BRIDGE CONDITION REPORT

DISTRICT:	**6**
ROUTE:	**I-55**
COUNTY:	**SANGAMON**
STRUCTURE NUMBER:	**084-0107 (NB)** **084-0108 (SB)**
SECTION:	**84-5-2B**
JOB NUMBER:	**D-96-532-03**

LOCATION:	I-55 OVER BRUSH CREEK
PREPARED BY:	COOMBE BLOXDORF P.C.
DATE PREPARED:	NOVEMBER, 2003
LETTING DATE:	11/17/06

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B. IDOT Master Structure Reports

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I. Abbreviated Existing Plans

I. Geographical and Administrative Data

Structure Number:	084-0107 (NB)/ 084-0108 (SB)
County:	Sangamon
Route Carried:	I-55
Feature Crossed:	Brush Creek
Section:	84-5-2B
Station:	550+56.54 (NB); 551+50.15 (SB)
Roadway Classification:	Interstate
Design Speed:	70 mph
ADT (current/design):	14,000 (2001); 18,360 (2021)
ADTT (current):	28% (2001)
Inventory Rating HS:	HS20.0 (NB); HS20.6 (SB)
Operating Rating HS:	HS32.8 (NB); HS35.0 (SB)
Sufficiency Rating:	96.0 (NB); 96.0 (SB)

Construction/Reconstruction/Repair History

These structures were built in 1972 as FAI 55, Section 84-5-2B carrying I-55 over Brush Creek. In 1979, both structures had a bituminous overlay with waterproofing membrane system installed along with neoprene expansion joints at the abutments. In 1990, an expansion joint seal was installed at the north abutment of the southbound structure. In 1992, the northbound structure had an overlay installed on the approach pavements and a new neoprene expansion joint at the south abutment was installed. The structures were scheduled to be overlaid again in 2003 with both expansion joints being replaced at that time.

II. Physical Description of Structure

The existing superstructures consist of six (6) wide flange beams supporting an 8" deck. The existing substructures consist of open abutments founded on steel H-piles and single hammerhead piers founded on spread footings. Rocker-type bearings are used at the abutments and north pier of each structure while fixed bolsters are used at the south pier of each structure. The existing structures are 159'-8" back to back of abutments. The deck is 40'-6" face to face of existing parapets and 44'-0" out to out. Aluminum railing is attached to each parapet. Each structure is skewed 39° 55' right forward. Each structure has been overlaid with a 1½" bituminous overlay and waterproofing membrane system. The existing structures are part of a tangent roadway alignment and are built at the end of a 400' vertical curve having a -1.18% initial slope and a 0% final grade. There are no current utility or other attachments.

III. Field Inspection and Physical Evaluation

The existing structures were visually inspected on December 29, 1999 by District 6 personnel. Copies of the Bridge Inspection Reports are included in this report as Attachment C. The structures have experienced significant overtopping flow resulting in road closures twice since the spring of 2001. Photocopies of photographs taken by the District of this overtopping flow are included in Attachment F. Additionally, photographs of the damage to the deck drains and the debris collected under the structure after the most recent of these events are included in Attachment F. Since the replacement of these bridges is warranted by their hydraulic inadequacy and not their current condition, no further inspection or evaluation of the existing structures is necessary at this time.

Geometric, Horizontal and Vertical Clearance/Hydraulic Data:

The existing structures each carry two 12'-0" lanes of one-way traffic. Each structure has an outside shoulder width of 11'-3" and a median shoulder width of 5'-3" for a total horizontal clearance of 40'-6". A 2'-0" minimum vertical clearance above the HWE_{50} of 587.9 is shown on the existing plans. There is a structure located on a frontage road directly upstream of the southbound I55 structure.

IV. Potential Scope of Work Determination and Analysis

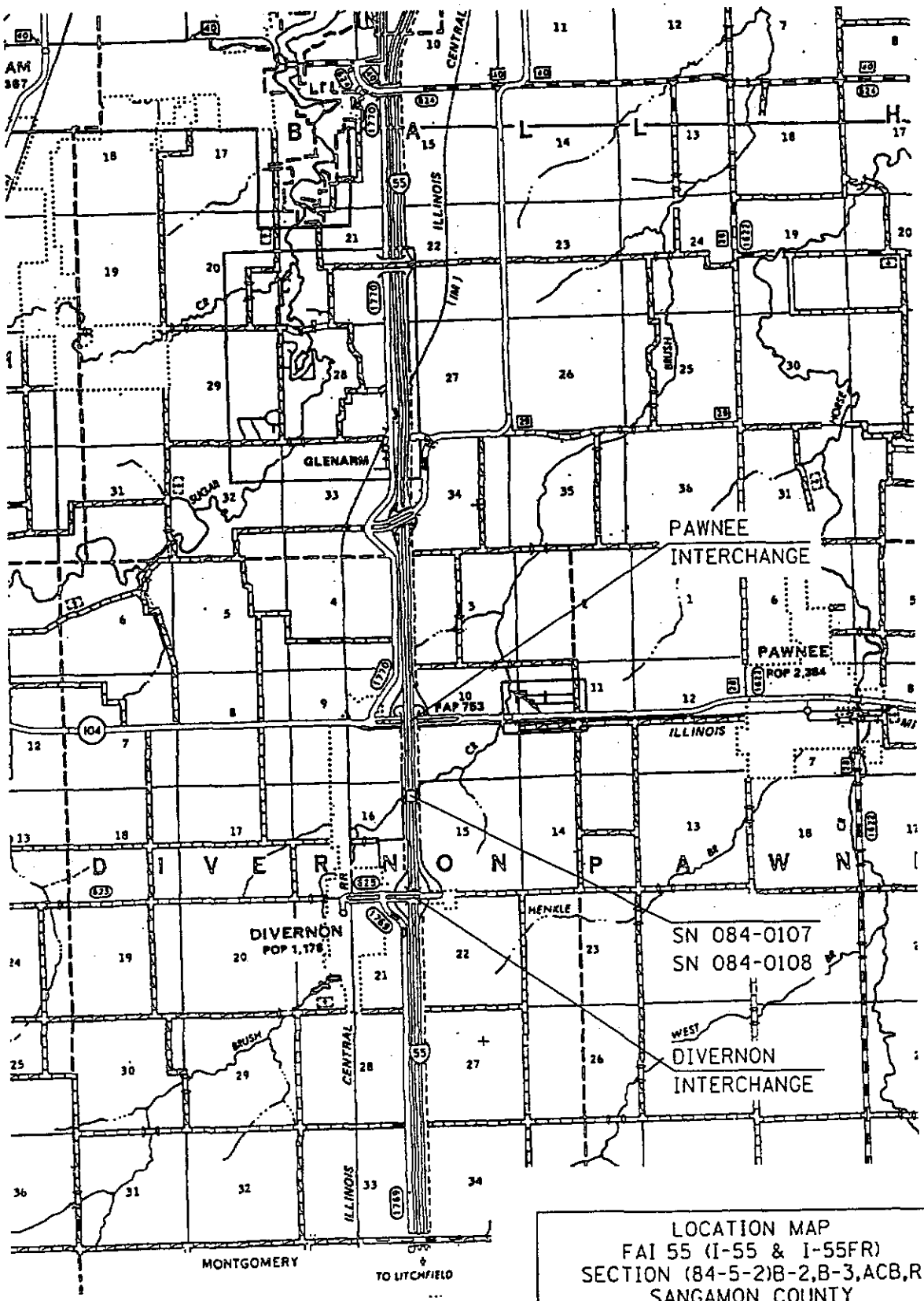
The hydraulic analysis of the structures contained in a report dated December 2, 2002 prepared by the Bridge Office Hydraulic Unit puts the HWE_{50} at 591.0. This Hydraulic Report further states that the District would prefer to see a prestressed I-beam superstructure at this location. A bridge length of 185'-0" and a grade raise of approximately 4'-0" are required at this location in order to provide the required minimum vertical clearance above HWE_{50} and adequate bridge opening. A proposed structure drawing is contained in Attachment E.

V. Discussion and Recommended Scope of Work

Since a complete replacement of both structures is necessary, the District also requested that the cost of an additional lane of traffic in each direction be investigated. Attachment H includes three options for the proposed plan and profile. Option 1 is a two lane roadway with the two lane structures, option 2 is a two lane roadway with the three lane structures and option 3 is a three lane roadway with the three lane structures. Cost estimates of the replacement of the existing structures with two 2-lane structures and two 3-lane structures are shown in Attachment D. These estimates include structure costs only. Traffic crossovers must be used during construction of the new structures since the proposed profile grade will be much higher than the existing.

Attachment A

Location Map



LOCATION MAP
FAI 55 (I-55 & I-55FR)
SECTION (84-5-2)B-2,B-3,ACB,R
SANGAMON COUNTY

Attachment B

IDOT Master Structure Reports

Illinois Department of Transportation
Structures Information Management System
Master Structure Report (S-107)

Structure Number: 084-0107 **District:** 6

Inventory Data

Facility Carried: I-55 (NB) | Bridge Name:
Feature Crossed: BRUSH CREEK | Location: .7MI S IL 104 INTCHG
Bridge Remarks:
Bridge Status: 1 OPEN - NO RESTRICT | StatusDate: 04/1988
Status Remarks:
Maint County: 084 SANGAMON | Maint Township: 11 DIVERNON
Maint Responsibility: 01 I.D.O.T.
Service On/Under: 1 HIGHWAY / 5 WATERWAY
Reporting Agency: 1 I.D.O.T. - BUREAU OF MAINTENANCE
Main Span Matl/Type: 4 STEEL CONTINUOUS / 02 STRINGER/MULTI-BEAM/GIRDER
Nbr Of Main Spans: 3 | Nbr Of Approach Spans: 0
Approaches
Near #1 Matl/Type: /
Near #2 Matl/Type: /
Far #1 Matl/Type: /
Far #2 Matl/Type: /
Median Width/Type: 0 Ft. / 0 None
Guardrail Type L/R: 0 None / 0 None
Toll Facility Indicator: 0 No Toll
Latitude: 39 D 34 M 50.17 S Longitude: 89 D 38 M 45.72 S
Deck Structure Type: A CIP CON NRMLLY FORM | Deck Structure Thickness: 8.0
Sidewalks Under Structure: 0 None

Sufficiency Rating: 96.0
HBRRP Eligible: No
Replaced By: 000-0000
Replaces: 000-0000
Last Update Date: 12/15/2001
Parallel Structure: Right
Multi-Level Structure Nbr:
Skew Direction: Right
Skew Angle: 39 D 55 M 00 S
Structure Flared: No
Historical Significance: No
Border Bridge State:
Bdr State SN:
Bdr State % Responsibility: 0
Structural Steel Wt: 155,600

Structure Length: 159.7
AASHTO Bridge Length: 99.9
Length of Long Span: 57.0
Bridge Roadway Width: 40.5
Appr Roadway Width: 40.0
Deck Width: 44.0
Sidewalk Width Right: 0.0
Sidewalk Width Left: 0.0
Navigation Control: 0 No
Navigation Horiz Clear: 0
Navigation Vert Clear: 0
Culvert Fill Depth: 0.0
Number Culvert Cells: 0
Culvert Opening Area: 0.0
Culvert Cell Height: 0.00
Culvert Cell Width: 0.00

Rated By: 2 IDOT | Rate Method: 2 ALLOWABLE STRESS
Inventory Rating: 20.0 (236) | Load Rating Date: 08/30/1999
Operating Rating: 32.8 (259)
Design Load: 01 HS20+MOD

Railroad Crossing Info
Crossing 1 Nbr:
Crossing 1 Nbr:
RR Lateral Underclear: 00.0
RR Vertical Underclear: 00 Ft 00 In

Key Route On Data

Key Route Nbr: FEDERAL-AID INTERSTATE 0055 | Station: 003.860
Appurtenances Main Route 00.000 | Segment:
Inventory County: 084 SANGAMON | Linked: Y
Township/Road Dist 11 DIVERNON | Natl. Hwy System: On NHS
Municipality 0000 | Inventory Direction: N North
Urban Area: None | Curr AADT Yr/Count: 2001 / 14000
Functional Class: 10 INTERSTATE, FAI | Est Truck Percentage: 28
Number Of Lanes: 2
One Or Two Way: 1 One-Way
Bypass Length: 0
Future AADT Yr/Cnt: 2021 / 18360
Designated Truck Rte: CLASS I
Special Systems: Yes

** CLEARANCES **	South/East	North/West
Max Rdwy Width:	040.5	
Horizontal:	042.1	000.0
Min Vertical:	99 Ft 11 In	00 Ft 00 In
10 Ft Vertical:	99 Ft 11 In	00 Ft 00 In
Lateral:		

Key Route Under Data

Station:
Segment:
Linked:
Natl. Hwy System:
Inventory Direction:
Curr AADT Yr/Count: /
Est Truck Percentage:
Number Of Lanes:
One Or Two Way:
Bypass Length:
Future AADT Yr/Cnt: /
Designated Truck Rte:
Special Systems:

South/East	North/West
Ft In	Ft In
Ft In	Ft In
Ft	Ft

*** Marked Route On Data ***

	Designation	Kind	Number
Route #1:	1 Mainline	1 Interstate Highway	0055
Route #2:			
Route #3:			

*** Marked Route Under Data ***

	Designation	Kind	Number

Illinois Department of Transportation
Structures Information Management System
Master Structure Report (S-107)

Structure Number: 084-0107 **District:** 6

Data Related to Inspection Information

***Inspection Intervals ***

Routine NBIS:	24 MOS	Underwater:	24 MOS		
Fracture Critical:	0 MOS	Special:	0 MOS		

*** Maximum Allowable Posting Limits ***

One Truck At A Time:		Combination Type 3S-1:	Tons
Single Unit Vehicles:	Tons	Combination Type 3S-2:	Tons

Bridge Posting Level: 5 No Posting Required

Inspection/Appraisal Information

Inspection Date: 01/08/2003 Special Inspection Date:

Inspection Temperature: 45 Deg. F

Deck:	7	GOOD CONDITION - SOME MINOR PROBLEMS
Superstructure:	6	SATISFACTORY CONDITION - MINOR DETERIORATION
Substructure:	7	GOOD CONDITION - SOME MINOR PROBLEMS
Culvert:	N	NOT APPLICABLE
Channel and Protection:	6	SATISFACTORY CONDITION - MINOR DETERIORATION
Structural Evaluation:	6	EQUAL TO PRESENT MINIMUM CRITERIA
Deck Geometry:	7	BETTER THAN PRESENT MINIMUM CRITERIA
Underclearance-Vert/Lat.:	N	NOT APPLICABLE
Waterway Adequacy:	6	EQUAL TO PRESENT MINIMUM CRITERIA
Approach Roadway Align:	8	EQUAL TO PRESENT DESIRABLE CRITERIA
Bridge Railing Appraisal:	2	Doesn't Meet Standards
Approach Guardrail:	232	Not Acceptable / Acceptable / Not Acceptable
Pier Navig Protection:	N	N/A

Insp by (Name): John Tevini

Utilities Attached:		
	N	N/A
	N	N/A
	N	N/A

Deck Wearing Surf:	G	BITUMINOUS OVERLAY
Deck Membrane:	A	WATERPROOF MEM SYST
Deck Protection:	J	NONE
Total Deck Thick:	09.5	
Last Paint Date:	09/1994	

Inspection Remarks:

** Actual Posted Limits **

Single Unit Vehicles:	Tons
Combination Type 3S-1:	Tons
Combination Type 3S-2:	Tons
One Truck At A Time:	

Last Paint Type: AT
LD SHP PRM GRN FNL
FLD ZINC & ACRYLIC

Underwater Inspection/Appraisal Information

Inspection Date:	02/08/2002	Inspection Category:	3 6	Restricted	Scour critical	
Temperature:	45	Inspection Method:	V P	Visual	Probe	
Inspected By:	D.COPENBARGER	Appraisal Rating:	7	GENERALLY GOOD - MINOR REPAIR POSSIBLE		

Inspection Remarks: NO PROBLEMS NOTED.

Scour Critical Information

Rating: 5 CALCULATED SCOUR ACCEPTABLE
Evaluation Method: A Computer Calculation
Analysis Date: 12/27/1993
Analysis By: GORDON BENSON

Miscellaneous

Fracture Critical Members: No
Microfilm Data Recorded: Yes

Construction Information

Year:	1972	Original	1979	Reconstructed	
Route:	FAI 55	Sta: 550+56.54	FAI 55	Sta: 550+56.54	
Section Nbr:	84-5-2B		1978 D6 WMS		
Contract Nbr:					
Fed Aid Pr #:	I 0552044076				
Built By:	1 I.D.O.T.		1 I.D.O.T.		

Waterway Information

Flood Design Frequency:	0 YRS	Drainage Area:	0 Acre
Flood Design Q (CFS):	0		
Flood Design Nat H W E:	0	Flood Base Q (CFS):	0
Flood Des Open Prop:	0 SF	Flood Base Nat H W E:	0

Proposed Improvement

Cost Estimate Year: Length:
Type of Work:
Done By:
Remarks:

*** Costs in Dollars ***

Bridge Cost:	
Roadway Cost:	
Total Project Cost:	

Illinois Department of Transportation
Structures Information Management System
Master Structure Report (S-107)

Structure Number: 084-0108 **District:** 6

Inventory Data

Facility Carried: I-55 (SB)
Bridge Name:
Feature Crossed: BRUSH CREEK
Location: .7MI S IL 104 INTCHG
Bridge Remarks:
Bridge Status: 1 OPEN - NO RESTRICT
StatusDate: 04/1988
Status Remarks:
Maint County: 084 SANGAMON
Maint Township: 11 DIVERNON
Maint Responsibility: 01 I.D.O.T.
Service On/Under: 1 HIGHWAY / 5 WATERWAY
Reporting Agency: 1 I.D.O.T. - BUREAU OF MAINTENANCE
Main Span Matl/Type: 4 STEEL CONTINUOUS / 02 STRINGER/MULTI-BEAM/GIRDER
Nbr Of Main Spans: 3
Nbr Of Approach Spans: 0

Approaches
Near #1 Matl/Type: /
Near #2 Matl/Type: /
Far #1 Matl/Type: /
Far #2 Matl/Type: /

Median Width/Type: 0 Ft. / 0 None
Guardrail Type L/R: 0 None / 0 None
Toll Facility Indicator: 0 No Toll
Latitude: 39 D 34 M 49.63 S Longitude: 89 D 38 M 45.71 S
Deck Structure Type: A CIP CON NRMLLY FORM
Deck Structure Thickness: 8.0
Sidewalks Under Structure: 0 None

Sufficiency Rating: 96.0
HBRRP Eligible: No
Replaced By: 000-0000
Replaces: 000-0000
Last Update Date: 12/15/2001
Parallel Structure: Left
Multi-Level Structure Nbr:
Skew Direction: Right
Skew Angle: 39 D 55 M 00 S
Structure Flared: No
Historical Significance: No
Border Bridge State:
Bdr State SN:
Bdr State % Responsibility: 0
Structural Steel Wt: 155,600

Structure Length: 159.7
AASHTO Bridge Length: 99.9
Length of Long Span: 57.0
Bridge Roadway Width: 40.5
Appr Roadway Width: 40.0
Deck Width: 44.0
Sidewalk Width Right: 0.0
Sidewalk Width Left: 0.0
Navigation Control: 0 No
Navigation Horiz Clear: 0
Navigation Vert Clear: 0
Culvert Fill Depth: 0.0
Number Culvert Cells: 0
Culvert Opening Area: 0.0
Culvert Cell Height: 0.00
Culvert Cell Width: 0.00

Rated By: 2 IDOT
Rate Method: 2 ALLOWABLE STRESS
Inventory Rating: 20.6 (237)
Load Rating Date: 08/30/1999
Operating Rating: 35.0 (263)
Design Load: 01 HS20+MOD

Railroad Crossing Info
Crossing 1 Nbr:
Crossing 1 Nbr:
RR Lateral Underclear: 00.0
RR Vertical Underclear: 00 Ft 00 In

Key Route On Data

Key Route Nbr: FEDERAL-AID INTERSTATE 0055
Station: 003.850
Appurtenances Main Route 00.000
Segment:
Inventory County: 084 SANGAMON
Linked: Y
Township/Road Dist 11 DIVERNON
Natl. Hwy System: On NHS
Municipality 0000
Inventory Direction: N North
Urban Area: None
Curr AADT Yr/Count: 2001 / 14000
Functional Class: 10 INTERSTATE, FAI
Est Truck Percentage: 28
** CLEARANCES ** South/East North/West
Number Of Lanes: 2
Max Rdwy Width: 040.7
One Or Two Way: 1 One-Way
Horizontal: 042.0 000.0
Bypass Length: 0
Min Vertical: 99 Ft 11 In 00 Ft 00 In
Future AADT Yr/Cnt: 2020 / 18360
10 Ft Vertical: 99 Ft 11 In 00 Ft 00 In
Designated Truck Rte: CLASS I
Lateral:
Special Systems: Yes

Key Route Under Data

Station:
Segment:
Linked:
Natl. Hwy System:
Inventory Direction:
Curr AADT Yr/Count: /
Est Truck Percentage:
South/East North/West
Number Of Lanes:
One Or Two Way:
Bypass Length:
Ft In Ft In
Future AADT Yr/Cnt: /
Ft In Ft In
Designated Truck Rte:
Ft Ft
Special Systems:

*** Marked Route On Data ***

	Designation	Kind	Number
Route #1:	1 Mainline	1 Interstate Highway	0055
Route #2:			
Route #3:			

*** Marked Route Under Data ***

	Designation	Kind	Number

Illinois Department of Transportation
Structures Information Management System
Master Structure Report (S-107)

Structure Number: 084-0108 **District:** 6

Data Related to Inspection Information

***Inspection Intervals ***

Routine NBIS:	24 MOS	Underwater:	24 MOS	One Truck At A Time:	
Fracture Critical:	0 MOS	Special:	0 MOS	Single Unit Vehicles:	Tons

*** Maximum Allowable Posting Limits ***

Combination Type 3S-1:		Tons
Combination Type 3S-2:		Tons

Bridge Posting Level: 5 No Posting Required

Inspection/Appraisal Information

Inspection Date: 08/19/2002 Special Inspection Date:

Inspection Temperature: 80 Deg. F

Deck:	7	GOOD CONDITION - SOME MINOR PROBLEMS
Superstructure:	7	GOOD CONDITION - SOME MINOR PROBLEMS
Substructure:	7	GOOD CONDITION - SOME MINOR PROBLEMS
Culvert:	N	NOT APPLICABLE
Channel and Protection:	6	SATISFACTORY CONDITION - MINOR DETERIORATION
Structural Evaluation:	7	BETTER THAN PRESENT MINIMUM CRITERIA
Deck Geometry:	7	BETTER THAN PRESENT MINIMUM CRITERIA
Underclearance-Vert/Lat.:	N	NOT APPLICABLE
Waterway Adequacy:	6	EQUAL TO PRESENT MINIMUM CRITERIA
Approach Roadway Align:	8	EQUAL TO PRESENT DESIRABLE CRITERIA
Bridge Railing Appraisal:	2	Doesn't Meet Standards
Approach Guardrail:	232	Not Acceptable / Acceptable / Not Acceptable
Pier Navig Protection:	N	N/A

Insp by (Name): J.RETTIG

Utilities Attached:	N	N/A
	N	N/A
	N	N/A
Deck Wearing Surf:	G	BITUMINOUS OVERLAY
Deck Membrane:	A	WATERPROOF MEM SYST
Deck Protection:	J	NONE
Total Deck Thick:	09.5	
Last Paint Date:	09/1994	

Inspection Remarks:

** Actual Posted Limits **

Single Unit Vehicles:	Tons
Combination Type 3S-1:	Tons
Combination Type 3S-2:	Tons
One Truck At A Time:	
Last Paint Type:	AT
	LD SHP PRM GRN FNL
	FLD ZINC & ACRYLIC

Underwater Inspection/Appraisal Information

Inspection Date:	02/08/2002	Inspection Category:	3 6	Restricted	Scour critical	
Temperature:	45	Inspection Method:	V P	Visual	Probe	

Inspected By: D.COPENBARGER Appraisal Rating: 7 GENERALLY GOOD - MINOR REPAIR POSSIBLE

Inspection Remarks: NO PROBLEMS.

Scour Critical Information

Rating: 5 CALCULATED SCOUR ACCEPTABLE Evaluation Method: A Computer Calculation

Analysis Date: 12/27/1993 Analysis By: GORDON BENSON

Miscellaneous

Fracture Critical Members: No

Microfilm Data Recorded: Yes

Construction Information

	Original		Reconstructed	
Year:	1972		1979	
Route:	FAI 55	Sta: 551+50.15	FAI 55	Sta: 551+50.15
Section Nbr:	84-5-2B-1		1978 D6 WMS	
Contract Nbr:				
Fed Aid Pr #:	0552044000			
Built By:	1 I.D.O.T.		1 I.D.O.T.	

Waterway Information

Flood Design Frequency:	0 YRS	Drainage Area:	0 Acre
Flood Design Q (CFS):	0		
Flood Design Nat H W E:	0	Flood Base Q (CFS):	0
Flood Des Open Prop:	0 SF	Flood Base Nat H W E:	0

Proposed Improvement

Cost Estimate Year: Length:

Type of Work:

Done By:

Remarks:

*** Costs in Dollars ***

Bridge Cost:

Roadway Cost:

Total Project Cost:

Attachment C

Bridge Inspection Reports

Bridge Inspection Report SN 084-0107

12/30/99

B-Smart Project
SN 084-0107
FAI 55 NB
84-5-2B
BRUSH CREEK
0.7MI S I-55/IL104 INT
Sangamon County

This structure was visually inspected on December 29, 1999, to determine its physical condition and recommendations for replacement or rehabilitation. The inspection concentrated on accessible portions of the bridge.

This structure, built in 1972, is a three span steel continuous multi-beam structure with open stub abutments. It has an overall length of 159.7 feet, measured from back to back of abutments, and a measured bridge roadway width of 40.5 feet. It carries FAI 55 NB over Brush Creek and is located 0.7 mile South of the I-55/IL104 interchange in Sangamon County.

Reconstruction History:
1). 1979 – Bituminous overlay and waterproof membrane system and new neoprene expansion joints.

2). 1992-Bituminous approach overlay at both abutments and new neoprene joint at south abutment.

A routine NBIS inspection conducted on January 7, 1999, rates the deck 7 (good condition), superstructure 6 (satisfactory condition) and the substructure 7 (good condition). The structure has an overall structural condition of 6 (equal to present minimum criteria). It is currently rated at 36 gross tons (HS 20.1) at the inventory stress level and at 59 gross tons (HS 32.9) at the operating stress level. The current sufficiency rating is 96.

Inspection Year	Deck	Superstructure	Substructure
1988	7	7	7
1993	7	6	7
1997	7	6	7

Findings:
- The bituminous wearing surface has heavy map cracking throughout. The deck soffit is generally in good condition with minor hairline transverse cracking throughout. There are minor delaminations around a few drains.

- The concrete parapets are generally in good condition with light cracking. The aluminum rail is in good condition.
- The steel beams show light to moderate rusting on the interior beams. The beam ends and fascias were painted in 1995 are in fair condition with minor rusting.
- The bearings at the abutments are heavily rusted with some section loss. The bearings at the piers are in good condition.
- All floor drains have previously been extended but were not supported from the fascia beam. There are 15 floor drain extensions missing.
- The north neoprene expansion joint at the north abutment has 12' of damaged hold down blocks. The joint is leaking. The south neoprene expansion joint is leaking slightly.
- The north abutment backwall has light map cracking at both wing junctions. There is one horizontal crack in the top portion of the cap.
- The south abutment backwall has light map cracking at both wing junctions.
- The piers are in good condition.
- The channel alignment is fair with the stream flowing along the south side to the north pier. There are no scour problems.
- The north approach has slight settlement.

Recommendations:
This project meets the requirements of a B-Smart project. As follows is the recommended work:

- Remove the bituminous wearing surface and waterproof membrane system and replace with 2 ¼" minimum microsilica wearing surface. It is estimated that there will be 10 sq. yd. (1.3%) of full depth patching and 30 sq. yd. (4%) of partial depth patching.
- Replace the bearings at both abutments.
- Remove the neoprene expansion joint seals and hold down blocks at both abutments. The concrete adjacent to the joint at the end of the deck and on the approach needs replaced at the north abutment only. Install polymer nosing and silicone joint sealer at both abutments.
- Plug every other deck drain and drains over substructure units. Replace missing drain extensions if not plugged and add support to bottom flange of fascia beam on all extensions to remain in place.
- Both approaches need overlayed out 100' from the abutments. This work should be included with roadway resurfacing.
- The guardrail needs updated.

Attached to this report are the latest NBIS/Pontis inspection reports with comments, economic analysis and two sets of photographs.

DAC

Start: 1/25A
End: 12:00

Remarks Long Ladder

I

0840107 | 28-Dec-98 | Traffic Control: 0

FAI 55 NB | .7MI S I-55/IL104INT | BRUSH CREEK | Past Insp Time: 0

RDWY WDTS	40.5 FT			FAI 55	84-5-2B	1991	Inspect Date 1-7-99
STR LNGTH	159.7 FT	No Posting		FAI 55	1978 D6 WMS	1979	Temperature 2
DK WDTH	44 FT			FAI 55	84-5-2B	1972	Inventory Loading
Main Spans	3	Utilities					Tons 20
App Spans	0	NNN	0				Prog Yr Out
WGT STR STL	155600	Paint	9409AT				Contract # 0
THICKNESS	8 9.5	Last Insp	970106				
HANDRAIL	1 Alum Oval on Con	Interval	24	MicroFilm	6-185	6-70,118	0 0
ABUT TYPE	Open Stub	SKEW	395500			ADTT On/Under	2286 0
PIER TYPE(s)	Hammerhead 0	WEARING SURF, MEMBRANE, DECK PROTECTION				ADT On/Under	12700 0
OPEN BRG	0 0	SURF C	GAJ	BITUMINOUS OVERLAY, WMS, NONE			Year 95
CLOSED BRG	12A 0	MATL C	402	STEEL CONTINUOUS STRINGER/MULTI-BEAM/WF BEAM			SCOPE OF WORK
NO JOINT	6A 6J	Suff #	98	STA 550+56.54	N Culvert	7 DECK	FAI 55 Resurfacing
PAINT CD	Field Applied Zinc Silicate & Acrylic					6 SUPER	
						7 SUB	Overall 6

Sn-15 | 000.084-0107.25621

DECK

Wearing Surface	3
Deck Structure Cond	4
Curbs	
Median	
Sidewalks	
Parapet	
Railing	4
Leaching Thru Cracks	3
Soffit	4
Drains	3
Light Standards	
Joint Leakage	2
Exp Jts or Devices	2
Item # 58	
Inspectors Rtg	7

Approach Roadway Condition

Approach Slab	3	
Settlement	3	
Expansion Joints		Item # 59
Approach-Guardrail	3	
Pavement	3	
Shoulders	3	
Embankment	3	
Drainage Items		
Item # 65		
Inspectors Rtg	6	

Culvert

Headwalls		
Top Slab		
Interior Walls		
Side Walls		Item # 61
Wingwalls		
Floor		Item # 111
Railing		
Siltation		
Settlement		Item # 36
Scour		
Item # 62		
Inspectors Rtg	N/A	

1-Needs Replacement 2-Poor 3-Fair 4-Good 5-New

SUPERSTRUCTURE

Bearing Devices	3
Stringers	
Girders or Beams	3
Floorbeams	
Diaphragms/Braces	3
Crack Leaching	
Joints/leakage-Condition	
Trusses	
Portals& Bracing	
Chords	
Paint	3
Drainage Systems	
Rivets or Bolts	3
Weld Conditions	
Rust____Worst % Lost	3
Conc Crack/Spall/Scaling	
Collision Damage	4
LL Deflection/Vibration	3
Alignment of Members	3
Inspectors Rtg	6

Channel & Chanel Protection

Channel Scour	3	
Erosion of Banks	3	
Drift	4	
Vegetation	3	
Channel Alignment	3	
Fender System		
Spur Dykes&Jetties		Item # 60
Rip-rap		
Concrete Slopewall	3	
Inspectors Rtg	6	

Pier/Abut Protection

	–	Item # 72

Railing Appraisal

Inspectors Rtg 2/2/3/2 Item # 71

SUBSTRUCTURE

Abutment-Wings	
Backwall	
Bearing Seats	
Breastwall	
Footings	
Erosion/Slopes	
Settlement	
Pile Bent Abut-Wings	3
Backwalls	3
Caps	3
Bearing Seats	
Piles	
Erosion/Slopes	3
Settlement	4
Piers-Caps	4
Columns	4
Crashwalls	
Footings	
Settlement	4
Pile Bent Pier-Caps	
Piles	
Settlement	
Conc Crack/Spall/Scaling	3
Steel Corrosion	
Timber Decay, Ect	
Debris on Seats	
Scour	3
Collision Damage	4
Inspectors Rtg	7

Approach Roadway Alignment

Riding Quality	3
Settlement	3
Structural Condition	3
Inspectors Rtg	8

Waterway Adequacy

Inspectors Rtg 6 DAC 1-21-99

Inspectors Signature Charles Lody

Inspectors Signature

Jan 7, 1999 034-0107

Bit. Wearing Surface has heavy map cracking throughout.

North expan. Joint is in poor condition, with ±12' showing damaged blocks. Joint has mod. leakage.

Cone parapets show light hairline vertical cracking. Alum rails are in good condition.

Deck soffit has minor hairline transverse cracking throughout. Good condition. Minor delaminations around a few drains.

Steel beams show light to moderate rusting on interior beams. Repainted beam ends look good.

North abut. backwall has light map cracking at both wing Jct. Some scaling noted at west wing Jct. (1) horizonal crack noted in top portion of the cap.

North pier OK

South pier cap has (1) small delamination on north side.

South abut. backwall / wing Jcts show light map cracking. Light scaling noted at west Jct.

Channel alignment fair stream flows along south side of North pier.

North appr has slight settlement.

* 12 drain extensions missing at south abut.

* North expan Jt damaged Neoprene blocks torn ±12 LF (Loose) ← 307 pontic

Equipment	0		Start:
Remarks	0		End:

0840107 28-Dec-96 Traffic Control: 0

FAI 55 NB .7MI S I-55/IL104INT BRUSH CREEK

RDWY WDTS	40.5 FT			FAI 55	84-5-2B	1991	Past Insp Time: 0
STR LNGTH	159.7 FT	No Posting		FAI 55	1978 D6 WMS	1979	Inspect Date 1-7-99
DK WDTH	44 FT			FAI 55	84-5-2B	1972	Temperature 8°
Main Spans	3	Utilities					Inventory Loading
App Spans	0	NNN					Tons 20
WGT STR STL	155600	Paint	9409AT				Prog Yr Out
THICKNESS	8 / 9.5	Last Insp	970106				Contract # 0
HANDRAIL	1 Alum Oval on Conc	Interval	24	MICROFILM	6-185	6-70,118	0 0
ABUT TYPE	Open Stub			SKEW	395500		ADOTT On/Under 2286 0
PIER TYPE(s)	Hammerhead	0		WEARING SURF, MEMBRANE, DECK PROTECTION			ADT On/Under 12700 0
OPEN BRG	0 0	SURF CD	GAJ	BITUMINOUS OVERLAY, WMS, NONE			Year 95
CLOSED BRG	12A 0	MATL CD	402	STEEL CONTINUOUS STRINGER/MULTI-BEAM/WF BEAM			SCOPE OF WORK.
NO JOINT	6A 6J	Suff #	98	STA	550+56.54	N Culvert	DECK 7 — FAI 55 Resurfacing
PAINT CD	Field Applied Zinc Silicate & Acrylic						SUPER 6
							SUB 7 — Overall 6

Sn-15 000.084-0107.25621 Bams Tables

Enviroment	Deck	Super	Sub
	4	4	1

Quantity in State (%)

Element	Description	Comments	Envt	Qty	Units	1	2	3	4	5
14	CONCRETE DECK PROTECTED W/AC OVERLAY		4	6840	SF		108	6387		21
107	Lead Painted Steel Open Girder		4	9653	SF		373	338		
172	Lead Painted Steel Closed Web/Box Girder & Open		4	12	EACH	12				
210	Concrete Pier Wall		1	1780	SF	1780				
215	Concrete Abutment		1	1026	SF		15	6		
234	Concrete Pier Or Abutment Cap		1	235	LF			3		
307	Neoprene Expansion Joint		4	58	LF			28	12	
308	Continouos Seal Neoprene Expansion Joint		4	58	LF	58				
311	Moveable Steel Brgs below Discontinuous Dk Jts		4	12	EACH		9			
313	Fixed Bearing		4	6	EACH	6				
316	Moveable Steel Bearings below Continuous Decks		4	6	EACH	6				
323	Approach Pavement		4	2	EACH		1			
331	Concrete Bridge Railing		4	311	LF	311				
361	Pier and Abutment Scour		1	1	EACH	1				

EXPAN. JT. MEAS 5° TEMP

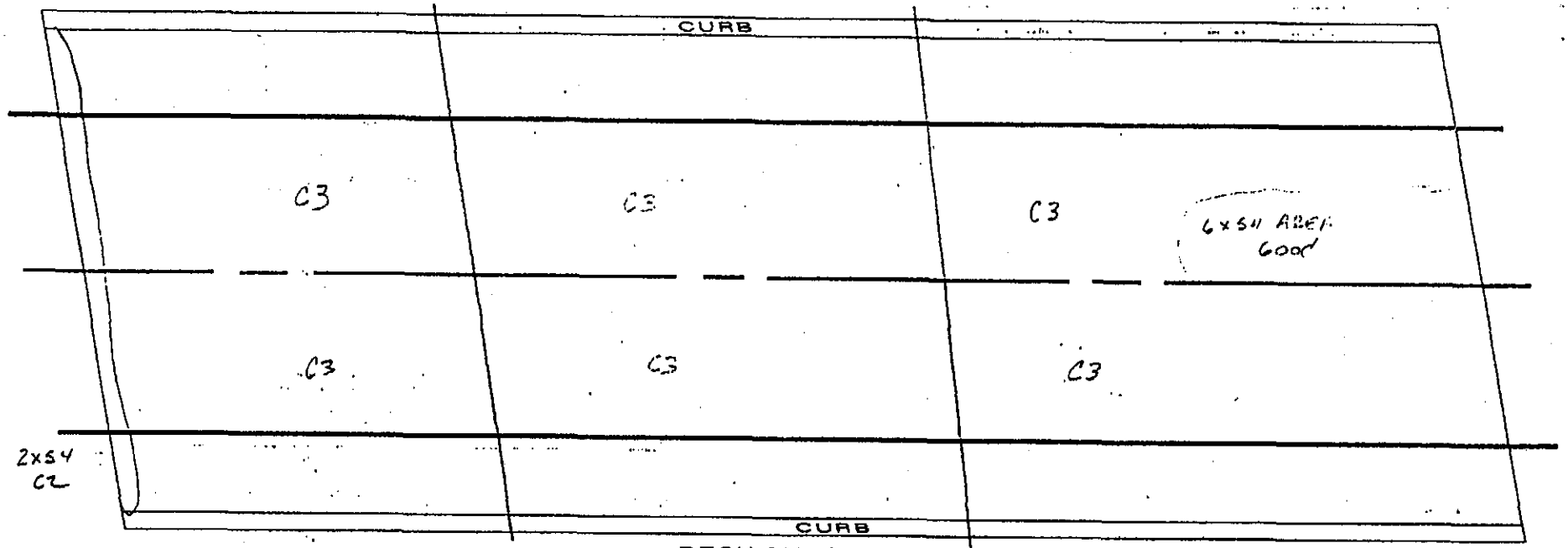
E — W

No. Abut. 2 1/8" — 2"

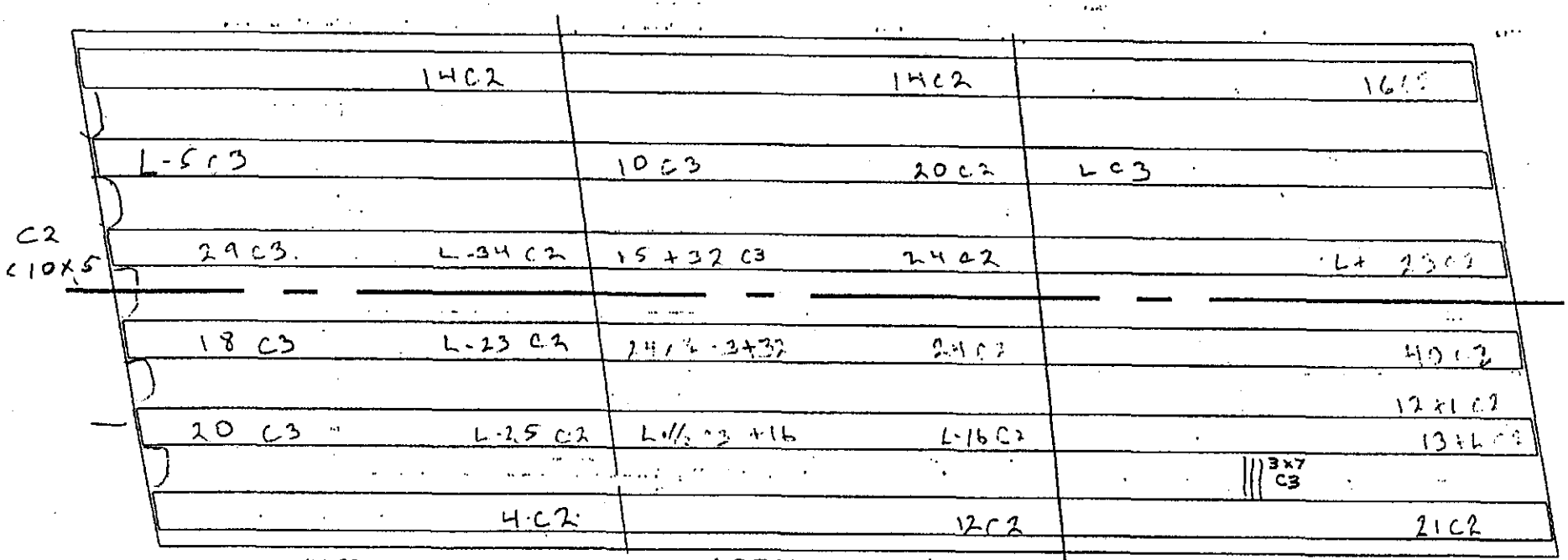
So. Abut. 2 3/8" — 2"

ENTERED 1-11-99 RK

STRUCTURE NO. 084-0107



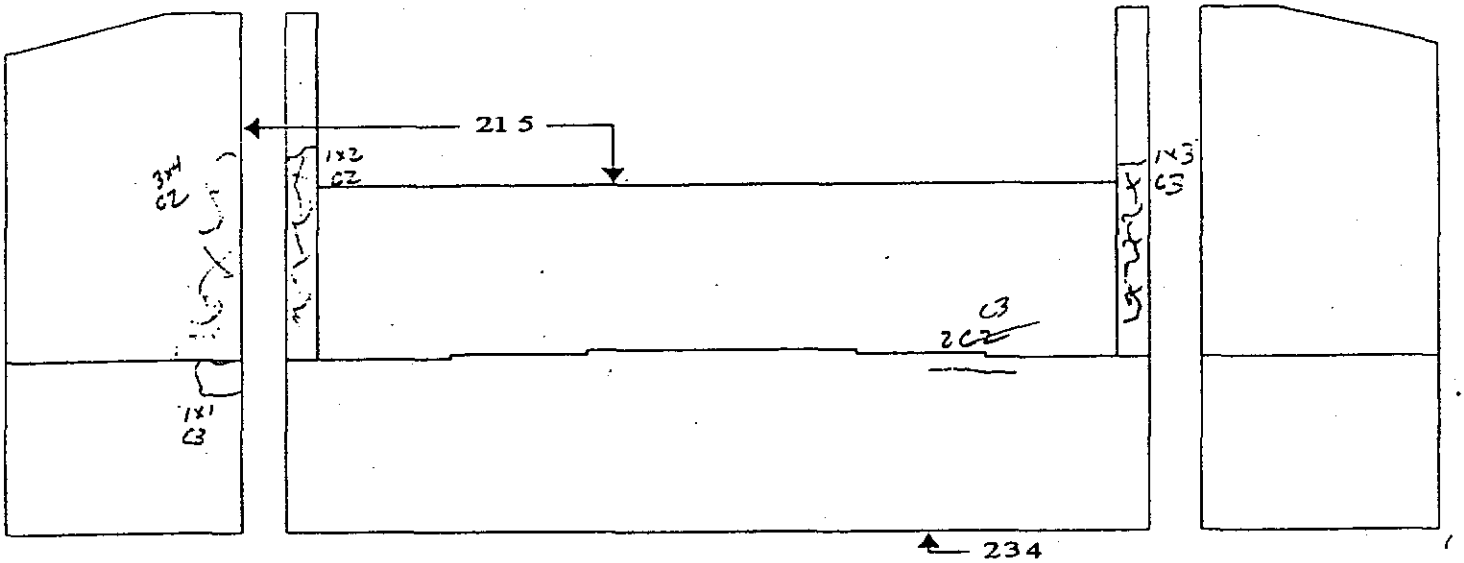
DECK SURFACE



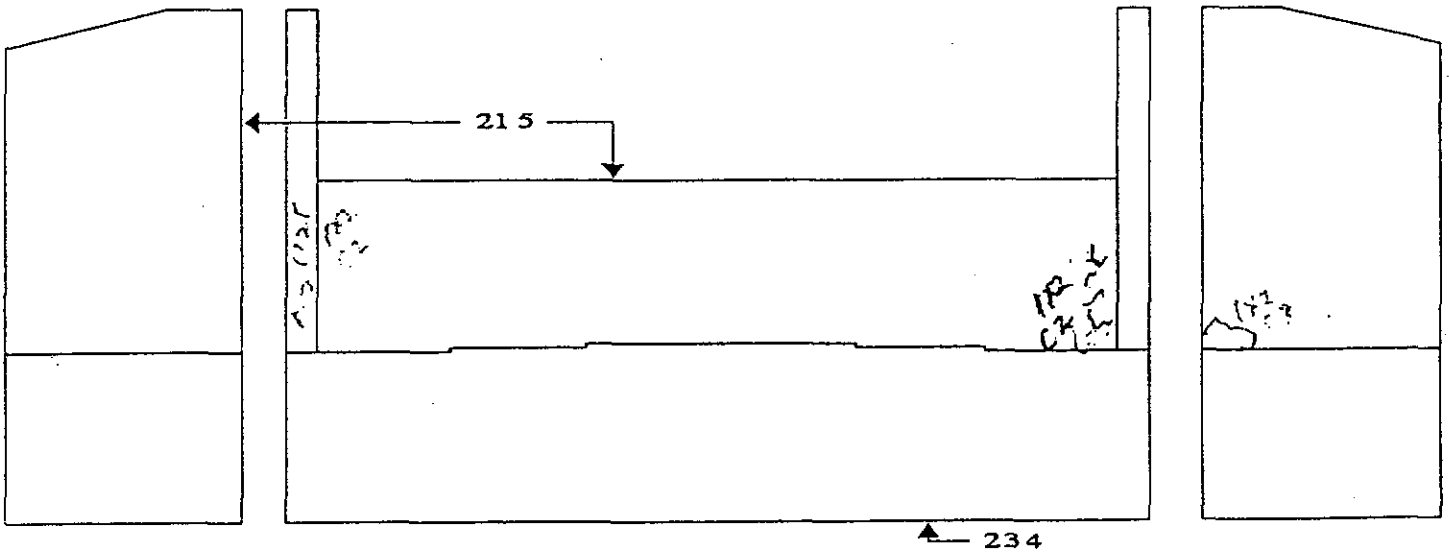
DECK SOFFIT

56.5

STRUCTURE NO. 084-0127



N ABUTMENT



S ABUTMENT

215

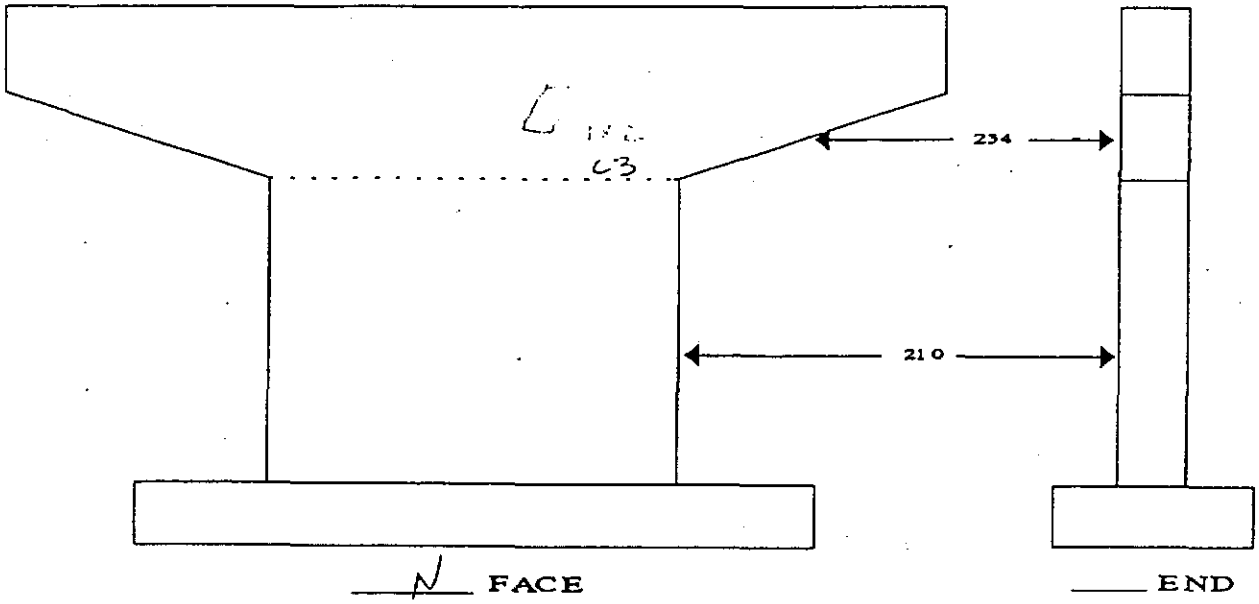
C2	C3
12	
2	3
2	2
2	6
18	

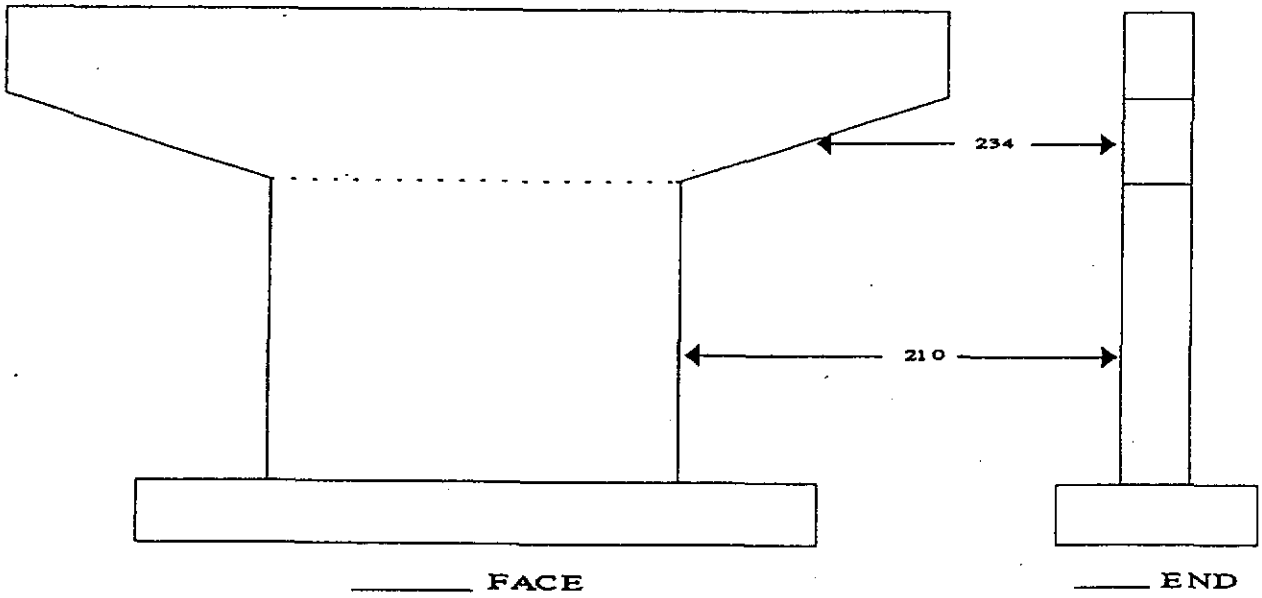
234

C3
2

STRUCTURE NO. 054-0107

S. Pier





234
63 1

ESTIMATE OF COST

SN # 084-0107
Location .7MI S I-55/IL104INT
Route: FAI-55 NB ADT Rev
Feature X: BRUSH CREEK 14-Jan-2000

Item #	Description	COST	Unit	QTY	TOTAL
Z0006110	BRIDGE DECK MICROSILICA CONCRETE OVERLAY	50	SQ YD	720	36000
Z0006200	CONCRETE BRIDGE DECK SCARIFICATION	6.1	SQ YD	720	4392
Z0016001	DECK SLAB REPAIR (FULL-DEPTH, TYPE I)	400	SQ YD	40	16000
Z0016200	DECK SLAB REPAIR, (PARTIAL)	200	SQ YD	80	16000
44000910	BITUMINOUS CONCRETE REMOVAL (DECK)	5.3	SQ YD	720	3816
50102400	CONC REM	600	CU YD	8	4800
X0320887	POLYMER CONCRETE NOSINGS	550	CU FT	13	7150
X0301424	SILICONE JOINT SEALER	40	LIN FT	115	4600
50300255	CONCRETE SUPER STRUCTURES(Parapet=0.1CY/ft)	600	CU YD	8	4800
50300260	BRIDGE DECK GROOVING	4	SQ YD	720	2880
50300530	FLOOR DRAIN EXTENSIONS	300	EACH	15	4500
50800205	REINFORCEMENT BARS, EPOXY COATED(deck)8Lbs/SF	0.8	LB	3000	2400
70100405	TRAFFIC CONTROL & PROTECTION STANDARD 701321	15000	EACH	1	15000
70400100	TEMP CONC BARRIER (Taper 12:1)	18	LIN FT	500	9000
70400200	REL TEMP CONC BARRIER per	4.5	LIN FT	500	2250
70400300	TEMP CONC BAR TERM SEC	200	EACH	4	800
	Traffic Barrier Terminal, Type 1 Special	2000	Each	4	8000
50300320	ELASTOMERIC BEARING ASSEMBLY TY II	900	EACH	12	10800
50500715	JACK AND REMOVE EXISTING BEARINGS	850	EACH	12	10200

Scope

Remove bituminous, patch deck and place microsilica overlay	0
New bearings at both abutments	
Remove the Neoprene joint seal and replace with polymer nosing and silicone both Abuts	0
At the north abutment replace the concrete adjacent to the joint	0
Drain extensions	163388
Note: Cost of overlaying approaches and upgrading guardrail not included. Add 10%	$179,727
To be included with roadway cost (resurfacing project).	Total Cost

45 $ per Sq Ft
Length 160 (Est length of new structures)
Width 44

Deck Replacement Cost (for Comparison Only) $316,800

Bridge Inspection Report SN 084-0108

12/30/99

B-Smart Project
SN 084-0108
FAI 55 SB
84-5-2B
BRUSH CREEK
0.7MI S I-55/IL104 INT
Sangamon County

This structure was visually inspected on December 29, 1999, to determine its physical condition and recommendations for replacement or rehabilitation. The inspection concentrated on accessible portions of the bridge.

This structure, built in 1972, is a three span steel continuous multi-beam structure with open stub abutments. It has an overall length of 159.7 feet, measured from back to back of abutments, and a measured bridge roadway width of 40.5 feet. It carries FAI 55 SB over Brush Creek and is located 0.7 mile South of the I-55/IL104 interchange in Sangamon County.

Reconstruction History:
1). 1979 - Bituminous overlay and waterproof membrane system and new neoprene expansion joints.
2). 1990 - Pavetech expansion joint seal installed at north abutment

A routine NBIS inspection conducted on August 31, 1998, rates the deck 7 (good condition), superstructure 7 (good condition) and the substructure 7 (good condition). The structure has an overall structural condition of 7 (better than minimum present minimum criteria). It is currently rated at 37 gross tons (HS 20.6) at the inventory stress level and at 63 gross tons (HS 35) at the operating stress level. The current sufficiency rating is 96.

Inspection Year	Deck	Superstructure	Substructure
1988	7	8	8
1993	7	6	7
1996	7	6	7

Findings:
- The bituminous wearing surface has heavy map cracking throughout. The deck soffit is generally in good condition with minor hairline transverse cracking throughout. There are minor delaminations around a few drains.
- The concrete parapets are generally in good condition with light cracking and a few small spalls. The aluminum rail is in good condition.

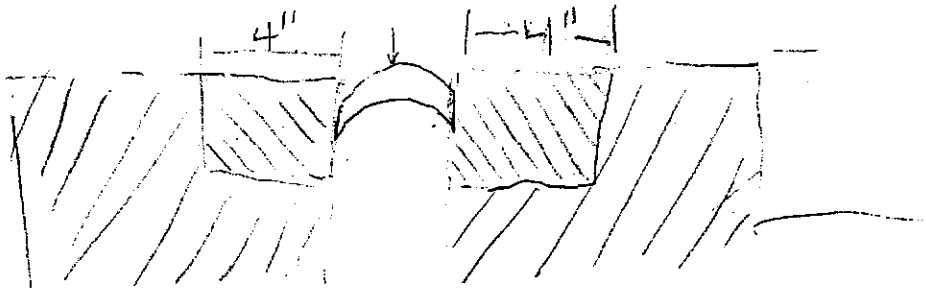
- The steel beams show light to moderate rusting on the interior beams. The beam ends and fascias were painted in 1995 are in fair condition with minor rusting.
- The bearings at the abutments are heavily rusted with some section loss. The bearings at the piers are in good condition.
- All floor drains have previously been extended but were not supported from the fascia beam. There are 15 floor drain extensions missing.
- The north expansion joint is a Pavetech joint installed in 1990. It is starting to break up and leak.
- The neoprene joint at the south abutment has several sections of missing hold down blocks. The joint is leaking and in poor overall condition.
- The north abutment backwall has light map cracking.
- The south abutment backwall has map cracking with efflorescence at both wing junctions.
- The piers are in good condition.
- The channel alignment is good. There are no scour problems.
- Both approaches have moderate settlement.

Recommendations:
This project meets the requirements of a B-Smart project. As follows is the recommended work:

- Remove the bituminous wearing surface and waterproof membrane system and replace with 2 ¼" minimum microsilica wearing surface. It is estimated that there will be 10 sq. yd. (1.3%) of full depth patching and 30 sq. yd. (4%) of partial depth patching.
- Replace the bearings at both abutments.
- Remove and replace the concrete adjacent to the joint at the end of the deck and on the approach at both abutments
- Remove the neoprene expansion joints seals. Install polymer nosing and silicone joint sealer at both abutments.
- Plug every other deck drain and drains over substructure units. Replace missing drain extensions if not plugged and add support to bottom flange of fascia beam on all extensions to remain in place.
- Both approaches need overlayed out 100' from the abutments. This work should be included with roadway resurfacing.
- The guardrail needs updated.

Attached to this report are the latest NBIS/Pontis inspection reports with comments, economic analysis and two sets of photographs.

DAC



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Remarks: [illegible]

Start: 7:30
End: 9:45

0840108 | 24-Jul-98 | Traffic Control: II 0

FAI 55 SB | .7MI S I-55/IL104INT | BRUSH CREEK | Past Insp Time: 0

RDWY WDTS	40.5 FT			FAI 55	84-5-2B-1	1990	Inspect Date [illegible]
STR LNGTH	159.7 FT	No Posting		FAI 55	1978 D6 WMS	1979	Temperature [illegible]
DK WDTH	44 FT			FAI 55	84-5-2B-1	1972	Inventory Loading
Main Spans	3	Utilities					Tons 21
App Spans	0	NNN	0				Prog Yr Out
WGT STR STL	155600	Paint	9409AT				Contract # 0
THICKNESS	8 9.5	Last Insp	960829				
HANDRAIL	1 Alum Oval on Con	Interval	24	MicroFilm	6-192	6-70,118	0 0
ABUT TYPE	Open Stub	SKEW	500000			ADTT On/Under	2286 0
PIER TYPE(s)	Hammerhead 0	WEARING SURF, MEMBRANE, DECK PROTECTION				ADT On/ Under	12700 0
OPEN BRG	0 0	SURF C	GAJ	BITUMINOUS OVERLAY, WMS, NONE			Year 95
CLOSED BRG	12A 0	MATL C	402	STEEL CONTINUOUS STRINGER/MULTI-BEAM/WF BEAM			SCOPE OF WORK
NO JOINT	6A 6J	Suff #	98	STA	551+50.15	N Culvert	7 DECK FAI 55 Resurfacing
PAINT CD	Field Applied Zinc Silicate & Acrylic						6 SUPER
							7 SUB Overall 6

Sn-15 000.084-0108.25622

DECK

Wearing Surface	3
Deck Structure Cond	3
Curbs	
Median	
Sidewalks	
Parapet	3
Railing	3
Leaching Thru Cracks	3
Soffit	3
Drains	3
Light Standards	
Joint Leakage	3
Exp Jts or Devices	3
Item # 58	
Inspectors Rtg	7

Approach Roadway Condition

Approach Slab	3	
Settlement	3	
Expansion Joints	3	Item # 59
Approach-Guardrail	3	
Pavement	3	
Shoulders	3	
Embankment	3	
Drainage Items		
Item # 65		
Inspectors Rtg	7	

Culvert

Headwalls		
Top Slab		
Interior Walls		
Side Walls		Item # 61
Wingwalls		
Floor		Item # 111
Railing		
Siltation		
Settlement		Item # 36
Scour		
Item # 62		
Inspectors Rtg	N/A	

SUPERSTRUCTURE

Bearing Devices	3
Stringers	
Girders or Beams	3
Floorbeams	
Diaphragms/Braces	4
Crack Leaching	
Joints/leakage-Condition	
Trusses	
Portals& Bracing	
Chords	
Paint	3
Drainage Systems	
Rivets or Bolts	3
Weld Conditions	
Rust____Worst % Lost	3
Conc Crack/Spall/Scaling	
Collision Damage	4
LL Deflection/Vibration	3
Alignment of Members	3
Inspectors Rtg	7

Channel & Chanel Protection

Channel Scour	3	
Erosion of Banks	3	
Drift	4	
Vegetation	3	
Channel Alignment	3	
Fender System		
Spur Dykes&Jetties		Item # 60
Rip-rap		
Concrete Slopewall	3	
Inspectors Rtg	6	

Pier/Abut Protection

Item # 72

Railing Appraisal

Inspectors Rtg Item # 71

2 12B12

SUBSTRUCTURE

Abutment-Wings	
Backwall	
Bearing Seats	
Breastwall	
Footings	
Erosion/Slopes	
Settlement	
Pile Bent Abut-Wings	3
Backwalls	3
Caps	3
Bearing Seats	3
Piles	
Erosion/Slopes	3
Settlement	
Piers-Caps	3
Columns	3
Crashwalls	
Footings	
Settlement	3
Pile Bent Pier-Caps	
Piles	
Settlement	
Conc Crack/Spall/Scaling	3
Steel Corrosion	
Timber Decay, Ect	
Debris on Seats	3
Scour	3
Collision Damage	4
Inspectors Rtg	7

Approach Roadway Alignment

Riding Quality	3
Settlement	3
Structural Condition	3
Inspectors Rtg	8

Waterway Adequacy

Inspectors Rtg 6

Inspectors Signature [signature] DAC 9-8-98

Inspectors Signature [signature]

1-Needs Replacement 2-Poor 3-Fair 4-Good 5-New

August 31, 1993 084-073

Bit Wearing Surface Is Map cracked throughout entire area.

South abut neoprene Joint has ±6' Section missing near E.

Conc parapets show light to moderate hairline vertical cracking throughout. A few small spalls to shallow rebars noted along East side.

Deck soffit has minor hairline transverse cracking with rust staining.

Steel beams have moderate rusting on bottom of bottom flanges throughout. Moderate rusting on abut rockers.

South abut backwall has light map cracking with efflo. leaching.

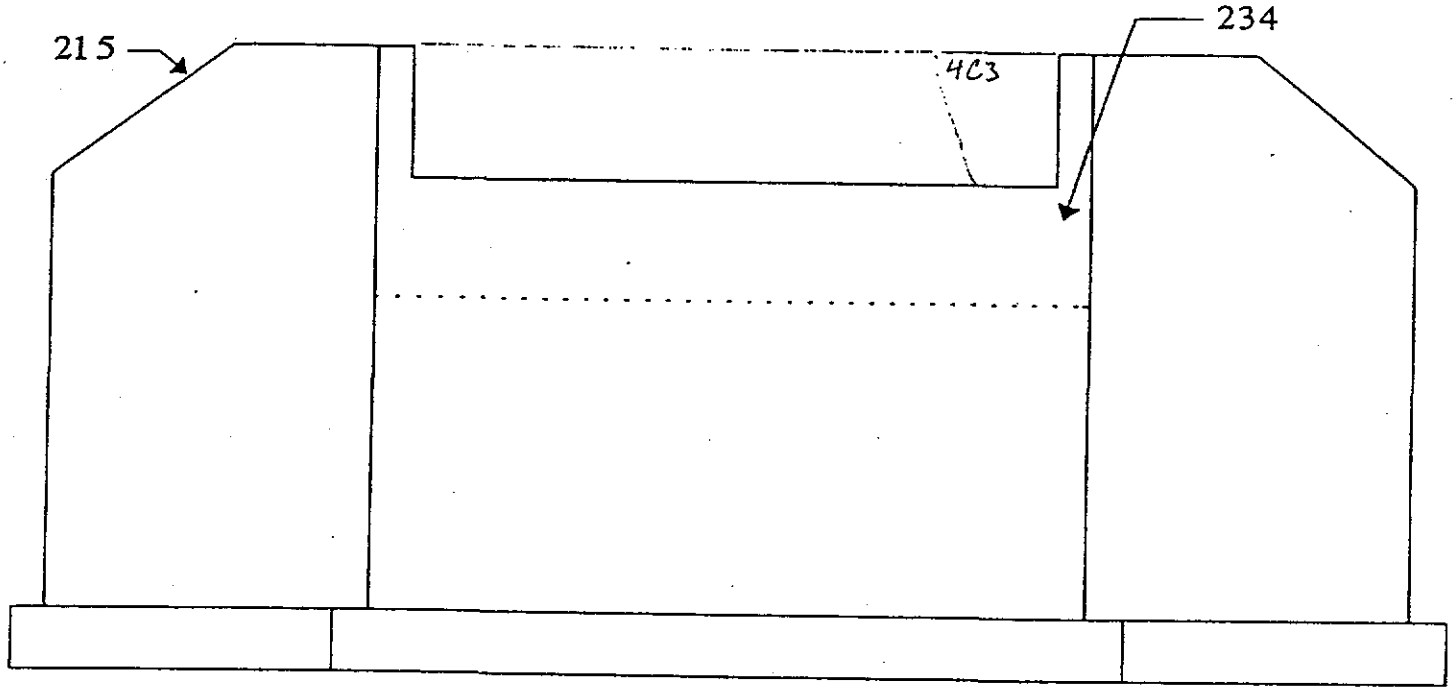
Both piers are in good condition.

North abut backwall has minor hairline vertical cracking.

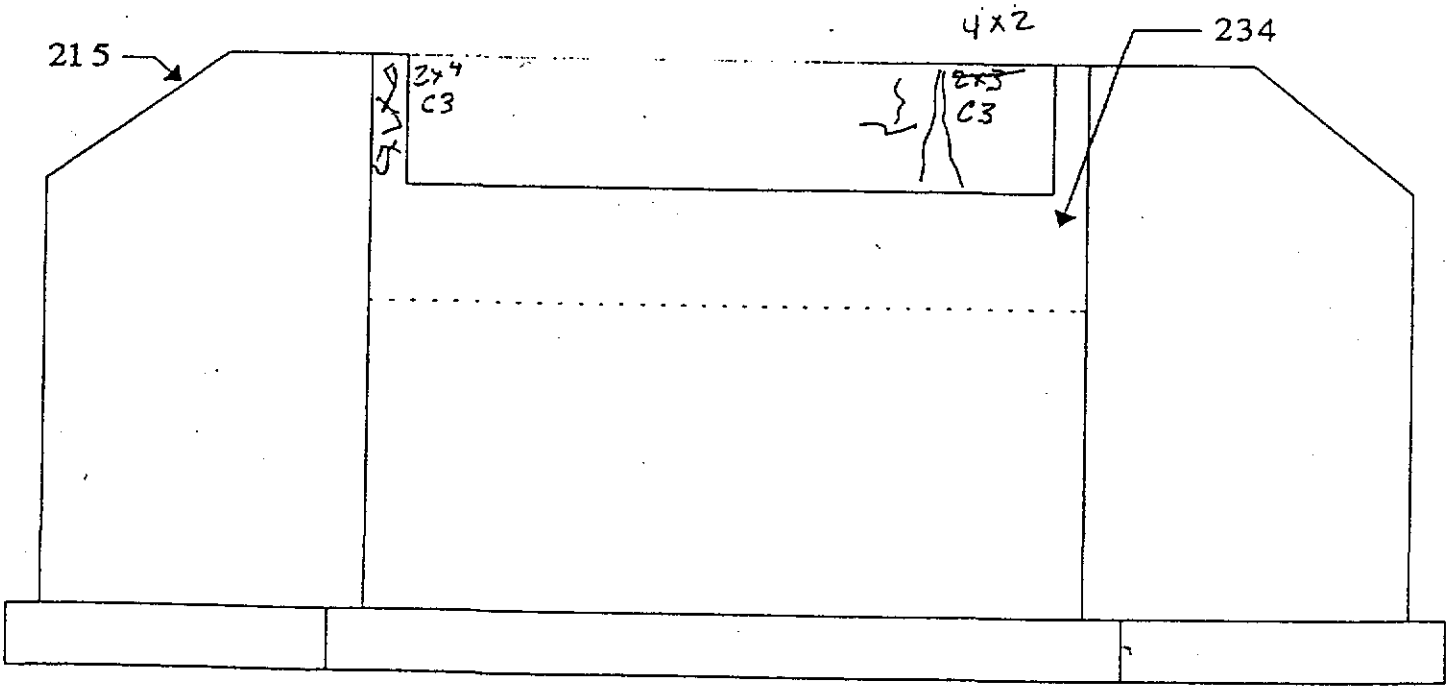
Channel alignment good.

Both appr slabs show moderate settlement.

STRUCTURE NO. 084105



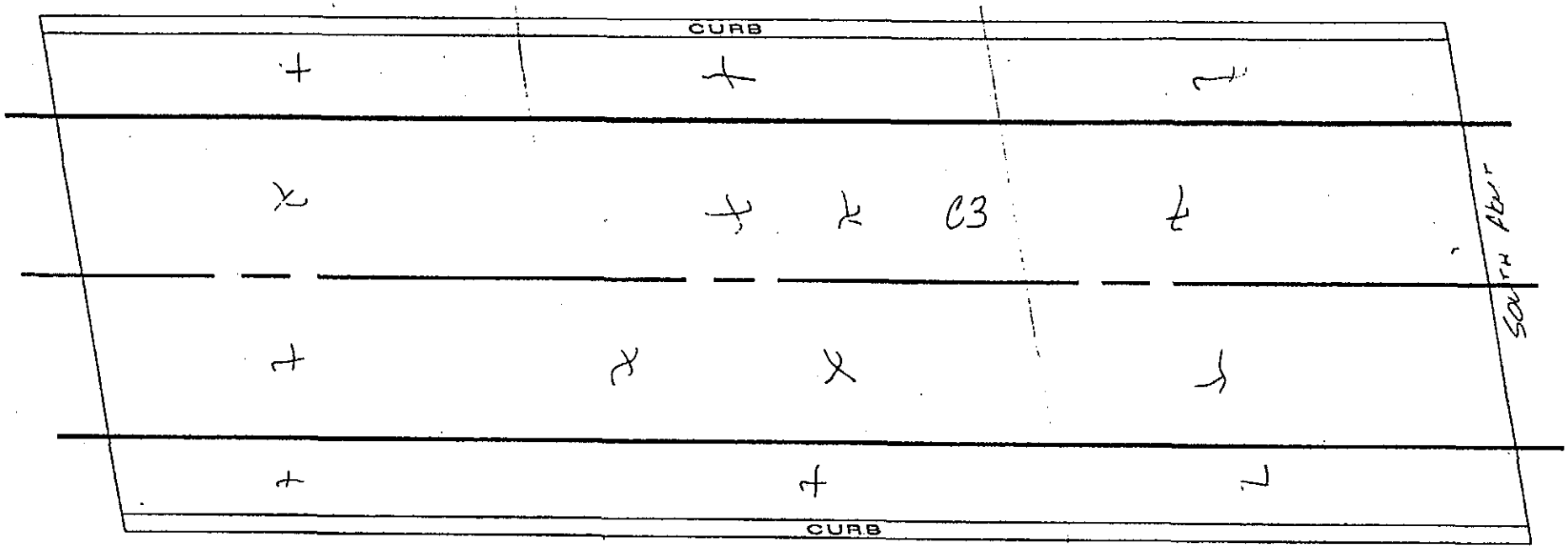
North ABUTMENT



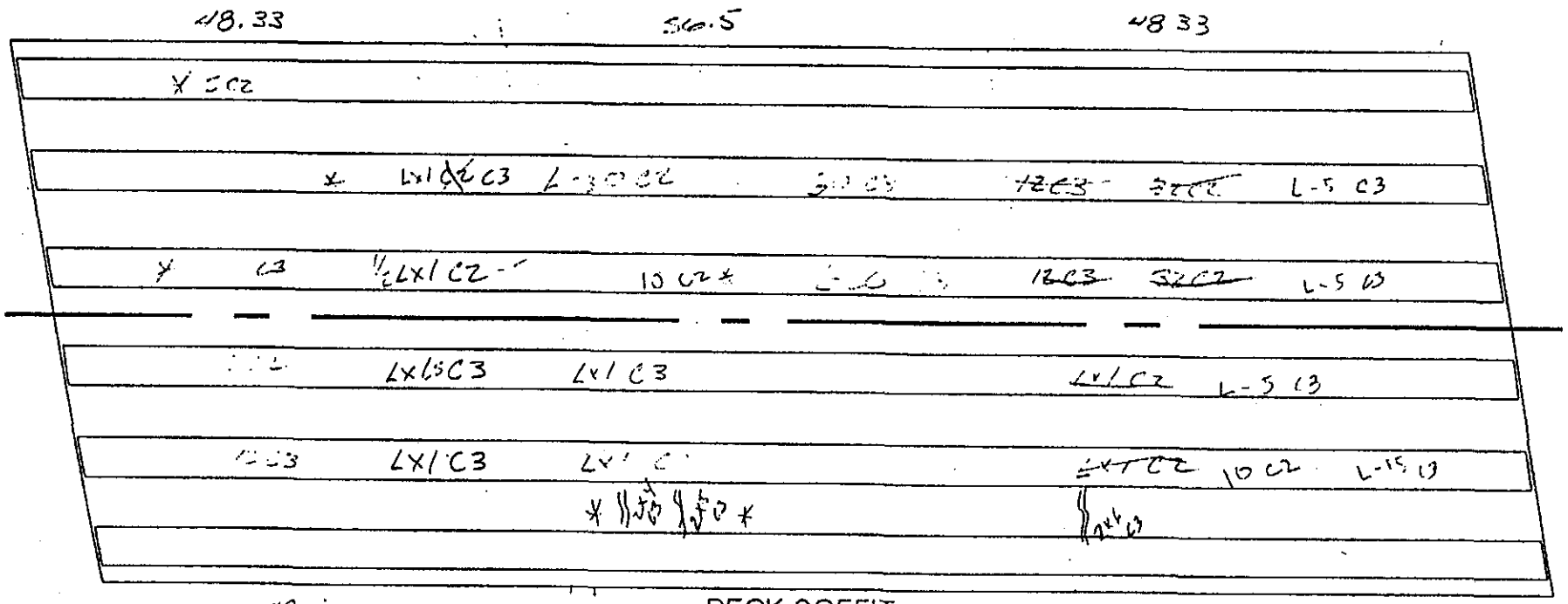
South ABUTMENT

#215
C3
18

STRUCTURE NO. 0840108



DECK SURFACE



DECK SOFFIT

ESTIMATE OF COST

SN # 084-0108
Location .7MI S I-55/IL104INT
Route: FAI-55 SB
Feature X: BRUSH CREEK

ADT

Rev
14-Jan-2000

Item #	Description	COST	Unit	QTY	TOTAL
Z0006110	BRIDGE DECK MICROSILICA CONCRETE OVERLAY	50	SQ YD	720	36000
Z0006200	CONCRETE BRIDGE DECK SCARIFICATION	6.1	SQ YD	720	4392
Z0016001	DECK SLAB REPAIR (FULL-DEPTH, TYPE I)	400	SQ YD	40	16000
Z0016200	DECK SLAB REPAIR, (PARTIAL)	200	SQ YD	80	16000
44000910	BITUMINOUS CONCRETE REMOVAL (DECK) use when a	5.3	SQ YD	720	3816
50102400	CONC REM	600	CU YD	16	9600
X0320887	POLYMER CONCRETE NOSINGS	550	CU FT	13	7150
X0301424	SILICONE JOINT SEALER	40	LIN FT	115	4600
50300255	CONCRETE SUPER STRUCTURES(Parapet=0.1CY/ft)	600	CU YD	16	9600
50300260	BRIDGE DECK GROOVING	4	SQ YD	720	2880
50300530	FLOOR DRAIN EXTENSIONS	300	EACH	15	4500
50800205	REINFORCEMENT BARS, EPOXY COATED(deck)8Lbs/SF	0.8	LB	3000	2400
70100405	TRAFFIC CONTROL & PROTECTION STANDARD 701321	15000	EACH	1	15000
70400100	TEMP CONC BARRIER (Tabor 12:1)	18	LIN FT	500	9000
70400200	REL TEMP CONC BARRIER	4.5	LIN FT	500	2250
70400300	TEMP CONC BAR TERM SEC	200	EACH	4	800
	Traffic Barrier Terminal, Type 1 Special	2000	Each	4	8000
50300320	ELASTOMERIC BEARING ASSEMBLY TY II	900	EACH	12	10800
50500715	JACK AND REMOVE EXISTING BEARINGS	850	EACH	12	10200

Scope

Remove bituminous, patch deck and place microsilica overlay	0
New bearings at both abutments	
Remove the Neoprene joint seal and replace with polymer nosing and silicone both abuts	0
At both abutments replace the concrete adjacent to the joint	0
Drain extensions	172988
Update guardrail terminals	Add 10% **$190,287**
Note: Cost of overlaying approachesand upgrading guardrail not included.	Total Cost
To be included with roadway cost (resurfacing project).	

45 $ per Sq Ft

Length 160 (Est length of new structures)
Width 44

Deck Replacement Cost (for Comparison Only) $316,800

Attachment D

Cost Analysis

ESTIMATE

SN: 084-0107 (NB)
084-0108 (SB)
Route: FAI 55
Location: I-55 over Brush Creek
Scope: Remove existing structures and replace with two 2-lane structures

Item	Unit	Unit Cost	Quantity	Total
Structure Excavation	cu yd	20	792	15,840
Concrete Superstructure	cu yd	700	572	400,400
Concrete Structures	cu yd	600	524	314,400
Protective Coat	sq yd	2	1,980	3,960
Bridge Deck Grooving	sq yd	10	1,510	15,100
Reinforcement Bars, Epoxy Coated	lb	1	182,800	182,800
Furnishing and Driving Steel Piles	ft	25	2,536	63,400
Prestressed I-Beams, 42"	ft	90	2,160	194,400
Porous Granular Embankment	cu yd	30	472	14,160
Stone Riprap, Class A4	sq yd	60	2,150	129,000
Filter Fabric for Use With Riprap	sq yd	2	2,150	4,300
Bridge Joint System (Expansion)	ft	40	226	9,040
Elastomeric Bearing Assembly	each	600	24	14,400
Bridge Seat Sealer	sq ft	4	620	2,480
				1,363,680

Note:
This cost estimate does not include costs associated with the grade raise or the traffic crossovers.

ESTIMATE

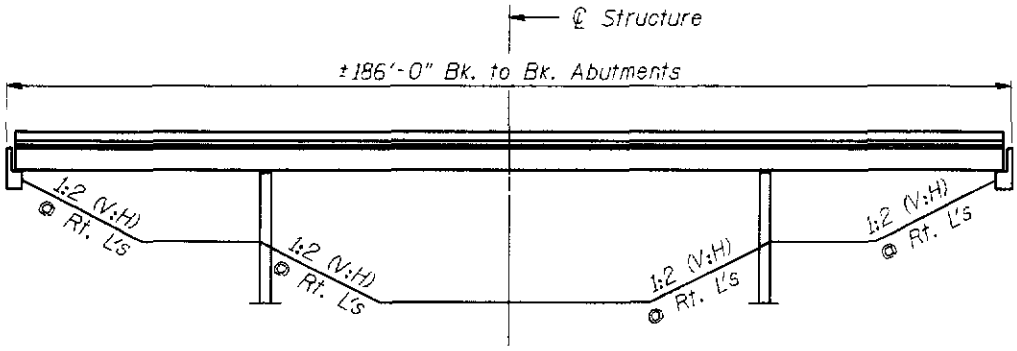
SN: 084-0107 (NB)
084-0108 (SB)
Route: FAI 55
Location: I-55 over Brush Creek
Scope: Remove existing structures and replace with two 3-lane structures

Item	Unit	Unit Cost	Quantity	Total
Structure Excavation	cu yd	20	1,088	21,760
Concrete Superstructure	cu yd	700	784	548,800
Concrete Structures	cu yd	600	720	432,000
Protective Coat	sq yd	2	2,710	5,420
Bridge Deck Grooving	sq yd	10	2,068	20,680
Reinforcement Bars, Epoxy Coated	lb	1	248,000	248,000
Furnishing and Driving Steel Piles	ft	25	3,432	85,800
Prestressed I-Beams, 42"	ft	90	2,880	259,200
Porous Granular Embankment	cu yd	30	650	19,500
Stone Riprap, Class A4	sq yd	60	2,660	159,600
Filter Fabric for Use With Riprap	sq yd	2	2,660	5,320
Bridge Joint System (Expansion)	ft	40	310	12,400
Elastomeric Bearing Assembly	each	600	32	19,200
Bridge Seat Sealer	sq ft	4	850	3,400
				1,841,080

Note:
This cost estimate does not include costs associated with the grade raise or the traffic crossovers.

Attachment E

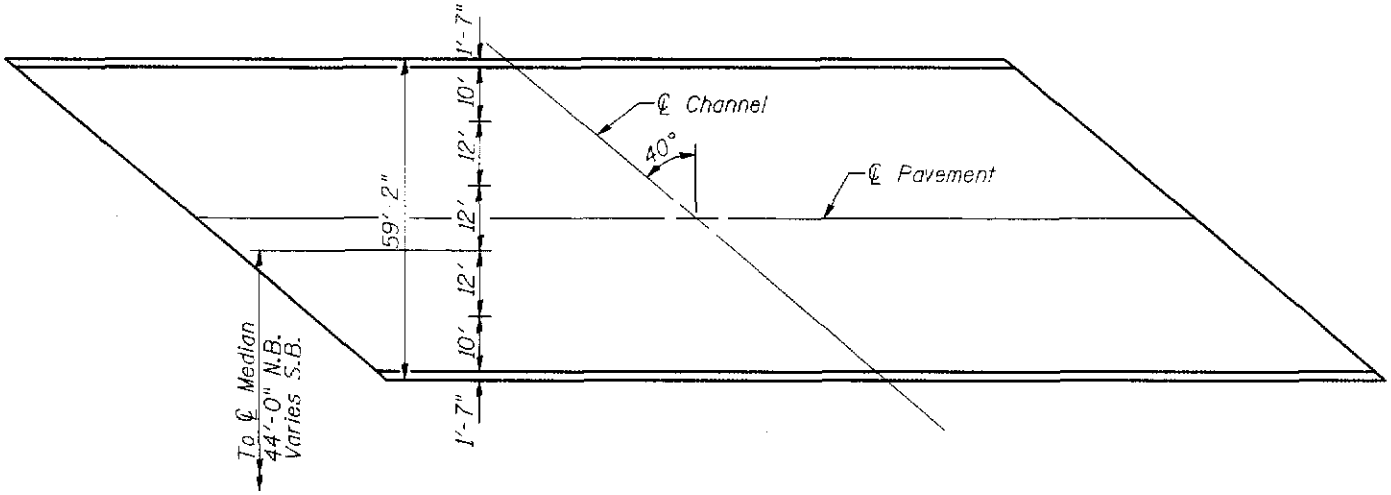
Proposed Structure Drawing and Cross Section



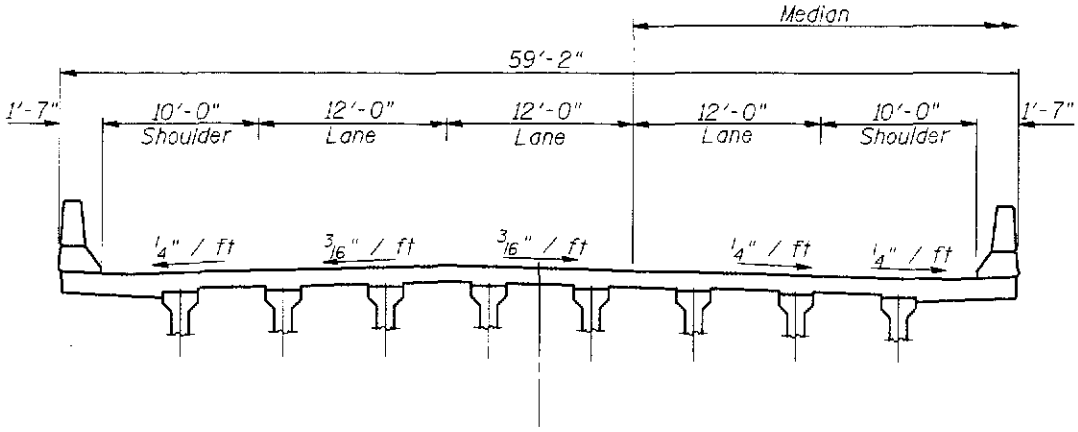
ELEVATION

NOTE

The number and location of piers, the profile and the bridge length are subject to refinement in final design.

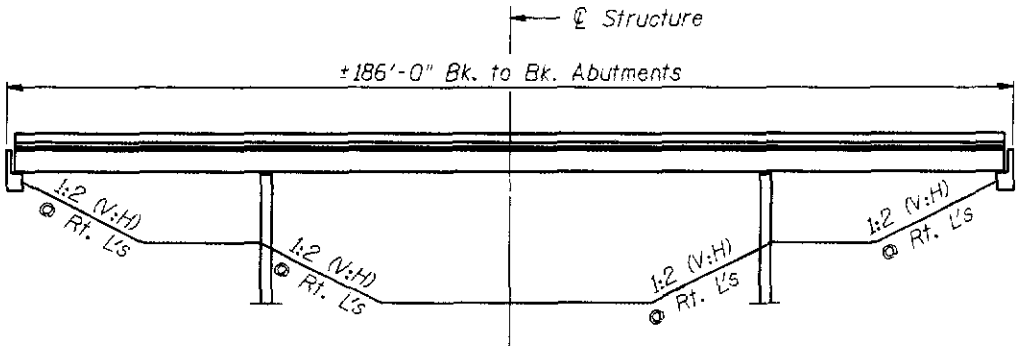


PLAN
(Showing NB Lanes)



CROSS SECTION
(Showing NB Lanes)

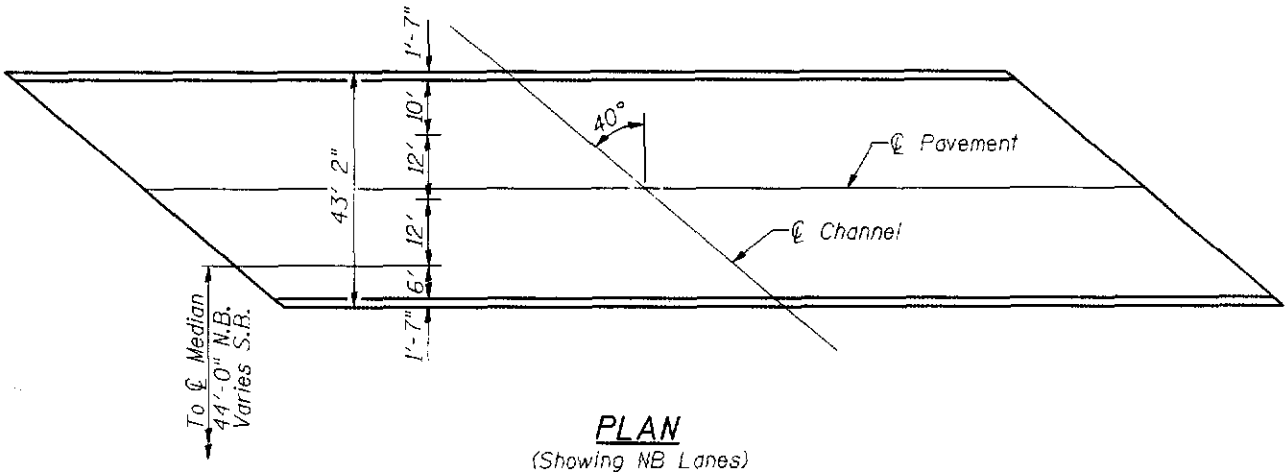
PROPOSED
STRUCTURE DRAWING
THREE LANE
STRUCTURES



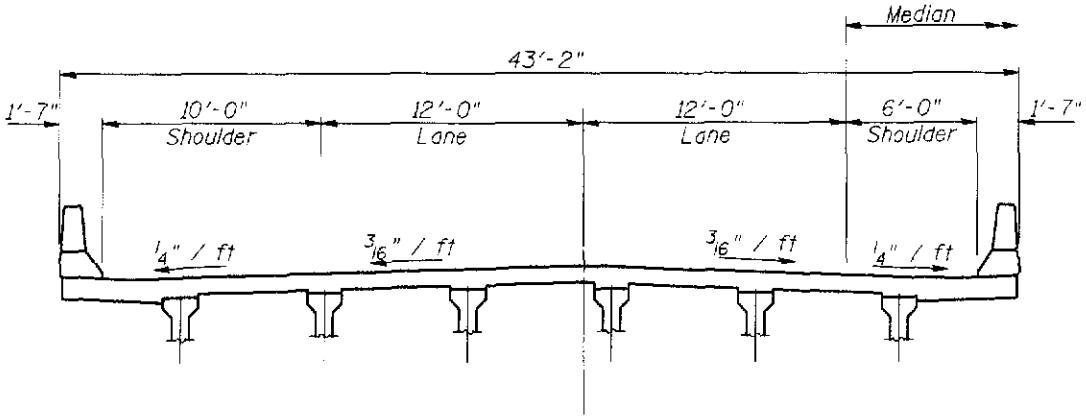
ELEVATION

NOTE

The number and location of piers, the profile and the bridge length are subject to refinement in final design.



PLAN
(Showing NB Lanes)



CROSS SECTION
(Showing NB Lanes)

PROPOSED
STRUCTURE DRAWING
TWO LANE
STRUCTURES

Attachment F

Structure Photos

Attachment G

Hydraulic Analysis Summary

Illinois Department of Transportation

Memorandum

To:	Victor A. Modeer	Attn: W. E. Martens
From:	Ralph E. Anderson	By: Todd E. Ahrens
Subject:	Hydraulic Report	Todd E. Ahrens
Date:	December 2, 2002	

REC'D DIST. & STUDIES & PLANS
DEC 11 2002

FAI Route 55 (I-55)
Morgan County

D-96-024-99
SN 084-0107 (FAI 55NB)
SN 084-0108 (FAI 55 SB)
SN 084-0002 (US 66)

I-55 over Brush Creek

We have reviewed the Hydraulic Report for the dual structures listed above. The report relates this high profile location has experienced significant overtopping flow resulting in road closure twice since the spring of 2001. Your attached memo suggests those events could be attributed to an anomalous rainfall pattern and that likely floodplain development upstream promises increased runoff. After discussions with your hydraulic staff and others, it is clear the undersized frontage road bridge just upstream is a major contributing factor. It is also clear that the District wants to give consideration to any alternative at this crossing that will reduce the frequency and magnitude of future overtopping flow. For this reason, we have developed seven different waterway information tables. They reflect proposed conditions ranging from the minimum improvement required to meet design \ regulatory requirements to a set of three new, multi-span bridges that minimize backwater for the regulatory Q100 event. They also model the impact of removing or replacing the frontage road structure. The tables and supporting notes are attached.

Your submittal memo, dated September 26, 2002, requested that we utilize the FIS discharges as the basis for our hydraulic recommendations. The Hydraulic Report (HR) consultant had supported that position by calibrating the discharges within the HEC-RAS model to produce water surface profiles in agreement with those observed during this spring's flooding. Although the calibrated discharges are roughly equivalent to FIS values, they are double the magnitude of the conventional USGS estimates that are utilized by all of the approved tables.

We feel the USGS regression analysis is the appropriate hydrologic method here. Primarily, this is due to the fact we were able to construct a HEC-RAS model utilizing the lower USGS numbers that still produces water surface profiles approximately equal to those observed. The attached notes detail the

adjustments made to the HEC-RAS model and also more of our thinking behind the discharge selection. In general, it is widely recognized that FIS values are ultra-conservative. In this case, FIS discharges are produced by a relatively obscure hydrologic method that has not been commonly employed for design purposes since sometime in the 1970's. Consistency and uniformity of design \ review dictate that we employ our standard hydrologic method, if the discharges can form the basis of a realistic hydraulic model reflective of past flood events. We feel the attached waterway information tables meet that standard. However, we do want to stress that this project will require an Individual Permit that can only be issued by the Illinois Department of Natural Resources-Office of Water Resources (IDNR-OWR) and that during their review they could request revisions be made to the proposed bridges.

We concur with a primary conclusion in the HR. Removal or replacement of the frontage road bridge just upstream is the most effective way to lower water surface profiles at I-55 and reduce the bridge length required to obtain the IDNR construction permit. Although larger events result in significant overtopping flow (frontage road PG is roughly 1 foot below the minimum existing I-55 PG) design backwater attributed solely to this structure is roughly 2 feet.

Table 5 represents proposed, dual I-55 structures and the removal of the existing frontage road bridge without replacement. The 186-ft. +\- I-55 bridge length is configured with 18-foot wide berms flanking the channel and 1:2 slopewalls. This berm width is considered the minimum to maintain the same 10-year effective flow area beneath the proposed bridge as the existing bridge. The overbank berms call for excavation to 582.0 +\-, which is below natural overbank elevations. The excavation allows the proposed opening to exceed existing for all events equal to and greater than
Q10. . A shorter structure without berms cannot satisfy that criteria. Some deposition can be expected here since the berm is lower than existing groundline. Consequently, to simulate the loss of effective overbank opening due to siltation, this same bridge length was modeled with berms placed at natural overbank elevations. Table 6 indicates the opening is reduced by roughly 6 – 7 %, while the design and regulatory headwaters were unchanged. The 186 ft. long structure with overbank excavation represents the shortest bridge length that is considered hydraulically adequate and also compliant with IDNR permit criteria.

Table 1 was developed for purposes of comparison. It demonstrates the bridge length required to eliminate Q100 backwater at I-55. The configuration does include overbank berms excavated to an elevation of 582.0. This table proposes a new frontage road structure the same length as the proposed I-55 bridge. It is our assumption that if the frontage road bridge is replaced, the rebuilt frontage road profile will be very similar to the interstate. It is our conclusion that adding a third identical bridge upstream of I-55 has the same impact on flood profiles as simply removing the existing upstream single span

and regrading appropriately. For example, a comparison of tables 3 and 5 illustrates that three new bridges of the same length causes identical backwater to new dual I-55 bridges coupled with the removal of the frontage road bridge.

Regardless of the scope of improvement and the bridge length selected, we strongly recommend meeting the design policy's criteria regarding low beam clearance and roadway freeboard. Given the flooding history, the uncertainty of the design discharge estimation for this watershed and the interstate traffic volume, it is highly unlikely we would grant a waiver from policy for either the 2-ft. low beam clearance or the 3-ft. roadway freeboard criteria. Consequently, all of the proposed waterway tables indicate a low beam elevation of 593.0. Mike Cima of our Planning Unit informs us the District prefers a concrete beam type, which results in a superstructure depth of roughly 4.7 ft. With low beam at 593.0, PG at the structure will be approximately 597.7 +\-. This would constitute a grade raise of roughly 4 feet above existing at the bridge. The waterway tables indicate the PG away from the bridge could dip to an elevation roughly 1 ft. above existing low grade, and still satisfy the roadway freeboard criteria. Again, our analyses with three identical bridges (tables 1, 2 and 3) assume the frontage road will be raised up to match the eventual I-55 profile grade.

As mentioned above, we modeled the alternatives that we considered feasible based on our field check and discussions with your staff. However, the final approval of the hydraulics can only be made by IDNR-OWR through its issuance of the Individual Permit. We are including the HEC-RAS model should additional scenarios need to be analyzed. If you have any comments, questions, or would care to discuss our review, please contact Neil VanBebber at 558-4536.

NV/dla253

WATERWAY INFORMATION TABLE 1 (Prop I-55 & Prop US 66)

Created Head = 0

Route:	I-55	S.N.:	084-0107, 084-0108
Section:		S.N.:	084-0002 (US 66)
County:	Sangamon	Waterway:	Brush Creek
Date:	11/22/2002	By:	N. VanBebber

Existing Low Grade Elevation: 593.7 ft. @ Sta. C_L Bridge

Drainage Area = 27.2 mi^2 Prop. Low Grade Elevation: 597.7 ft. @ Sta. C_L Bridge

	Freq. Yr.	Q ft^3/s	Opening - ft^2 Exist. *	Opening - ft^2 Prop.	Nat. H.W.E.	Head - ft. Exist.	Head - ft. Prop.	Headwater Elev. Exist.	Headwater Elev. Prop.
	10	2430	1021	1337	589.3	1.0	0.0	590.3	589.3
Design	50	3800	1021	1611	591.0	2.5	0.0	593.5	591.0
Base	100	4400	1021	1711	591.6	2.9	0.0	594.5	591.6
Max. Calc.	500	5840	1021	1946	593.0	2.7	0.2	595.7	593.2

10 Year Velocity through Existing Bridge = 2.4 fps 10 Year Velocity through Prop. Bridge = 1.8 fps

ALL-TIME H.W.E. & DATE: 595.4 06/06/2001 594.3 05/13/2002

SCOPE OF WORK: Total removal and replacement of I-55 and US 66 bridges. Three new bridges with 0 created head.

* I-55 Existing Bridge Openings

PROPOSED STRUCTURE

TYPE:	Open Abuts.	
LENGTH:	243'	Bk. to Bk. Abuts.
SPANS:	4	
L. BEAM:	593.0	
SKEW:	40	

EXISTING STRUCTURE

TYPE:	Open Abuts.	
LENGTH:	159' 8"	Bk. to Bk. Abuts.
SPANS:	3	
L. BEAM:	589.4	
SKEW:	40	

NOTE: PROPOSED STRUCTURE DETAILS ARE PRELIMINARY; SUBJECT TO REFINEMENT IN TSL STAGE.

WATERWAY INFORMATION TABLE 2 (Prop I-55 with Prop US 66)

Route:	I-55	S.N.:	084-0107, 084-0108
Section:		S.N.:	084-0002 (US 66)
County:	Sangamon	Waterway:	Brush Creek
Date:	11/22/2002	By:	N. VanBebber

Existing Low Grade Elevation: 593.7 ft. @ Sta. C_L Bridge

Drainage Area = 27.2 mi^2 Prop. Low Grade Elevation: 597.7 ft. @ Sta. C_L Bridge

	Freq.	Q	Opening - ft^2		Nat.	Head - ft.		Headwater Elev.	
	Yr.	ft^3/s	Exist. *	Prop.	H.W.E.	Exist.	Prop.	Exist.	Prop.
	10	2430	1011	1034	589.3	1.0	0.2	590.3	589.5
Design	50	3800	1021	1238	591.0	2.5	0.3	593.5	591.3
Base	100	4400	1021	1312	591.6	2.9	0.5	594.5	592.1
Max. Calc.	500	5840	1021	1490	593.0	2.7	0.7	595.7	593.7

10 Year Velocity through Existing Bridge = 2.4 fps 10 Year Velocity through Prop. Bridge = 2.4 fps

ALL-TIME H.W.E. & DATE: 595.4 06/06/2001 594.3 05/13/2002

SCOPE OF WORK: Total removal and replacement of I-55 and US 66 bridges. Three new bridges.

* I-55 Existing Bridge Openings

PROPOSED STRUCTURE

TYPE:	Open Abuts.	
LENGTH:	186'	Bk. to Bk. Abuts.
SPANS:	3	
L. BEAM:	593.0	
SKEW:	40	

EXISTING STRUCTURE

TYPE:	Open Abuts.	
LENGTH:	159' 8"	Bk. to Bk. Abuts.
SPANS:	3	
L. BEAM:	589.4	
SKEW:	40	

NOTE: PROPOSED STRUCTURE DETAILS ARE PRELIMINARY; SUBJECT TO REFINEMENT IN TSL STAGE.

WATERWAY INFORMATION TABLE 3 (Prop I-55 with Prop US 66)

Route:	I-55	S.N.:	084-0107, 084-0108
Section:		S.N.:	084-0002 (US 66)
County:	Sangamon	Waterway:	Brush Creek
Date:	11/22/2002	By:	N. VanBebber

Existing Low Grade Elevation: 592.0 ft. @ Sta. C_L Bridge

Drainage Area = 27.2 mi^2 Prop. Low Grade Elevation: 597.7 ft. @ Sta. C_L Bridge

	Freq. Yr.	Q ft^3/s	Opening - ft^2 Exist. *	Opening - ft^2 Prop.	Nat. H.W.E.	Head - ft. Exist.	Head - ft. Prop.	Headwater Elev. Exist.	Headwater Elev. Prop.
	10	2430	511	1034	589.3	1.0	0.2	590.3	589.5
Design	50	3800	511	1238	591.0	2.5	0.3	593.5	591.3
Base	100	4400	511	1312	591.6	2.9	0.5	594.5	592.1
Max. Calc.	500	5840	511	1490	593.0	2.7	0.7	595.7	593.7

10 Year Velocity through Existing Bridge = 4.8 fps 10 Year Velocity through Prop. Bridge = 2.4 fps

ALL-TIME H.W.E. & DATE: 595.4 06/06/2001 594.3 05/13/2002

SCOPE OF WORK: Total removal and replacement of I-55 and US 66 bridges. Three new bridges.

* US 66 Existing Bridge Opening

PROPOSED STRUCTURE

TYPE:	Open Abuts.	
LENGTH:	186'	Bk. to Bk. Abuts.
SPANS:	3	
L. BEAM:	593.0	
SKEW:	40	

EXISTING STRUCTURE

TYPE:	Closed Abuts.	
LENGTH:	73' 0"	Bk. to Bk. Abuts.
SPANS:	3	
L. BEAM:	587.5	
SKEW:	40	

NOTE: PROPOSED STRUCTURE DETAILS ARE PRELIMINARY; SUBJECT TO REFINEMENT IN TSL STAGE.

WATERWAY INFORMATION TABLE 4 (Prop I-55 with Exist US 66)

Route:	I-55	S.N.:	084-0107, 084-0108
Section:		S.N.:	084-0002 (US 66)
County:	Sangamon	Waterway:	Brush Creek
Date:	11/21/2002	By:	N. VanBebber

Existing Low Grade Elevation: 592.0 ft. @ Sta. C_L Bridge

Drainage Area = 27.2 mi^2 Prop. Low Grade Elevation: 597.7 ft. @ Sta. C_L Bridge

	Freq. Yr.	Q ft^3/s	Opening - ft^2 Exist. *	Opening - ft^2 Prop.	Nat. H.W.E.	Head - ft. Exist.	Head - ft. Prop.	Headwater Elev. Exist.	Headwater Elev. Prop.
	10	2430	511	1034	589.3	1.0	1.0	590.3	590.3
Design	50	3800	511	1238	591.0	2.5	2.3	593.5	593.3
Base	100	4400	511	1312	591.6	2.9	2.8	594.5	594.4
Max. Calc.	500	5840	511	1490	593.0	2.7	3.3	595.7	596.3

10 Year Velocity through Existing Bridge = 4.8 fps 10 Year Velocity through Prop. Bridge = 2.4 fps

ALL-TIME H.W.E. & DATE: 595.4 06/06/2001 594.3 05/13/2002

SCOPE OF WORK: Total removal and replacement of I-55 bridges. Existing US 66 Bridge remains in place. Two new bridges.

* US 66 Existing Bridge Opening

PROPOSED STRUCTURE

TYPE:	Open Abuts.	
LENGTH:	186'	Bk. to Bk. Abuts.
SPANS:	3	
L. BEAM:	593.0	
SKEW:	40	

EXISTING STRUCTURE

TYPE:	Closed Abuts.	
LENGTH:	73' 0"	Bk. to Bk. Abuts.
SPANS:	3	
L. BEAM:	587.5	
SKEW:	40	

NOTE: PROPOSED STRUCTURE DETAILS ARE PRELIMINARY; SUBJECT TO REFINEMENT IN TSL STAGE.

WATERWAY INFORMATION TABLE 5 (Prop I-55 w/o US 66)

Route:	I-55	S.N.:	084-0107, 084-0108
Section:		S.N.:	084-0002 (US 66)
County:	Sangamon	Waterway:	Brush Creek
Date:	11/22/2002	By:	N. VanBebber

Existing Low Grade Elevation: 593.7 ft. @ Sta. C_L Bridge

Drainage Area = 27.2 mi^2 Prop. Low Grade Elevation: 597.7 ft. @ Sta. C_L Bridge

	Freq. Yr.	Q ft^3/s	Opening - ft^2 Exist.	Opening - ft^2 Prop.	Nat. H.W.E.	Head - ft. Exist.	Head - ft. Prop.	Headwater Elev. Exist.	Headwater Elev. Prop.
	10	2430	1011	1034	589.3	1.0	0.2	590.3	589.5
Design	50	3800	1021	1238	591.0	2.5	0.3	593.5	591.3
Base	100	4400	1021	1312	591.6	2.9	0.5	594.5	592.1
Max. Calc.	500	5840	1021	1490	593.0	2.7	0.7	595.7	593.7

10 Year Velocity through Existing Bridge = 2.4 fps 10 Year Velocity through Prop. Bridge = 2.4 fps

ALL-TIME H.W.E. & DATE: 595.4 06/06/2001 594.3 05/13/2002

SCOPE OF WORK: Removal of US bridge and Total Removal and Replacement of I-55 bridges. Two new bridges.

* I-55 Existing Bridge Openings

PROPOSED STRUCTURE

TYPE: Open Abuts.
LENGTH: 186' Bk. to Bk. Abuts.
SPANS: 3
L. BEAM: 593.0
SKEW: 40

EXISTING STRUCTURE

TYPE: Open Abuts.
LENGTH: 159' 8" Bk. to Bk. Abuts.
SPANS: 3
L. BEAM: 589.4
SKEW: 40

NOTE: PROPOSED STRUCTURE DETAILS ARE PRELIMINARY; SUBJECT TO REFINEMENT IN TSL STAGE.

WATERWAY INFORMATION TABLE 6 (Prop I-55 with Prop US 66)

Overbank berms at 585.0.

Route:	I-55	S.N.:	084-0107, 084-0108
Section:		S.N.:	084-0002 (US 66)
County:	Sangamon	Waterway:	Brush Creek
Date:	11/22/2002	By:	N. VanBebber

Existing Low Grade Elevation: 593.7 ft. @ Sta. C_L Bridge

Drainage Area = 27.2 mi^2 Prop. Low Grade Elevation: 597.7 ft. @ Sta. C_L Bridge

	Freq. Yr.	Q ft^3/s	Opening - ft^2 Exist. *	Opening - ft^2 Prop.	Nat. H.W.E.	Head - ft. Exist.	Head - ft. Prop.	Headwater Elev. Exist.	Headwater Elev. Prop.
	10	2430	1011	948	589.3	1.0	0.2	590.3	589.5
Design	50	3800	1021	1154	591.0	2.5	0.3	593.5	591.3
Base	100	4400	1021	1229	591.6	2.9	0.5	594.5	592.1
Max. Calc.	500	5840	1021	1406	593.0	2.7	0.7	595.7	593.7

10 Year Velocity through Existing Bridge = 2.4 fps 10 Year Velocity through Prop. Bridge = 2.6 fps

ALL-TIME H.W.E. & DATE: 595.4 06/06/2001 594.3 05/13/2002

SCOPE OF WORK: Total removal and replacement of I-55 and US 66 bridges. Overbank berms at 585.0 Three new bridges.

* I-55 Existing Bridge Openings

PROPOSED STRUCTURE

TYPE: Open Abuts.
LENGTH: 186' Bk. to Bk. Abuts.
SPANS: 3
L. BEAM: 593.0
SKEW: 40

EXISTING STRUCTURE

TYPE: Open Abuts.
LENGTH: 159' 8" Bk. to Bk. Abuts.
SPANS: 3
L. BEAM: 589.4
SKEW: 40

NOTE: PROPOSED STRUCTURE DETAILS ARE PRELIMINARY; SUBJECT TO REFINEMENT IN TSL STAGE.

WATERWAY INFORMATION TABLE 7 (Prop I-55 with Exist US 66)

Overbank berms at 585.0.

Route:	I-55	S.N.:	084-0107, 084-0108
Section:		S.N.:	084-0002 (US 66)
County:	Sangamon	Waterway:	Brush Creek
Date:	11/21/2002	By:	N. VanBebber

Existing Low Grade Elevation: 592.0 ft. @ Sta. C_L Bridge

Drainage Area = 27.2 mi^2 Prop. Low Grade Elevation: 597.7 ft. @ Sta. C_L Bridge

	Freq. Yr.	Q ft^3/s	Opening - ft^2 Exist. *	Opening - ft^2 Prop.	Nat. H.W.E.	Head - ft. Exist.	Head - ft. Prop.	Headwater Elev. Exist.	Headwater Elev. Prop.
	10	2430	511	948	589.3	1.0	1.0	590.3	590.3
Design	50	3800	511	1154	591.0	2.5	2.3	593.5	593.3
Base	100	4400	511	1229	591.6	2.9	2.8	594.5	594.4
Max. Calc.	500	5840	511	1406	593.0	2.7	3.3	595.7	596.3

10 Year Velocity through Existing Bridge = 4.8 fps 10 Year Velocity through Prop. Bridge = 2.6 fps

ALL-TIME H.W.E. & DATE: 595.4 06/06/2001 594.3 05/13/2002

SCOPE OF WORK: Total removal and replacement of I-55 bridges. Existing US 66 Bridge remains in place. Two new bridges.

* US 66 Existing Bridge Opening

Overbank berms at 585.0.

PROPOSED STRUCTURE

TYPE: Open Abuts.
LENGTH: 186' Bk. to Bk. Abuts.
SPANS: 3
L. BEAM: 593.0
SKEW: 40

EXISTING STRUCTURE

TYPE: Closed Abuts.
LENGTH: 73' 0" Bk. to Bk. Abuts.
SPANS: 3
L. BEAM: 587.5
SKEW: 40

NOTE: PROPOSED STRUCTURE DETAILS ARE PRELIMINARY; SUBJECT TO REFINEMENT IN TSL STAGE.

Attachment H

Proposed Plan and Profile

Attachment I

Abbreviated Existing Plans