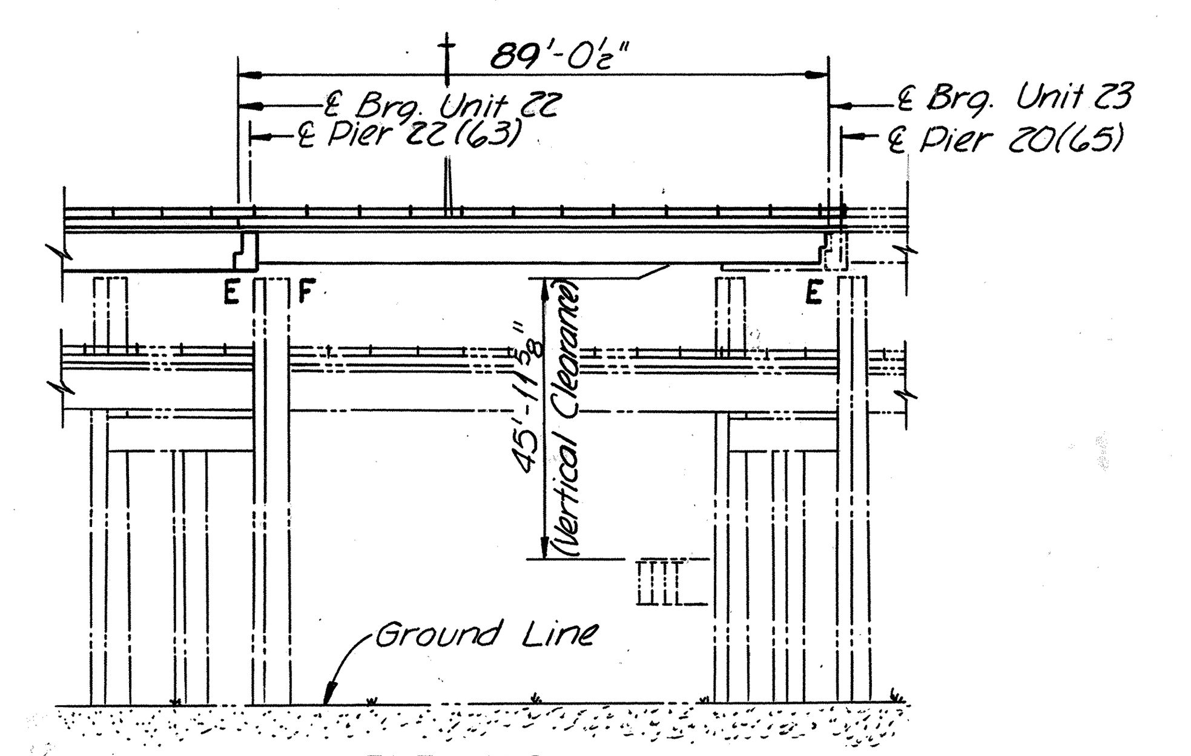
‡ All Concrete for Superstructure shall be Class A4 and for Substructure Class A3.

End Br. no. 66 (E.B. Rdwy) & Contract 10 | Begin Br. no. 68 (Ramp W-S) by others



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.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.V.	1-9-69	1	Span Fixities & R.R. name added	PRMS	4-19-74
CHECKED	G.C.C.	5-26-69	2	Sign Bridge added & Struct. St'l Qty.	R.B.H.	9-74
IN CHARGE			3	As Built	TEM	8-76

AS BUILT

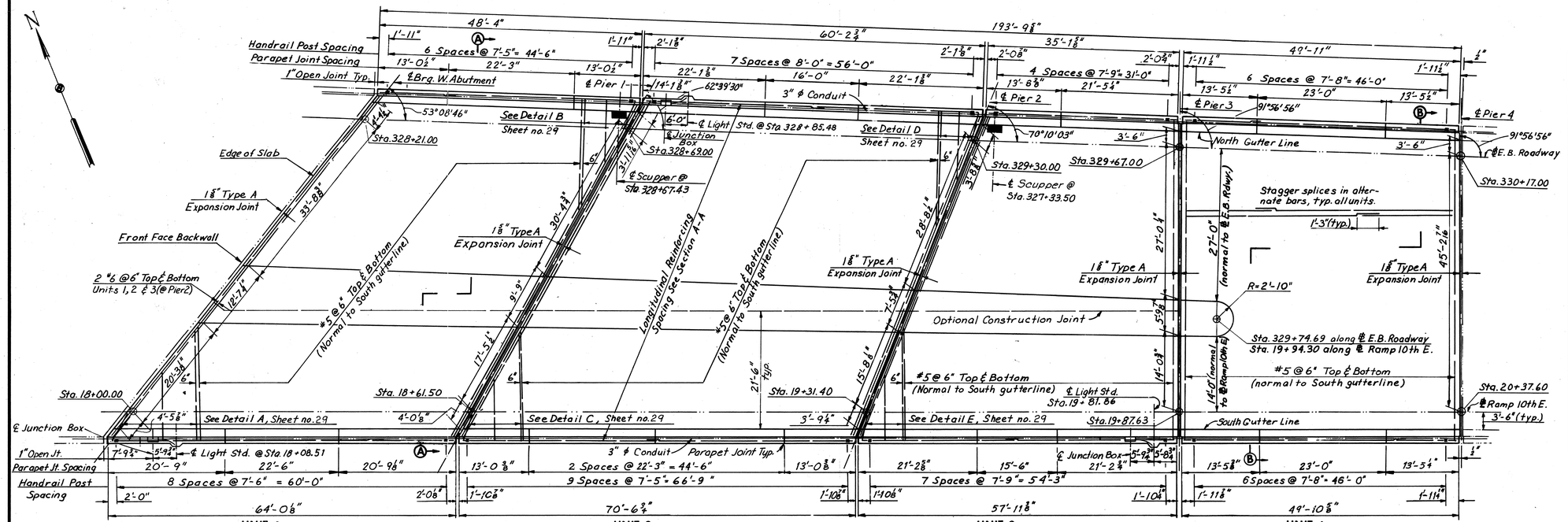
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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

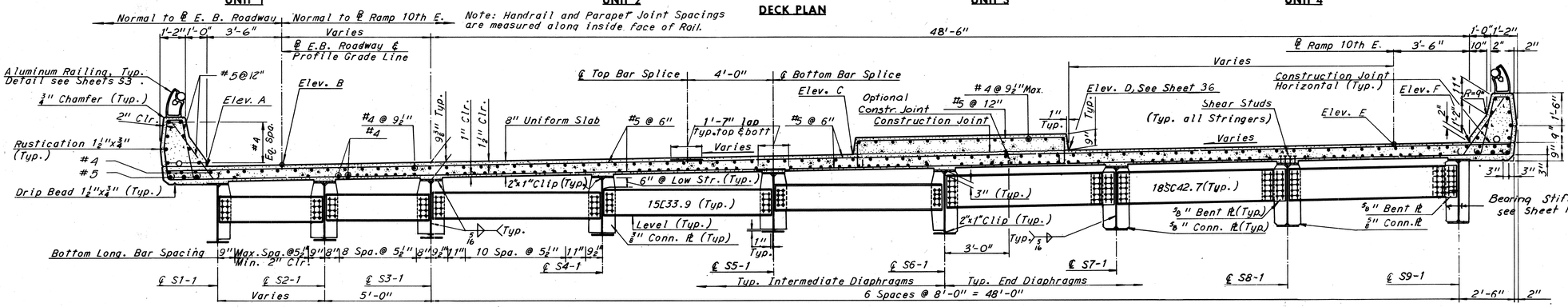
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	154	265



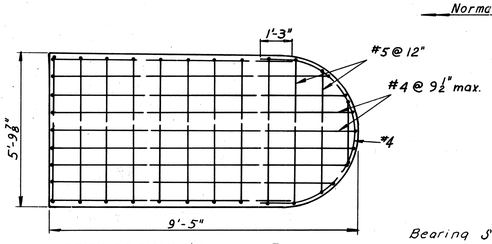
DECK PLAN

Normal to ℄ E. B. Roadway, Normal to ℄ Ramp 10th E.

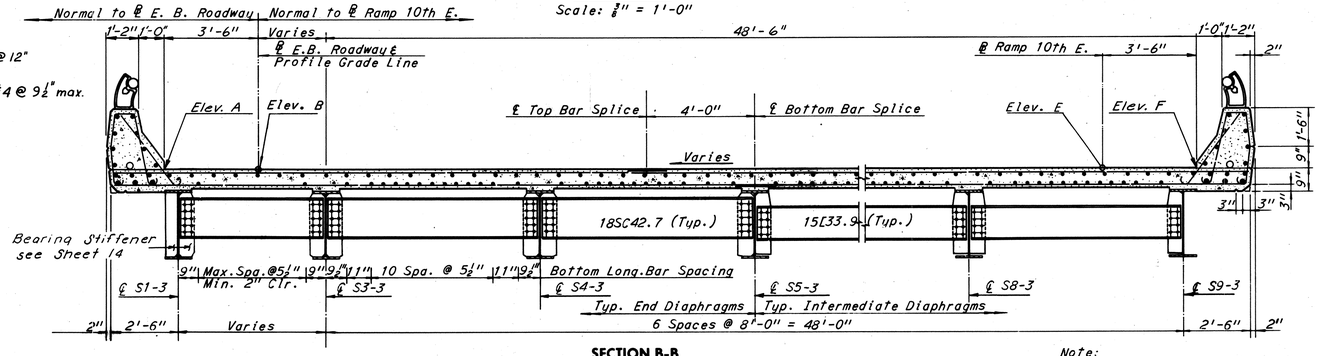
Note: Handrail and Parapet Joint Spacings are measured along inside face of Rail.



SECTION A-A
Scale: ⅜" = 1'-0"



REINFORCING DETAIL AT NOSE
Scale: ⅜"=1'-0"



SECTION B-B
Scale: ⅜" = 1'-0"

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	75.76	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.

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.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	J.D.	8-6-68	2	As Built	T.E.M.	8-76
CHECKED	J.V.	10-23-68		Bar Space Added	PRMS	4-19-74
IN CHARGE						

AS BUILT

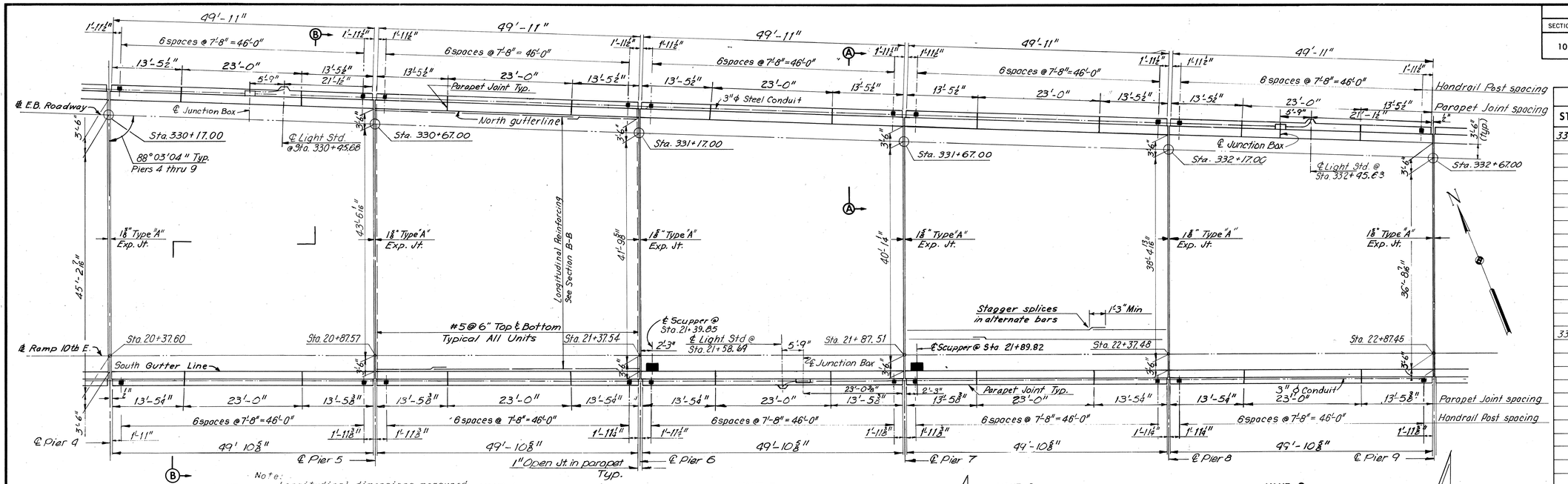
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER 12TH ST. - R.R. TRACKS AND 16TH ST.
DECK PLAN - UNITS 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

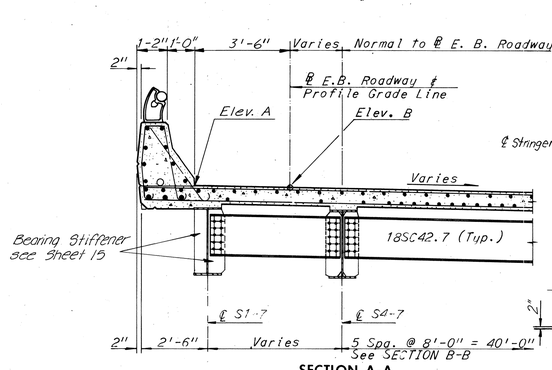
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	155	265



Note: Longitudinal dimensions measured along inside face of rail.

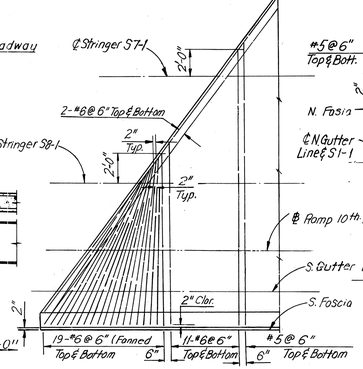
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
330+10.00	79.39	79.44	80.08
+16.88	79.50	--	--
+17.00	--	79.54	--
+18.66	--	--	80.12
+20.00	79.54	79.59	80.13
+30.00	79.71	79.73	80.16
+40.00	79.86	79.88	80.21
+50.00	80.02	80.03	80.27
+60.00	80.17	80.18	80.32
+66.88	80.28	--	--
+67.00	--	80.28	--
+68.60	--	--	80.36
+70.00	80.32	80.33	80.37
+80.00	80.48	80.47	80.43
+90.00	80.63	80.62	80.49
331+00.00	80.79	80.77	80.54
+10.00	80.94	80.92	80.60
+16.88	81.05	--	--
+17.00	--	81.02	--
+18.54	--	--	80.65
+20.00	81.09	81.07	80.66
+30.00	81.26	81.21	80.72
+40.00	81.41	81.36	80.78
+50.00	81.57	81.51	80.84
+60.00	81.72	81.66	80.92
+66.88	81.82	--	--
+67.00	--	81.76	--
+68.48	--	--	81.00
+70.00	81.87	81.81	81.01
+80.00	82.02	81.95	81.12
+90.00	82.17	82.10	81.25
332+00.00	82.32	82.25	81.40
+10.00	82.47	82.40	81.56
+16.88	82.57	--	--
+17.00	--	82.50	--
+18.42	--	--	81.69
+20.00	82.62	82.55	81.71
+30.00	82.76	82.69	81.86
+40.00	82.91	82.84	82.02
+50.00	83.06	82.99	82.17
+60.00	83.21	83.14	82.33
+66.88	83.31	---	--
+67.00	--	83.24	--
+68.37	--	--	82.46
+70.00	83.36	83.29	82.48

UNIT 5



SECTION A-A
Scale: ⅜" = 1'-0"

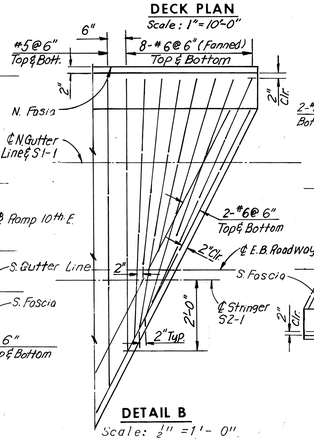
UNIT 6



DETAIL A
Scale: ⅛" = 1'-0"

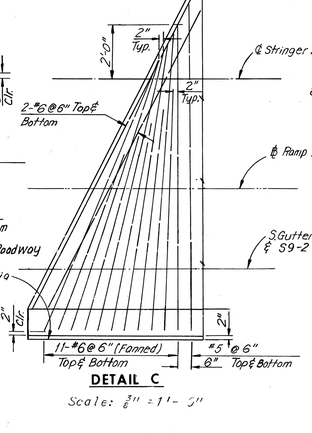
UNIT 7

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



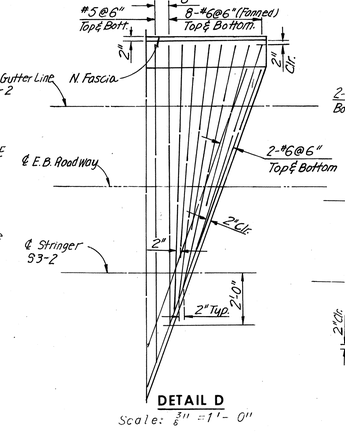
DETAIL B
Scale: ½" = 1'-0"

UNIT 8

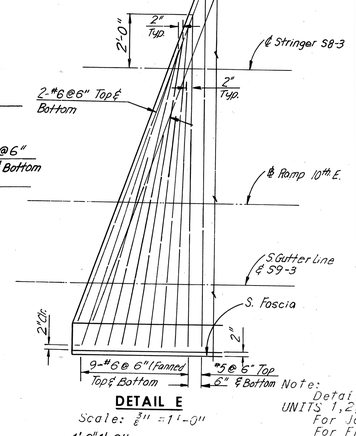


DETAIL C
Scale: ⅜" = 1'-0"

UNIT 9

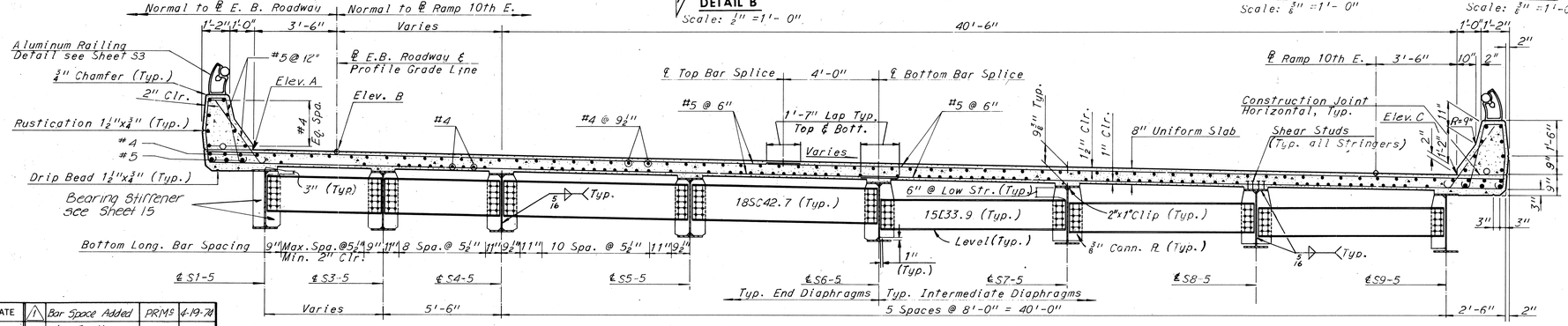


DETAIL D
Scale: ⅜" = 1'-0"



DETAIL E
Scale: ⅜" = 1'-0"

Details A through E belong to DECK-PLAN-UNITS 1,2,3 and 4, see Sheet 28
For Joint Details, see Sheet 37
For Framing Plan, see Sheet 15.
For Handrail Details, see Sheet 53.
For Superstructure Quantities, see Sheet 2.
For Standard Drainage Details, see Support Type 1, Sheet S5 & 56.



SECTION B-B
Scale: ⅜" = 1'-0"

	BY	DATE
MADE	SHS	8-2-68
CHECKED	AHH	11-1-68
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built	TEM	8-76

AS BUILT

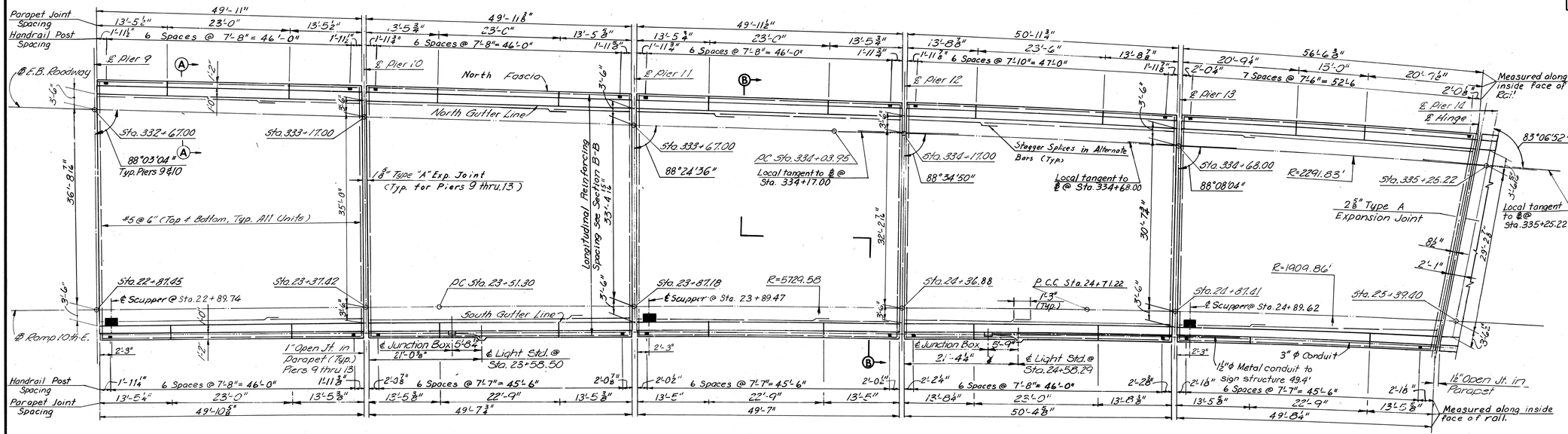
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
DECK PLAN - UNITS 5, 6, 7, 8, AND 9

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

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 29 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	156	265

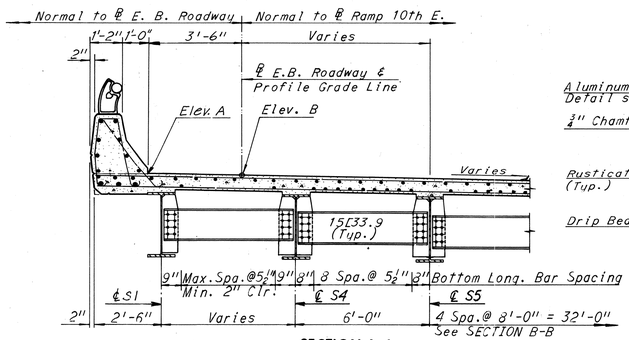


UNIT 10 UNIT 11 UNIT 12 UNIT 13 UNIT 14

DECK PLAN

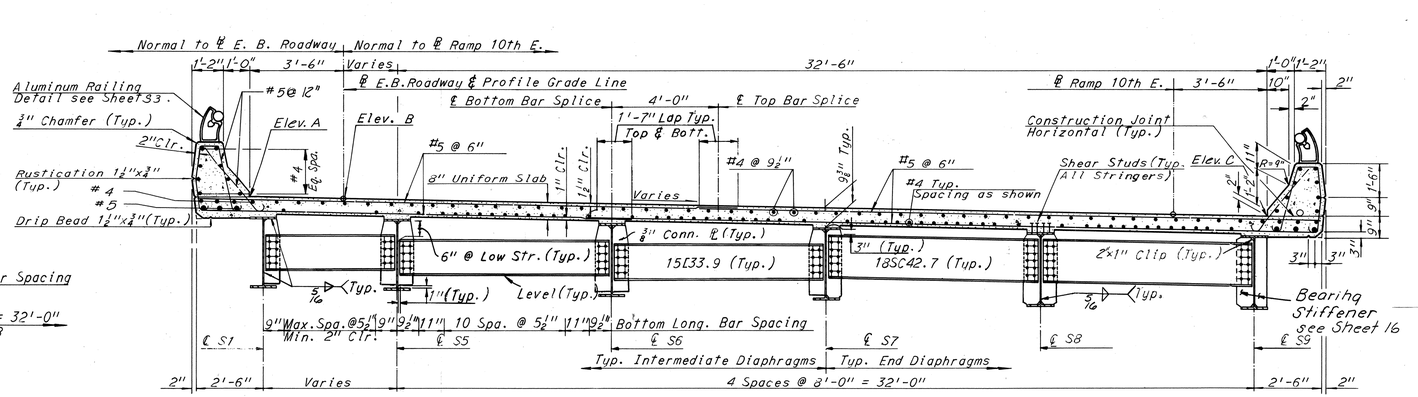
Scale 1" = 10'-0"

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
332+60.00	83.21	83.14	82.33
332+66.88	83.31	———	———
332+67.00	———	83.24	———
332+68.37	———	———	82.46
332+70.00	83.36	83.29	82.48
332+80.00	83.50	83.43	82.64
332+90.00	83.65	83.58	82.79
333+00.00	83.80	83.73	82.95
333+10.00	83.95	83.88	83.10
333+16.88	84.05	———	———
333+17.00	———	83.98	———
333+18.31	———	———	83.21
333+20.00	84.10	84.03	83.23
333+30.00	84.25	84.17	83.35
333+40.00	84.40	84.32	83.45
333+50.00	84.56	84.47	83.54
333+60.00	84.71	84.62	83.62
333+66.90	84.82	———	———
333+67.00	———	84.72	———
333+68.02	———	———	83.69
333+70.00	84.86	84.77	83.70
333+80.00	85.03	84.91	83.78
333+90.00	85.18	85.06	83.86
334+00.00	85.34	85.21	83.94
334+10.00	85.49	85.36	84.03
334+16.91	85.60	———	———
334+17.00	———	85.46	———
334+17.88	———	———	84.10
334+20.00	85.64	85.51	84.12
334+30.00	85.80	85.65	84.20
334+40.00	85.95	85.80	84.30
334+50.00	86.11	85.95	84.39
334+60.00	86.26	86.10	84.49
334+67.89	86.38	———	———
334+68.00	———	86.22	———
334+69.11	———	———	84.63
334+70.00	86.41	86.25	84.61
334+80.00	86.56	86.39	84.74
334+90.00	86.71	86.54	84.88
335+00.00	86.86	86.69	85.04
335+10.00	87.01	86.84	85.20
335+20.00	87.15	86.97	85.35
335+25.64	87.23	———	———
335+25.22	———	87.04	———
335+21.29	———	———	85.36
335+30.00	87.29	87.11	85.49



SECTION A-A

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 16.
For Handrail Details, see Sheet 53
For Superstructure quantities, see Sheet 2.
For Standard Drainage Details, see Support Type , Sheet S5 ℄ S6.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	WJC	8-5-68	2	Bar Space Added	PRM	4-19-74
CHECKED	JD	10-21-68		As Built	TEM	8-76
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

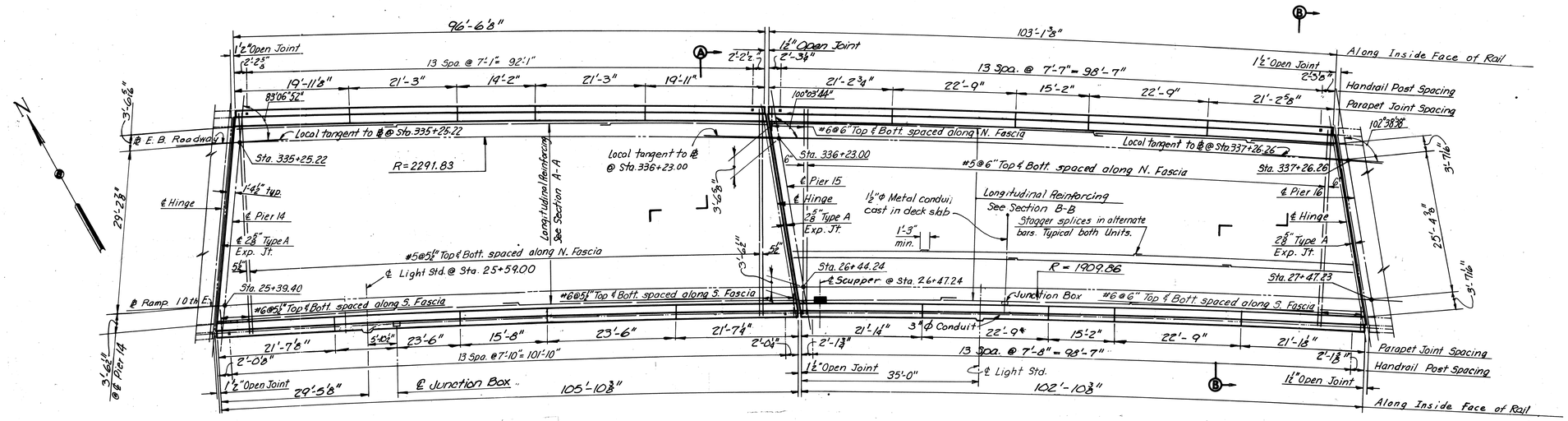
BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST - R.R. TRACKS AND 16TH ST.
DECK PLAN - UNITS 10.11.12.13 AND 14

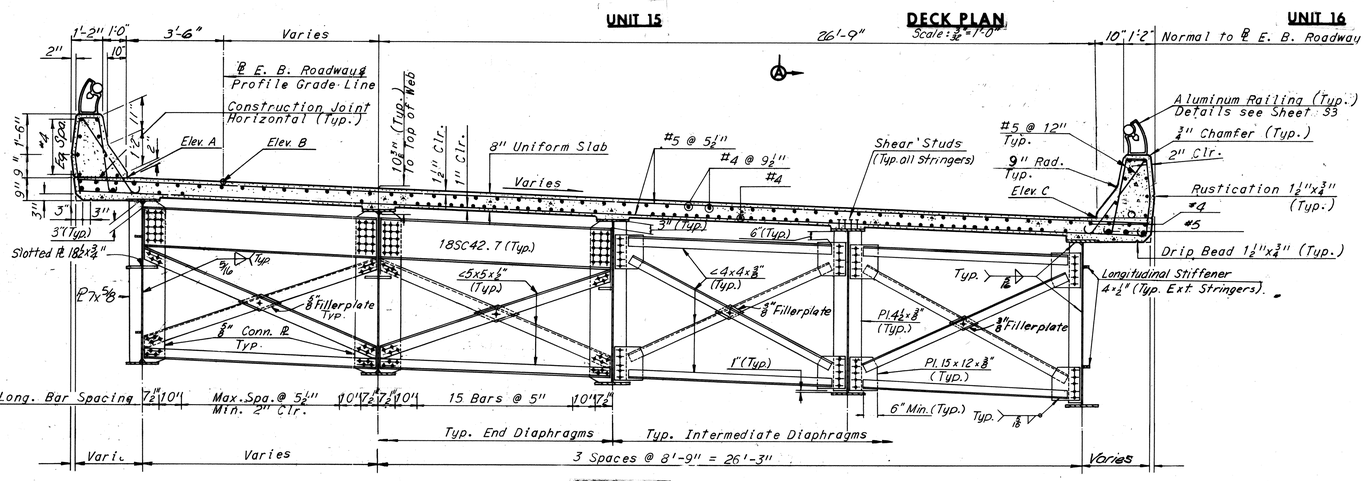
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 30 OF 46

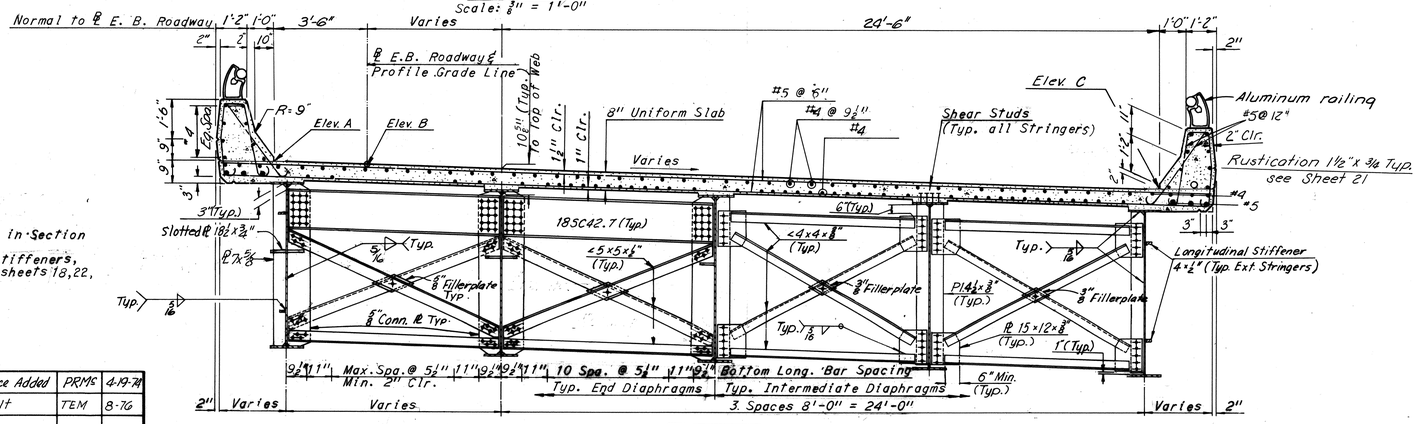
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	157	265

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
+25.98	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





SECTION A-A
Scale: ⅜" = 1'-0"



SECTION B-B
Scale: ⅜" = 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				
MADE	RLM	8-6-68	2	As Built	PRMG	4-19-74
CHECKED	SCC	10-21-68			TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

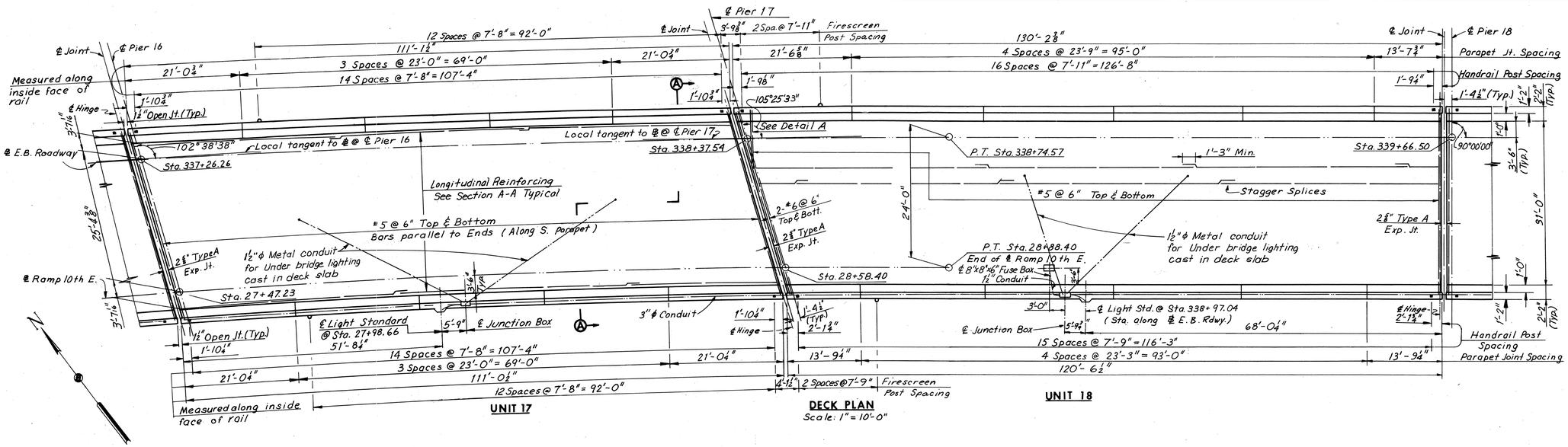
AS BUILT

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 15 AND 16

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

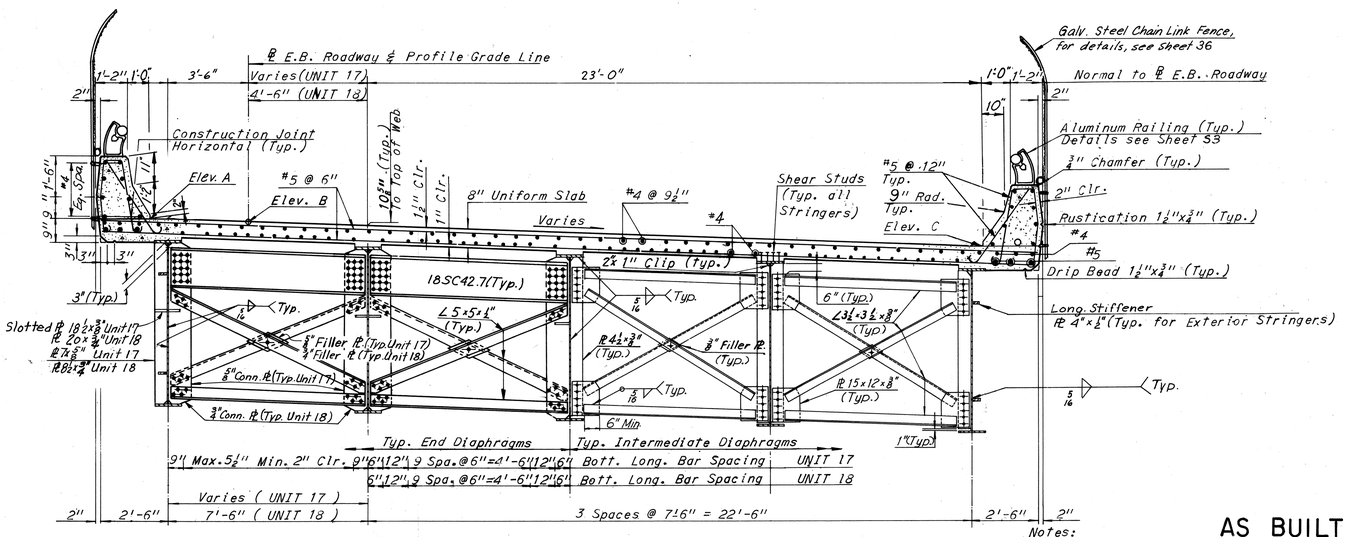
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 31 OF 46



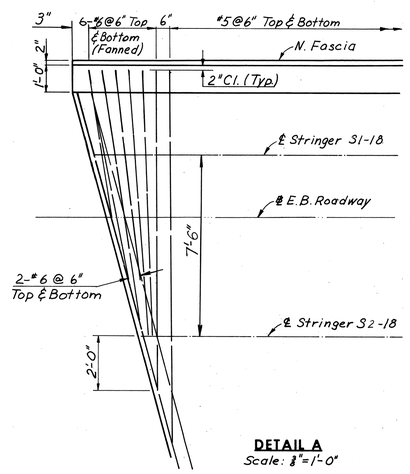
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	158	205

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	88.57
+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"

AS BUILT

Notes:
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.

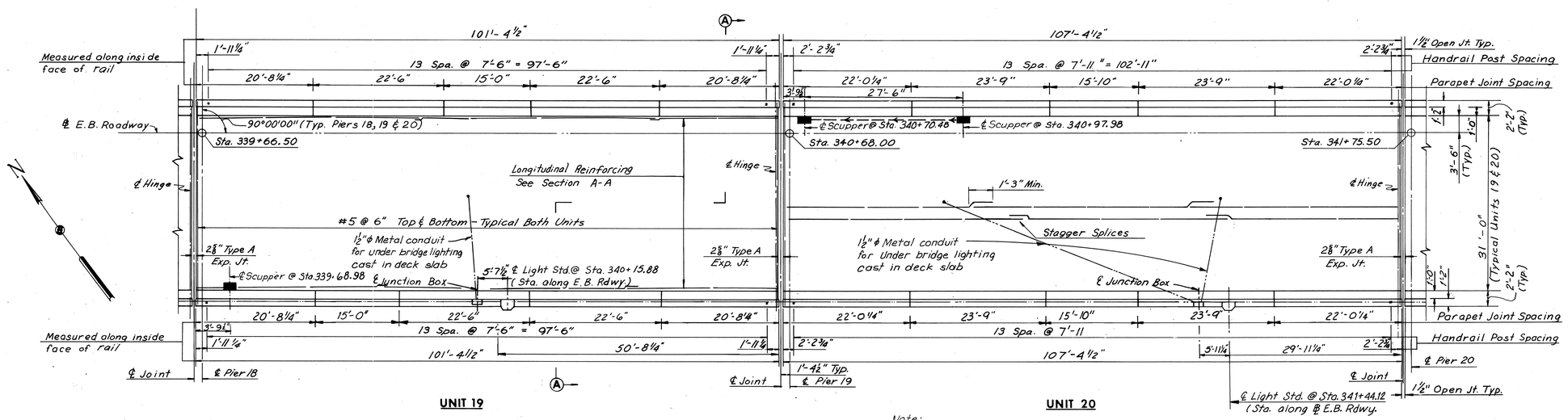
DECK PLAN – UNITS 17 AND 18

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

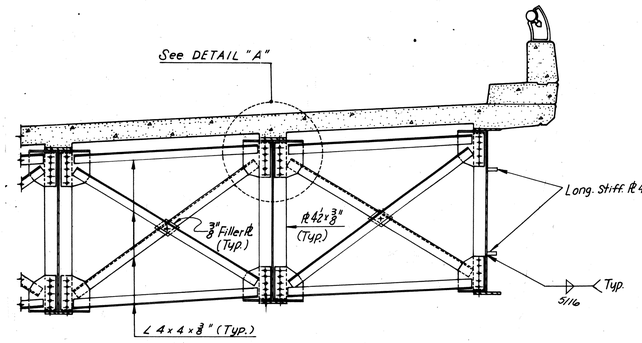
SCALE:
CONTRACT NO.: 10
SHEET NO. 32 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	159	265

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

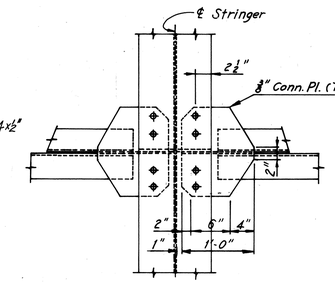


Note: For Standard Drainage details for Unit 19 See Support Type 2 Sheet S5 and for Unit 20 Support Type 7 Sheet S6.

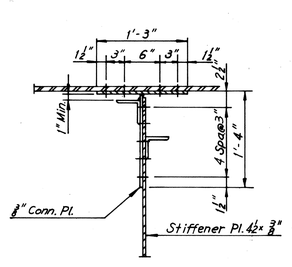


INTERMEDIATE DIAPHRAGM
Scale: ⅜"=1'-0"

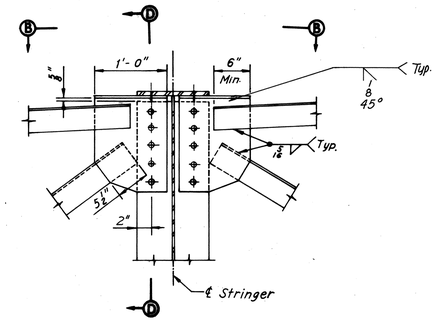
DECK PLAN
Scale: 1"=10'-0"



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



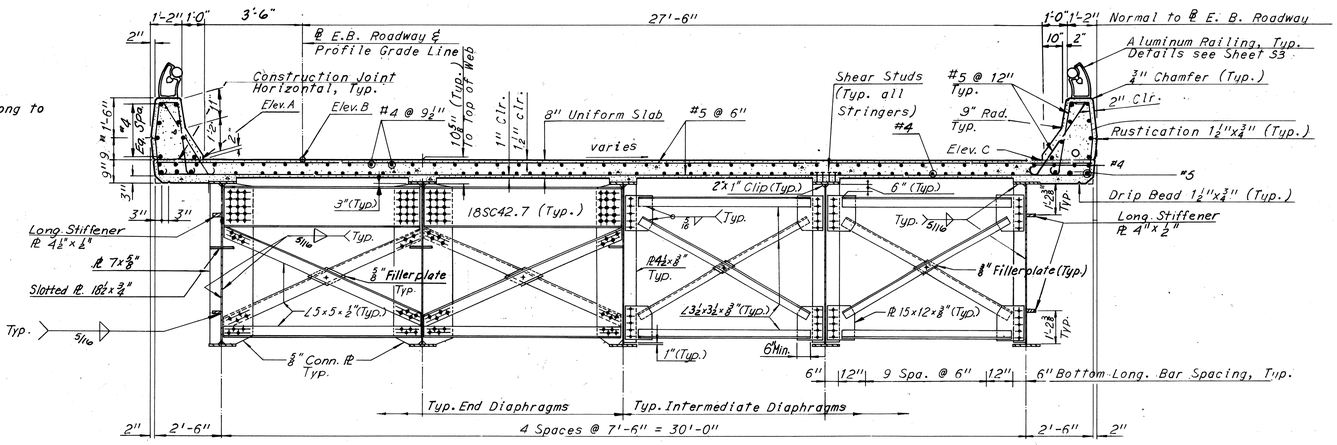
SECTION D-D
Scale:



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	NO.	REVISION	BY	DATE
MADE	SHS	8-2-68				
CHECKED	R. C.	10-18-68	1	As Built	TEM	8-76
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

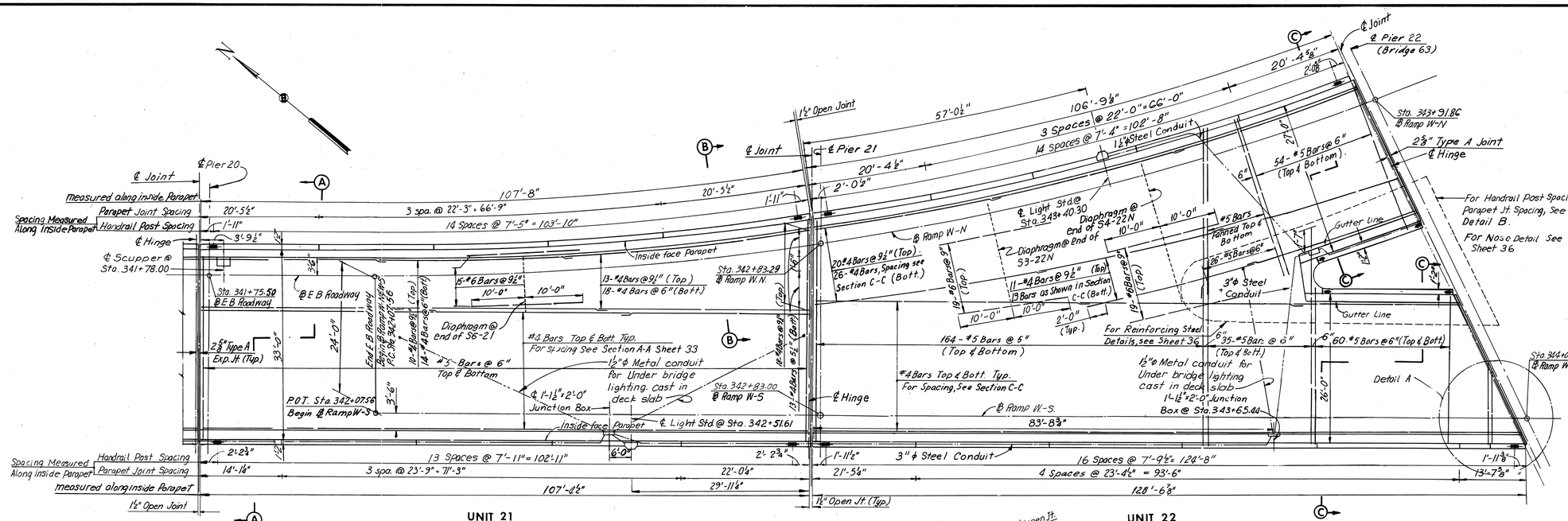
BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.

DECK PLAN-UNITS 19 AND 20

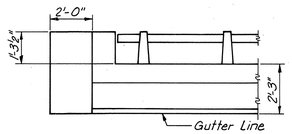
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 33 OF 46

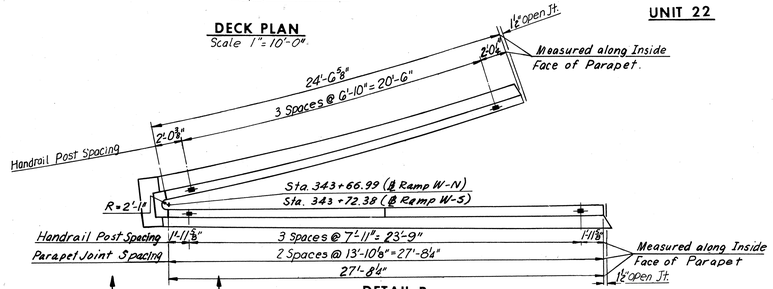
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	160	265



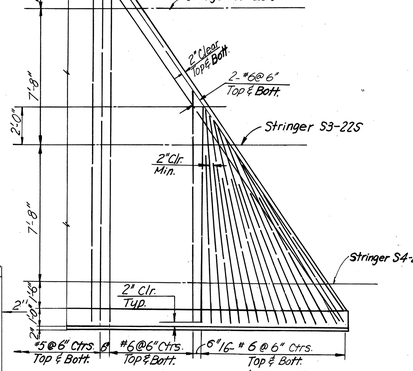
Note: For Section A-A, see Sheet 33.



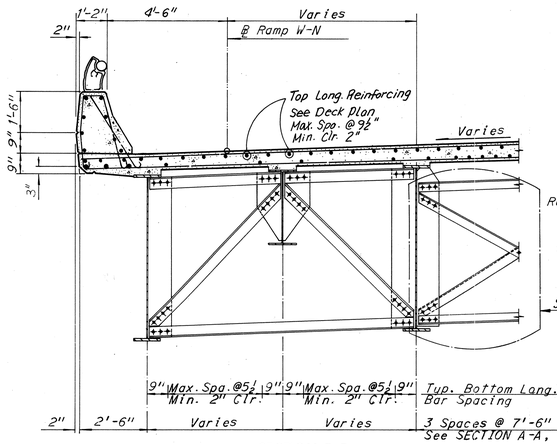
VIEW D-D
No Scale



DECK PLAN
Scale 1" = 10'-0"

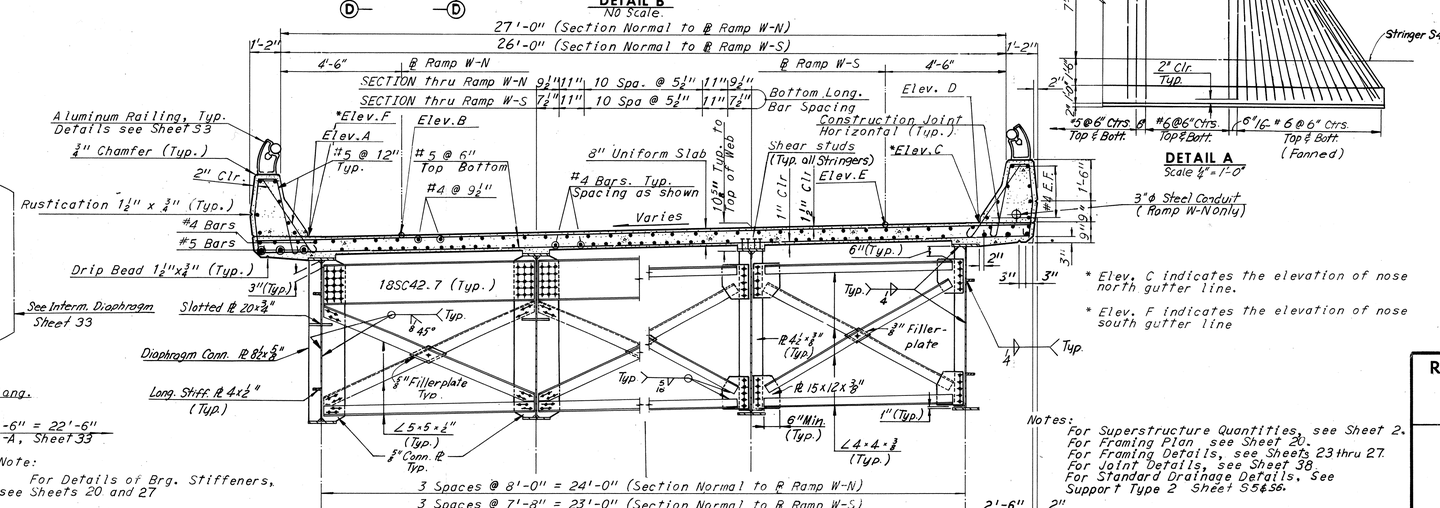


DETAIL A
Scale ½" = 1'-0"



SECTION B-B
Scale: ⅜" = 1'-0"

Note: For Details of Brg. Stiffeners, see Sheets 20 and 27



SECTION C-C
Scale: ⅜" = 1'-0"

Note: Intermediate Diaphragms shown can only be used where stringers are straight. For Intermediate Diaphragm Details at curved stringers, see Sheet 33.

* Elev. C indicates the elevation of nose north gutter line.

* Elev. F indicates the elevation of nose south gutter line

Notes:
For Superstructure Quantities, see Sheet 2.
For Framing Plan see Sheet 20.
For Framing Details, see Sheets 23 thru 27.
For Joint Details, see Sheet 38.
For Standard Drainage Details, see Support Type 2 Sheet S54.56.

ELEVATION TABLE

STATION ℄ RampW-N	ELEV. A	ELEV. B	*ELEV. C
341+75.50	92.61	92.68	—
+80.00	92.65	92.72	—
+90.00	92.74	92.81	—
342+00.00	92.82	92.89	—
+10.00	92.90	92.97	—
+20.00	92.98	93.06	—
+30.00	93.06	93.15	—
+40.00	93.14	93.24	—
+50.00	93.21	93.32	—
+60.00	93.26	93.38	—
+70.00	93.32	93.45	—
+80.00	93.35	93.49	—
+90.00	93.37	93.52	—
343+00.00	93.39	93.55	—
+10.00	93.40	93.57	—
+20.00	93.38	93.56	—
+30.00	93.35	93.54	—
+40.00	93.30	93.50	—
+50.00	93.22	93.43	—
+60.00	93.14	93.35	94.64
+70.00	93.02	93.23	94.52
+80.00	92.86	93.07	94.36
+90.00	92.66	92.87	94.16

ELEVATION TABLE

STATION ℄ RampW-S	ELEV. D	ELEV. E	*ELEV. F
342+07.56	93.50	93.43	—
+10.00	93.52	93.45	—
+20.00	93.61	93.54	—
+30.00	93.69	93.62	—
+40.00	93.78	93.71	—
+50.00	93.87	93.80	—
+60.00	93.97	93.90	—
+70.00	94.08	94.01	—
+80.00	94.20	94.13	—
+90.00	94.31	94.24	—
343+00.00	94.42	94.35	—
+10.00	94.53	94.46	—
+20.00	94.64	94.57	—
+30.00	94.74	94.67	—
+40.00	94.84	94.77	—
+50.00	94.93	94.86	—
+60.00	95.01	94.94	94.53
+70.00	95.07	95.00	94.59
+80.00	95.14	95.07	94.69
+90.00	95.18	95.12	94.79
344+00.00	95.21	95.16	94.89
+10.00	95.22	95.18	94.96

	BY	DATE				
MADE	G.S.H.	08-09-68				
CHECKED	S.C.C.	10-25-68	1	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

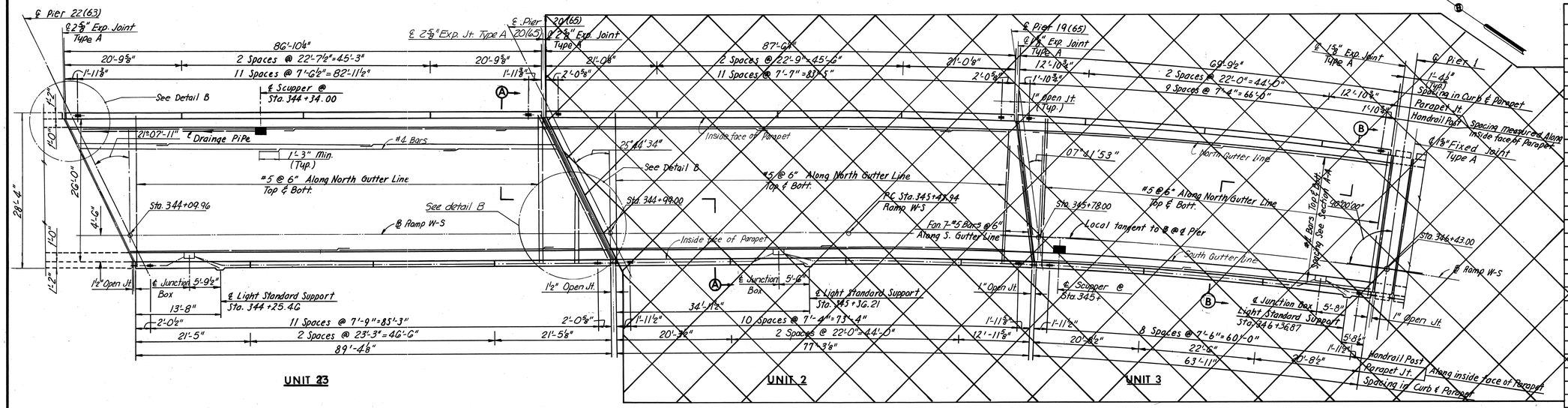
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
DECK PLAN —UNITS 21 AND 22

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

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 34 OF 46

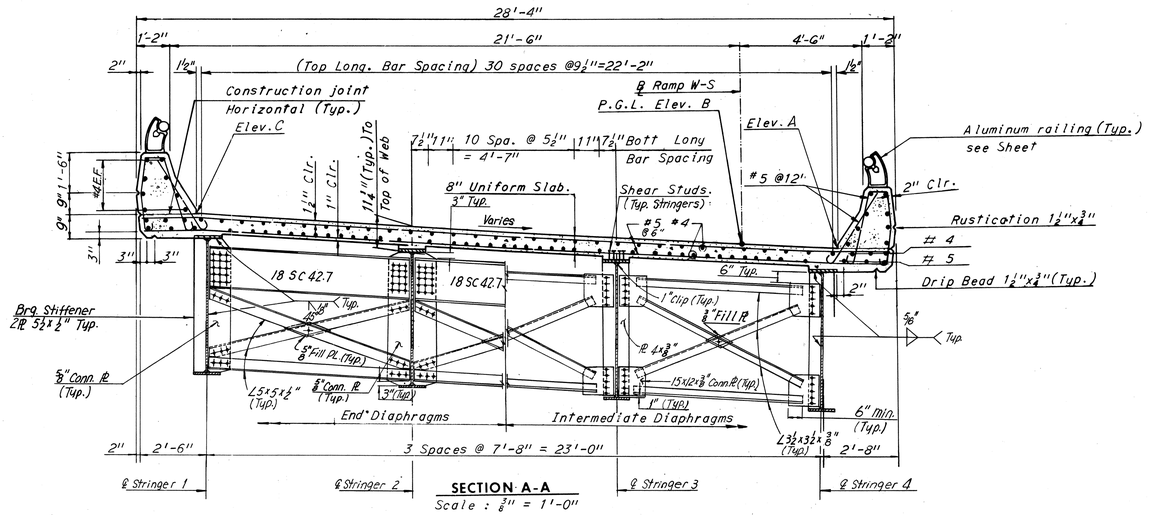
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	161	265



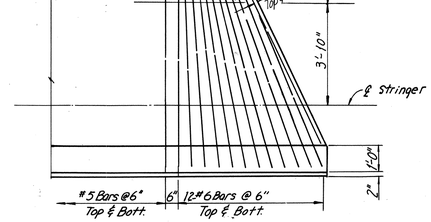
DECK PLAN
Scale: 1"=10'-0"

Note:
Section B-B, see Sheet 20.

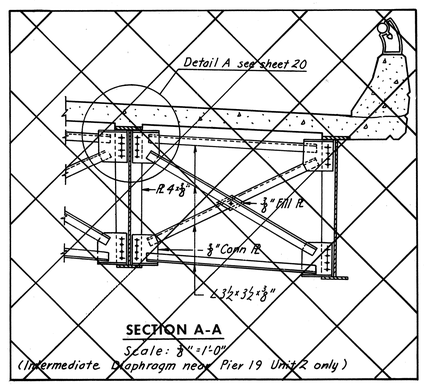
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
344+00.00	95.21	95.16	94.89
+10.00	95.22	95.18	94.96
+20.00	95.21	95.18	95.02
+30.00	95.19	95.17	95.06
+40.00	95.14	95.13	95.08
+50.00	95.08	95.08	95.08
+60.00	95.01	95.02	95.10
+70.00	94.91	94.94	95.10
+80.00	94.81	94.85	95.10
+90.00	94.69	94.75	95.08
345+00.00	94.47	94.06	93.99
+10.00	94.51	94.02	93.94
+20.00	94.55	93.98	93.89
+30.00	94.60	93.94	93.83
+40.00	94.63	93.89	93.76
+50.00	94.65	93.83	93.69
+60.00	94.66	93.76	93.61
+70.00	94.66	93.68	93.52
+73.84	94.66	---	---
+77.08	---	---	93.44
+78.00	---	93.61	---
+80.00	94.66	93.59	93.41
345+90.00	94.62	93.49	93.29
346+00.00	94.56	93.38	93.17
+10.00	94.47	93.25	93.05
+20.00	94.35	93.12	92.91
+30.00	94.20	92.97	92.76
+40.00	94.06	92.82	92.61
+41.63	---	---	92.59
+41.66	94.02	---	---



SECTION A-A
Scale : ⅜" = 1'-0"



DETAIL B
Scale: ⅜"=1'-0"



SECTION A-A
Scale: ⅜"=1'-0"
(Intermediate Diaphragm near Pier 19 Unit 2 only)

Notes
For Framing Plan, see Sheet 21.
For Standard Lighting Details, see Sheet S4.
For Standard Drainage Details, see Support Type 2 Sheet S5&S6.
For Joint Details, see Sheet 38.
For Standard Handrail Details, see Sheet S3.

	BY	DATE				
MADE	G.S.H.	10-29-68	1	Bar Call-outs Added	PRMS	4-19-74
CHECKED	A.H.H.	12-13-68	2	As Built	TEM	8-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

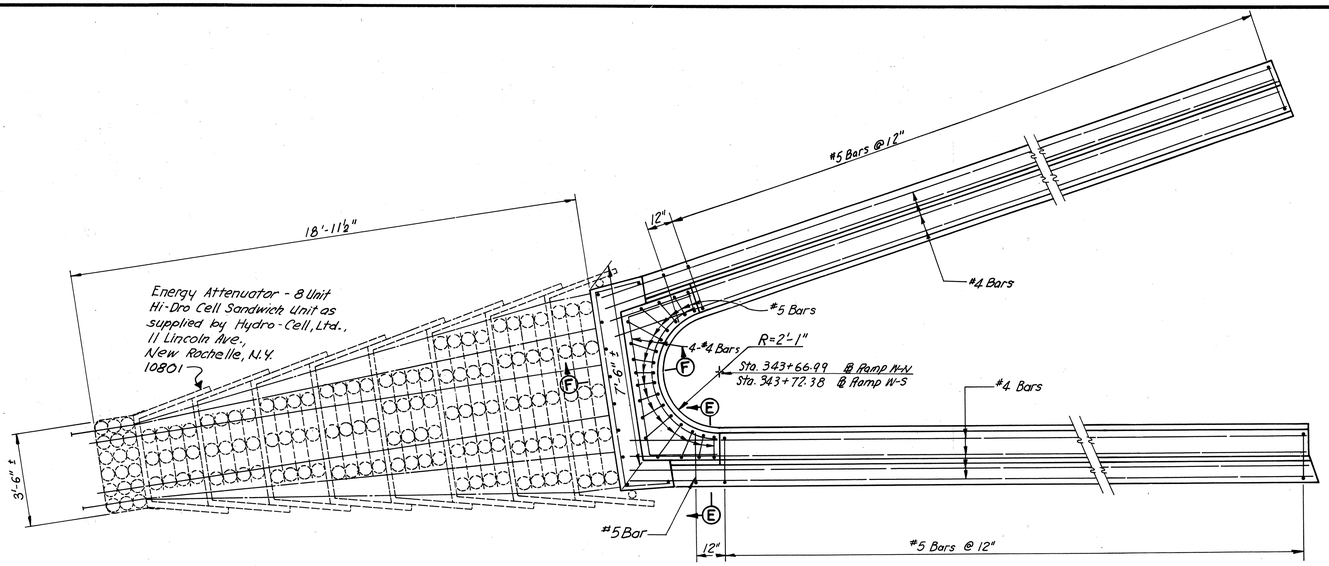
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST.-R.R. TRACKS AND 16TH ST.
DECK PLAN — UNIT 23

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

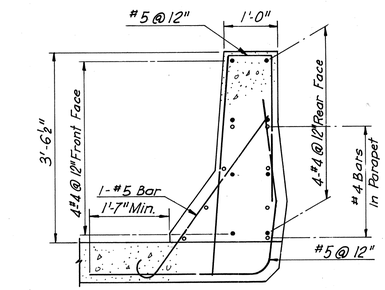
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 35 OF 46

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	162	265

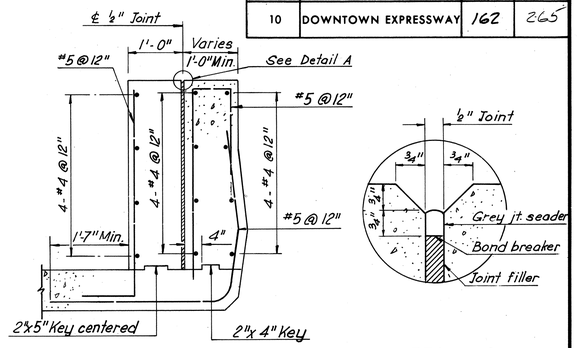


Note:
Reinforcing Steel in curb and parapet is shown.
For typical section thru. curb and parapet, see Section C-C Sheet 34.

CURB AND PARAPET REINFORCING STEEL DETAIL
Scale : ⅜" = 1'-0"

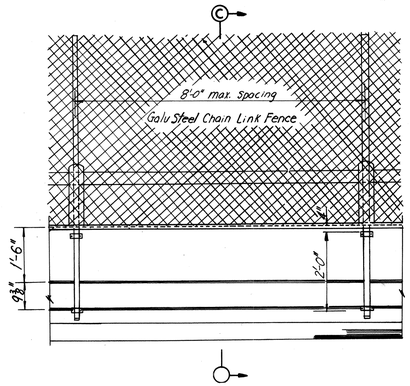


SECTION E-E
(Deck Steel Not Shown)
Scale : ¾" = 1'-0"

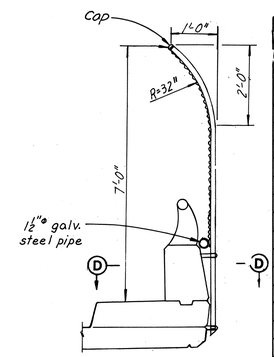


SECTION F-F
(Deck Steel Not Shown)
Scale : ¾" = 1'-0"

DETAIL A
Scale : Half Size



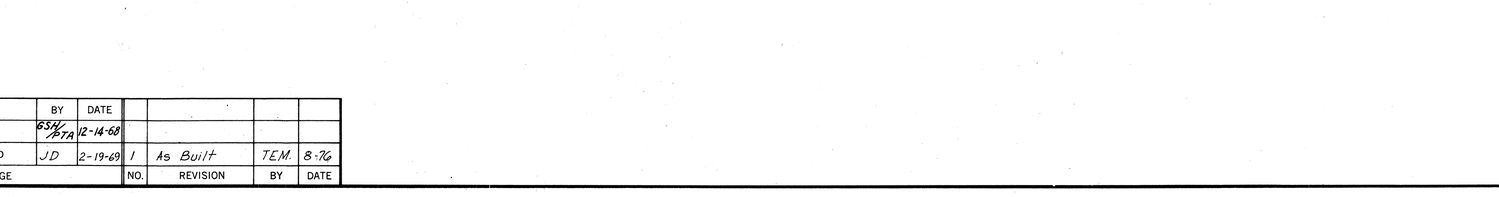
ELEVATION VIEW



SECTION C-C

ELEVATION TABLE			
STATION ℄ Ramp 10th C.	ELEV. D	ELEV. E	ELEV. F
17 + 90.00	76.88	77.20	77.26
+ 97.59	—	—	77.41
18 + 00.00	77.08	77.40	77.46
+ 10.00	77.28	77.60	77.66
+ 12.70	77.33	—	—
+ 20.00	77.48	77.79	77.85
+ 30.00	77.68	77.99	78.05
+ 40.00	77.87	78.18	78.24
+ 50.00	78.07	78.38	78.44
+ 59.82	—	—	78.63
+ 60.00	78.26	78.57	78.63
+ 61.50	—	78.60	—
+ 70.00	78.44	78.74	78.80
+ 70.04	78.44	—	—
+ 80.00	78.60	78.90	78.96
+ 90.00	78.75	79.05	79.11
19 + 00.00	78.88	79.18	79.24
+ 10.00	79.00	79.30	79.36
+ 20.00	79.11	79.40	79.46
+ 30.00	79.20	79.49	79.55
+ 30.20	—	—	79.55
+ 31.40	—	79.50	—
+ 37.22	79.25	—	—
+ 40.00	79.27	79.56	79.62
+ 50.00	79.33	79.62	79.68
+ 60.00	79.39	79.67	79.73
+ 70.00	79.44	79.72	79.78
+ 80.00	79.49	79.78	79.84
+ 87.63	79.53	79.82	79.88
+ 90.00	79.55	79.83	79.89
+ 94.30	79.58	79.85	79.91
20 + 00.00	—	79.88	79.94

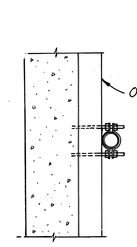
Note:
See Sheet 28 for Location of Elevations above.



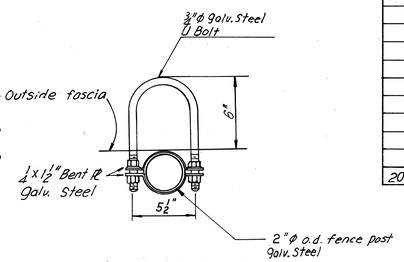
Note:
Reinforcing Steel in Slab is shown.

* Spacing measured along north curb of nose.

SLAB REINFORCING STEEL DETAIL
Scale : ⅜" = 1'-0"



SECTION D-D



FENCE POST CLAMP

FIRE SCREEN DETAILS
No Scale

Note:
For location of fence, see Sheet 32.
For location of nose, see Sheet 34.

	BY	DATE				
MADE	GSH/BTA	12-14-68				
CHECKED	JD	2-19-69	1	As Built	TEM.	8-76
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

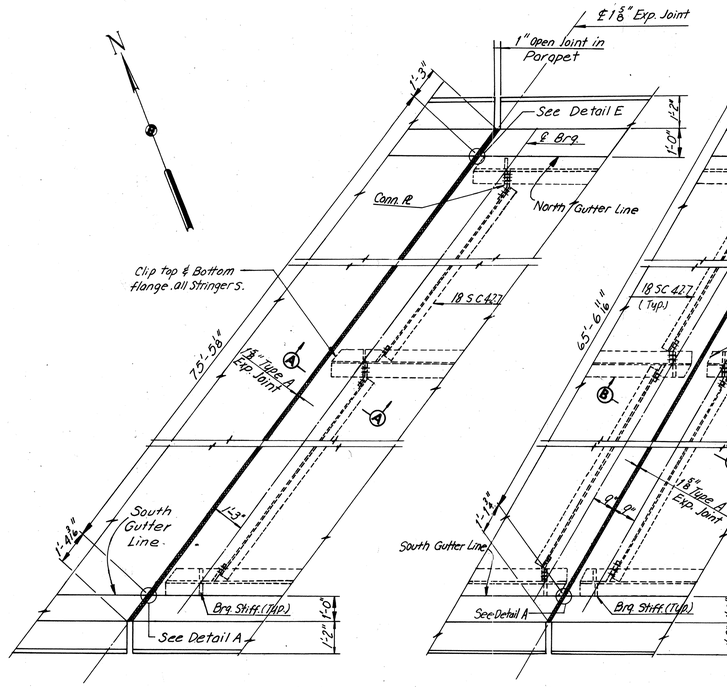
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 66
EASTBOUND ROADWAY OVER
12TH ST. - R.R. TRACKS AND 16TH ST.
SUPERSTRUCTURE DETAILS

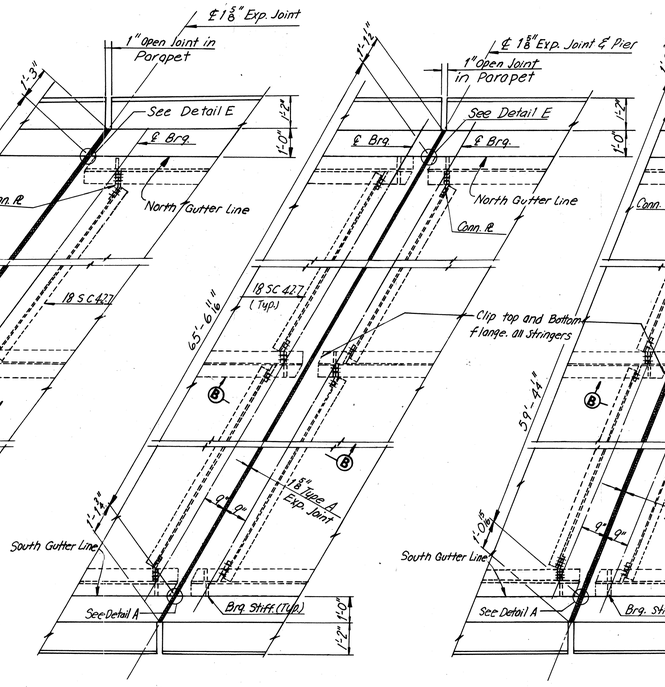
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 36 OF 46

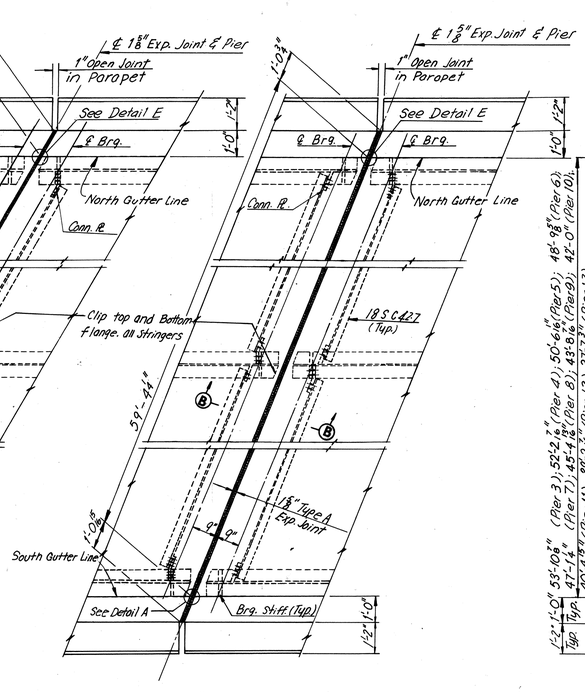
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	163	265



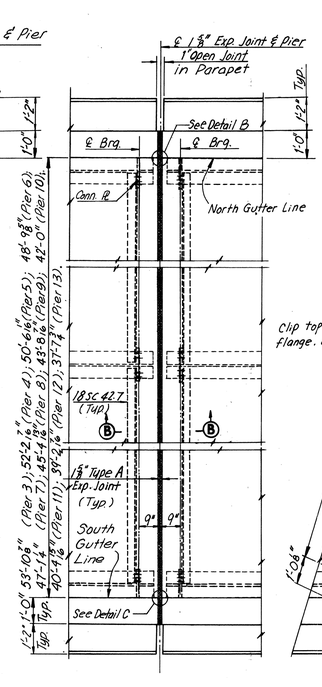
PLAN — JOINT AT WEST ABUTMENT
Scale : ⅜" = 1'-0"



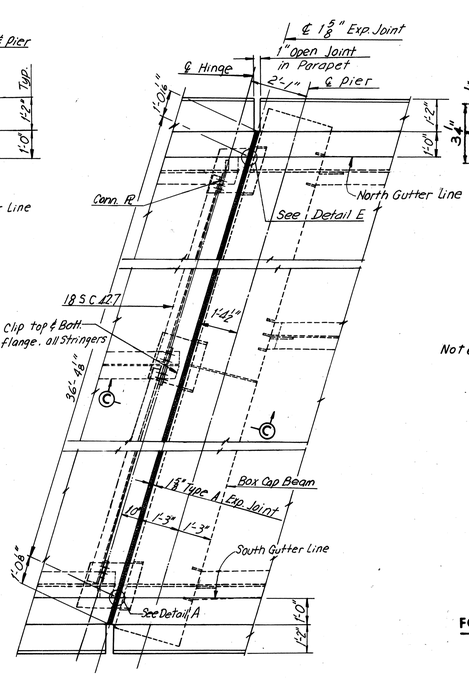
PLAN — JOINT AT PIER 1
Scale : ⅜" = 1'-0"



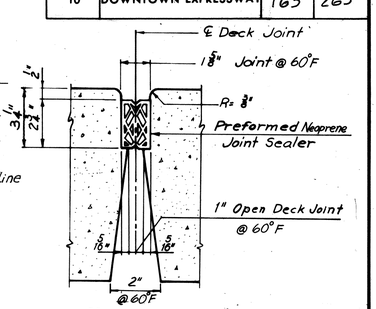
PLAN — JOINT AT PIER 2
Scale : ⅜" = 1'-0"



PLAN — JOINT AT PIERS 3 THRU. 13
Scale : ⅜" = 1'-0"

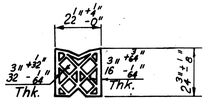


PLAN — JOINT AT PIER 14
Scale : ⅜" = 1'-0"

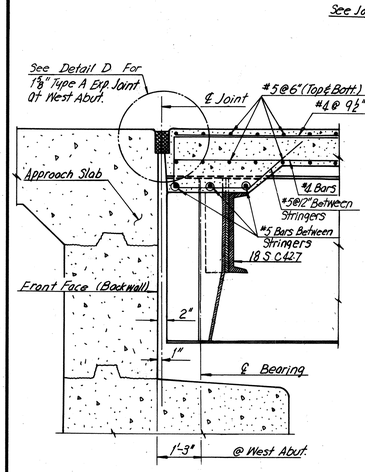


1⅝" TYPE "A" EXPANSION JOINT

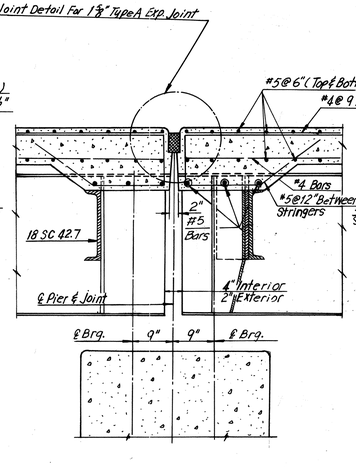
Note: For Joint Detail @ Abutment see Detail D.



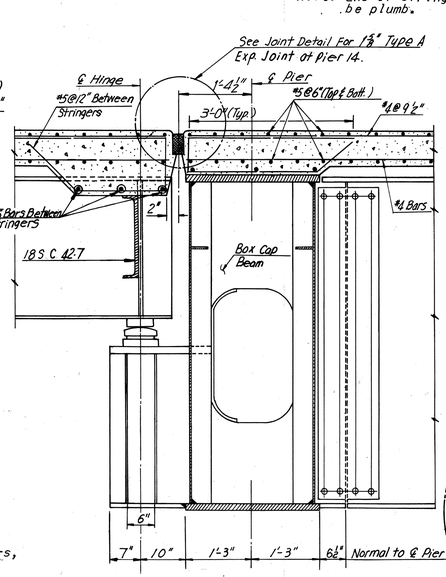
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" EXPANSION JOINT



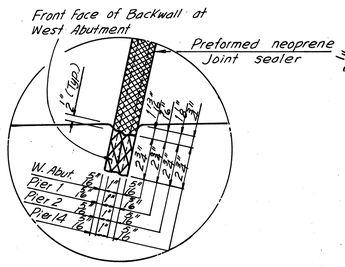
SECTION A-A
Scale : ¾" = 1'-0"



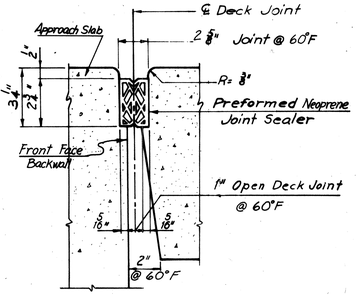
SECTION B-B
Scale : ¾" = 1'-0"



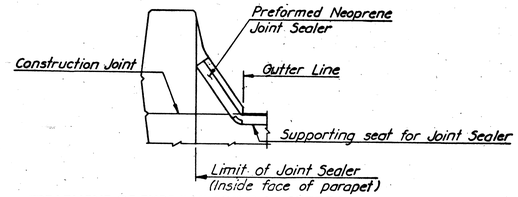
SECTION C-C
Scale : ¾" = 1'-0"



DETAIL A
No Scale

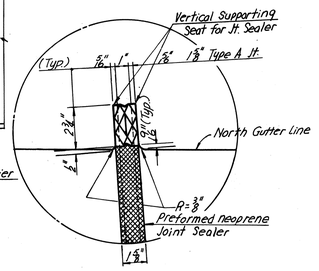


DETAIL D
No Scale

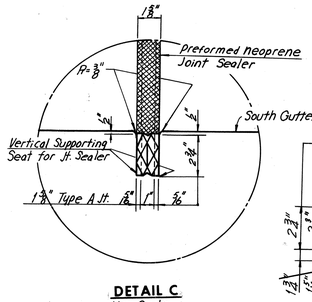


TREATMENT OF TYPE "A" JOINT AT GUTTER

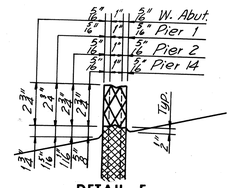
AS BUILT



DETAIL B
No Scale
Typical for Piers 3 thru. 13.



DETAIL C
No Scale
Typical for Piers 3 thru 13



DETAIL E
No Scale

Note: End of stringers and connection ℞'s shall be plumb.

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.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.S.H.	10-10-68				
CHECKED	C.E.B	2-5-69	1	As Built	TEM	8-76
IN CHARGE						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

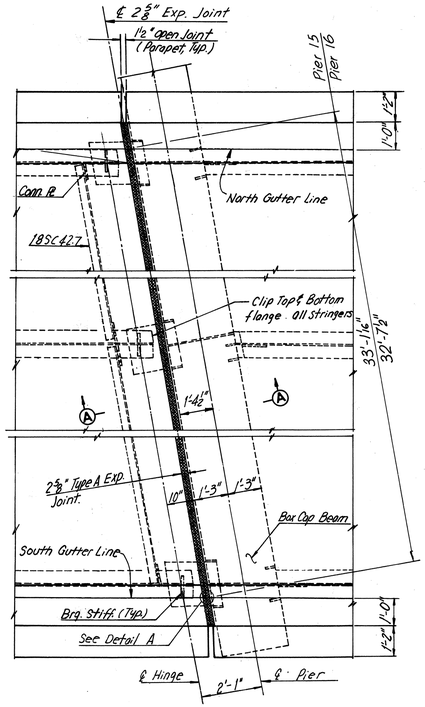
BRIDGE NO. 66
EASTBOUND ROADWAY O\
12TH ST. - R.R. TRACKS AND 161

JOINT DETAILS

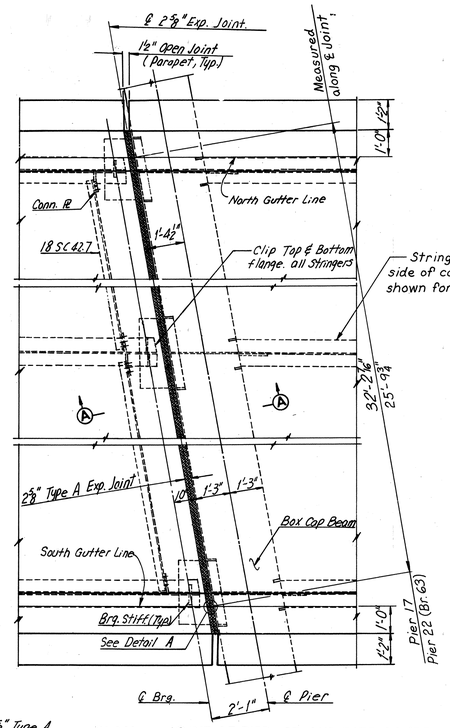
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO. 10
SHEET NO. 37 OF 46

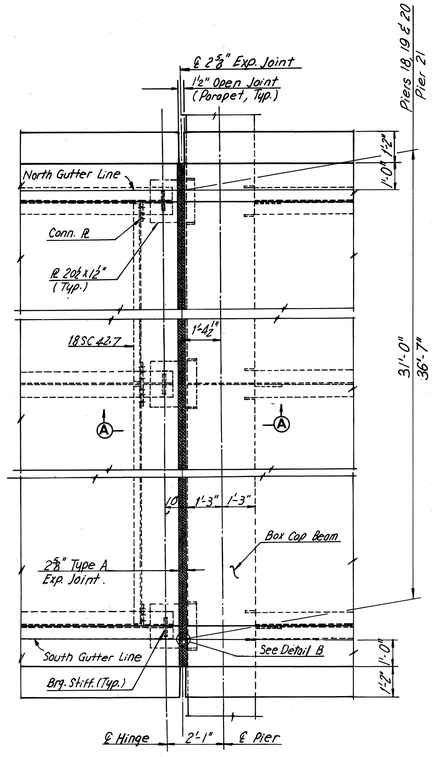
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	164	265



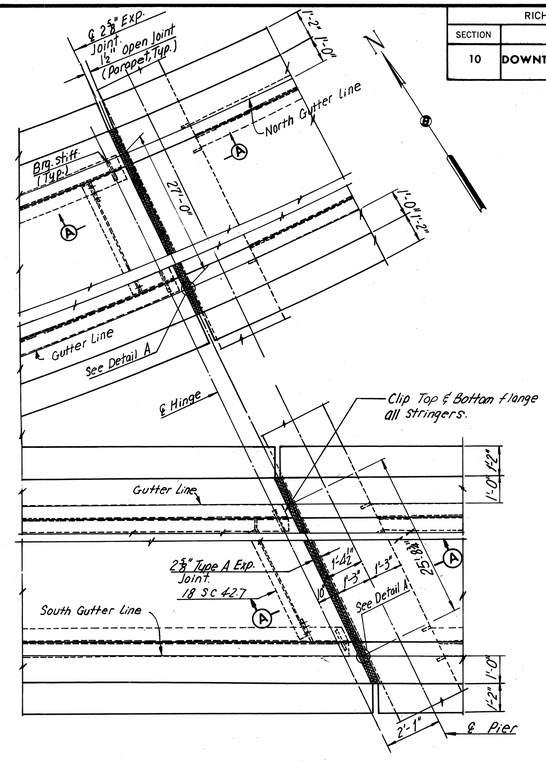
PLAN — JOINT AT PIERS 15 AND 16
Scale ⅜" = 1'-0"



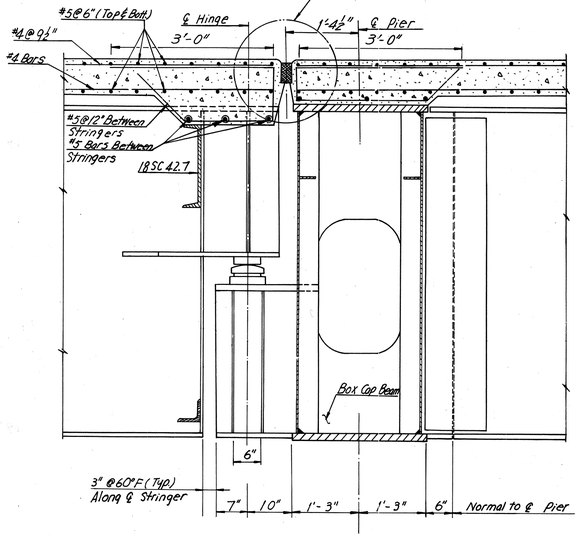
PLAN — JOINT AT PIER 17 AND PIER 22 (BR. 63)
Scale ⅜" = 1'-0"



PLAN — JOINT AT PIERS 18 19 ,20 AND 21 (BRIDGE 63)
Scale ⅜" = 1'-0"



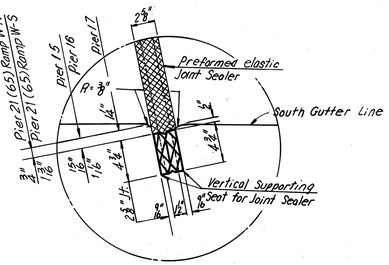
PLAN — JOINT AT PIER 22 (BRIDGE 63)
Scale ⅜" = 1'-0"



SECTION A-A
Scale ⅜" = 1'-0"

Note:
All horizontal dimensions of Section shown above are normal to ℄ joint and pier.

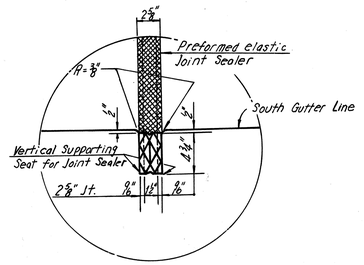
Note:
End of stringers and connection ℞'s shall be plumb.



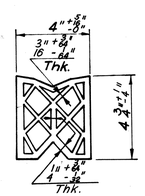
DETAIL A
No Scale
Typical for Piers 15 thru. 17 & Pier 21 (Br. 65)

Note:
For details of bearing stiffeners, see Framing Plan Sheets 17 thru 21.

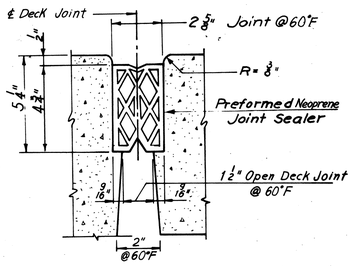
Note:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, straight lines. The size of opening shall be adjusted to allow for anticipated dead load rotation of ends of the slab and for the temperature at the time of construction.



DETAIL B
No Scale
Typical for Piers 18 thru. 20 & Pier 21 (Br. 63.)

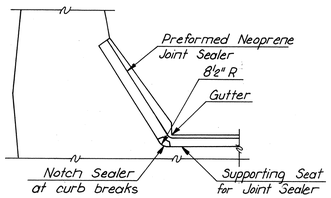


PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" EXPANSION JOINT
No Scale



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

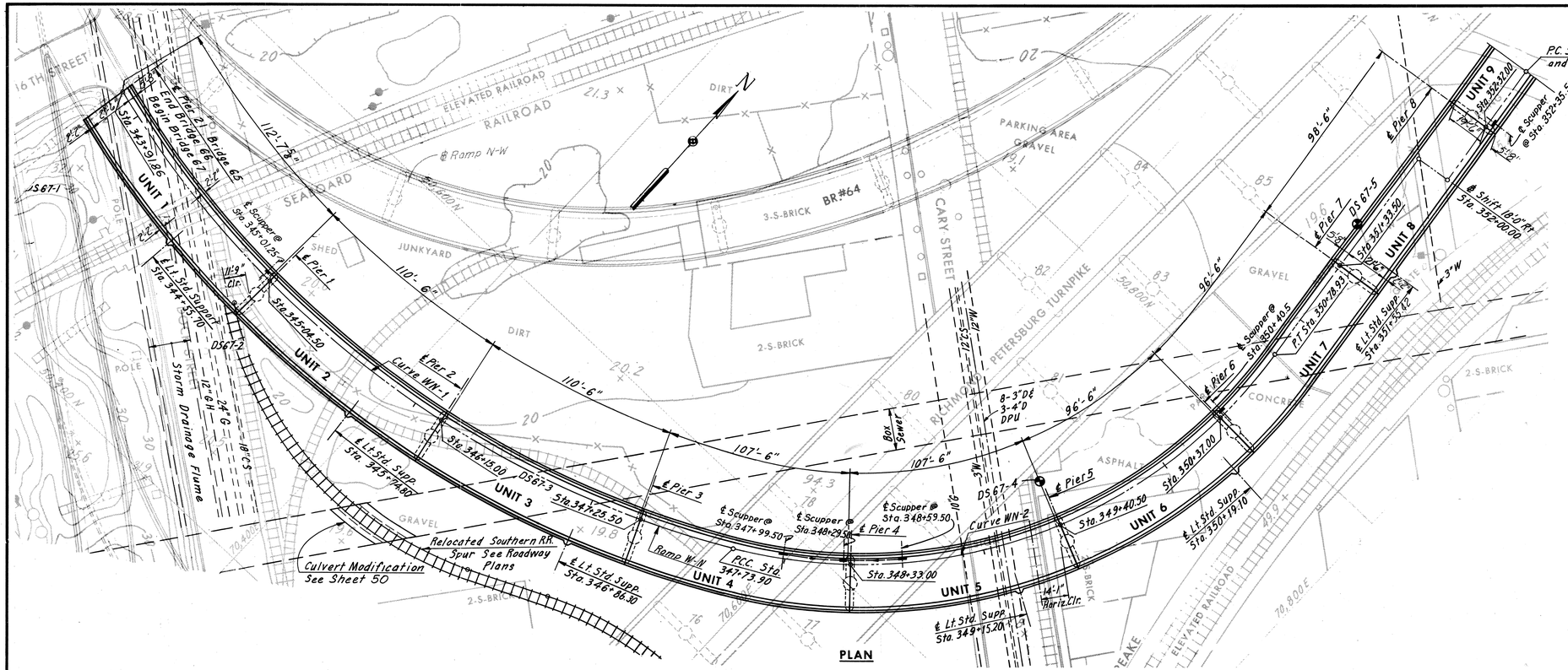
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 38 OF 46

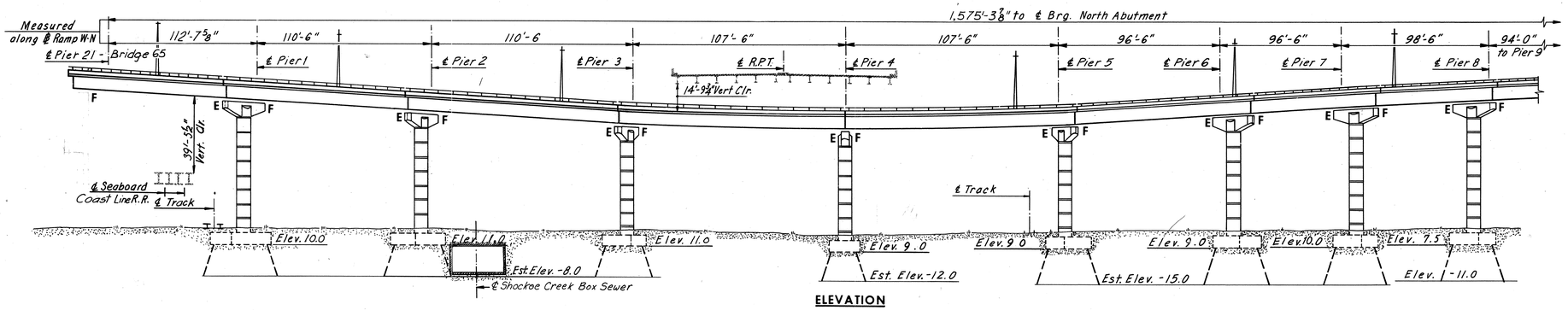
Bridge 67

(Ramp from Eastbound Downtown Expressway “Rte. 195” to Northbound I-95 over Dock Street, East Cary Street, East Main Street “Rte. 60” and CSX RR)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	173	265





ELEVATION

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'

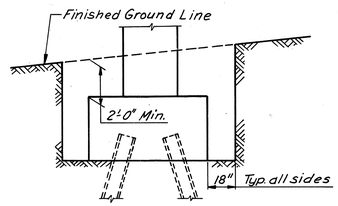
Curve: WN-4
P.I. = Sta 355+39.85
Δ = 5°01'11"
D = 1°30'
T = 167.43'
L = 334.65'
R = 3,819.72'

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

INDEX

Note:
For General Notes, see Sheet 4.
For Quantity Table, see Sheet 3

	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 8	JLK	6-6-75
IN CHARGE			1	Sheets 42 & 45 added	LBP	3-5-75

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

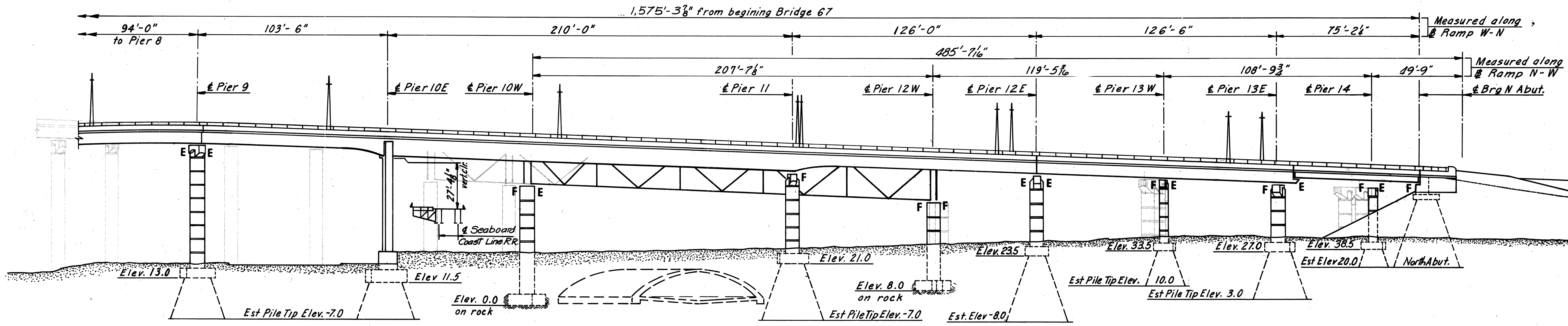
BRIDGE NO. 67
RAMP W-N CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

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

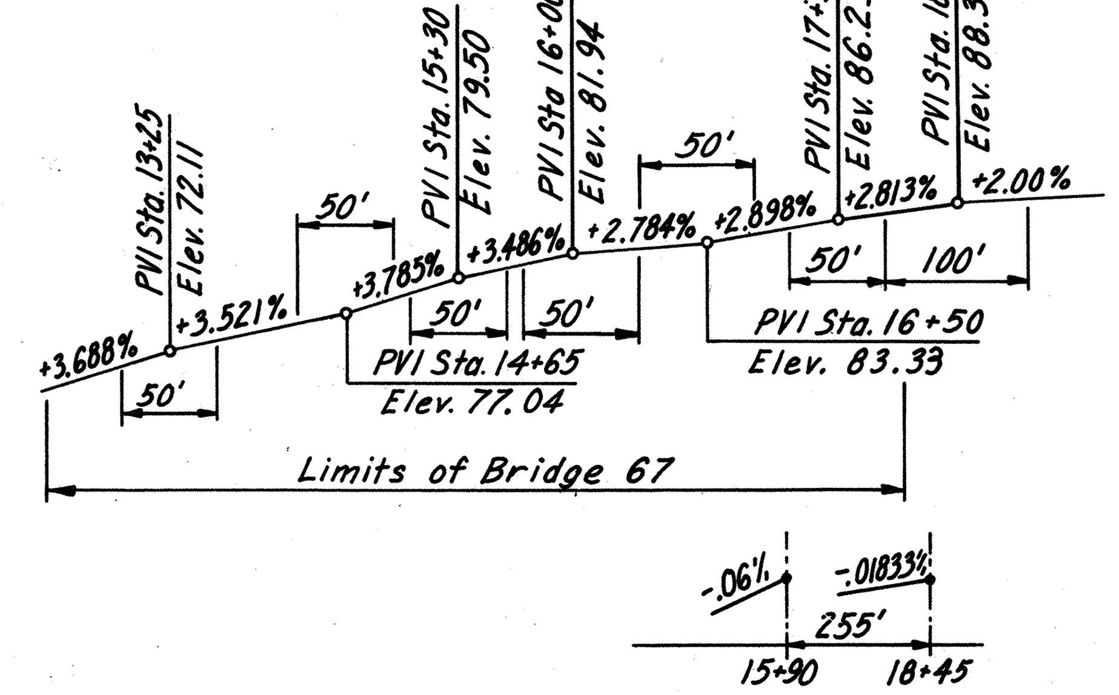
SCALE: 1" = 30'-0"
CONTRACT NO.: 10
SHEET NO. 1 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	174	265

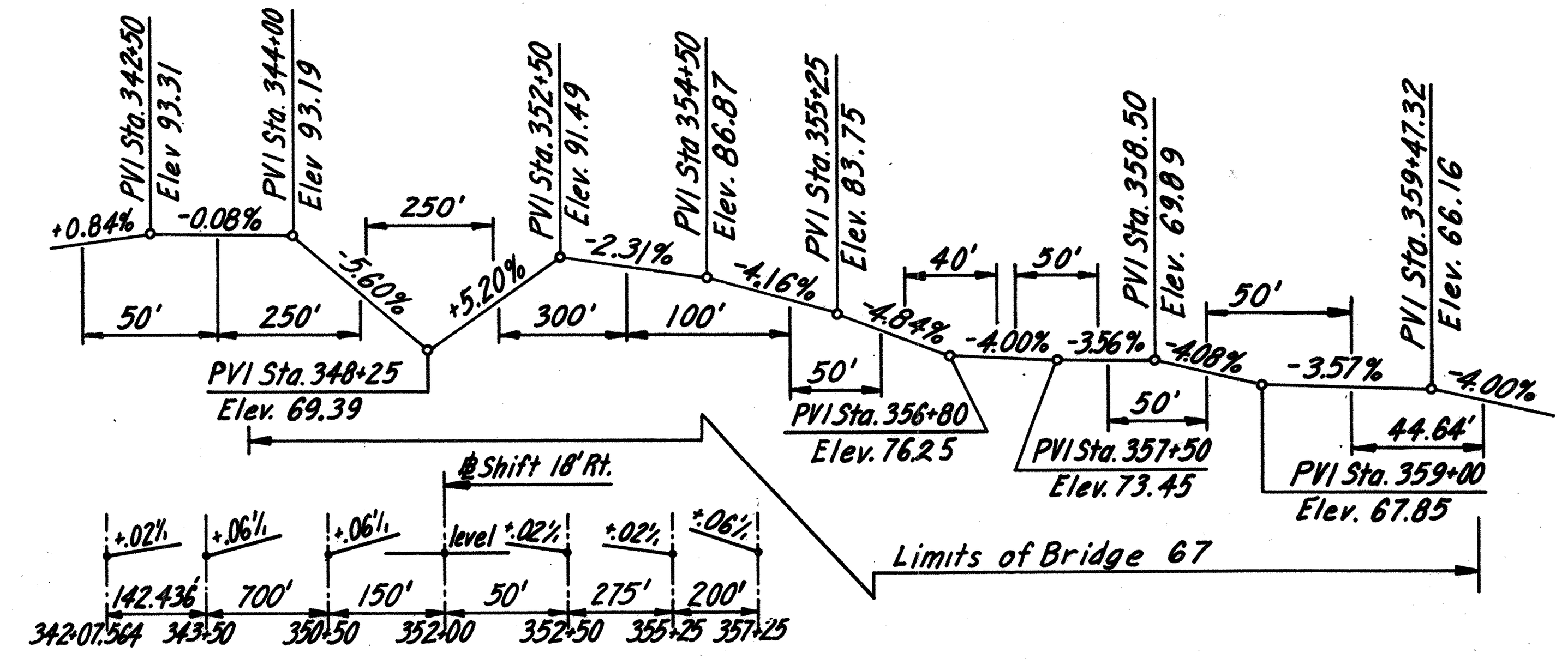
PLAN
Scale: 1" = 30'-0"



ELEVATION
Scale: 1" = 30'-0"



PROFILE GRADE **CROSS SLOPE - RAMP N-W**



PROFILE GRADE AND CROSS SLOPE - RAM W-N

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	12-30-68	2	As Built	TEM	6-77
CHECKED	KCT	5-12-69	1	Revised Piers & Abut Sta. & Span Length	DWB	1-24-75
IN CHARGE						

AS BUILT

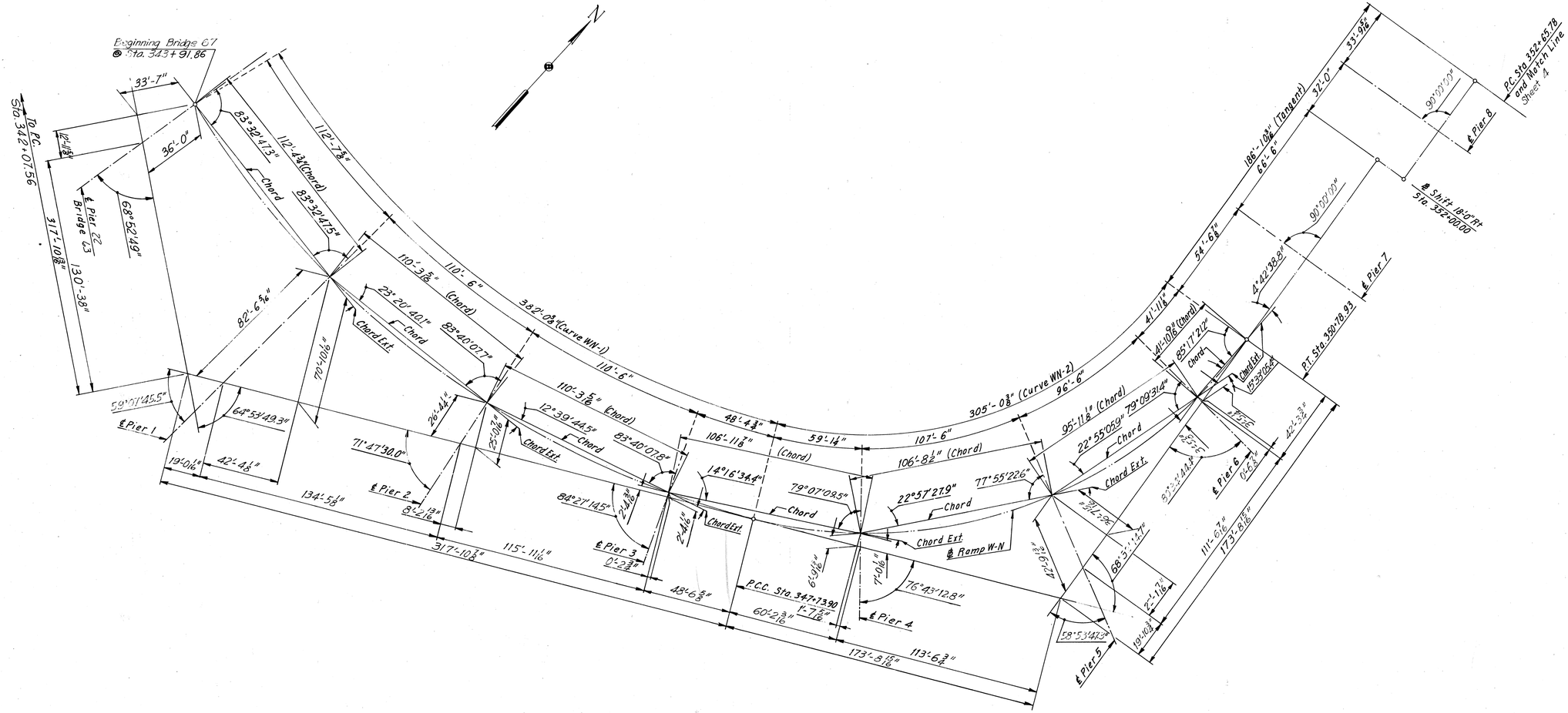
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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: As Noted
CONTRACT NO.: 10
SHEET NO. 2 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	175	265



LAYOUT SKETCH
Scale: 1"=30'-0"

ESTIMATED QUANTITIES

	Structure Excavation Cu. Yds.	Concrete (‡) Cu. Yds.	Reinforcing Steel Lbs.	Str. Steel Mild Carbon Lbs.	Str. Steel High Stregth Lbs.	Aluminum Railing (1-Rail) Lin. Ft.	Porous Backfill Cu. Yds.	Underdrain 6" Dia. Pipe Lin. Ft.	Steel Piles 10BP42 Lin.Ft.	Steel Piles 12BP53 Lin.Ft.
Superstructure	---	1,729.0	394,000	1,852,700	550,750	2,930	---	---	---	---
Substructure	2,821	2,456.0	376,600	125,200	1,850	---	14	27	630	5,745
Total	2,821	4,185.0 ‡	770,600	1,977,900	552,600	2,930	14	27	630	5,745

	Steel Piles 14BP73 Lin. Ft	Asphalt Damp-proofing Sq. Yds.	Approach Slab Concrete(‡) Cu. Yds.	Approach Slab Reinforcing Steel Lbs.	Metal Conduit 3" Dia. Lin. Ft.	Sheet Piling Lump Sum	Bridge Drainage Metal Work Lbs.	Concr. Slab Slope Prot. Sq. Yds.	Modifications to existing Shockoe Creek Box Sewer Lump Sum	Modifications To R.P. Turn-pike Bridge Lump Sum	Elastomeric Expansion Dam Type 250 Lin. Ft.	Elastomeric Expansion Dam Type 400A Lin. Ft.
Superstructure	---	---	---		2,030	--	14,020	---	---	1	18	25
Substructure	760	27	38.0	7900	--	1	---	291	1	-	--	--
Total	760	27	38.0 ‡	7900	2,030	1	14,020	291	1	1	18	25

‡ All Concrete for Superstructure shall be Class A4 and for Substructure Class A3.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	AMH	3-28-69				
CHECKED	KCT	5-5-69	1	As Built	TEM	6-77
IN CHARGE						

AS BUILT

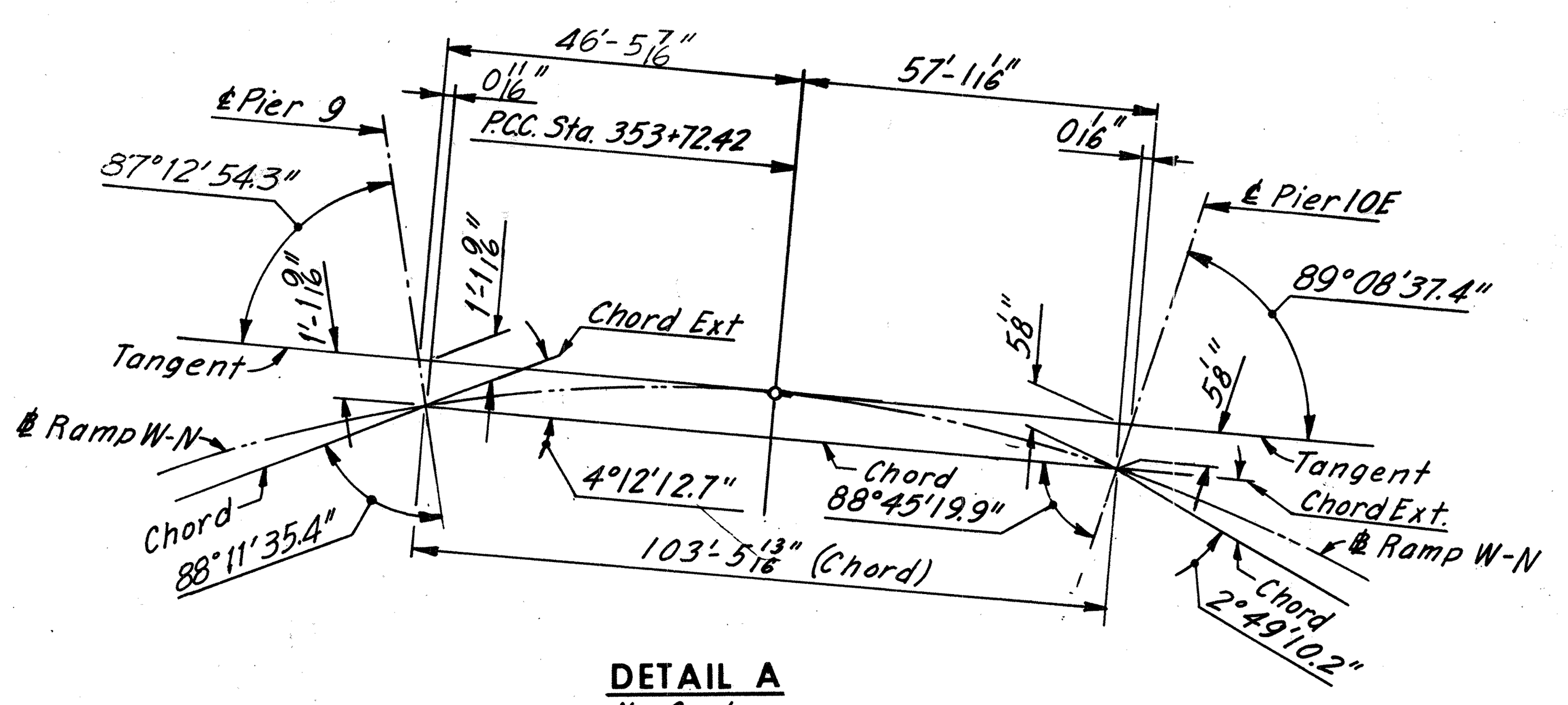
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
LAYOUT

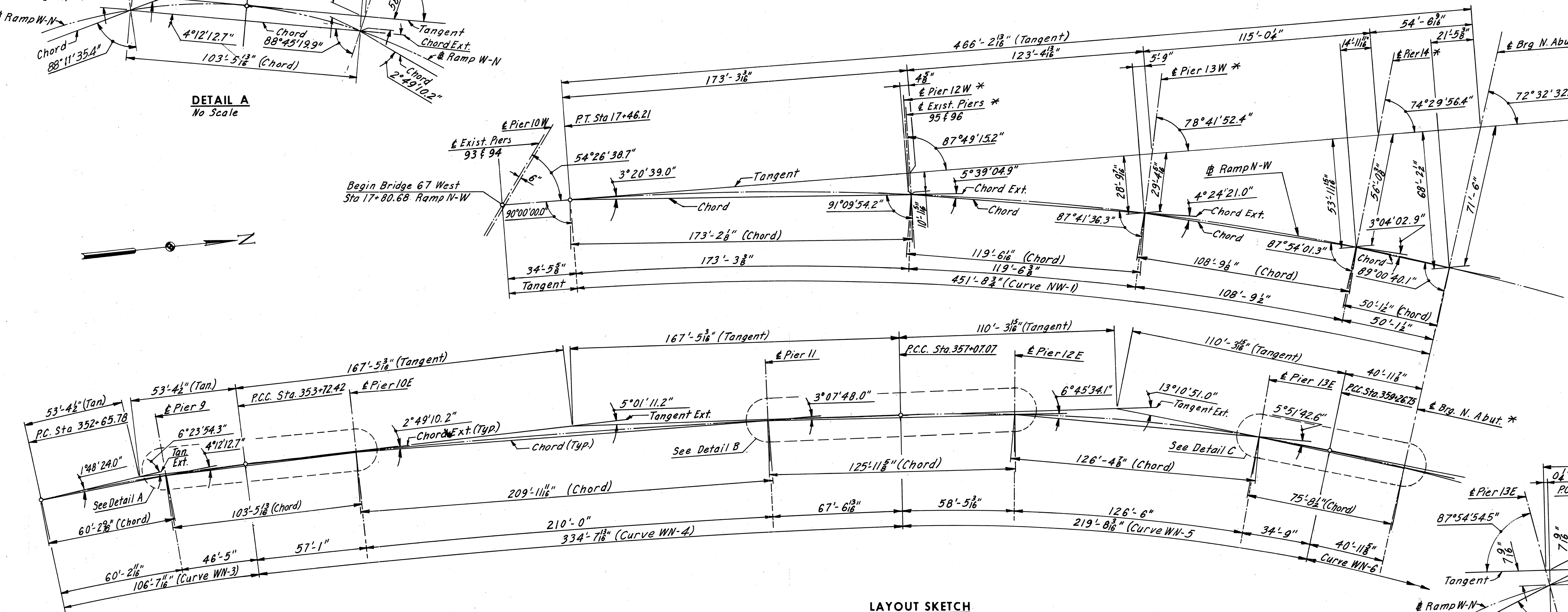
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 3 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	176	265

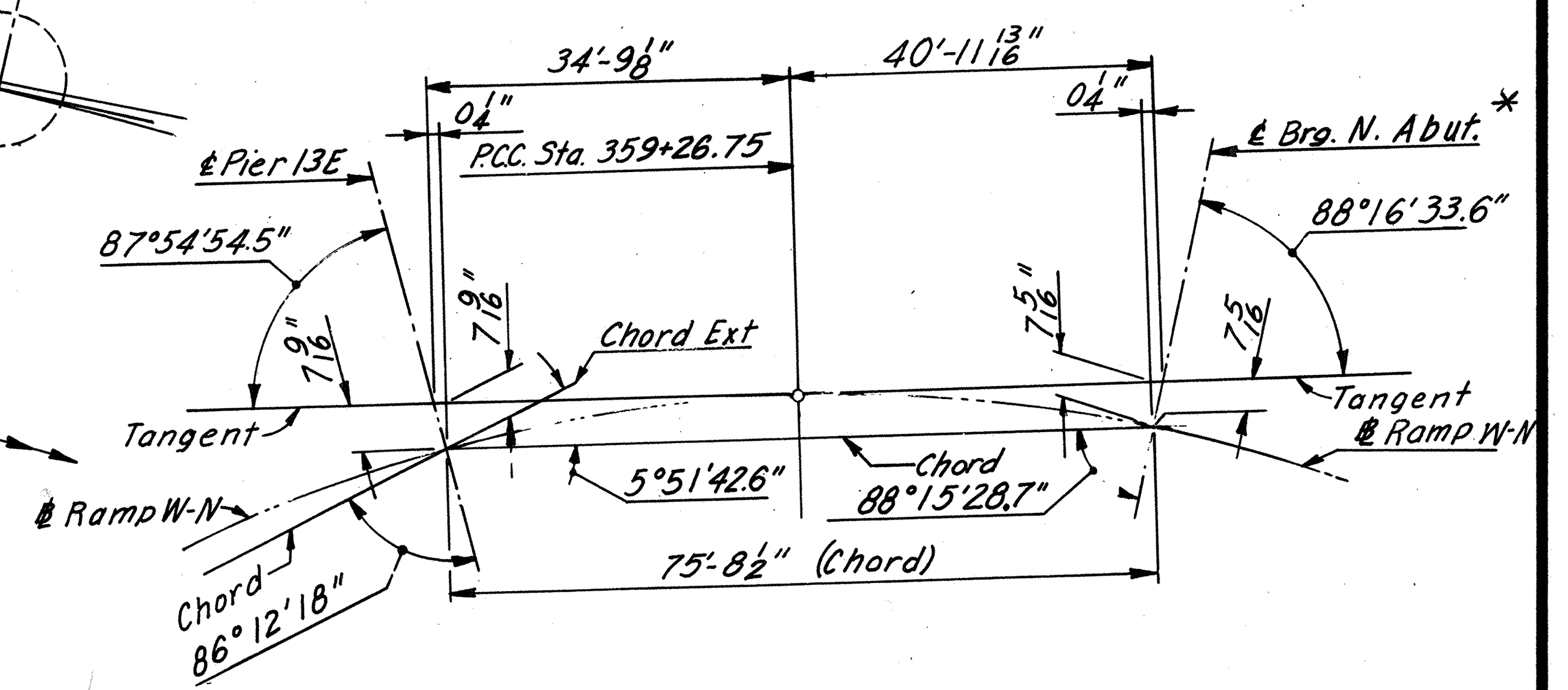


DETAIL A
No Scale

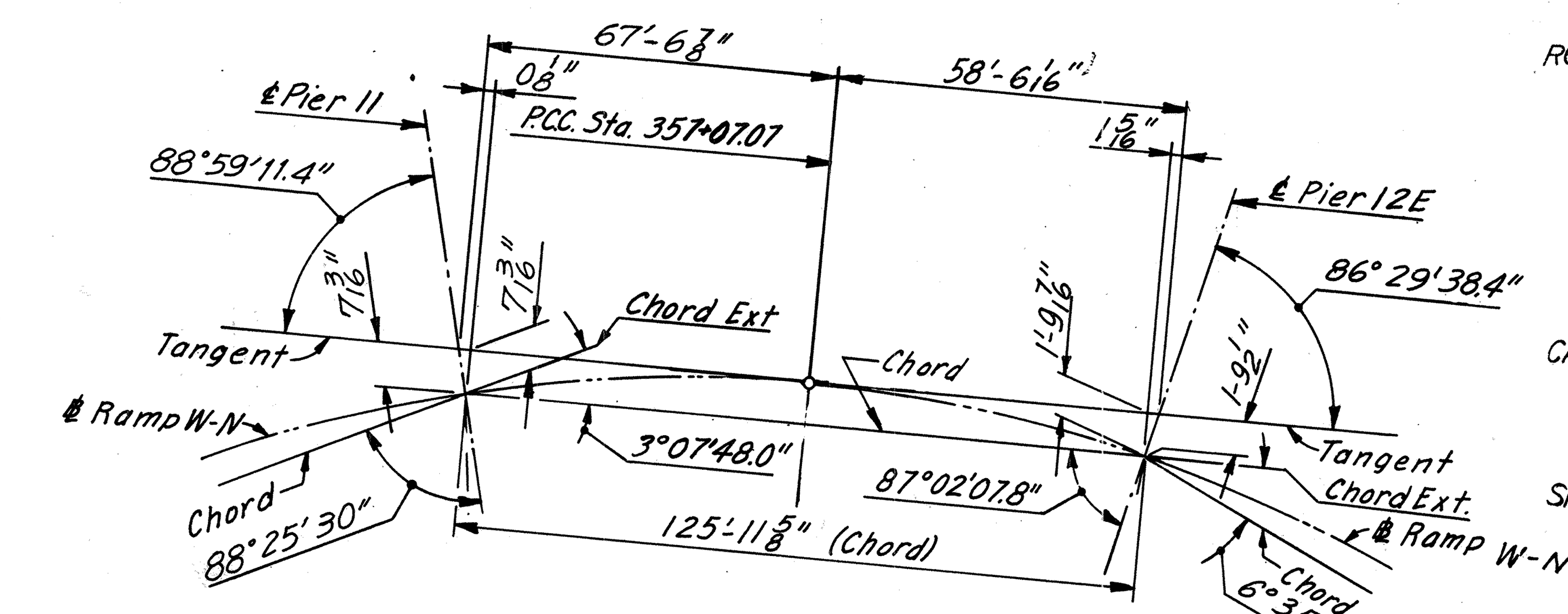


LAYOUT SKETCH
Scale: 1" = 30'-0"

*Note:
The centerline shown is for layout only. See abutment and pier drawings for exact locations of columns.



DETAIL C
No Scale



DETAIL B
No Scale

GENERAL NOTES:

ROADWAY: One variable width roadway connecting Br. 66 (E.B. Roadway) with Richmond-Petersburg Turnpike.

Face to face of railing is 27'-0" thru the Ramp section, transitioning to 13'-0" widening along Northbound Lanes of the R.P.T.
Also included is 13'-0" widening of Southbound Lanes of the R.P.T. from North Abutment to Pier 94.

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 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 3/4" 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 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 615 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 7/8" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

AS BUILT

	BY	DATE	△	Note Added	Rff	12-11-74
MADE	AMH	3-27-69	2	As Built	TEM	6-77
CHECKED	KCT	5-6-69				
IN CHARGE			NO.	REVISION	BY	DATE

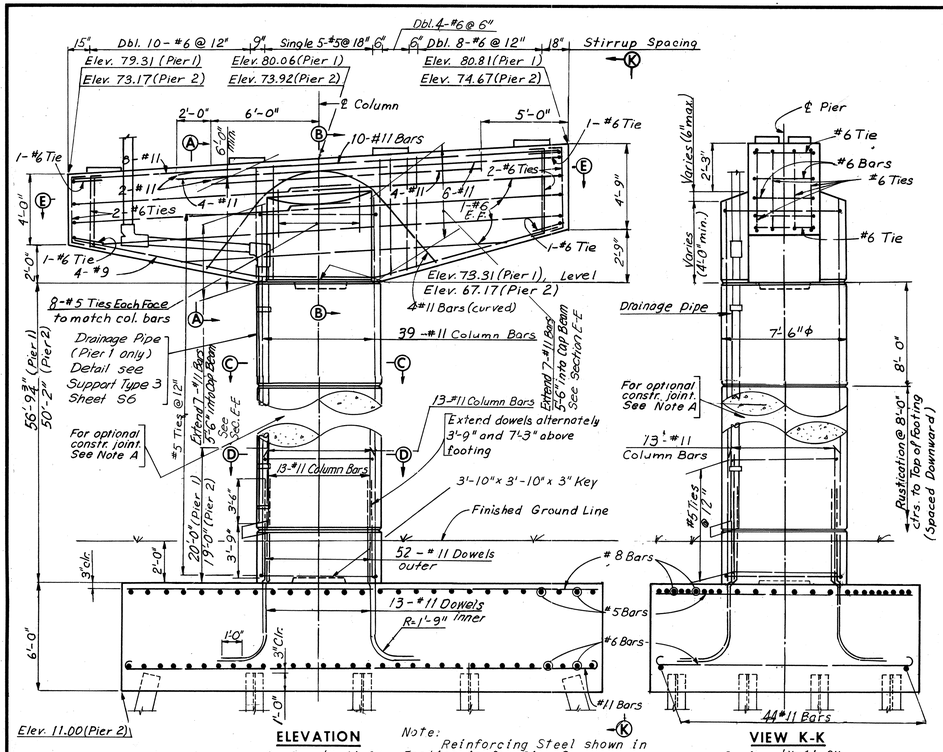
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
LAYOUT

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

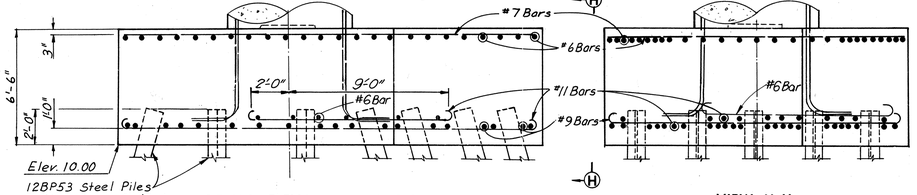
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 4 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	177	265



ELEVATION
Scale: 1"=1'-0"

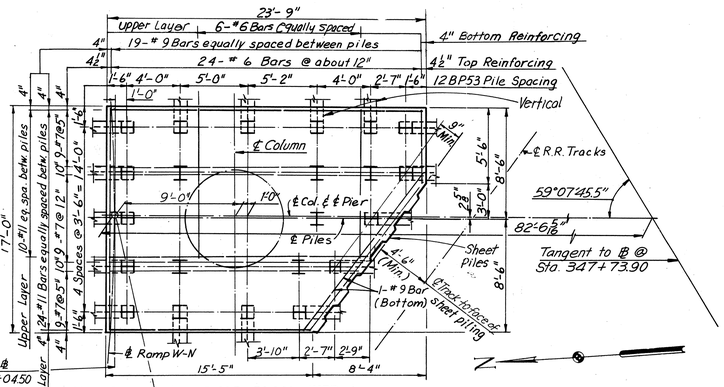
Note: Reinforcing Steel shown in Footing is for Pier 2.



FOOTING ELEVATION - PIER 1
Scale: 1"=1'-0"

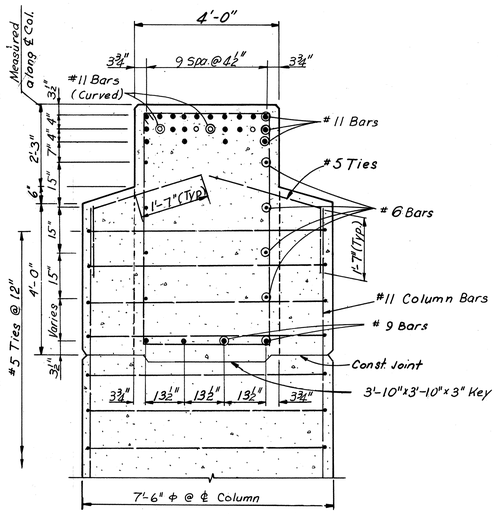
VIEW K-K
Scale: 1"=1'-0"

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

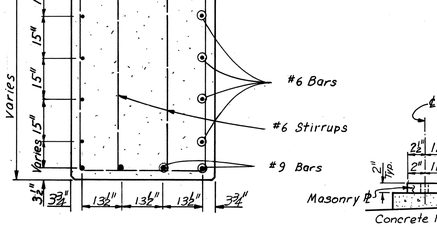


FOOTING PLAN - PIER 1
Scale: 3/16"=1'-0"

Note: For 12BP53 Steel Pile Details, see Sheet 6. All piles shall be 12BP53 Steel Piles (Design capacity = 57 tons). Batter all piles 3" per foot where shown. For Standard Shoe details, See Sheets S16,S2. For Framing Plan, See Sheet 19 & 20. Estimated Pile tip Elevation 18.00.

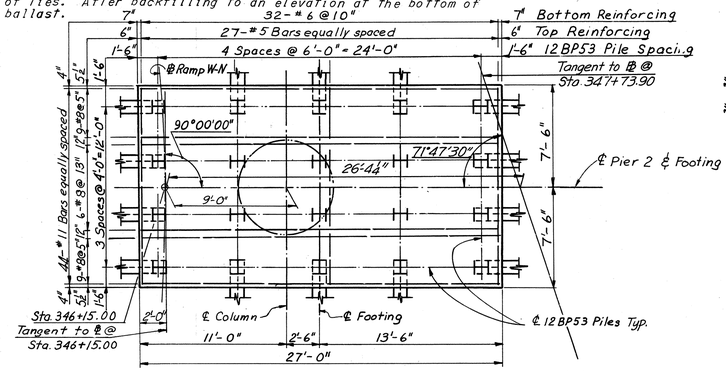


SECTION B-B
Scale: 1/2"=1'-0"



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

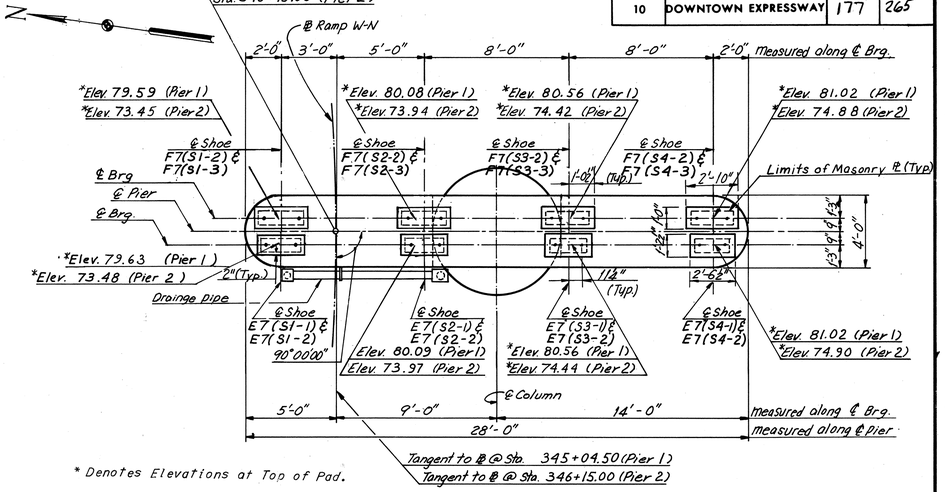
Note: (Pier 1 only)
The face of the Sheet piling to ℄ Track not encroach within 4'-6" and nor over the top of rail during the Construction of the piers.
The Sheet piling shall be cut off at the Elev. of Bottom of ties. After backfilling to an elevation at the bottom of ballast.



FOOTING PLAN - PIER 2
Scale: 3/16"=1'-0"

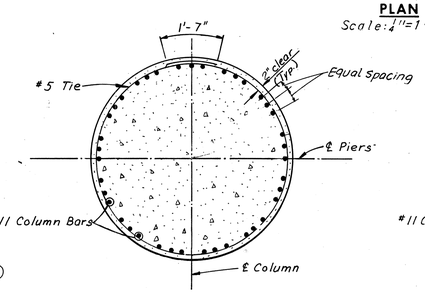
Note: Footing elevations are approximate only and may be varied to suit field conditions as directed by the Engineer. Vertical shaft reinforcing shall not be cut until these elevations are established. Where elevations change more than 2 ft., redesign will be required.

FOOTINGS FOR PIERS 1 AND 2 ARE ECCENTRIC AS SHOWN ON FOOTING PLANS ABOVE

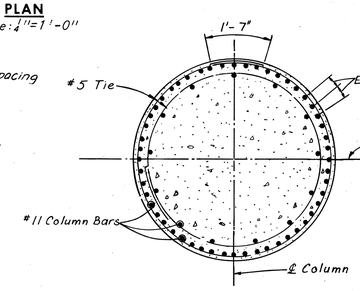


* Denotes Elevations at Top of Pad.

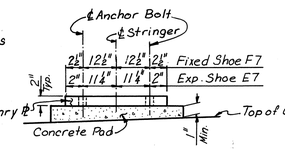
PLAN
Scale: 1/4"=1'-0"



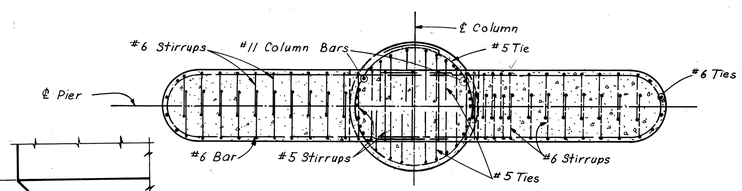
SECTION C-C
Scale: 3/8"=1'-0"



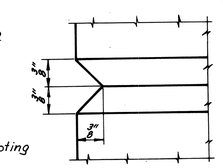
SECTION D-D
Scale: 3/8"=1'-0"



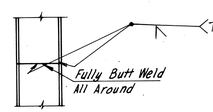
PAD ELEVATION VIEW
No Scale



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



RUSTICATION DETAIL
Full Scale



PILE SPLICE DETAIL
No Scale

Note A:
A construction joint will be permitted at a rustication near midheight of the column. The column reinforcement may be lap spliced near the construction joint. The lap at the splice shall be a minmum of 3'-6". Splices shall be staggered atleast 3'-3" between adjacent bars.

	BY	DATE				
MADE	J.D.	9-16-68				
CHECKED	G.S.H.	4-21-69	1	As Built	TEM	6-77
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

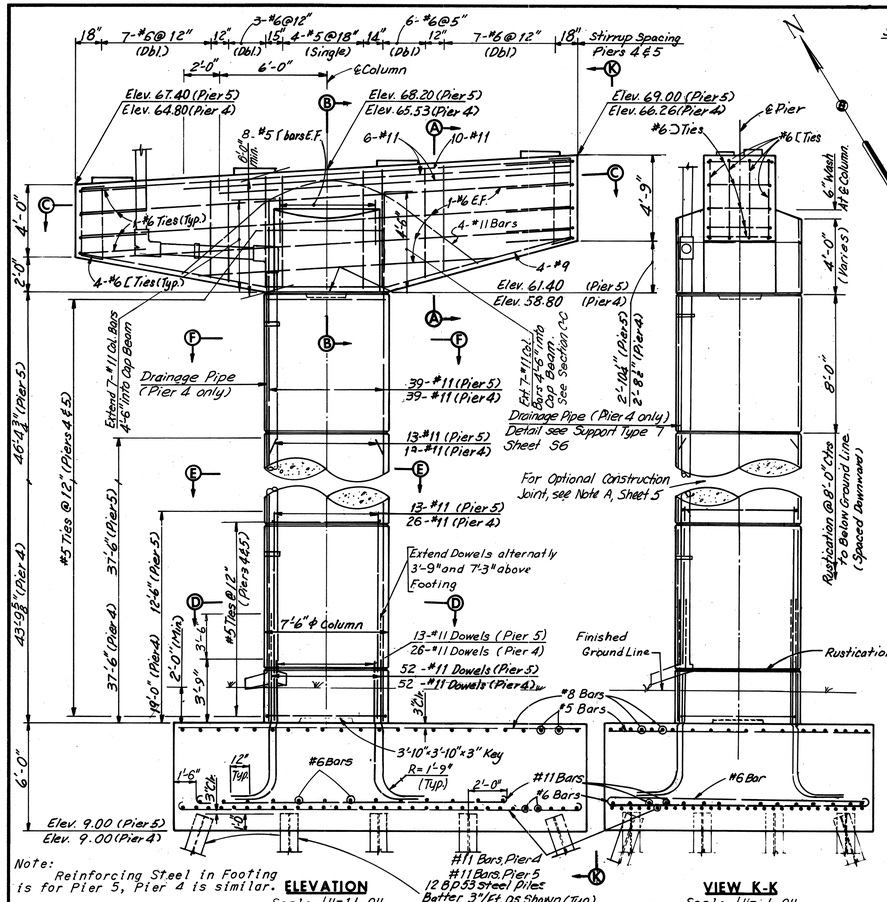
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

PIERS 1 AND 2

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

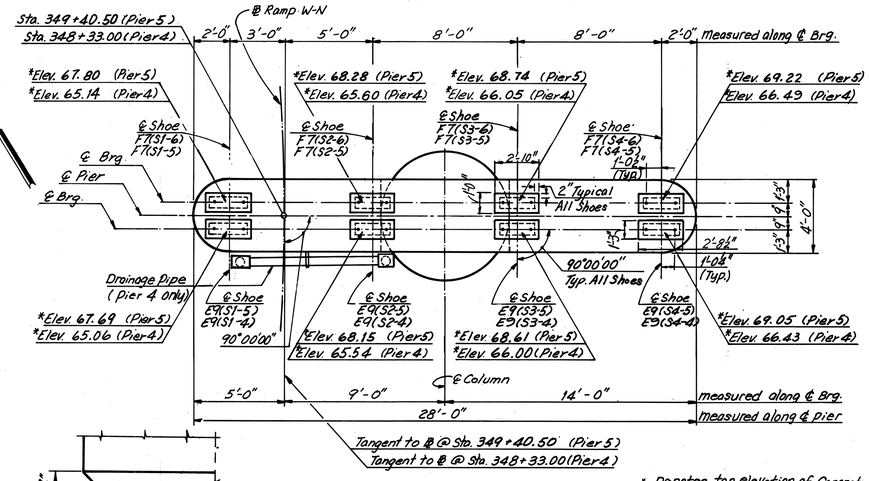
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 5 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	179	265



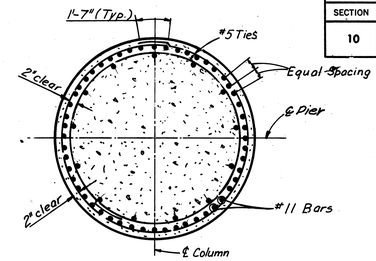
Note: Reinforcing Steel in Footing is for Pier 5, Pier 4 is similar.

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

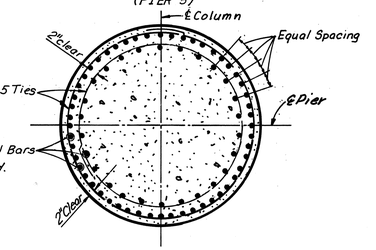


PLAN
Scale 1/4"=1'-0"

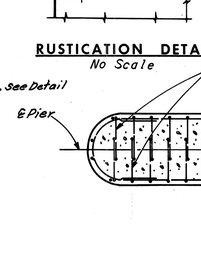
* Denotes top elevation of Concrete pad.



SECTION D-D
Scale 3/8"=1'-0"
(PIER 5)



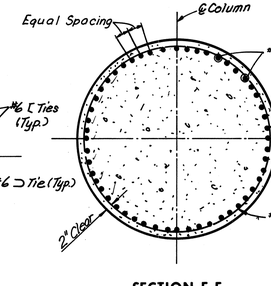
SECTION D-D
Scale 3/8"=1'-0"
(PIER 4)



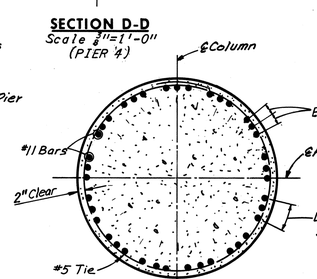
RUSTICATION DETAIL
No Scale

(Pier 5 Column Reinforcing shown, Pier 4 similar)

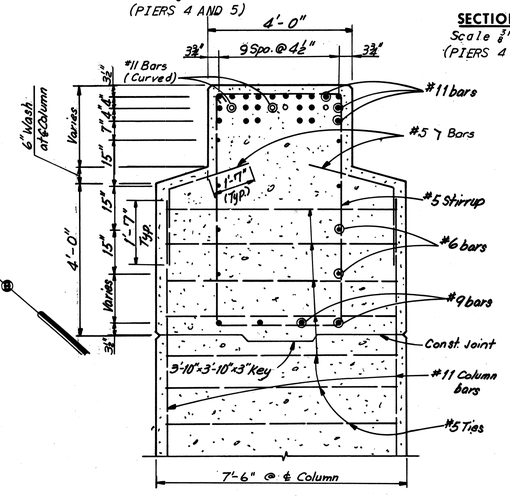
SECTION C-C
Scale 1/4"=1'-0"



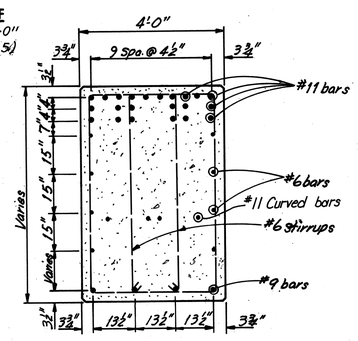
SECTION E-E
Scale 3/8"=1'-0"
(PIERS 4 AND 5)



SECTION F-F
Scale 3/8"=1'-0"
(PIERS 4 AND 5)

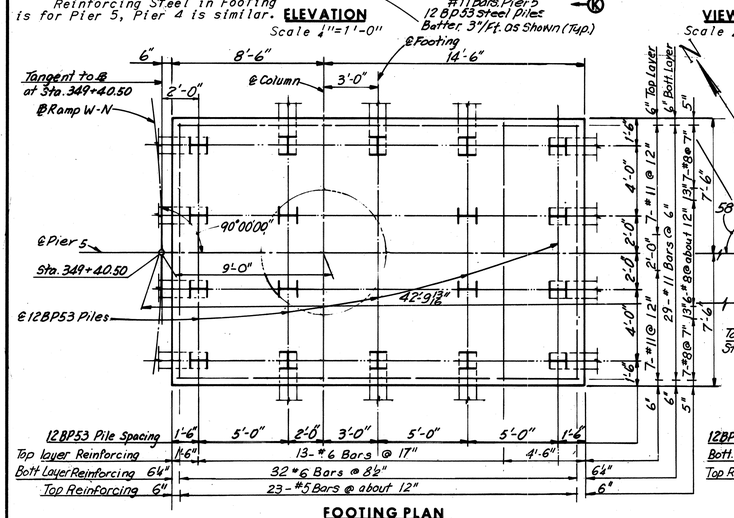


SECTION B-B
Scale 3/8"=1'-0"

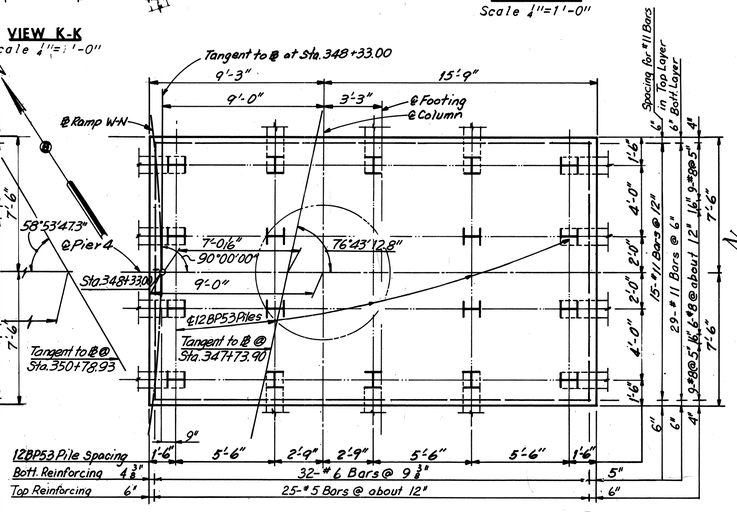


SECTION A-A
Scale 3/8"=1'-0"

VIEW K-K
Scale 1/4"=1'-0"



FOOTING PLAN
Scale 1/4"=1'-0"
(PIER 5)



FOOTING PLAN
Scale 1/4"=1'-0"
(PIER 4)

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 2Ft., redesign will be required.

FOOTINGS FOR PIERS 4 AND 5 ARE ECCENTRIC AS SHOWN ON FOOTING PLANS ABOVE

Note: All piles shall be 12BP53 Steel Piles (Design capacity = 57 tons). Batter all piles 3" per foot where shown. For Standard Shoe details, see Sheets S1& S2. For framing Plan, see Sheet 20€21. Estimated Pile tip Elevation -12.00 (Pier 4) and -15.00 (Pier 5).

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.C.C.	9-14-68	2	As Built	TEM	6-77
CHECKED	J. D.	9-17-68				
IN CHARGE				Note Added	LRH	4-19-74

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
PIERS 4 AND 5

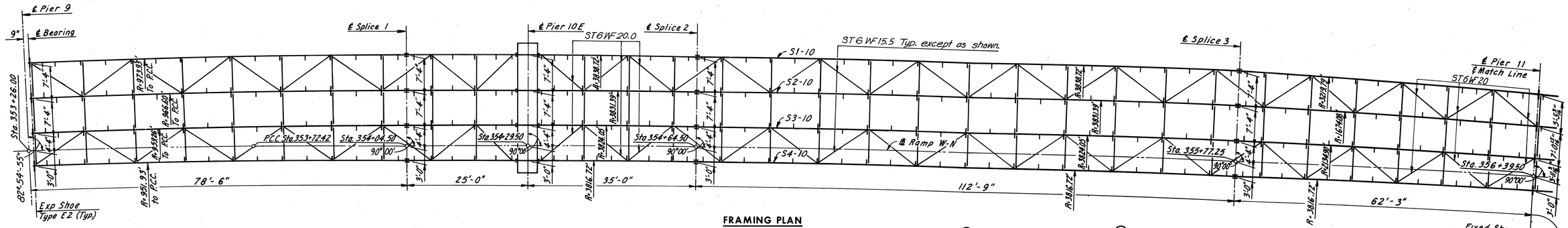
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 7 OF 54

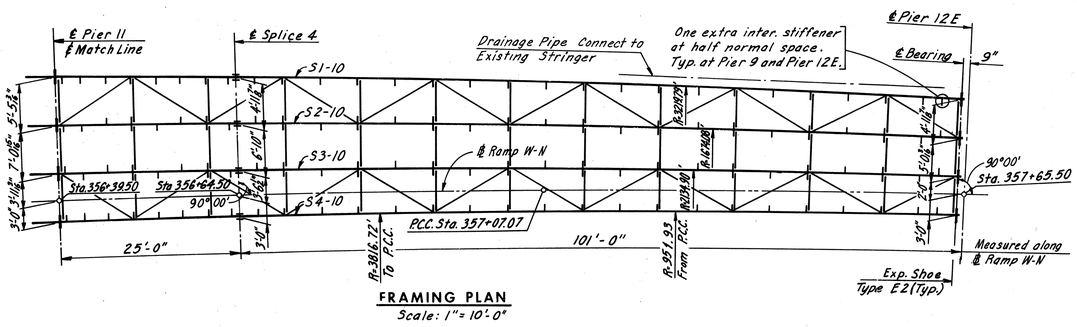
SHOE SCHEDULE			
EXP. SHOE		FIXED SHOE	
TYPE	NO.	TYPE	NO.
E2	8	SP-1	4

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	196	265

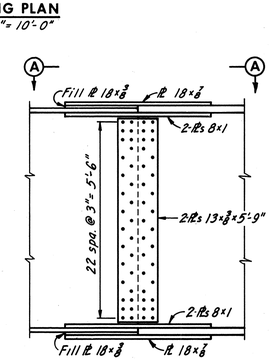
N



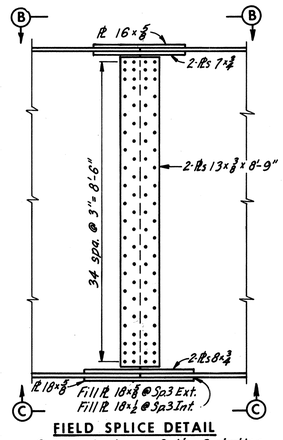
FRAMING PLAN
Scale: 1"= 10'-0"



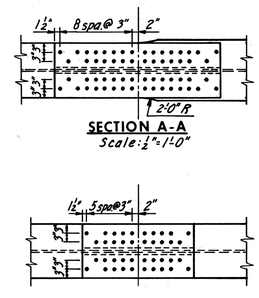
FRAMING PLAN
Scale: 1"= 10'-0"



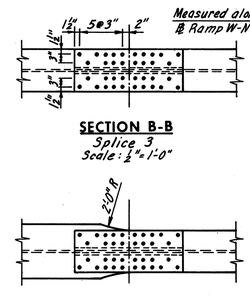
FIELD SPLICE DETAIL
Splice 1 Shown ; Splice 4 similar
Scale: ½"=1'-0"



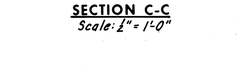
FIELD SPLICE DETAIL
Splice 2 shown; Splice 3 similar
Scale: ½"= 1'-0"



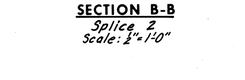
SECTION A-A
Scale: ½"=1'-0"



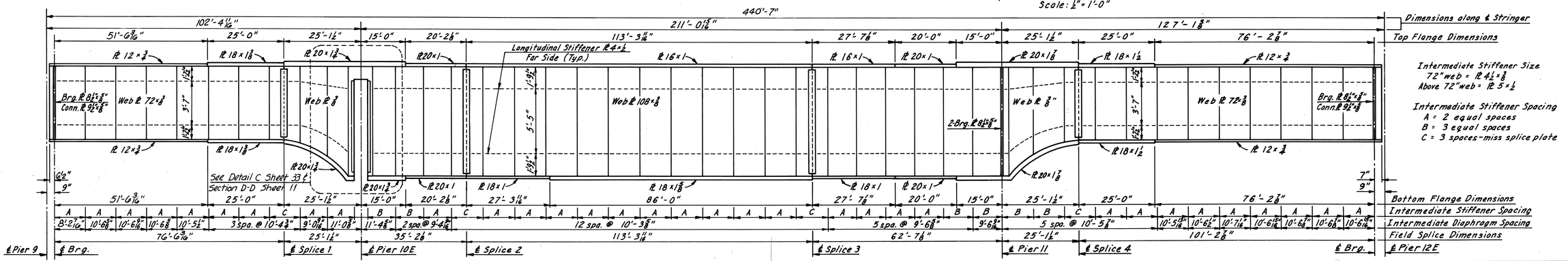
SECTION B-B
Splice 3
Scale: ½"=1'-0"



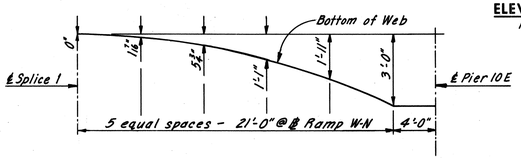
SECTION C-C
Scale: ½"=1'-0"



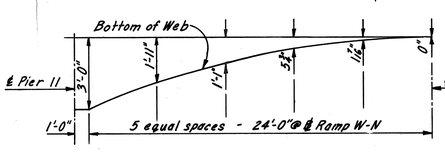
SECTION B-B
Splice 2
Scale: ½"=1'-0"



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 S2.
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.

AS BUILT

	BY	DATE
MADE	AMH	2-2869
CHECKED	JD	4-26-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	Note Added	LRH	4-19-74
2	As Built	TEM	6-77

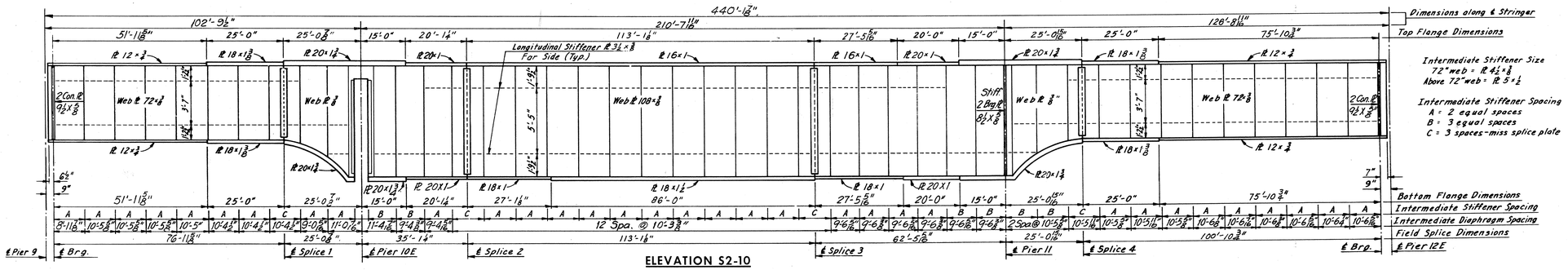
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
FRAMING PLAN - UNIT 10

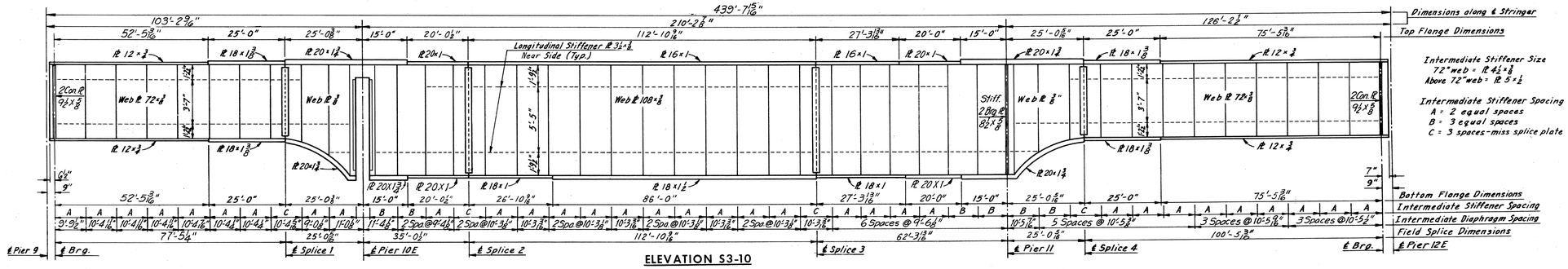
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 24 OF 54

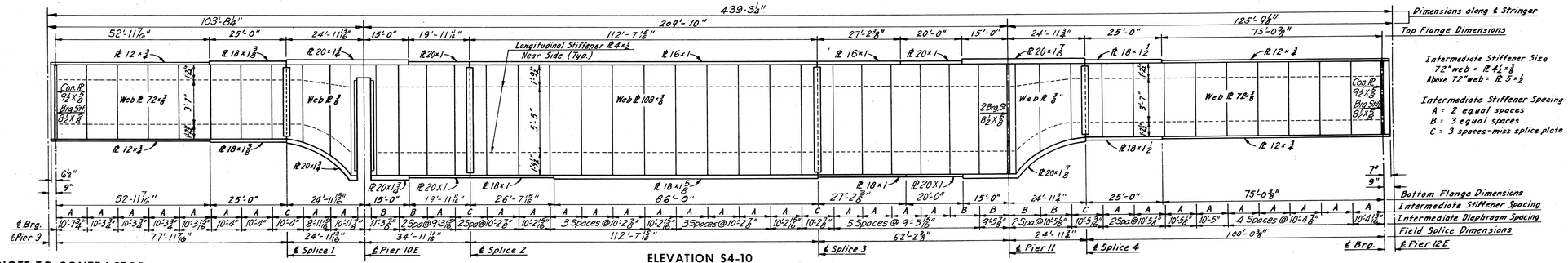
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	197	265



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

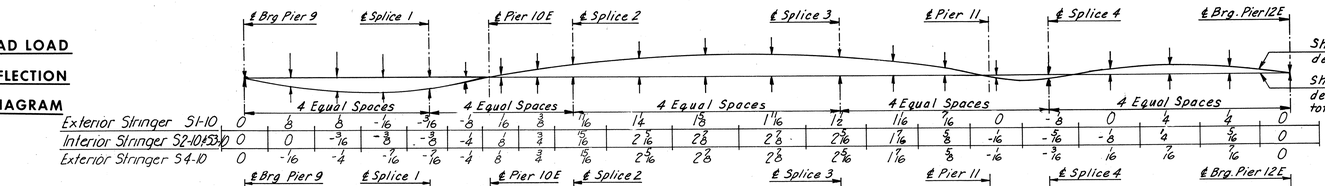
The stringers shall be fabricated with an upward camber amounting to the tabulated value. This will provide approximate compensation for deflection under full dead load and for comformity with finished grade.

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.

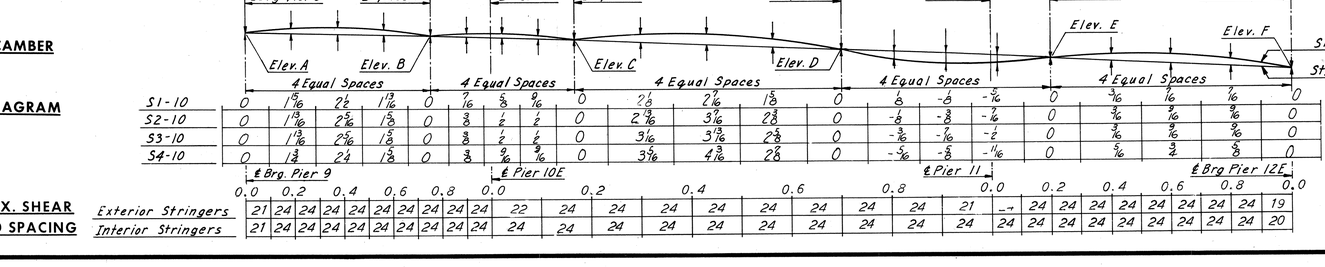
If stringers are not cambered distance top of stringers to top of slab will vary along the stringer in accordance with the offset dimensions shown in the Camber Diagram, and with minimum distance as shown in Cross-Section on Sheet

	BY	DATE				
MADE	AMH	2-28-69	2	As Built	TEM	6-77
CHECKED	JD	4-29-69				
IN CHARGE			NO.	REVISION	BY	DATE

DEAD LOAD DEFLECTION DIAGRAM



CAMBER DIAGRAM



Note:
Deflections, camber, and stud spacings are in inches.

MAX. SHEAR STUD SPACING

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.

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

UNIT 13 | UNIT 14 | UNIT 15

℄ Existing Piers 95 & 96 | ℄ Existing FB 16 | ℄ Pier 12W | ℄ Brg | ℄ Pier 13 W. | ℄ Pier 14 & ℄ Bearing (Radial) | 10" @ ℄ R.P.T. | ℄ Bearing Stringers (Radial)

119'-5 3/16"
4 Spa. @ 19'-6" = 78'-0"
4 Spa. @ 19'-6" = 78'-0"
17'-2 13/16"
16'-11 13/16"
22'-0 5/16"
21'-9 1/16"
108'-9 3/4"
3 Spa. @ 21'-4" = 64'-0"
3 Spa. @ 21'-4" = 64'-0"
21'-11 7/8"
21'-9"
49'-9"

22'-3 5/16"
21'-5 15/16"
Normal to ℄ Pier
85°31'30"
1:5
90°00'00"
90°00'00"
89°03'35"
89°03'35"
90°00'00"

24'-5 7/8"
24'-4 5/8"
24'-4 5/8"
24'-5 7/8"
24'-4 5/8"
24'-4 5/8"
Measured Along ℄ Ramp N-W
Measured Along ℄ S-1
Measured Along ℄ S-2

S1-13 | S2-13 | S1-14 | S2-14 | S1-15 | S2-15

R=1494.39' | R=1432.39'

G13 | G14 | G15 | G16 | G17

Sta. 15+73.60 ℄ Ramp N-W
Sta. 15+73.09 ℄ Ramp N-W
Sta. 14+53.66 ℄ Ramp N-W.
Sta. 13+44.85 ℄ Ramp N-W
Sta. 12+95.10 ℄ Ramp N-W.

Fixed Shoe (Type F4M Typ.)
Exp. Shoe (Type E6 Typ.)
Fixed Shoe (Type F4M. Typ.)
Exp. Shoe (Type E1. Typ.)
Fixed Shoe (Type F1M. Typ.)

℄ Brg. N. Abutment.
℄ R.P.T.
℄ Ramp N-W
52'-0"
52'-0"

℄ Pier 96 Sta 1720+44.963
℄ Pier 95 Sta 1720+30.397
Sta 1720+49.115

Note:
Dimensions from ℄ Pier to ℄ Brgs. are normal to ℄ Pier.

90° typ. intermediate diaphragms

℄ Piers 97 & 98 Sta. 1721+58.811
Sta. 358+92.00 ℄ Ramp W-N.
℄ Piers 99 & 100 Sta. 1722+63.871
℄ 1" Long. Jt.
R=1388.64'
Fixed Shoe (Type F9 Typ.)
Exp. Shoe (Type E1 Typ.)
radial
℄ brg. of stringers
Fixed Shoe (Type F1 Typ.)
℄ Brg. N. Abutment.
Sta. 1723+11.87

Exp. Shoe (Type E4 Typ.)
Sta. 357+65.50 ℄ Ramp W-N.
℄ Ramp W-N
R=954.93'
PC.C. Sta. 357+07.01 ℄ Ramp W-N

S1-11 | S2-11 | S3-11 | S1-12 | S2-12

R=1386.88' | R=1131.84' | R=951.93' | R=1380.39'

Measured Along ℄ S-1
Measured Along ℄ S-2
Measured Along ℄ S-3
Measured Along ℄ Ramp N-W

12'-8 7/8" | 12'-8 5/8" | 12'-8 1/4" | 12'-8 3/8" | 12'-8 1/4" | 12'-8 5/16" | 12'-8 1/8" | 12'-8" | 12'-8" | 10'-0 1/8" | 16'-8 1/4"
12'-7 7/16" | 12'-7 1/4" | 12'-7 1/16" | 12'-7 1/8" | 12'-7 5/16" | 12'-7 5/8" | 12'-7 1/4" | 12'-7 1/4" | 12'-7 1/8" | 12'-7 3/8" | 9'-11 3/8"

4 Spa. @ 12'-6 7/16" = 50'-1 3/4"
2 Spa. @ 12'-6 3/8" = 25'-0 3/4"
4 Spa. @ 12'-6 7/16" = 50'-1 3/4"
126'-6"
2 Spa. @ 16'-4 5/8" = 32'-9 1/4"
3 Spa. @ 16'-4 5/8" = 49'-1 7/8"
65'-2 1/4"

16'-1 1/16"
15'-10 1/4"

℄ Pier 13E
Sta. 359+02.00
P.C.C. Sta. 359+26.75 Bk. = Sta. 359+29.43 Ahd. ℄ Ramp W-N
℄ Brg. Stringers
Sta. 359+69.87 ℄ Ramp W-N.
℄ Brg. N. Abutment.
℄ Pier 12 E

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.

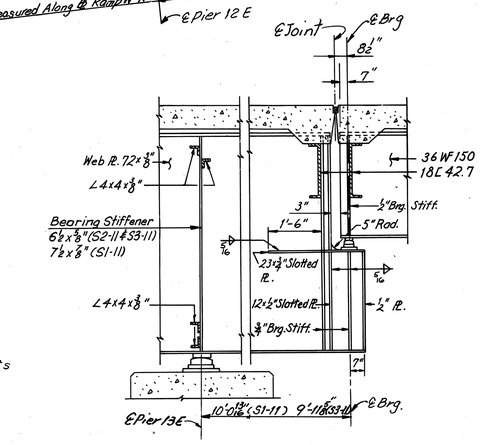
Note:
Dimensions shown on the plans for existing structural metalwork are in accordance with drawings prepared for the original construction. The Contractor shall verify all necessary dimensions of existing structural metalwork prior to fabrication of new metalwork.
New Diaphragms are to match Existing Diaphragms, in Units 13, 14 and 15.

	BY	DATE				
MADE	Y.C.P. G.C.C.	2-24-69	2	Framing Revised Units 12, 13, 14, 15	R&V	12-5-74
CHECKED	K.C.T.	4-2669	1	P.C.C. ℄ WN	DWB	12-11-74
IN CHARGE			3	As Built	TEM	6-77
			NO.	REVISION	BY	DATE

UNIT 11

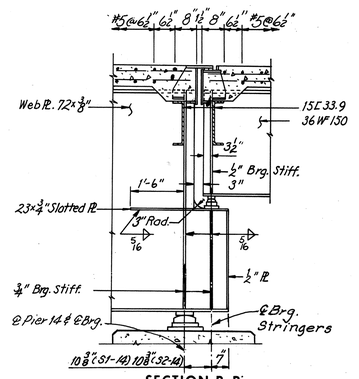
FRAMING PLAN
Scale: 1"=10'-0"

Note:
Intermediate stiffener Pls. 4x3/8" 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.



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

UNIT 12



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

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	-	-

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

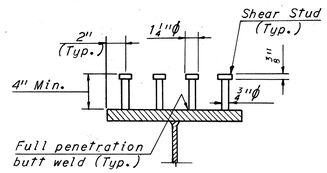
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

FRAMING PLAN - UNITS 11, 12, 13, 14 AND 15

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

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 26 OF 54

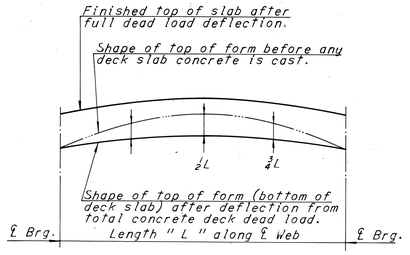
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	199	265



SHEAR STUD DETAIL
No Scale

SHEAR STUD NOTE

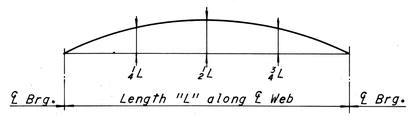
Capacity = 3,400 lbs. per stud.
The Contractor may, if he elects, use three ⅞" diameter studs at the same longitudinal spacing in lieu of the four ¾" diameter studs shown.
Stud rows shall be placed parallel to the main deck reinforcing.
Shear stud spacing shown is maximum spacing.



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.

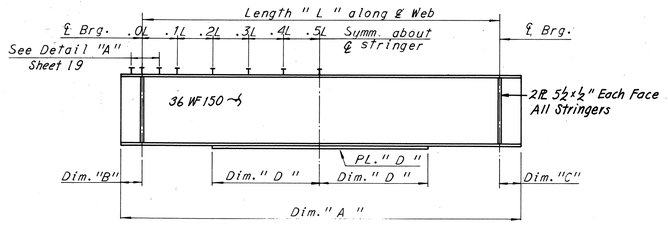


CAMBER DIAGRAM

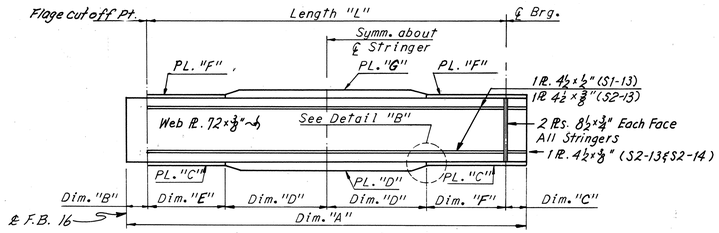
NOTE TO FABRICATOR

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.

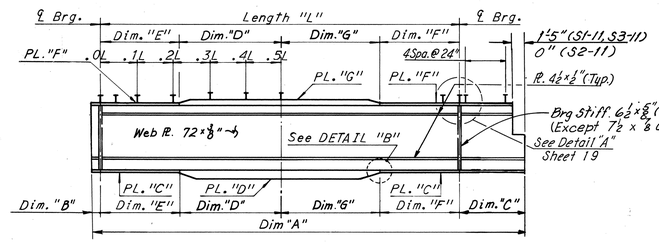
Note:
Stringers having a total camber of less than 1" are not required to be shop cambered, but should be turned so that any mill tolerance deviation from straightness will be in the direction shown by the Camber Diagram.
If stringers are not cambered, distance top of stringers to top of slab will vary 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



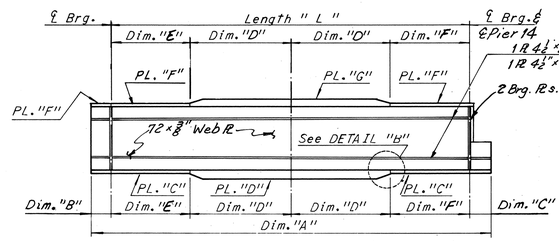
STRINGER ELEVATION
No Scale
(Unit 12 ℄ 15)



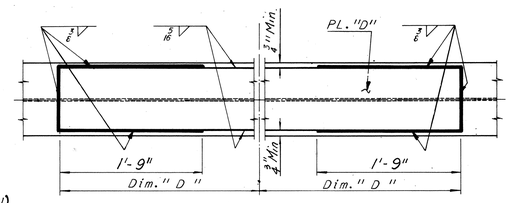
STRINGER ELEVATION
No Scale
(Unit 13)



STRINGER ELEVATION
No Scale
(Unit 11)

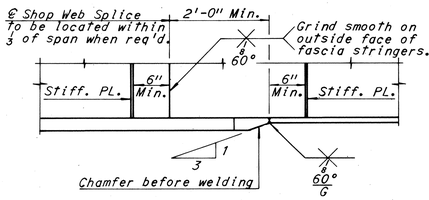


STRINGER ELEVATION
No Scale
(Unit 14)



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	138'-1 15/16"	126'-11"	7"	10'-7 15/16"	38'-0"	25'-5 9/16"	25'-5¼"	38'-0"	16'-1 9/16"	18 x 2"	12 x1"	16 x 1"	17"	19"	24"	24"	24"
	S2-11	127'-3 3/8"	126'-1 3/8"	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 7/8"	125'-4 1/16"	7"	10'-6 5/8"	37'-8"	25'-0 9/16"	18'-6 9/16"	44'-2"	14 x1"	14x2 "	12x⅞"	12x1"	.22"	24"	24"	24"	24"
12	S1-12	66'-9 7/16"	65'-6 7/16"	7"	8"	24'-0"	--	--	--	36WF150	10½x¾ "	-	-	8"	9"	11"	12½"	15"
	S3-12	66'-5 9/16"	65'-0 1/16"	7"	10"	23'-9"	--	--	--	36WF150	10½x¾ "	-	-	10"	11"	14½"	17½"	24"
13	S1-13	118'-4 5/8"	116'-7 1/16"	11"	10½"	37'-0"	21'-3 9/16"	21'-3 9/16"	-	18x1"	18x1⅛"	18x1"	18x1⅛"	-	-	-	-	-
	S2-13	117'-4 1/4"	115'-6 3/16"	11"	10½"	36'-0"	21'-9 3/8"	21'-9 3/8"	-	18x1"	18x1¼"	18x1"	18x1¼"	-	-	-	-	-
14	S1-14	110'-4 1/16"	108'-0 9/16"	10½"	10½"	35'-0"	19'-0 9/16"	19'-0 9/16"	-	18x1"	18x1¼"	18x1"	18x1¼"	-	-	-	-	-
	S2-14	109'-10 3/8"	107'-6 1/2"	10½"	1'-5 3/8"	35'-0"	18'-9 1/4"	18'-9 1/4"	-	18x⅞"	18x1⅜"	18x⅞"	18x1⅜"	-	-	-	-	-
15	S1-15	50'-1 1/4"	48'-11 3/16"	3½"	10"	-	-	-	-	36WF150	-	-	-	-	-	-	-	-
	S2-15	49'-8 11/16"	48'-9 7/16"	3½"	8"	-	-	-	-	36WF150	-	-	-	-	-	-	-	-

DEAD LOAD DEFLECTION SCHEDULE

¼L	½L	¾L
1 5/16	1 9/16	1 ¼
1 1/16	2 1/16	1 1/16
1 9/16	2 ⅛	1 7/16
¹⁵/₁₆	¾	⁹/₁₆
1 3/16	1 ½	1 3/16
1 ⅛	1 ½	1 ⅛
1 3/16	1 ⅜	1 3/16
1 ⅛	1 ½	1 ⅜
⅞	1 ⅛	⅞
⅝	1 ¼	⅝
⁵/₁₆	⅜	⁵/₁₆
⁵/₁₆	⅜	⁵/₁₆

CAMBER SCHEDULE

¼L	½L	¾L
2 3/4	3 3/8	2 9/16
2 1/16	4 ⅛	3 ⅛
2 5/8	4	2 15/16
¾	1	13/16
1	1 7/16	1 ⅛
1 9/16	2 3/16	1 3/16
1 ½	2 ⅝	1 ½
1 ⅛	1 ¾	1 5/16
½	¾	½
⅝	1 ¼	⅝
⁵/₁₆	⅜	⁵/₁₆
⁵/₁₆	½	⁵/₁₆

* Spacing begins at termination of 6 spaces @ 4".

	BY	DATE				
MADE	V.C.P. G.C.C.	2-26-69	2	As Built	TEM	G-77
CHECKED	K.C.T.	4-28-69				
IN CHARGE			NO.	REVISION	BY	DATE

Framing Revised Units 12, 13, 14, 15 — Rff — 12-5-74

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

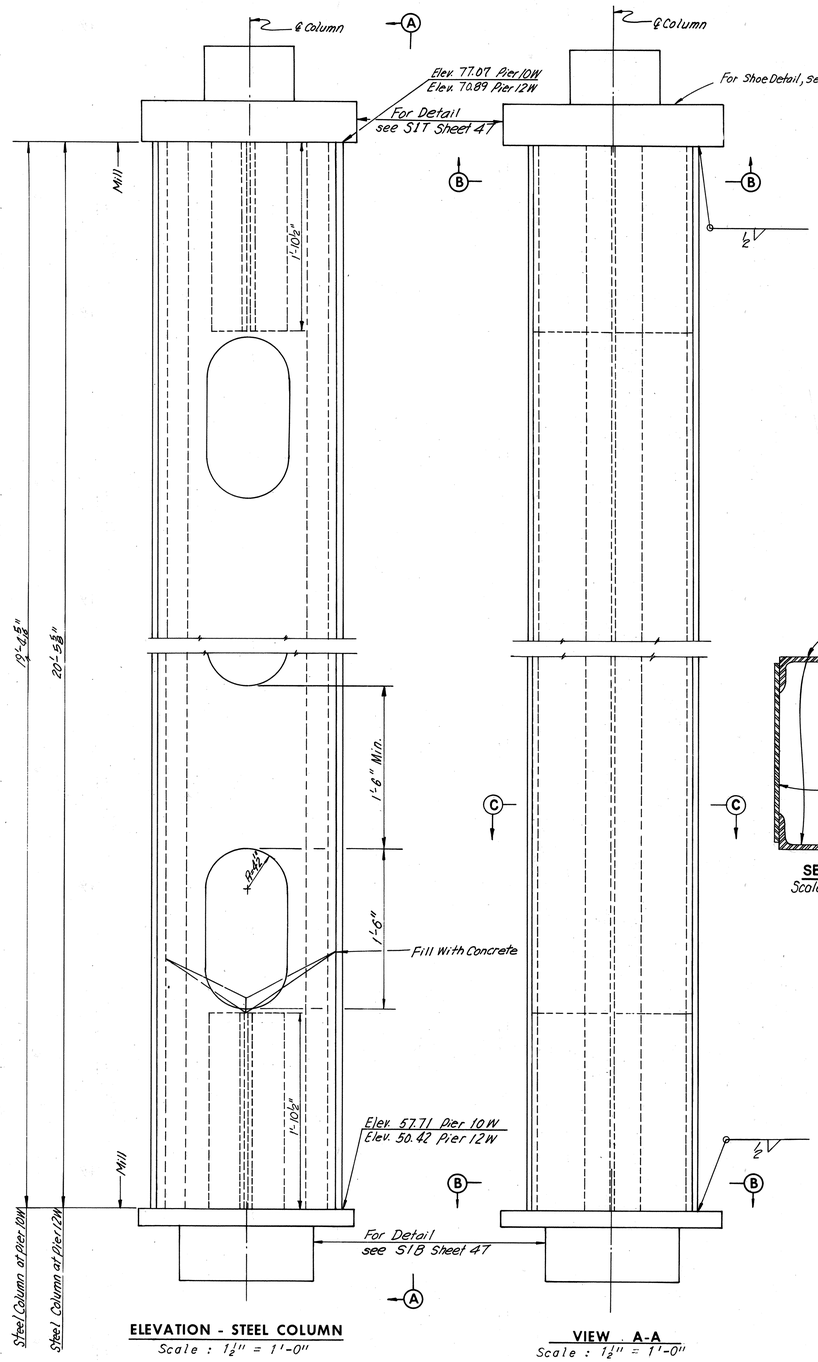
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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

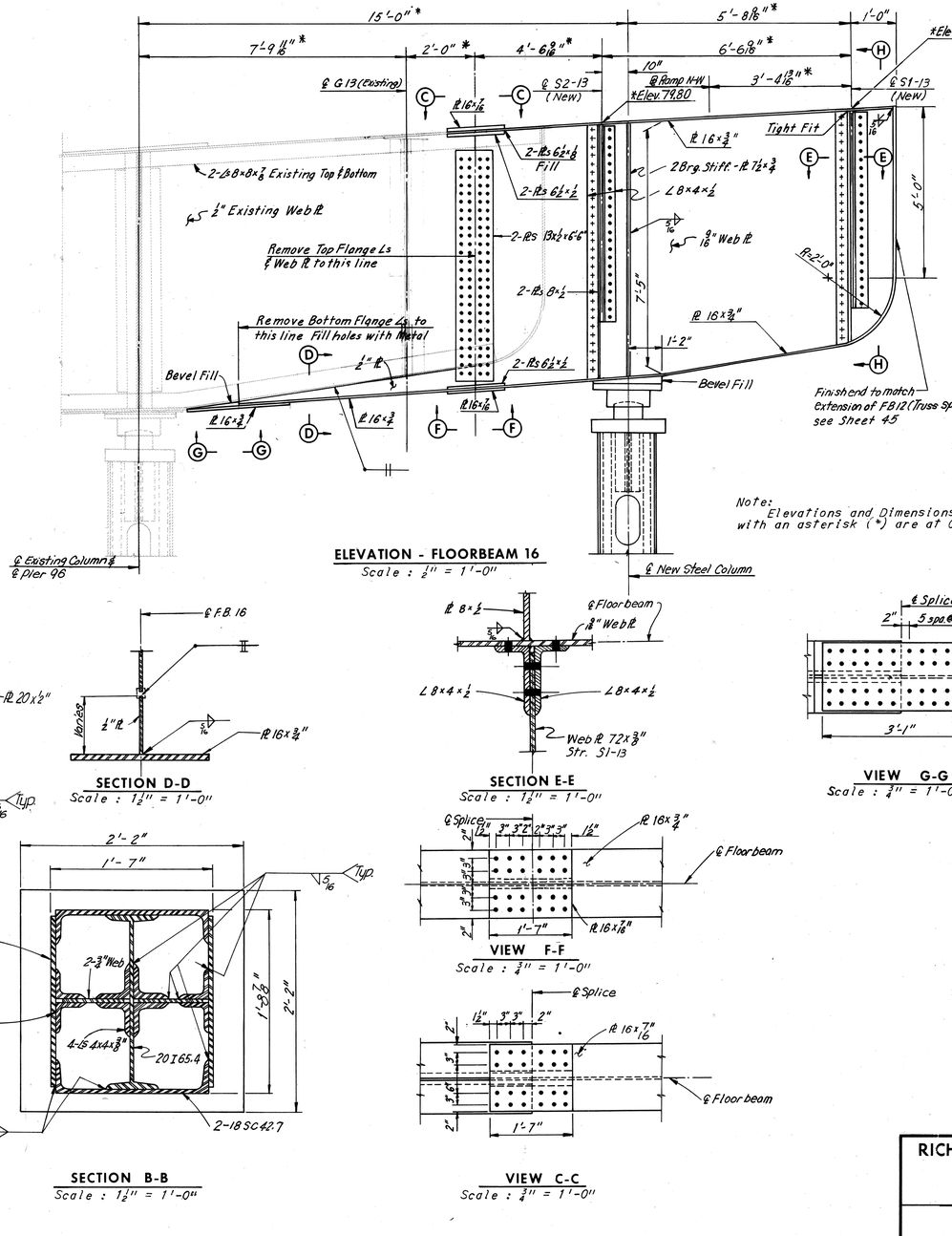
SCALE: No Scale
CONTRACT NO.: 10
SHEET NO. 27 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	200	265

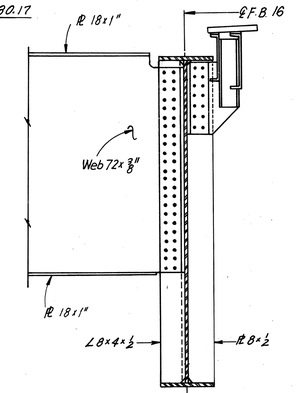


ELEVATION - STEEL COLUMN
Scale : 1½" = 1'-0"

VIEW A-A
Scale : 1½" = 1'-0"



ELEVATION - FLOORBEAM 16
Scale : ½" = 1'-0"

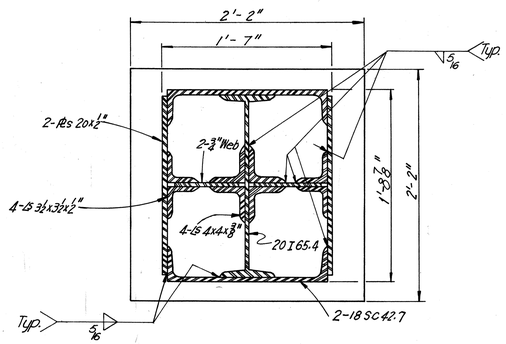


SECTION H-H
Scale : ½" = 1'-0"

Note:
Elevations and Dimensions denoted with an asterisk (*) are at ℄ F.B. 16.

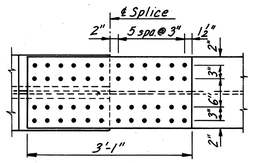
SECTION C-C
Scale : 1½" = 1'-0"

SECTION D-D
Scale : 1½" = 1'-0"



SECTION B-B
Scale : 1½" = 1'-0"

SECTION E-E
Scale : 1½" = 1'-0"



VIEW G-G
Scale : ¼" = 1'-0"

VIEW F-F
Scale : ¾" = 1'-0"

VIEW C-C
Scale : ¾" = 1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.S.H.	3-11-69	3	As Built	TEM	6-77
CHECKED	S.C.C.	6-13-69	A	Revised Elev.	REV	1-24-75
IN CHARGE			1	Bolts Deleted Welded Conn.	T.E.M.	10-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

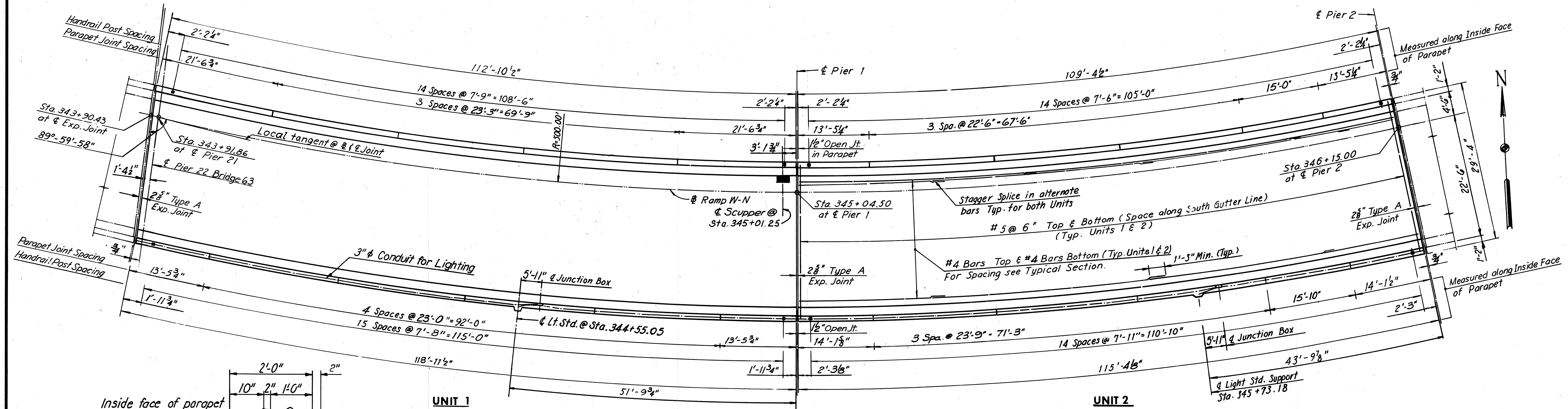
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

FLOORBEAM 16 AND STEEL COLUMNS

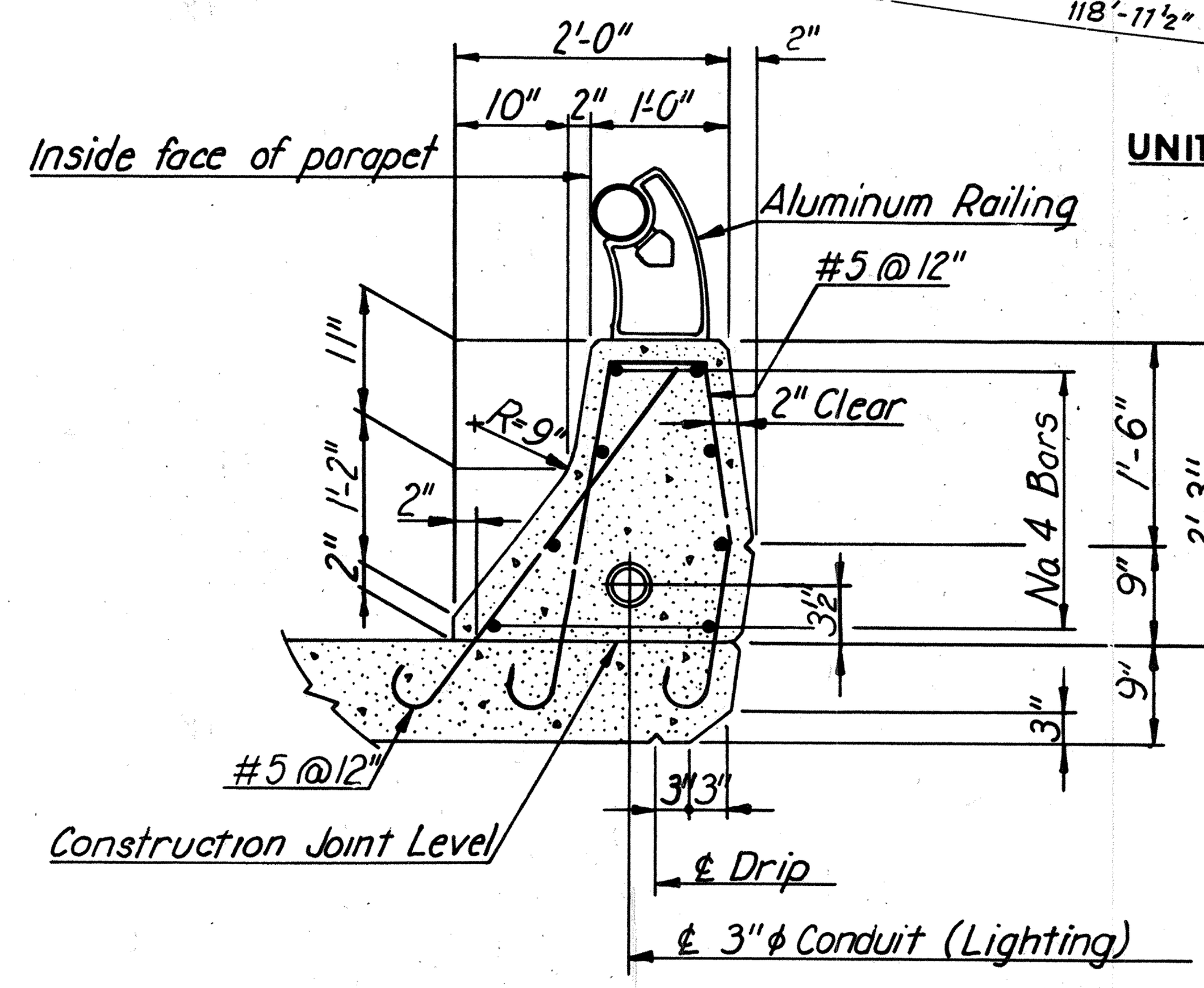
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 28 OF 54

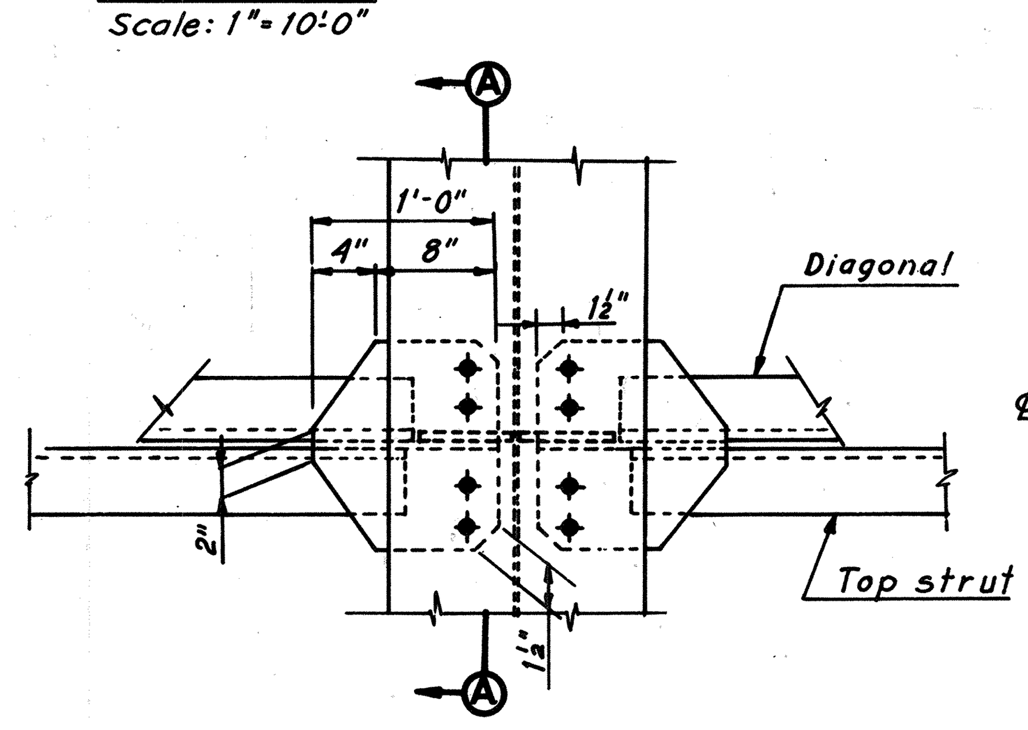
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
'0	DOWNTOWN EXPRESSWAY	201	265



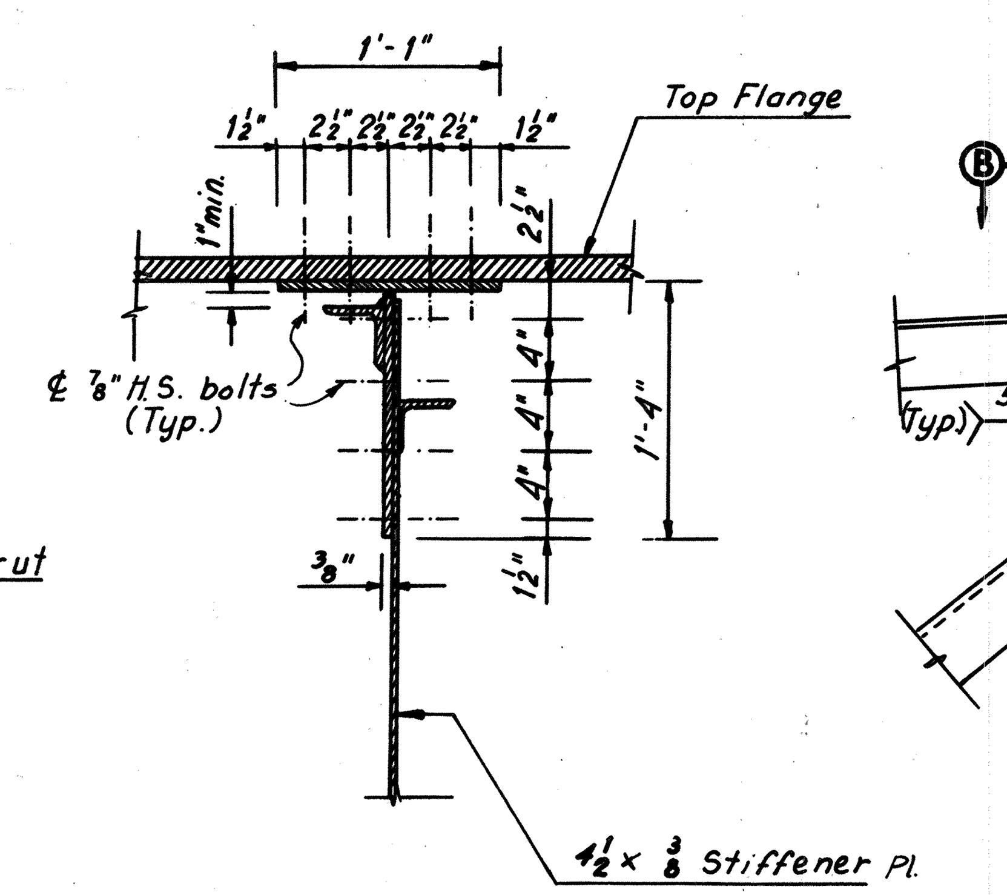
DECK PLAN
Scale: 1" = 10'-0"



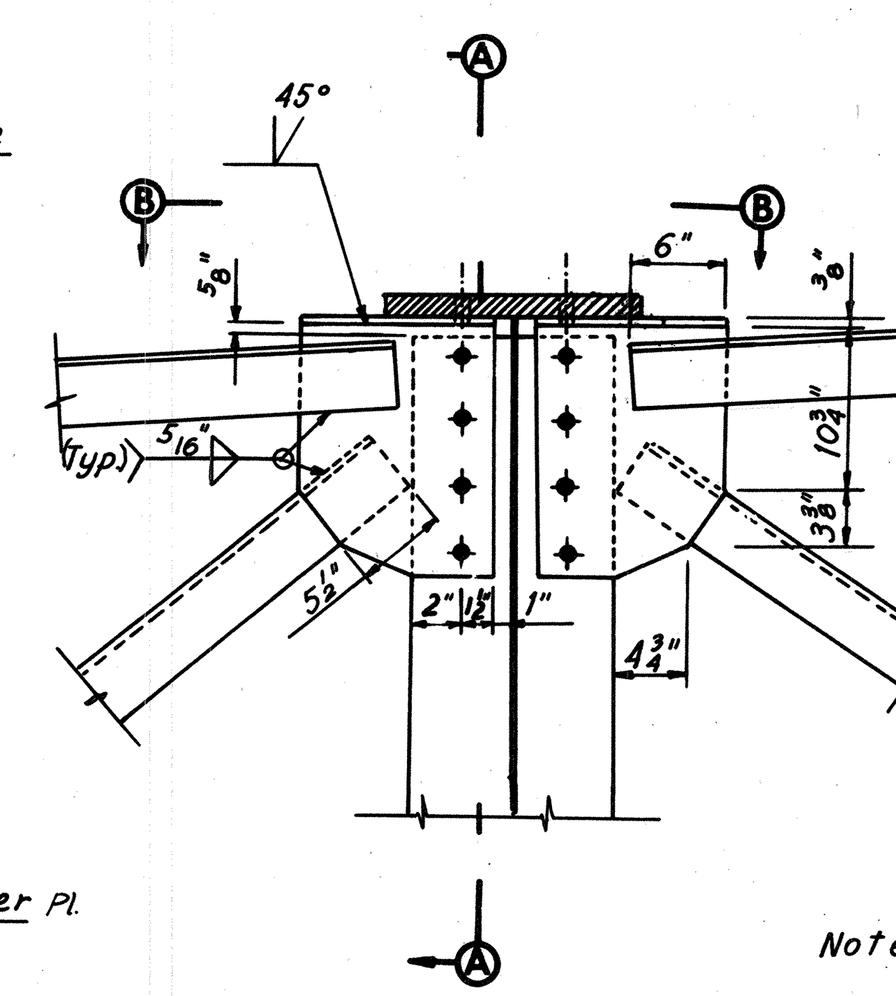
TYPICAL PARAPET DETAIL
Scale: 3/4" = 1'-0"



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



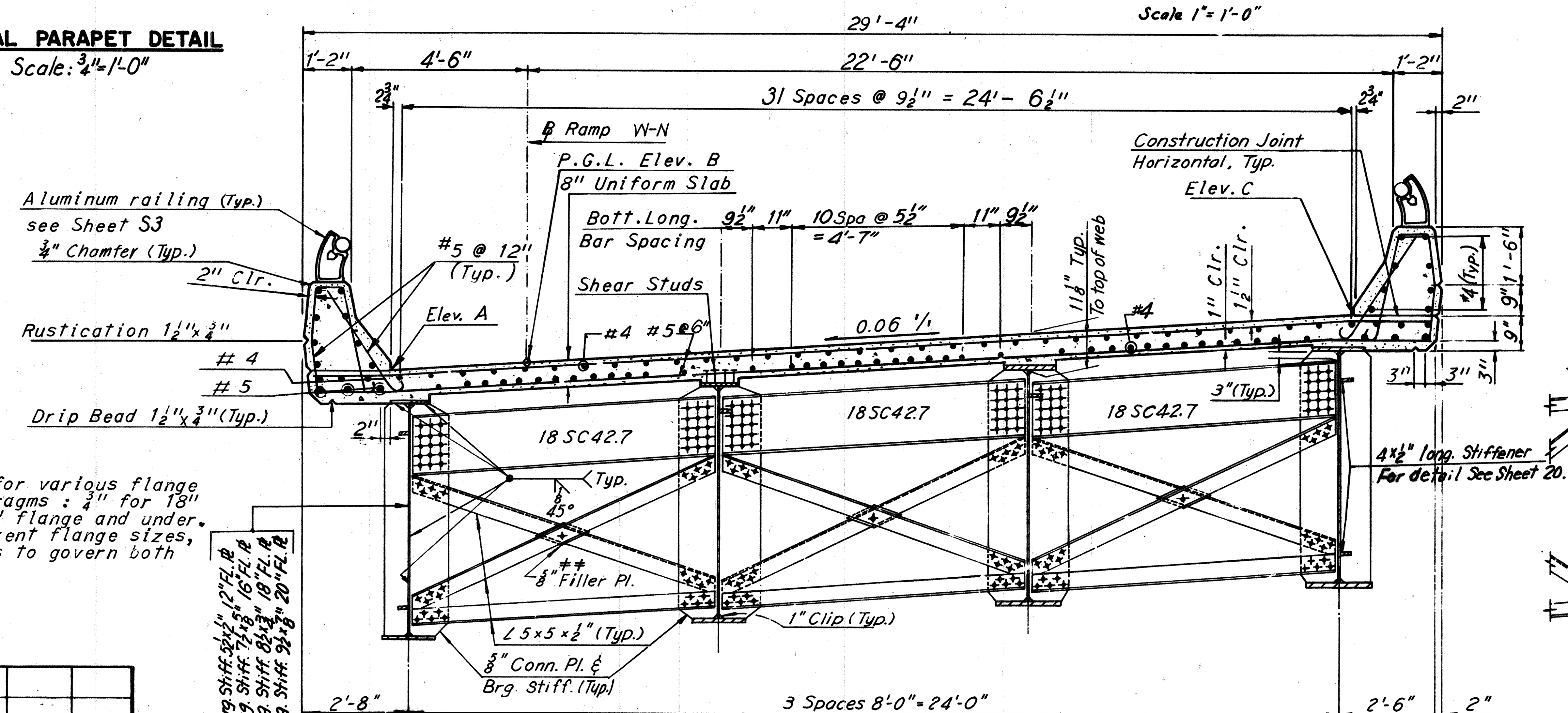
SECTION A-A
Scale 1" = 1'-0"



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

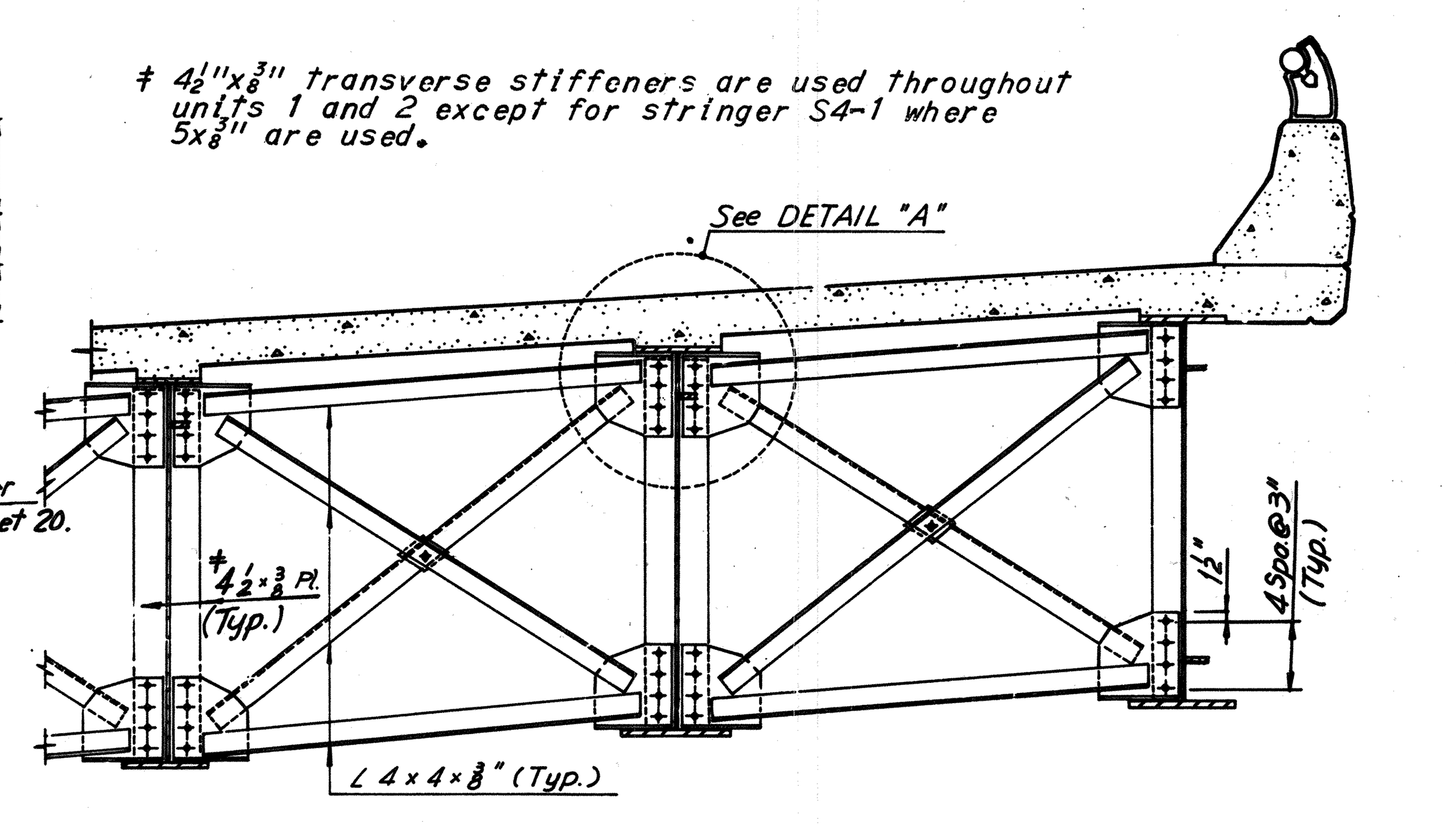
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
343+80.00	92.86	93.07	94.36
90.00	92.66	92.87	94.16
90.43	92.65	92.86	94.15
91.86	92.61	92.82	94.11
344+00.00	92.40	92.61	93.90
10.00	92.09	92.30	93.59
20.00	91.73	91.94	93.28
30.00	91.32	91.53	92.82
40.00	90.86	91.07	92.36
50.00	90.34	90.55	91.84
60.00	89.79	90.00	91.29
70.00	89.26	89.47	90.76
80.00	88.72	88.93	90.22
90.00	88.14	88.35	89.64
345+00.00	87.55	87.76	89.05
04.50	87.28	87.49	[illegible]
10.00	86.94	87.15	[illegible]
20.00	86.35	86.56	87.85
30.00	85.75	85.96	87.25
40.00	85.17	85.38	86.67
50.00	84.58	84.79	86.08
60.00	84.02	84.23	85.52
70.00	83.46	83.67	84.96
80.00	82.90	83.11	84.40
90.00	82.34	82.55	83.84
346+00.00	81.78	81.99	83.28
10.00	81.22	81.43	82.72
15.00	80.94	81.15	82.44
20.00	80.66	80.87	82.16

Notes:
For Layout of Pier 21 see Sheet 2 of Bridge #65 (Ramp S-W).
For Framing Details of Pier 21 see Sheet 20 of Bridge #66 (E.B. Roadway).
Piers 1 and 2 both are radial to ℄ Ramp N-W (Curve NW-1)
For intermediate diaphragm and transverse stiffener spacing see Sheet 19.
For Handrail Details see Sheet S3.
For Lighting Details see Sheet S4.
For Standard Drainage Details see Support Type 3 Sheet S6.
For Joint Details see Sheet 48.



TYPICAL SECTION-END DIAPHRAGM
Scale: 3/8" = 1'-0"

‡ $4\frac{1}{2}$" x $\frac{3}{8}$" transverse stiffeners are used throughout units 1 and 2 except for stringer S4-1 where 5x$\frac{3}{8}$" are used.



INTERMEDIATE DIAPHRAGM
Scale: 3/8" = 1'-0"

‡‡ The following conn. ℄ thickness for various flange sizes shall be used at end diaphragms: 3/4" for 18" flange, 5/8" for 15" and 1/2" for 12" flange and under. In bays where girders have different flange sizes, the conn. ℄ for the bigger one is to govern both conn. ℄'s.

	BY	DATE				
MADE	M.H.H.	8-17-68				
CHECKED	S.C.C.	11-4-68	1	As Built	TEM	6-77
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

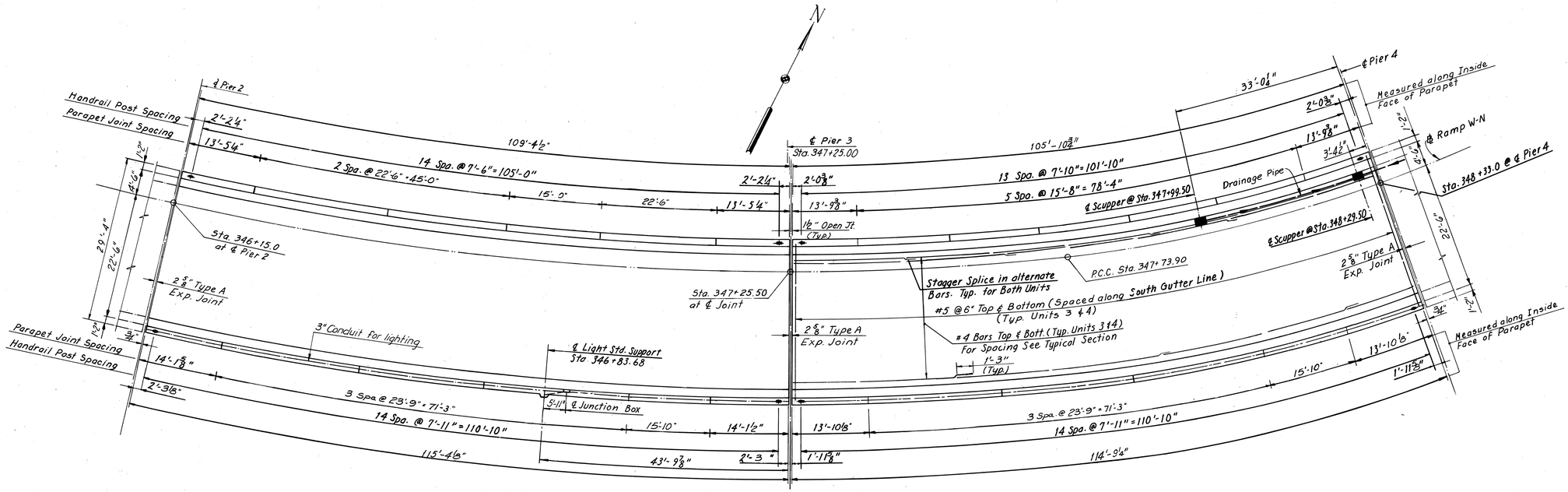
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
DECK PLAN - UNITS 1 AND 2

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

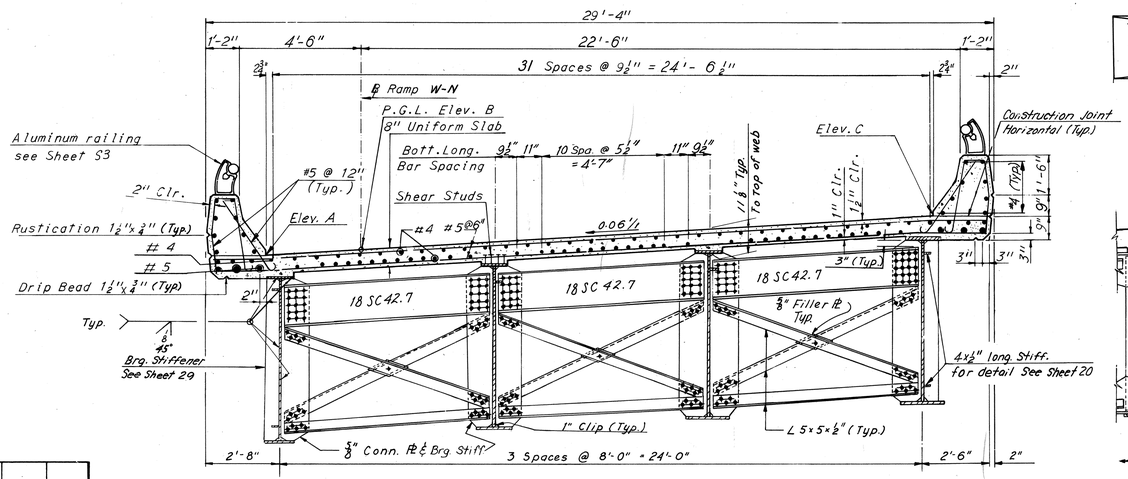
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 29 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	202	265



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

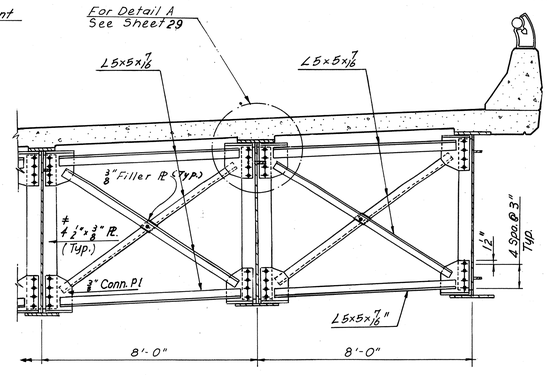
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
346+10.00	81.22	81.43	82.72
+15.00	80.94	81'15	82.44
+20.00	80.66	80.87	82.15
+30.00	80.10	80.31	81.60
+40.00	79.54	79.75	81.04
+50.00	78.98	79.19	80.48
+60.00	78.42	78.63	79.92
+70.00	77.86	78.07	79.36
+80.00	77.30	77.51	78.80
347+00.00	76.18	76.39	77.68
+10.00	75.64	75.85	77.14
+20.00	75.15	75.36	76.65
+25.50	74.89	75.10	76.39
+30.00	74.69	74.90	76.19
+40.00	74.29	74.50	75.79
+50.00	73.92	74.13	75.42
+60.00	73.60	73.81	75.10
+70.00	73.32	73.53	74.82
+80.00	73.08	73.29	74.58
+90.00	72.89	73.10	74.39
348+00.00	72.74	72.95	74.24
+10.00	72.63	72.84	74.13
+20.00	72.57	72.78	74.07
+30.00	72.55	72.76	74.05
+33.00	72.55	72.76	74.05
+40.00	72.57	72.78	74.07



TYPICAL SECTION - END DIAPHRAGM
Scale: ⅜" = 1'-0"

$4\frac{1}{2}\times\frac{3}{8}$" transverse stiffeners are used throughout units 1 and 2 except for stringer S4~~-4~~ where $5\times\frac{3}{8}$" are used.

~~* All intermediate diaphragms in Unit 3 and the first three in Unit 4 consist of L5 4x4x$\frac{3}{8}$. Last five intermediate diaphragms in Unit 4 consist of L5x4x$\frac{1}{2}$ and L5x5x$\frac{7}{16}$~~



INTERMEDIATE DIAPHRAGM
Scale: ⅜" = 1'-0"

Notes:
Piers 2, 3 and 4 are all radial to ℄ Ramp W-N (Curves WN-1 and WN-2).
For intermediate diaphragm and transverse stiffener spacing see Sheet 20.
For Details of diaphragm connections to top and bottom flanges of stringers see Sheet 29.
For Handrail Details see Sheet S3.
For Lighting Details see Sheet S4.
For Standard Drainage Details see Support Type 3, Sheet S6.
(Pipes between Scuppers in Unit 4 to be connected as shown for Support Type 7, Sheet S6.)
For Typical Parapet Detail, see Sheet 29.
For Joint Details see Sheet 48.

	BY	DATE				
MADE	C.E.B.		2	As Built	TEM	G-77
CHECKED	K C T	11-4-68	⚠	revised angle Size Intermediate diap.	RSH	1-24-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

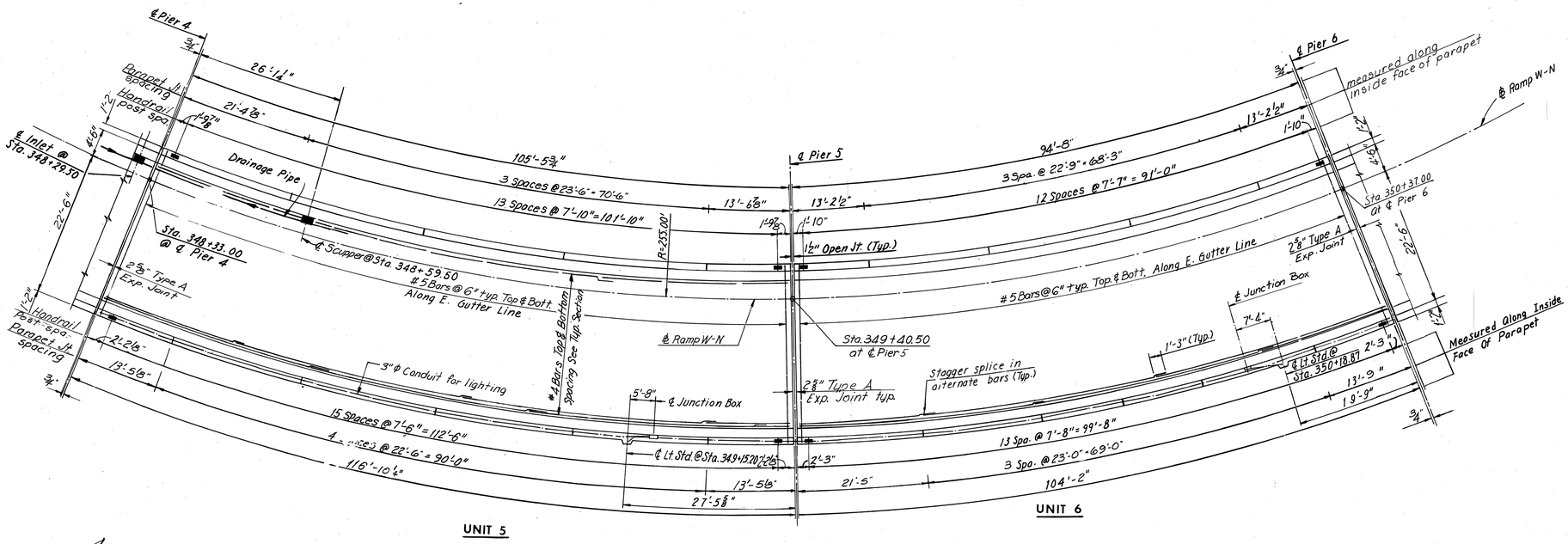
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
DECK PLAN UNITS 3 AND 4

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

SCALE: As noted
CONTRACT NO.: 10
SHEET NO. 30 OF 54

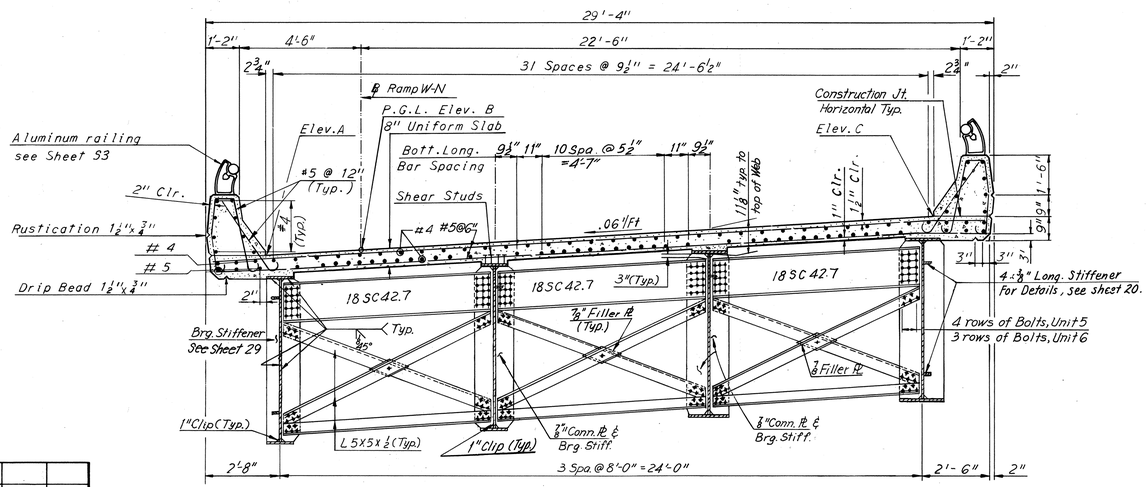
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	203	265



DECK PLAN

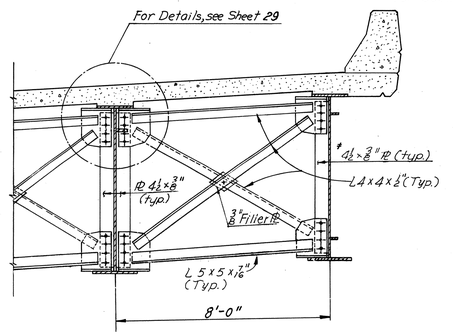
Scale: 1" = 10'-0"

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
348+33.00	72.55	72.76	74.05
+40.00	72.57	72.78	74.07
+50.00	72.64	72.85	74.14
+60.00	72.75	72.96	74.25
+70.00	72.90	73.11	74.40
+80.00	73.10	73.31	74.60
+90.00	73.34	73.55	74.84
349+00.00	73.62	73.83	75.12
+10.00	73.95	74.16	75.45
+20.00	74.31	74.52	75.81
+30.00	74.73	74.94	76.23
+40.00	75.18	75.39	76.68
+40.50	75.21	75.42	76.71
+50.00	75.68	75.89	77.18
+60.00	76.20	76.41	77.70
+70.00	76.72	76.93	78.22
+80.00	77.24	77.45	78.74
+90.00	77.76	77.97	79.27
350+00.00	78.28	78.49	79.78
+10.00	78.80	79.01	80.30
+20.00	79.32	79.53	80.82
+30.00	79.84	80.05	81.34
+37.00	80.21	80.41	81.69
+40.00	80.36	80.57	81.84



TYPICAL SECTION – END DIAPHRAGM

Scale: ⅜" = 1'-0"



INTERMEDIATE DIAPHRAGM

Scale: ⅜" = 1'-0"

Notes:

Piers 4, 5 and 6 are all radial to ℄ Ramp W-N (Curve WN-2)
For Details of diaphragm connections to top and bottom flanges of stringers see Sheet 29.
For intermediate diaphragm and transverse stiffener spacings see Sheet 21.
For Handrail Details see Sheet 53.
For Lighting Details see Sheet 54.
For Standard Drainage Details see Support Type 7 Sheet 56.
For Typical Parapet Detail, see Sheet 29.
For Joint Details see Sheet 48.

4½x⅜ transverse stiffeners are used throughout Units 5 and 6 except for Stringer S4-5 where 5x⅜ are used.

	BY	DATE				
MADE	AHH	8-26-68				
CHECKED	KCT	11-1-68	1	As Built	TEM	6-77
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

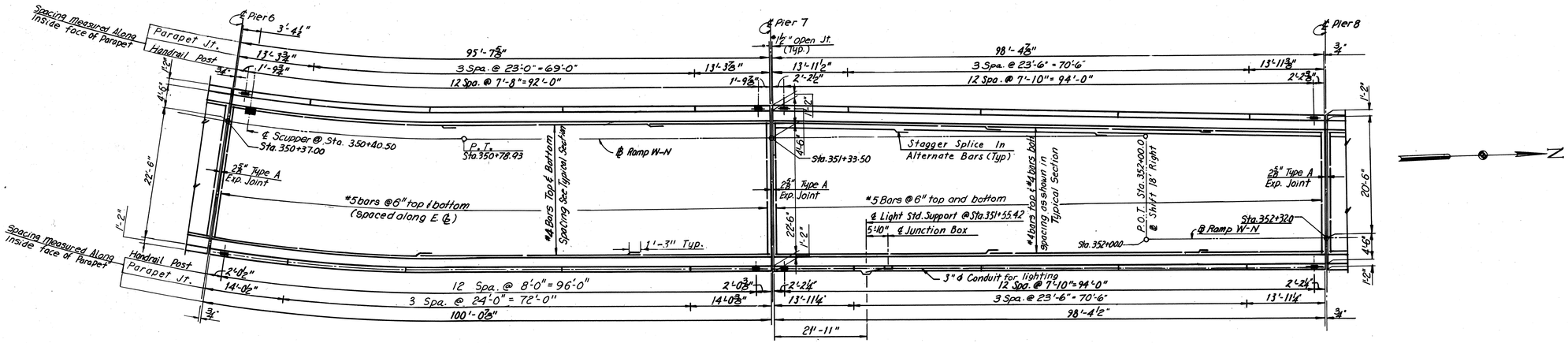
DECK PLAN–UNITS 5 AND 6

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

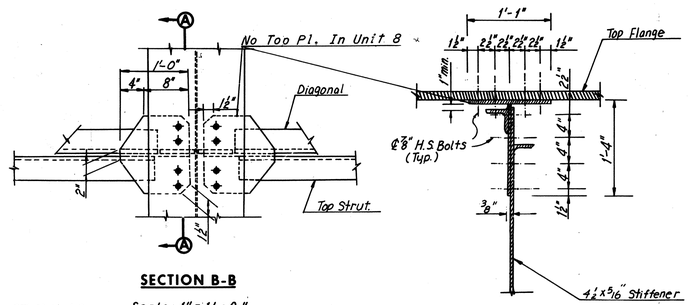
SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 31 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	204	265

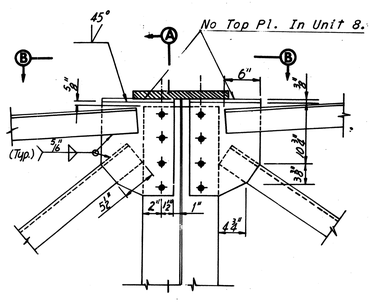
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
350+37.00	80.21	80.41	81.69
+40.00	80.36	80.57	81.84
+50.00	80.89	81.09	82.33
+60.00	81.41	81.61	82.80
+70.00	81.94	82.13	83.25
+80.00	82.49	82.65	83.68
+90.00	83.02	83.17	84.11
351+00.00	83.55	83.69	84.55
+10.00	84.07	84.20	84.97
+20.00	84.56	84.68	85.37
+30.00	85.04	85.13	85.73
+33.50	85.20	85.29	85.86
+40.00	85.49	85.57	86.08
+50.00	85.91	85.97	86.40
+60.00	86.31	86.36	86.70
+70.00	86.69	86.71	86.97
+80.00	87.03	87.05	87.22
+90.00	87.35	87.35	87.44
352+00.00	87.64	87.64	87.64
+10.00	87.97	87.89	87.88
+20.00	88.28	88.13	88.10
+30.00	88.56	88.33	88.30
+32.00	88.62	88.37	88.34



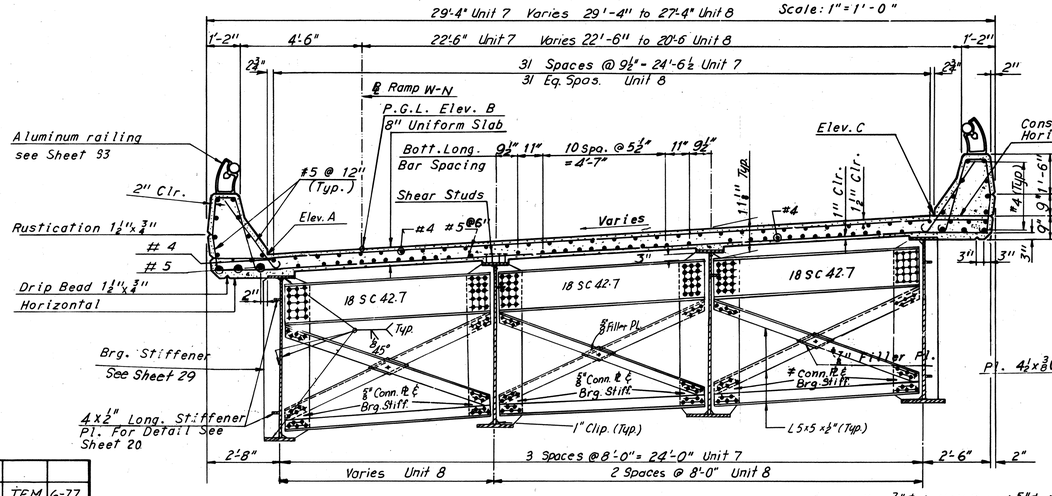
DECK PLAN
Scale 1" = 10'-0"



SECTION B-B

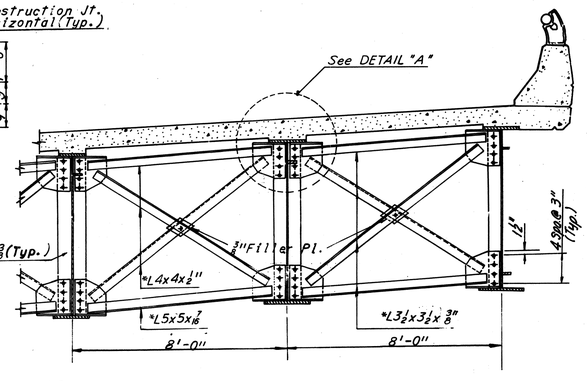


DETAIL "A"
Scale : 1"=1'-0"



TYPICAL SECTION — END DIAPHRAGM
Scale ⅜" = 1'-0"

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



INTERMEDIATE DIAPHRAGM
Scale ⅜" = 1'-0"

* Use ⅞" ℄ in Unit 7 and ⅝" ℄ in Unit 8

Note: For connection of stringer S4-8 to 18SC42.7 @ end-Diaphragms use 3 rows of bolts instead of 4 rows as shown above for Unit 7.

* The first three intermediate diaphragms in Unit 7 consist of Ls4x4x½ (curved portion of roadway). All intermediate diaphragms in Unit 8 and the last two in Unit 7 consist of Ls3½x3½x⅜ (tangent portion of roadway).

Notes:
For intermediate diaphragm and transverse stiffener spacings see Sheet 22.
For Handrail Details see Sheet 53.
For Lighting Details see Sheet 54.
For Standard Drainage Details see Support Type 3 Sheet 56.
For Typical Parapet Details, see Sheet 29

	BY	DATE
MADE	GSH	08-22-68
CHECKED	KCT	11-1-68
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built	TEM	6-77
1	Light Sta. Location	JLK	6-6-75

AS BUILT

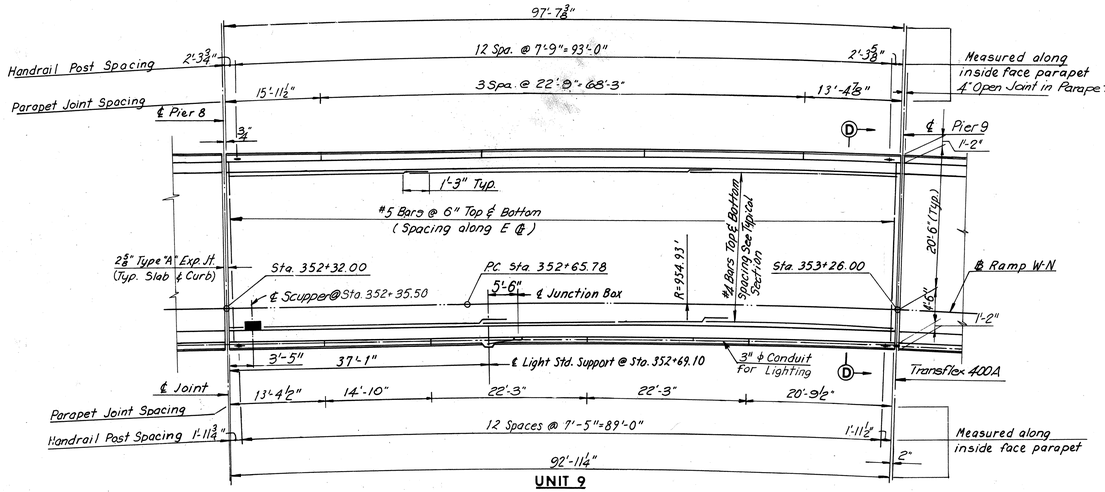
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
DECK PLAN UNITS – 7 AND 8

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

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 32 OF 54

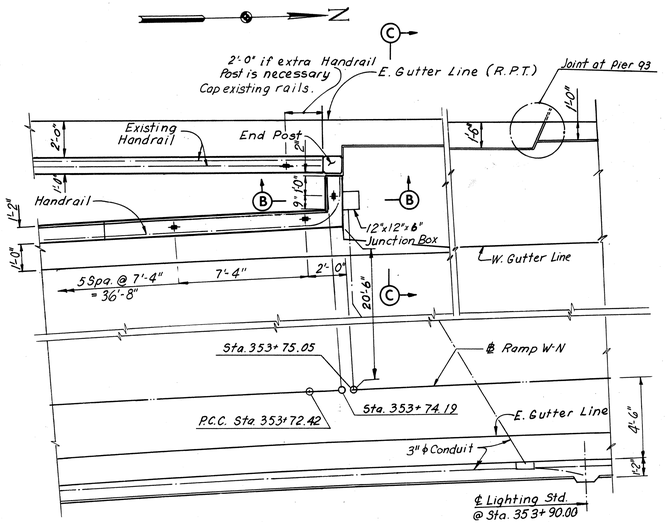
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	205	265



UNIT 9

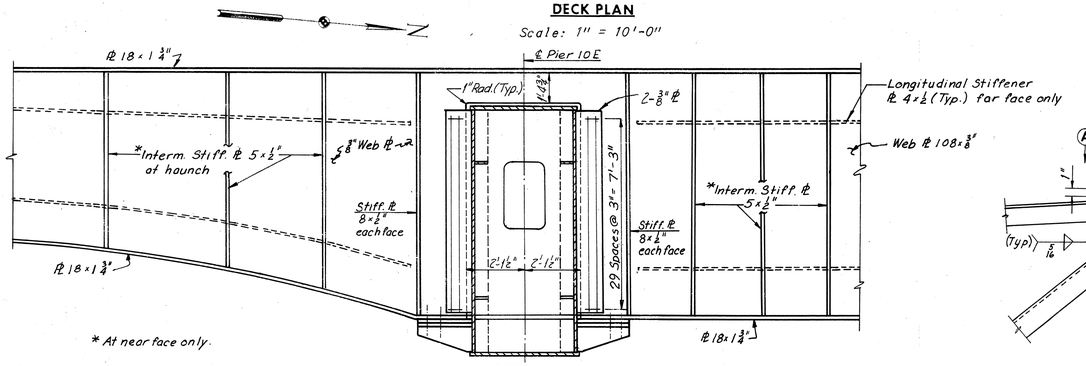
DECK PLAN

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

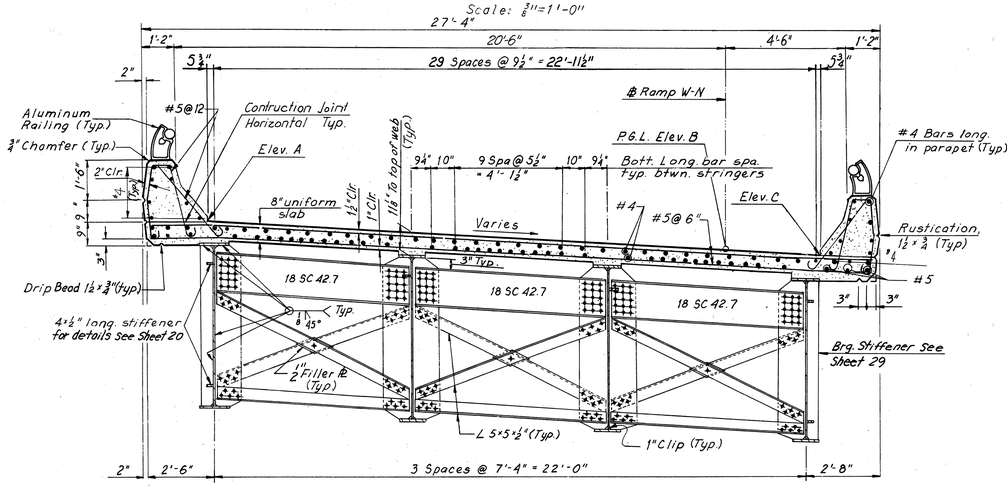
Note: Connect Lighting Conduit in existing structure with Junction Box at nose of new part of structure.



* At near face only.

DETAIL C

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



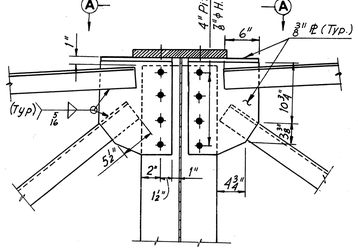
SECTION D-D — END DIAPHRAGM

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

Unit 9 shown, Unit 10 Diaphragm similar

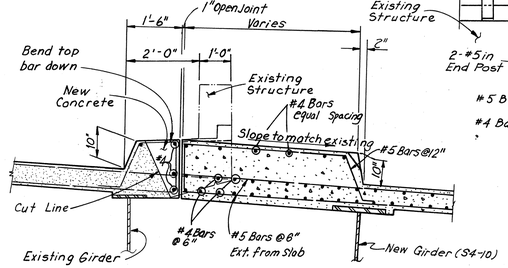
DETAIL A

Scale: 1" = 1'-0"



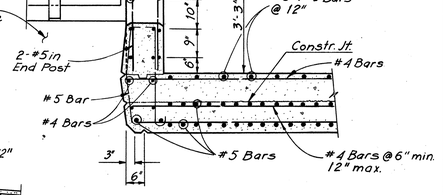
DETAIL B

Scale: 1"=1'-0"



SECTION C-C

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



SECTION B-B

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

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
CHECKED	A.M.H.	4-21-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	As Built	TEM	6-77
1	Revised ∠ size, Intermediate Diap. Unit 9	RKF	1-24-75

AS BUILT

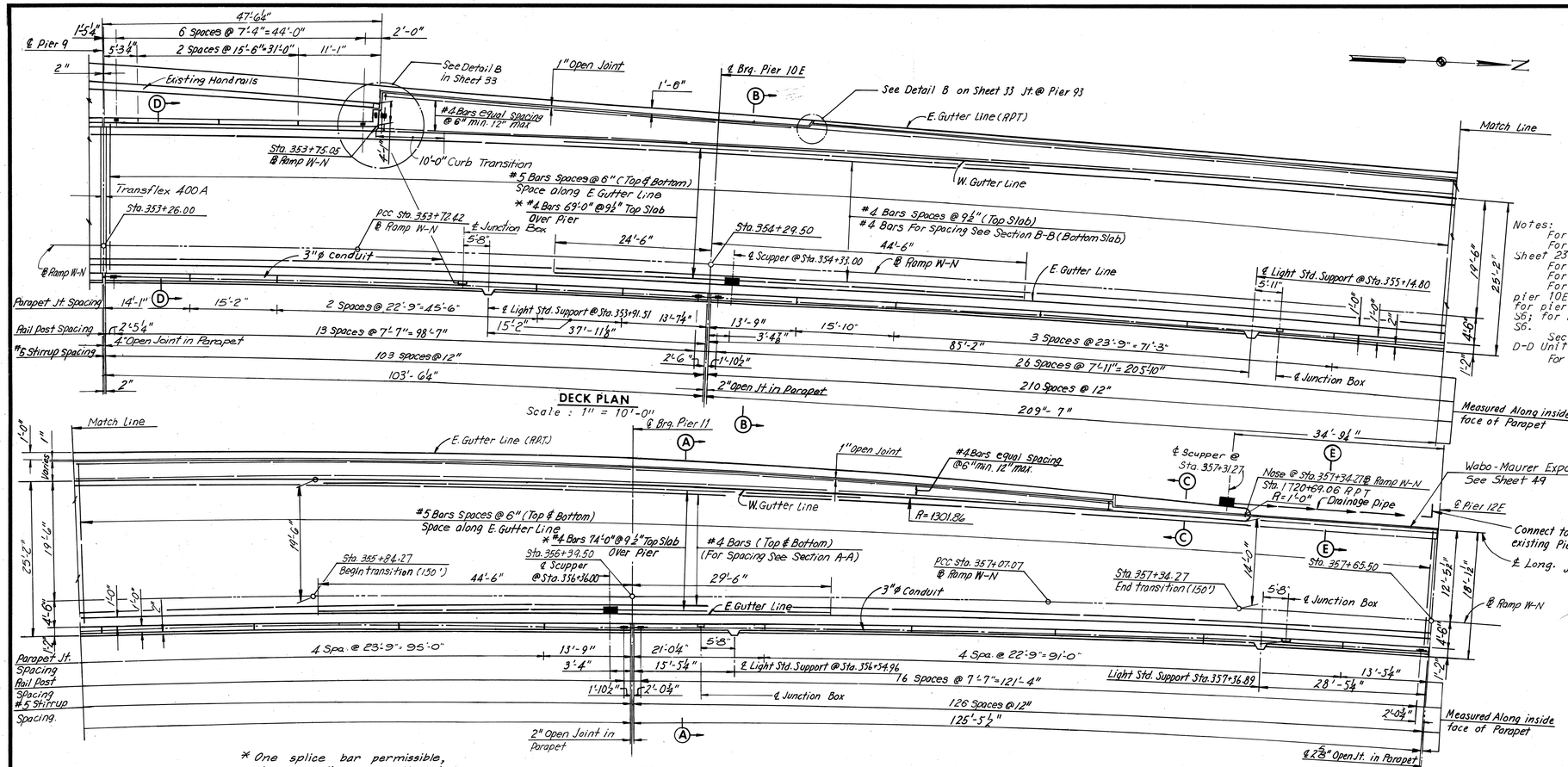
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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



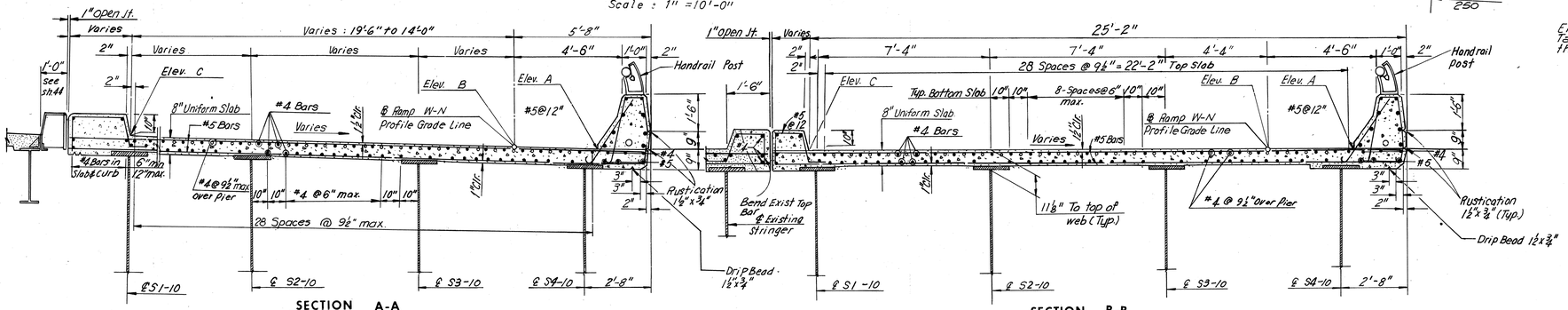
* One splice bar permissible, stagger splices on adjacent bars

Notes:
For End Diaphragms see, Sheet 33.
For Intermediate Diaphragms see, Sheet 23.
For Handrail Details see, Sheet S3.
For Lighting Details see, Sheet S4.
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 29.

ELEVATION TABLE

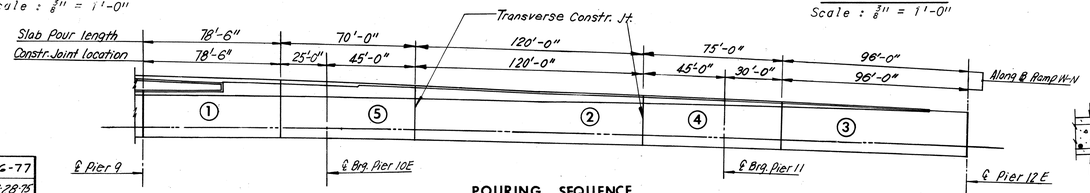
STATION	ELEV. A	ELEV. B	ELEV. C
353+26.00	88.98	89.05	89.43
+30.00	88.96	89.03	89.41
+40.00	88.89	88.96	89.34
+50.00	88.80	88.87	89.25
+60.00	88.68	88.75	89.13
+70.00	88.54	88.61	88.99
+80.00	88.37	88.44	88.82
+90.00	88.17	88.24	88.62
354+00.00	87.96	88.03	88.41
+10.00	87.72	87.79	88.17
+20.00	87.46	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.

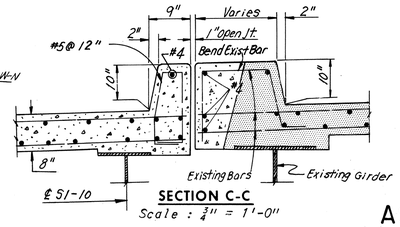


SECTION A-A
Scale : ⅜" = 1'-0"

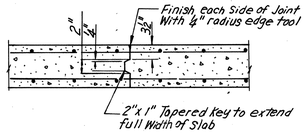
SECTION B-B
Scale : ⅜" = 1'-0"



POURING SEQUENCE
Scale : 1" = 40'-0"



SECTION C-C
Scale : ¾" = 1'-0"



TRANSVERSE CONSTRUCTION

JOINT DETAIL
No Scale

	BY	DATE
MADE	G.S.H	2-26-69
CHECKED	AMH	4-23-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	As Built	TEM	6-77
2	Note for Table of Elevations	DWB	1-28-75
1	Rev. length of bars, Rev. Road width	RKJ	1-24-75

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

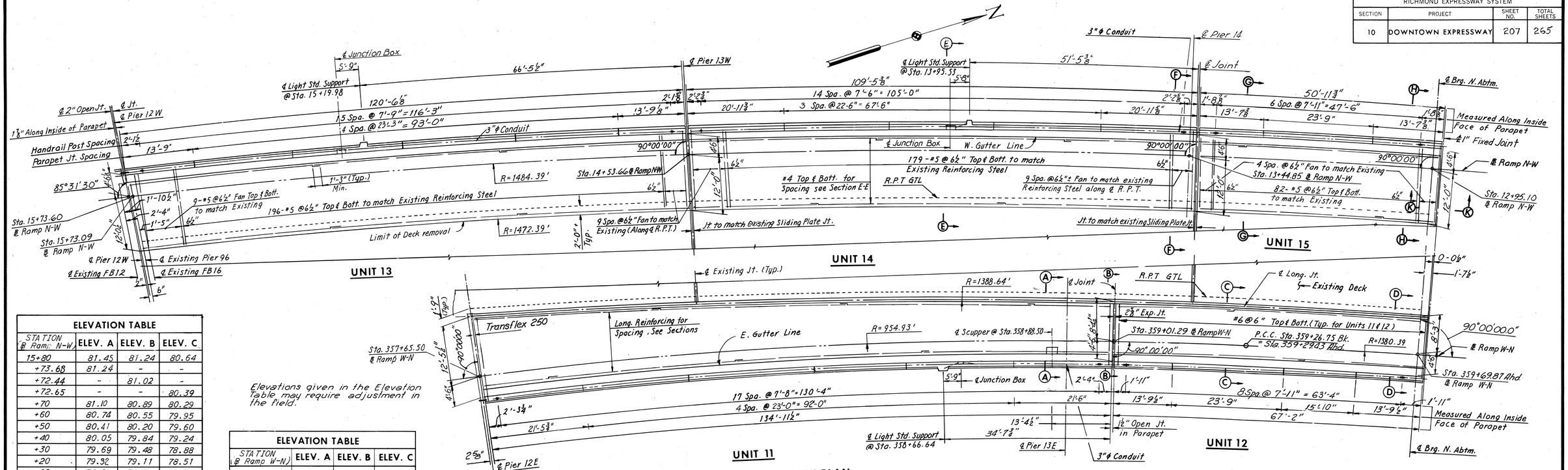
BRIDGE NO. 67
RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

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

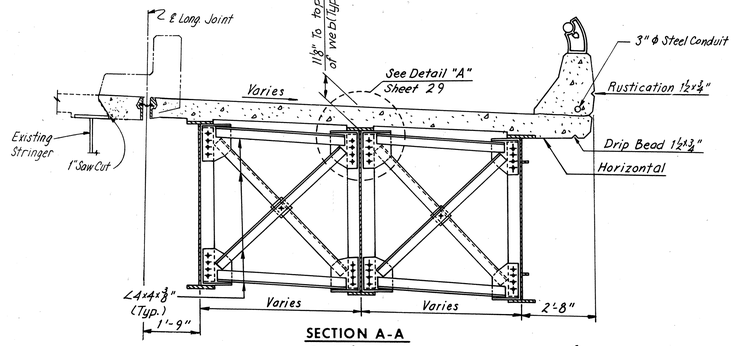
Scale: 1" = 10'-0"

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	72.74
+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

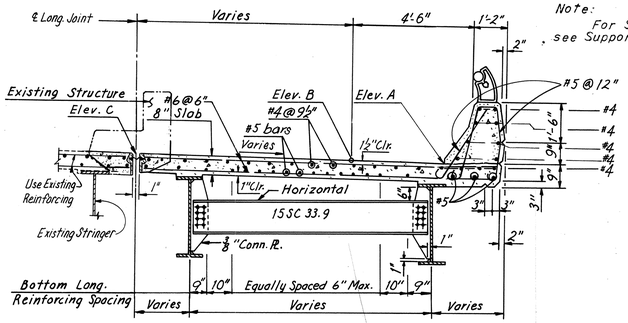
Elevations given in the Elevation Table may require adjustment in the field.

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	68.06	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	67.29	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.

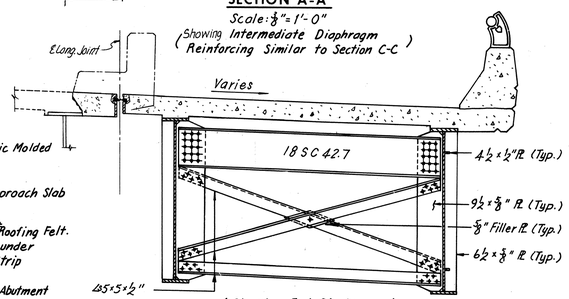


SECTION A-A
Scale: ⅜" = 1'-0"



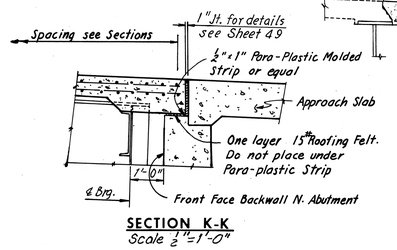
(Showing Intermediate Diaphragm)

Note:
For Standard Drainage Details for Unit 11, see Support Type 3 Sheet 36,

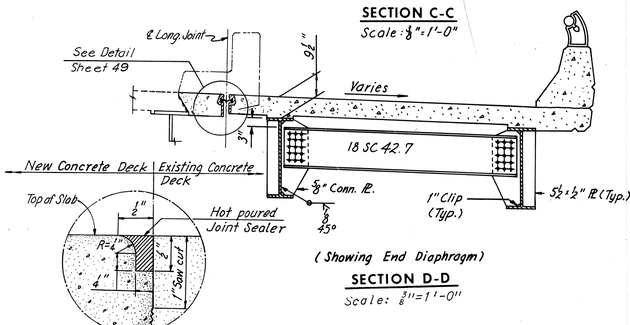


(Showing End Diaphragm)

SECTION B-B
Scale: ⅜" = 1'-0"



SECTION K-K
Scale ½" = 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	Y.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 & Abutment No. Change	DWB	1-17-75

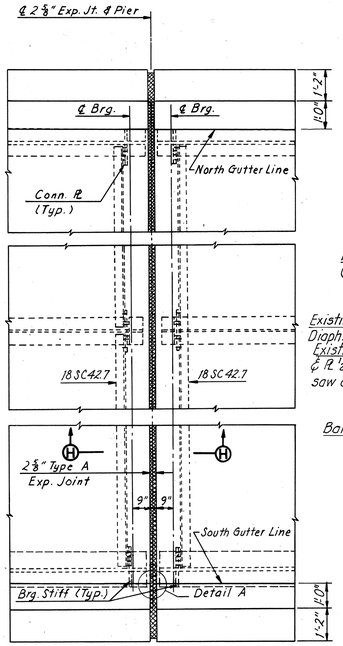
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

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	220	265

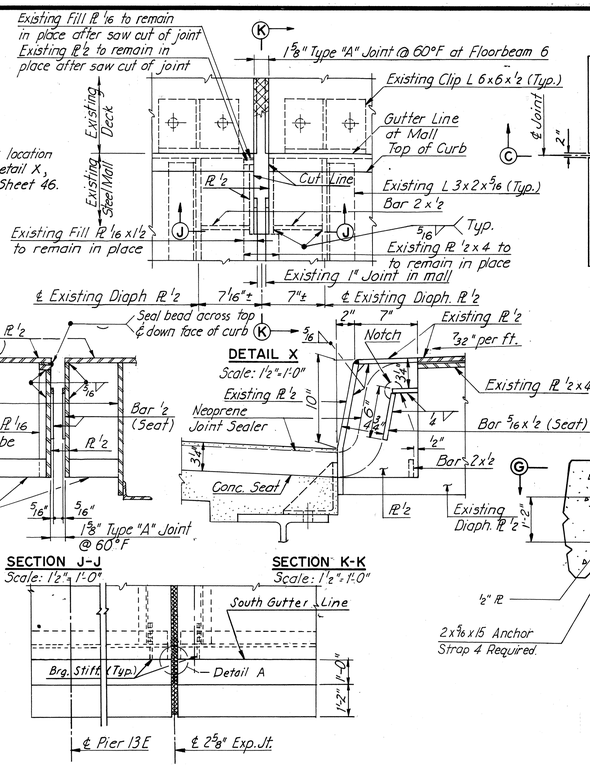


PLAN — JOINT AT PIERS 1 THRU 8

Scale: ⅜" = 1'-0"

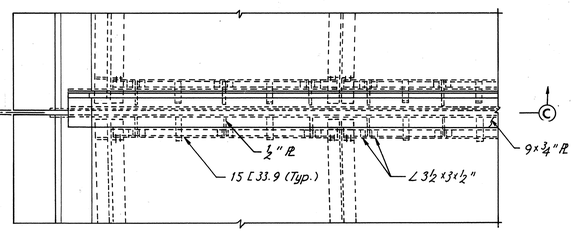
SECTION H-H

Scale: ½" = 1'-0"



PLAN — JOINT AT PIER 13 E

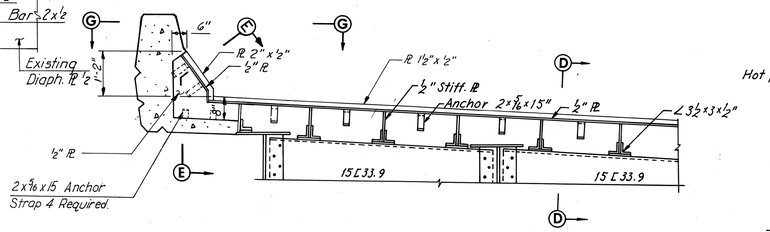
Scale: ⅜" = 1'-0"



PLAN — JOINT AT PIERS 13W AND 14

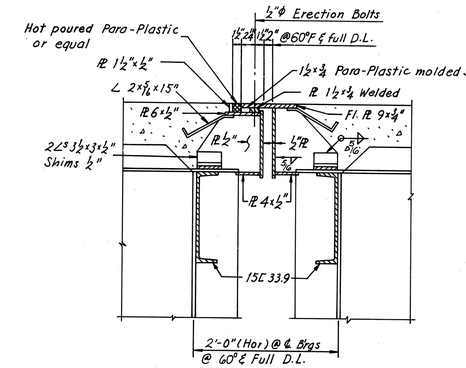
Scale: ½" = 1'-0"

(Pier 13 W Shown, Pier 14 Similar)



SECTION C-C

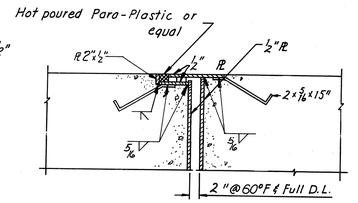
Scale: ½" = 1'-0"



SECTION D-D

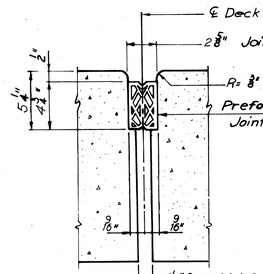
Scale: 1" = 1'-0"

(Pier 13 W shown, Pier 14 similar)



SECTION E-E

Scale: 1" = 1'-0"

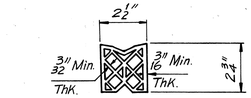


2⅝" TYPE "A" JOINT

No Scale

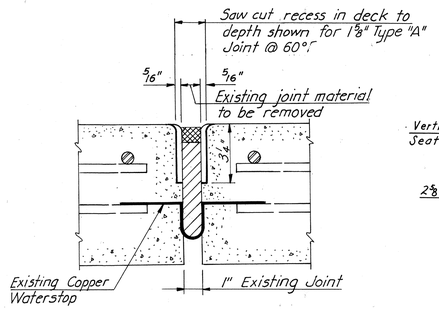
SECTION H-H

Scale: ½" = 1'-0"



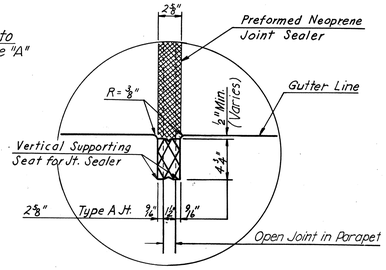
PREFORMED NEOPRENE JOINT SEALER

No Scale



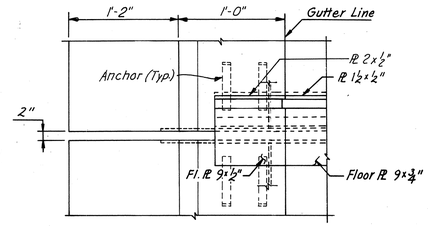
TYPICAL SECTION THRU EXISTING DECK JOINT AT FLOORBEAM 6

Scale: 3" = 1'-0"



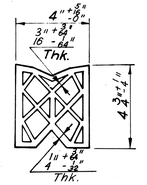
DETAIL A

No Scale



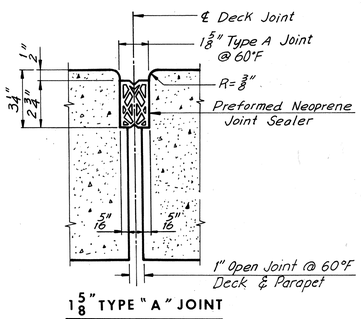
VIEW G-G

No Scale



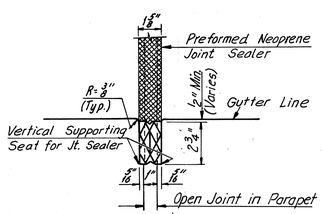
PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT

No Scale



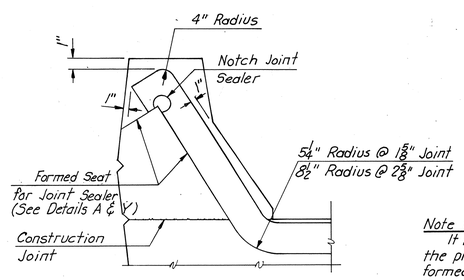
1⅝" TYPE "A" JOINT

Scale: 3" = 1'-0"



DETAIL Y

No Scale



TREATMENT OF TYPE "A" JOINT AT CURB

No Scale

Note for Type "A" Joints:

It is absolutely essential that the opening 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.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	Y.C.P	3-25-69	3	As Built	TEM	6-77
CHECKED	G.S.H.	7-10-69	2	Joint Det. for exist. Joint & Mall added	J.B.P.	2-25-75
IN CHARGE			1	1⅝" Type "A" Joint details added	J.B.P.	2-7-75

RICHMOND METROPOLITAN AUTHORITY

RICHMOND EXPRESSWAY SYSTEM

DOWNTOWN EXPRESSWAY

BRIDGE NO. 67

RAMP W-N CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

JOINT DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF

consulting engineers

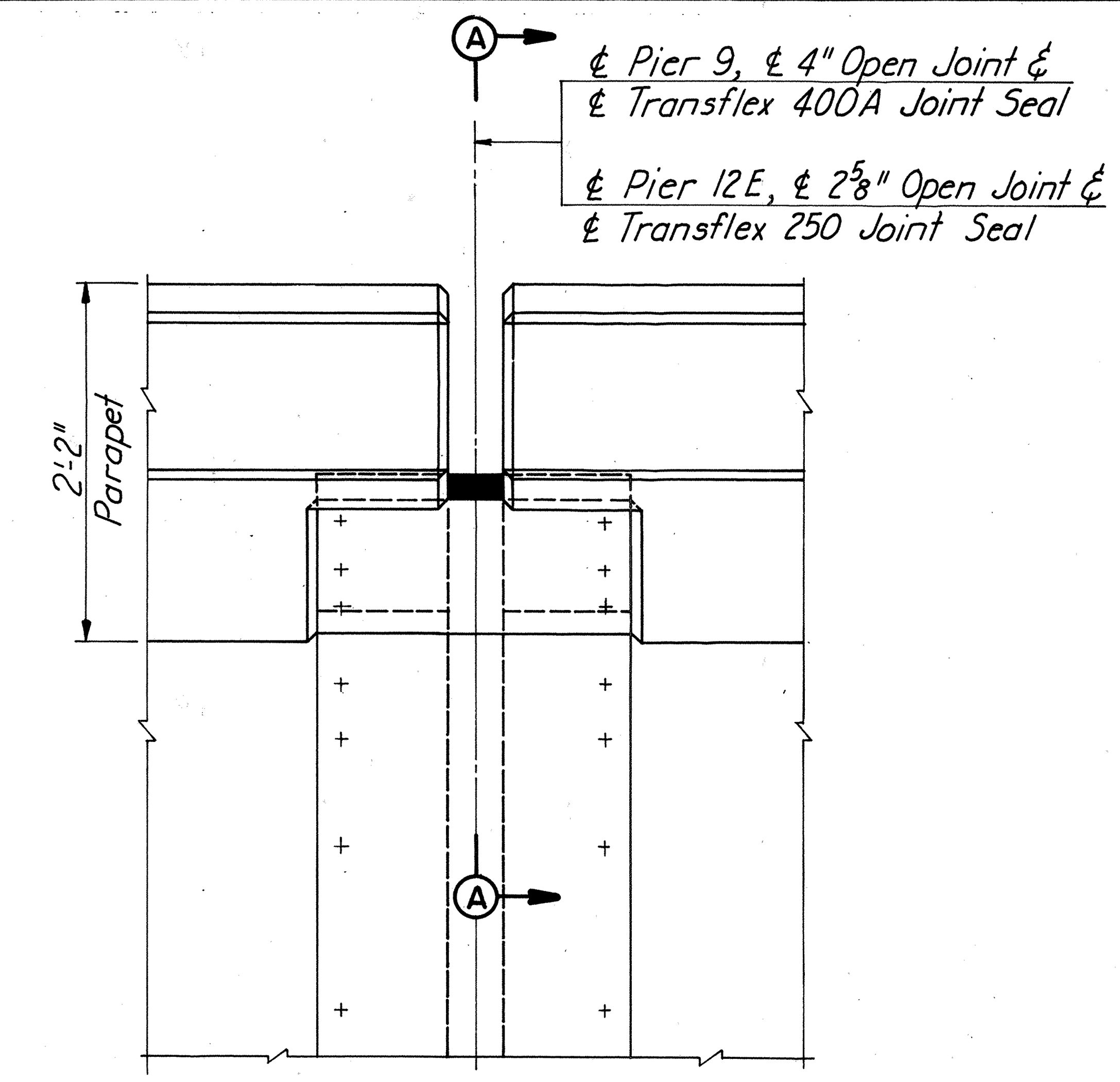
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted

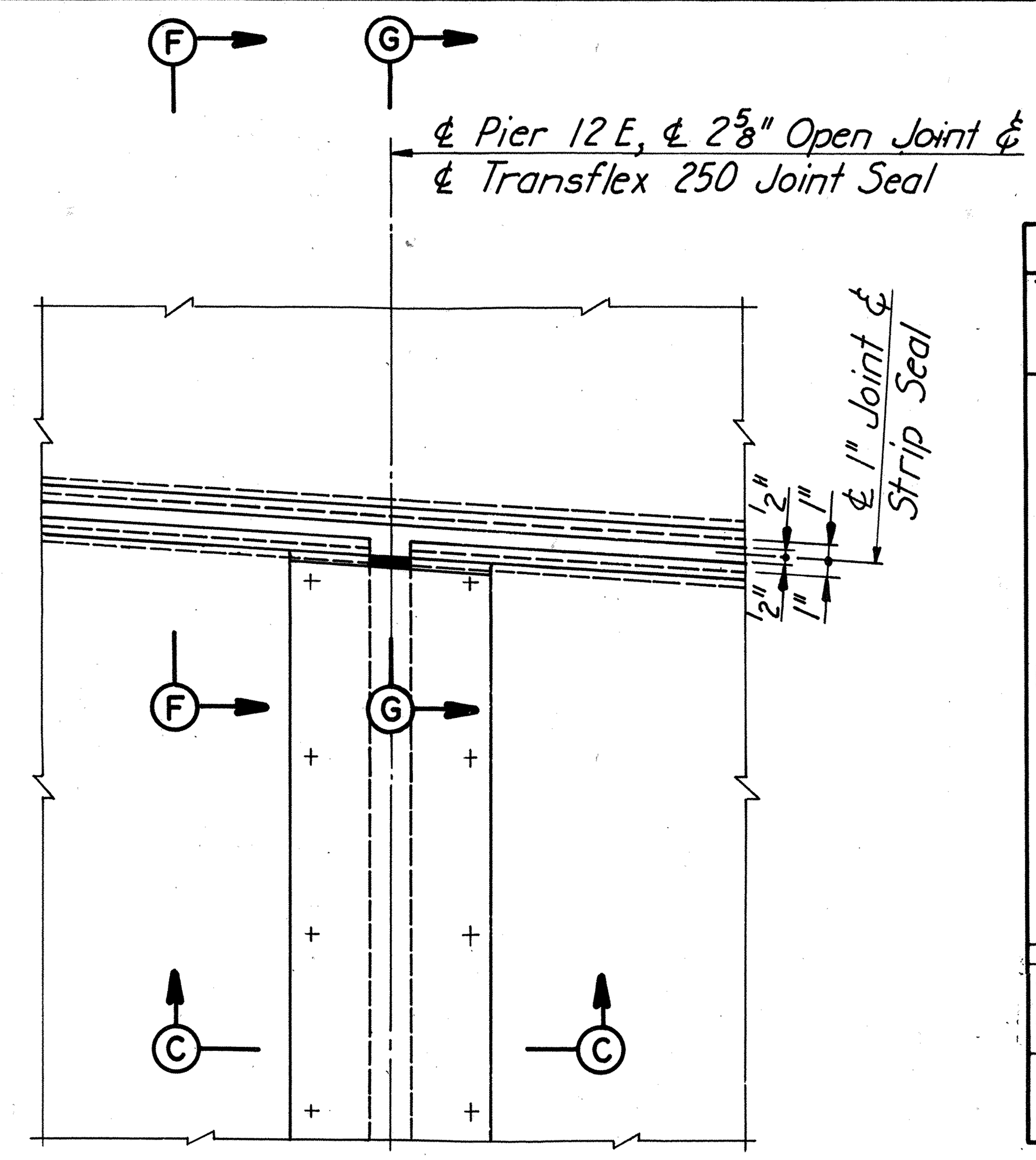
CONTRACT NO.: 10

SHEET NO 48 OF 54

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
10	DOWNTOWN EXPRESSWAY	221	265



PARTIAL PLAN OF JOINTS AT PIERS 9 & 12E
Scale: 1"=1'-0"



PARTIAL PLAN OF JOINT AT PIER 12E
Scale: 1"=1'-0"

NOTES FOR WABO-MAURER JOINTS:

Do not use steel extrusions as screed support.

Steel extrusion shall conform to ASTM A36.

Structural steel shall conform to ASTM A588.

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.

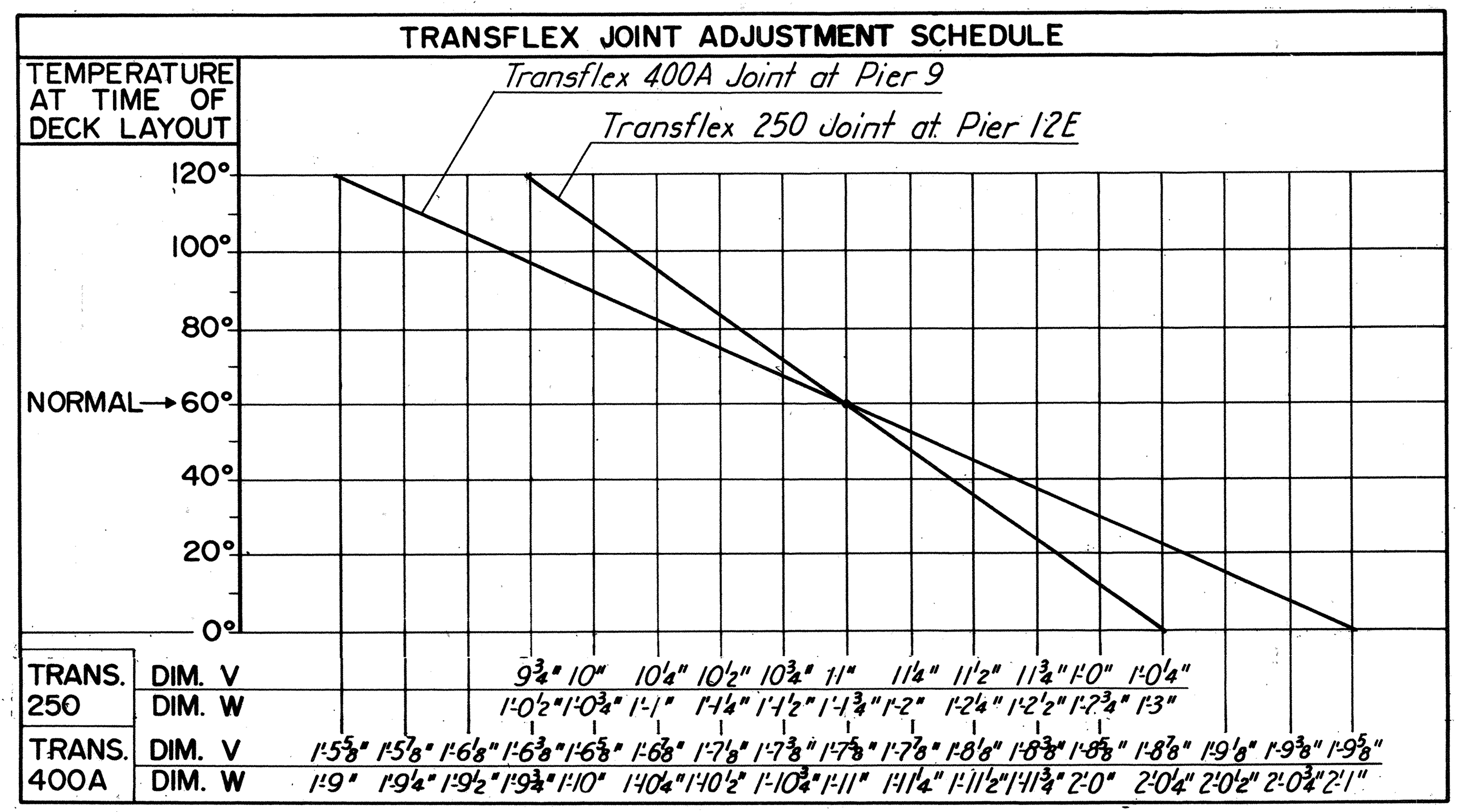
Steel assembly shall be sandblasted in the shop prior to painting.

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.

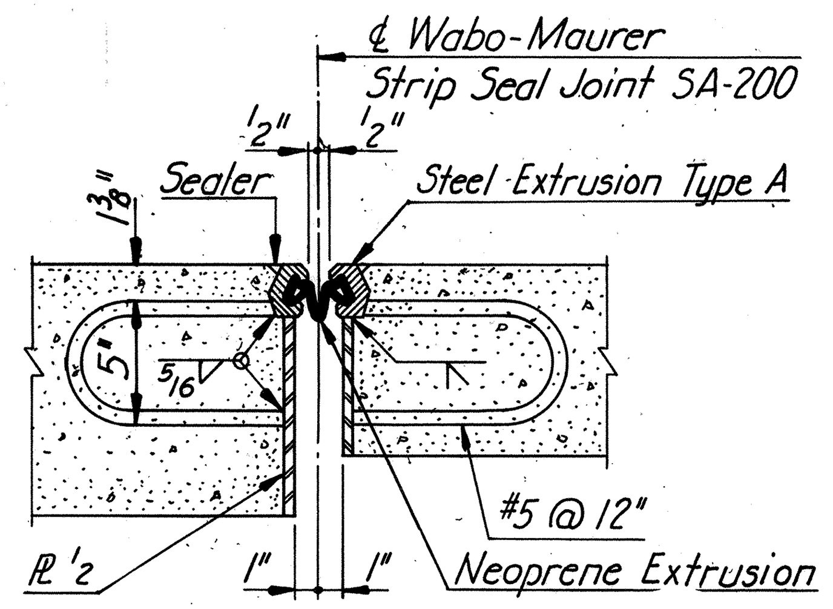
The Wabo-Maurer joint assembly shall be installed in accordance with manufacturer's recommended construction methods.

TRANSFLEX JOINT ADJUSTMENT SCHEDULE

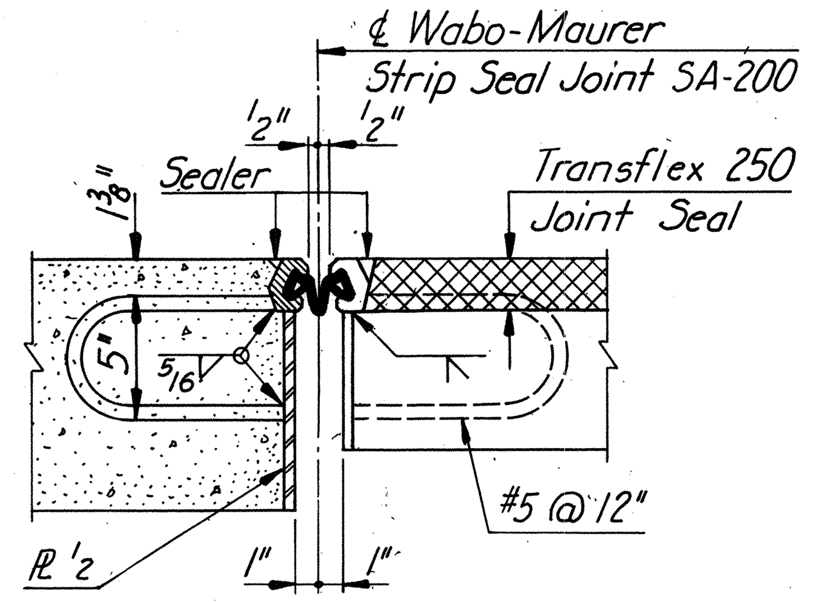


NOTES FOR FILLED JOINTS:

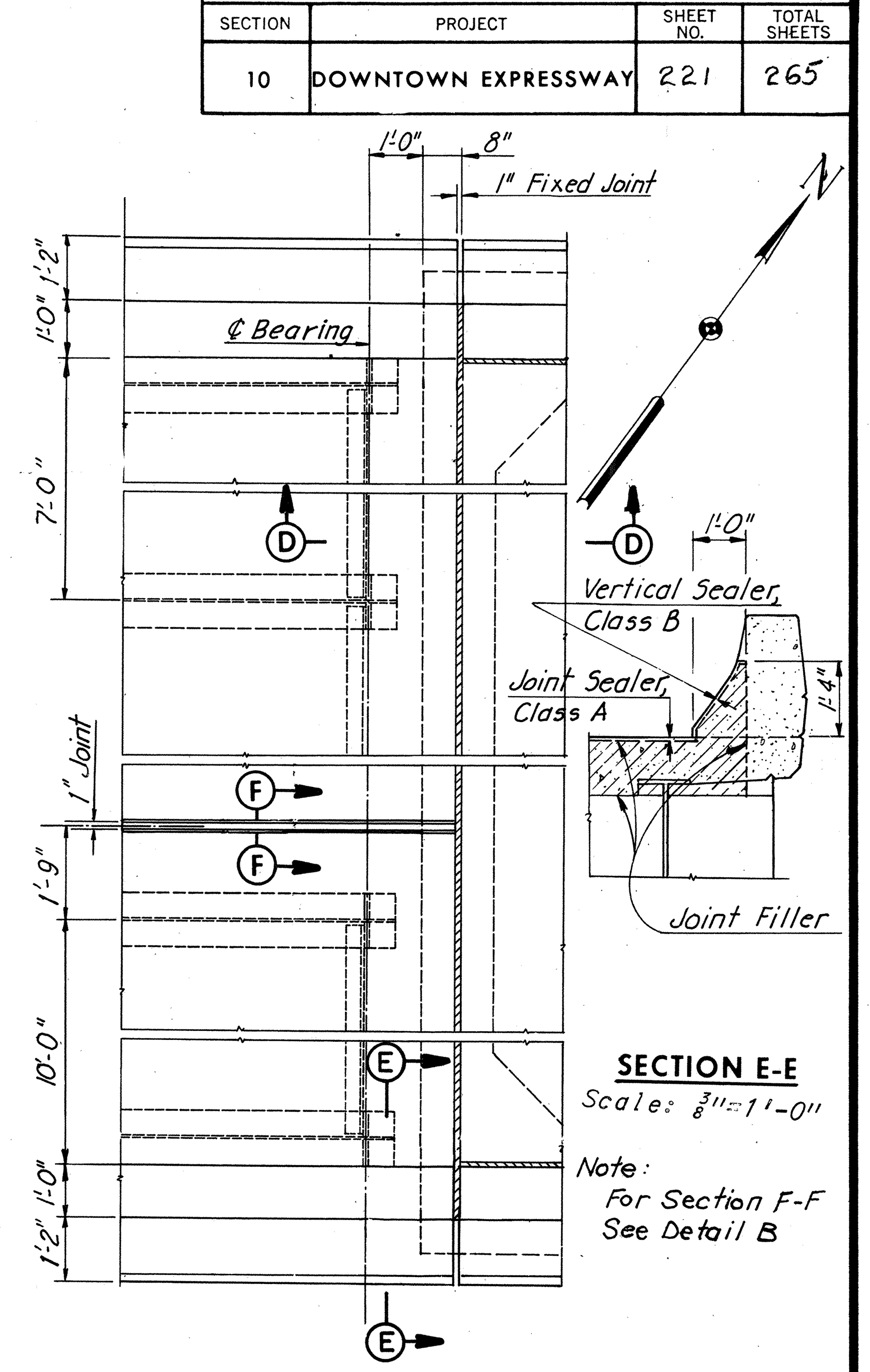
Joints shall be free of cracked and spalled areas and their faces shall be free of all foreign matter, curing compound, oils, greases and dirt. All faces must be sandblasted or brushed with a mechanical rotary wire brush. Just prior to sealing, the joint shall be blown out with oil-free and water-free compressed air.



SECTION F-F
Scale: 1½"=1'-0"



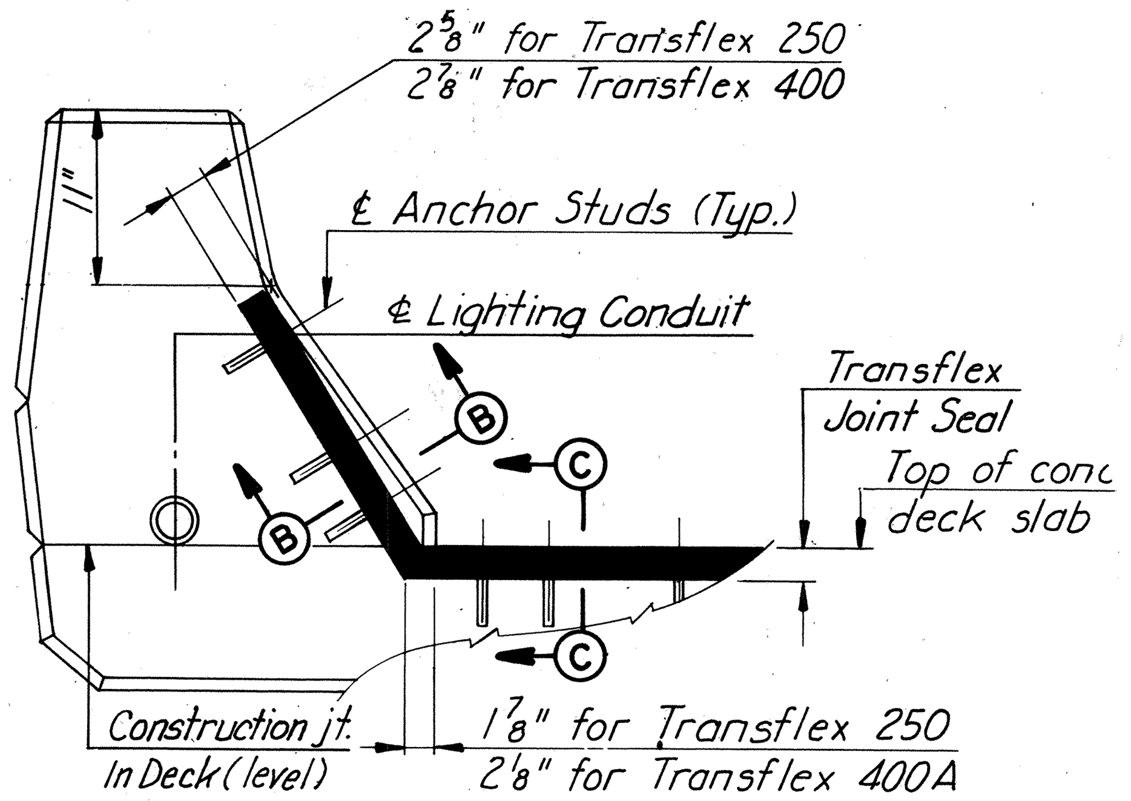
SECTION G-G
Scale: 1½"=1'-0"



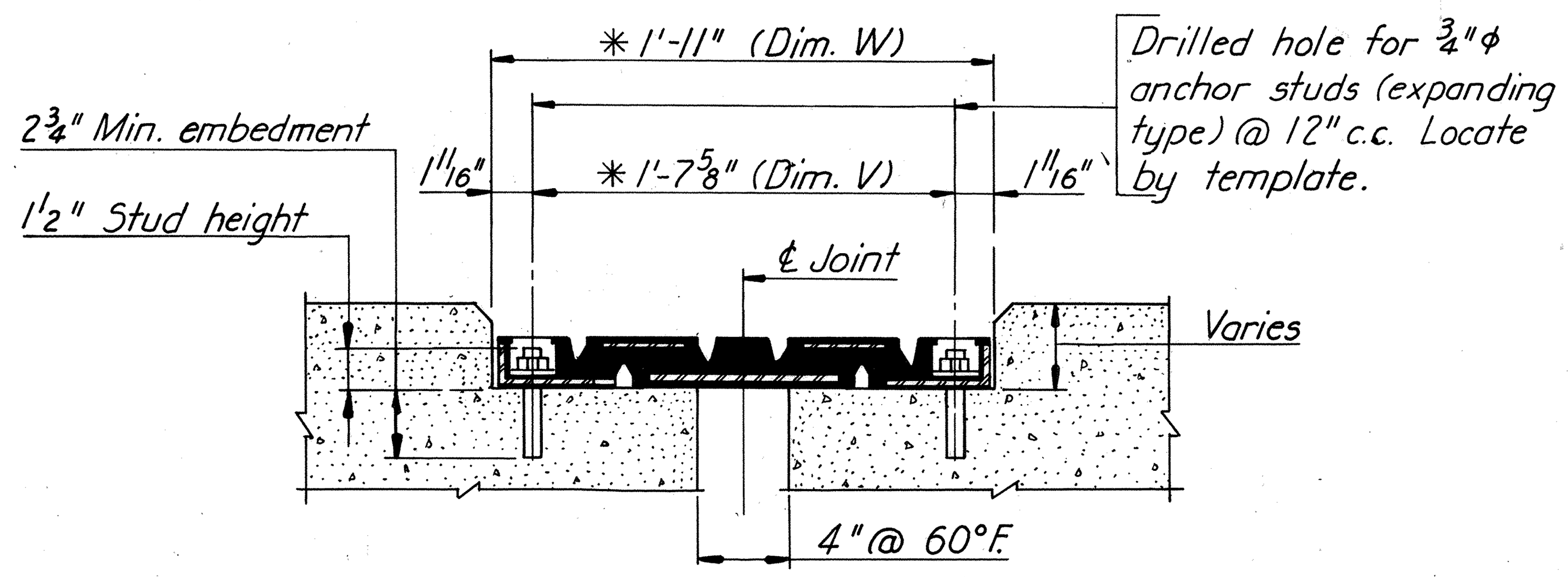
SECTION E-E
Scale: ⅜"=1'-0"

Note:
For Section F-F
See Detail B

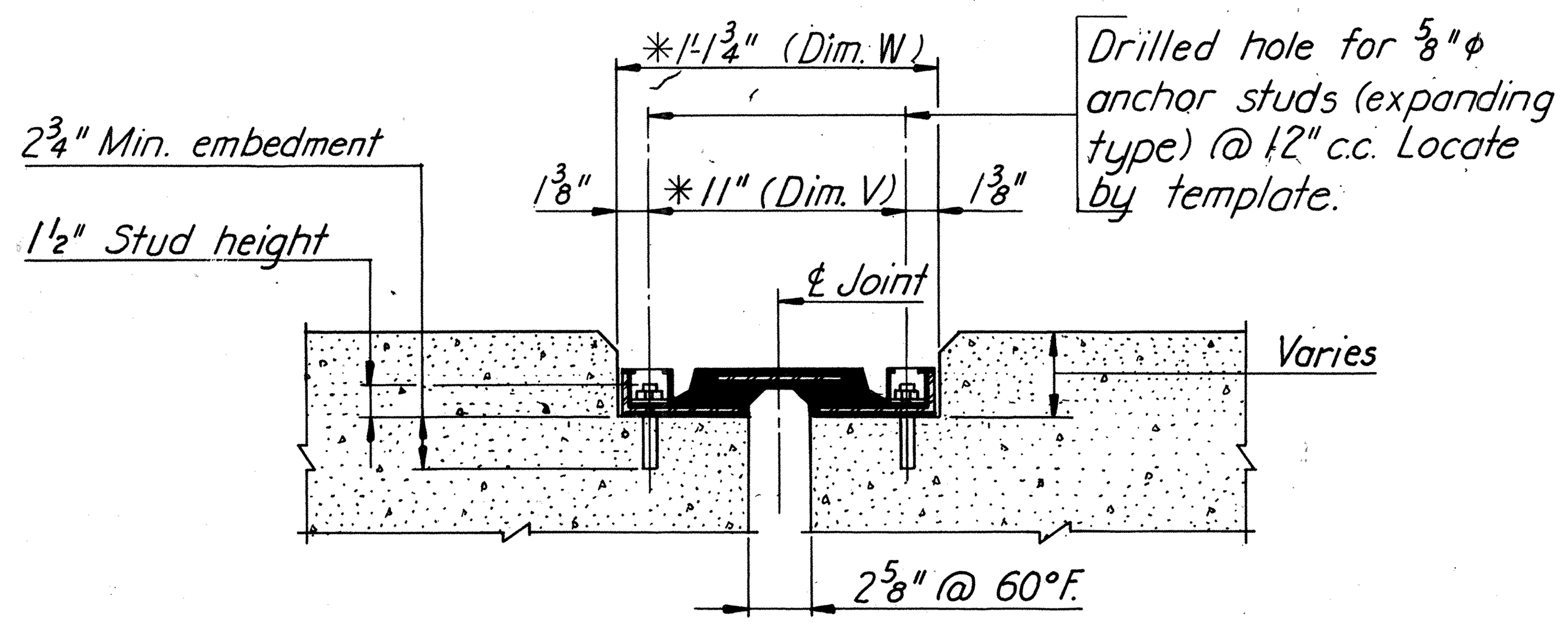
PLAN JOINT AT NORTH ABUTMENT
Scale: ⅜"=1'-0"



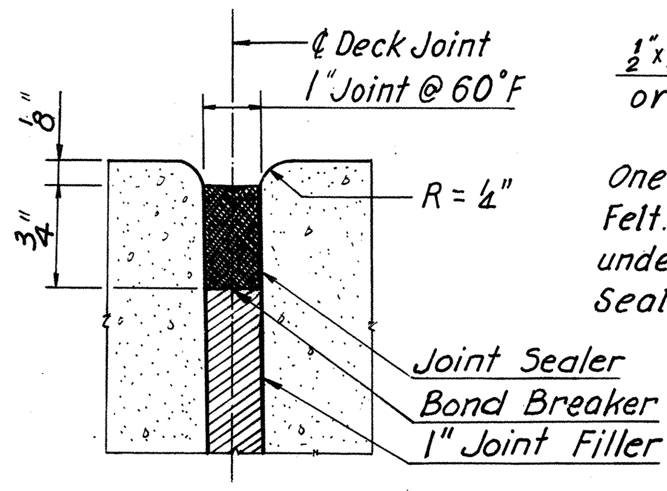
SECTION A-A
Scale: 1"=1'-0"



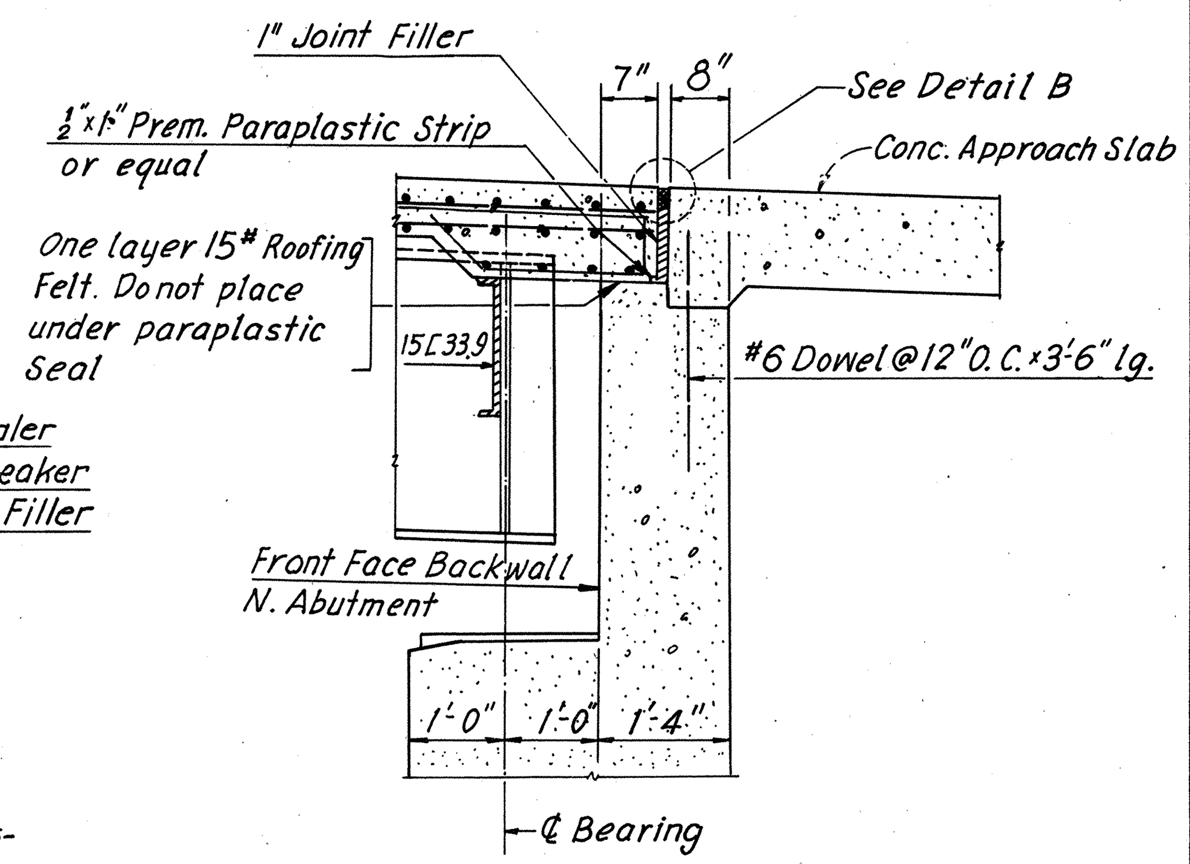
SECTION B-B
TRANSFLEX 400A JOINT
Scale: 1½"=1'-0"



SECTION B-B
TRANSFLEX 250 JOINT
Scale: 1½"=1'-0"



DETAIL B
No Scale



SECTION D-D
Scale: ½"=1'-0"

Note:

Transflex 250 Joints and Transflex 400A Joints shall be paid for as Elastomeric Expansion Dams, Type 250 and Elastomeric Expansion Dams, Type 400A respectively.

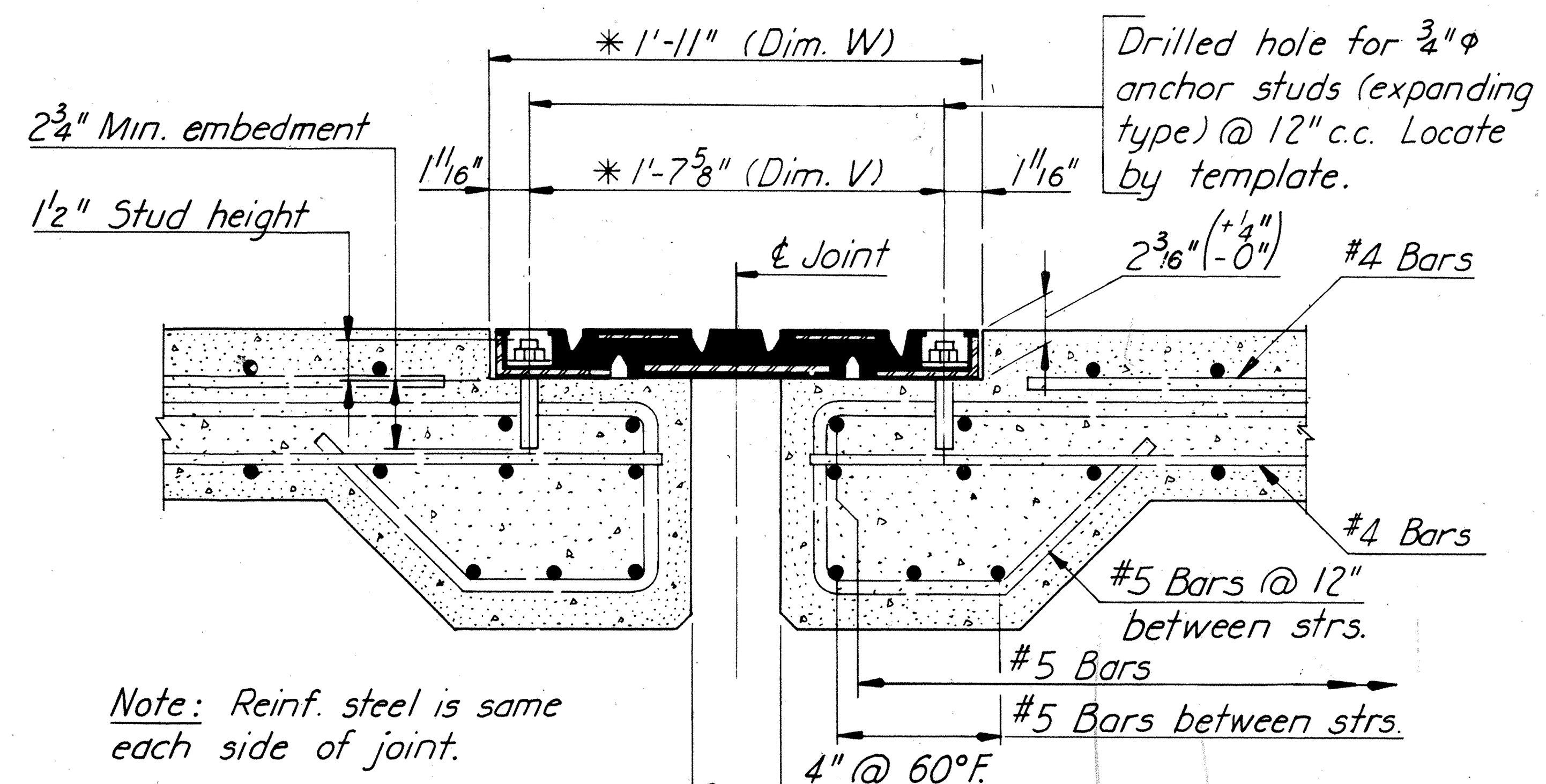
The neoprene and the steel be considered a incidental pay item to the bridge structural steel

NOTES FOR TRANSFLEX JOINTS:

✱ Dimension shown is at 60°F. For Dim. V and W adjustment due to temperature change, see Joint Adjustment Schedule.

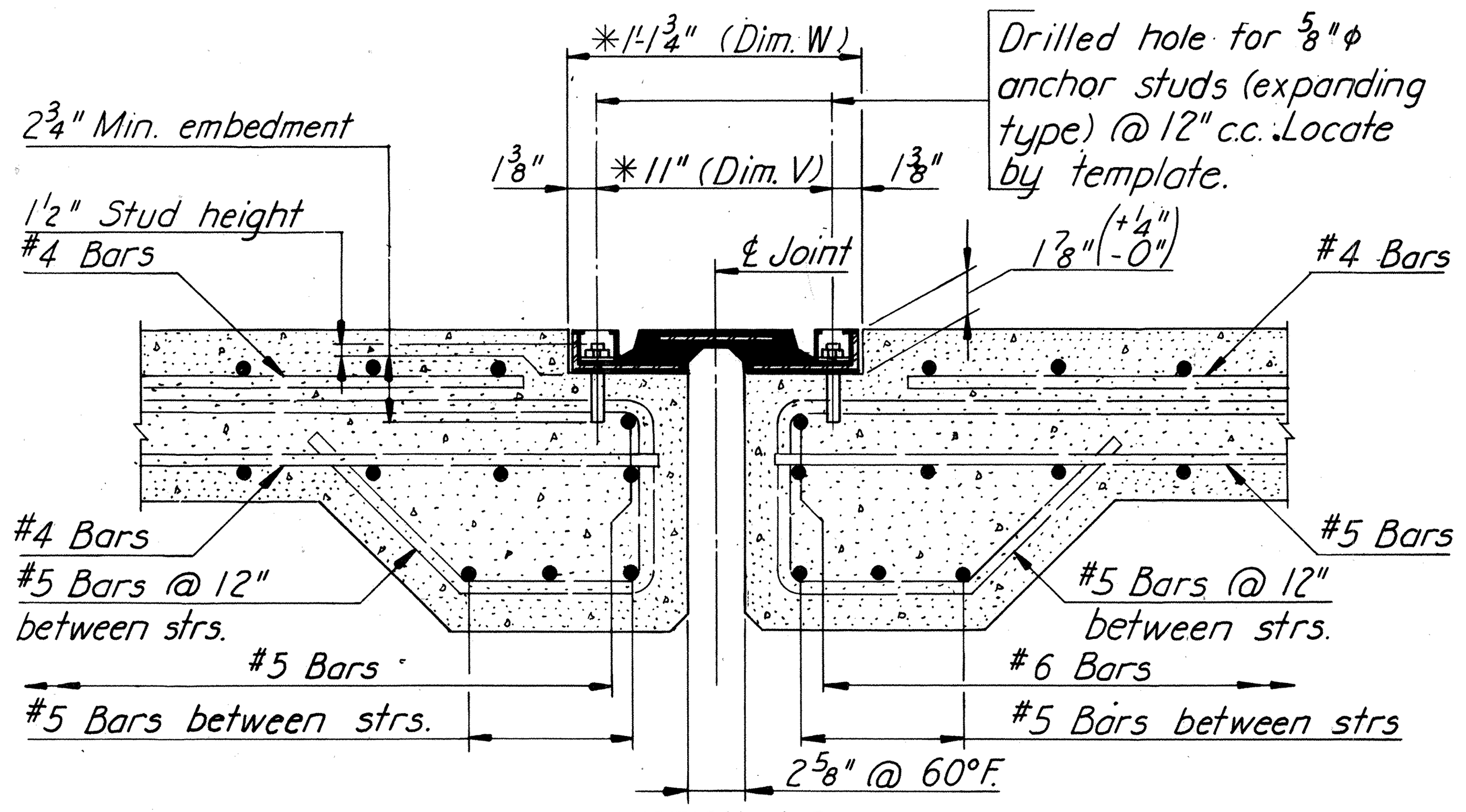
Anchors may be drilled in as shown, or cast-in-place Swedge bolts, 6" long. If they are drilled in, care shall be exercised in placing the deck reinf. steel so that the bars will not interfere with the drilling.

Transflex Seals shall be installed in accordance with manufacturer's recommendations.



Note: Reinf. steel is same each side of joint.

SECTION C-C
TRANSFLEX 400A JOINT
Scale: 1½"=1'-0"



SECTION C-C
TRANSFLEX 250 JOINT
Scale: 1½"=1'-0"

	BY	DATE				
MADE	K.C.T.	4-3-69				
CHECKED	G.S.H.	7-17-69	1	As Built	TEM	6-77
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
JOINT DETAILS

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

SCALE: As Noted
CONTRACT NO.: 10
SHEET NO. 49 OF 54

Bridge 68

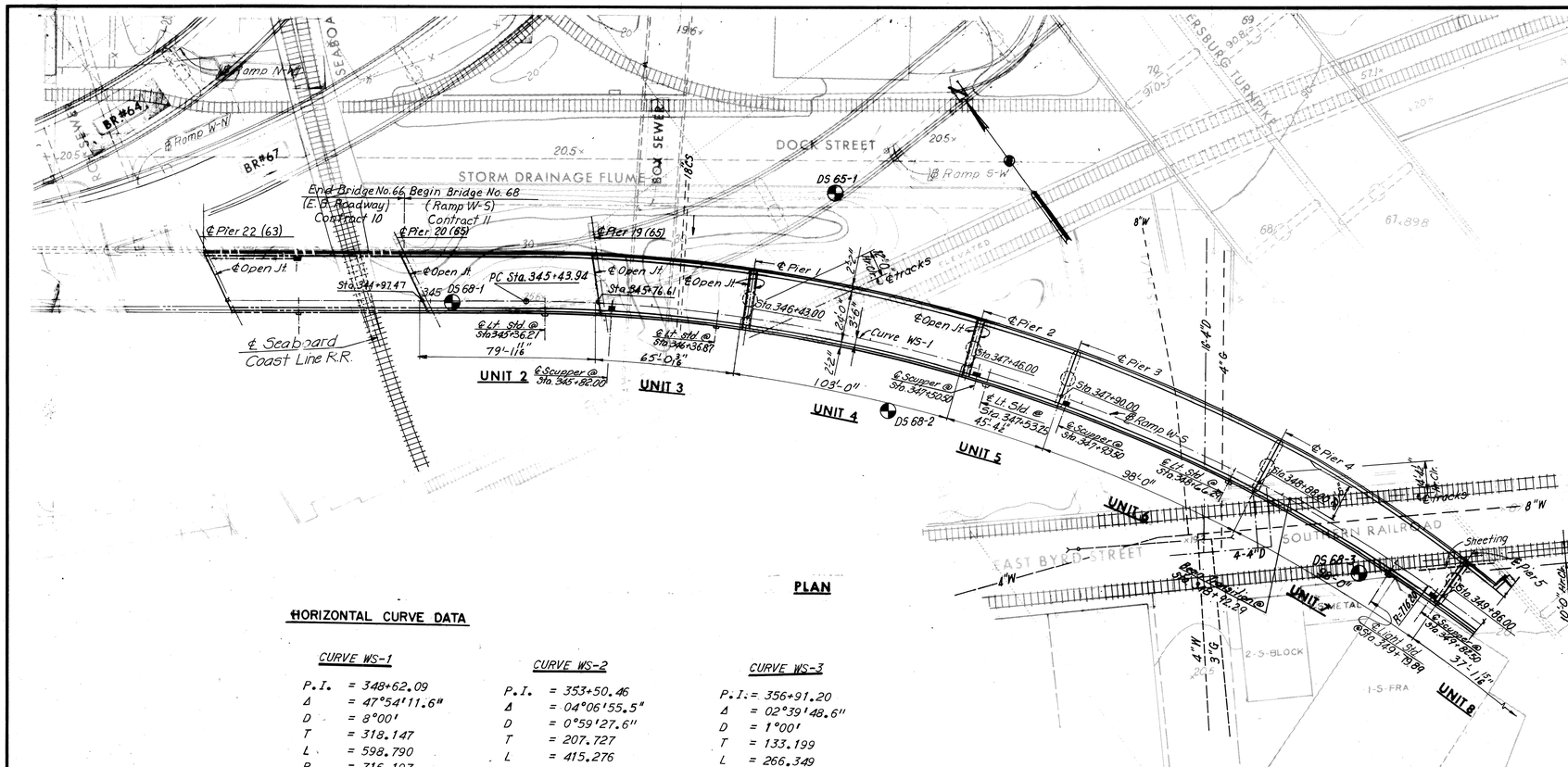
(Ramp from Eastbound Downtown Expressway “Rte. 195” to Southbound I-95 over East Byrd Street, NS RR and CSX RR)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	64	97

INDEX

PLAN



HORIZONTAL CURVE DATA

CURVE WS-1

P.I.	= 348+62.09
Δ	= 47°54'11.6"
D	= 8°00'
T	= 318.147
L	= 598.790
R	= 716.197

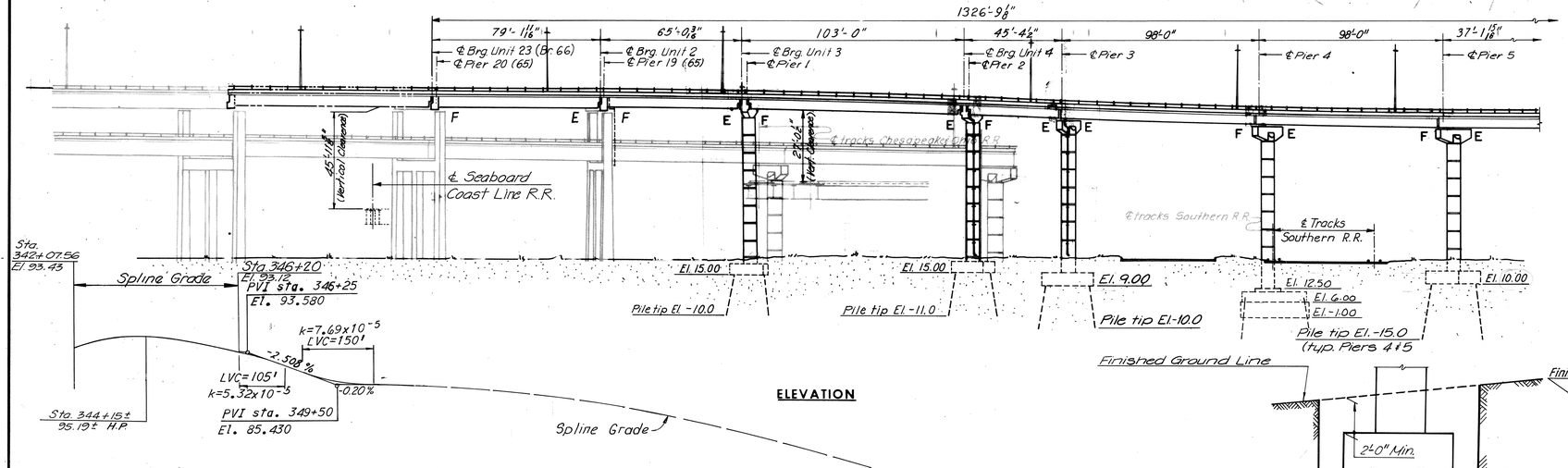
CURVE WS-2

P.I.	= 353+50.46
Δ	= 04°06'55.5"
D	= 0°59'27.6"
T	= 207.727
L	= 415.276
R	= 5,781.578

CURVE WS-3

P.I.	= 356+91.20
Δ	= 02°39'48.6"
D	= 1°00'
T	= 133.199
L	= 266.349
R	= 5,729.578

ELEVATION



GENERAL NOTES

ROADWAY: One 24'-0" clear roadway transitioning into a 13'-6" widening of existing Richmond-Petersburg Turnpike.

CAPACITY: Dead load includes 15lbs. 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 Regular Excavation. All excavation above these limits shall be classified as Regular Excavation and is not included in the Structural Quantities.

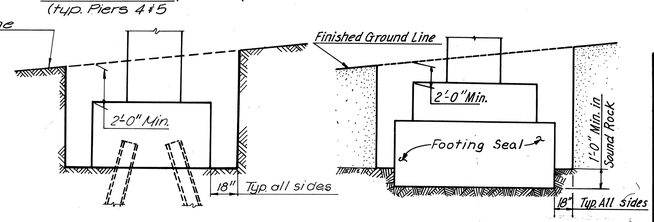
FOUNDATIONS: Footings shall rest on firm material. Foundation material shall be dry and special attention is called to Section 401.05 of General Specifications and to the Contract Special Provisions, concerning preparation of foundations for footings.

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 ¾" diameter unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

LIMITS OF STRUCTURE EXCAVATION

No Scale



	BY	DATE
MADE	J.V.	4-2-69
CHECKED	G.S.H.	7-16-69
IN CHARGE		

NO.	REVISION	BY	DATE
3	Rev. Profile Grade & Ramp W-S	SSS	12-75
2	Profile Grade W-S, Index	TEM	8-26-75
1	Seaboard Coast Line Added	TEM	6-74

△2 PROFILE GRADE ℄ RAMP W-S

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

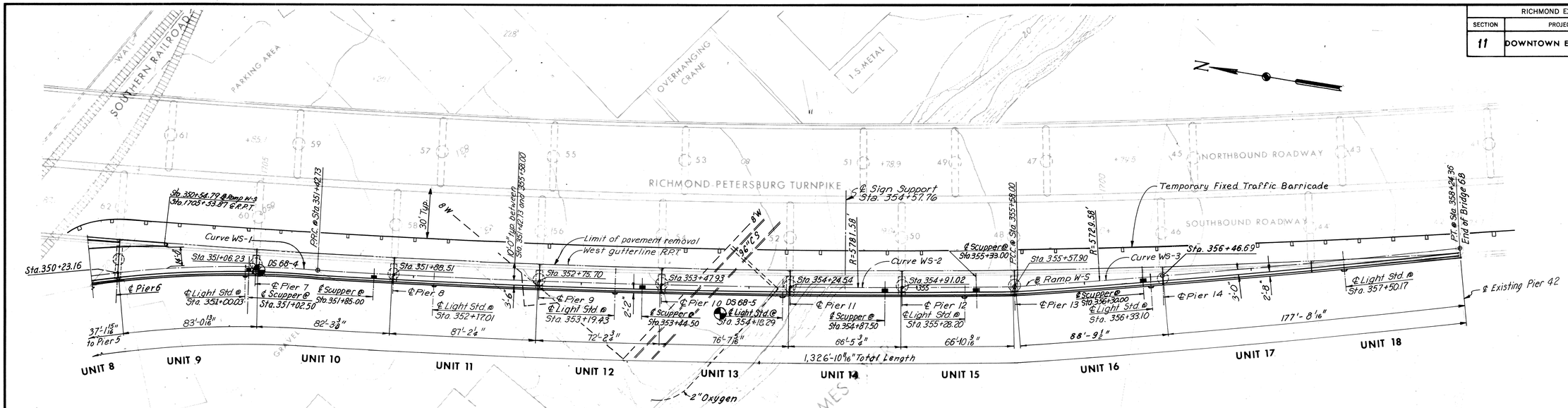
BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

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

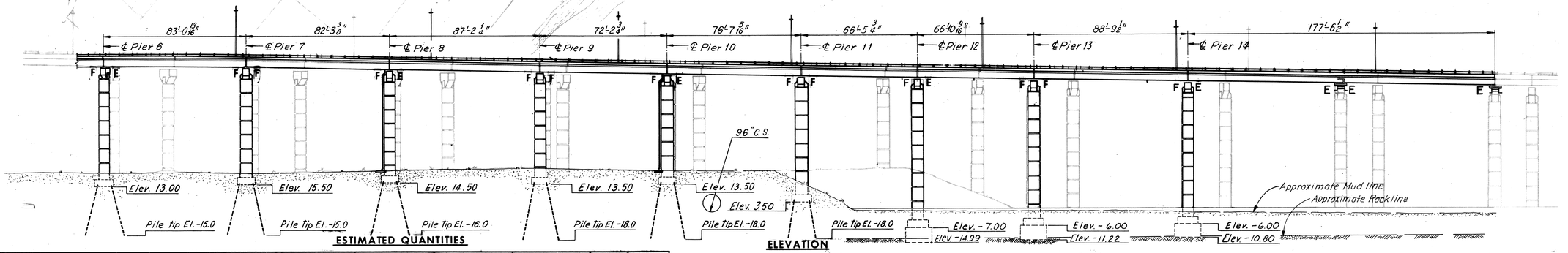
SCALE: 1"=30'
CONTRACT NO.: 11
SHEET NO. 1 OF 28

64

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	65	97



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	----	888.7	215,200	600,400	255,600	1,849	-----
Substructure	1,415*	1,751.0	245,300	31,600	8,400	---	2,630
Total	1,415*	2,639.7	460,500	632,000	264,000	1,849	2,630

	Steel Piles 12BP53 Lin. Ft.	Tremie Concrete Class T3 Cu. Yds	Sheeting Pier 5 Lump Sum	Metal Conduit Lin. Ft.	Bridge Drainage Metal work Lbs.	Modifications to R.P. Turnpike Bridge Lump Sum	Modifications to Existing Retaining Wall Cu. Yds.	Temporary Barricade Lin. Ft.
Superstructure	---	---		1310	11,450	1	50	
Substructure	1,412	173.3	1	---	---	-	-	
Total	1,412	173.3	1	1,310	11,450	1	50	990

	BY	DATE
MADE	J.V	4-3-69
CHECKED	G.S.H.	7-16-69
IN CHARGE		

NO.	REVISION	BY	DATE
1	At Pier 44 & 42 Struc. Steel Quan	T.E.M.	8-26-75

* Including 365 Cu. Yds. of " Underwater " Excavation for Piers 12, 13 and 14.

† All concrete for Superstructure shall be Class A4 and for Substructure Class A3. Concrete for Footing Seals shall be Tremie Concrete, Class T3 and is listed separately.

AS BUILT

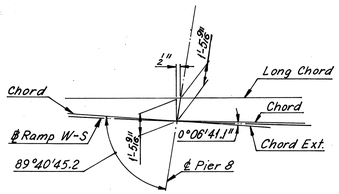
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
GENERAL PLAN AND ELEVATION

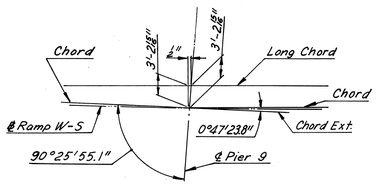
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=30'
CONTRACT NO. 11
SHEET NO. 2 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	66	97



DETAIL B
No Scale



DETAIL C
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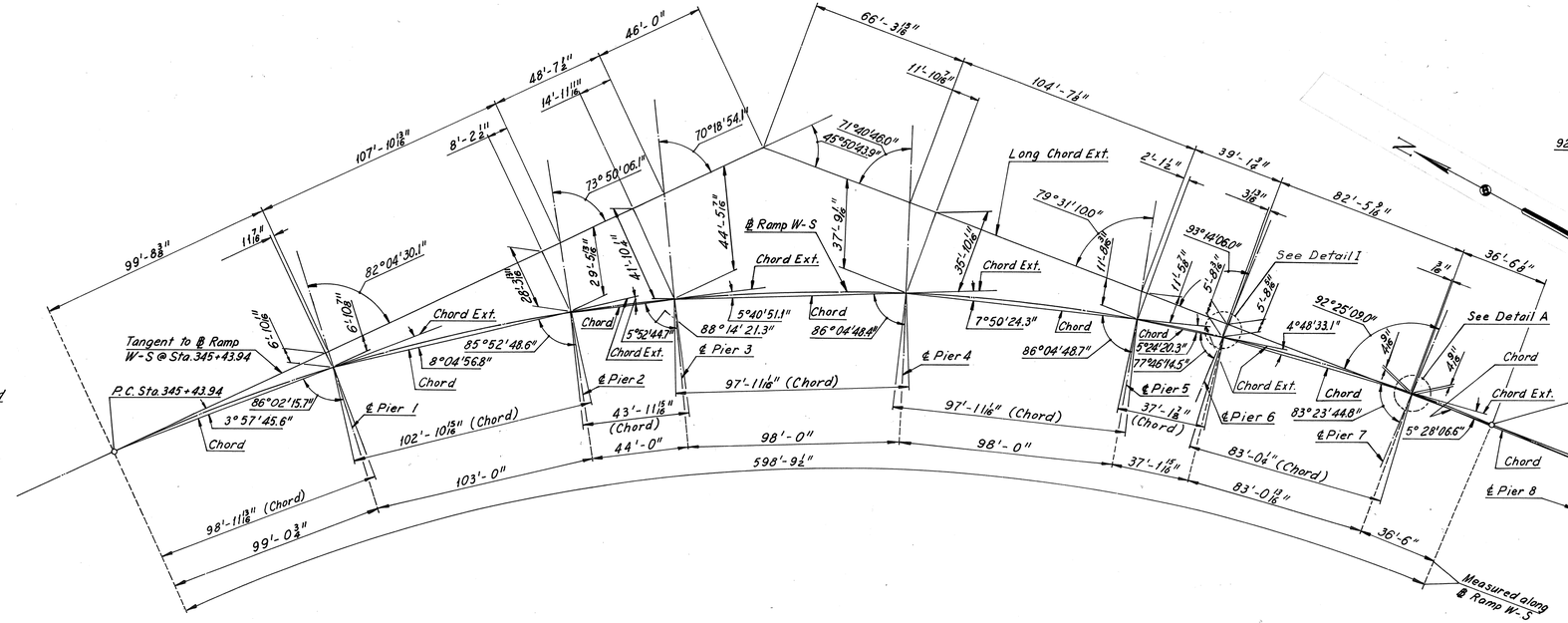

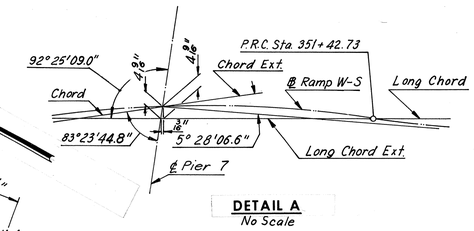

DETAIL A
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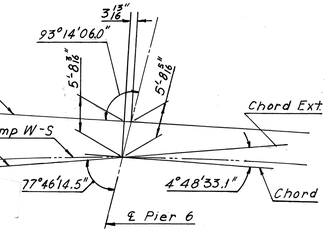

DETAIL I
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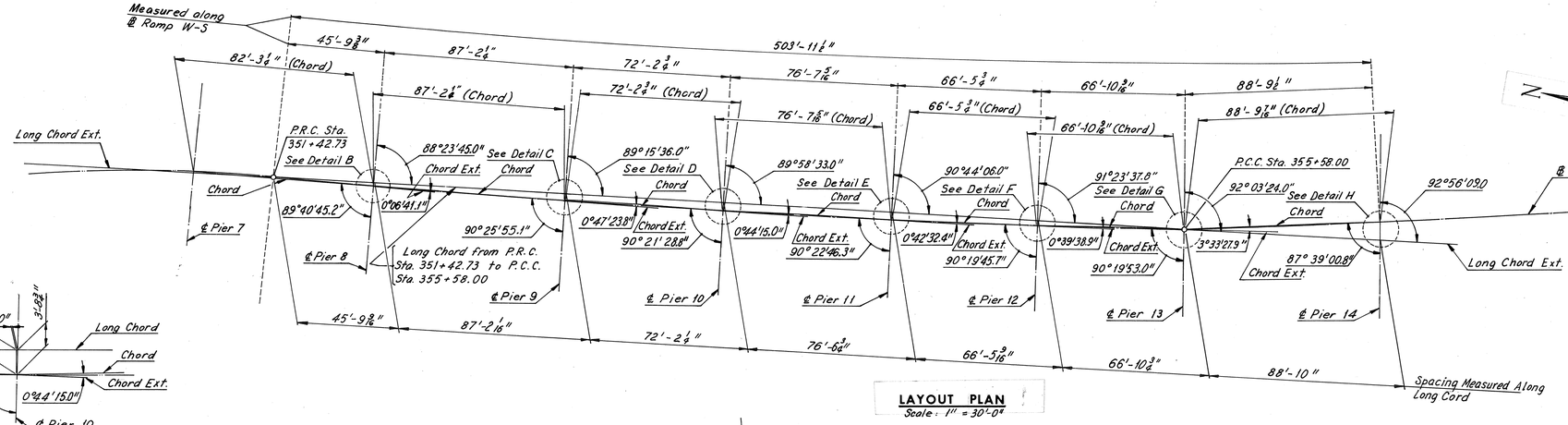
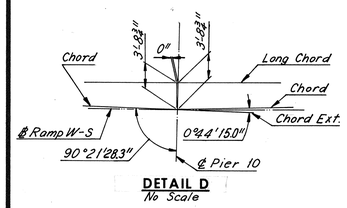


LAYOUT PLAN
Scale: 1" = 30'-0"



DETAIL D
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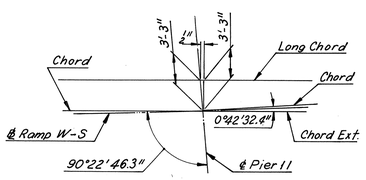

DETAIL E
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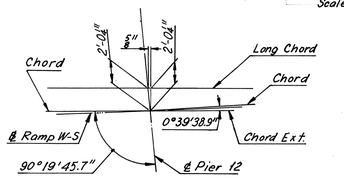

DETAIL F
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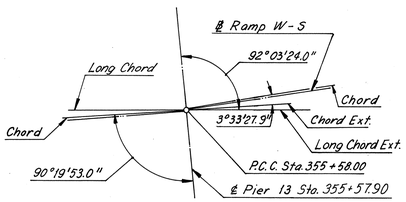

DETAIL G
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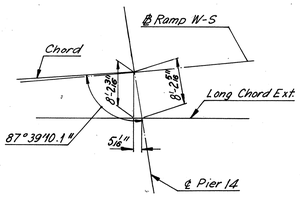


DETAIL H
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
MADE	PTA	3-24-69				
CHECKED	JD	4-22-69				
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE

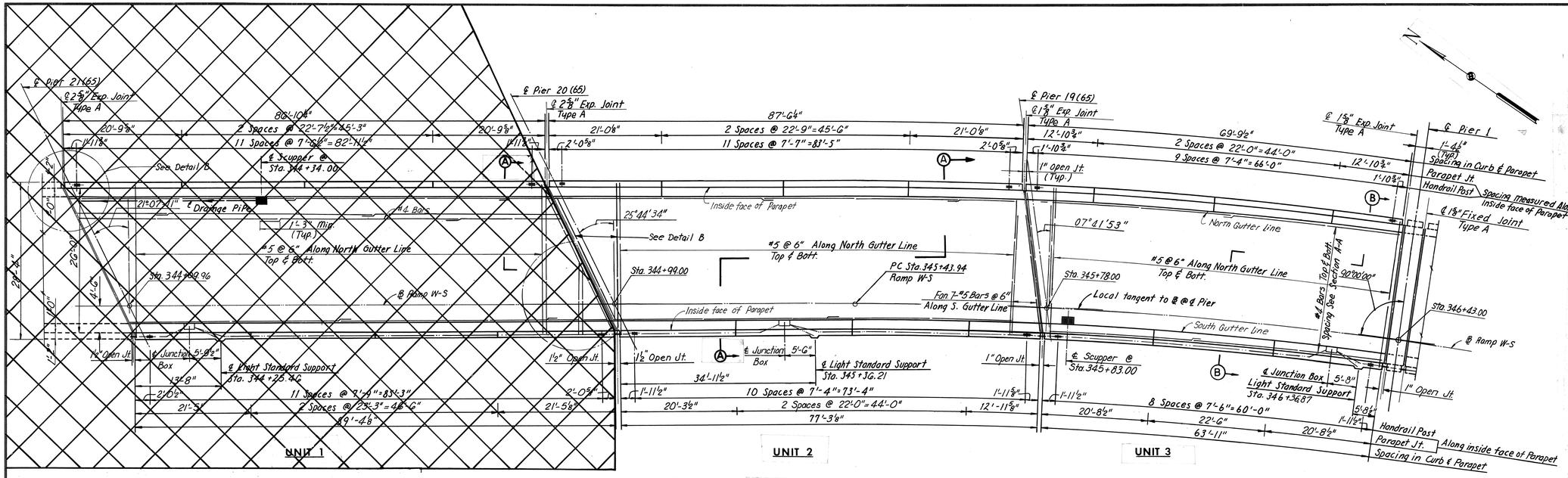
LAYOUT

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

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 3 OF 28

66

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	82	97



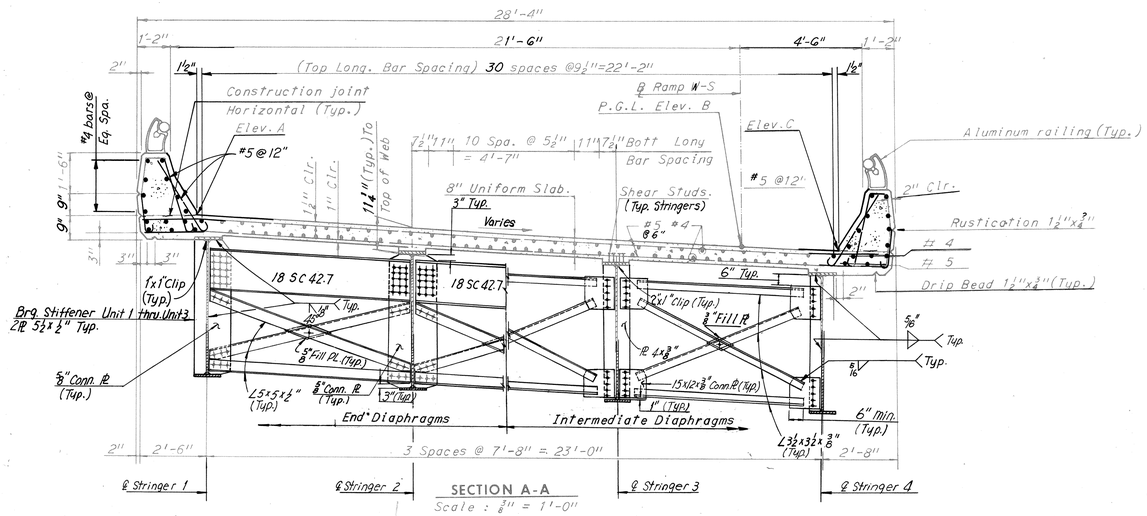
Note:
Pier 20(65) and Pier 19(65) denotes Piers 21, 20 and 19 of Bridge 65(Ramp S-W).

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

Note:
Section B-B, see Sheet 20.

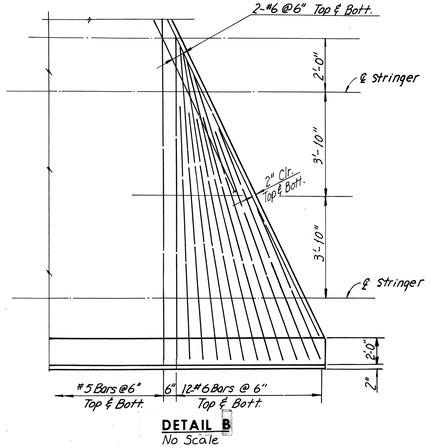
ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
344+00.57	94.89	------	------
344+00.00	94.89	95.16	95.21
+09.84	------	------	95.22
+09.96	------	95.18	------
+10.00	94.96	95.18	95.22
+20.00	95.02	95.18	95.21
+30.00	95.06	95.17	95.19
+40.00	95.08	95.13	95.14
+50.00	95.08	95.08	95.08
+60.00	95.10	95.02	95.01
+70.00	95.10	94.94	94.91
+80.00	95.10	94.85	94.81
+87.57	95.08	------	------
+90.00	95.08	94.75	94.69
+99.16	------	------	94.59
344+99.00	------	94.66	------
345+00.00	95.06	94.65	94.58
+10.00	95.03	94.54	94.46
+20.00	95.01	94.44	94.34
+30.00	94.99	94.33	94.22
+40.00	94.96	94.22	94.09
+50.00	94.92	94.10	93.96
+60.00	94.88	93.98	93.84
+70.00	94.84	93.86	93.69
+73.84	94.82	------	------
+77.08	------	------	93.58
+78.00	------	93.75	------
+80.00	94.79	93.72	93.54
345+90.00	94.74	93.59	93.39
346+00.00	94.67	93.44	93.23
+10.00	94.51	93.28	93.07
+20.00	94.35	93.12	92.91
+30.00	94.20	92.97	92.76
+40.00	94.05	92.82	92.61
+41.63	---	---	92.59
+41.66	94.02	---	---

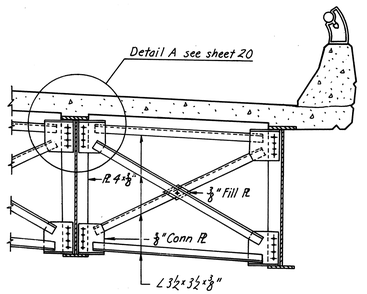


SECTION A-A
Scale: ⅜"=1'-0"

Note:
End Diaphragm for Unit 3, see Sheet 20.



DETAIL B
No Scale



SECTION A-A
Scale: ⅜"=1'-0"
(Intermediate Diaphragm near Pier 19 Unit 2 only)

Notes
For Framing Plan, see Sheet 12.
For Standard Lighting Details, see Sheet S4.
For Standard Drainage Details, see Support Type 2 Sheets S5 and S6.
For Joint Details, see Sheet 25.
For Standard Handrail Details, see Sheet S3.

AS BUILT

	BY	DATE				
MADE	G.S.H.	10-29-68	2	Elev. Table	T.E.M.	3-76
CHECKED	A.H.H.	12-13-68	1	Rev. Elev. Table	S.S.S.	12-75
IN CHARGE			NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE

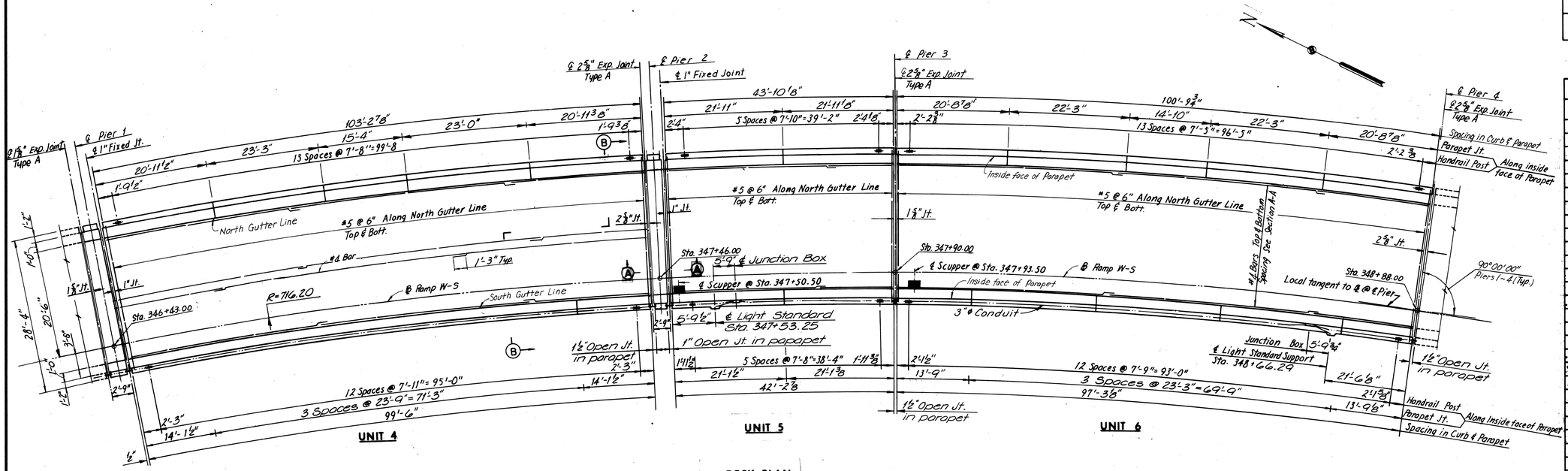
DECK PLAN — UNITS 1,2 AND 3

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

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 19 OF 28

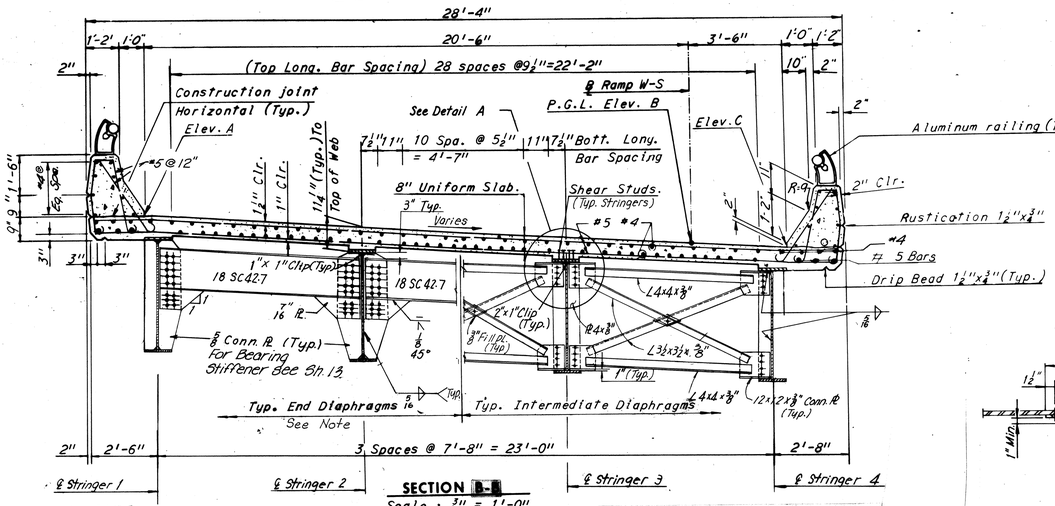
82

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	83	97



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

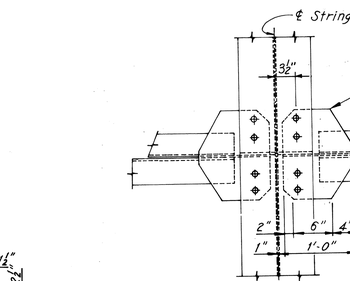
ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
346+43.00	94.00	92.77	92.56
+50.00	93.88	92.65	92.44
+60.00	93.71	92.48	92.27
+70.00	93.32	92.29	92.08
+80.00	93.32	92.09	91.88
346+90.00	93.11	91.88	91.67
347+00.00	92.90	91.67	91.46
+10.00	92.67	91.44	91.23
+20.00	92.43	91.20	90.99
+30.00	92.18	90.95	90.74
+40.00	91.93	90.70	90.49
+44.62	---	---	90.37
+44.66	91.81	---	---
+46.00	91.78	90.55	90.34
+50.00	91.68	90.45	90.24
+60.00	91.42	90.19	89.98
+70.00	91.17	89.94	89.73
+80.00	90.92	89.69	89.48
347+90.00	90.67	89.44	89.23
348+00.00	90.42	89.19	88.98
+10.00	90.17	88.94	88.73
+20.00	89.92	88.69	88.48
+30.00	89.67	88.44	88.23
+40.00	89.42	88.19	87.98
+50.00	89.17	87.94	87.73
+60.00	88.92	87.69	87.48
+70.00	88.67	87.44	87.23
+80.00	88.42	87.19	86.98
348+88.00	88.23	87.00	86.79



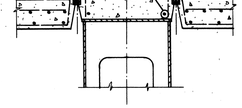
SECTION D-D
Scale : ⅜" = 1'-0"

Note: End Diaphragm shown at Piers 3,4 and 5. Piers 1 and 2 similar. 7/16" R. not required at Piers 1 and 2.

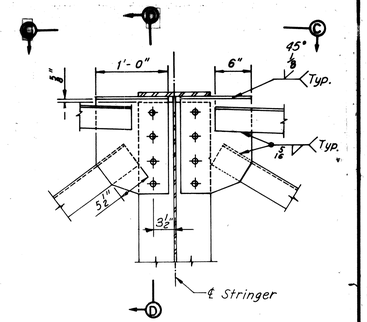
SECTION D-D
No Scale



VIEW C-C
No Scale



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



DETAIL A
No Scale

Notes
For Framing Plan see Sheet 13.
For Joint Details see Sheet 25.
For Standard Lighting Details see Sheet S4.
For Standard Handrail Details see Sheet S3.
For Standard Drainage Details see Support Type 4 Sheets S5 & S6.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	G.S.H.	10-31-68	2	Dim. in Det A and view C-C	TEM	8-76
CHECKED	AHH	12-13-68	1	Corrected Dimension	SSS	12-75
IN CHARGE						

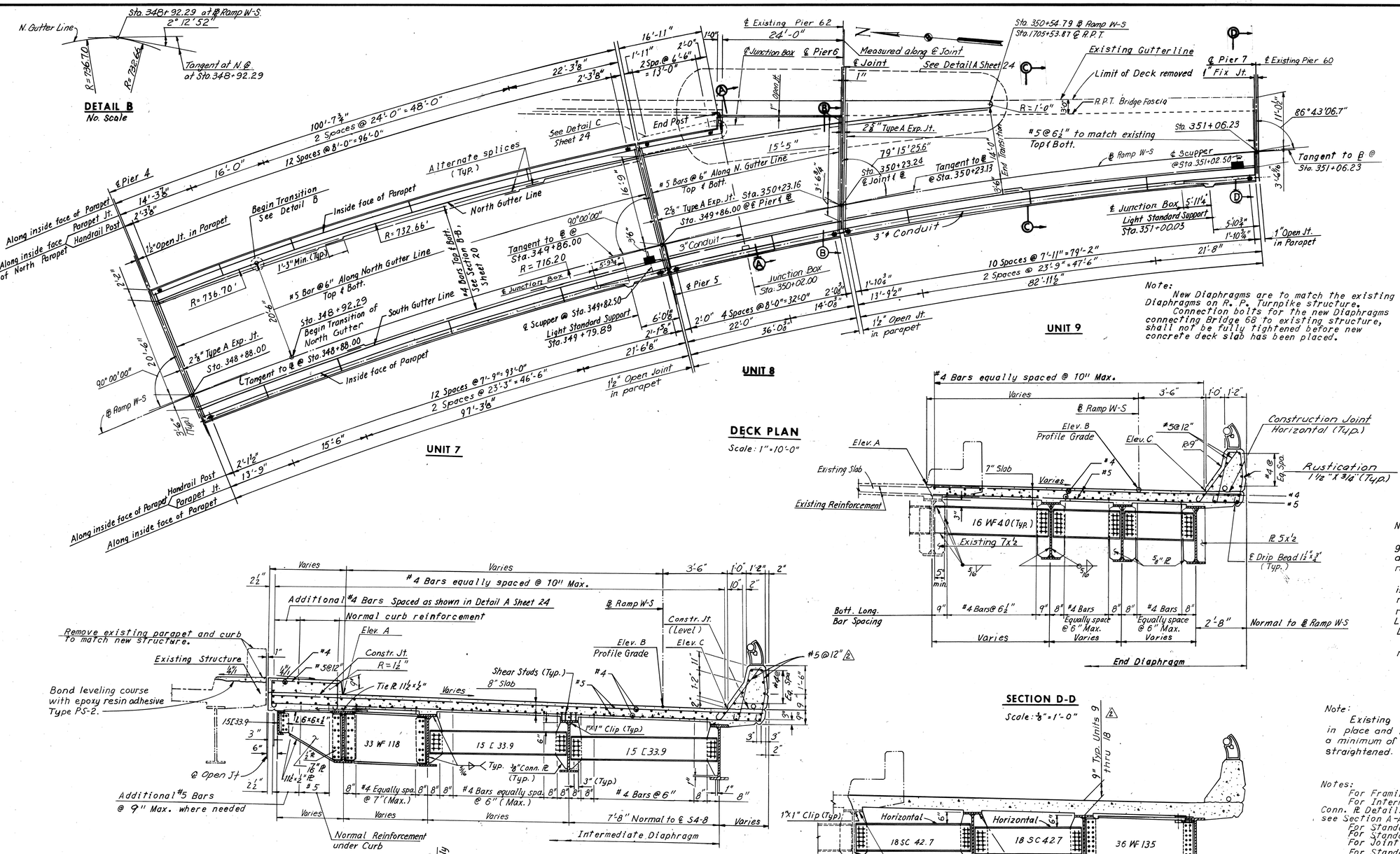
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
DECK PLAN — UNITS 4, 5 AND 6

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

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 20 OF 28

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	84	97

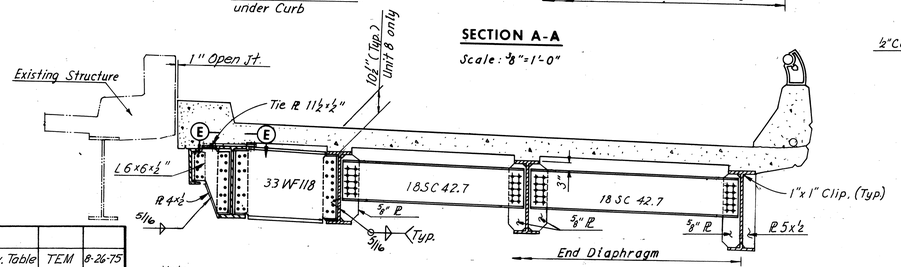


DECK PLAN

Scale: 1"=10'-0"

SECTION A-A

Scale: ⅜"=1'-0"



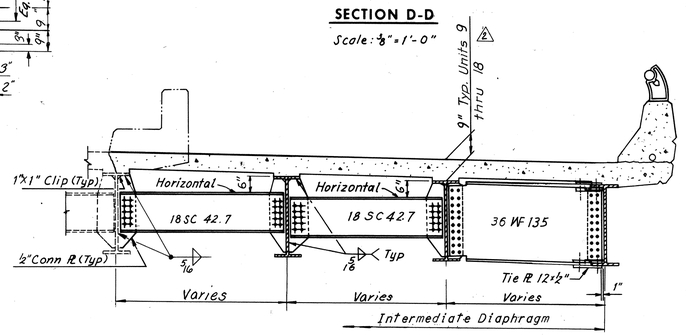
SECTION B-B

Scale: ½"=1'-0"

Note: Section E-E, See Section G-G on Sheet 24.

SECTION C-C

Scale: ⅜"=1'-0"



SECTION D-D

Scale: ⅜"=1'-0"

Note: Existing No. 5 transverse steel top & bottom to remain in place and be cleaned of concrete. Existing steel shall extend a minimum of 2'-0" into new concrete. Bottom reinf. shall be straightened.

Notes:
For Framing Plan Details see Sheet 14.
For Intermediate Diaphragm Details, Conn. PL Details and Reinforcement in Unit 7, see Section A-A of Sheet 20.
For Standard Handrail Details, see Sheet S3.
For Standard Lighting Details, see Sheet S4.
For Joint Details, see Sheet 25.
For Standard Drainage Details for Unit 7 see Support Type 3 and for Unit 9 see Support Type 5, both on Sheets S5 & S6.
End Diaphragms for Unit 7 @ pier 4 and-5 see Section A-A Sheet 20.

ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
348+88.00	88.20	87.00	86.79
+90	88.18	86.95	86.74
349+00.00	87.94	86.73	86.52
+10	87.72	86.53	86.32
+20	87.50	86.34	86.13
+30	87.30	86.16	85.95
+40	87.12	86.01	85.80
+50	86.95	85.86	85.65
+60	86.72	85.74	85.54
+70	86.51	85.62	85.44
+80	86.32	85.53	85.36
+86	86.21	85.48	85.32
+90	86.15	85.44	85.30
350+00.00	85.99	85.38	85.25
+10	85.85	85.33	85.21
+20	85.74	85.29	84.19
+22.57	—	—	85.18
+23.24	—	85.28	—
+26.05	85.76	—	—
+30	85.72	85.26	85.15
+40	85.49	85.18	85.10
+50	85.32	85.05	84.94
+54.79	85.25	85.03	84.94
+60	85.17	84.88	84.81
+70	84.99	84.71	84.64
+80	84.85	84.60	84.52
+90	84.69	84.45	84.37
351+00.00	84.51	84.29	84.21
—	—	—	—
+06.23	84.40	84.31	84.29
—	—	—	—

Note A:
Elev. A between Sta. 348+88 and 350+54.79 is given along the East Gutter Line Ramp W-S and are radial to the Base Line Ramp W-S at the respective stations
Elev. A from Sta. 350+54.79 to the End of Bridge is given along existing Gutter Line R.P.T. and are radial to the existing Base Line R.P.T. at the respective stations as given along the Base Line Ramp W-S. Cross Slope is radial to the Base Line R.P.T.
Elev. A is to be field verified. Minor adjustments may be required.

	BY	DATE
MADE	Y.C.P.	11-8-68
CHECKED	D.E.S.	1-16-69
IN CHARGE		

NO.	REVISION	BY	DATE
2	Revised Elev. Table	TEM	8-26-75
1	End Diaph. Conn. at exist. String.	TEM	8-75

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE

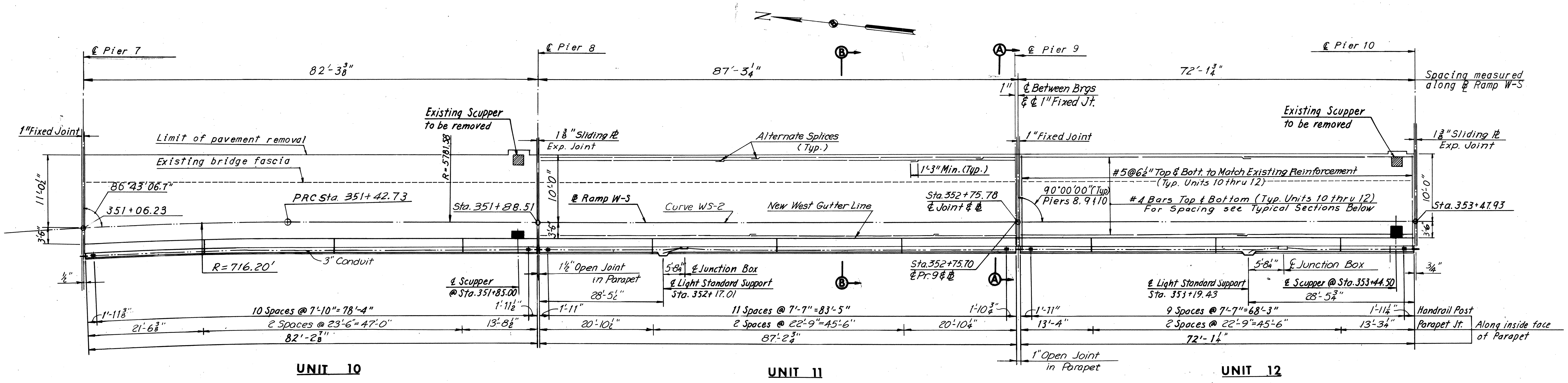
DECK PLAN-UNITS 7, 8 AND 9

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

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 21 OF 28

84

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	85	97



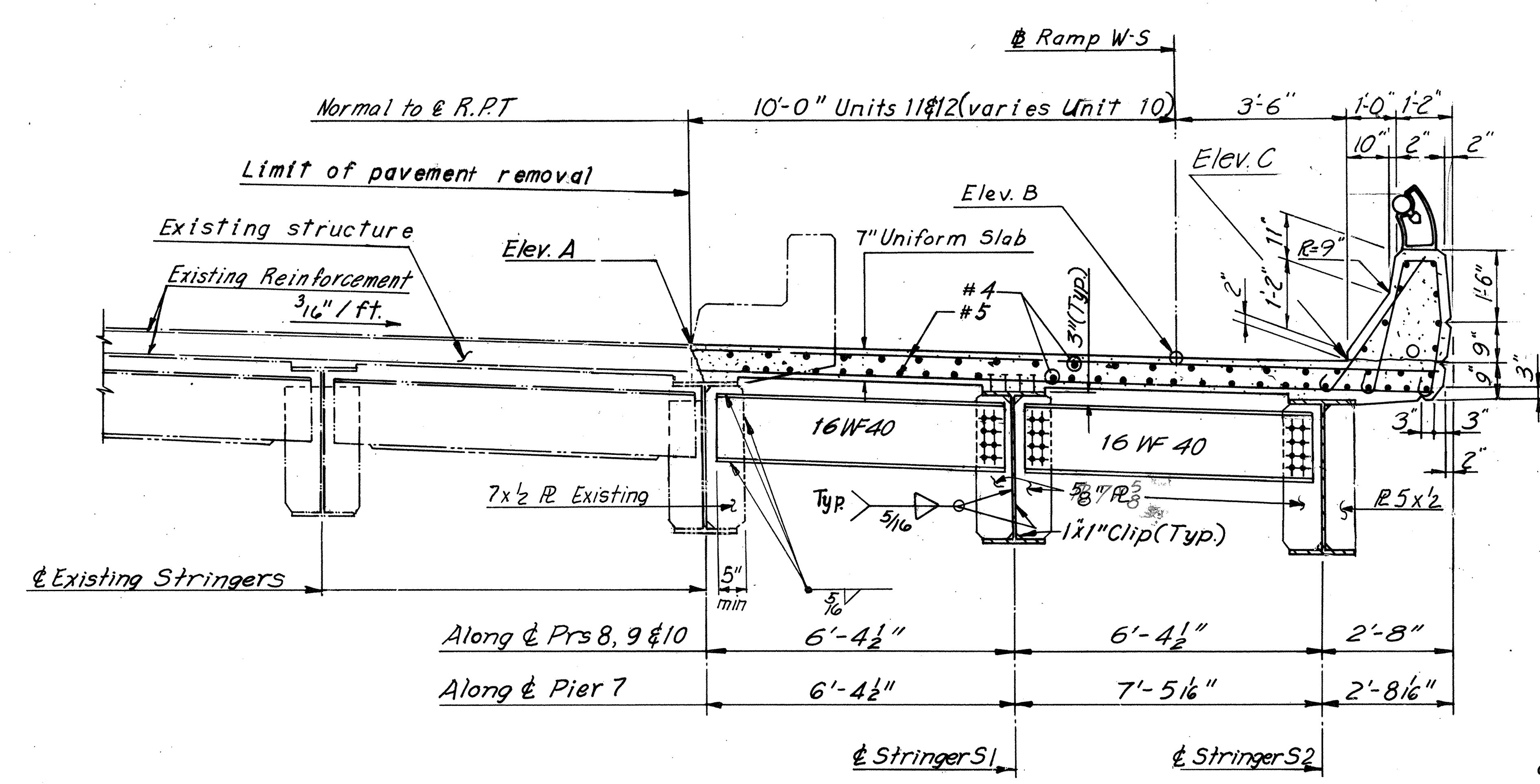
DECK PLAN

Scale: 1"=10'-0"

Note:
New Diaphragms are to match the existing Diaphragms on R. P. Turnpike structure.
Connection bolts for the new Diaphragms connecting Bridge 68 to existing structure, shall not be fully tightened before new concrete deck slab has been placed.

ELEVATION TABLE			
STATION	ELEV. A	ELEV. B	ELEV. C
——	——	——	——
+06.23	84.52	84.34	84.29
——	——	——	——
+ 10	84.39	84.18	84.10
+ 20	84.23	84.02	8 .94
+ 30	84.07	83.85	83.78
+ 40	83.90	83.70	83.62
+ 50	83.77	83.57	83.49
+ 60	83.56	83.36	83.28
+ 70	83.42	83.21	83.15
+ 80	83.26	83.05	82.99
+88.51	83.13	83.03	82.99
+ 90	83.12	83.01	82.98
352 + 00	82.94	82.85	82.82
+ 10	82.76	82.69	82.66
+ 20	82.60	82.53	82.50
+ 30	82.45	82.37	82.34
+ 40	82.29	82.21	82.19
+ 50	82.17	82.06	82.03
+ 60	82.01	81.90	81.87
+ 70	81.85	81.74	81.71
+75.78	81.81	81.67	81.62
+ 80	81.73	81.60	81.55
+ 90	81.56	81.44	81.39
353 + 00	81.41	81.28	81.23
+ 10	81.25	81.12	81.08
+ 20	81.04	80.95	80.92
+ 30	80.93	80.80	80.76
+ 40	80.75	80.64	80.60
+47.93	80.65	80.52	80.48

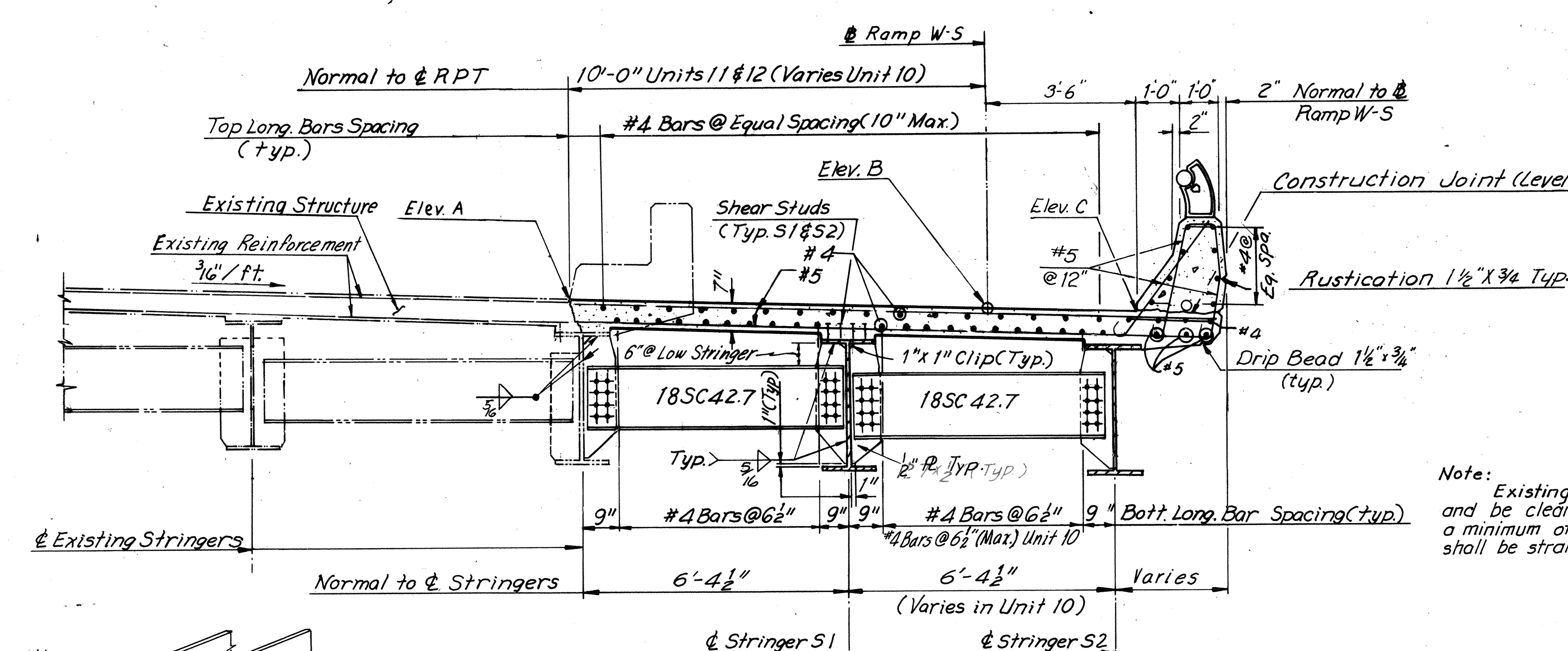
Note:
See Note A Sheet 2L



END DIAPHRAGM

TYPICAL SECTION A-A

Scale: ⅜" = 1'-0"

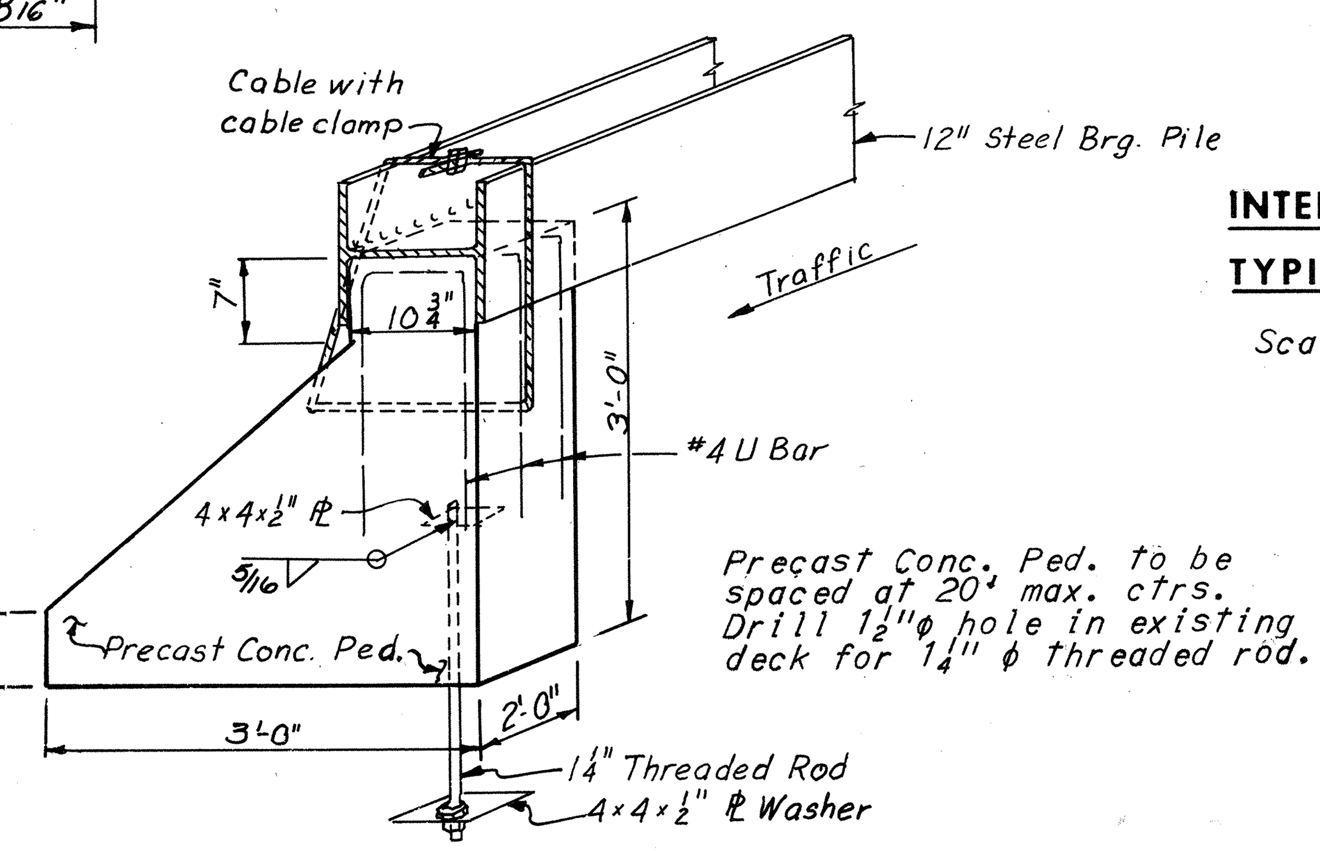


INTERMEDIATE DIAPHRAGM

TYPICAL SECTION B-B

Scale: ⅜" = 1'-0"

Note:
Existing No. 5 transverse steel to remain in place and be cleaned of concrete. Existing steel shall extend a minimum of 2'-0" into new concrete. Bottom reinf. shall be straightened.



Precast Conc. Ped. to be spaced at 20' max. ctrs.
Drill 1½" ϕ hole in existing deck for 1¼" ϕ threaded rod.

PROPOSED TEMPORARY FIXED TRAFFIC BARRICADE

Scale: ¾"=1'-0"

Notes
For Framing Plan Details see Sheet 15
For Joint Details see Sheet 25
For Quantities see Sheet 2.
For Standard Handrail Details, see Sheet S3.
For Standard Lighting Details, see Sheet S4.
For Standard Drainage Details, see Support Type 9 on Sheets S5 & S6.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	C.E.B.	12-3-68	2	Revised Elev. Table & Note Deleted	TEM	8-26-75
CHECKED	D.E.S.	1-15-69	1	End Diaph. Conn. at exist. String.	TEM	8-26-75
IN CHARGE						

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

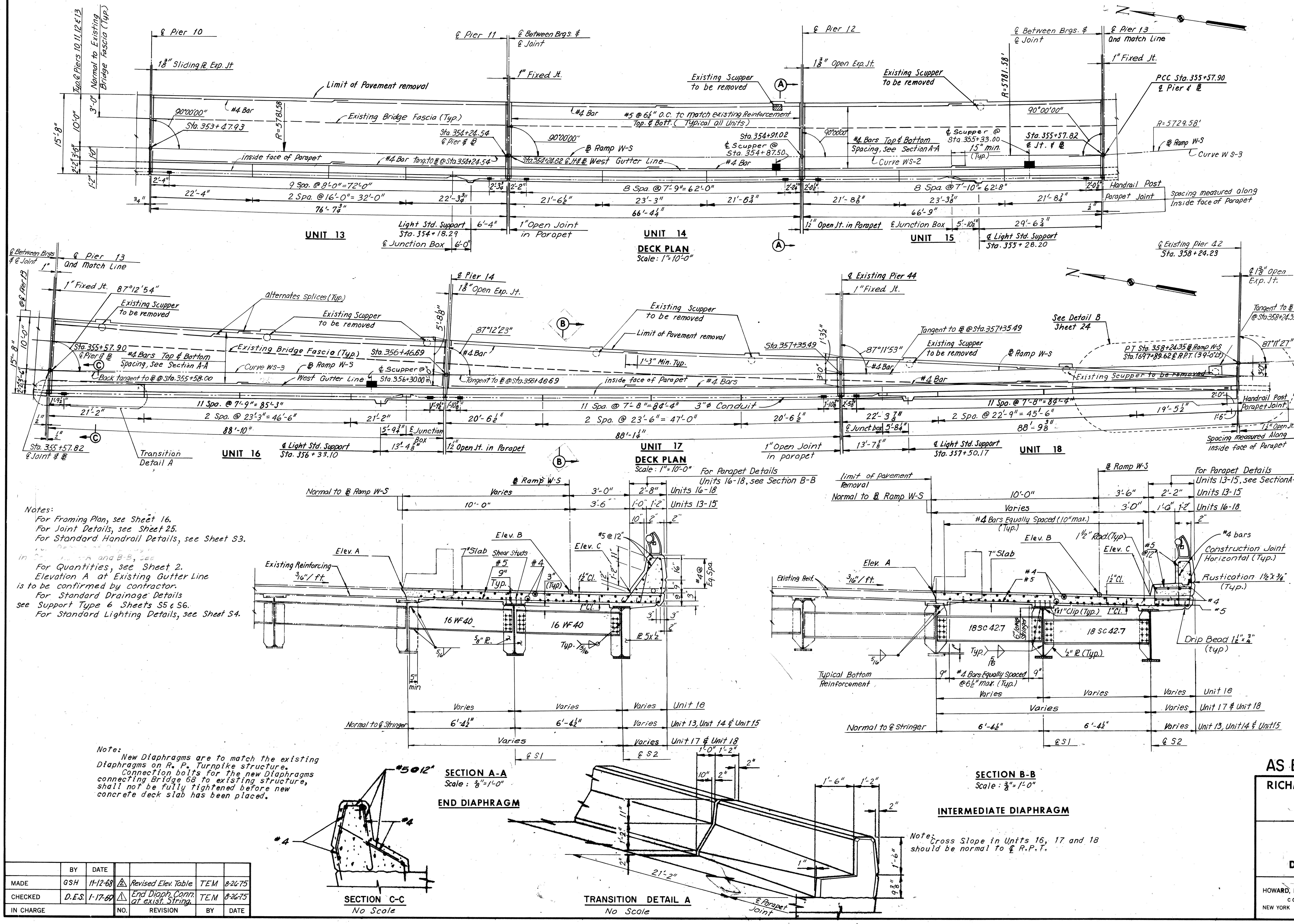
BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
DECK PLAN - UNITS 10, 11 AND 12

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

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 22 OF 28

85

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	86	97



ELEVATION TABLE

STATION	ELEV. A	ELEV. B	ELEV. C
353 + 47.93	80.65	80.52	80.48
+ 50	80.63	80.49	80.44
+ 60	80.43	80.32	80.28
+ 70	80.29	80.17	80.12
+ 80	80.11	80.00	79.97
+ 90	79.97	79.85	79.81
354 + 00.00	79.82	79.69	79.65
+ 10	79.64	79.53	79.49
+ 20	79.48	79.37	79.33
+ 24.62	79.43	79.30	79.26
+ 30	79.33	79.22	79.17
+ 40	79.18	79.06	79.01
+ 50	79.00	78.89	78.86
+ 60	78.85	78.74	78.70
+ 70	78.69	78.58	78.54
+ 80	78.51	78.41	78.38
354 + 90	78.35	78.25	78.22
+ 91.02	78.34	78.24	78.21
355 + 00.00	78.18	78.09	78.06
+ 10	78.06	77.95	77.90
+ 20	77.85	77.77	77.75
+ 30	77.67	77.61	77.59
+ 40	77.54	77.46	77.43
+ 50	77.36	77.29	77.27
+ 57.82	77.27	77.17	77.15
+ 60	77.22	77.14	77.11
+ 70	77.03	76.98	76.96
+ 80	76.85	76.82	76.81
+ 90	76.66	76.66	76.66
356 + 00.00	76.50	76.51	76.51
+ 10	76.34	76.35	76.36
+ 20	76.17	76.20	76.21
+ 30	76.03	76.05	76.06
+ 40	75.87	75.90	75.91
+ 46.69	75.80	75.80	75.81
+ 50	75.71	75.74	75.76
+ 60	75.73	75.66	75.60
+ 70	75.35	75.40	75.45
+ 80	75.24	75.27	75.30
+ 90	75.11	75.13	75.15
357 + 00.00	74.94	74.96	75.00
+ 10	74.78	74.81	74.85
+ 20	74.65	74.67	74.70
+ 30	74.52	74.53	74.55
+ 35.49	74.44	74.45	74.47
+ 40	74.35	74.36	74.40
+ 50	74.17	74.18	74.25
+ 60	74.01	74.01	74.10
+ 70	—	74.00	73.94
+ 80	—	73.85	73.79
+ 90	—	73.70	73.64
358 + 00.00	—	73.55	73.49
+ 10	—	73.39	73.33
+ 20	—	73.24	73.19
+ 24.24	—	73.18	73.13

Note:
See Note A Sheet 21.

Notes:
For Framing Plan, see Sheet 16.
For Joint Details, see Sheet 25.
For Standard Handrail Details, see Sheet S3.
For Quantities, see Sheet 2.
Elevation A at Existing Gutter Line is to be confirmed by contractor.
For Standard Drainage Details see Support Type 6 Sheets S5 & S6.
For Standard Lighting Details, see Sheet S4.

Note:
New Diaphragms are to match the existing Diaphragms on R. P. Turnpike structure.
Connection bolts for the new Diaphragms connecting Bridge 68 to existing structure, shall not be fully tightened before new concrete deck slab has been placed.

Note: Cross Slope in Units 16, 17 and 18 should be normal to ℄ R.P.T.

	BY	DATE				
MADE	GSH	11-12-68	2	Revised Elev. Table	TEM	8-26-75
CHECKED	D.E.S.	1-17-69	1	End Diaph. Conn. at exist. String.	TEM	8-26-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

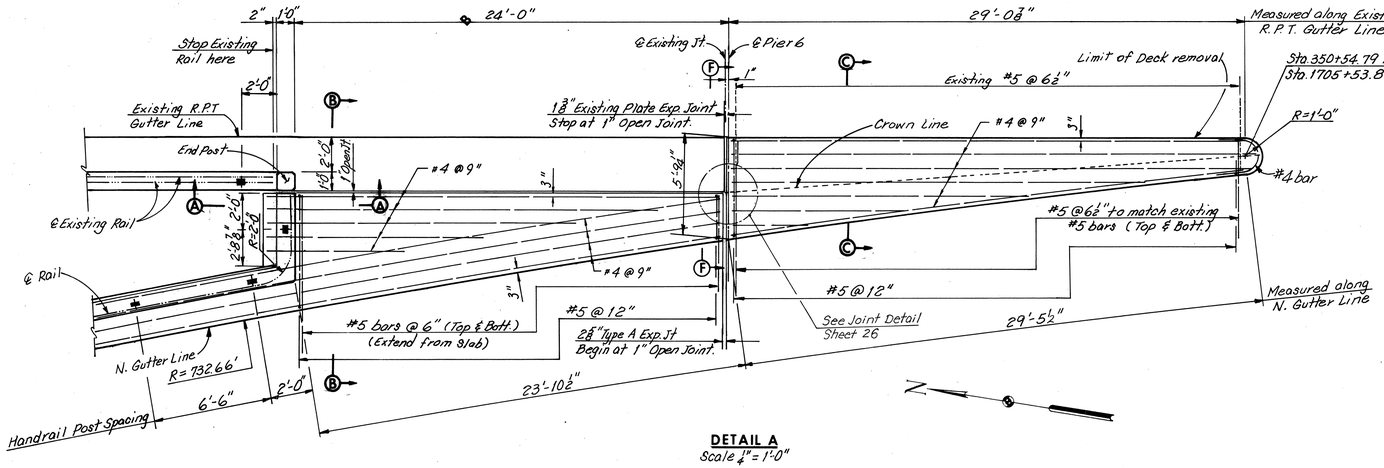
BRIDGE NO. 68
RAMP W-S CONNECTION TO RICHMOND-PETERSBURG TURNPIKE
DECK PLAN — UNITS 13 THRU. 18

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

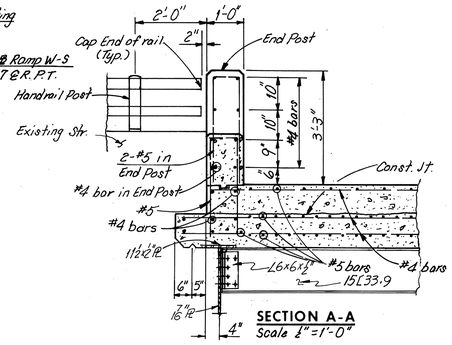
SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 23 OF 28

86

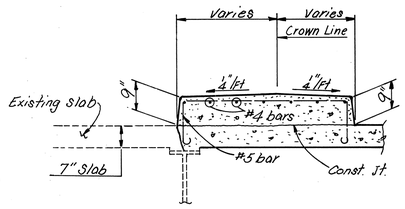
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	87	97



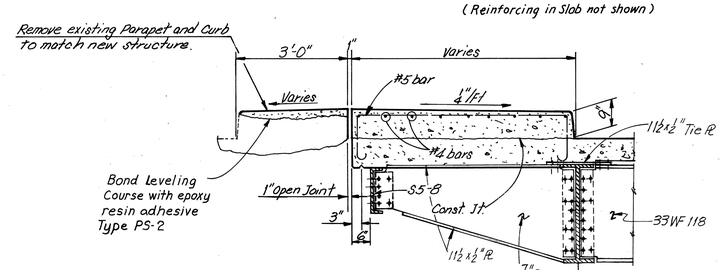
DETAIL A
Scale ¼"=1'-0"



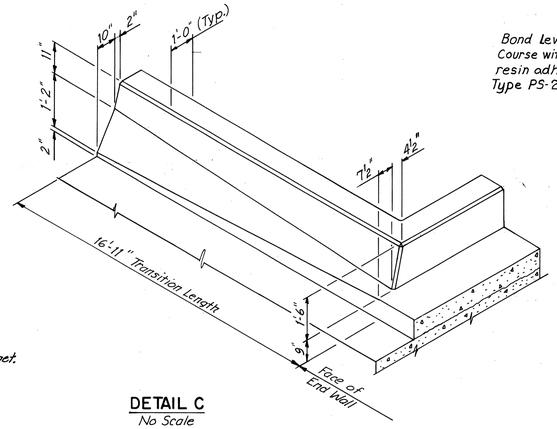
SECTION A-A
Scale ½"=1'-0"



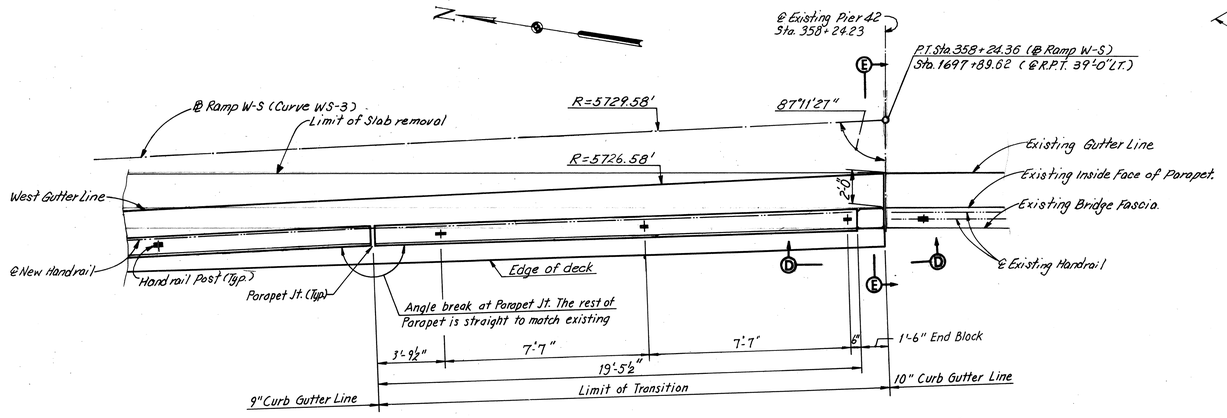
SECTION C-C
Scale ½"=1'-0"
(Reinforcing in Slab not shown)



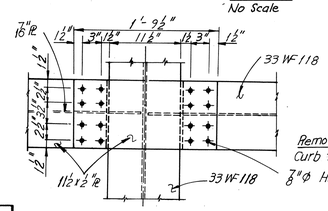
SECTION B-B
Scale ½"=1'-0"
(Reinforcing in Slab not shown)



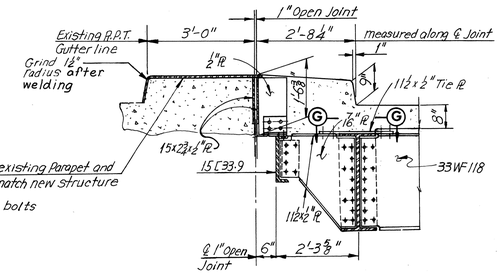
DETAIL C
No Scale



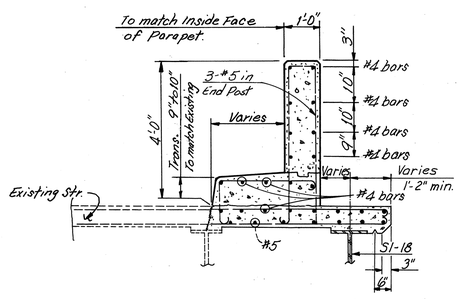
DETAIL B
No Scale



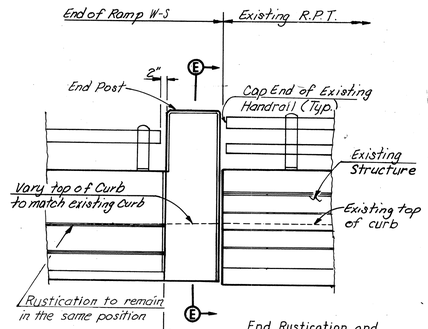
SECTION G-G
Scale : 1"=1'-0"



SECTION F-F
Scale : ½"=1'-0"



SECTION E-E
Scale ½"=1'-0"



VIEW D-D
Scale ½"=1'-0"

Notes:
For location of Details A and C, see Sheet 21.
For location of Detail B, see Sheet 23.

	BY	DATE				
MADE	G.C.C.	1-29-69	2	Det. A & Sect. A-A	TEM	4-76
CHECKED	YCP	2-3-69	1	Section E-E	TEM	8-26-75
IN CHARGE			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE
SUPERSTRUCTURE DETAILS

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

SCALE: As Noted
CONTRACT NO.: 11
SHEET NO. 24 OF 28

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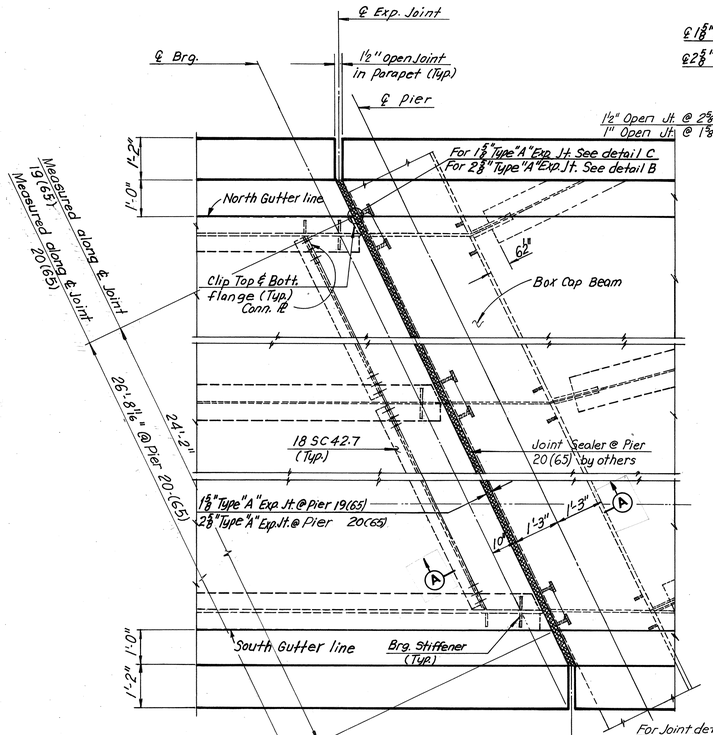
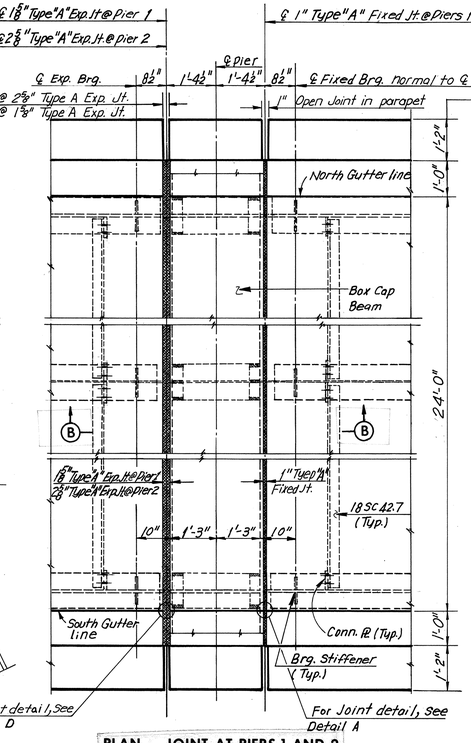
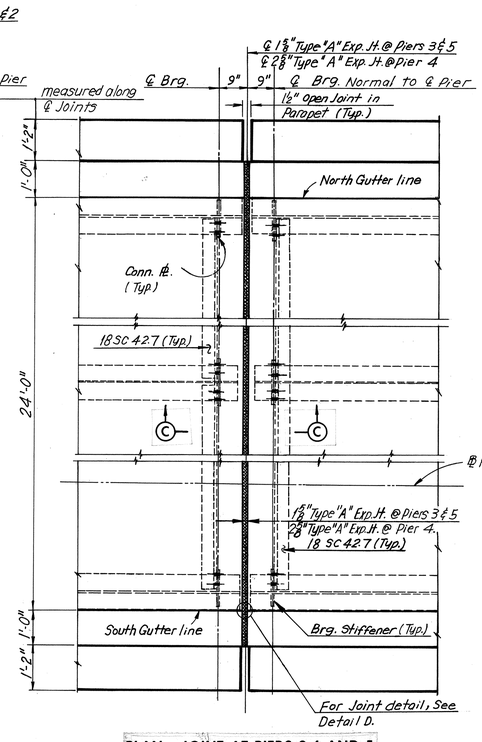
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	88	97



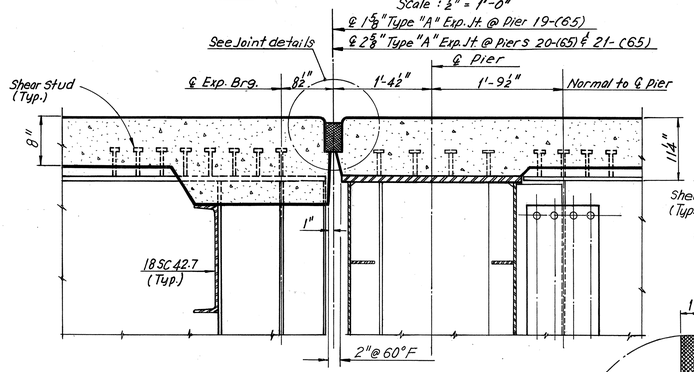
PLAN - JOINT AT PIERS 19 (65) AND 20(65)
Scale : ½" = 1'-0"



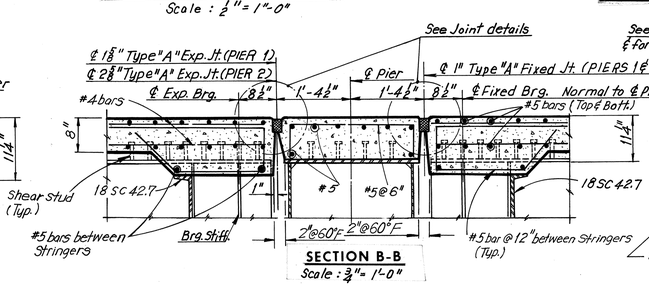
PLAN - JOINT AT PIERS 1 AND 2
Scale : ½" = 1'-0"



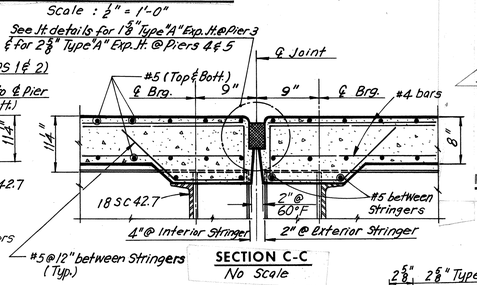
PLAN - JOINT AT PIERS 3,4 AND 5
Scale : ½" = 1'-0"



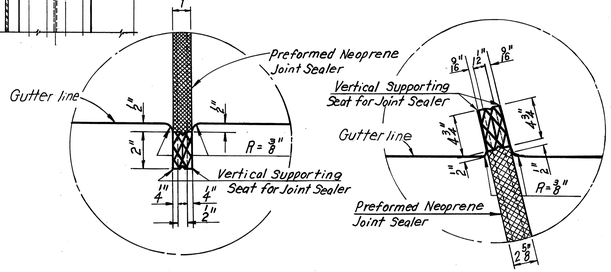
SECTION A-A
Scale : 1"= 1'-0"



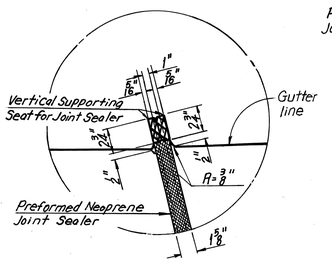
SECTION B-B
Scale : ¾"= 1'-0"



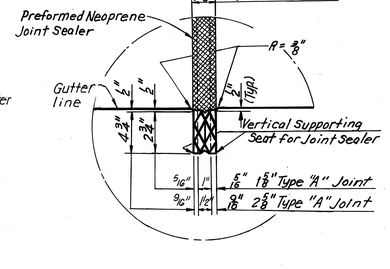
SECTION C-C
No Scale



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



DETAIL C
Scale : 1½"= 1'-0"

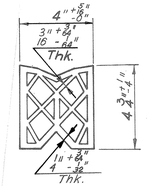


DETAIL D
No Scale

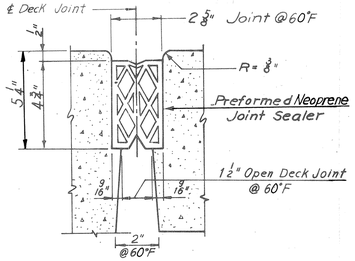
Note:
Reinforcings of Section A-A are similar to Section B-B.

Note:
Horizontal dimensions as shown in the cross sections are normal to ℄ Joint.

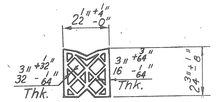
	BY	DATE				
MADE	G.S.H.	9-26-69				
CHECKED	V.C.P.	10-1-69	1	Diaph conn. ℙ @ Piers 3,4 & 5	T.E.M.	8-26-75
IN CHARGE			NO.	REVISION	BY	DATE



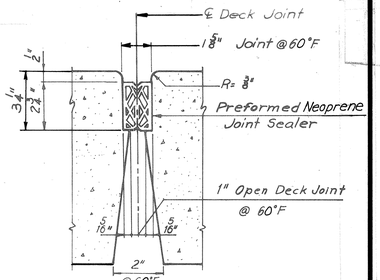
PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT



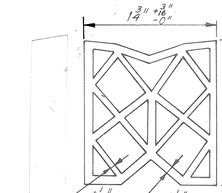
2⅝" TYPE "A" JOINT



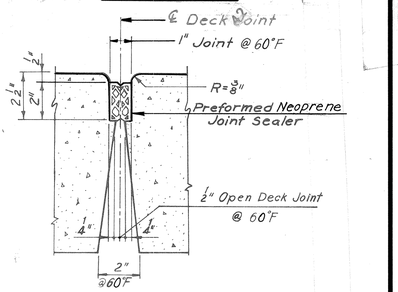
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT



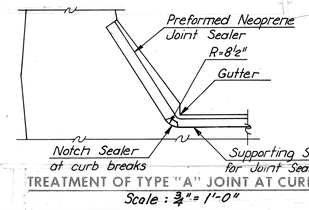
1⅝" TYPE "A" JOINT



PREFORMED NEOPRENE JOINT SEALER FOR 1" TYPE "A" JOINT



1" TYPE "A" JOINT



TREATMENT OF TYPE "A" JOINT AT CURB
Scale : ¾"= 1'-0"

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE

JOINT DETAILS

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

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 25 OF 28

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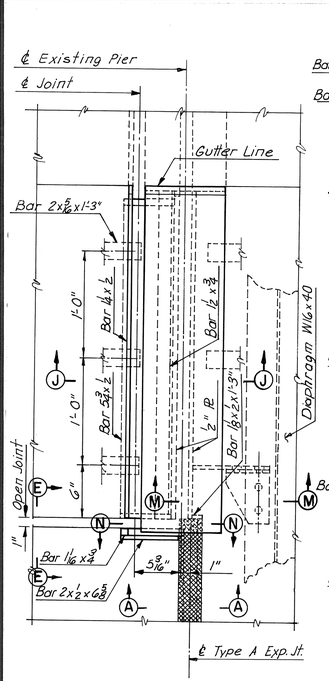
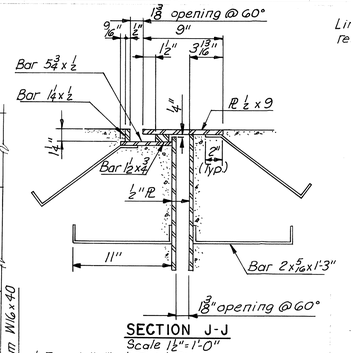
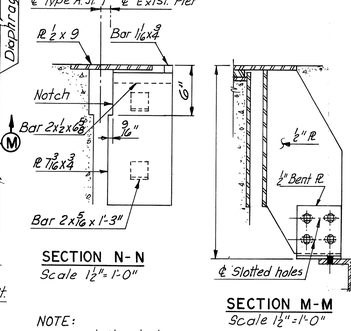
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
11	DOWNTOWN EXPRESSWAY	89	97



PLAN-JOINT AT PIER 6
Scale 1½"=1'-0"



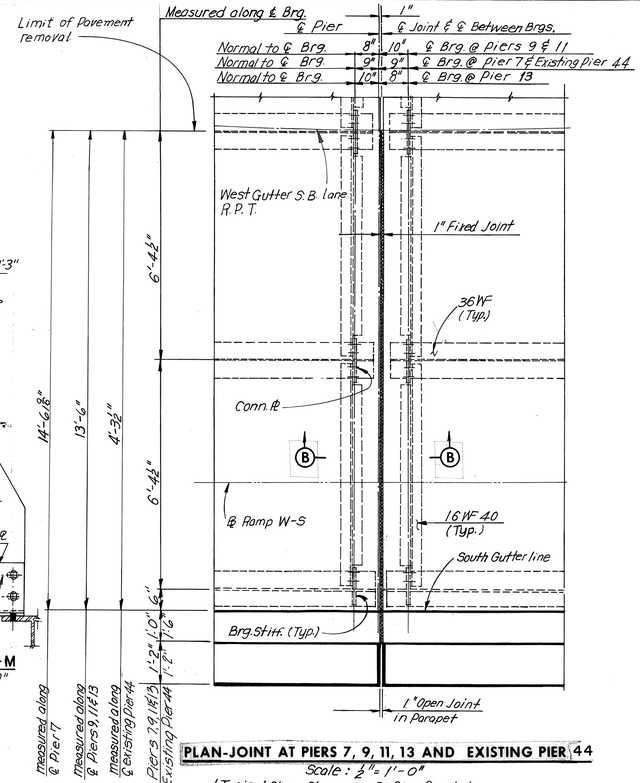
SECTION J-J
Scale 1½"=1'-0"



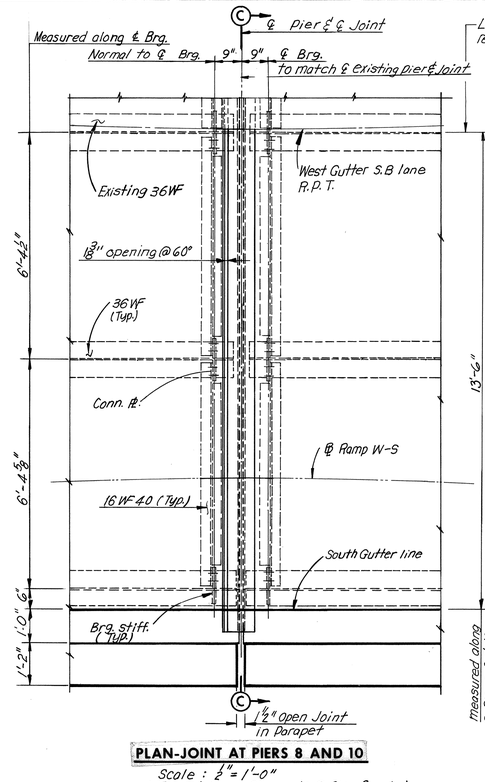
SECTION N-N
Scale 1½"=1'-0"

SECTION M-M
Scale 1½"=1'-0"

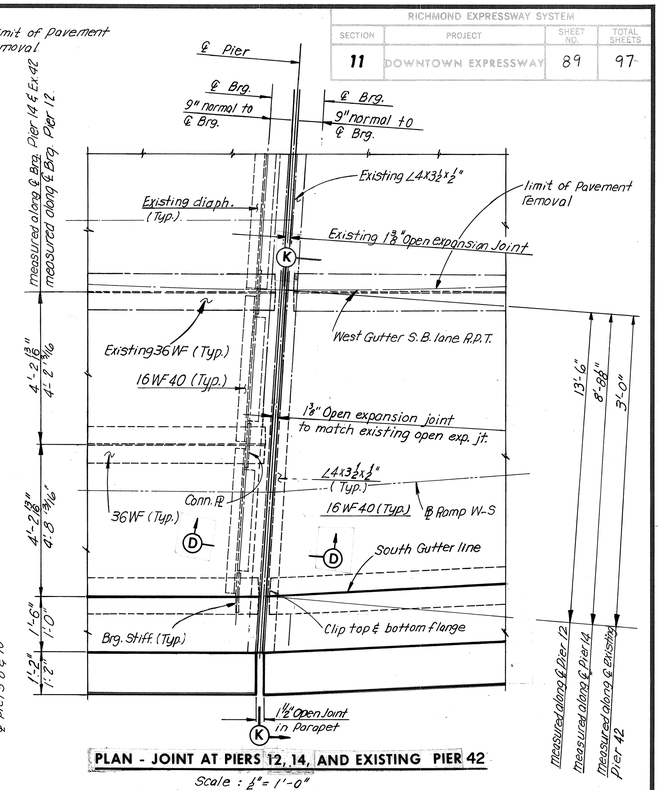
NOTE:
For detail not shown see Section F-F.



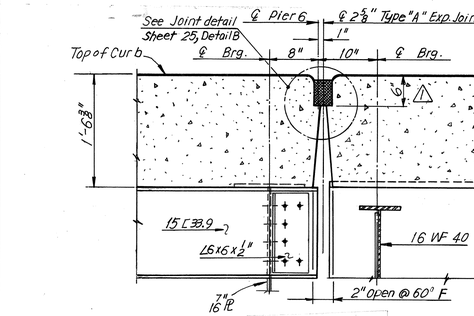
PLAN-JOINT AT PIERS 7, 9, 11, 13 AND EXISTING PIER 44
Scale : ½"= 1'-0"
(Typical Plan Shown is @ Pier 9 only)



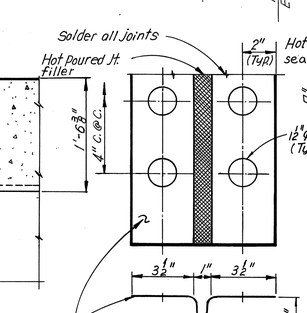
PLAN-JOINT AT PIERS 8 AND 10
Scale : ½"= 1'-0"
(Typical Plan Shown is @ Pier 8 only)



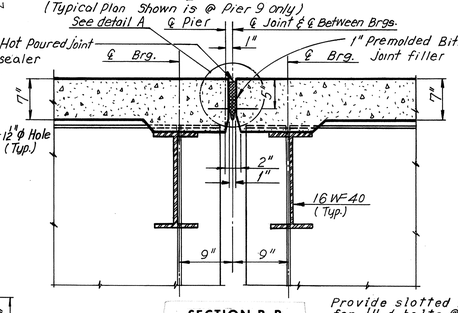
PLAN - JOINT AT PIERS 12, 14, AND EXISTING PIER 42
Scale : ½"= 1'-0"
(Typical Plan Shown is @ Pier 14 only)



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



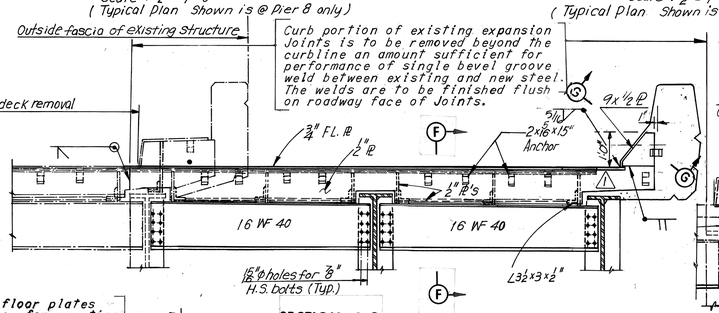
DETAIL A
Scale: 3" = 1'-0"



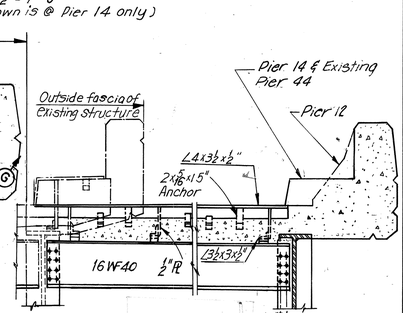
SECTION B-B
Scale : 1" = 1'-0"

JOINT BETWEEN FIXED BEARINGS

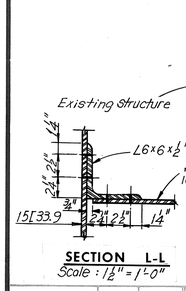
Provide slotted holes in floor plates for ¾" ø bolts @ 2'-0" a.c. for erection. Fill holes with hot poured joint sealer after bolts are removed.



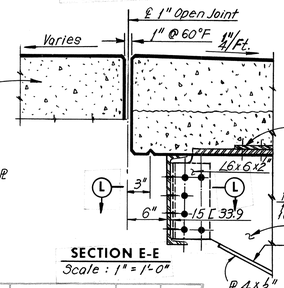
SECTION C-C
Scale : ½"= 1'-0"



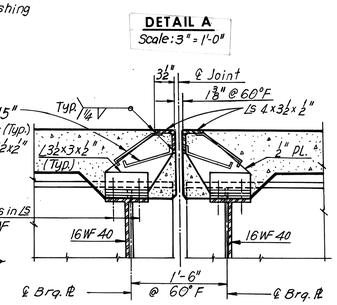
SECTION K-K
Scale : ½"= 1'-0"



SECTION L-L
Scale : 1½"= 1'-0"

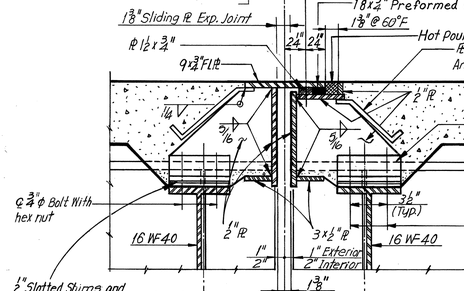


SECTION E-E
Scale : 1" = 1'-0"



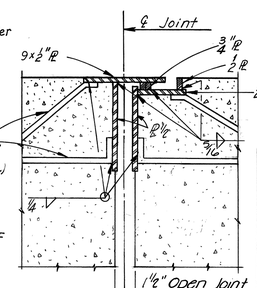
SECTION D-D
Scale : 1" = 1'-0"

Note:
Reinforcing of all Sections are not Shown.



SECTION F-F
Scale : 1½"= 1'-0"

Note:
All fillet welds are ¼" unless otherwise shown.



SECTION G-G
Scale : 1½"= 1'-0"

AS BUILT

Note:
Horizontal dimensions as shown in the Cross sections are normal to ℄ joint.

Note:
Joints for piers 7 through 14 and existing piers 42 & 44 have to match existing joints.

	BY	DATE				
MADE	G.S.H.	10-10-69				
CHECKED	Y.C.P.	10-17-69	NO.	REVISION	BY	DATE
IN CHARGE			1	Joint Details @ Piers 6, 8 & 10	T.E.M.	12-8-76

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 68
RAMP W-S CONNECTION TO
RICHMOND-PETERSBURG TURNPIKE

JOINT DETAILS

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

SCALE: As Noted
CONTRACT NO. 11
SHEET NO. 26 OF 28

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