

2-DIST  
04

B.I.N.  
7VB

**STRUCTURES INSPECTION FIELD REPORT**  
**SPECIAL MEMBER INSPECTION**

BR. DEPT. NO.  
B-07-015=W-04-039

CITY/TOWN <b>BELMONT=WALTHAM</b>	8-STRUCTURE NO. <b>B07015-7VB-MUN-CUL</b>	11-Kilo. POINT <b>000.000</b>	90-ROUTINE INSP. DATE <b>May 21, 2020</b>	93*-SPEC. MEMB. INSP. DATE <b>Nov 24, 2021</b>
07-FACILITY CARRIED <b>ST 60 TRAPELO RD</b>	MEMORIAL NAME/LOCAL NAME	27-YR BUILT <b>1850</b>	106-YR REBUILT <b>1900</b>	*YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER BEAVER BROOK</b>	26-FUNCTIONAL CLASS <b>Urban Arterial</b>	DIST. BRIDGE INSPECTION ENGINEER <b>J. Dideo</b>		
43-STRUCTURE TYPE <b>801 : Masonry Slab</b>	22-OWNER Town Agency	21-MAINTAINER Town Agency	TEAM LEADER <i>T. Franciosa</i>	PROJ MGR <i>Michael Baker Intl Inc</i>
107-DECK TYPE <b>1 : Concrete Cast-in-Place</b>	WEATHER <b>Clear</b>	TEMP. (air) <b>-4°C</b>	TEAM MEMBERS <b>T. GLEASON</b>	

**WEIGHT POSTING** *Not Applicable*  **X**

Actual Posting	H	3	3S2	Single
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Recommended Posting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waived Date: <input type="text"/>	EJDMT Date: <input type="text"/>			

Signs In Place (Y=Yes, N=No, NR=Not Required)  
Legibility/Visibility

At bridge		Advance	
E	W	E	W
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLANS (Y/N):  **N**

(V.C.R.) (Y/N):  **N**

TAPE#: \_\_\_\_\_

**RATING**

Rating Report (Y/N):  **N** Date:  ----

Recommend for Rating or Rerating (Y/N):  **N**

If YES please give priority:  
HIGH ( ) MEDIUM ( ) LOW ( )

Inspection data at time of existing rating  
I 58: - I 59: - I 60: - I 62: - Date: 00/00/0000

REASON:

**SPECIAL MEMBER(S):**

	MEMBER	CRACK (Y/N):	WELD'S CONDITION (0-9)	LOCATION OF CORROSION, SECTION LOSS (%), CRACKS, COLLISION DAMAGE, STRESS CONCENTRATION, ETC.	CONDITION		INV. RATING OF MEMBER FROM RATING ANALYSIS			Deficiencies
					PREVIOUS	PRESENT	H-20	3	3S2	
					(0-9)	(0-9)				
A	Item 58.2 - Deck Condition	N	-	See remarks in comments section.	3	3	Not Rated			S-A
B	Item 59.1 - Beams	N	-	See remarks in comments section.	3	3	Not Rated			S-A
C	Item 60.1.d - Breastwalls	N	-	See remarks in comments section.	4	4	Not Rated			S-A
D										
E										

List of field tests performed:

	I-58	I-59	I-60	I-62
(Overall Previous Condition)	<input type="text"/> <b>3</b>	<input type="text"/> <b>3</b>	<input type="text"/> <b>4</b>	<input type="text"/> <b>-</b>
(Overall Current Condition)	<input type="text"/> <b>3</b>	<input type="text"/> <b>3</b>	<input type="text"/> <b>4</b>	<input type="text"/> <b>-</b>

**DEFICIENCY:** A defect in a structure that requires corrective action.

**CATEGORIES OF DEFICIENCIES:**

**M= Minor Deficiency** - Deficiencies which are minor in nature, generally do not impact the structural integrity of the bridge and could easily be repaired. Examples include but are not limited to: Spalled concrete, Minor pot holes, Minor corrosion of steel, Minor scouring, Clogged drainage, etc.

**S= Severe/Major Deficiency** - Deficiencies which are more extensive in nature and need more planning and effort to repair. Examples include but are not limited to: Moderate to major deterioration in concrete, Exposed and corroded rebars, Considerable settlement, Considerable scouring or undermining, Moderate to extensive corrosion to structural steel with measurable loss of section, etc.

**C-S= Critical Structural Deficiency** - A deficiency in a structural element of a bridge that poses an extreme unsafe condition due to the failure or imminent failure of the element which will affect the structural integrity of the bridge.

**C-H= Critical Hazard Deficiency** - A deficiency in a component or element of a bridge that poses an extreme hazard or unsafe condition to the public, but does not impair the structural integrity of the bridge. Examples include but are not limited to: Loose concrete hanging down over traffic or pedestrians, A hole in a sidewalk that may cause injuries to pedestrians, Missing section of bridge railing, etc.

**URGENCY OF REPAIR:**

**I = Immediate-** [Inspector(s) immediately contact District Bridge Inspection Engineer (DBIE) to report the Deficiency and to receive further instruction from him/her].

**A = ASAP-** [Action/Repair should be initiated by District Maintenance Engineer or the Responsible Party (if not a State owned bridge) upon receipt of the Inspection Report].

**P = Prioritize-** [Shall be prioritized by District Maintenance Engineer or the Responsible Party (if not a State owned bridge) and repairs made when funds and/or manpower is available].

**X=UNKNOWN      N=NOT APPLICABLE      H=HIDDEN/INACCESSIBLE      R=REMOVED**

CITY/TOWN BELMONT=WALTHAM	B.I.N. 7VB	BR. DEPT. NO. B-07-015=W-04-039	8.-STRUCTURE NO. B07015-7VB-MUN-CUL	INSPECTION DATE NOV 24, 2021
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## REMARKS

### BRIDGE ORIENTATION

Structure B-07-015=W-04-039 (7VB) carries ST 60 Trapelo Road over Beaver Brook along the border line between the town of Belmont and city of Waltham. The approaches are west and east and the elevations are south and north (**see Photos 1-4**). Beaver Brook flows from north to south (**see Photos 5-6**).

### GENERAL REMARKS

There are multiple superstructure types for this bridge. There are sixteen (16) granite slabs labeled Slab 1 through 16 from south to north (**see Photo 7**). There are eight (8) steel beams labeled Beam 1 through 8 between Slabs 4 and 5, with a utility main at Beam 5 (**see Photo 8**). There is a concrete slab with stay-in-place forms between Slabs 12 and 13 (**see Photo 9**). North of Slab 16 there is a concrete extension. The original abutments are comprised of dry laid stone at the south side, and the bridge was widened using cast-in-place concrete abutments on the north side (**see Sketch 2 and Photo 10**). There is a bituminous wearing surface that has been retrofitted with steel roadway plates that span the length of the superstructure (**see Sketch 1 and Photo 11**).

"Caution" signs are in place at both approaches (**see Photos 12 and 13**).

There was a previously noted gaseous smell near the Southwest Wingwall. There was no gaseous smell noted during the time of this inspection.

### Special Member Inspection

The scope of the Special Member Inspection includes the hands on inspection and monitoring of identified members with advanced deterioration.

### ITEM 58 - DECK

#### Item 58.2 - Deck Condition

The roadway plates are designated as P1 through P6 from south to north (**see Photo 11**). There are isolated fully broken tack welds between roadway plates. The north tack weld between P5 and P6 has been repaired since the previous Special Member Inspection (5/21/21). The plates with broken tack welds typically deflect under live load. There is typically minor scrapes and gouges on the leading edge of the roadway plates. There is an isolated 2'-4" wide x 7" long x 2" deep spall in the pavement at the northeast corner of P4. There is a depressed bituminous patch with radial up to 1/8" cracks at the northeast corner of P5 (**see Photo 14**). The location was previously noted as a 2'-0" wide x 7" long x 2" deep spall in the previous Special Member Inspection. Also, there are isolated transverse hairline cracks in the approaches adjacent to the plates. **See Sketch 1** for conditions and locations.

### ITEM 59 - SUPERSTRUCTURE

#### Item 59.1 - Beams

Conditions noted with the Granite Masonry Slabs and the Steel Beams are documented as follows:

#### Granite Slabs:

The southwest corner of Slab 1 is unsupported for 6" (**see Photo 15**). There are isolated longitudinal and diagonal hairline cracks, some with efflorescence near the abutments. There are several up to full width transverse hairline cracks, some with efflorescence near mid-span (**see Photo 16**). Slab 7 near mid-span has an up to 2" wide x full depth transverse crack, with a 20" long x 13" wide x 2" deep spall at the south edge (**see Photo 17**). Slab 6 and 7 are monitored with crack gauges. The crack gauges indicated little to no movement since installation. The crack gauge at Slab 7 read 0.05 mm from zero (**see Photo 18**). **See Sketch 2** for conditions and locations.

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## REMARKS

### Item 59.1 - Beams (Cont'd)

#### Steel I-Beams:

There is timber shielding between the steel I-beams preventing inspection of the web and top flanges. The beams typically exhibit minor rotation about the longitudinal axis, resulting in the bottom flanges no longer being level.

There is typically heavy rust and laminated rust throughout the beams. The top and bottom flange of isolated beams near the abutments and at mid-span have up to 100% section loss x full width (**see Photos 19-20**). See **Sketch 3** for conditions and locations.

#### Reinforced Concrete Slab:

The reinforced concrete slab which acts as part of the superstructure below the westbound roadway is missing 50% of the stay in place forms on the north side of the slab.

There are two spalls with exposed rebar along the south edge measuring up to 2'-6" long x 9" high x 6" wide (**see Photo 21**). There is a 24" long x 16" wide delamination at the northwest corner. See **Sketch 2** for conditions and locations.

### ITEM 60 - SUBSTRUCTURE

#### Item 60.1 - Abutments

##### Item 60.1.d - Breastwalls

There are typically voids up to 2'-0" deep throughout the abutments. There are missing and cracked stones throughout both breastwalls and below the drainage pipes. Isolated areas have been repaired and filled with concrete and sandbags. Conditions and locations are as follows:

##### West Abutment:

At the south face, there is a 2'-0" long x 18" high x 14" deep void with shifted stones (**see Photo 22**).

Below Slab 2, there is a 3'-4" long x 20" high x 2'-0" deep void with shifted stones.

Below Slab 5 at the waterline, there are two (2) up to 2'-0" in diameter x up to 2'-0" deep voids.

Below Slab 9 at the top of the abutment, there is a 18" long x 3" high x 14" deep void.

Below Slab 9 at mid-height, there is missing sandbags at concrete and sandbag repair.

Below the concrete slab between Slabs 12 & 13, there is a full height hairline crack up to 2'-0" high in the masonry stone.

Below Slab 13, there is a 12" long x 2'-0" high x 2'-10" deep spall in the cast in place concrete.

##### East Abutment:

Below Slab 1, there are full height cracks in multiple stones up to 10" long x up to ¼" wide and a 1-1/2" long x 5" high x 3" deep spall (**See Photo 23**).

Below Slab 1 and 2 below the water line, there is 2'-0" long x 16" deep scour.

Below Slab 4 at the waterline, there is a 2'-5" long x 20" high x 3'-3" deep void.

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## REMARKS

### Item 60.1.d - Breastwalls (Cont'd)

Between Slab 5 and the top of the breastwall, there is a 20" wide x 3" high x 2'-0" deep void.

Below Slab 5 at the waterline, there is a 2'-6" long x 2'-3" high x 3'-2" deep void (see Photo 24).

### Sketch / Photo Log

- Sketch 1 : Roadway Plate Conditions
- Sketch 2 : Superstructure Conditions
- Sketch 3 : Steel Beam Conditions
- Photo 1 : East approach, looking east.
- Photo 2 : West approach, looking west.
- Photo 3 : North Elevation
- Photo 4 : South Elevation
- Photo 5 : Downstream, looking south.
- Photo 6 : Upstream, looking north.
- Photo 7 : Typical underside, granite slab looking east.
- Photo 8 : Typical underside, steel beams looking east.
- Photo 9 : Typical underside, concrete slab looking west.
- Photo 10 : Typical underside, concrete extension looking south.
- Photo 11 : Typical retrofitted steel roadway plates looking south.
- Photo 12 : "Caution" sign in-place at the east approach.
- Photo 13 : "Caution" sign in-place at the west approach.
- Photo 14 : Steel Plate 4 and 5 at the northeast corner have 2'-4" W x 7" L x 2" D spall and 2'-0" W x 7" L patch with radial cracking, respectively.
- Photo 15 : Slab 1 southwest corner at West Abutment: Slab is unsupported for 6".
- Photo 16 : Slab 6 underside near Mid-span: Transverse hairline crack with efflorescence. Note: Crack Gauge.
- Photo 17 : Slab 7 near Mid-span: Up to 2" W x FW x FD crack with a 20" L x 13" W x 2" D spall. Note: Crack gauge.
- Photo 18 : Slab 7 near Mid-span: Crack gauge shows minor movement ( < 1 mm in both directions).
- Photo 19 : Steel Beams 2 and 3, bottom flange near East Abutment: Up to 100% section loss x 1" wide with 3/16" thickness remaining.
- Photo 20 : Steel Beam 8 bottom flange near Mid-span: 100% section loss x up to full width.
- Photo 21 : Concrete slab at the south edge: Two (2) up to 2'-6" L x 6" W x up to 9" D edge spalls with exposed rebar.
- Photo 22 : South face of West Abutment: 2'-0" L x 18" H x 14" D void with shifted stones
- Photo 23 : East Abutment below south edge of Slab 1: Multiple stones with vertical cracks up to 10" L x up to 1/4" W and an isolated 5" H x 1-1/2" W x 3" D spall.
- Photo 24 : East Abutment below Slab 5 at the waterline: 2'-6" L x 2'-3" H x 3'-2" D void.

CITY/TOWN  
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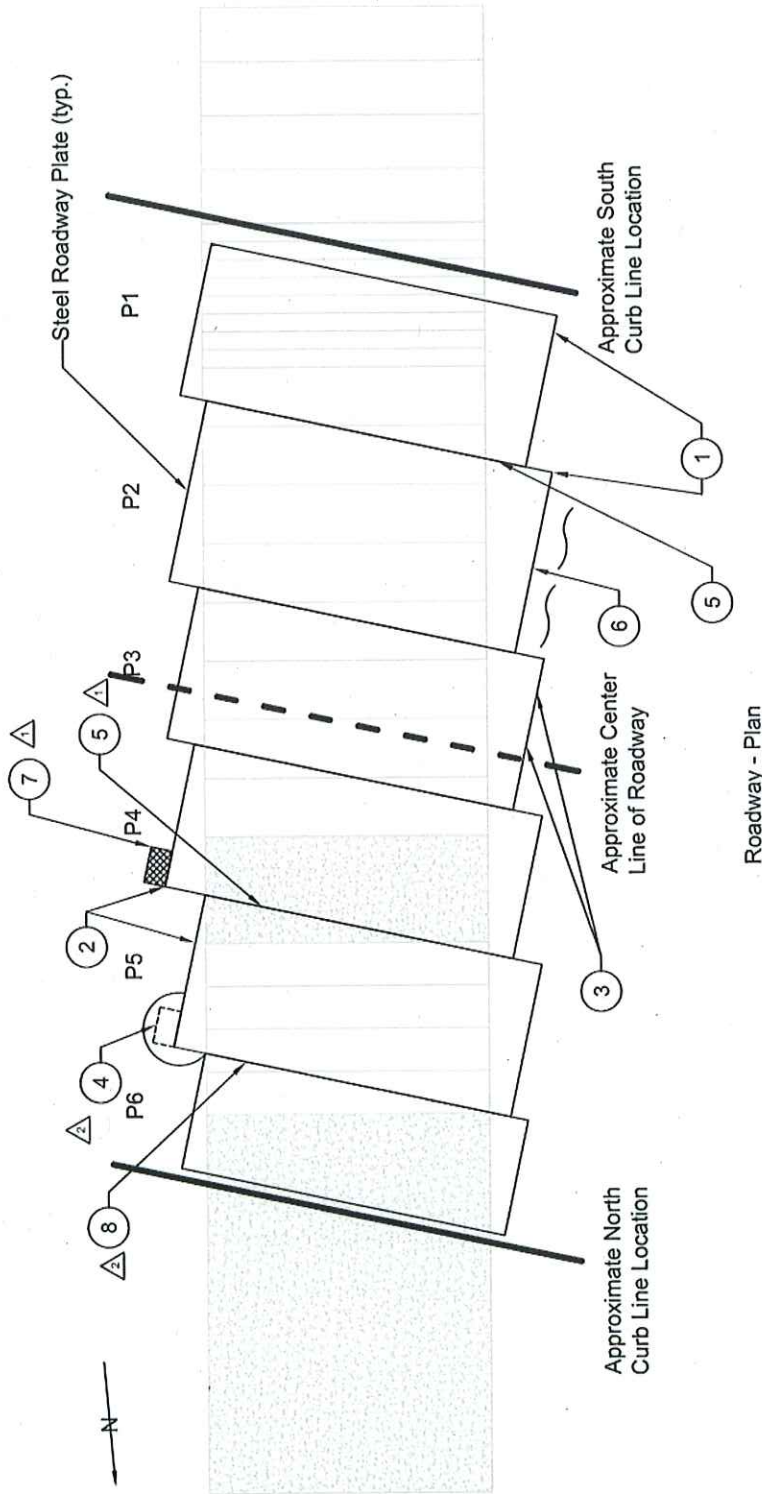
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**SKETCHES**



Sketch 1: Roadway Plate Conditions

**Legend:**

- Spall (typ.)
- Delamination (typ.)
- Patch
- Hairline Crack (U.O.N)
- Hairline Crack with Efflorescence (U.O.N)
- Delta 1 (Indicates a newly documented condition)
- Delta 2 (Indicates a change in a previously noted condition)

**Condition:**

1. Southwest corner deflects under live load
2. Northeast corner deflects under live load
3. Minor spalls adjacent to roadway plate
4. 2'-0" W x 7" L depressed bituminous patch with radial cracks  $\frac{1}{8}$ " W
5. Full length broken tack weld (typ. 5" L)
6. Minor scrapes and gouges (typ.)
7. 2'-4" W x 7" L x 2" D spall/pothole
8. Broken tack weld repaired

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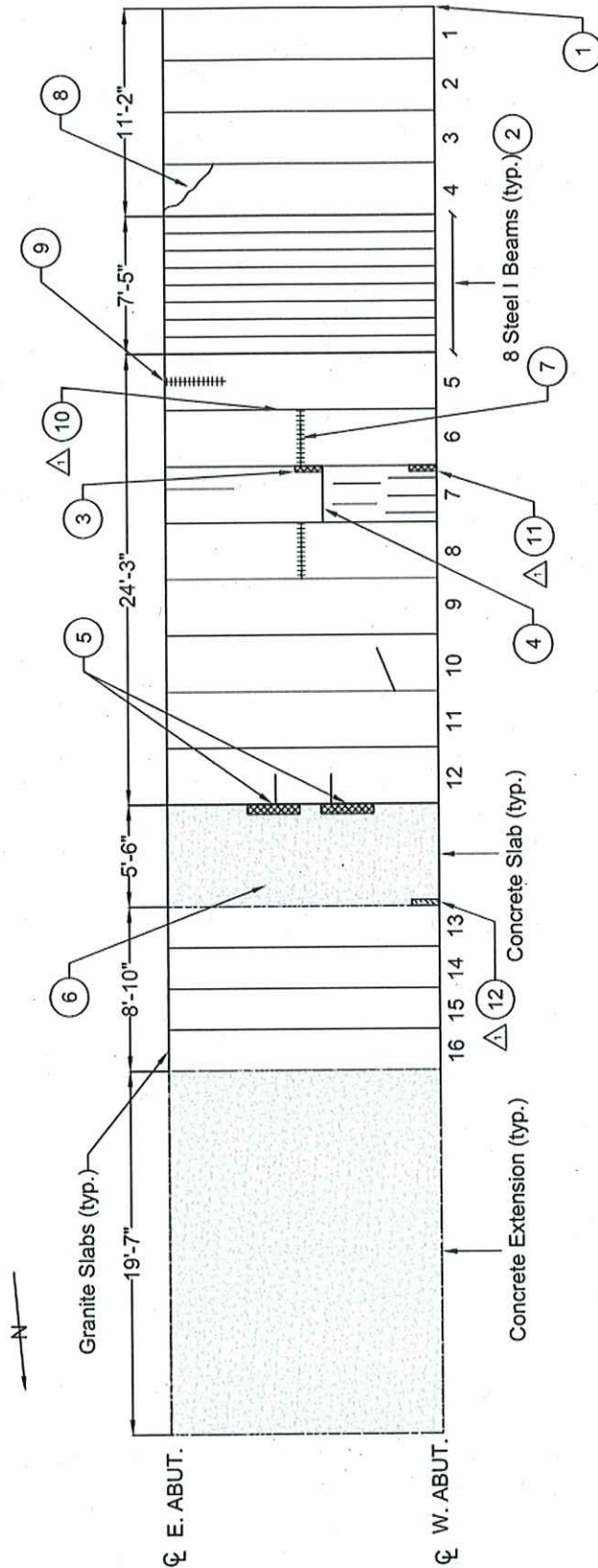
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**SKETCHES**



Reflected Underside

Sketch 2: Superstructure Conditions

Legend:

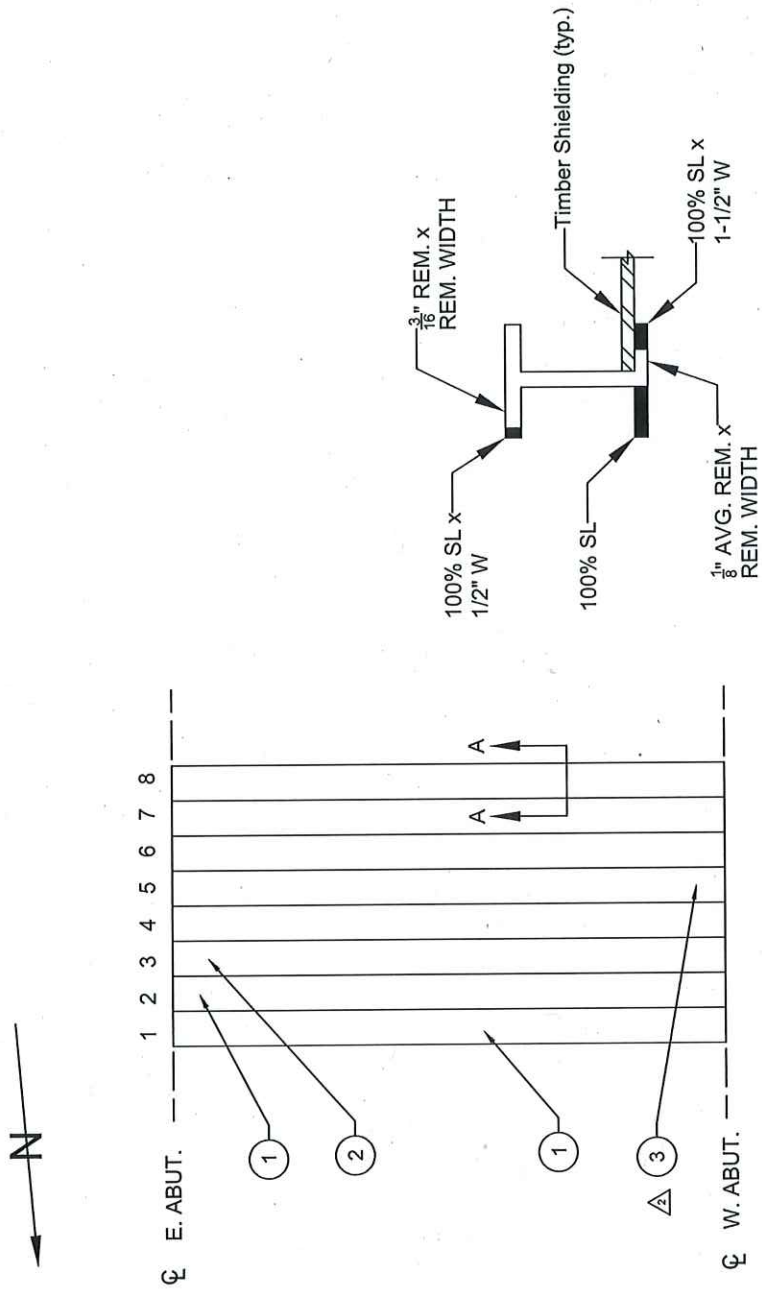
- Spall (typ.)
- Delamination (typ.)
- Hairline Crack (U.O.N)
- Hairline Crack with Efflorescence (U.O.N)
- Delta 1 (Indicates a newly documented condition)
- Delta 2 (Indicates a change in a previously noted condition)

Condition:

1. Granite Slab end unsupported at the SW corner for 6"
2. See Sketch 3: Steel Beam Conditions
3. Granite Slab with a 20" L x 13" W x 2" D spall
4. Granite slab with up to 2" W x full depth crack. Crack gauge reads 0.05mm
5. Two (2) up to 30" L x 6" W x up to 9" D edge spall with exposed rebar
6. 50% of stay in place forms are missing
7. Full width hairline crack with efflorescence. Note: Crack gauge reads 0.00mm
8. 6'-0" L hairline crack
9. 2'-6" L hairline crack with minor efflorescence
10. Loose pointing between the beams
11. 2'-0" L x 5" W x 2" D spall
12. 2'-0" L x 16" W delamination

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**SKETCHES**



Section A-A  
Beam 8

Steel Beam - Reflected Underside  
(N.T.S.)

**NOTE:**  
Interior web and top flange inaccessible due to timber shielding.  
Beams bottom flanges are typically rotated.

**Sketch 3: Steel Beam Conditions**

- Legend:**
- $\triangle 1$  - Indicates a newly documented condition
  - $\triangle 2$  - Indicates a change in a previously noted condition
- Conditions:**
1. Bottom Flange: 100% section loss x 1" W at the south leg,  $\frac{3}{16}$ " average remaining x remaining width
  2. Bottom Flange: 100% section loss x  $\frac{1}{2}$ " W at legs,  $\frac{1}{8}$ " average remaining x remaining width
  3. Bottom Flange: North Flange 2" W cut out at the west end above the drainage pipe. South Flange 100% section loss x  $\frac{1}{2}$ " W

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**PHOTOS**

Photo 1: East approach, looking east.



Photo 2: West approach, looking west.



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**PHOTOS**



**Photo 3: North Elevation**



**Photo 4: South Elevation**

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**PHOTOS**

Photo 5: Downstream, looking south.



Photo 6: Upstream, looking north.

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**PHOTOS**

Photo 7: Typical underside, granite slab looking east.



Photo 8: Typical underside, steel beams looking east.

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**PHOTOS**

Photo 9: Typical underside, concrete slab looking west.



Photo 10: Typical underside, concrete extension looking south.

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**PHOTOS**

Photo 11: Typical retrofitted steel roadway plates looking south.



Photo 12: "Caution" sign in-place at the east approach.

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## PHOTOS



Photo 13: "Caution" sign in-place at the west approach.



Photo 14: Steel Plate 4 and 5 at the northeast corner have 2'-4" W x 7" L x 2" D spall and 2'-0" W x 7" L patch with radial cracking, respectively.

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**PHOTOS**

**Photo 15:** Slab 1 southwest corner at West Abutment: Slab is unsupported for 6".



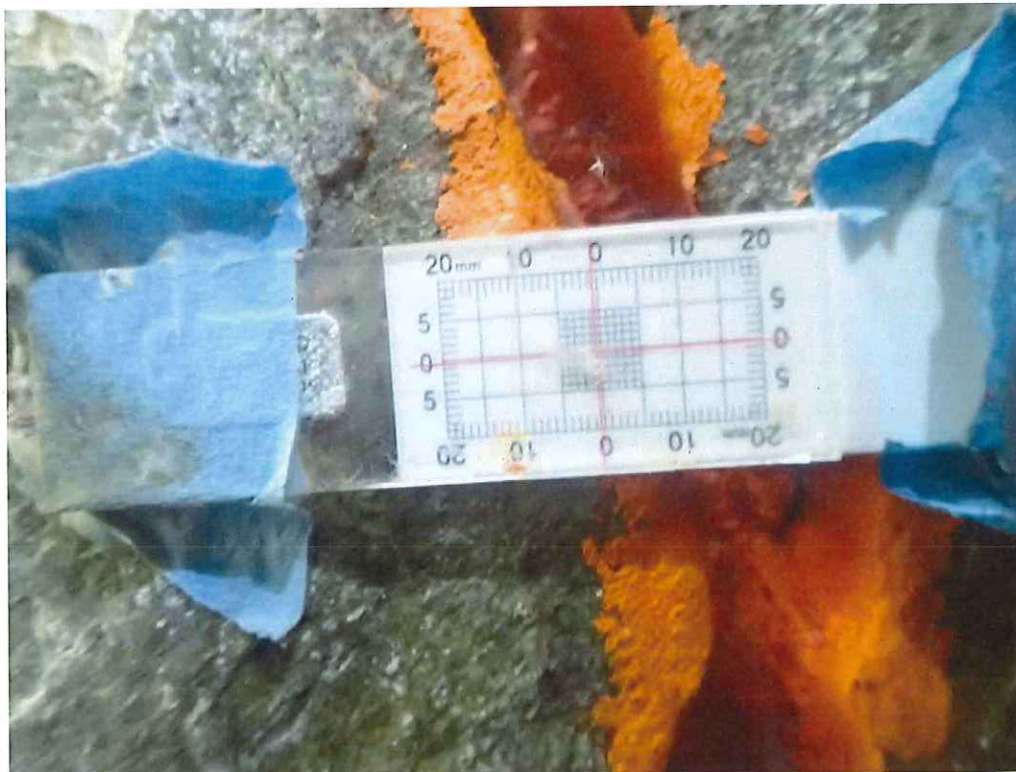
**Photo 16:** Slab 6 underside near Mid-span: Transverse hairline crack with efflorescence. Note: Crack Gauge.

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## PHOTOS



**Photo 17:** Slab 7 near Mid-span: Up to 2" W x FW x FD crack with a 20" L x 13" W x 2" D spall. Note: Crack gauge.



**Photo 18:** Slab 7 near Mid-span: Crack gauge shows minor movement (< 1 mm in both directions).



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**PHOTOS**

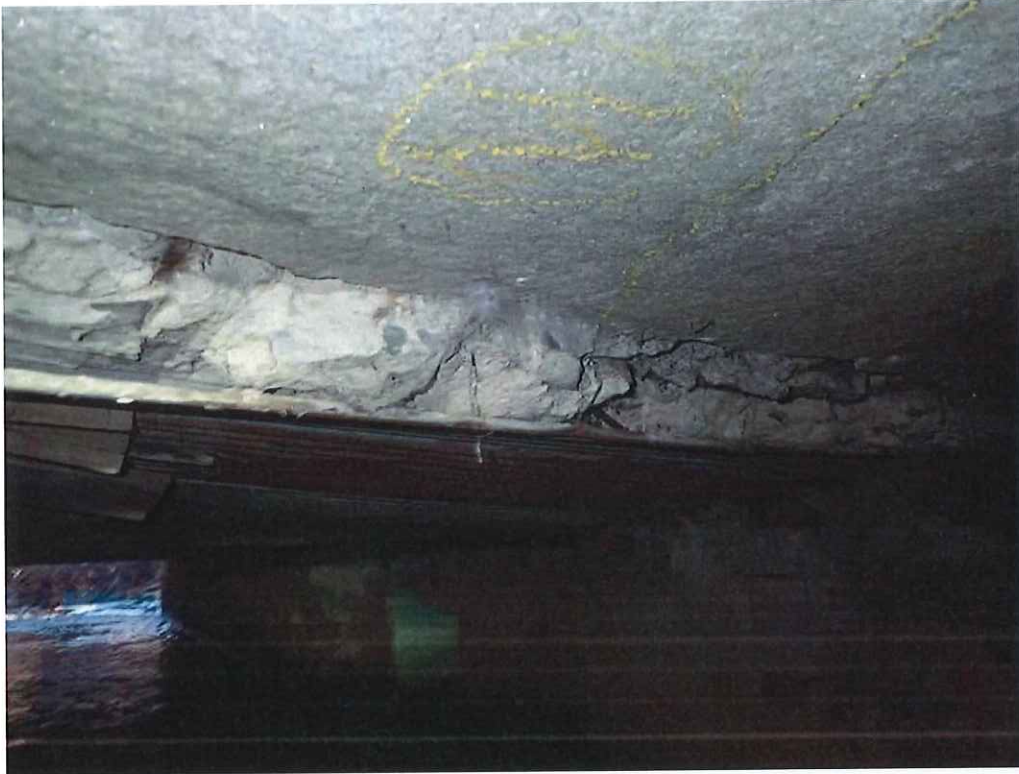
**Photo 19:** Steel Beams 2 and 3, bottom flange near East Abutment: Up to 100% section loss x 1" wide with 3/16" thickness remaining.



**Photo 20:** Steel Beam 8 bottom flange near Mid-span: 100% section loss x up to full width.

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## PHOTOS



**Photo 21:** Concrete slab at the south edge: Two (2) up to 2'-6" L x 6" W x up to 9" D edge spalls with exposed rebar.



**Photo 22:** South face of West Abutment: 2'-0" L x 18" H x 14" D void with shifted stones

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## PHOTOS



**Photo 23:** East Abutment below south edge of Slab 1: Multiple stones with vertical cracks up to 10" L x up to 1/4" W and an isolated 5" H x 1-1/2" W x 3" D spall.



**Photo 24:** East Abutment below Slab 5 at the waterline: 2'-6" L x 2'-3" H x 3'-2" D void.