APPENDIX
DR-2018

RECORD DRAWINGS

RMTA BRIDGES 4, 36, 46, 47, 48, 49, 50, 51, 54, 55, 56, 57, 58, 60 & 62

RMTA System Map

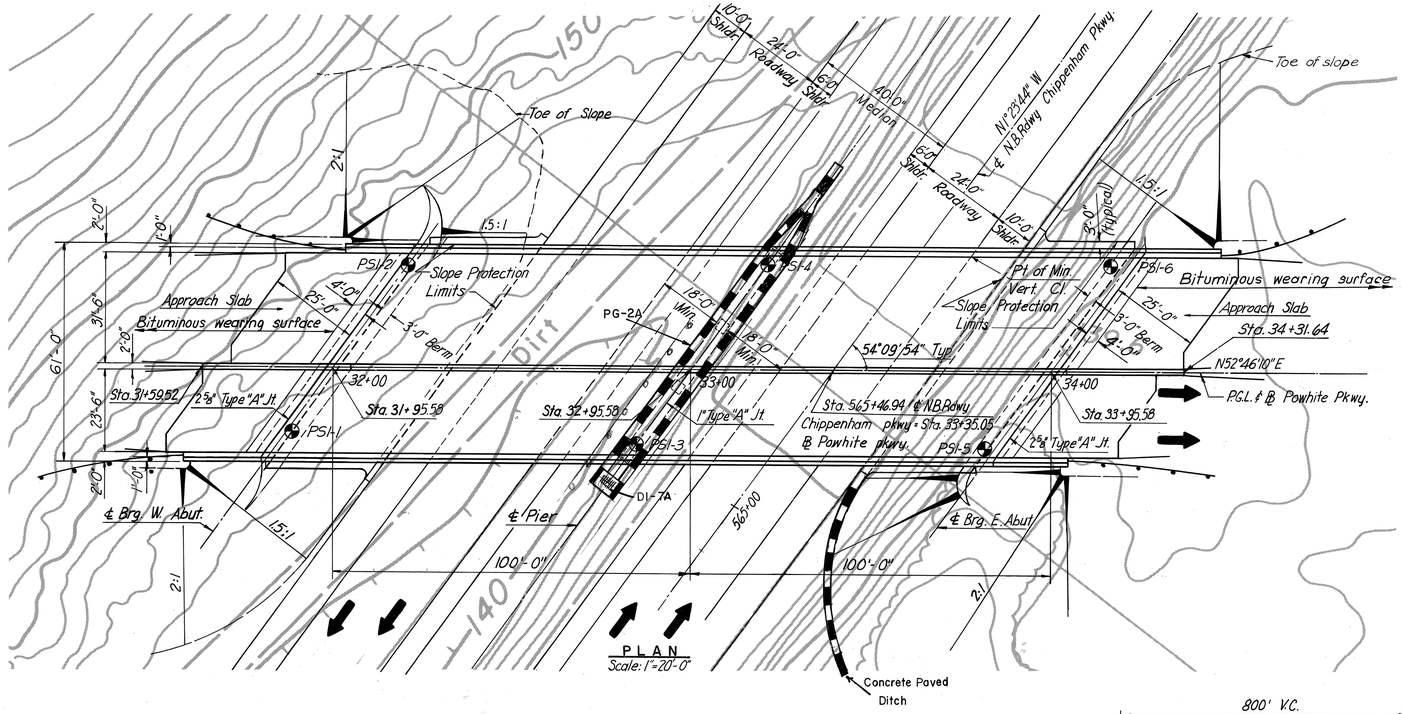
RICHMOND EXPRESSWAY SYSTEM
Scale: 0 1000 2000 3000ft.
48 - Bridge Number
RMTA Facilities Shown in Red
RMTA
RICHMOND METROPOLITAN TRANSPORTATION AUTHORITY
RICHMOND
JOSEPH BRYAN PARK
Toll Booths
BRYAN PARK INTERCHANGE
LABURNUM AVE.
WESTWOOD AVE.
NORTH AVE.
BROOK RD.
CHAMBERLAYNE AVE.
BROOKLAND PARK BLVD.
OVERBROOK RD.
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.
Science Museum Of Virginia
VIRGINIA UNION UNIVERSITY
HERMITAGE RD.
RICHMOND PETERSBURG TURNPIKE
HUGUENOT BRIDGE
HUGUENOT ROAD
RIVERSIDE DR.
Williams Island
DOVER RD.
I-195
Virginia Museum Of Fine Arts
Downtown Expressway Extension
SEABOARD COAST LINE
CLAY ST.
MARSHALL ST.
LEIGH ST.
FAIRFIELD AVE.
Section Two Connection To I-195
IDLEWOOD AVE.
MAPLEWOOD AVE.
CITY STADIUM
PORTLAND PL.
BOULEVARD INTERCHANGE
PARKWOOD AVE.
GRANT RD.
Toll Booths
STADIUM INTERCHANGE
DOUGLASDALE RD.
WILLIAM BYRD PARK
Toll Plaza
GRAYLAND AVE.
Monroe Park
The Mosque
Public Library
COLISEUM
Toll Booths
Virginia Commonwealth University
FRANKLIN ST.
ADAMS ST.
Downtown Expressway State Rte. 195
CHERRY ST.
LAUREL ST.
BELVIDERE
State Penetentiary
Chamber of Commerce
City Hall
Med. Col. Of Va. (VCU)
STATE CAPITOL
Shockoe Slip Historic District
MAIN ST. STATION
CARRINGTON ST.
NINE MILE RD.
MOSBY ST.
MECHANICSVILLE
Connection to Downtown Expressway
Section Three
MAYMONT PARK
Toll Plaza
MEADOW ST.
COLORADO AVE.
MT. CALVARY CEMETERY
HOLLYWOOD CEMETERY
RIVERVIEW CEMETERY
Section Four Downtown Expressway
Toll Booths
DOWNTOWN I-95 INTERCHANGE
MARSHALL ST.
BROAD ST.
25TH ST.
CLAY ST.
Chimborazo Park
JAMES RIVER BRIDGE
MAYOS BRIDGE
MANCHESTER BRIDGE
ROBERT E. LEE BRIDGE
JAMES RIVER
Water Works
WILLOW OAKS
COUNTRY CLUB
Section One
POWHITE BRIDGE OVER THE JAMES RIVER
Toll Booths
FOREST HILL AVE.
FOREST HILL AVE. INTERCHANGE
Powhite Parkway State Rte 76
Toll Plaza (SB)
Toll Plaza (NB)
(SOUTHERN RAILWAY)
BLILELY RD.
JAHNKE RD.
CHIPPENHAM PARKWAY INTERCHANGE
CHIPPENHAM PARKWAY
Powhite Parkway Extension (VDOT Toll Road)
BOULEVARD BRIDGE 7500# Limit
WESTOVER HILLS BLVD.
CSX RAILWAY
NORFOLK SOUTHERN
SEABOARD COAST LINE
CSX RAILWAY
FOREST HILL PARK
FOREST HILL AVE.
SEMMES AVE.
HULL ST.
COMMERCE RD.
MAURY ST.
SOUTHERN RAILWAY

Bridge 4

(Southbound Powhite Parkway {Rte. 76}
Over Chippenham Parkway {Rte. 150})

Record Set Plans

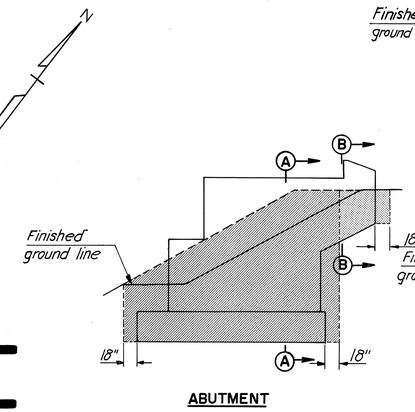
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	118	188



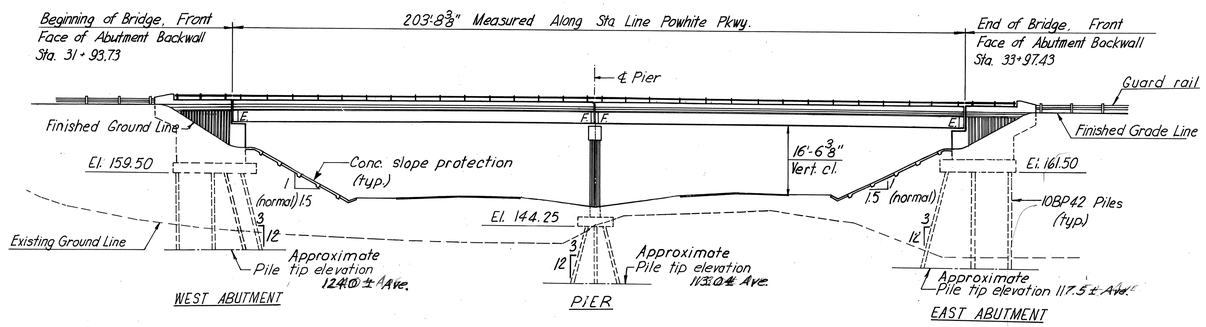
PLAN
Scale: 1"=20'-0"

PROFILE GRADE DATA
POWHITE PKWY.
No Scale

PROFILE GRADE DATA
CHIPPENHAM PKWY.
No Scale



PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale



ELEVATION
Scale: 1"=20'-0"

	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

INDEX

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

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

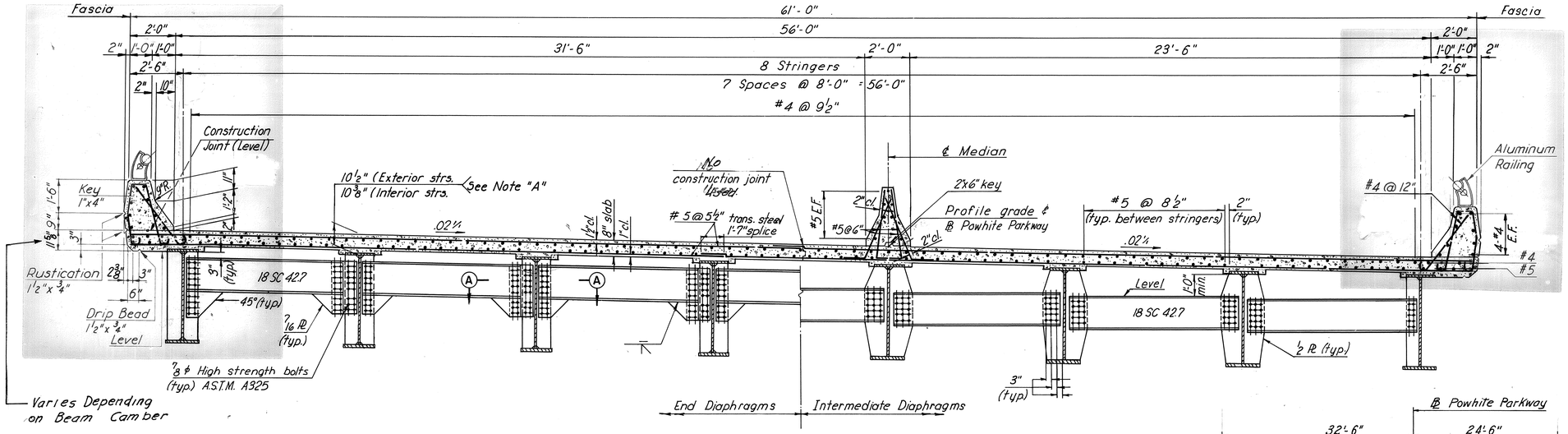
POWHITE PARKWAY OVER CHIPPENHAM PARKWAY
BRIDGE B-04

GENERAL PLAN & ELEVATION

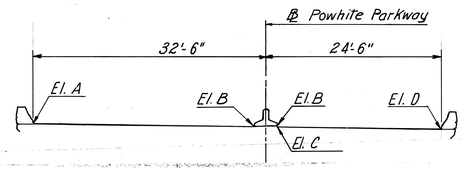
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

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

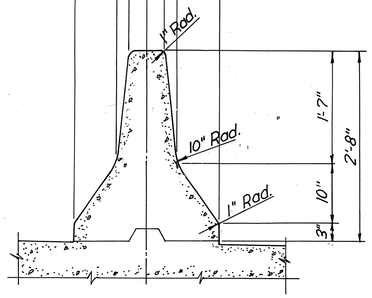
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	126	188



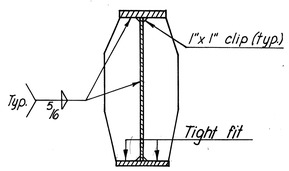
TYPICAL CROSS SECTION
Scale 3/8" = 1'-0"



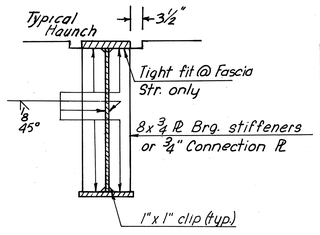
NOTE "A":
Dimension shown is measured from top of web to top of slab at the intersection of the centerline of stringer and the centerline of bearing. This dimension may be varied between bearings as required to care for variation in camber, except that no portion of the stringer flange may fall within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



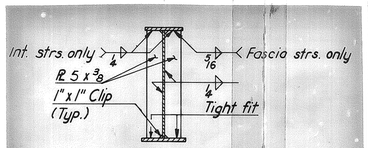
TYPICAL MEDIAN SECTION
Scale 1"=1'-0"



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

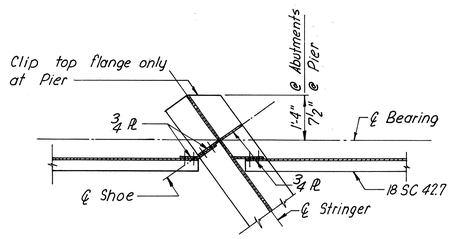


END DIAPHRAGM CONNECTION PLATE AND/OR BEARING STIFFENERS



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

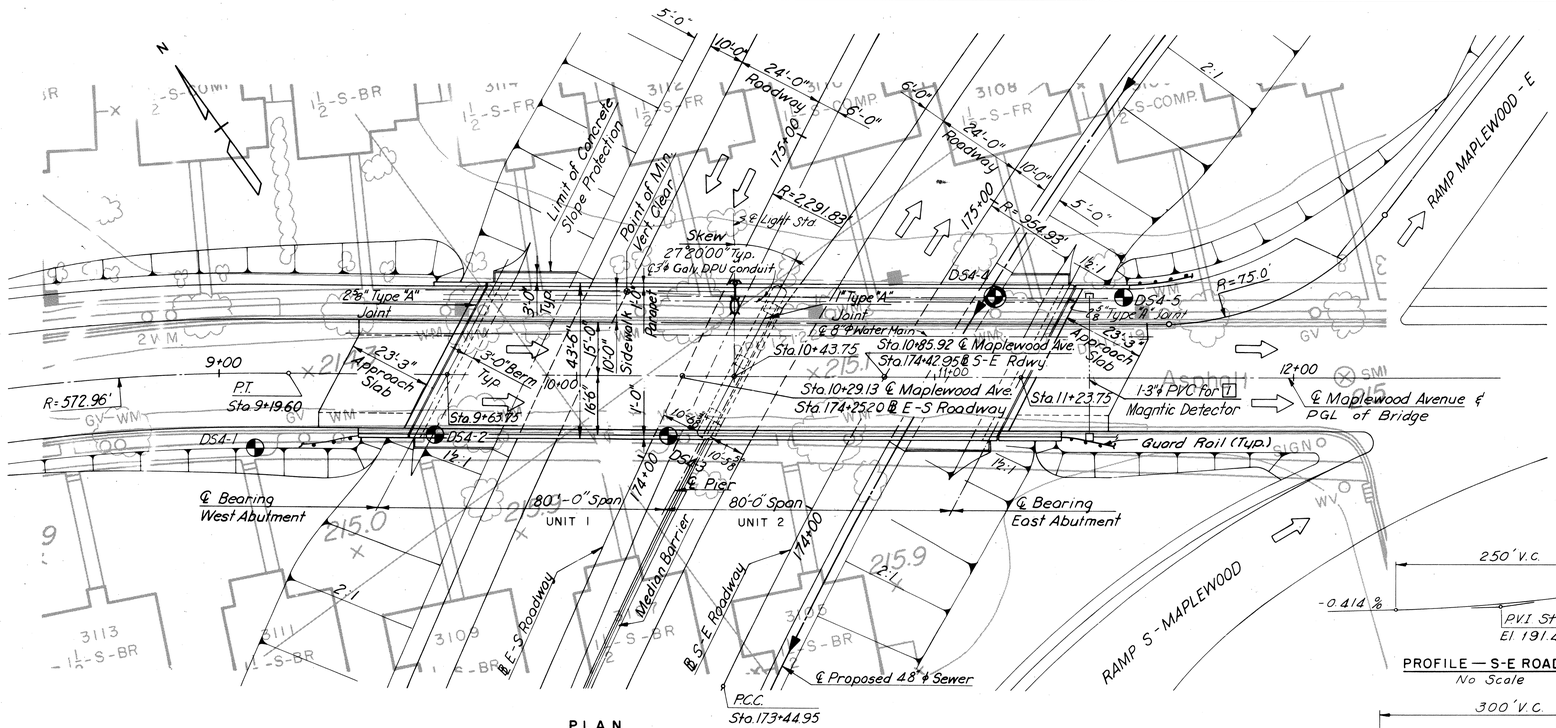
SCALE: AS SHOWN
CONTRACT NO.: 2
SHEET NO. 9 OF 14

Bridge 36

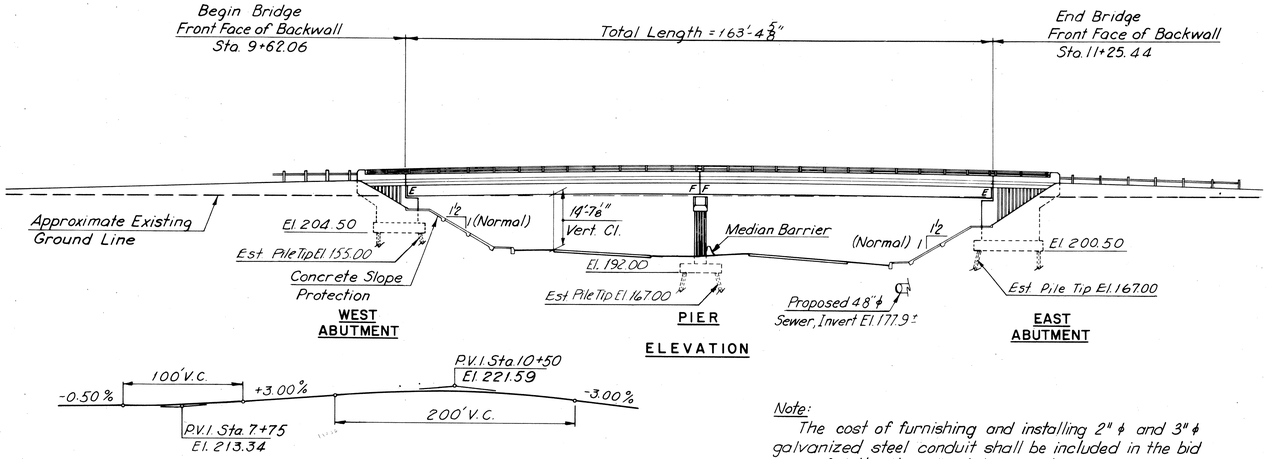
(Maplewood Avenue
Over Downtown Expressway Connector {Rte. 146})

Record Set Plans

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



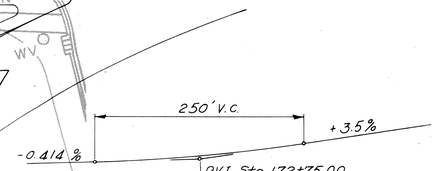
PLAN



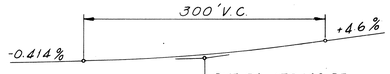
ELEVATION

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 PVC CONDUIT L.F.
SUPERSTRUCTURE		276.2			270,749	327		53,067					213	1,176	34
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	3-12-68	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

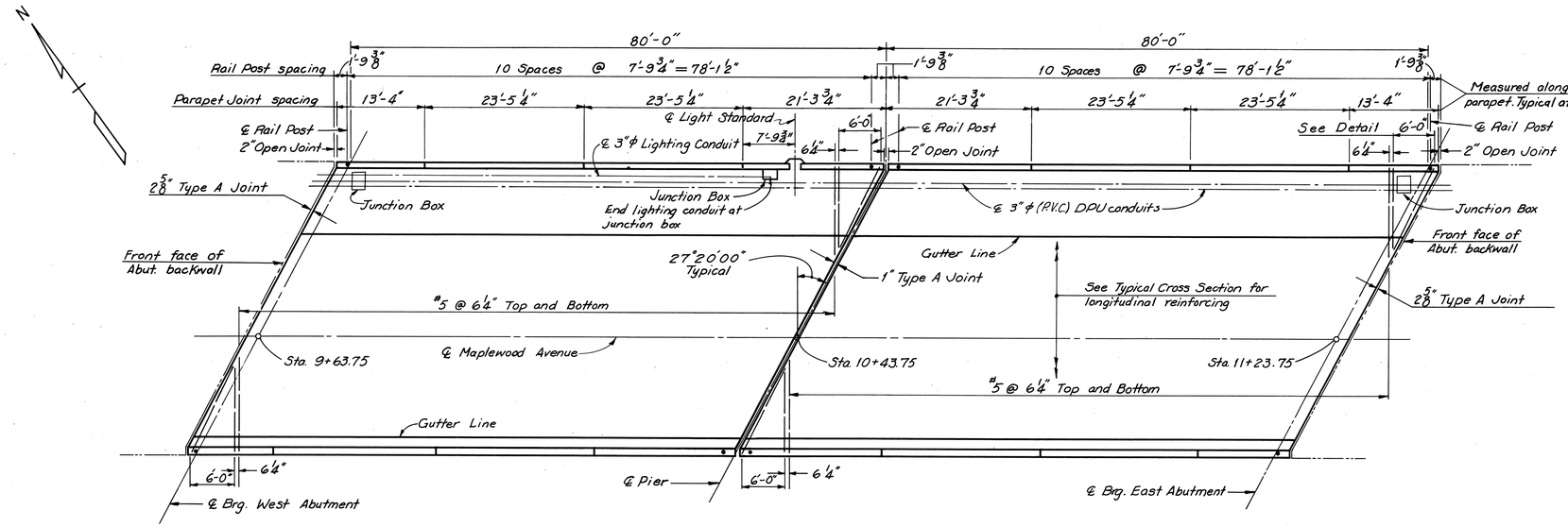
BRIDGE NO. 36
MAPLEWOOD AVENUE OVER
DOWNTOWN EXPRESSWAY
GENERAL PLAN AND ELEVATION

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

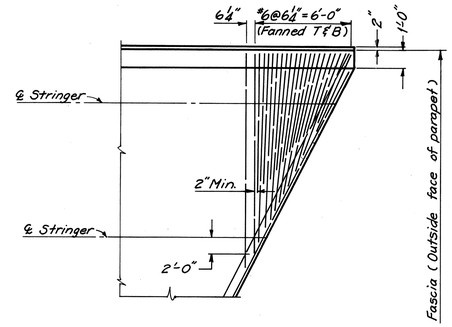
SCALE: 1"= 20' UNLESS NOTED
CONTRACT NO.: 7
SHEET NO. 1 OF 10

96

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



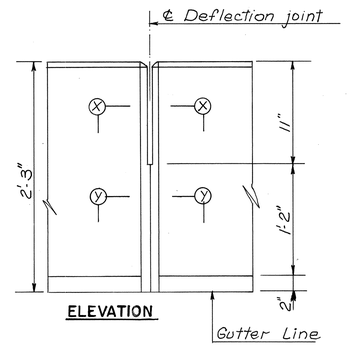
DECK PLAN
1"= 10'



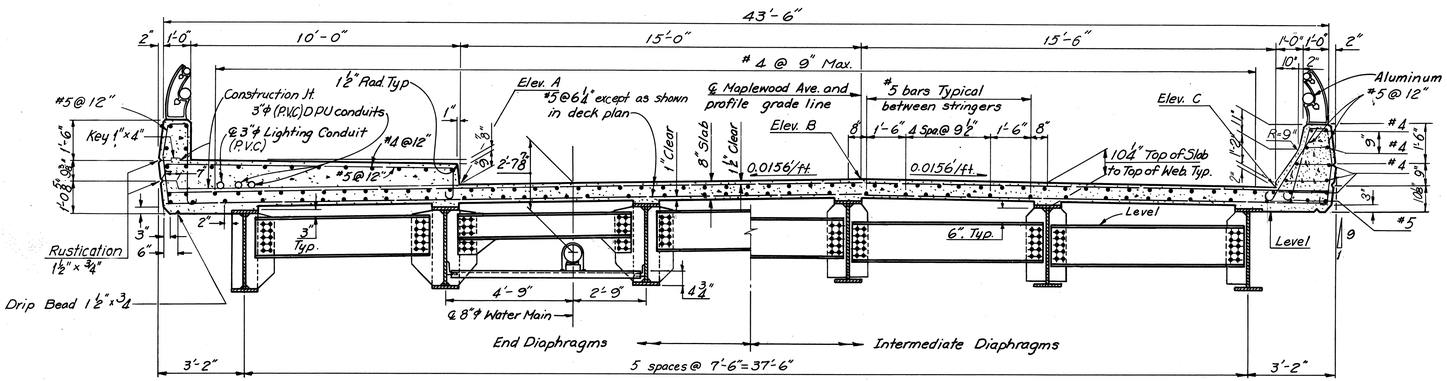
TYPICAL ACUTE CORNER REINFORCING DETAIL
No Scale

3 Junction Boxes

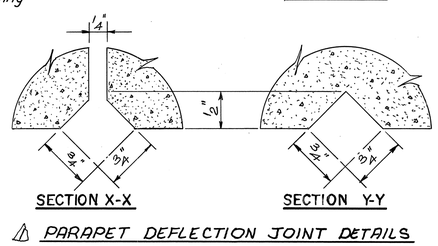
2 each 2'-0" x 1'-11"
1 each 2'-0" x 1'-½"



ROADWAY ELEVATIONS			
LOCATION	ELEV. A	ELEV. B	ELEV. C
Front Face W. Abut. Bkwall	218.89	218.93	218.47
¼ Point	219.32	219.41	219.00
½ Point	219.62	219.76	219.40
¾ Point	219.80	219.98	219.67
Center Line Pier	219.86	220.08	219.82
¼ Point	219.78	220.06	219.84
½ Point	219.59	219.91	219.74
¾ Point	219.27	219.64	219.51
Front Face E. Abut. Bkwall	218.82	219.24	219.16



TYPICAL CROSS SECTION
⅜" = 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 and DPU conduit details, see Standard Electrical Details (Bridge Carrying City Street) Sheet 34.

	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.		NO.	REVISION	BY	DATE

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

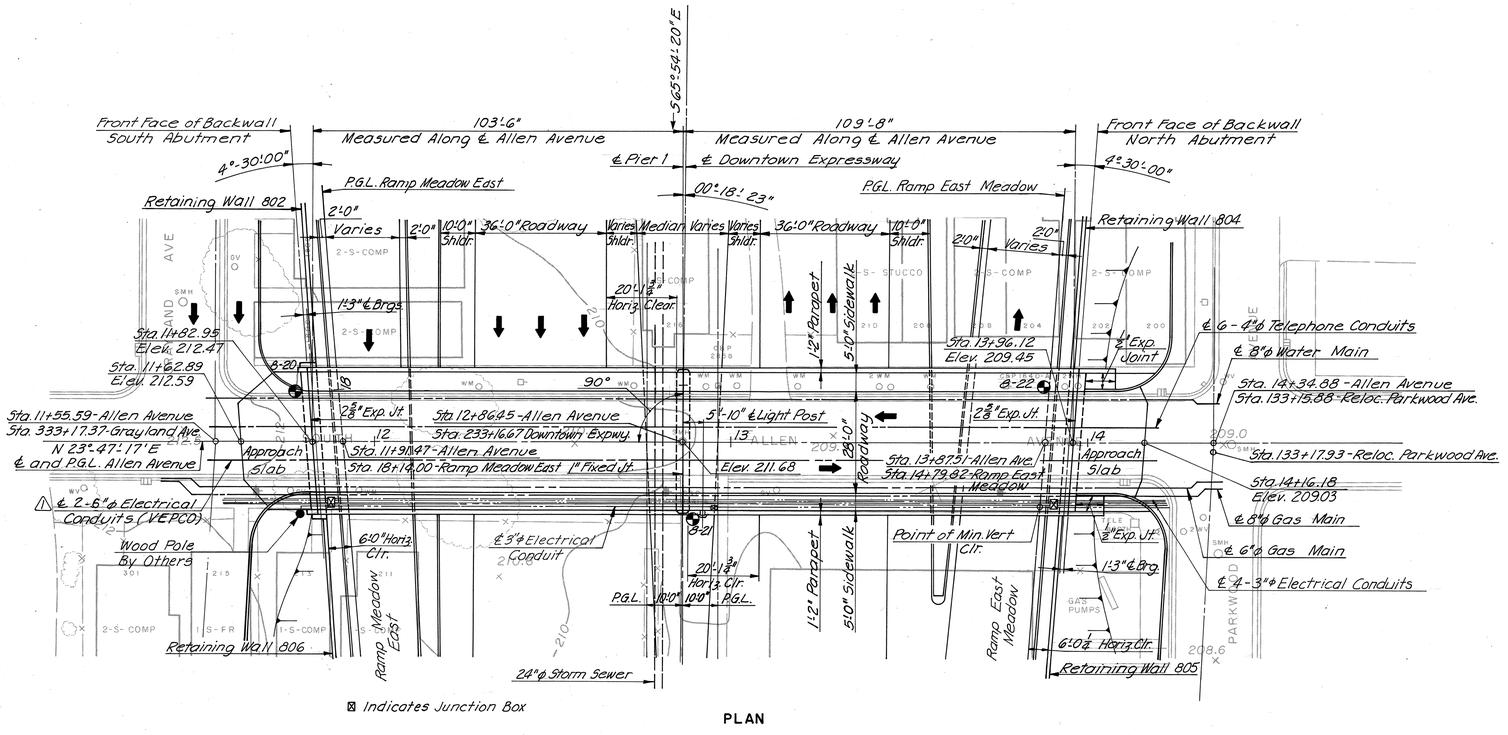
102

Bridge 46

(South Allen Street
Over Downtown Expressway {Rte. 195})

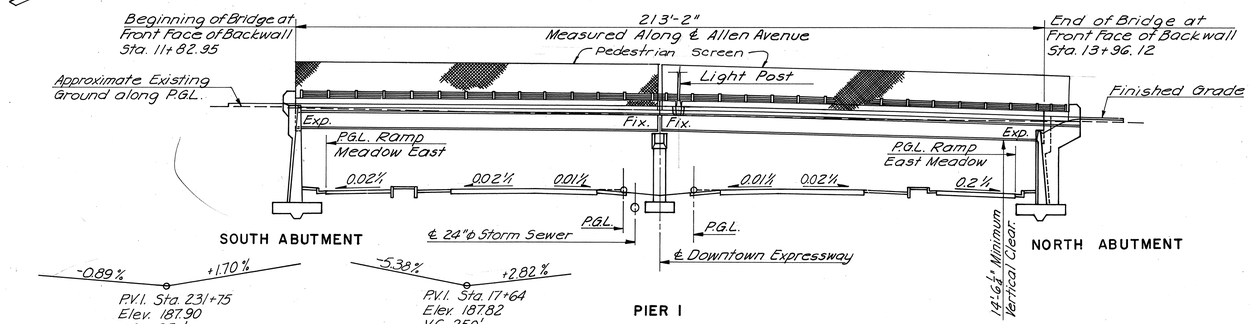
Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	174	



⊠ Indicates Junction Box

PLAN



	BY	DATE				
MADE	W.D.U.	8-67		AS BUILT	HMN	
CHECKED	W.E.O.	10-67	⚠	Rev. No. of Quantity Vepco Conduits	DGT	11-12-74
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

GENERAL NOTES:

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

CAPACITY: Dead Load - Includes 15 lbs. per sq. ft. for future wearing surface.
Live Loads - H S 20-44 loading and B.P.R. modified for military vehicles.

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

CONTRACT SPECIAL PROVISIONS:

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

DATUM: CITY OF RICHMOND

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

BENCH MARK: C-28. Monument located in walk S.W. Corner Idlewood and South Allen. Elev. 217.02.

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

NOTES:
Top of Pavement Elevations at ends of Deck along P.G.L. are given on Plan, remaining Pavement Elevations are given on Sheet 8.
Indicates 2½"ϕ Cased Hole Boring.

ESTIMATED QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	REINFORCING STEEL LBS.	STRUCTURAL STEEL-A36 LBS.	ALUMINUM BRIDGE RAILING L.F.	PEDESTRIAN SCREEN L.F.	ASPHALT DAMP-PROOFING S.Y.	6 INCH PIPE UNDERDRAIN L.S.	POROUS BACKFILL C.Y.	GAS MAIN 8"ϕ L.F.	GAS MAIN 6"ϕ L.F.	WATER MAIN 8"ϕ L.F.	CONDUIT 6"ϕ VEPCO L.F.	CONDUIT 4"ϕ TELEPHONE L.F.	3"ϕ PVC CONDUIT L.F.	2"ϕ METAL CONDUIT L.F.	STONE BEDDING TON
Superstructure		339.7		68,968	350,433	431	441				262	259	254	514	1278	1275	4	
South Abutment	165		195.4	13,503				117	48	68								
Pier 1	84		64.2	15,928														7.92
North Abutment	168		191.9	14,323				113	36	61								21.98
Approach Slabs			65.6	14,887														
Total	417	339.7	517.1	127,609	350,433	431	441	230	84	129	262	259	254	514	1278	1275	4	29.90

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

GENERAL PLAN AND ELEVATION

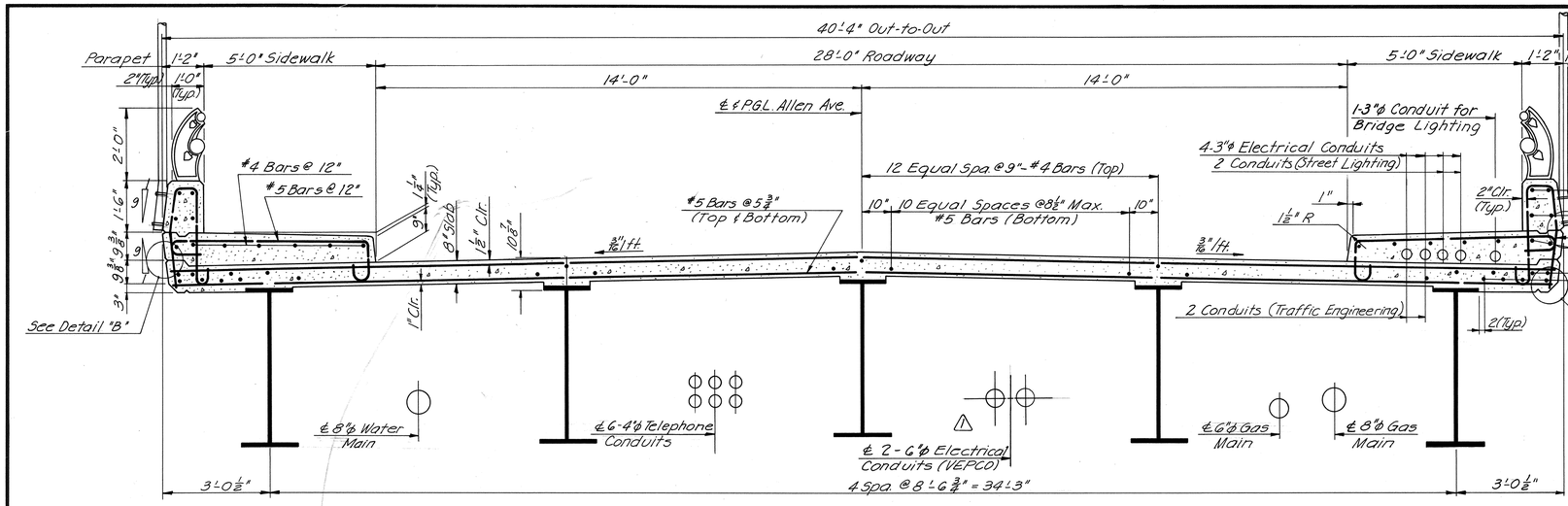
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

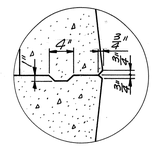
SCALE: 1" = 20'
CONTRACT NO.: 8
SHEET NO. 1 OF 10

174

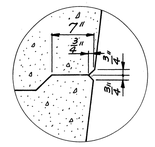
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	180	



TYPICAL CROSS SECTION
Scale : ½" = 1'-0"



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



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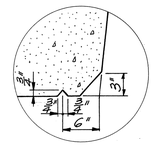

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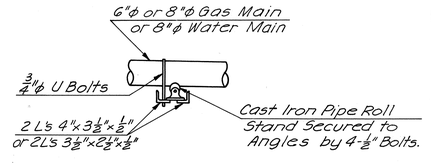
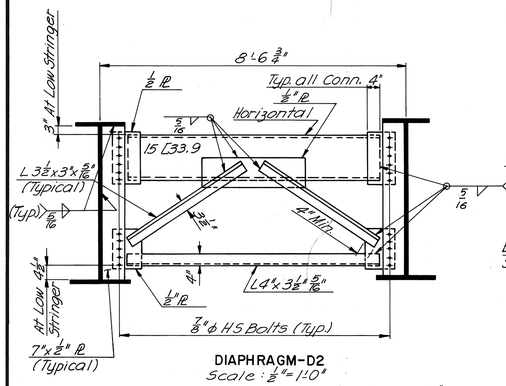


SECTION A-A
Scale : ½" = 1'-0"



DIAPHRAGM-D2
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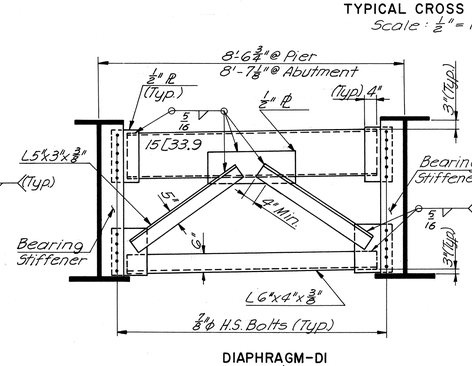

DIAPHRAGM-D1
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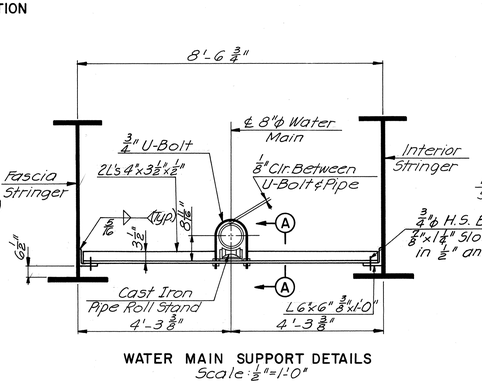
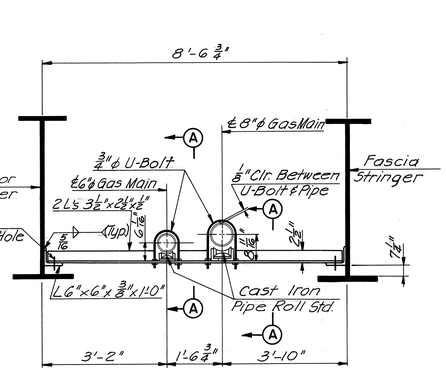
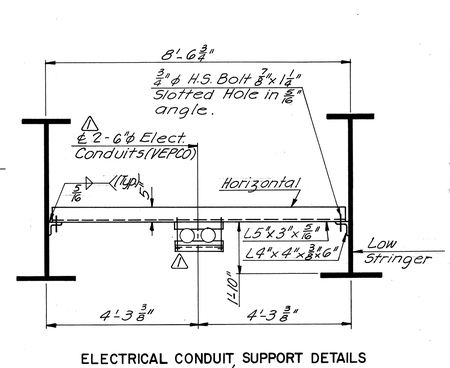


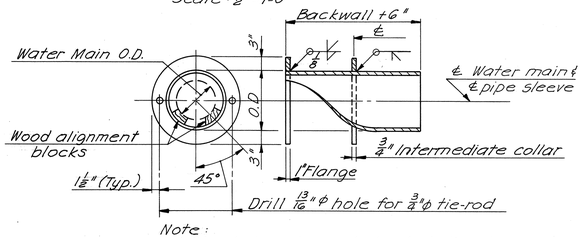
WATER MAIN SUPPORT DETAILS
Scale : ½" = 1'-0"



GAS MAIN SUPPORT DETAILS
Scale : ½" = 1'-0"

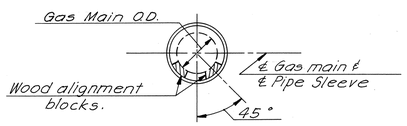


ELECTRICAL CONDUIT SUPPORT DETAILS
Scale : ½" 1'-0"



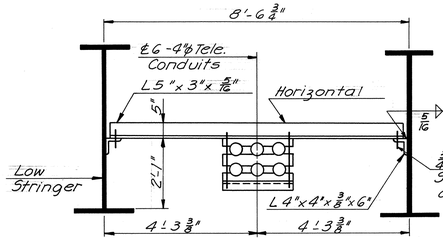
Note :
Steel pipe sleeve to be hot-diped galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR WATER MAIN



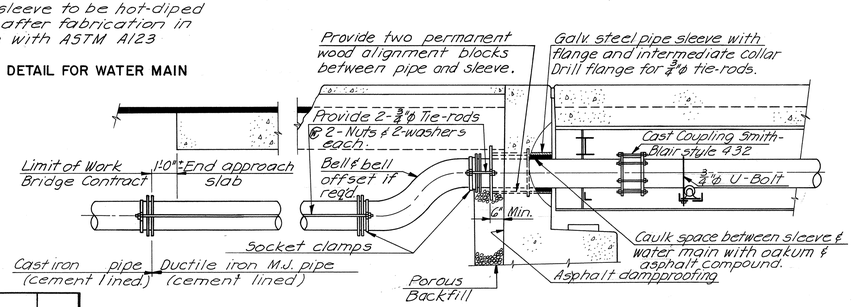
Note :
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR GAS MAIN

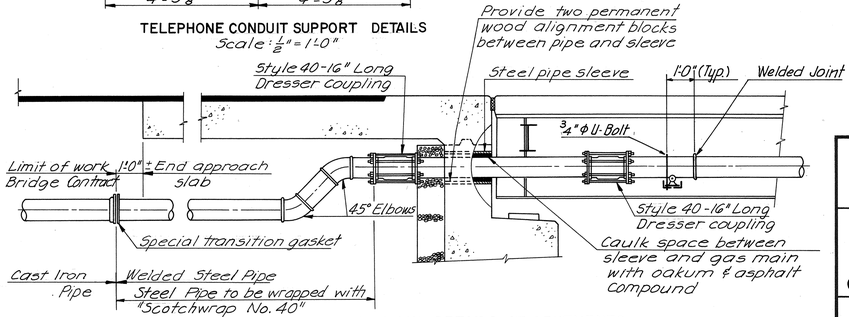


TELEPHONE CONDUIT SUPPORT DETAILS
Scale : ½" = 1'-0"

NOTES :
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 6.
For Slab Plan, see Sheet 8.
For Electrical Conduit Hanger Details, see Sheet 910



WATER MAIN DETAILS AT ABUTMENTS
Scale : ⅜" = 1'-0"



GAS MAIN DETAILS AT ABUTMENTS
Scale : ⅜" 1'-0"

	BY	DATE				
MADE	C.F.S. R.P.R.	9-67		AS BUILT	HMW	
CHECKED	W.E.O.	10-67	⚠	Rev. No. VEPCO Conduits	DGT	11-12-74
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B46
ALLEN AVENUE OVER
DOWNTOWN EXPRESSWAY

CROSS SECTION & UTILITY DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

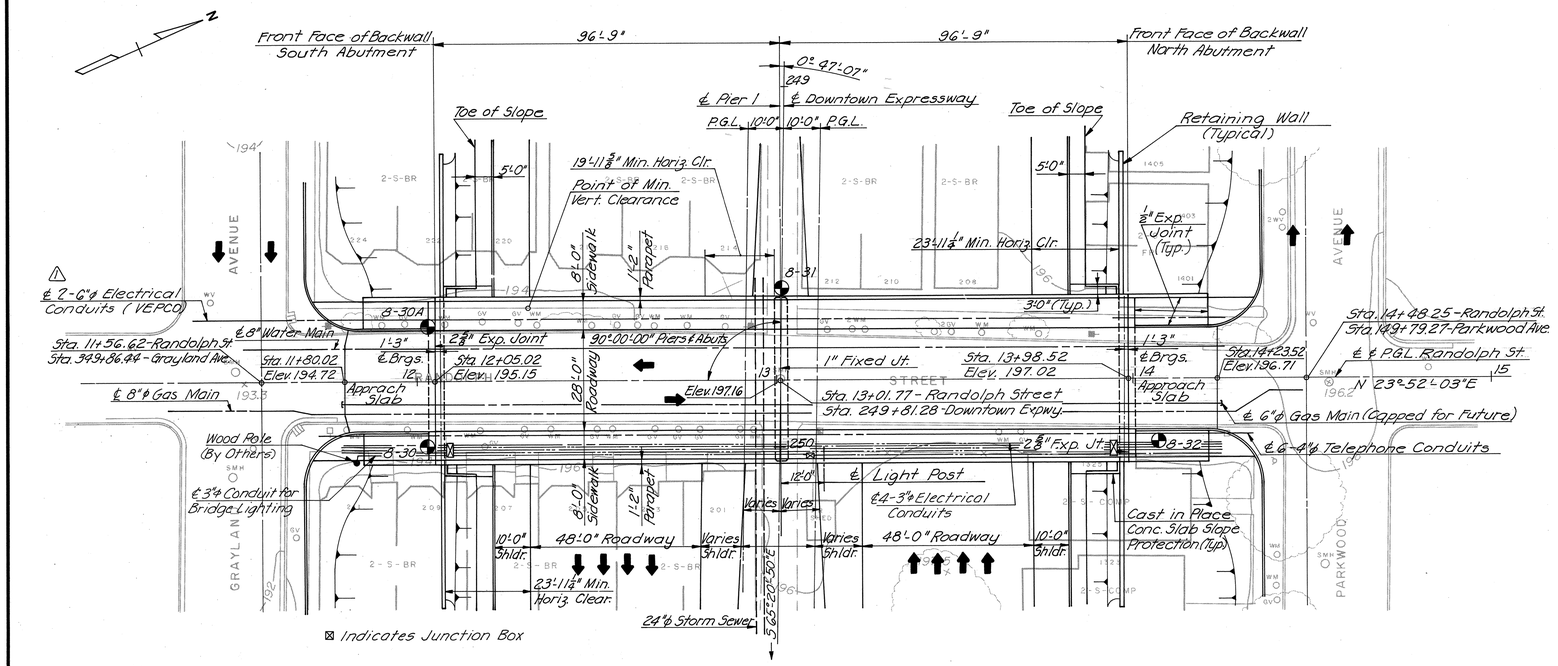
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 7 OF 10

Bridge 47

(South Randolph Street
Over Downtown Expressway {Rte. 195})

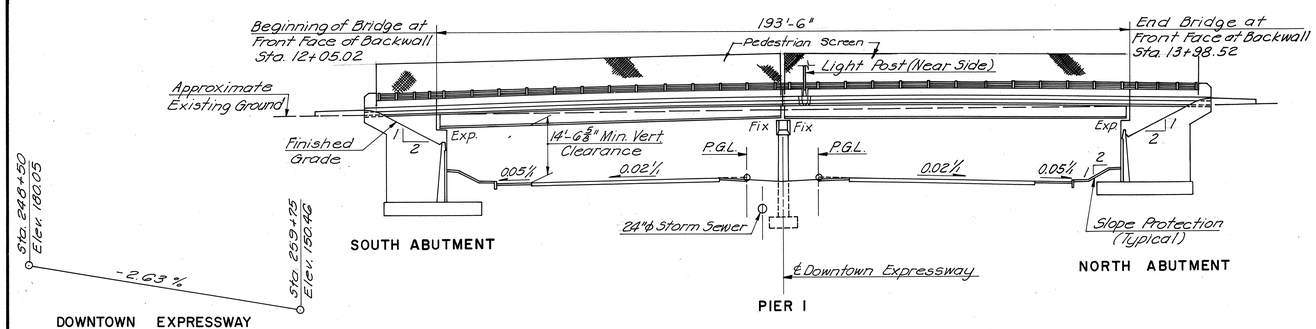
Record Set Plans

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



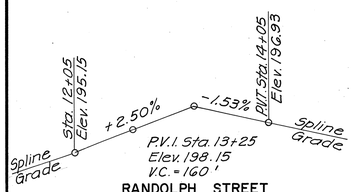
⊠ Indicates Junction Box

PLAN



ELEVATION

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



RANDOLPH STREET
PROFILE DATA

	BY	DATE				
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CHECKED	W.E.O.	11-67	△	Rev. No. & Quantity VEPCO Conduits	DGT	1/12/74
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

GENERAL NOTES:

ROADWAY CAPACITY: One 28'-0" Clear roadway. Two 8'-0" sidewalks. Dead Load - Includes 151bs. per sq. ft. for future wearing surface. Live Loads - HS20-44 loading and B.P.R. modified for military vehicles.

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

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

DATUM: CITY OF RICHMOND

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

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

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

ESTIMATED QUANTITIES

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

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 47
RANDOLPH STREET OVER DOWNTOWN EXPRESSWAY

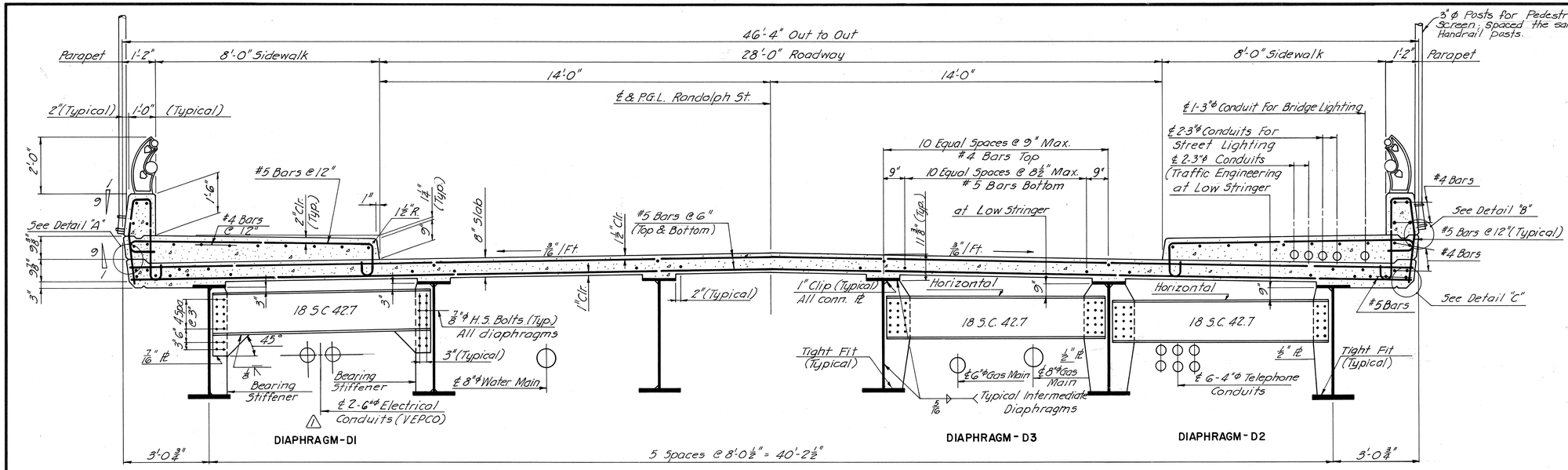
GENERAL PLAN AND ELEVATION

AMERICAN ENGINEERS
Richmond, Virginia

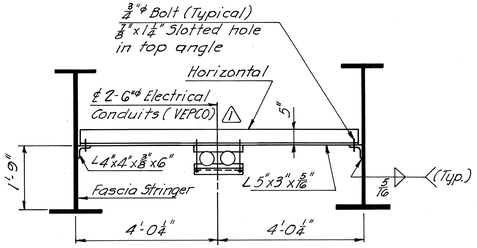
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

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

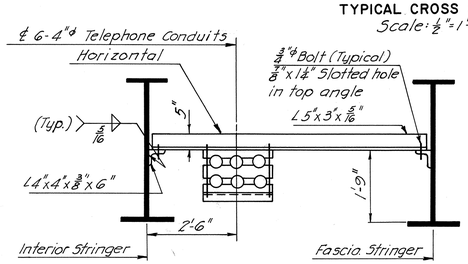
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	192	



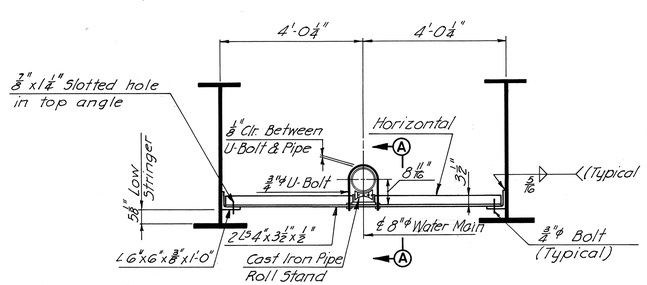
TYPICAL CROSS SECTION
Scale: ½"=1'-0"



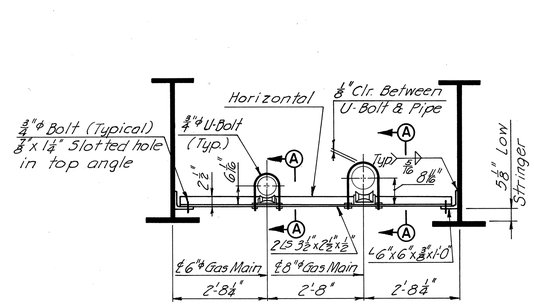
ELECTRICAL CONDUIT SUPPORT DETAILS
Scale: ½"=1'-0"



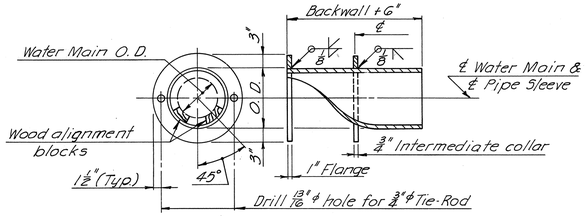
TELEPHONE CONDUIT SUPPORT DETAILS
Scale: ½"=1'-0"



WATER MAIN SUPPORT DETAILS
Scale: ½"=1'-0"

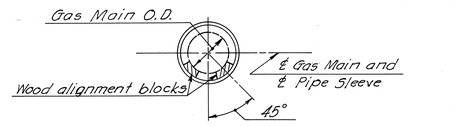


GAS MAIN SUPPORT DETAILS
Scale: ½"=1'-0"



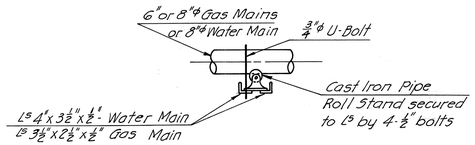
NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR WATER MAIN



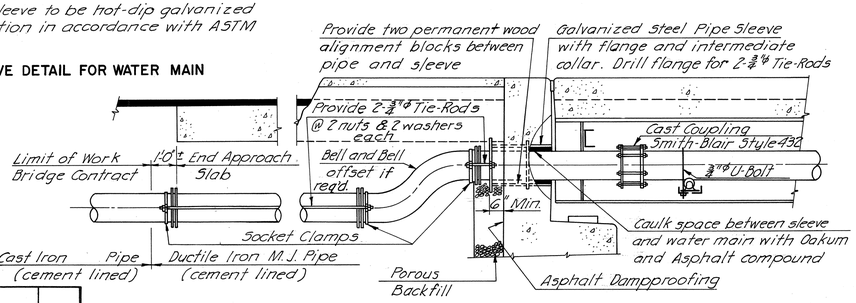
NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR GAS MAIN

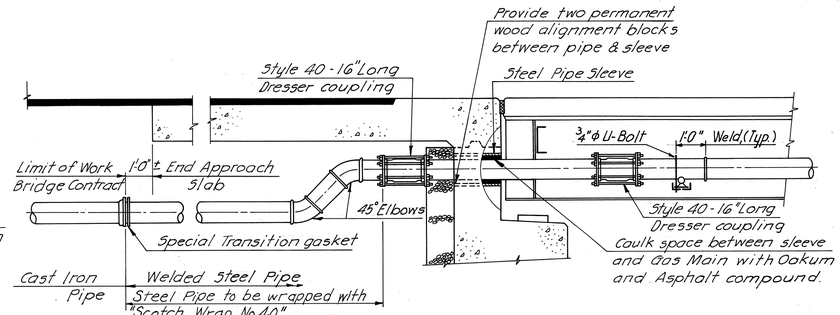


SECTION A-A
No Scale

NOTES:
For General Notes, see Sheet 1.
For Slab Plan, see Sheet 10.
For Framing Plan, see Sheet 8.
For Electrical Conduit Hanger Details, see Sheet 310.



WATER MAIN DETAILS AT ABUTMENTS
Scale: ⅜"=1'-0"



GAS MAIN DETAILS AT ABUTMENTS
Scale: ⅜"=1'-0"

	BY	DATE				
MADE	CFS	9-67		AS BUILT	HMW	
CHECKED	WEO	10-67	⚠	Rev. No. VEPCO Conduits	DGT	11-12-74
IN CHARGE	WEO		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B47
RANDOLPH STREET OVER
DOWNTOWN EXPRESSWAY

CROSS SECTION & UTILITY DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 9 OF 12

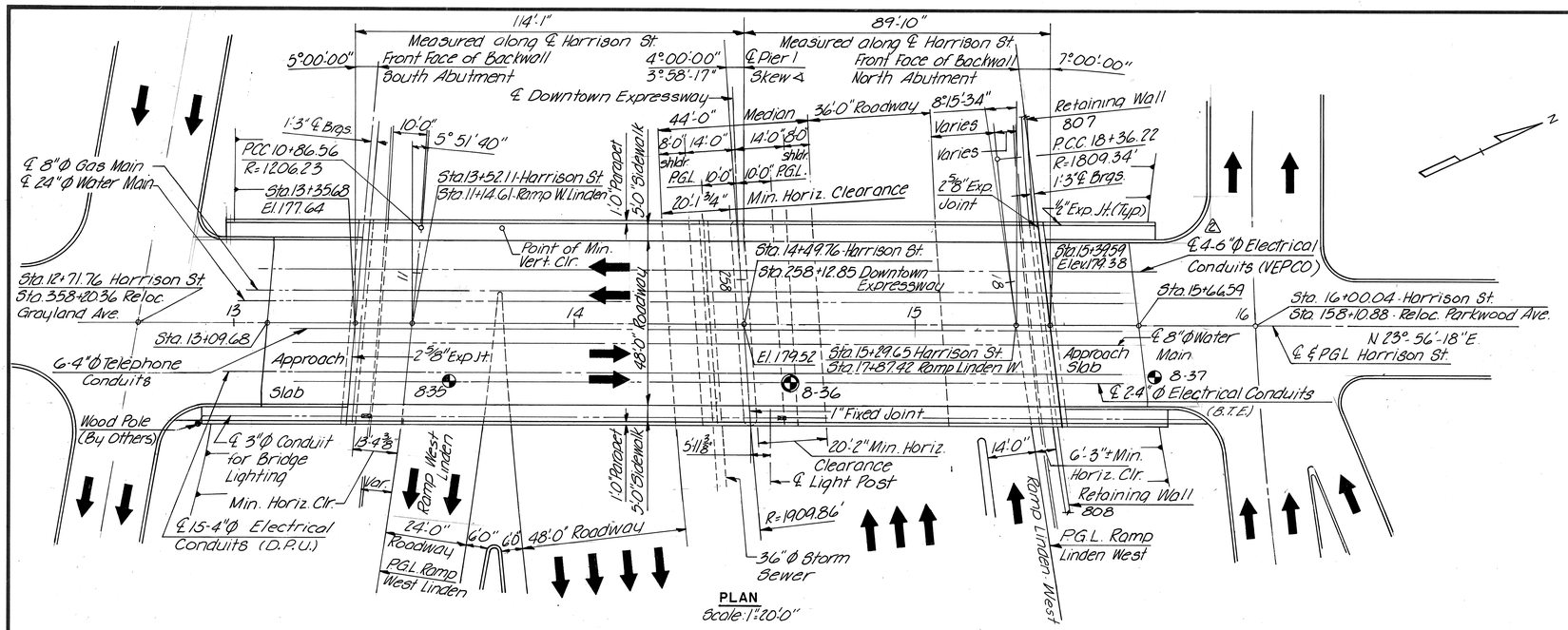
192

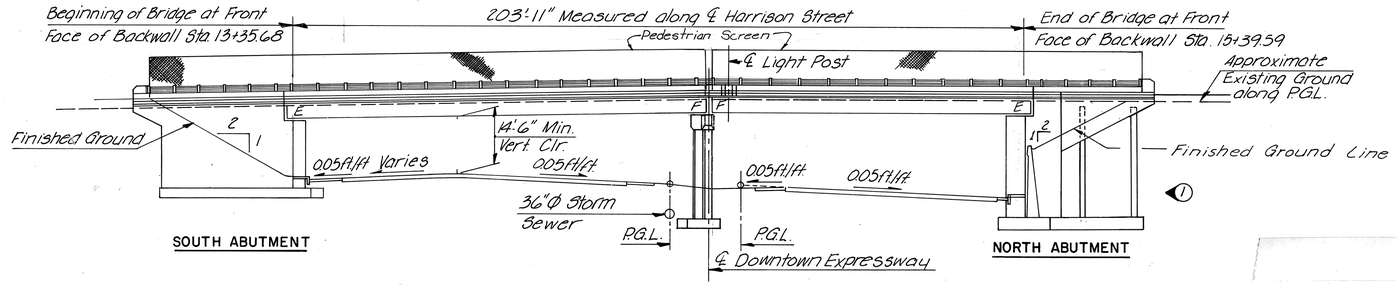
Bridge 48

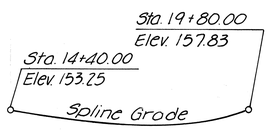
(South Harrison Street
Over Downtown Expressway {Rte. 195})

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	196	







PROFILE RAMP LINDEN WEST
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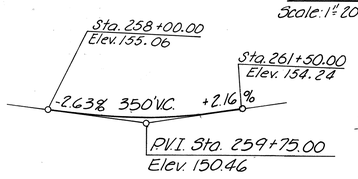

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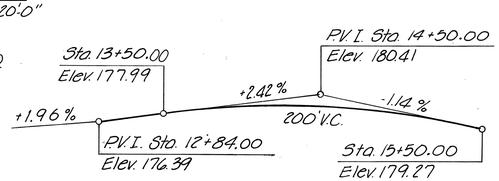

PROFILE HARRISON STREET
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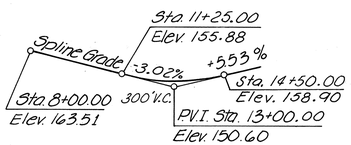


PROFILE RAMP WEST LINDEN
No Scale

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.	REINFORCING STEEL LBS.	POROUS BACKFILL C.Y.	ALUMINUM BR. RAILING (2 RAIL) L.F.	ASPHALT DAMPPROOFING S.Y.	UNDERDRAIN 6" Ø PIPE L.F.	WATERMAIN 24" Ø PIPE L.F.	WATERMAIN 8" Ø PIPE L.F.	GAS MAIN 8" Ø PIPE L.F.	CONDUITS (VEPCO) 6" Ø L.F.	CONDUIT 4" Ø TELEPHONE L.F.	CONDUIT 4" Ø DPU & BTE L.F.	STEEL [3] PILES 10 BP 42 L.F.	PVC CONDUIT 3" Ø L.F.	PEDESTRIAN SCREEN L.F.
SUPERSTRUCTURE		437.12			470,378	92,871		408			249	259.5	255	1,024 [2]	1556	3400		249	408
SOUTH ABUTMENT	1250 [2]		512.94 [3]			51,897 [3]	127.1 [2]	75	280 [2]	144 [3]							[2] 478.4		81
NORTH ABUTMENT	2100 [2]		626.94 [3]			[2] 91,112	132	58	300	63							[2] 512.3		64
PIER 1	606		282.20			31,883													
APPROACH SLABS				116.12		40,377													
TOTAL	3956 [1]	437.12	1422.08	116.12	470,378	[3] 308,140	259.1 [3]	541	580 [2]	207 [2]	249	259.5	255	1,024 [2]	1556	3400	[3] 990.7	249	553

GENERAL NOTES

ROADWAY: One 48'-0" clear roadway. Two 5'-0" sidewalks.

CAPACITY: Dead Load - Includes 15 lbs. per sq. foot for future wearing surface. Live Load - H S20-44 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, 1973 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: U.S.C. and G.S. (Sea level, 1929 General Adjustment).

TEMPERATURE: The normal temperature referred to on 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 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 the 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 Specification A615 Grade 40. All reinforcing bar dimensions on the detailed plans 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 ASTM 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 ASTM Specification A325.

All shop welded web splices, flange splices and web to flange welds shall be made by the submerged arc process.

BENCH MARK: C-34 Monument in walk on the East side of Harrison Street between Parkwood Avenue and Cary Street. Elev. 179.381.

NOTES: Top of Pavement Elevations at ends of deck along P.G.L. are given on the plan. Remaining pavement elevations are given on Sheet 11. The cost of furnishing and installing 2"Ø and 3"Ø galvanized steel conduit shall be included in the bid price for the item "Metal Conduit".

Indicates 2½"Ø cased hole boring.

INDEX

AS BUILT

				AS BUILT	HMN	
DESIGNED	P.R.M.C.	10/73	[3]	Sheets 4a & 7a added Quantities revised	R.R.L.	12-9-74
DRAWN	R.P.C.	11/73	[2]	Rev. No. 8 Quantity Vapco Conduits	D.G.T.	1-12-74
CHECKED	D.E.R.	11/73	1	No. Abut. (Re. Stl. Qty.	P.R.M.C.	12-12-73
IN CHARGE	L.J.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

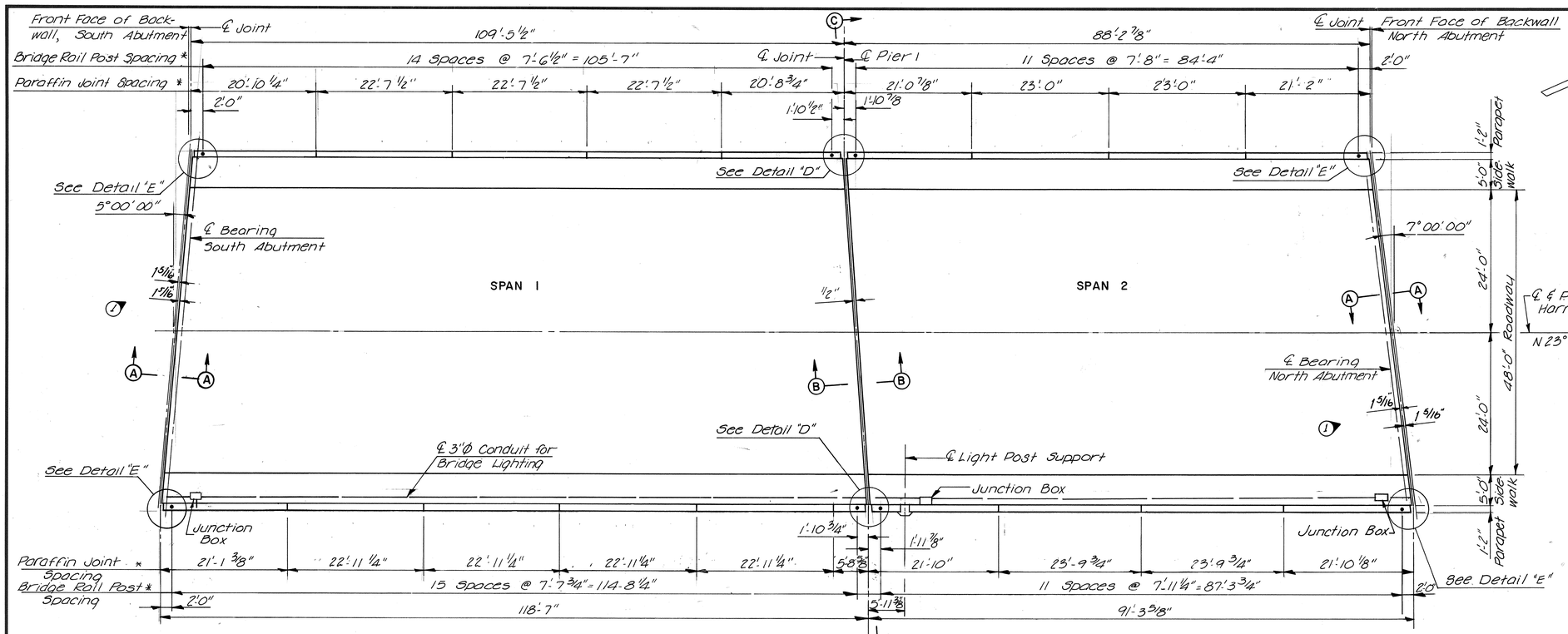
STRUCTURE B 48
HARRISON STREET OVER
DOWNTOWN EXPRESSWAY

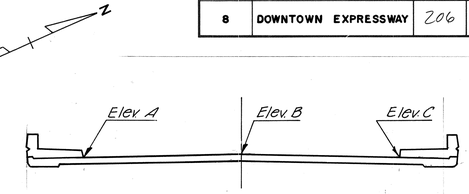
GENERAL PLAN AND ELEVATION

SCALE As Shown
DATE Nov. 29, 1973
SHEET 1 OF 15

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

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	206	



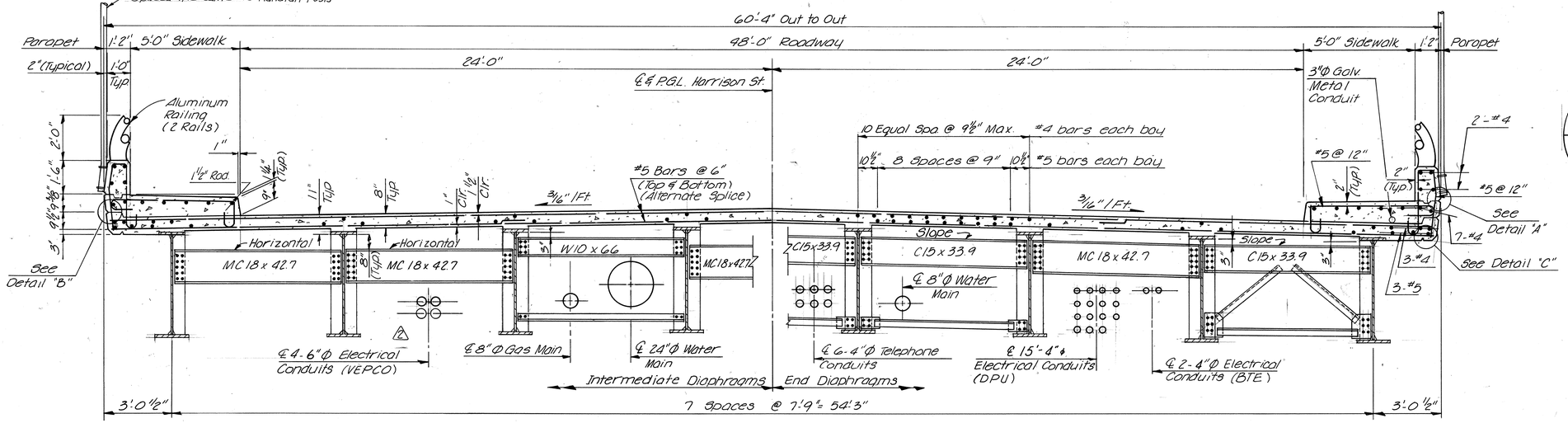


GUTTERLINE ELEVATIONS			
STATION	ELEV. A	ELEV. B	ELEV. C
13+33.58	———	177.59	177.22
13+35.68	177.27	177.64	177.27
13+37.78	177.32	177.69	———
13+40	177.38	177.75	177.38
13+50	177.62	177.99	177.62
13+60	177.85	178.22	177.85
13+70	178.07	178.44	178.07
13+80	178.26	178.63	178.26
13+90	178.44	178.81	178.44
14+00	178.60	178.97	178.60
14+10	178.75	179.12	178.75
14+20	178.88	179.25	178.88
14+30	178.98	179.35	178.98
14+40	179.07	179.44	179.07
14+48.08	179.13	179.50	———
14+49.76	179.15	179.52	179.15
14+50	179.15	179.52	179.15
14+51.44	———	179.53	179.16
14+60	179.21	179.58	179.21
14+70	179.24	179.61	179.24
14+80	179.26	179.63	179.26
14+90	179.26	179.63	179.26
15+00	179.25	179.62	179.25
15+10	179.21	179.58	179.21
15+20	179.16	179.53	179.16
15+30	179.09	179.46	179.09
15+36.64	179.04	179.41	———
15+39.59	179.01	179.38	179.01
15+40	179.00	179.37	179.00
15+42.54	———	179.35	178.98

* Distances measured along inside face of parapet

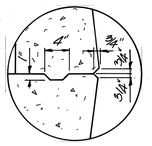
DECK PLAN
Scale 1" = 10'-0"

Note:
For Lighting details and metal conduit details see Standard Electrical Details (Bridge carrying city streets), Sheet 8-4

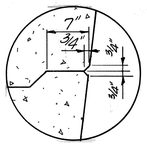


TYPICAL CROSS SECTION
Scale: 3/8" = 1'-0"

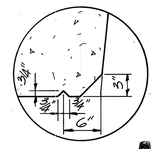
Note:
For general notes, see Sheet 1
For Sections A-A, B-B, C-C and Details "D", "E" see Sheet 12
For Framing Plan, see Sheet 9
For Joint Details, see Sheet 12
For Bridge Railing Details, see Sheet 8-3



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



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



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

AS BUILT

DESIGNED	P.R.M.C.	10/73		AS BUILT	HMW	
DRAWN	R.P.C.	11/73	2	Rev. No. VEPCO Conduits	DGT	11-12-74
CHECKED	L.J.H.	11/73	1	Dim. Changed	PRMc	12-12-73
IN CHARGE	L.J.H.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B48
HARRISON STREET OVER
DOWNTOWN EXPRESSWAY
DECK PLAN AND CROSS SECTION

SCALE As Shown
DATE Nov. 29, 1973
SHEET 11 OF 15

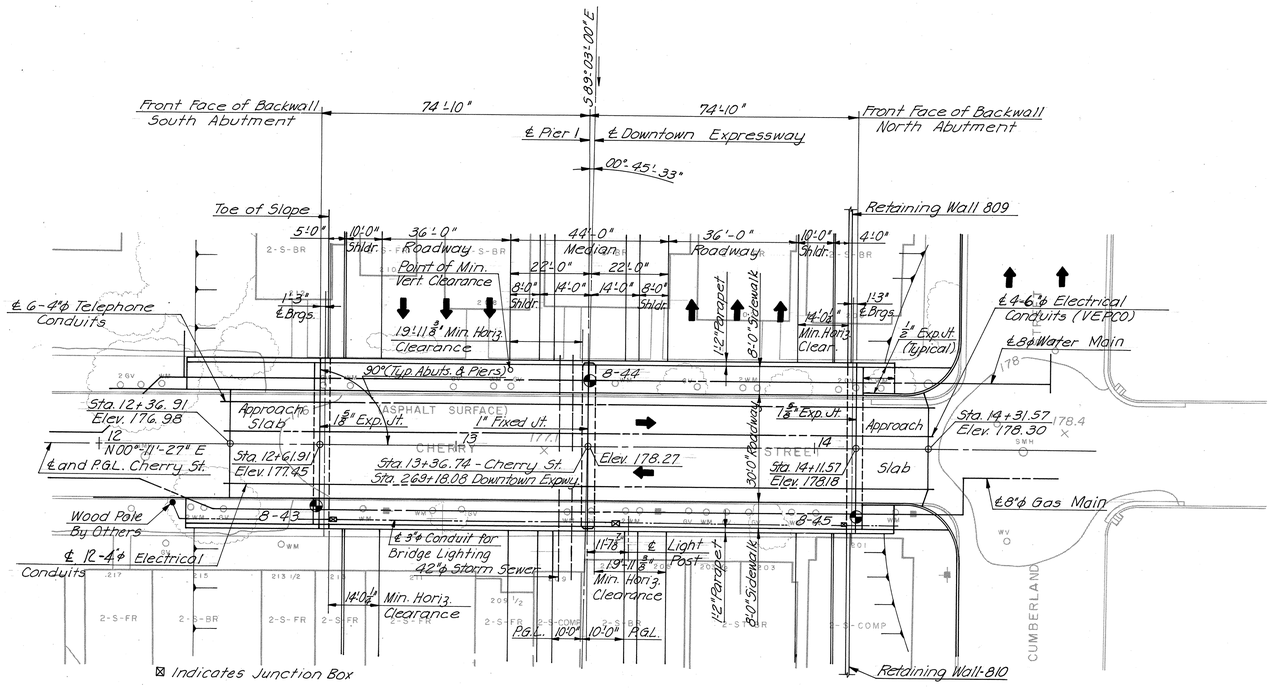
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

Bridge 49

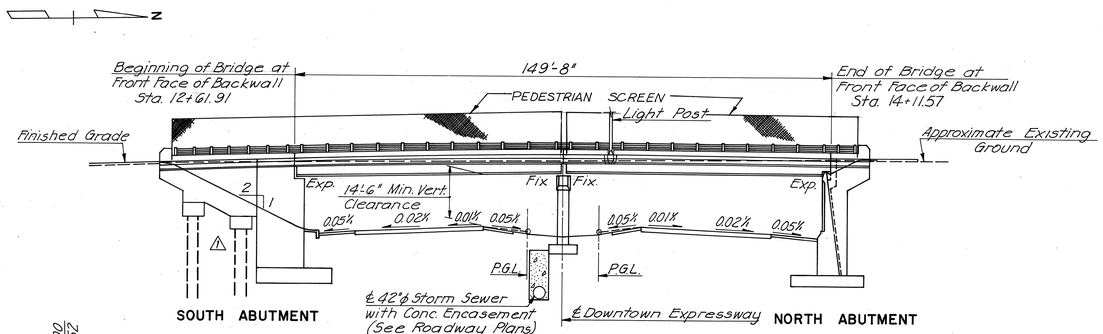
(South Cherry Street
Over Downtown Expressway {Rte. 195})

Record Set Plans

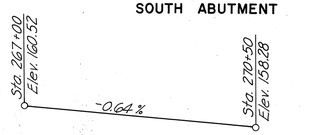
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	2//	



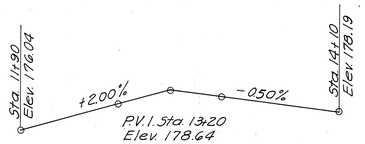
PLAN



ELEVATION



DOWNTOWN EXPRESSWAY



CHERRY STREET PROFILE DATA

	BY	DATE				
MADE	W.D.U.	8-67		AS BUILT	H.M.W.	
CHECKED	W.E.O.	12-67	⚠	S. Abut. Footing & Quantities	T.E.M.	3-75
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

INDEX

NOTES:
Top of Pavement Elevations at ends of deck along P.G.L. are given on plan; Remaining pavement elevations are given on Sheet 9.

◉ Indicates 2½"ϕ Cased Hole Boring.

GENERAL NOTES:

ROADWAY CAPACITY: One 30'-0" Clear roadway. Two 8'-0" sidewalks. Dead Load - Includes 15 lbs. per sq. foot for future wearing surface. Live Load - H S 20-44 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 Bridge 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 A.S.T.M. A615 Grade 40. All reinforcing bar dimensions on the detailed drawings are to centers of bars unless otherwise noted. Clear distance between reinforcing steel and face of concrete shall be as noted on the plans. All bar laps shall be 30 diameters of the smaller diameter bar unless otherwise noted.

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

BENCH MARK: C-36 Monument in sidewalk, N.W. Corner Idlewood and South Cherry. Elev. 173.57.

ESTIMATED QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	REINFORCING STEEL LBS.	STRUCTURAL STEEL A36 LBS.	ALUMINUM BRIDGE RAILING L.F.	ASPHALT DAMP-PROOFING S.Y.	6 INCH PIPE UNDERDRAIN L.F.	POROUS BACKFILL C.Y.	GAS MAIN 8"ϕ L.F.	WATER MAIN 8"ϕ L.F.	CONDUIT 6"ϕ VEPCO L.F.	CONDUIT 4"ϕ TELE. L.F.	CONDUIT 4"ϕ CITY L.F.	10BP42 STEEL PILES L.F.	PVC CONDUIT 3"ϕ L.F.	METAL CONDUIT 2"ϕ L.F.	PEDESTRIAN SCREEN L.F.
Superstructure		286.45		52,924	275,080.3	381				195						147.	4	381
South Abutment	885 ⚠		457.64 ⚠	49,884			188	47	107		197.8	788	918.	2142	963			7
Pier 1	90		79.86	16,123														
North Abutment	638		371.58	26,943			157	57	83									7
Approach Slabs			74.53	16,762														
Total	1613 ⚠	286.45	983.61 ⚠	162,636	275,080.3	381	345	104	190	195	197.8	788	918.	2142	963	147.	4	395

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 49
CHERRY STREET OVER DOWNTOWN EXPRESSWAY

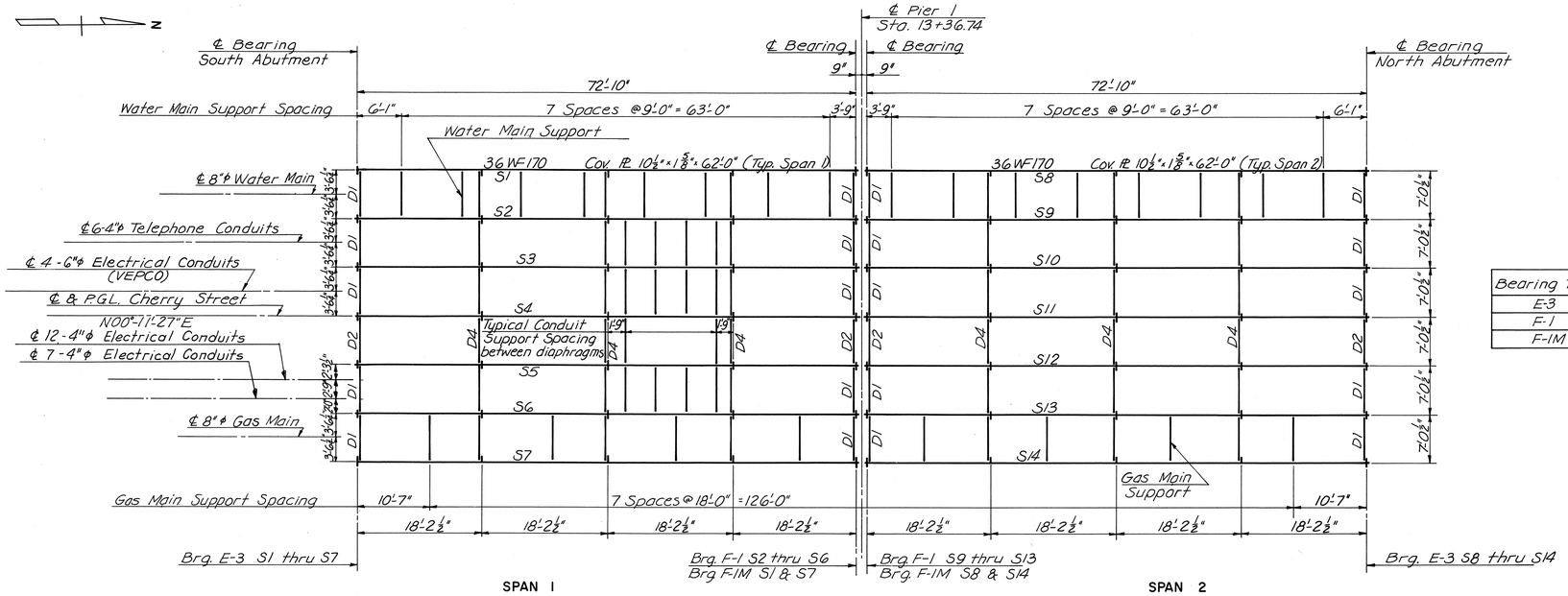
GENERAL PLAN AND ELEVATION

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1" = 20'
CONTRACT NO.: 8
SHEET NO. 1 OF 11

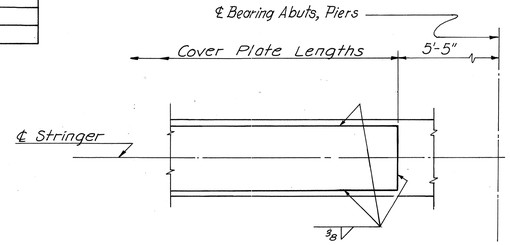
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	217	



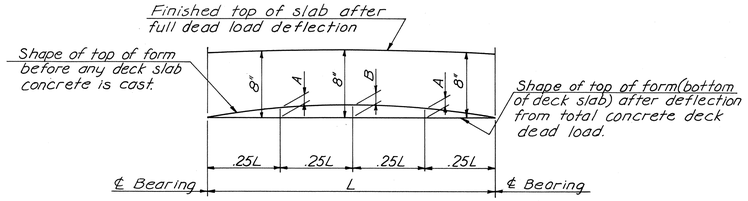
FRAMING PLAN
Scale: 1" = 10'-0"

NOTE: All intermediate diaphragms are D3 unless otherwise noted.

Bearing Type	No. Required
E-3	14
F-1	10
F-1M	4



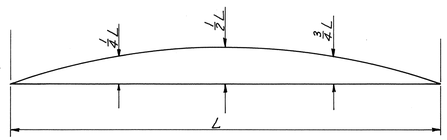
COVER PLATE DETAILS
Scale: 1" = 1'-0"



DEAD LOAD DEFLECTION DIAGRAM

Stringers	A	B
S1, S7, S8, S14	1 15/16"	1½"
S2 thru S6, S9 thru S13	1 15/16"	1¼"

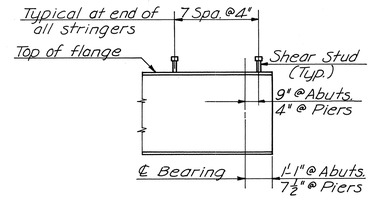
NOTE TO CONTRACTOR:
The above deflections are those anticipated to occur in the stringer upon placement of the total concrete deck dead load. In practice the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall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



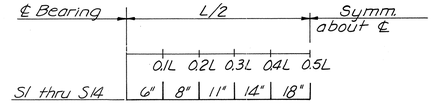
CAMBER DIAGRAM

Stringers	¼L, ¾L	½L
S1, S6, S7	2 1/4"	3 3/16"
S3 thru S5	2 1/4"	3 1/8"
S8, S13, S14	2 1/4"	3 3/16"
S10 thru S12	2 1/4"	3 1/8"
S2 & S9	2 3/16"	3 1/16"

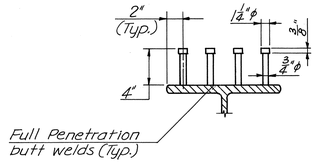
NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to (see table). This will provide approximate compensation for deflection under full dead load and for conformity with finished grade. Stringers which are not required to be shop cambered shall be turned so that any mill tolerance deviation from straightness will be in the direction shown by the camber diagram above.



DETAIL A
No Scale



SHEAR STUD SPACING
No Scale
Shear Stud Spacing shown is Maximum



SHEAR STUD DETAILS
Scale: 1½" = 1'-0"

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

NOTES:
Structural steel shall conform to ASTM Specifications A36 (latest revision).
For General Notes see Sheet 1.
For Superstructure Cross Section see Sheet 8.
For Bearing Shoe Dimensions see Standard Sheet S1.
For Diaphragm Details see Sheet 8.
For Utility Support Details see Sheet 8.

AS BUILT

	BY	DATE
MADE	T.D.J.	8-67
CHECKED	W.E.O.	9-67
IN CHARGE	W.E.O.	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 49
CHERRY STREET OVER
DOWNTOWN EXPRESSWAY

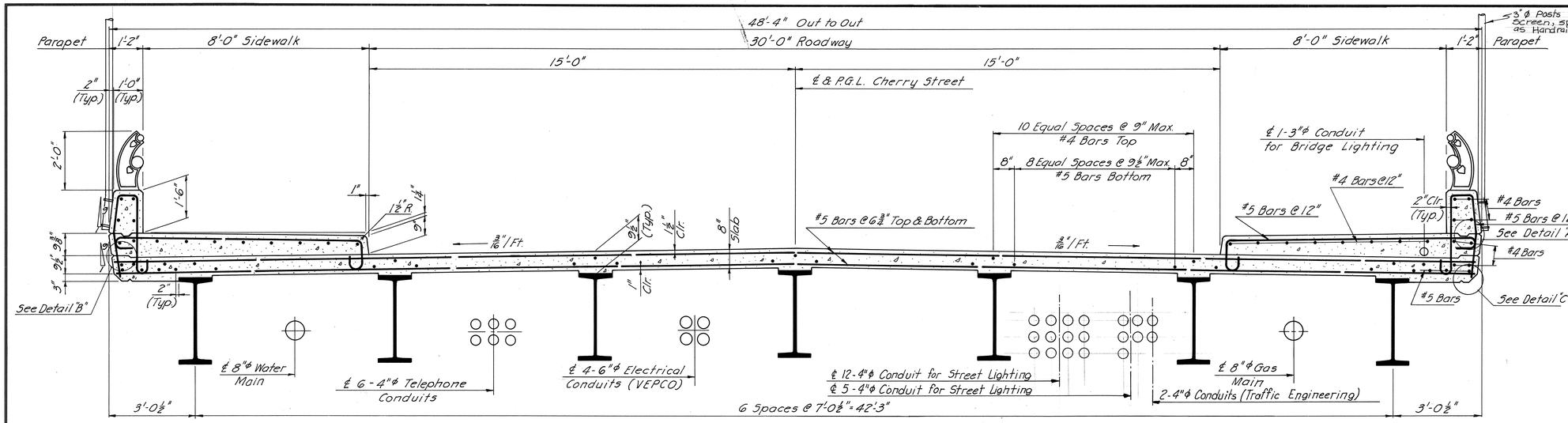
FRAMING PLAN

AMERICAN ENGINEERS
Richmond, Virginia

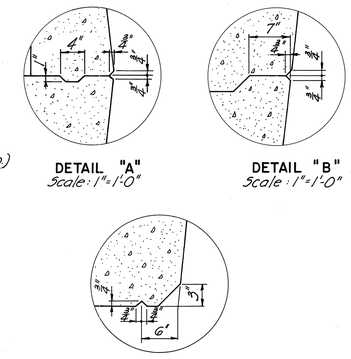
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 7 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	218	



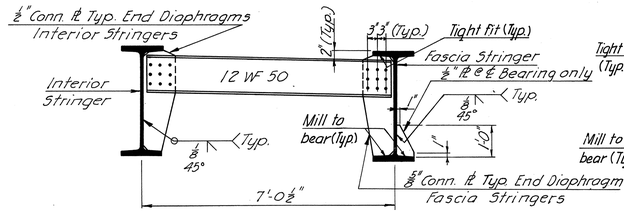
TYPICAL CROSS SECTION
Scale: ½" = 1'-0"



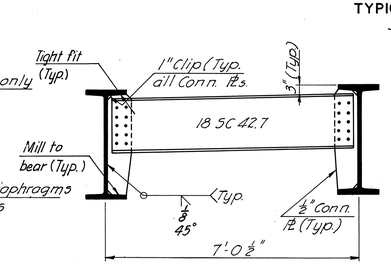
DETAIL "A"
Scale: 1" = 1'-0"

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

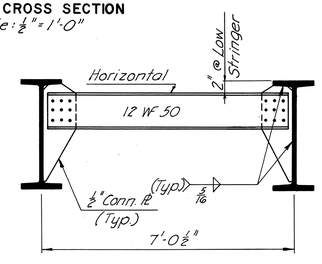
DETAIL "C"
Scale: 1" = 1'-0"



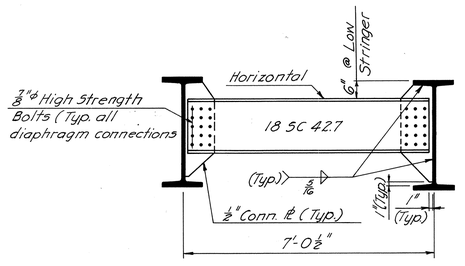
DIAPHRAGM - D1
Scale: ½" = 1'-0"



DIAPHRAGM - D2
Scale: ½" = 1'-0"



DIAPHRAGM - D3
Scale: ½" = 1'-0"



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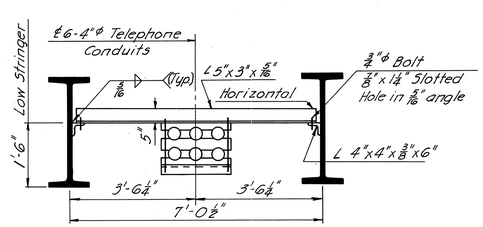
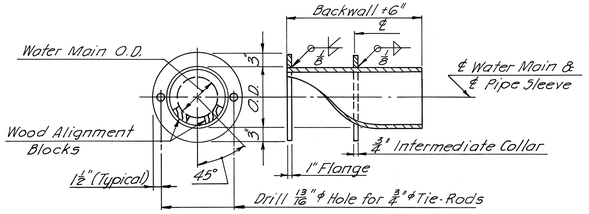
Scale: ½" = 1'-0"

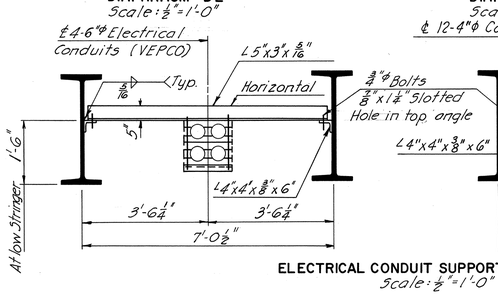


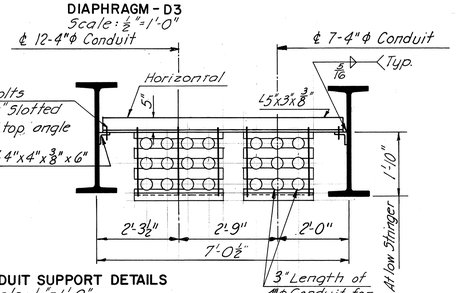
TELEPHONE CONDUIT SUPPORT DETAILS
Scale: ½" = 1'-0"



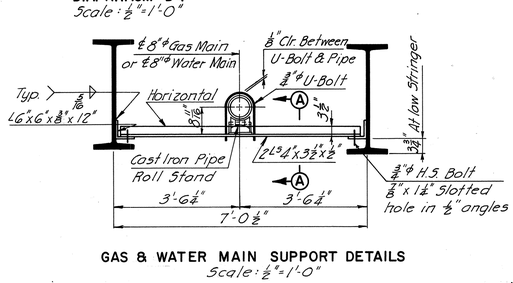
NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A 123

PIPE SLEEVE DETAIL FOR WATER MAIN

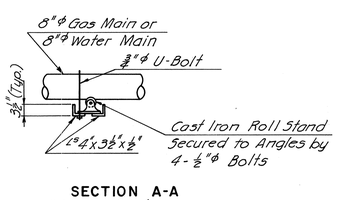




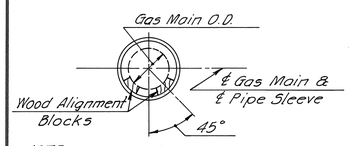
ELECTRICAL CONDUIT SUPPORT DETAILS
Scale: ½" = 1'-0"



GAS & WATER MAIN SUPPORT DETAILS
Scale: ½" = 1'-0"

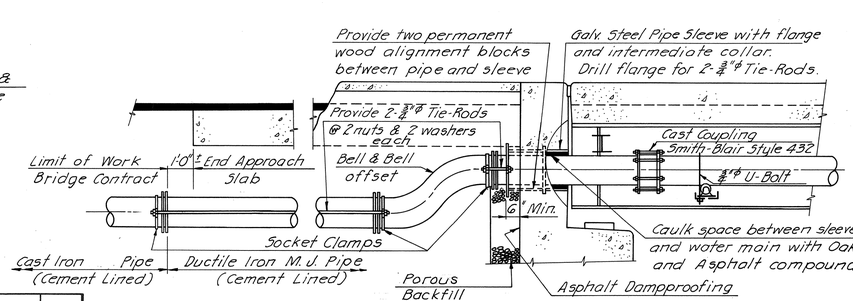


SECTION A-A
No Scale

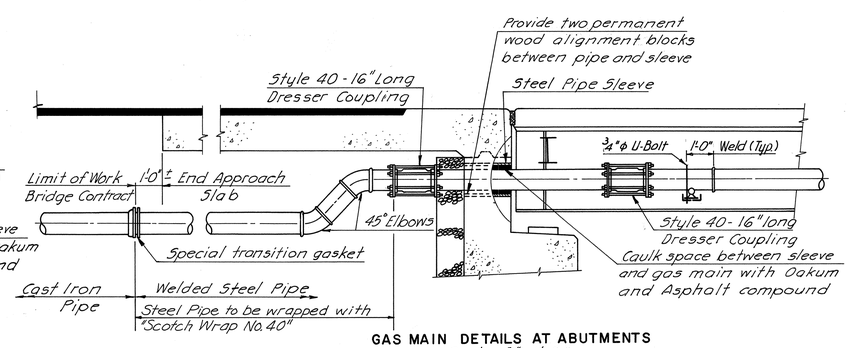


NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR GAS MAIN



WATER MAIN DETAILS AT ABUTMENTS
Scale: ⅜" = 1'-0"



GAS MAIN DETAILS AT ABUTMENTS
Scale: ⅜" = 1'-0"

NOTES:
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 7.
For Slab Plan, see Sheet 9.
For Electrical Conduit Hanger Details, see Sheet 510.

AS BUILT

	BY	DATE				
MADE	CFS	8-67				
CHECKED	WEO	10-67		AS BUILT	HMW	
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B49
CHERRY STREET OVER
DOWNTOWN EXPRESSWAY

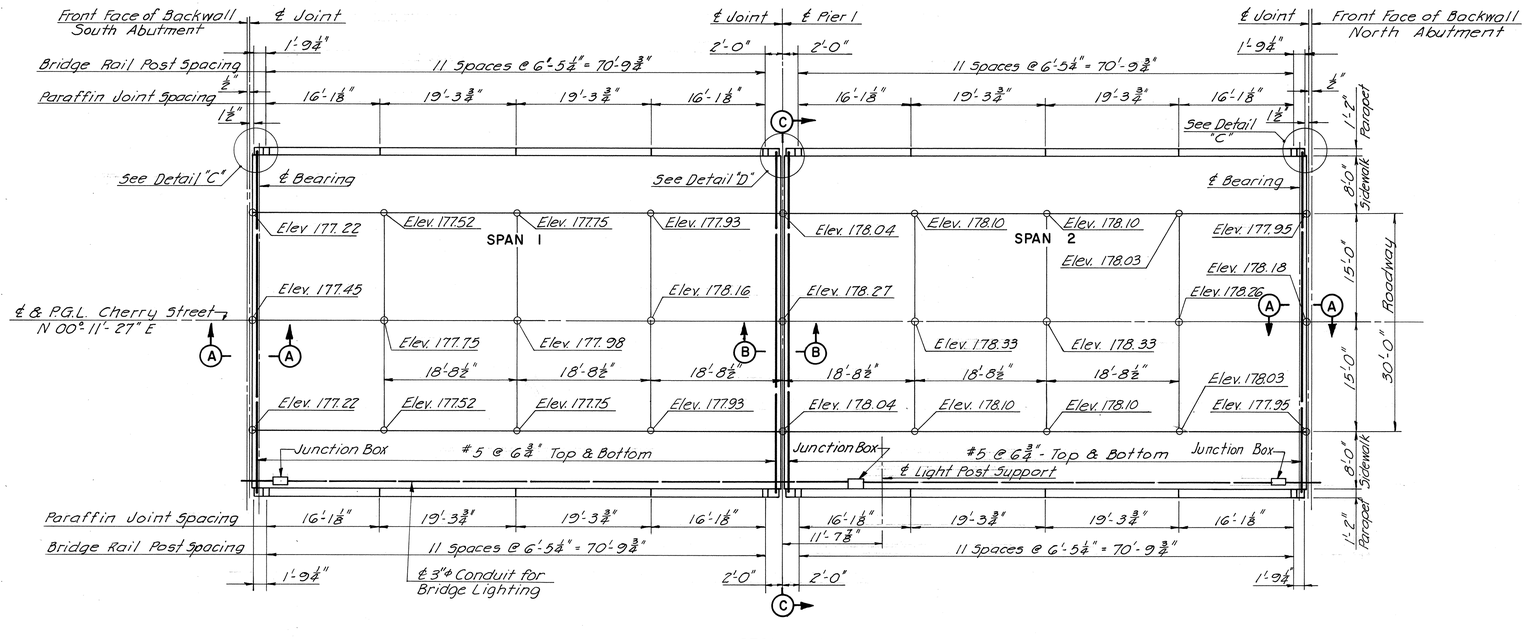
CROSS SECTION & UTILITY DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

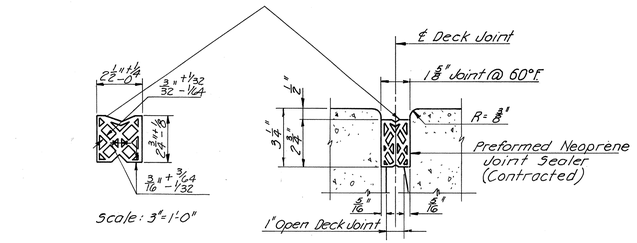
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 8 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	219	

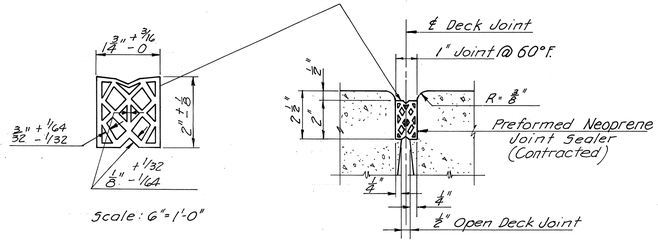


DECK PLAN
Scale: 1"=10'-0"

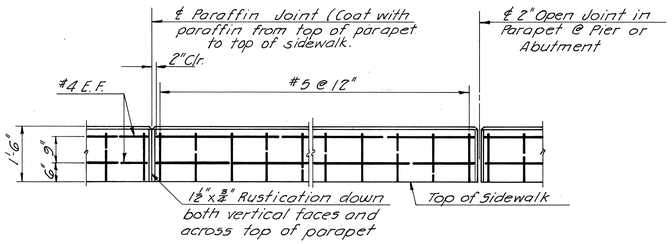
N



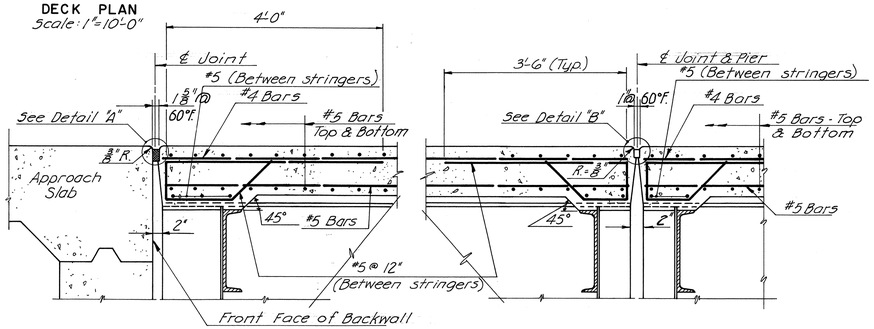
DETAIL "A"
Scale: 3"=1'-0"



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

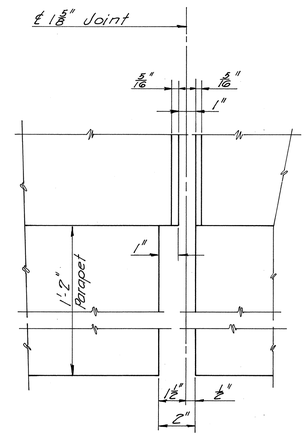


TYPICAL PARAPET ELEVATION
Scale: ½"=1'-0"

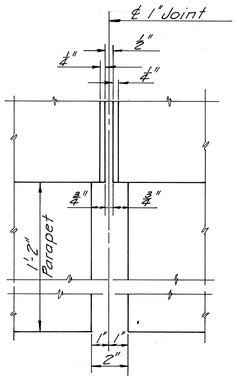


SECTION A-A
Scale: ¾"=1'-0"

SECTION B-B
Scale: ¾"=1'-0"

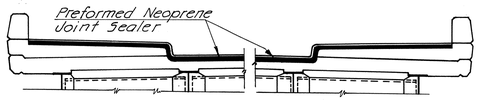


DETAIL "C"
Scale: 3"=1'-0"

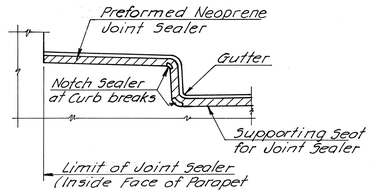


DETAIL "D"
Scale: 3"=1'-0"

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



SECTION C-C
Scale: ½"=1'-0"



TREATMENT OF JOINT AT CURB
No Scale

NOTES:
For Typical Deck Cross Section, see Sheet 8.
For Railing Details, see Sheet 53.
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 7.
For Light Post Support Details, see Sheet S4.

AS BUILT

	BY	DATE				
MADE	DLA	7-67				
CHECKED	WEO	10-67				
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B49
CHERRY STREET OVER
DOWNTOWN EXPRESSWAY

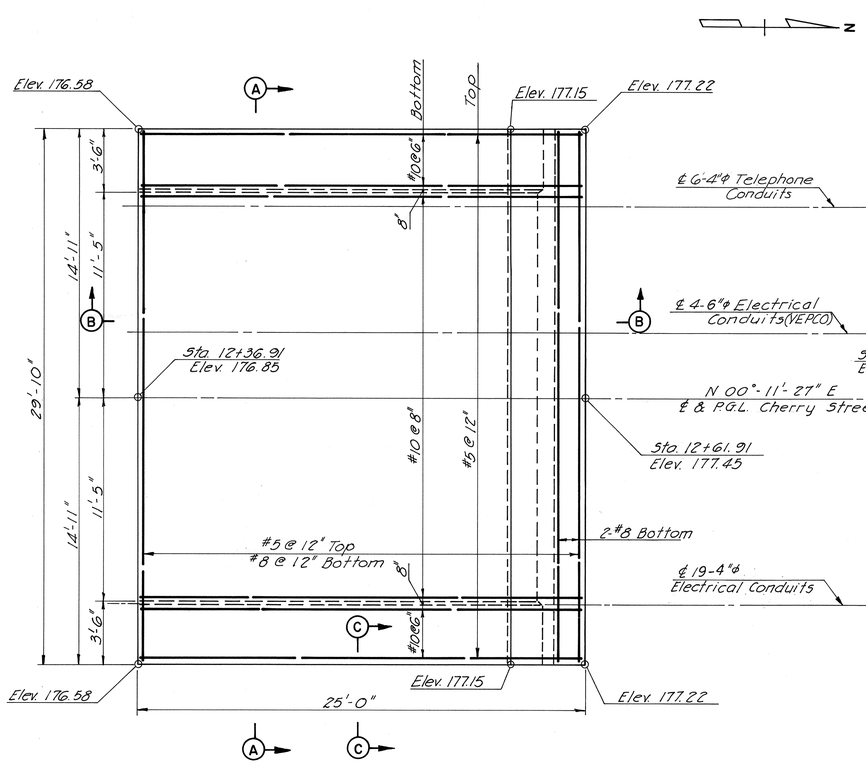
DECK PLAN AND JOINT DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

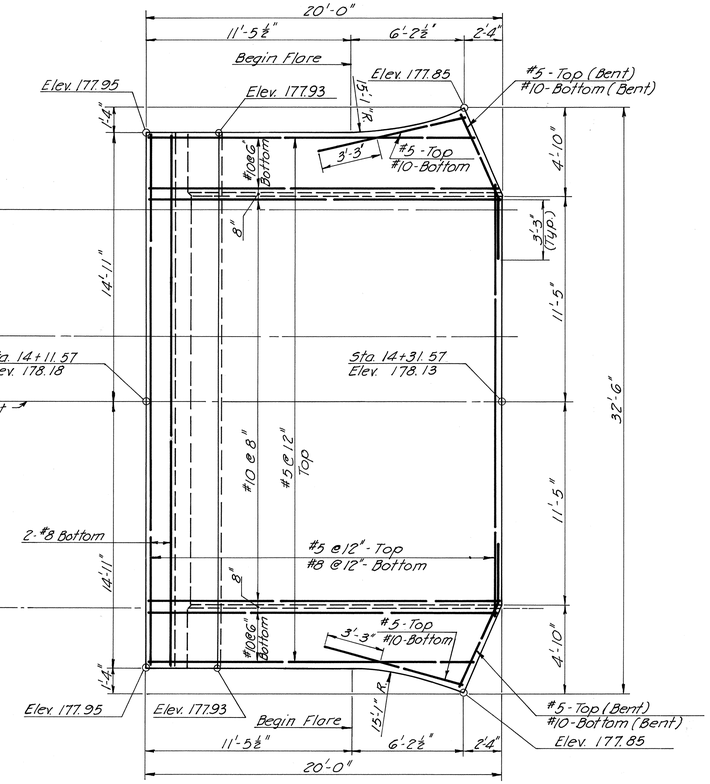
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 9 OF 11

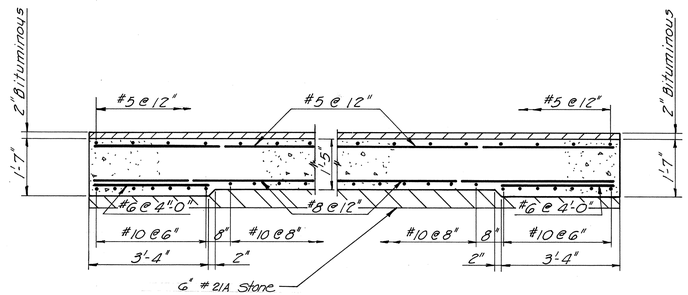
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	220	



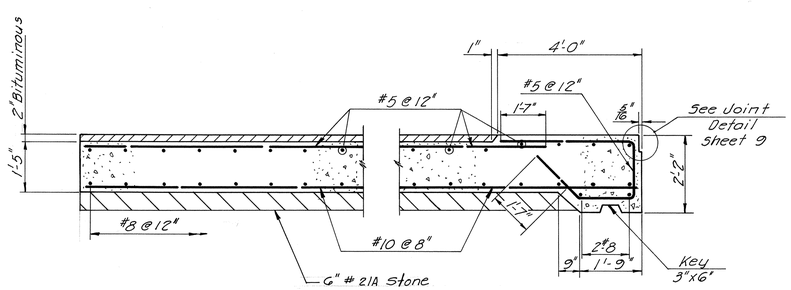
PLAN - SOUTH ABUTMENT
Scale: 1/4"=1'-0"



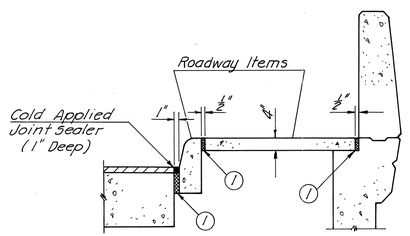
PLAN - NORTH ABUTMENT
Scale: 1/4"=1'-0"



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



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



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

NOTE:
All reinforcing steel shall be 2" Clear.
ELEVATIONS SHOWN ARE TO TOP OF CONCRETE.

AS BUILT

	BY	DATE
MADE	RPR	8-67
CHECKED	WEO	9-67
IN CHARGE	WEO	

NO.	REVISION	BY	DATE
	AS BUILT	HMW	

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 49
CHERRY STREET OVER
DOWNTOWN EXPRESSWAY

APPROACH SLABS

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 10 OF 11

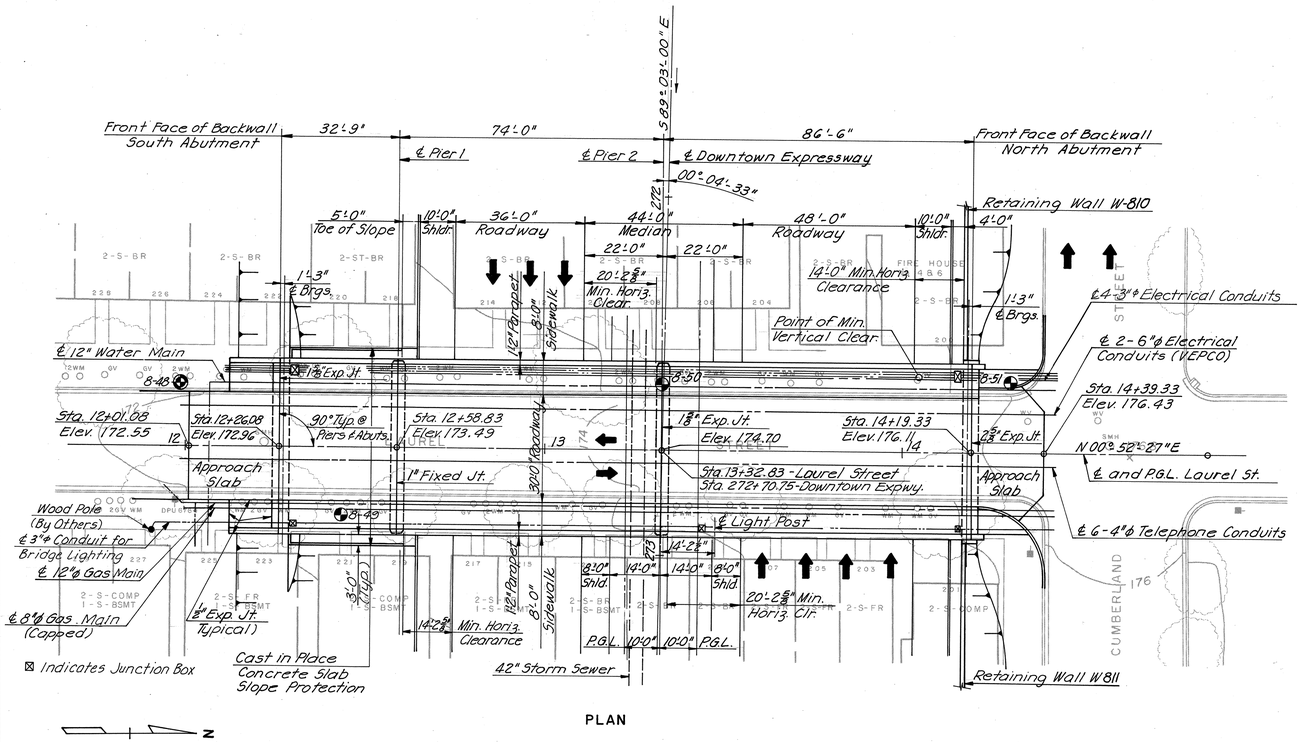
220

Bridge 50

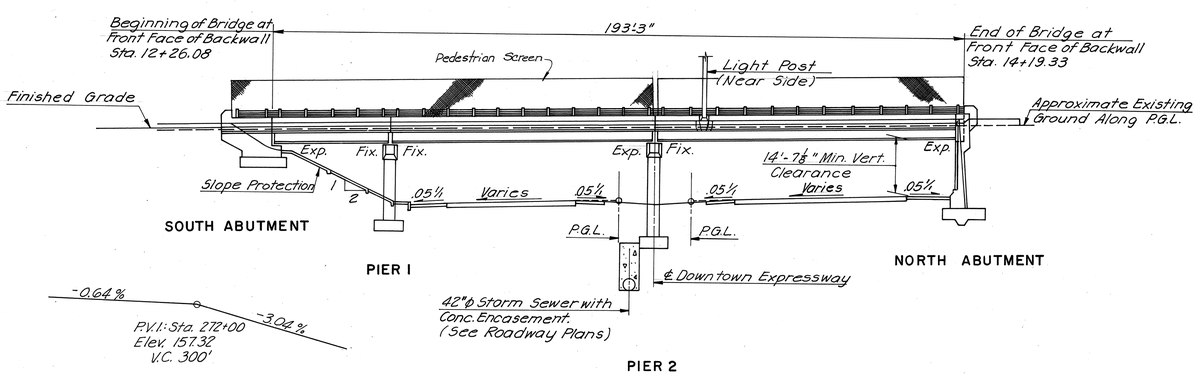
(South Laurel Street
Over Downtown Expressway {Rte. 195})

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	222	

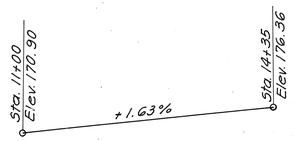


PLAN



ELEVATION

DOWNTOWN EXPRESSWAY



LAUREL STREET

PROFILE DATA

	BY	DATE				
MADE	W.D.U.	8-67				
CHECKED	W.E.O.	10-67		AS BUILT	H.M.W.	4-76
IN CHARGE	W.E.O.		NO.	REVISION	BY	DATE

GENERAL NOTES:

ROADWAY: One 30'-0" Clear roadway. Two 8'-0" sidewalks.

CAPACITY: Dead Load - Includes 15 lbs. per sq. ft. for future wearing surface.
Live Loads - HS 20-44 loading and B.P.R. modified for military vehicles.

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

CONTRACT SPECIAL PROVISIONS:

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

DATUM: CITY OF RICHMOND

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

BENCH MARK: C-38. Monument located in walk N.E. Corner Cumberland and South Laurel. Elev. 176.83.

INDEX

NOTES:
Top of Pavement Elevations at ends of Deck along P.G.L. are given on Plan, Remaining Pavement Elevations are given on Sheet 7.
Indicates 2½"ϕ Cased Hole Boring.
Indicates 4"ϕ Cased Hole Boring.

ESTIMATED QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	REINFORCING STEEL LBS.	STRUCTURAL STEEL-A36 LBS.	ALUMINUM BRIDGE RAILING L.F.	ASPHALT DAMP-PROOFING S.Y.	6 INCH PIPE UNDERDRAIN L.F.	POROUS BACKFILL C.Y.	CONC. SLAB SLOPE PROTECTION S.Y.	GAS MAIN 12"ϕ L.F.	GAS MAIN 8"ϕ L.F.	WATER MAIN 12"ϕ L.F.	CONDUITS 6"ϕ VEPCO L.F.	CONDUITS 4"ϕ TEL. L.F.	3"ϕ PVC CONDUIT L.F.	2"ϕ METAL CONDUIT L.F.	Pedestrian Screen L.F.	
Superstructure		364.21		68,195	382,078.4	408					226	217.3	208	481	1442	960.5	4	420	
South Abutment	134		88.24	4,873			43	57	14	232.6									
Pier 1	241		92.65	16,300															
Pier 2	272		91.54	19,411															
North Abutment	268.12		242.29	12,341			119	55	72										
Approach Slabs			76.60	17,263															
Total	915.12	364.21	597.32	138,383	382,078.4	408	162	112	86	232.6	226	217.3	208	481	1442	960.5	4	420	

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY

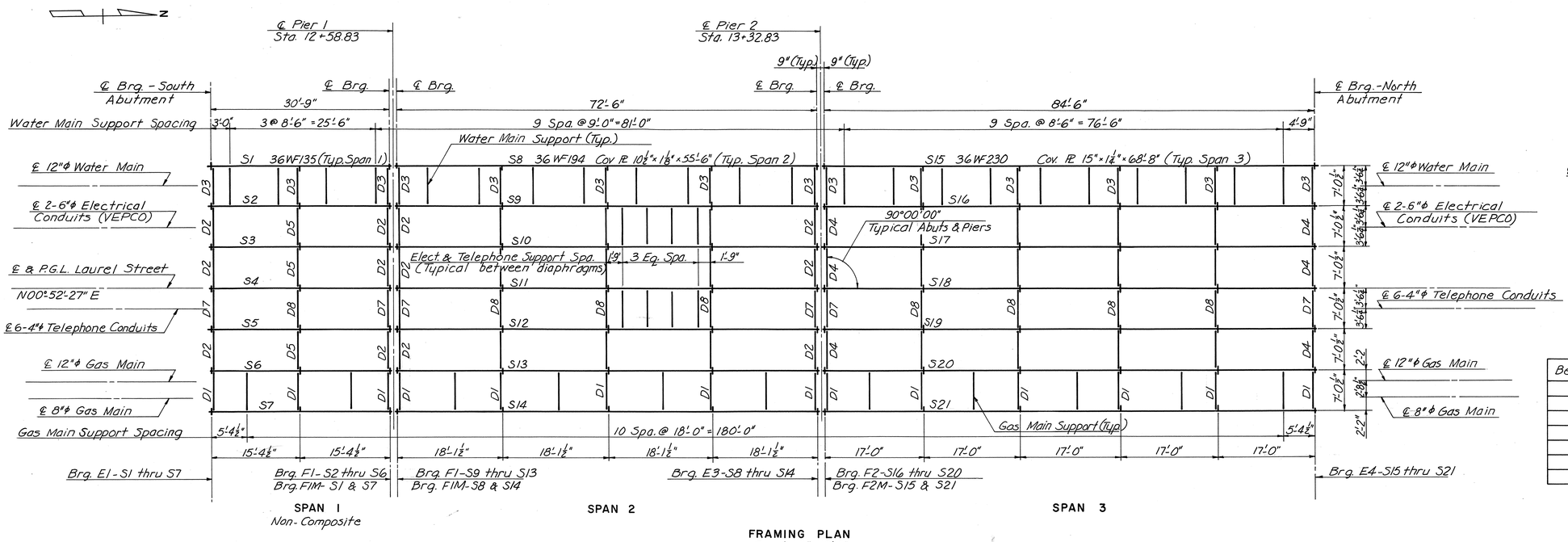
GENERAL PLAN AND ELEVATION

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

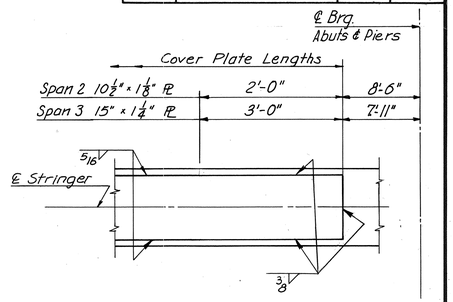
SCALE: 1" = 20'
CONTRACT NO.: 8
SHEET NO. 1 OF 9

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



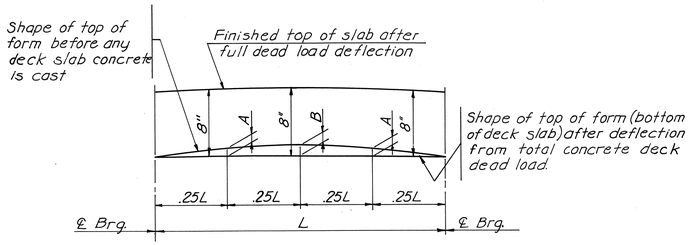
FRAMING PLAN
Scale: 1" = 10'-0"

Note: All intermediate diaphragms are D6 unless otherwise noted.



COVER PLATE DETAIL
No Scale

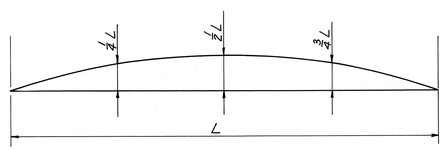
Bearing Type	No. Required
E1	7
F1	10
F1M	4
E3	7
F2	5
F2M	2
E4	7



DEAD LOAD DEFLECTION DIAGRAM

Stringers	A	B
S1 thru S7	1/16"	1/8"
S8, S14	1"	1 1/16"
S9 thru S13	7/8"	1 1/16"
S15, S21	1 1/8"	2 1/16"
S16 thru S20	1 1/4"	1 1/4"

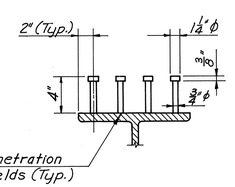
NOTE TO CONTRACTOR:
The above deflections are those anticipated to occur in the stringer upon placement of the total concrete deck dead load. In practice the stringers in place are not likely to have the exact camber to compensate for these deflections during construction. The residual amounts shall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



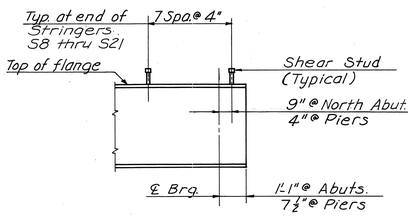
CAMBER DIAGRAM

Stringers	¼L, ¾L	½L
S8, S14	1 3/16"	1 1/8"
S9 thru S13	1 1/16"	1 1/16"
S15, S21	2"	2 1/16"
S16 thru S20	1 13/16"	2 3/16"

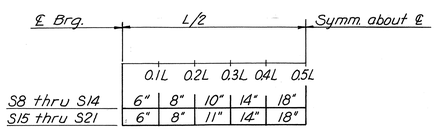
NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to (see table). This will provide approximate compensation for deflection under full dead load and for conformity with finished grade. Stringers which are not required to be shop cambered shall be turned so that any mill tolerance deviation from straightness will be in the direction shown by the camber diagram above.



SHEAR STUD DETAIL
Scale: 1½" = 1'-0"



DETAIL "A"
No Scale



SHEAR STUD SPACING
No Scale
Shear Stud spacing shown is maximum

Shear Stud Notes:
Capacity = 3400 lbs. per stud.
Three ⅞" diameter studs may be substituted at the same longitudinal spacing as shown for four ¾" diameter studs.
Stud rows to be placed perpendicular to ℄ stringer.
For end condition see Detail "A".

Notes:
Structural steel shall conform to ASTM Specifications A36 (latest revision).
For General Notes see Sheet 1.
For Superstructure Cross Section see Sheet 6.
For Diaphragm Details see Sheet 6.
For Utility Support Details see Sheet 6.
For Bearing Shoe Dimensions see Standard Sheet S1.

AS BUILT

	BY	DATE
MADE	F.B.C.	7-67
CHECKED	W.E.O.	9-67
IN CHARGE W.E.O.		

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

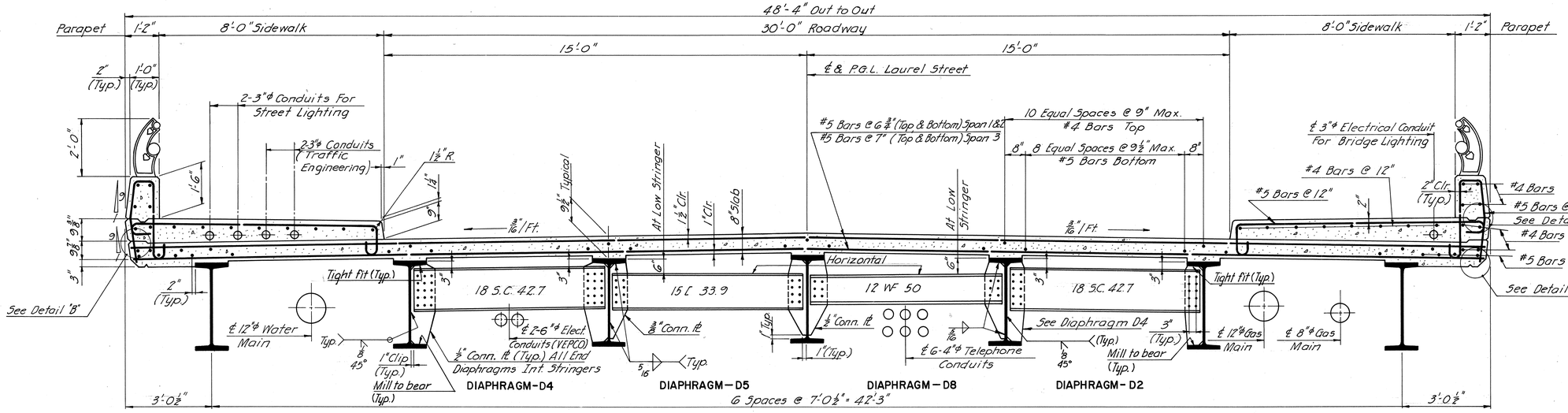
STRUCTURE B 50
LAUREL STREET OVER DOWNTOWN EXPRESSWAY
FRAMING PLAN

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

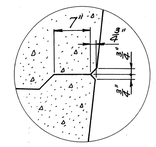
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 5 OF 9

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

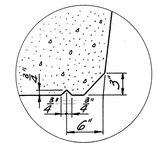


TYPICAL CROSS SECTION
Scale: ½" = 1'-0"

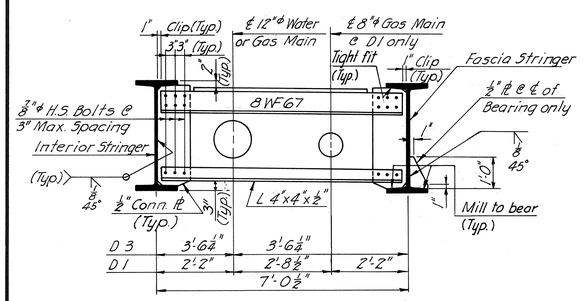
DETAIL "A"
Scale: 1" = 1'-0"



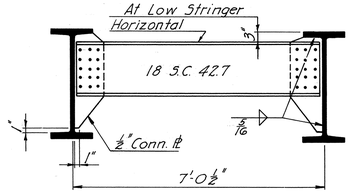
DETAIL "B"
Scale: 1" = 1'-0"



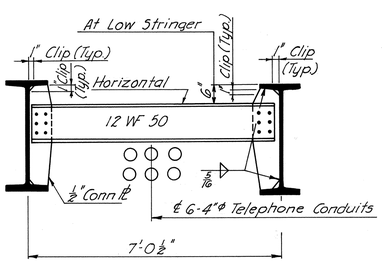
DETAIL "C"
Scale: 1" = 1'-0"



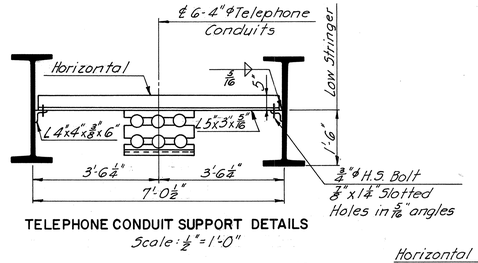
DIAPHRAGM-D1



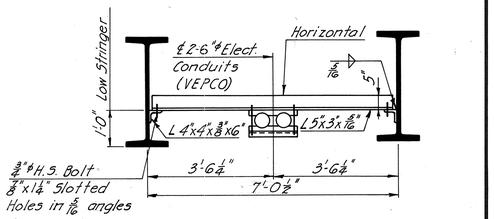
DIAPHRAGM – D6
Scale: ½" = 1'-0"



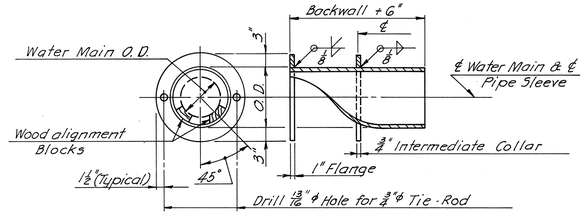
DIAPHRAGM – D7
Scale: ½" = 1'-0"



TELEPHONE CONDUIT SUPPORT DETAILS
Scale: ½" = 1'-0"

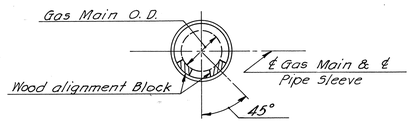


ELECTRICAL CONDUIT SUPPORT DETAILS
Scale: ½" = 1'-0"



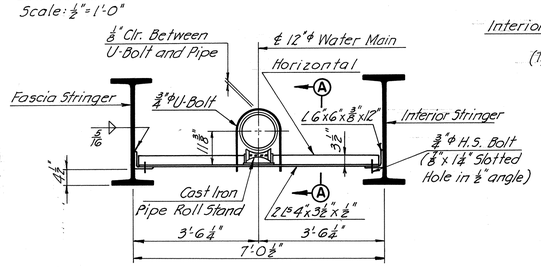
NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

PIPE SLEEVE DETAIL FOR WATER MAIN

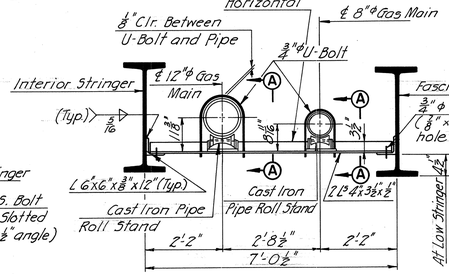


NOTE:
Steel pipe sleeve to be hot-dip galvanized after fabrication in accordance with ASTM A123

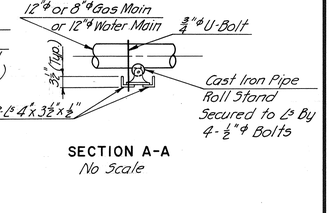
PIPE SLEEVE DETAIL FOR GAS MAIN



WATER MAIN SUPPORT DETAILS
Scale: ½" = 1'-0"

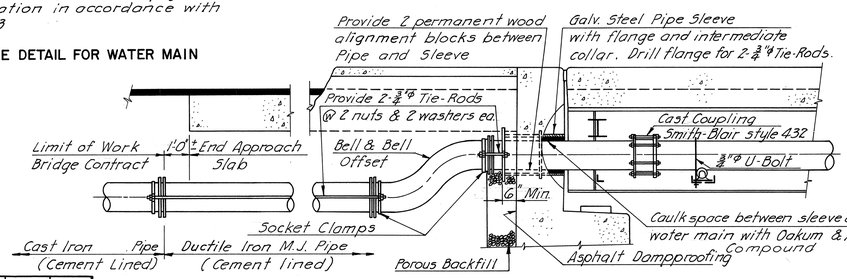


GAS MAIN SUPPORT DETAILS
Scale: ½" = 1'-0"

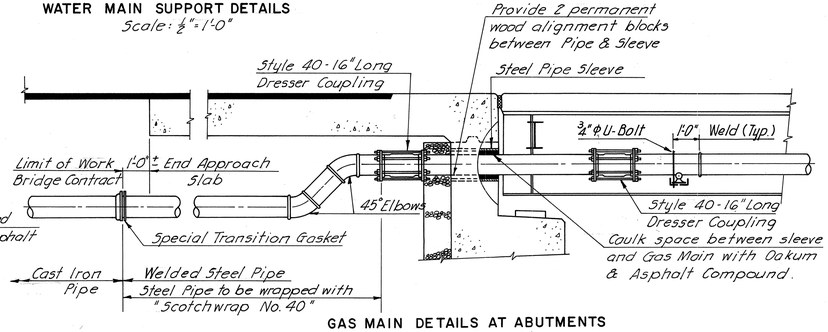


SECTION A-A
No Scale

NOTES:
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 5.
For Slab Plan, see Sheet 7.
For Electrical Conduit Hanger Details, see Sheet S10



WATER MAIN DETAILS AT ABUTMENTS
Scale: ⅜" = 1'-0"



GAS MAIN DETAILS AT ABUTMENTS
Scale: ⅜" = 1'-0"

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	C.F.S.	8-67				
CHECKED	W.E.O.	10-67				
IN CHARGE	W.E.O.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY

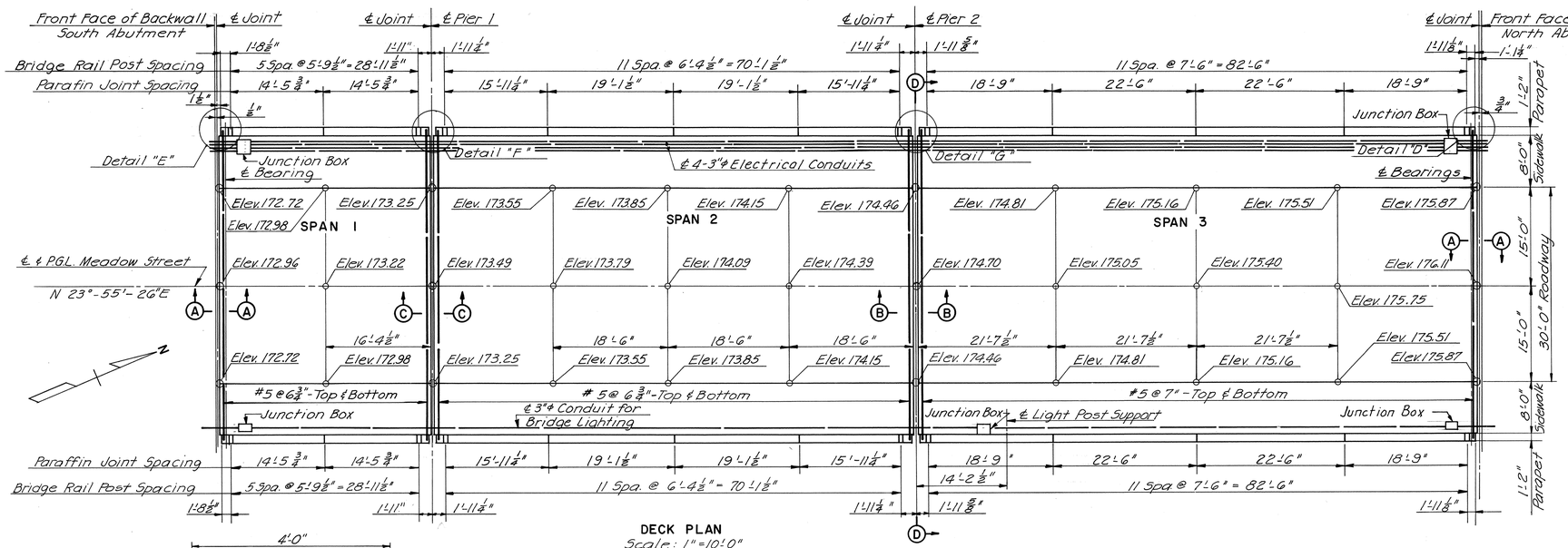
CROSS SECTION & UTILITY DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

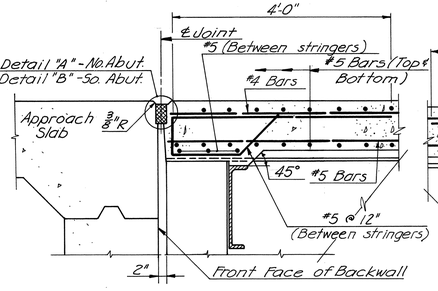
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 6 OF 9

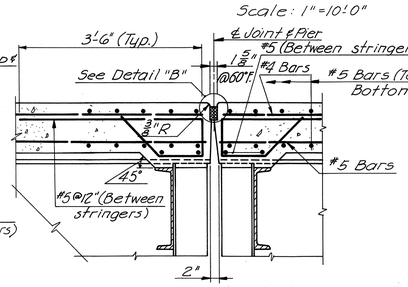
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	228	



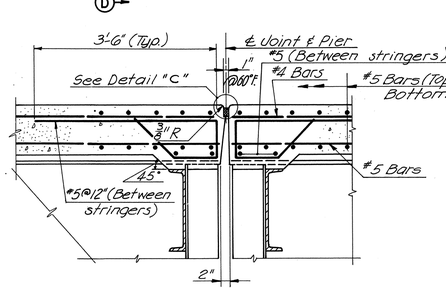
DECK PLAN
Scale: 1" = 10'-0"



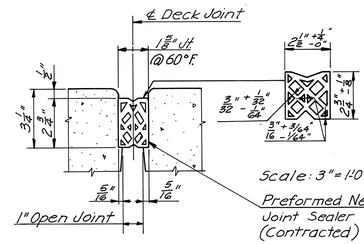
SECTION A-A
Scale: 3/4" = 1'-0"



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

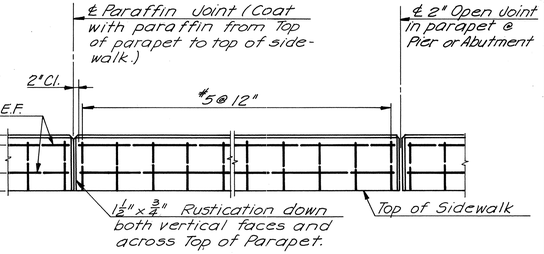


SECTION C-C
Scale: 3/4" = 1'-0"

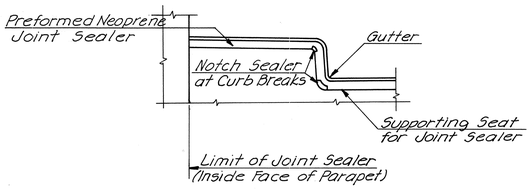


Scale: 3" = 1'-0"

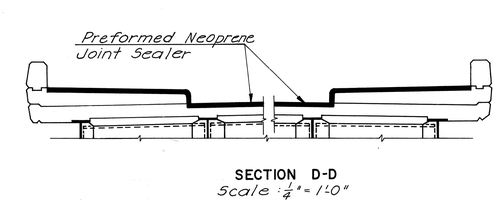
DETAIL "B"
Scale: 3" = 1'-0"



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



TREATMENT OF JOINT AT CURB
No Scale



SECTION D-D
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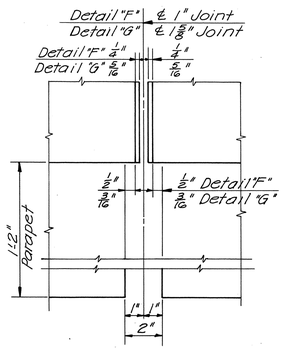
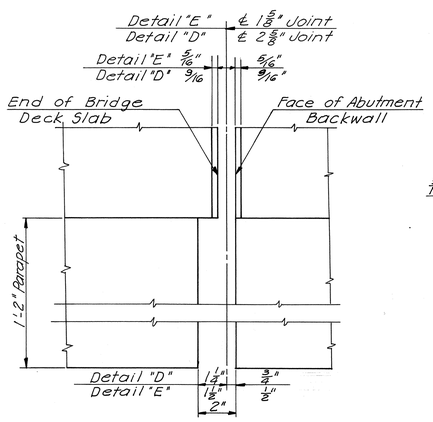


DETAIL "F" & "G"
Scale: 3" = 1'-0"



DETAIL "D" & "E"
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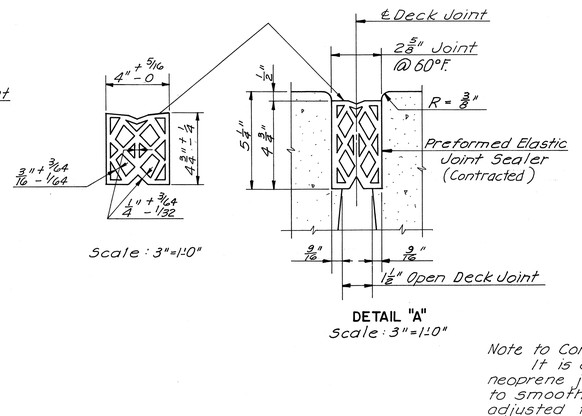
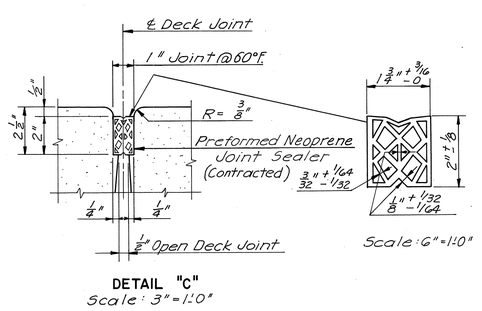


Scale: 3" = 1'-0"

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



Scale: 6" = 1'-0"

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

NOTES:
For Typical Deck Cross Section, see Sheet 6.
For General Notes, see Sheet 1.
For Framing Plan, see Sheet 5.
For Railing Details see Sheet 53.
For Light Post Support Details see Sheet 54.

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.

AS BUILT

	BY	DATE
MADE	R.P.R.	8-67
CHECKED	W.E.O.	9-67
IN CHARGE	W.E.O.	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY

DECK PLAN AND JOINT DETAILS

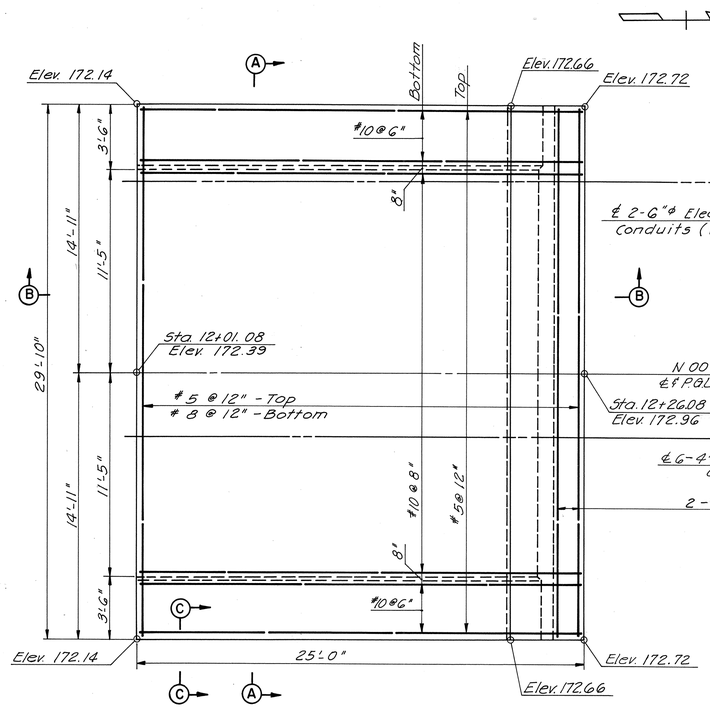
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

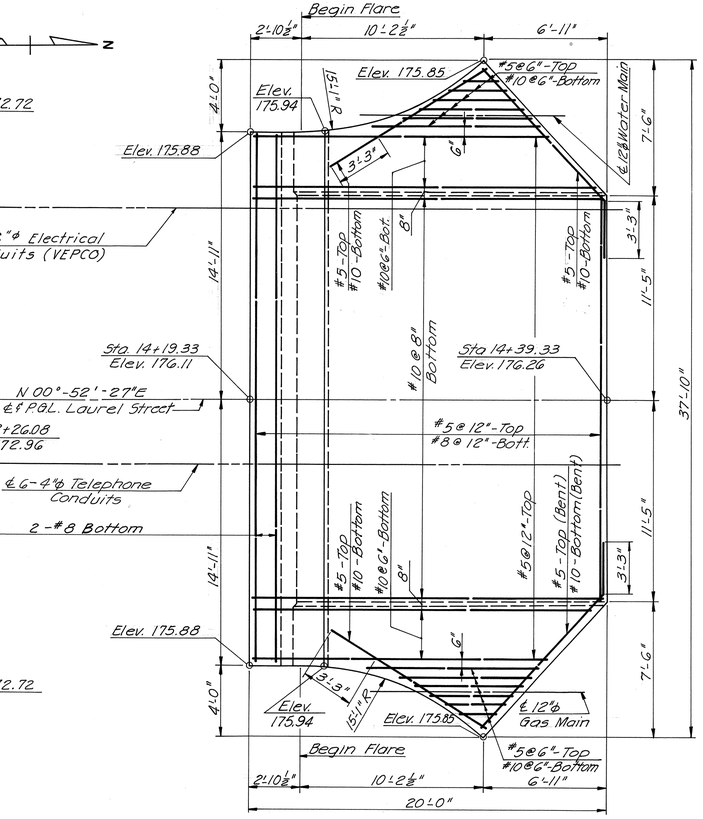
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 7 OF 9

228

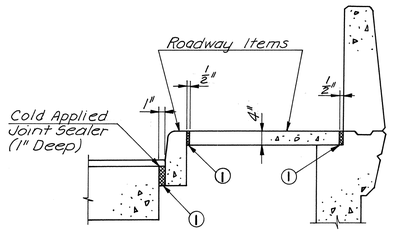
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	229	



PLAN — SOUTH ABUTMENT
Scale : 1/4"=1'-0"

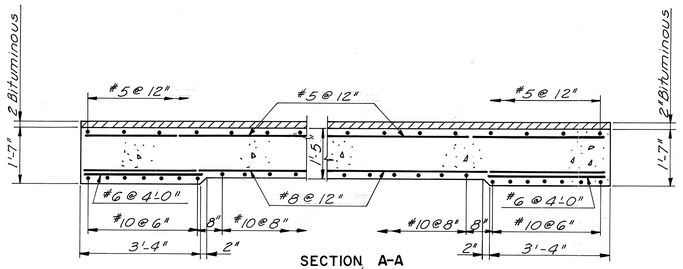


PLAN — NORTH ABUTMENT
Scale : 1/4"=1'-0"

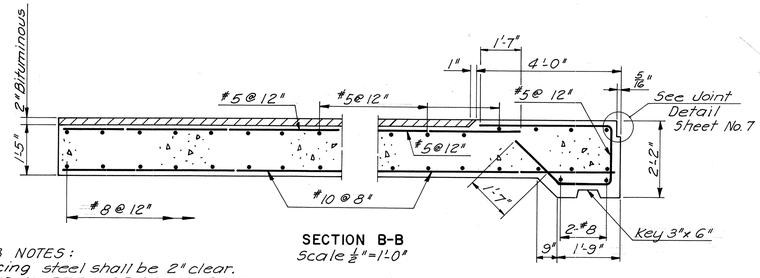


① Preformed Expansion Joint Material

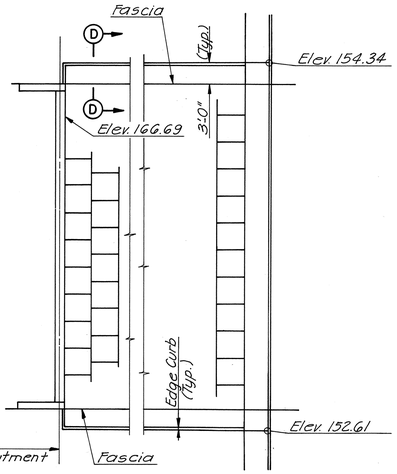
SECTION C-C
Scale: 1/4"=1'-0"



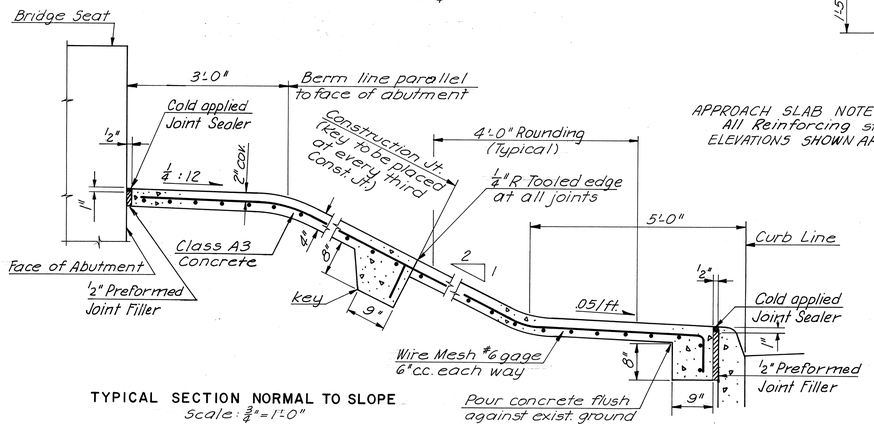
SECTION A-A
Scale : 1/2"=1'-0"



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

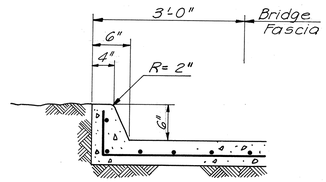


PLAN — SLOPE PROTECTION
Scale: 3/32"=1'-0"



TYPICAL SECTION NORMAL TO SLOPE
Scale: 3/4"=1'-0"

APPROACH SLAB NOTES:
All Reinforcing steel shall be 2" clear.
ELEVATIONS SHOWN ARE TO TOP OF CONCRETE.



SECTION D-D
No Scale

SLOPE PROTECTION NOTES:

The Item "Concrete Slope Protection" shall include the excavation of or the placing and compaction of any embankment material necessary to bring the surface of the paved slopes of the finished elevations shown on the plans.

"Concrete Slope Protection" shall be paid for at the contract unit price per square yard, which price shall include the concrete slab including wire mesh and joint filler.

The slab shall be constructed in 4'0"x4'0" panels, placed in horizontal courses, alternate panels poured in a staggered pattern with adjacent panels poured later. The slab shall be Class A3 concrete of such consistency that it can be placed without the use of top forms, the surface shall be finished with a wood float.

Reinforcement shall consist of wire mesh #6 gage, 6" c.c. each way, placed at the center of the slab, and continuous through construction joints.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	R.P.R.	8-67				
CHECKED	W.E.O.	9-67				
IN CHARGE	W.E.O.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 50
LAUREL STREET OVER
DOWNTOWN EXPRESSWAY
APPROACH SLAB & SLOPE PROTECTION DETAILS

AMERICAN ENGINEERS
Richmond, Virginia

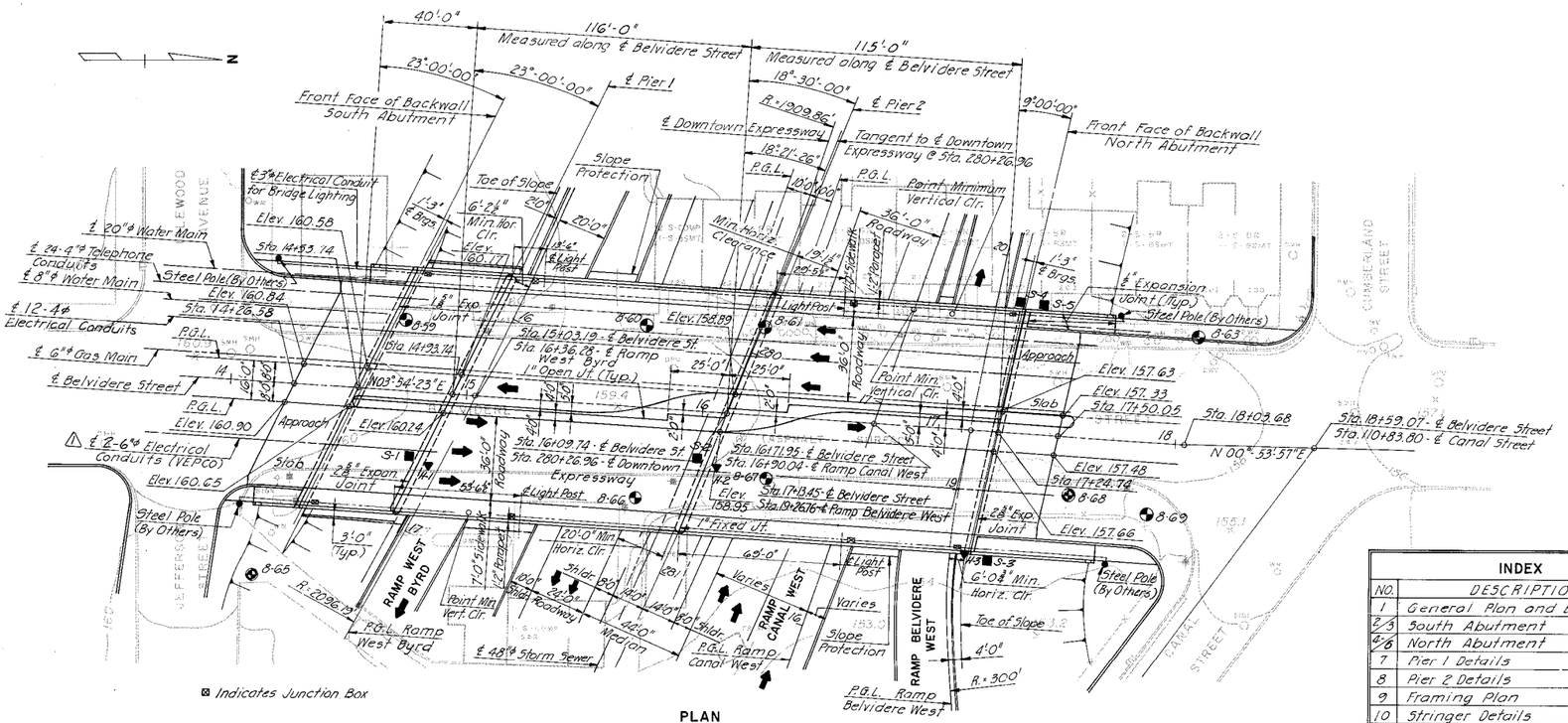
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 8 OF 9

Bridge 51

(South Belvidere Street
Over Downtown Expressway {Rte. 195})

Record Set Plans



RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	231	

PLAN

ELEVATION

PROFILE DATA

GENERAL NOTES:

ROADWAY: Two 36'-0" Clear roadways. Two 7'-0" Sidewalks. One variable median.

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"φ unless otherwise noted and shall conform to A.S.T.M. Specification A-325.

BENCH MARK: C-40 Monument located at S.E. corner Idlewood Avenue and Belvidere Street. Elev. 160.76.

INDEX

ESTIMATED QUANTITIES

	STRUCTURE EXCAVATION C.Y.	CONCRETE CLASS A4 C.Y.	CONCRETE CLASS A3 C.Y.	REINFORCING STEEL LBS.	STRUCTURAL STEEL A36 LBS	ALUMINUM BRIDGE RAILING L.F.	CONCRETE SLAB SLOPE PROTECTION S.Y.	ASPHALT DAMP-PROOFING S.Y.	6" INCH PIPE UNDERDRAIN L.F.	POROUS BACKFILL C.Y.	GAS MAIN 6"φ L.F.	WATER MAIN 20"φ L.F.	WATER MAIN 8"φ L.F.	CONDUIT 6"φ VEPCO L.F.	CONDUIT 4"φ TELE. L.F.	Pedestrian Screen L.F.	CONDUIT 4"φ CITY L.F.	3"φ PVC. CONDUIT L.F.	2"φ METAL CONDUIT L.F.		
Superstructure		962.16		224,141	1,324,511.8	658					323	247	313	664 △	6,504	665	3,252	570	16		
South Abutment	475		234.47	11,589			564.9	228	126	76											
Pier 1	598		258.89	50,865			295.1														
Pier 2	318		258.71	48,366																	
North Abutment	1,194		891.55	75,607			131.2	468	170	289											
Approach Slabs			258.08	58,162																	
Total	2,585	962.16	1,901.70	468,730	1,324,511.8	658	991.2	696	296	365	323	247	313	664 △	6,504	665	3,252	570	16		

	BY	DATE				
MADE	WDU	10-67		AS BUILT	HMW	4-76
CHECKED	WEO	12-67	△	Rev. VEPCO Quantity	DGT	11-12-74
IN CHARGE	WEO		NO.	REVISION	BY	DATE

NOTES: Top of Pavement Elevations at ends of Deck along P.G.L.'s are given on Plan; Remaining Pavement Elevations are given on Sheet 14.
⊗ - Indicates 2½"φ Cased Hole Boring.
⊕ - Indicates 4"φ Cased Hole Boring
▼ - Indicates Geonor Heave Points
■ - Indicates Settlement Points

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B 51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

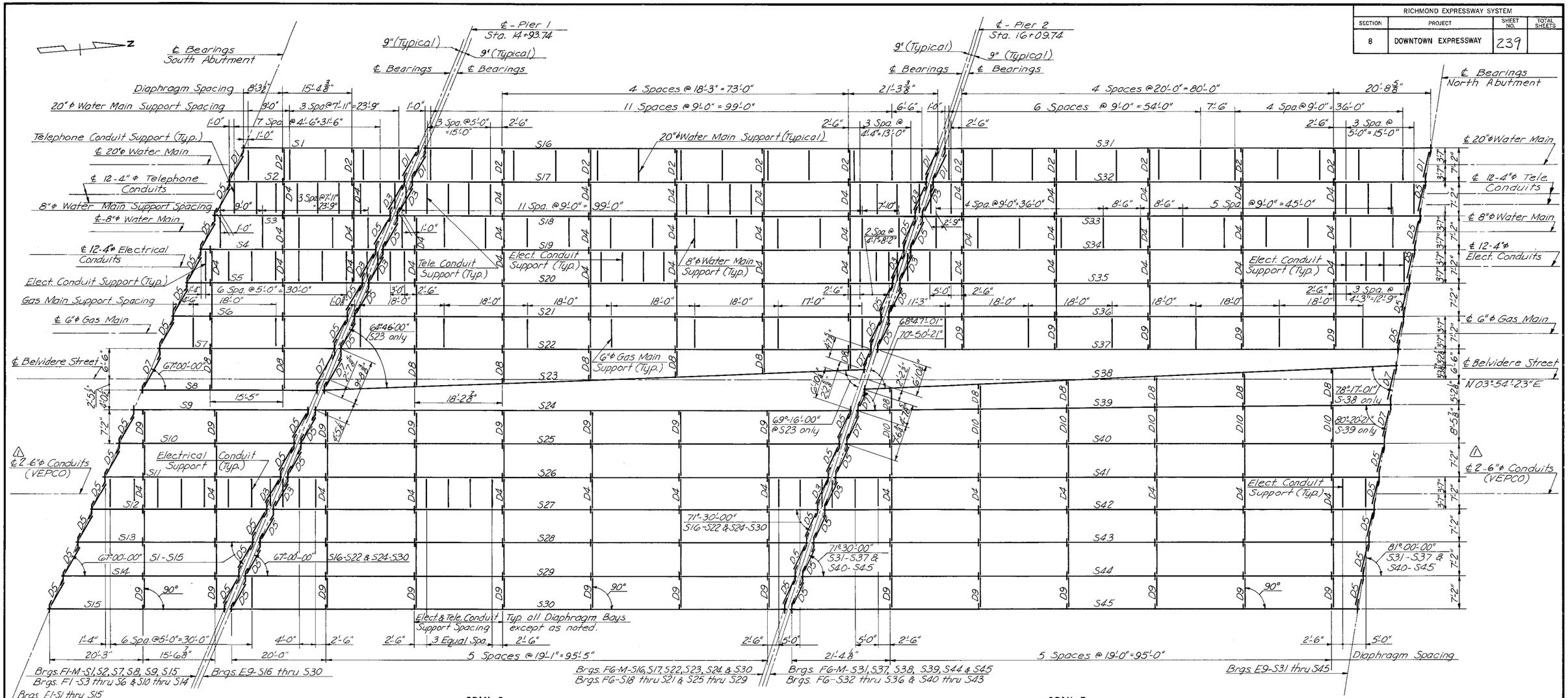
GENERAL PLAN AND ELEVATION

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1" = 30'-0"
CONTRACT NO.: 8
SHEET NO. 1 OF 21

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	239	



SPAN 1
Non-Composite

SPAN 2

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

SPAN 3

Bearing Type	No. Required
F1	9
F1-M	6
F6	18
F6-M	12
E1	15
E9	30

Stringer Lengths ℄ Brg. to ℄ Brg.							
S1 thru S15	37'-9 7/8"	S22	113'-9 3/8"	S30	118'-10 1/8"	S38	114'-3 3/8"
		S23	116'-2 3/8"	S31	104'-2 5/8"	S39	114'-3 3/8"
S16	109'-11 3/8"	S24	114'-11 3/8"	S32	105'-5 3/8"	S40	115'-4 1/8"
S17	110'-7 1/8"	S25	115'-7 1/8"	S33	106'-9"	S41	116'-7 7/8"
S18	111'-2 3/8"	S26	116'-3 1/8"	S34	108'-0 5/8"	S42	117'-10 5/8"
S19	111'-10 1/2"	S27	116'-10 3/8"	S35	109'-3 1/8"	S43	119'-1 3/8"
S20	112'-6 1/8"	S28	117'-6 5/8"	S36	110'-6 3/8"	S44	120'-4 1/8"
S21	113'-2"	S29	118'-2 3/8"	S37	111'-9 5/8"	S45	121'-8"

NOTE:
All Intermediate Diaphragms are D6 unless otherwise noted.
Intermediate Stiffeners shall be located on inside face of stringers S1, S15, S16, S30, S31 & S45. They shall be located on alternate sides along the remaining stringers.

INTERMEDIATE STIFFENER SPACING (MAXIMUM)

Stringer	1st 2 Spaces	.1L	.2L	.3L	.4L	.5L
S1 thru S15	2'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"
S16 thru S45	1'-9"	3'-6"	3'-10"	4'-0"	4'-0"	4'-0"

NOTES:
Structural Steel Shall Conform to ASTM Specifications A-36 (Latest Revision).
For General Notes see Sheet 1.
For Superstructure Cross Section see Sheet 11.
For Diaphragm Details see Sheet 12.
For Utility Support Details see Sheet 13.
For Bearing Shoe Dimensions see Sheet 51.
For Stringer Details see Sheet 10.
For Stiffener Details see Sheet 10.

	BY	DATE
MADE	D.L.A.	9-67
CHECKED	W.E.O.	12-67
IN CHARGE	W.E.O.	

NO.	REVISION	BY	DATE
1	Rev. No. VEPCO Conduits	DGT	1-11-74

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

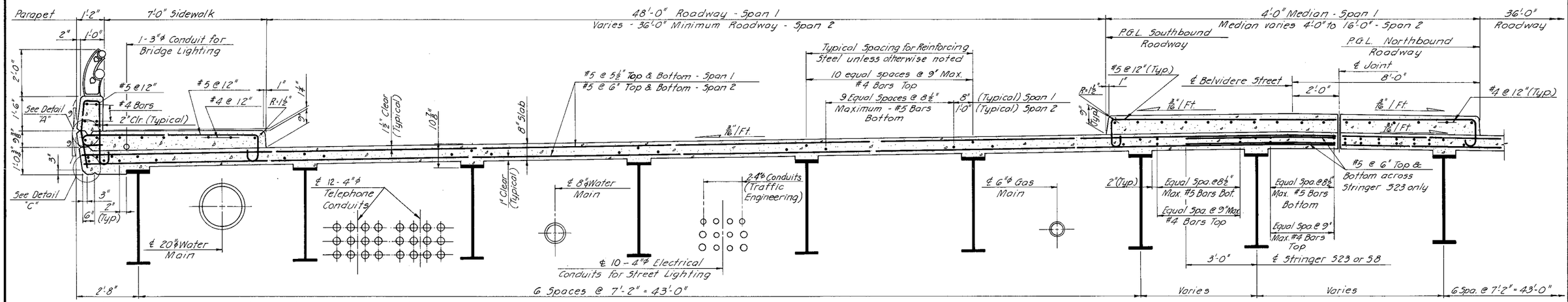
STRUCTURE B51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY
FRAMING PLAN

AMERICAN ENGINEERS
Richmond, Virginia

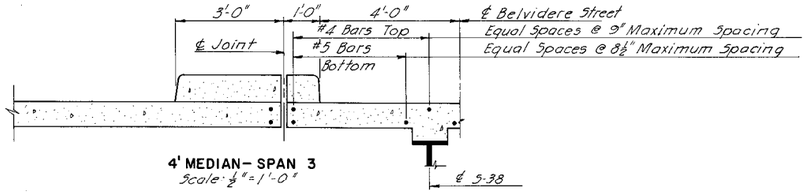
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 9 OF 21

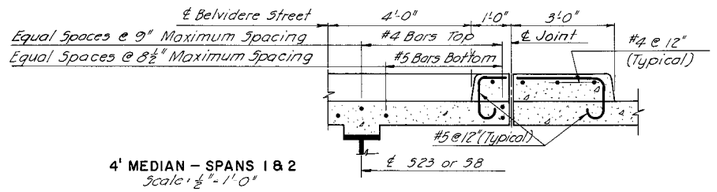
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	241	



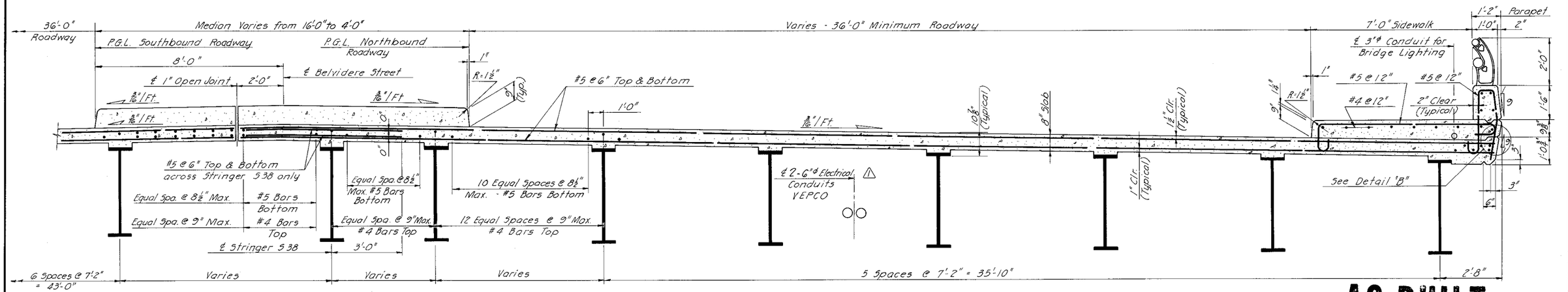
TYPICAL CROSS SECTION
Southbound Roadway (Spans 1 & 2 Shown)
Scale: ½" = 1'-0"



4' MEDIAN – SPAN 3
Scale: ½" = 1'-0"

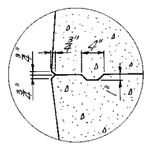


4' MEDIAN – SPANS 1 & 2
Scale: ½" = 1'-0"

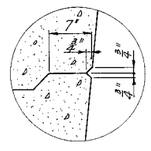


TYPICAL CROSS SECTION
Northbound Roadway (Span 3 Shown)
Scale: ½" = 1'-0"

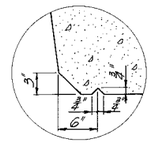
AS BUILT



DETAIL "A"
Scale: 1½"/1'-0"



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



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

NOTES:
For General Notes, see Sheet 1.
for Framing Plan, see Sheet 9.
For Slab Plan, see Sheet 14.
for Diophragm Details, see Sheet 12.
for Joint Details, see Sheet 15.
for Railing Details, see Sheet 53.

	BY	DATE				
MADE	DLA	9-67				
CHECKED	WEO	12-67	⚠ Rev. No. VEPCO Conduits		DGT	11-1274
IN CHARGE	WEO		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY

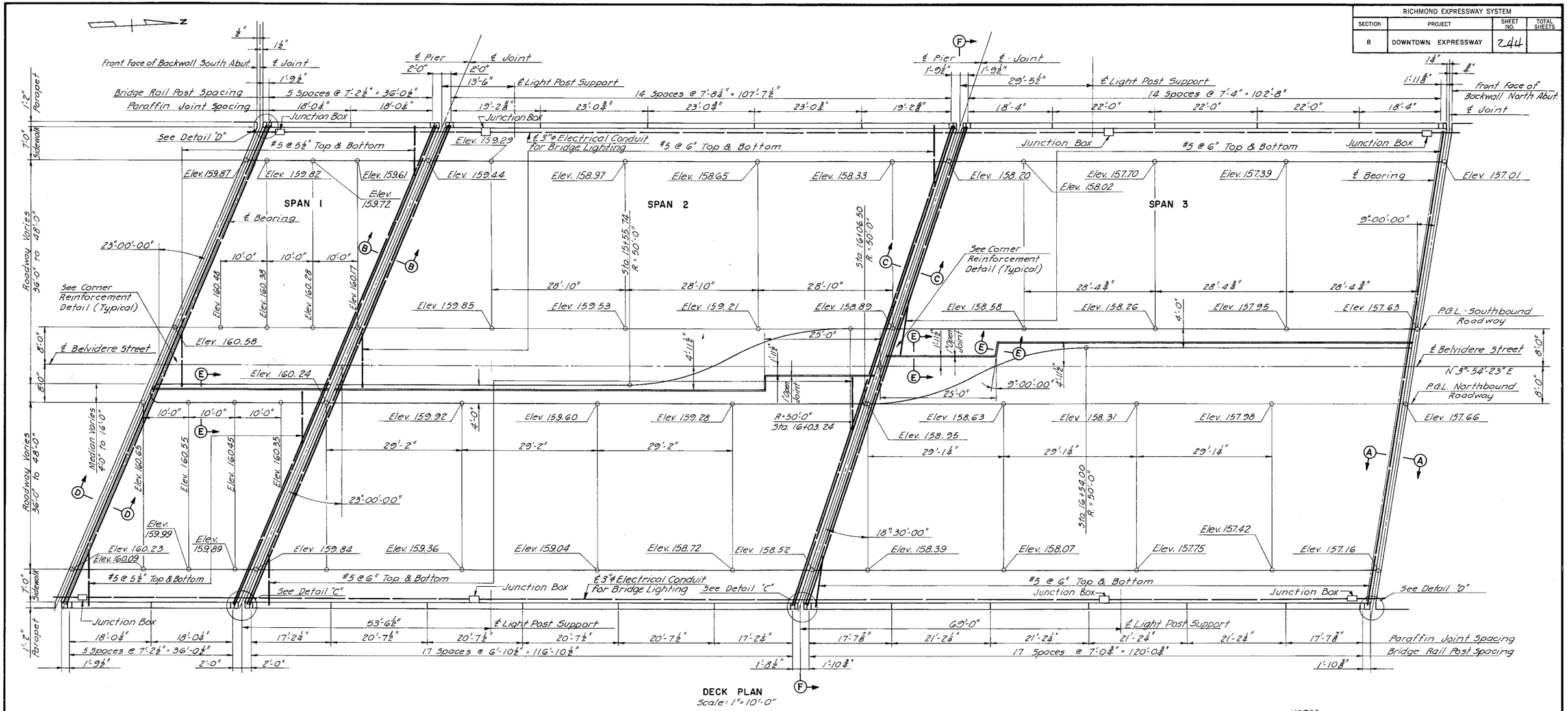
CROSS SECTION

AMERICAN ENGINEERS
Richmond, Virginia

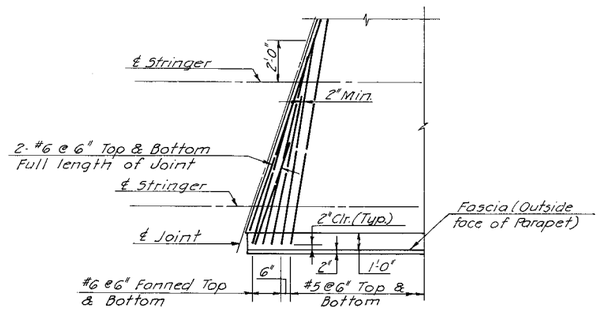
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 11 OF 21

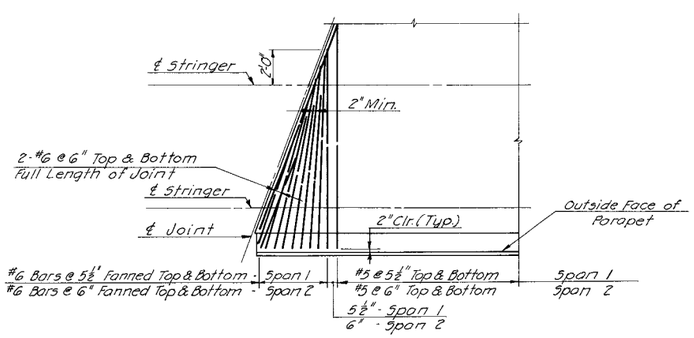
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	244	



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



TYPICAL CORNER REINFORCEMENT DETAIL
(Pier 2 - Span 3)
Outside Face of Parapet Shown (Median Joint Similar)
Scale: ¼"=1'-0"



TYPICAL CORNER REINFORCEMENT DETAIL
(Spans 1 & 2)
Outside Face of Parapet Shown (Median Joint Similar)
Scale: ¼"=1'-0"

NOTES:
For General Notes, see Sheet 1
For Typical Deck Cross Section, see Sheet 11.
For Joint Details, see Sheet 15.
For Sections and Details, see Sheet 15.
For Typical Parapet Elevation, see Sheet 15.

AS BUILT

	BY	DATE
MADE	DLA	9-67
CHECKED	WEO	12-67
IN CHARGE	WEO	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

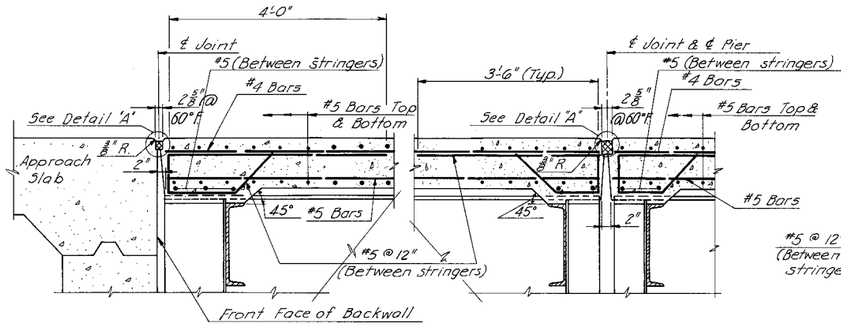
STRUCTURE B51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY
DECK PLAN

AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

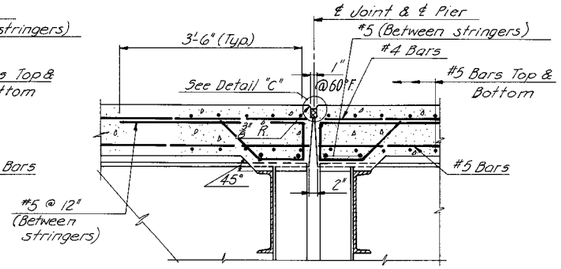
SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 14 OF 21

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	245	

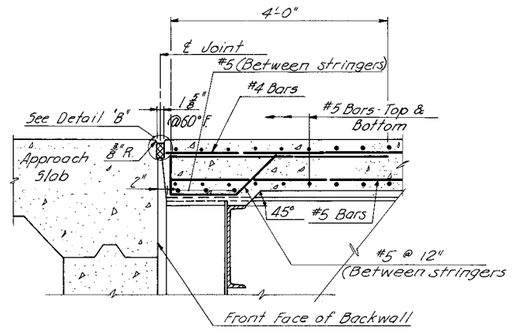


SECTION A-A
Scale: 3/4"=1'-0"

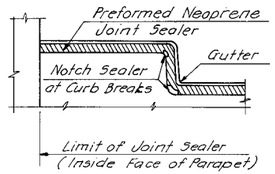
SECTION B-B
Scale: 3/4"=1'-0"



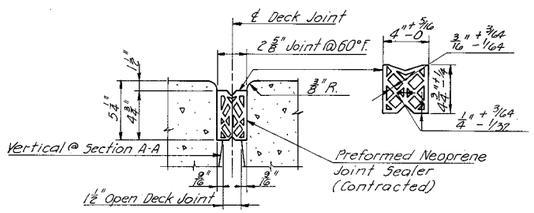
SECTION C-C
Scale: 3/4"=1'-0"



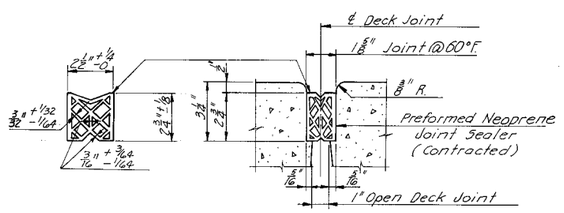
SECTION D-D
Scale: 3/4"=1'-0"



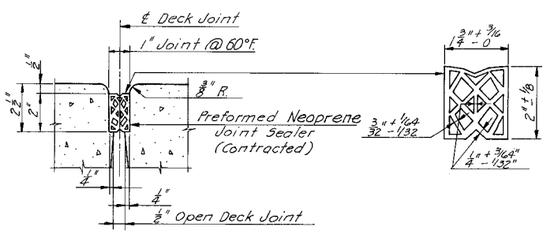
TREATMENT OF JOINT AT CURB AND MEDIAN
No Scale



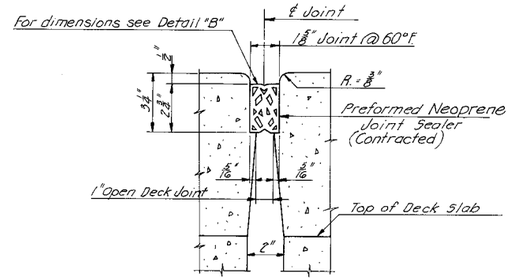
DETAIL "A"
No Scale



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

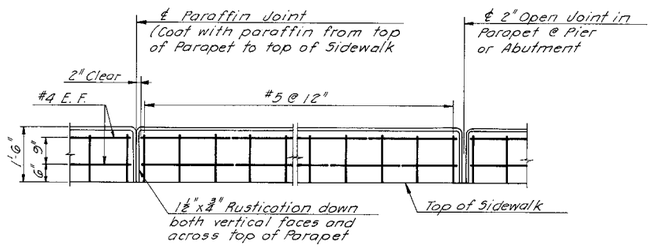


DETAIL "C"
Scale: 3"=1'-0"

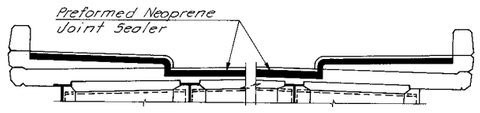


SECTION E-E
Scale: 3"=1'-0"

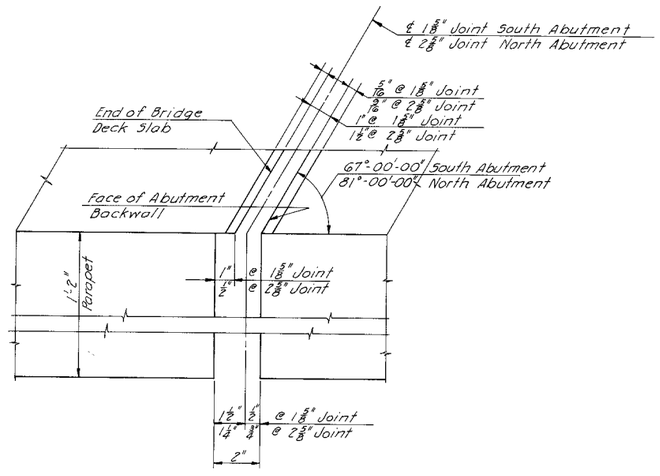
Note to Contractor:
It is absolutely essential that the openings for the preformed neoprene joint sealers be accurately formed and constructed to smooth, and straight lines. The size of the opening shall be adjusted to allow for anticipated dead load rotation of the ends of the slab and for the temperature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



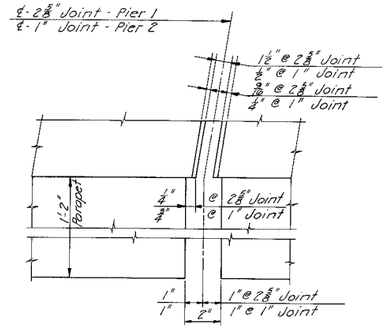
TYPICAL PARAPET ELEVATION
Scale: 1/2"=1'-0"



SECTION F-F
No Scale



DETAIL "D"
No Scale



DETAIL "C"
No Scale

NOTES:
For Typical Deck Cross Section, see Sheet 11
For Deck Plan, see Sheet 14.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	DLA	9-67				
CHECKED	WEO	12-67				
IN CHARGE	WEO					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER DOWNTOWN EXPRESSWAY
JOINT DETAILS

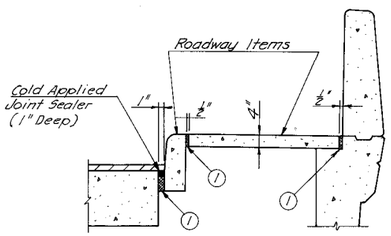
AMERICAN ENGINEERS
Richmond, Virginia

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 15 OF 21

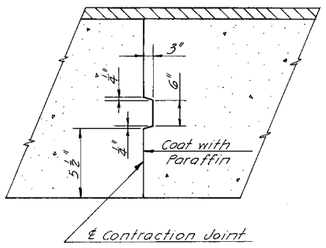
245

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	246	

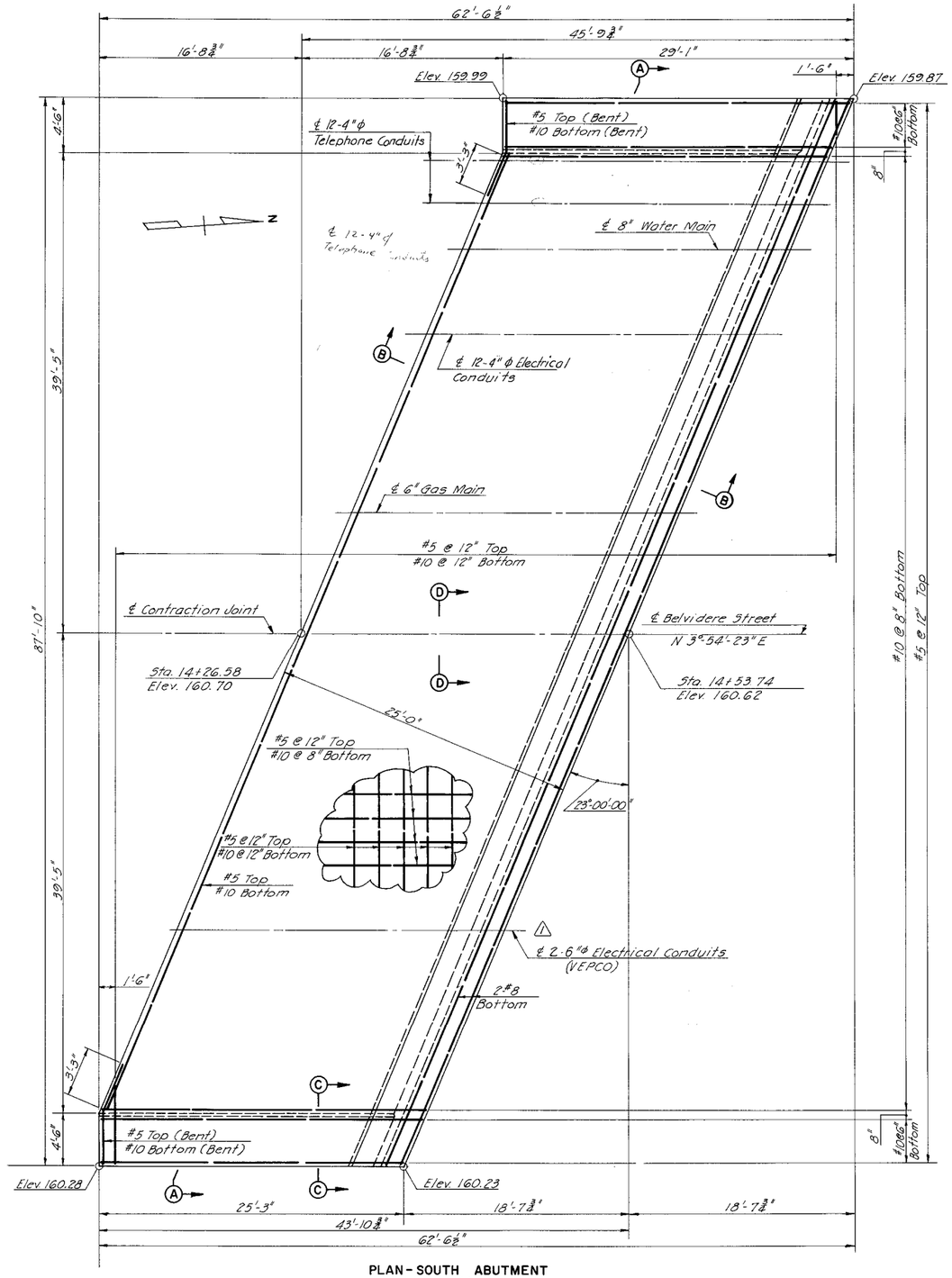


1 = Preformed Expansion Joint Material

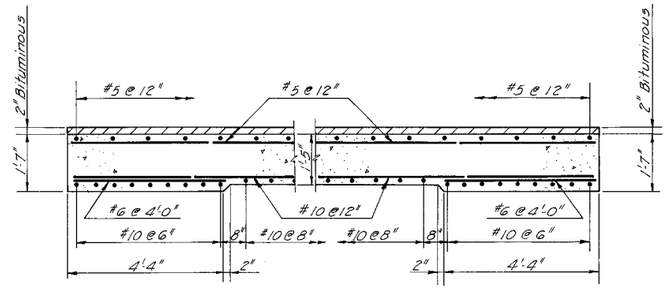
SECTION C-C
Scale: 1"=1'-0"



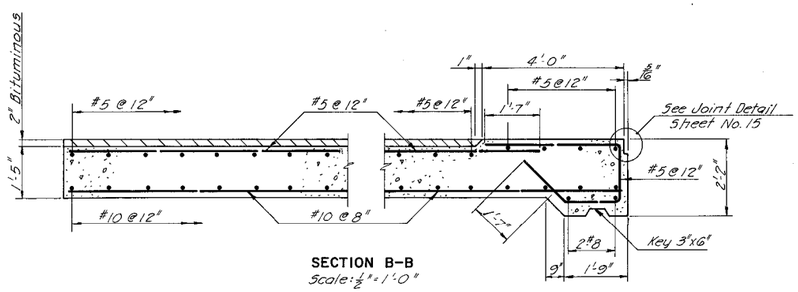
SECTION D-D
(CONTRACTION JOINT DETAIL)
No Scale



PLAN - SOUTH ABUTMENT
Scale: ⅜"=1'-0"



SECTION A-A
Scale: ½"=1'-0"



SECTION B-B
Scale: ½"=1'-0"

NOTES:
All reinforcing steel shall be 2" Clear.
ELEVATIONS SHOWN ARE TO TOP OF CONCRETE.

AS BUILT

	BY	DATE				
MADE	TOJ	10-67				
CHECKED	WEO	12-67	1	Rev. No. Vepco Conduits	DGT	11-12-74
IN CHARGE	WEO		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

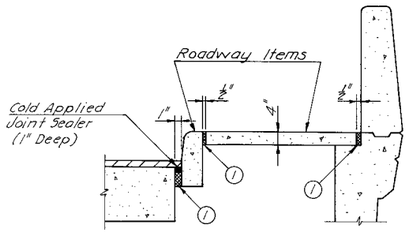
STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY
APPROACH SLAB
SOUTH ABUTMENT

AMERICAN ENGINEERS
Richmond, Virginia

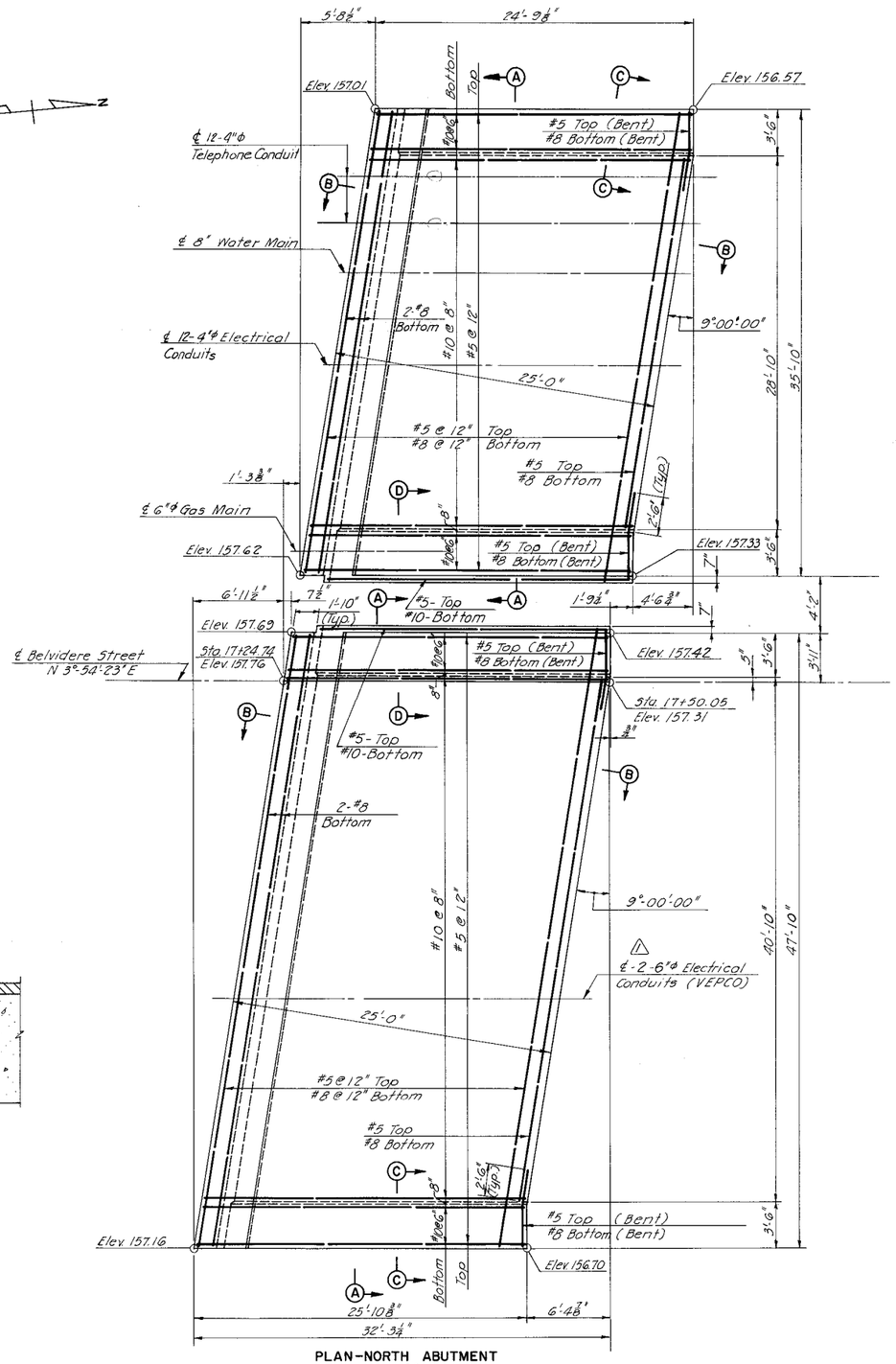
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: AS NOTED
CONTRACT NO.: 8
SHEET NO. 16 OF 21

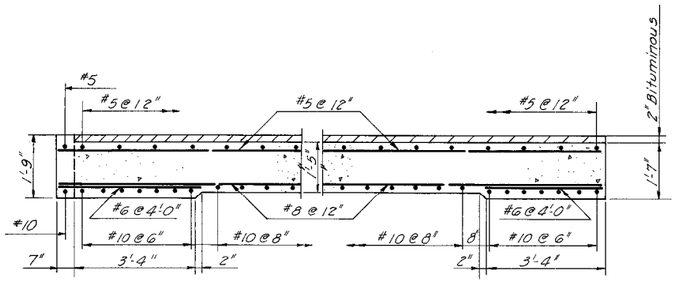
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	247	



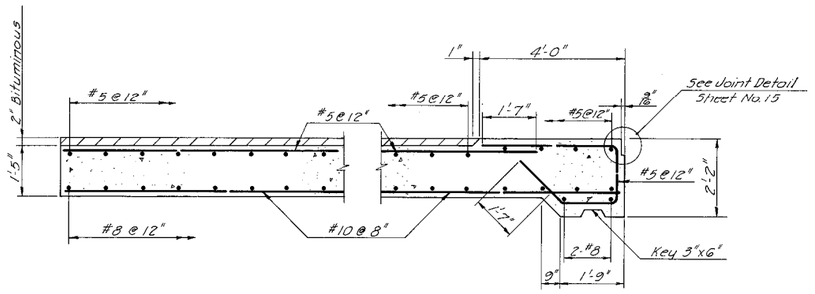
SECTION C-C
Scale: 1"=1'-0"



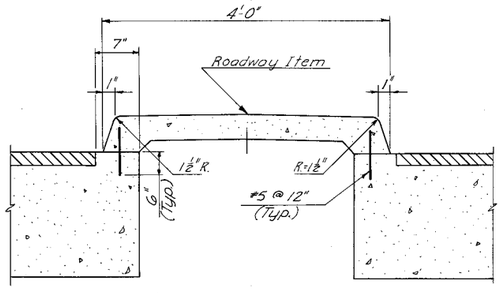
PLAN-NORTH ABUTMENT
Scale: 3/16"=1'-0"



SECTION A-A
Scale: ½"=1'-0"



SECTION B-B
Scale: ½"=1'-0"



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

NOTES:
All reinforcing steel shall be 2" Clear.
ELEVATIONS SHOWN ARE TO TOP OF CONCRETE.

	BY	DATE				
MADE	TDJ	10-67				
CHECKED	WEO	12-67	1	Rev. No. VEPCO Conduits	DGT	1-12-70
IN CHARGE	WEO		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

STRUCTURE B51
BELVIDERE STREET OVER
DOWNTOWN EXPRESSWAY
APPROACH SLAB
NORTH ABUTMENT

AMERICAN ENGINEERS Richmond, Virginia	SCALE: AS NOTED
HOWARD, NEEDLES, TAMMEN & BERGENDOFF General Consultants	CONTRACT NO.: 8
	SHEET NO. 17 OF 21

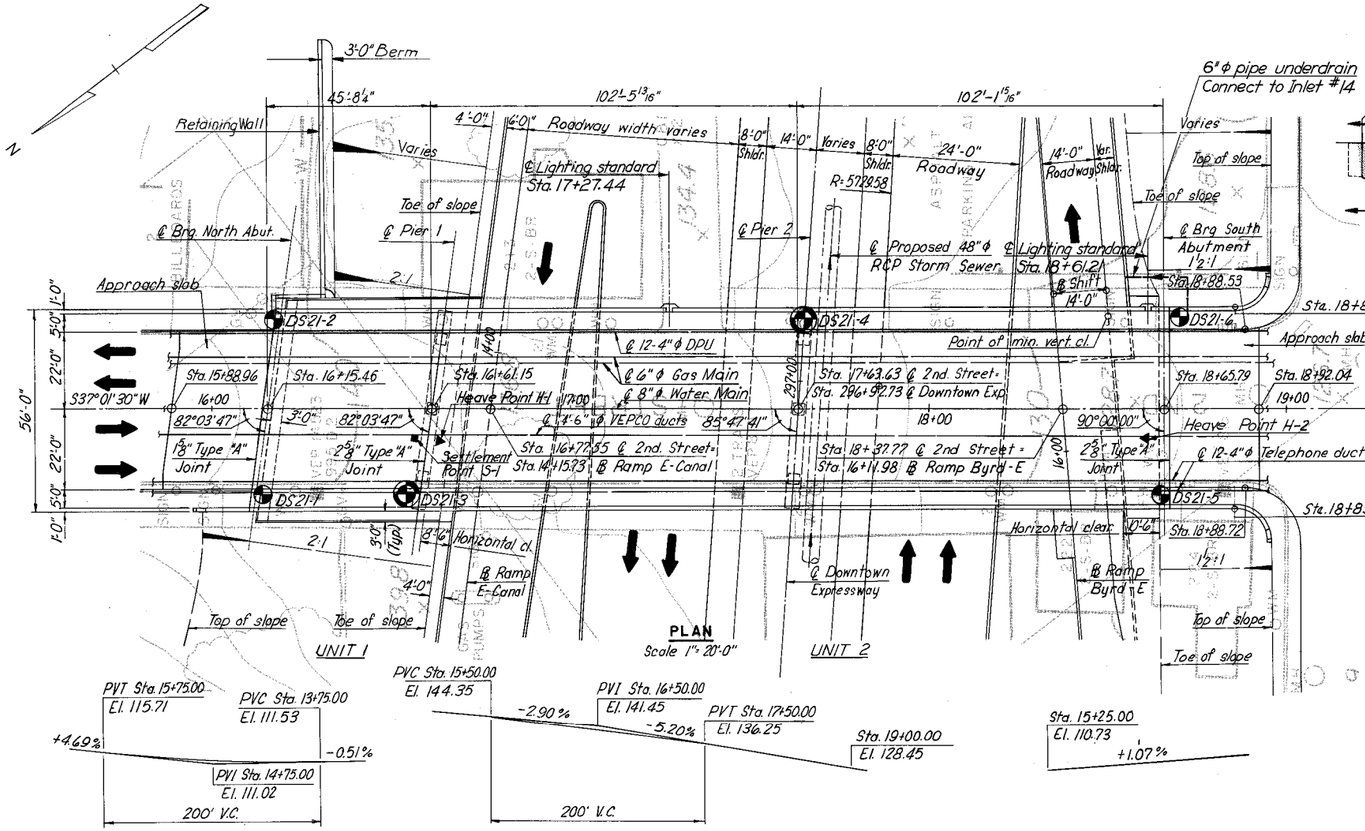
Bridge 54

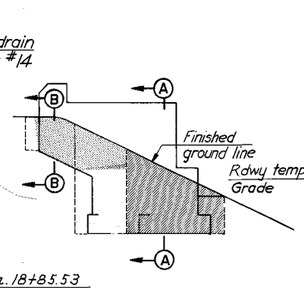
(South 2nd Street
Over Downtown Expressway {Rte. 195})

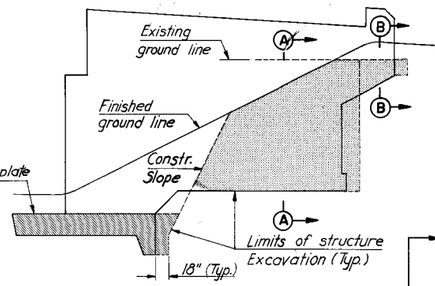
Record Set Plans

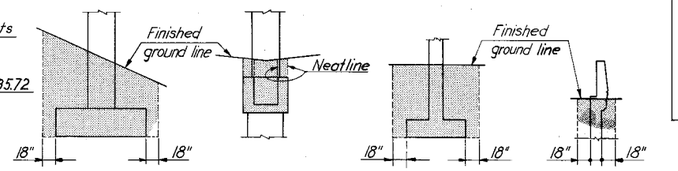
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	119	

INDEX

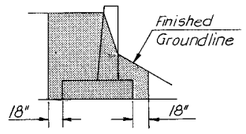








PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale



⚠ RETAINING WALL AT NORTH ABUTMENT

INSTRUMENTATION:
▼ Indicates location of Heave Point.
■ Indicates location of Settlement Point.

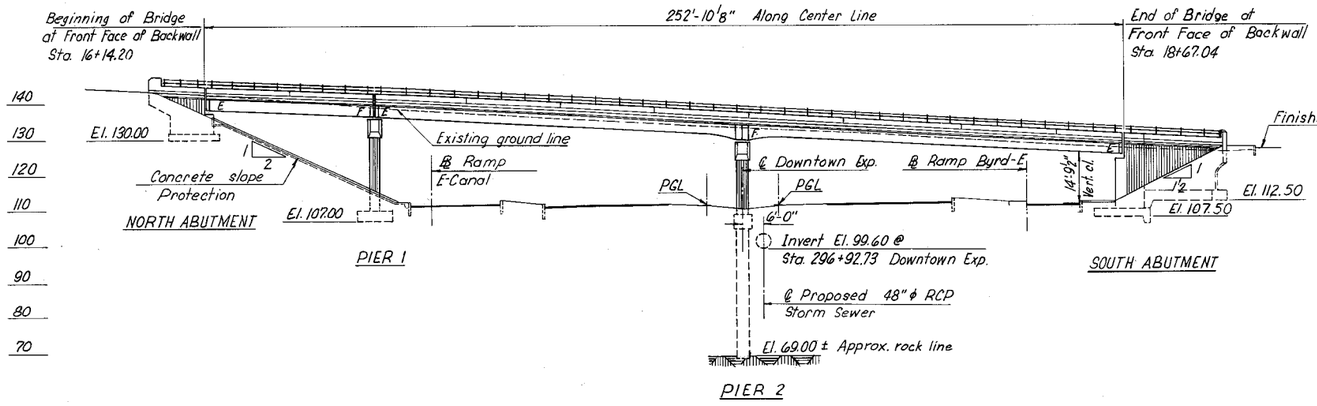
BORINGS:
Indicates location of 2½" ϕ cased hole boring.
Indicates location of 4' ϕ cased hole boring.
For boring data, see Boring Logs sheet.

NOTE: For General Notes and Quantities, see next sheet.

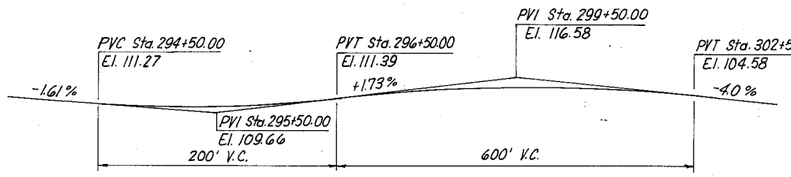
PROFILE GRADE
RAMP E–CANAL
Not to Scale

PROFILE GRADE
SOUTH SECOND STREET BRIDGE
Not to Scale

PROFILE GRADE
RAMP BYRD-E
Not to Scale



ELEVATION
Scale 1"=20'-0"



PROFILE GRADE
DOWNTOWN EXPRESSWAY
Not to Scale

	BY	DATE				
MADE	E.F.	6.67	2	As Built	TEM	6-77
CHECKED	DSB	5-68	⚠	Retaining Wall Added		
IN CHARGE PRY			NO.	REVISION	BY	DATE

AS BUILT

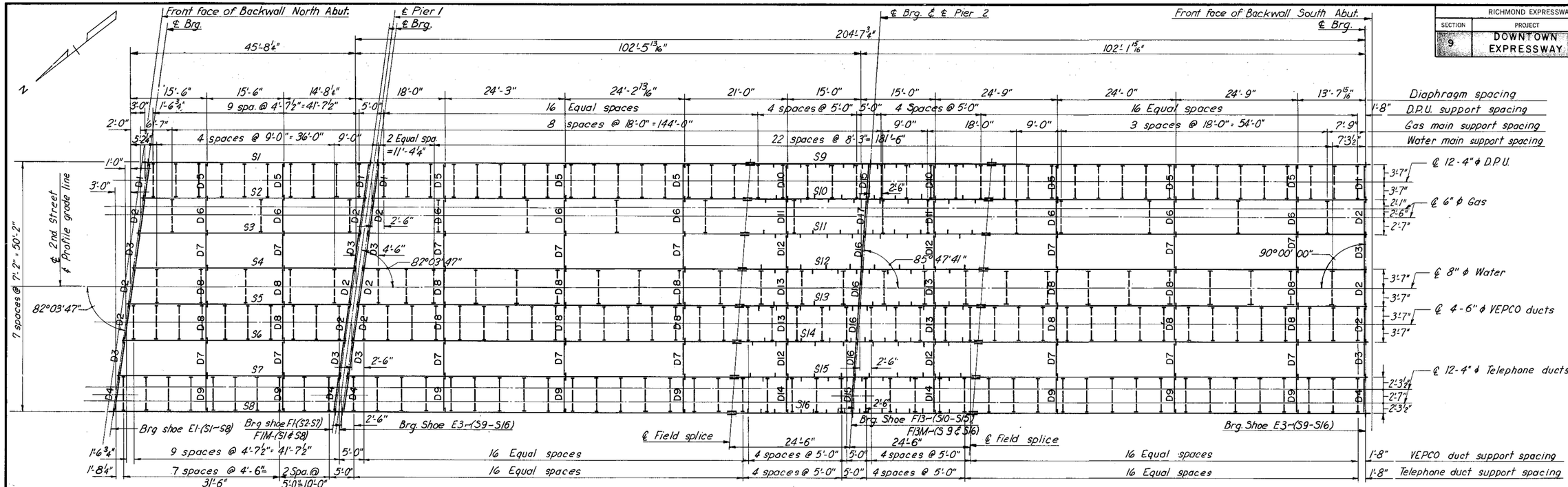
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-54
2ND STREET OVER DOWNTOWN EXPRESSWAY
GENERAL PLAN AND ELEVATION

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

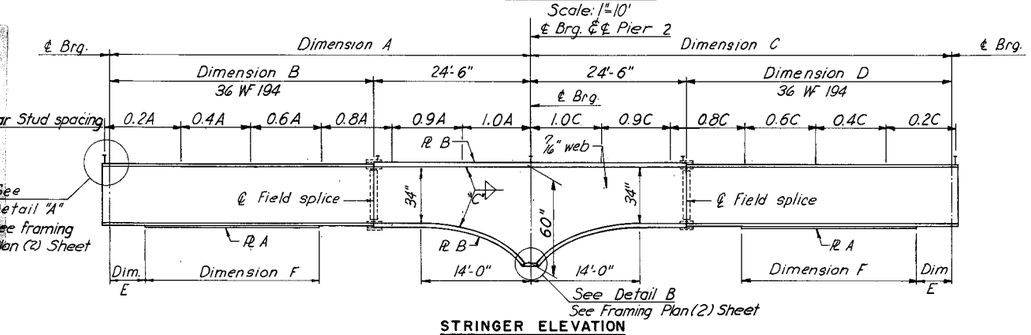
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 1 OF 20

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	129	



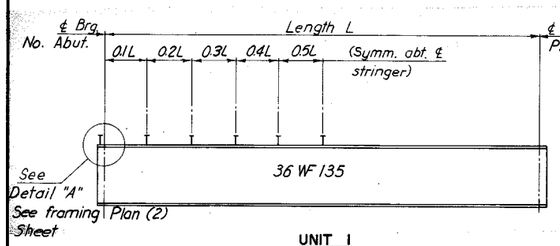
FRAMING PLAN

Scale: 1" = 10'



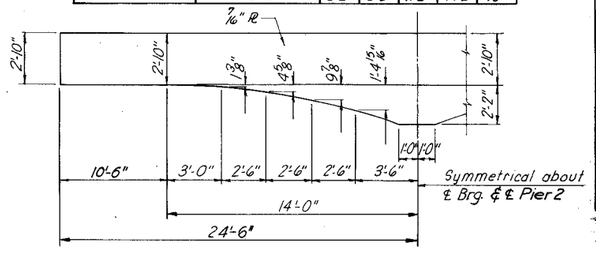
STRINGER ELEVATION

No Scale



UNIT 1 STRINGER ELEVATION

UNIT 1 STRINGER SCHEDULE						
STRINGER	LENGTH ℄ BRG. TO ℄ BRG.	SHEAR STUD SPACING** 0.1L	0.2L	0.3L	0.4L	0.5L
S1-S8	44'-11 3/16"	8½	9½	11½	14½	16

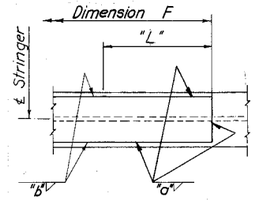


WELDED PLATE WEB DETAILS

UNIT 2 STRINGER SCHEDULE																		
STRINGER	DIM. A	DIM. B	DIM. C	DIM. D	DIM. E	R A DIM. F	R A SIZE	"L"	"a"	"b"	R B SIZE	R B "c"	SHEAR STUD SPACING ** 0.2*	0.4*	0.6*	0.8*	0.9*	1.0*
S9	100'-0 15/16"	75'-6 5/16"	100'-3 3/4"	75'-9 3/4"	9'-3"	61'-0"	10½ x 1 5/8	2'-3"	5/8"	3/8"	18 x 1 3/8	5/16	7"	10"	11"	7"	18"	24"
S10	100'-6 9/16"	76'-0 9/16"	100'-10 1/16"	76'-4 1/16"	10'-3"	59'-6"	10½ x 1 5/8"				18 x 1'2		8"	11"	12"	8"		
S11	101'-0 1/4"	76'-6 1/4"	101'-4 7/16"	76'-10 7/16"	11'-6"	57'-6"	10½ x 1¼				18 x 1¼							
S12	101'-5 13/16"	76'-11 15/16"	101'-10 3/4"	77'-4 3/4"	10'-3"	60'-6"	10½ x 1 5/8				18 x 1'2							
S13	101'-11 9/16"	77'-5 3/16"	102'-5 1/16"	77'-11 1/16"		61'-0"	10½ x 1 5/8				18 x 1'2							
S14	102'-5 1/4"	77'-11¼"	102'-11 3/8"	78'-5 3/8"		61'-6"	10½ x 1 3/8				18 x 1½							
S15	102'-10 5/8"	78'-4 3/8"	103'-5 1/16"	78'-11 1/16"	10'-3"	62'-0"	10½ x 1 5/8				18 x 1'2	5/16	8"	11"	12"	8"		
S16	103'-4 3/16"	78'-10 9/16"	104'-0"	79'-6"	9'-0"	64'-0"	10½ x 1'8	2'-3"	5/8"	3/8"	18 x 1 5/8	3/8	7"	10"	11"	7"	18	24

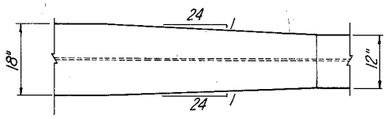
* To be applied to either A or C dimension.

** Shear stud spacing shown is maximum spacing.



R A DETAIL
No Scale

SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E1	8	F1	6
E3	16	F1M	2
		F13	6
		F13M	2



HORIZONTAL FLANGE TRANSITION
Scale 3/4" = 1'-0"

Note:
For additional details see Framing Plan (2) Sheet.

	BY	DATE				
MADE	EVR	3-68				
CHECKED	DSB	5-68	1	As Built	TEM	6-77
IN CHARGE P.R.Y.			NO.	REVISION	BY	DATE

AS BUILT

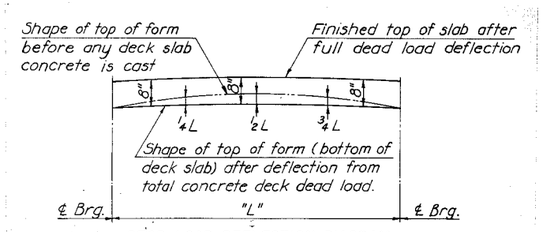
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-54
2ND STREET OVER DOWNTOWN EXPRESSWAY
FRAMING PLAN (1)

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 11 OF 20

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	130	



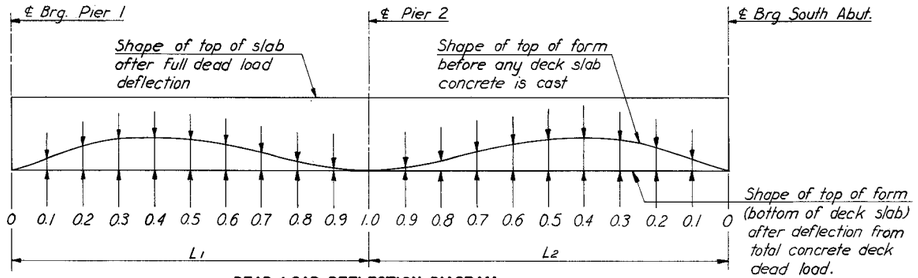
DEAD LOAD DEFLECTION DIAGRAM
UNIT 1

DEFLECTION SCHEDULE		
STR.	1/4 L & 3/4 L	1/2 L
S1-S8	1/4"	3/8"

NOTE TO CONTRACTOR:

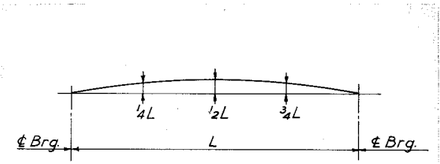
The above deflections are those anticipated to occur in the stringer upon placement of the total concrete deck dead load.

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

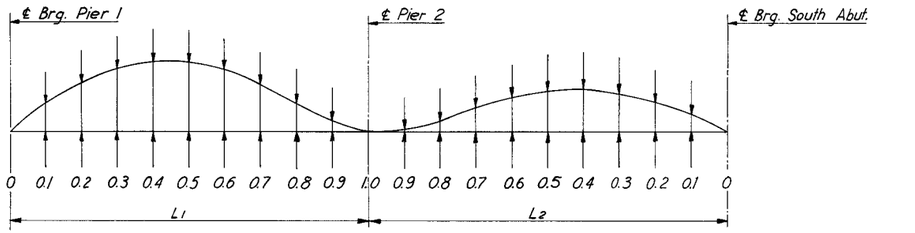


DEAD LOAD DEFLECTION DIAGRAM
UNIT 2

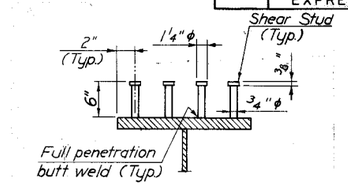
DEFLECTION SCHEDULE										
STR.	0.1L1 0.1L2	0.2L1 0.2L2	0.3L1 0.3L2	0.4L1 0.4L2	0.5L1 0.5L2	0.6L1 0.6L2	0.7L1 0.7L2	0.8L1 0.8L	0.9L1 0.9L2	1.0
S9	1/16"	1/4"	5/8"	13/16"	1 1/16"	1 7/16"	1"	1/2"	1/8"	0"
S10-S12	5/8"	1/8"	1/2"	1 5/8"	1 1/2"	1 1/4"	7/8"	7/16"	1/8"	0"
S13-S15	3/4"	1/4"	1 1/16"	1 13/16"	1 1/16"	1 7/16"	1"	1/2"	1/8"	0"
S16	3/4"	1 3/8"	1 13/16"	2"	1 7/8"	1 9/16"	1 1/16"	9/16"	3/16"	0"



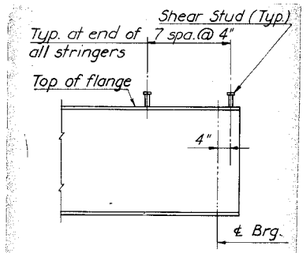
CAMBER DIAGRAM
UNIT 1



CAMBER DIAGRAM
UNIT 2



SHEAR STUD DETAIL
No Scale



DETAIL "A"
No Scale

SHEAR STUD NOTE:

Capacity = 3,400 lbs. per stud.

The contractor may, if he elects, use three 7/8" diameter studs at the same longitudinal spacing in lieu of the four 3/4" diameter studs shown.

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

CAMBER SCHEDULE			
STR.	1/4 L	1/2 L	3/4 L
S8	5/8"	1"	5/8"

NOTE TO FABRICATOR:

The above stringers shall be fabricated with an upward camber amounting to the tabulated value.

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

Stringers which are not required to be shop cambered shall be turned so that any mill tolerance deviation from straightness will be in the direction shown by the camber diagram above.

Dimensions are in inches.

CAMBER SCHEDULE																			
STR.	0.1L1	0.2L1	0.3L1	0.4L1	0.5L1	0.6L1	0.7L1	0.8L1	0.9L1	1.0	0.9L2	0.8L2	0.7L2	0.6L2	0.5L2	0.4L2	0.3L2	0.2L2	0.1L2
S9	1 1/2"	2 11/16"	3 1/2"	3 7/8"	3 13/16"	3 3/8"	2 9/16"	1 5/8"	11/16"	0"	3/16"	5/8"	1/4"	1 13/16"	2 3/16"	2 1/4"	2 1/16"	1 3/8	15/16"
S10-S12	1 1/2"	2 5/8"	3 3/8"	3 3/4	3 1/16"	3 1/4"	2 1/2"	1 9/16"	11/16"	0"	3/16"	9/16"	1/8"	1 5/8"	2"	2 1/8"	2"	1 1/2"	7/8"
S13-S15	1 9/16"	2 13/16"	3 1/16"	4 1/16"	4"	3 1/2"	2 3/4"	1 1/16"	3/4"	0"	3/16"	5/8"	1/4"	1 13/16"	2 3/16"	2 5/16"	2 3/16"	1 1/16"	15/16"
S16	1 11/16"	3"	3 3/16"	4 1/4"	4 3/16"	3 11/16"	2 7/8"	1 13/16"	3/4"	0"	3/16"	13/16"	1 3/8"	2"	2 3/8"	2 1/2"	2 5/16"	1 3/16"	1

FILL PLATE THICKNESS

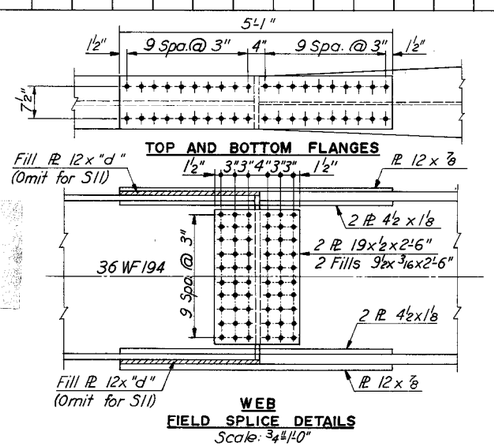
STR.	"d"
S9	1/8"
S10	1/4"
S12-S15	
S16	3/8"

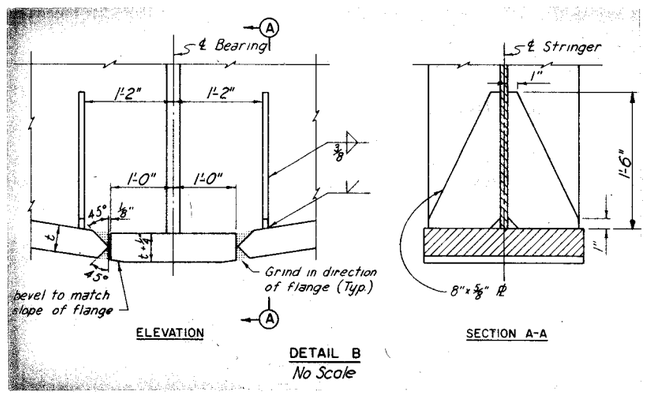
STRINGER SPLICE NOTE

Web splice plates shall have horizontal rolled or mill sheared edges. Vertical edges may be shop sheared or flame cut.

For S9 and S16 place heads of H.S. bolts on outside face of web splices.

For all stringers place heads down for flange splices.





	BY	DATE				
MADE	EVR	3-68				
CHECKED	A.J.S.	3-68	1	As Built	TEM	6-77
IN CHARGE	P.R.V.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-54
2ND STREET OVER DOWNTOWN EXPRESSWAY

FRAMING PLAN (2)

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 12 OF 20

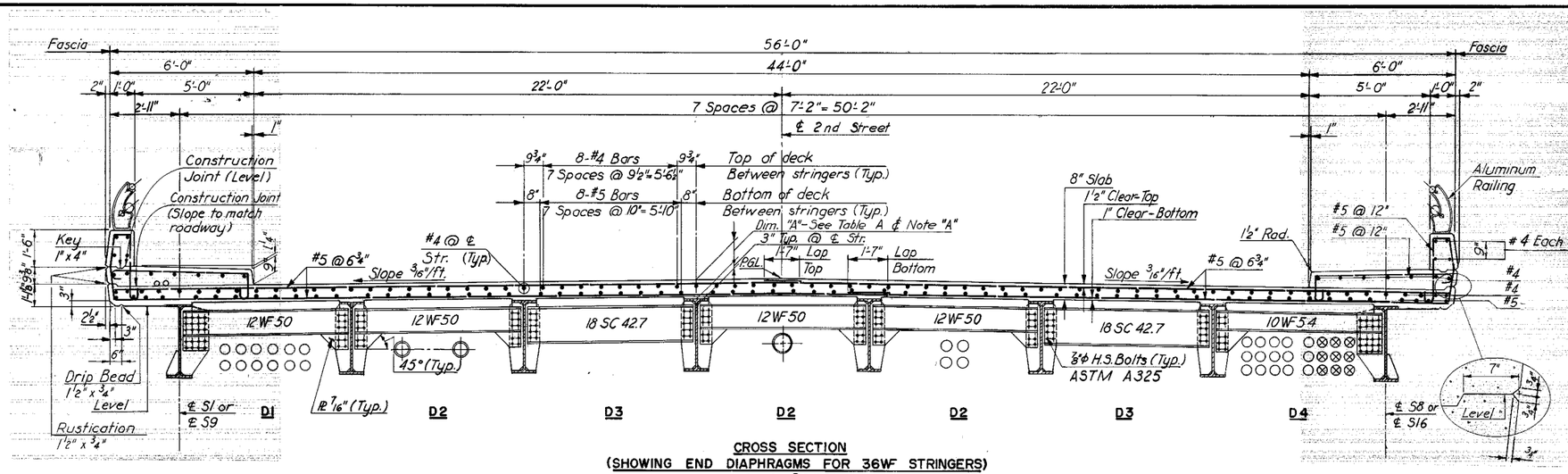
AS BUILT

130

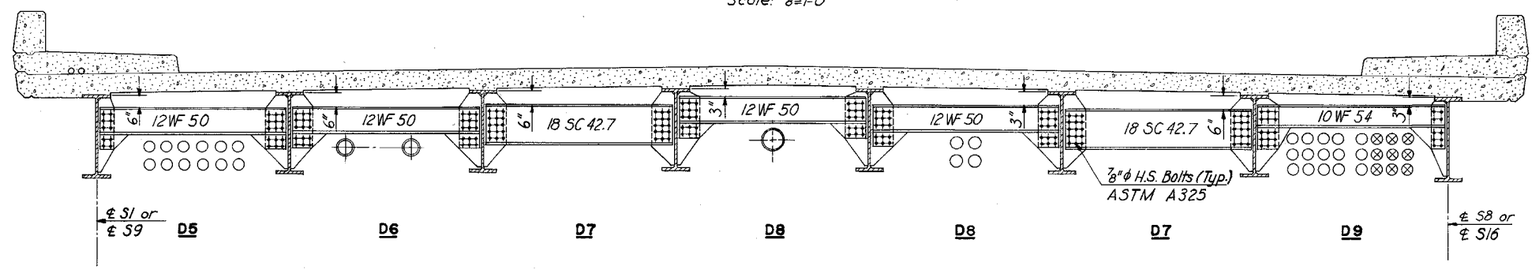
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	131	

TABLE A	
STRINGER	DIM "A"
S1-S8	10⅞"
S9-S16	10½"

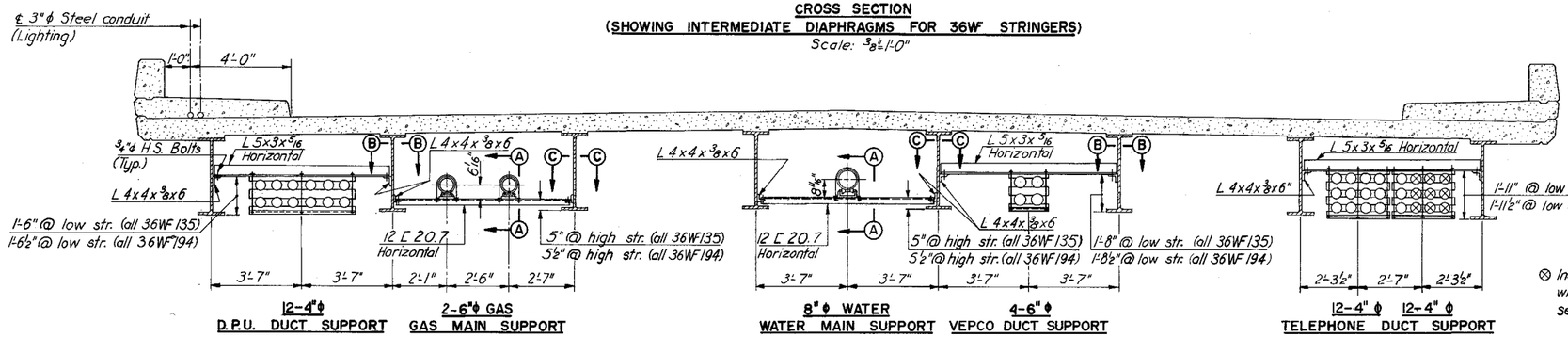
NOTE "A":
Dimension shown is measured from top of stringer to top of slab at the intersection of the centerline of stringer and the centerline of bearing. At exterior stringers this is measured to the cross slope extended. This dimension may be varied between bearings as required to care for variation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



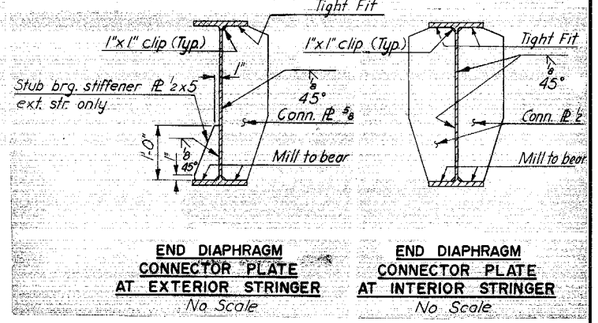
CROSS SECTION
(SHOWING END DIAPHRAGMS FOR 36WF STRINGERS)
Scale: ⅜"=1'-0"



CROSS SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS FOR 36WF STRINGERS)
Scale: ⅜"=1'-0"

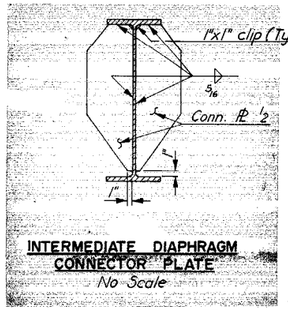


⊗ Indicates existing telephone ducts which are to be maintained in service. See Sheet 3.



END DIAPHRAGM CONNECTOR PLATE AT EXTERIOR STRINGER
No Scale

END DIAPHRAGM CONNECTOR PLATE AT INTERIOR STRINGER
No Scale



INTERMEDIATE DIAPHRAGM CONNECTOR PLATE
No Scale

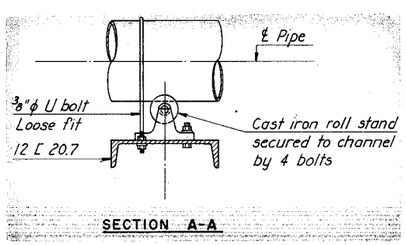
FOR 36WF STRINGERS

NOTES:
For spacing and location of utility supports and diaphragms, see Framing Plan (1) sheet.

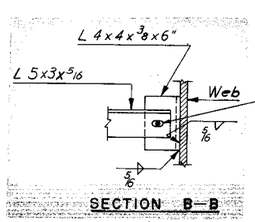
For Basic Attachment Details for cement asbestos conduit, see Standard Conduit Installation Details sheet.

For details showing gas and water mains thru abutments, see Standard Utility Support Details At Bridge Abutments sheet.

CROSS SECTION
(SHOWING UTILITY SUPPORTS FOR 36WF STRINGERS)
Scale: ⅜"=1'-0"

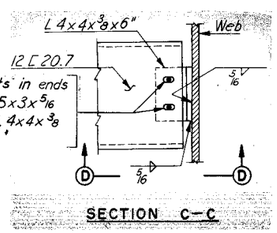


SECTION A-A

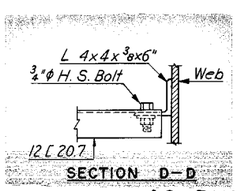


SECTION B-B

Provide 13/16"x1¼" slots in ends of 12 C 20.7 and L 5x3x5/16 and 13/16" ϕ hole in L 4x4x⅜ for ¾ ϕ H.S. bolts



SECTION C-C



SECTION D-D

	BY	DATE				
MADE	EVR	10-67				
CHECKED	DSB	5-68	1	As Built	TEM	6-77
IN CHARGE	P.R.V.		NO.	REVISION	BY	DATE

AS BUILT

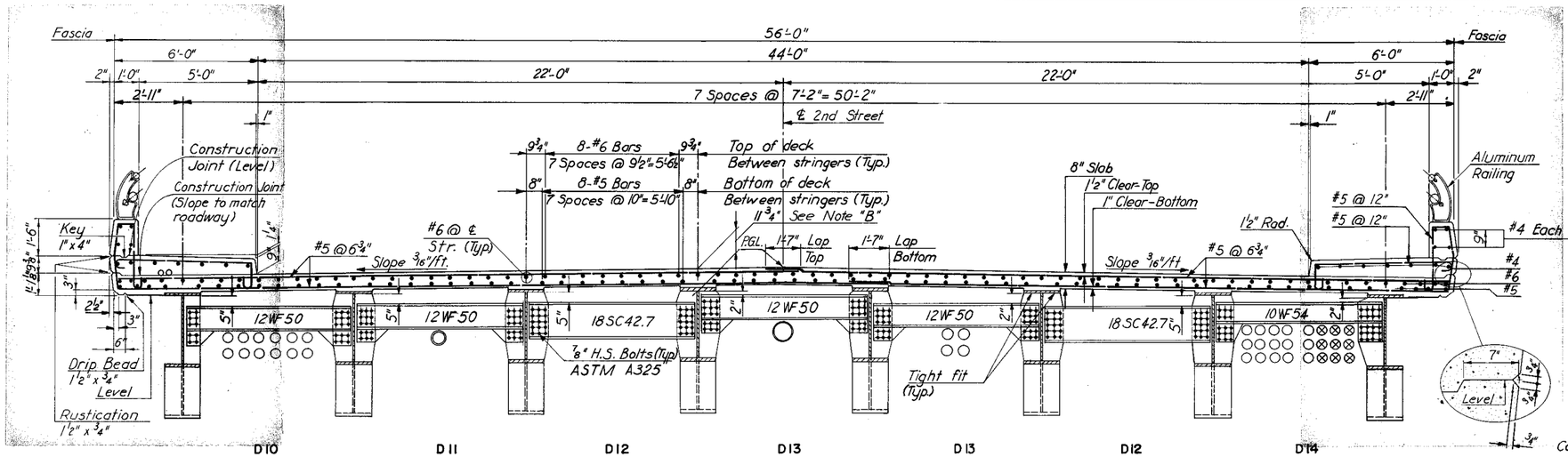
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-54
2ND STREET OVER DOWNTOWN EXPRESSWAY
CROSS SECTION (1)

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

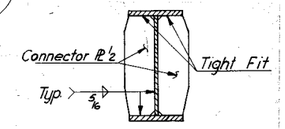
SCALE: AS SHOWN
CONTRACT NO. 9
SHEET NO. 13 OF 20

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	132	

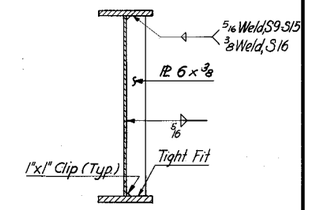


CROSS SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS FOR WELDED PLATE STRINGERS)
Scale: 3/8" = 1'-0"

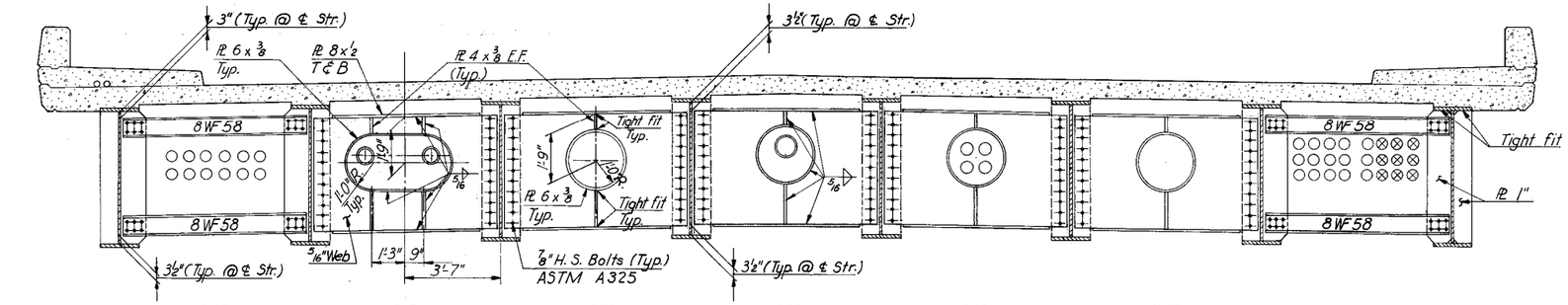
NOTE "B":
Dimension shown is measured from top of web to top of slab at the intersection of the centerline of stringer and the centerline of bearing. At exterior stringers this is measured to the cross slope extended. This dimension may be varied between bearings as required to care for variation in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



INTERMEDIATE DIAPHRAGM CONNECTOR PLATE
D10 THRU D14



INTERMEDIATE STIFFENER AT DIAPHRAGM D5 THRU D9

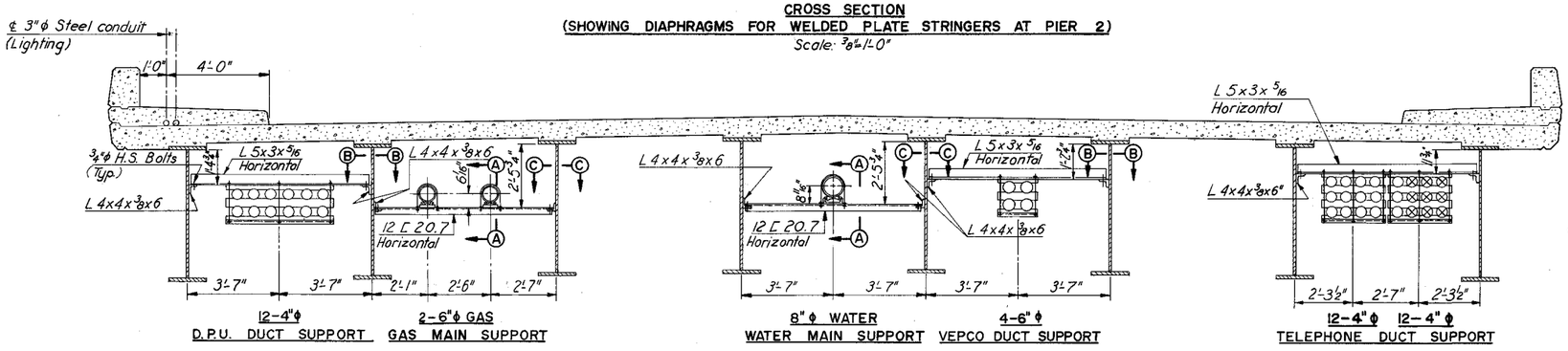


CROSS SECTION
(SHOWING DIAPHRAGMS FOR WELDED PLATE STRINGERS AT PIER 2)
Scale: 3/8" = 1'-0"

BEARING STIFFENER AT PIER 2
D15 & D16

* *Bearing stiffener width is minimum and may be increased to accommodate diaphragm.*

FOR WELDED PLATE STRINGERS
No Scale



12-4" ϕ D.P.U. DUCT SUPPORT | **2-6" ϕ GAS GAS MAIN SUPPORT** | **8" ϕ WATER WATER MAIN SUPPORT** | **4-6" ϕ VEPCO DUCT SUPPORT** | **12-4" ϕ 12-4" ϕ TELEPHONE DUCT SUPPORT**

CROSS SECTION
(SHOWING UTILITY SUPPORTS FOR WELDED PLATE STRINGERS)
Scale: 3/8" = 1'-0"

⊗ *Indicates existing telephone ducts which are to be maintained in service. See Sheet 3.*

NOTES:

For spacing and location of utility supports and diaphragms, see Framing Plan (1) sheet.

For Basic Attachment Details for cement asbestos conduit, see Standard Conduit Installation Details sheet.

For details showing gas and water mains thru abutments, see Standard Utility Support Details At Bridge Abutments sheet.

For Sections A-A, B-B, C-C, see Cross Section (1) Sheet.

	BY	DATE				
MADE	EVR	1-68				
CHECKED	DSB	5-68	1	As Built	TEM	6-77
IN CHARGE P.R.Y.			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

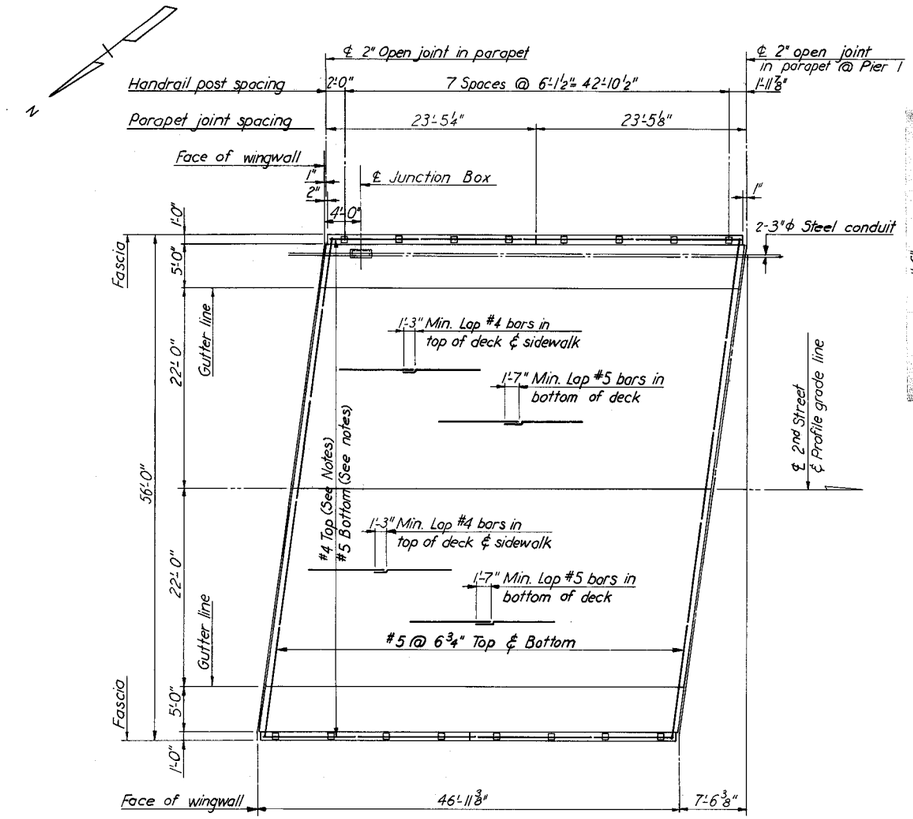
BRIDGE B-54
2ND STREET OVER DOWNTOWN EXPRESSWAY

CROSS SECTION (2)

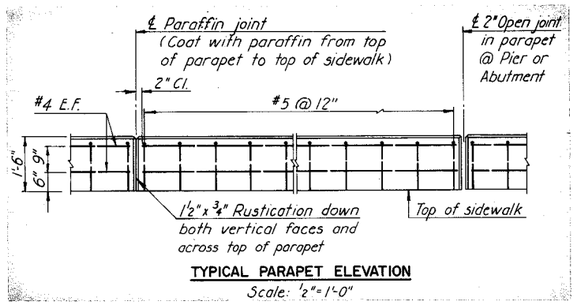
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 14 OF 20

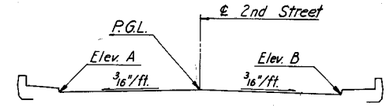
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	133	



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



TYPICAL PARAPET ELEVATION
Scale: ½"=1'-0"



(LOOKING IN DIRECTION OF STATIONING)

PAVEMENT ELEVATIONS

STATION	ELEV. A	℄ & P.G.L.	ELEV. B	STATION	ELEV. A	℄ & P.G.L.	ELEV. B
15+90.00	*142.76	*143.10	*142.76	+40.00	136.42	136.76	136.42
16+00.00	*142.42	*142.76	*142.42	17+50.00	135.91	136.25	135.91
+10.00	*142.06	*142.40	142.06	+60.00	135.39	135.73	135.39*
+11.13	——	——	142.02	+62.01	——	——	135.28
+14.20	——	142.25	——	+63.63	——	135.54	——
+17.26	141.80	——	——	+65.25	135.11	——	——
+20.00	141.70	142.04	141.70	+70.00	134.87	135.21	134.87
+30.00	141.32	141.66	141.32	+80.00	134.35	134.69	134.35
+40.00	140.93	141.27	140.93	+90.00	133.83	134.17	133.83
16+50.00	140.53	140.87	140.53	18+00.00	133.31	133.65	133.31
+58.08	——	——	140.20	+10.00	132.79	133.13	132.79
+60.00	140.12	140.46	140.12	+20.00	132.27	132.61	132.27
+61.15	——	140.42	——	+30.00	131.75	132.09	131.75
+64.21	139.94	——	——	+40.00	131.23	131.57	131.23
+70.00	139.70	140.04	139.70	18+50.00	130.71	131.05	130.71
+80.00	139.27	139.61	139.27	+60.00	130.19	130.53	130.19
+90.00	138.82	139.16	138.82	+67.04	129.82	130.16	129.82
17+00.00	138.37	138.71	138.37	+70.00	129.67	130.01	129.67
+10.00	137.90	138.24	137.90	+80.00	*129.15	*129.49	*129.15
+20.00	137.42	137.76	137.42	+90.00	——	*128.97	——
+30.00	136.93	137.27	136.93	19+00.00	——	*128.45	——

* Elevations shown are given to top of bituminous surfacing.

NOTES:

For location and spacing of deck, parapet and sidewalk reinforcing, see Cross Section (1) sheet.

For location and spacing of reinforcing in haunch over end diaphragms, see Joint Details sheet.

For lighting standard base, junction box details and additional reinforcing, see Standard Electrical Details sheet S4.

	BY	DATE				
MADE	EVR	3-68				
CHECKED	DSB	5-68	1	As Built	TEM	6-77
IN CHARGE P.R.V.			NO.	REVISION	BY	DATE

AS BUILT

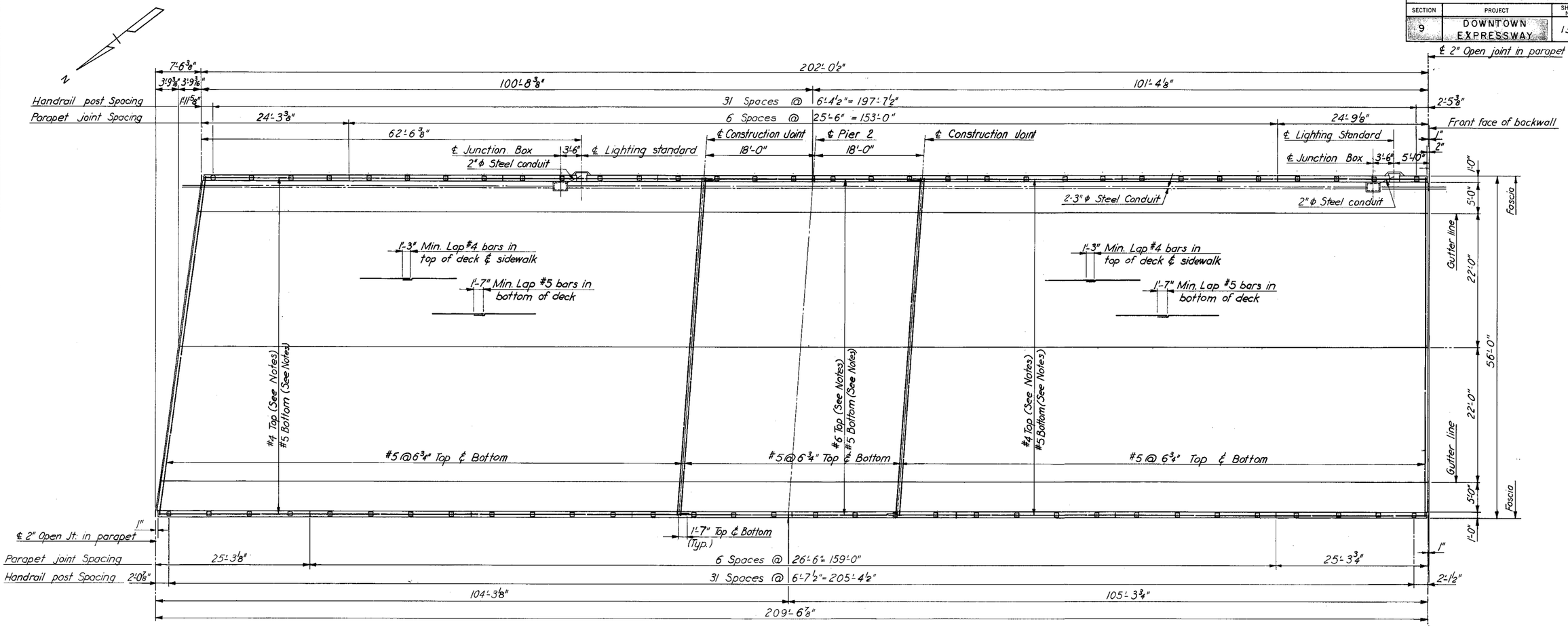
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-54
2ND STREET OVER DOWNTOWN EXPRESSWAY
DECK PLAN 1

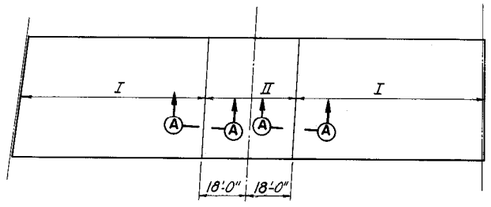
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 15 OF 20

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	134	



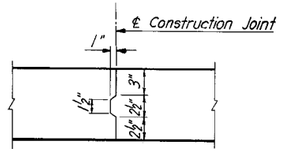
PLAN — UNIT 2
Scale: 1/8"=1'-0"



OPTIONAL
DECK POURING SEQUENCE
No Scale

Area marked I indicates first pour.
Area marked II indicates second pour.

Note:
Unit 2 was poured in one pour.



SECTION A-A
No Scale

NOTES:

For location and spacing of deck parapet and sidewalk reinforcement see Cross Section (1) Sheet for end portion and Cross Section (2) Sheet for Pier 2.

For location and spacing of reinforcing in haunch over end diaphragms, see Joint Details sheet.

For lighting standard base, junction box details and additional reinforcing, see Standard Electrical Details sheet S4.

	BY	DATE				
MADE	EVR	3-68				
CHECKED	DSB	5-68	1	As Built	TEM	6-77
IN CHARGE	PRY		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-54
2ND STREET OVER
DOWNTOWN EXPRESSWAY

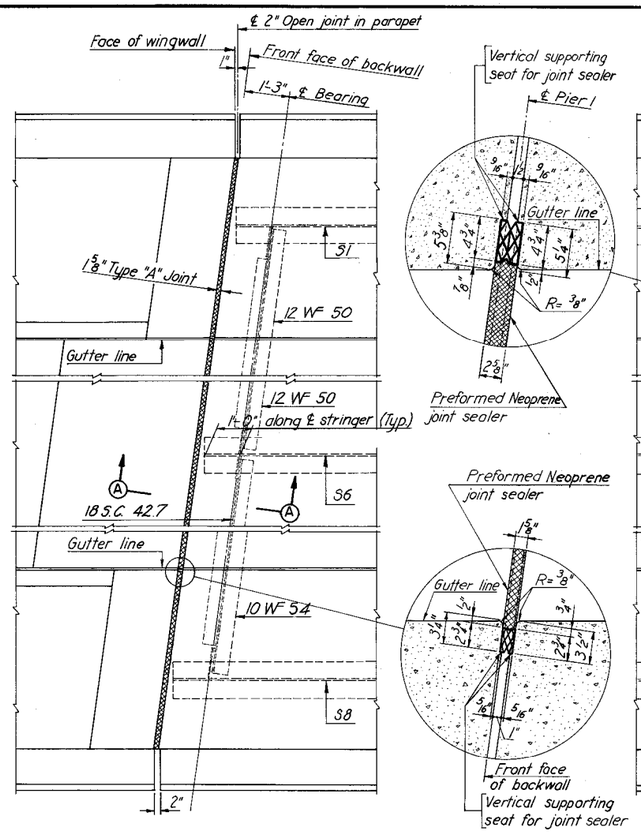
DECK PLAN 2

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

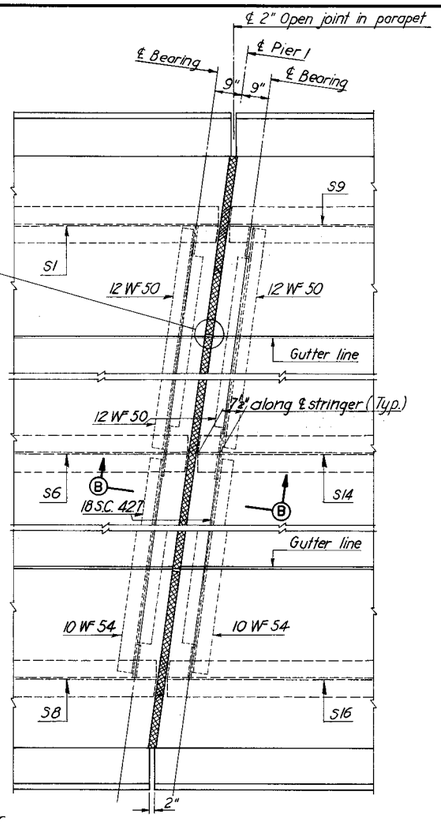
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 16 OF 20

134

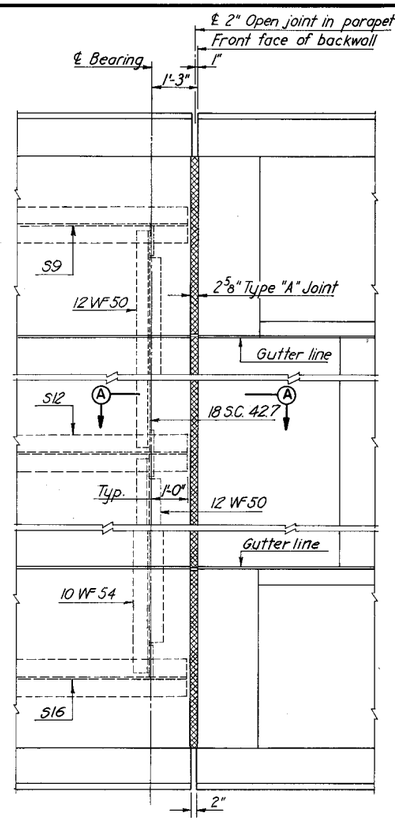
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	135	



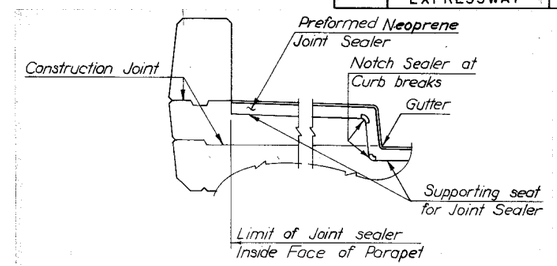
PLAN - JOINT AT NORTH ABUTMENT
Scale: ½"=1'-0"



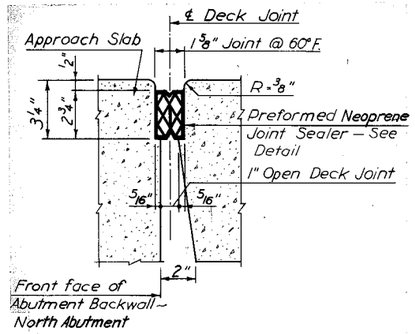
PLAN - JOINT AT PIER I
Scale: ½"=1'-0"



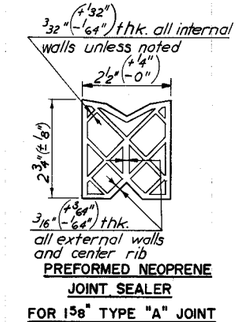
PLAN - JOINT AT SOUTH ABUTMENT
Scale: ½"=1'-0"



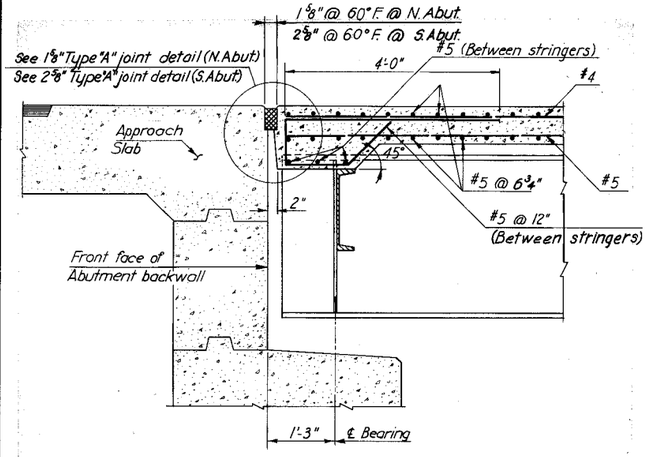
TREATMENT OF TYPE "A" JOINT AT CURB
No Scale



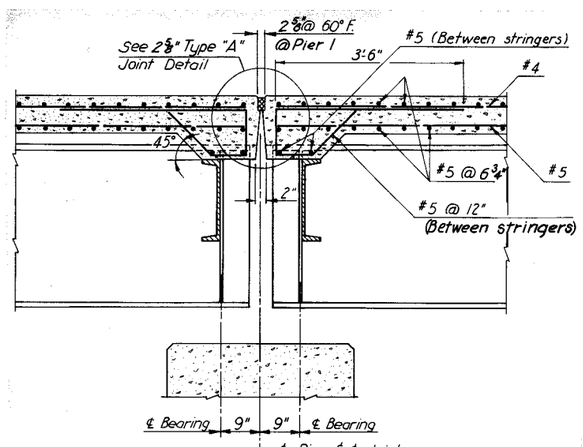
1⅝" TYPE "A" JOINT
Scale: 3"=1'-0"



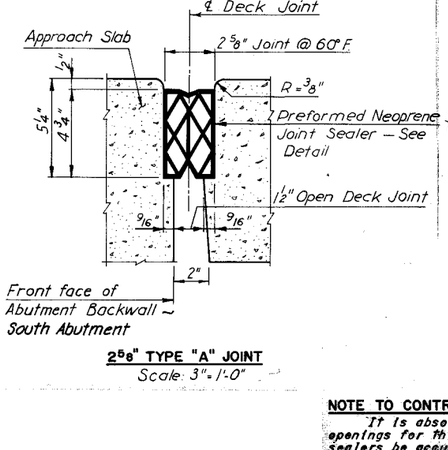
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half size



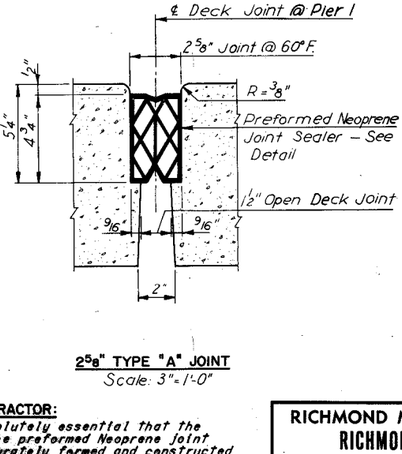
SECTION A-A
Scale: ¾"=1'-0"



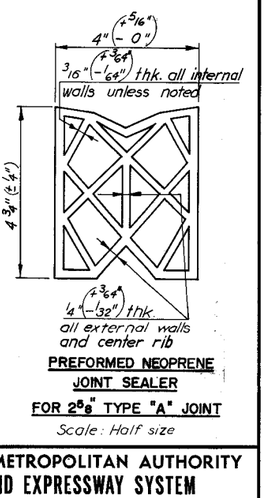
SECTION B-B
Scale: ¾"=1'-0"



2⅝" TYPE "A" JOINT
Scale: 3"=1'-0"



2⅝" TYPE "A" JOINT
Scale: 3"=1'-0"



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

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

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-54
2ND STREET OVER DOWNTOWN EXPRESSWAY

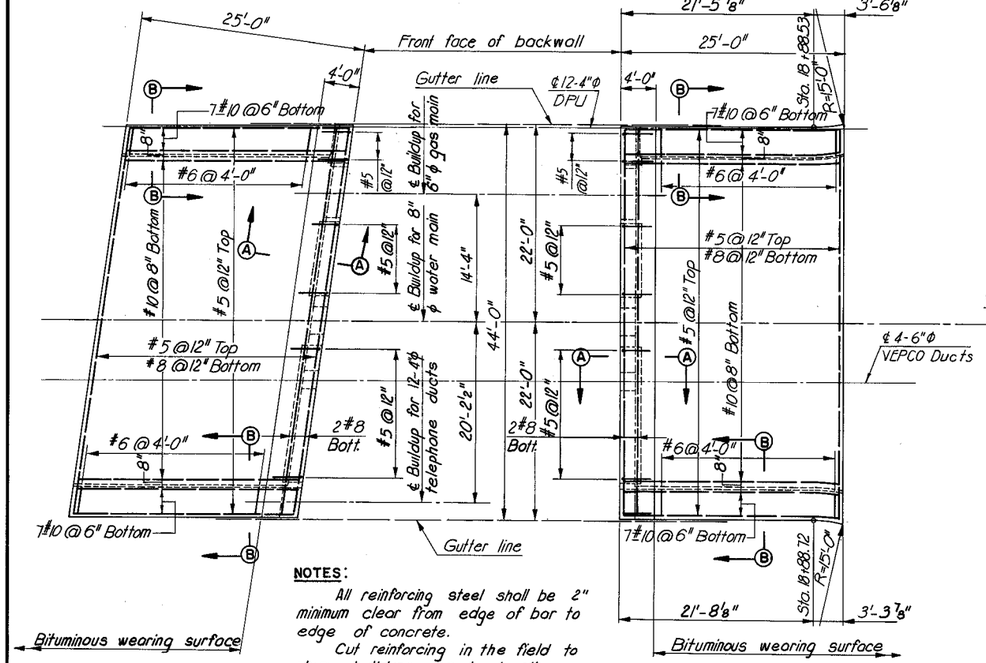
JOINT DETAILS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 17 OF 20

135

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	136	



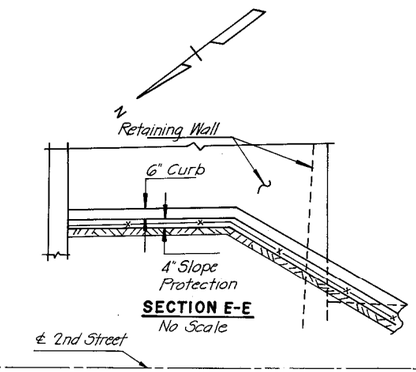
NOTES:

All reinforcing steel shall be 2" minimum clear from edge of bar to edge of concrete.

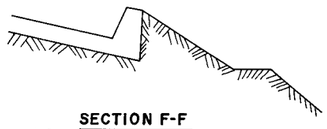
Cut reinforcing in the field to clear buildups on backwall.

NORTH APPROACH SLAB
Scale: ⅛"=1'-0"

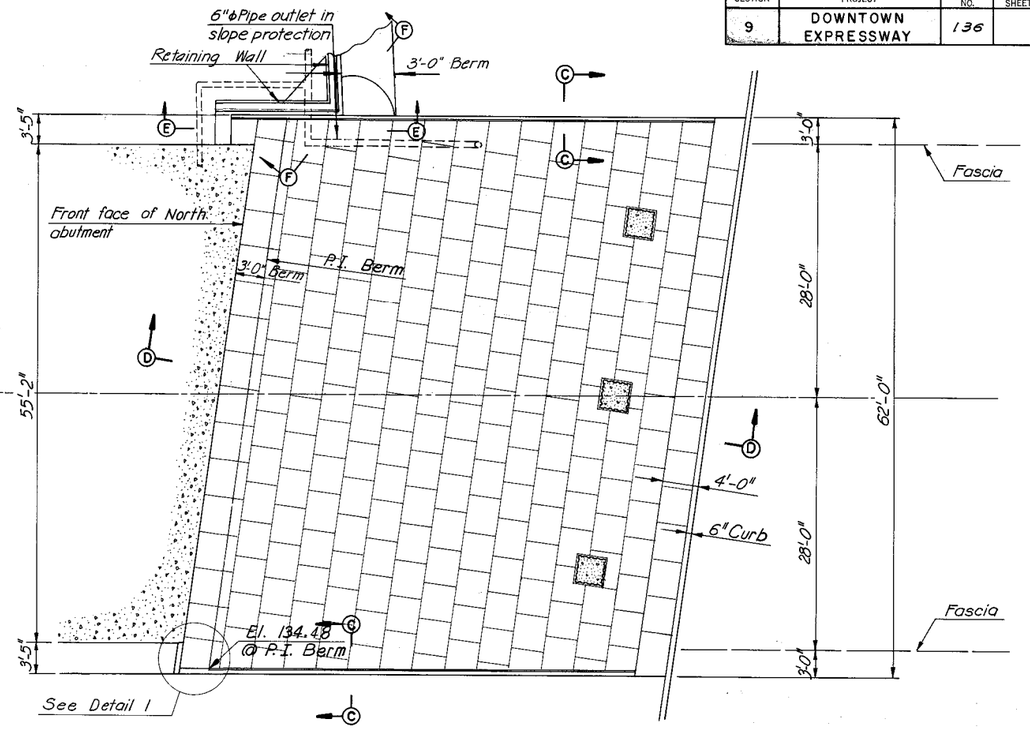
SOUTH APPROACH SLAB
Scale: ⅛"=1'-0"



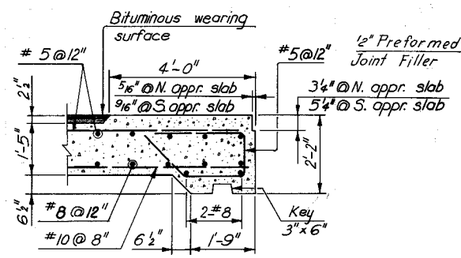
SECTION E-E
No Scale



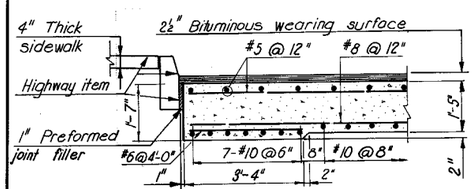
SECTION F-F



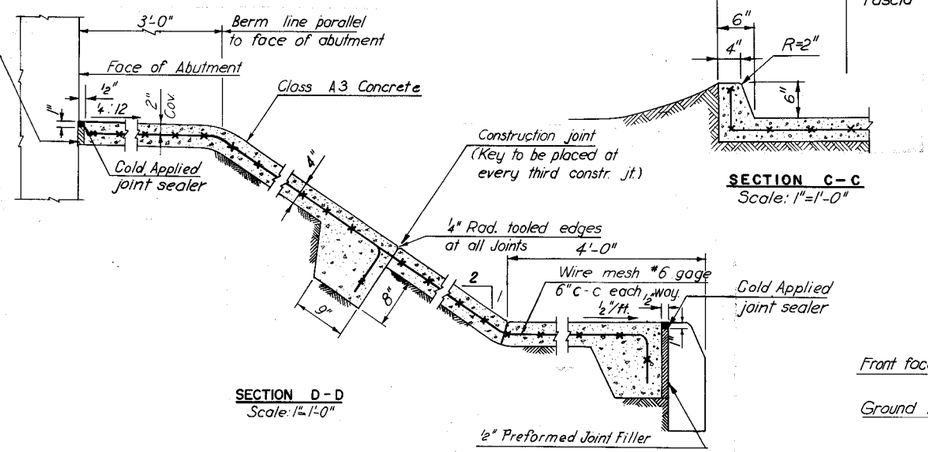
PLAN OF SLOPE PROTECTION
Scale: ⅛"=1'-0"



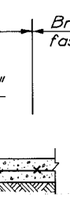
SECTION A-A
Scale: ½"=1'-0"



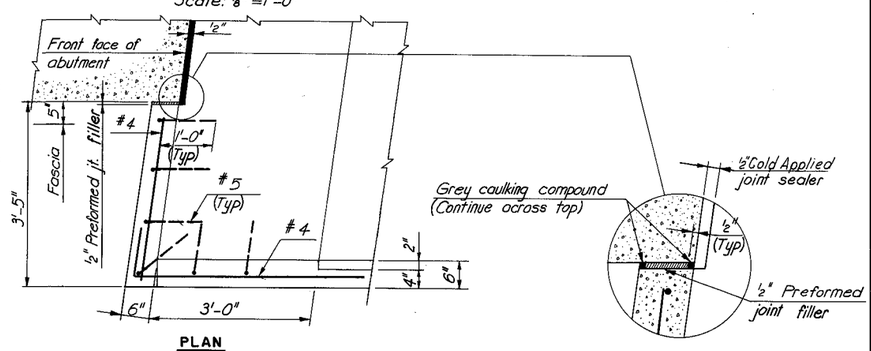
SECTION B-B
Scale: ½"=1'-0"



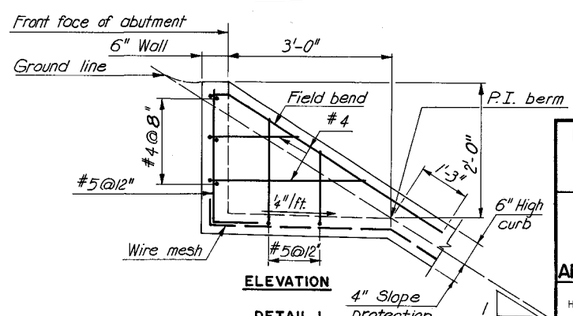
SECTION D-D
Scale: 1"=1'-0"



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



PLAN



ELEVATION

DETAIL 1
Scale: ¾"=1'-0"

SLOPE PROTECTION NOTE:

The item "Cast-in-Place Concrete Slab Slope Protection" shall include the excavation of, or the placing and compaction of any embankment material necessary to bring the surface of the paved slopes to the finished elevations shown on the plans.

"Cast-in-Place Concrete Slab Slope Protection" shall be paid for at the contract unit price per square yard, which price shall include the concrete slab including wire mesh and joint filler.

The slab shall be constructed in 4'-0" x 4'-0" panels, placed in horizontal courses, alternate panels being poured in a staggered pattern with adjacent panels poured later. The slab shall be Class A3 concrete of such consistency that it can be placed without the use of top forms. The surface shall be finished with a wood float.

Reinforcing shall consist of wire mesh No. 6 gage, 6" c.c. each way, placed at the center of the slab, and continuous through construction joints.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	ebm	12-67	2	As Built	TEM	6-77
CHECKED	DSB	5-68	1	Slope Protection @ N.E. Corner		
IN CHARGE	P.R.V.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-54

2ND STREET OVER DOWNTOWN EXPRESSWAY

APPROACH SLABS AND SLOPE PROTECTION

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 18 OF 20

136

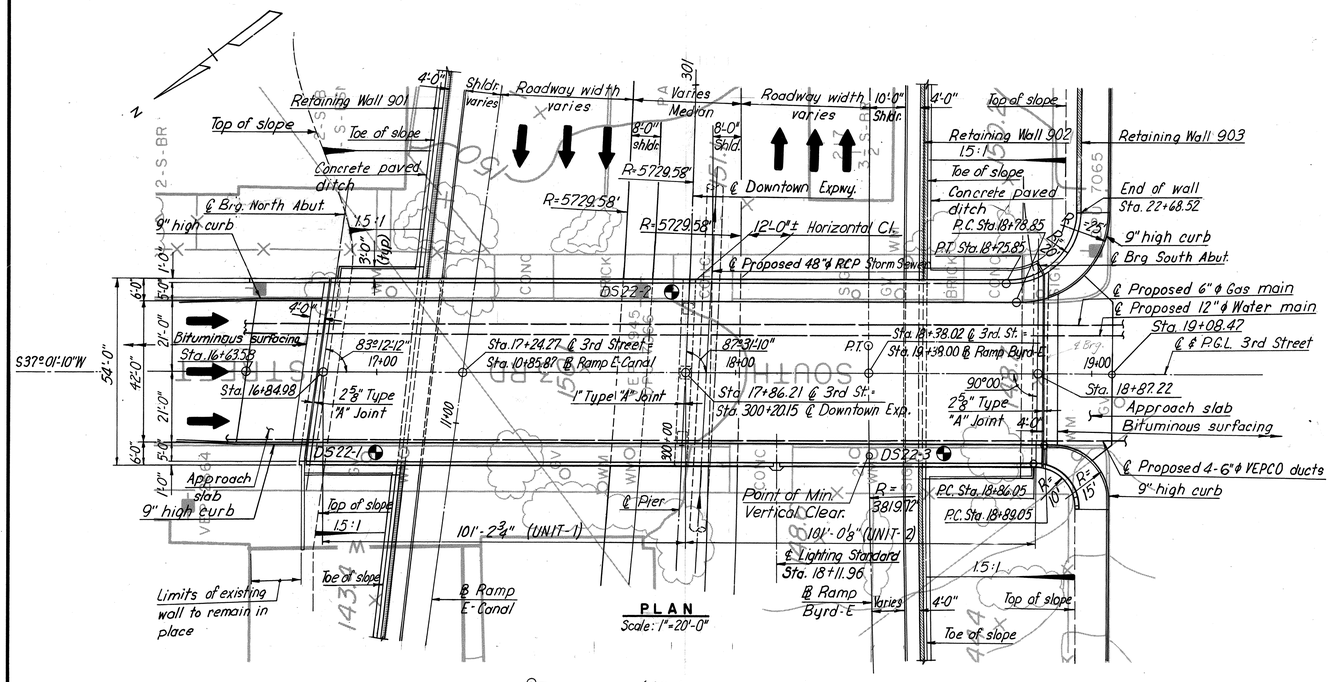
Bridge 55

(South 3rd Street
Over Downtown Expressway {Rte. 195})

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	139	

INDEX



PLAN
Scale: 1"=20'-0"

SECTION A-A

PIER 1

SECTION B-B

SECTION C-C

PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale

PROFILE GRADE
3RD STREET
Not to Scale

PROFILE GRADE
DOWNTOWN EXPRESSWAY
Not to Scale

ELEVATION
Scale 1"=20'-0"

BORINGS: ⊕ Indicates location of 2½"ϕ cased hole boring. For boring data, see Boring Logs sheet.

NOTE: For General Notes and Quantities, see next sheet.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.E.M.	1-68	2	As Built	TEM	6-77
CHECKED	A.B.P.	3-68	1	Ret. Wall Deleted	H.M.W.	4-15-76
IN CHARGE	P.R.Y.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

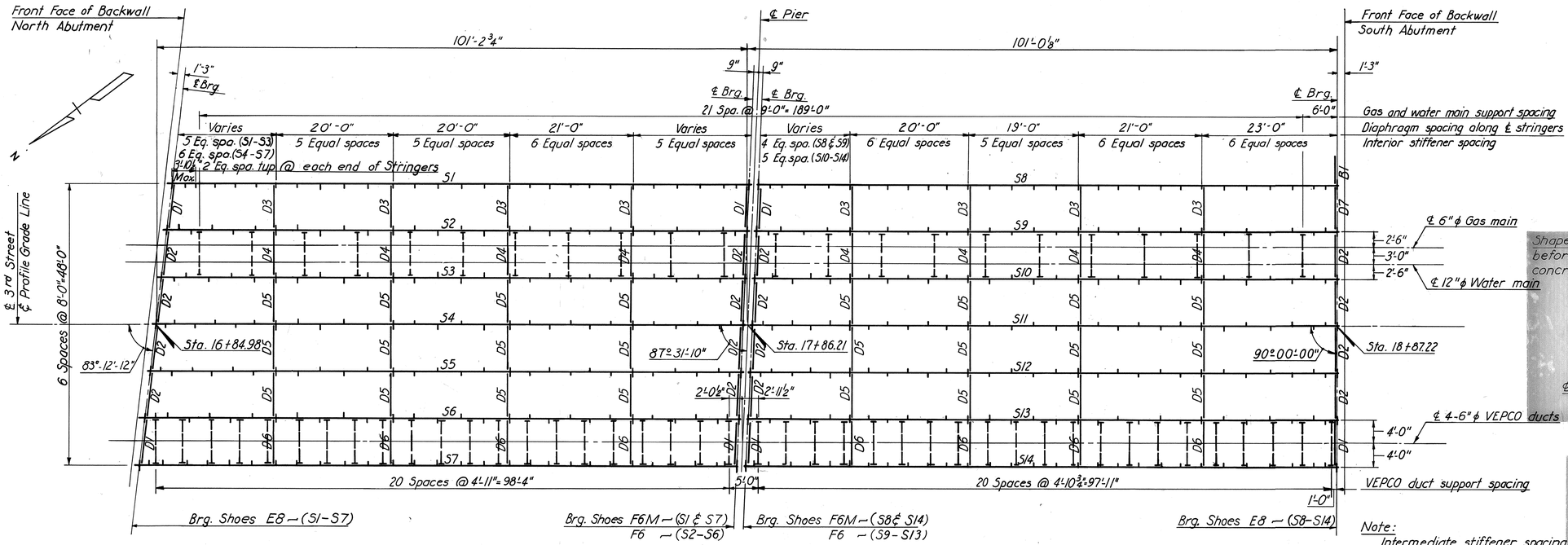
BRIDGE B-55
3RD STREET OVER DOWNTOWN EXPRESSWAY

GENERAL PLAN AND ELEVATION

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

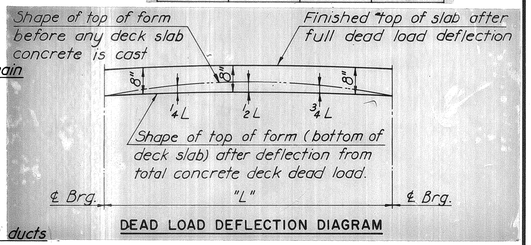
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 1 OF 16

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	149	



FRAMING PLAN
Scale: 1"=10'

SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E8	14	F6M	4
		F6	10



DEAD LOAD DEFLECTION DIAGRAM

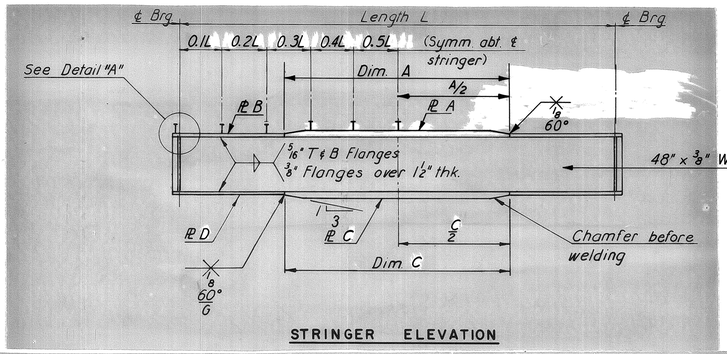
DEFLECTION SCHEDULE					
STR.	¼L & ¾L	½L	STR.	¼L & ¾L	½L
S1, S6, S8			S2, S3, S9	1½"	2"
S11, S12	1½"	2⅛"	S10, S13		
S14			S4, S5, S7	1⅝"	2⅛"

Note:
Intermediate stiffener spacing along stringers may be varied to clear utility supports.

CAMBER DIAGRAM

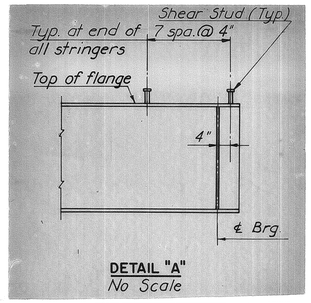
CAMBER SCHEDULE							
STR.	¼L	½L	¾L	STR.	¼L	½L	¾L
S1-S3				S4, S5	2"	2⅞"	2"
S6	2"	2¾"	2"	S7			
S8-S14							

NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
Dimensions are in inches.

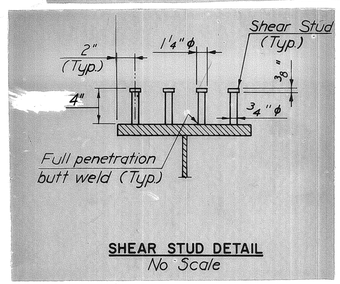


STRINGER ELEVATION

STRINGER SCHEDULE												
STR.	LENGTH ℄ BRG. TO ℄ BRG.	℄ A	DIM A	℄ B	℄ C	DIM C	℄ D	SHEAR STUD SPACING 0.1L	0.2L	0.3L	0.4L	0.5L
S1	98'-7⅞"	16 x ¼	53'-0"	16 x ⅞	20 x 1⅞	63'-0"	20 x 1¼	9"	10½"	13½"	18"	21"
S2	99'-3⅜"	16 x 1⅜	57'-0"			64'-0"		10"	11½"	14"	18"	20"
S3	99'-10½"	16 x 1⅜	57'-0"								18"	20"
S4	100'-5¾"	16 x 1¼	53'-0"								17½"	19½"
S5	101'-1⅛"	16 x ¼	53'-0"		20 x 1⅞	64'-0"	20 x 1¼				17½"	19½"
S6	101'-8⅝"	16 x 1⅜	59'-0"	16 x ⅞	20 x 2	62'-0"	20 x 1⅜	10"	11½"	14"	17½"	20"
S7	102'-3⅝"	16 x 1½	57'-0"	16 x 1	20 x 2⅛	66'-0"	20 x 1⅜	9"	10½"	13½"	18½"	22"
S8	99'-2⅜"	16 x ¼	53'-0"	16 x ⅞	20 x 1⅞	63'-0"	20 x 1¼	9"	10½"	13½"	18"	21"
S9	99'-6¹³/₁₆"	16 x 1⅜	57'-0"			64'-0"		10"	11½"	14"	18"	20"
S10	99'-10¹⁵/₁₆"	16 x 1⅜	57'-0"			64'-0"					18"	20"
S11	100'-3⅜"	16 x 1¼	52'-0"			63'-0"					17½"	19½"
S12	100'-7¼"	16 x 1¼	52'-0"		20 x 1⅞	63'-0"	20 x 1¼			14"	17½"	19½"
S13	100'-11⅞"	16 x 1⅜	58'-0"	16 x ⅞	20 x 2	61'-0"	20 x 1⅜	10"	11½"	13½"	18"	20"
S14	101'-3⅝"	16 x 1½	55'-0"	16 x 1	20 x 2⅛	65'-0"	20 x 1⅜	9"	11"	13½"	18½"	22"



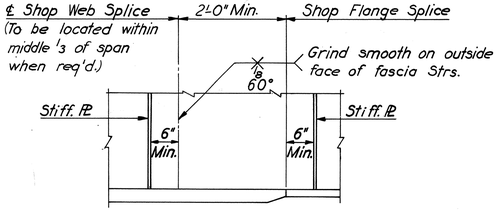
DETAIL "A"
No Scale



SHEAR STUD DETAIL
No Scale

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

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



SHOP SPLICE DETAILS
Scale: ¾"=1'-0"

AS BUILT

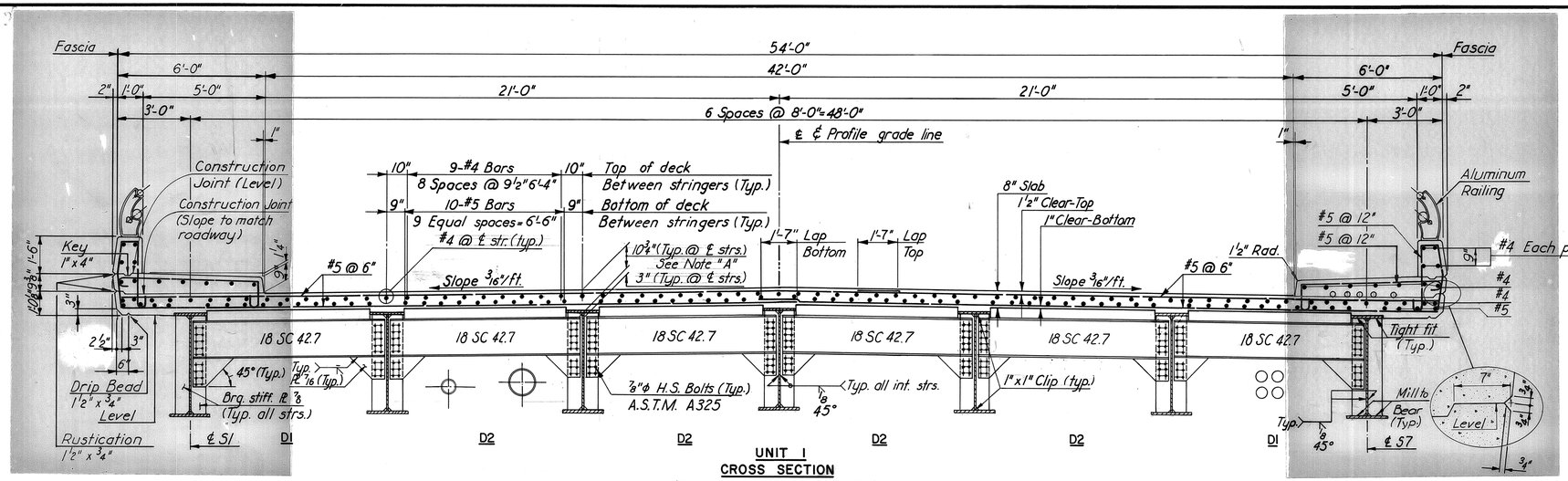
	BY	DATE				
MADE	EVR	12-14				
CHECKED	T.E.M.	2-68	1	As Built	TEM	6-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE B-55
3RD STREET OVER DOWNTOWN EXPRESSWAY
FRAMING PLAN

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

SCALE: AS SHOWN
CONTRACT NO. 9
SHEET NO. 11 OF 16

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	150	



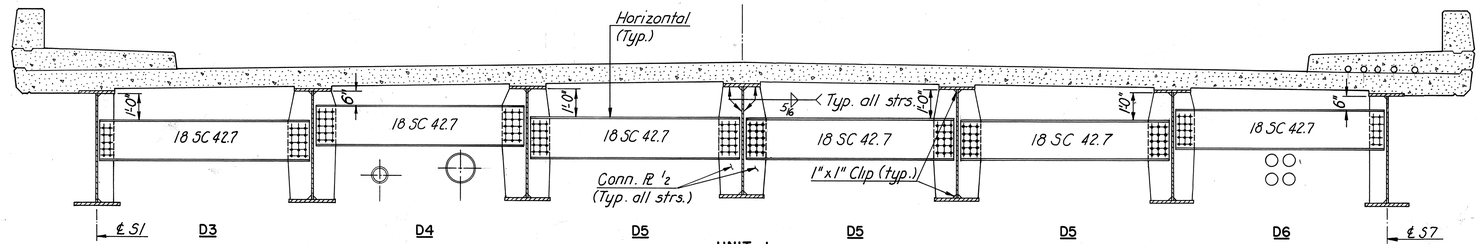
UNIT 1
CROSS SECTION
(SHOWING END DIAPHRAGMS)
Scale: ⅜"=1'-0"

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. At exterior stringers this is measured to the cross slope extended. 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.

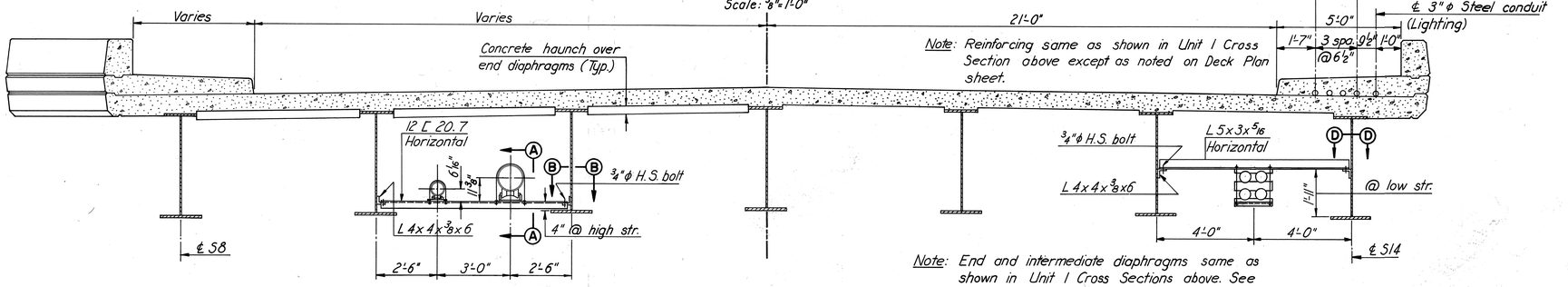
NOTES:
For spacing and location of utility supports and diaphragms, see Framing Plan sheet.

For Basic Attachment Details for cement asbestos conduit, see Standard Conduit Installation Details sheet.

For details showing gas and water mains thru abutments, see Standard Utility Support Details At Bridge Abutments sheet.



UNIT 1
CROSS SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)
Scale: ⅜"=1'-0"

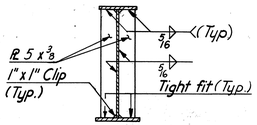


Note: Reinforcing same as shown in Unit 1 Cross Section above except as noted on Deck Plan sheet.

Note: End and intermediate diaphragms same as shown in Unit 1 Cross Sections above. See Framing Plan sheet and Partial Cross Section this sheet.

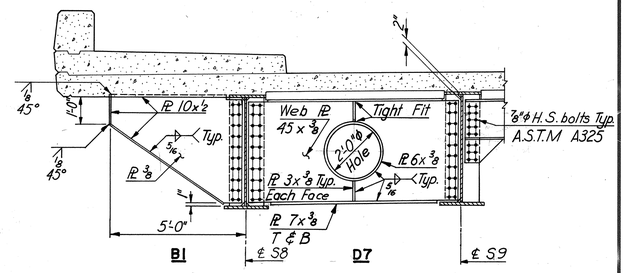
6"ϕ GAS 12"ϕ WATER
GAS & WATER MAIN SUPPORT

4-6"ϕ
VEPCO DUCT SUPPORT

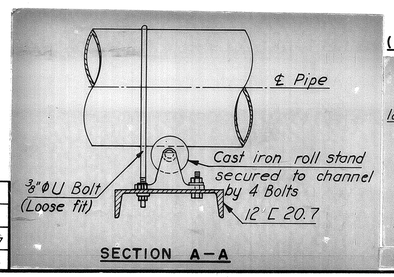


Note: Stiffener shall be welded to compression flange and have a tight fit to the tension flange.

INTERMEDIATE STIFFENER DETAIL

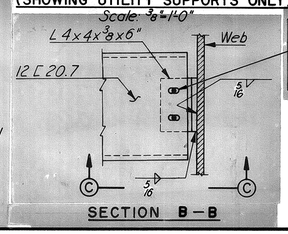


UNIT 2
PARTIAL CROSS SECTION
(SHOWING END DIAPHRAGM AT SOUTH ABUTMENT)
Scale: ⅜"=1'-0"



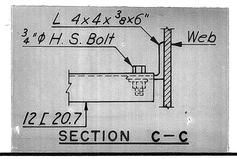
SECTION A–A

UNIT 2
CROSS SECTION
(SHOWING UTILITY SUPPORTS ONLY)
Scale: ⅜"=1'-0"

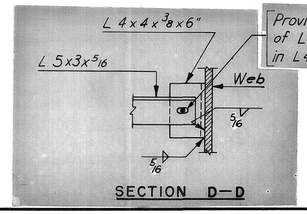


Provide 13/16"x1¼" slots in ends of 12 C 20.7 and 13/16"ϕ hole in L 4x4x⅜x6 for ¾"ϕ H.S. bolt.

SECTION B–B



SECTION C–C



Provide 13/16"x1¼" slots in ends of L 5x3x5/16 and 13/16"ϕ hole in L 4x4x⅜x6 for ¾"ϕ H.S. bolt.

SECTION D–D

	BY	DATE				
MADE	C.B.P.	10-67				
CHECKED	T.E.M.	2-68	1	As Built	T.E.M.	6-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

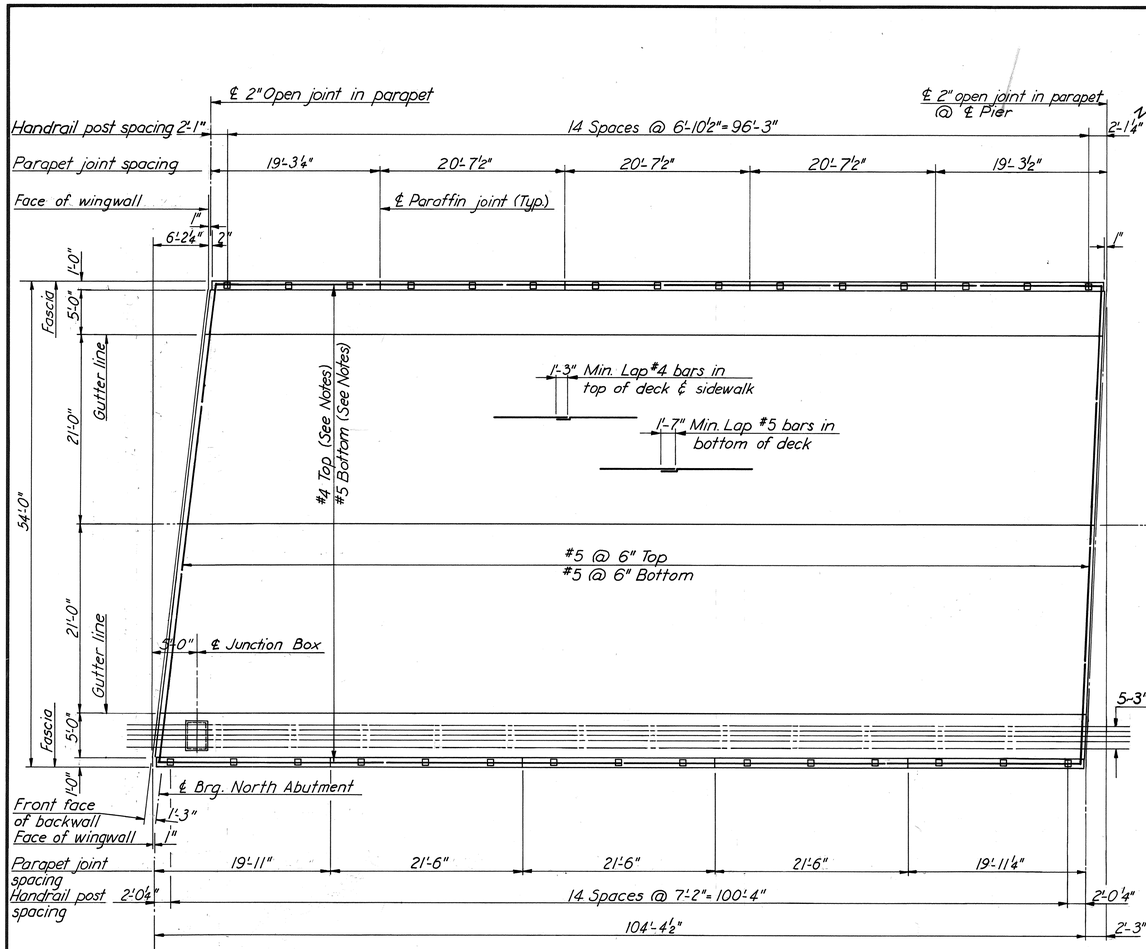
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE B-55
3RD STREET OVER DOWNTOWN EXPRESSWAY
CROSS SECTION AND UTILITY DETAILS

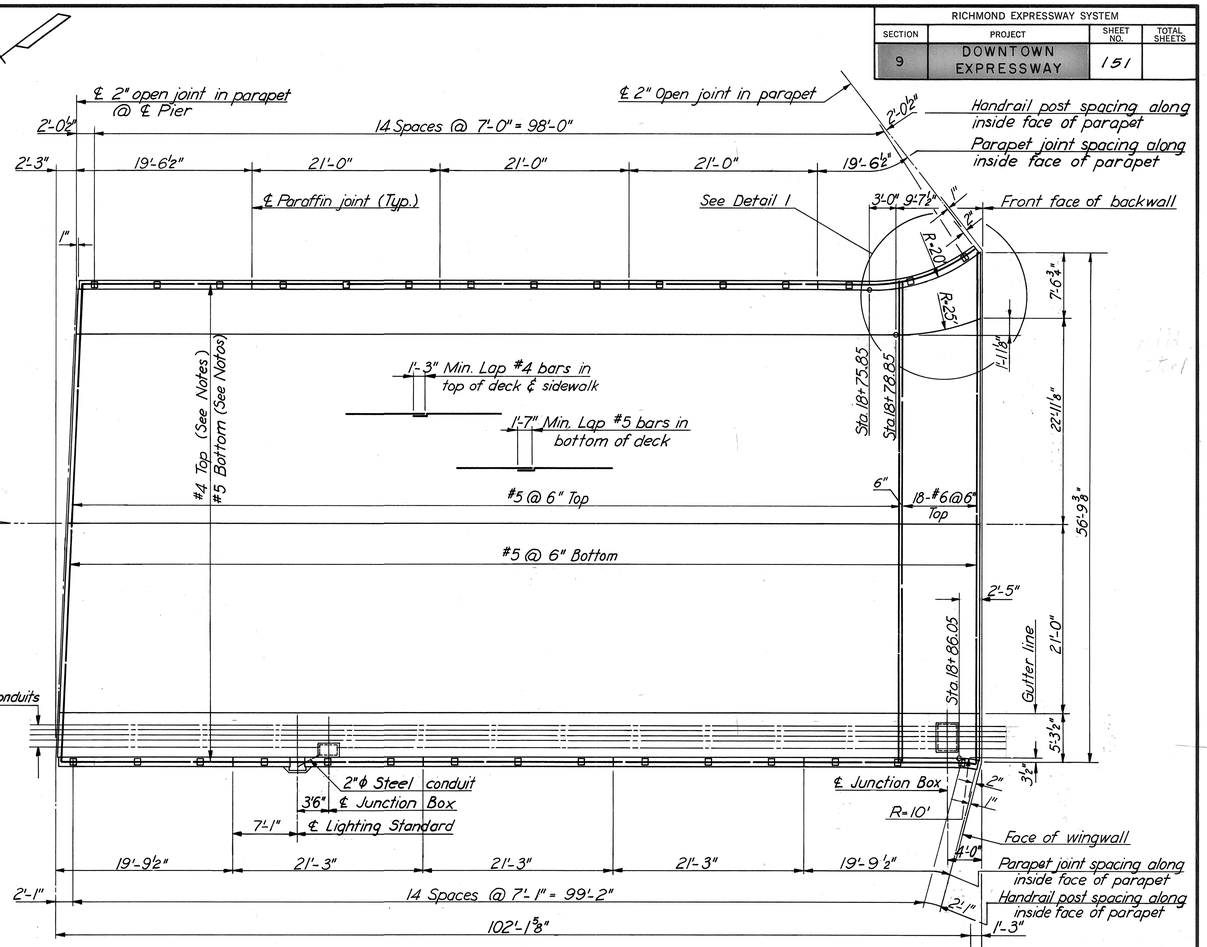
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 12 OF 16

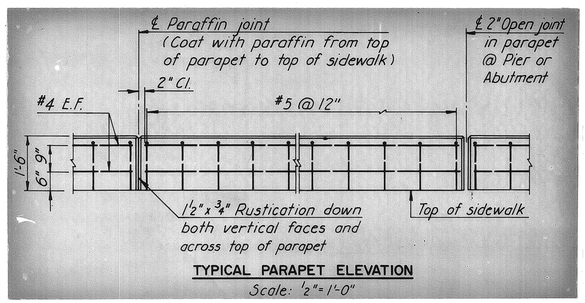
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	151	



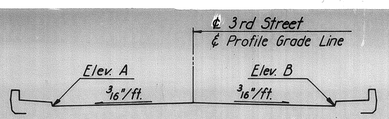
PLAN - UNIT 1
Scale: ⅜" = 1'-0"



PLAN - UNIT 2
Scale: ⅜" = 1'-0"



TYPICAL PARAPET ELEVATION
Scale: ½" = 1'-0"

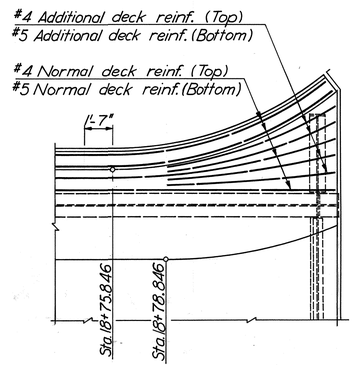


(LOOKING IN DIRECTION OF STATIONING)

PAVEMENT ELEVATIONS

STATION	ELEV. A	℄ & P.G.L.	ELEV. B	STATION	ELEV. A	℄ & P.G.L.	ELEV. B
16+60	—	152.05*	151.72*	+85.30	—	—	150.47
+70	151.62*	151.95*	151.62*	+86.21	—	150.79	—
+80	151.52*	151.85	151.52	+87.12	150.45	—	—
+81.23	—	—	151.51	+90	150.42	150.75	150.42
+83.72	—	151.81	—	18+00	150.32	150.65	150.32
+86.23	151.46	—	—	+10	150.22	150.55	150.22
+90	151.42	151.75	151.42	+20	150.12	150.45	150.12
17+00	151.32	151.65	151.32	+30	150.02	150.35	149.02
+10	151.22	151.55	151.22	+40	149.92	150.25	149.92
+20	151.12	151.45	151.12	+50	149.82	150.15	149.82
+30	151.02	151.35	151.02	+60	149.72	150.05	149.72
+40	150.92	151.25	150.92	+70	149.62	149.95	149.62
+50	150.82	151.15	150.82	+80	149.51	149.85	149.52
+60	150.72	151.05	150.72	+88.47	149.42	149.77	149.44
+70	150.62	150.95	150.62	+90	149.40	149.75	149.43
+80	150.52	150.85	150.52	19+00	149.27*	149.65*	148.67*
				+08.47	—	149.57*	—

* Elevations shown are given at top of bituminous surfacing.



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

NOTES:

For location and spacing of deck, parapet and sidewalk reinforcing, see Cross Section and Utility Details sheet.

For location and spacing of reinforcing in haunch over end diaphragms, see Joint Details sheet.

For lighting standard base, junction box details and additional reinforcing, see Standard Electrical Details sheet S4.

AS BUILT

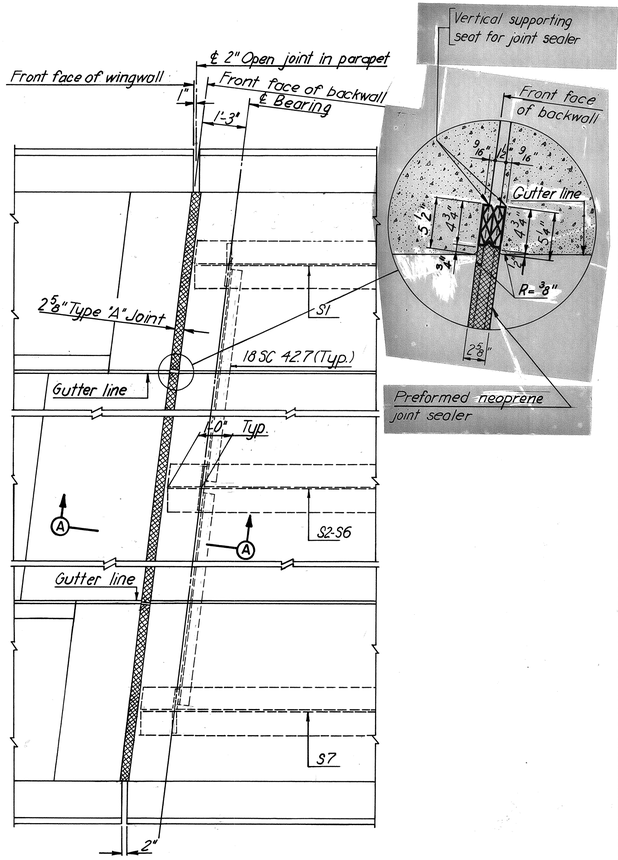
	BY	DATE				
MADE	J.B.M.	9-67				
CHECKED	T.E.M.	2-68	1	As Built	TEM	6-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

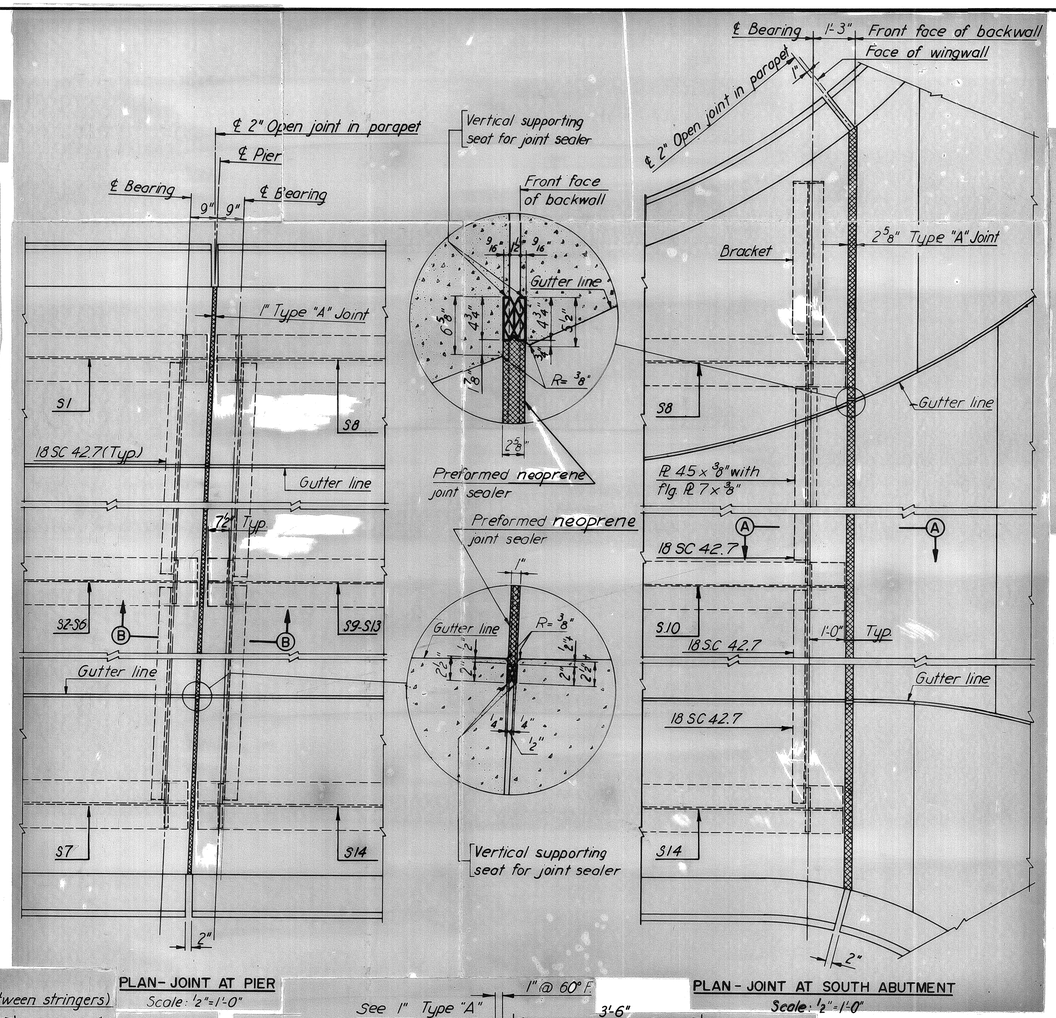
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE B-55
3RD STREET OVER DOWNTOWN EXPRESSWAY
DECK PLANS

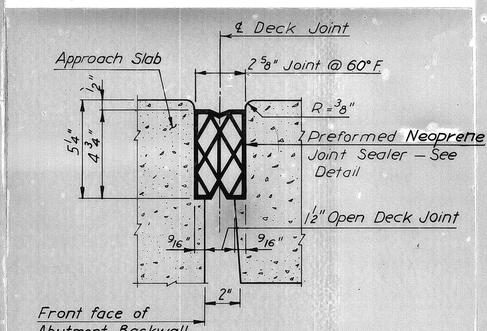
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 13 OF 16

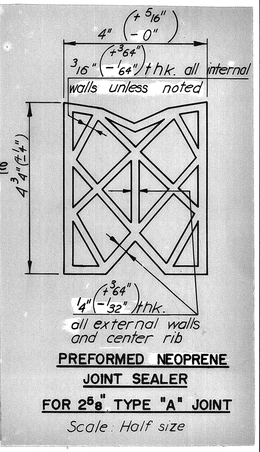
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	152	



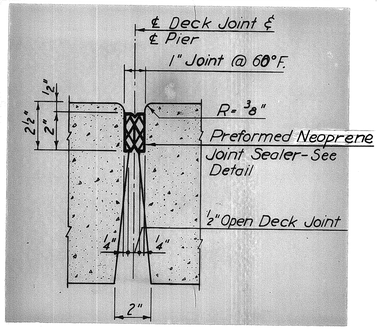




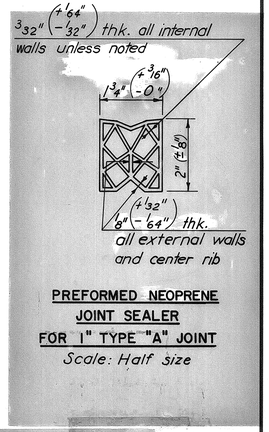
2⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"



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

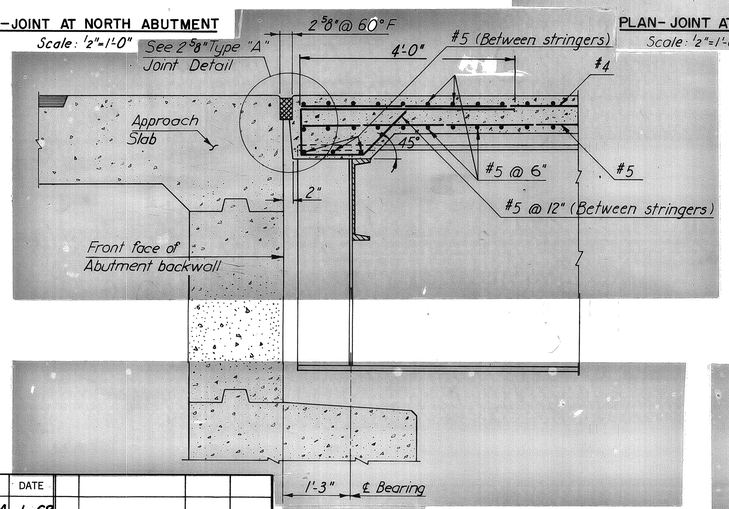


1" TYPE "A" JOINT
Scale: 3" = 1'-0"



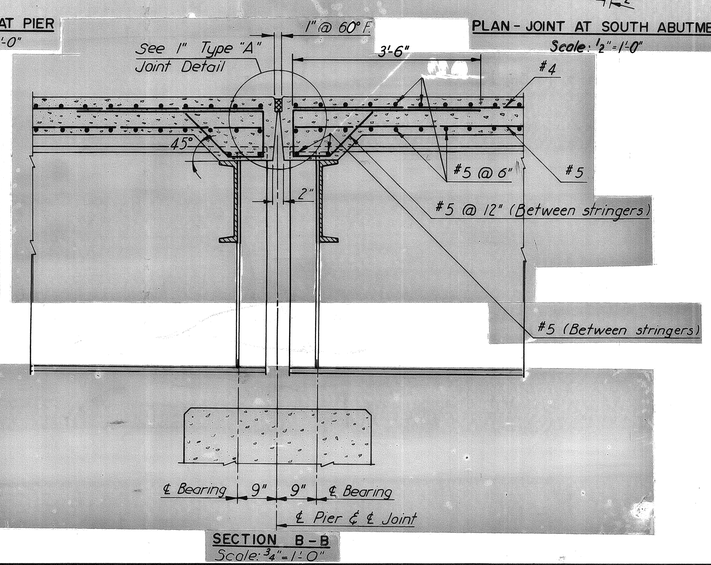
PREFORMED NEOPRENE JOINT SEALER FOR 1" TYPE "A" JOINT
Scale: Half size

PLAN — JOINT AT NORTH ABUTMENT
Scale: ½"=1'-0"



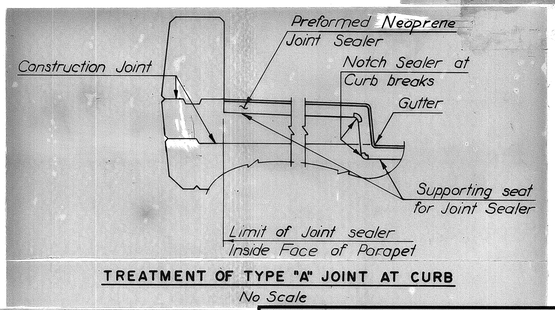
SECTION A-A
Scale: ¾"=1'-0"

PLAN — JOINT AT PIER
Scale: ½"=1'-0"



SECTION B-B
Scale: ¾"=1'-0"

PLAN — JOINT AT SOUTH ABUTMENT
Scale: ½"=1'-0"



TREATMENT OF TYPE "A" JOINT AT CURB
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				
MADE	D.L.A.	1-68				
CHECKED	A.B.P.	3-68	1	As Built	TEM	6-77
IN CHARGE	P.R.V.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

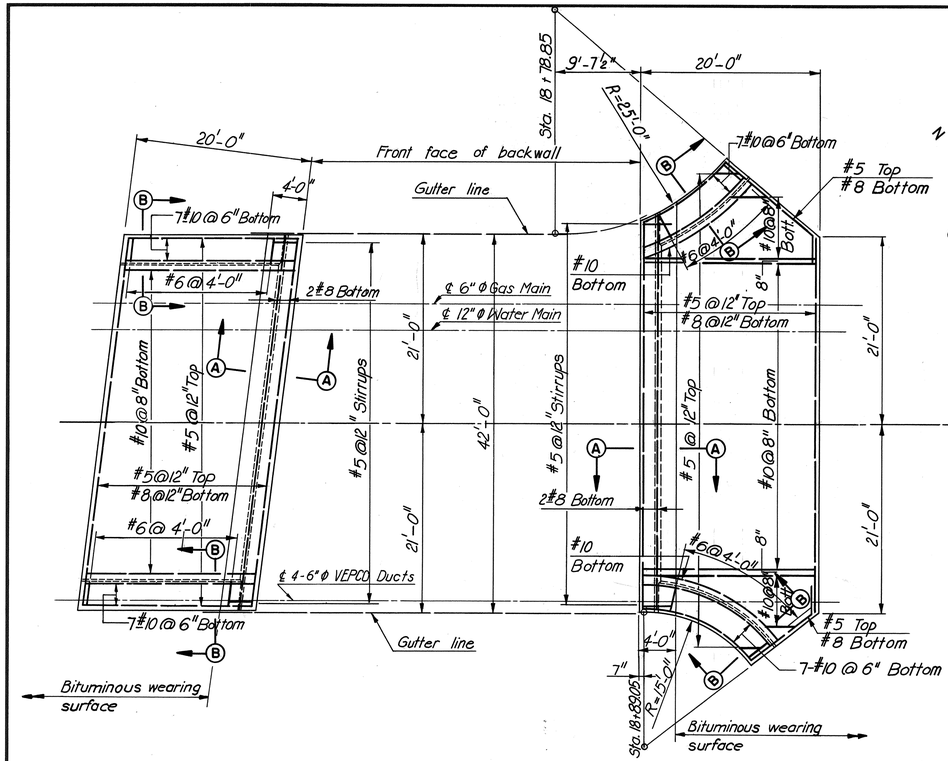
BRIDGE B-55
3RD STREET OVER DOWNTOWN EXPRESSWAY

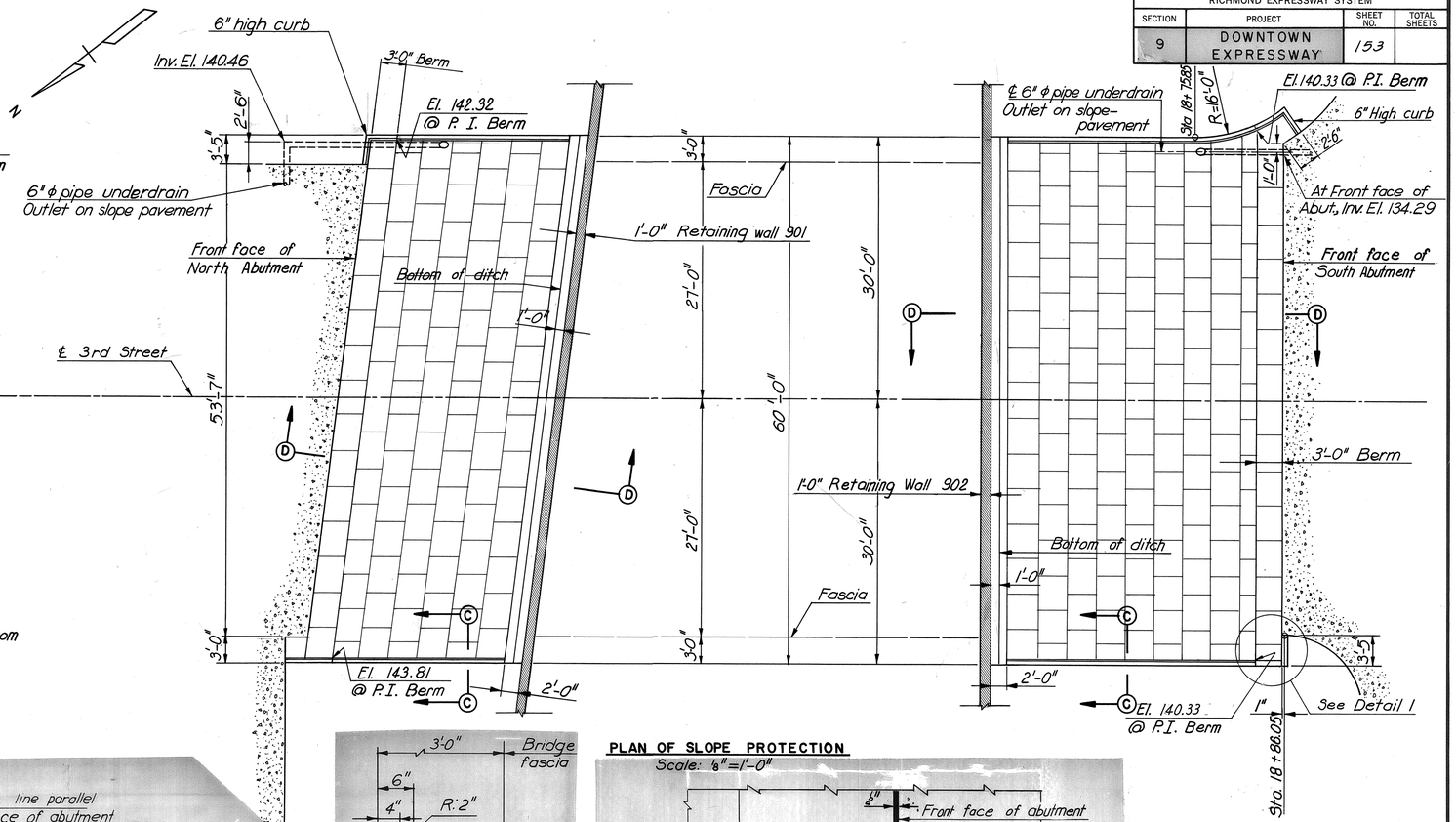
JOINT DETAILS

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

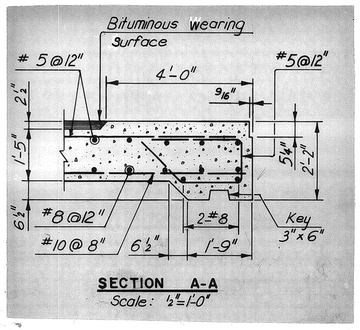
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 14 OF 16

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	153	

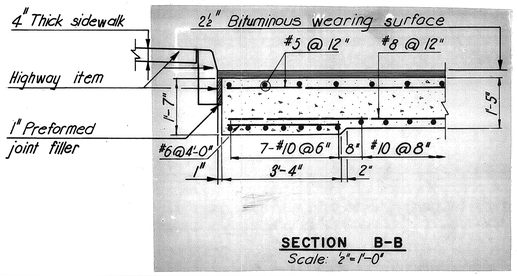




NORTH APPROACH SLAB
Scale: ⅛"=1'-0"

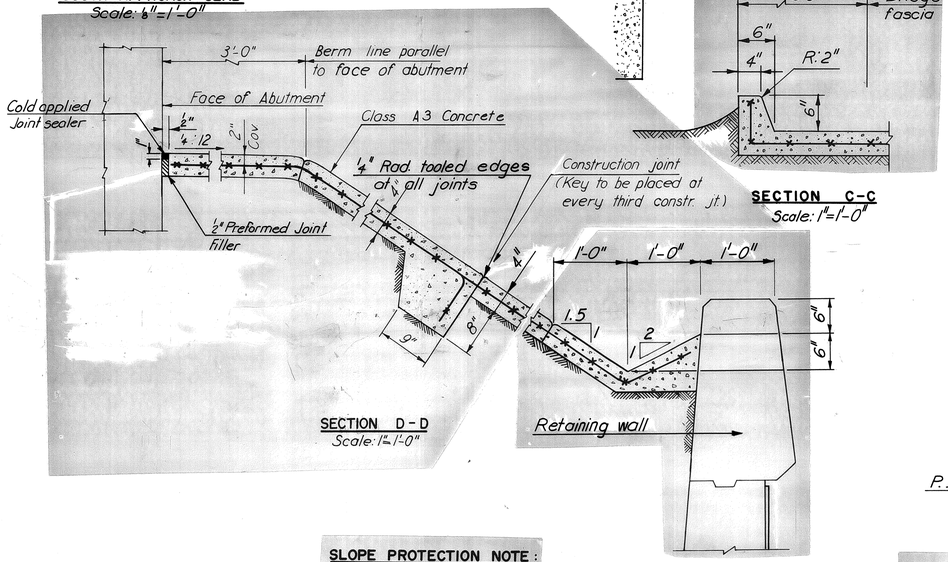


SECTION A-A
Scale: ½"=1'-0"

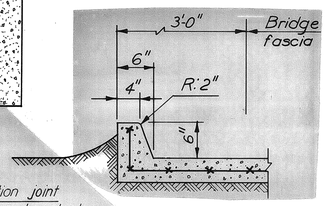


SECTION B-B
Scale: 2"=1'-0"

SOUTH APPROACH SLAB
Scale: ⅛"=1'-0"

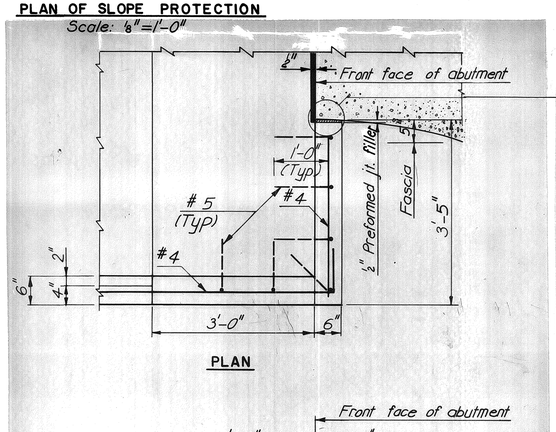


SECTION D-D
Scale: 1"=1'-0"

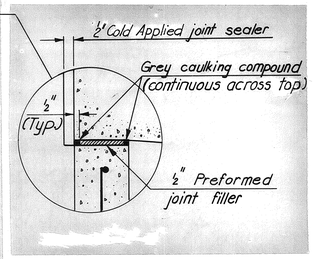


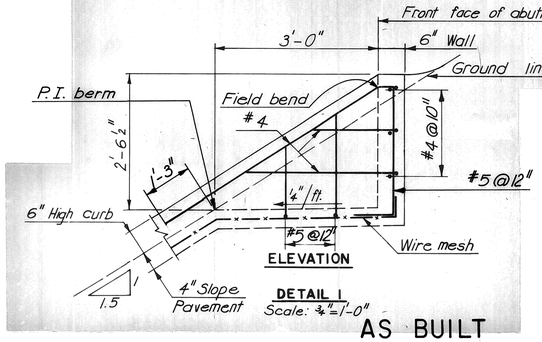
SECTION C-C
Scale: 1"=1'-0"

PLAN OF SLOPE PROTECTION
Scale: ⅛"=1'-0"



PLAN





ELEVATION

DETAIL 1
Scale: ¾"=1'-0"

SLOPE PROTECTION NOTE :

The item "Cast-in-Place Concrete Slab Slope Protection" shall include the excavation of, or the placing and compaction of any embankment material necessary to bring the surface of the paved slopes to the finished elevations shown on the plans.

"Cast-in-Place Concrete Slab Slope Protection" shall be paid for at the contract unit price per square yard, which price shall include the concrete slab including wire mesh and joint filler.

The slab shall be constructed in 4'-0" x 4'-0" panels, placed in horizontal courses, alternate panels being poured in a staggered pattern with adjacent panels poured later. The slab shall be Class A3 concrete of such consistency that it can be placed without the use of top forms. The surface shall be finished with a wood float.

Reinforcing shall consist of wire mesh No. 6 gage, 6" c.c. each way, placed at the center of the slab, and continuous through construction joints.

	BY	DATE				
MADE	elm	12-67				
CHECKED	TEM	2-68	1	As Built	TEM	6-77
IN CHARGE P.R.V.			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-55
3RD STREET OVER DOWNTOWN EXPRESSWAY

APPROACH SLABS AND SLOPE PROTECTION

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 15 OF 16

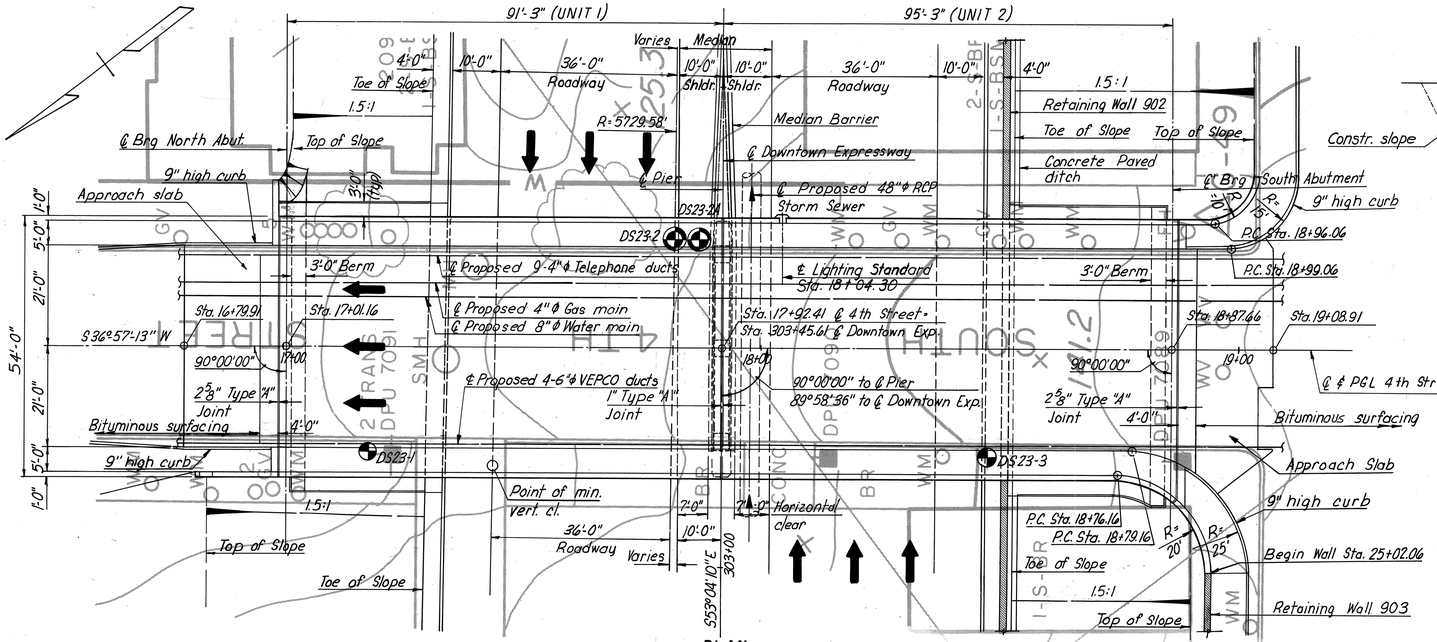
Bridge 56

(South 4th Street
Over Downtown Expressway {Rte. 195})

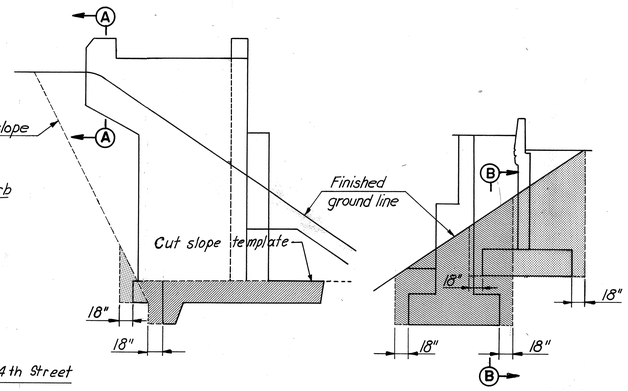
Record Set Plans

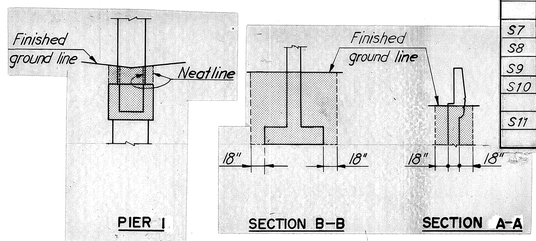
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	155	

INDEX

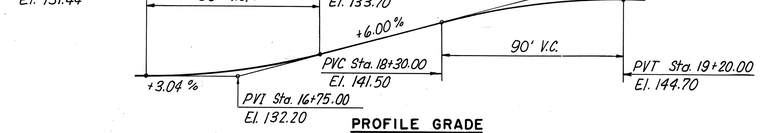


PLAN
Scale 1"=15'-0"

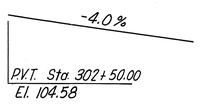




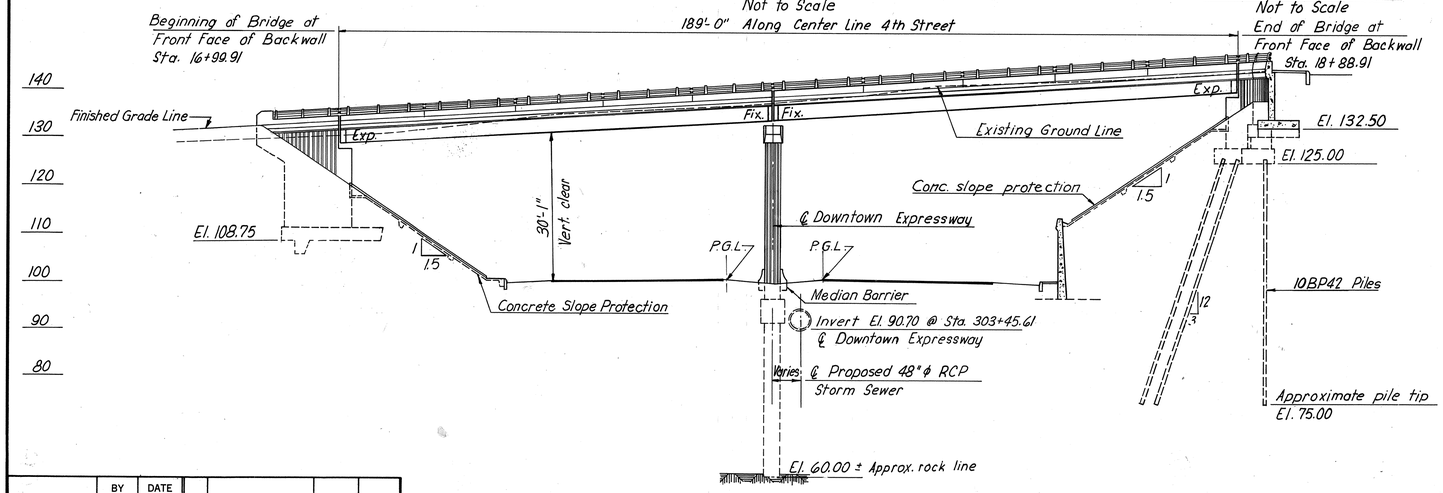
PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale



PROFILE GRADE
4TH STREET
Not to Scale



PROFILE GRADE
DOWNTOWN EXPRESSWAY
Not to Scale



ELEVATION
Scale 1"=15'-0"

BORINGS:	Indicates location of 2½"ϕ cased hole boring.
	Indicates location of 4'ϕ cased hole boring.
	For boring data, see Boring Logs sheet.
NOTE:	For General Notes and Quantities, see next sheet.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	T.E.M.	2-68				
CHECKED	L.B.P.	3-68	1	As Built	TEM	7-77
IN CHARGE	P.R.V.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-56
4TH STREET OVER DOWNTOWN EXPRESSWAY

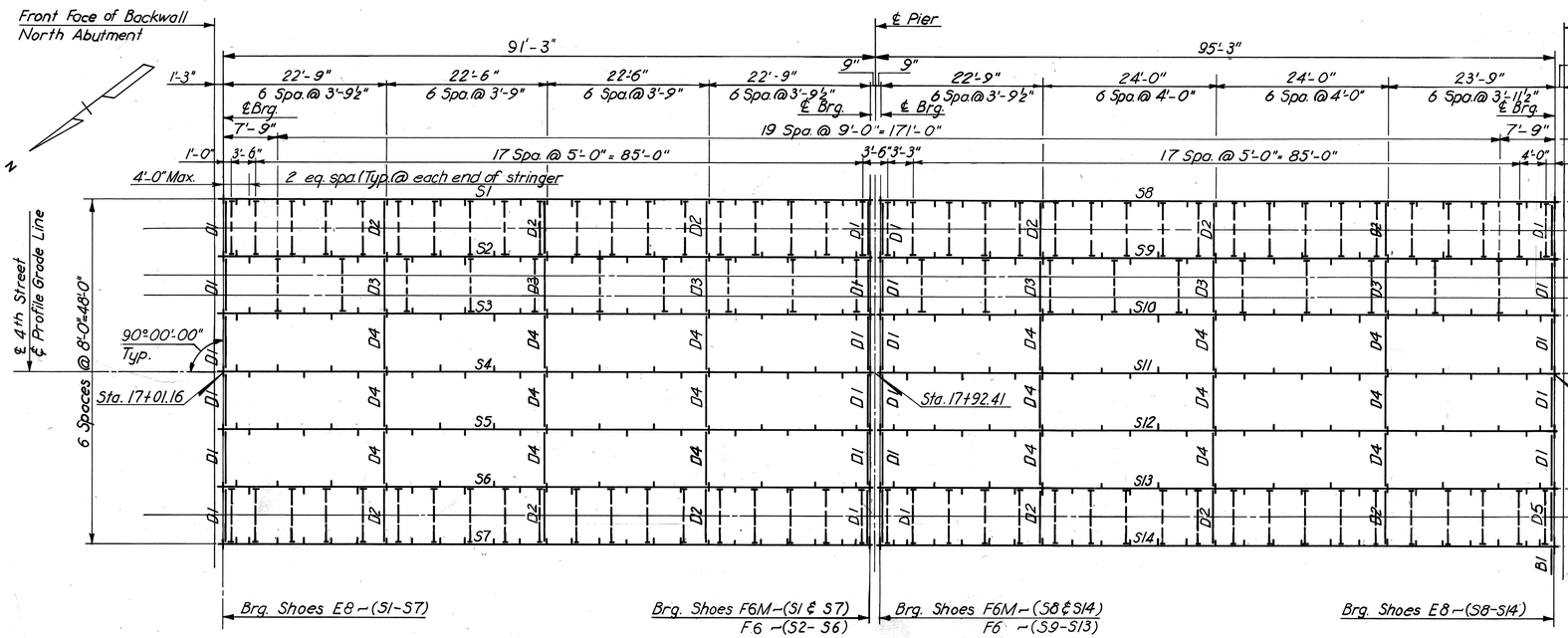
GENERAL PLAN AND ELEVATION

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 1 OF 15

155

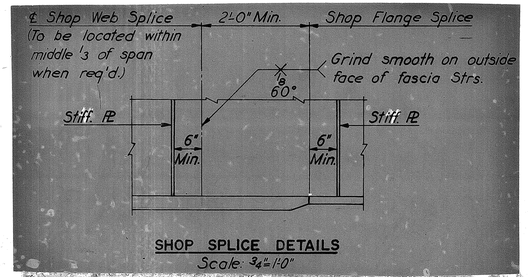
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	164	



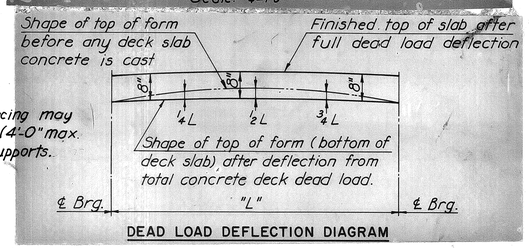
FRAMING PLAN
Scale: 1"=10'

Note:
Intermediate stiffener spacing may be varied along stringers (4'-0" max. spacing) to clear utility supports.

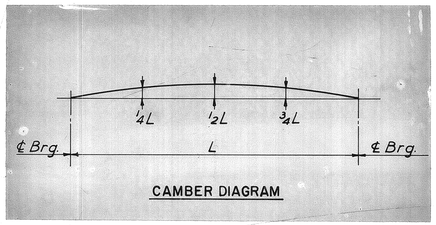
SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E8	14	F6	10
		F6M	4



SHOP SPLICE DETAILS
Scale: ¾"=1'-0"



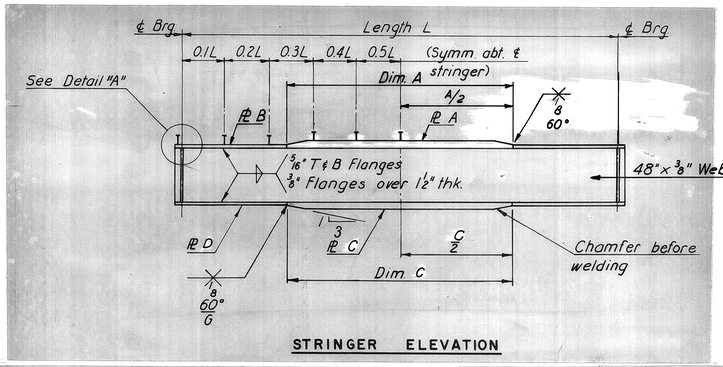
DEAD LOAD DEFLECTION DIAGRAM



CAMBER DIAGRAM

CAMBER SCHEDULE							
STR.	¼L	½L	¾L	STR.	¼L	½L	¾L
S1, S2	1 5/8"	2'4"	1 5/8"	S8	4½"	7 3/8"	6'8"
S4-S7				S11, S12			
S3	1 5/8"	2 3/8"	1 5/8"	S9, S10	4½"	7½"	6'8"
				S13, S14			

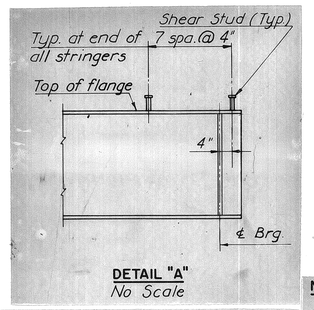
NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
Dimensions are in inches.



STRINGER ELEVATION

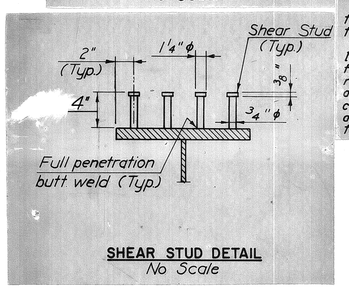
STRINGER SCHEDULE												
STR.	LENGTH ℄ BRG. TO ℄ BRG.	PL A	DIM A	PL B	PL C	DIM C	PL D	SHEAR STUD SPACING 0.1L	0.2L	0.3L	0.4L	0.5L
S1	90'-6"	16 x 1	42'-0"	16 x ¾	20 x 1 5/8	55'-0"	20 x 1/8	9"	10½"	13½"	17½"	20½"
S2		16 x 1	40'-0"		20 x 1 5/8	53'-0"	20 x 1/8	10"	11½"	13½"	17"	19"
S3		16 x 7/8	34'-0"		20 x 1 5/8	53'-0"	20 x 1/8	10"		13½"	16½"	18½"
S4			29'-0"		20 x 1½	57'-0"	20 x 1	9½"		14"		
S5			29'-0"		20 x 1½	57'-0"	20 x 1	9½"	11½"	14"		
S6		16 x 7/8	34'-0"		20 x 1 5/8	53'-0"	20 x 1/8	9½"	11"	13½"	16½"	18½"
S7	90' 6"	16 x 1	42'-0"		20 x 1 5/8	55'-0"		9"	10½"	13½"	17½"	20½"
S8	94'-6"	16 x 1/8	53'-0"		20 x 1¾	62'-0"		9"	10½"	13½"		21"
S9		16 x 1/8	52'-0"		20 x 1¾	61'-0"		9½"	11"	14"		19½"
S10		16 x 1/8	50'-0"		20 x 1¾	60'-0"		10"	11½"		17½"	19½"
S11		16 x 1	44'-0"		20 x 1 5/8	58'-0"		10"	11½"		17"	19"
S12		16 x 1	44'-0"		20 x 1 5/8	58'-0"		10"	11½"		17"	19"
S13		16 x 1/8	50'-0"		20 x 1¾	61'-0"	20 x 1/8	9½"	11"	14"	17"	19½"
S14	94'-6"	16 x 1/8	53'-0"	16 x ¾	20 x 1/8	58'-0"	20 x 1/4	9"	10½"	13½"	17½"	21"

Note: Lengths shown are horizontal distances measured along centerlines of stringers.



DETAIL "A"
No Scale

DEFLECTION SCHEDULE		
STR.	¼L & ¾L	½L
S1 - S7	1¼"	1¾"
S8, S11, S12	1⅞"	2"
S9, S10, S13, S14	1⅜"	1⅞"



SHEAR STUD DETAIL
No Scale

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

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

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EVR	10-20				
CHECKED	T.E.M.	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-56
4TH STREET OVER DOWNTOWN EXPRESSWAY

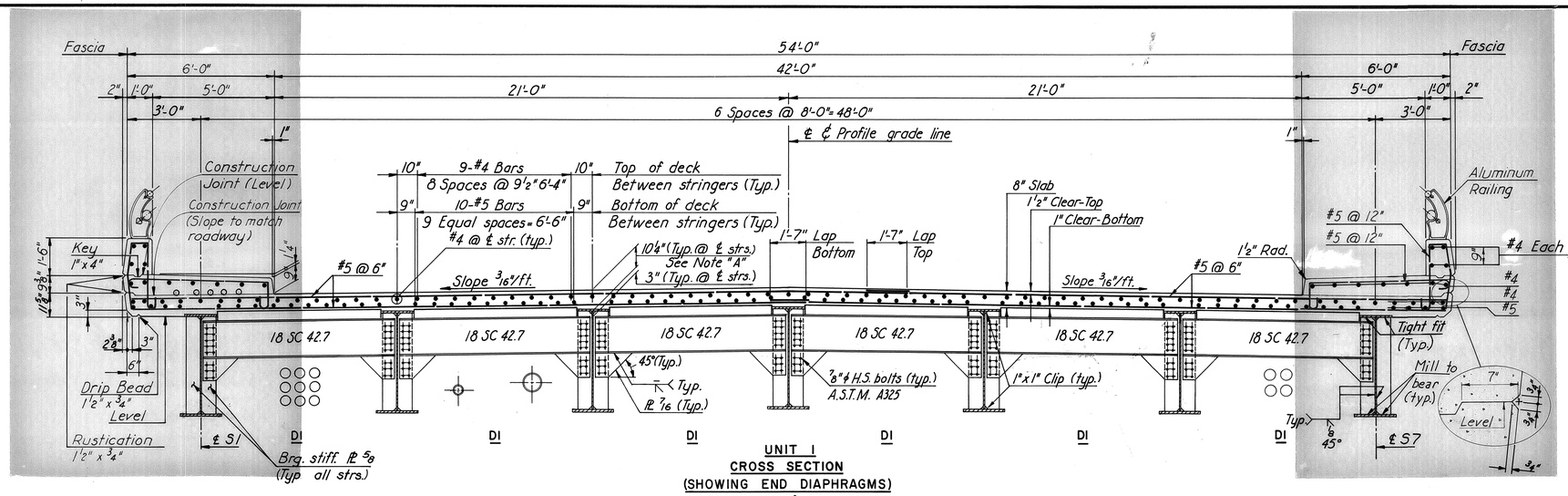
FRAMING PLAN

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

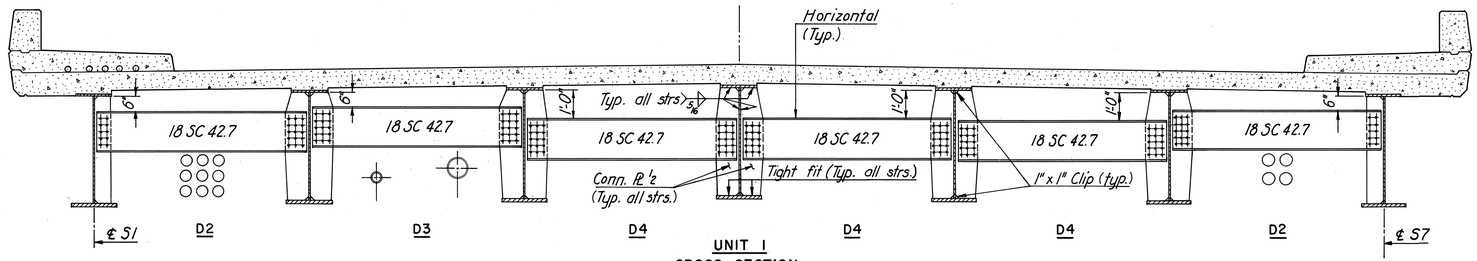
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 10 OF 15

164

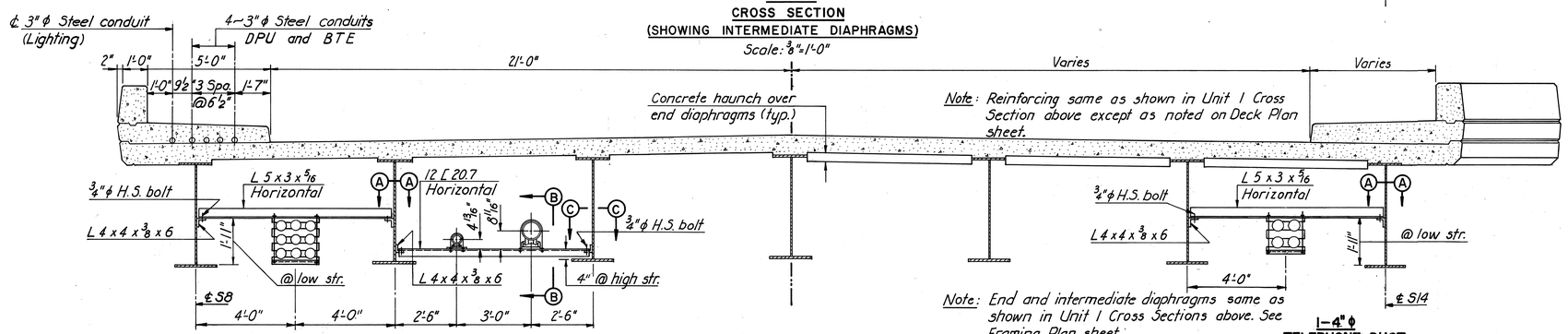
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	165	



UNIT I
CROSS SECTION
(SHOWING END DIAPHRAGMS)
Scale: 3/8" = 1'-0"



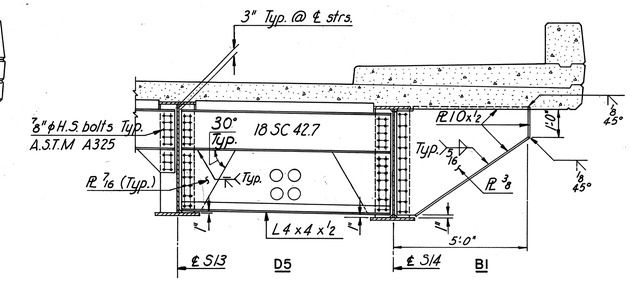
UNIT I
CROSS SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)
Scale: 3/8" = 1'-0"



9 - 4" ϕ
TELEPHONE DUCT SUPPORT

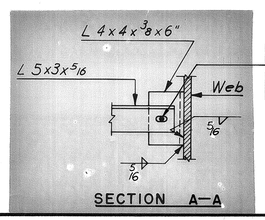
4" ϕ GAS 8" ϕ WATER
GAS & WATER MAIN SUPPORT

1 - 4" ϕ
TELEPHONE DUCT
4-6" ϕ
VEPCO DUCT SUPPORT

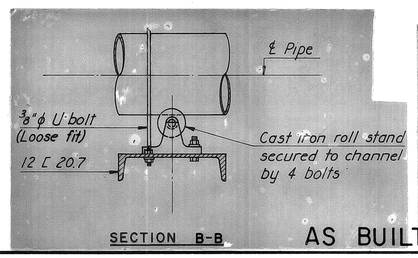


UNIT 2
PARTIAL CROSS SECTION
(SHOWING END DIAPHRAGM AT SOUTH ABUTMENT)
Scale: 3/8" = 1'-0"

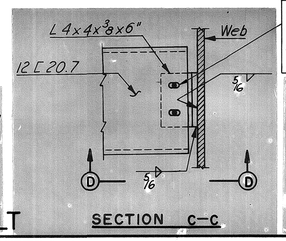
UNIT 2
CROSS SECTION
(SHOWING UTILITY SUPPORTS ONLY)
Scale: 3/8" = 1'-0"



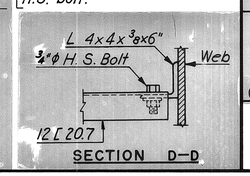
Provide 13/16" x 1/4" slots in ends of L 5 x 3 x 5/16 and 13/16" ϕ hole in L 4 x 4 x 3/8 x 6 for 3/4" ϕ H.S. bolt.



AS BUILT



Provide 13/16" x 1 1/4" slots in ends of 12 [20.7 and 13/16" ϕ hole in L 4 x 4 x 3/8 x 6 for 3/4" ϕ H.S. bolt.

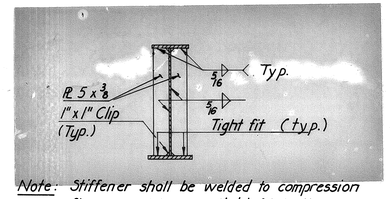


NOTE "A":
Dimension shown is measured from top of web to top of slab at the intersection of the centerline of stringer and the centerline of bearing. At exterior stringers this is measured to the cross slope extended. This dimension may be varied between bearings as required to care for variation in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

NOTES:
For spacing and location of utility supports and diaphragms, see Framing Plan sheet.

For Basic Attachment Details for cement asbestos conduit, see Standard Conduit Installation Details sheet.

For details showing gas and water mains thru abutments, see Standard Utility Support Details At Bridge Abutments sheet.



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

INTERMEDIATE STIFFENER DETAIL

	BY	DATE				
MADE	G.B.P.	11-67				
CHECKED	T.E.M.	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-56
4TH STREET OVER
DOWNTOWN EXPRESSWAY

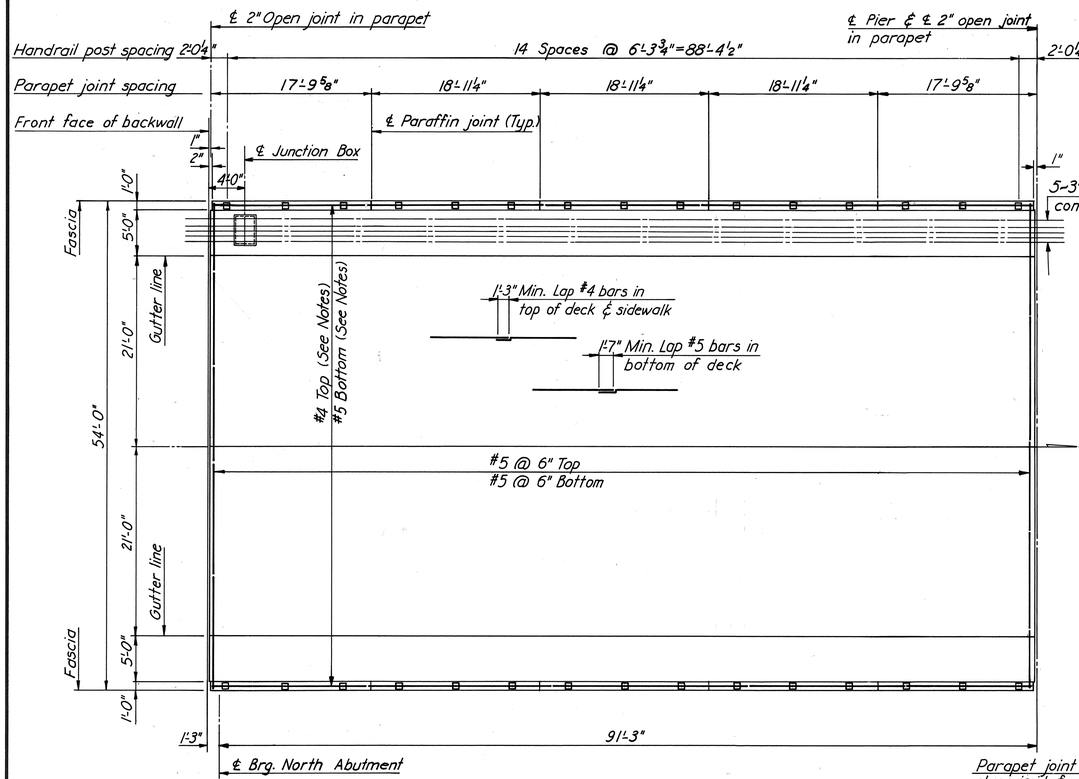
CROSS SECTION AND UTILITY DETAILS

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

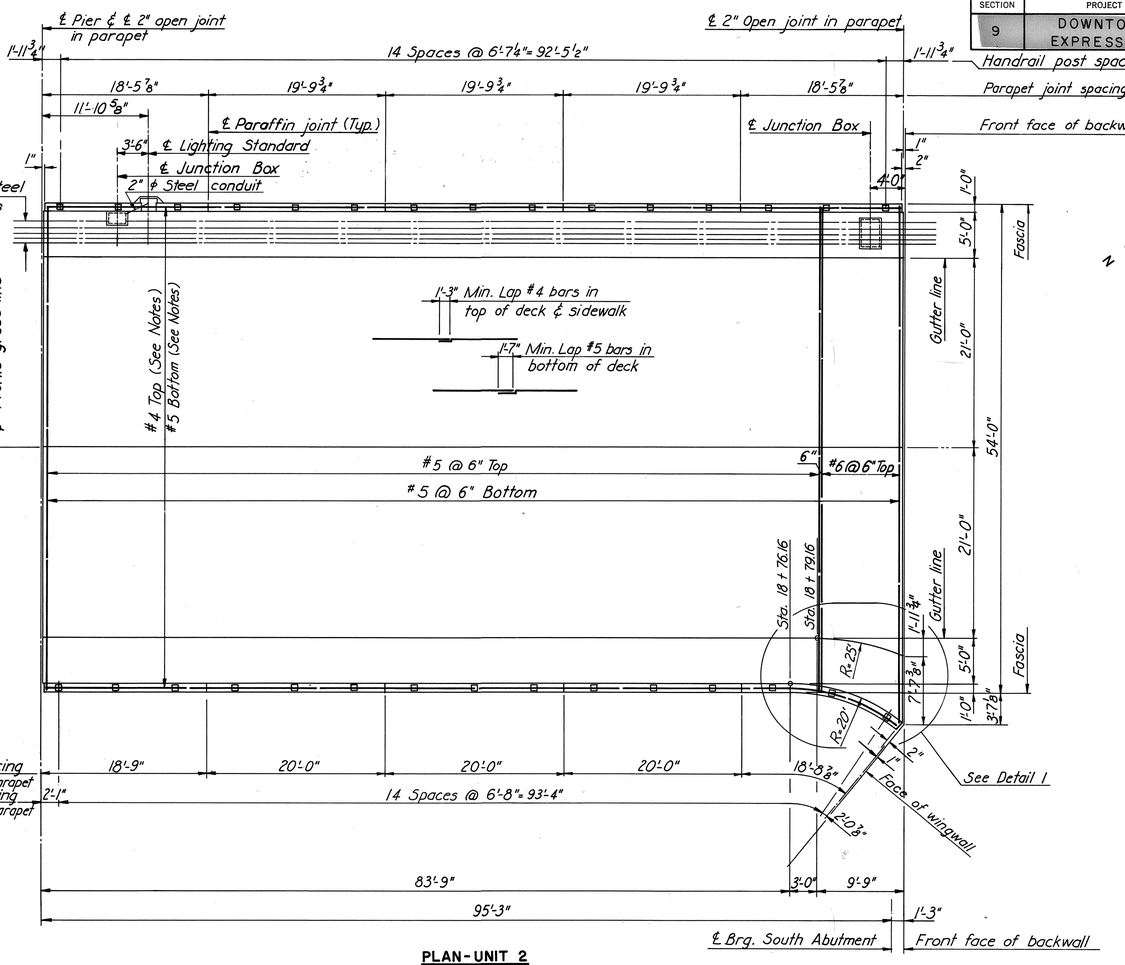
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 11 OF 15

165

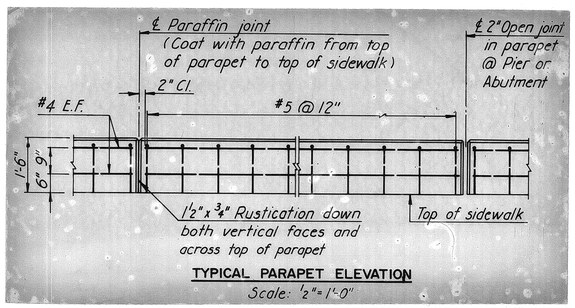
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	166	



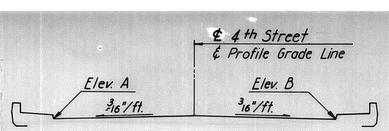
PLAN-UNIT 1
Scale: ⅛"=1'-0"



PLAN-UNIT 2
Scale: ⅛"=1'-0"



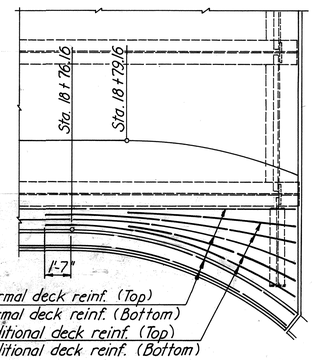
TYPICAL PARAPET ELEVATION
Scale: ½"=1'-0"



(LOOKING IN DIRECTION OF STATIONING)

PAVEMENT ELEVATIONS							
STATION	ELEV. A	℄ & P.G.L.	ELEV. B	STATION	ELEV. A	℄ & P.G.L.	ELEV. B
16+80	*132.29	*132.62	*132.29	18+00	139.37	139.70	139.37
16+90	*132.80	*133.13	*132.80	+10	139.97	140.30	139.97
+99.91	133.37	133.70	133.37	+20	140.57	140.90	140.57
17+10	133.97	134.30	133.97	+30	141.17	141.50	141.17
+20	134.57	134.90	134.57	+40	141.75	142.07	141.75
+30	135.17	135.50	135.17	+50	142.26	142.59	142.26
+40	135.77	136.10	135.77	+60	142.73	143.06	142.73
+50	136.37	136.70	136.37	+70	143.14	143.47	143.14
+60	136.97	137.30	136.97	+80	143.49	143.82	143.49
+70	137.57	137.90	137.57	+88.91	143.76	144.09	143.72
+80	138.17	138.50	138.17	+90	143.79	144.12	143.75
+90	138.77	139.10	138.77	19+00	*143.90	*144.37	*144.12
+92.41	138.92	139.25	138.92				

* Elevations shown are given to top of bituminous surfacing.



DETAIL 1
Scale: ¼"=1'-0"

NOTES:

For location and spacing of deck, parapet and sidewalk reinforcing, see Cross Section and Utility Details sheet.

For location and spacing of reinforcing in haunch over end diaphragms, see Joint Details sheet.

For lighting standard base, junction box details and additional reinforcing, see Standard Electrical Details sheet S4.

	BY	DATE				
MADE	d.B.P.	9-67				
CHECKED	T.E.M.	2-68	1	As Built	T.E.M.	7-77
IN CHARGE	P.R.V.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

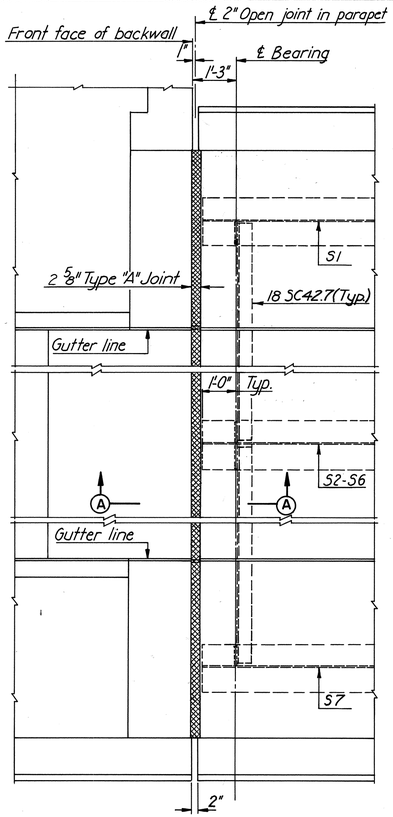
BRIDGE B-56
4TH STREET OVER DOWNTOWN EXPRESSWAY

DECK PLANS

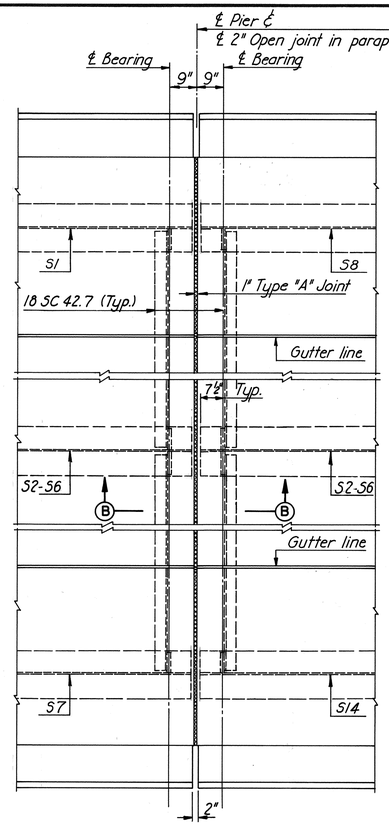
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 12 OF 15

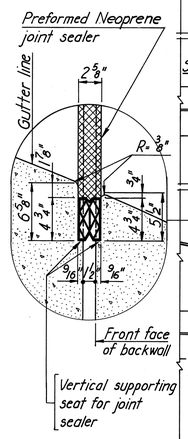
166

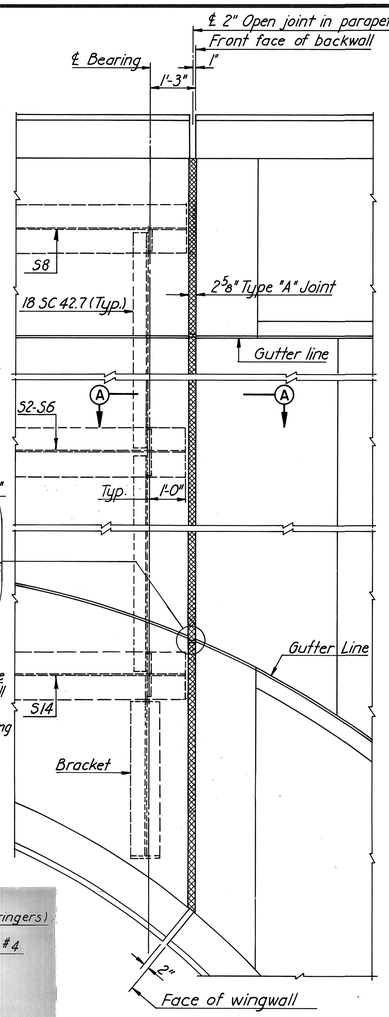


PLAN - JOINT AT NORTH ABUTMENT
Scale: 1/2"=1'-0"

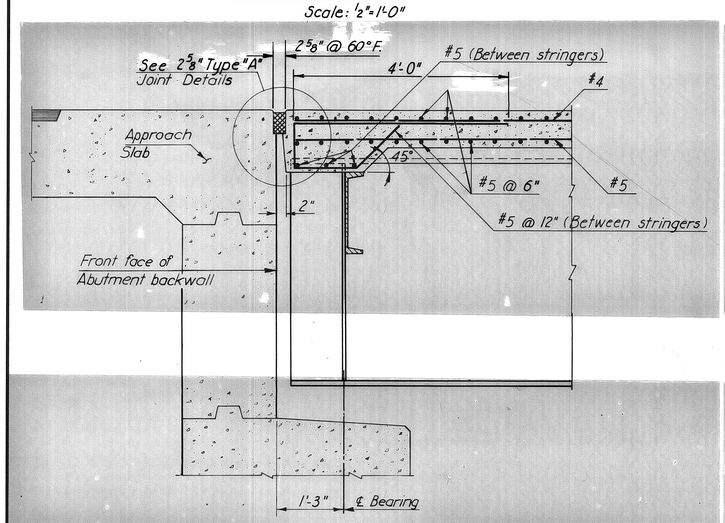


PLAN - JOINT AT PIER
Scale: 1/2"=1'-0"

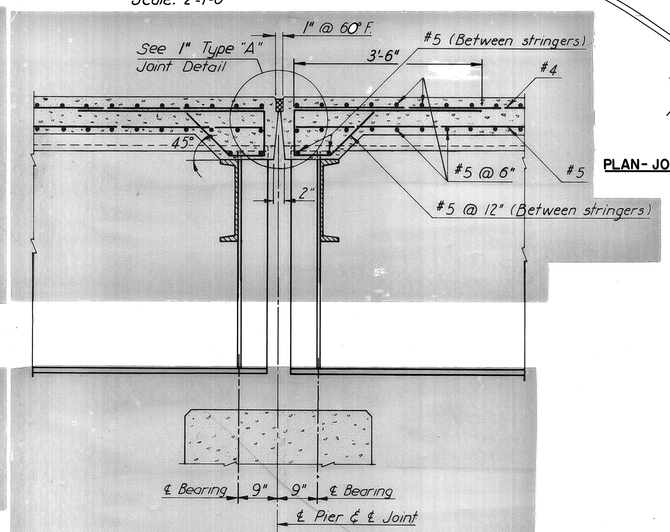




PLAN - JOINT AT SOUTH ABUTMENT
Scale: 1/2"=1'-0"

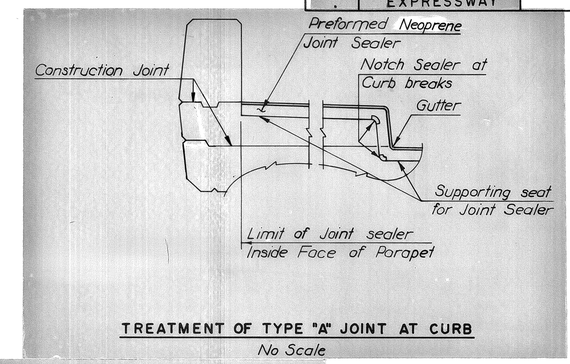


SECTION A-A
Scale: 3/4"=1'-0"

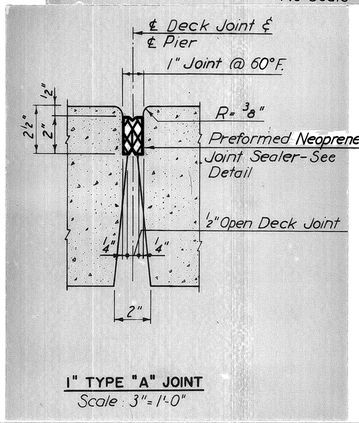


SECTION B-B
Scale: 3/4"=1'-0"

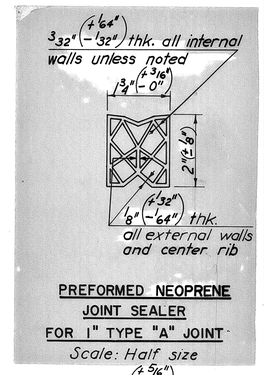
	BY	DATE	NO.	REVISION	BY	DATE
MADE	K.B.P.	9-67				
CHECKED	T.E.M.	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.					



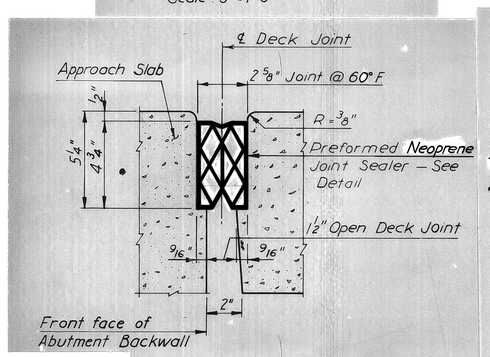
TREATMENT OF TYPE "A" JOINT AT CURB
No Scale



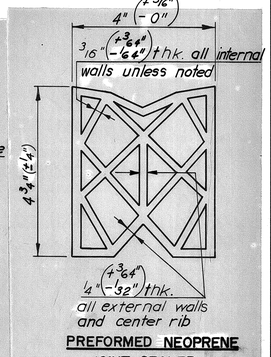
1" TYPE "A" JOINT
Scale: 3"=1'-0"



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



2 5/8" TYPE "A" JOINT
Scale: 3"=1'-0"



PREFORMED NEOPRENE
JOINT SEALER
FOR 2 5/8" TYPE "A" JOINT
Scale: Half size

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.

AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	167	

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

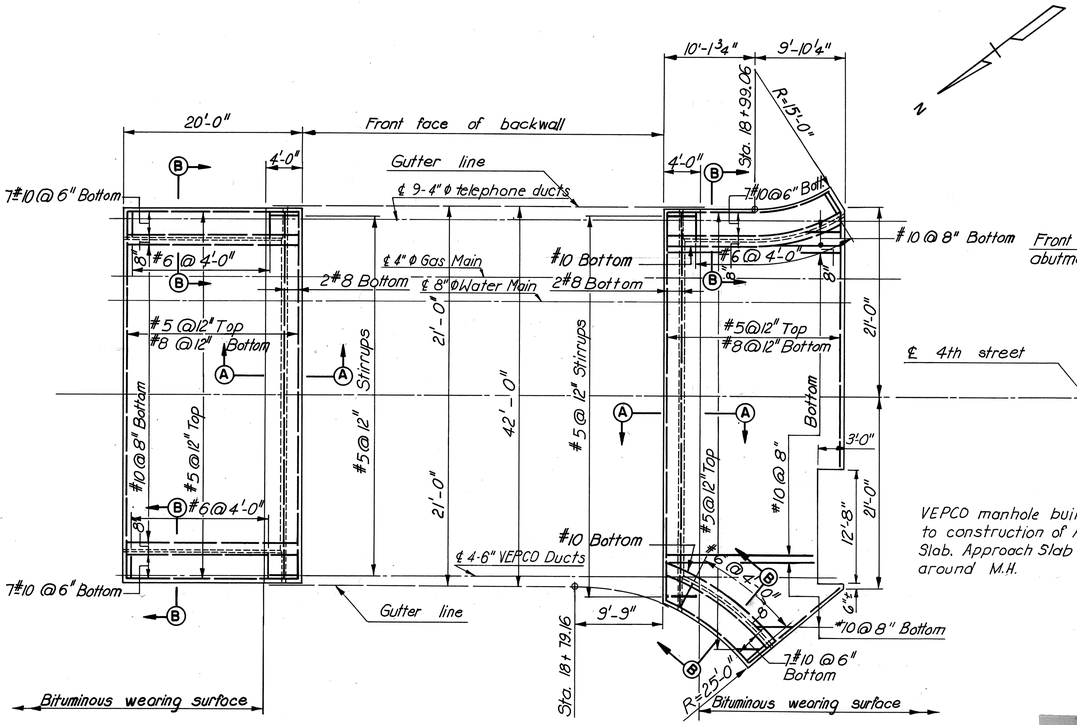
BRIDGE B-56
4TH STREET OVER
DOWNTOWN EXPRESSWAY

JOINT DETAILS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 13 OF 15

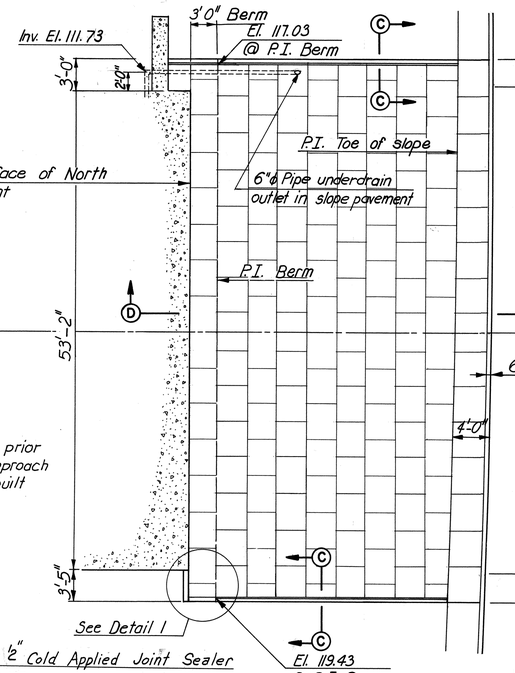
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	168	

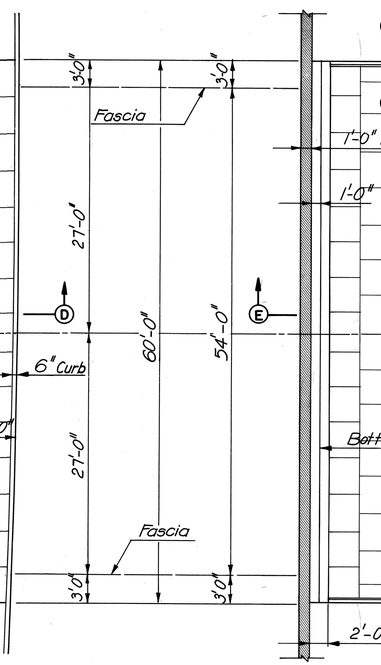


NORTH APPROACH SLAB
Scale: ⅛" = 1'-0"

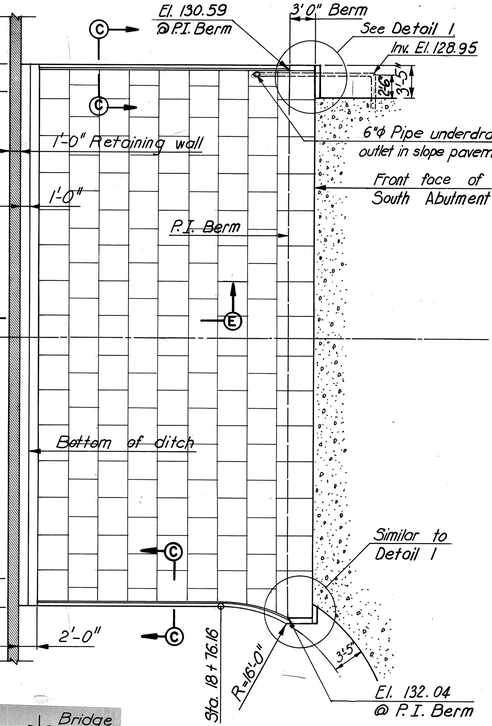
SOUTH APPROACH SLAB
Scale: ⅛" = 1'-0"

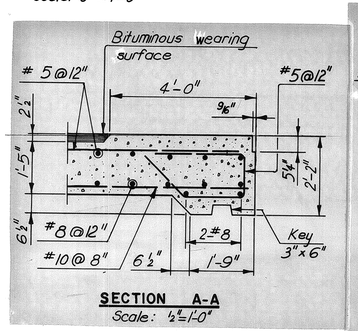
VEPCO manhole built prior to construction of Approach Slab. Approach Slab built around M.H.



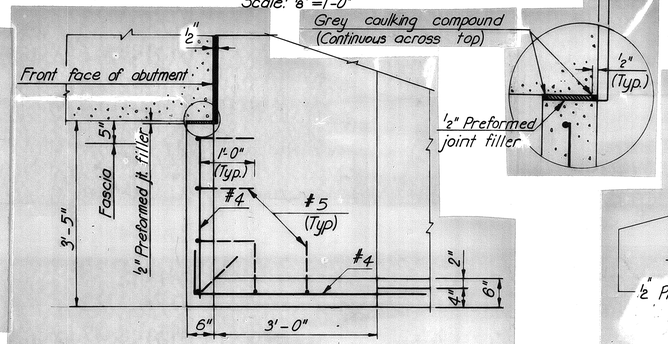


PLAN OF SLOPE PROTECTION
Scale: ⅛" = 1'-0"

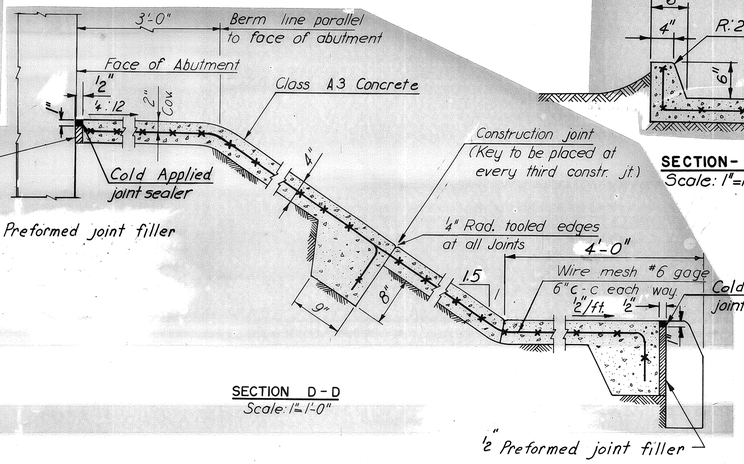




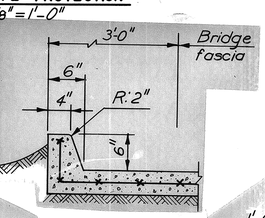
SECTION A-A
Scale: ½" = 1'-0"



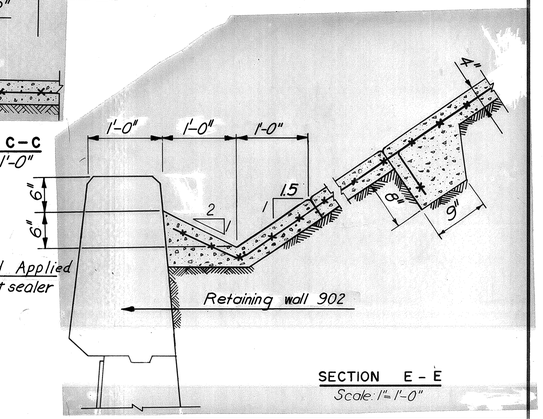
PLAN



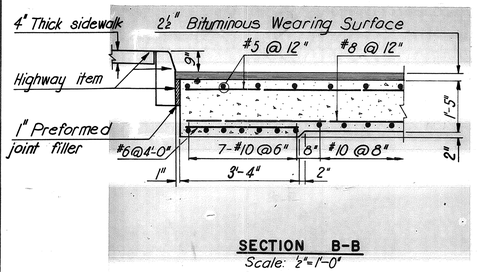
SECTION D-D
Scale: ½" = 1'-0"



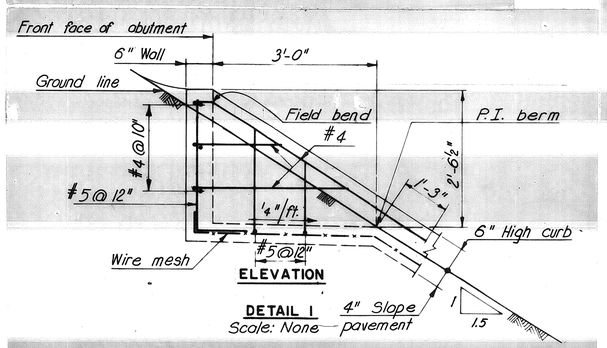
SECTION - C-C
Scale: 1" = 1'-0"



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



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



ELEVATION

DETAIL I
Scale: None
4" Slope pavement

SLOPE PROTECTION NOTE:

The item "Cast-in-Place Concrete Slab Slope Protection" shall include the excavation of, or the placing and compaction of any embankment material necessary to bring the surface of the paved slopes to the finished elevations shown on the plans.

"Cast-in-Place Concrete Slab Slope Protection" shall be paid for at the contract unit price per square yard, which price shall include the concrete slab including wire mesh and joint filler.

The slab shall be constructed in 4'-0" x 4'-0" panels, placed in horizontal courses, alternate panels being poured in a staggered pattern with adjacent panels poured later. The slab shall be Class A3 concrete of such consistency that it can be placed without the use of top forms. The surface shall be finished with a wood float.

Reinforcing shall consist of wire mesh No. 6 gage, 6" c.c. each way, placed at the center of the slab, and continuous through construction joints.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	elm	2-67				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.V.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-56
4TH STREET OVER
DOWNTOWN EXPRESSWAY

APPROACH SLABS AND SLOPE PROTECTION

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 14 OF 15

168

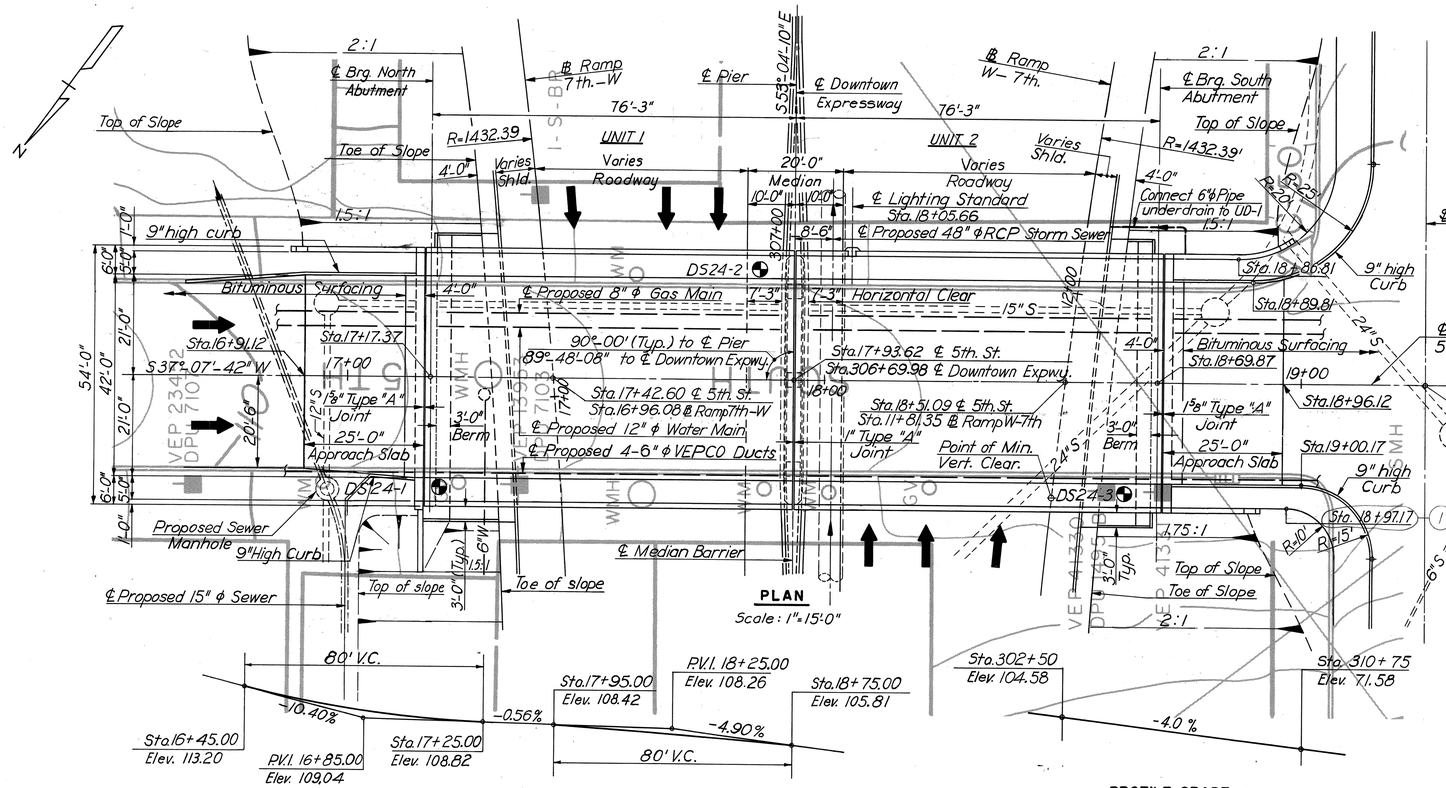
Bridge 57

(South 5th Street
Over Downtown Expressway {Rte. 195})

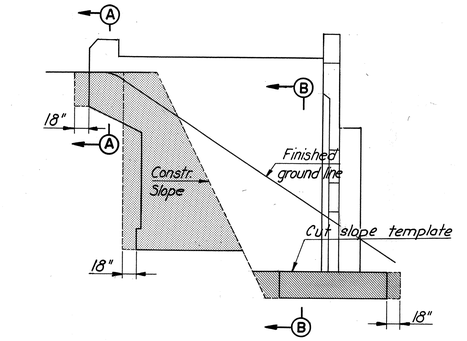
Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	170	

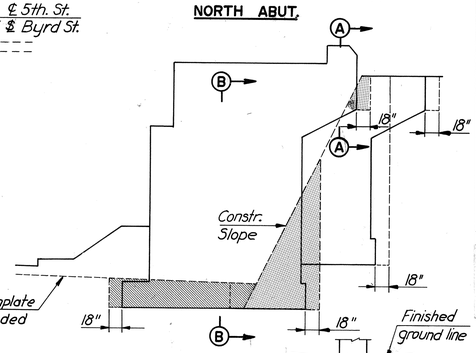
INDEX



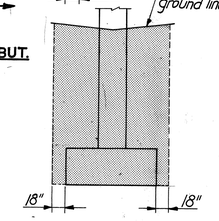
PLAN
Scale: 1"=15'-0"



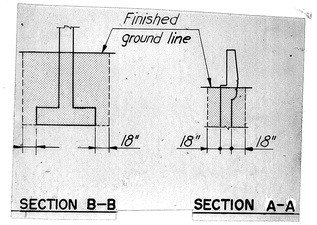
NORTH ABUT.



SOUTH ABUT.

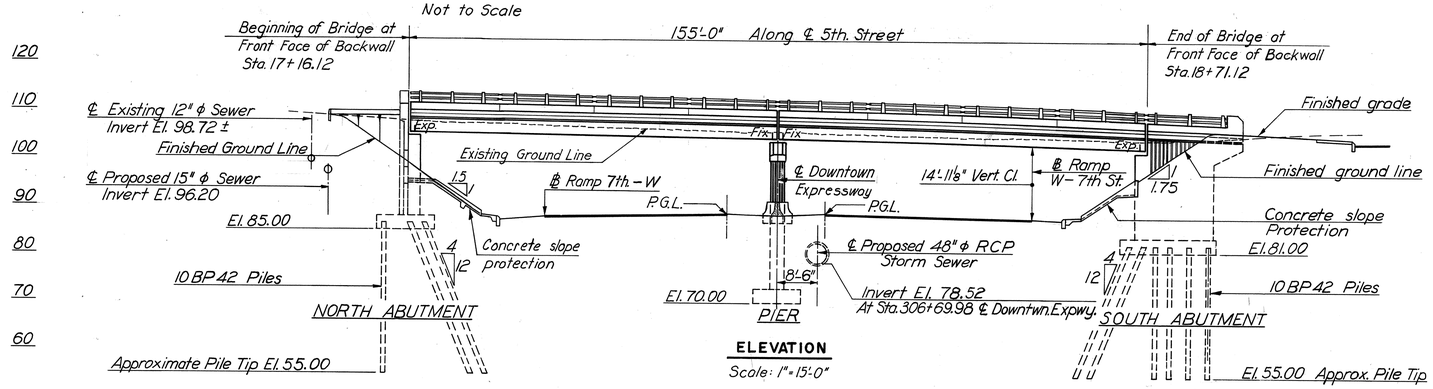


PIER I



SECTION B–B **SECTION A–A**

PROFILE GRADE
5th STREET
Not to Scale



ELEVATION
Scale: 1"=15'-0"

PROFILE GRADE
DOWNTOWN EXPRESSWAY
Not to Scale

PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale

BORINGS: ● Indicates location of 2½"ϕ cased hole boring. For boring data, see Boring Logs sheet.

NOTE: For General Notes and Quantities, see next sheet.

	BY	DATE
MADE	J.B.M.	1-68
CHECKED	T.E.M.	2-68
IN CHARGE	P.R.Y.	

NO.	REVISION	BY	DATE
1	As Built	T.E.M.	7-77

AS BUILT

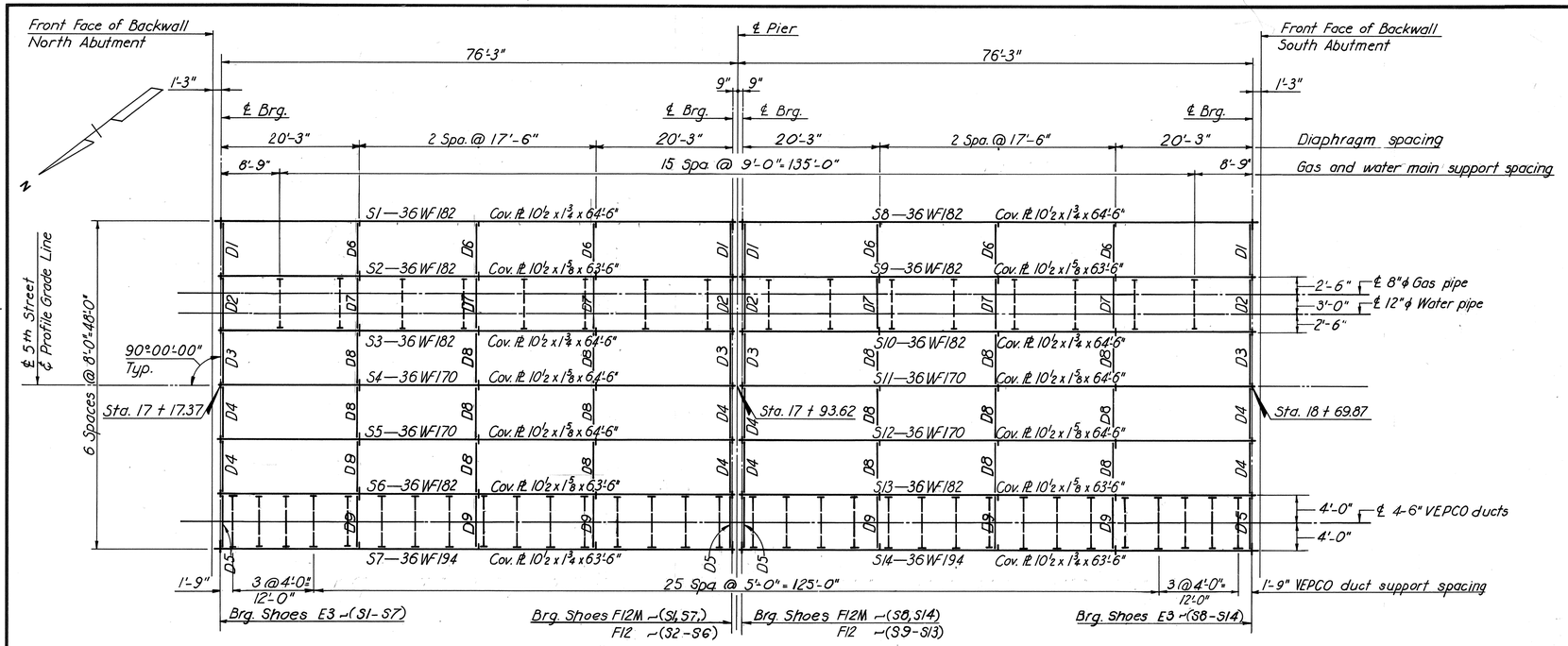
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-57
5TH STREET OVER DOWNTOWN EXPRESSWAY
GENERAL PLAN AND ELEVATION

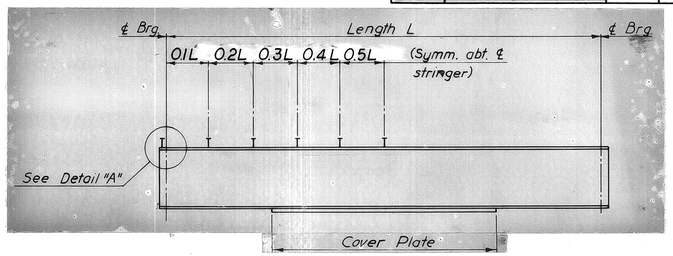
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO. 9
SHEET NO. 1 OF 15

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	179	



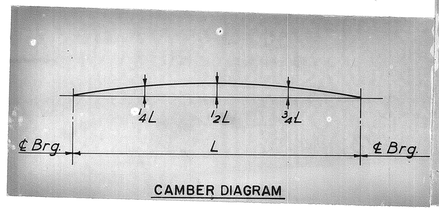
FRAMING PLAN
Scale: 1"=10'



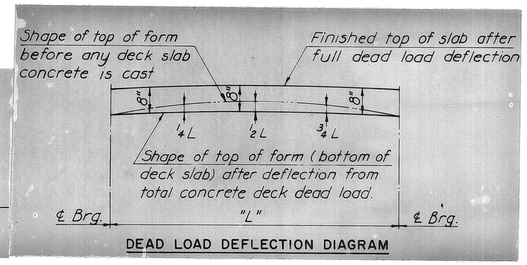
STRINGER ELEVATION

STRINGER SCHEDULE						
STRINGER	LENGTH ℄ BRG. TO ℄ BRG.	SHEAR STUD SPACING 0.1L	0.2L	0.3L	0.4L	0.5L
S1, S8	75'-6"	7"	8"	11"	13½"	15½"
S2, S9					13"	14½"
S3, S10					13"	14½"
S4, S11					12½"	14"
S5, S12						14"
S6, S13					12½"	14½"
S7, S14	75'-6"	7"	8"	11"	13½"	16"

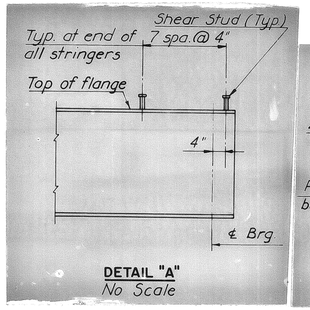
Note:
Lengths shown are horizontal distances measured along centerlines of stringers.



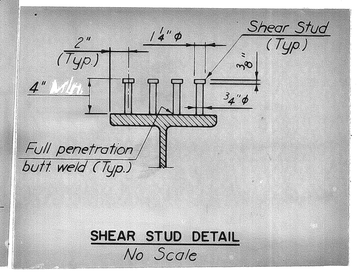
CAMBER DIAGRAM



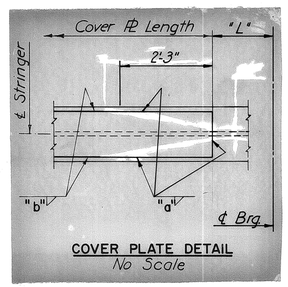
DEAD LOAD DEFLECTION DIAGRAM



DETAIL "A"
No Scale



SHEAR STUD DETAIL
No Scale



COVER PLATE DETAIL
No Scale

SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E3	14	F12	10
		F12M	4

CAMBER SCHEDULE			
STR.	¼L	½L	¾L
S7	1"	1 5/8"	
S1, S6	1"	1¾"	1'¼"
S2-S5	1'8"		
S14	5½"	6½"	
S8, S13	5½"	6 5/8"	4 3/8"
S9-S12	5 5/8"		

DEFLECTION SCHEDULE		
STR.	¼L & ¾L	½L
S1, S4, S5		
S7, S8, S11	1'8"	1½"
S12, S14		
S2, S3, S6	1"	1½"
S9, S10, S13		

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.

COVER PLATE SCHEDULE				
STR.	COVER PL.	"L"	"a"	"b"
S1, S8	10½x1¾	5'-6"	5/8"	3/8"
S3, S10		5'-6		
S7, S14	10½x1¾	6'-0"		
S2, S9	10½x1⅝	6'-0"		
S4, S11		5'-6"		
S5, S12		5'-6"		
S6, S13	10½x1⅝	6'-0"	5/8"	3/8"

NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
Dimensions are in inches.

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

	BY	DATE	NO.	REVISION	BY	DATE
MADE	D.L.A	12-67				
CHECKED	T.E.M.	2-68	1	As Built	TEM	7-77
IN CHARGE	PRY					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-57
5TH STREET OVER
DOWNTOWN EXPRESSWAY

FRAMING PLAN

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

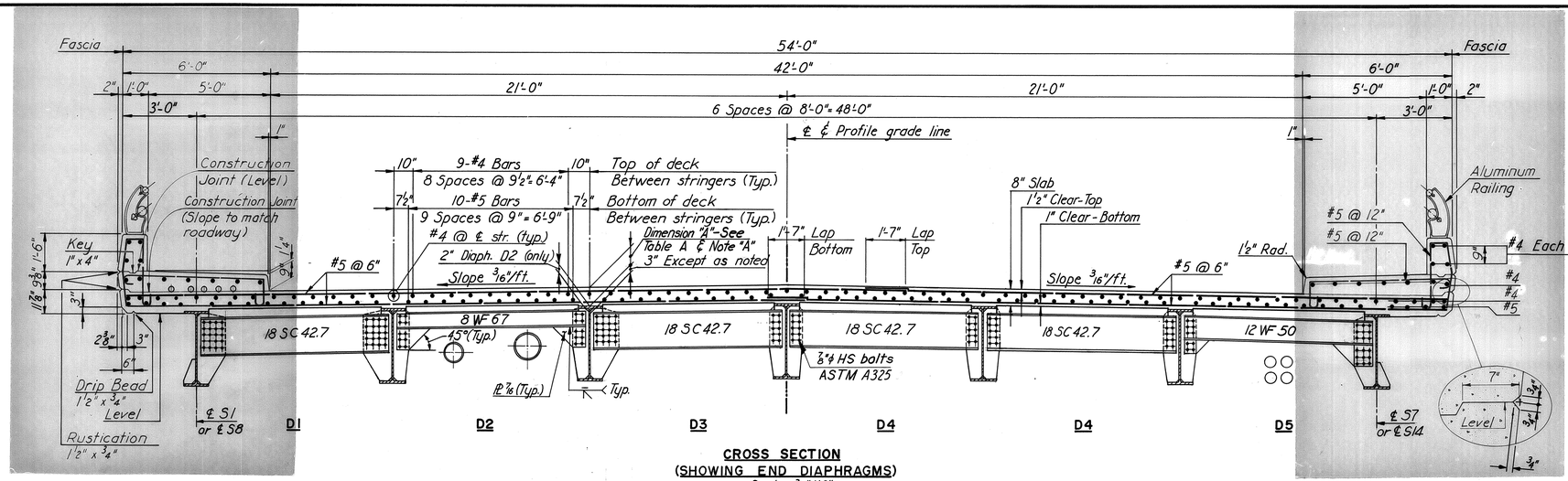
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 10 OF 15

179

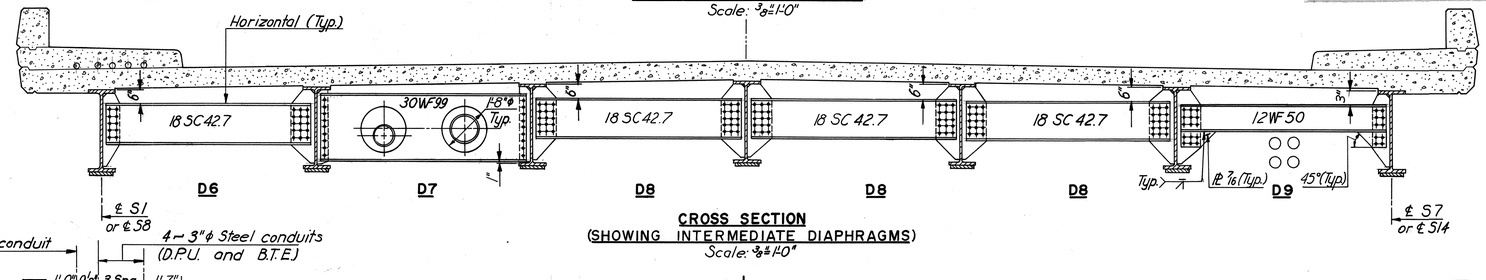
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	180	

TABLE A	
STRINGER	DIM "A"
S1-S6, S8-S13	9¼"
S7, S14	9⅛"

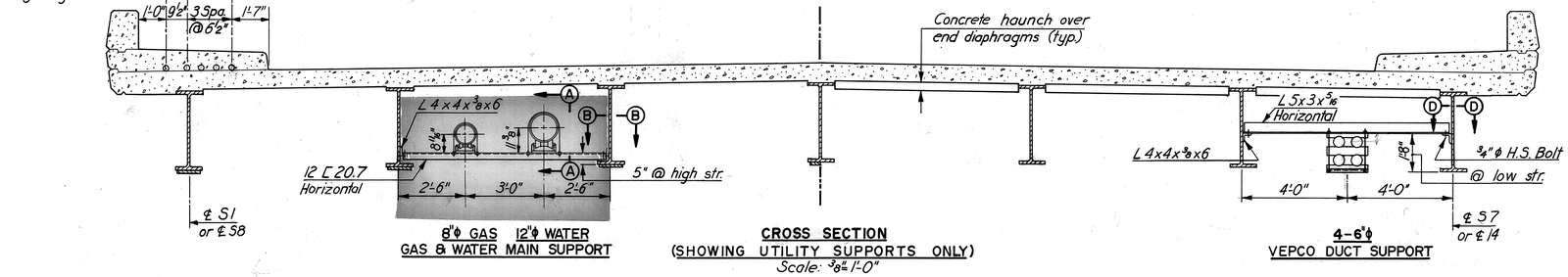
NOTE "A":
Dimension shown is measured from top of stringer to top of slab at the intersection of the centerline of stringer and the centerline of bearing. At exterior stringers this is measured to the cross slope extended. This dimension may be varied between bearings as required to care for variation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



CROSS SECTION
(SHOWING END DIAPHRAGMS)
Scale: ⅜" = 1'-0"

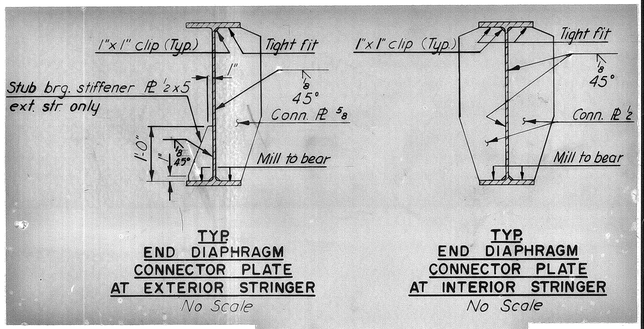


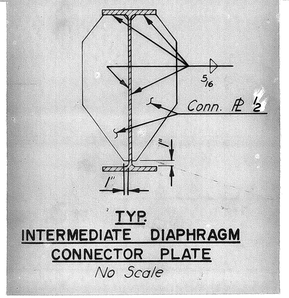
CROSS SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)
Scale: ⅜" = 1'-0"



8" ø GAS 12" ø WATER
GAS & WATER MAIN SUPPORT

4-6" ø
VEPCO DUCT SUPPORT

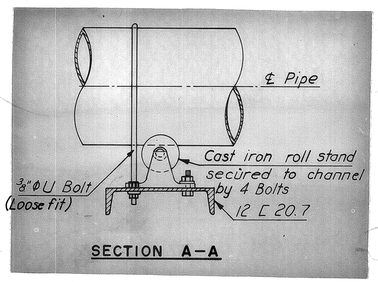




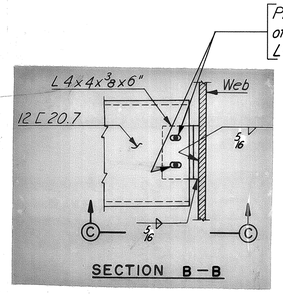
NOTES:
For spacing and location of utility supports and diaphragms, see Framing Plan sheet.

For Basic Attachment Details for cement asbestos conduit, see Standard Conduit Installation Details sheet.

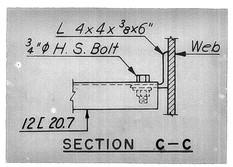
For details showing gas and water mains thru abutments, see Standard Utility Support Details At Bridge Abutments sheet.



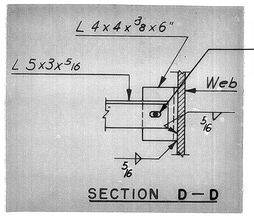
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

	BY	DATE				
MADE	EVR	11-67				
CHECKED	T.E.M.	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.V.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

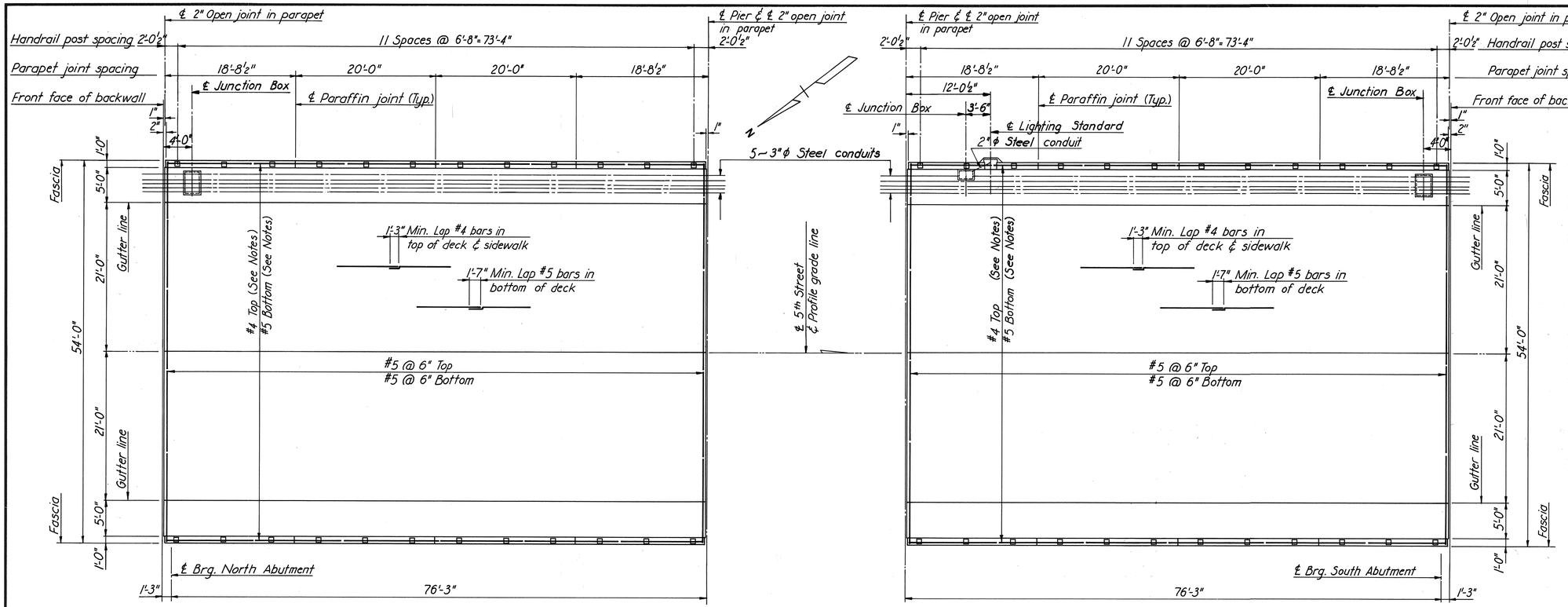
BRIDGE B-57
5TH STREET OVER
DOWNTOWN EXPRESSWAY

CROSS SECTION AND UTILITY DETAILS

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

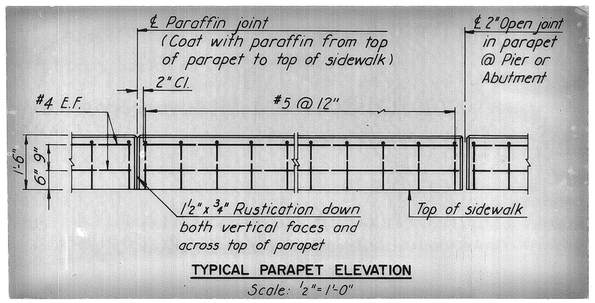
SCALE: AS SHOWN
CONTRACT NO. 9
SHEET NO. 11 OF 15

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	181	

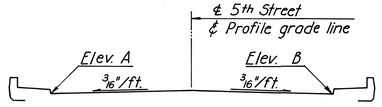


PLAN - UNIT 1
Scale: 1/8" = 1'-0"

PLAN - UNIT 2
Scale: 1/8" = 1'-0"



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



(LOOKING IN DIRECTION OF STATIONING)

PAVEMENT ELEVATIONS

STATION	ELEV. A	℄ & P.G.L.	ELEV. B	STATION	ELEV. A	℄ & P.G.L.	ELEV. B
16+90	——	*109.77	——	18+00	108.06	108.39	108.06
17+00	*109.01	*109.34	*108.63	+10	107.92	108.25	107.92
+10	*108.71	*109.04	*108.53	+20	107.69	108.02	107.69
+16.12	108.59	108.92	108.52	+30	107.38	107.71	107.38
+20	108.53	108.86	108.50	+40	107.01	107.34	107.01
+30	108.46	108.79	108.46	+50	106.61	106.94	106.61
+40	108.40	108.73	108.40	+60	106.18	106.51	106.18
+50	108.35	108.68	108.35	+70	105.72	106.05	105.72
+60	108.29	108.62	108.29	+71.12	105.67	105.99	105.67
+70	108.23	108.56	108.23	+80	*105.23	*105.56	*105.25
+80	108.18	108.51	108.18	+90	*104.64	*105.07	*104.72
+90	108.12	108.45	108.12	19+00	——	*104.58	——
+93.62	108.10	108.43	108.10				

* Elevations shown are given to top of bituminous surfacing.

NOTES:

For location and spacing of deck, parapet and sidewalk reinforcing, see Cross Section and Utility Details sheet.

For location and spacing of reinforcing in haunch over end diaphragms, see Joint Details sheet.

For lighting standard base, junction box details and additional reinforcing, see Standard Electrical Details sheet S4.

	BY	DATE				
MADE	A.B.P.	9-67				
CHECKED	T.E.M	2-68	1	As Built	T.E.M	1-77
IN CHARGE	P.R.V.		NO.	REVISION	BY	DATE

AS BUILT

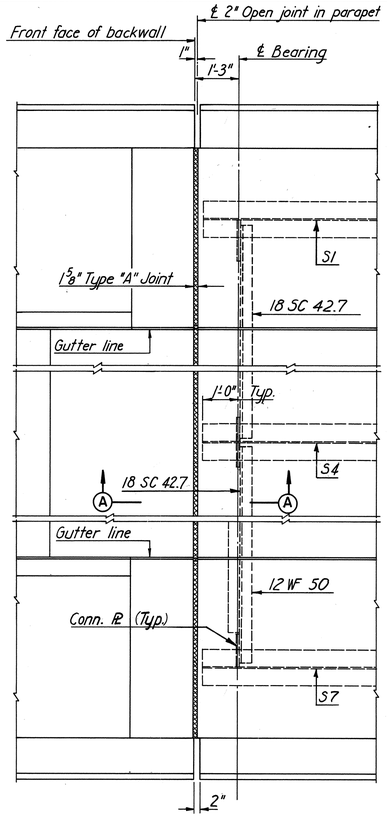
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-57
5TH STREET OVER DOWNTOWN EXPRESSWAY

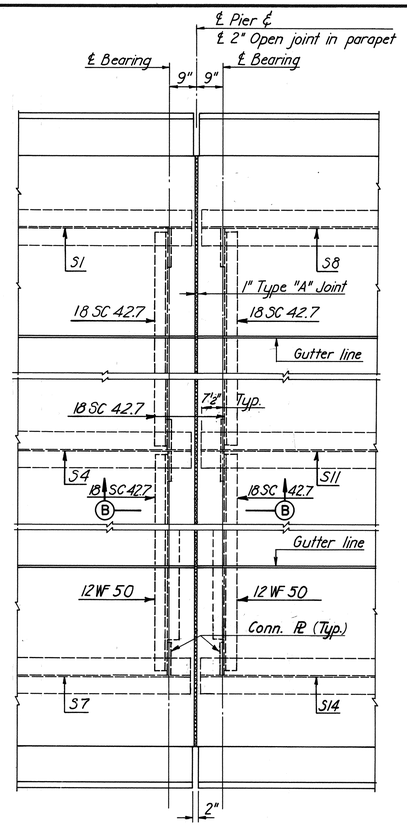
DECK PLANS

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

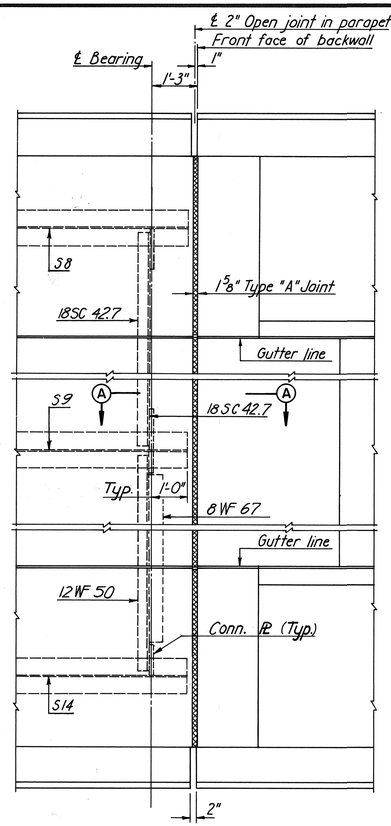
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 12 OF 15



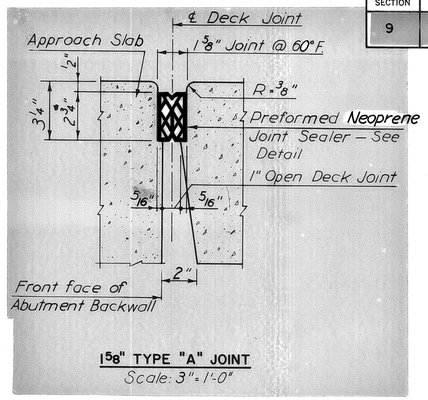
PLAN - JOINT AT NORTH ABUTMENT
Scale: ½"=1'-0"



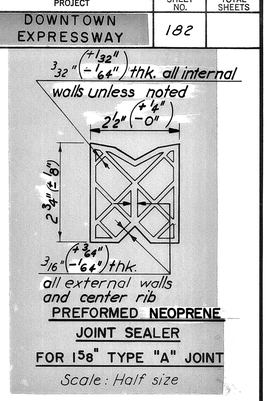
PLAN - JOINT AT PIER
Scale: ½"=1'-0"



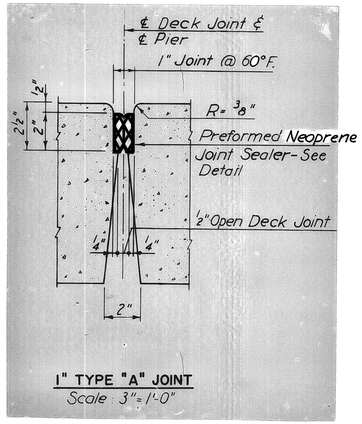
PLAN - JOINT AT SOUTH ABUTMENT
Scale: ½"=1'-0"



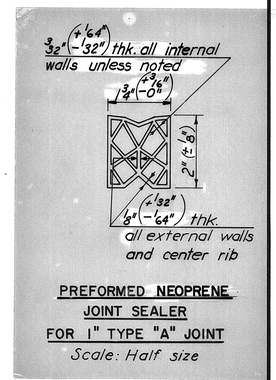
1⅝" TYPE "A" JOINT
Scale: 3"=1'-0"



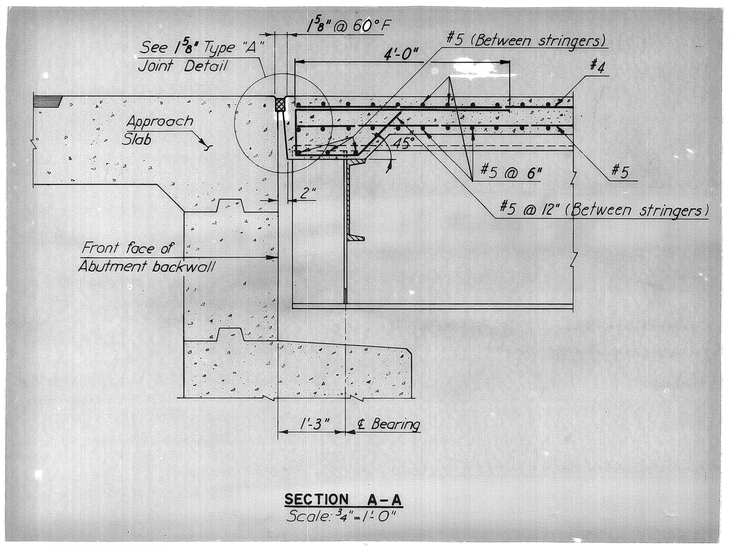
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half size



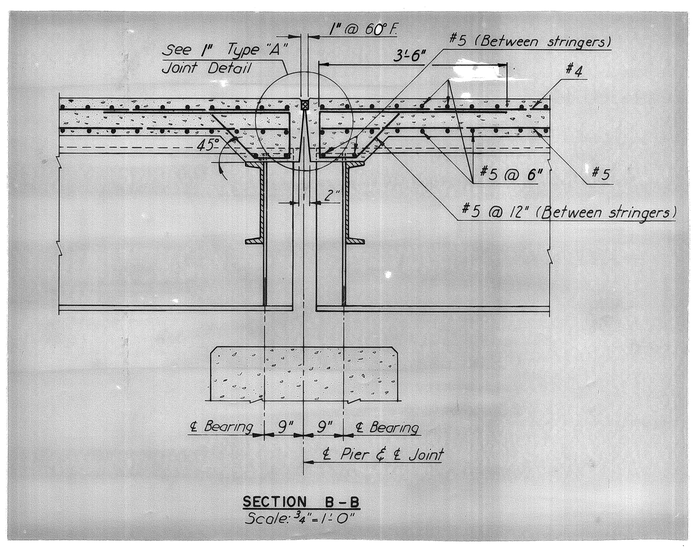
1" TYPE "A" JOINT
Scale 3"=1'-0"



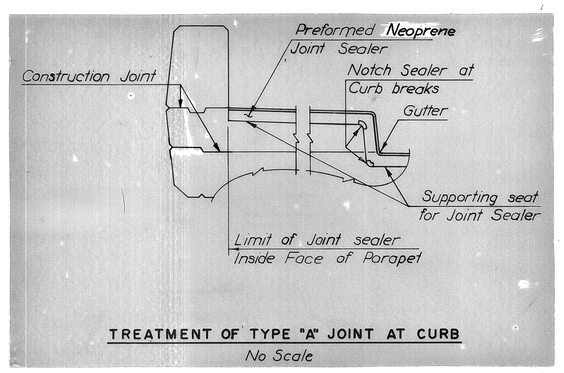
PREFORMED NEOPRENE JOINT SEALER FOR 1" TYPE "A" JOINT
Scale: Half size



SECTION A-A
Scale: ¾"=1'-0"



SECTION B-B
Scale: ¾"=1'-0"



TREATMENT OF TYPE "A" JOINT AT CURB
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
MADE	A.B.P.	9-67
CHECKED	T.E.M.	2-68
IN CHARGE	P.R.V.	

NO.	REVISION	BY	DATE
1	As Built	TEM	7-77

AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	182	

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

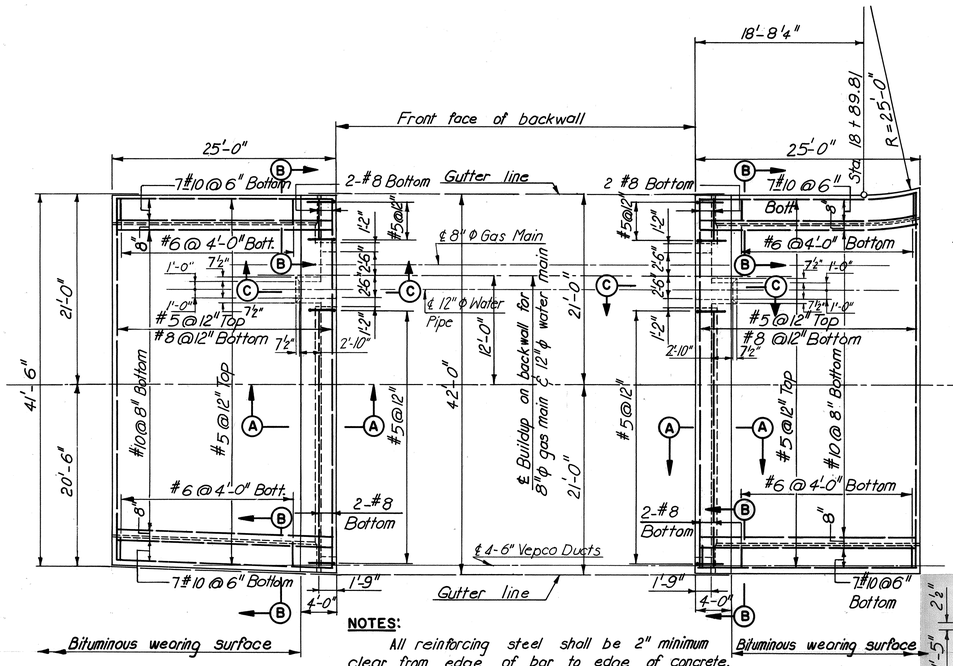
BRIDGE B-57
5TH STREET OVER DOWNTOWN EXPRESSWAY
JOINT DETAILS

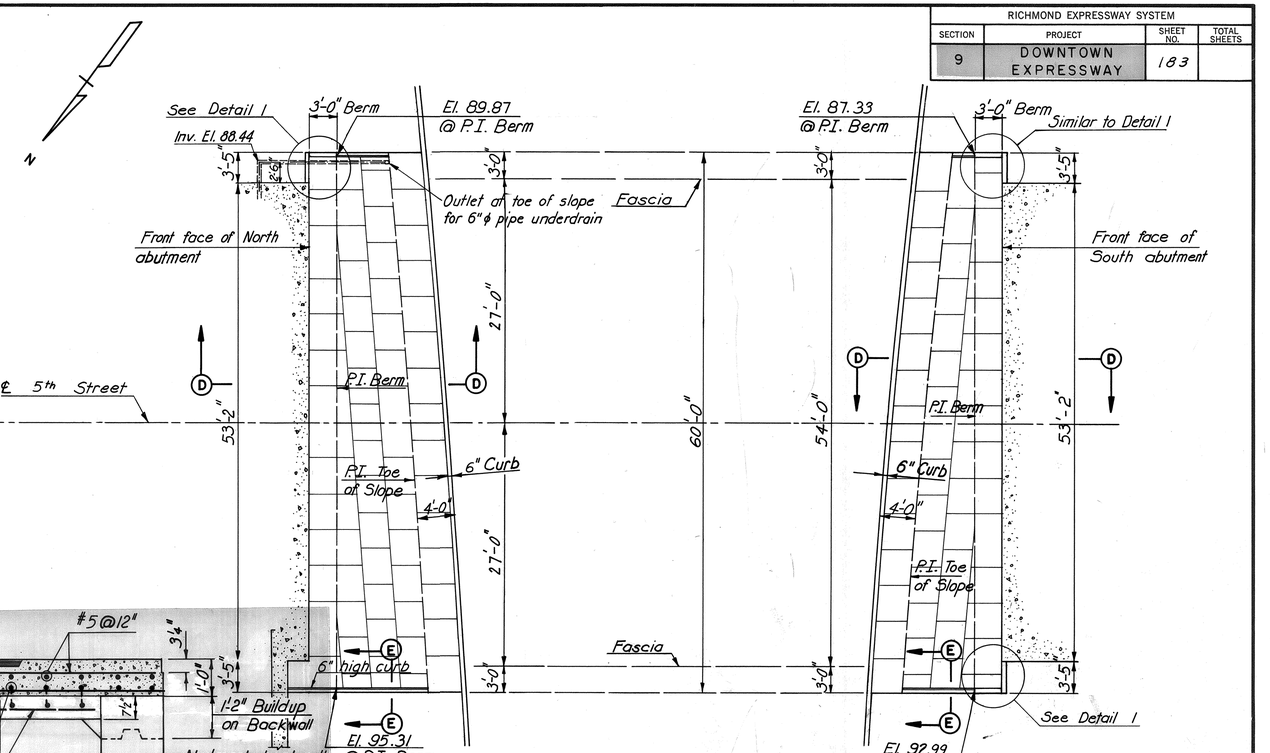
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

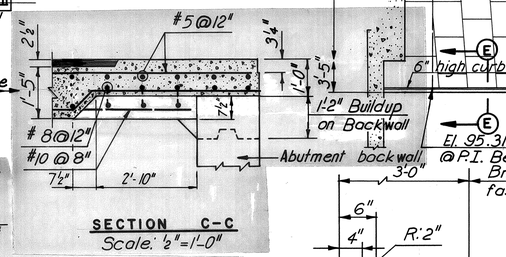
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 13 OF 15

182

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	183	

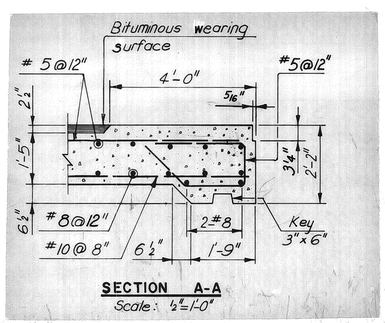






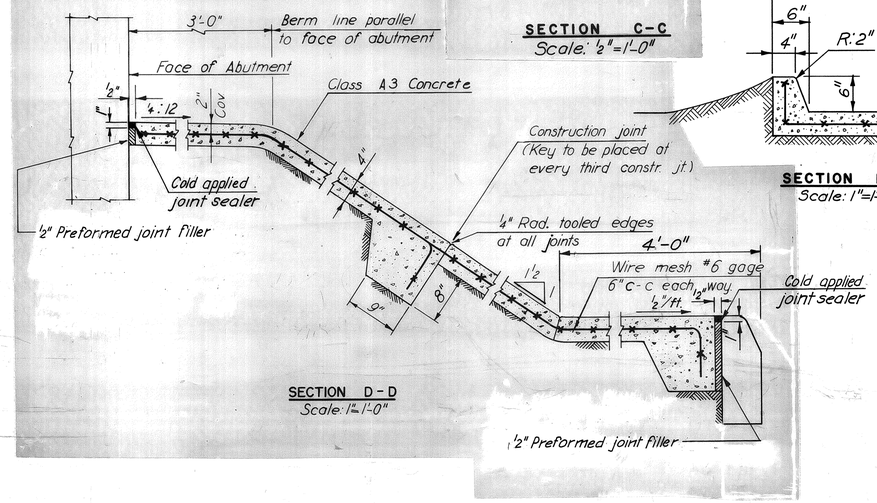
SECTION C-C
Scale: ½"=1'-0"

NORTH APPROACH SLAB
Scale: ⅛"=1'-0"



SECTION A-A
Scale: ½"=1'-0"

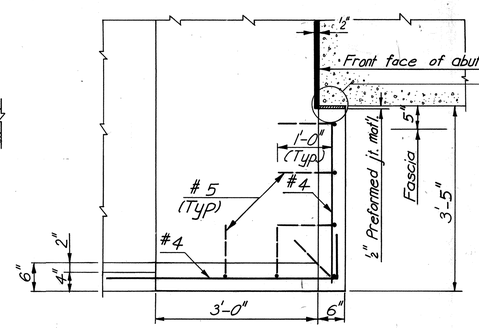
SOUTH APPROACH SLAB
Scale: ⅛"=1'-0"



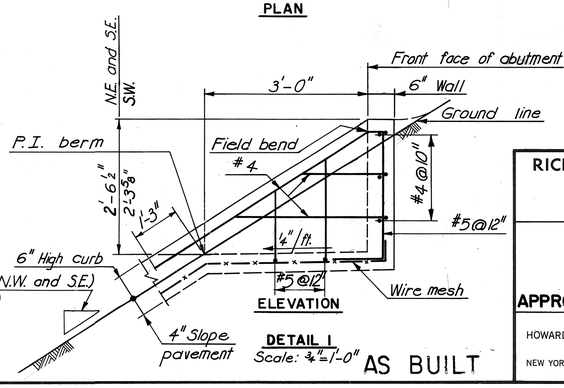
SECTION D-D
Scale: 1"=1'-0"

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

PLAN OF SLOPE PROTECTION
Scale: ⅛"=1'-0"

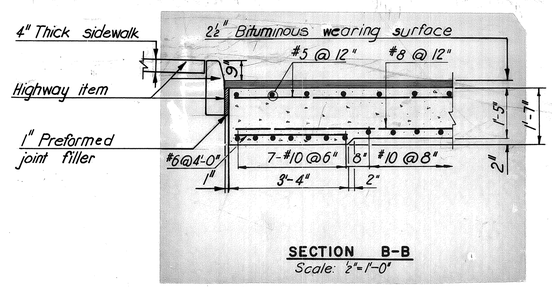


PLAN



ELEVATION

DETAIL 1
Scale: ¾"=1'-0"



SECTION B-B
Scale: ½"=1'-0"

SLOPE PROTECTION NOTE:

The item "Cast-in-Place Concrete Slab Slope Protection" shall include the excavation of, or the placing and compaction of any embankment material necessary to bring the surface of the paved slopes to the finished elevations shown on the plans.

"Cast-in-Place Concrete Slab Slope Protection" shall be paid for at the contract unit price per square yard, which price shall include the concrete slab including wire mesh and joint filler.

The slab shall be constructed in 4'-0" x 4'-0" panels, placed in horizontal courses, alternate panels being poured in a staggered pattern with adjacent panels poured later. The slab shall be Class A3 concrete of such consistency that it can be placed without the use of top forms. The surface shall be finished with a wood float.

Reinforcing shall consist of wire mesh No. 6 gage, 6" c.c. each way, placed at the center of the slab, and continuous through construction joints.

	BY	DATE
MADE	elm	11-67
CHECKED	T.E.M	2-68
IN CHARGE	P.R.V.	

NO.	REVISION	BY	DATE
1	As Built	T.E.M.	7-77

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-57
5TH STREET OVER DOWNTOWN EXPRESSWAY

APPROACH SLABS AND SLOPE PROTECTION

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 14 OF 15

AS BUILT

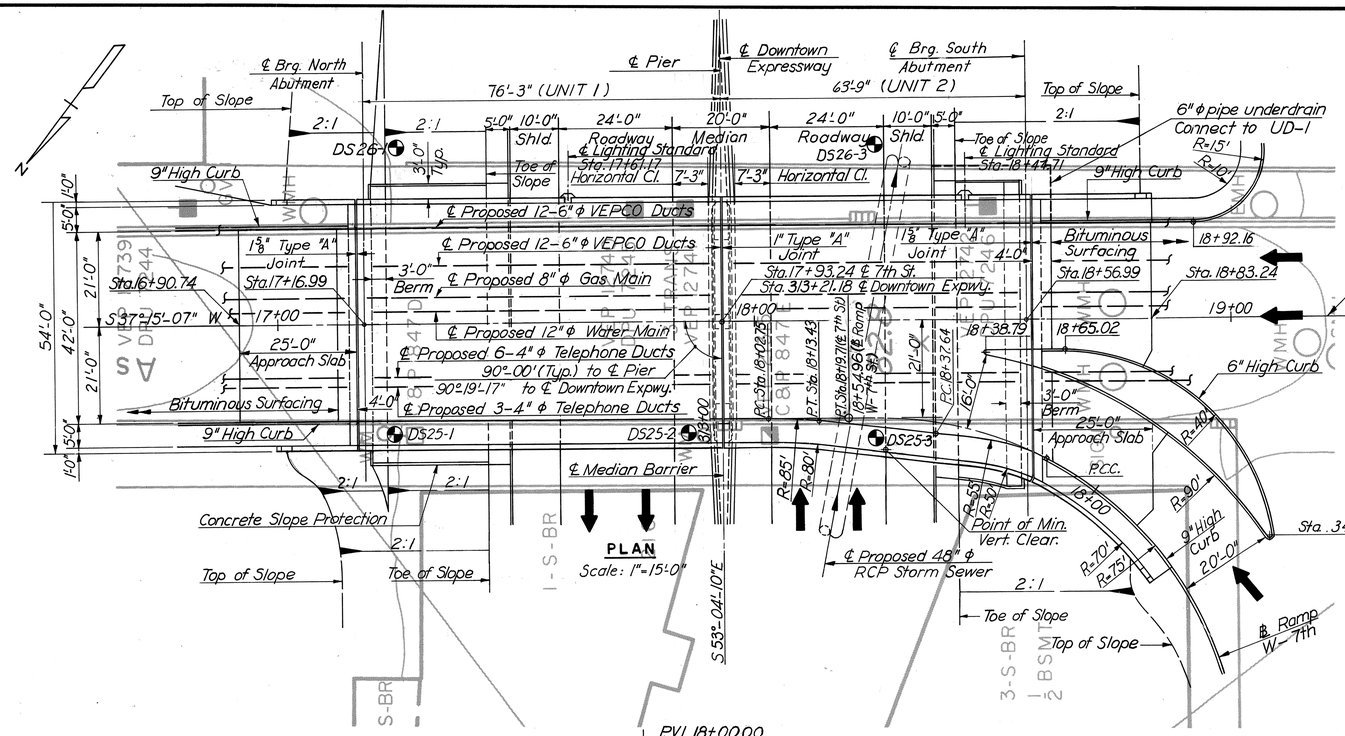
183

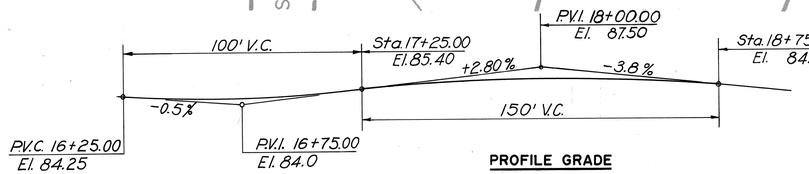
Bridge 58

(South 7th Street
Over Downtown Expressway {Rte. 195})

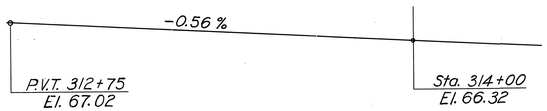
Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	185	

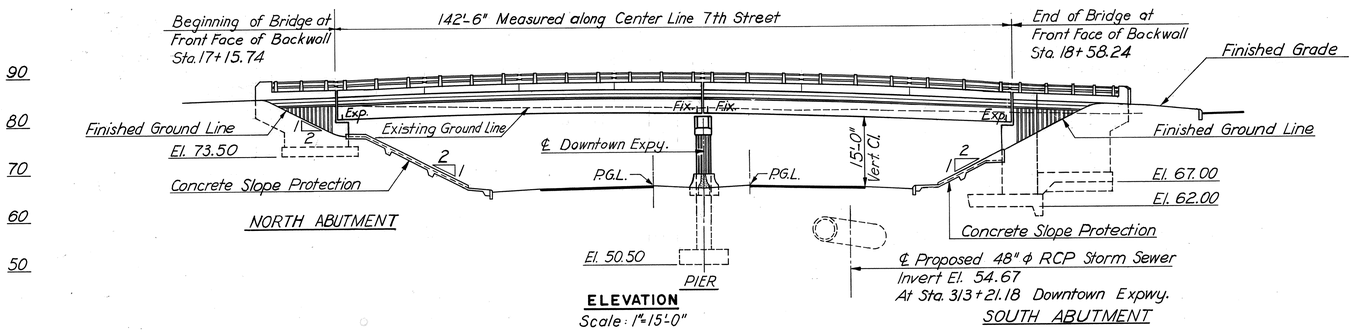




PROFILE GRADE
7th STREET
Not to Scale



PROFILE GRADE
DOWNTOWN EXPRESSWAY
Not to Scale



ELEVATION
Scale: 1"=15'-0"

INDEX

PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale

BORINGS: ⊕ Indicates location of 2½"ϕ cased hole boring. For boring data, see Boring Logs sheet.

NOTE: For General Notes and Quantities, see next sheet.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	JBM	1-68				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE	PRV					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

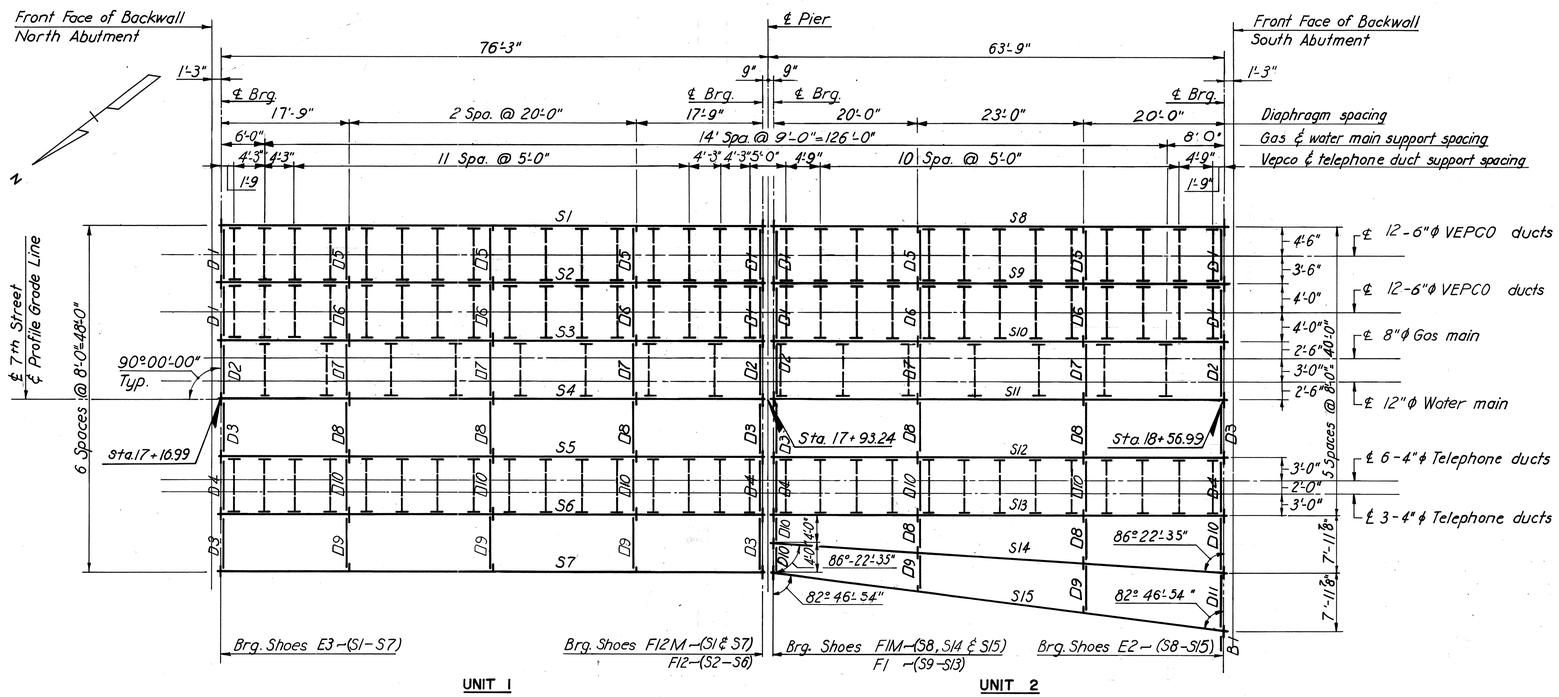
BRIDGE B-58
7TH STREET OVER DOWNTOWN EXPRESSWAY

GENERAL PLAN AND ELEVATION

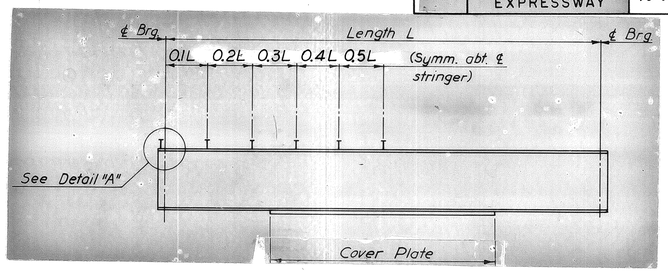
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO. 9
SHEET NO. 1 OF 17

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	194	



FRAMING PLAN
Scale: 1" = 10'

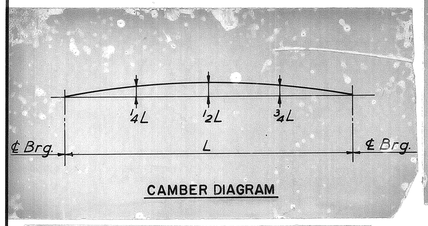


STRINGER ELEVATION

STRINGER SCHEDULE

STRINGER	LENGTH ℄ BRG. TO ℄ BRG.	COVER PLATE	SHEAR STUD SPACING 0.1L	0.2L	0.3L	0.4L	0.5L
S1 – 36 WF 194	75'-6"	10½ x 1¾ x 64'-0"	7"	8"	11"	13½"	15½"
S2 – 36 WF 194	↕	10½ x 1¾ x 64'-0"	↕	↕	10½"	13"	14½"
S3 – 36 WF 182	↕	10½ x 1¾ x 65'-0"	↕	↕	11"	↕	↕
S4 – 36 WF 182	↕	10½ x 1⅞ x 64'-6"	↕	↕	↕	↕	↕
S5 – 36 WF 182	↕	10½ x 1⅞ x 63'-6"	↕	↕	↕	↕	↕
S6 – 36 WF 182	↕	10½ x 1⅞ x 63'-6"	↕	↕	↕	13"	14½"
S7 – 36 WF 182	75'-6"	10½ x 1¾ x 64'-6"	7"	8"	11"	13½"	15½"
S8 – 36 WF 150	63'-0"	10½ x 1 x 51'-0"	7"	8"	10½"	13½"	15"
S9 – 36 WF 150	↕	10½ x 1 x 51'-0"	↕	↕	10½"	12½"	14"
S10 – 36 WF 150	↕	10½ x 1 x 51'-0"	↕	↕	11"	↕	↕
S11 – 36 WF 135	↕	10½ x 1⅛ x 53'-0"	↕	↕	↕	↕	↕
S12 –	↕	10½ x 1⅛ x 53'-0"	7"	↕	10½"	↕	14"
S13 –	63'-0"	10½ x ⅞ x 51'-6"	7½"	8"	11½"	12½"	15"
S14 –	63'-1⅜"	10½ x ⅝ x 48'-6"	9"	10"	13"	15½"	17"
S15 – 36 WF 135	63'-6⅛"	10½ x ¾ x 49'-6"	8½"	10"	12½"	16"	18½"

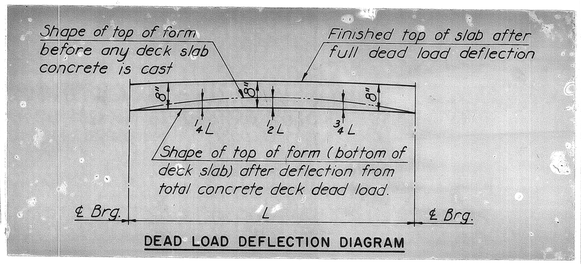
Note:
Lengths shown are horizontal distances measured along centerlines of stringers.



CAMBER DIAGRAM

CAMBER SCHEDULE

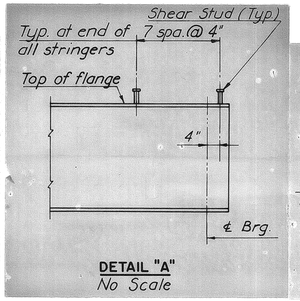
STR.	¼L	½L	¾L	STR.	¼L	½L	¾L
S1, S5-S7	4"	5 5/8"	4'8"	S8-S10	2⅞"	3⅞"	2⅞"
S2	4"	5½"		S11, S13	2⅞"	4"	2⅞"
S4	4'8"	5 5/8"		S14	3"	4"	3"
S3	4'6"	5⅜"	4'4"	S15	3⅛"	4'8"	3⅛"



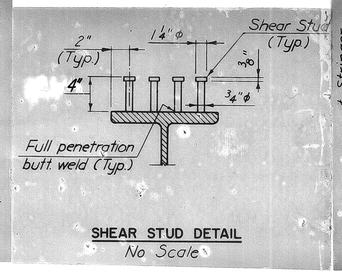
DEAD LOAD DEFLECTION DIAGRAM

DEFLECTION SCHEDULE

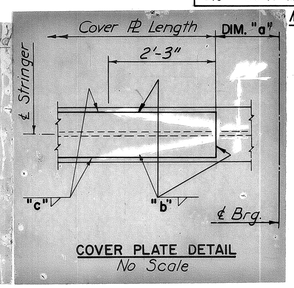
STR.	¼L & ¾L	½L	STR.	¼L & ¾L	½L
S1, S3, S7	1'8"	1'2"	S8-S14	¾"	1"
S2, S4-S6	1"		S13	5/8"	⅞"



DETAIL "A"
No Scale



SHEAR STUD DETAIL
No Scale



COVER PLATE DETAIL
No Scale

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

COVER PLATE SCHEDULE

STR.	DIM. "a"	Cover Pl.	"b"	"c"
S1 & S2	5'-9"	10½ x 1¾	↕	↕
S3	5'-3"	↕	↕	↕
S4 & S7	5'-6"	↕	↕	↕
S5 & S6	6'-0"	10½ x 1⅞	5⅞"	3⅜"
S8-S10	6'-0"	10½ x 1	↕	↕
S11 & S12	5'-0"	10½ x 1⅛	↕	↕
S13	5'-9"	10½ x ⅞	↕	↕
S14	7'-3¾	10½ x 5⅝	↕	↕
S15	7'-0 1/16"	10½ x ¾	↕	↕

SHOE SCHEDULE

EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E2	8	F1	5
E3	7	F1M	3
		F12	5
		F12N	2

NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
Dimensions are in inches.

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

	BY	DATE	NO.	REVISION	BY	DATE
MADE	D.L.A.	10-67				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE	A.R.V.					

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE B-58
7TH STREET OVER DOWNTOWN EXPRESSWAY
FRAMING PLAN

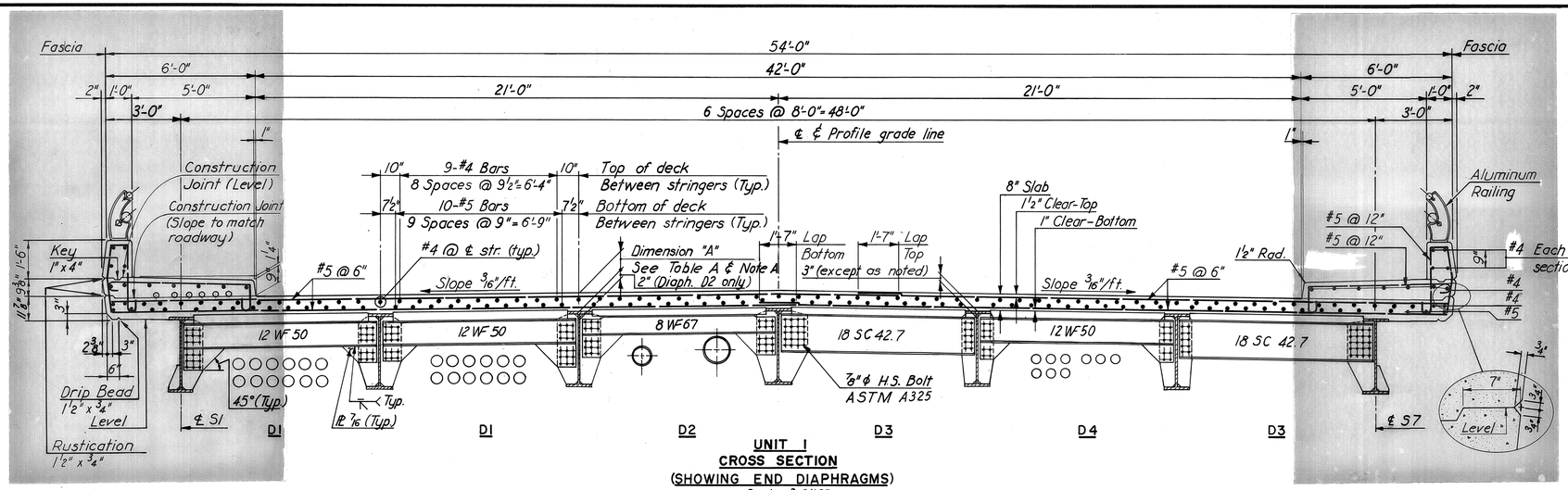
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 10 OF 17

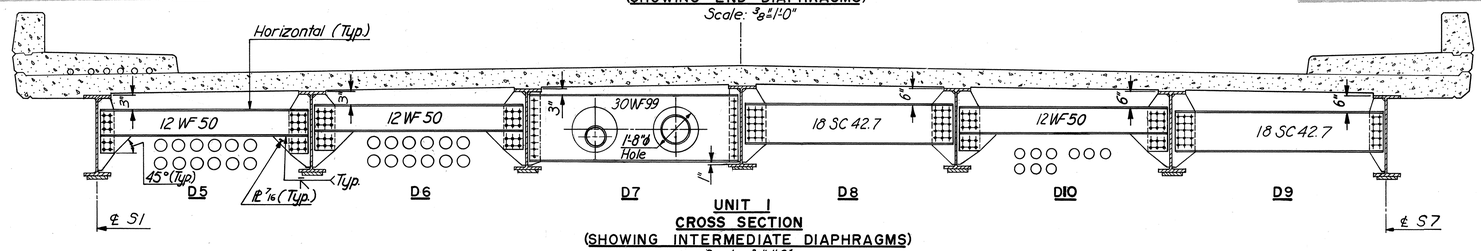
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	195	

TABLE A	
STRINGER	DIM "A"
S1, S2	9⅛"
S3-S7	9¼"
S8-S15	9½"

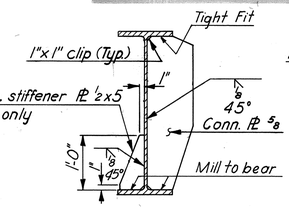
NOTE "A":
Dimension shown is measured from top of stringer to top of slab at the intersection of the centerline of stringer and the centerline of bearing. At exterior stringers this is measured to the cross slope extended. This dimension may be varied between bearings as required to care for variation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



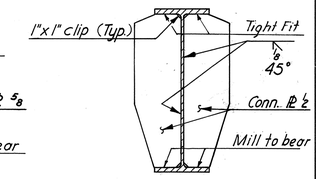
UNIT 1
CROSS SECTION
(SHOWING END DIAPHRAGMS)
Scale: ⅜" = 1'-0"



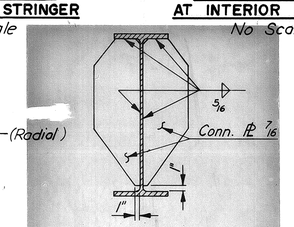
UNIT 1
CROSS SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)
Scale: ⅜" = 1'-0"



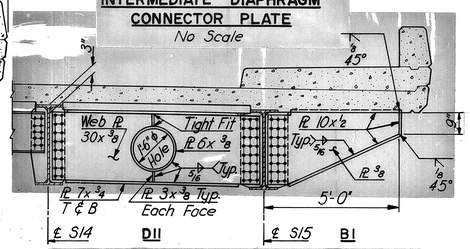
TYP
END DIAPHRAGM
CONNECTOR PLATE
AT EXTERIOR STRINGER
No Scale



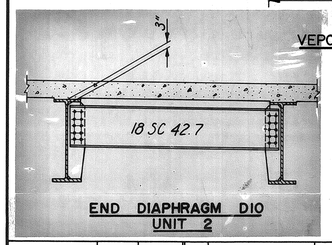
TYP
END DIAPHRAGM
CONNECTOR PLATE
AT INTERIOR STRINGER
No Scale



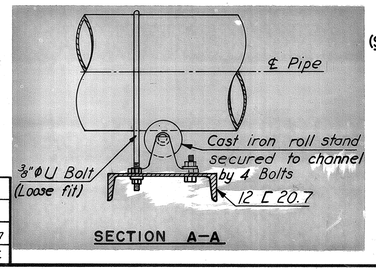
TYP
INTERMEDIATE DIAPHRAGM
CONNECTOR PLATE
No Scale



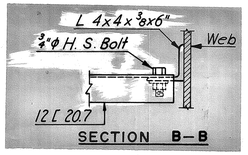
UNIT 2
PARTIAL CROSS SECTION
(SHOWING END DIAPHRAGM AT SOUTH ABUTMENT)
Scale: ⅜" = 1'-0"



END DIAPHRAGM D10
UNIT 2

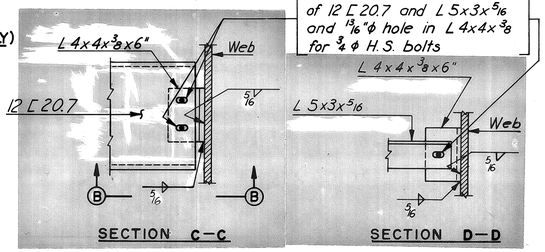


SECTION A-A



SECTION B-B

UNIT 2
CROSS SECTION
(SHOWING UTILITY SUPPORTS ONLY)
Scale: ⅜" = 1'-0"



SECTION C-C

SECTION D-D

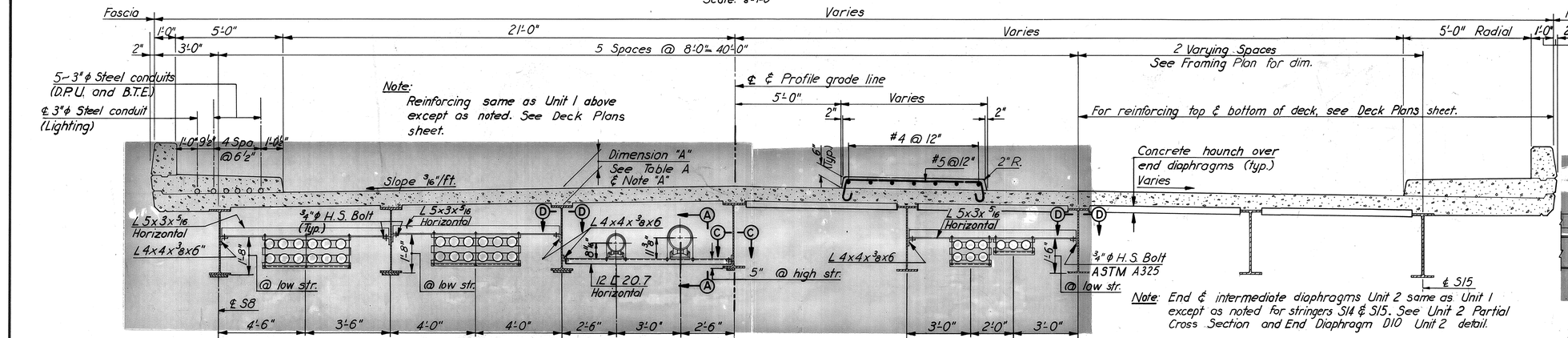
	BY	DATE				
MADE	EVR	10-67				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE	PRY.		NO.	REVISION	BY	DATE

12-6" ϕ VEPCO DUCT SUPPORT

12-6" ϕ VEPCO DUCT SUPPORT

8" ϕ GAS 12" ϕ WATER GAS & WATER MAIN SUPPORT

6-4" ϕ 3-4" ϕ TELEPHONE DUCT SUPPORT



Note: End ℄ intermediate diaphragms Unit 2 same as Unit 1 except as noted for stringers S14 & S15. See Unit 2 Partial Cross Section and End Diaphragm D10 Unit 2 detail.

NOTES:

For spacing and location of utility supports and diaphragms, see Framing Plan sheet.

For Basic Attachment Details for cement asbestos conduit, see Standard Conduit Installation Details sheet.

For details showing gas and water mains thru abutments, see Standard Utility Support Details At Bridge Abutments sheet.

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-58
7TH STREET OVER DOWNTOWN EXPRESSWAY

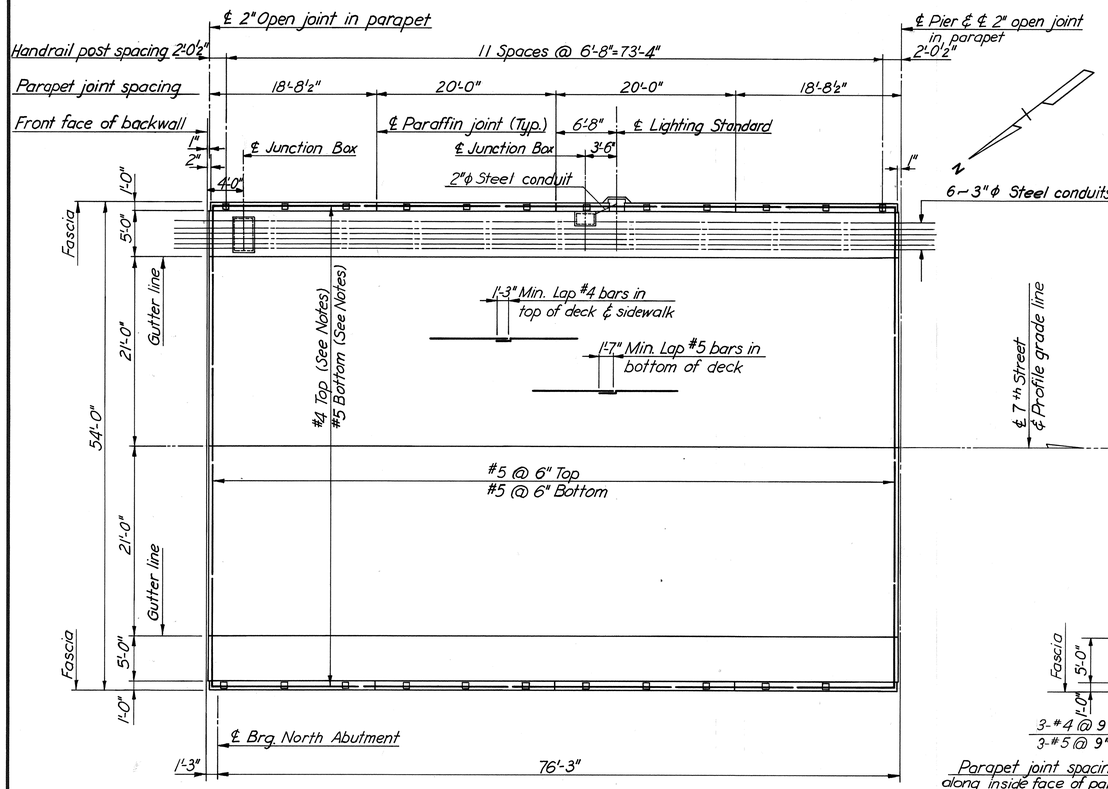
CROSS SECTION AND UTILITY DETAILS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 11 OF 17

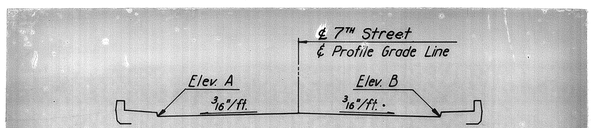
195

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	196	



UNIT 1

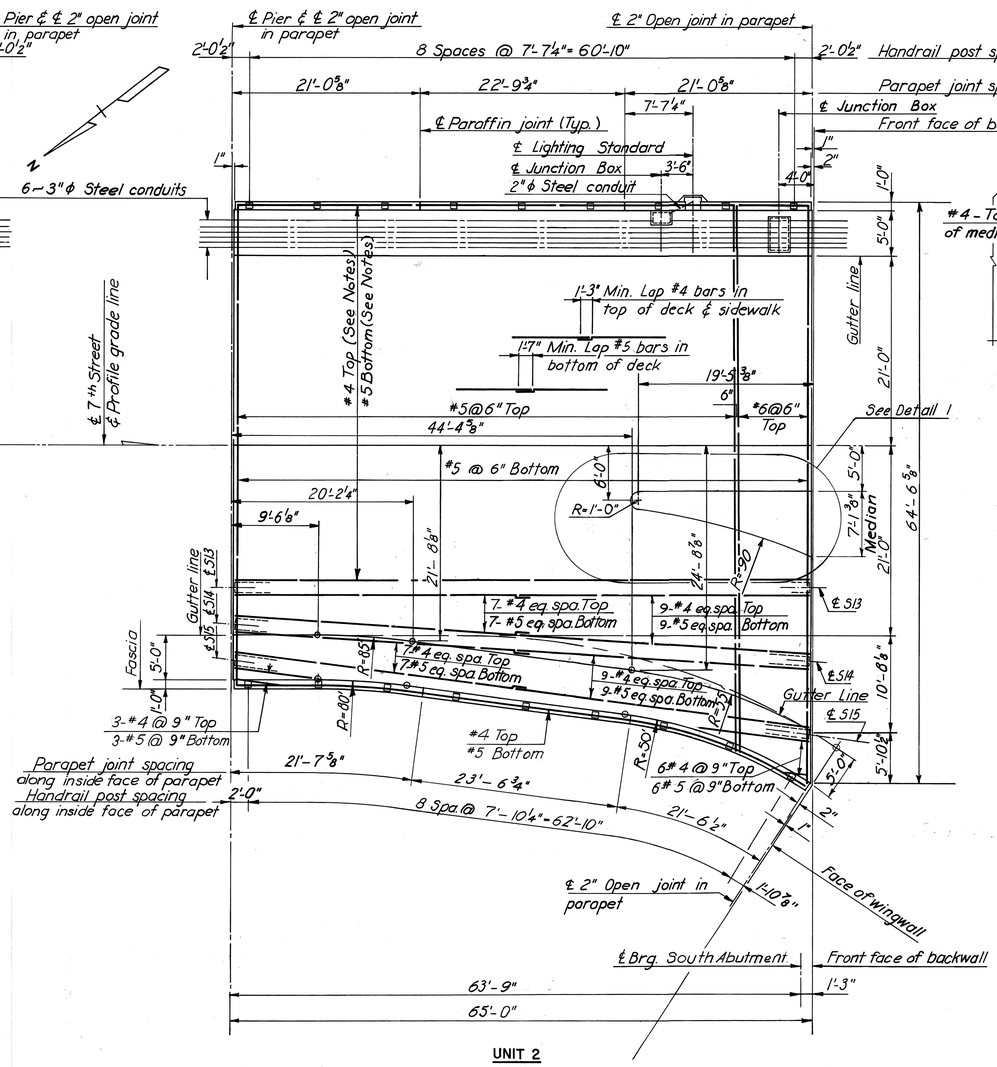
Scale: 1/8"=1'-0"



PAVEMENT ELEVATIONS

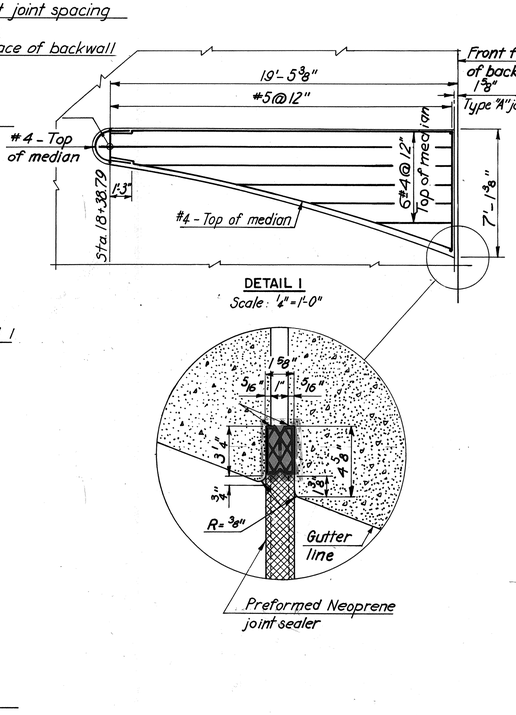
STATION	ELEV. A	℄ & P.G.L.	ELEV. B	STATION	ELEV. A	℄ & P.G.L.	ELEV. B
16+90	*84.29	*84.62	*84.29	+93.24	85.96	86.29	85.96
17+00	*84.47	*84.80	*84.47	18+00	85.94	86.26	85.90
+10	*84.69	*85.02	*84.69	+10	85.86	86.19	85.76
+15.74	84.83	85.16	84.83	+20	85.75	86.08	85.55
+20	84.93	85.26	84.93	+30	85.59	85.92	85.29
+30	85.21	85.54	85.21	+40	85.38	85.71	84.98
+40	85.44	85.77	85.44	+50	85.14	85.46	84.56
+50	85.63	85.96	85.63	+58.24	84.89	85.22	84.12
+60	85.78	86.11	85.78	+60	84.84	85.17	84.03
+70	85.89	86.22	85.89	+70	*84.50	*84.83	*83.56
+80	85.95	86.28	85.95	+80	*84.12	*84.46	*83.15
+90	85.96	86.29	85.96	—	—	—	—

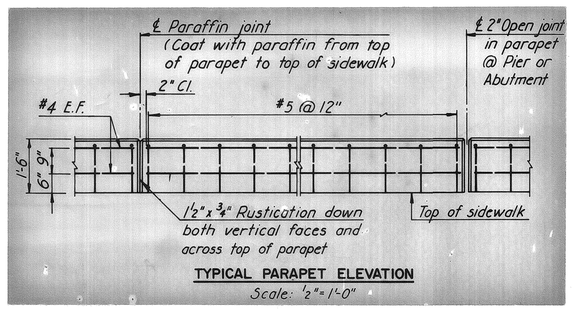
*Elevations shown are given to top of bituminous surfacing.



UNIT 2

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





NOTES:

For location and spacing of deck, parapet and sidewalk reinforcing, see Cross Section and Utility Details sheet.

For location and spacing of reinforcing in haunch over end diaphragms, see Joint Details sheet.

For lighting standard base, junction box details and additional reinforcing, see Standard Electrical Details sheet 54.

	BY	DATE				
MADE	J.B.M.	1-68				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE P.R.V.			NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

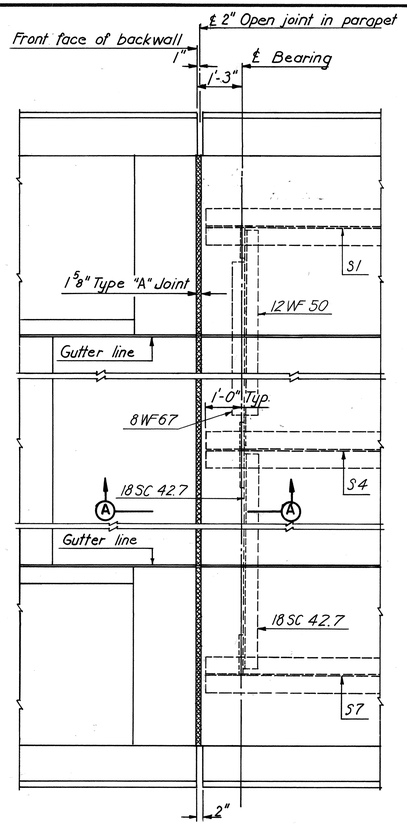
BRIDGE B-58

7TH STREET OVER DOWNTOWN EXPRESSWAY

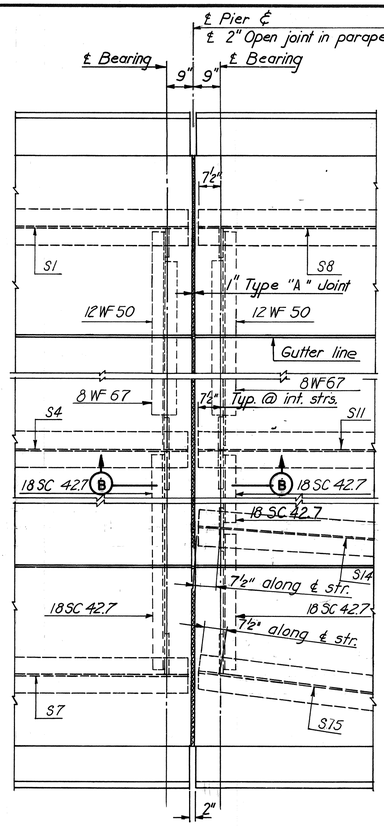
DECK PLANS

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

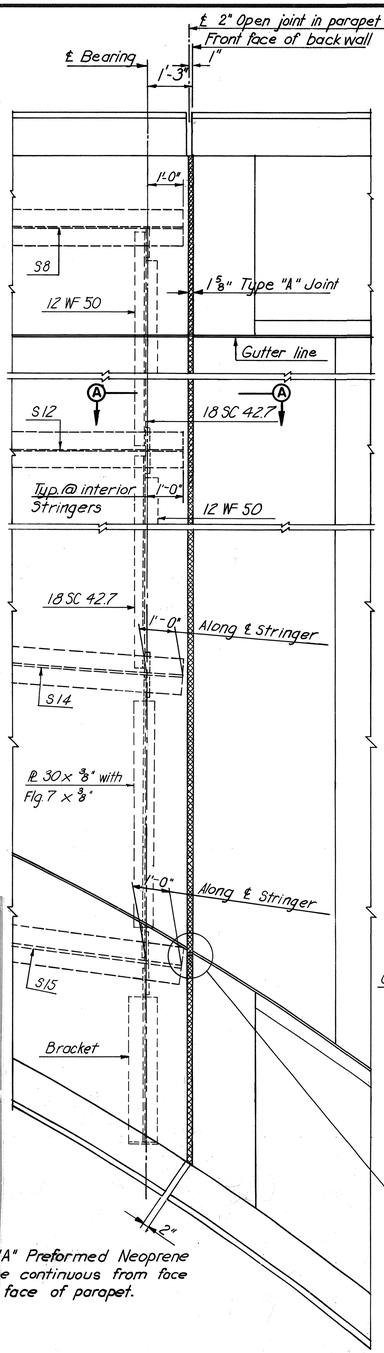
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 12 OF 17



PLAN - JOINT AT NORTH ABUTMENT
Scale: ½" = 1'-0"

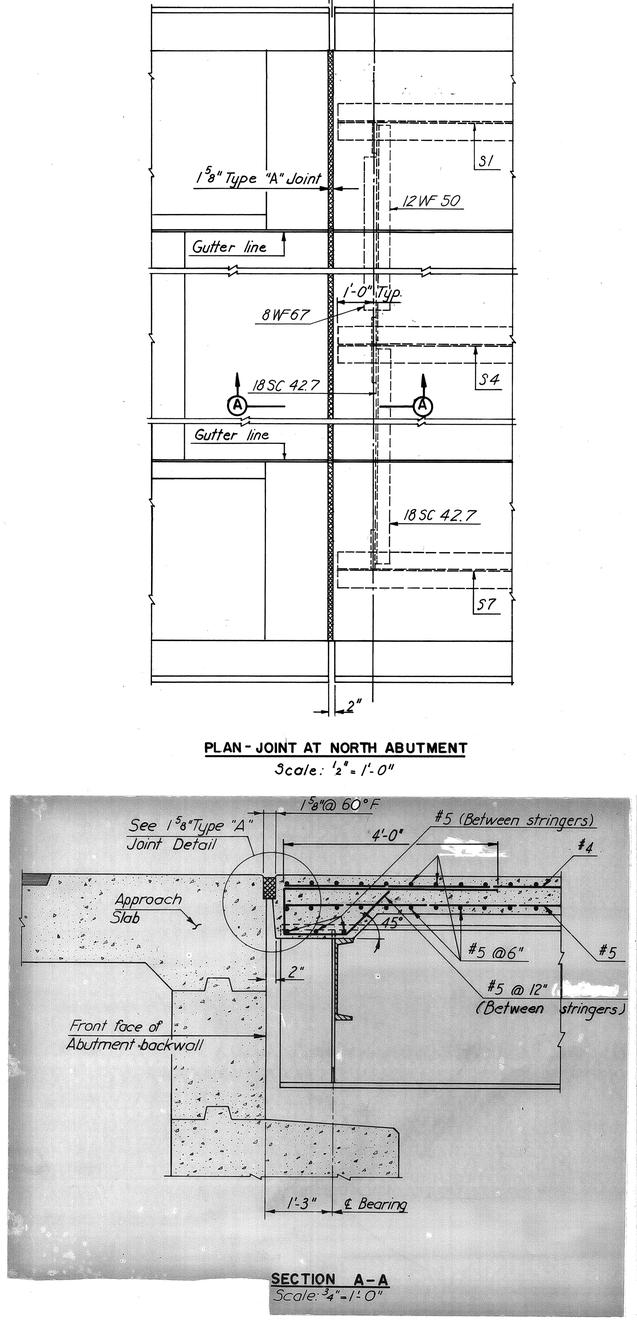


PLAN - JOINT AT PIER
Scale: ½" = 1'-0"

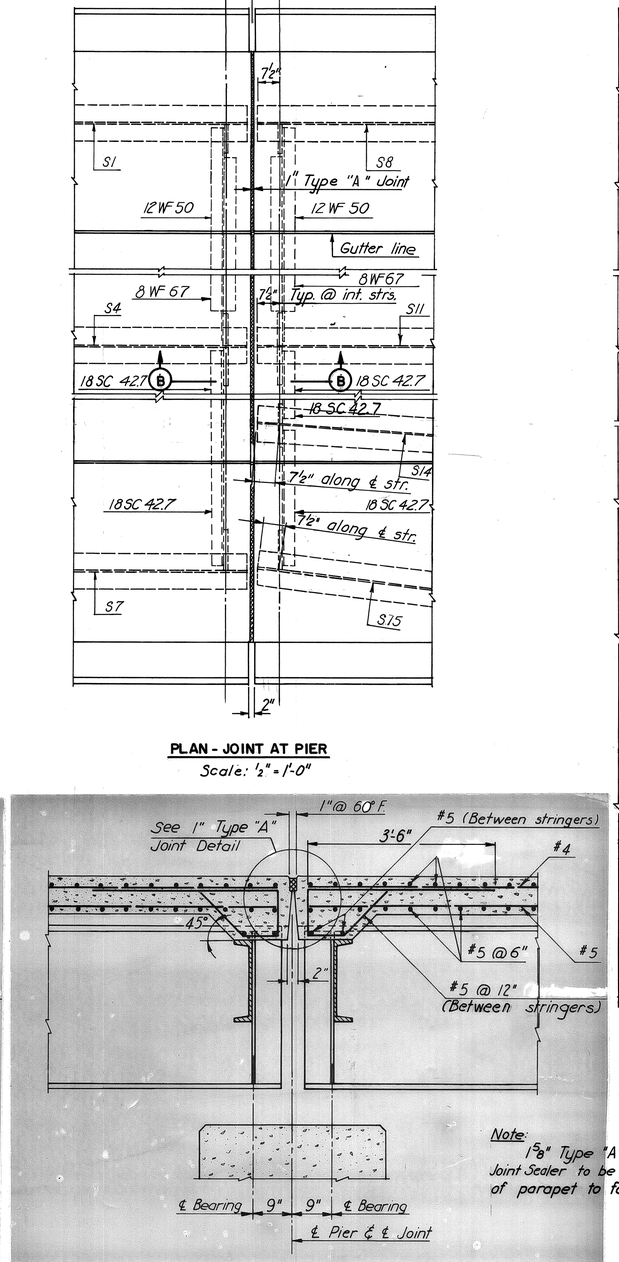


PLAN - JOINT AT SOUTH ABUTMENT
Scale: ½" = 1'-0"

Note:
For detail showing vertical support seat for preformed elastic joint sealer at median curb, see Detail 1 on Deck Plan sheet.

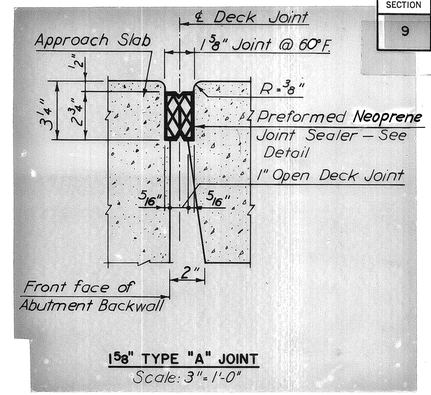


SECTION A-A
Scale: ¾" = 1'-0"

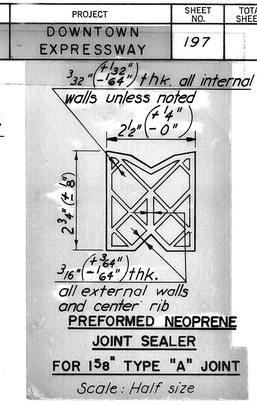


SECTION B-B
Scale: ¾" = 1'-0"

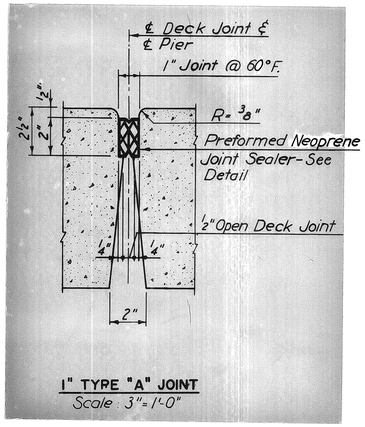
Note:
1⅝" Type "A" Preformed Neoprene Joint Sealer to be continuous from face of parapet to face of parapet.



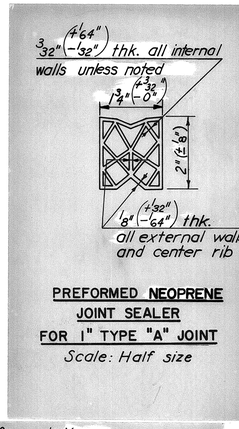
1⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"



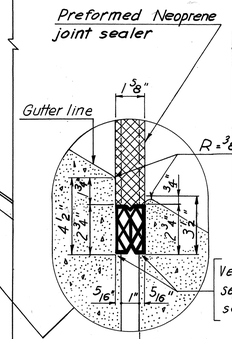
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half size

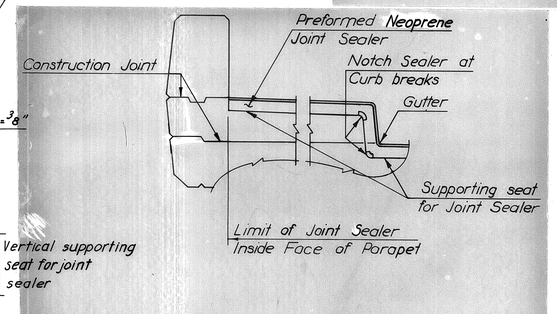


1" TYPE "A" JOINT
Scale: 3" = 1'-0"



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





TREATMENT OF TYPE "A" JOINT AT CURB
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
MADE	E.V.R.	1-68
CHECKED	TEM	2-68
IN CHARGE	P.R.Y.	

NO.	REVISION	BY	DATE
1	As Built	TEM	7-77

AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	197	

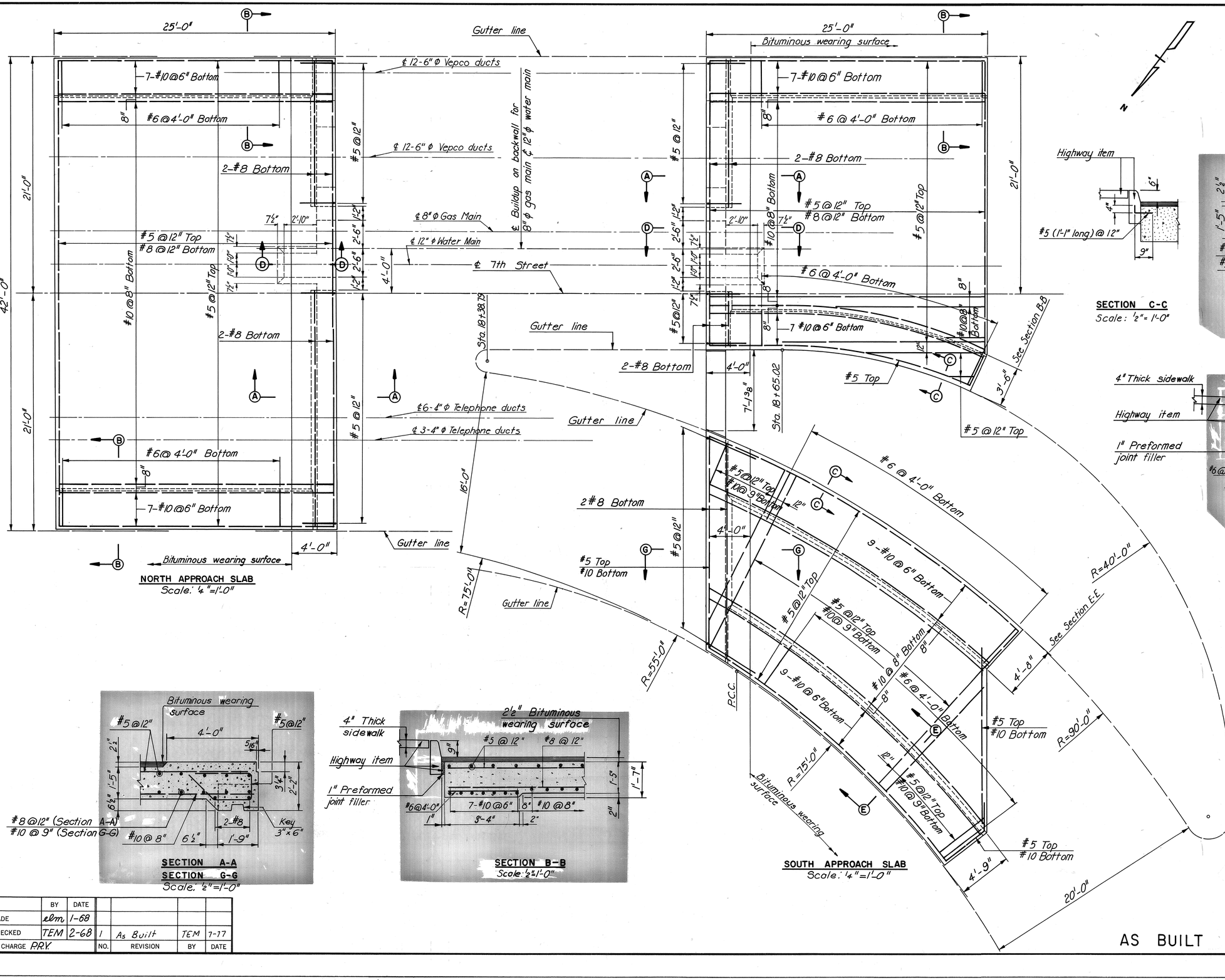
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-58
7TH STREET OVER DOWNTOWN EXPRESSWAY
JOINT DETAILS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 13 OF 17

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	198	



NOTES:

All reinforcing steel shall be 2" minimum clear from edge of bar to edge of concrete.

Cut reinforcing in the field to clear build-up on abutment backwall.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	elm	1-68				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE PRV						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-58
7TH STREET OVER DOWNTOWN EXPRESSWAY
APPROACH SLABS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 14 OF 17

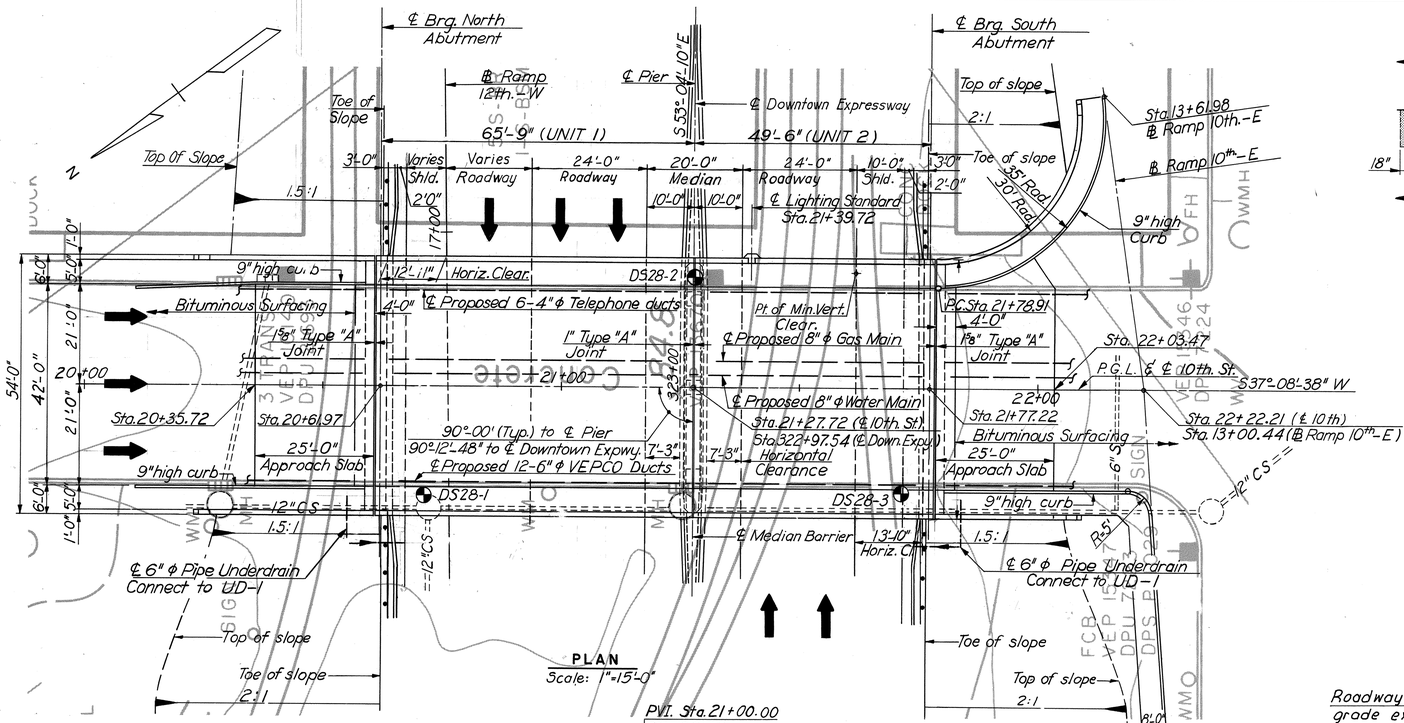
Bridge 60

(South 10th Street
Over Downtown Expressway {Rte. 195})

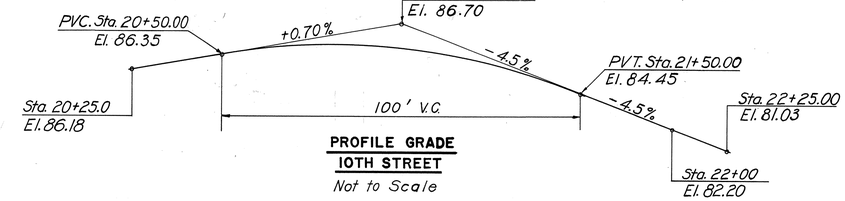
Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	204	

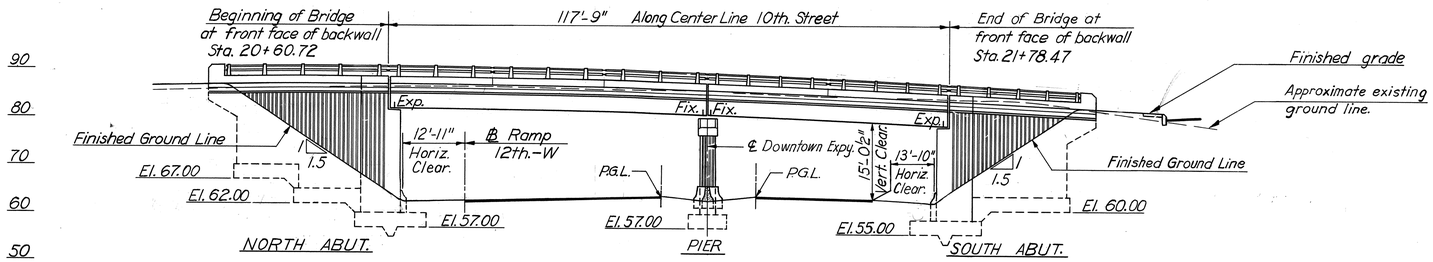
INDEX



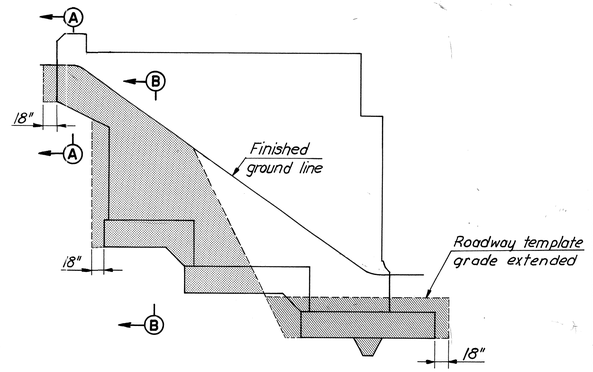
PLAN
Scale: 1"=15'-0"



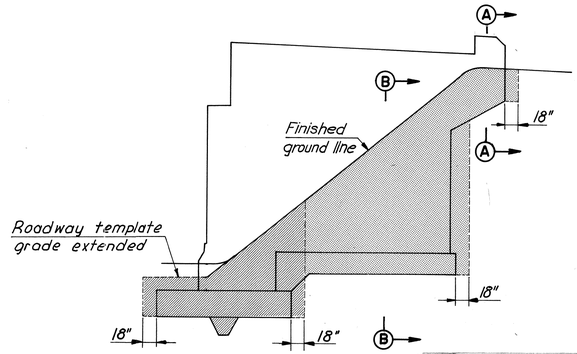
PROFILE GRADE
10TH STREET
Not to Scale



ELEVATION
Scale 1"=15'



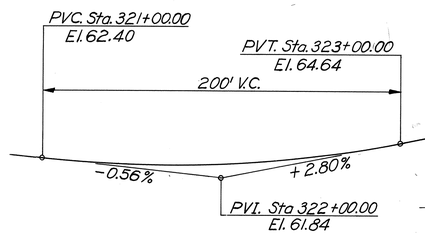
NORTH ABUT.



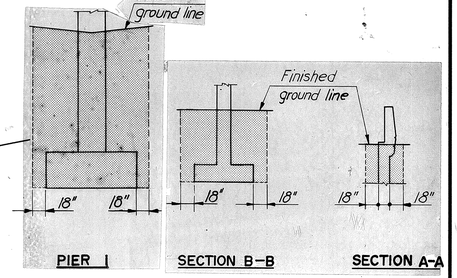
SOUTH ABUT.

BORINGS: Indicates location of 2½"ϕ cased hole boring.
For boring data, see Boring Logs sheet.

NOTE: For General Notes and Quantities, see next sheet.



PROFILE GRADE
DOWNTOWN EXPRESSWAY
Not to Scale



PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale

	BY	DATE				
MADE	J.B.M.	12-67	2	As Built	TEM	7-77
CHECKED	A.B.P.	3-68	1	North East WW	TEM	6-74
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

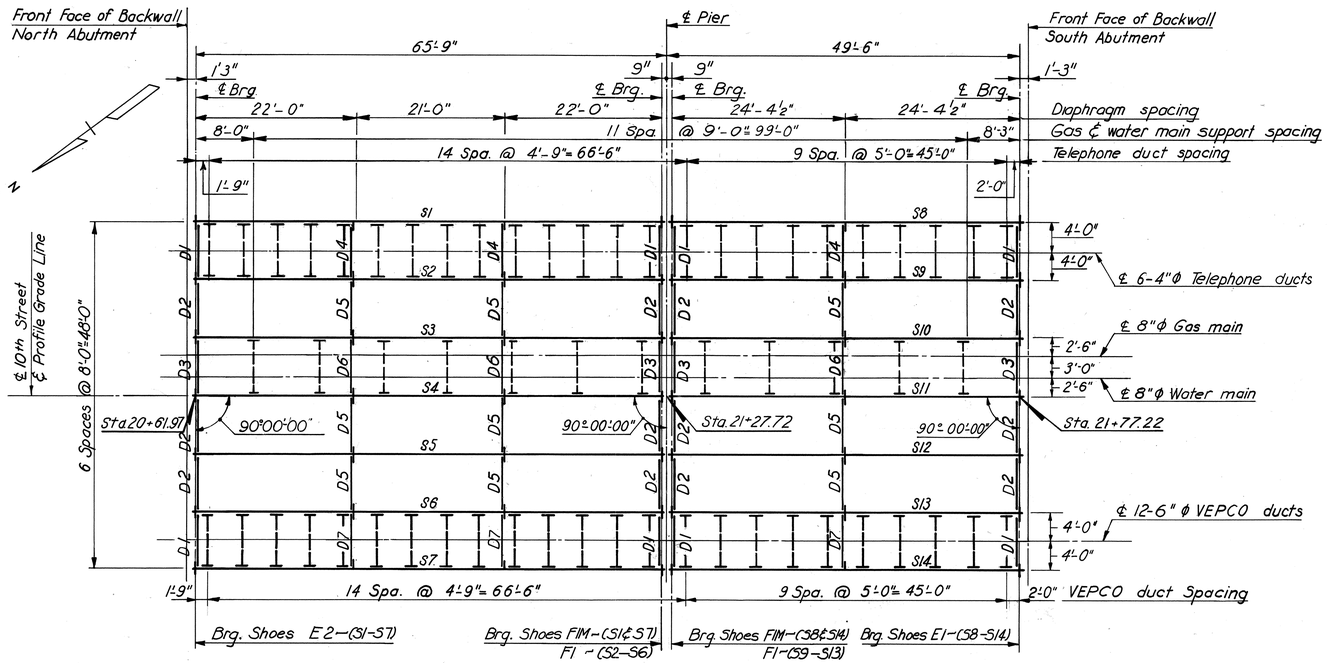
BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY

GENERAL PLAN AND ELEVATION

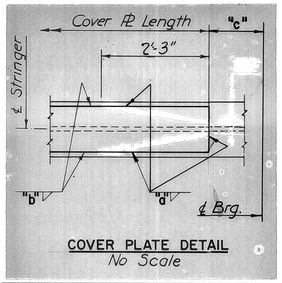
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 1 OF 17

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	215	

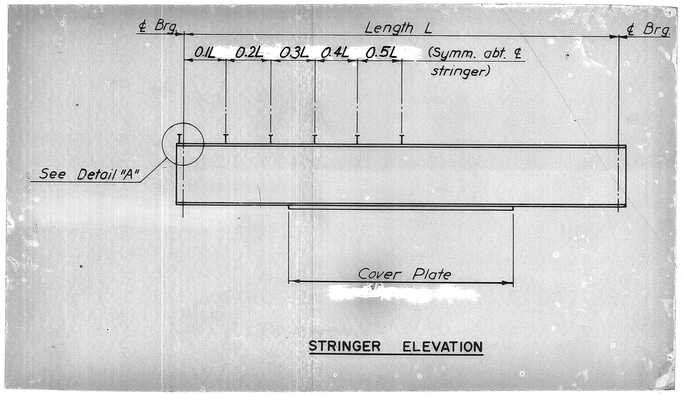


FRAMING PLAN
Scale: 1" = 10'



COVER PLATE DETAIL
No Scale

COVER PLATE SCHEDULE				
STR.	COVER PL.	"a"	"b"	"c"
S1,S6,S7	10½ x 1¼	½"	5/16"	5'-3"
S2-S5	10½ x 1⅛	½"	5/16"	5'-9"



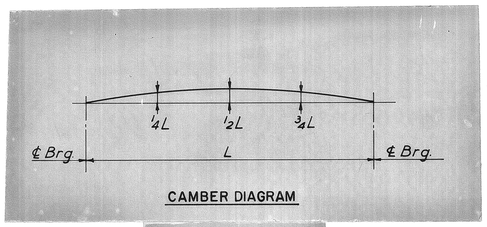
STRINGER ELEVATION

STRINGER SCHEDULE

STRINGER	LENGTH ℄ BRG. TO ℄ BRG.	COVER PLATE	SHEAR STUD SPACING 0.1L	0.2L	0.3L	0.4L	0.5L
S1 — 36 WF 150	65'-0"	10½ x 1¼ x 54'-6"	6½"	8"	10½"	13"	15"
S2		10½ x 1⅛ x 53'-6"	7"			12½"	14"
S3		10½ x 1⅛ x 53'-6"					
S4		10½ x 1⅛ x 53'-6"					
S5		10½ x 1⅛ x 53'-6"					
S6		10½ x 1¼ x 54'-6"	7"	9"	10½"	12½"	14"
S7	65'-0"	10½ x 1¼ x 54'-6"	6½"	8"	10½"	13"	15"
S8	48'-9"	No Cover Plates	7½"	9"	10½"	13½"	15½"
S9						12½"	14"
S10							
S11							
S12							
S13						12½"	14"
S14 — 36 WF 150	48'-9"	No Cover Plates	7½"	9"	10½"	13½"	15½"

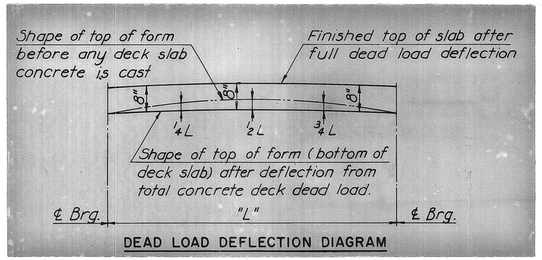
Note: Lengths shown are horizontal distances measured along centerlines of stringers.

SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E1	7	F1	10
E2	7	F1M	4



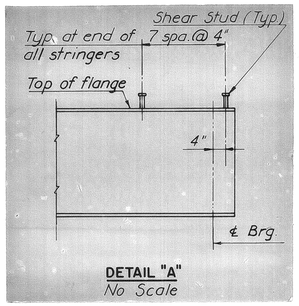
CAMBER DIAGRAM

CAMBER SCHEDULE			
STR.	¼L	½L	¾L
S2	3 3/8"	4 5/8"	3 3/8"
S4-S6			
S1,S3	3½"	4 5/8"	3½"
S7			
S8-S14	1¼"	1½"	¾"

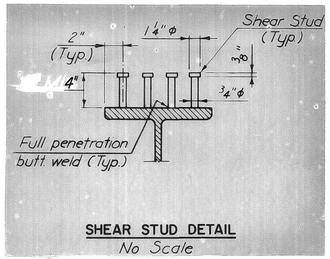


DEAD LOAD DEFLECTION DIAGRAM

DEFLECTION SCHEDULE		
STR.	¼L & ¾L	½L
S1,S3,S5-S7	¾"	1⅛"
S2, S4	¾"	1"
S8-S14	⅜"	½"



DETAIL "A"
No Scale



SHEAR STUD DETAIL
No Scale

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

NOTE TO FABRICATOR:
The above stringers shall be fabricated with an upward camber amounting to the tabulated value.
This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
Dimensions are in inches.

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

	BY	DATE	NO.	REVISION	BY	DATE
MADE	EVR	11-67				
CHECKED	T.E.M.	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.					

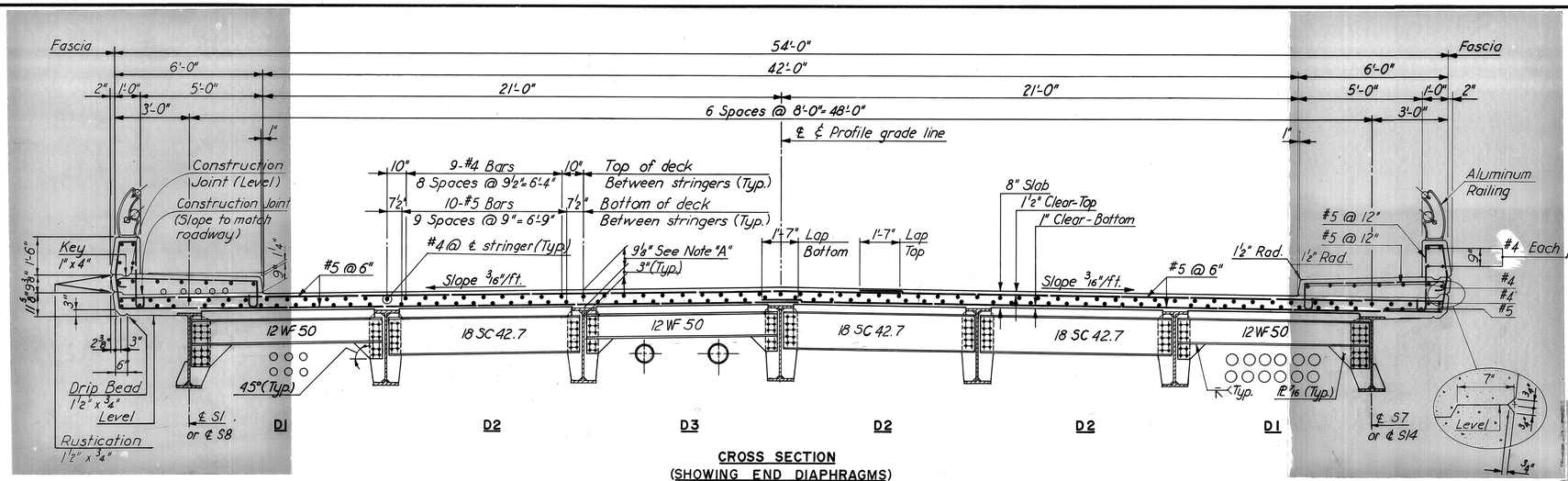
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY
FRAMING PLAN

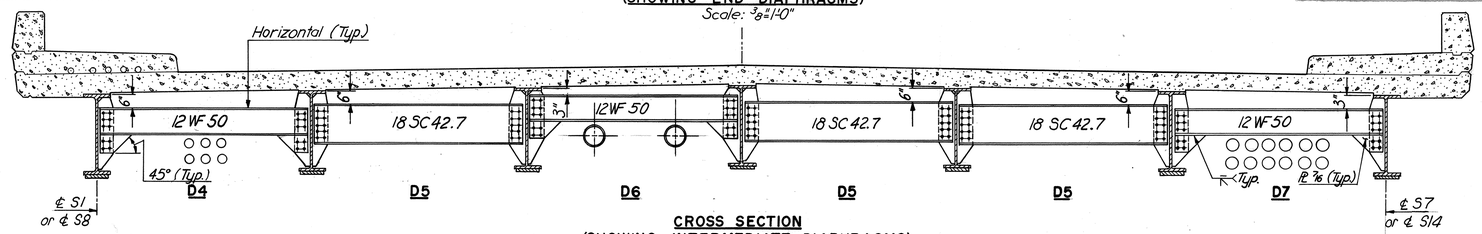
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 12 OF 17

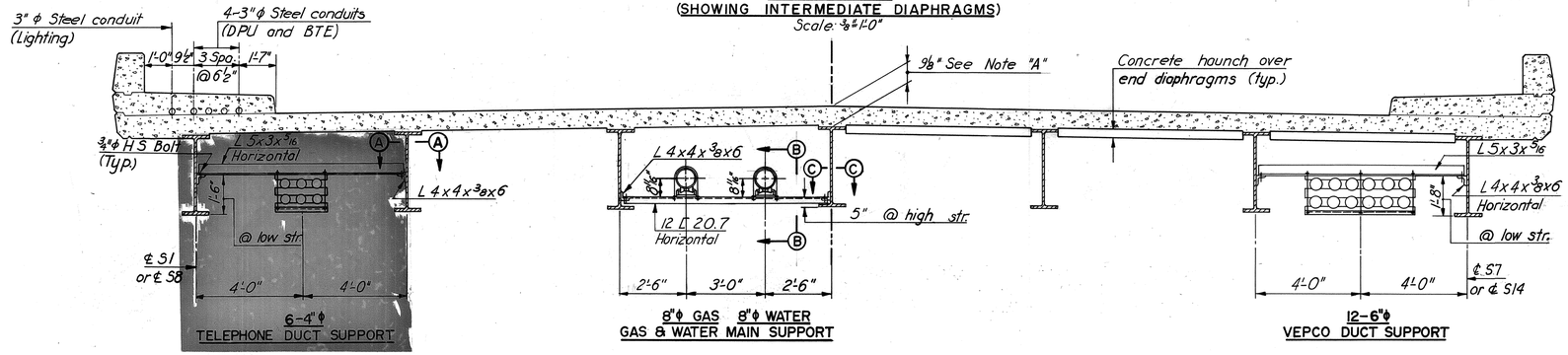
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	216	



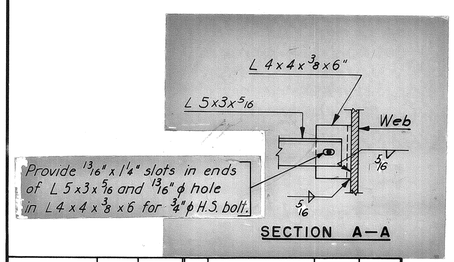
CROSS SECTION
(SHOWING END DIAPHRAGMS)
Scale: 3/8" = 1'-0"

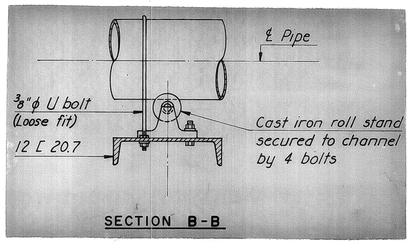


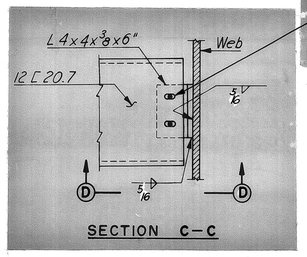
CROSS SECTION
(SHOWING INTERMEDIATE DIAPHRAGMS)
Scale: 3/8" = 1'-0"

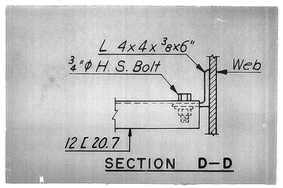


CROSS SECTION
(SHOWING UTILITY SUPPORTS ONLY)
Scale: 3/8" = 1'-0"

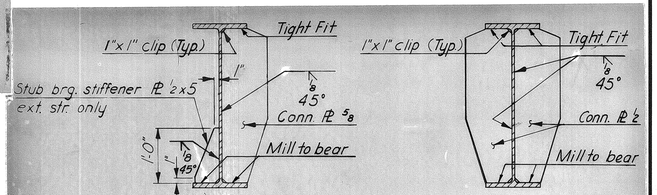






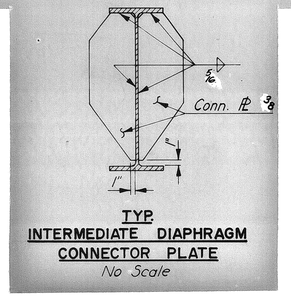


NOTE "A":
Dimension shown is measured from top of stringer to top of slab at the intersection of the centerline of stringer and the centerline of bearing. At exterior stringers this is measured to the cross slope extended. This dimension may be varied between bearings as required to care for variation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



TYP END DIAPHRAGM CONNECTOR PLATE AT EXTERIOR STRINGER
No Scale

TYP END DIAPHRAGM CONNECTOR PLATE AT INTERIOR STRINGER
No Scale



TYP INTERMEDIATE DIAPHRAGM CONNECTOR PLATE
No Scale

NOTES:
For spacing and location of utility supports and diaphragms, see Framing Plan sheet.

For Basic Attachment Details for cement asbestos conduit, see Standard Conduit Installation Details sheet.

For details showing gas and water mains thru abutments, see Standard Utility Support Details At Bridge Abutments sheet.

	BY	DATE				
MADE	EVR	10-9				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE	PRY		NO.	REVISION	BY	DATE

AS BUILT

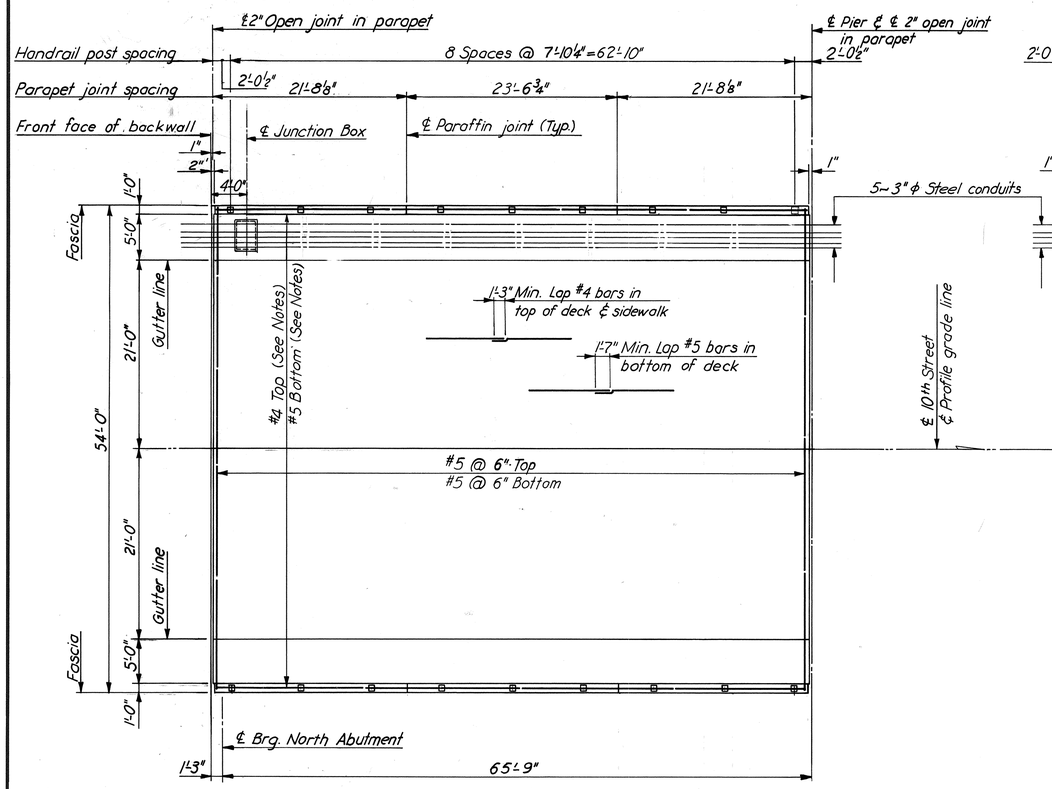
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY
BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY
CROSS SECTION AND UTILITY DETAILS

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

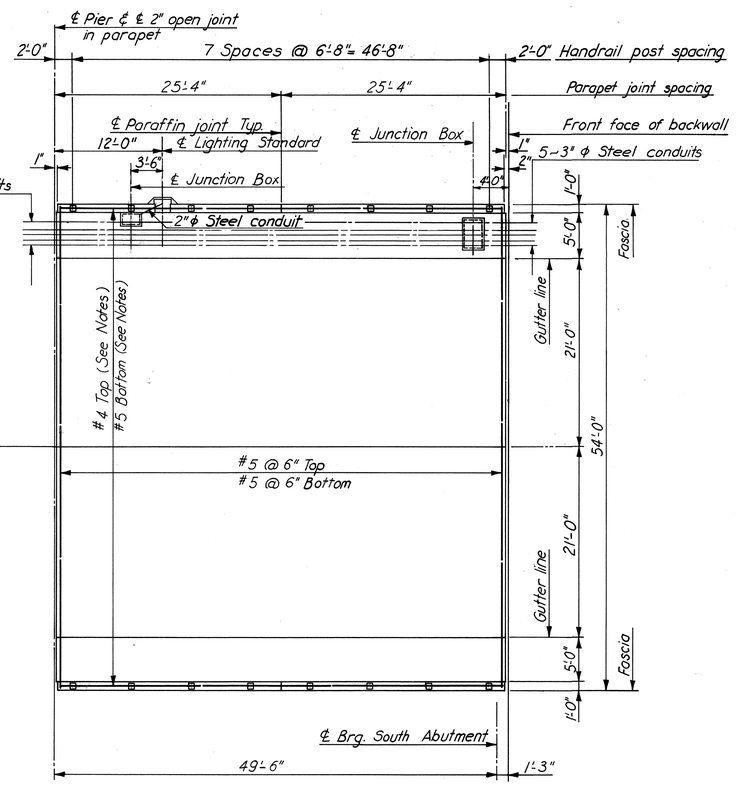
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 13 OF 17

216

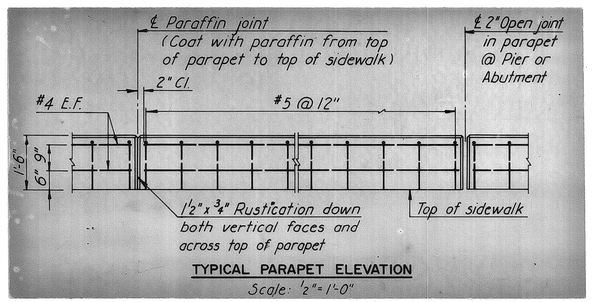
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	217	



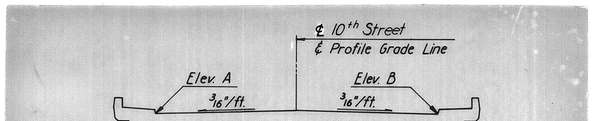
PLAN-UNIT 1
Scale: ⅛" = 1'-0"



PLAN - UNIT 2
Scale: ⅛" = 1'-0"



TYPICAL PARAPET ELEVATION
Scale: ½" = 1'-0"



(LOOKING IN DIRECTION OF STATIONING)

PAVEMENT ELEVATIONS

STATION	ELEV. A	℄ & P.G.L.	ELEV. B	STATION	ELEV. A	℄ & P.G.L.	ELEV. B
20+20	—	*86.14	—	+27.72	85.00	85.32	85.00
+30		*86.21		+30	84.92	85.25	84.92
+40	*85.95	*86.28	*85.82	+40	84.55	84.87	84.55
+50	*86.02	*86.35	*86.02	+50	84.12	84.45	84.12
+60	86.07	86.39	86.07	+60	83.67	84.00	83.67
+60.72	86.07	86.40	86.07	+70	83.22	83.55	83.22
+70	86.06	86.39	86.06	+78.47	82.84	83.17	82.84
+80	86.00	86.33	86.00	+80	82.79	83.10	82.77
+90	85.89	86.21	85.89	+90	*82.24	*82.65	*82.32
21+00	85.72	86.05	85.72	22+00	*81.56	*82.20	*81.92
+10	85.51	85.83	85.51	+10	—	*81.75	—
+20	85.24	85.57	85.24				

* Elevations shown are given to top of bituminous surfacing.

NOTES:

For location and spacing of deck, parapet and sidewalk reinforcing, see Cross Section and Utility Details sheet.

For location and spacing of reinforcing in haunch over end diaphragms, see Joint Details sheet.

For lighting standard base, junction box details and additional reinforcing, see Standard Electrical Details sheet S4.

	BY	DATE				
MADE	EVR	10-67				
CHECKED	T.E.M	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

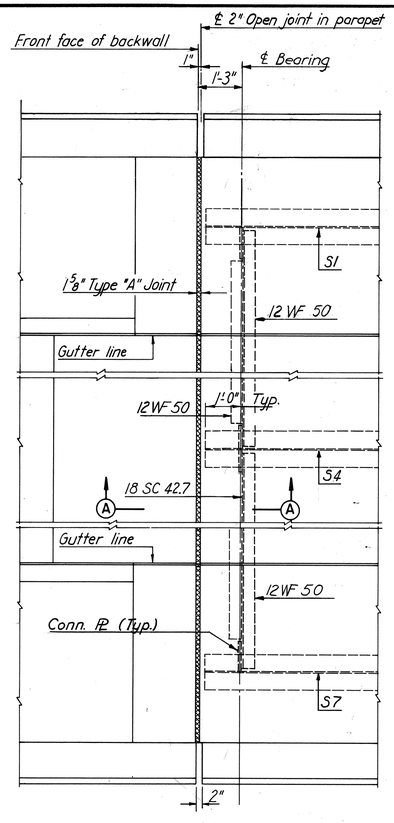
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60
10TH STREET OVER DOWNTOWN EXPRESSWAY

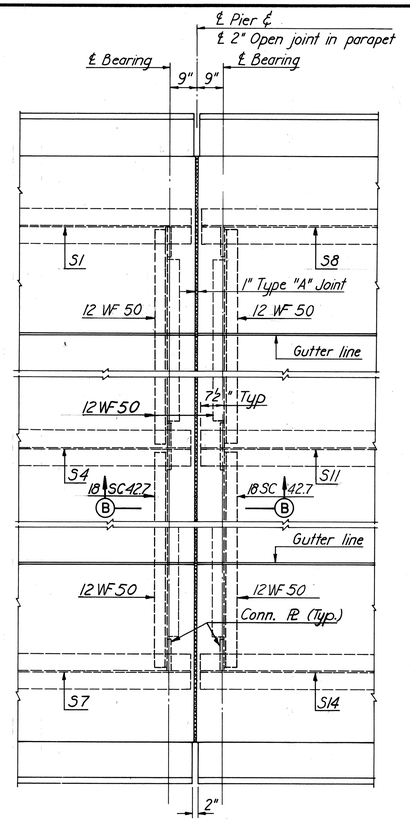
DECK PLANS

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

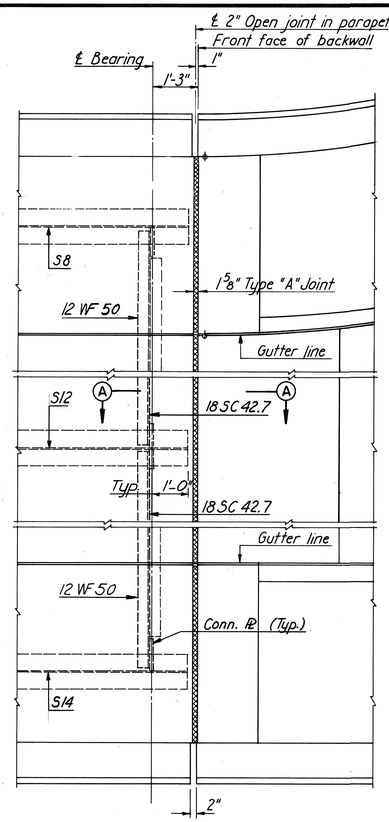
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 14 OF 17



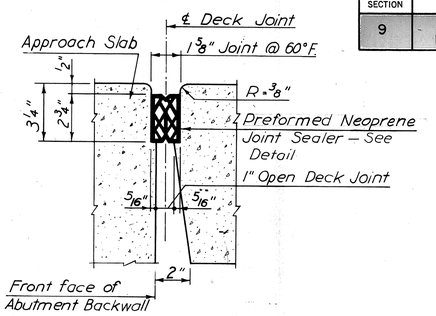
PLAN - JOINT AT NORTH ABUTMENT
Scale: ½"=1'-0"



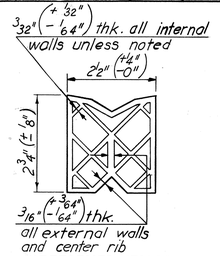
PLAN - JOINT AT PIER
Scale: ½"=1'-0"



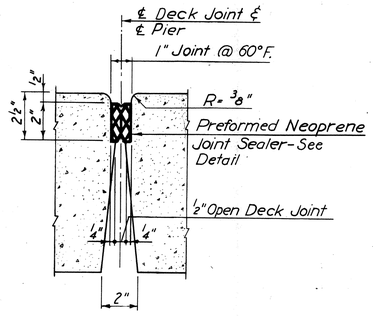
PLAN - JOINT AT SOUTH ABUTMENT
Scale: ½"=1'-0"



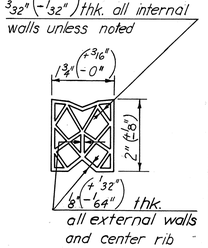
1⅝" TYPE "A" JOINT
Scale: 3"=1'-0"



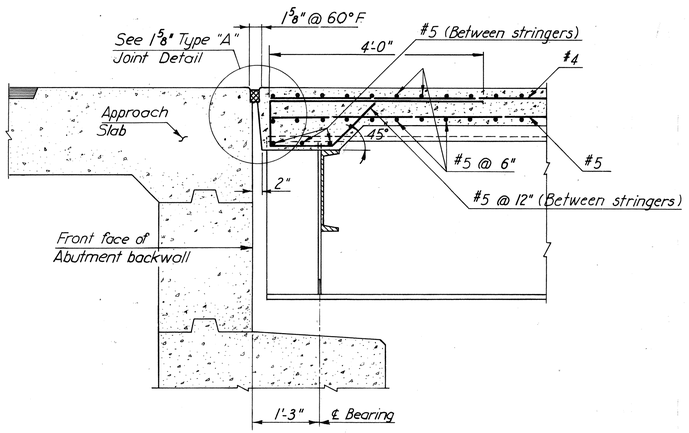
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half size



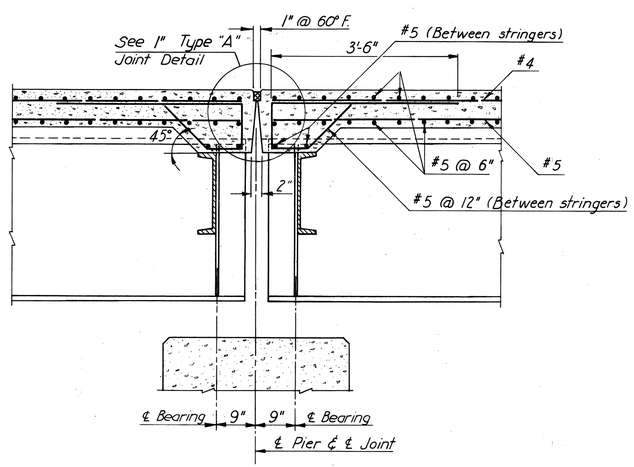
1" TYPE "A" JOINT
Scale: 3"=1'-0"



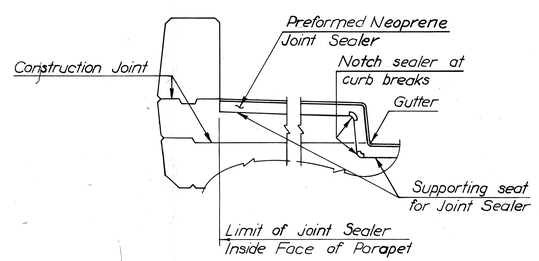
PREFORMED NEOPRENE JOINT SEALER FOR 1" TYPE "A" JOINT
Scale: Half size



SECTION A-A
Scale: ¾"=1'-0"



SECTION B-B
Scale: ¾"=1'-0"



TREATMENT OF TYPE "A" JOINT AT CURB
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
MADE	A.B.P.	9-67
CHECKED	TEM	2-68
IN CHARGE	P.R.Y.	

NO.	REVISION	BY	DATE
1	As Built	TEM	7-77

AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	218	

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60

10TH STREET OVER DOWNTOWN EXPRESSWAY

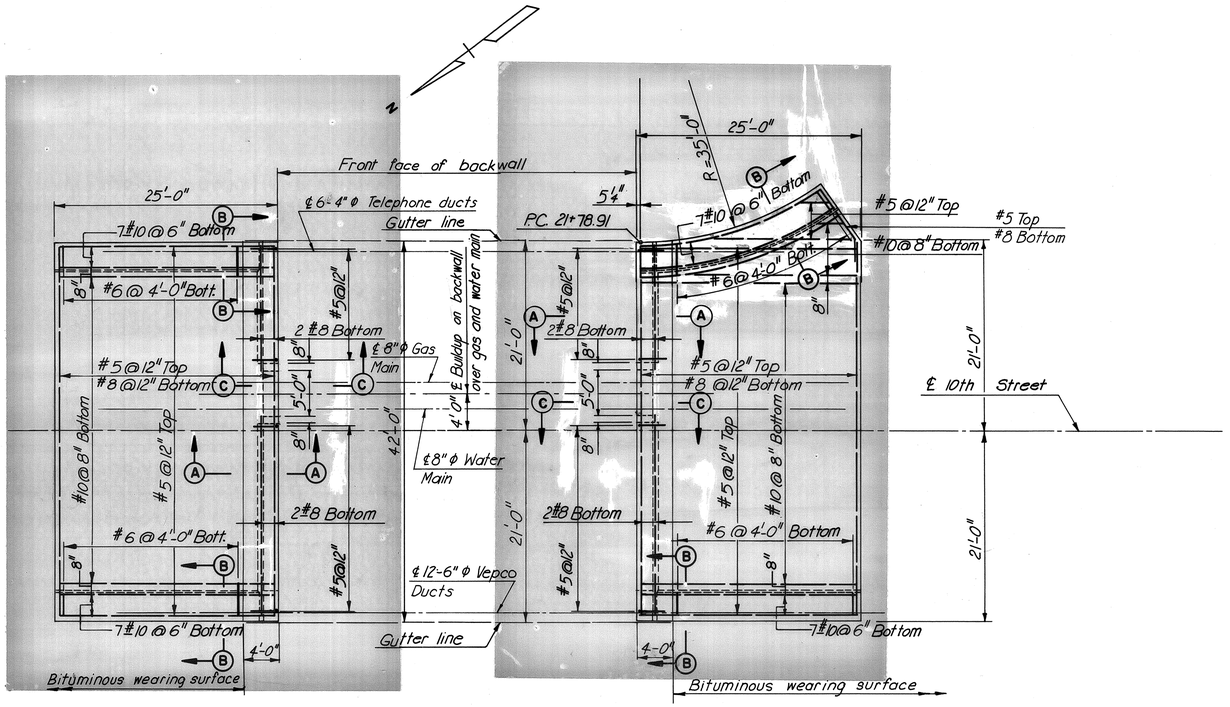
JOINT DETAILS

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

SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 15 OF 17

218

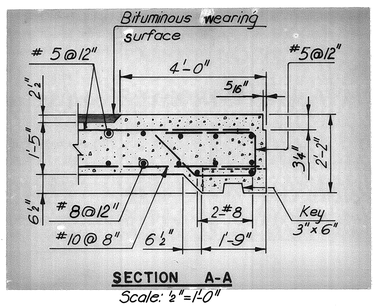
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	219	



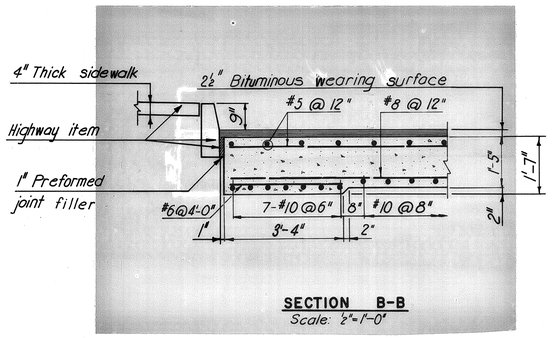
NORTH APPROACH SLAB
Scale : ⅛"=1'-0"

SOUTH APPROACH SLAB
Scale: ⅛"=1'-0"

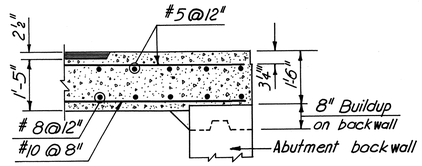
NOTE:
All reinforcing steel shall be 2" min. clear from edge of bar to edge of concrete.



SECTION A-A
Scale: ½"=1'-0"



SECTION B-B
Scale: ½"=1'-0"



SECTION C-C
Scale: ½"=1'-0"

	BY	DATE				
MADE	elm	12-67				
CHECKED	TEM	2-68	1	As Built	TEM	7-77
IN CHARGE	P.R.Y.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE B-60
10TH STREET OVER
DOWNTOWN EXPRESSWAY
APPROACH SLABS

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

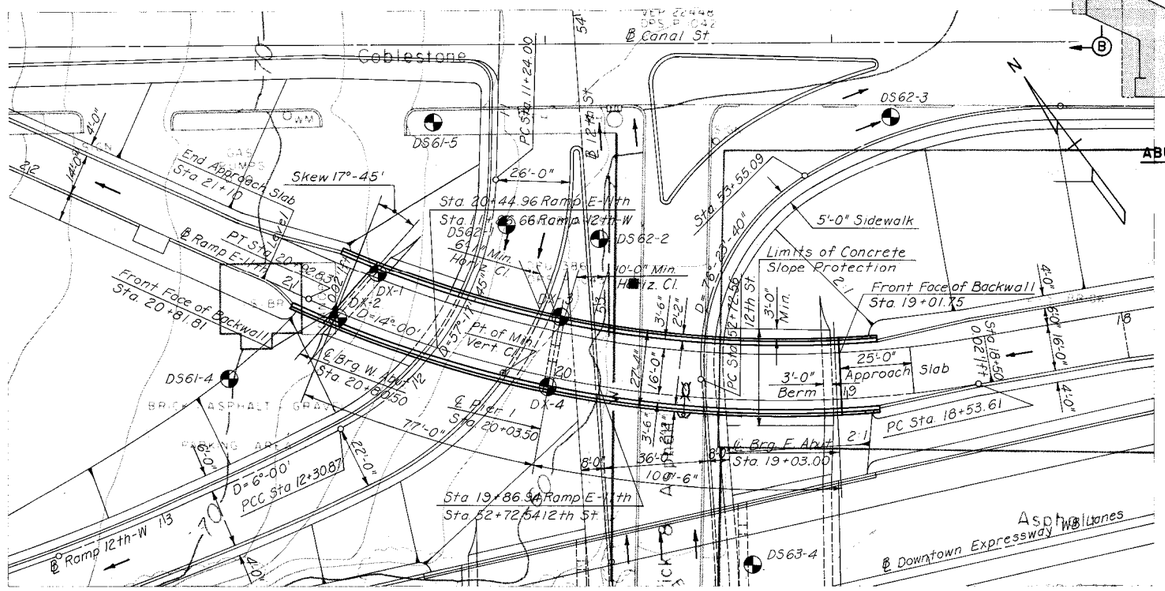
SCALE: AS SHOWN
CONTRACT NO.: 9
SHEET NO. 16 OF 17

Bridge 62

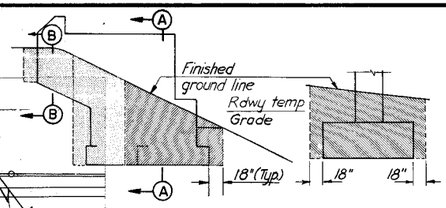
(Westbound Downtown Expressway {Rte. 195} 11th Street Off-Ramp Over South 12th Street)

Record Set Plans

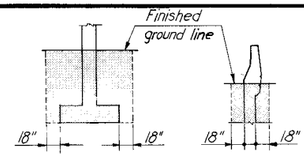
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	231	



PLAN
Scale: 1" = 25'



ABUTMENT

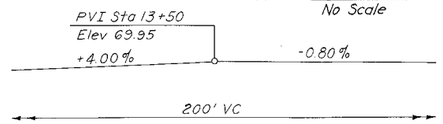


PIER

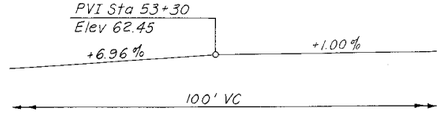
SECTION A–A

SECTION B–B

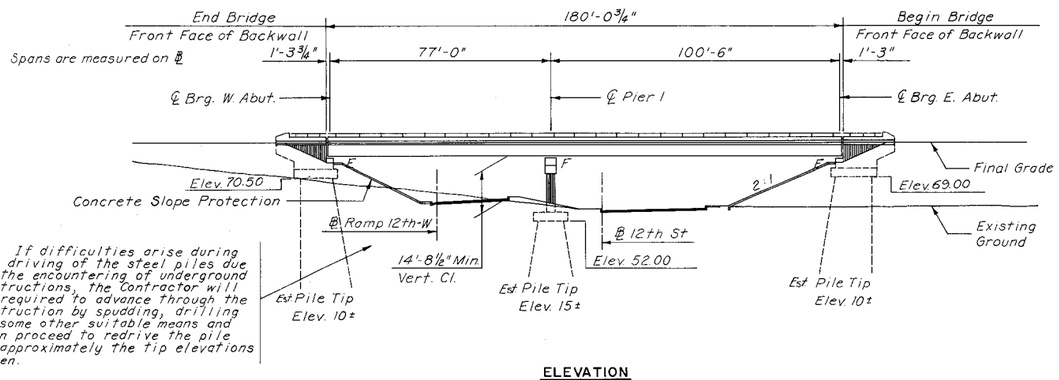
PAYMENT LIMITS FOR STRUCTURE EXCAVATIONS
No Scale



PROFILE GRADE RAMP 12TH-W
No Scale



PROFILE GRADE 12TH ST
No Scale



ELEVATION
Scale: 1" = 25'

INDEX OF SHEETS	
No.	Title
1	General Plan and Elevation
2	West Abutment
3	East Abutment
4	Pier 1
5	Stringers
6	Stringer Details
7	Slab
8	Joint Details
9	Approach Slab and Slope Protection Details
10 & 11	Boring Logs
S1	Standard Shoe Details
S2	Standard Aluminum Railing Details (1 Rail)
S5	Standard Electrical Details (Exp. Bridges)
S7	Standard Architectural Details

GENERAL NOTES

ROADWAY: One 25'-0" face to face of rail.

CAPACITY: Dead Load-Includes 15 lbs. per sq. ft. for future wearing surface. Live Loads-HS20-44 loading and B.P.R. modified for military vehicles.

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

CONTRACT SPECIAL PROVISIONS

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

DATUM: CITY OF RICHMOND

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

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

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

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

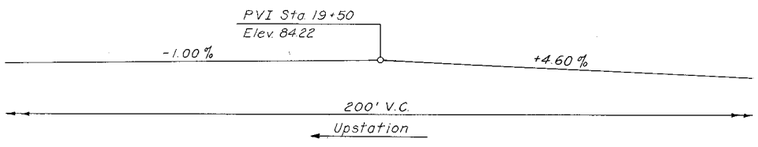
CONCRETE NOTES: Concrete in superstructure shall be Class A4. All other concrete shall be Class A3. All exposed edges and corners shall have a ¾" chamfer or fillet unless otherwise noted. Care in the method of vibration, The use of low-slump concrete, and or other means shall be employed to prevent downgrade movement of newly placed slab concrete. (When gradient is over 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.
All shop welded web splices, flange splices and web to flange welds shall be made by the submerged arc process.



PROFILE RAMP E-11TH
No Scale

ESTIMATE OF QUANTITIES

	Structure Excavation C.Y.	Concrete Class A4 C.Y.	Concrete Substruc. C.Y.	Class A3 App. Slab C.Y.	Reinforcing Steel Lbs.	Structural Steel A-36 Lbs.	Aluminum Br. Railing (1 Rail) L.F.	Porous Backfill C.Y.	Steel Piles 10BP42 L.F.	Conc. Slab Slope Prot S.Y.	Asphalt Dampproof'g S.Y.	Underdrain 6" ø Pipe L.F.	Metal Conduit 3" ø L.F.
Superstructure		171.51			39,055	168,253	349						183
West Abutment	133		78.63		4,298		30	5	581.3	123.25	14	59	23.5
East Abutment	135		81.50		4,235		30	5	719.3	162.2	14	55	23.5
Pier 1	113		71.37		22,443				670.1				
Approach Slabs				49.82	11,682								
Total	381	171.51	231.50	49.82	81,713	168,253	409	10	1970.7	286.45	28	114	230

AS BUILT

	BY	DATE				
MADE	JLJ	11-67	2	As Built	TEM	7-77
CHECKED	LDL	1-68	1	Revised Light location	TEM	9-74
IN CHARGE	PRV		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

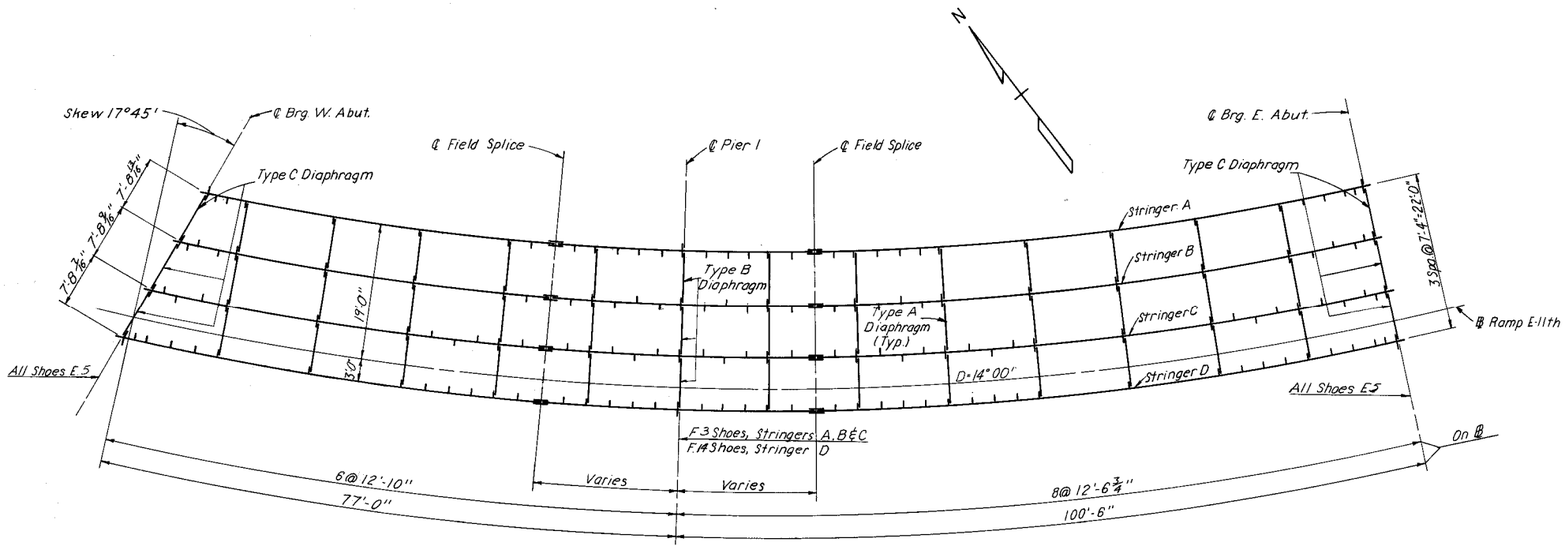
BRIDGE NO. 62
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST
GENERAL PLAN AND ELEVATION

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

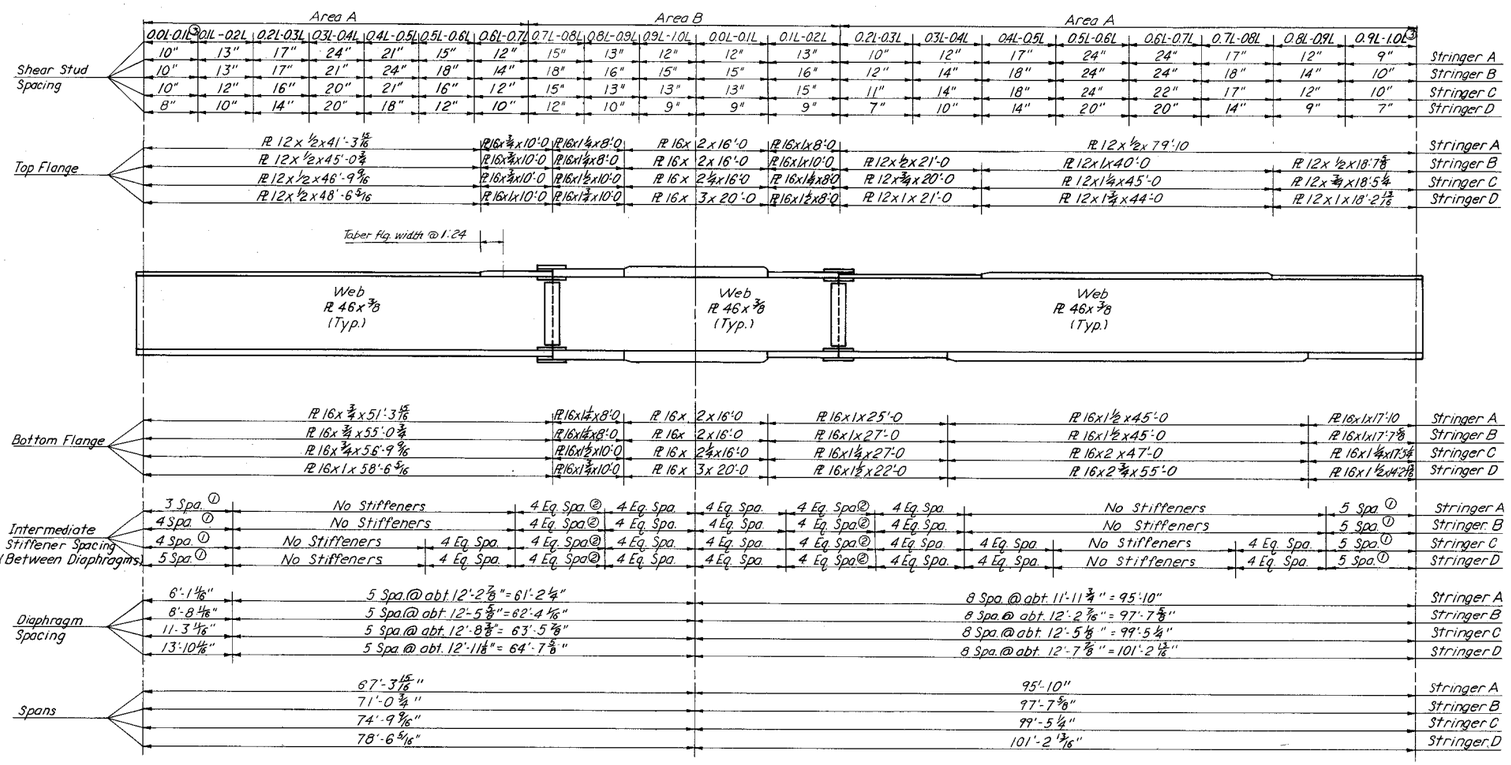
SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 1 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	235	

SHOE SCHEDULE			
EXPANSION SHOES		FIXED SHOES	
TYPE	NO. REQD.	TYPE	NO. REQD.
E5	8	F3	3
		F14	1

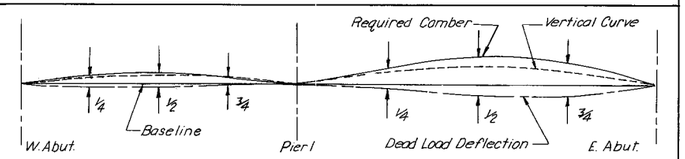


FRAMING PLAN
Scale 1"=10'



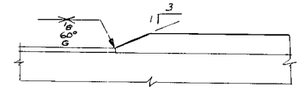
GIRDER ELEVATION
No Scale

DEFLECTION AND CAMBER



STRINGER	ITEM	W. ABUT.	1/4	1/2	3/4	PIER 1	1/4	1/2	3/4	E. ABUT.
A	Steel	0	1/16	1/16	0	0	3/16	3/8	1/4	0
	Slab	0	3/16	1/8	0	0	5/8	1 1/16	2/3	0
	Curb and Parapet	0	1/16	1/16	-1/16	0	1/4	7/16	3/8	0
	Vertical Curve	0	15/16	1 5/8	1 3/8	0	3 3/16	4 1/4	3 3/16	0
	Required Camber	0	1 1/4	1 7/8	1 5/16	0	4 5/8	6 1/8	4 1/16	0
B	Steel	0	1/16	1/16	0	0	1/4	3/8	1/4	0
	Slab	0	3/16	1/8	0	0	3/4	1 5/16	1 1/16	0
	Curb and Parapet	0	0	0	0	0	0	1/16	0	0
	Vertical Curve	0	15/16	1 5/8	1 3/8	0	3 3/16	4 1/4	3 3/16	0
	Required Camber	0	1 3/16	1 15/16	1 3/8	0	4 3/16	6	4 1/2	0
C	Steel	0	1/16	1/16	0	0	3/16	3/8	1/4	0
	Slab	0	1/4	3/16	0	0	3/4	1 5/16	1 1/16	0
	Curb and Parapet	0	0	0	0	0	1/16	1/4	1/16	0
	Vertical Curve	0	15/16	1 11/16	1 7/16	0	3 3/16	4 1/4	3 3/16	0
	Required Camber	0	1 1/4	1 15/16	1 7/16	0	4 3/16	6 1/16	4 9/16	0
D	Steel	0	1/16	1/16	0	0	1/4	5/16	1/4	0
	Slab	0	1/4	3/16	0	0	5/8	1 1/8	7/8	0
	Curb and Parapet	0	1/8	1/8	0	0	5/16	3/16	1/16	0
	Vertical Curve	0	15/16	1 11/16	1 7/16	0	3 3/16	4 1/4	3 3/16	0
	Required Camber	0	1 3/8	2 1/16	1 7/16	0	4 3/8	6 1/4	4 3/4	0

The stringers shall be fabricated with an upward camber amounting to the tabulated values. These values are in inches.
This will provide approximate compensation for deflection under full dead load and for conformity with finished grade.
The deflections anticipated to occur in the stringer upon placement of the total concrete deck dead load are equal to the sum of the values listed for "Slab" and "Curb and Parapet."
Deviations from exact camber of the stringers shall be provided for by adjusting forms to vary the thickness of the concrete bolster between the bottom of the slab and the top of the stringers.



SHOP FLANGE SPLICE DETAILS

① The first two spaces at the ends of the stringers shall be one-half of the remaining spaces.

② Stiffeners shall be relocated as required to clear web splice plates.

③ See Shear Stud Details At End Bearings.

	BY	DATE				
MADE	RDR	12-67				
CHECKED	JLJ	1-68	1	As Built	TEM	7-77
IN CHARGE PRY			NO.	REVISION	BY	DATE

AS BUILT

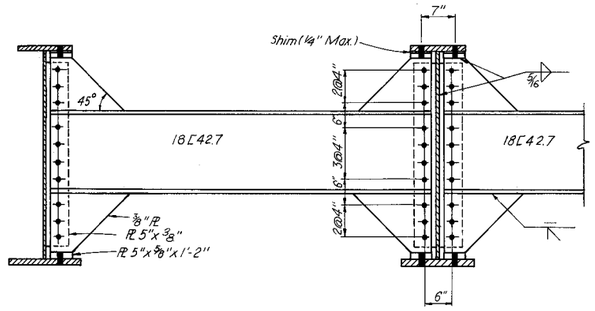
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

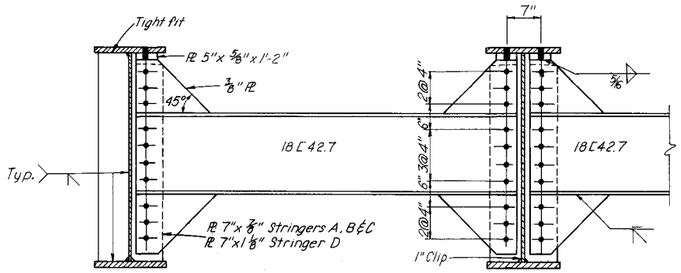
BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W OVER 12TH ST.
STRINGERS

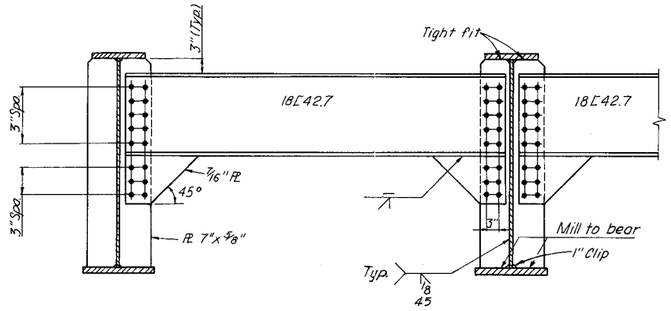
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 5 OF 11

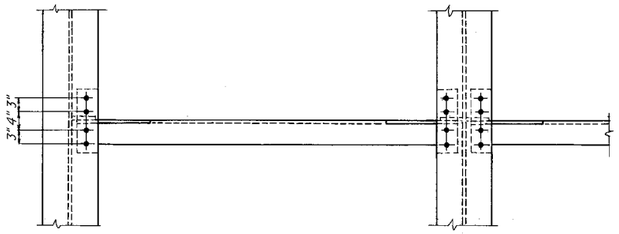
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	236	



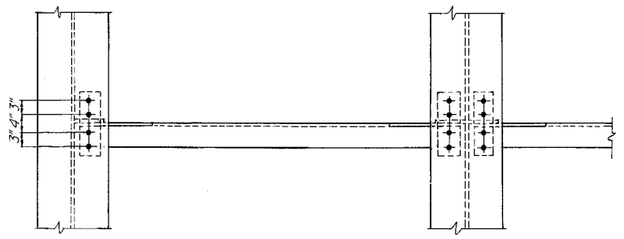




TYPE C DIAPHRAGM
Scale 3/4"=1'-0"

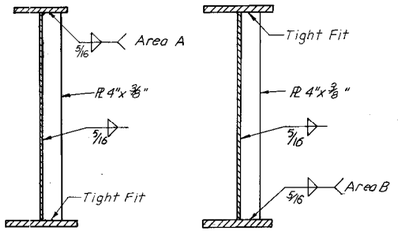


TYPE A DIAPHRAGM
Scale 3/4"=1'-0"

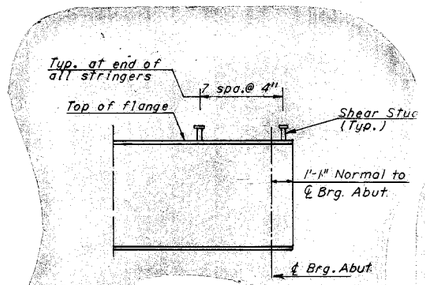


TYPE B DIAPHRAGM
Scale 3/4"=1'-0"

Note:
Intermediate stiffeners shall be used on inside of Stringers A and D and alternate sides of Stringers B and C.



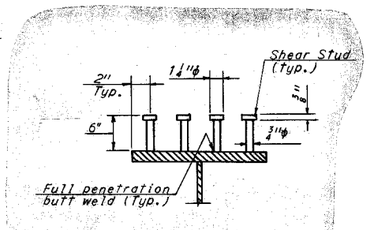
INTERMEDIATE STIFFENER
Scale 3/8"=1'-0"



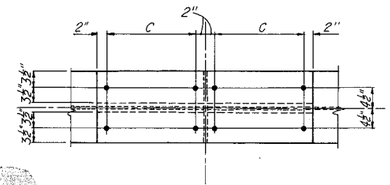
SHEAR STUD DETAILS AT END BEARINGS
No Scale

SHEAR STUD NOTE

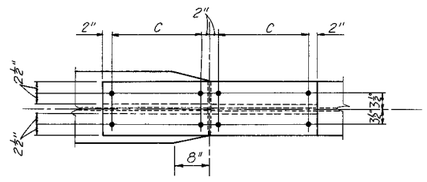
Capacity = 3,400 lbs. per stud.
The contractor may, if he elects, use three 7/8" diameter studs at the same longitudinal spacing in lieu of the four 3/4" diameter studs shown.
Stud rows shall be placed parallel to the main deck reinforcing.
Shear stud spacing shown is maximum spacing.



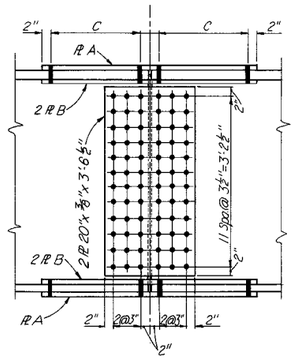
SHEAR STUD DETAIL
No Scale



16 INCH FLANGE TO 16 INCH FLANGE
Scale 3/4"=1'-0"



16 INCH FLANGE TO 12 INCH FLANGE
Scale 3/4"=1'-0"



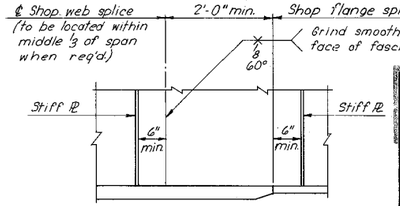
WEB SPLICE
Scale 3/4"=1'-0"

SPLICES			
FLANGE	Fl. A	Fl. B	C
Fl 12"x 1/2"	Fl 12"x 3/8"	Fl 5"x 3/8"	3 Spa.@ 3"
Fl 12"x 3/4"	Fl 12"x 11/16"	Fl 5"x 11/16"	4 Spa.@ 3"
Fl 12"x 1"	Fl 12"x 15/16"	Fl 5"x 15/16"	6 Spa.@ 3"
Fl 16"x 3/4"	Fl 16"x 7/8"	Fl 7"x 1/2"	6 Spa.@ 3"
Fl 16"x 1"	Fl 16"x 1/2"	Fl 7"x 5/8"	8 Spa.@ 3"
Fl 16"x 1 1/4"	Fl 16"x 5/8"	Fl 7"x 3/4"	10 Spa.@ 3"
Fl 16"x 1 1/2"	Fl 16"x 3/4"	Fl 7"x 7/8"	12 Spa.@ 3"

Note:
When splicing plates of unequal thickness, the splice for the smaller plate shall be used. Use fill plates as required at these locations.

MINIMUM FILLET WELDS	
THICKER PART JOINED (INCHES)	FILLET WELD (INCHES)
To 3/4 inclusive	5/16
Over 3/4 to 1 1/2	5/16
Over 1 1/2 to 2 1/4	3/8
Over 2 1/4 to 6	1/2

The above table shall be used where weld sizes are not indicated. The weld size need not exceed the thickness of the thinner part joined.



SHOP SPLICE DETAILS
Scale 3/4"=1'-0"

FIELD SPLICE DETAILS

	BY	DATE				
MADE	RDR	1-2-68				
CHECKED	JLJ	1-68	1	As Built	TEM	7-77
IN CHARGE	PRY		NO.	REVISION	BY	DATE

AS BUILT

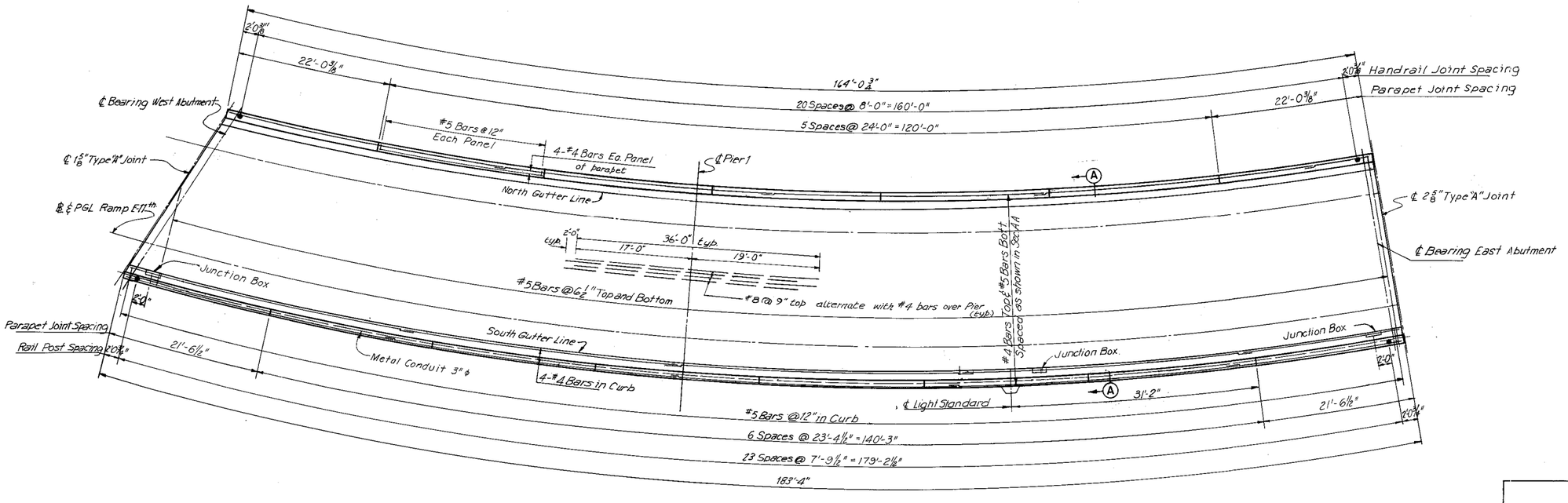
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W OVER 12TH ST.
STRINGER DETAILS

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

SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 6 OF 11

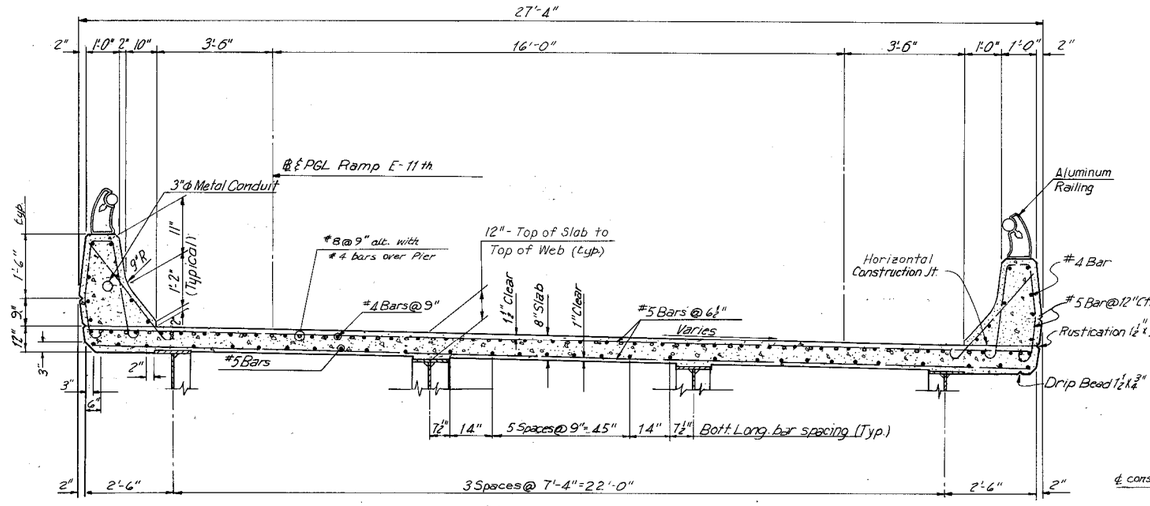
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	237	



DECK PLAN

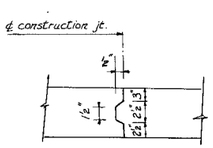
Scale $\frac{1}{8}$"=1'-0"

TABLE OF ELEVATIONS			
LOCATION	N. GUTTER	BASE LINE	S. GUTTER
℄ JT. W. ABUT	82.58	82.90	82.96
1/4 POINT	82.76	83.10	83.16
1/2 POINT	82.92	83.29	83.35
3/4 POINT	83.00	83.39	83.46
℄ PIER I	82.99	83.38	83.45
1/4 POINT	82.83	83.22	83.29
1/2 POINT	82.48	82.87	82.94
3/4 POINT	81.95	82.34	82.41
℄ JT. E. ABUT	81.23	81.63	81.70



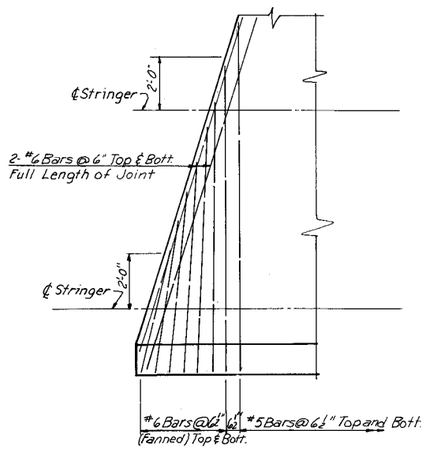
SECTION A-A

Scale $\frac{1}{2}$"=1'-0"



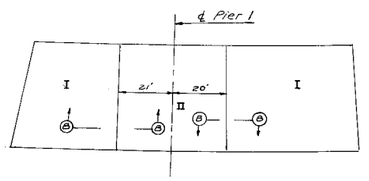
SECTION B-B

no scale



ACUTE CORNER REINFORCING FOR DECK SLAB

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



OPTIONAL DECK POURING SEQUENCE

no scale

I indicates first pour
II indicates second pour

Note:
Deck poured in one pour.

	BY	DATE				
MADE	RRP	12-20-67	2	As Built	TEM	7-77
CHECKED	JLJ	12-22-67	1	Revised Light Std. Locations	T.E.M.	9-74
IN CHARGE P.R.V.			NO.	REVISION	BY	DATE

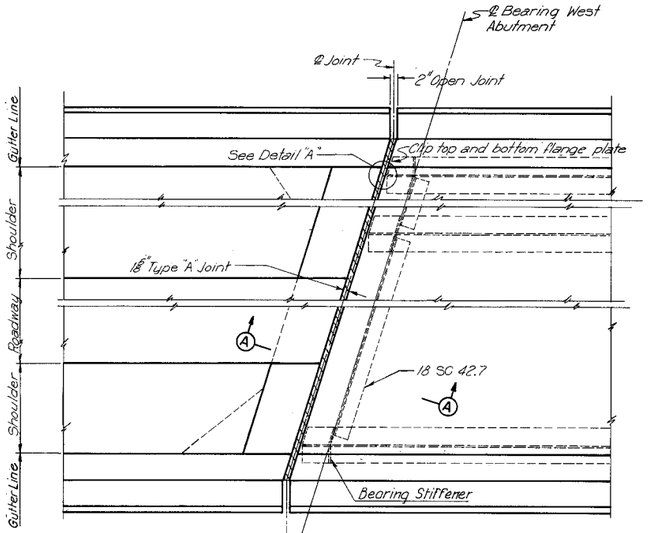
AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

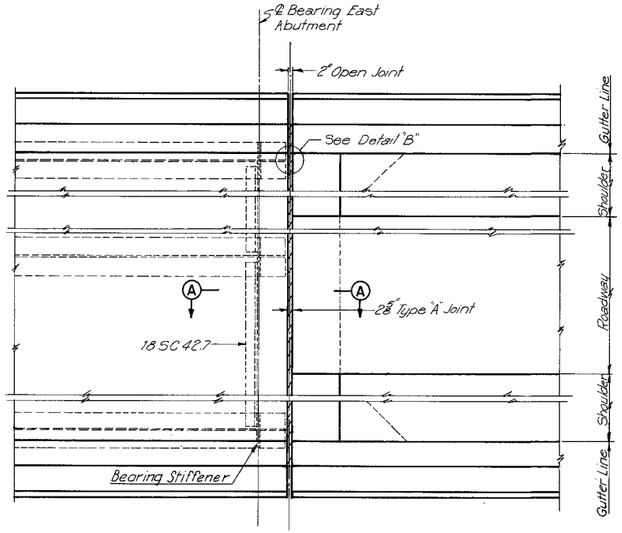
BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W
OVER 12TH ST.
SLAB

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

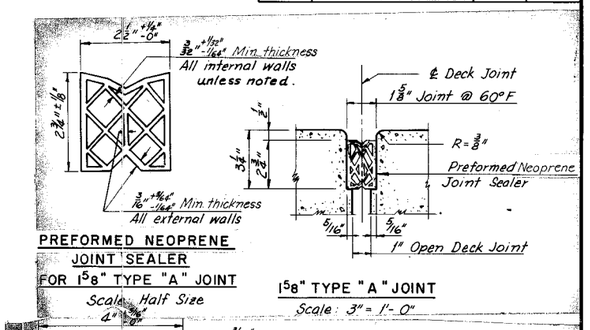
SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 7 OF 11



PLAN-JOINT AT WEST ABUTMENT
No Scale

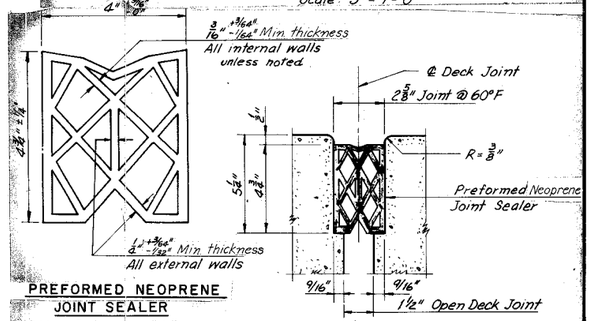


PLAN-JOINT AT EAST ABUTMENT
No Scale



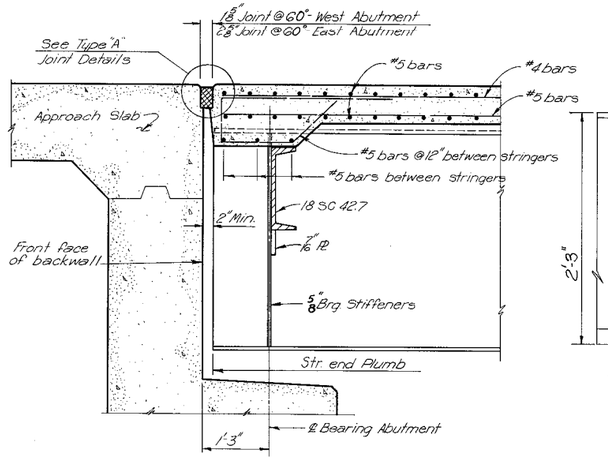
PREFORMED NEOPRENE JOINT SEALER FOR 1⅝" TYPE "A" JOINT
Scale: Half Size

1⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"

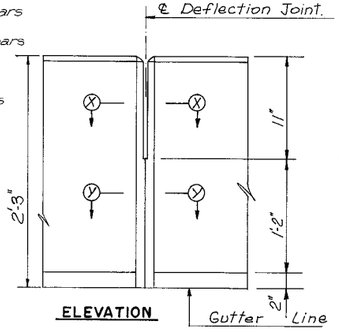


PREFORMED NEOPRENE JOINT SEALER FOR 2⅝" TYPE "A" JOINT
Scale: Half Size

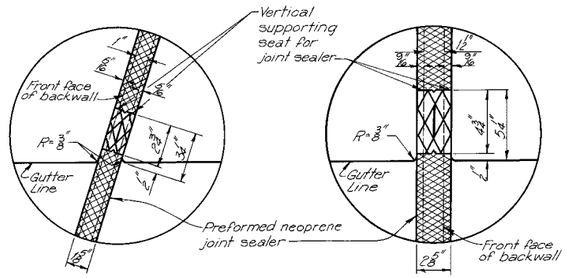
2⅝" TYPE "A" JOINT
Scale: 3" = 1'-0"



SECTION A-A
Scale: ¾"=1'0"

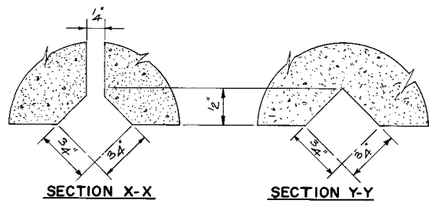


ELEVATION



DETAIL "A"
No Scale

DETAIL "B"
No Scale

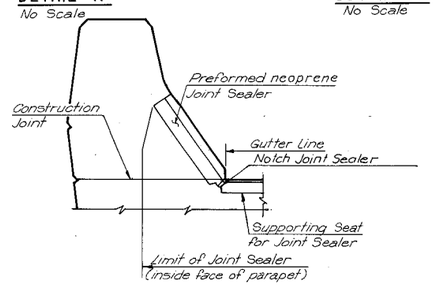


SECTION X-X

SECTION Y-Y

Note: Groove details are for both sides of parapet.

PARAPET DEFLECTION JOINT DETAILS



TREATMENT OF TYPE "A" JOINT AT GUTTER LINE
No Scale

NOTE TO CONTRACTOR:
It is absolutely essential that the openings for the preformed neobrene 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.

AS BUILT

	BY	DATE
MADE	LDL	1-68
CHECKED	JLJ	1-68
IN CHARGE	PRY	

NO.	REVISION	BY	DATE
2	As Built	TEM	7-17
⚠	PARAPET JOINT ADDED.	T.E.M	7-74

RICHMOND EXPRESSWAY SYSTEM

SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	238	

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

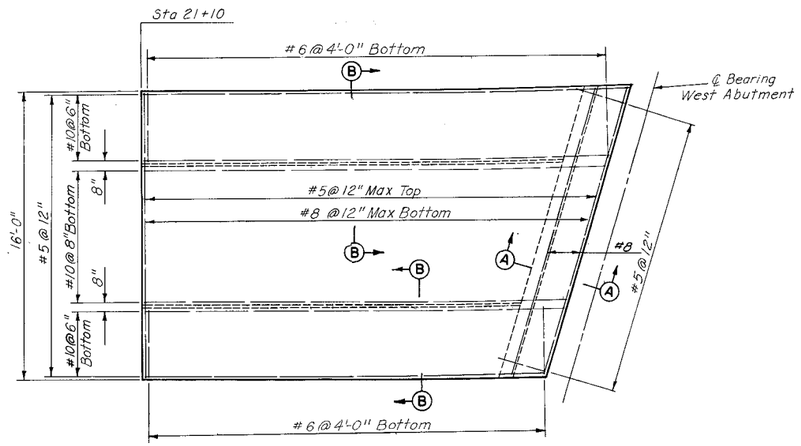
BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W
OVER 12TH ST.

JOINT DETAILS

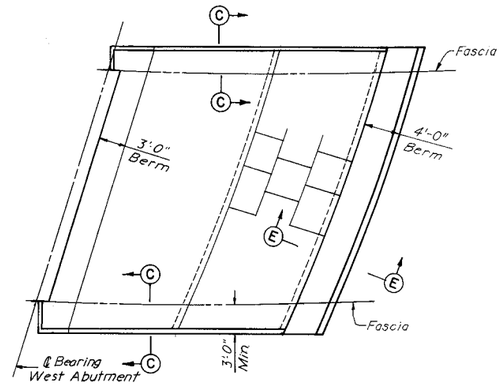
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

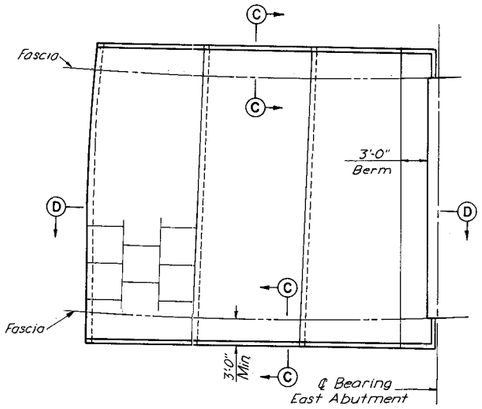
SCALE: As Shown
CONTRACT NO.: 9
SHEET NO. 8 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	239	

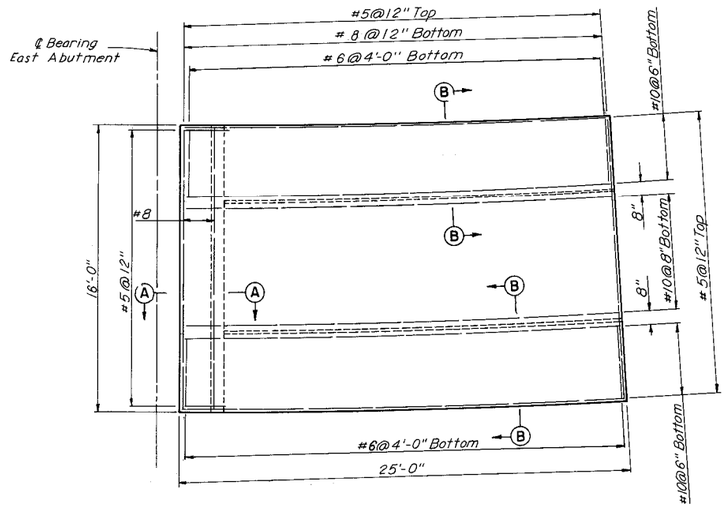


WEST APPROACH SLAB
Scale ¼"=1'-0"

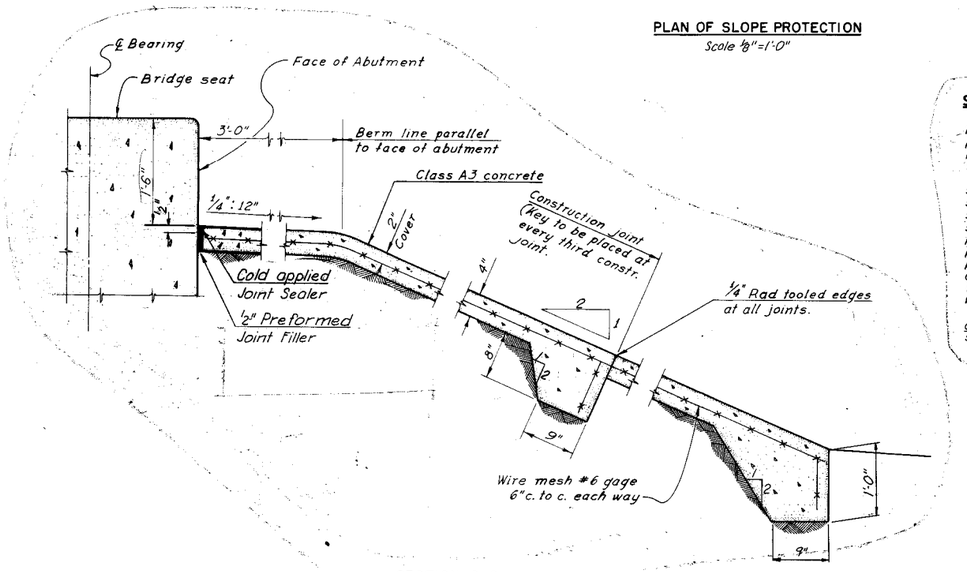




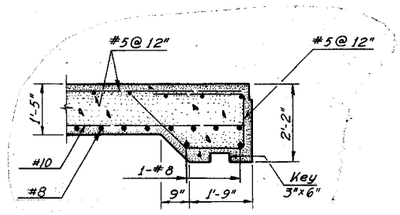
PLAN OF SLOPE PROTECTION
Scale ⅛"=1'-0"



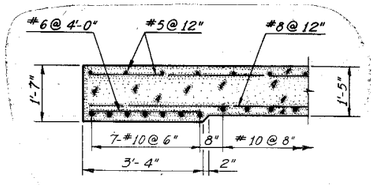
EAST APPROACH SLAB
Scale ¼"=1'-0"



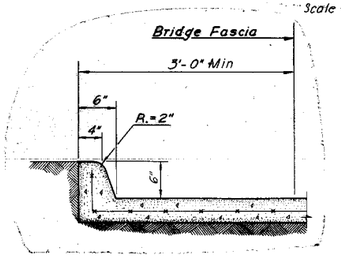
SECTION D-D
Scale 1"=1'-0"



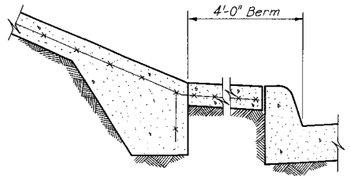
SECTION A-A
Scale ½"=1'-0"



SECTION B-B
Scale ½"=1'-0"



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



SECTION F-E
Scale: 1"=1'-0"
See Section D-D for details not shown.

SLOPE PROTECTION NOTE

The item "Cast-in-place Concrete Slab Slope Protection" shall include the excavation of, or the placing and compaction of any embankment material necessary to bring the surface of the paved slopes to the finished elevations shown on the plans.

"Cast-in Place Concrete Slab Slope Protection shall be paid for at the contract unit price per square yard, which price shall include the concrete slab including wire mesh and joint filler. The slab shall be constructed in 4'-0" x 4'-0" panels, placed in horizontal courses, alternate panels being poured in a staggered pattern with adjacent panels poured later. The slab shall be Class A3 Concrete of such consistency that it can be placed without the use of top forms, the surface shall be finished with a wood float.

Reinforcing shall consist of wire mesh No.6 gage, 6" C.C. each way, placed at the center of the slab, and continuous through construction joints.

	BY	DATE				
MADE	ADR	1-68				
CHECKED	JLJ	1-68	1	As Built	TEM	7-77
IN CHARGE	PRY		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

BRIDGE NO. 62
RAMP E-11TH OVER RAMP 12TH-W
OVER 12TH ST.
APPROACH SLAB AND
SLOPE PROTECTION DETAILS

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

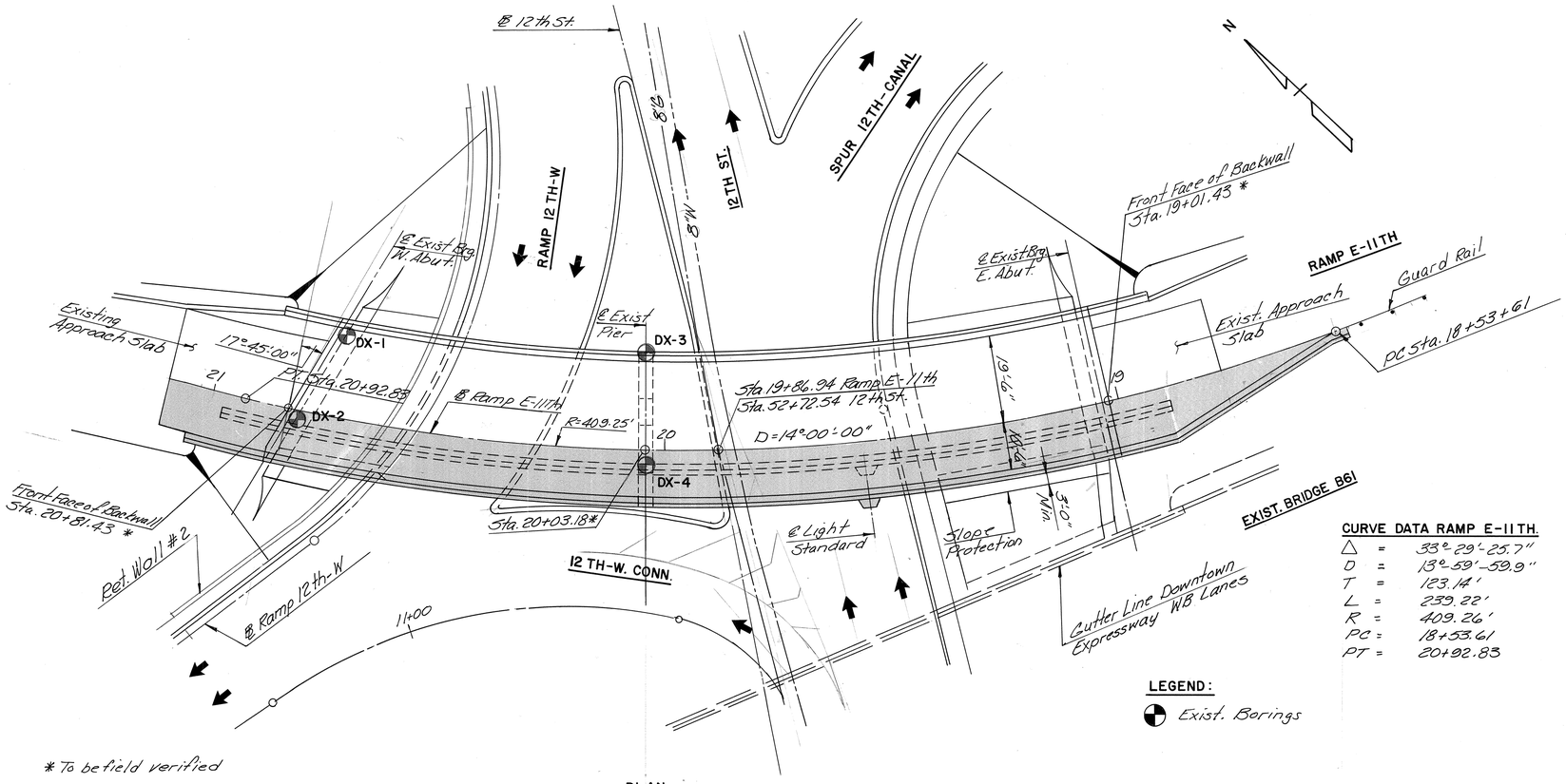
SCALE: As Noted
CONTRACT NO.: 9
SHEET NO. 9 OF 11

Bridge 62 Widening

(Westbound Downtown Expressway {Rte. 195} 11th Street Off-Ramp Over South 12th Street)

Record Set Plans

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(1)	

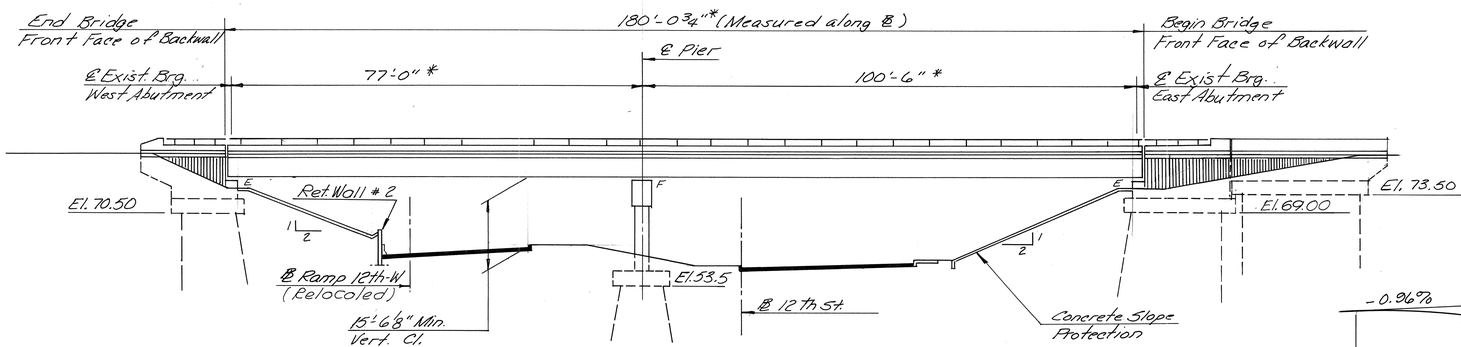


* To be field verified

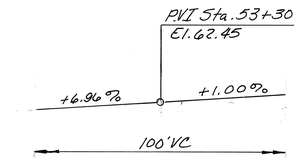
PLAN
Scale: 1"=15'

CURVE DATA RAMP E-11TH.		
△	=	33°-29'-25.7"
D	=	13°-59'-59.9"
T	=	123.14'
L	=	239.22'
R	=	409.26'
PC	=	18+53.61
PT	=	20+92.83

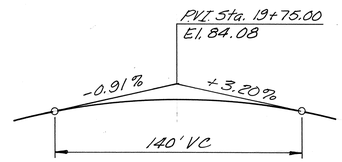
LEGEND:
Exist. Borings



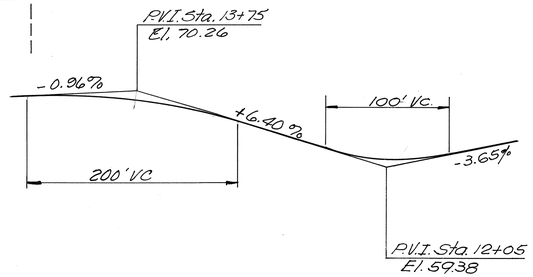
ELEVATION
Scale: 1"=15'



PROFILE GRADE 12 TH. ST.
No Scale



PROFILE GRADE RAMP E-11 TH.
(WIDENING)
No Scale



PROFILE GRADE RAMP 12TH-W
(RELOCATED)
No Scale

GENERAL NOTES:

WIDTH: WIDENING OF 7'-0" TO THE SOUTH OF THE EXISTING STRUCTURE.

SPAN LAYOUT: 100.5'-77' CONTINUOUS STEEL PLATE GIRDER SPANS.

CAPACITY: HS20-44 LOADING AND ALTERNATE MILITARY LOADING. DESIGN LOADING INCLUDES 15 PSF FOR FUTURE WEARING SURFACE AND 20 PSF ALLOWANCE FOR CONSTRUCTION TOLERANCES AND CONSTRUCTION METHODS.

SPECIFICATIONS:

CONSTRUCTION: VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, 1987.

DESIGN: AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, 1989, INCLUDING INTERIM SPECIFICATIONS, 1990 AND VDOT MODIFICATIONS.

STANDARDS: VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE STANDARDS, 1989.

ALL DIMENSIONS ARE MEASURED HORIZONTALLY AND VERTICALLY UNLESS OTHERWISE SPECIFIED.

THESE PLANS ARE INCOMPLETE UNLESS ACCOMPANIED BY THE SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS INCLUDED IN THE CONTRACT DOCUMENTS.

THE USE OF STAY-IN-PLACE FORMS WILL NOT BE PERMITTED.

ALL STRUCTURAL STEEL SHALL BE ASTM A36, EXCEPT AS NOTED.

CONCRETE IN SUPERSTRUCTURE SHALL BE CLASS A4. ALL OTHER CONCRETE SHALL BE CLASS A3.

DEFORMED REINFORCING BARS SHALL CONFORM TO ASTM A615, GRADE 60. ALL REINFORCING BAR DIMENSIONS ON THE DETAILED DRAWINGS ARE TO CENTERS OF BARS EXCEPT WHERE OTHERWISE NOTED AND ARE SUBJECT TO FABRICATION AND CONSTRUCTION TOLERANCES.

H-PILES HAVE A DESIGN CAPACITY OF 45 TONS PER PILE, AND SHALL BE DRIVEN TO REFUSAL.

PRIOR TO THE COMMENCEMENT OF ANY WORK THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND ELEVATIONS OF THE EXISTING STRUCTURE AND REPORT TO THE ENGINEER ANY DISCREPANCIES BETWEEN FIELD MEASUREMENTS AND MEASUREMENT SHOWN ON THE CONTRACT PLANS.

THE CONTRACTOR SHALL COORDINATE CONSTRUCTION OF RETAINING WALL NO. 2 WITH THE BRIDGE B62 CONTRACTOR.

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12 TH-W AND 12 TH ST.
PLAN AND ELEVATION

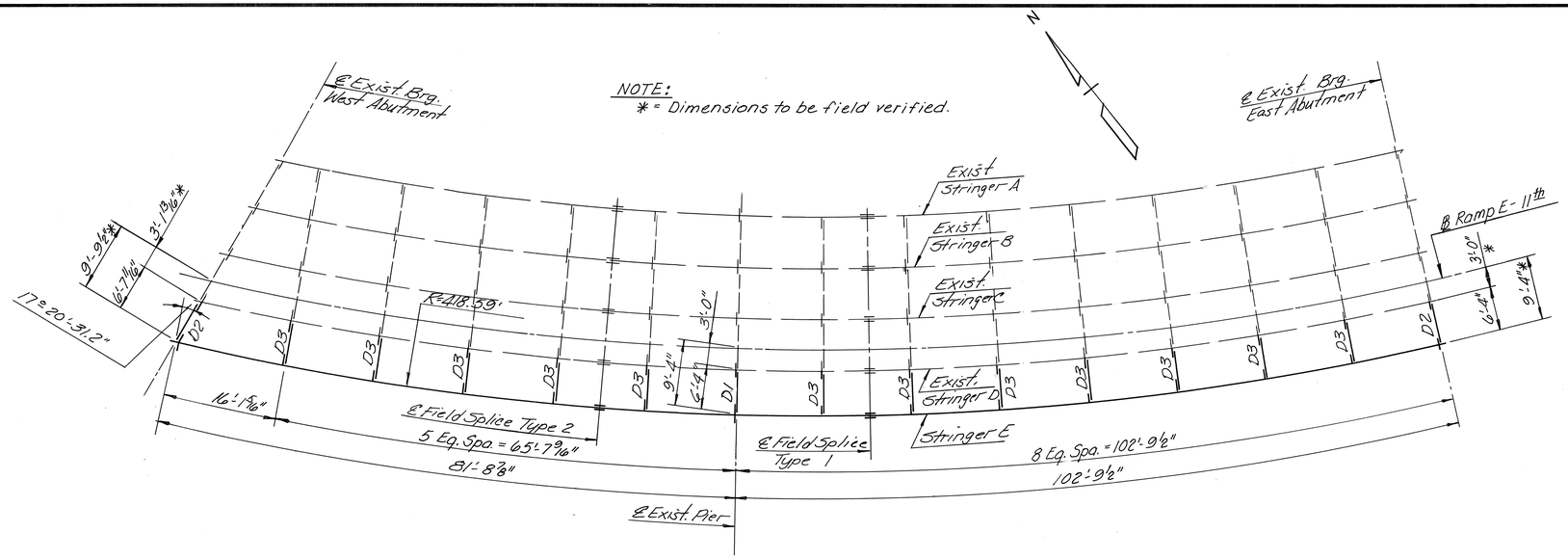
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 1 OF 31

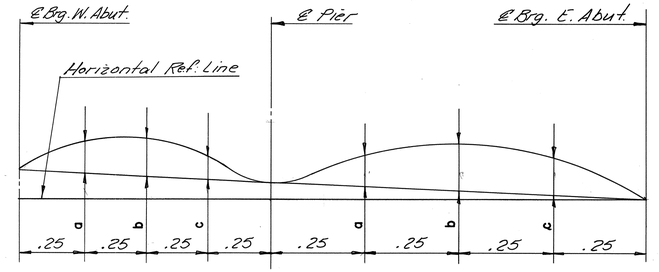
14237-21-02

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(9)	

NOTE:
* = Dimensions to be field verified.



FRAMING PLAN
Scale: 1" = 10'



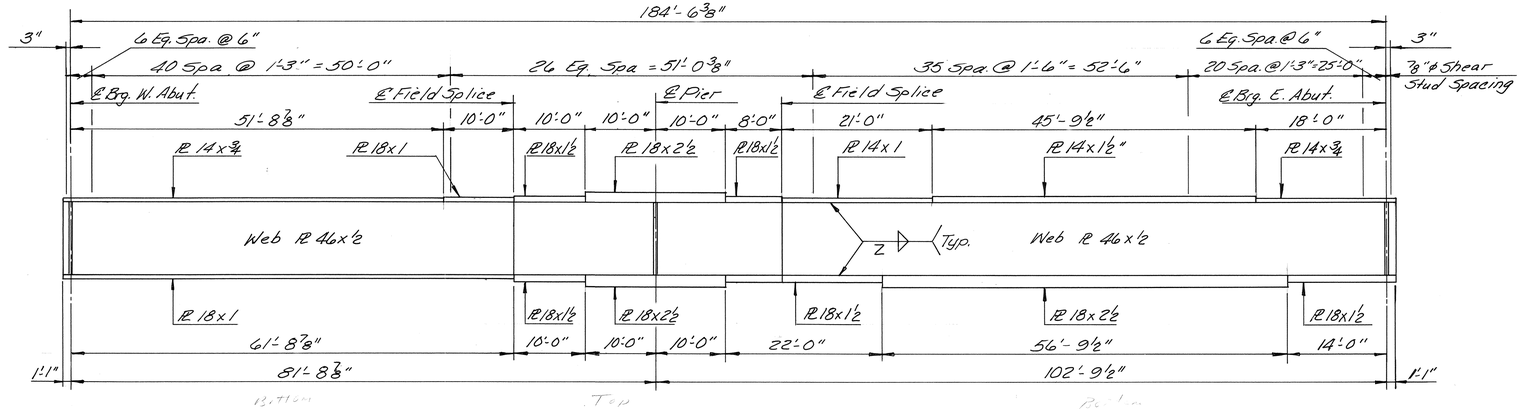
CAMBER DIAGRAM
No Scale

CAMBER SCHEDULE - STRINGER E									
ITEM	W. ABUT	a	b	c	PIER	a	b	c	E. ABUT
△s	—	1/16"	1/16"	-1/16"	—	1/4	3/8	5/16	—
△'s	—	1/4	3/16	1/16	—	1/2	1 1/16	7/8	—
△c	—	1/16	3/16	1/16	—	3/16	5/16	1/4	—
VC	—	3/4	1 1/2	1 7/16	—	3 3/16	4 7/16	3 5/16	—
Total	—	1 1/8	1 15/16	1 9/16	—	4 1/4	6 3/16	4 3/4	—

△s Camber due to dead load of steel.
△'s Camber due to dead load of deck slab and bolster and 20 p.s.f. allowance for construction methods and construction tolerance.
△c Camber due to dead load of parapets.
VC Camber due to roadway vertical curve.
Dimensions are in inches.

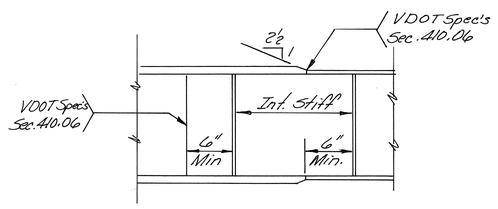
NOTE TO FABRICATOR

The girders shall be fabricated with an upward camber amounting to the sum of △s + △'s + △c + VC. This will provide approximate compensation for deflection under full dead load for conformity with the finished grade.

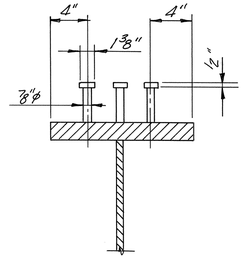


GIRDER ELEVATION
No Scale

FLANGE THICKNESS	Z
¾" to 1½"	5/16
1⅜" to 2"	⅜



WELDED SPLICE DETAIL
No Scale



SHEAR STUD DETAIL
No Scale

AS BUILT

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	
IN CHARGE	SR	

NO.	REVISION	BY	DATE

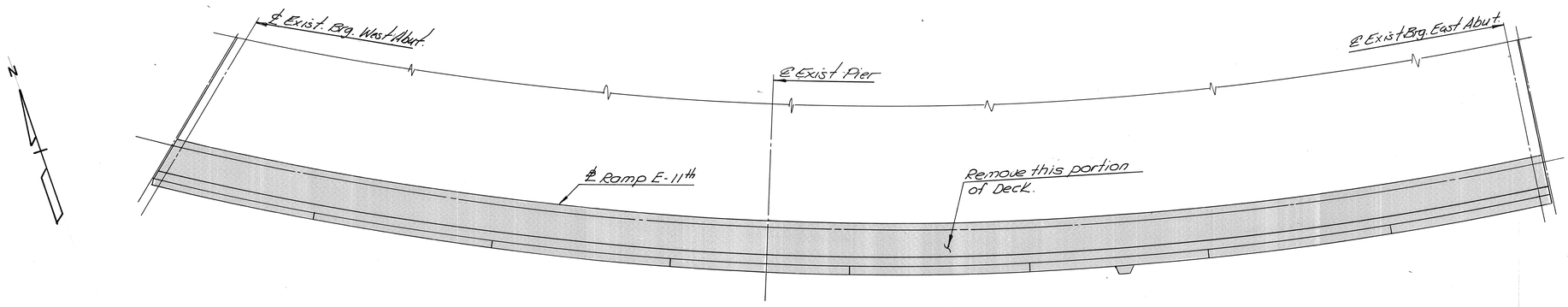
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
FRAMING PLAN AND GIRDER ELEVATION

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

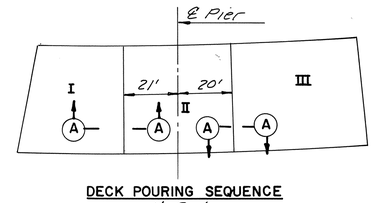
SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 9 OF 31

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6 (11)	



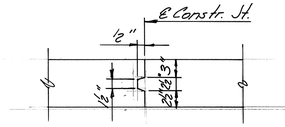
DECK REMOVAL
Scale: 1/8"=1'-0"

NOTE:
After removing the existing portion of concrete as shown, remove the longitudinal bars in that area. The existing transverse bars should be thoroughly cleaned and incorporated in the finished structure.

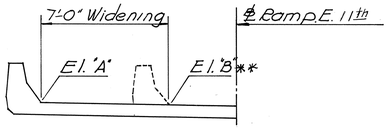


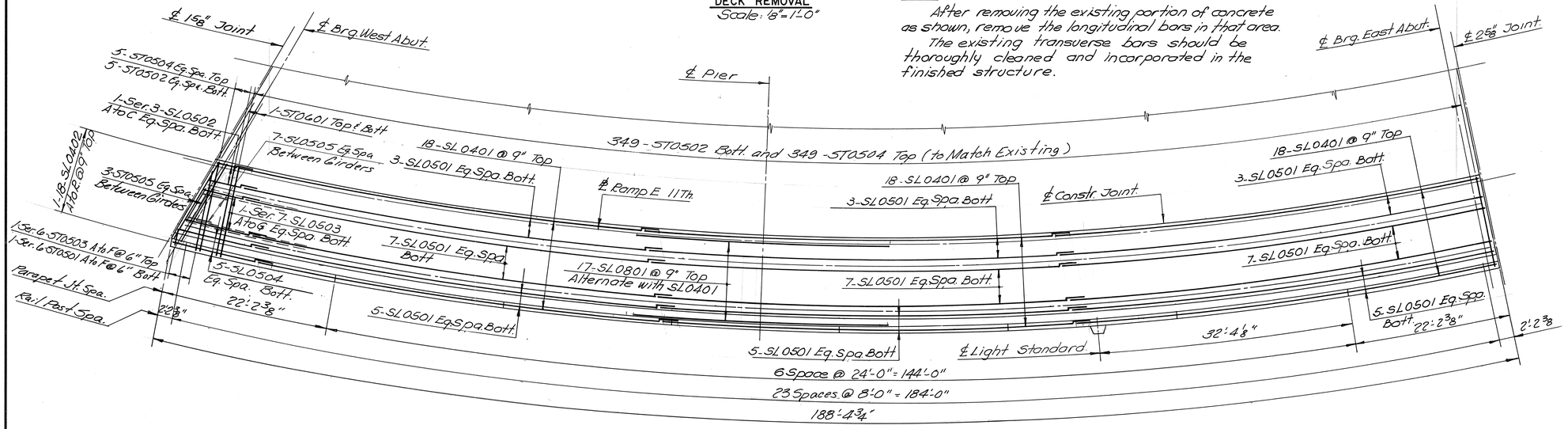
DECK POURING SEQUENCE
No Scale

NOTE:
The numbers shown indicate the order of concrete placement in deck sections.



SECTION A-A
No Scale



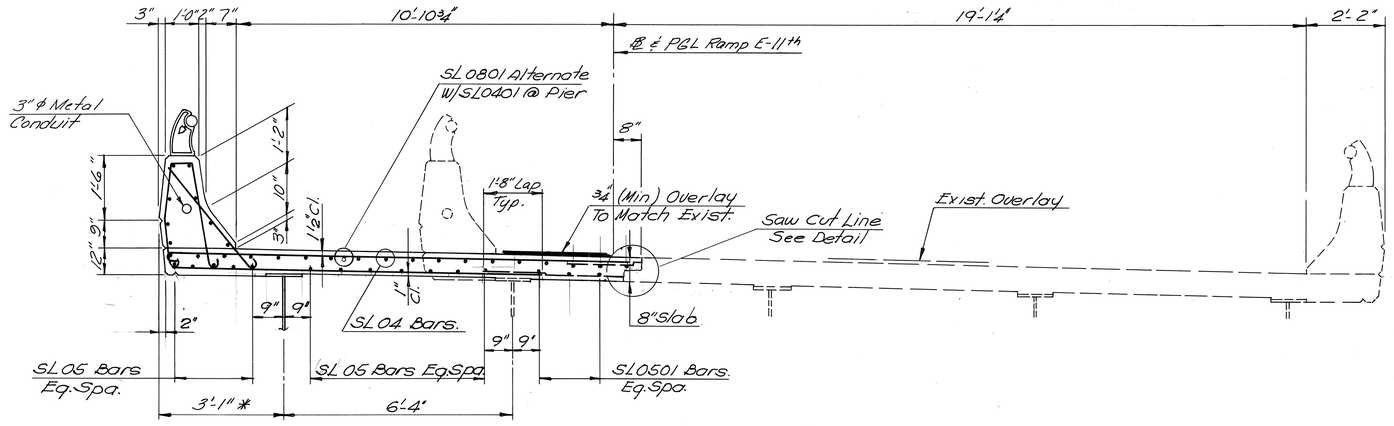


PLAN
Scale: 1/8"=1'-0"

DECK SLAB ELEVATIONS		
STATION	El. "A"	El. "B"**
℄ Jt. W. Abut.	83.38	83.19
¼ pt.	83.54	83.30
½ pt.	83.71	83.47
¾ pt.	83.80	83.55
℄ Pier	83.79	83.64
¼ pt	83.61	83.40
½ pt	83.26	83.03
¾ pt	82.71	82.52
℄ Jt. E. Abut	81.98	81.86

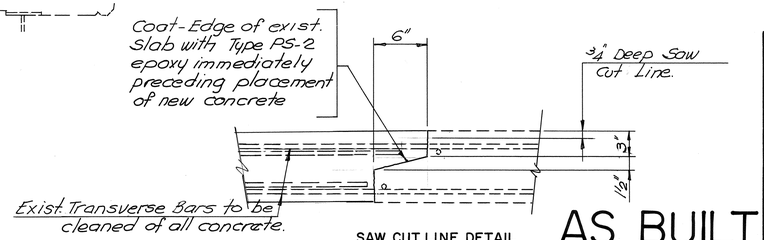
** Existing deck elevations. Above elevations are to top of overlay

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



TYPICAL SECTION
Scale: ½"=1'-0"

* Dimensions to be field verified.



SAW CUT LINE DETAIL
Scale: 1½"=1'-0"

AS BUILT

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.

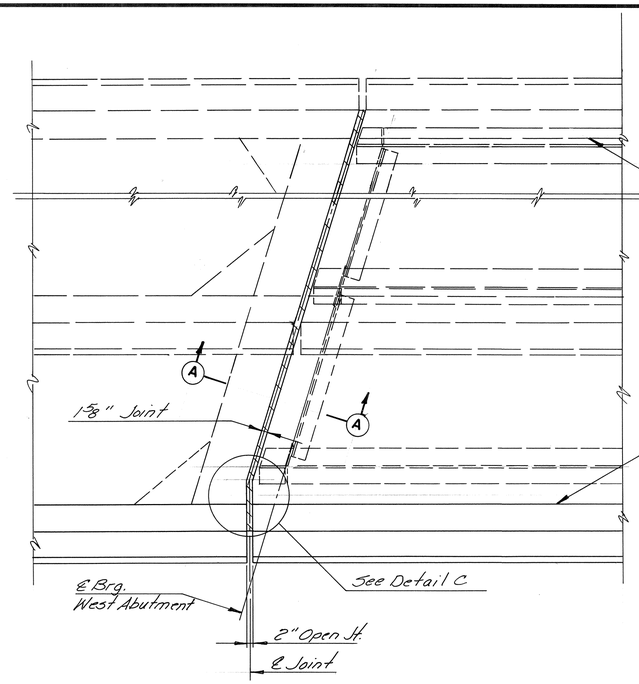
DECK PLAN AND TYPICAL SECTION

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

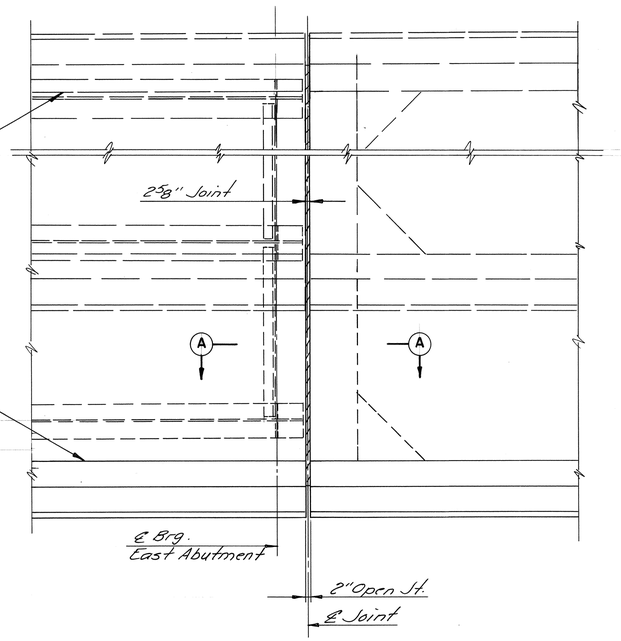
SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 11 OF 31

NEWS

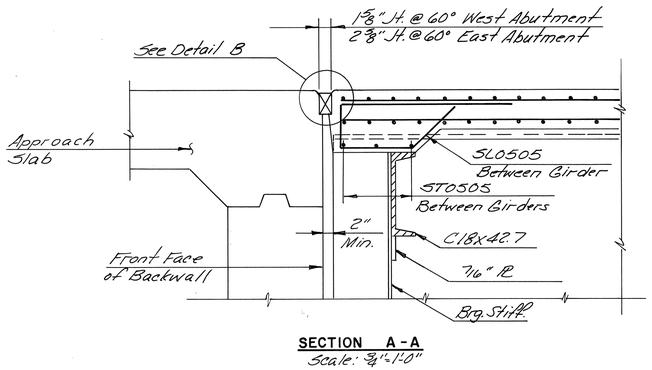
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(13)	



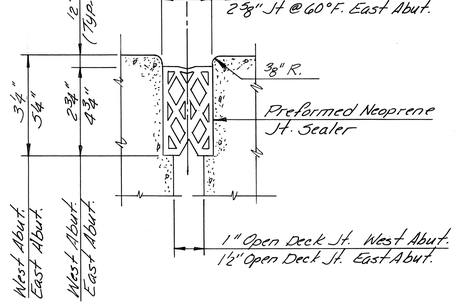
PLAN - JOINT AT WEST ABUTMENT
No Scale



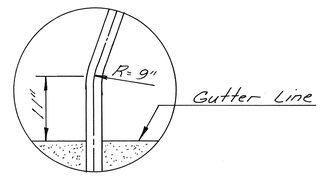
PLAN - JOINT AT EAST ABUTMENT
No Scale



SECTION A - A
Scale: ¾"=1'-0"

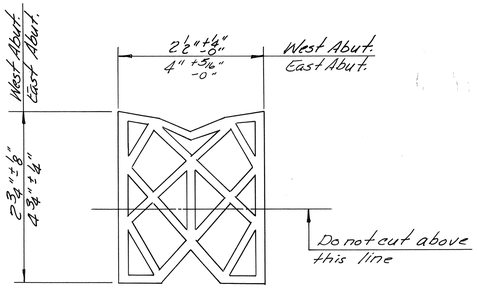


DETAIL B
No Scale

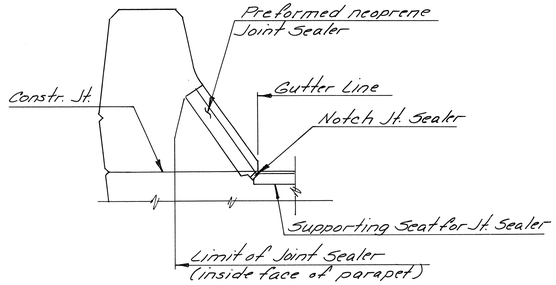


DETAIL C
Scale: 1"=1'-0"

NOTE:
Existing preformed joint sealer at each Abutment to be completely removed. New continuous joint sealer shall be installed from gutter to gutter and up faces of parapet as shown. In damaged areas, joint edges on existing deck slab (R=⅜") shall be repaired.



PREFORMED NEOPRENE JOINT SEALER
No Scale



TREATMENT OF JOINT AT GUTTER LINE
No Scale

	BY	DATE	NO.	REVISION	BY	DATE
MADE	TAL	12/90				
CHECKED	BS	12/90				
IN CHARGE	SR					

AS BUILT

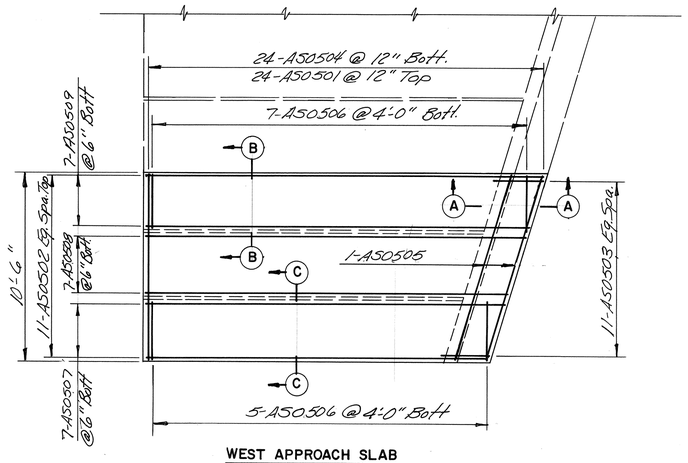
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
JOINT DETAILS

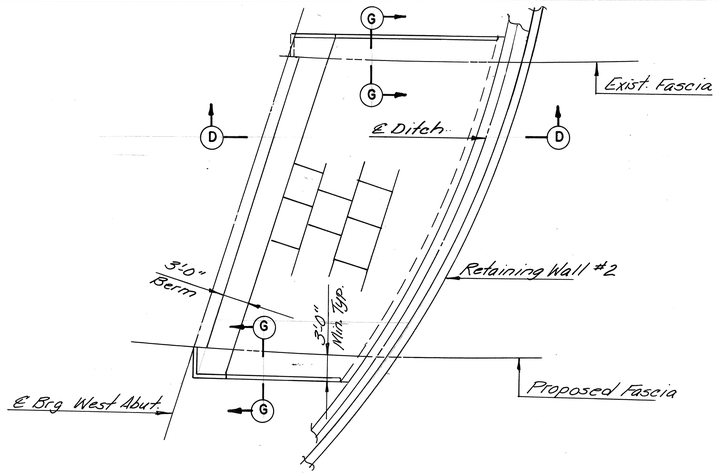
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
Alexandria, Virginia

SCALE: As Shown
CONTRACT NO: C-15
SHEET NO. 13 OF 31

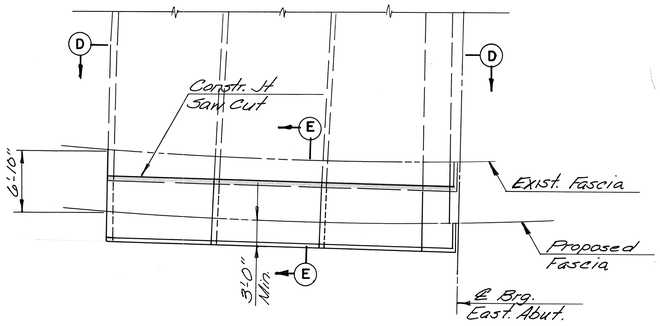
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C-15	1990-1991 IMPROVEMENTS	6(14)	



WEST APPROACH SLAB
Scale: 4"=1'-0"

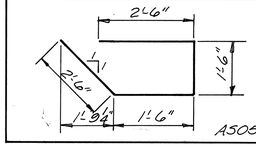


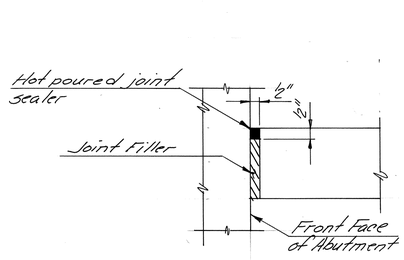
WEST SLOPE PROTECTION
Scale: 1/8"=1'-0"



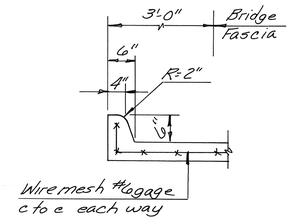
EAST SLOPE PROTECTION
Scale: 1/8"=1'-0"

REINFORCING STEEL SCHEDULE			
MARK	NO	LENGTH	LOCATION
A50501	24	10'-0"	Top Transverse
A50502	11	19'-0"	Top Longitudinal
A to K		22'-0"	Top Longitudinal
A50503	11	8'-0"	End Longitudinal
A50504	24	10'-0"	Bottom Transverse
A50505	2	10'-6"	Bottom Transverse
A50506	12	3'-2"	Bottom Transverse
A50507	7	19'-0"	Bottom Longitudinal
A to G		20'-0"	Bottom Longitudinal
A50508	7	20'-0"	Bottom Longitudinal
A to G		21'-0"	Bottom Longitudinal
A50509	7	21'-0"	Bottom Longitudinal
A to G		22'-0"	Bottom Longitudinal

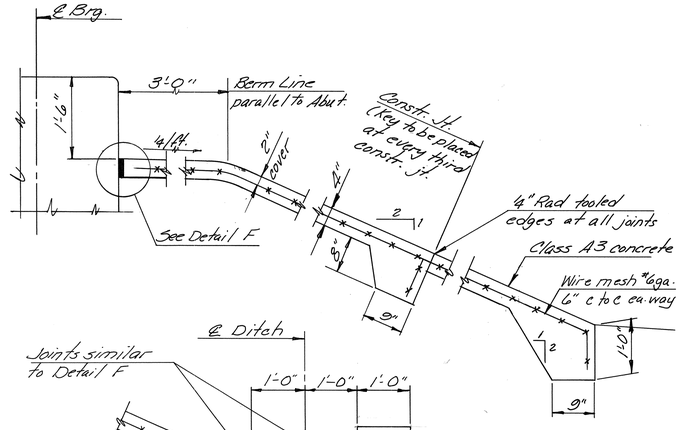




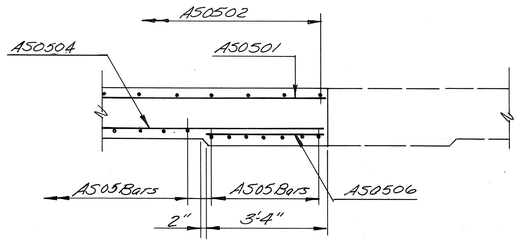
DETAIL F
No Scale



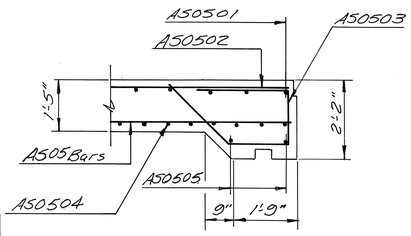
SECTION G-G
Scale: 3/4"=1'-0"



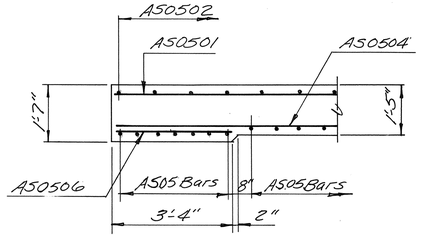
SECTION D-D
Scale: 3/4"=1'-0"



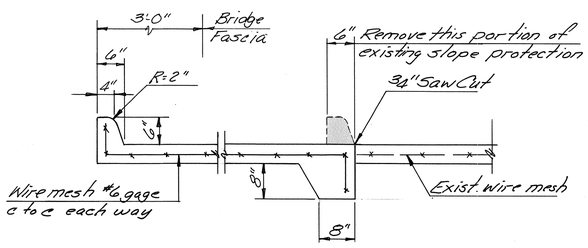
SECTION B-B
Scale: 1/2"=1'-0"



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



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



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

	BY	DATE
MADE	TAL	12/90
CHECKED	BS	12/90
IN CHARGE	SR	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BRIDGE NO. 62 WIDENING
RAMP E-11TH OVER
RAMP 12TH-W AND 12TH ST.
APPROACH SLAB AND SLOPE PROTECTION DETAILS

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

SCALE: As Shown
CONTRACT NO.: C-15
SHEET NO. 14 OF 31

AS BUILT