Cumberland Viaduct Rehabilitation Project Contract No. AL4095180R

Presenter – Bob Bofinger
MDSHA – Office of Structures

Project Justification & Improvements

- **Condition State** – The deck, superstructure and substructure was rated a 5 and repairs completed improved the rating to 7 for sub and superstructure.
- **System Preservation** – Proposed work to address substructure and superstructure. The concrete deck will be replaced on the MD 51 bridge in the next 3 years and a concrete overlay or deck replacement in the future for the I-68 bridge.
- **Costs** – The costs would be too high for a complete replacement, the I-68 traffic would need to be detoured through the City of Cumberland. The repairs needed are so extensive and the structure is so large. MDSHA choose the most economical option for a complete rehabilitation to substructure, steel girders and beams and repairs to curbs, roadway joints and replace lighting. .
- **Safety** – There are also several municipal roads, two railways, a waterfront development, and a significant amount parking beneath the bridge. Numerous areas in need of repair are directly over vehicles and pedestrians, with the possibility of falling from overhead.

Project Description

- This project, located in Allegany County, is for the cleaning, painting, and rehabilitation of Bridge Nos. 0109200 MD 51 over CSX RR and Canal Parkway, 0109600 I-68 over Wills Creek, CSX RR and Municipal Streets, 0110700 I-68 Ramp A over Mechanic Street, 0110800 I-68 Ramp B over Howard Street, 0110900 I-68 Ramp C over Mechanic Street, 0111000 I-68 Ramp D over Centre Street, 0111100 I-68 Ramp E over Centre Street & Queen City Dr and 0111200 I-68 Ramp F over Centre Street & Queen City Dr in the City of Cumberland, Maryland.

Background

- The structures is on the Interstate MD 51 and Route 68 and was built in 1965 & 1968. The MD 51 bridge had a numerous HMA overlays and concrete median replaced with a jersey wall. The I-68 bridge had its concrete deck overlayed and median barrier replaced in 1976.
- These well traveled structures has had many construction maintenance and remedial repairs over the years
- Major Repairs – I-68 Bridge
  - 1988 – Substructure Repairs
  - 1990, 1995, 1997 – Partial Clean and Paint
  - 1992, 1998 – Bearing Pedestal Repairs
  - 1999 – Drainage troughs added at all piers

Contract Facts

- Contract bid - $14 M 790 calendar days
- Bid Date – 08/30/2012
- NTP – 11/27/2012
- End Date – 06/30/2015 142 CD extension
- 3 Redlines - $425,000
- 42 RFI's
- 10 Change orders – $3 M
- 100 sheets of contract plans

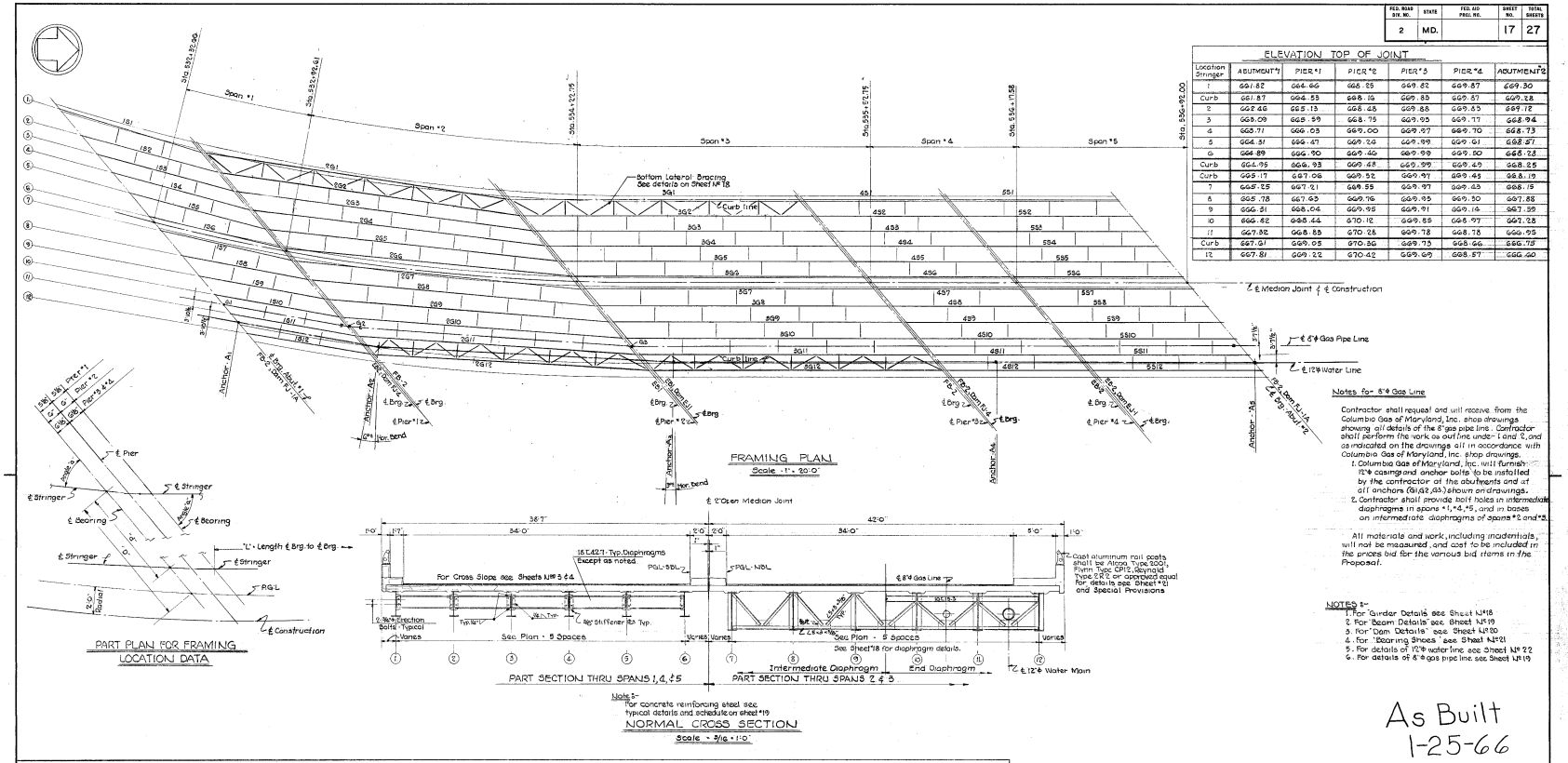
The Team

- Engineer – Office of Structures – Structures Remedial – Robert G. Bofinger, P.E – Lead Engineer - In-house design
- Consultant Engineer: Tuhin, Basu & Associates – Details
- Contract Adminstrator – District 6, La Vale Stephen Bucy – ADE Construction & PE's Derick Winfield & David Bittner
- Paint Inspection – Tony Wotten
- Contractor – Titan Industrial Services Michael Forakis & William Rothman

Bridge Facts – MD 51 Bridge over CSX

- 5 span steel beam and steel girder bridge
- Built in 1965 prior to the Viaduct bridge
- Span 5 is over Canal Parkway, MD 61
- Major arterial road to industrial companies

As-built framing plan



Location Stringer	ABUTMENT #1	PIER #1	PIER #2	PIER #3	PIER #4	ABUTMENT #2
1	661.82	664.66	668.25	669.82	669.87	669.30
Curb	661.87	664.53	668.16	669.85	669.87	669.28
2	662.46	665.13	668.65	669.88	669.85	669.12
3	663.09	665.59	668.75	669.95	669.77	668.94
4	663.71	666.03	668.90	669.97	669.70	668.73
5	664.31	666.41	669.06	669.99	669.61	668.51
6	664.89	666.90	669.46	669.99	669.50	668.28
Curb	664.95	666.93	669.48	669.99	669.49	668.25
Curb	663.17	667.08	669.52	669.97	669.45	668.19
7	665.25	667.21	669.55	669.97	669.45	668.15
8	665.78	667.65	669.76	669.95	669.30	667.88
9	666.21	668.04	669.95	669.91	669.14	667.59
10	666.62	668.44	670.12	669.85	668.97	667.28
11	667.02	668.85	670.28	669.78	668.78	666.95
Curb	667.01	669.05	670.36	669.73	668.66	666.75
12	667.81	669.22	670.42	669.69	668.57	666.60

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
2	MD.		17	27

Notes for 8"ϕ Gas Line

Contractor shall request and will receive from the Columbia Gas of Maryland, Inc. shop drawings showing all details of the 8"gas pipe line. Contractor shall perform the work as outline under 1 and 2, and as indicated on the drawings all in accordance with Columbia Gas of Maryland, Inc. shop drawings.

1. Columbia Gas of Maryland, Inc. will furnish 12"ϕ casings and anchor bolts to be installed by the contractor at the abutments and at all anchors (S1, S2, S3,) shown on drawings.
2. Contractor shall provide bolt holes in intermediate diaphragms in spans #1, #4, #5, and in bases on intermediate diaphragms of spans #2 and #3.

All materials and work, including incidentials, will not be measured, and cost to be included in the prices bid for the various bid items in the Proposal.

NOTES 5-
1. For Girder Details see Sheet №18
2. For Beam Details see Sheet №19
3. For "Dam Details" see Sheet №20
4. For "Bearing Shoes" see Sheet №21
5. For details of 16"ϕ water line see Sheet № 22
6. For details of 8"ϕ gas pipe line see Sheet №19

FRAMING LOCATION SCHEDULE

Bridge Stringer №	SPAN № 1					SPAN № 2					SPAN № 3					SPAN № 4					SPAN № 5				
	ABUTMENT #1			PIER #1		PIER #1			PIER #2		PIER #2			PIER #3		PIER #3			PIER #4		PIER #4			ABUTMENT #2	
	"D"	"d"	Angle "a"	"L"	"D"	"D"	"d"	Angle "a"	"L"	"D"	"D"	"d"	Angle "a"	"L"	"D"	"D"	"d"	Angle "a"	"L"	"D"	"D"	"d"	Angle "a"	"L"	"D"	"D"	"d"
1	63'-0"	12'-4"	32°06'-34"	98'-2"⅝	90'-5"⅛	10'-5"⅜		42°58'-19"	135'-1"⅛	43'-4"⅝	7'-0"¼	50°58'-00"	121'-3"¼	45'-5"⅛	8'-10"⅛	45'-5"⅛	8'-10"⅛	50°09'-00	63'-0"					50°09'-00	73'-9"		
2	50'-8"	12'-4"	33°00'-45"	66'-6"⅛	42'-2"⅛	10'-3"⅜		42°22'-14"	133'-1"⅛	36'-4"⅛	8'-10"⅜	50°09'-00	105'-0"⅜	36'-3"⅛	8'-10"⅜	36'-7"	8'-10"⅜										
3	38'-4"	12'-4"	39°58'-48"	64'-10"⅛	31'-10"⅛	10'-3"⅜		42°52'-34"	132'-1"⅛	27'-5"⅜	8'-10"⅜			27'-6"⅛		27'-8"⅛	8'-10"⅜										
4	26'-0"	12'-4"	36°59'-55"	63'-2"⅛	21'-6"⅛	10'-3"⅜		43°17'-16"	131'-1"⅛	18'-6"⅛	8'-10"⅜			18'-6"⅛		18'-9"⅛	8'-10"⅜										
5	13'-8"	12'-4"	36°04'-17"	61'-6"⅜	11'-8"⅛	10'-3"⅜		43°48'-22"	130'-1"⅛	9'-11"⅛	8'-10"⅜			9'-11"⅛	8'-10"⅜	9'-10"⅜	8'-10"⅜										
6	1'-4"	-	37°12'-09"	59'-11"⅛	0'-10"⅛	-		44°07'-52"	129'-1"⅛	0'-8"⅛	-			0'-8"⅛	-	0'-11"⅛	-										
7	1'-10"	-	50°48'-05"	60'-6"	2'-1"⅛	-		46°05'-00"	128'-7"⅛	1'-1"⅛	-			1'-2"⅛	-	0'-11"⅛	-										
8	13'-8"⅛	11'-10"⅜	31°58'-17"	59'-5"⅛	10'-1"⅜	10'-6"⅜		46°-0"⅜	10'-5"⅜	9'-5"⅛				10'-1"⅜	9'-5"⅜	10'-1"⅜	9'-5"⅜										
9	25'-3"⅜	11'-10"⅜	28°05'-11"	58'-6"⅜	24'-7"⅜	10'-9"⅜		46°55'-45"	10'-5"⅜	20'-0"⅜	9'-5"⅜			20'-0"⅜		19'-10"⅜	9'-5"⅜										
10	37'-6"⅝	11'-10"⅜	24°11'-51"	57'-6"⅜	35'-1"⅜	10'-6"⅜		46°-1"⅜	10'-5"⅜	29'-5"⅜	9'-5"⅜			29'-6"		29'-3"⅜	9'-5"⅜										
11	49'-2"⅛	11'-10"⅜	20°05'-09"	56'-5"⅜	45'-8"	10'-6"⅜		45°58'-40"	10'-5"⅜	38'-11"⅜	9'-5"⅜			38'-11"⅜	9'-5"⅜	38'-9"	9'-5"⅜										
12	61'-1"	11'-10"⅜	16°56'-41"	55'-2"⅜	56'-2"⅜	10'-6"⅜		45°-4"⅜	10'-5"⅜	48'-4"⅛	9'-5"⅜	50°09'-00	128'-6"⅜	48'-2"⅜	9'-5"⅜	48'-2"⅜	9'-5"⅜	50°09'-00	63'-6"					50°09'-00	73'-9"		

GREEN ASSOCIATES INC.
CONSULTING ENGINEERS
BALTIMORE, MARYLAND

REVISIONS

STATE OF MARYLAND
STATE ROADS COMMISSION
BALTIMORE, MD.

CUMBERLAND THRUWAY - SOUTH APPROACH
BRIDGE OVER B.&O. R.R.
FRAMING PLAN

SCALE AS NOTED DATE JULY, 1963 CONTRACT A-452-10-620

MADE BY L. Ng
TRACED BY A.H.J.
CHECKED BY R.G.L.

SHEET No. 17 OF 27

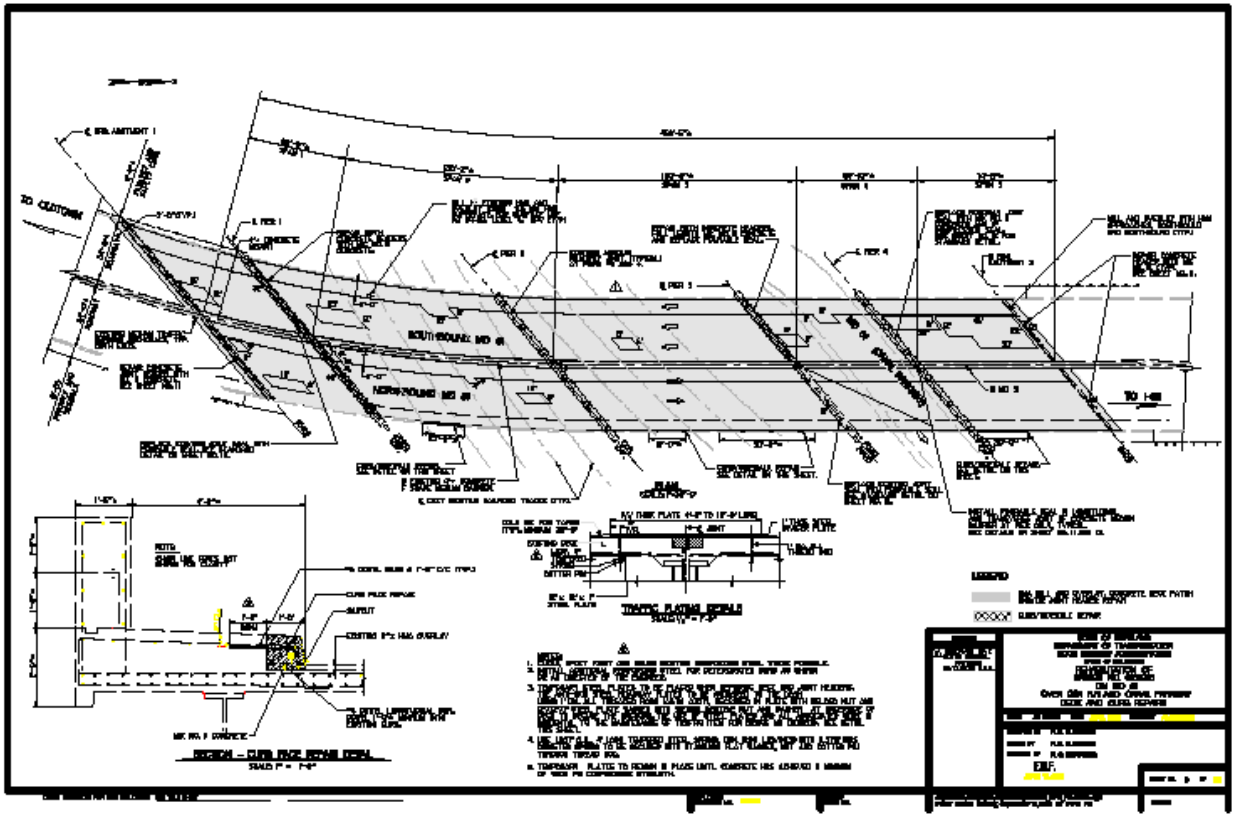
INDEXED

BRIDGE No. 1092

Survey Book No.

File No. Pocket No. Folder No. 6

Contract plan



Scope of Work – MD 51 Bridge

- Repair all pier caps and crash walls with Mix No. 6 Concrete.
- Repair concrete end diaphragms at all piers with pneumatically applied mortar (P.A.M.), and repair both abutments with cast in place concrete.
- Epoxy coat all pier caps, crash walls and abutments.
- Carbon Fiber wrap all columns at piers.
- Retrofit girder 12 at Pier 3, Span 3.
- Replace gusset and diaphragm connection plates and lateral bracing with section loss/holes at various locations as shown on the plans.
- Grind, or grind and re-weld cracks in diaphragm connection welds as shown on the plans.

Scope – MD 51 Bridge – Con'd

- Plank entire Span 4 over Canal Parkway and replace deteriorated planks in Span Nos. 2 and 3, in Bay 6.
- Replace pier roadway joints 1 and 3 with pourable seal and backer rods. Replace Pier 4 roadway joint with a 3 in. compression seal.
- Repair concrete roadway joint header at pier 3 and south abutment with Modified Mix No. 9 concrete.
- Install pourable seal in longitudinal joint at median barrier (Pier only).
- Zone painting
- Mill 2 inches existing HMA and overlay at South Abutment.

Zone Painting

Concrete repair - Substructure

Column & Pier repairs

Deck & roadway joint repairs

Steel repairs

Timber planking

Bridge Facts - I-68 EB & WB

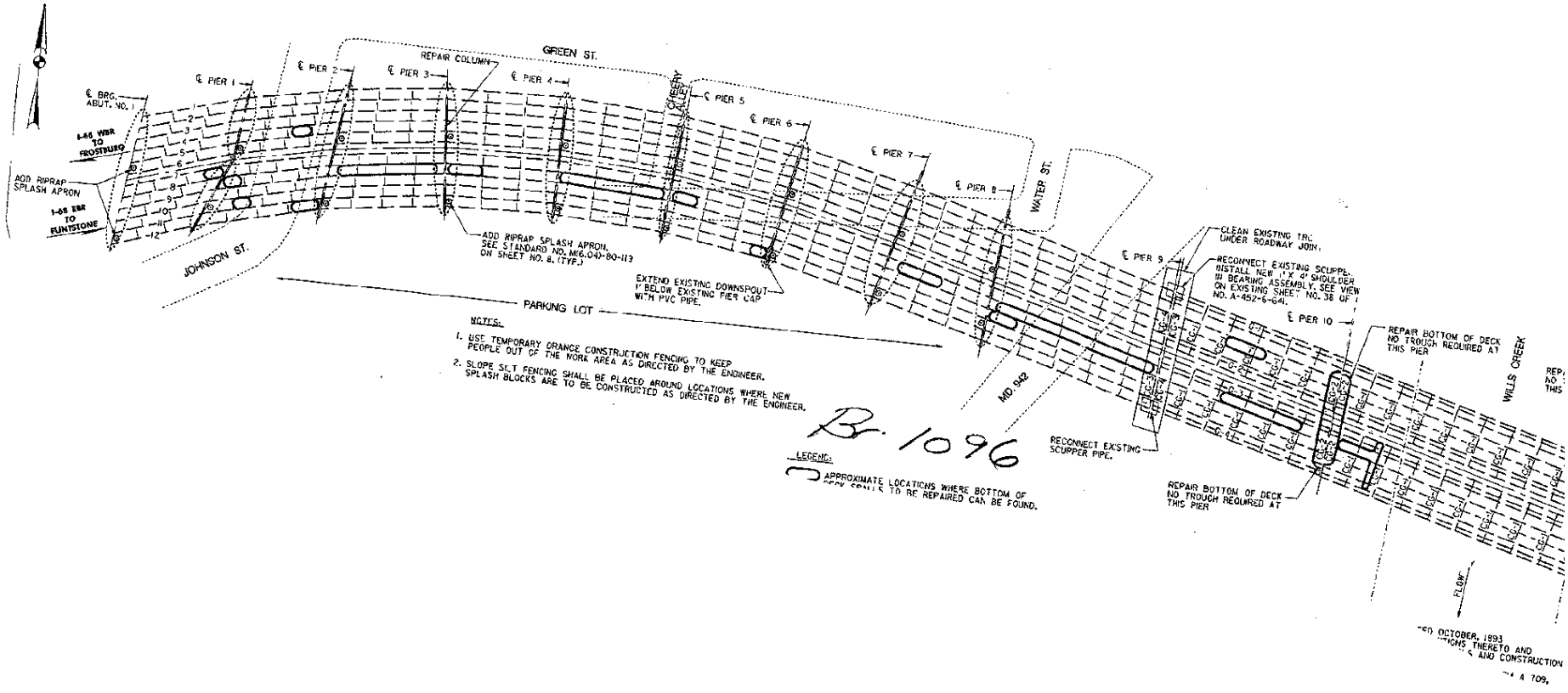
- Bridge Nos. 0109600, 0110700 - 0111200
- 44 Span Steel Girder / Beam Bridge
- 6 total entrance/exit ramps.
- Total mainline structure length is 3,121 linear feet
- The AADT for I-68 EB/WB was 45,252 vehicles as of December 2008
- There are 1308 beam/girder ends through out the structure
- Spans 10 through 12 are fracture critical

Special Features

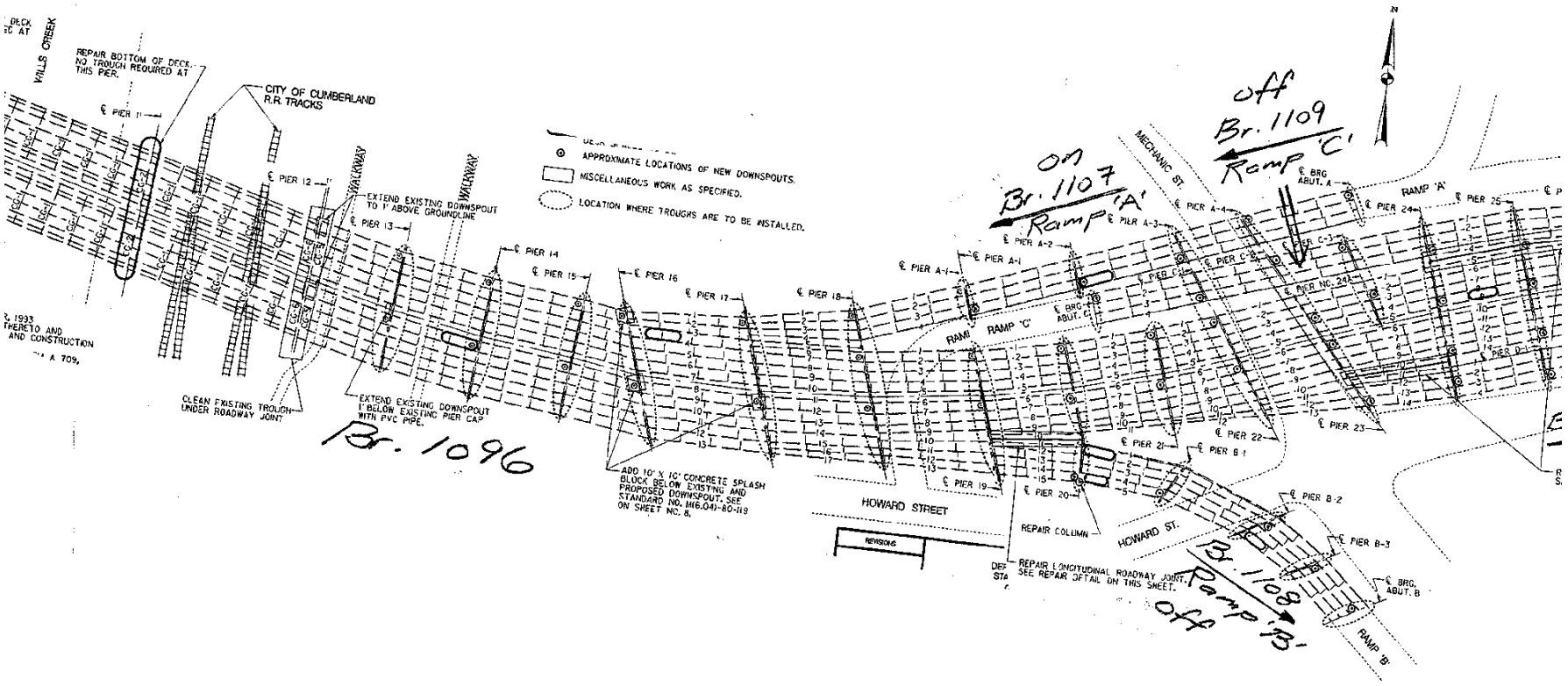
- Replace finger roadway joints at Piers 9 and 12
- Dry hydrants added at Piers 21, 33 and 42 as request City of Cumberland Fire Dept.
- Rehabilitation of substructure and superstructure steel beam/girders and bearing areas.

I-68 Bridge – Cumberland Viaduct

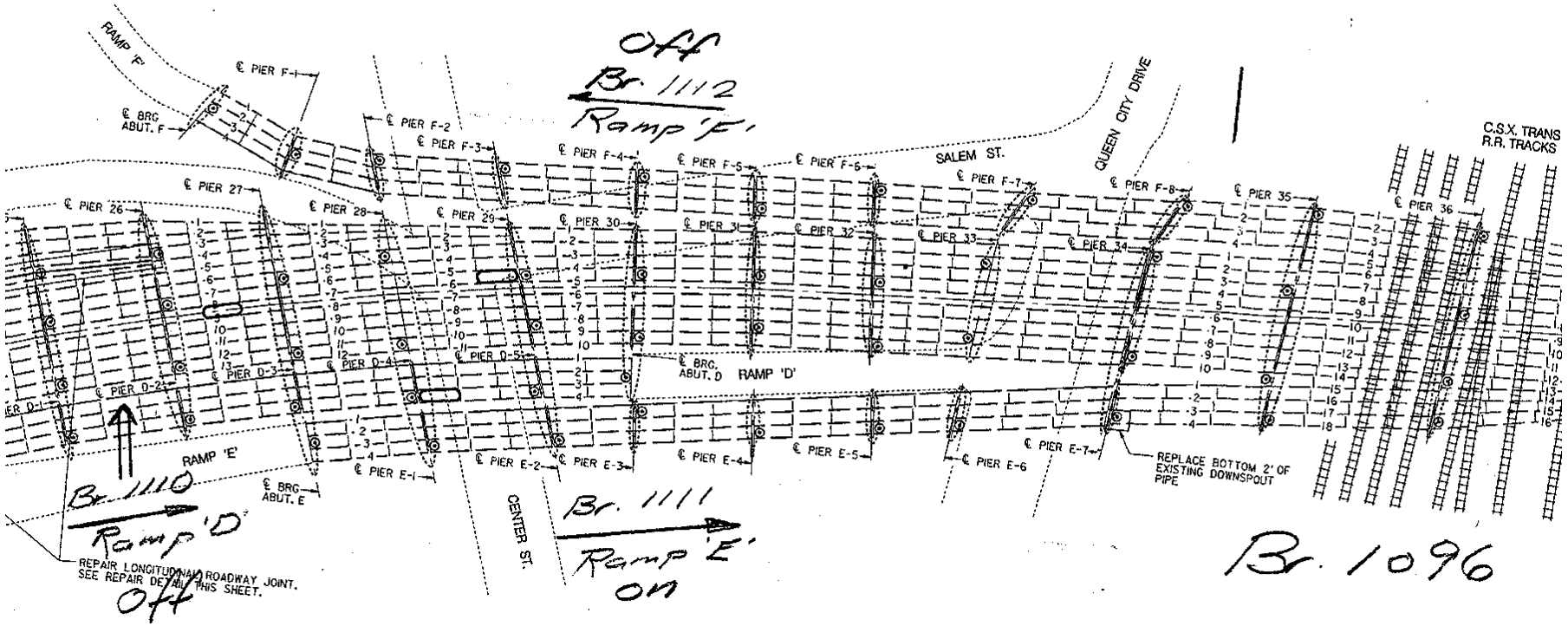
West End / Willis Creek



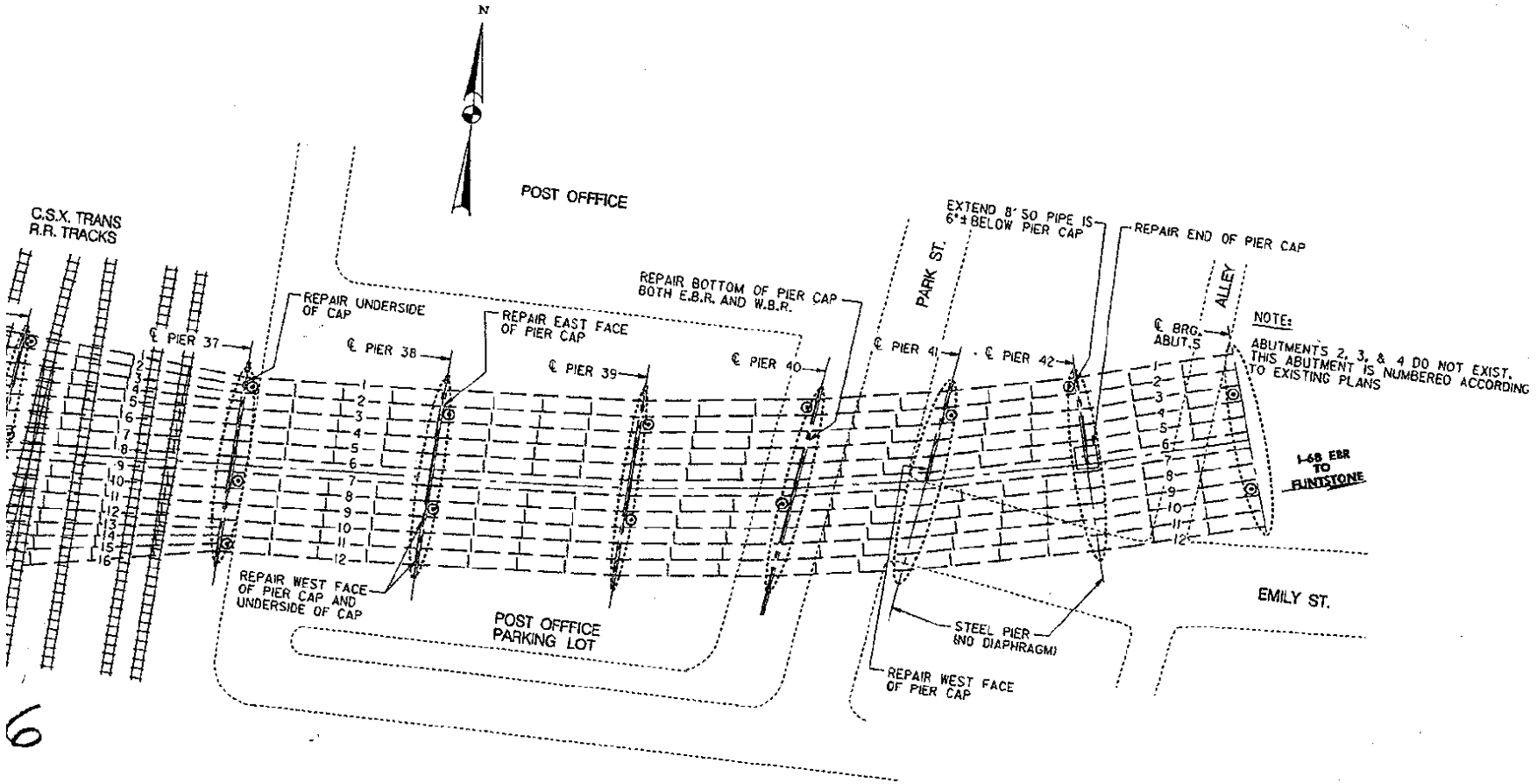
Willis Creek / Interchange



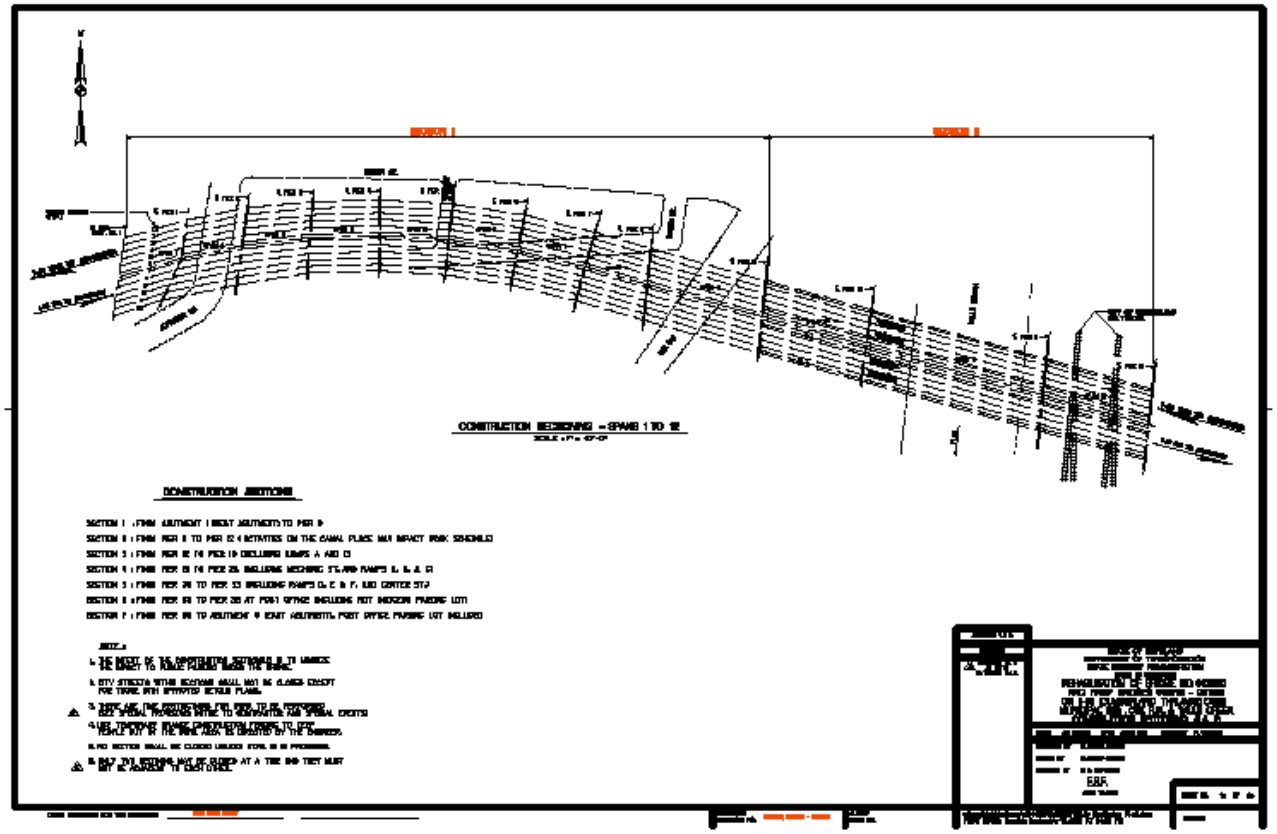
Interchange / CSX R.R.



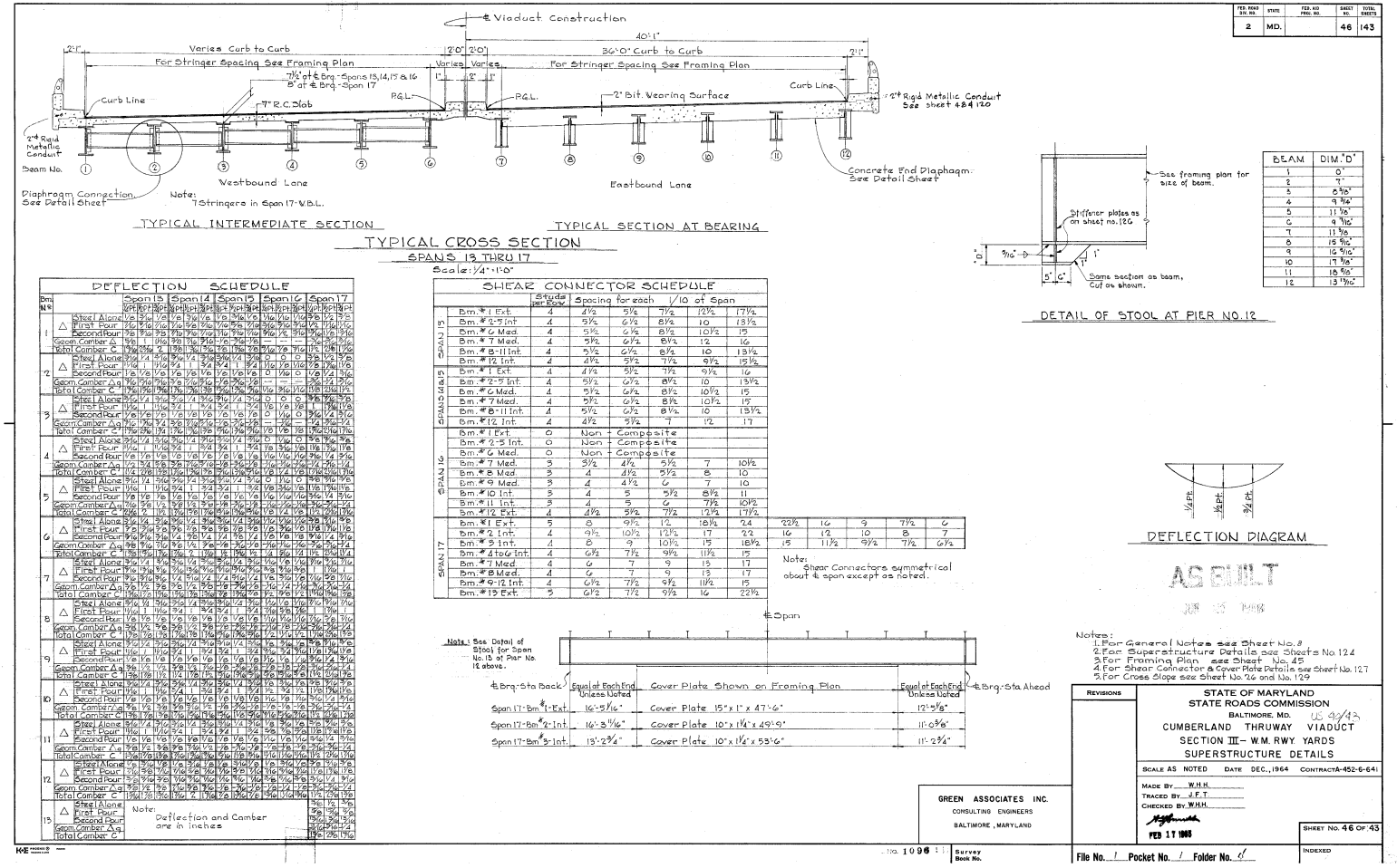
CSX R.R. / East End



Contract plans - Sections



Typical cross sections



BEAM	DIM. "D"
1	0
2	7"
3	8 5/16"
4	9 9/16"
5	11 1/8
6	9 9/16"
7	11 1/8
8	15 9/16"
9	16 9/16"
10	17 9/16"
11	18 5/16"
12	13 13/16"

DEFLECTION SCHEDULE

Beam No.		Span 13			Span 14			Span 15			Span 16			Span 17		
		0.4	0.6	0.8	0.4	0.6	0.8	0.4	0.6	0.8	0.4	0.6	0.8	0.4	0.6	0.8
1	Steel Alone	1/8	3/16	1/4	1/8	3/16	1/4	1/8	3/16	1/4	1/8	1/16	1/16	1/16	3/16	1/2
	First Pour	1/16	3/16	3/16	1/16	3/16	3/16	1/16	3/16	3/16	3/16	3/16	1/16	1/16	1/16	1/16
	Second Pour	1/8	1/8	1/8	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
	Geom. Camber Δ	1/8	1/16	3/16	1/16	1/16	3/16	1/16	1/16	3/16	—	—	—	1/16	3/16	1/2
	Total Camber C	3/16	3/16	1/2	1/8	3/16	1/2	1/8	3/16	1/2	1/8	1/16	1/16	1/8	1/16	1/16
2	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	3/16	1/4	5/16	0	0	0	3/16	1/16	1/16
	First Pour	1/16	1	1/16	3/16	1	3/16	3/16	1	3/16	1/16	1/16	1/16	1/8	1/16	1/16
	Second Pour	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	0	1/16	0	1/8	1/4	3/16
	Geom. Camber Δ	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	3/16	—	—	—	1/16	1/4	3/16
	Total Camber C	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	1/16	1/16	1/4	3/16
3	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	1/16	1/8	3/16	0	0	0	3/16	1/4	3/16
	First Pour	1/16	1	1/16	3/16	1	3/16	1/16	1	3/16	1/16	1/8	1/8	1/8	1	1/16
	Second Pour	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/8	0	1/16	0	3/16	1/4	3/16
	Geom. Camber Δ	3/16	1/16	3/16	3/16	1/16	3/16	1/16	1/16	1/8	—	—	—	1/4	3/16	1/2
	Total Camber C	3/16	3/16	1/4	1/16	3/16	1/4	1/16	1/16	1/8	1/16	1/16	1/8	1/16	1/16	1/16
4	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	1/4	5/16	3/8	0	1/16	0	5/16	3/16	3/16
	First Pour	1/16	1	1/16	3/16	1	3/16	1/4	1	5/16	1/16	1/16	1/16	1/16	1/16	1/16
	Second Pour	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/4	3/16
	Geom. Camber Δ	1/2	3/4	5/8	3/8	1/2	5/8	3/8	1/2	5/8	1/16	1/16	1/16	3/4	5/16	1/2
	Total Camber C	1/4	1/2	1/8	1/16	1/2	1/8	1/16	1/2	1/8	1/8	1/4	1/8	1/16	1/16	1/16
5	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	3/16	1/4	5/16	0	1/16	0	3/16	1/16	1/16
	First Pour	1/16	1	1/16	3/16	1	3/16	1	1	1	1/16	1/16	1/16	1/16	1/16	1/16
	Second Pour	1/8	1/16	1/8	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
	Geom. Camber Δ	3/16	1/2	5/8	1/2	3/16	5/8	1/2	3/16	5/8	1/16	1/16	1/16	3/16	3/16	1/2
	Total Camber C	3/16	1/2	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/8	1/16	1/16	1/16	1/16	1/16
6	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	1/4	5/16	3/8	1/16	1/16	1/16	5/16	1/16	1/16
	First Pour	1/16	1	1/16	3/16	1	3/16	1/4	1	5/16	1/16	1/16	1/16	1/16	1/16	1/16
	Second Pour	1/8	3/16	1/8	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
	Geom. Camber Δ	3/8	3/16	1/2	3/16	1/16	1/2	3/16	1/16	1/2	1/16	1/16	1/16	3/16	1/16	1/4
	Total Camber C	3/8	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	1/8	1/16	1/16	3/16	1/16	1/16
7	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	1/4	5/16	3/8	1/16	1/16	1/16	5/16	1/16	1/16
	First Pour	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1	1/16
	Second Pour	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
	Geom. Camber Δ	3/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	1/16	1/16	3/16	1/16
	Total Camber C	3/16	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	1/16	1/16	1/16	1/16	3/16	1/16
8	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	3/16	1/4	5/16	1/16	1/16	1/16	3/16	1/16	1/16
	First Pour	1/16	1	1/16	3/16	1	3/16	1	1	1	1/16	1/16	1/16	1/16	1	1/16
	Second Pour	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
	Geom. Camber Δ	3/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	1/16	1/16	3/16	1/16
	Total Camber C	3/16	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	1/16	1/16	1/16	1/16	3/16	1/16
9	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	1/4	5/16	3/8	1/16	1/16	1/16	5/16	1/16	1/16
	First Pour	1/16	1	1/16	3/16	1	3/16	1	1	1	1/16	1/16	1/16	1/16	1/16	1/16
	Second Pour	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/4	3/16
	Geom. Camber Δ	3/16	1/16	1/4	3/8	1/16	1/4	3/8	1/16	1/4	1/16	1/16	1/16	3/16	1/4	1/16
	Total Camber C	3/16	1/16	1/16	3/16	1/16	1/16	3/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
10	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	3/16	1/4	5/16	1/16	1/16	1/16	3/16	1/16	1/16
	First Pour	1/16	1	1/16	3/16	1	3/16	1	1	1	1/16	1/16	1/16	1/16	1/16	1/16
	Second Pour	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
	Geom. Camber Δ	3/8	1/2	5/8	3/8	1/2	5/8	3/8	1/2	5/8	1/16	1/16	1/16	3/16	5/16	1/4
	Total Camber C	3/8	1/2	5/8	3/8	1/2	5/8	3/8	1/2	5/8	1/16	1/16	1/16	3/16	5/16	1/4
11	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	1/4	5/16	3/8	1/16	1/16	1/16	5/16	1/16	1/16
	First Pour	1/16	1	1/16	3/16	1	3/16	1	1	1	1/16	1/16	1/16	1/16	1/16	1/16
	Second Pour	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/4	3/16
	Geom. Camber Δ	3/8	1/2	3/8	3/8	1/16	1/8	3/8	1/16	1/8	1/16	1/16	1/16	3/16	1/4	1/16
	Total Camber C	3/8	1/2	3/8	3/8	1/16	1/8	3/8	1/16	1/8	1/16	1/16	1/16	3/16	1/16	1/16
12	Steel Alone	3/16	1/4	5/16	3/16	1/4	5/16	3/16	1/4	5/16	1/16	1/16	1/16	3/16	1/16	1/16
	First Pour	1/16	1	1/16	3/16	1	3/16	1	1	1	1/16	1/16	1/16	1/16	1/16	1/16
	Second Pour	1/8	3/16	1/8	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16
	Geom. Camber Δ	3/8	1/2	5/8	3/8	1/16	1/8	3/8	1/16	1/8	1/16	1/16	1/16	3/16	1/4	1/16
	Total Camber C	3/8	1/2	5/8	3/8	1/16	1/8	3/8	1/16	1/8	1/16	1/16	1/16	3/16	1/16	1/16
13	Steel Alone													3/16	1/2	3/8
	First Pour													1/16	3/16	3/16
	Second Pour													1/16	1/16	1/16
	Geom. Camber Δ													3/16	1/2	1/4
	Total Camber C													1/16	3/16	1/16

Note: Deflection and Camber are in Inches

SHEAR CONNECTOR SCHEDULE

		Stirrups per Row	Spacing for each 1/10 of Span				
SPAN 13	Bm. # 1 Ext.	4	4½	5½	7½	12½	17½
	Bm. # 2-5 Int.	4	5½	6½	8½	10	13½
	Bm. # 6 Med.	4	5½	6½	8½	10½	15
	Bm. # 7 Med.	4	5½	6½	8½	12	16
	Bm. # 8-11 Int.	4	5½	6½	8½	10	13½
	Bm. # 12 Int.	4	4½	5½	7½	9½	15½
SPANS 14 & 15	Bm. # 1 Ext.	4	4½	5½	7½	9½	16
	Bm. # 2-5 Int.	4	5½	6½	8½	10	13½
	Bm. # 6 Med.	4	5½	6½	8½	10½	15
	Bm. # 7 Med.	4	5½	6½	8½	10½	15
	Bm. # 8-11 Int.	4	5½	6½	8½	10	13½
	Bm. # 12 Int.	4	4½	5½	7	12	17
SPAN 16	Bm. # 1 Ext.	0	Non - Composite				
	Bm. # 2-5 Int.	0	Non - Composite				
	Bm. # 6 Med.	0	Non - Composite				
	Bm. # 7 Med.	3	5½	4½	5½	7	10½
	Bm. # 8 Med.	3	4	4½	5½	8	10
	Bm. # 9 Med.	3	4	4½	6	7	10
	Bm. # 10 Int.	3	4	5	5½	8½	11
	Bm. # 11 Int.	3	4	5	6	7½	10½
	Bm. # 12 Ext.	4	4½	5½	7½	10½	17½
SPAN 17	Bm. # 1 Ext.	5	8	9½	12	18½	24
	Bm. # 2 Int.	4	9½	10½	12½	17	22
	Bm. # 3 Int.	4	8	9	10½	15	18½
	Bm. # 4 to 6 Int.	4	6½	7½	9½	11½	15
	Bm. # 7 Med.	4	6	7	9	13	17
	Bm. # 8 Med.	4	6	7	9	13	17
	Bm. # 9-12 Int.	4	6½	7½	9½	11½	15
	Bm. # 13 Ext.	3	6½	7½	9½	16	22½

22½	16	9	7½	6	
16	12	10	8	7	
15	11½	9½	7½	6½	

Note: Shear Connectors symmetrical about ℄ span except as noted.

Note: See Detail of Stool for Span No. 13 at Pier No. 12 above.

Notes:
1. For General Notes see Sheet No. 8
2. For Superstructure Details see Sheets No. 124
3. For Framing Plan see Sheet No. 45
4. For Shear Connector & Cover Plate Details see Sheet No. 127
5. For Cross Slope see Sheet No. 26 and No. 129

AS BUILT

REVISIONS

STATE OF MARYLAND
STATE ROADS COMMISSION
BALTIMORE, MD. US 40/13
CUMBERLAND THRUWAY VIADUCT
SECTION III - WM. RWY YARDS
SUPERSTRUCTURE DETAILS

SCALE AS NOTED DATE DEC., 1964 CONTRACT A-452-6-641

MADE BY W.H.H.
TRACED BY J.F.T.
CHECKED BY W.H.H.

FEB 17 1965

SHEET NO. 46 OF 143

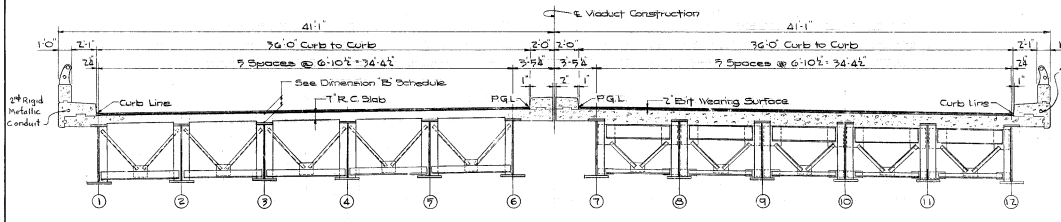
INDEXED

GREEN ASSOCIATES INC.
CONSULTING ENGINEERS
BALTIMORE, MARYLAND

No. 1096 | Survey Book No.

File No. 1 Pocket No. 1 Folder No. 6

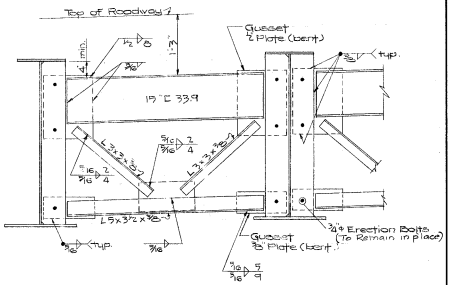
FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
2	MD.		22	143



TYPICAL INTERMEDIATE SECTION

DIMENSION "B" SCHEDULE	
G1 & G12	10"
G2 - G5	8¾"
G6 - G11	9¼"
G6 & G7	9¼"

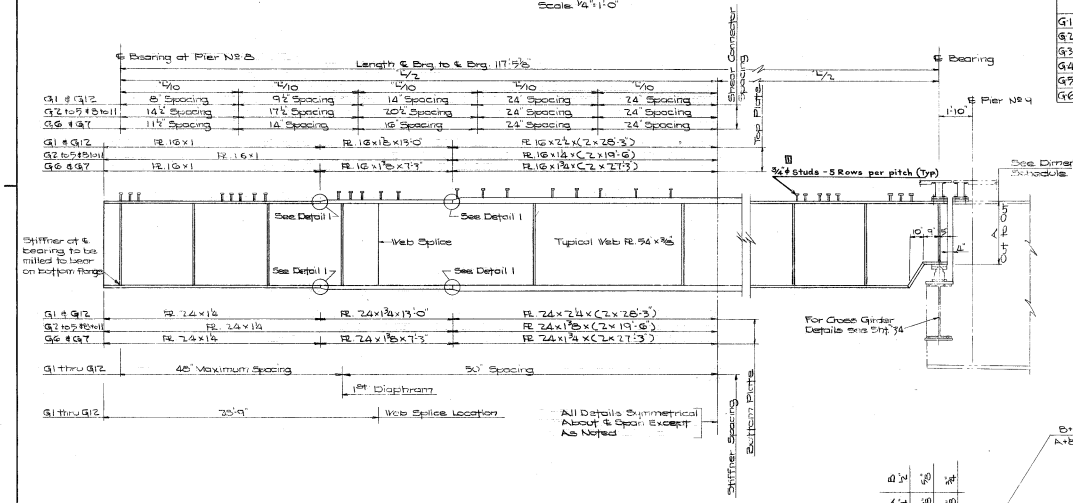
TYPICAL SECTION AT BEARING AT PIER No 8
(For Section at Bearing at Pier No 9 See Sheet No 23)

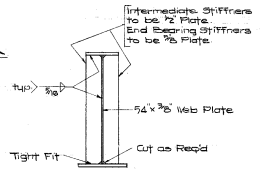


TYPICAL END DIAPHRAGM AT PIER 8 ONLY
Scale ¾"=1'-0"

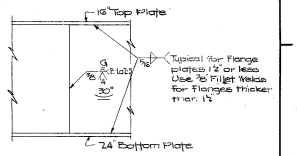
TYPICAL CROSS SECTION
SPAN No 9
Scale ¼"=1'-0"

DIMENSION "A" SCHEDULE			
G1	3'-4"	G7	3'-11⅝"
G2	3'-6½"	G8	3'-10⅝"
G3	3'-7¾"	G9	3'-9⅝"
G4	3'-9¼"	G10	3'-7⅝"
G5	3'-10⅝"	G11	3'-6⅝"
G6	3'-11⅝"	G12	3'-4"

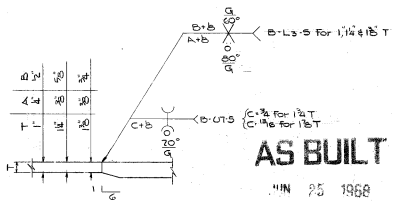




TYPICAL SECTION THRU GIRDER



TYPICAL WEB SPLICE



DETAIL No 1

NOTES:
1. For General Notes see Sheet No 8.
2. For location of Girders and Diaphrams see Sheet No 20.
3. For Camber Schedule and Girder details see Sheet 23.
4. Final welding of intermediate diaphragms to girders shall not be done until concrete deck slab has been placed.
5. For Shear Connector Details see Sheet No. 127

REVISIONS
① Stud size and number of rows indicated. E.C.S. 5-11-65

GREEN ASSOCIATES INC.
CONSULTING ENGINEERS
BALTIMORE, MARYLAND

STATE OF MARYLAND
STATE ROADS COMMISSION
BALTIMORE, MD. US 40/40

CUMBERLAND THRUWAY VIADUCT
SECTION I-WEST END
SPAN 9 GIRDER DETAILS

SCALE AS NOTED DATE DEC., 1964 CONTRACT A-452-6-641

MADE BY R.K.P.
TRACED BY R.D.W.
CHECKED BY F.A.S.

FEB 17 1966

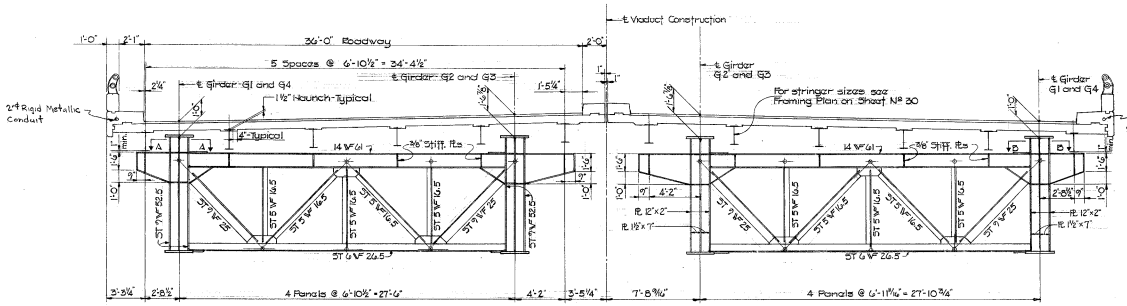
SHEET No. 22 OF 143

INDEXED

Survey Book No.

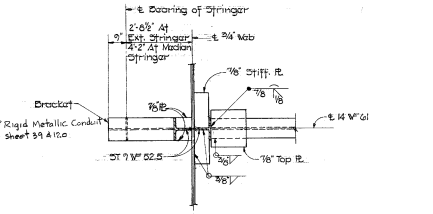
File No. / Pocket No. / Folder No. 4/

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
2	MD.		33	143

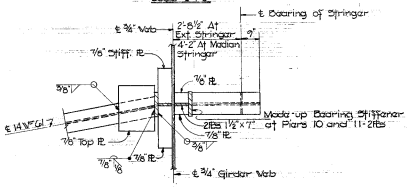


INTERMEDIATE CROSS GIRDER CG-1
Scale: ½"=1'-0"

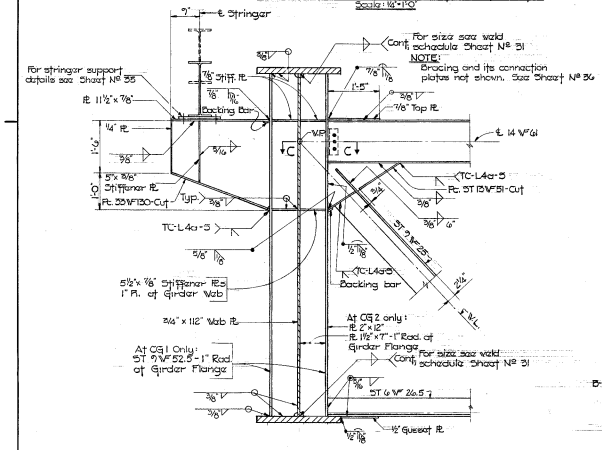
CROSS GIRDER CG-2 AT PIERS Nº. 10 AND 11
Scale: ½"=1'-0"

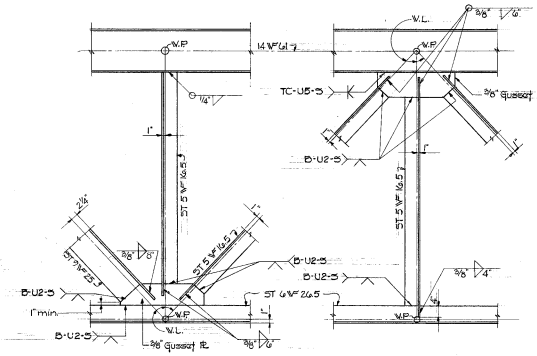


SECTION "A-A"
Scale: ½"=1'-0"

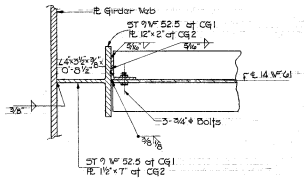


SECTION "B-B"
Scale: ½"=1'-0"





CROSS GIRDER CG-1 AND CROSS GIRDER CG-2 AT PIERS Nº. 10 AND 11
Scale: ¾"=1'-0"



SECTION "C-C"
Scale: ½"=1'-0"

AS BUILT
JUN 25 1968

NOTES:
1. For General Notes see Sheet No. 8
2. For Location of Cross Girders see Framing Plan Sheet No. 30
3. For Superstructure Details see Sheet No. 121
4. For Cross Slopes see Sheet No. 25 and No. 129

REVISIONS

STATE OF MARYLAND
STATE ROADS COMMISSION
BALTIMORE, MD. 10/48

CUMBERLAND THRUWAY VIADUCT
SECTION II — WILLS CREEK
CROSS GIRDER CG1 & CG2

SCALE AS NOTED DATE DEC., 1964 CONTRACT A-452-6-641

MADE BY F.G.S.
TRACED BY J.F.T.
CHECKED BY F.G.S.

FEB 17 1965

SHEET No. 33 OF 143

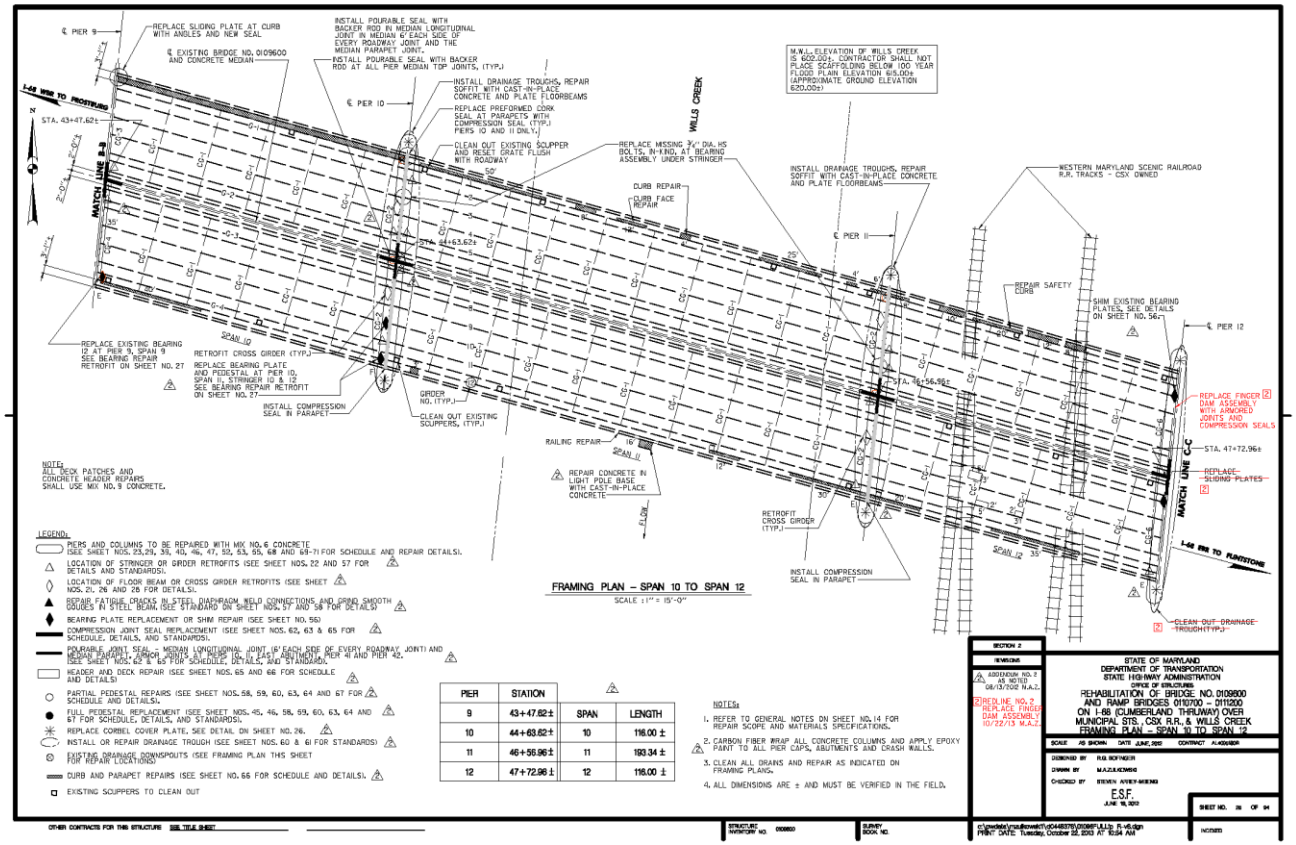
GREEN ASSOCIATES INC.
CONSULTING ENGINEERS
BALTIMORE, MARYLAND

Survey Book No.

File No. 1 Pocket No. 1 Folder No. 4

INDEXED

General and Framing Plan



Scope of Work – I-68 Bridge

- Repair spalls in columns, pier caps, pedestals and abutments with Mix No. 6 Concrete.
- Replace concrete pedestals, jacking required.
- Epoxy coat all pier caps, crash walls and abutments.
- Retrofit Stringer Ends at Piers 9, 10, 11 and 12.
- Retrofit Floorbeam top and lower chord support beam and corbels in cross girder at Piers 9, 10, 11 and 12.
- Replace steel bearing pedestal No. 6 at Pier 28, steel bent.

Scope of Work – I-68 Bridge – Con'd

- Replace bearing plates at stringer 12, Pier 9, Span 10, and at stringer 10 and 12, Pier 10.
- Shim bearing plates at various locations.
- Replace both broken shoulder bolts at Pier 9, Span 9 and girder bearing 1 at pier 12.
- Clean and repair drainage troughs.
- Repair soffit at pier 10 and 11 with pneumatically applied mortar.
- Install drainage troughs at piers 10 and 11.

Scope of Work – I-68 Bridge Con'd

- Repair all drainage systems and clean out all scuppers.
-
- Drill and grind smooth diaphragm connection weld cracks.
-
- Fiber wrap all concrete columns.
-
- Repair deck headers and deck spalls, replace compression seals in roadway joints.

Scope of Work – I-68 Bridge Con'd

- Repair concrete parapet, railing and safety curbs as indicated on plans.
- Repair assembly joint at Pier 9, Eastbound I-68.
- Install pourable seals at armor roadway joint and longitudinal opening in median.
- Remove and replace pigeon netting in Span 35, Ramp E Span 8 and Ramp F Span 9.
- Install new highway lighting.
- Complete clean and paint the entire structure.

Complete Clean & Paint


SPEED LIMIT
40


SPEED LIMIT
40

Steel defects

Steel Repairs


ST2 S12 P11


St 4
Sp 12
P 11

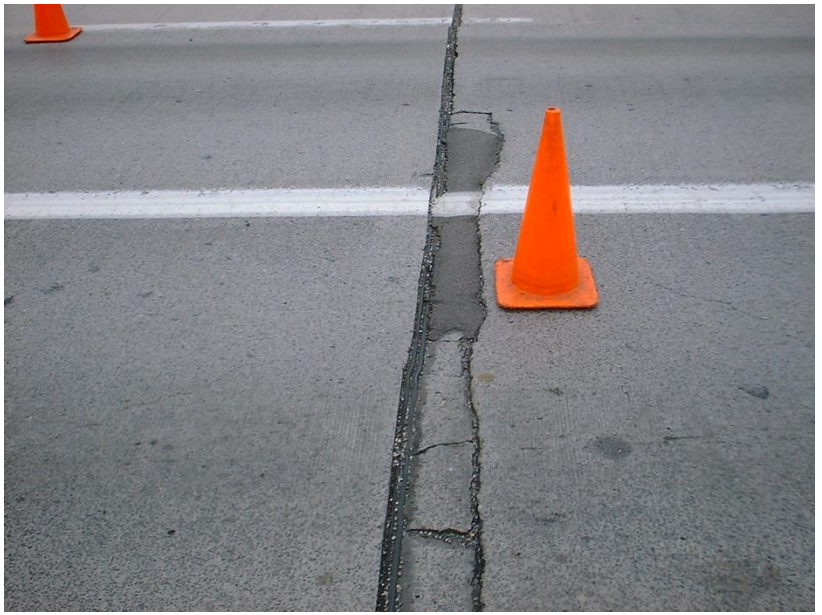
Concrete defects

Concrete defects

Drainage – troughs & scuppers

Concrete repair

Roadway compression seals



2016 Award of Excellence
MDQI Partnering
Construction Silver Award