

October 31, 2007

# PHASE I- PRELIMINARY REPORT

## Town of Acton

### Summary of Conditions and Recommendations for the Repair/Rehabilitation of Town Owned Bridges



A-02-009



A-02-007



A-02-011



A-02-020



A-02-008

Submitted to:



Submitted by:



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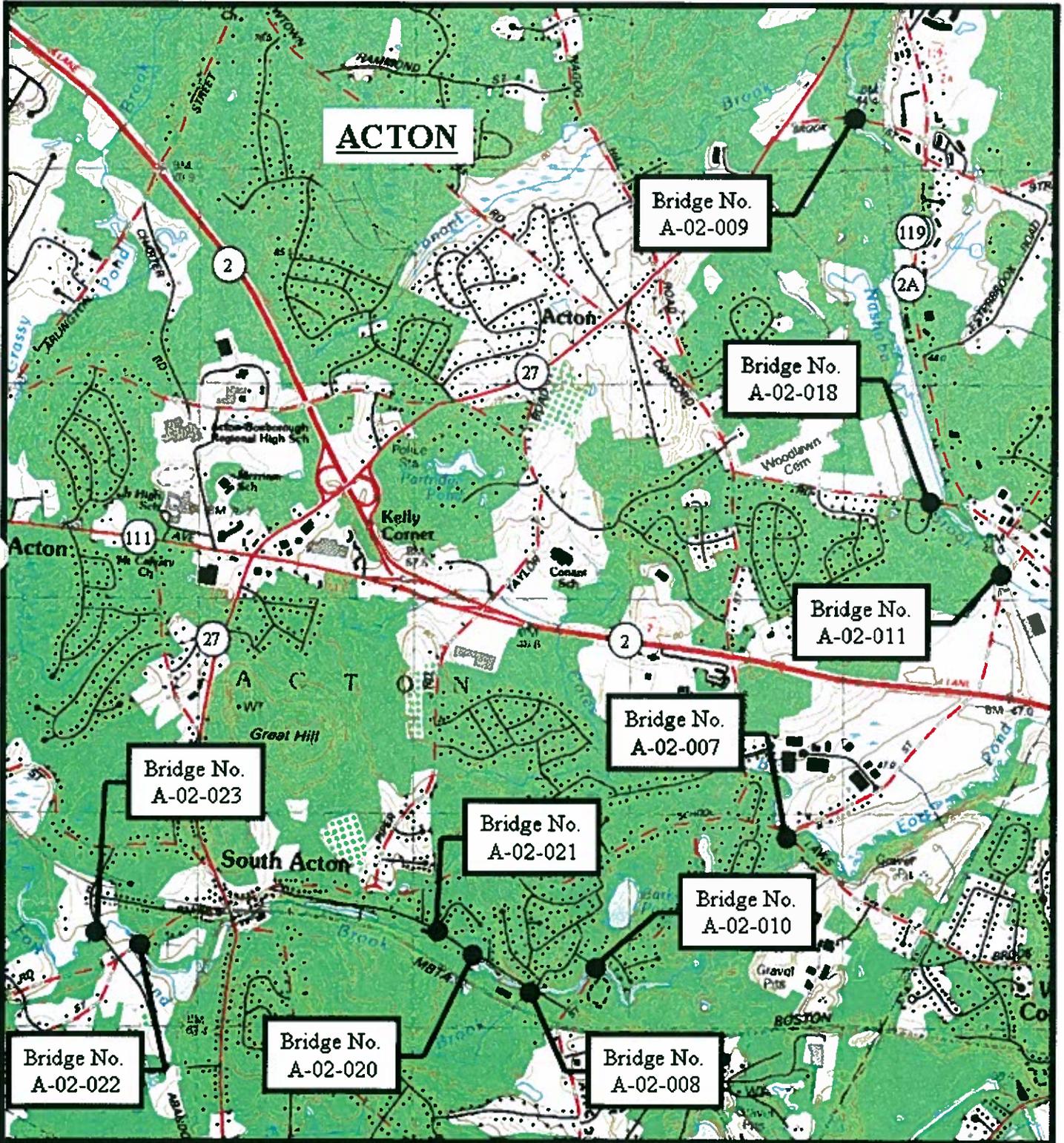


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# ACTON

## Repair and Rehabilitation of Town Owned Bridges



### PROJECT LOCUS

Scale: 1:24000



## **I. EXECUTIVE SUMMARY**

### **Background**

The Town of Acton has requested Chas. H. Sells, Inc. (SELLS) to inspect and evaluate ten (10) Town Owned Bridges in the Town of Acton, MA. The bridges include Bridge No. A-02-018 (Concord Road over Nashoba Brook), Bridge No. A-02-011 (Wetherbee Street over Nashoba Brook), Bridge No. A-02-009 (Brook Street over Nashoba Brook), Bridge No. A-02-008 (River Street over Fort Pond Brook), Bridge No. A-02-021 (River Street over Fort Pond Brook), Bridge No. A-02-020 (River Street over Fort Pond Brook), Bridge No. A-02-023 (Martin Street over Fort Pond Brook), Bridge No. A-02-022 (Stow Street over Fort Pond Brook), Bridge No. A-02-007 (Lawsbrook Road over Fort Pond Brook) and Bridge No. A-02-010 (Parker Street over Fort Pond Brook). The purpose of this project is to develop and implement a maintenance/repair plan in order to extend their service life. The work shall consist of the inspection, evaluation, design and final preparation of construction drawings and documents necessary to complete the assigned project.

### **Proposed Project**

This project involves the inspection and evaluation of the above mentioned ten (10) bridges in the Town of Acton. The proposed bridges consist of two (2) corrugated steel pipe culvert structures, two (2) corrugated steel pipe arch culvert structures, two (2) corrugated steel deck arch structures, two (2) reinforced concrete box culvert structures, one (1) concrete encased steel beam superstructure and one (1) concrete "T" beam superstructure. This report summarizes the findings of SELLS field inspection and research. The report also identifies and prioritizes needed repairs to these structures and provides a preliminary cost estimate for these repairs.

### **Field Inspection**

The bridge structures were inspected between the dates of September 19 and 21, 2007 by Justin Downing and Keith Desroches of SELLS. The equipment used for these inspections included chest waders, hip waders, boat, chipping hammers and assorted measuring devices. The bridge structures were inspected with a hands-on inspection for their conformity with the most current MassHighway Department's Bridge Inspection Reports and to identify those elements that are in need of repair with the goal of extending the service life of these structures.

**II. BRIDGE DESCRIPTION AND ORIENTATION, SUMMARY OF EXISTING CONDITIONS, RECOMMENDED MAINTENANCE, BRIDGE SKETCHES AND PHOTOS BY BRIDGE**

**BRIDGE NO. A-02-007 (LAWSBROOK ROAD OVER FORT POND BROOK)**

**Bridge Description and Orientation:**

The Lawsbrook Road Bridge over the Fort Port Pond Brook is a single span concrete “T” beam bridge that was built in 1928 (see Sketches & Photos #1, #2 & #3). Lawsbrook Road, at the bridge, is oriented North and South over the Fort Pond Brook which flows West to East. There are seven (7) “T” beams and six (6) bays labeled West to East and two (2) abutments labeled North and South.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Bridge Rail	<ul style="list-style-type: none"> <li>West Bridge Rail posts bent severely to the North</li> <li>East Bridge Rail posts are twisted</li> <li>2<sup>nd</sup> vertical post from North, East Bridge Rail, is missing 2 anchor bolts</li> </ul>	1  4
	<ul style="list-style-type: none"> <li>Minor impacts to the Northeast and Northwest approach rails</li> <li>Missing vertical post at the paved waterway at the Northeast corner</li> </ul>	5

**Top of Bridge & Bridge Deck Deficiencies (NBIS Item #58 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Safety Curb	<ul style="list-style-type: none"> <li>Moderate to severe scaling and up to 100% loss of steel edging along both safety curbs</li> </ul>	4
Deck Underside	<ul style="list-style-type: none"> <li>Light scaling throughout</li> <li>Rust staining around deck drains in Bays #2 &amp; #5 at South Abutment</li> <li>Spall measuring 17”L x 17”W x 3”D, with exposed rebar in Bay #5, 8’-0” from South Abutment</li> <li>2 small surface spalls measuring 8”W x 6”L x ½”D at the midspan of Bay #6</li> </ul>	9
Parapet	<ul style="list-style-type: none"> <li>Light to moderate scaling throughout the West parapet</li> <li>Severe scaling throughout the East parapet</li> </ul>	2



	<ul style="list-style-type: none"> <li>Moderate spalling and undermining of the 2<sup>nd</sup> vertical post base plate from the North along the East bridge rail with exposed anchor bolts</li> </ul>	6
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Superstructure Deficiencies (NBIS Item #59 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Concrete "T" Beams	<ul style="list-style-type: none"> <li>Random areas of spalling along the lower flange, narrow vertical cracks, light to moderate scaling and random areas of honeycombing</li> </ul>	1
	<ul style="list-style-type: none"> <li>Spall measuring 12"L x 8"W x up to 2"D, lower West corner of Beam #1 at South Abutment</li> </ul>	1
	<ul style="list-style-type: none"> <li>5 shallow surface spalls along West face of Beam #1 with exposed rusted rebar</li> </ul>	
	<ul style="list-style-type: none"> <li>Narrow vertical crack near midspan and 12'-0" from North Abutment – Beam 2</li> </ul>	
	<ul style="list-style-type: none"> <li>Light to moderate scaling along West face from midspan to North Abutment with hairline "U" shaped cracks near midspan – Beam 3</li> </ul>	
	<ul style="list-style-type: none"> <li>Large honeycombed area along East face of Beam #3 at South Abutment</li> </ul>	
	<ul style="list-style-type: none"> <li>Spall with exposed rusted rebar that measures 2'-6"L x up to full height x up to ¾"D along East face of Beam #3 at the North end</li> </ul>	
	<ul style="list-style-type: none"> <li>10'-0"L x 4" high narrow horizontal crack along lower East face of Beam #4</li> </ul>	7
	<ul style="list-style-type: none"> <li>Spall with exposed rusted stirrups measuring 4'-0"L x up to full height along lower East face at the North Abutment – Beam 5</li> </ul>	8
	<ul style="list-style-type: none"> <li>Incipient spall measuring up to 18"L along lower West edge at South Abutment</li> </ul>	6
<ul style="list-style-type: none"> <li>Spall measuring 6'-6"L x up to full width x up to 3"H, with exposed rusted rebar, that begins approximately 5'-6" from North Abutment – Beam 7</li> </ul>		
<ul style="list-style-type: none"> <li>Spall measuring 6'-6"L x 8"W x 3"D, with exposed rusted rebar, that begins at the South Abutment – Beam 7</li> </ul>	10	

Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Abutment Breastwalls	<ul style="list-style-type: none"> <li>Majority of abutments are not visible due to high water</li> <li>Light to moderate scaling with moderate scaling (waterline abrasion)</li> </ul>	



Abutment Backwalls	<ul style="list-style-type: none"> <li>• Random shallow surface spalls with exposed rusted rebar in all Bays except Bay #2 at North Abutment</li> <li>• Random shallow surface spalls with exposed rusted rebar in Bays #4 &amp; #5 at South Abutment</li> <li>• Hollow areas along bridge seat in Bays #1 &amp; #2 at South Abutment</li> </ul>	11
Wingwalls	<ul style="list-style-type: none"> <li>• Light to moderate scaling, random hairline cracks and light to moderate vegetation growth along tops</li> <li>• Heavy vegetation growth with hairline diagonal cracks with efflorescence staining at Northwest Wingwall</li> </ul>	1

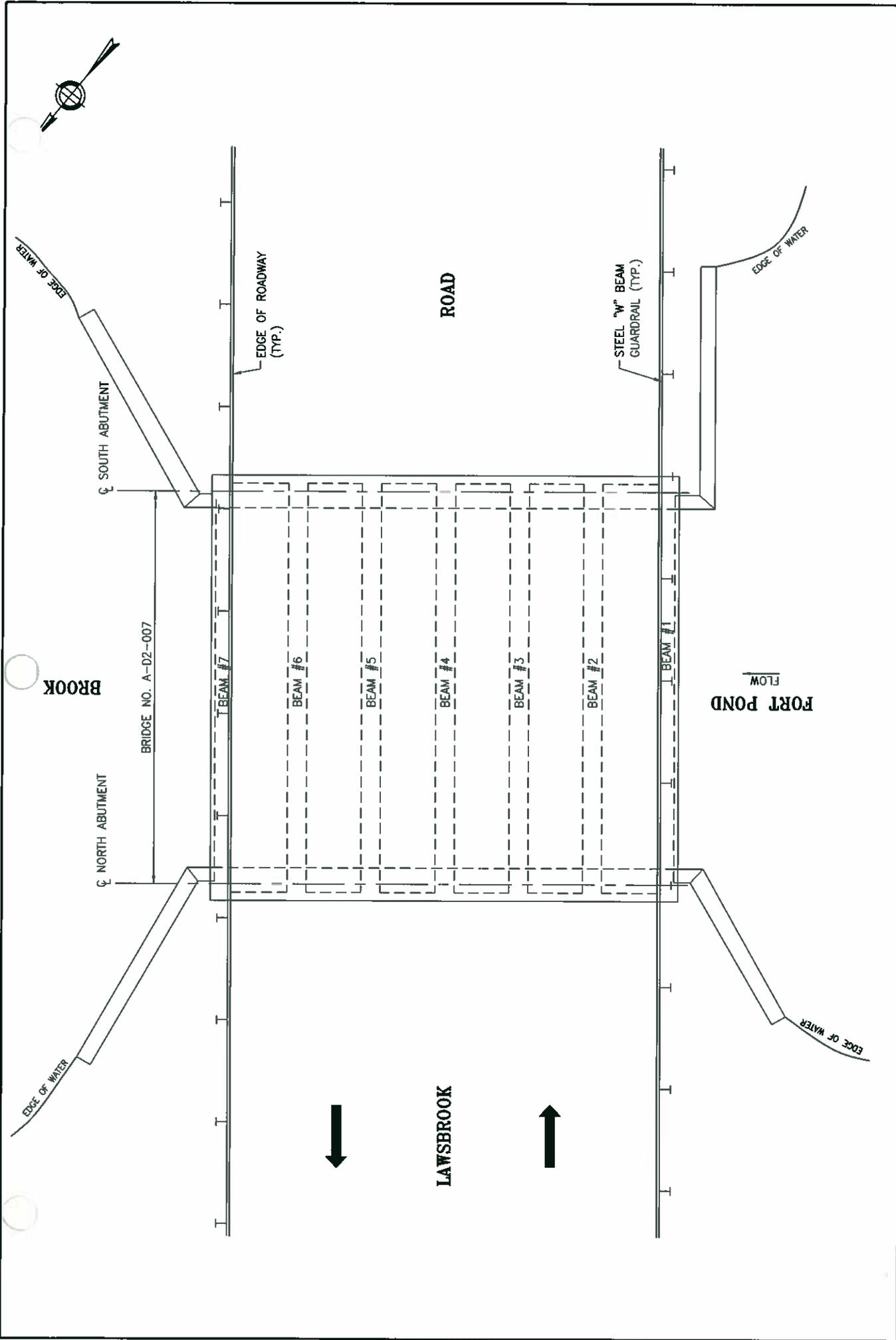
**Recommended Maintenance:**

The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the Lawsbrook Road Bridge over Fort Pond Brook:

Element & Location		Deficiency	Repair Needed	Priority
#1	Safety curbs (both)	Moderate to severe scaling	Patch with cementitious mortar	Low
#2	Safety curbs (both)	100% section loss of steel edging	Remove edging	Low
#3	NE approach guardrail	Missing vertical post in water way	Place vertical post at this location	Moderate
#4	West bridge rail	Guardrail posts bent to North, substandard system	Replace bridge rail	High
#5	East bridge rail, vertical posts	Guardrail posts twisted, substandard system	Replace bridge rail	High
#6	East parapet	Severe scaling, full length	Patch with cementitious mortar	Low
#7	Underside of Deck, Bay #5	Spall with exposed rusted rebar	Patch with cementitious mortar	Moderate
#8	Underside of Deck, Bay #6	Surface spalls at Midspan	Patch with cementitious mortar	Low
#9	Beam #1 at South Abutment	Spall along lower West edge	Repair with concrete or jacket beam with steel plates	Moderate
#10	West face of Beam #1	Five surface spalls	Repair with concrete or jacket beam with steel plates	Moderate
#11	Beam #3 at South Abutment	Honeycombing along East face	Repair with concrete or jacket beam with steel plates	Low



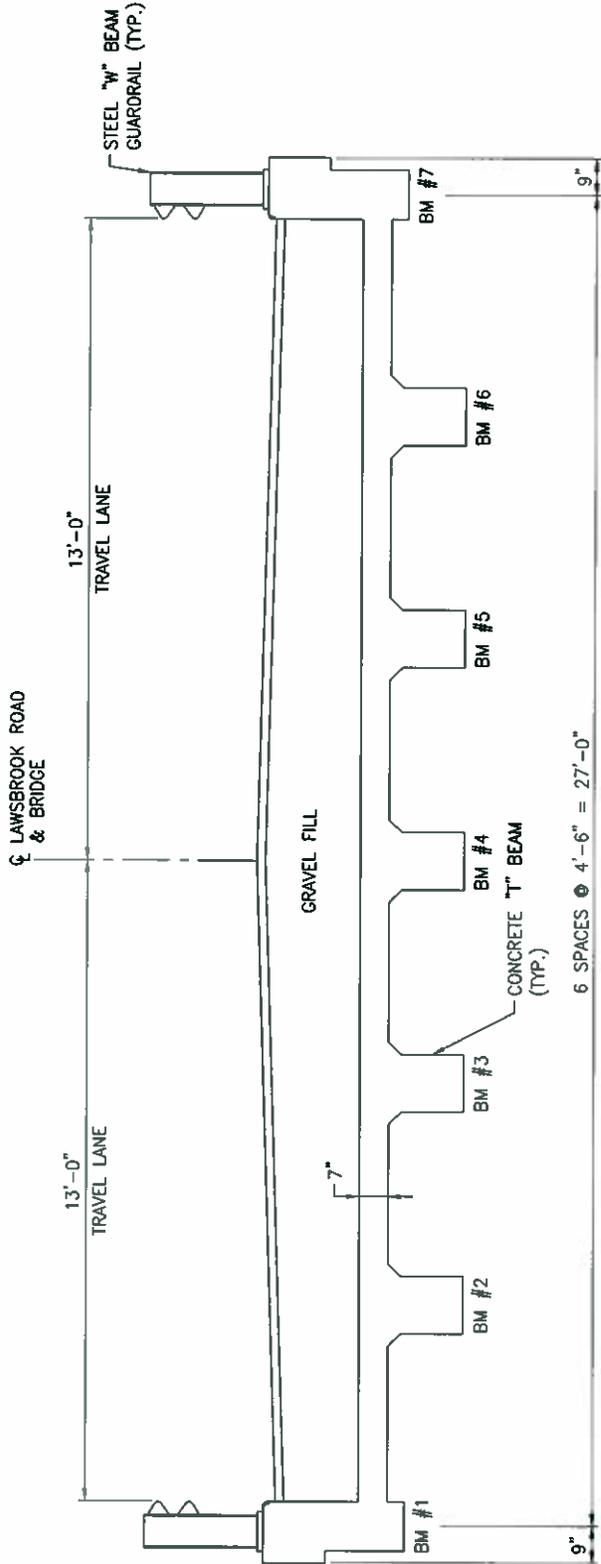
#12	Beam #5 at North Abutment	Spall with exposed stirrups	Repair with concrete or jacket beam with steel plates	Moderate
#13	Beam #6 at South Abutment	Incipient spall along lower West edge	Repair with concrete or jacket beam with steel plates	Moderate
#14	Beam #7 near North Abutment	Spall with exposed rebar	Repair with concrete or jacket beam with steel plates	Moderate
#15	Beam #7 at South Abutment	Spall with exposed rebar	Repair with concrete or jacket beam with steel plates	Moderate
#16	North Abutment backwall	Shallow spalls in all bays except #2	Patch with cementitious mortar	Low
#17	South Abutment backwall	Hollow areas and incipient spalls in Bays #1 & #2	Patch with cementitious mortar	Low
#18	South Abutment backwall	Shallow spalls in Bays #4 & #5	Patch with cementitious mortar	Low



**ACTION: LAWSBROOK ROAD OVER  
 FORT POND BROOK, BRIDGE NO. A-02-007  
 PLAN - SCALE: N.T.S.**

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 Consulting Engineers, Surveyors & Photogrammetrists





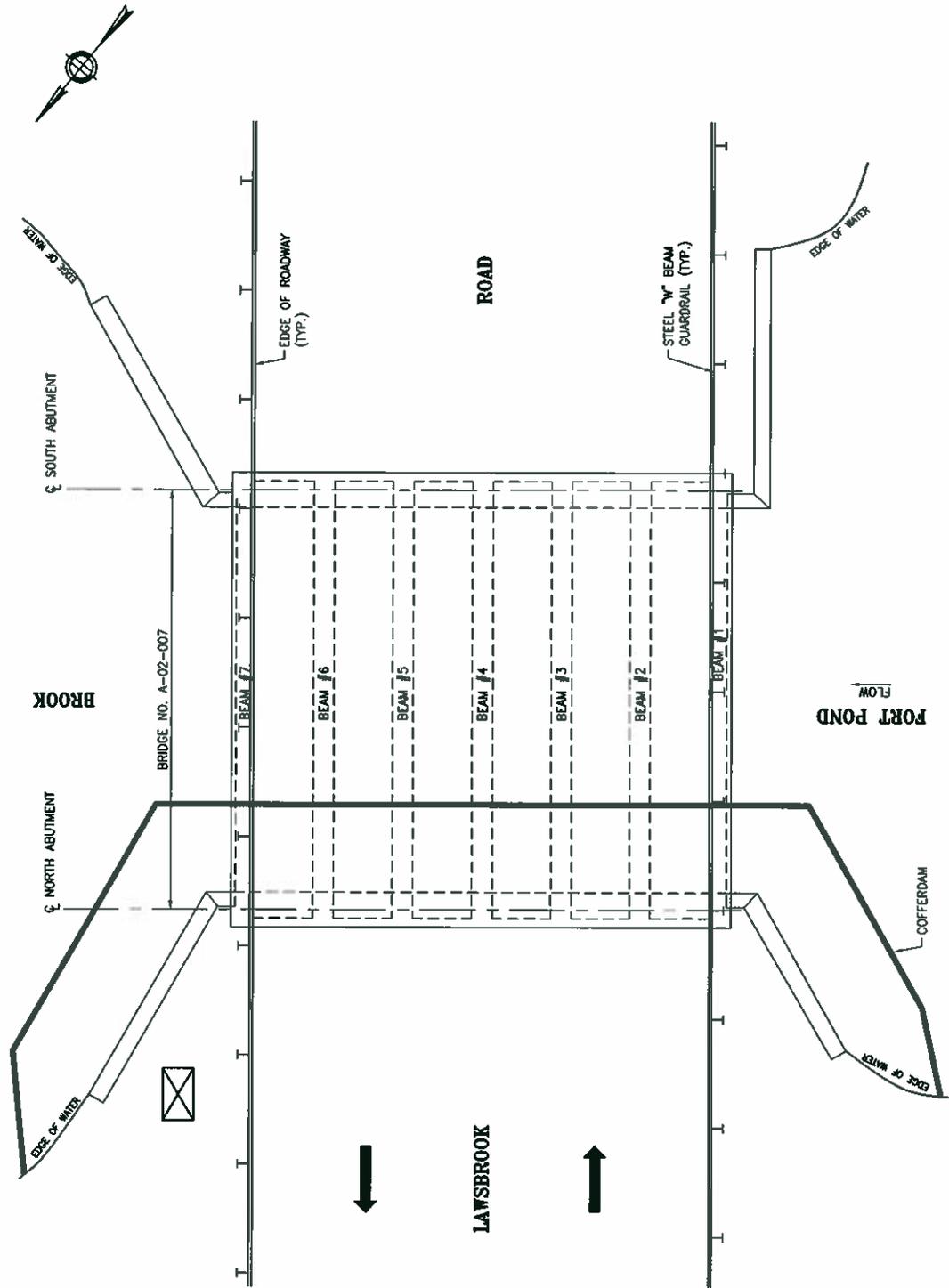
FLOW →



**ACTON: LAWSBROOK ROAD OVER  
 FORT POND BROOK, BRIDGE NO. A-02-007  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





- LEGEND**
- COFFERDAM
  - ⊠ SEDIMENTATION BASIN

STAGE I



**ACTION: LAWSBROOK ROAD OVER  
 FORT POND BROOK, BRIDGE NO. A-02-007  
 WATER CONTROL PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists



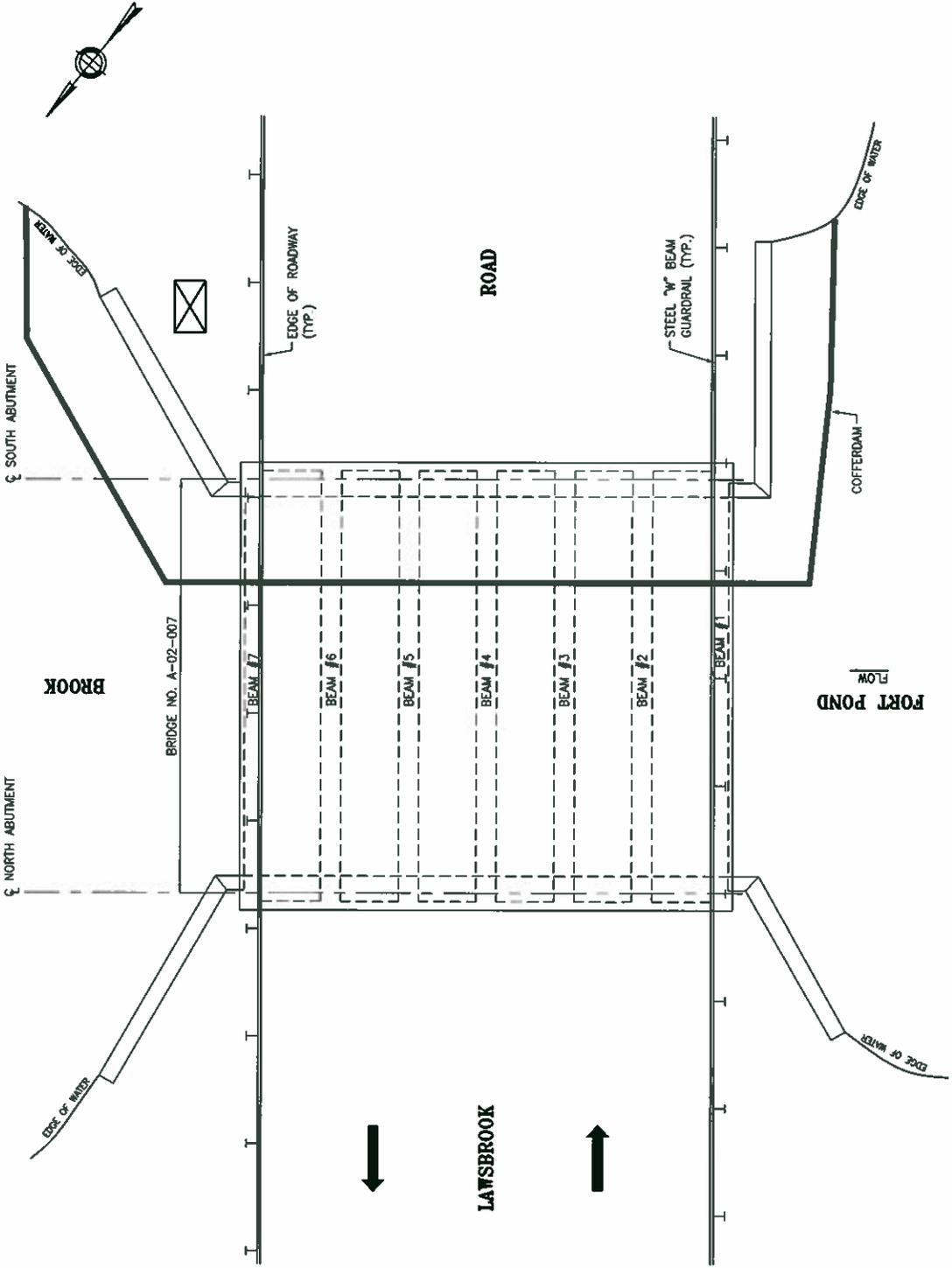


**ACTION: LAWSBROOK ROAD OVER  
 FORT POND BROOK, BRIDGE NO. A-02-007  
 WATER CONTROL PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists



**STAGE II**



- LEGEND**
- COFFERDAM
  - ⊗ SEDIMENTATION BASIN

Bridge #: A-02-007

Photo #: 1

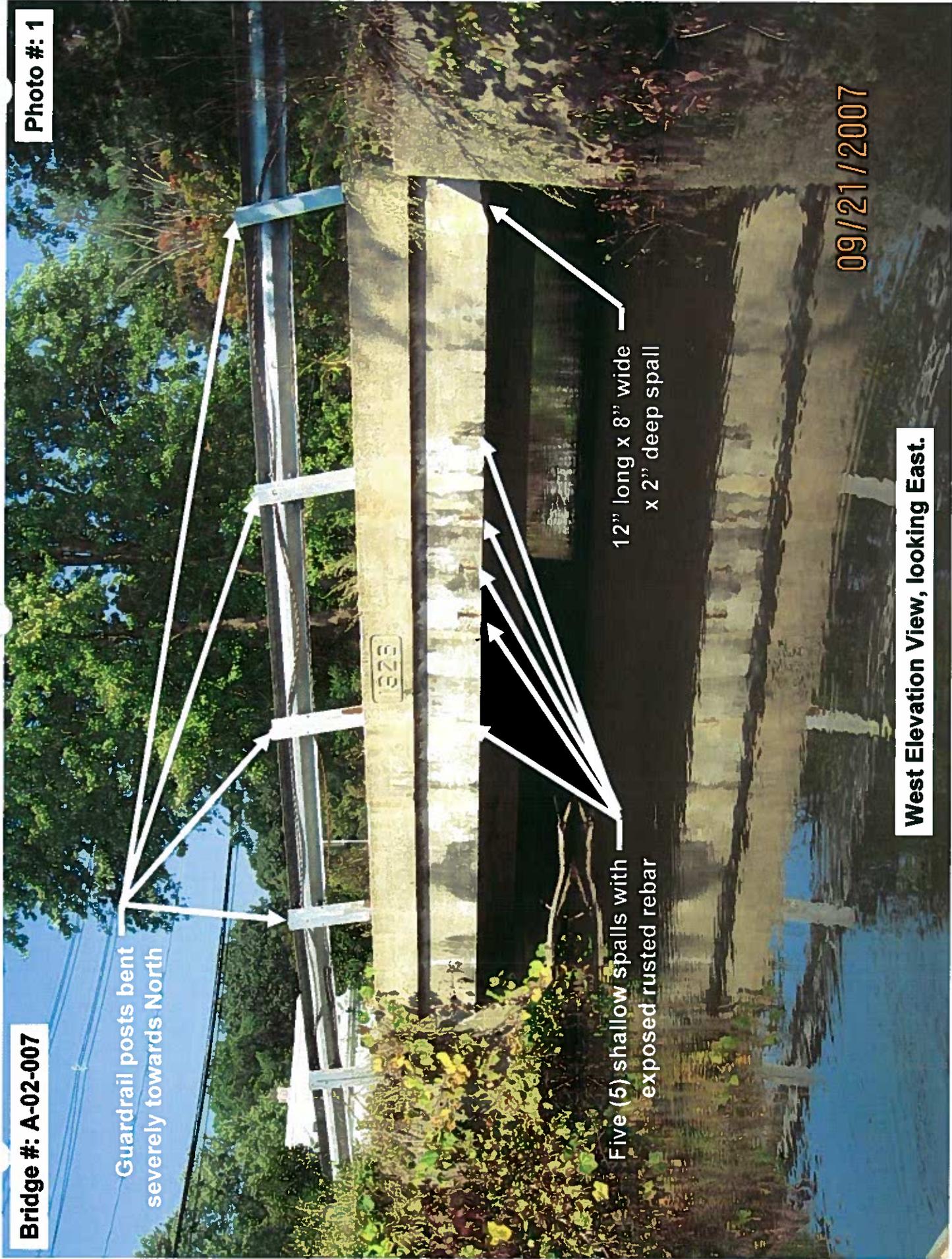
Guardrail posts bent severely towards North

Five (5) shallow spalls with exposed rusted rebar

12" long x 8" wide x 2" deep spall

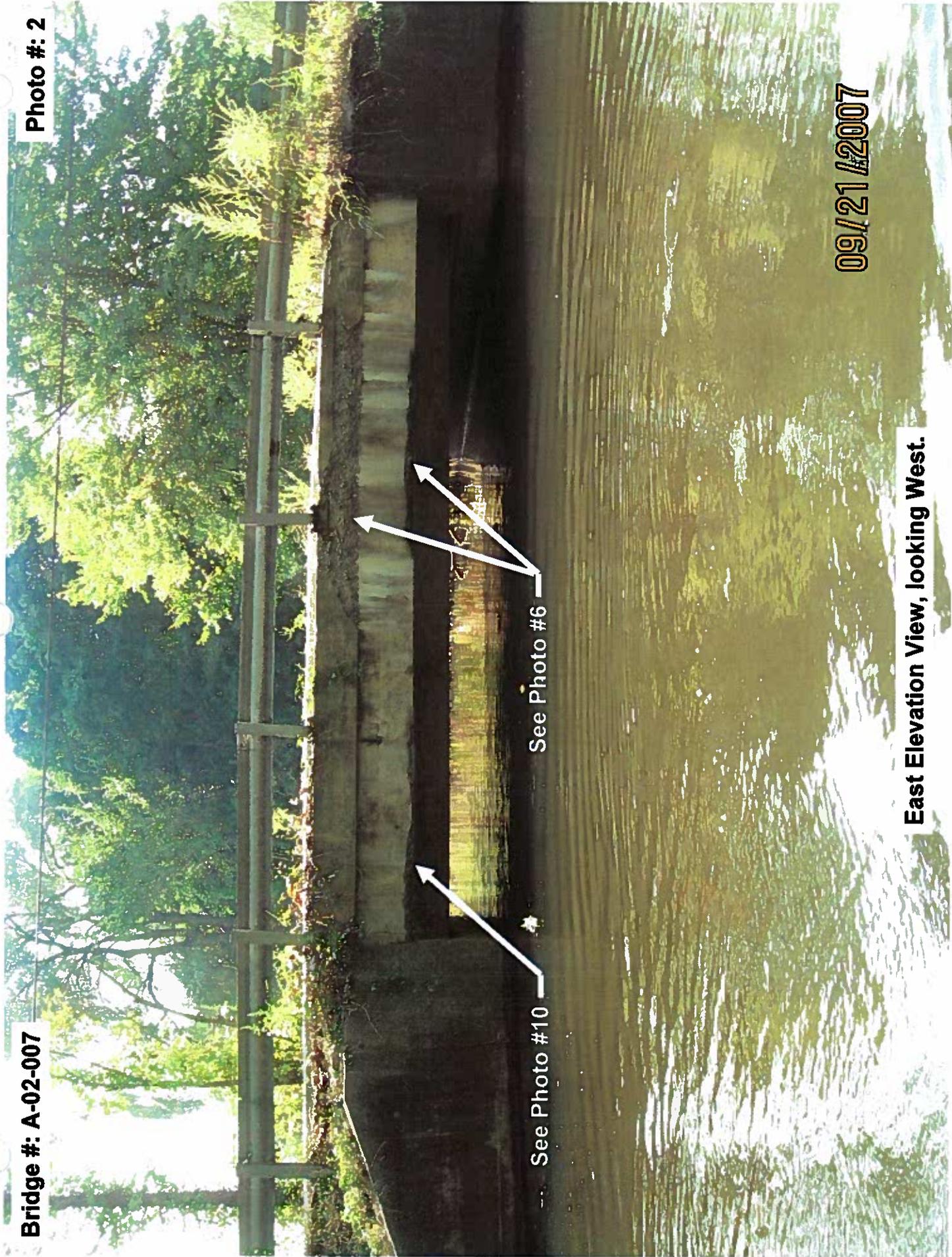
09/21/2007

West Elevation View, looking East.



Bridge #: A-02-007

Photo #: 2



See Photo #10

See Photo #6

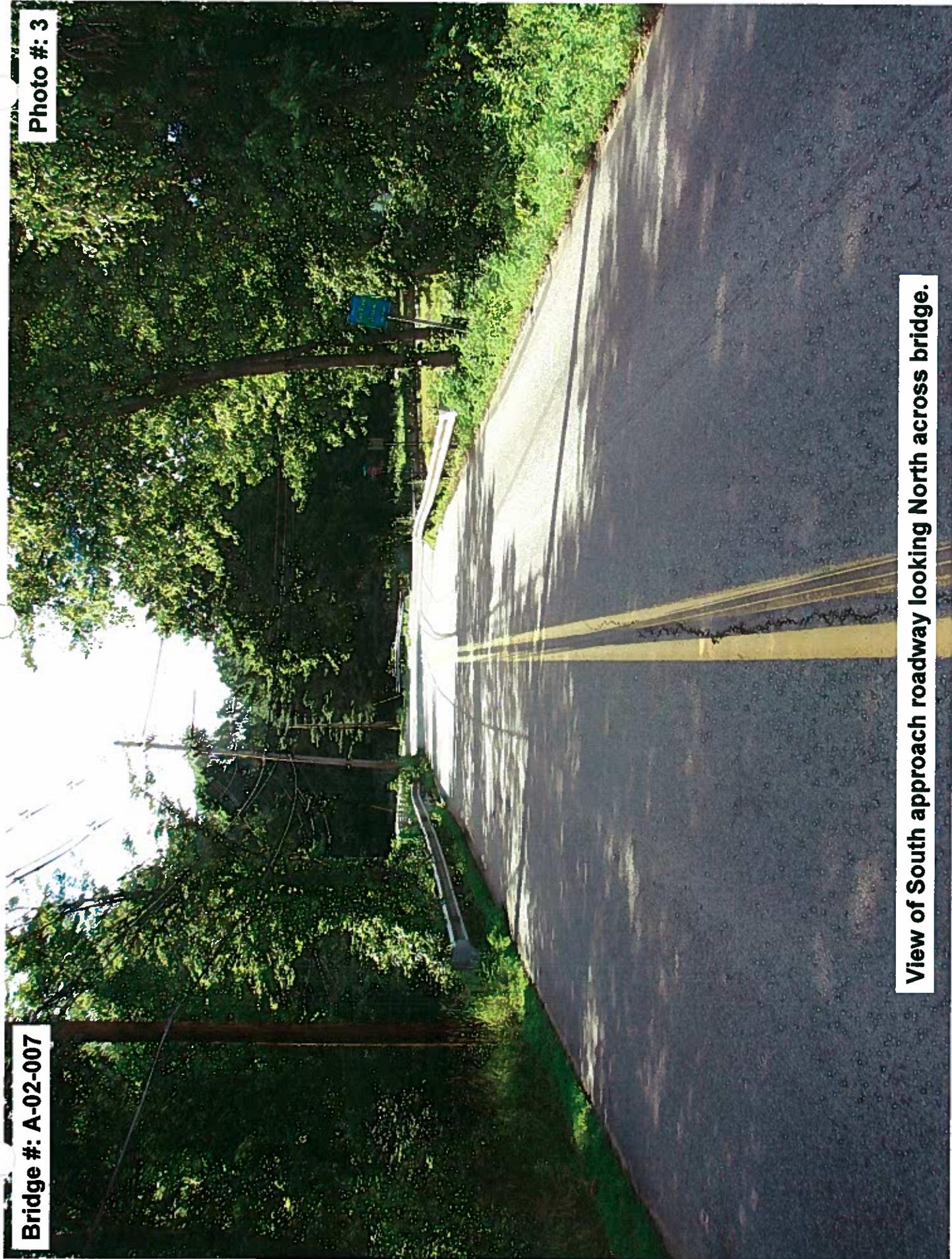
East Elevation View, looking West.

09/21/2007

Bridge #: A-02-007

Photo #: 3

View of South approach roadway looking North across bridge.



Bridge #: A-02-007

Photo #: 4

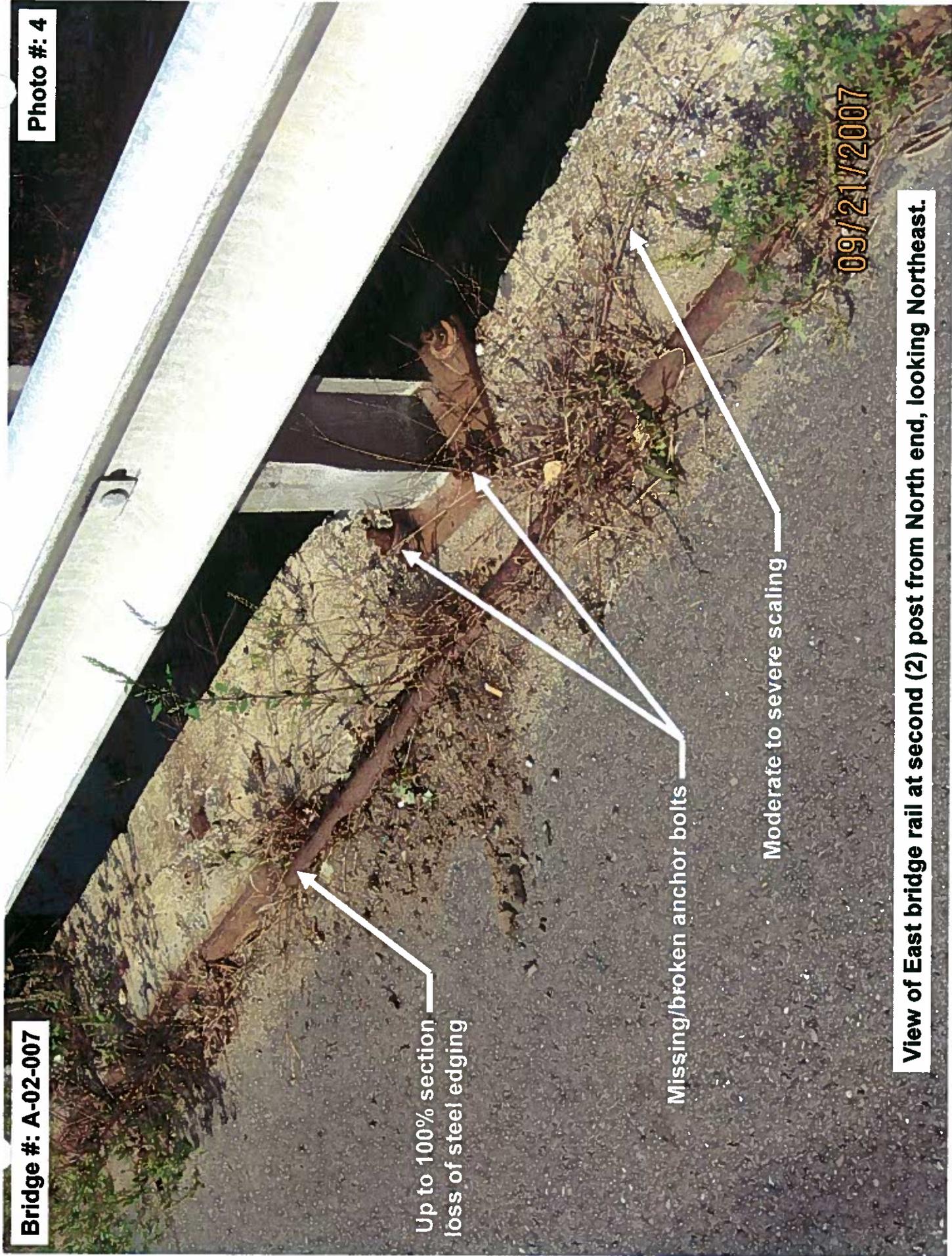
Up to 100% section  
loss of steel edging

Missing/broken anchor bolts

Moderate to severe scaling

09/21/2007

View of East bridge rail at second (2) post from North end, looking Northeast.



Bridge #: A-02-007

Photo #: 5



View of Northeast approach guardrail, looking North.

Bridge #: A-02-007

Photo #: 6

Severe scaling with undermining  
of the guardrail base plate

6'-6" long x up to full width  
x up to 3" high spall

09/21/2007

View of East parapet at the North end, looking Northwest.



Bridge #: A-02-007

Photo #: 7

10'-0" long narrow  
horizontal crack

09/21/2007

View of the East face of Beam #4 at the North end, looking North.



Bridge #: A-02-007

Photo #: 8

4'-0" long x up to full height spall  
with exposed rusted stirrups



09/21/2007

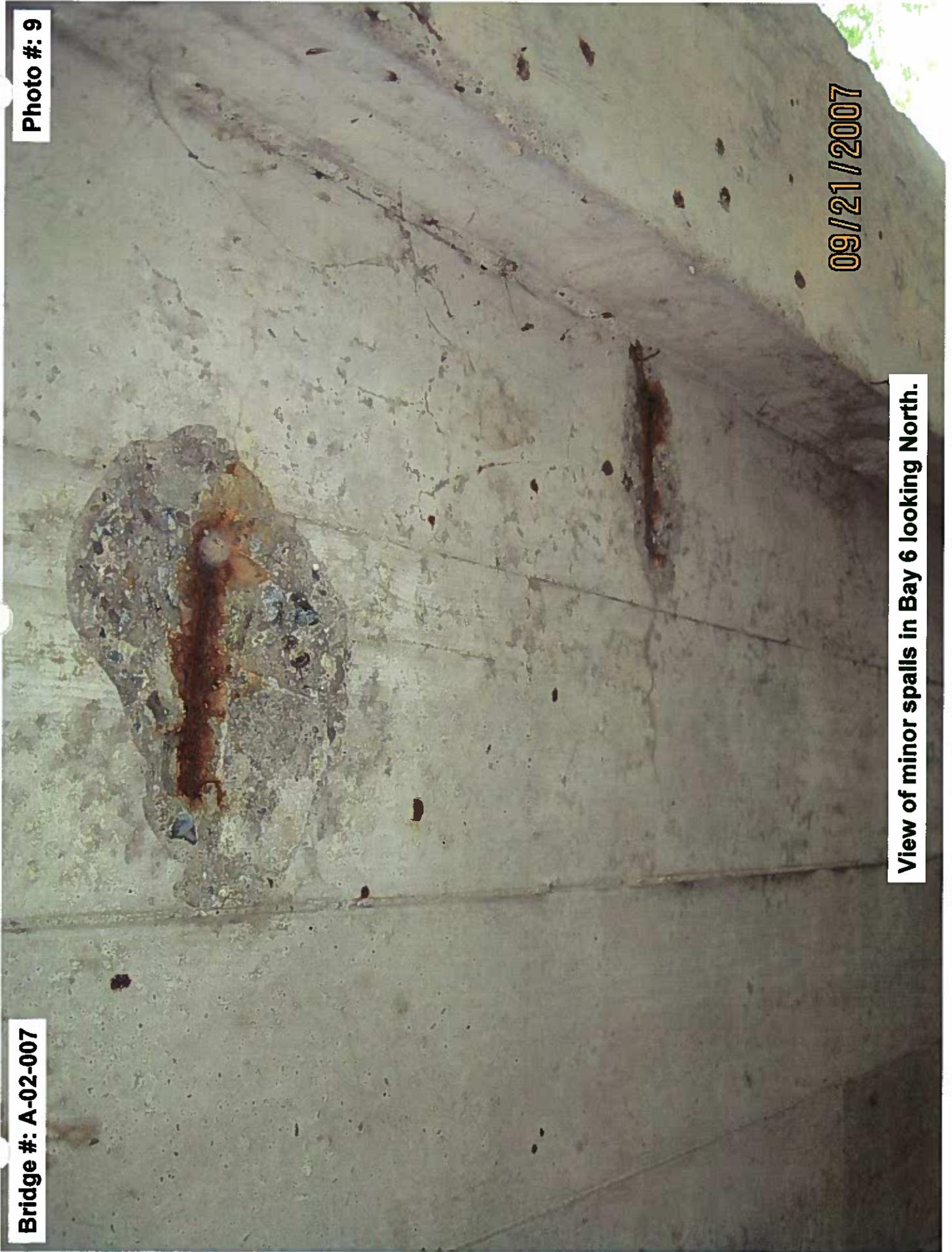
View of the East face of Beam #5 at the North end, looking North.

Bridge #: A-02-007

Photo #: 9

09/21/2007

View of minor spalls in Bay 6 looking North.



Bridge #: A-02-007

Photo #: 10



6'-6" long x 8" wide (underside) x 3" high spall

09/21/2007

View of East face of Beam #7 at the South end, looking South.

Bridge #: A-02-007

Photo #: 11

Typical condition of minor spalling  
with exposed rusted rebars

09/21/2007

View of North Abutment backwall, Bay #4, looking North.





**BRIDGE NO. A-02-008 (RIVER STREET OVER FORT POND BROOK AT CARRIAGE DRIVE)**

**Bridge Description and Orientation:**

The River Street Bridge over Fort Pond Brook is a single span corrugated steel arch deck structure that was built in 1937 (see Sketches & Photos #1 & #2). River Street, at the bridge, is oriented West and East over the Fort Pond Brook which flows South to North.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Bridge Rail	<ul style="list-style-type: none"> <li>• Areas of missing mortar, separation of mortar, random voids and narrow to medium cracks in mortar</li> <li>• 25% of South bridge rail is missing mortar</li> <li>• 2 voids under 4<sup>th</sup> cap stone from East end, South bridge rail that measure measures 10”L x 2”H x 4”D</li> <li>• Small void in North bridge rail, located approximately 20’-0” from East end and 12” above roadway that measures 10”H x 3” L x 2.5”D</li> <li>• Small void in North bridge rail, located approximately 30’-0” from West end that measures 18”L x 1”H x 2”D</li> <li>• Granite cap stones show minor misalignment and minor cracked and/or missing mortar between stones</li> <li>• Western most cap stone along the North bridge rail is misaligned up to 1”</li> </ul>	3
	<ul style="list-style-type: none"> <li>• Western most cap stone along the North bridge rail is misaligned up to 1”</li> </ul>	4
Approach Guardrail	<ul style="list-style-type: none"> <li>• Not attached to stone masonry bridge rail</li> <li>• Minor impact to terminal end at Southeast approach</li> </ul>	

**Top of Bridge Deficiencies (NBIS Item #58 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Wearing Surface	<ul style="list-style-type: none"> <li>• Hairline to narrow random cracks throughout</li> <li>• Light vegetation growth along curbs</li> <li>• Beveled curb is spalled throughout</li> </ul>	3



Superstructure Deficiencies (NBIS Item #59 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Corrugated Steel Arch Deck	<ul style="list-style-type: none"> <li>Light oxidation throughout upper portion of arch, light to moderate rusting of the lower portion and random areas of protective coat deterioration</li> <li>2" outward deformation at the West side of deck arch above spring line</li> </ul>	5
	<ul style="list-style-type: none"> <li>Random missing and deteriorated connection bolts</li> <li>Light to moderate rusting of lower connection plate between arch and abutment</li> <li>Heavier rusting and minor steel delamination at Southeast, Southwest and Northwest corners</li> </ul>	6, 7, 8
Headwalls	<ul style="list-style-type: none"> <li>Numerous hairline to narrow cracks in mortar and separation of the mortar between stones</li> <li>Minor separation and small voids along arch ring, especially at the North headwall</li> </ul>	1

Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Abutment Breastwalls	<ul style="list-style-type: none"> <li>Moderate to heavy scaling (waterline abrasion) throughout</li> <li>Spall at the Northwest corner that measures 40"L x 7"H x 3"D (at waterline)</li> <li>Minor aggradation at Southeast corner of bridge</li> </ul>	8
Wingwalls	<ul style="list-style-type: none"> <li>Numerous hairline to narrow random cracks in mortar and minor separation between stones</li> </ul>	9
	<ul style="list-style-type: none"> <li>Large voids in Southeast wingwall along bottom and random small voids between stones</li> <li>Area of missing mortar near East end of Northeast wingwall that measures 8'-0"W x 4'-0"H</li> </ul>	10

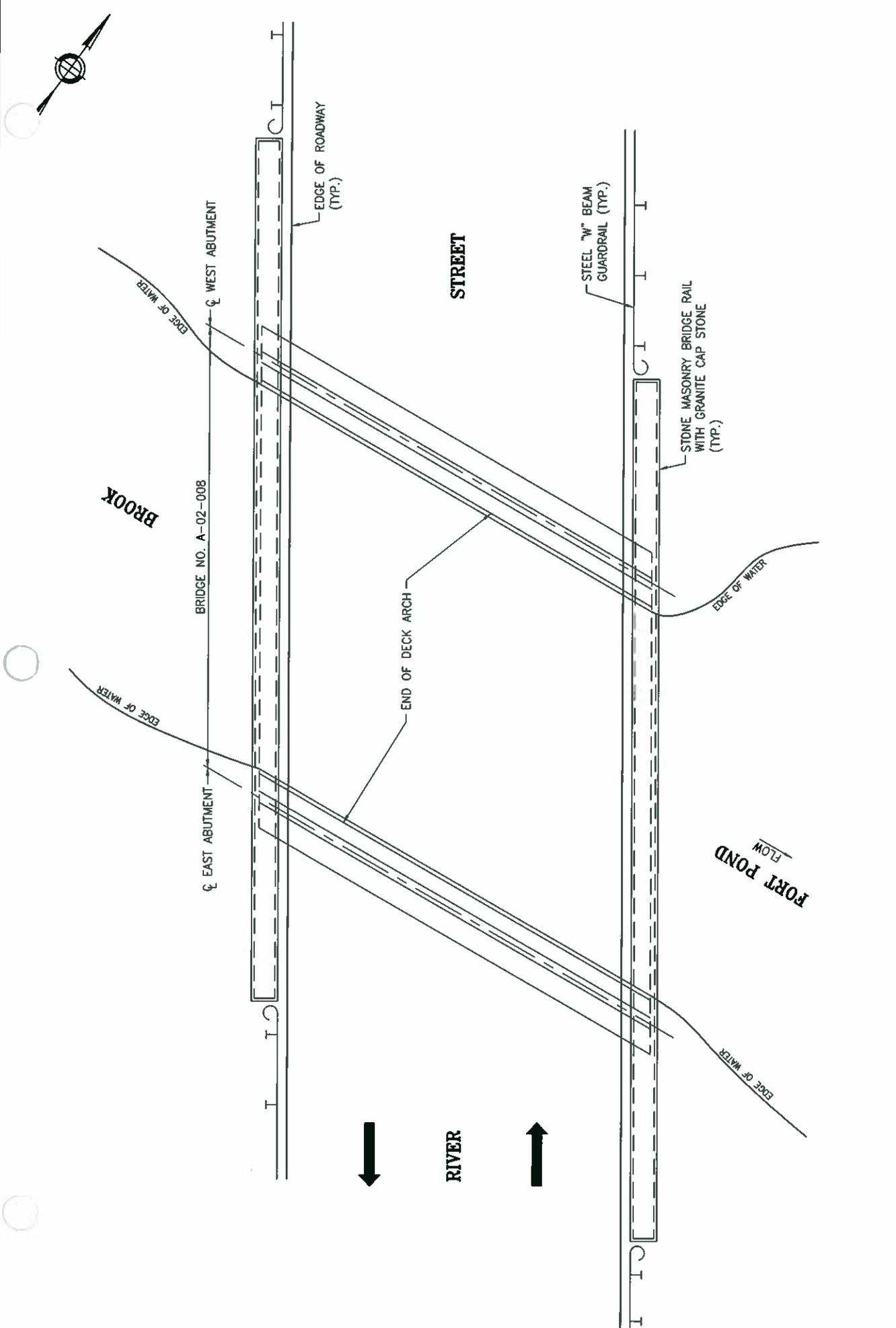
**Recommended Maintenance:**

The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the River Street Bridge over Fort Pond Brook (at Carriage Drive):

Element & Location		Deficiency	Repair Needed	Priority
#1	Top of bridge	Beveled curb spalling along bridge rail	Remove beveled curb and replace with asphalt berm	Low



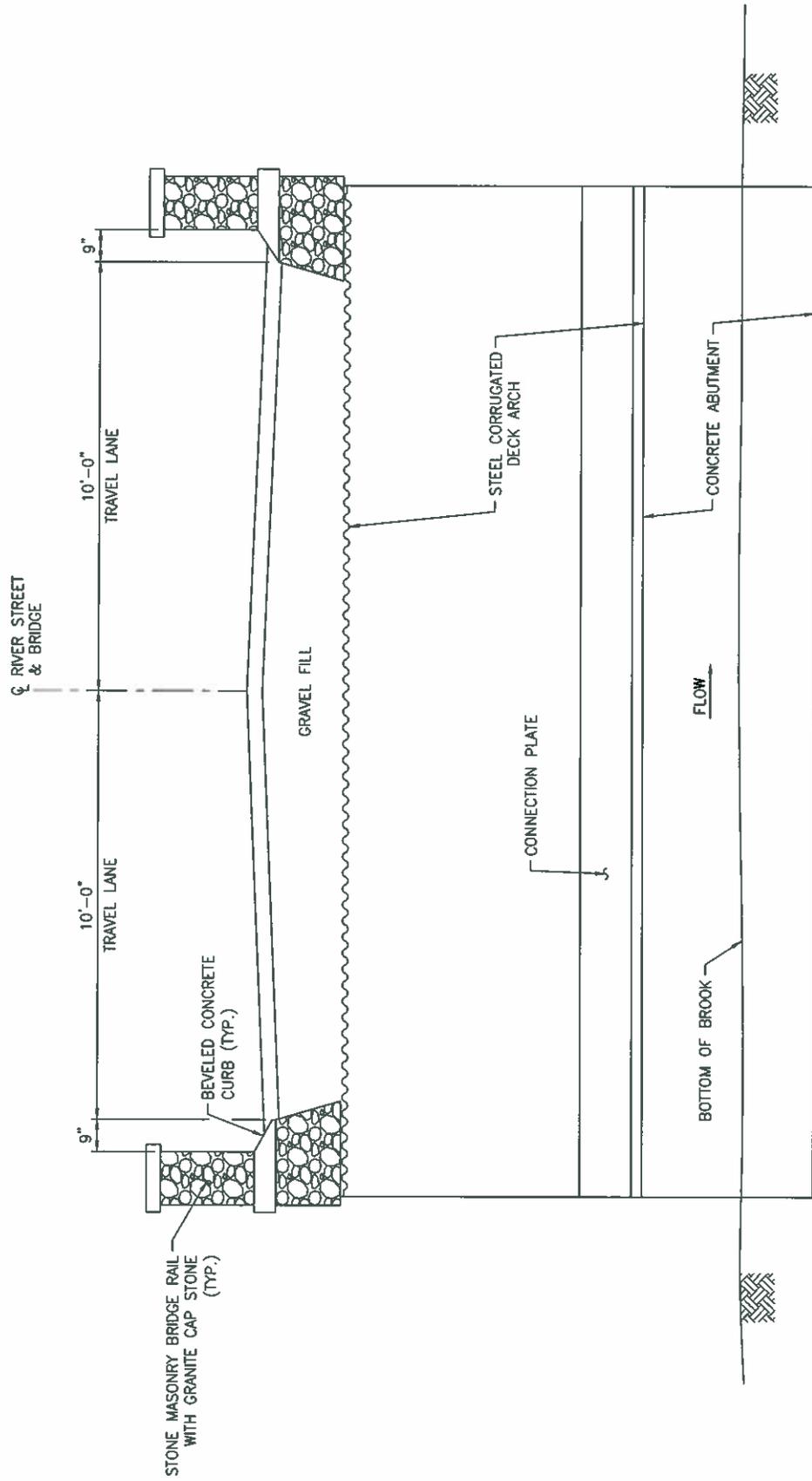
#2	SE approach guardrail terminal end	Collision Damage	Remove and replace terminal end	Low
#3	North and South bridge rail	Hairline to narrow cracks in mortar and between cap stones & voids between stones	Fill voids and repoint stone masonry as needed	Low
#4	Steel Arch Deck	Cracking and peeling throughout and light to moderate rusting and minor steel delamination at abutments	Clean and place new protective coating throughout	Moderate
#5	North and South stone masonry headwalls	Hairline to narrow cracks in mortar	Repoint stone masonry as needed	Low
#6	West Abutment, North end	Spall at waterline	Patch with cementitious mortar	Low
#7	Wingwalls	Hairline random cracks in mortar	Repoint stone masonry as needed	Low



**ACTION: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-008  
 PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists

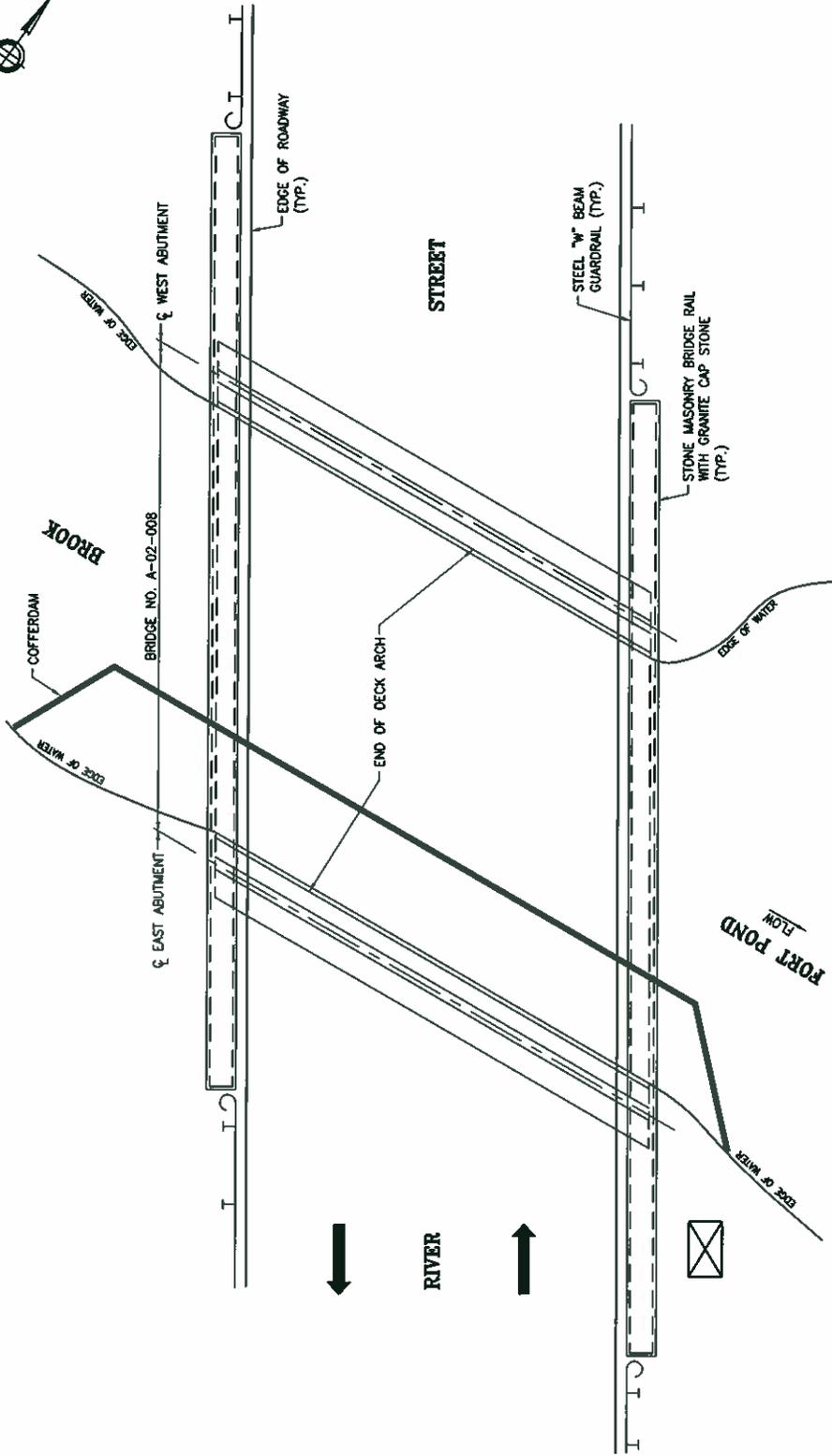




ACTION: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-008  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.

**CHAS. H. SELLS, INC.**  
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**LEGEND**

— COFFERDAM

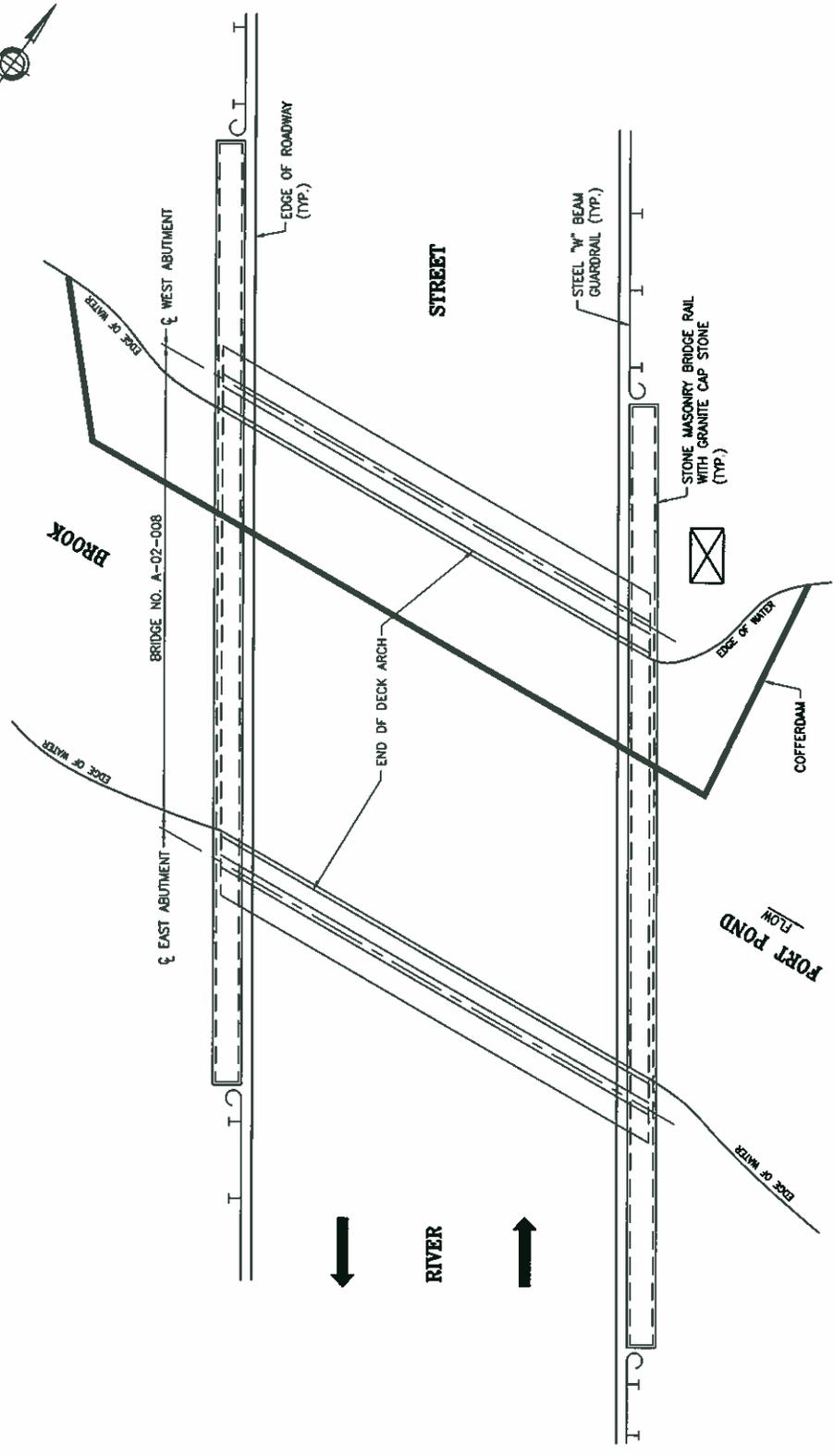
⊠ SEDIMENTATION BASIN

STAGE I

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists

**ACTION: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-008  
 WATER CONTROL PLAN - SCALE: N.T.S.**





**LEGEND**  
 — COFFERDAM  
 ⊗ SEDIMENTATION BASIN

**STAGE II**



**ACTION: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-008  
 WATER CONTROL PLAN - SCALE: N.T.S.**

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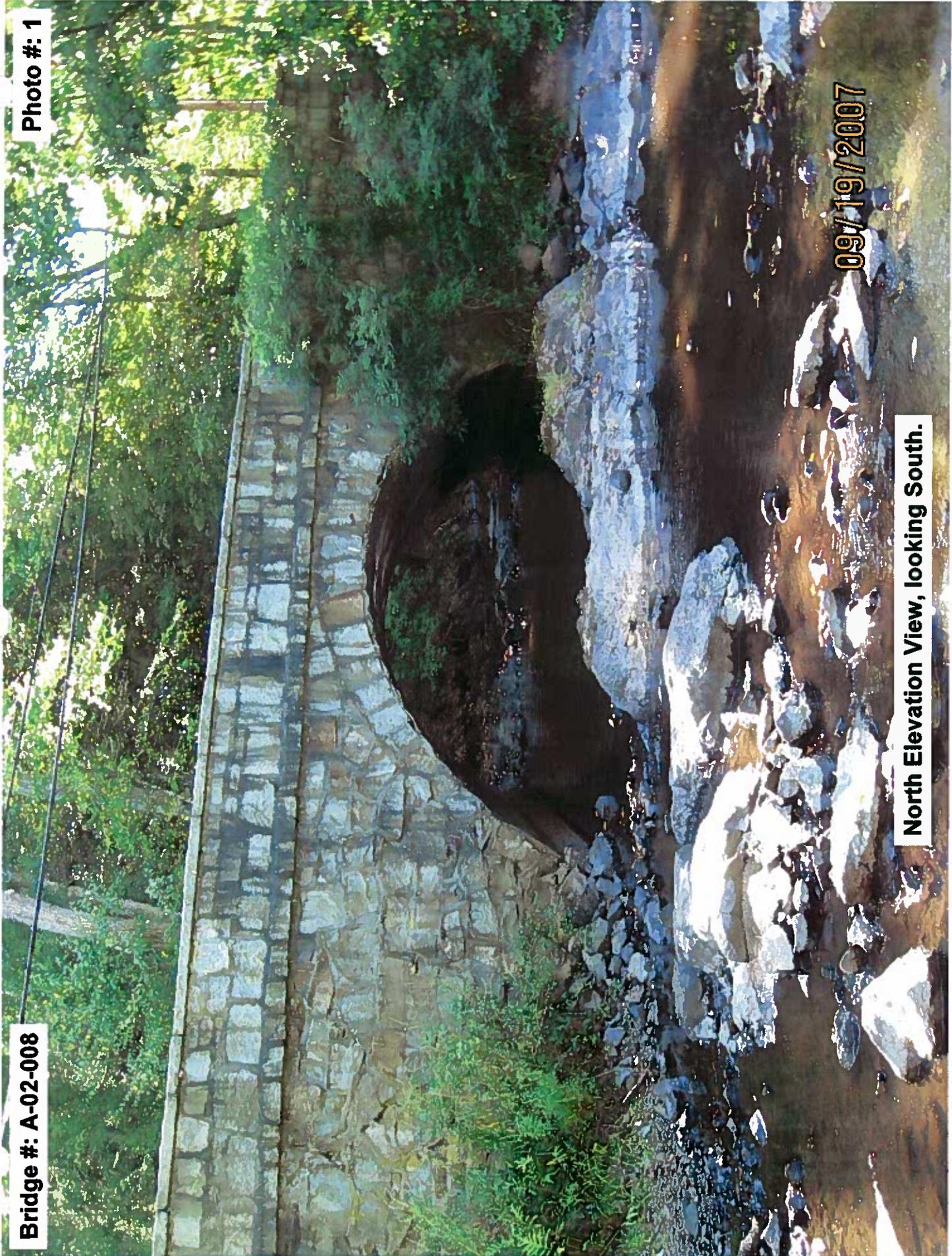


Bridge #: A-02-008

Photo #: 1

09/19/2007

North Elevation View, looking South.



Bridge #: A-02-008

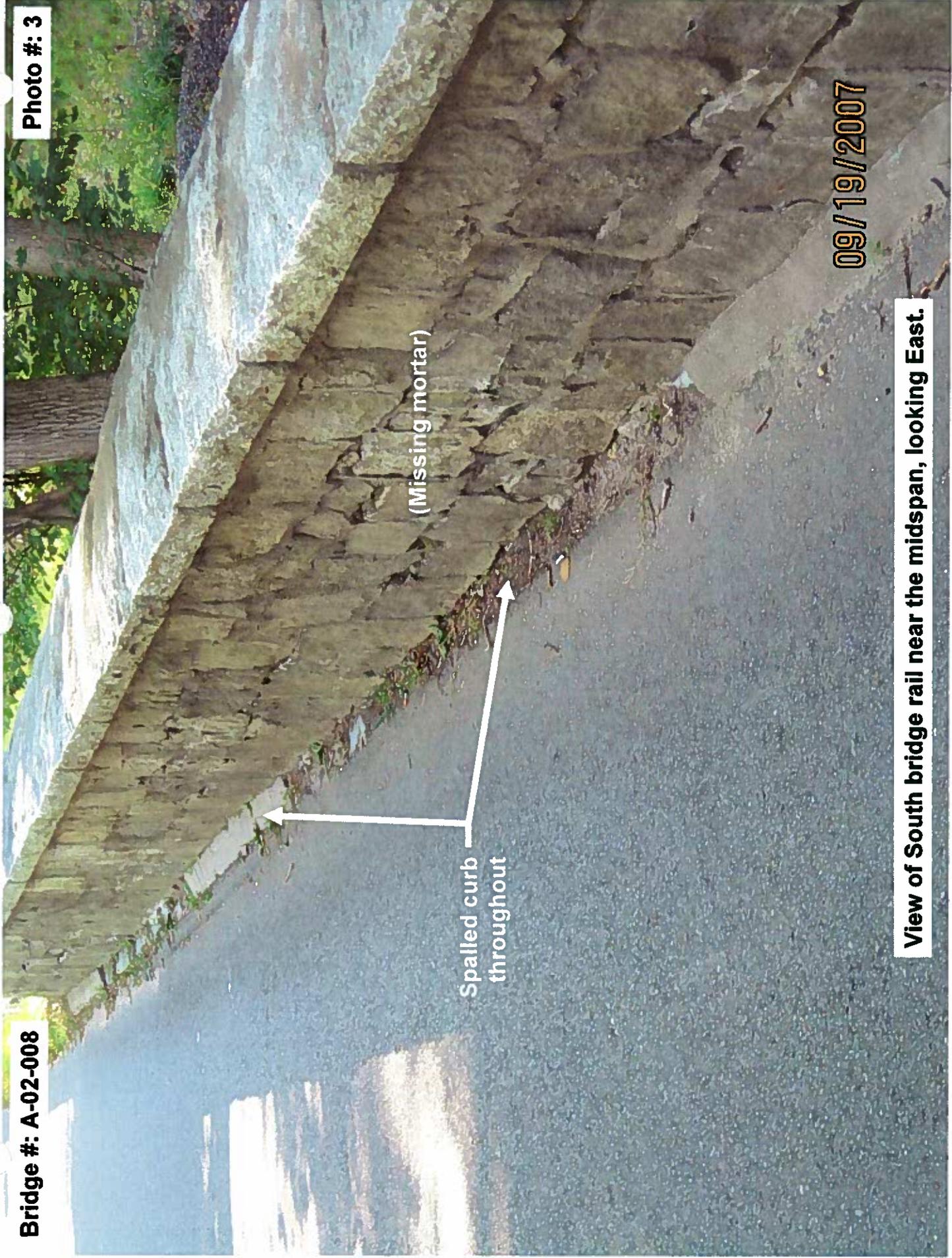
Photo #: 2



View of North approach roadway looking South across bridge.

Bridge #: A-02-008

Photo #: 3



View of South bridge rail near the midspan, looking East.

09/19/2007

Bridge #: A-02-008

Photo #: 4

1" Misalignment

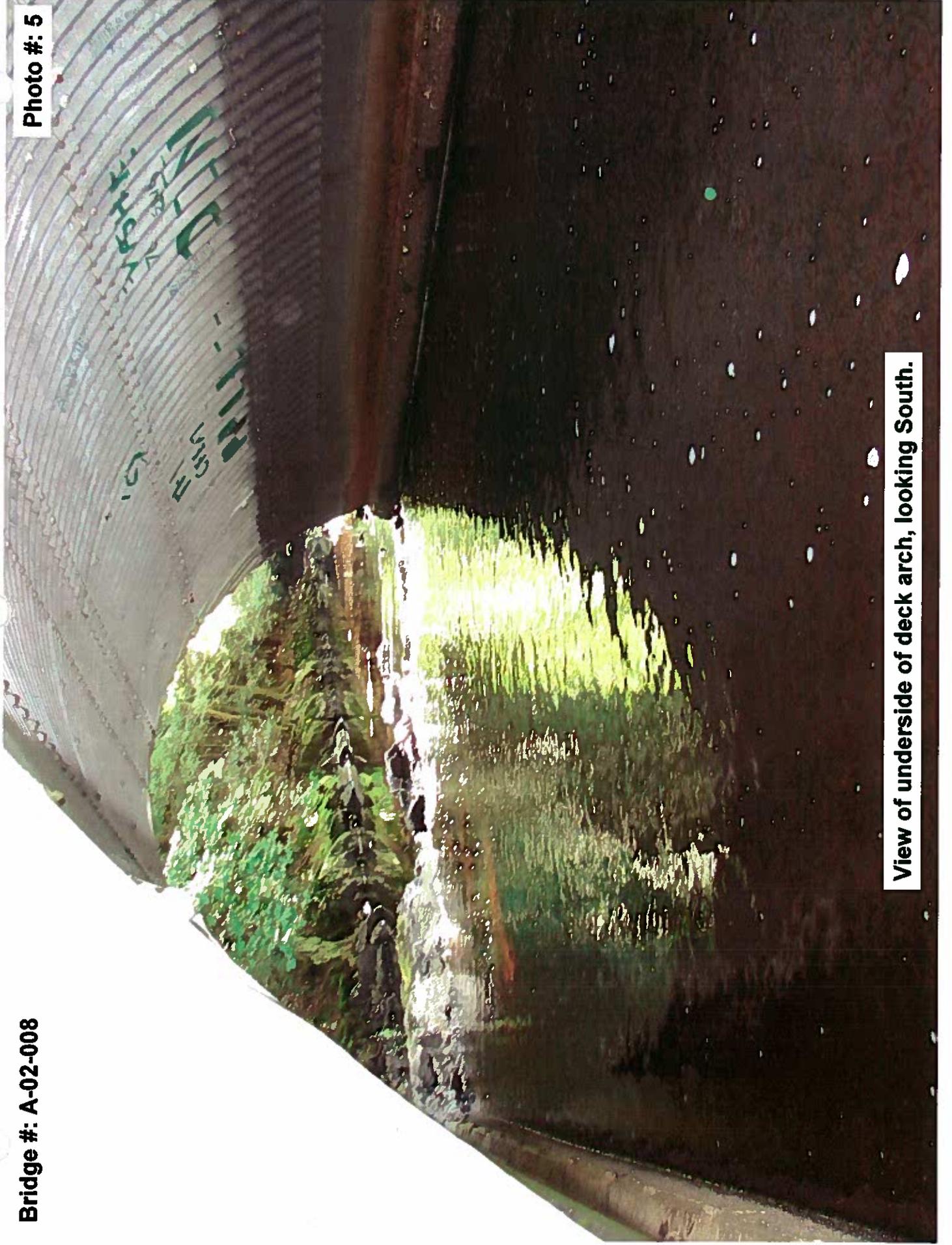
09/19/2007

View of North bridge rail at the West end, looking East.



Bridge #: A-02-008

Photo #: 5



View of underside of deck arch, looking South.

Bridge #: A-02-008

Photo #: 6

09/19/2007

View of Southeast corner of the deck arch, looking East.



Bridge #: A-02-008

Photo #: 7

09/19/2007

View of the Southwest corner of the deck arch, looking West.



Bridge #: A-02-008

Photo #: 8

40" L x 7" H x  
3" D spall

09/19/2007

View of the Northwest corner of the deck arch, looking West.



Bridge #: A-02-008

Photo #: 9

09/19/2007

View of the Southeast retaining wall, looking South.



Bridge #: A-02-008

Photo #: 10

8'-0" wide

4'-0" high

09/19/2007

View of the Northeast wingwall, near the East end, looking South.





**BRIDGE NO. A-02-009 (BROOK STREET OVER NASHOBA BROOK)**

**Bridge Description and Orientation:**

The Brook Street Bridge over the Nashoba Brook is a twin corrugated steel pipe arch culvert that was built in 1938 (see Sketches & Photos #1 & #2). Brook Street, at the bridge, is oriented West and East over the Nashoba Brook which flows from North to South. The twin corrugated steel barrels are labeled West and East.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Bridge Rail	• Areas of missing mortar, separation of mortar, random voids and narrow to medium cracks in mortar	4
	• Wide crack in mortar in South bridge rail over West barrel that measures FH x up to 1"W, located approximately 12'-0" from the West end	
	• West end of South bridge rail is settled several inches beginning at the crack over the West barrel	4
	• Wide crack in mortar in North bridge rail over West barrel that measures FH x up to 1/2 "W, located approximately 9'-0" from the West end	
	• Minor misalignment and minor cracked and/or missing mortar between granite cap stones	
Approach Guardrail	• Not attached to stone masonry bridge rail	

**Top of Bridge Deficiencies (NBIS Item #58 in Inspection Report):**

Element	Deficiency	Reference Photo(s)
Wearing Surface	<ul style="list-style-type: none"> <li>• Wide transverse crack at the West end of bridge</li> <li>• Several medium to wide random cracks throughout</li> <li>• Light to moderate vegetation growth along South side of roadway</li> <li>• Heavy vegetation growth along North side</li> </ul>	3



**Superstructure Deficiencies (NBIS Item #59 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Corrugated Steel Barrels	<ul style="list-style-type: none"> <li>• Light to moderate rusting along the waterline with minor steel delamination and heavier rusting at both ends of both barrels</li> <li>• Areas of peeling protective coating and peeling throughout</li> <li>• 100% section loss at East side of West barrel at South end that measures 9”H x 5” long</li> <li>• 100% section loss at West side of West barrel at South end that measures 11”H x 4” long</li> <li>• Heavy aggradation at the upstream and downstream ends of both barrels</li> <li>• Light to moderate accumulation of sand and debris along the bottom of both barrels</li> </ul>	<p style="text-align: center;">5</p> <p style="text-align: center;">6</p> <p style="text-align: center;">7</p> <p style="text-align: center;">8</p>
North Headwall	<ul style="list-style-type: none"> <li>• Numerous narrow to medium cracks and separation of mortar between stones, random hairline to narrow cracks and loose stones throughout</li> <li>• Full height, jagged crack with separated stones above West barrel</li> <li>• Dislodged stones at upper West corner of East barrel and upper East corner of West barrel</li> <li>• Void at lower East face of West barrel that measures 20”H x 5”W x up to 18” penetration</li> <li>• Small voids along the East face of East barrel and West face of West barrel at North headwall</li> <li>• Voids along waterline between barrels at North headwall wall that measure full height x up to 3”H x up to 10” penetration</li> </ul>	<p style="text-align: center;">9</p> <p style="text-align: center;">10</p>
South Headwall	<ul style="list-style-type: none"> <li>• Full height, jagged crack with separated stones above West barrel</li> <li>• Void at West face of West barrel that measures 12”H x up to 3.5”W x up to 4.5” of penetration</li> <li>• Minor delamination of stones at upper East corner of East barrel</li> <li>• Void at East face of East barrel that measures 14”H x 2”W x 4” of penetration</li> <li>• Void at West side of East barrel that measures 6”H x 2”W x up to 6” of penetration</li> <li>• Small void between barrels adjacent to West barrel that measures 14”H x up to 6”W x 29” of penetration (at waterline)</li> </ul>	<p style="text-align: center;">1, 11</p> <p style="text-align: center;">1</p> <p style="text-align: center;">1</p>



	<ul style="list-style-type: none"> <li>• Small void between barrels adjacent to West barrel that measures 7”H x 11”W x 19.5” of penetration (approximately 3’-0” from waterline)</li> <li>• Void at waterline between barrels that measures 15”H x 3”W x up to 25” of penetration</li> </ul>	1
		1

Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Wingwalls	<ul style="list-style-type: none"> <li>• Mortared stone walls that show numerous hairline to narrow random cracks in mortar and minor separation between stones</li> <li>• Light vegetation growth at the Northwest wingwall and moderate to heavy vegetation growth at the Southwest and Southeast wingwalls</li> <li>• Retaining walls at Northeast and Northwest corners show minor voids and/or missing stones throughout</li> </ul>	12

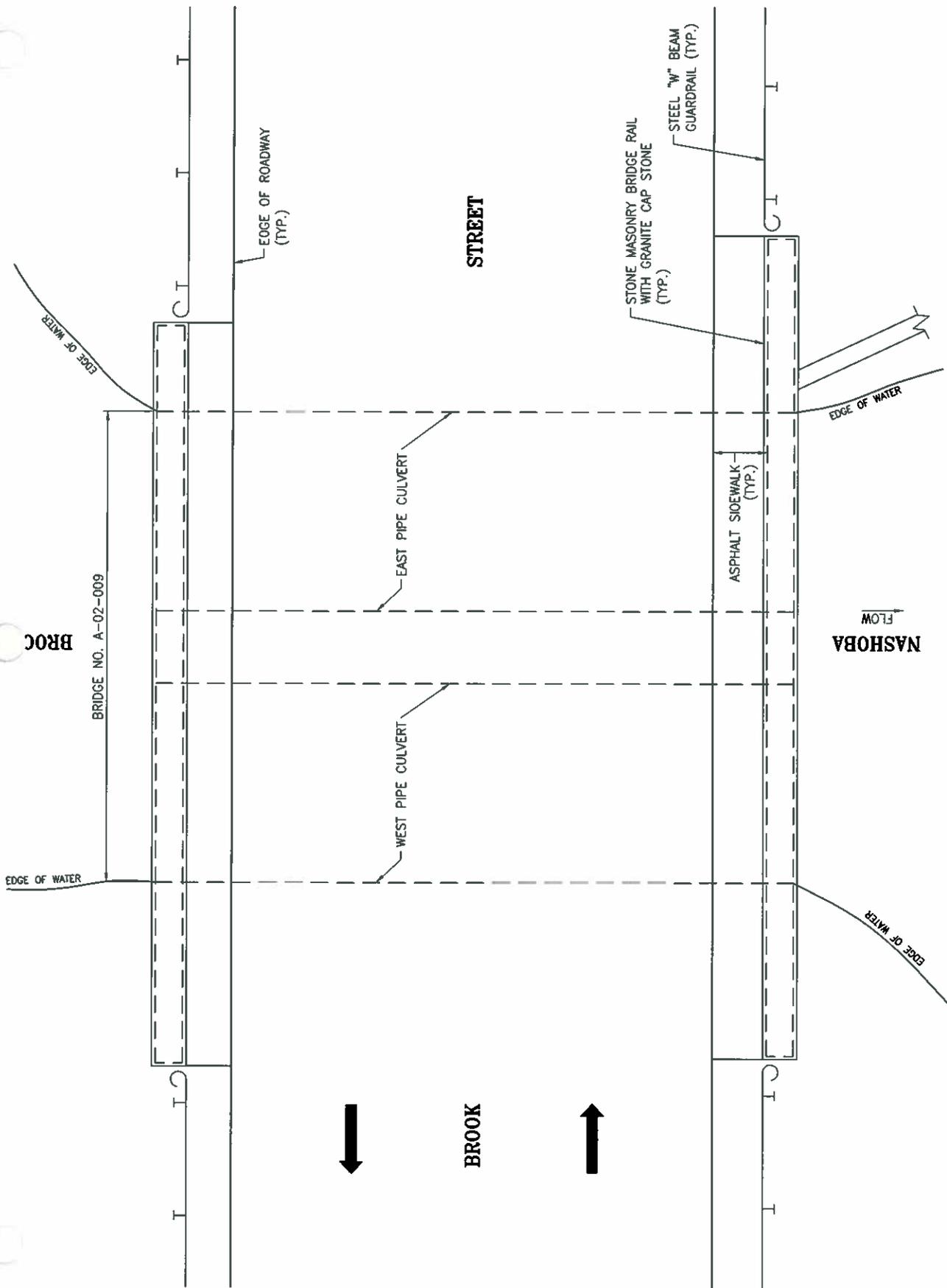
**Recommended Maintenance:**

The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the Brook Street Bridge over Nashoba Brook:

Element & Location	Deficiency	Repair Needed	Priority
#1 Top of bridge	Light to heavy vegetation growth	Remove vegetation growth	Low
#2 Wearing Surface	Random and transverse cracks	Fill cracks with sealer	Low
#3 North and South bridge rail	Hairline to narrow cracks in mortar	Repoint stones as needed	Low
#4 Protective coating of steel barrels	Cracking and peeling throughout	Clean and place new protective coating	High
#5 South end of West barrel, West side	100% Section loss	Remove deteriorated steel	High
#6 South end of West barrel, East side	100% Section loss	Remove deteriorated steel	High
#7 North stone masonry headwall	Full height, jagged crack above West barrel	Repoint stones as needed	Low
#8 North headwall around barrels	Voids around barrels & along waterline	Fill voids with concrete	High



#9	South stone masonry headwall	Full height, jagged crack above West barrel	Repoint stones as needed	Low
#10	South headwall around barrels	Voids	Fill holes/voids with concrete	Moderate
#11	Wingwalls	Hairline random cracks in mortar	Repoint stones as needed	Low



BROC

BRIDGE NO. A-02-009

EDGE OF ROADWAY (TYP.)

STREET

EAST PIPE CULVERT

WEST PIPE CULVERT

ASPHALT SIDEWALK (TYP.)

STONE MASONRY BRIDGE RAIL WITH GRANITE CAP STONE (TYP.)

STEEL "W" BEAM GUARDRAIL (TYP.)

NASHOBA BROOK

FLOW



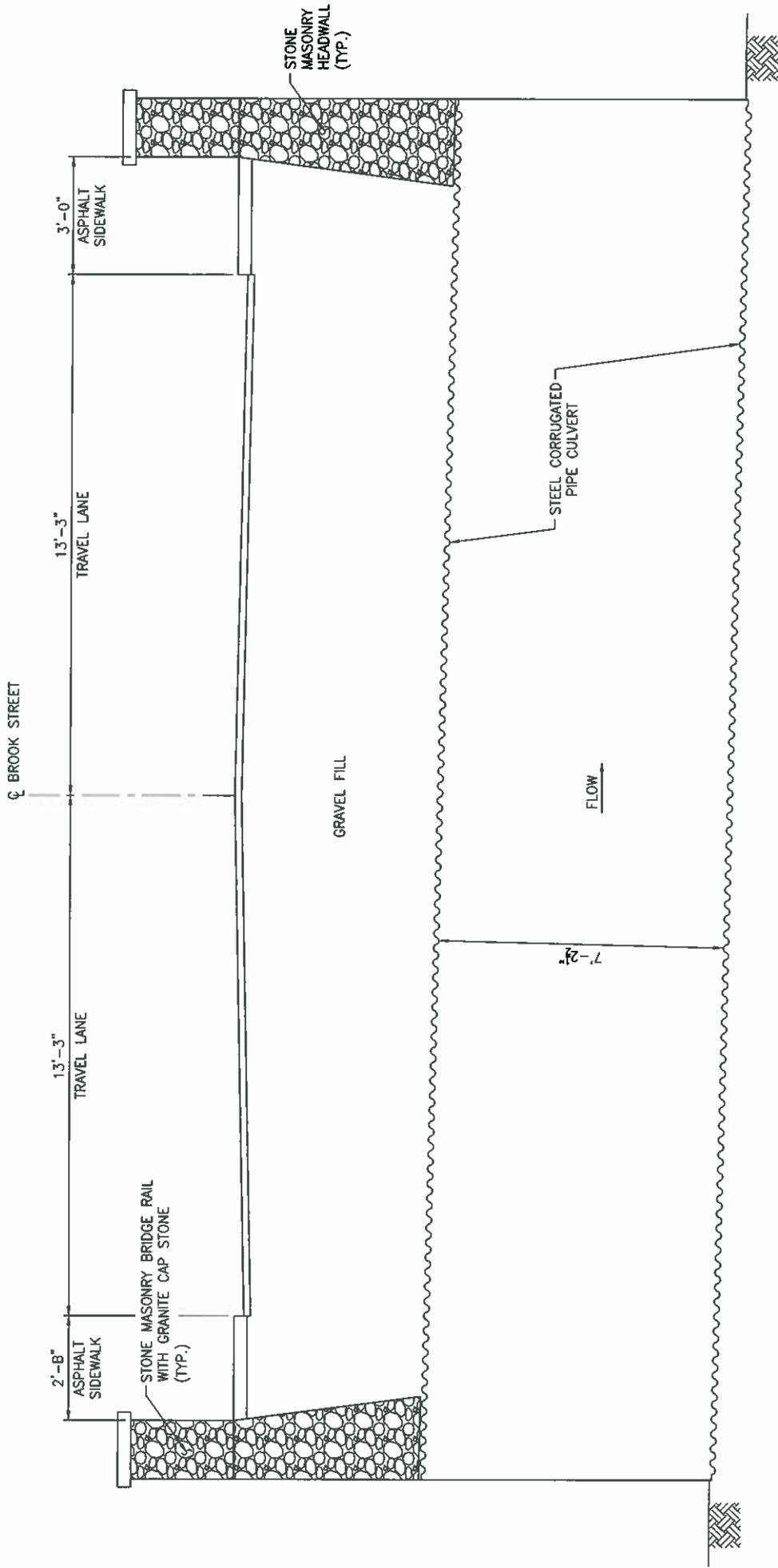
BROOK



**ACTION: BROOK STREET OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-009  
 PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists

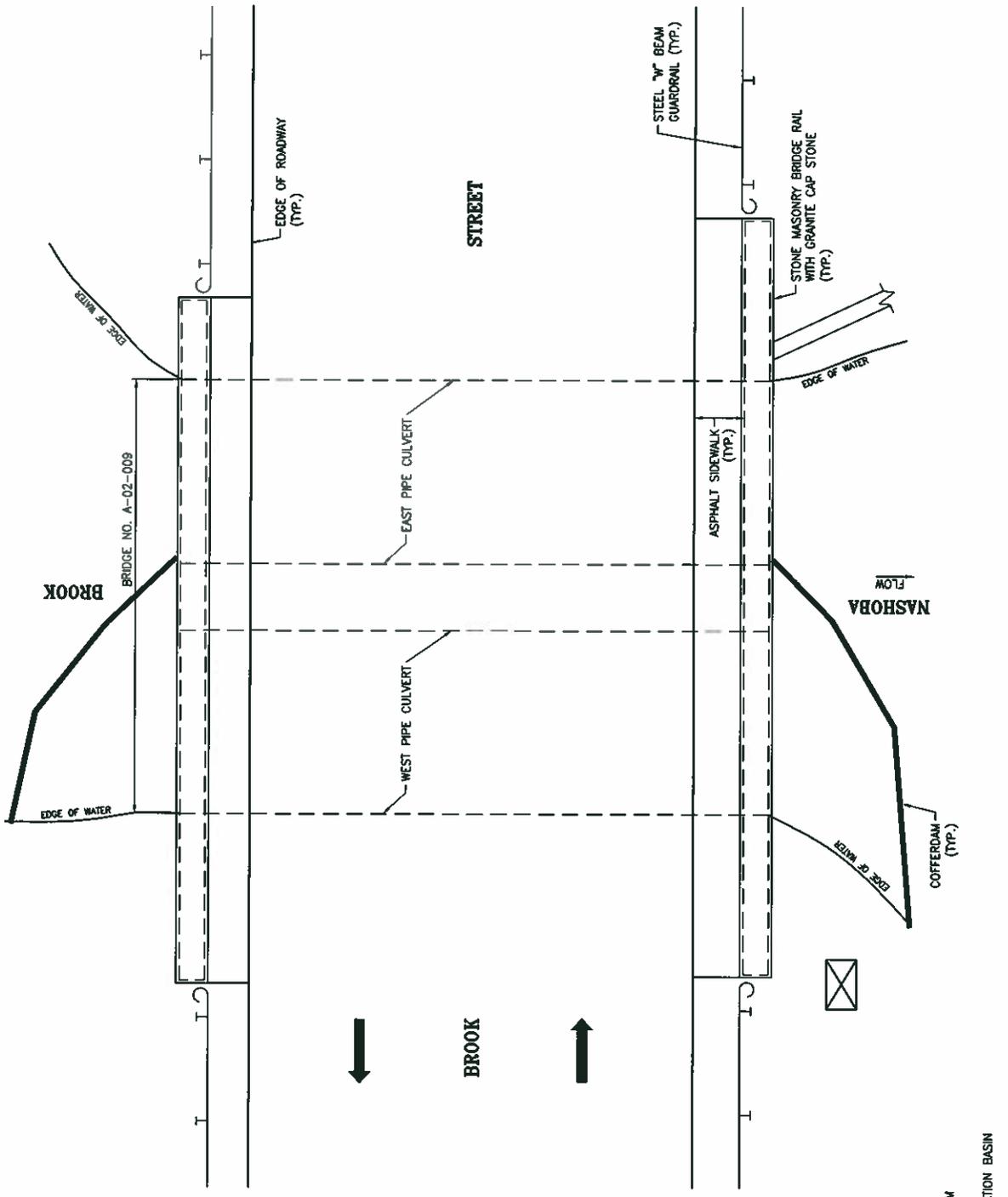




ACTION: BROOK STREET OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-009  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





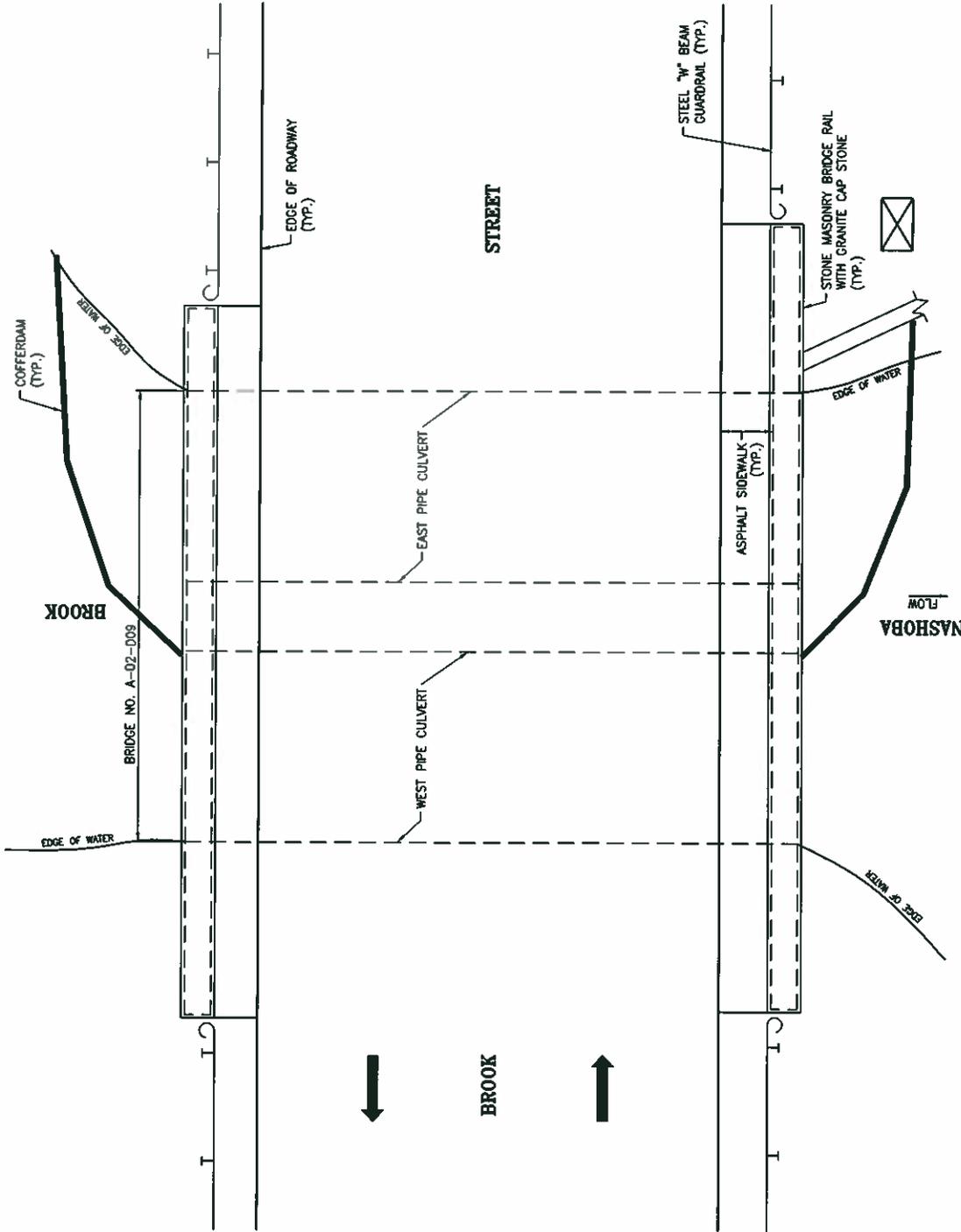
- LEGEND**
- COFFERDAM
  - SEDIMENTATION BASIN

STAGE I

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists



**ACTION: BROOK STREET OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-009  
 WATER CONTROL PLAN - SCALE: N.T.S.**



**LEGEND**

— COFFERDAM

⊠ SEDIMENTATION BASIN

STAGE II

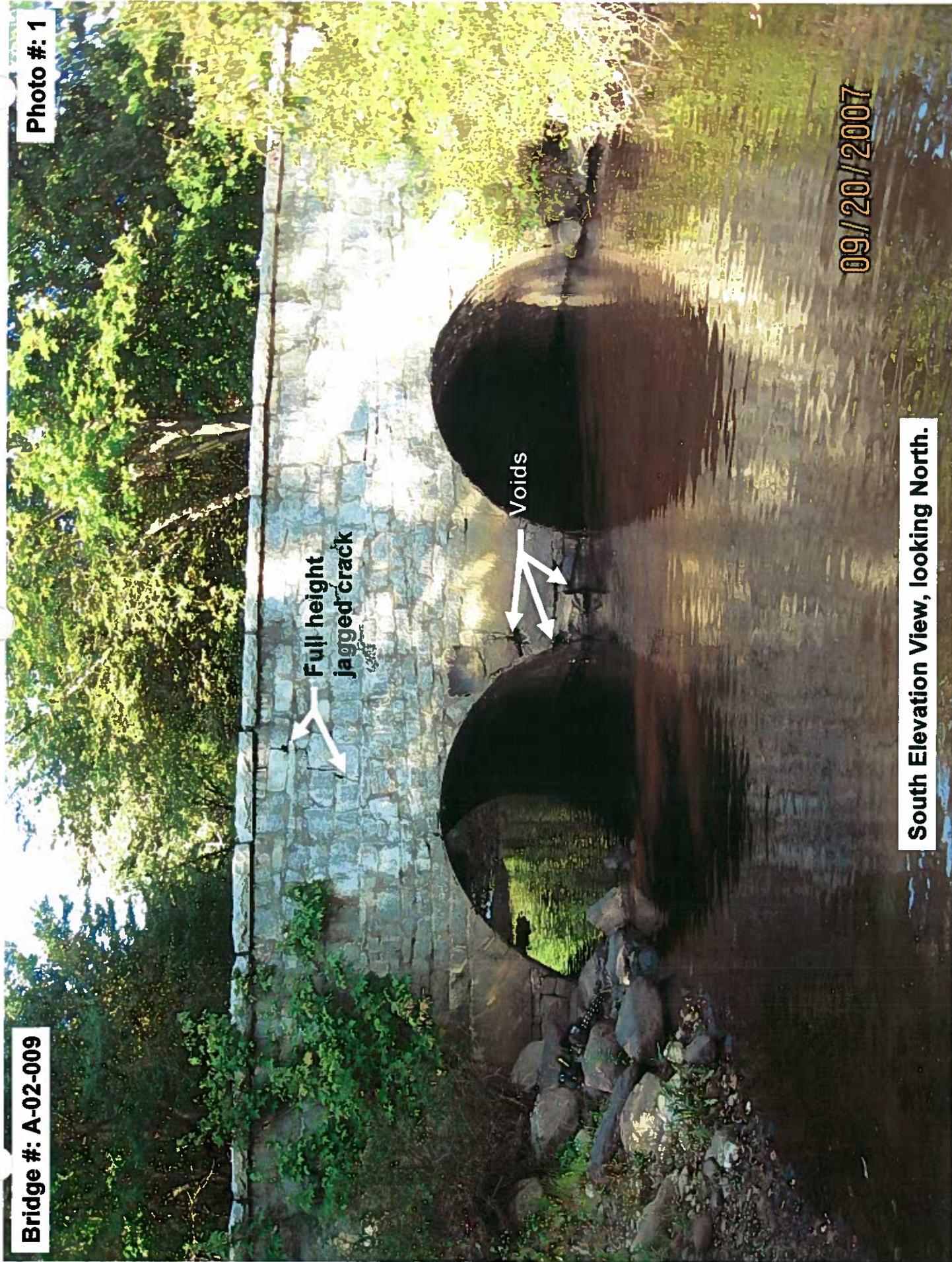
**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists

**ACTION: BROOK STREET OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-009  
 WATER CONTROL PLAN - SCALE: N.T.S.**



Bridge #: A-02-009

Photo #: 1



Full height jagged crack

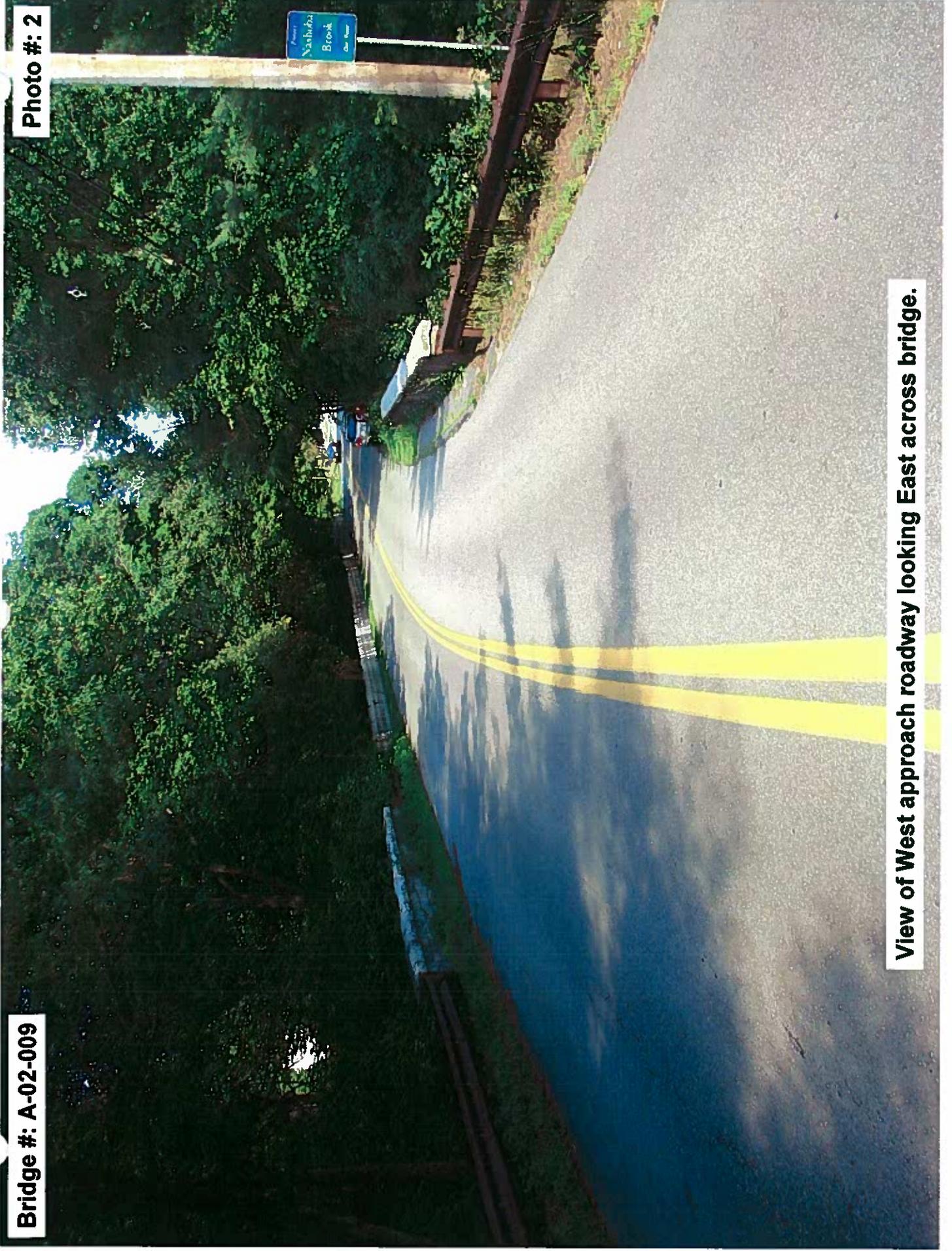
Voids

09/20/2007

South Elevation View, looking North.

Bridge #: A-02-009

Photo #: 2



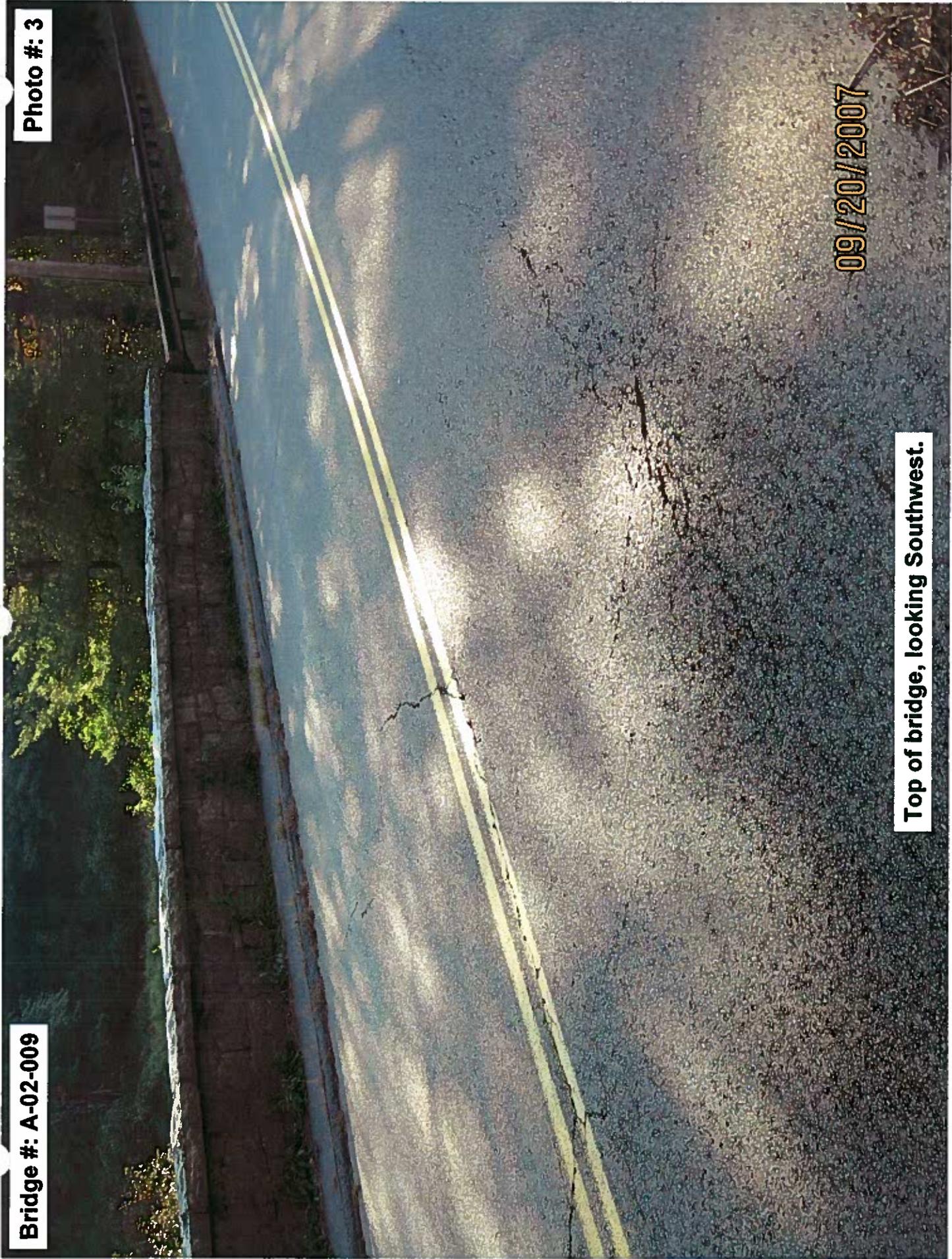
View of West approach roadway looking East across bridge.

Bridge #: A-02-009

Photo #: 3

09/20/2007

Top of bridge, looking Southwest.



Bridge #: A-02-009

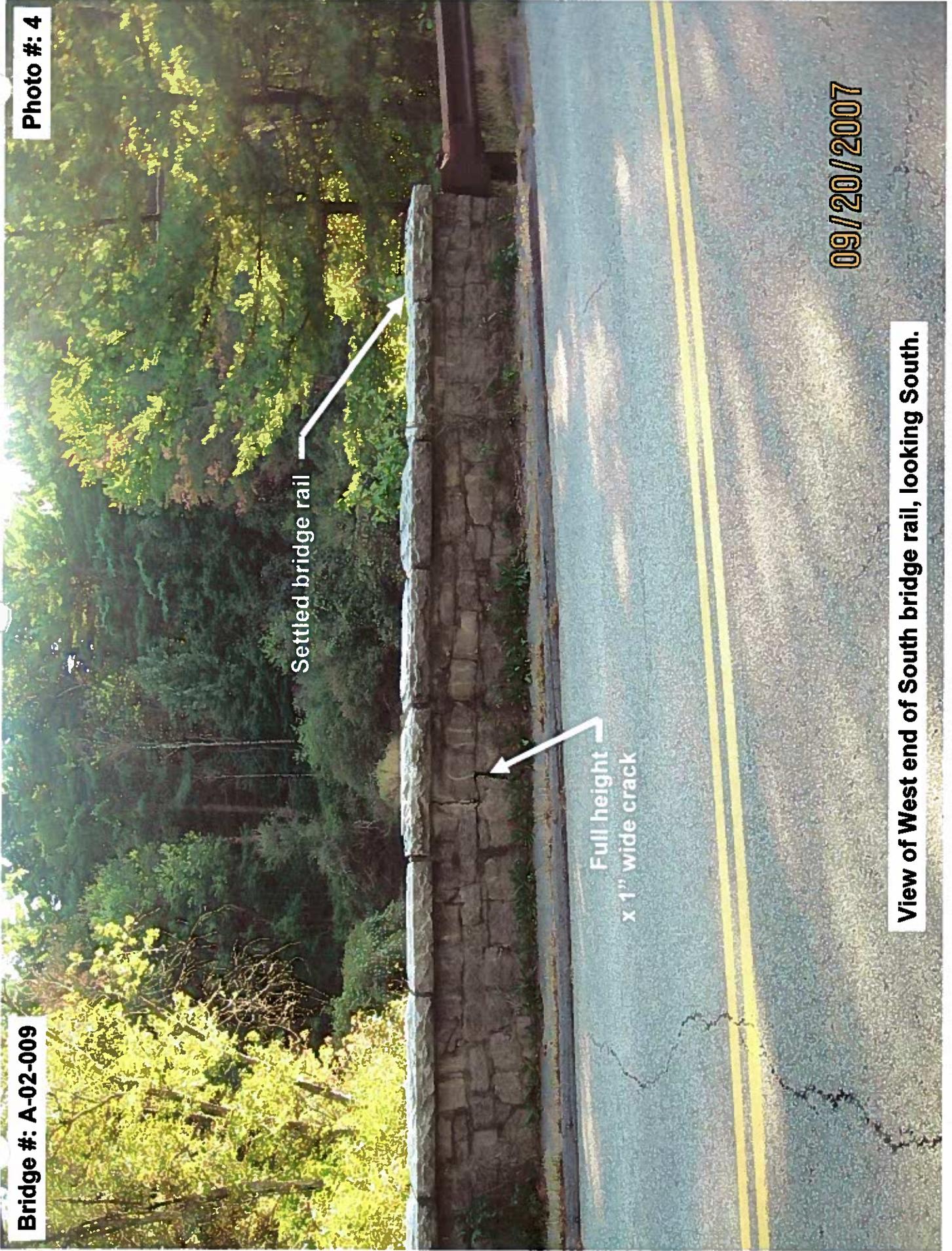
Photo #: 4

Settled bridge rail

Full height  
x 1" wide crack

09/20/2007

View of West end of South bridge rail, looking South.

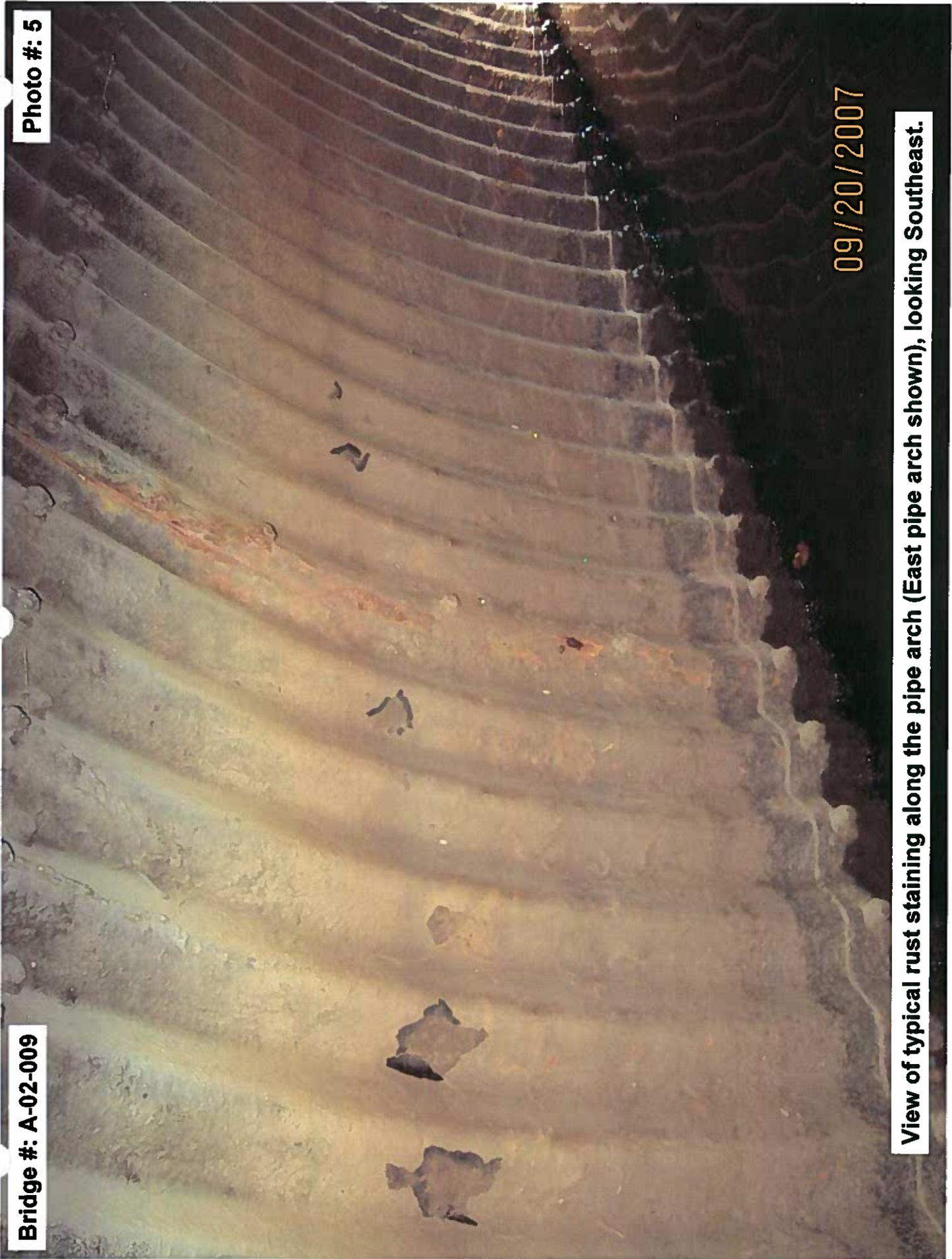


Bridge #: A-02-009

Photo #: 5

09/20/2007

View of typical rust staining along the pipe arch (East pipe arch shown), looking Southeast.



Bridge #: A-02-009

Photo #: 6

09/20/2007

View of typical peeling protective coat along the pipe arch (East pipe arch shown), looking East.



Bridge #: A-02-009

Photo #: 7

9" high x 5" long area  
of 100% section loss

09/20/2007

View of 100% section loss at the South end of the West pipe arch, looking East.



Bridge #: A-02-009

Photo #: 8

11" high x 4" long area  
of 100% section loss

09/20/2007

View of 100% section loss at the South end of the West pipe arch, looking West.



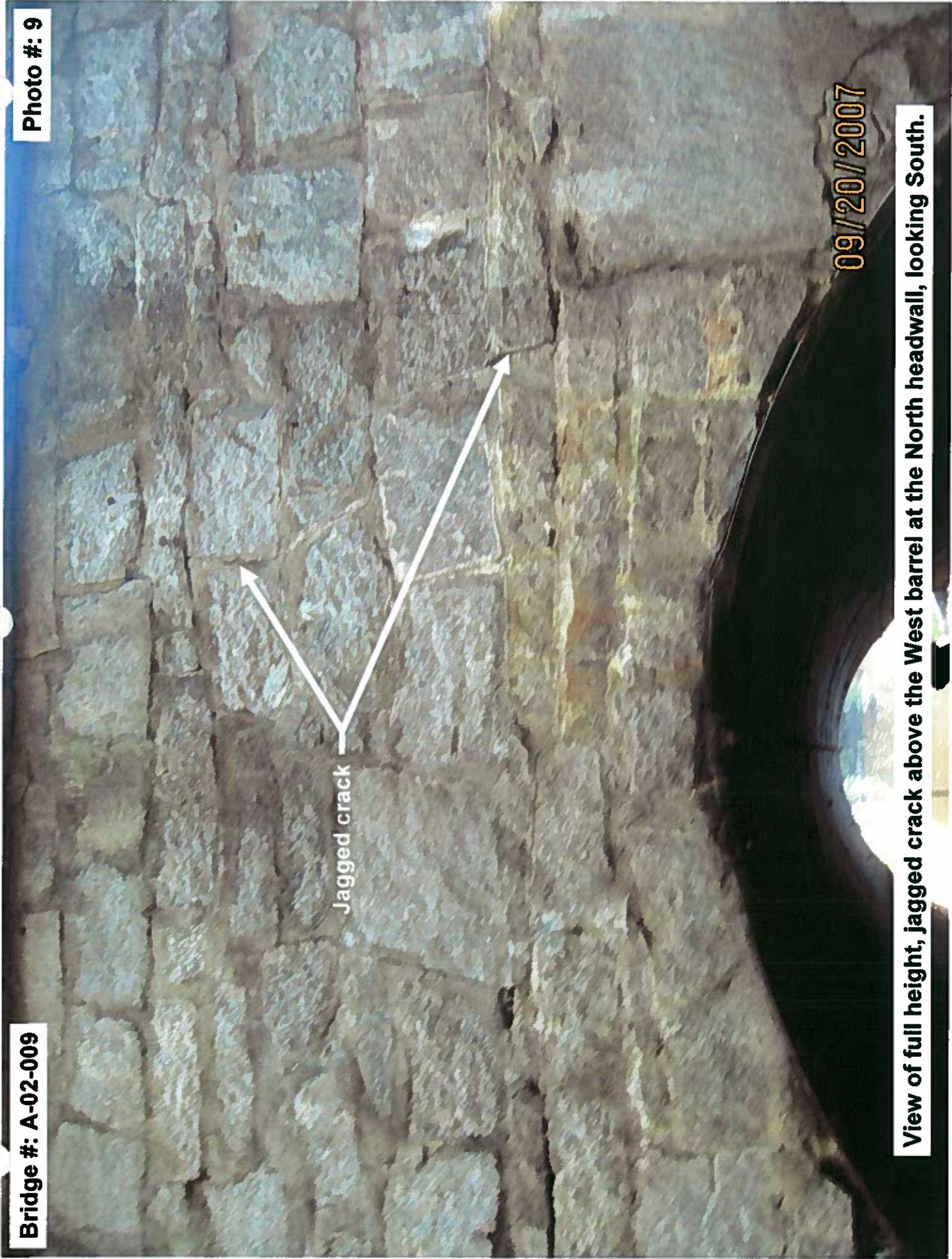
Bridge #: A-02-009

Photo #: 9

Jagged crack

09/20/2007

View of full height, jagged crack above the West barrel at the North headwall, looking South.



Bridge #: A-02-009

Photo #: 10



09/20/2007

View of voids along the waterline at the North closure wall, looking South.

**Bridge #: A-02-009**

**Photo #: 11**



**View of full height, jagged crack above the West barrel at the South headwall, looking North.**

Bridge #: A-02-009

Photo #: 12

09/20/2007

Typical condition of upstream retaining walls (Northwest wall shown), looking West.



**BRIDGE NO. A-02-010 (PARKER STREET OVER FORT POND BROOK)**

**Bridge Description and Orientation:**

The Parker Street Bridge over Fort Pond Brook is a single span corrugated steel arch deck structure that was built in 1938 (see Sketches & Photos #1, #2 & #3). There are concrete encased steel beams that cantilever beyond the West and East fascias as part of widening of the bridge which must have occurred after the original construction. Parker Street, at the bridge, is oriented North and South over the Fort Pond Brook which flows West to East.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Bridge Rail/Approach Guardrail	<ul style="list-style-type: none"> <li>• Bridge Rail is substandard</li> <li>• Steel "W" Beam guardrail that shows areas of light rust staining and random areas of dents and minor impacts</li> <li>• 3<sup>rd</sup> vertical post base plate from North on East side bridge rail is undermined from safety curb spall</li> <li>• Northwest terminal end shows minor collision damage</li> </ul>	4
Safety Curb	<ul style="list-style-type: none"> <li>• Minor spalling along the top East Side that measures up to 4" high</li> </ul>	2

**Top of Bridge Deficiencies (NBIS Item #58 in Inspection Report):**

Element	Deficiency	Reference Photo(s)
Wearing Surface	<ul style="list-style-type: none"> <li>• Hairline to narrow random cracks throughout</li> <li>• Light to moderate vegetation growth along curbs</li> </ul>	3
Deck Underside (Overhangs)	<ul style="list-style-type: none"> <li>• Light to moderate scaling, heavy efflorescence staining with incrustation and stalactites</li> <li>• Exposed corrugated form at Southwest corner of bridge that measures 20"L x full width x 2"D</li> </ul>	

**Superstructure Deficiencies (NBIS Item #59 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Corrugated Steel Arch Deck	<ul style="list-style-type: none"> <li>• Light oxidation throughout upper portion of arch, light to moderate rusting of the lower portion and random areas of protective coat deterioration</li> </ul>	5



	<ul style="list-style-type: none"> <li>Moderate to heavy rusting with light to moderate steel delamination and negligible section loss along the lower connection plate between the deck arch and abutment</li> <li>Random missing and deteriorated connection bolts</li> </ul>	6
Steel Beams (Overhangs)	<ul style="list-style-type: none"> <li>Exposed bottom flanges show heavy to severe rusting with minor steel delamination for their full exposed length</li> </ul>	7
East Headwall	<ul style="list-style-type: none"> <li>Random narrow cracks and minor separation in the mortar, minor spalling along the top of headwall, below the underside of deck and small voids at the crown that measure up to 8" of penetration</li> </ul>	8
	<ul style="list-style-type: none"> <li>1<sup>st</sup> cantilevered stone from the bottom at North side has a crack up to 1/2" wide for full height of stone</li> <li>Heavy vegetation growth with dislodged stones, minor separation and small voids with up to 16" of penetration at the South side</li> </ul>	11
West Headwall	<ul style="list-style-type: none"> <li>Random narrow cracks and random voids along the arch ring</li> <li>Void at 1<sup>st</sup> arch seam (from the South Abutment) that measures 16"L x up to 6"H x up to 26" of penetration</li> <li>Void located approximately 2'-0" from North Abutment, that measures 6'-6" L (Along the arch ring) x up to 6"H x up to 10" of penetration with fill spilling through</li> </ul>	9

Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Abutment Breastwalls	<ul style="list-style-type: none"> <li>Moderate to severe scaling (waterline abrasion) throughout</li> <li>10'-0"L areas of exposed footing at the East end of the North Abutment</li> <li>10'-0"L areas of exposed footing at the West end of the South Abutment</li> <li>Spall at the West end of the South Abutment that measures 5'-0"L x up to 5"H x full depth (at water line)</li> </ul>	10
Wingwalls	<ul style="list-style-type: none"> <li>Light to moderate vegetation growth throughout with random narrow cracks and voids throughout</li> <li>2" of separation between the East end of the arch and Northeast wingwall</li> </ul>	11
	<ul style="list-style-type: none"> <li>Numerous voids along interface between East end of arch and Northeast wingwall that measures 16"H x 4.5"W x up to 18" of penetration</li> <li>Void at waterline of Northeast wingwall, located approximately 2'-0" from arch, that measures 13"L x 10"H x 6" of penetration</li> </ul>	11



	<ul style="list-style-type: none"> <li>• Void at waterline of Northeast wingwall, located approximately 4'-0" from arch, that measures 3'-0"L x up to 12"H x up to 33" of penetration</li> <li>• Void at waterline of Northeast wingwall, located approximately 9'-0" from arch, that measures 4'-0"L x up to 20"H x up to 28" of penetration</li> <li>• Southeast wingwall shows numerous dead trees that are beginning to lean into waterway</li> <li>• Void at waterline of Northwest wingwall, located approximately 3'-0" from arch, that measures 12"L x 13"H x up to 16" of penetration</li> <li>• Void at waterline of Southwest wingwall, located approximately 1'-0" from arch, that measures 22"L x 20"H x up to 21" of penetration</li> </ul>	12
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**Recommended Maintenance:**

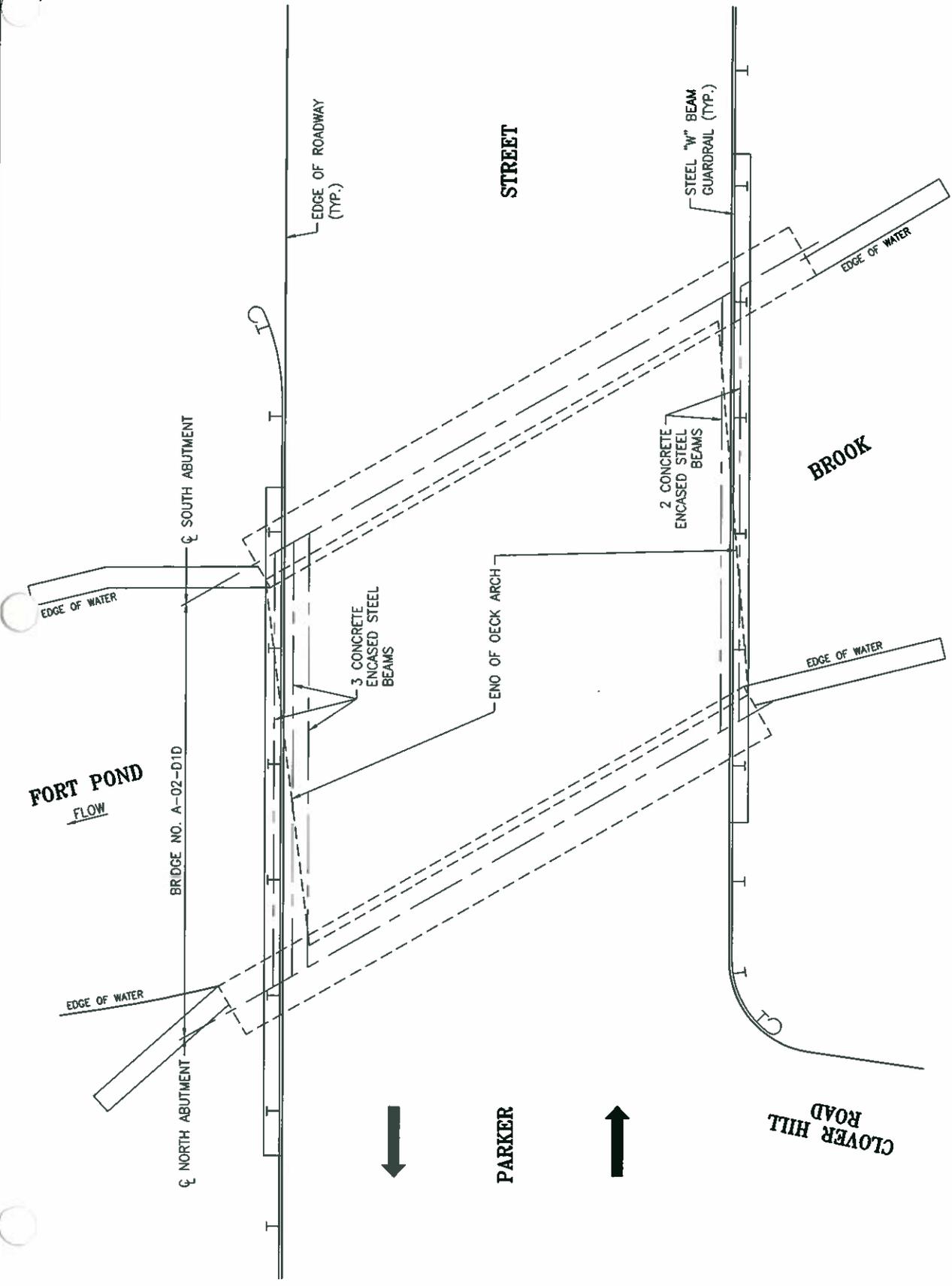
The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the Parker Street Bridge over Fort Pond Brook:

Element & Location		Deficiency	Repair Needed	Priority
#1	East safety curb/parapet	Minor spalling	Patch with cementitious mortar	Low
#2	NE approach guardrail terminal end	Collision Damage	Remove and replace terminal end	Low
#3	Bridge Rail	Substandard rail system	Replace entire bridge rail with Modified Thrie Beam rail system	High
#4	Arch deck at both abutments	Moderate to heavy rusting and minor steel delamination	Clean and place new protective coating	Moderate
#5	Bottom face of steel beams at overhangs	Heavy to severe rusting and minor steel delamination	Clean and paint steel	Moderate
#6	Stone masonry headwalls	Hairline to narrow cracks in mortar, stones and voids	Fill voids and repoint stone masonry as needed	Moderate
#7	East stone masonry headwall at North Abutment	½" wide crack in cantilevered stone	Evaluate load paths	Moderate
#8	East end of North Abutment	Exposed footing	Consider placing riprap along abutments	Low



#9	West end of South Abutment	Exposed footing	Consider placing riprap along abutments	Low
#10	West end of South Abutment	Severe scaling and minor spalling	Patch with cementitious mortar	Low
#11	Southeast wingwall	Numerous dead trees along top of wall	Remove trees	Low
#12	Wingwalls	Voids and deteriorated mortar	Fill voids and repoint stone masonry as needed	Moderate

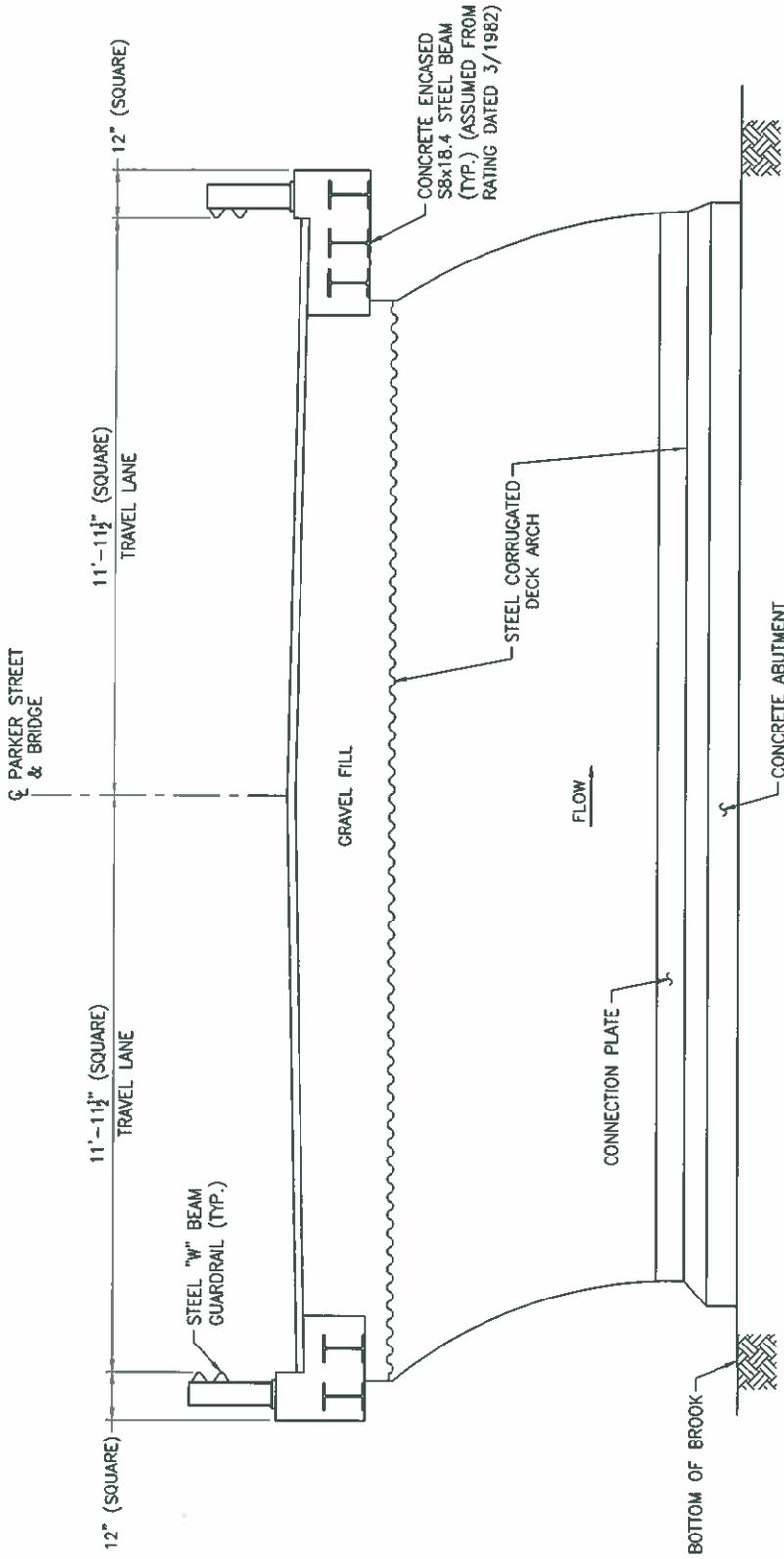
\* - This structure has an unusual configuration. While the corrugated steel arch is in satisfactory condition, the widened sections have more deterioration. According to the Rating Report, the encased steel beams are the controlling structural element. Further, the exact support, extent and configuration of these widened sections cannot readily be ascertained. Therefore, the Town may want to have further studies performed to determine whether partial or full replacement may be needed in the near future.



**ACTION: PARKER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-010  
 PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists

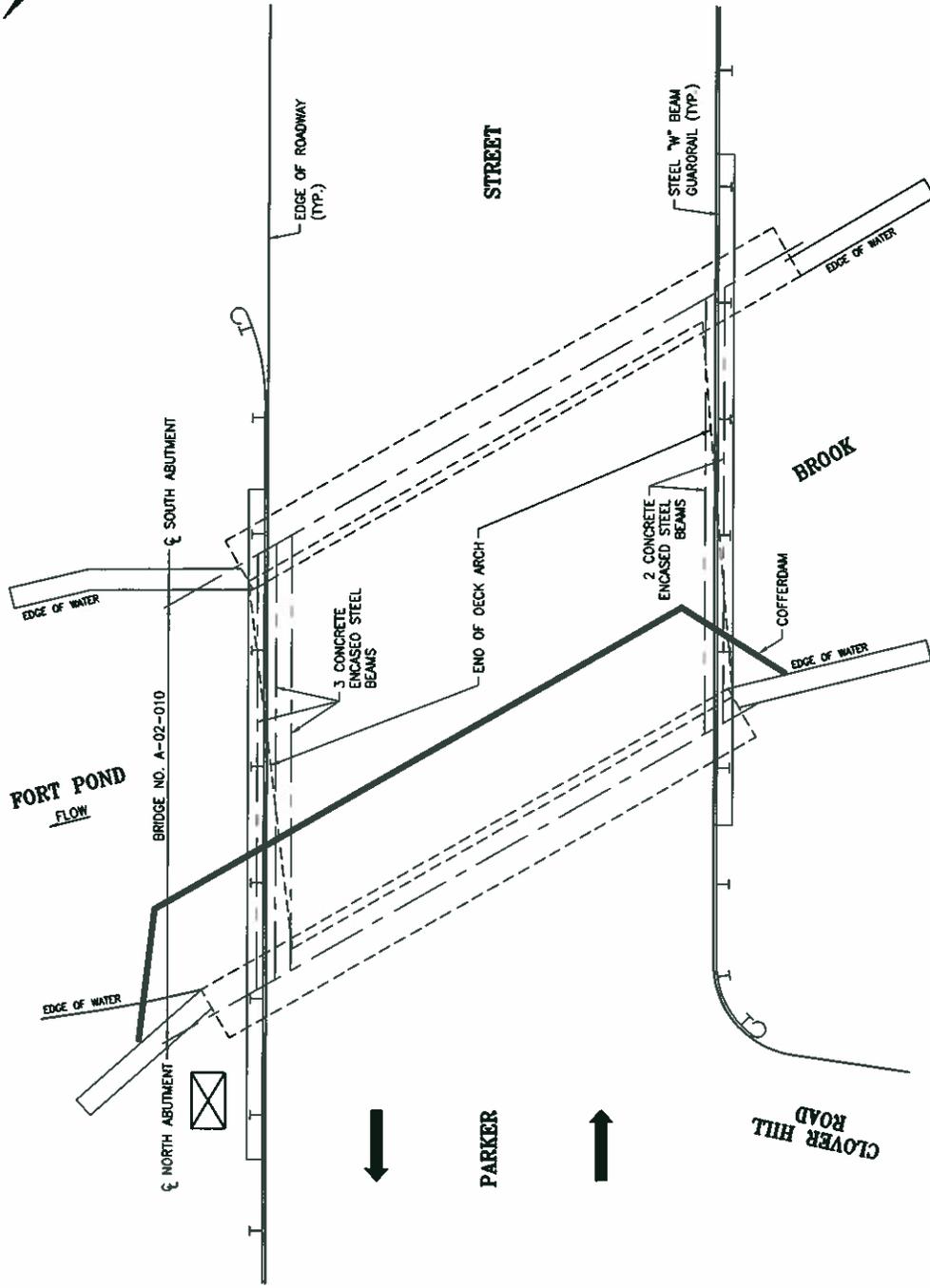




ACTION: PARKER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-010  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





**LEGEND**

— COFFERDAM

⊗ SEDIMENTATION BASIN

STAGE I

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists



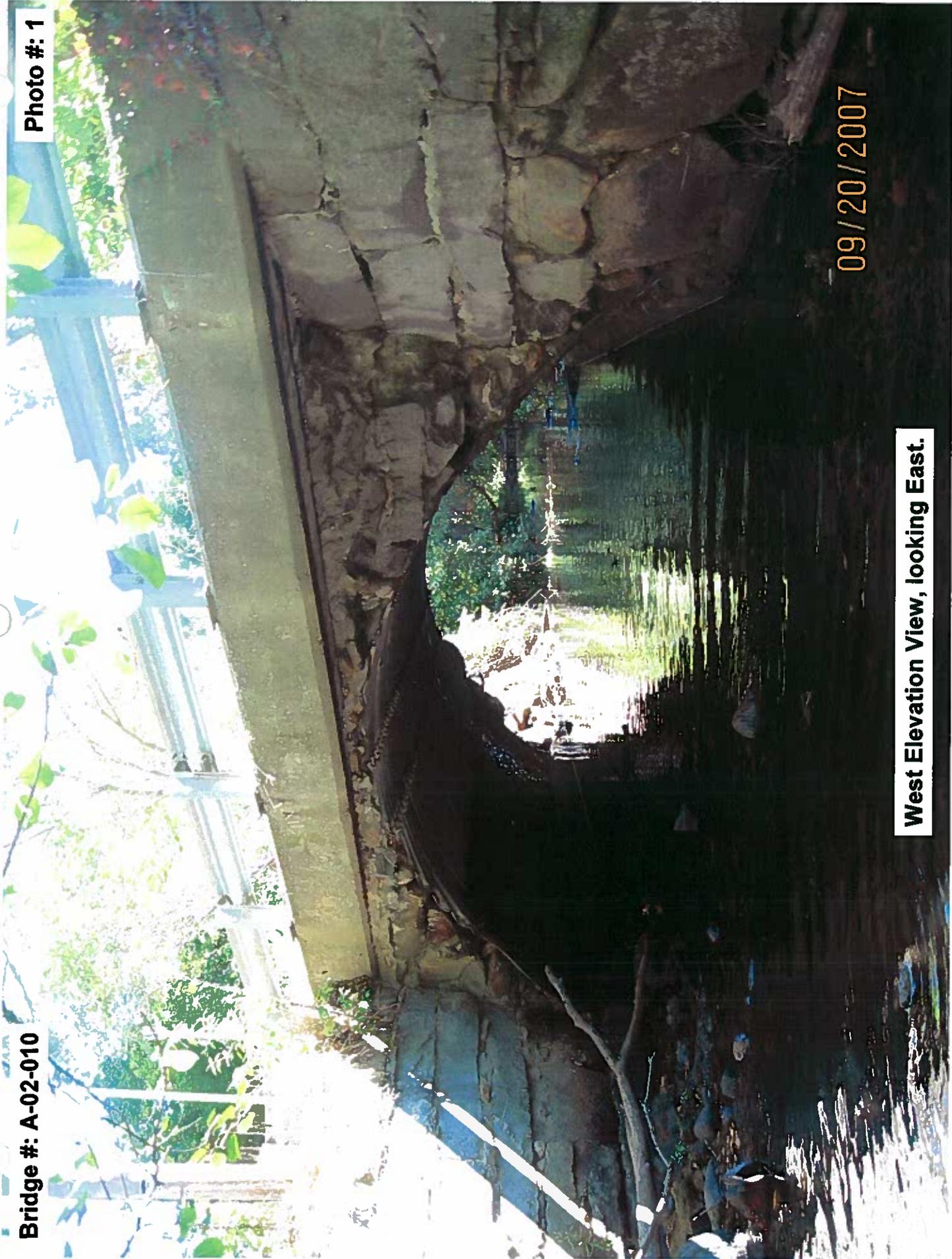
**ACTION: PARKER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-010  
 WATER CONTROL PLAN - SCALE: N.T.S.**





Bridge #: A-02-010

Photo #: 1



West Elevation View, looking East.

09/20/2007

Bridge #: A-02-010

Photo #: 2

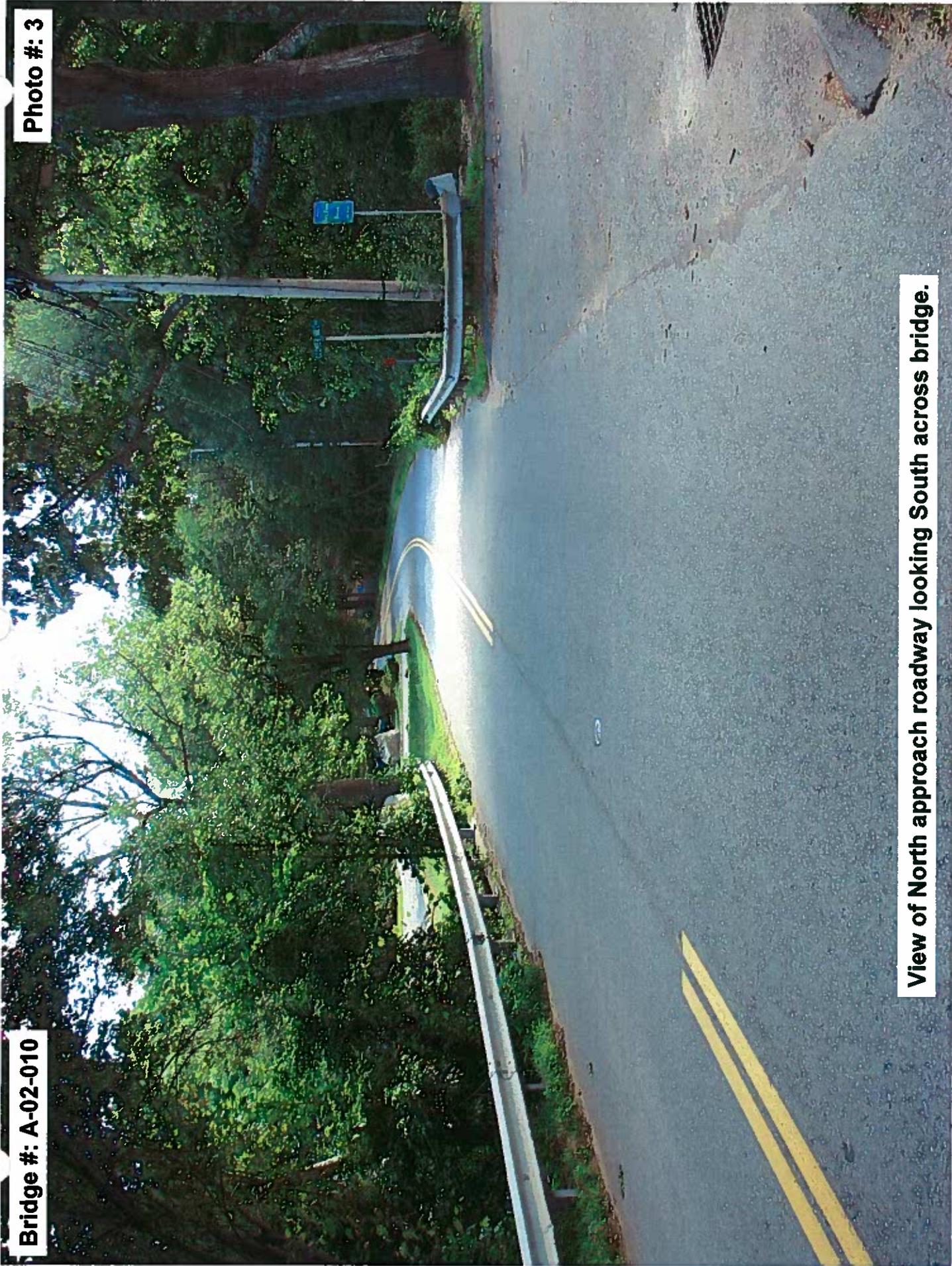
(Cracks with efflorescence)

East Elevation View, looking South.



Bridge #: A-02-010

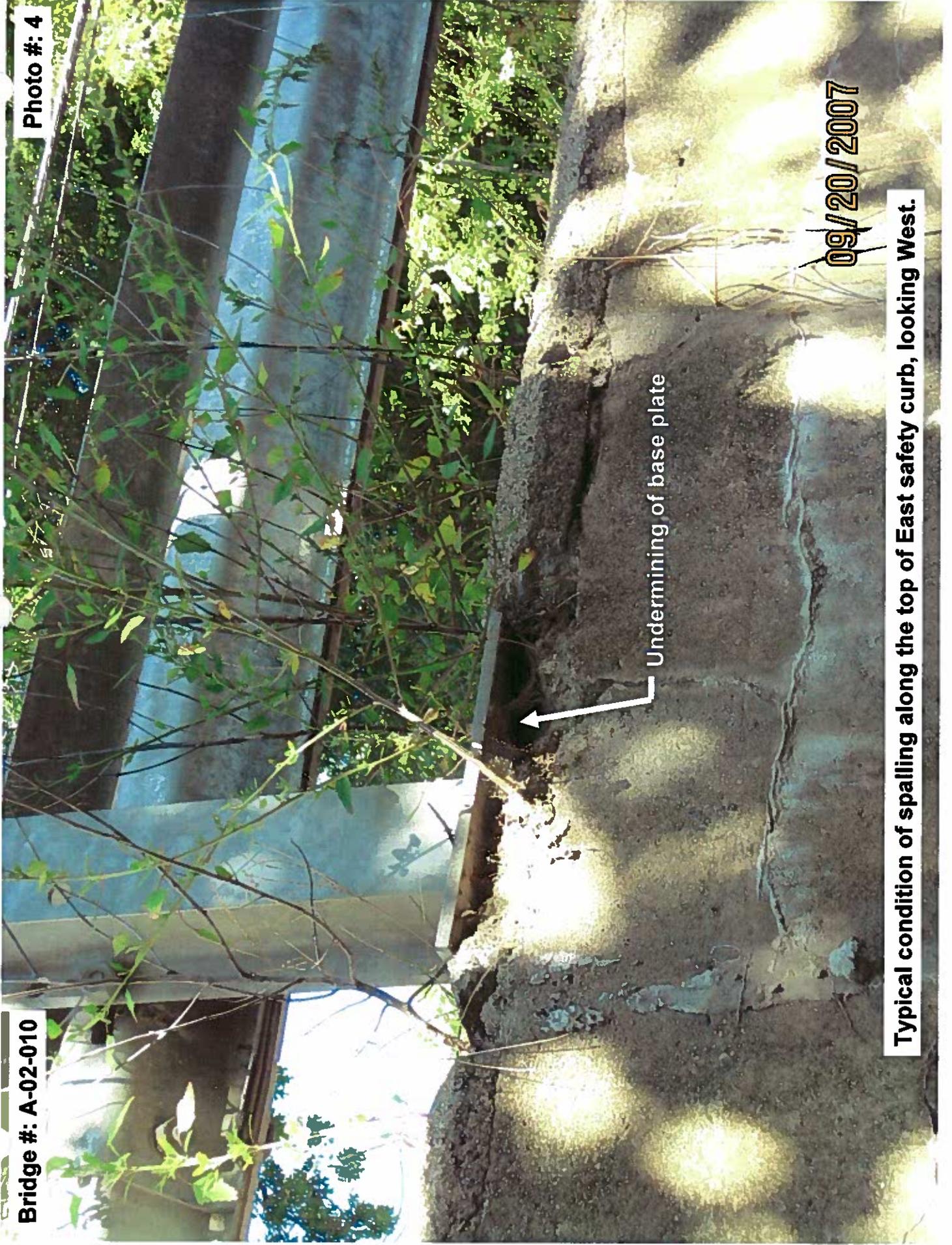
Photo #: 3



View of North approach roadway looking South across bridge.

Bridge #: A-02-010

Photo #: 4



09/20/2007

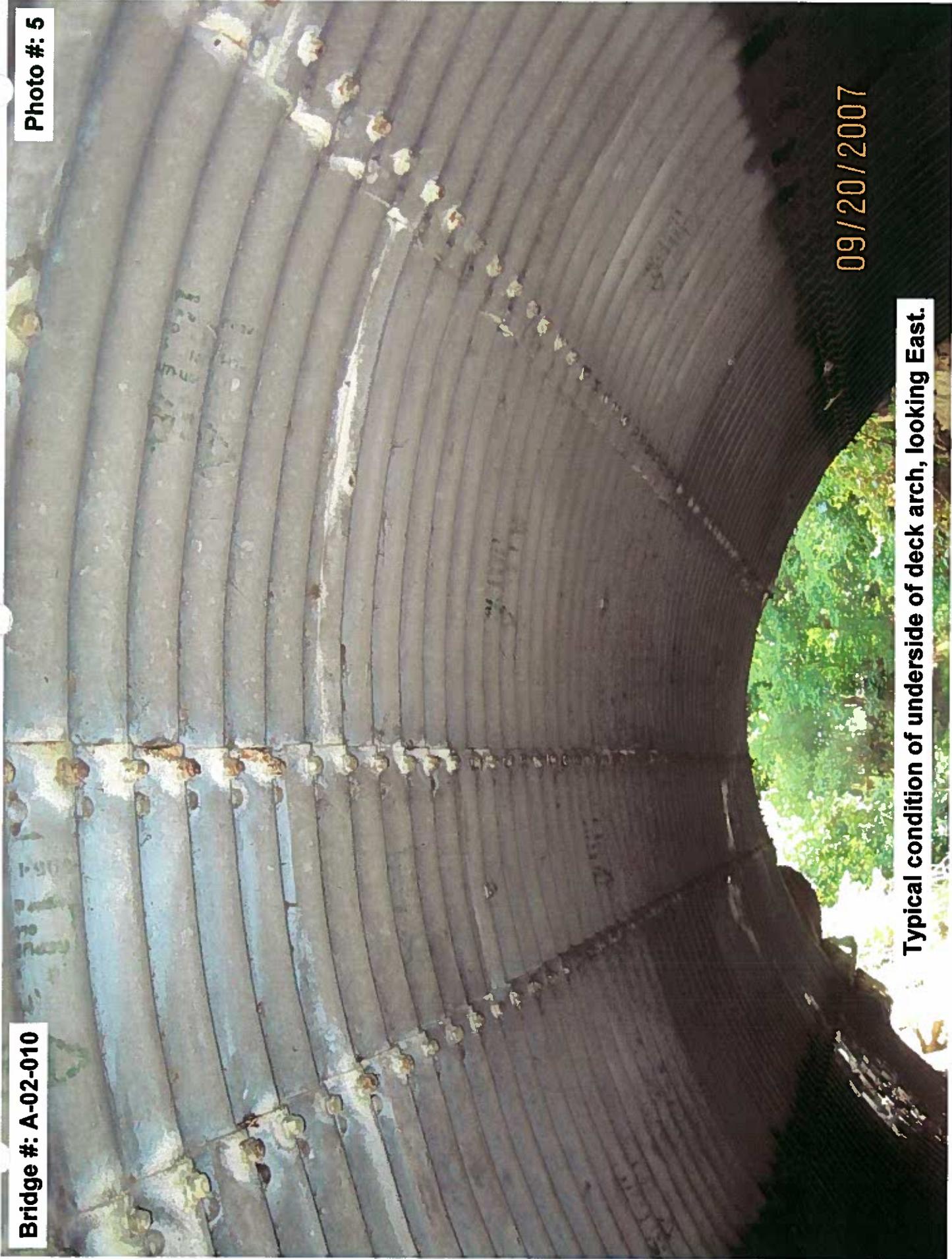
Typical condition of spalling along the top of East safety curb, looking West.

Bridge #: A-02-010

Photo #: 5

09/20/2007

Typical condition of underside of deck arch, looking East.



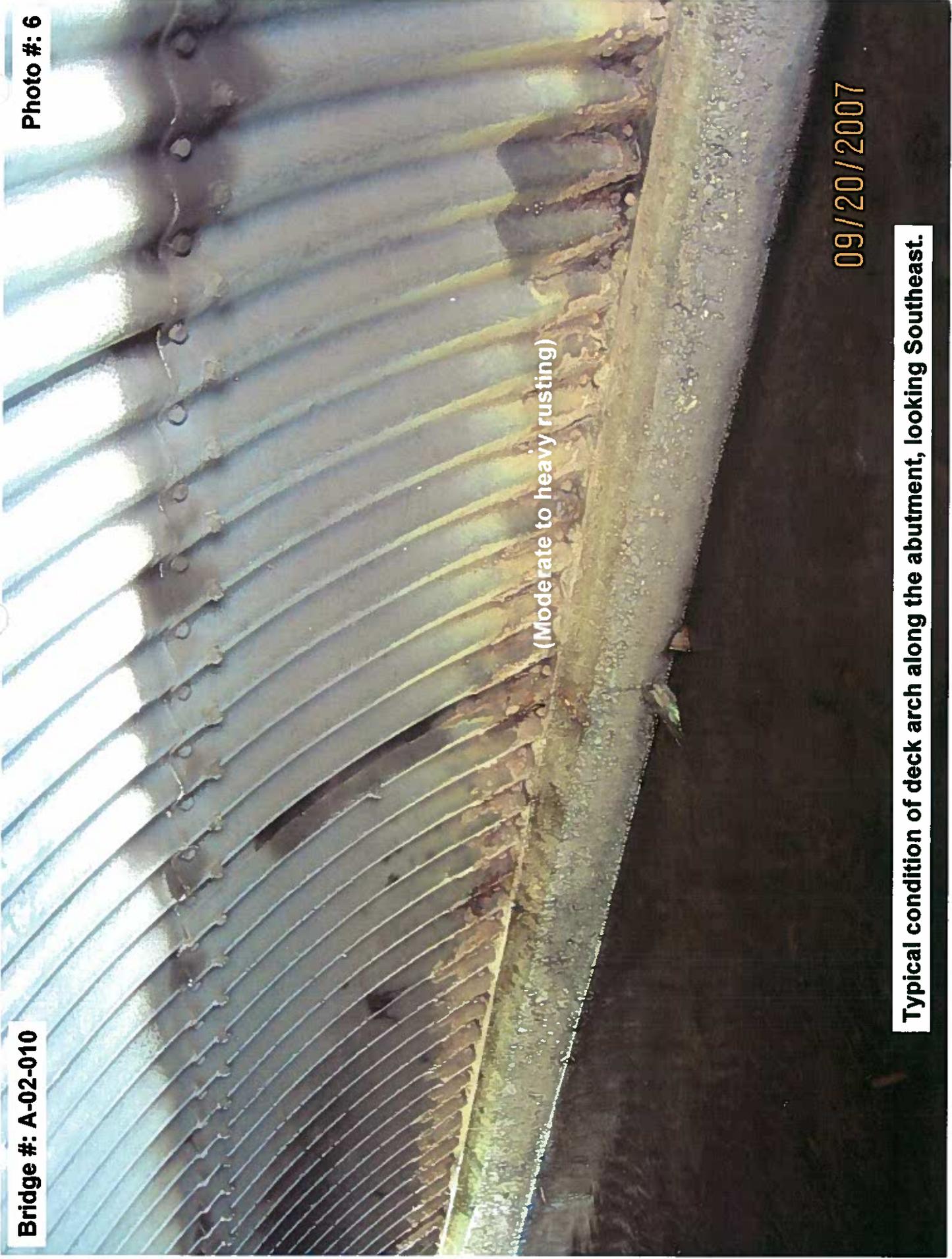
Bridge #: A-02-010

Photo #: 6

(Moderate to heavy rusting)

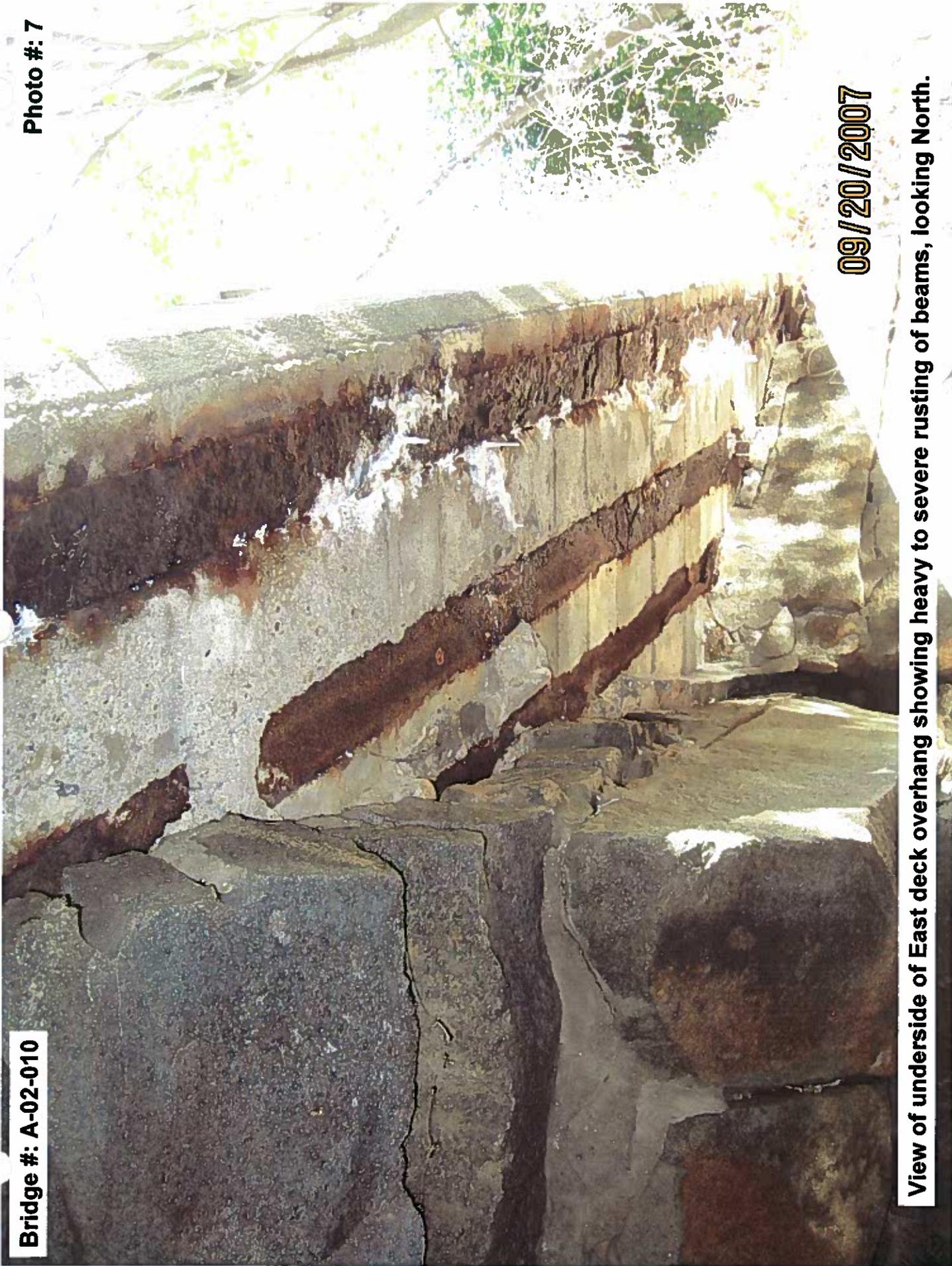
09/20/2007

Typical condition of deck arch along the abutment, looking Southeast.



Bridge #: A-02-010

Photo #: 7

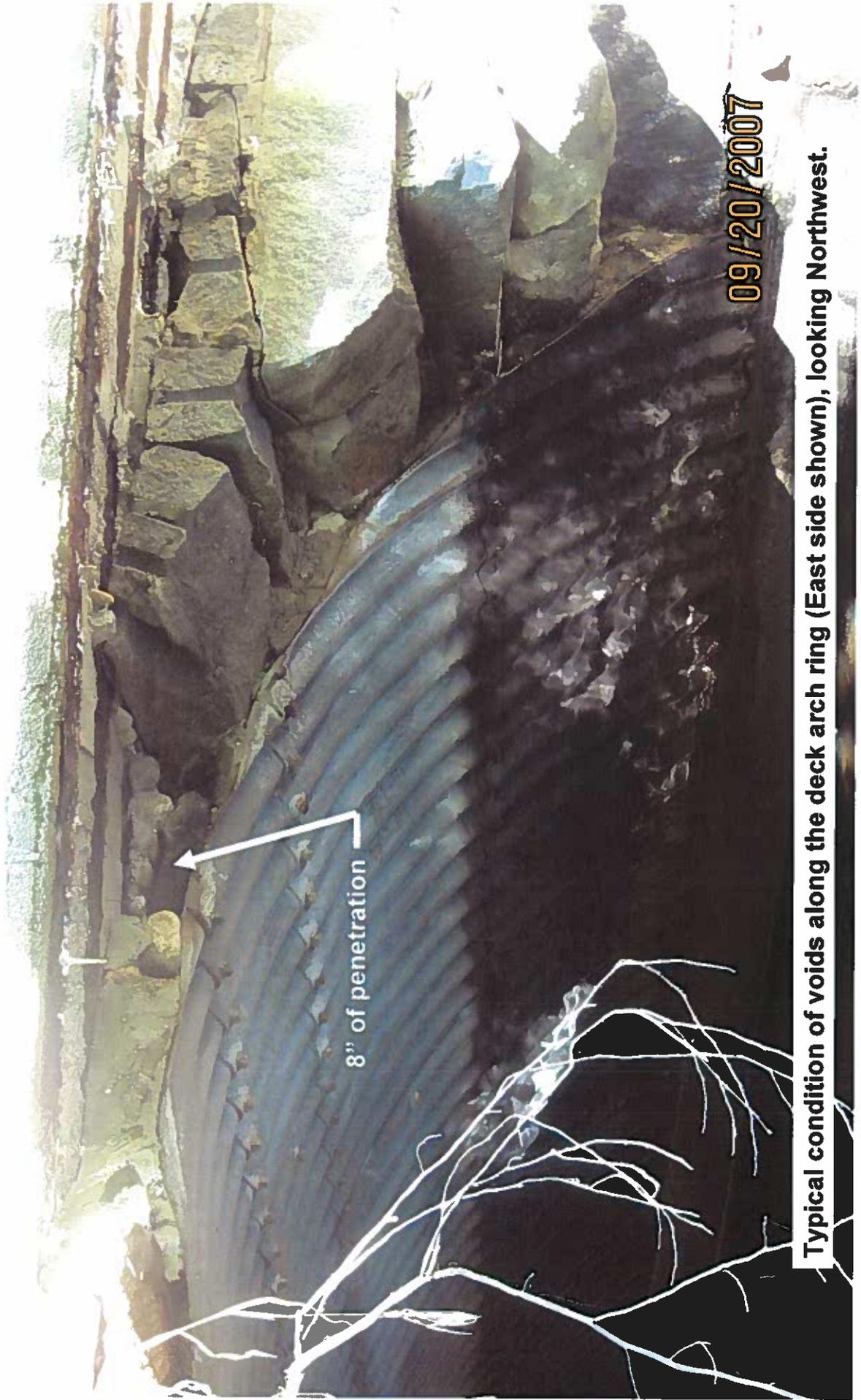


09/20/2007

View of underside of East deck overhang showing heavy to severe rusting of beams, looking North.

Bridge #: A-02-010

Photo #: 8



09/20/2007

Typical condition of voids along the deck arch ring (East side shown), looking Northwest.

Bridge #: A-02-010

Photo #: 9

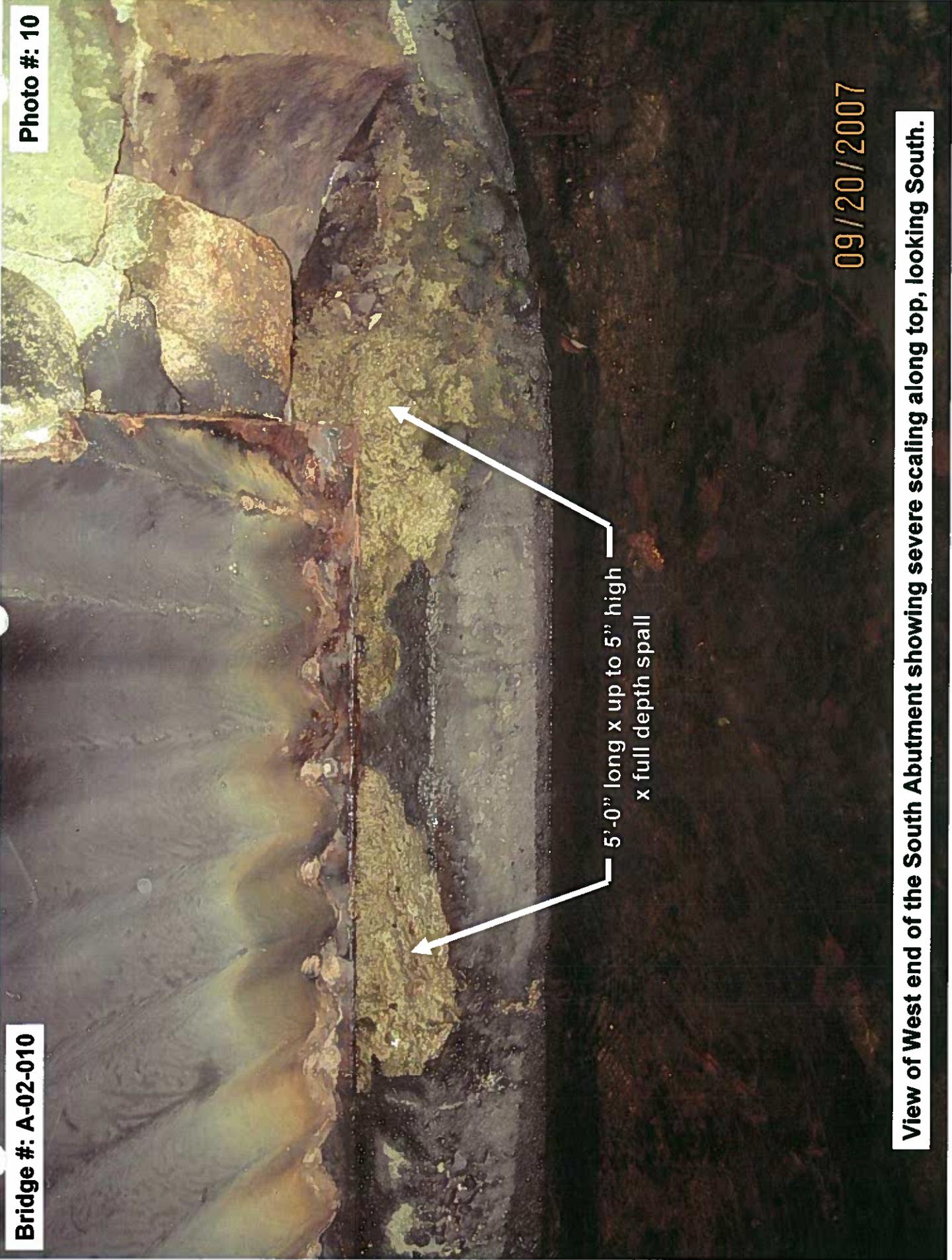


09/20/2007

Northwest corner of the bridge showing voids along the arch ring, looking East.

Bridge #: A-02-010

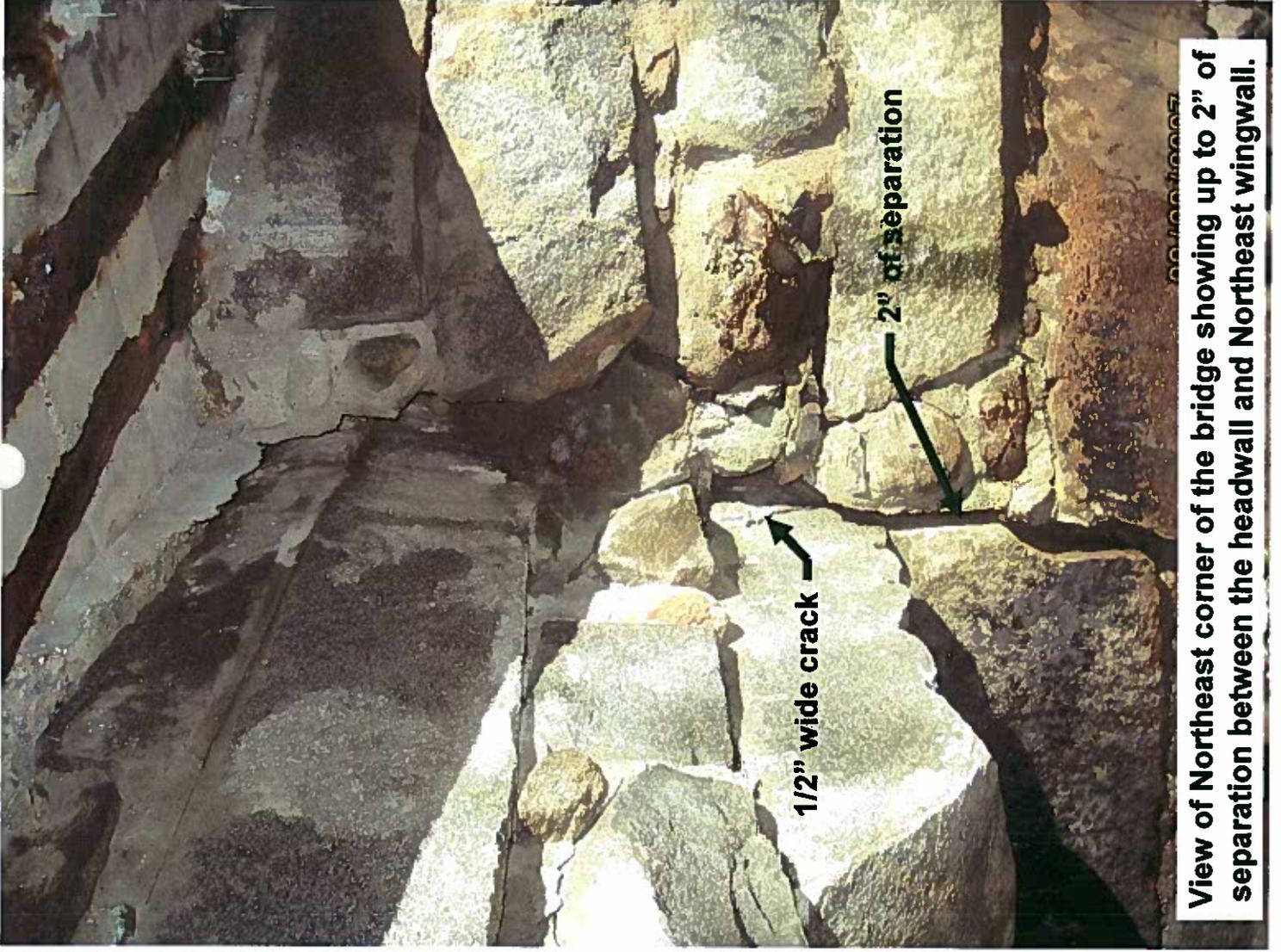
Photo #: 10



5'-0" long x up to 5" high  
x full depth spall

09/20/2007

View of West end of the South Abutment showing severe scaling along top, looking South.



View of Northeast corner of the bridge showing up to 2" of separation between the headwall and Northeast wingwall.

Bridge #: A-02-010

Photo #: 12



Numerous voids  
along wingwall

09/20/2007

Typical condition of the wingwalls (Northeast wingwall shown), looking North.



**BRIDGE NO. A-02-011 (WETHERBEE STREET OVER NASHOBA BROOK)**

**Bridge Description and Orientation:**

The Wetherbee Street Bridge over the Nashoba Brook is a three (3) cell reinforced concrete box culvert that was built in 1997 (see Sketches and Photos #1 & #2). Wetherbee Street, at the bridge, is oriented North and South over the Nashoba Brook which flows from West to East. The three (3) cell box culvert is labeled as North, Middle and South boxes with the North legs of the culverts being labeled #1 to #7 and the South legs being labeled #2 to #8 due to the skew along the face of the culvert.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Approach Guardrail	<ul style="list-style-type: none"> <li>Minor collision damage to the terminal end at Northeast approach guardrail</li> <li>Minor collision damage to Northwest approach guardrail</li> </ul>	
Safety Curb	<ul style="list-style-type: none"> <li>Narrow through crack in the West safety curb that corresponds with narrow vertical cracks in the joint between the South and Middle Box Culverts at the West end</li> </ul>	

**Top of Bridge Deficiencies (NBIS Item #58 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Wearing Surface	<ul style="list-style-type: none"> <li>Small settled area at the Northwest corner of bridge at the West curb line</li> <li>Random narrow to medium cracks and moderate to heavy vegetation growth along approaches, curb lines and wingwalls</li> <li>Sawcut at North approach roadway, Southbound lane, is beginning to open up</li> </ul>	3

**Superstructure Deficiencies (NBIS Item #59 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Concrete Box Culverts	<ul style="list-style-type: none"> <li>Light to moderate scaling with heavier scaling along the waterline (waterline abrasion)</li> <li>Light to moderate water staining throughout</li> <li>Light to moderate leakage at the roof joints</li> </ul>	4



	<ul style="list-style-type: none"> <li>• Random areas of missing concrete filler, minor chipping and spalling along the segment joints</li> <li>• Random hairline longitudinal cracks in the roof and upper chamfer</li> <li>• Missing filler between the joints of the Middle Box Culvert at the upstream end below the waterline with up to 30" of penetration (Latest MHD Dive Report)</li> <li>• Majority of South Box Culvert segments show height differential up to 1.5" with no significant gaps</li> <li>• Concrete filler between the segment joints is beginning to crack and separate in random locations</li> <li>• Patch in roof of South Box Culvert, Segment #3 near South leg</li> <li>• Lip of concrete floor is intermittently exposed along the West end of the South Box Culvert, up to 4" in height (Latest MHD Dive Report)</li> <li>• Majority of Middle Box Culvert segments show height differential up to 1", gaps up to 1.75" and up to 4" of penetration</li> <li>• Moderate to heavy leakage in the roof joint between Segments #3 &amp; #4 and light to moderate leakage of the remainder of the joints in the Middle Box Culvert</li> <li>• Spall at the West end of the Middle Box Culvert, South leg, that measures 17"H x up to 4"W x up to 30" of penetration</li> <li>• Majority of North Box Culvert segments show height differential up to 1.25", gaps up to 1.5" and up to 2.75" of penetration</li> <li>• Heavy to severe aggradation in the North Box Culvert (up to 3'-0" deep) Active leakage in the roof joint between Segments #6 &amp; #7</li> </ul>	5
		7
		6
		8
		9
Headwalls	<ul style="list-style-type: none"> <li>• Light scaling, light water staining and random hairline random cracks with light concrete discoloration throughout.</li> <li>• Narrow full height vertical cracks with light efflorescence staining over the construction joint between boxes at both headwalls</li> </ul>	1

Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)

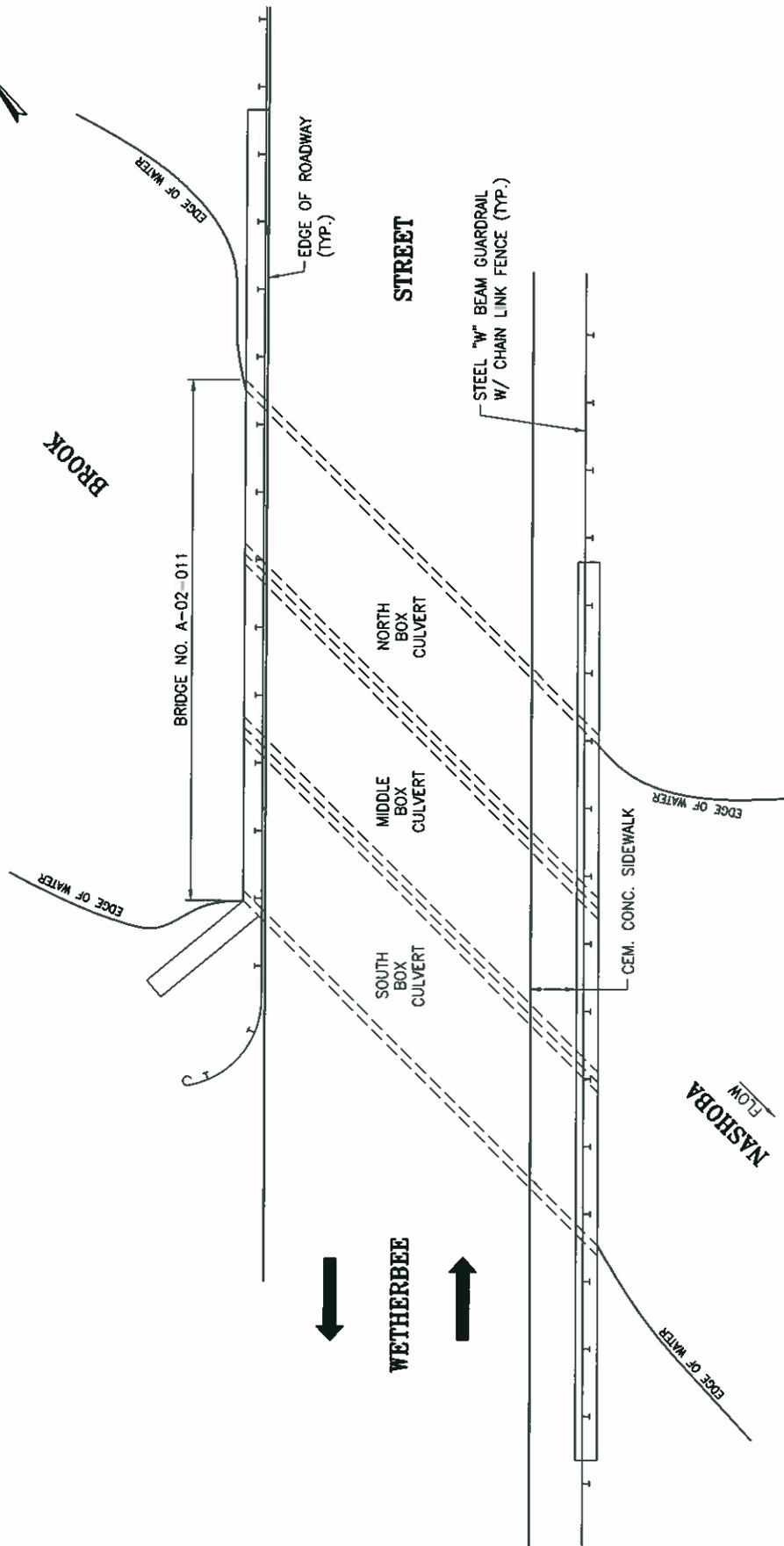
Element	Deficiency	Reference Photo(s)
Wingwalls	<ul style="list-style-type: none"> <li>• Light scaling and honeycombing throughout with random hairline random cracks and light efflorescence staining</li> </ul>	



**Recommended Maintenance:**

The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the Wetherbee Street Bridge over Nashoba Brook:

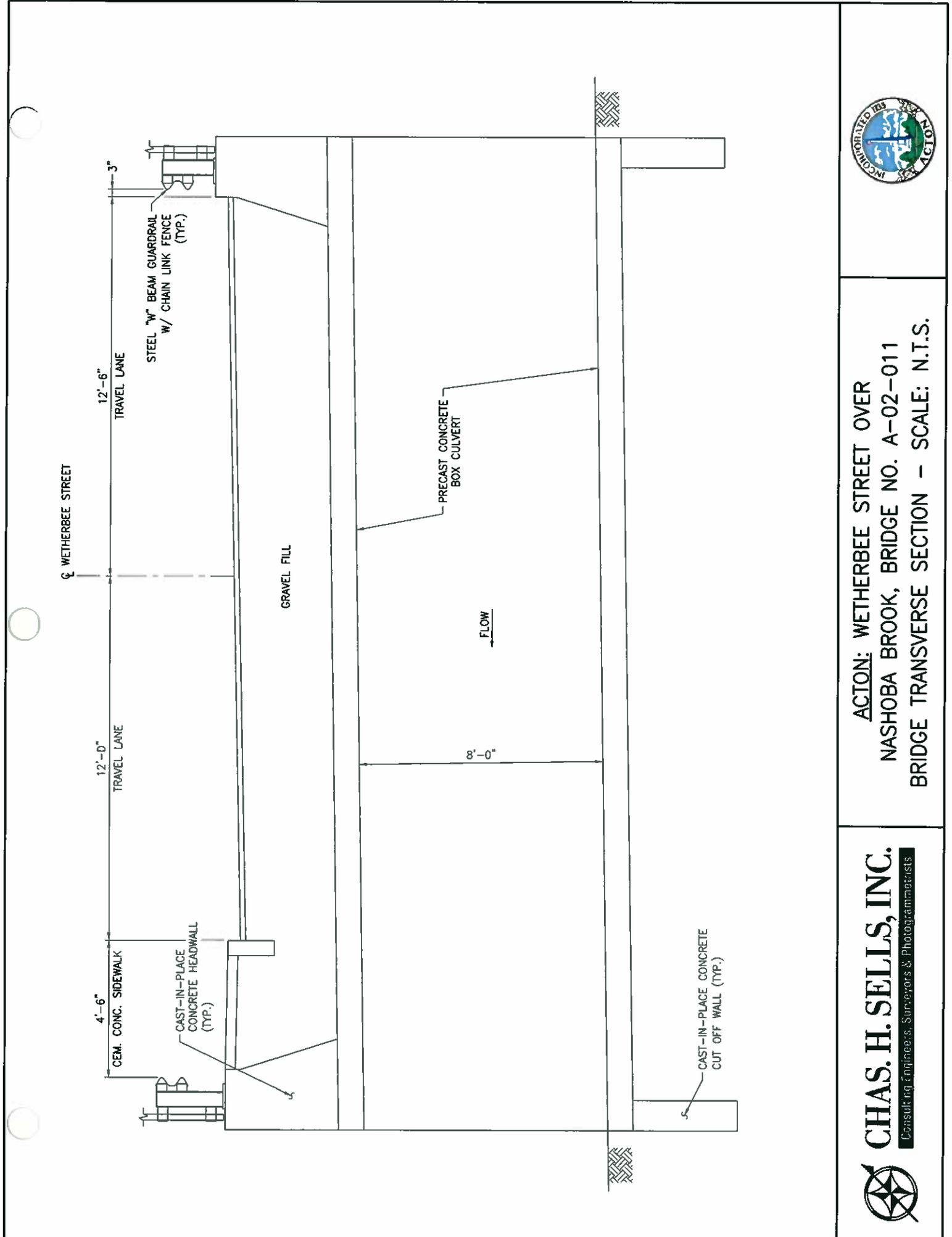
Element & Location		Deficiency	Repair Needed	Priority
#1	Top of bridge	Heavy vegetation growth	Remove vegetation growth	Low
#2	Top of West headwall between South and Middle Box Culvert	Narrow through crack	Seal crack with methacrylate	Low
#3	NE approach guardrail terminal end	Collision Damage	Remove and replace terminal end	Low
#4	NW approach guardrail	Collision Damage	Remove and replace damaged portions	Low
#5	North approach roadway	Spalling along sawcut	Reseal joint	Low
#6	Joints between boxes at waterline	Voids with up to 30" penetration	Fill and reseal joints as needed	Moderate
#7	Segment Joints (all segments)	Gap between segment joints	Fill and reseal joints as needed	Moderate
#8	West end, South leg, Middle Box Culvert	Spall	Patch with cementitious mortar	Moderate
#9	West Headwall	Narrow full height vertical cracks over const. joints	Seal cracks with methacrylate	Low
#10	East Headwall	Narrow full height vertical cracks over const. joints	Seal cracks with methacrylate	Low



**ACTION: WETHERBEE STREET OVER  
NASHOBA BROOK, BRIDGE NO. A-02-011  
PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
Consulting Engineers, Surveyors & Photogrammetrists





**ACTION: WETHERBEE STREET OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-011  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists



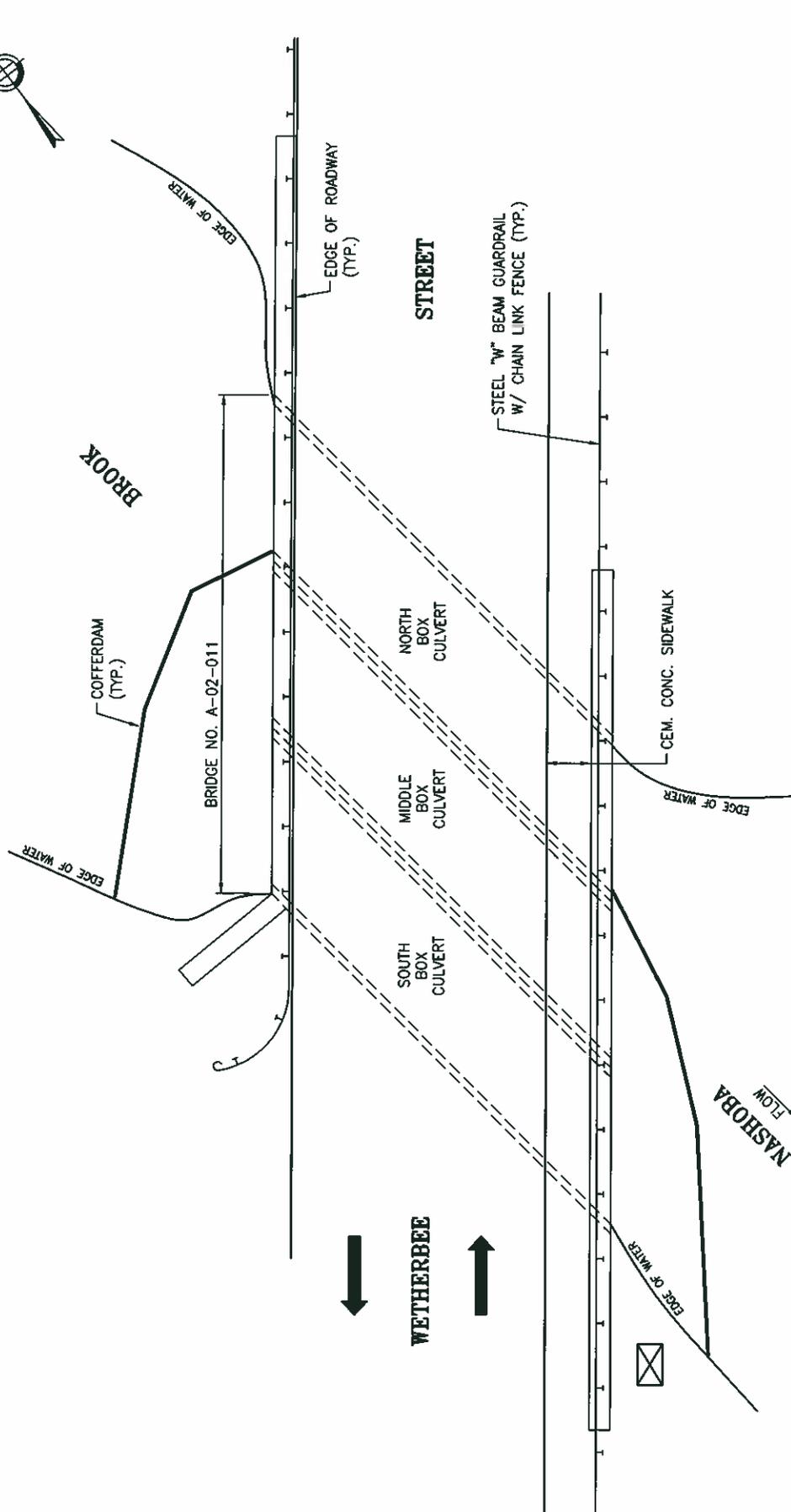


**ACTION: WETHERBEE STREET OVER  
NASHOBA BROOK, BRIDGE NO. A-02-011  
WATER CONTROL PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
Consulting Engineers, Surveyors & Photogrammetrists



**STAGE I**



**LEGEND**

— COFFERDAM

⊠ SEDIMENTATION BASIN

↓  
**WETHERBEE**  
↑

**NASHOBA**  
FLOW

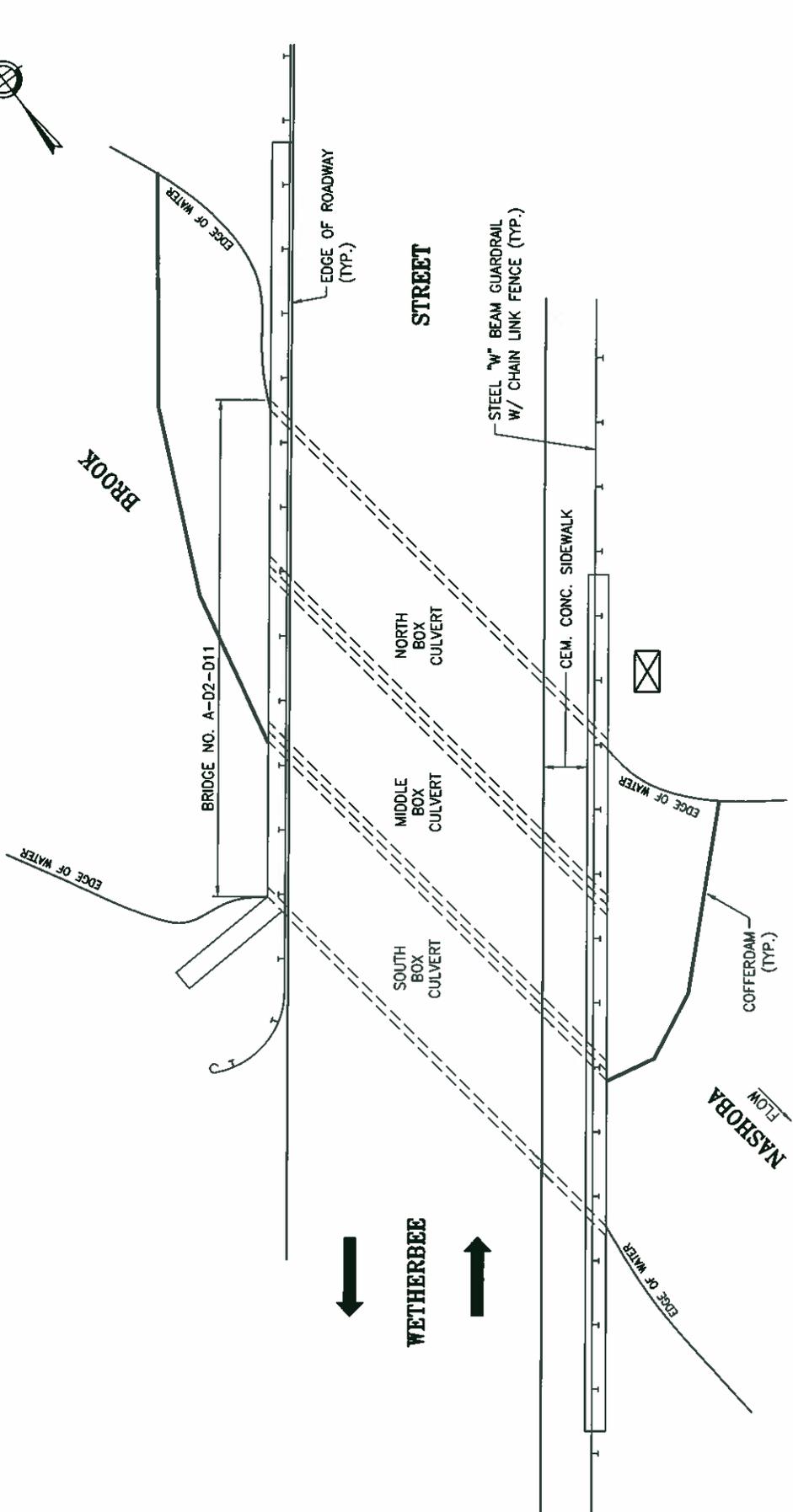


**ACTION: WETHERBEE STREET OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-011  
 WATER CONTROL PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists



**STAGE II**



- LEGEND**
- — COFFERDAM
  - ⊠ — SEDIMENTATION BASIN

Bridge #: A-02-011

Photo #: 1

Crack with efflorescence

(North Box)

(South Box)

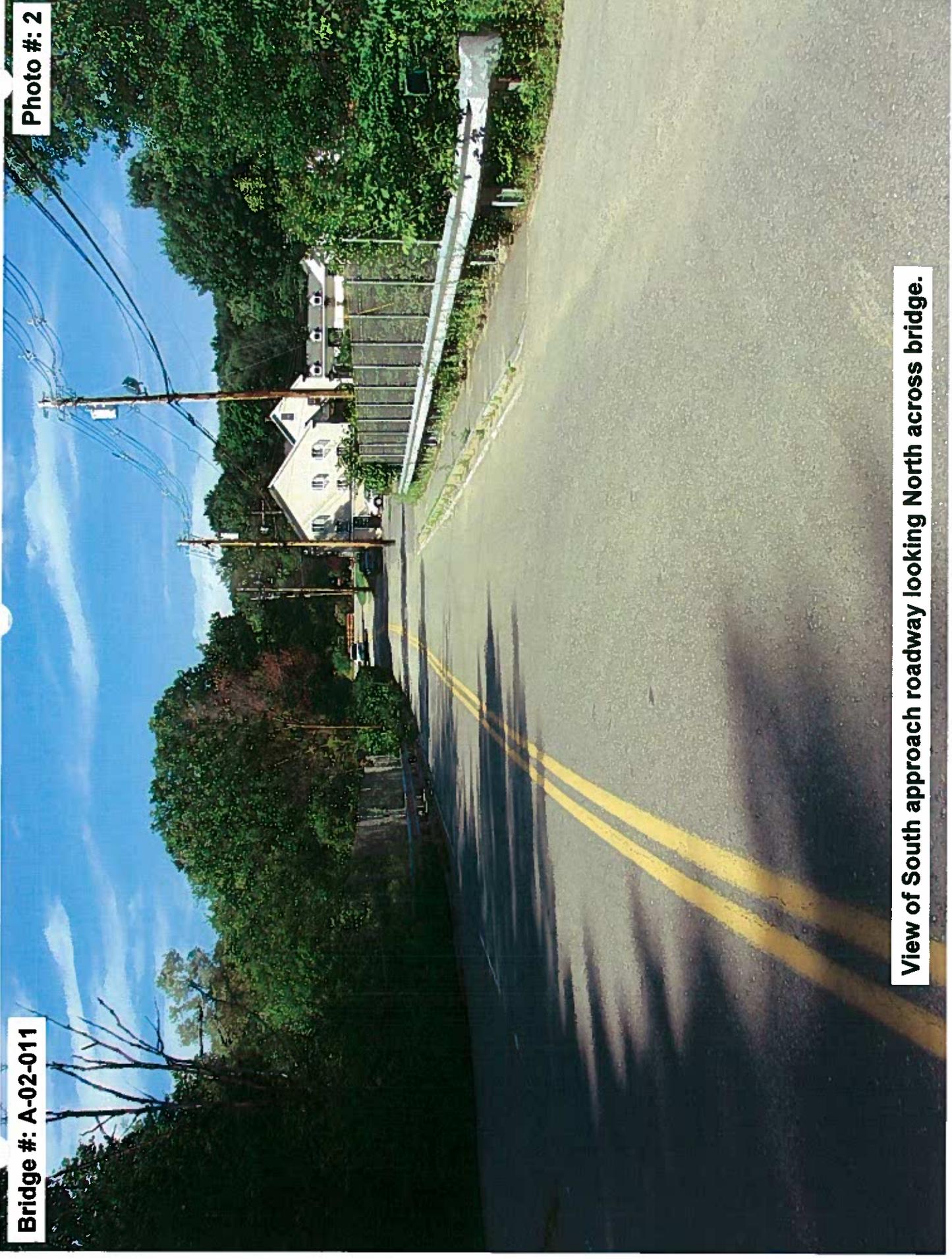
09/21/2007

West Elevation View, looking East.



Bridge #: A-02-011

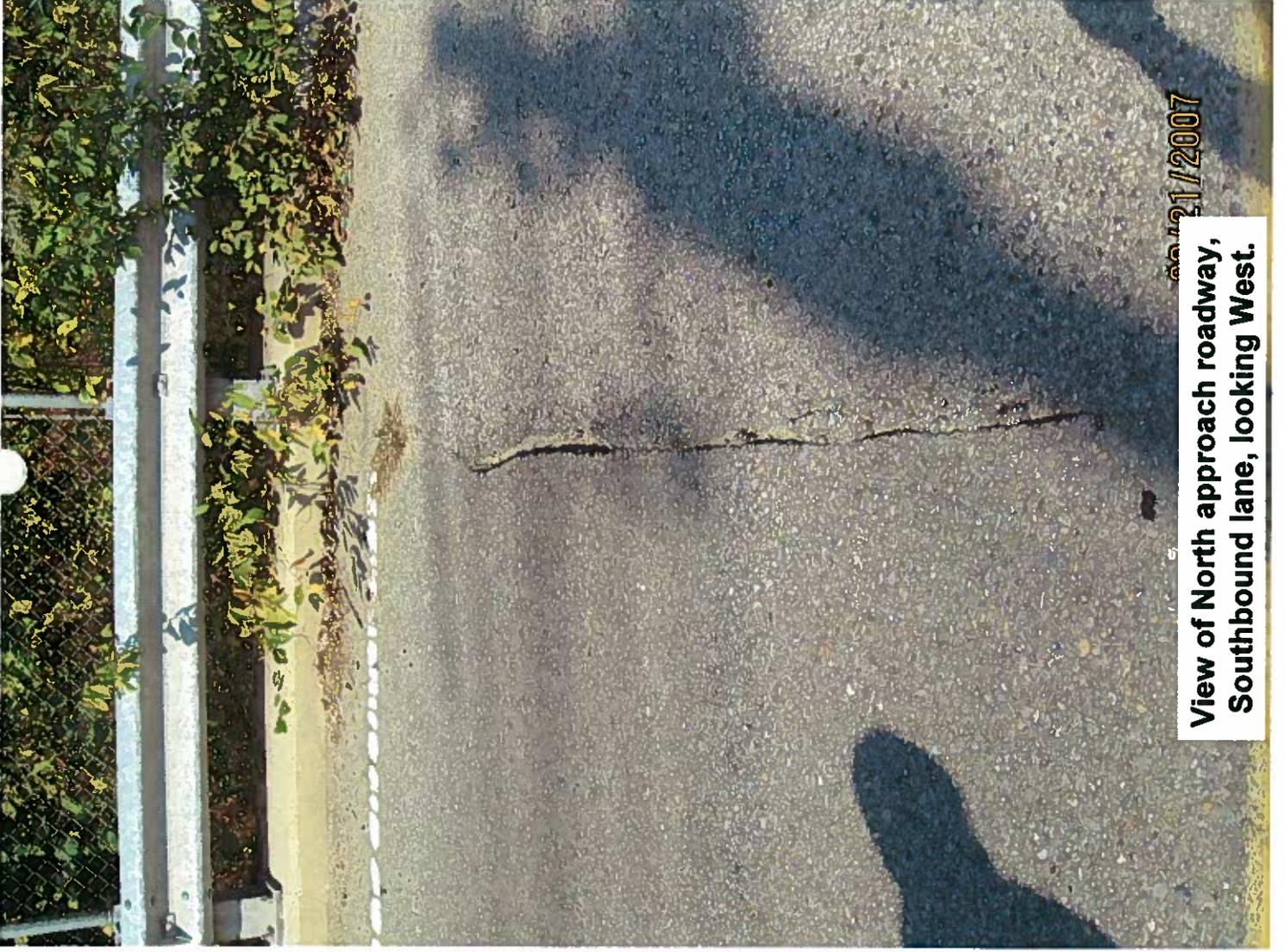
Photo #: 2



View of South approach roadway looking North across bridge.

Bridge #: A-02-011

Photo #: 3



View of North approach roadway,  
Southbound lane, looking West.

Bridge #: A-02-011

Photo #: 4



(Segment 5)

(Segment 6)

View of typical leakage along the segment joints (South Culvert shown), looking North.

0070140707

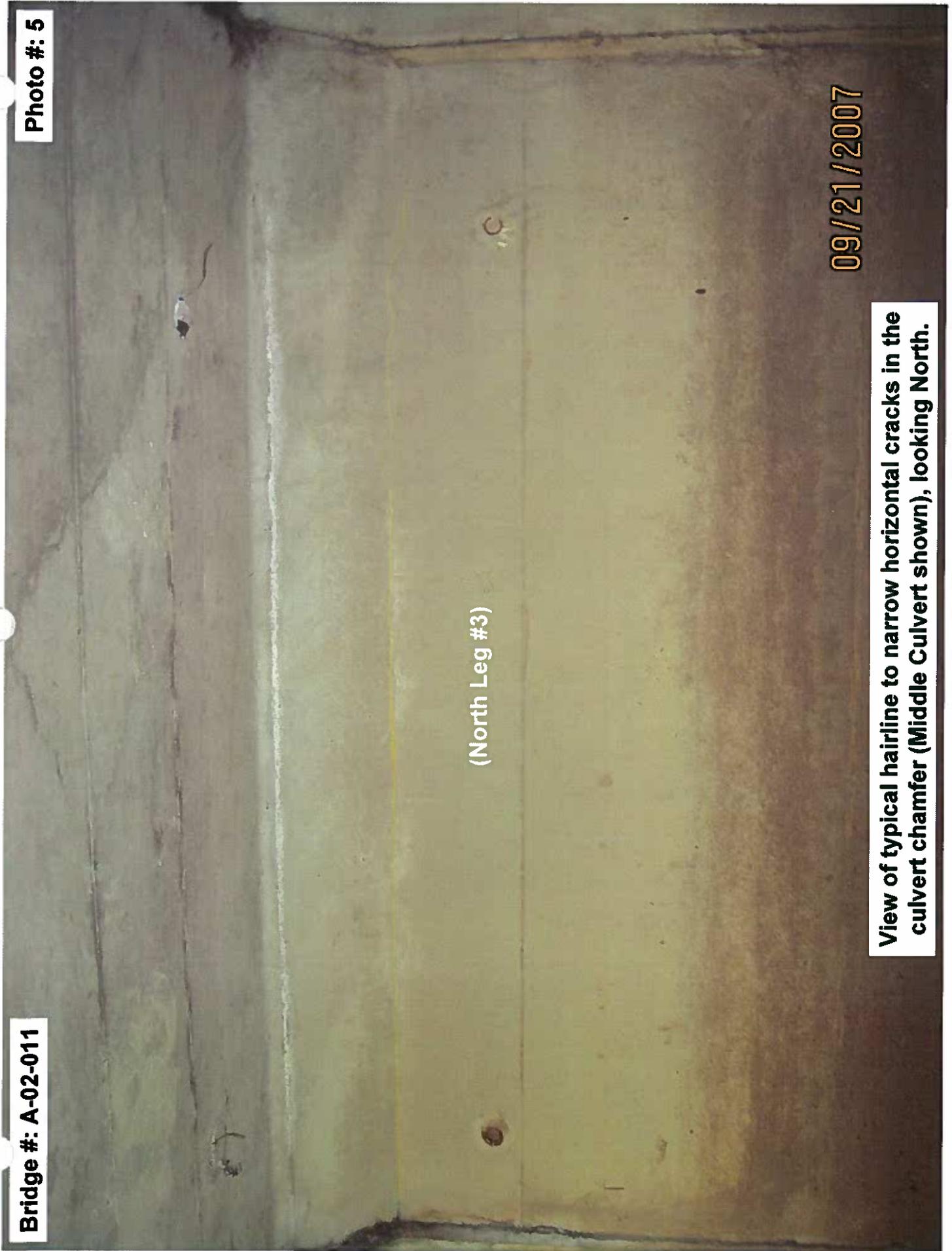
Bridge #: A-02-011

Photo #: 5

(North Leg #3)

09/21/2007

View of typical hairline to narrow horizontal cracks in the culvert chamfer (Middle Culvert shown), looking North.



Bridge #: A-02-011

Photo #: 6



View of typical gaps and leakage along the segment joints (Middle Culvert shown), looking South.

Bridge #: A-02-011

Photo #: 7

(Segment 3)

(Segment 4)

(Segment 5)

09/21/2007

View of heavy leakage and height differential between segments (Middle Culvert shown), looking East.

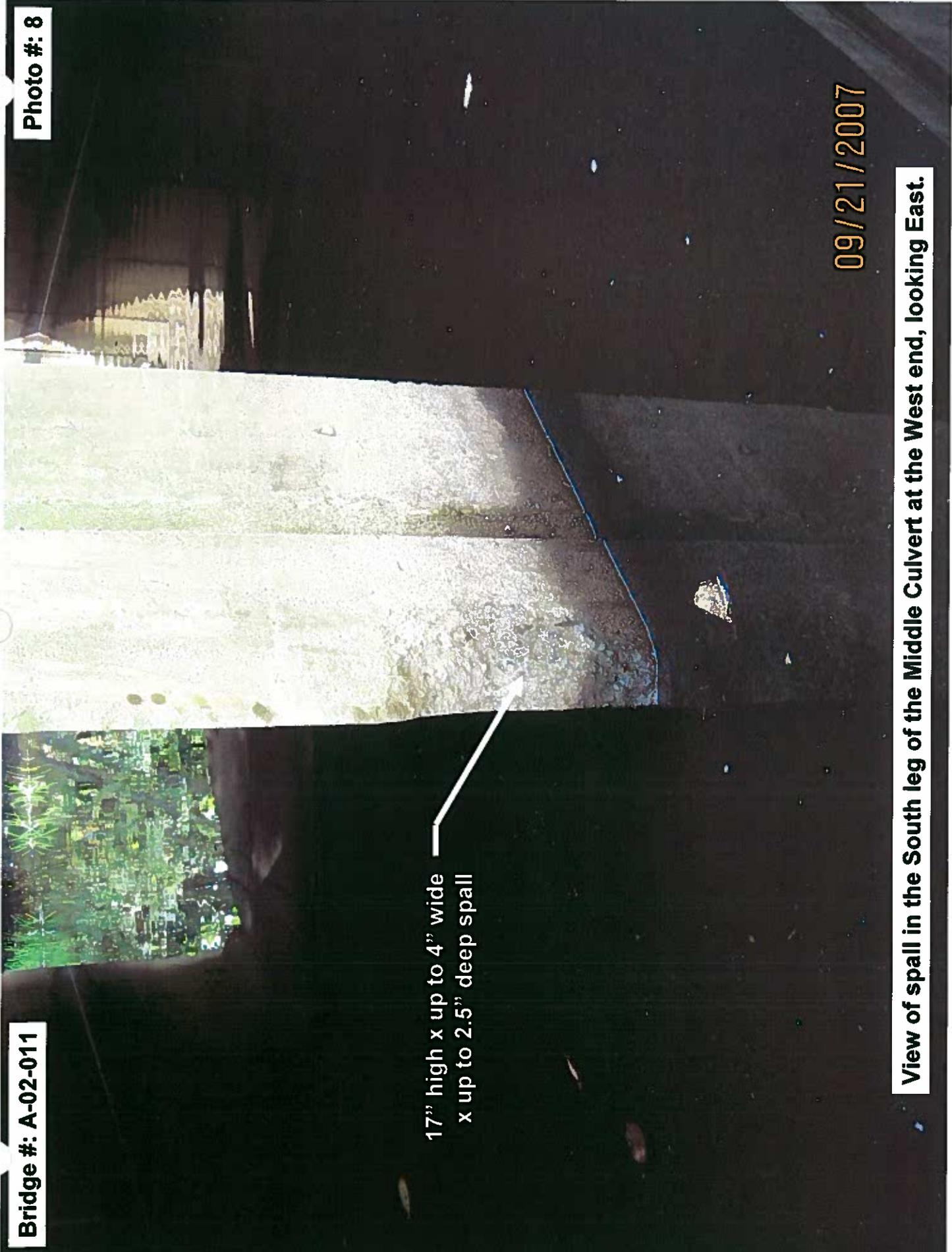
Bridge #: A-02-011

Photo #: 8

17" high x up to 4" wide  
x up to 2.5" deep spall

09/21/2007

View of spall in the South leg of the Middle Culvert at the West end, looking East.



Bridge #: A-02-011

Photo #: 9

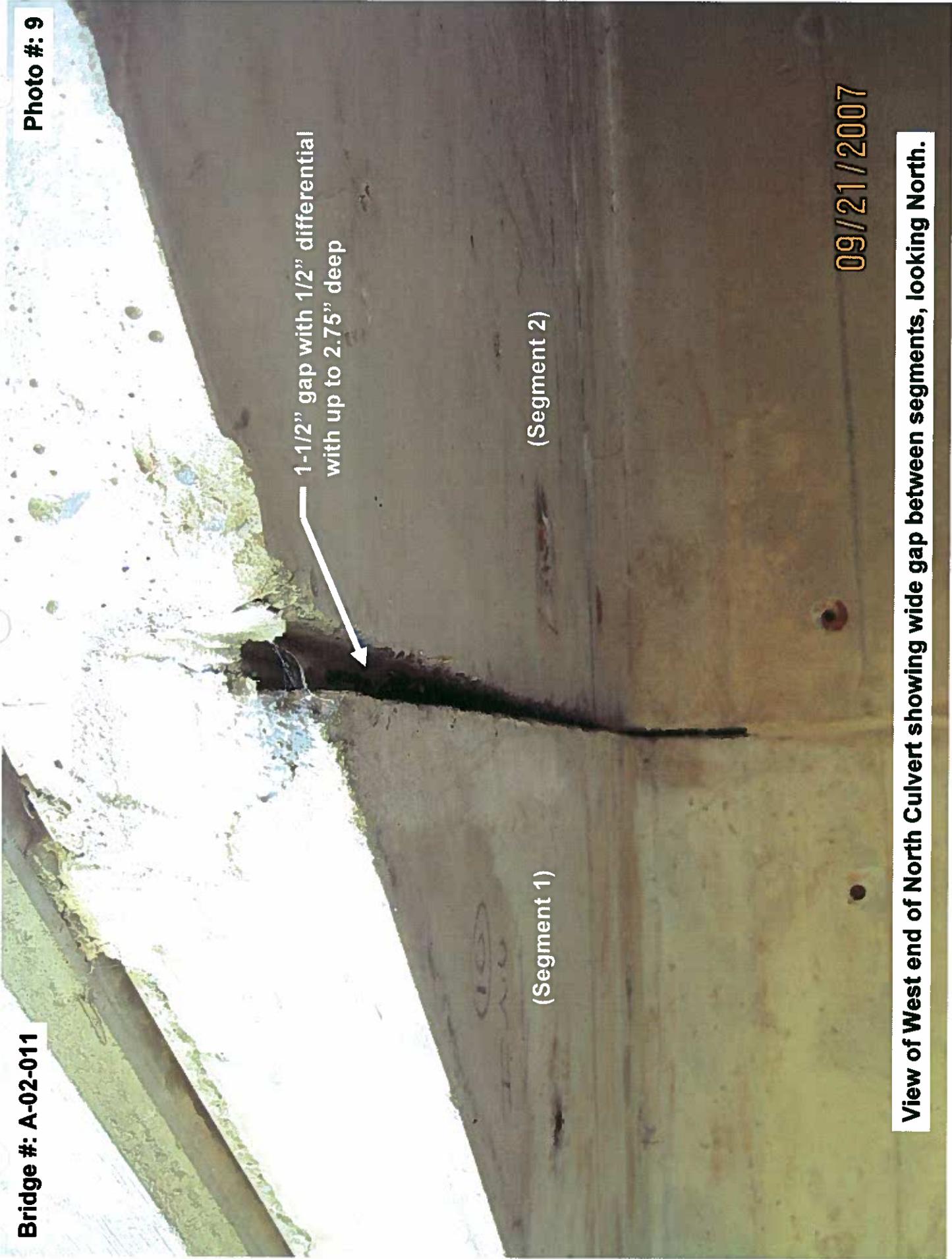
1-1/2" gap with 1/2" differential  
with up to 2.75" deep

(Segment 1)

(Segment 2)

09/21/2007

View of West end of North Culvert showing wide gap between segments, looking North.





**BRIDGE NO. A-02-018 (CONCORD ROAD OVER NASHOBA BROOK)**

**Bridge Description and Orientation:**

The Concord Road Bridge over the Nashoba Brook is a twin reinforced precast concrete box culvert structure that was built in 1994 (see Sketches & Photos #1 & #2). Concord Road, at the bridge, is oriented East and West over the Nashoba Brook which flows from North to South. The twin box culvert is labeled as East and West boxes.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Approach Guardrail	<ul style="list-style-type: none"> <li>Minor dents and scrapes throughout</li> </ul>	

**Top of Bridge Deficiencies (NBIS Item #58 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Wearing Surface	<ul style="list-style-type: none"> <li>Wide crack between the East and West Box Culvert in the South granite curb and filler concrete</li> </ul>	3
	<ul style="list-style-type: none"> <li>Minor erosion at the Northeast corner of bridge</li> <li>Wide transverse crack (up to ½" wide) between the South headwall and concrete filler behind the granite curb</li> <li>Granite approach curb is settled up to 1.75"</li> </ul>	4

**Superstructure Deficiencies (NBIS Item #59 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Concrete Box Culverts	<ul style="list-style-type: none"> <li>Light accumulation of debris between segment joints</li> <li>Light scaling throughout with moderate scaling along the waterline (waterline abrasion)</li> <li>Light to moderate vegetation growth along both walls of both culverts</li> </ul>	5
	<ul style="list-style-type: none"> <li>Numerous pock marks and moderate to heavy water staining throughout</li> <li>Majority of segments show height differential up to 1", gaps with missing and/or deteriorated mortar up to 1.5" and up to 6" of penetration</li> </ul>	6



	<ul style="list-style-type: none"> <li>2 small spalls in roof of Segment #3, East Box Culvert, that measure 7"W x 6"L x 1/2"D in the middle of the roof and 9"W x 7"L x 1/2"D at the West end of the roof</li> </ul>	
Headwalls	<ul style="list-style-type: none"> <li>Light scaling and random hairline cracks with light concrete discoloration throughout</li> <li>Up to 1/8" gap between East and West Box Culvert and up to 1" gap at the parapet of the North Headwall</li> </ul>	1

Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Wingwalls	<ul style="list-style-type: none"> <li>Light vegetation growth along the top of the Northeast, Northwest and Southeast wingwalls with moderate vegetation growth along the top of the Southwest wingwall</li> </ul>	
Downstream Channel Walls	<ul style="list-style-type: none"> <li>Light to heavy scaling with deteriorated and spalled gunite patch coat and random narrow to medium cracks throughout</li> </ul>	8

**Recommended Maintenance:**

The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the Concord Road Bridge over Nashoba Brook:

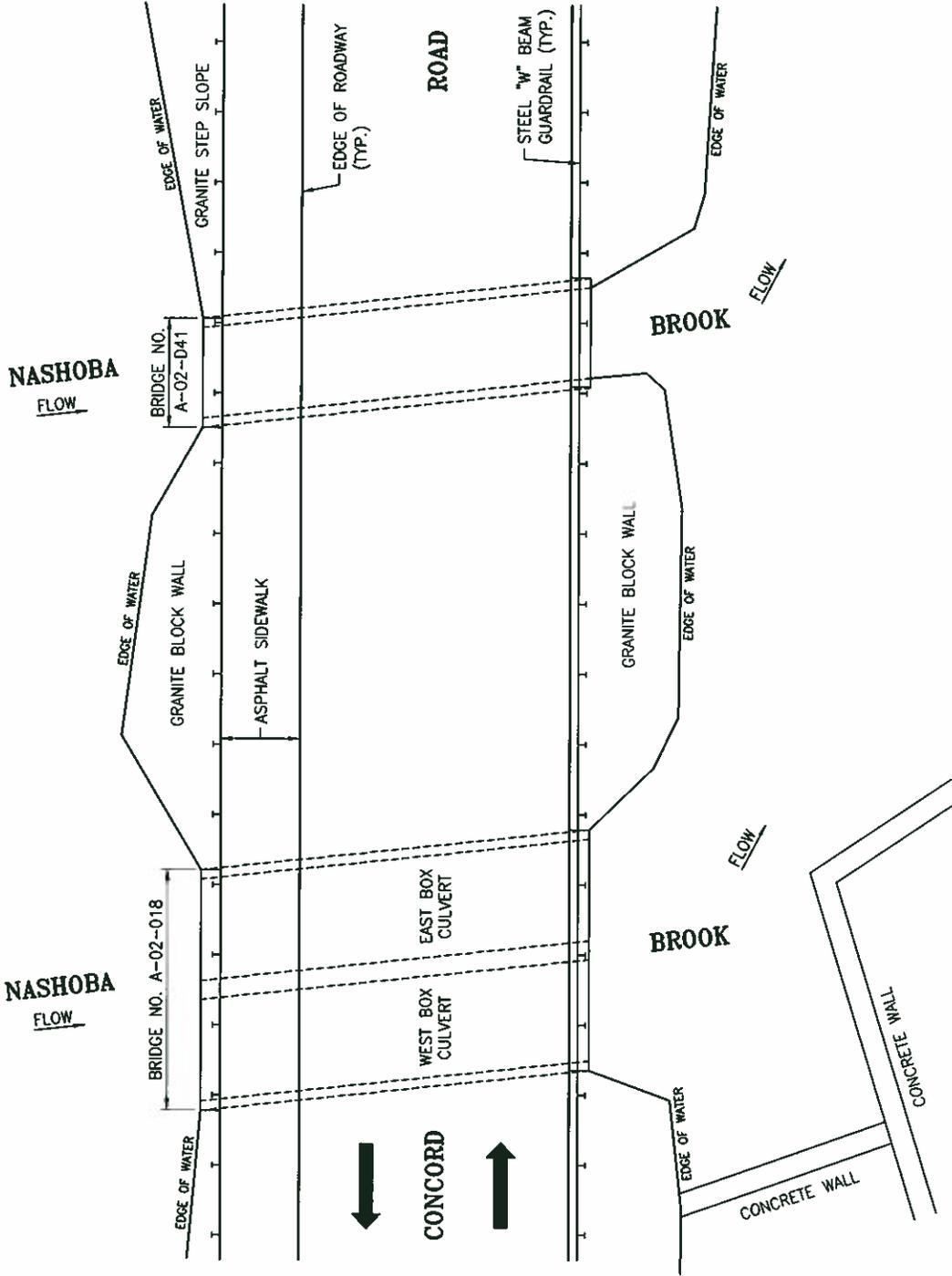
Element & Location	Deficiency	Repair Needed	Priority
#1 South curb	Wide crack between granite curb and headwall	Fill with Joint Filler & Sealer	Low
#2 Culvert Segment Joints	Gap between segment joints	Remove debris and place joint filler and sealer	Low
#3 Segment #3 Roof, East Box Culvert	Two spalls in roof	Patch with cementitious mortar	Low
#4 North Headwall	1/8" gap between boxes	Construction Defect – no repair	N/A
*#5 Downstream Channel Walls	Deterioration to face of wall along base	Repair/patch existing concrete with quick set concrete	*Moderate

\* - This element may be beyond the Town's Right of Way. Therefore, there may be a question as to whether the Town is responsible for maintenance of these walls.

If repairs for Items #2 & #3 require water control per the Town of Acton Conservation Commission, then it is not recommended to do these repairs at this time. These repairs are very minor (low priority) and the cost of water control would greatly exceed benefits at this time.



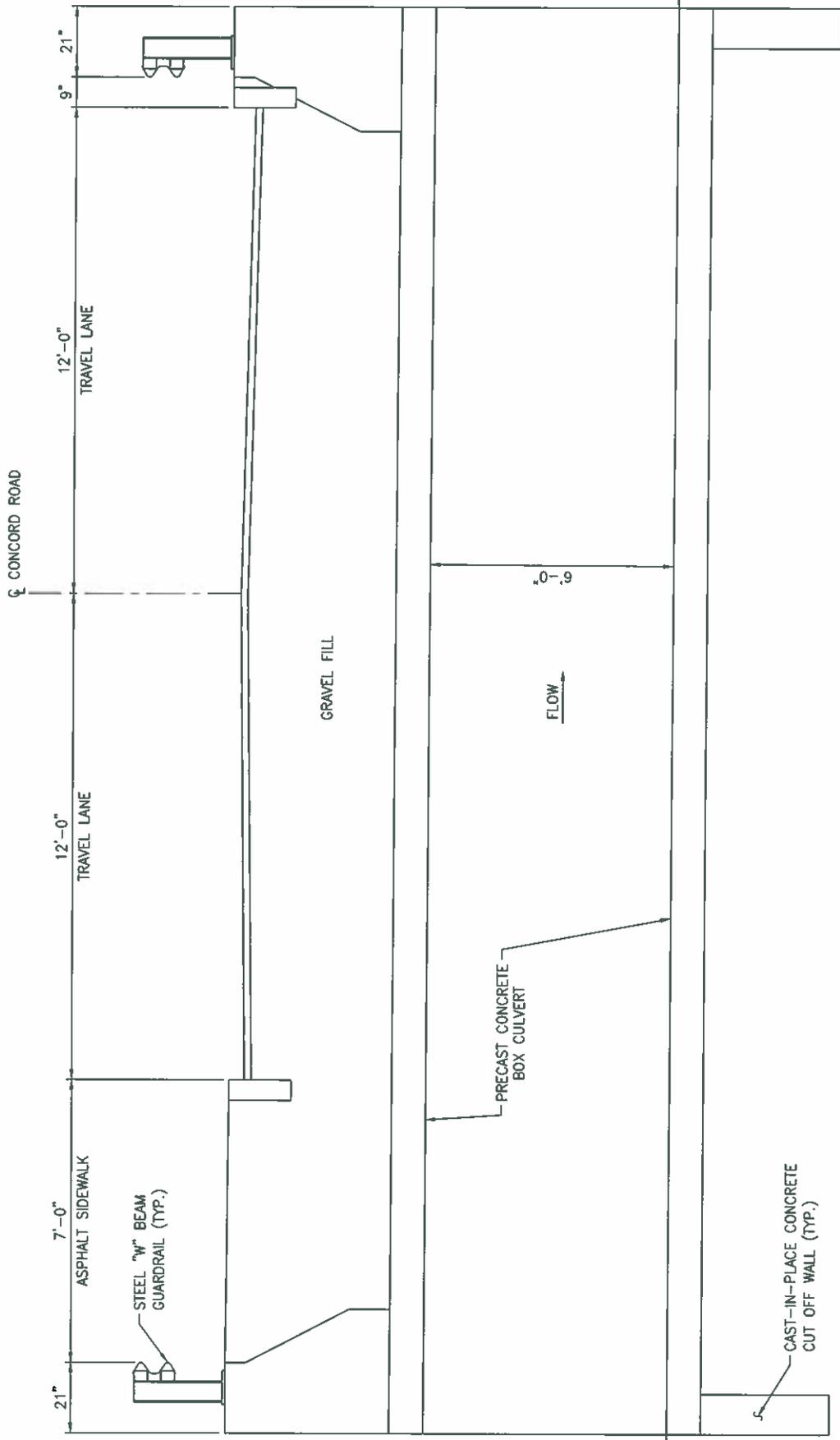
ICE HOUSE POND



ACTON: CONCORD ROAD OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-018  
 PLAN - SCALE: N.T.S.

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





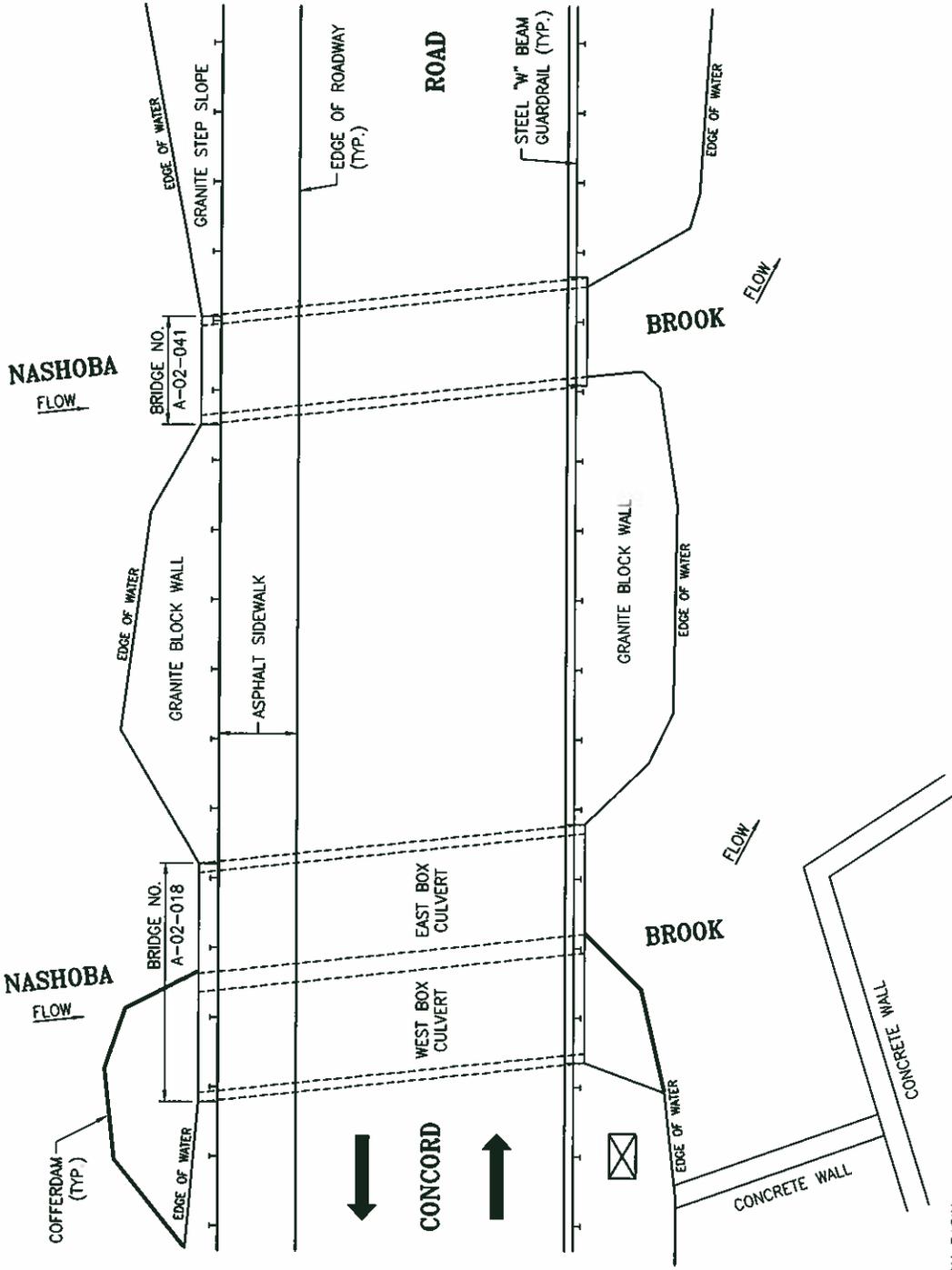
**ACTON: CONCORD ROAD OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-018  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





ICE HOUSE POND



**LEGEND**

- COFFERDAM
- ⊠ SEDIMENTATION BASIN

STAGE I



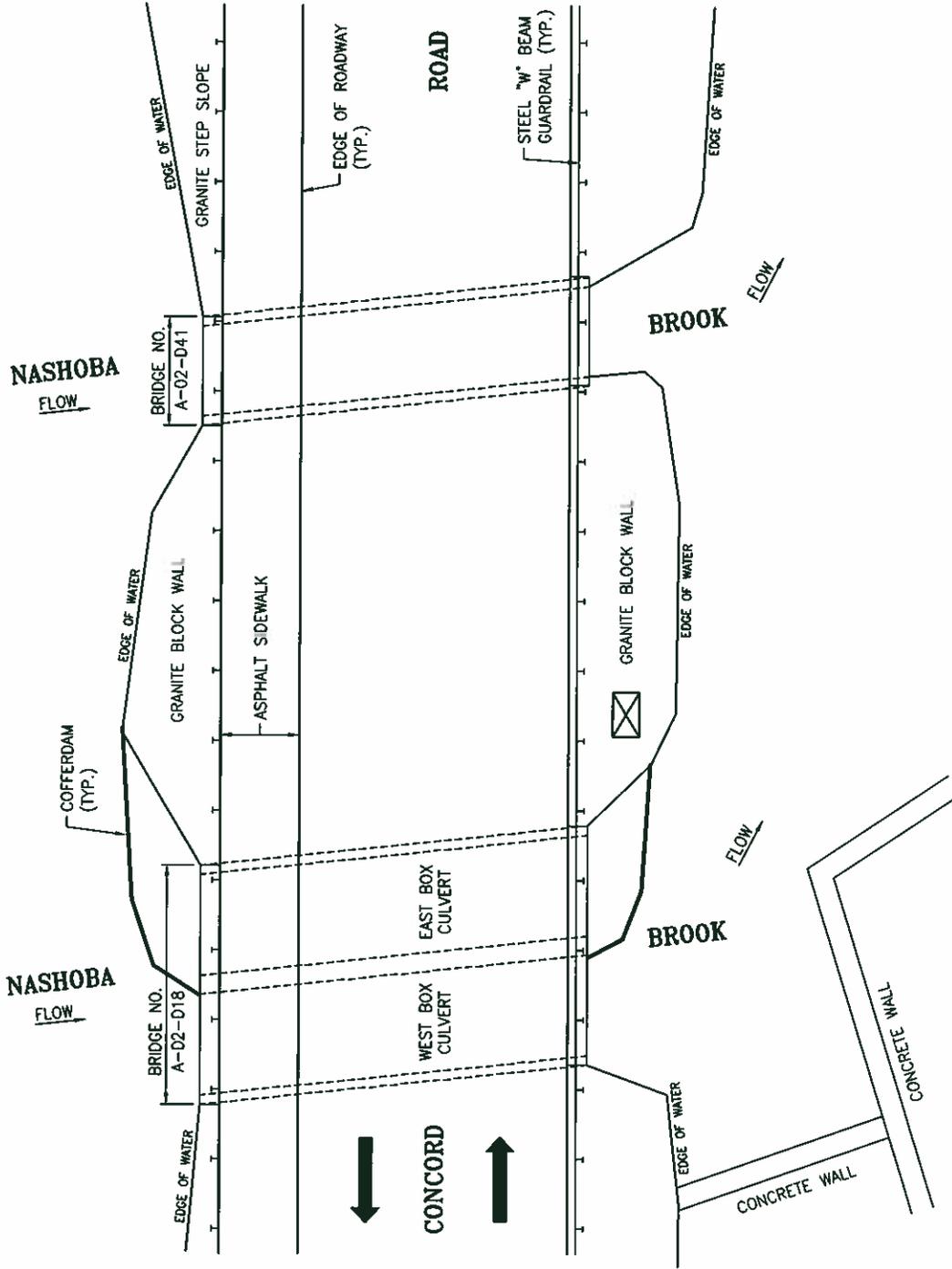
**ACTION:** CONCORD ROAD OVER  
 NASHOBA BROOK, BRIDGE NO. A-02-018  
 WATER CONTROL PLAN - SCALE: N.T.S.

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





ICE HOUSE POND



**LEGEND**

— — COFFERDAM

⊠ — SEDIMENTATION BASIN

STAGE II



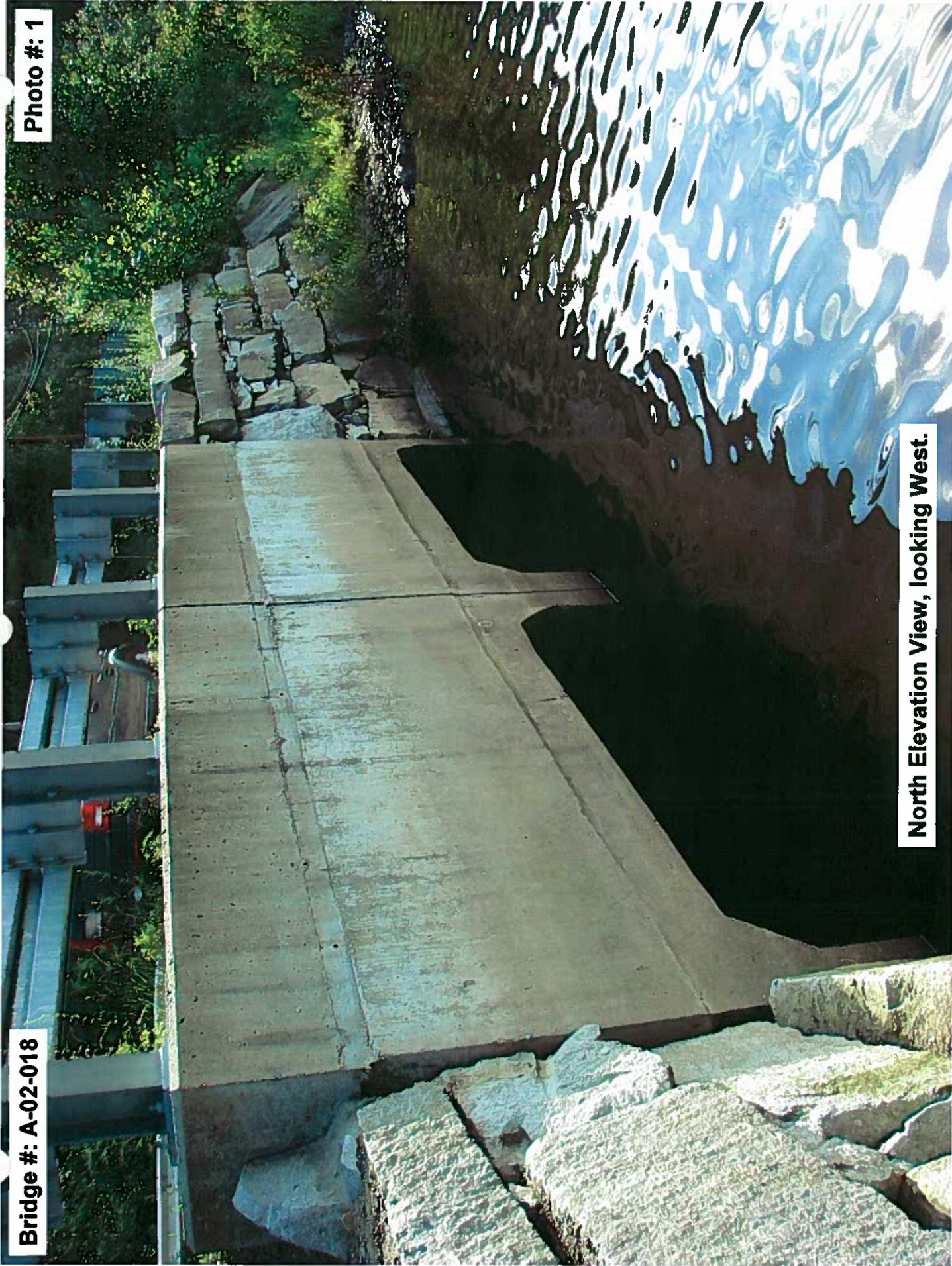
**CHAS. H. SELLS, INC.**  
Consulting Engineers, Surveyors & Photogrammetrists

**ACTION: CONCORD ROAD OVER  
NASHOBA BROOK, BRIDGE NO. A-02-018  
WATER CONTROL PLAN - SCALE: N.T.S.**



Bridge #: A-02-018

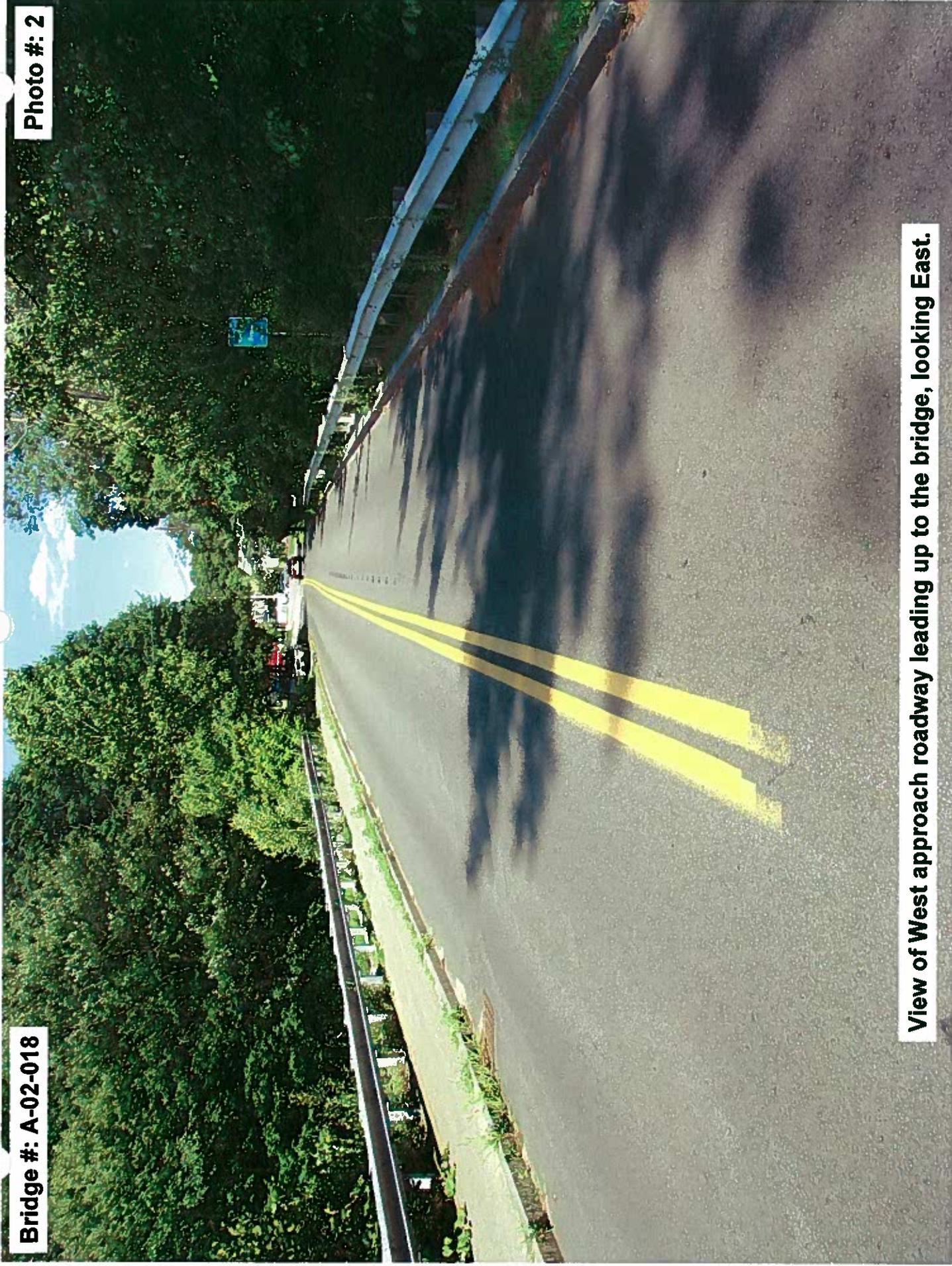
Photo #: 1



North Elevation View, looking West.

Bridge #: A-02-018

Photo #: 2



View of West approach roadway leading up to the bridge, looking East.

Bridge #: A-02-018

Photo #: 3

09/20/2007

View of Northeast corner of the bridge showing minor erosion, looking West.



Bridge #: A-02-018

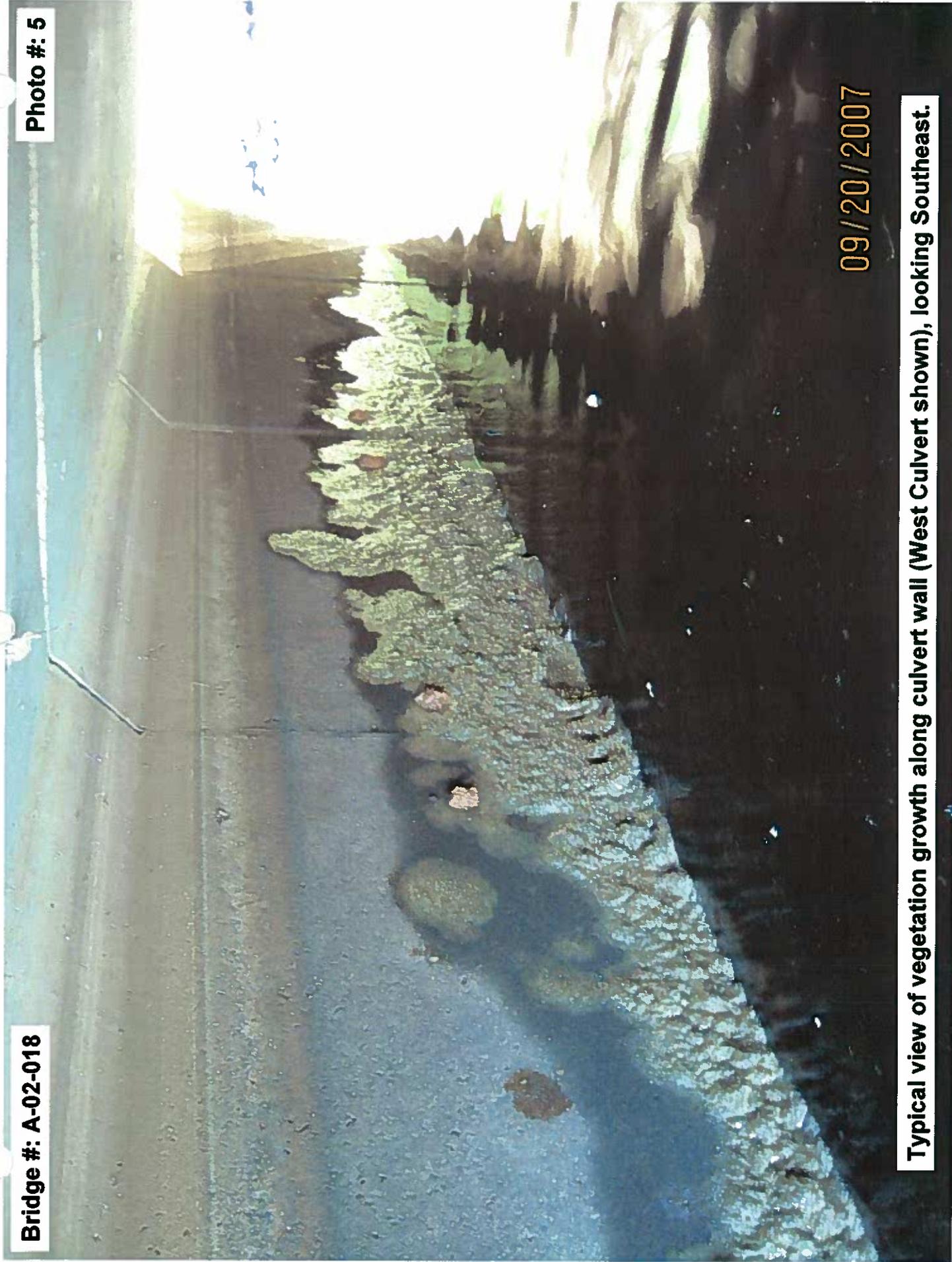
Photo #: 4



View of wide crack along the South headwall, looking West.

Bridge #: A-02-018

Photo #: 5



09/20/2007

Typical view of vegetation growth along culvert wall (West Culvert shown), looking Southeast.

Bridge #: A-02-018

Photo #: 6

(Segment 2)

(Segment 1)

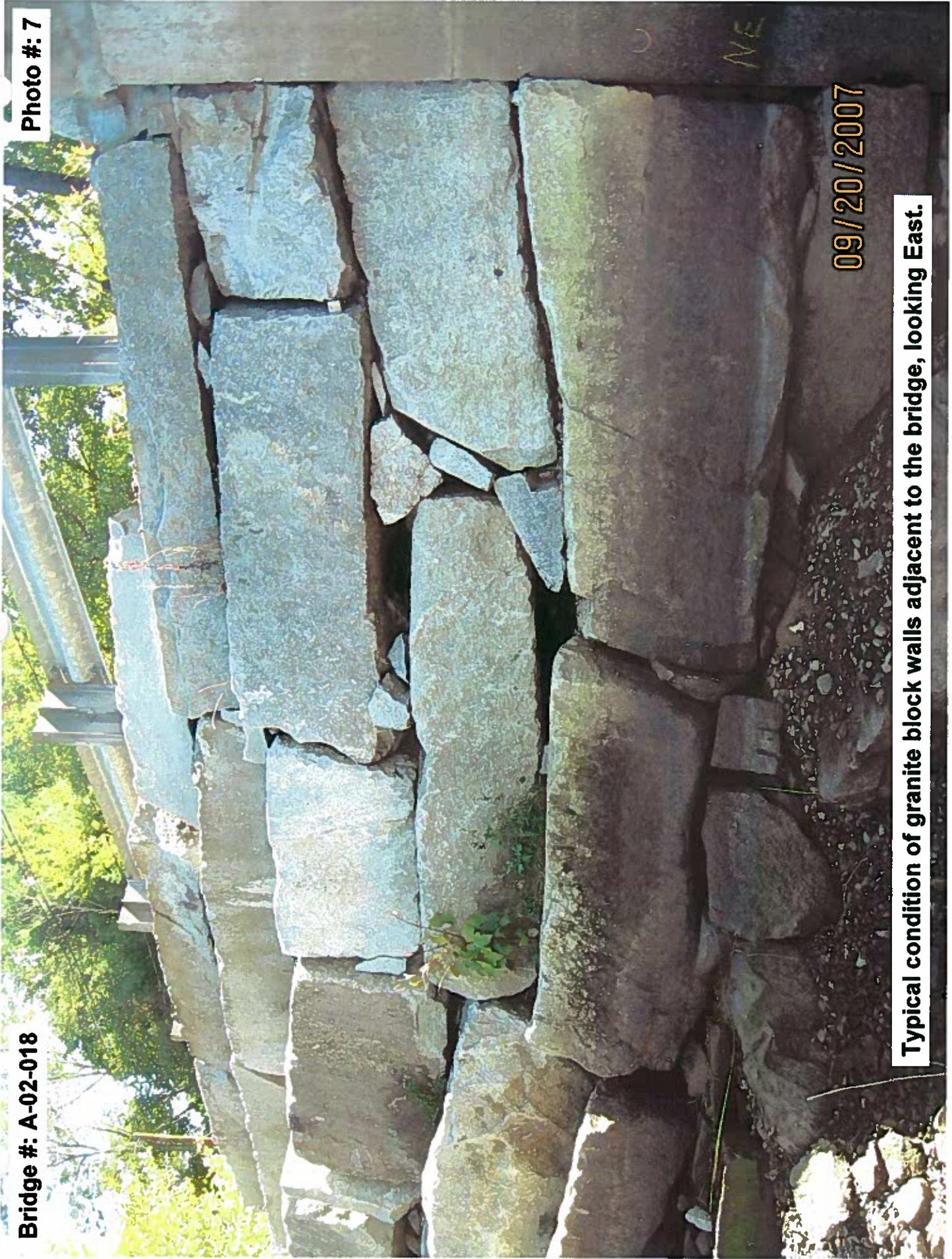
09/20/2007

Typical condition of segment joints (West Culvert shown), looking West.



Bridge #: A-02-018

Photo #: 7



09/20/2007

Typical condition of granite block walls adjacent to the bridge, looking East.

Bridge #: A-02-018

Photo #: 8



09/20/2007

Typical condition of channel walls downstream from the bridge, looking Southeast.



**BRIDGE NO. A-02-020 (RIVER STREET OVER FORT POND BROOK AT MERRIAM LANE)**

**Bridge Description and Orientation:**

The River Street Bridge over Fort Pond Brook is a twin corrugated steel pipe culvert that was built in 1981 (see Sketches & Photos #1, #2 & #3). River Street, at the bridge, is oriented West and East over the Fort Pond Brook which flows North to South. The pipe culverts are labeled West and East.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Bridge Rail / Approach Guardrail	<ul style="list-style-type: none"> <li>Minor dents and scrapes throughout steel "W" Beam guardrail</li> </ul>	

**Top of Bridge Deficiencies (NBIS Item #58 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Wearing Surface	<ul style="list-style-type: none"> <li>Random narrow cracks and moderate vegetation growth between the guardrail and headwalls at the North side</li> </ul>	

**Superstructure Deficiencies (NBIS Item #59 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Corrugated Steel Pipe Culverts	<ul style="list-style-type: none"> <li>Inverts of pipe culverts were not visible due to the high water</li> </ul>	
	<ul style="list-style-type: none"> <li>Minor deterioration of the protective coating with random areas of peeling and chipping protective coat, light to moderate rusting along the waterline and random missing connection bolts throughout</li> </ul>	4 5
	<ul style="list-style-type: none"> <li>Moderate accumulation of debris within pipe culverts</li> </ul>	
	<ul style="list-style-type: none"> <li>3 holes in top of West pipe culvert that measure up to 1.5" in diameter and show missing fill material, located approximately 9'-0" from the South end</li> </ul>	6
	<ul style="list-style-type: none"> <li>2 holes in top of East pipe culvert that measure up to 1.5" in diameter and show missing fill material, located approximately 9'-0" from the South end</li> </ul>	
	<ul style="list-style-type: none"> <li>Minor undermining at both ends of both pipe culverts</li> </ul>	



North Headwall	<ul style="list-style-type: none"> <li>• Random hairline to narrow cracks in the mortar and separation of the mortar between stones as well as loose stones throughout</li> <li>• Void at the West face of the West pipe culvert that measures up to 12"H x 6"W x 8" of penetration</li> <li>• Void between the Northeast wingwall and the East face of the East pipe culvert that measures 7"H x 8"W x greater than 12'-0" of penetration</li> <li>• Top of the North headwall shows medium to wide reflective cracks in the mortar between the cap stones with areas of missing pointing and protective coat</li> <li>• Random voids all around the edges of the pipes</li> </ul>	1
South Headwall	<ul style="list-style-type: none"> <li>• Random hairline to narrow cracks and separation of the mortar between stones as well as loose stones throughout</li> <li>• Top of the South headwall shows medium to wide reflective cracks in the cap stones with areas of missing pointing and protective coat</li> <li>• Numerous voids all around the edges of the pipes</li> </ul>	2

Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Wingwalls	<ul style="list-style-type: none"> <li>• Random narrow cracks in mortar</li> <li>• Random voids and missing mortar at the West pipe culvert of the Northwest wingwall</li> <li>• Random cracks in the mortar and a missing stone near the top of the Northeast wingwall that measures 10"W x 3"H x 10"D</li> <li>• Random minor voids throughout the Southwest wingwall with light vegetation growth near the base</li> </ul>	7

Channel Deficiencies (NBIS Item #61 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Debris	<ul style="list-style-type: none"> <li>• Moderate to heavy accumulation of debris (tree limbs) at the upstream face of both pipe culverts</li> <li>• Minor scour at the upstream (North) end</li> <li>• Moderate to heavy aggradation at the South end of both pipe culverts</li> </ul>	1



**Recommended Maintenance:**

The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the River Street Bridge over Fort Pond Brook (at Merriam Lane):

Element & Location		Deficiency	Repair Needed	Priority
#1	North side of bridge	Moderate to heavy vegetation growth	Remove vegetation growth	Low
#2	Corrugated steel pipes	Cracking and peeling throughout with light to moderate rusting	Blast clean and place new protective coating	High
#3	Top of West pipe culvert	Three punctures from guard rail installation	Weld repair plate	Moderate
#4	Top of East pipe culvert	Two punctures from guardrail installation	Weld repair plate	Moderate
#5	Both ends, both pipe culverts	Undermining at ends	Place riprap at both ends	Moderate
#6	Stone masonry headwalls (both)	Hairline to narrow random cracks	Clean and repoint mortar	Moderate
#7	North headwalls around pipes	Voids	Fill holes/voids with concrete	High
#8	South headwalls around pipes	Voids	Fill holes/voids with concrete	High
#9	Wingwalls	Cracks in mortar and random voids	Fill any voids and repoint stone masonry as needed	Low
#10	Upstream face of both pipe culverts	Debris	Remove debris from channel	Moderate



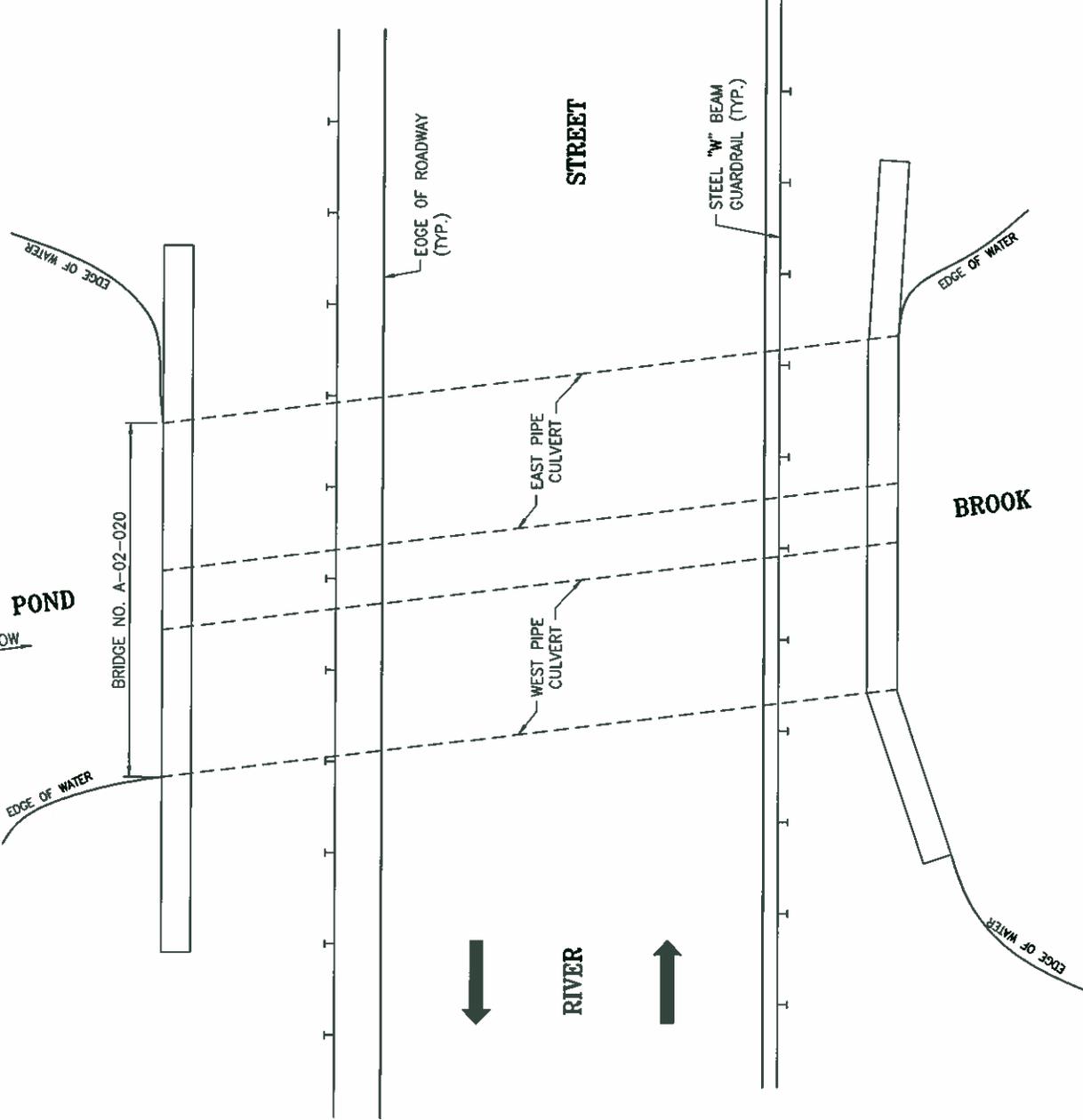
**ACTION: RIVER STREET OVER  
FORT POND BROOK, BRIDGE NO. A-02-020  
PLAN - SCALE: N.T.S.**

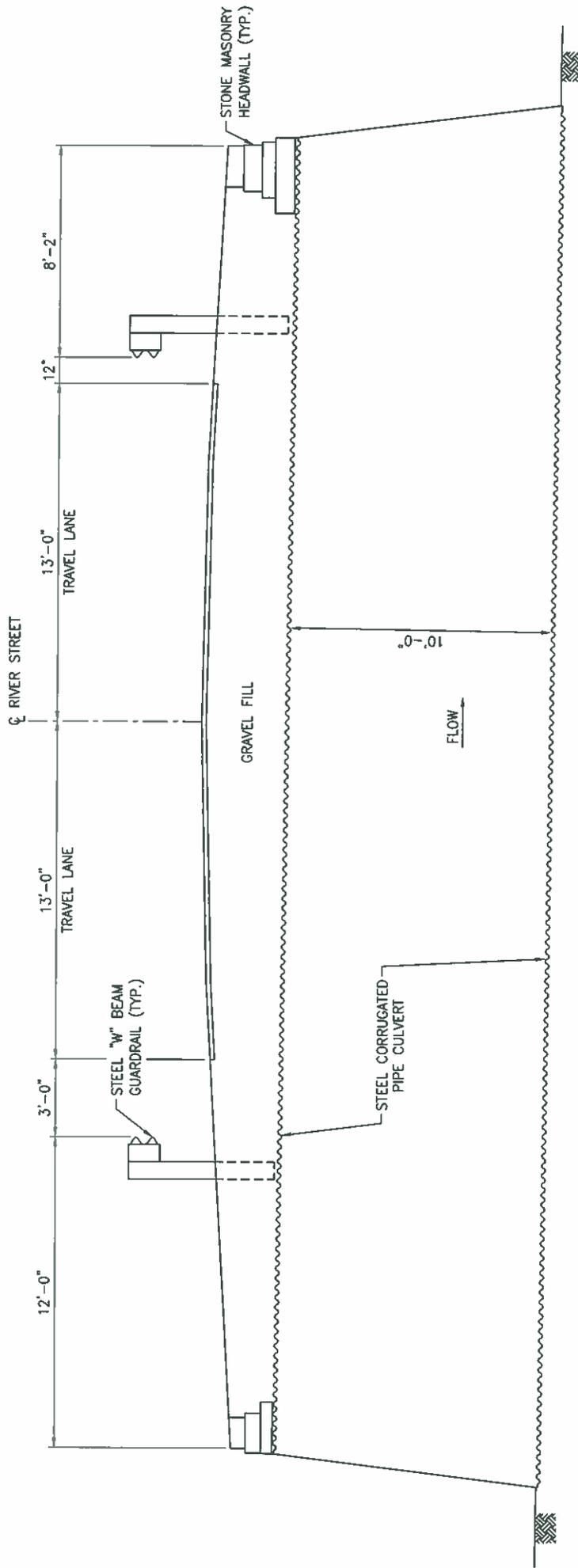
**CHAS. H. SELLS, INC.**  
Consulting Engineers, Surveyors & Photogrammetrists



**FORT POND  
FLOW**

BRIDGE NO. A-02-020

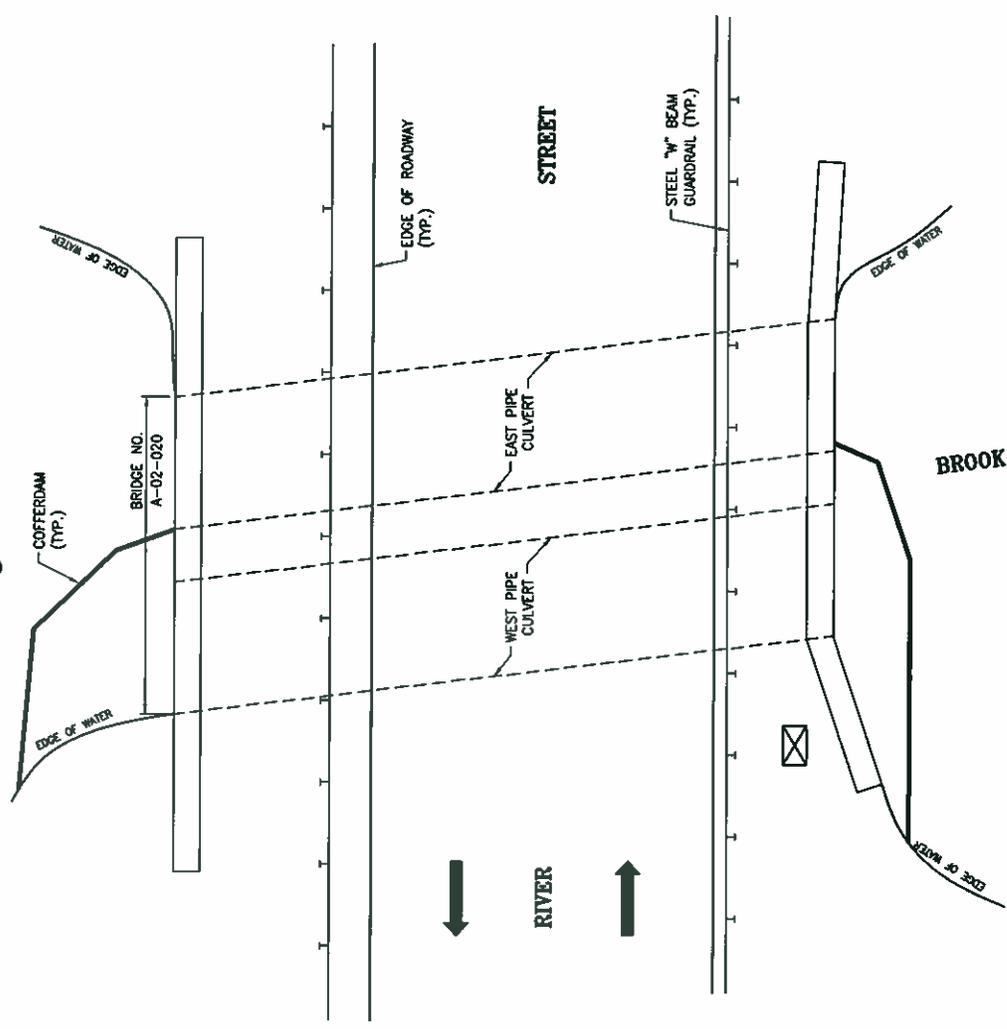




**ACTON: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-020  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





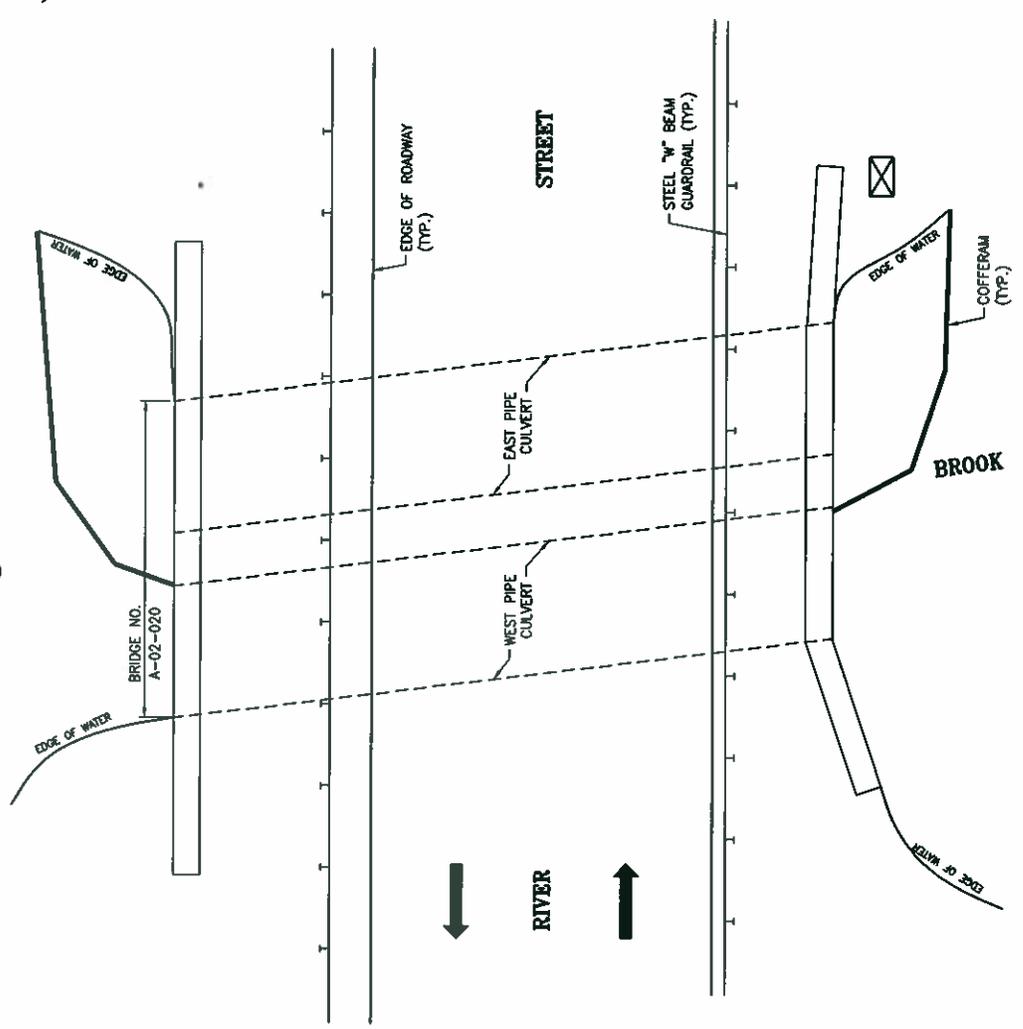
- LEGEND**
- - COFFERDAM
  - - SEDIMENTATION BASIN

STAGE 1

**ACTION: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-020  
 WATER CONTROL PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





- LEGEND**
- COFFERDAM
  - ⊠ SEDIMENTATION BASIN

STAGE II

**ACTION: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-020  
 WATER CONTROL PLAN - SCALE: N.T.S.**



**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists



Bridge #: A-02-020

Photo #: 1

Heavy vegetation

See Photo #7

Voids

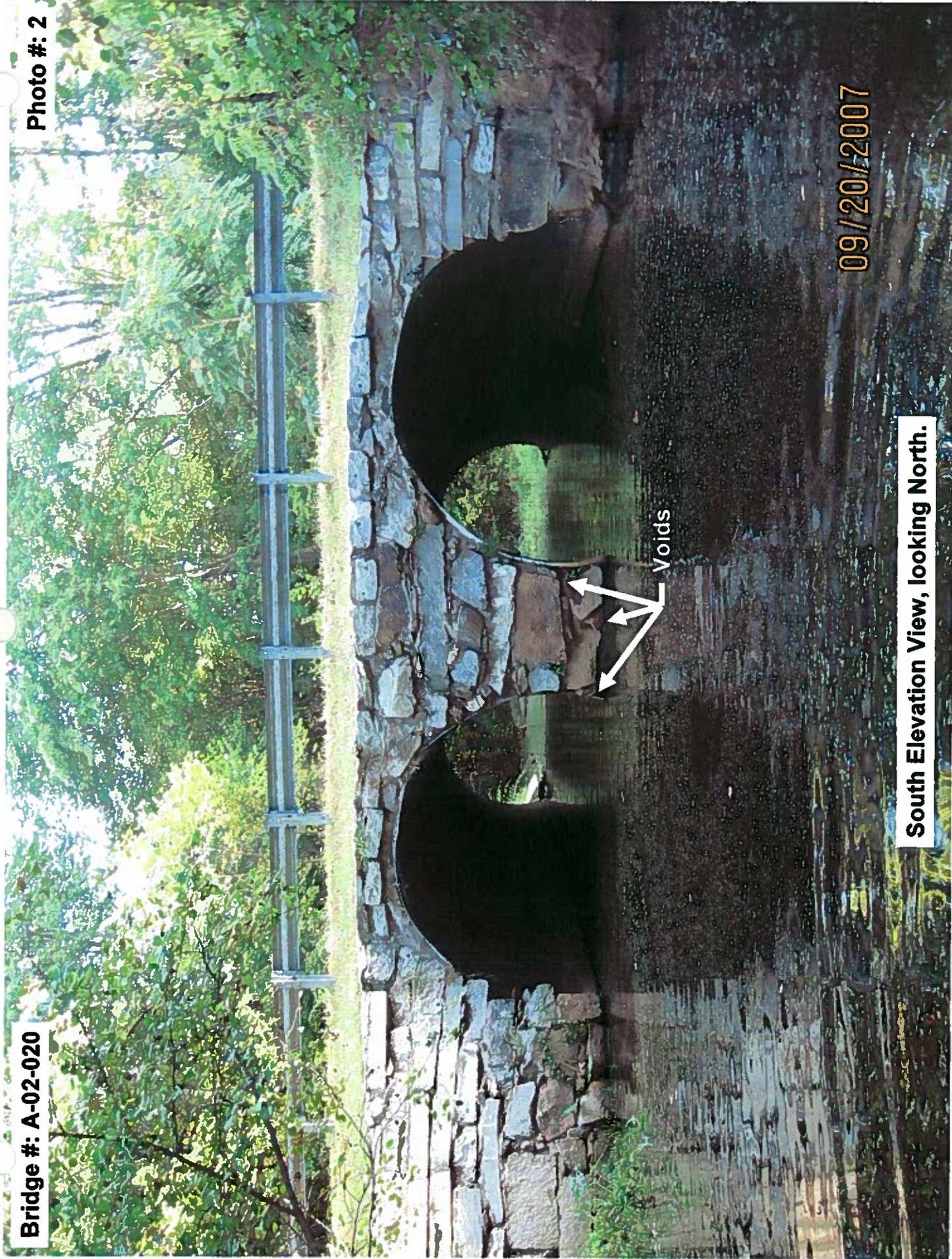
09/20/2007

North Elevation View, looking South.



Bridge #: A-02-020

Photo #: 2



09/20/2007

South Elevation View, looking North.

Bridge #: A-02-020

Photo #: 3



View of East approach roadway looking West across bridge.

Bridge #: A-02-020

Photo #: 4

Light to moderate rusting



09/20/2007

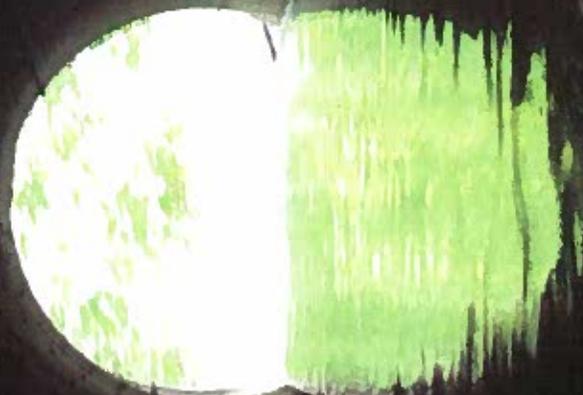
Typical condition of West pipe culvert, looking North.

Bridge #: A-02-020

Photo #: 5

09/20/2007

Typical condition of East pipe culvert, looking North.



Bridge #: A-02-020

Photo #: 6

09/20/2007

View of three (3) punctures to the top of the West pipe culvert, looking East.



Bridge #: A-02-020

Photo #: 7

10" wide x 3" high x 10" deep hole

09/20/2007

Typical condition of the wingwalls (Northeast wingwall shown), looking South.





**BRIDGE NO. A-02-021 (RIVER STREET OVER FORT POND BROOK AT VANDERBILT ROAD)**

**Bridge Description and Orientation:**

The River Street Bridge over Fort Pond Brook is a twin corrugated steel pipe arch culvert that was built in 1981 (see Sketches & Photos #1 & #2). River Street, at the bridge, is oriented West and East over the Fort Pond Brook which flows South to North. The pipe arches are labeled West and East.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Bridge Rail / Approach Guardrail	<ul style="list-style-type: none"> <li>Minor dents and scrapes throughout</li> <li>Minor collision damage at the Southeast terminal end</li> </ul>	3

**Top of Bridge Deficiencies (NBIS Item #58 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Wearing Surface	<ul style="list-style-type: none"> <li>Random medium cracks over the East pipe arch</li> </ul>	
Vegetated Shoulder	<ul style="list-style-type: none"> <li>Large sink hole between the South headwall and South bridge rail/guardrail that measures 18" long x 12" wide x up to 16" deep, located between the 3<sup>rd</sup> and 4<sup>th</sup> guardrail posts from the East</li> </ul>	

**Superstructure Deficiencies (NBIS Item #59 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Corrugated Steel Pipe Arch Culvert	<ul style="list-style-type: none"> <li>Moderate to heavy rusting along the lower portion of both haunches and areas of peeling and chipping of the protective coating</li> </ul>	4, 5
	<ul style="list-style-type: none"> <li>Minor accumulation of debris along the bottom of both pipe arches with heavier accumulation at the South end of the West pipe arch and the middle of the East pipe arch</li> </ul>	5
	<ul style="list-style-type: none"> <li>2" outward deformation in roof of West pipe arch at the approximate midspan</li> </ul>	6
	<ul style="list-style-type: none"> <li>Random missing connection bolts throughout</li> </ul>	



	<ul style="list-style-type: none"> <li>2 puncture holes in the top of the East pipe arch that measure 3”L x 1”W, located approximately 5’-0” from the South end</li> <li>Minor undermining at both ends of both pipe arches due to no riprap protection</li> </ul>	7
North Headwall	<ul style="list-style-type: none"> <li>Random hairline to narrow cracks in mortar and separation of mortar between stones as well as loose stones throughout</li> <li>Minor separation of mortar near arch crown at both pipe arches (up to ½”)</li> <li>Void in East side of West pipe arch that measures 22”W x 7”H x 10” of penetration</li> </ul>	8
South Headwall	<ul style="list-style-type: none"> <li>Numerous voids around the East and West pipe arches</li> <li>Void at the East side of the East pipe arch that measures 18”H x 4’-0”W x up to 33” of penetration</li> <li>Void at the West side of the West pipe arch that measures 17”H x 6”W x up to 30” of penetration</li> <li>Void at the West side of the East pipe arch that measures 16”H x up to 20”W x 30” of penetration</li> <li>Void at the East side of the West pipe arch that measures 14”H x 5”W x 8” of penetration</li> </ul>	9

Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Wingwalls	<ul style="list-style-type: none"> <li>Numerous narrow to medium random cracks in mortar and minor separation between stones</li> <li>Light to moderate vegetation growth at all 4 corners</li> <li>Minor settlement of stones at the Southeast wingwall corner with voids at the base that measure up to 18” of penetration</li> <li>Large washout, located approximately 10’-0” upstream from bridge, that measures 4’-0” wide x 5’-6” high x up to 55” of penetration</li> <li>Void under drain outlet at the Northwest wingwall/retaining wall that measures 3’-0”W x 10”H x up to 21” of penetration</li> <li>Bank along the Northwest edge of brook is sloughing into the brook</li> </ul>	10
		11

Channel Deficiencies (NBIS Item #61 in Inspection Report)

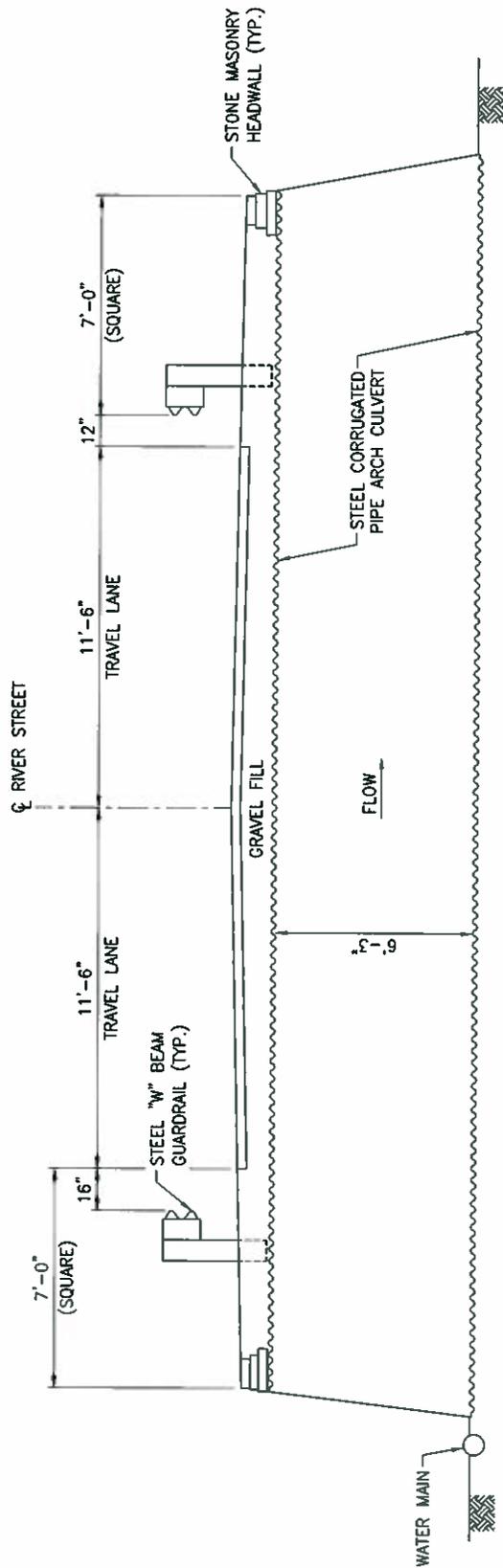
Element	Deficiency	Reference Photo(s)
Debris	<ul style="list-style-type: none"> <li>Moderate to heavy accumulation of debris (tree limbs) at the upstream face of both pipe culverts</li> </ul>	1

**Recommended Maintenance:**

The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the River Street Bridge over Fort Pond Brook (at Vanderbilt Road):

Element & Location		Deficiency	Repair Needed	Priority
#1	Top of bridge	Light to heavy vegetation growth	Remove vegetation growth	Low
#2	Between South headwall and South guardrail	Sink hole	Fill sink hole and compact	Moderate
#3	SE approach guardrail terminal end	Collision Damage	Remove and replace terminal end	Low
#4	Pipe arches (both)	Moderate to heavy rusting as well as cracking and peeling of the protective coating	Blast clean and place new protective coating	High
#5	East pipe arch, approximately 5.0' from South end	Two punctures in top of pipe arch	Weld repair plate	Moderate
#6	Pipe arch ends	Scour	Place riprap at both ends	Moderate
#7	North and South stone masonry headwalls	Hairline to narrow cracks in mortar and separation of mortar	Repoint stone masonry as needed	Moderate
#8	North headwalls around pipe arches	Voids around pipes/headwalls	Fill holes/voids with concrete	High
#9	South headwalls around pipe arches	Voids around pipes/headwalls	Fill holes/voids with concrete	High
#10	Wingwalls	Narrow to medium random cracks in mortar	Repoint stone masonry as needed	Low
#11	SW Retaining wall, approximately 10.0' upstream from bridge	Partial failure of wall	Rebuild failed portion of wall	Moderate
#12	Upstream face of both pipe arches	Debris	Remove debris from channel	Moderate

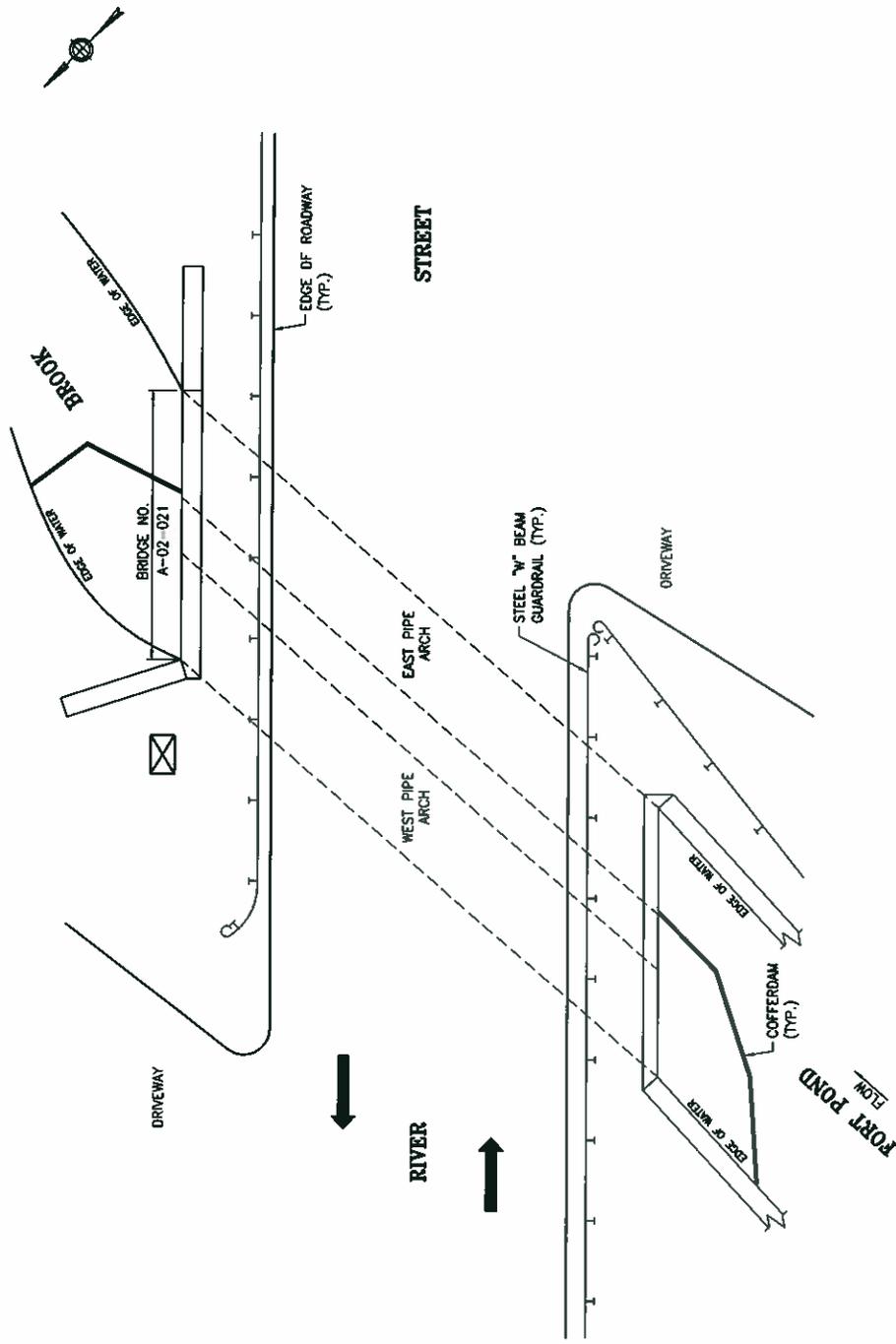




**ACTION: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-021  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





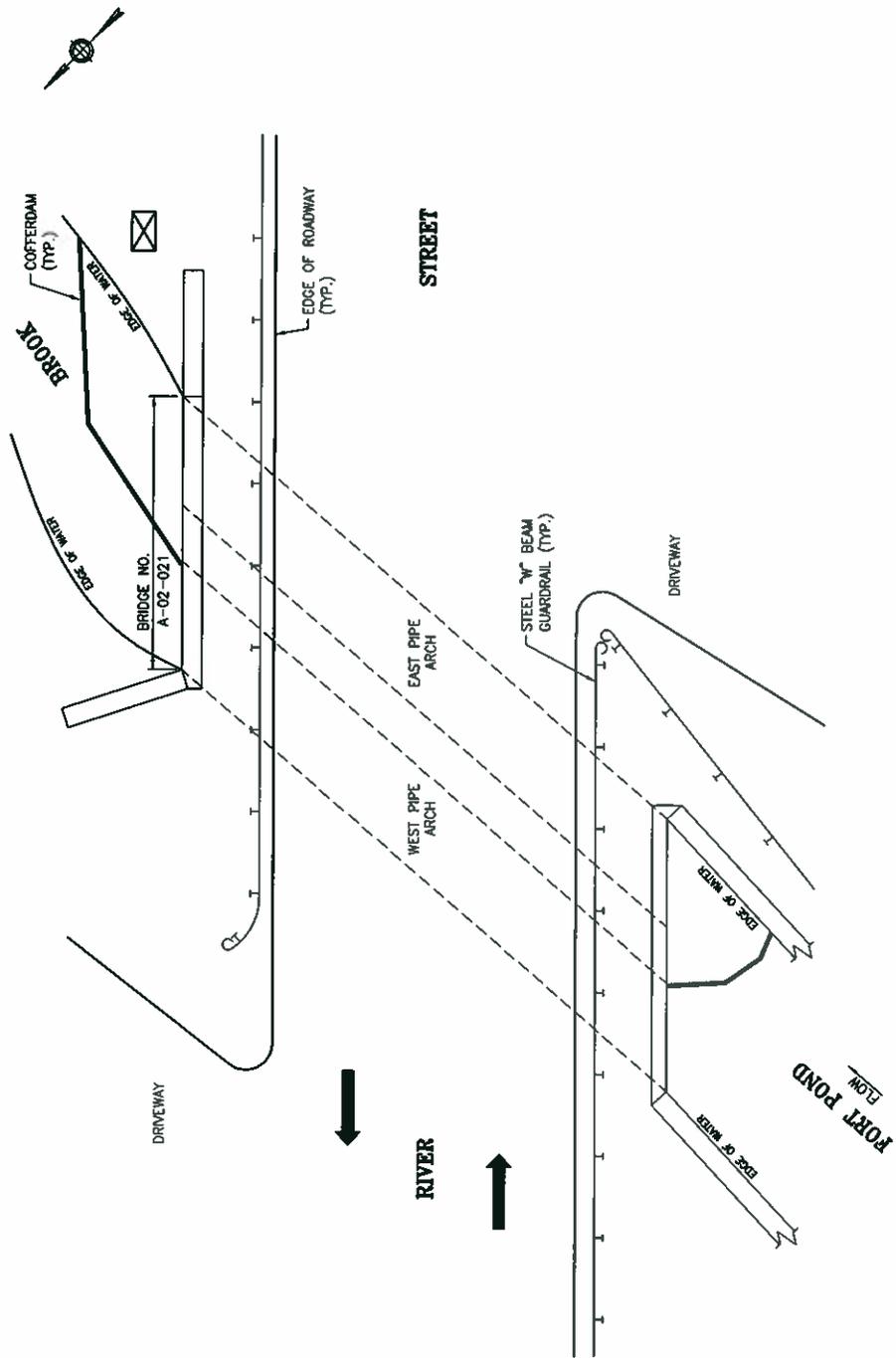
- LEGEND**
- COFFERDAM
  - ⊠ SEDIMENTATION BASIN

STAGE I

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists

**ACTION: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-021  
 WATER CONTROL PLAN - SCALE: N.T.S.**





- LEGEND**
- COFFERDAM
  - ⊠ SEDIMENTATION BASIN

**STAGE II**

**ACTION: RIVER STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-021  
 WATER CONTROL PLAN - SCALE: N.T.S.**



**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists

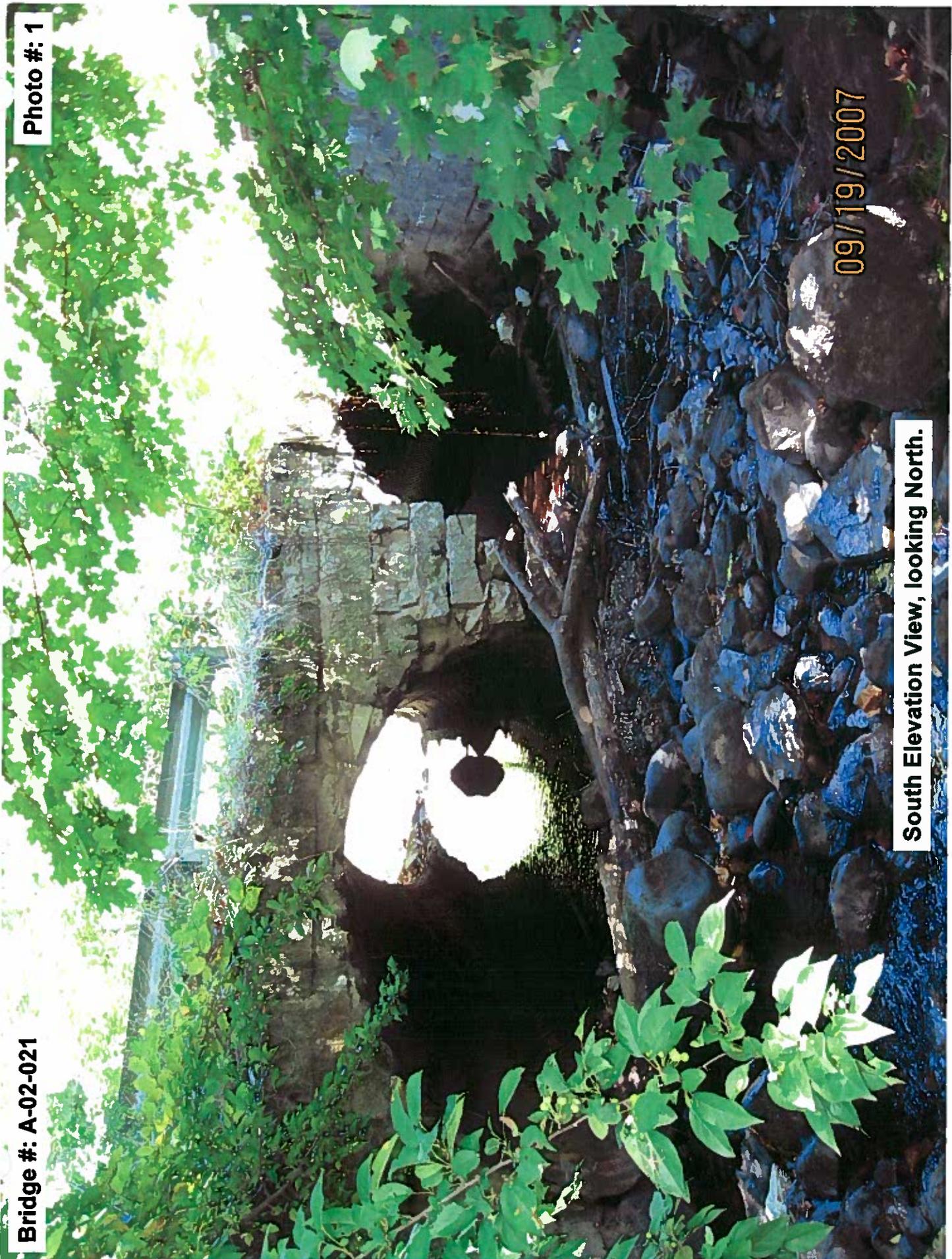


Bridge #: A-02-021

Photo #: 1

09/19/2007

South Elevation View, looking North.



Bridge #: A-02-021

Photo #: 2



View of West approach roadway looking East across bridge.

Bridge #: A-02-021

Photo #: 3



09/19/2007

View of minor collision damage to the Southeast approach guardrail.

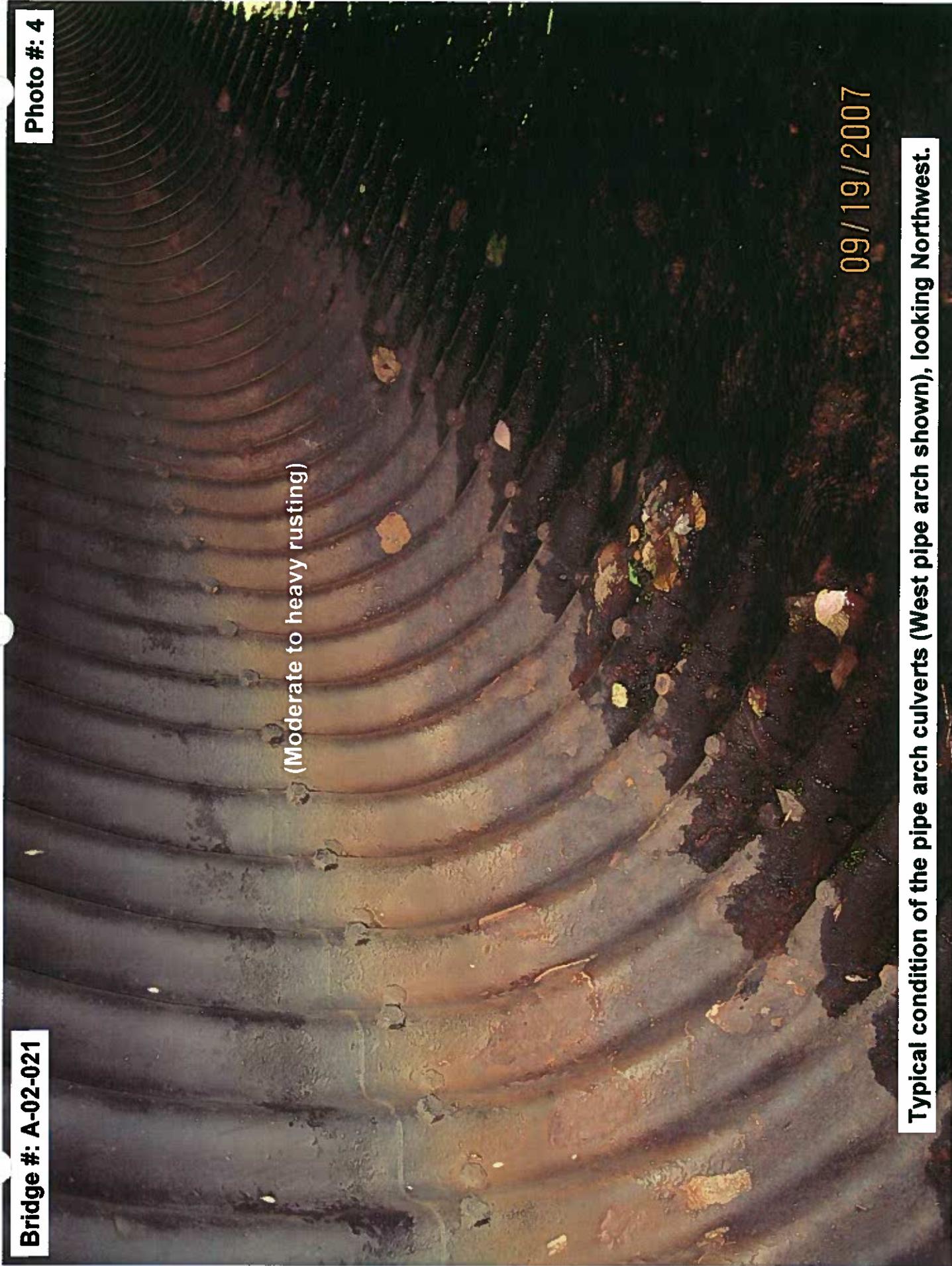
Bridge #: A-02-021

Photo #: 4

(Moderate to heavy rusting)

09/19/2007

Typical condition of the pipe arch culverts (West pipe arch shown), looking Northwest.

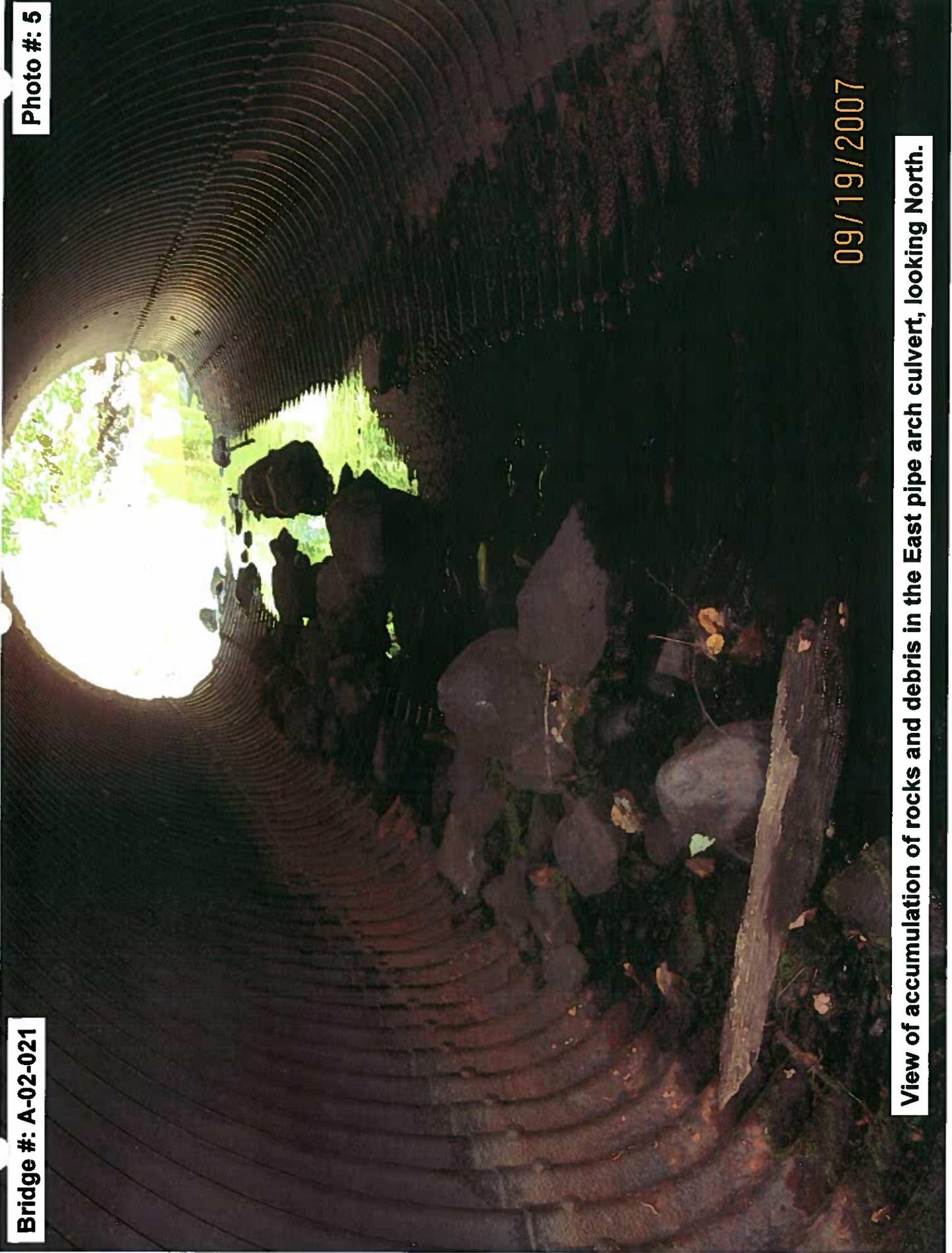


Bridge #: A-02-021

Photo #: 5

09/19/2007

View of accumulation of rocks and debris in the East pipe arch culvert, looking North.

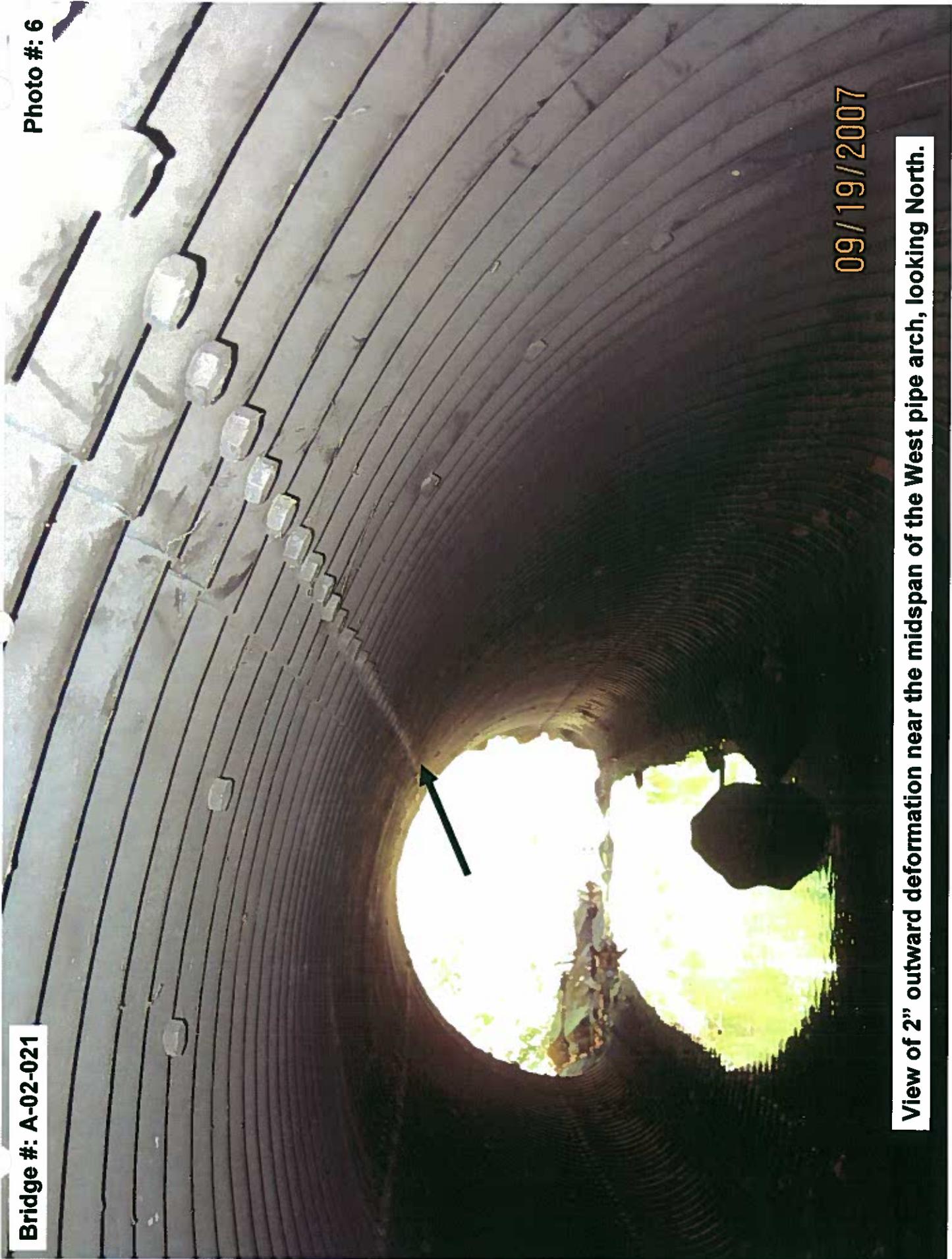


Bridge #: A-02-021

Photo #: 6

09/19/2007

View of 2" outward deformation near the midspan of the West pipe arch, looking North.



Bridge #: A-02-021

Photo #: 7

09/19/2007

View of two (2) punctures in the East pipe arch culvert near the top, looking Northeast.



Bridge #: A-02-021

Photo #: 8



09/19/2007

View of North end of West pipe arch showing undermining (up to 10" deep), looking Southeast.

Bridge #: A-02-021

Photo #: 9



09/19/2007

View of South end of East pipe arch showing undermining (up to 33" deep), looking North.

Bridge #: A-02-021

Photo #: 10

09/19/2007

View of Southeast wingwall showing minor settlement of stones and voids (up to 18" deep), looking Northeast.



Bridge #: A-02-021

Photo #: 11

4'-0" wide x 5'-6" high  
x 55" deep washout

09/19/2007

View of Southwest retaining wall showing large washout area, located approximately 10'-0" from the bridge, looking West.





**BRIDGE NO. A-02-022 (STOW STREET OVER FORT POND BROOK)**

**Bridge Description and Orientation:**

The Stow Street Bridge over Fort Pond Brook is a two (2) span concrete encased steel beam structure that was built in 1924 (see Sketches and Photos #1 & #2). Stow Street, at the bridge, is oriented West and East over the Fort Pond Brook which flows North to South. There are nine (9) beams and eight (8) bays labeled South to North, two (2) abutments labeled West and East and a single pier. The spans are labeled West and East spans.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Approach Guardrail	<ul style="list-style-type: none"> <li>Minor collision damage to the Southeast terminal end</li> </ul>	3

**Top of Bridge & Bridge Deck Deficiencies (NBIS Item #58 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Safety Curb	<ul style="list-style-type: none"> <li>Spall in North safety curb under 2<sup>nd</sup> post from West that measures 24"L x 2"H x 2"D</li> </ul>	2
Deck Underside	<ul style="list-style-type: none"> <li>Light to moderate scaling, minor honeycombing and random narrow cracks throughout</li> <li>Light efflorescence staining and incrustation in random locations</li> </ul>	4
	<ul style="list-style-type: none"> <li>Spall with exposed rusted rebar on the bottom of the utility slab near the West end of Bay #1 in the West Span that measures 14"L x 6"W x 1/2"D</li> </ul>	5
	<ul style="list-style-type: none"> <li>Spall in the North fascia/end of deck in the West Span that measures 12'-0"L x up to 8"H x up to 5"D</li> <li>Patched, hollow area that measures 40"L x full width in the East Span at the East Abutment, Bay #4</li> </ul>	

**Superstructure Deficiencies (NBIS Item #59 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Concrete Encased Steel Beams	<ul style="list-style-type: none"> <li>Bottom of concrete encasement is spalled off of Beams #3 to #9 in the West Span and Beams #4 to #9 in the East Span</li> </ul>	6



	<ul style="list-style-type: none"> <li>Exposed portions of bottom flanges are heavily to severely rusted with minor steel delamination but negligible section loss</li> <li>Vertical faces of beam's encasement show moderate to heavy scaling throughout with moderate to heavy efflorescence staining adjacent to Beams #3 and #9 in the West Span</li> </ul>	6
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Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Abutments	<ul style="list-style-type: none"> <li>Heavy to severe scaling (waterline abrasion) along both breastwalls</li> <li>Random narrow to medium cracks at the South end of the West Abutment</li> <li>Medium vertical crack under Bay #2 at the West Abutment</li> <li>Wide vertical crack with adjacent concrete delamination under Bay #5 at the East Abutment</li> <li>Spall in Bay #5 at the East Abutment that measures 18"L x 4"H x 2"D</li> <li>Spall with a large exposed stone, located adjacent to Beam #6 in Bay #6 at the East Abutment, that measures 14"H x 11"W x 4"D</li> </ul>	7
Pierwall	<ul style="list-style-type: none"> <li>Heavy to severe scaling (waterline abrasion) and random medium to wide vertical and diagonal cracks throughout</li> <li>Spall at the Southwest corner of the pierwall that measures 40"L x 12"H x 7"D continues to the Southeast corner and measures 12"L x 7"H x 6"D</li> <li>Spall under Beam #6 at the West face of the pierwall in the West Span that measures 6"L x 1.75"H x up to 10"D</li> <li>Severe scaling at the Northeast corner</li> <li>Spall at Northwest corner that measures 30"L x 20"H x 8"D with a full height wide vertical crack</li> <li>Exposed ledge under Beams #5 to #7 along the East face of the pierwall that shows wide horizontal cracks up to 18" above the bottom of the channel</li> </ul>	8 9 10 11 12 13
Wingwalls	<ul style="list-style-type: none"> <li>Moderate scaling (waterline abrasion) at the waterline</li> <li>Medium horizontal crack at the top of the Northeast wingwall</li> <li>Southeast embankment is sloughing into the channel</li> </ul>	14



**Recommended Maintenance:**

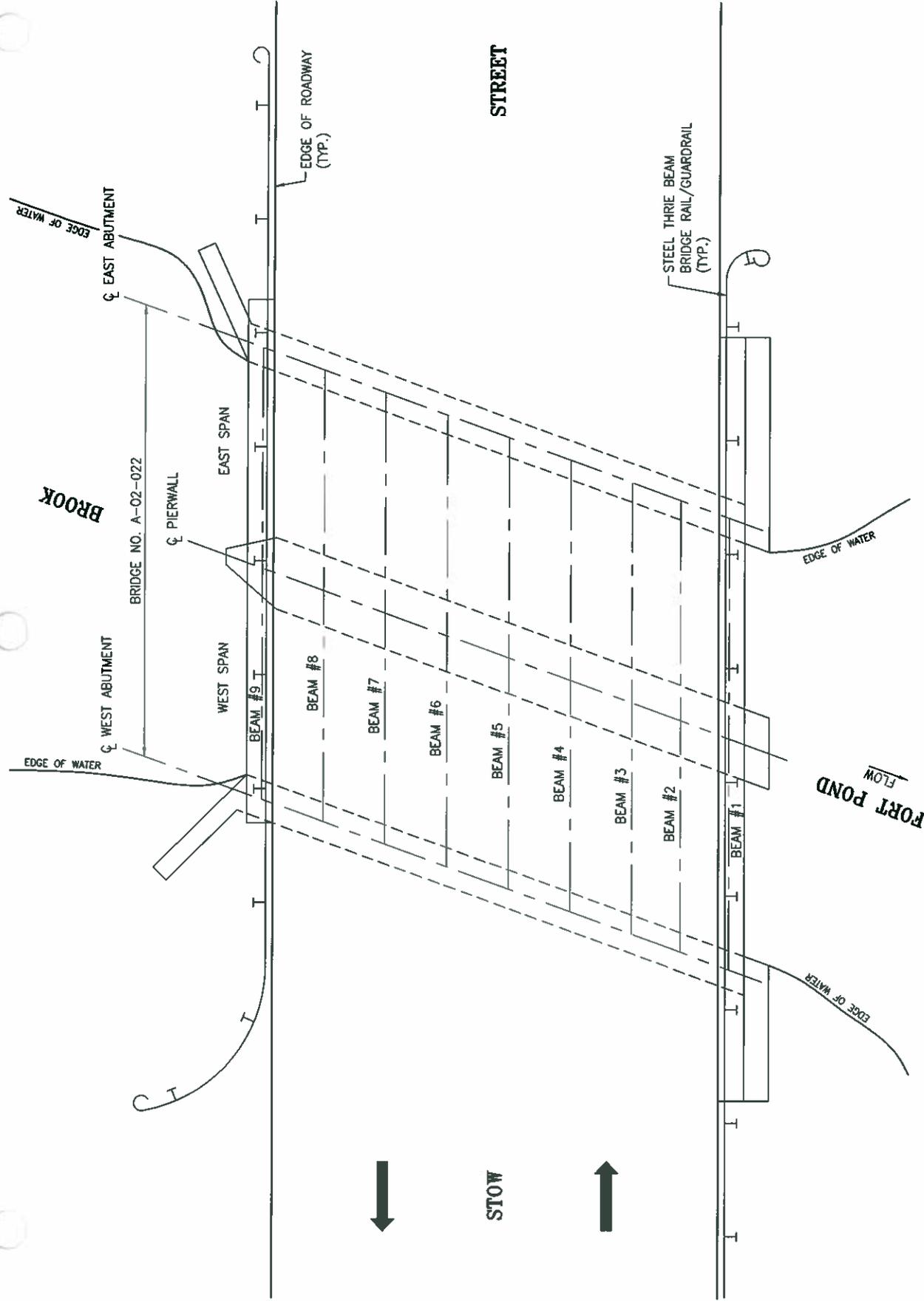
The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the Stow Street Bridge over Fort Pond Brook:

Element & Location		Deficiency	Repair Needed	Priority
#1	North bridge rail safety curb	Spall along top edge	Patch with cementitious mortar	Low
#2	SE approach guardrail terminal end	Collision damage	Remove and replace terminal end	Low
#3	Underside of deck near West end of utility slab	Spall with exposed rusted rebar	Patch with cementitious mortar	Low
#4	North fascia, West span	Spall along fascia	Patch with cementitious mortar	Low
#5	Bottom face of concrete encased steel Beams #3 to #9, both spans	Spalling concrete encasement	*Remove all concrete encasement to reduce dead load per Rating Report Recommendations	Moderate
#6	Bottom flange of concrete encased steel beams #3 to #9, both spans	Heavy to severe rusting and minor steel delamination	*Clean and paint to protect exposed steel	Moderate
#7	West Abutment breastwall, Bay #2	Medium vertical crack	Fill with crack sealer	Low
#8	East Abutment backwall, Bay #6	Spall	Patch with cementitious mortar	Low
#9	South end of pierwall	Spall along both faces	Fill/patch spall/void with concrete	Moderate
#10	West face, pierwall under Beam #6	Spall	Patch with cementitious mortar	Moderate
#11	East face, pierwall under Beams #5 to #7	Cracks/abrasion along waterline	Seal voids/cracks at base of pierwall along top of ledge	Low
#12	Northeast wingwall	Medium horizontal crack	Fill with crack sealer	Low
#13	Southeast approach channel embankment	Sloughing	Place larger riprap or otherwise stabilize embankment	Low

\* - As the Town already has a replacement design completed for this bridge, expending significant funds to extend the existing bridge's service life may not be warranted. Therefore,



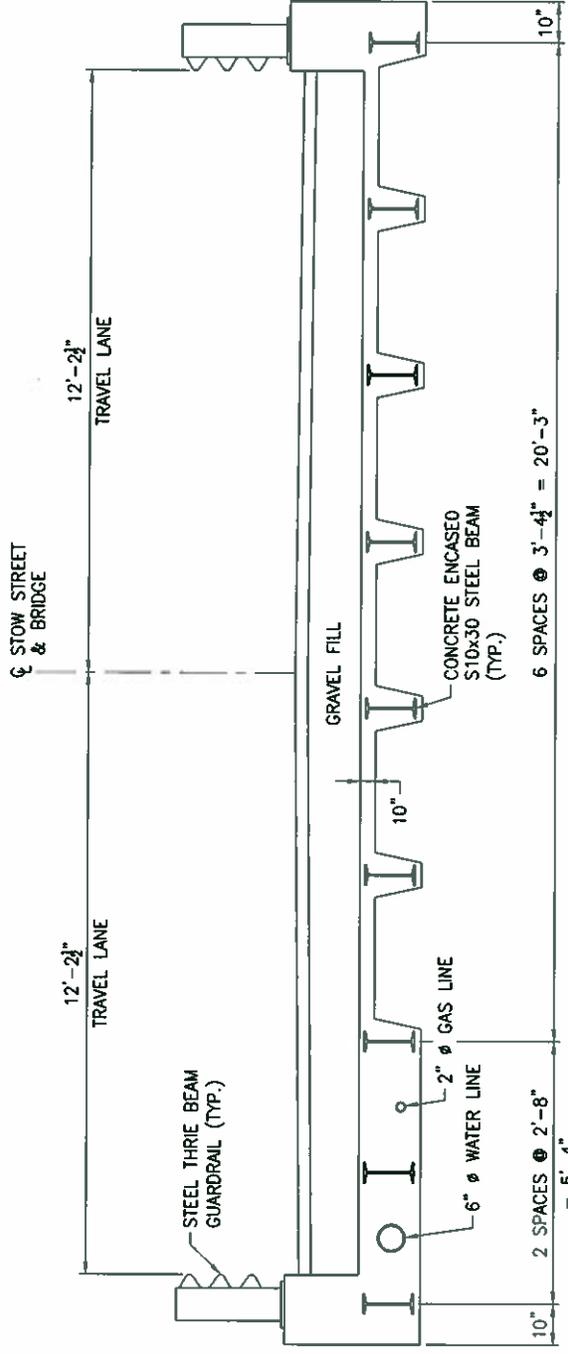
costly Items such as removing the concrete encasement and painting the steel beams may not provide value. The service life of this bridge is nearing its end having been in service for 83 years.



**ACTION: STOW STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-022  
 PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





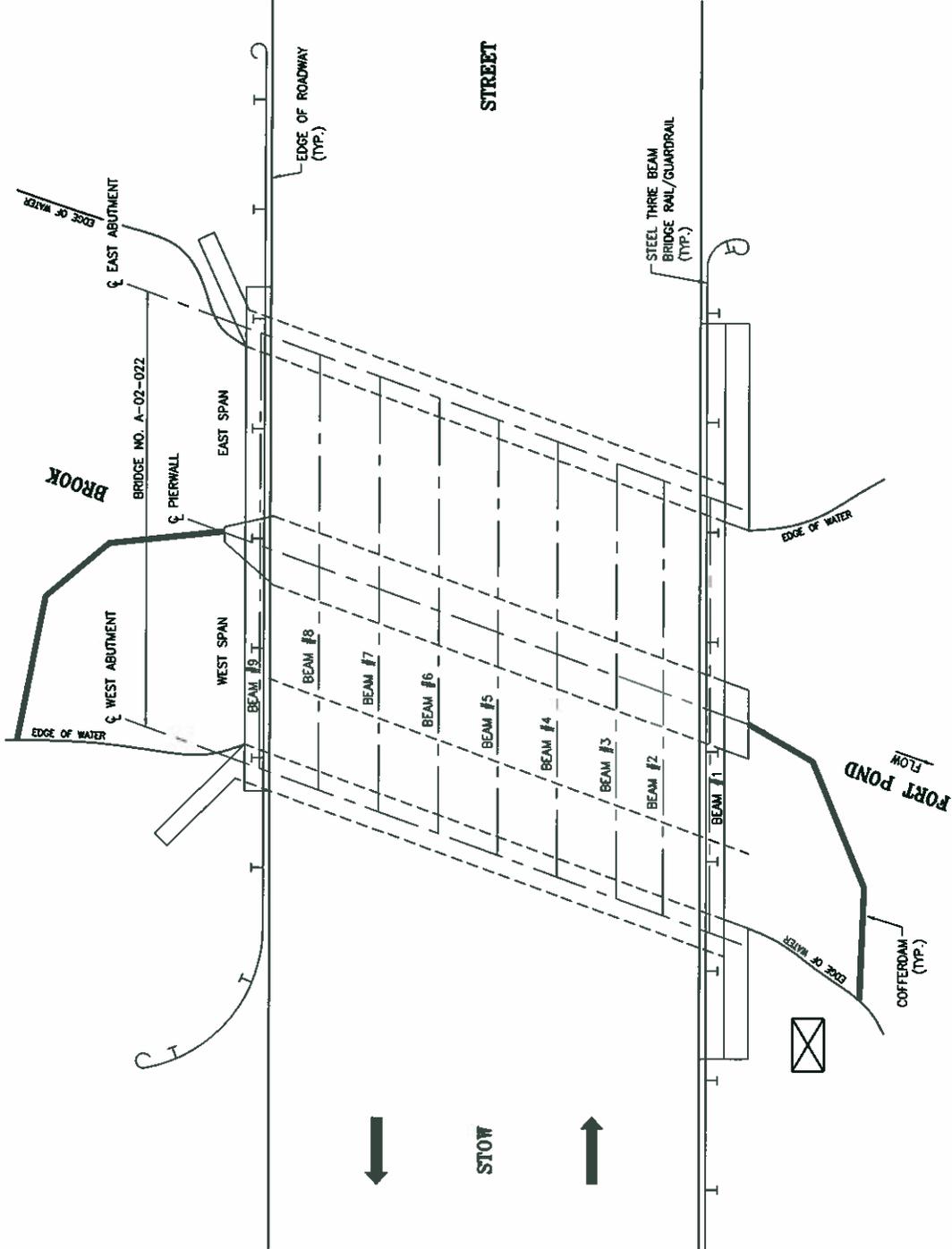
FLOW →



**ACTION: STOW STREET OVER**  
**FORT POND BROOK, BRIDGE NO. A-02-022**  
**BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





**LEGEND**  
 --- COFFORDAM  
 ⊠ SEDIMENTATION BASIN

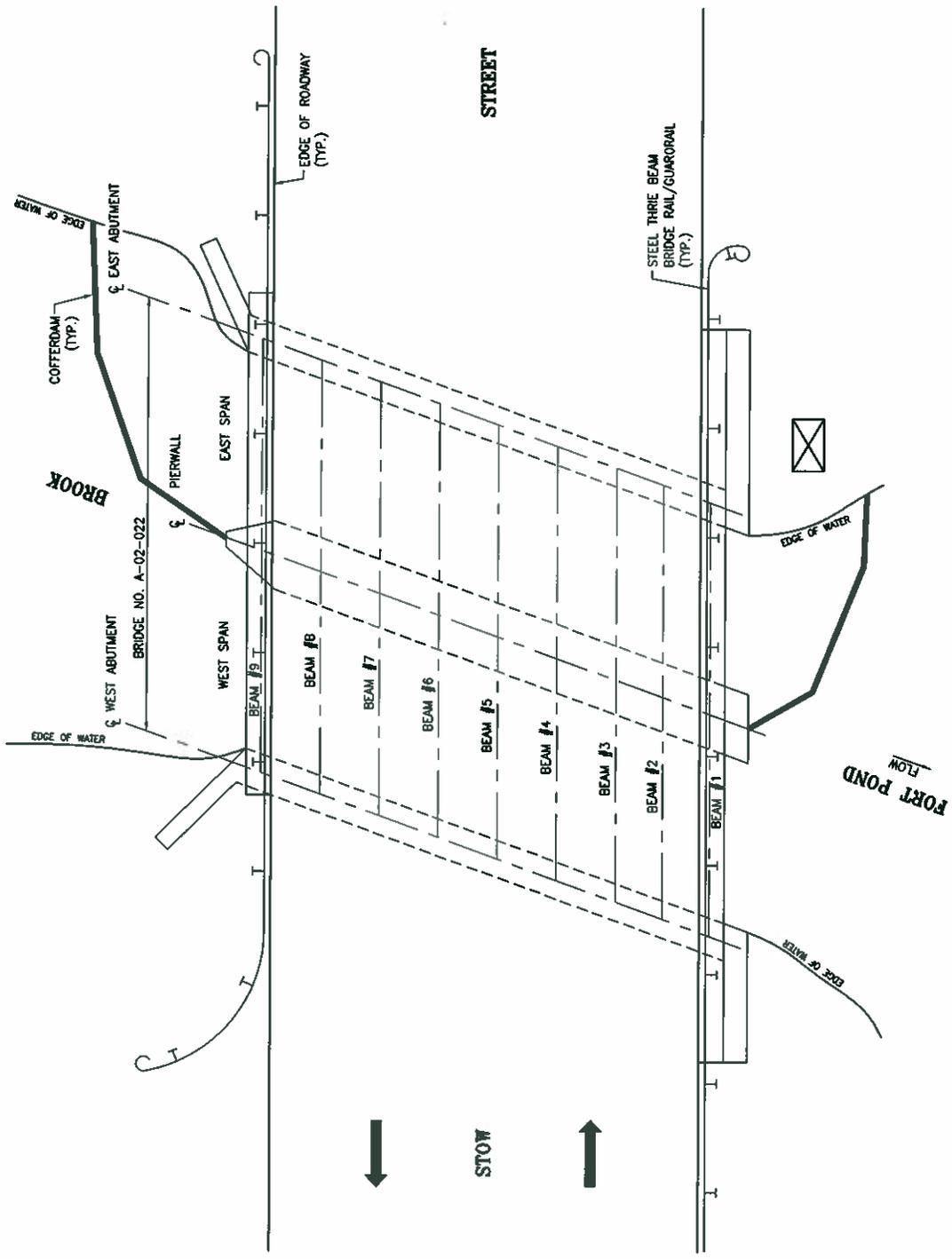
STAGE I

**ACTION: STOW STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-022  
 WATER CONTROL PLAN - SCALE: N.T.S.**



**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





↓  
STOW  
↑

**LEGEND**  
 - COFFERDAM  
 ⊠ SEDIMENTATION BASIN

STAGE II



**ACTION: STOW STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-022  
 WATER CONTROL PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists



Bridge #: A-02-022

Photo #: 1



South Elevation View, looking West.

Bridge #: A-02-022

Photo #: 2

Spall, 24" long  
x 2" high x 2" deep

View of East approach roadway looking West across bridge.



Bridge #: A-02-022

Photo #: 3



09/19/2007

View of Southeast approach guardrail showing minor collision damage, looking West.

Bridge #: A-02-022

Photo #: 4

14" long x 6" wide x 1/2" deep  
spall with exposed rebar

09/19/2007

View of minor spalling and efflorescence staining to the underside of utility slab at the South end, looking West.

Bridge #: A-02-022

Photo #: 5

12'-0" long x up to 8" high x up to 5" deep  
spall

09/19/2007

View of North parapet, West Span, showing a large spall along the end of deck, looking West.



**Bridge #: A-02-022**

**Photo #: 6**



**Typical condition of exposed bottom flange showing heavy to severe rusting and minor steel delamination, looking East.**

Bridge #: A-02-022

Photo #: 7

14" high x 11" wide  
X 4" deep spall

(Beam #6, East Span)

09/19/2007

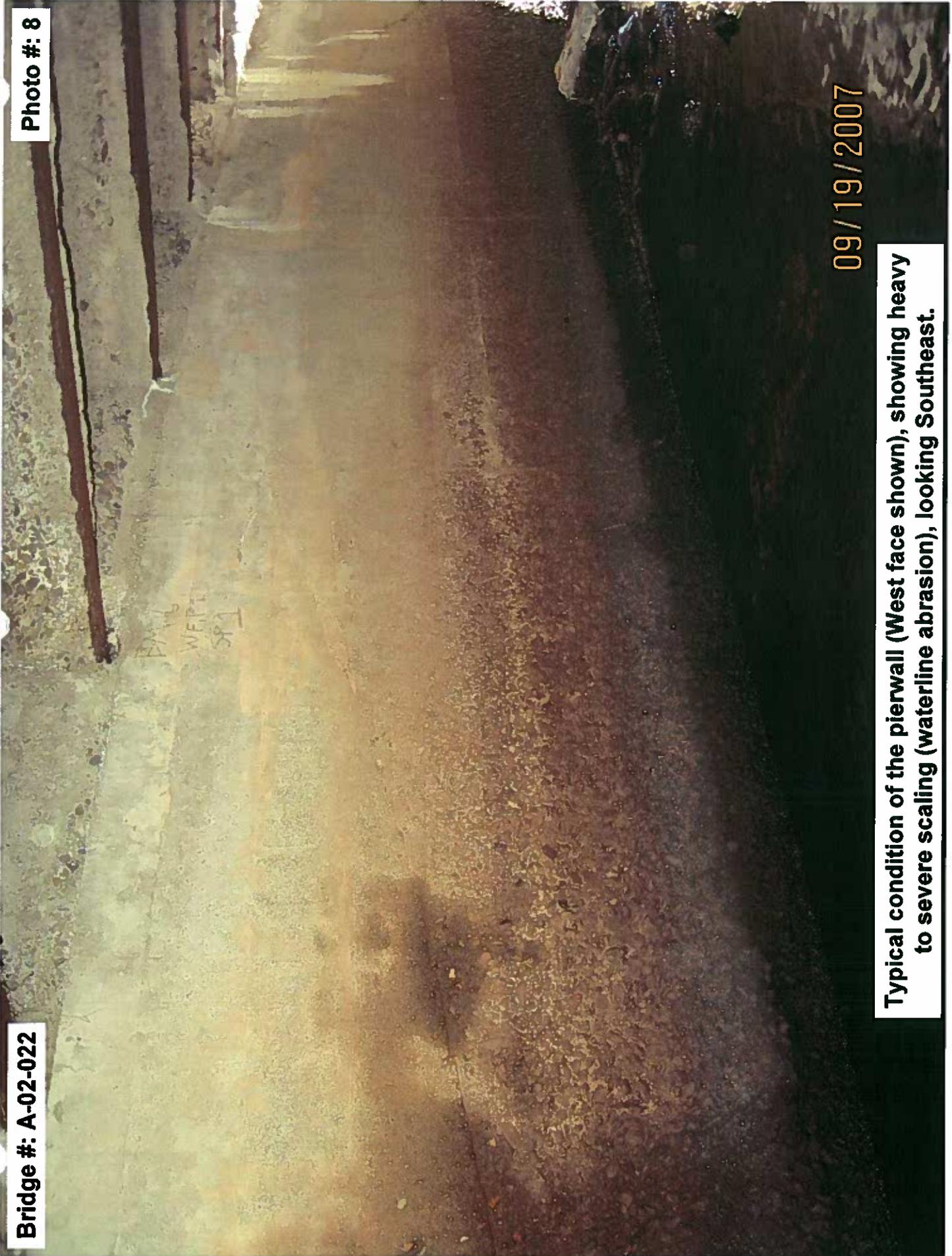
View of the East end of Beam #6 at the East Abutment showing a large spall in the backwall, looking East.

Bridge #: A-02-022

Photo #: 8

09/19/2007

Typical condition of the pierwall (West face shown), showing heavy to severe scaling (waterline abrasion), looking Southeast.



Bridge #: A-02-022

Photo #: 9

40" long x 12" high x 7" deep spall



09/19/2007

View of the Southwest corner of the pierwall showing a large spall with exposed ledge, looking East.

Bridge #: A-02-022

Photo #: 10

09/19/2007

View of the South end of the pierwall showing a large spall along the waterline, looking North.



Bridge #: A-02-022

Photo #: 11

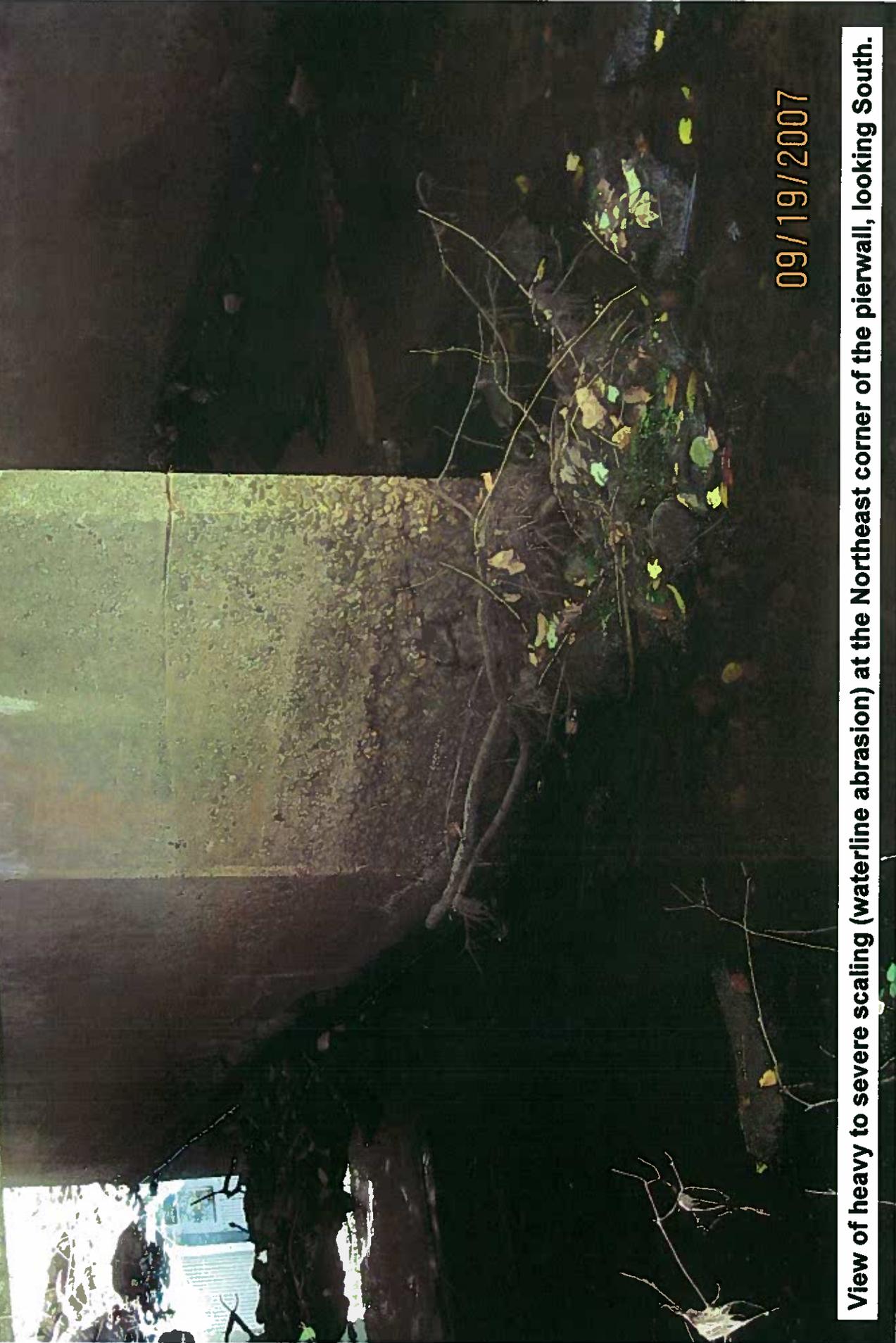


6" long x 1.75" high  
x up to 10" deep spall

View of small spall under Beam #6 at the West face of the pierwall, looking East.

Bridge #: A-02-022

Photo #: 12



09/19/2007

View of heavy to severe scaling (waterline abrasion) at the Northeast corner of the pierwall, looking South.

Bridge #: A-02-022

Photo #: 13

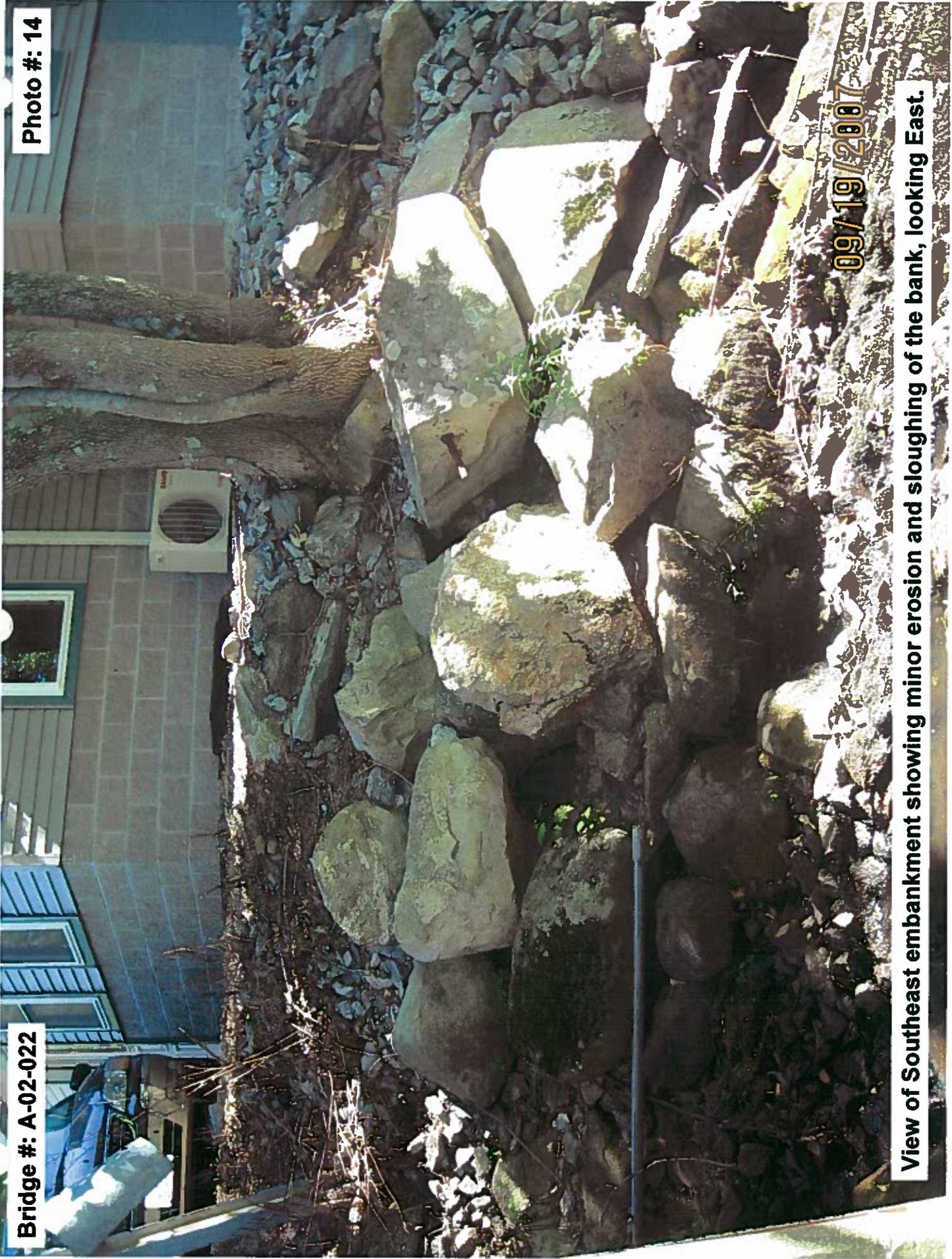


09/19/2007

View of accumulation of rocks and debris in the East Span, looking South.

Bridge #: A-02-022

Photo #: 14



09/19/2007

View of Southeast embankment showing minor erosion and sloughing of the bank, looking East.



**BRIDGE NO. A-02-023 (MARTIN STREET OVER FORT POND BROOK)**

**Bridge Description and Orientation:**

The Martin Street Bridge over Fort Pond Brook is a twin corrugated steel pipe arch culvert that was built in 1965 (see Sketches and Photos #1, #2 & #3). Martin Street, at the bridge, is oriented North and South over the Fort Pond Brook which flows West to East. The pipe arches are labeled South and North.

**Summary of Existing Conditions:**

**Bridge Rail & Approach Guardrail Deficiencies (NBIS Item #36 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Bridge Rail / Approach Guardrail	<ul style="list-style-type: none"> <li>No deficiencies noted</li> </ul>	3

**Top of Bridge Deficiencies (NBIS Item #58 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Wearing Surface	<ul style="list-style-type: none"> <li>Light to moderate vegetation growth at all 4 approaches to the bridge</li> </ul>	3

**Superstructure Deficiencies (NBIS Item #59 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Corrugated Steel Pipe Arch Culvert	<ul style="list-style-type: none"> <li>Random missing connection bolts and minor deterioration of the protective coating with the majority of the protective coating failing along the waterline</li> <li>Minor accumulation of debris along the bottom of both pipe arches</li> <li>Moderate aggradation at the West end of both pipe arches</li> <li>East end of North and South pipe arches are undermined up to 8"</li> </ul>	2
	<ul style="list-style-type: none"> <li>West end of North and South pipe arches are undermined up to 12"</li> <li>Moderate to severe rusting with minor steel delamination along the lower haunch of both pipe arches, located approximately 12" above the bottom of barrel, just below the seam of the arch sections</li> </ul>	4, 5, 6



	<ul style="list-style-type: none"> <li>Hole in South pipe arch (North face), located 8'-7" from East end, that measures 2"L x 5"H x up to 4" of penetration</li> <li>Hole in South pipe arch (South face), located 12'-0" from East end, that measures 1" in diameter x up to 1.5" of penetration</li> <li>Hole in South pipe arch (South face), located 13'-6" from East end, that measures 2.5"L x 1.5"H x up to 2.5" of penetration</li> <li>Hole in South pipe arch (South face), located 21'-8" from East end, that measures 2"L x 2.5"H x up to 1" of penetration</li> <li>Hole in South pipe arch (South face), located 33'-8" from East end, that measures 3.5"L x 3"H x up to 3" of penetration</li> <li>3 holes in South pipe arch (South face), located 36'-8" from East end, that measure 3"L x 3"H x up to 3" of penetration, 4"L x 5"H x up to 3.5" of penetration and 3"L x 5"H x up to 4" of penetration</li> <li>Hole in North pipe arch (North face), located 16'-0" from East end, that measures 1"L x 2"H x up to 1" of penetration</li> <li>Hole in North pipe arch (North face), located 18'-6" from East end, that measures 3"L x 3"H x up to 1" of penetration</li> <li>Hole in North pipe arch (North face), located 27'-0" from East end, that measures 2"L x 2"H x up to 3" of penetration</li> <li>Hole in North pipe arch (North face), located 40'-0" from East end, that measures 4"L x 5"H x up to 2" of penetration</li> <li>Hole in North pipe arch (North face), located 41'-6" from East end, that measures 4"L x 2.5"H x up to 3" of penetration</li> <li>Hole in North pipe arch (North face), located 42'-0" from East end, that measures 2"L x 1"H x up to 2" of penetration</li> </ul>	7 8 9 10 10 10
West Headwall	<ul style="list-style-type: none"> <li>Light to heavy vegetation growth</li> <li>Random narrow to medium cracks in mortar, minor settlement of the stone throughout and minor erosion at the South side of the South pipe arch</li> <li>Void in 2<sup>nd</sup> row from channel bottom between pipe arches that measures full width x 6"H x up to 19" of penetration</li> <li>Void between South face of North pipe arch and West headwall that measures 16"H x 2"W x up to 26" of penetration</li> </ul>	11 1 1
East Headwall	<ul style="list-style-type: none"> <li>Wide crack in mortar over South pipe arch</li> <li>Void at the North face of the South pipe arch and the headwall that measures 11"H x 8"W x up to 1" of penetration</li> </ul>	2



	<ul style="list-style-type: none"> <li>• Void at bottom of headwall between pipe arches that measures 8.5"L x 3"W x up to 12" of penetration</li> <li>• Void at South face of North pipe and headwall that measures 9"H x 6"W x up to 4'-9" of penetration</li> </ul>	2
		2

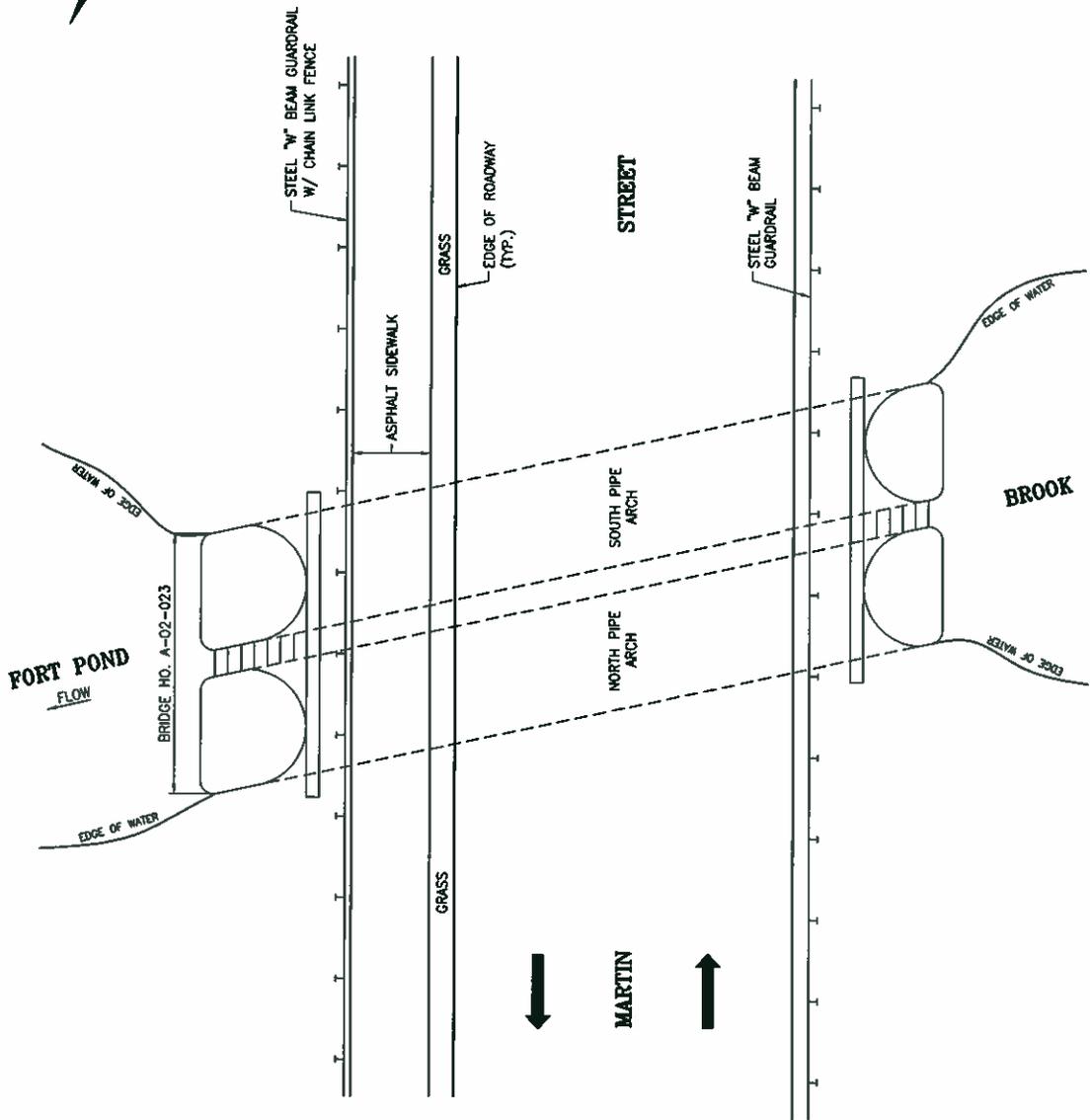
**Abutment/Foundation Deficiencies (NBIS Item #60 in Inspection Report)**

Element	Deficiency	Reference Photo(s)
Wingwalls	<ul style="list-style-type: none"> <li>• Light to moderate vegetation growth throughout all 4 wingwalls</li> </ul>	

**Recommended Maintenance:**

The following table outlines the deficiencies and repairs needed, along with the priority of the repair, to the Martin Street Bridge over Fort Pond Brook:

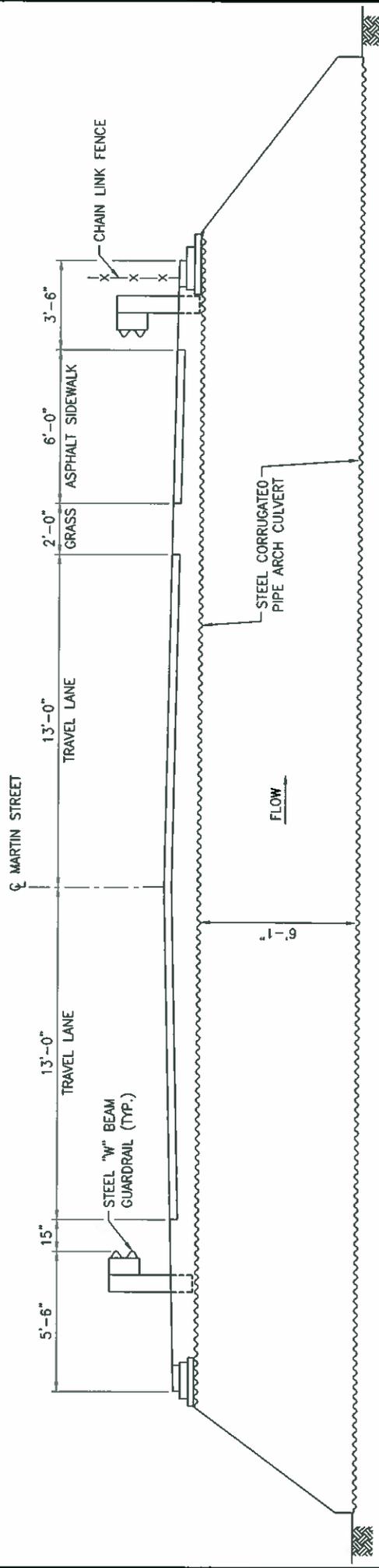
Element & Location		Deficiency	Repair Needed	Priority
#1	Protective coating of pipe arches	Cracking and peeling throughout	Clean and reseal with protective coating throughout	High
#2	East end, both pipe arches	Undermining up to 8"	Place riprap at ends and seal voids around pipe arches	High
#3	West end, both pipe arches	Undermining up to 12"	Place riprap at ends and seal voids around pipe arches	High
#4	Haunch of both pipe arches	Moderate to severe rusting	Pave inverts full length within normal water range	High
#5	South pipe arch, South face	Numerous holes in arch at haunch	Repair holes prior to placing new paved invert	High
#6	South pipe arch, North face	Hole in arch at haunch	Repair holes prior to placing new paved invert	High
#7	North pipe arch, North face	Numerous holes in arch at haunch	Repair holes prior to placing new paved invert	High
#8	Stone masonry headwalls	Narrow to medium cracks in mortar	Repoint stone masonry headwalls as needed	Low
#9	Pipe arch / headwall ends	Voids around pipe arches and undermining of pipe arches	Fill voids with concrete to seal gaps	High



**ACTION: MARTIN STREET OVER  
FORT POND BROOK, BRIDGE NO. A-02-023  
PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
Consulting Engineers, Surveyors & Photogrammetrists

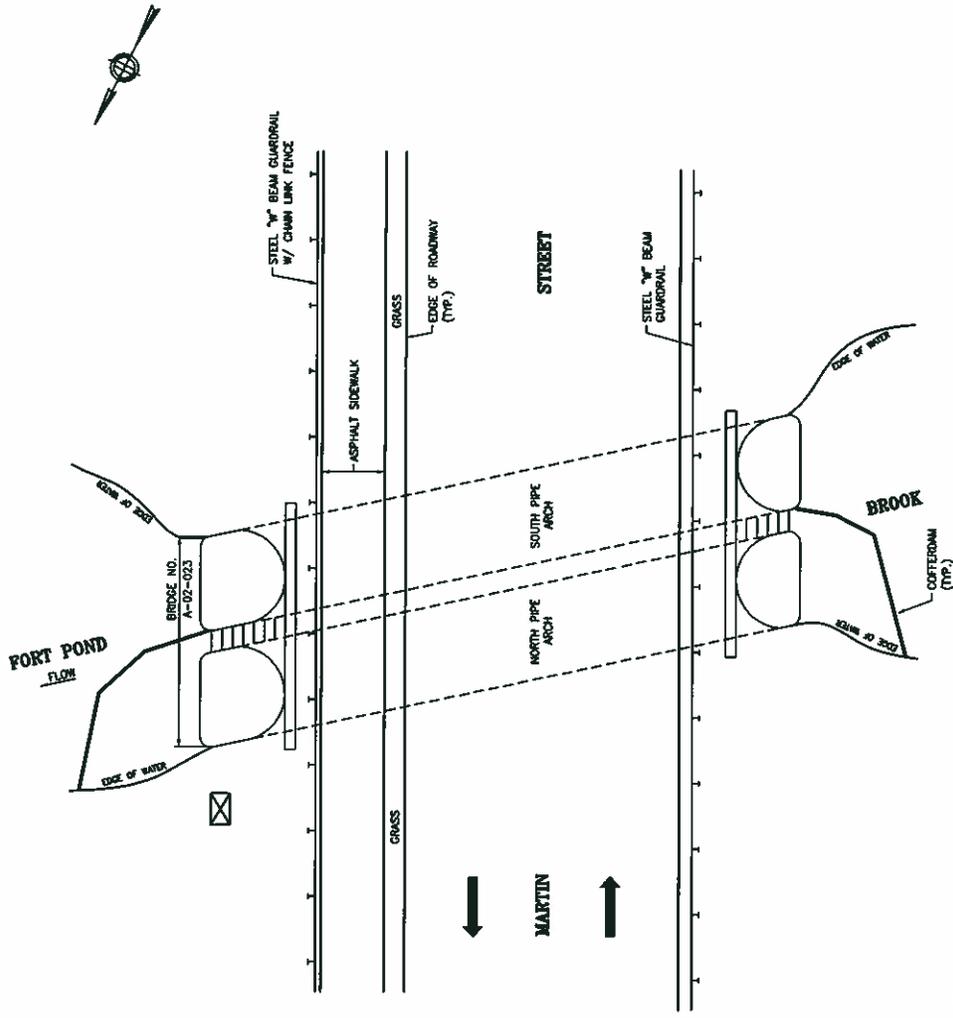




**ACTION: MARTIN STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-023  
 BRIDGE TRANSVERSE SECTION - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





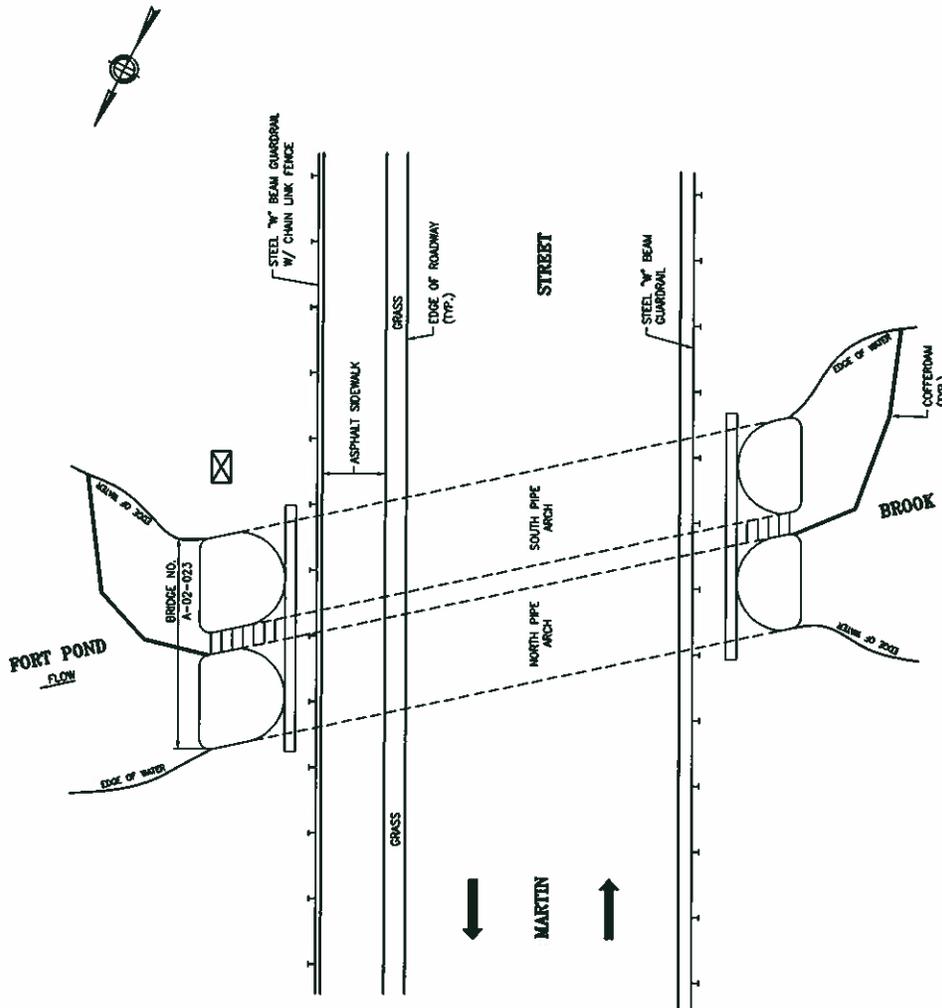
- LEGEND**
- - COFFERDAM
  - - SEDIMENTATION BASIN

STAGE I

**ACTION: MARTIN STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-023  
 WATER CONTROL PLAN - SCALE: N.T.S.**

**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists





- LEGEND**
- - COFFERDAM
  - ⊗ - SEDIMENTATION BASIN

**STAGE II**

**ACTION: MARTIN STREET OVER  
 FORT POND BROOK, BRIDGE NO. A-02-023  
 WATER CONTROL PLAN - SCALE: N.T.S.**



**CHAS. H. SELLS, INC.**  
 Consulting Engineers, Surveyors & Photogrammetrists



Bridge #: A-02-023

Photo #: 1

09/19/2007

West Elevation View, looking West.



Bridge #: A-02-023

Photo #: 2

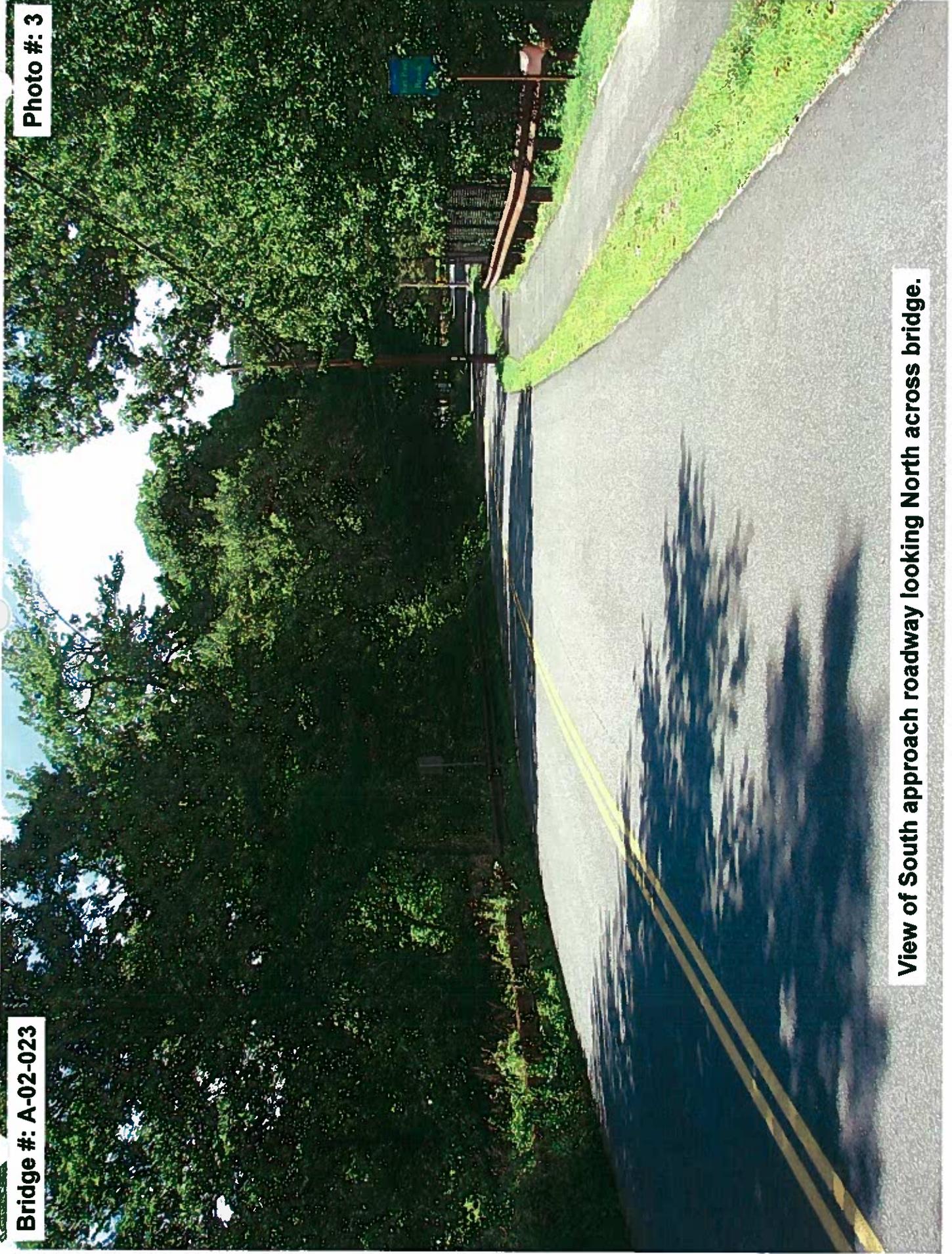
09/19/2007

East Elevation View, looking Southwest.



Bridge #: A-02-023

Photo #: 3



View of South approach roadway looking North across bridge.

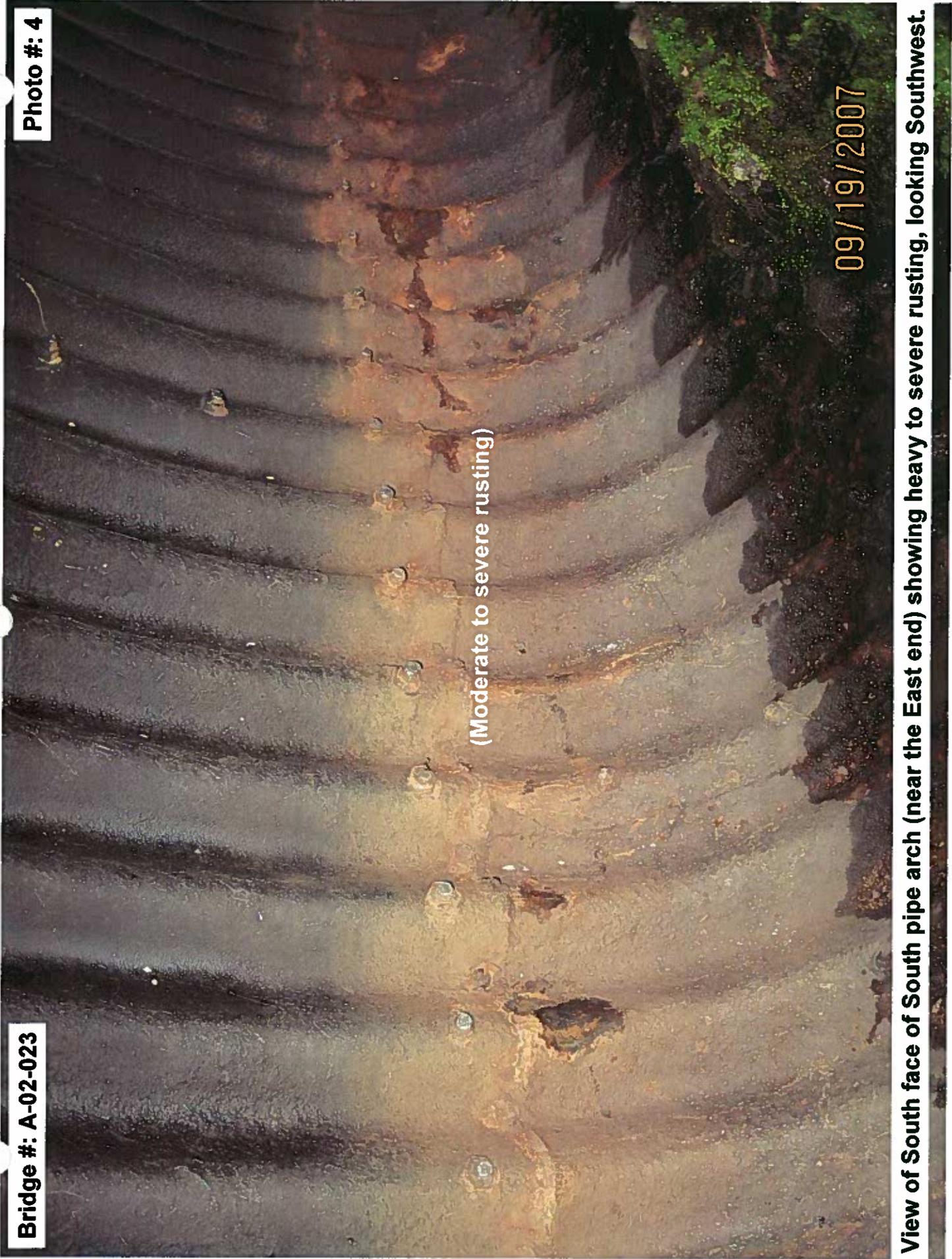
Bridge #: A-02-023

Photo #: 4

(Moderate to severe rusting)

09/19/2007

View of South face of South pipe arch (near the East end) showing heavy to severe rusting, looking Southwest.



Bridge #: A-02-023

Photo #: 5

(Moderate to severe rusting)

09/19/2007

View of South face of South pipe arch (near the midspan) showing heavy to severe rusting, looking Southwest.

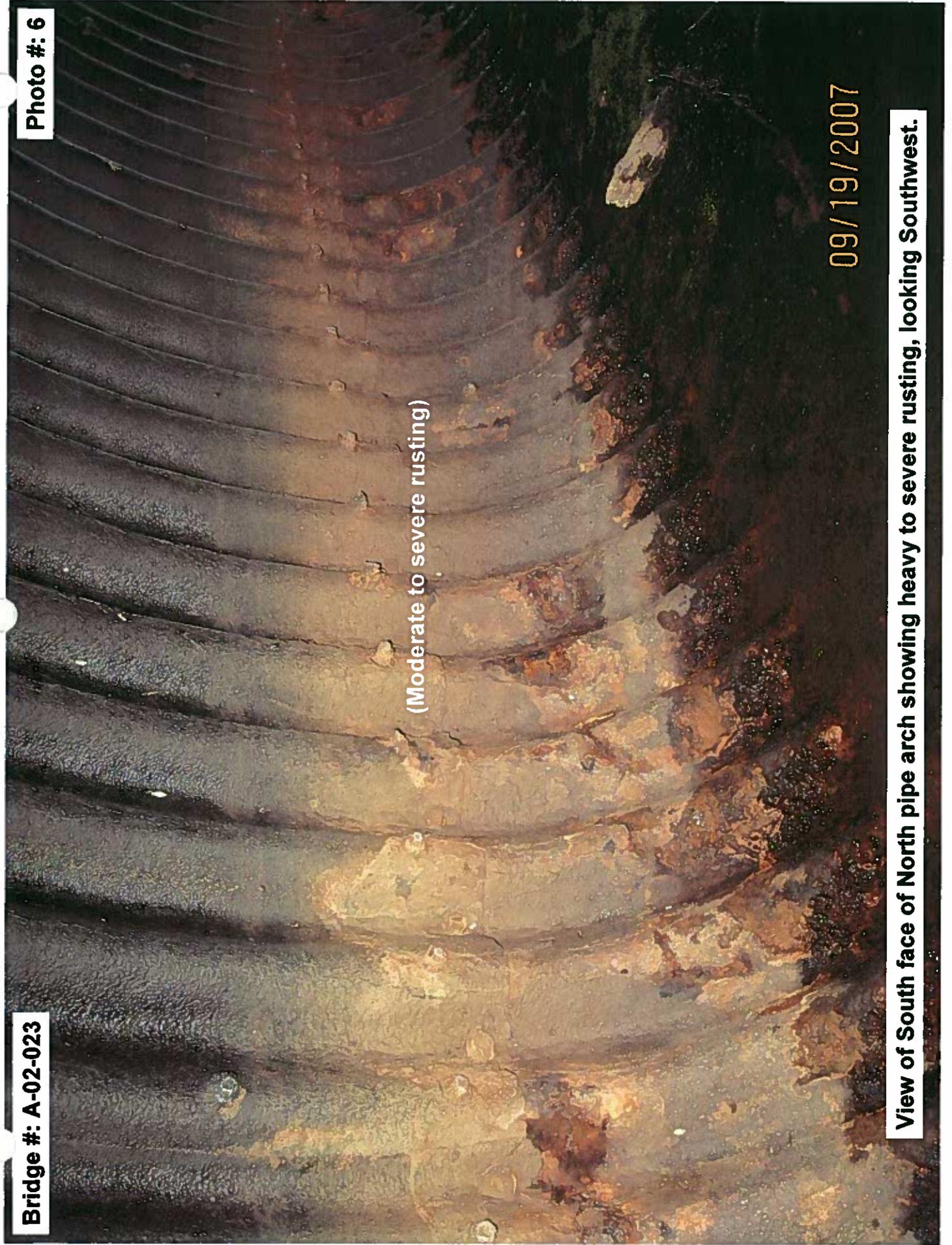
Bridge #: A-02-023

Photo #: 6

(Moderate to severe rusting)

09/19/2007

View of South face of North pipe arch showing heavy to severe rusting, looking Southwest.



Bridge #: A-02-023

Photo #: 7

3.5" long x 3" high x up to 1/3" penetration

09/19/2007

View of South face of South pipe arch, approximately 33'-8" from the East end.



**Bridge #: A-02-023**

**Photo #: 8**

3.5" long x 3" high x up to 3" penetration

3" long x 3" high x 3" penetration

4" long x 5" high x 3.5" penetration

3" long x 5" high x 4" penetration

09/19/2007

**View of South face of South Barrel, approximately 36'-8" from the East end.**



Bridge #: A-02-023

Photo #: 9

1" long x 2" high x up to 1" penetration

3" long x 3" high x up to 1" penetration

09/19/2007

View of North face of North Barrel, approximately 17'-0" from the East end.



Bridge #: A-02-023

Photo #: 10

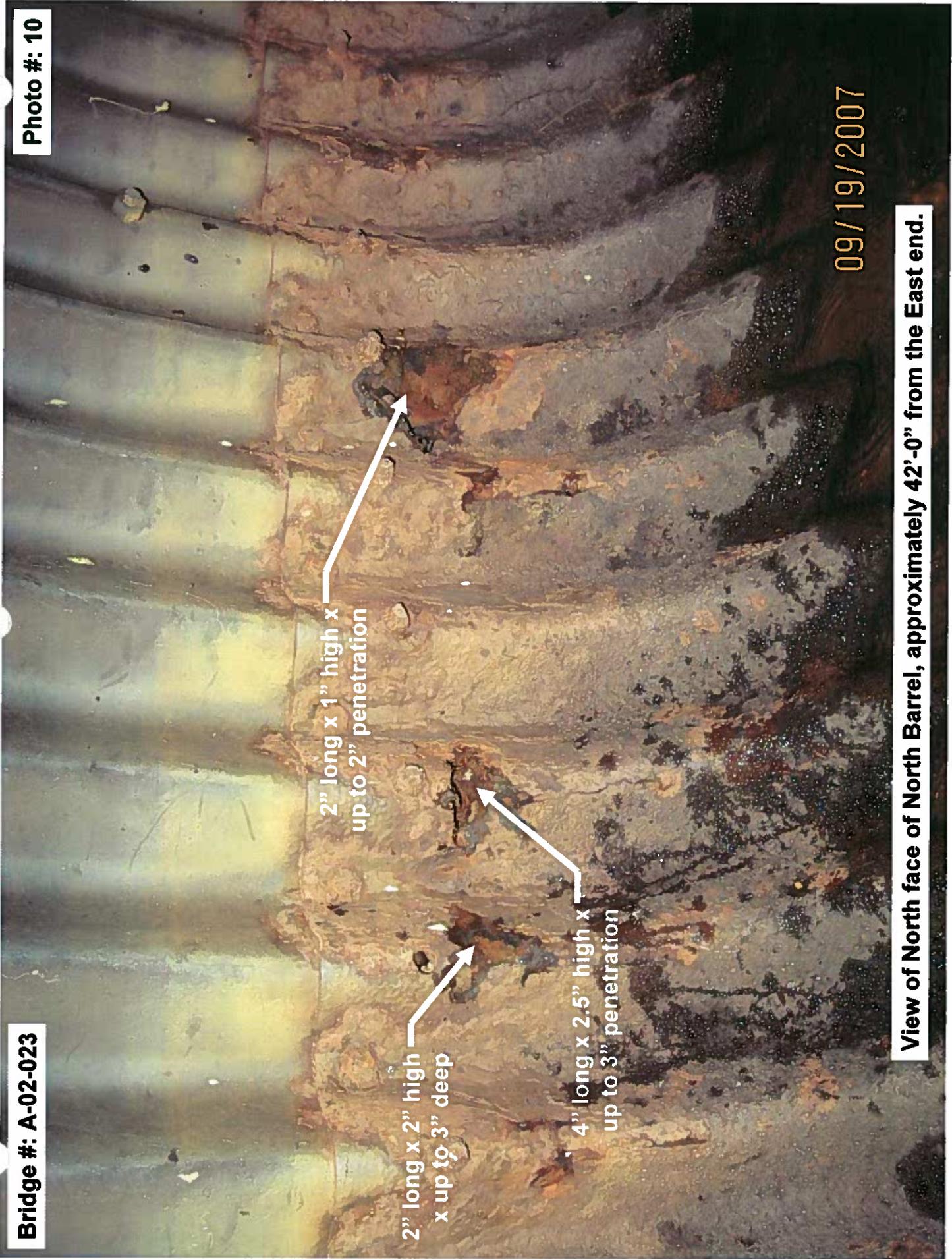
2" long x 2" high  
x up to 3" deep

2" long x 1" high x  
up to 2" penetration

4" long x 2.5" high x  
up to 3" penetration

09/19/2007

View of North face of North Barrel, approximately 42'-0" from the East end.



Bridge #: A-02-023

Photo #: 11

09/19/2007

View of Southwest corner of the bridge showing heavy vegetation growth, looking East.





### **III. RECOMMENDATIONS OF REPAIRS TO TOWN OWNED BRIDGES**

The following is a list, by bridge, of repairs that SELLS recommends to be immediate priorities. These repairs are all associated with extending the long term structural capacity and/or upgrading significantly substandard safety features.

#### **Bridge No. A-02-007 (Lawsbrook Road over Fort Pond Brook)**

SELLS recommends that the current steel W-beam guardrail/bridge rail be replaced in its entirety with a Modified Thrie Beam Bridge Rail and repairs be done to the concrete safety curbs. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately **\$44,000**.

#### **Bridge No. A-02-008 (River Street over Fort Pond Brook at Carriage Drive)**

SELLS recommends that the corrugated steel deck arch and lower connection plates be cleaned and coated with a new protective coating, particularly at the lower ends where the steel plate meets the concrete abutments. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately **\$41,000**.

#### **Bridge No. A-02-009 (Brook Street over Nashoba Brook)**

SELLS recommends that the steel corrugated pipe arch culverts be cleaned and coated with a new protective coating. Also, voids between the headwalls and pipe arches shall be filled to prevent the infiltration of water behind the pipe arches. Lastly, the stone masonry bridge rail and headwalls shall be repointed to fill the large gaps in the mortar. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately **\$92,000**.

#### **Bridge No. A-02-010 (Parker Street over Fort Pond Brook)**

SELLS recommends that the current steel W-beam guardrail/bridge rail be replaced in its entirety with a Modified Thrie Beam Bridge Rail and the steel corrugated deck arch and lower connection plates be cleaned and coated with a new protective coating, particularly at the lower ends where the steel plate meets the concrete abutments. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately **\$87,000**.

#### **Bridge No. A-02-011 (Wetherbee Street over Nashoba Brook)**

SELLS recommends that no work be done to this bridge at this time. The repairs that are recommended to be done to this structure would provide minimal benefits at this time. The Town should continue to monitor MassHighway Bridge Inspection Reports for changes to the bridge's condition.

Bridge No. A-02-018 (Concord Road over Nashoba Brook)

SELLS recommends that no work be done to this bridge at this time. The repairs that are recommended to be done to this structure would provide minimal benefits at this time. The Town should continue to monitor MassHighway Bridge Inspection Reports for changes to the bridge's condition.

Repairs are needed to the channel walls downstream from the bridge. As previously mentioned, these walls may be beyond the Town's Right of Way (owned by others.) Therefore, there may be a question as to whether the Town is responsible for maintenance of these walls.

Bridge No. A-02-020 (River Street over Fort Pond Brook at Merriam Lane)

SELLS recommends that the steel corrugated pipe culverts be cleaned and coated with a new protective coating. Also, voids between the headwalls and pipe arches shall be filled to prevent the infiltration of water behind the pipe arches. Riprap shall also be placed at the culvert ends to prevent undermining. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately **\$100,000**.

Bridge No. A-02-021 (River Street over Fort Pond Brook at Vanderbilt Road)

SELLS recommends that the steel corrugated pipe arch culverts be cleaned and coated with a new protective coating. Also, voids between the headwalls and pipe arches shall be filled to prevent the infiltration of water behind the pipe arches. Riprap shall also be placed at the culvert ends to prevent undermining and the failed section of the Southwest wingwall should be rebuilt. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately **\$74,000**.

Bridge No. A-02-022 (Stow Street over Fort Pond Brook)

SELLS recommends that the remaining concrete be removed from the bottom portion of the concrete encased steel beams and repairs be done to the faces of both abutments and both faces of the pierwall. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately **\$26,000**.

Bridge No. A-02-023 (Martin Street over Fort Pond Brook)

SELLS recommends that the steel corrugated pipe arch culverts be cleaned and coated with a new protective coating, weld/fasten steel corrugated plates over the areas where there is 100% section loss (holes) and severe rusting and steel delamination, place a reinforced concrete paved invert in both pipe arches, fill the voids between the headwalls and the pipe arches to prevent the infiltration of water behind the pipe arches and place riprap at both ends to prevent undermining. Based on the recommended repairs, the preliminary construction cost estimate to accomplish this work is approximately **\$88,000**.



#### **IV. PRIORITY OF REPAIRS TO TOWN OWNED BRIDGES**

The information provided above for the recommended repairs to the ten (10) Town Owned Bridges shows that repairs will be needed to a majority of the bridge structures to extend their service life. It shall be noted that the cost of water control for the repairs to be performed “in-the-dry” as well as for protection of the waterway is a significant cost for each of the bridge structures. In fact, the cost of water control is the basis for limiting our recommendations on several of the bridges. It shall also be noted that the water control measures, repointing of the stone masonry walls and other bridge repairs may require temporary easements and/or rights of entry from adjacent property owners at each of the bridge locations. The following is a priority list, by bridge, that indicates what SELLS believes should be the Town’s approach to repairs on these structures. There may of course be savings by grouping similar work by repair/bridge type. For example, SELLS recommends that the Town’s top priority should be the corrugated steel pipe culvert structures and in particular repairing and replacing the coating of these pipes as this is the primary structural member for these bridges.

1. Bridge No. A-02-023 (Martin Street over Fort Pond Brook) – Repairing the holes in the pipes, replacing the protective coating and placing a concrete invert should be the Town’s top priority. These repairs are essential in order to ensure the current load carrying capacity of the structure.
2. Bridge No. A-02-009 (Brook Street over Nashoba Brook) – Replacing the protective coating and sealing the voids around the pipe ends is a high priority for this structure and should be addressed immediately.
3. Bridge No. A-02-021 (River Street over Fort Pond Brook at Vanderbilt Road) – Replacing the protective coating and sealing the voids around the pipe ends is a high priority for this structure and should be addressed immediately.
4. Bridge No. A-02-020 (River Street over Fort Pond Brook at Merriam Lane) – Replacing the protective coating and sealing the voids around the pipe ends is a high priority for this structure and should be addressed immediately.
5. Bridge No. A-02-008 (River Street over Fort Pond Brook at Carriage Drive) – Replacing the protective coating, primarily at the arch ends, is a moderate priority for this structure and should be addressed. However, it is not as critical as the corrugated pipes since the arch ends are not constantly exposed to water and do not exhibit the same level of deterioration even though this structure is significantly older than the corrugated pipe bridges.
6. Bridge No. A-02-022 (Stow Street over Fort Pond Brook) – This structure requires moderate repairs to the abutments and pierwall that can be accomplished for a relatively low cost of construction. However, there is already a full set of bridge replacement drawings for this bridge. SELLS recommends that these drawings, through the Town and MassHighway, be revisited to pursue future replacement of the bridge through MassHighway’s Footprint Bridge Program.
7. Bridge No. A-02-010 (Parker Street over Fort Pond Brook) – This structure requires minor repairs to the deck arch and abutments without much benefit. It is



- recommended that the substandard bridge rail be replaced to address safety concerns and the Town seek the aid of MassHighway for possible future replacement.
8. Bridge No. A-02-007 (Lawsbrook Road over Fort Pond Brook) – This structure requires minor repairs to the deck and concrete “T” beams. The cost of water control would be expensive and difficult to accomplish and therefore the repairs needed on the underside of the bridge are not recommended considering the limited benefit they would provide. It is recommended that the existing substandard bridge rail be replaced to address a safety concern and the Town seek the aid of MassHighway for possible future replacement considering the age and condition of this structure.
  9. Bridge No. A-02-011 (Wetherbee Street over Nashoba Brook) – This structure requires minor repairs that will provide minimal benefits to the long term life of the structure and are therefore not recommended at this time because of the high cost associated with water control.
  10. Bridge No. A-02-018 (Concord Road over Nashoba Brook) – This structure requires minor repairs that will provide minimal benefits to the long term life of the structure and are therefore not recommended at this time because of the high cost associated with water control.

## V. WETLAND PERMITTING DISCUSSION

Work will be required in the waterway at six (6) of the eight (8) recommended bridge locations to accomplish the necessary repairs. The water control measures shown in the Plans represent current methods used by MassHighway in diverting water so that work can be accomplished “in-the-dry” and so that sediments can be contained. There will be temporary impacts to Land Under Water as a result of installing cofferdams to accomplish repairs “in-the-dry.” In addition, there will be permanent impacts at those bridges where new riprap is proposed. These permanent impacts are limited to approximately 150 SF to 250 SF at each of the three (3) bridges where riprap is recommended.

## VI. PRELIMINARY CONSTRUCTION COST ESTIMATE

The total construction cost, for all ten (10) Town Owned Bridges, at the Phase I - Preliminary Report design level is estimated to be approximately **\$875,000**, which cost does not include the cost for any utility work or right-of-way acquisitions. However, based on the recommendations for repairs from SELLS, the total construction cost estimate for the repairs that will be beneficial to the long term life of the bridge is approximately **\$552,000**. (See Appendix A for item summary sheets for each bridge structure)



**APPENDIX A**

**PRELIMINARY CONSTRUCTION COST  
ESTIMATE SUMMARY SHEETS**

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-007  
October 31, 2007**

TOWN	Acton		CLASS	-	
STATION	N/A	ROAD	Lawsbrook Road	OVER	Fort Pond Brook
TYPE	Conc. Tee Beams	ROADWAY	26'-0"	WALKS	None
SPAN	25'-0"	LENGTH	26'-0"	CL. UNDER BR.	N/A

**FULL REPAIR LIST**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-007			
992.11	1	EA	Guardrail Post - Steel	\$100	\$100
	4	EA	Steel Highway Guard Transition Beam	\$300	\$1,200
	t	LS	Mobilization	\$3,700	\$3,700
	20	UD	Safety Controls for Construction Operations	\$200	\$4,000
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	80	FT	Temporary Concrete Barrier	\$40	\$3,200
	500	DD	Reflectorized Drums	\$0.50	\$250
	250	SF	Cementitious Mortar for Patching	\$50	\$12,500
	5200	LB	Structural Steel	\$5	\$26,000
	60	FT	Modified Thrie Beam Rail System	\$175	\$10,500
	t	LS	Control of Water Structure No. A-02-007	\$55,000	\$55,000
	20	UD	Police Officer	\$300	\$6,000
				<b>SUBTOTAL =</b>	<b>\$125,050</b>
				<b>Contingency - 33% =</b>	<b>\$41,267</b>
				<b>TOTAL =</b>	<b>\$166,317</b>
				<b>CALL =</b>	<b>\$167,000</b>

**RECOMMENDED REPAIRS ONLY**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-007			
992.11	t	EA	Guardrail Post - Steel	\$100	\$100
	4	EA	Steel Highway Guard Transition Beam	\$300	\$1,200
	t	LS	Mobilization	\$1,000	\$1,000
	20	UD	Safety Controls for Construction Operations	\$200	\$4,000
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	80	FT	Temporary Concrete Barrier	\$40	\$3,200
	500	DD	Reflectorized Drums	\$1	\$250
	80	SF	Cementitious Mortar for Patching	\$50	\$4,000
	60	FT	Modified Thrie Beam Rail System	\$175	\$10,500
	20	UD	Police Officer	\$300	\$6,000
				<b>SUBTOTAL =</b>	<b>\$32,850</b>
				<b>Contingency - 33% =</b>	<b>\$10,841</b>
				<b>TOTAL =</b>	<b>\$43,691</b>
				<b>CALL =</b>	<b>\$44,000</b>

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-008  
October 31, 2007**

<b>TOWN</b>	Acton	<b>CLASS</b>	-
<b>STATION</b>	(at Carriage Dr.)	<b>ROAD</b>	River Street
<b>TYPE</b>	Steel Arch Deck	<b>ROADWAY</b>	20'-0"
<b>SPAN</b>	23'-0"	<b>LENGTH</b>	28'-10"
		<b>OVER</b>	Fort Pond Brook
		<b>WALKS</b>	None
		<b>CL. UNDER BR.</b>	N/A

**FULL REPAIR LIST**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION (FULL REPAIR)**

		<b>BREAKDOWN OF ALL MAINTENANCE ITEMS REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-008</b>			
992.11	115	FT	Hot Mix Asphalt Berm, Type A - Modified	\$5	\$575
	1	EA	Steel W-Beam Terminal Section (Single Faced)	\$60	\$60
	1	LS	Mobilization	\$1,600	\$1,600
	15	UD	Safety Controls for Construction Operations	\$200	\$3,000
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	375	DD	Reflectorized Drums	\$0.50	\$188
	145	SY	Repointing Stone Masonry Walls	\$50	\$7,250
	150	SF	Cementitious Mortar for Patching	\$50	\$7,500
	735	SF	Clean and Coat Corrugated Steel	\$15	\$11,025
	1	LS	Control of Water Structure No. A-02-008	\$16,000	\$16,000
	15	UD	Police Officer	\$300	\$4,500
				<b>SUBTOTAL =</b>	<b>\$54,298</b>
				<b>Contingency - 33% =</b>	<b>\$17,918</b>
				<b>TOTAL =</b>	<b>\$72,216</b>
				<b>CALL =</b>	<b>\$73,000</b>

**RECOMMENDED REPAIRS ONLY**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION (SELLS RECOMMENDATIONS)**

		<b>BREAKDOWN OF ALL MAINTENANCE ITEMS REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-008</b>			
992.11	1	LS	Mobilization	\$900	\$900
	130	UD	Safety Signing for Construction Operations	\$20	\$2,600
	735	SF	Clean and Coat Corrugated Steel	\$15	\$11,025
	1	LS	Control of Water Structure No. A-02-008	\$16,000	\$16,000
				<b>SUBTOTAL =</b>	<b>\$30,525</b>
				<b>Contingency - 33% =</b>	<b>\$10,073</b>
				<b>TOTAL =</b>	<b>\$40,598</b>
				<b>CALL =</b>	<b>\$41,000</b>

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-009  
October 31, 2007**

<b>TOWN</b>	Acton			<b>CLASS</b>	-
<b>STATION</b>	N/A	<b>ROAD</b>	Brook Street	<b>OVER</b>	Nashoba Brook
<b>TYPE</b>	Corrugated Steel Barrels	<b>ROADWAY</b>	26'-6"	<b>WALKS</b>	2 - 3'-0"
<b>SPAN</b>	2 - 11'-0"	<b>LENGTH</b>	26'-0"	<b>CL. UNDER BR.</b>	N/A

**FULL REPAIR LIST**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-009				
992.11	100	FT	Routing, Drying and Sealing Cracks in Existing Pavement	\$50	\$5,000	
	1	LS	Mobilization	\$2,200	\$2,200	
	10	UD	Safety Controls for Construction Operations	\$200	\$2,000	
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600	
	250	DD	Reflectorized Drums	\$0.50	\$125	
	5	CY	Pressure Injected Grout	\$750	\$3,750	
	160	SY	Repointing Stone Masonry Walls	\$50	\$8,000	
	2140	SF	Clean and Coat Corrugated Steel	\$15	\$32,100	
	1	LS	Control of Water Structure No. A-02-009	\$15,000	\$15,000	
	10	UD	Police Officer	\$300	\$3,000	
				<b>SUBTOTAL =</b>	<b>\$73,775</b>	
				<b>Contingency - 33% =</b>	<b>\$24,346</b>	
				<b>TOTAL =</b>	<b>\$98,121</b>	
				<b>CALL =</b>	<b>\$99,000</b>	

**RECOMMENDED REPAIRS ONLY**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-009				
992.11	1	LS	Mobilization	\$2,000	\$2,000	
	10	UD	Safety Controls for Construction Operations	\$200	\$2,000	
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600	
	250	DD	Reflectorized Drums	\$0.50	\$125	
	5	CY	Pressure Injected Grout	\$750	\$3,750	
	160	SY	Repointing Stone Masonry Walls	\$50	\$8,000	
	2140	SF	Clean and Coat Corrugated Steel	\$15	\$32,100	
	1	LS	Control of Water Structure No. A-02-009	\$15,000	\$15,000	
	10	UD	Police Officer	\$300	\$3,000	
				<b>SUBTOTAL =</b>	<b>\$68,575</b>	
				<b>Contingency - 33% =</b>	<b>\$22,630</b>	
				<b>TOTAL =</b>	<b>\$91,205</b>	
				<b>CALL =</b>	<b>\$92,000</b>	

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-010  
October 31, 2007**

<b>TOWN</b>	Acton	<b>CLASS</b>	-
<b>STATION</b>	N/A	<b>OVER</b>	Fort Pond Brook
<b>TYPE</b>	Steel Arch Deck	<b>ROADWAY</b>	24'-0"
<b>SPAN</b>	21'-2"	<b>LENGTH</b>	25'-8"
		<b>CL. UNDER BR.</b>	N/A

**FULL REPAIR LIST  
ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u>			
		<u>REHABILITATION OF BRIDGE STRUCTURE</u>			
		<u>BRIDGE NO. A-02-010</u>			
992.11	2	EA	Tree Removed - Diameter Under 24 inches	\$600	\$1,200
	1	EA	Steel W-Beam Terminal Section (Single Faced)	\$60	\$60
	4	EA	Steel Highway Guard Transition Beam	\$300	\$1,200
	1	LS	Mobilization	\$2,200	\$2,200
	20	UD	Safety Controls for Construction Operations	\$200	\$4,000
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	75	FT	Temporary Concrete Barrier	\$40	\$3,000
	500	DD	Reflectorized Drums	\$0.50	\$250
	5	CY	Pressure Injected Grout	\$750	\$3,750
	60	SY	Repointing Stone Masonry Walls	\$50	\$3,000
	65	SF	Cementitious Mortar for Patching	\$50	\$3,250
	740	SF	Clean and Coat Corrugated Steel	\$15	\$11,100
	1	LS	Clean and Paint (Overcoat) Steel Bridge No. A-02-010	\$800	\$800
	75	FT	Modified Thrie Beam Rail System	\$175	\$13,125
	38	TON	Riprap	\$65	\$2,470
	1	LS	Control of Water Structure No. A-02-010	\$15,000	\$15,000
	20	UD	Police Officer	\$300	\$6,000
				<b>SUBTOTAL =</b>	<b>\$73,005</b>
				<b>Contingency - 33% =</b>	<b>\$24,092</b>
				<b>TOTAL =</b>	<b>\$97,097</b>
				<b>CALL =</b>	<b>\$98,000</b>

**RECOMMENDED REPAIRS ONLY  
ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u>			
		<u>REHABILITATION OF BRIDGE STRUCTURE</u>			
		<u>BRIDGE NO. A-02-010</u>			
992.11	1	EA	Steel W-Beam Terminal Section (Single Faced)	\$60	\$60
	4	EA	Steel Highway Guard Transition Beam	\$300	\$1,200
	1	LS	Mobilization	\$1,900	\$1,900
	20	UD	Safety Controls for Construction Operations	\$200	\$4,000
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	75	FT	Temporary Concrete Barrier	\$40	\$3,000
	500	DD	Reflectorized Drums	\$0.50	\$250
	5	CY	Pressure Injected Grout	\$750	\$3,750
	60	SY	Repointing Stone Masonry Walls	\$50	\$3,000
	740	SF	Clean and Coat Corrugated Steel	\$15	\$11,100
	75	FT	Modified Thrie Beam Rail System	\$175	\$13,125
	1	LS	Control of Water Structure No. A-02-010	\$15,000	\$15,000
	20	UD	Police Officer	\$300	\$6,000
				<b>SUBTOTAL =</b>	<b>\$64,985</b>
				<b>Contingency - 33% =</b>	<b>\$21,445</b>
				<b>TOTAL =</b>	<b>\$86,430</b>
				<b>CALL =</b>	<b>\$87,000</b>

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-011  
October 31, 2007**

<b>TOWN</b>	Acton		<b>CLASS</b>	-	
<b>STATION</b>	N/A	<b>ROAD</b>	Wetherbee Street	<b>OVER</b>	Nashoba Brook
<b>TYPE</b>	Conc. Box Culvert	<b>ROADWAY</b>	24'-6"	<b>WALKS</b>	1 - 4'-3"
<b>SPAN</b>	3 - 10'-0"	<b>LENGTH</b>	48'-1"	<b>CL. UNDER BR.</b>	N/A

**FULL REPAIR LIST**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION/MAINTENANCE**

		<b>BREAKDOWN OF ALL MAINTENANCE ITEMS REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-011</b>				
992.11	1	LS	Selective Clearing and Grubbing	\$250	\$250	
	30	FT	Steel W-Beam Highway Guard (Single Faced)	\$15	\$450	
	1	EA	Steel W-Beam Terminal Section (Single Faced)	\$60	\$60	
	1	LS	Mobilization	\$1,000	\$1,000	
	10	UD	Safety Controls for Construction Operations	\$200	\$2,000	
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600	
	250	DD	Reflectorized Drums	\$0.50	\$125	
	30	FT	Crack Sealing with Methacrylate	\$45	\$1,350	
	115	FT	Bonded Closed Cell Joint System	\$50	\$5,750	
	5	SF	Cementitious Mortar for Patching	\$50	\$250	
	1	LS	Control of Water Structure No. A-02-011	\$16,000	\$16,000	
	10	UD	Police Officer	\$300	\$3,000	
				<b>SUBTOTAL =</b>	<b>\$32,836</b>	
				<b>Contingency - 33% =</b>	<b>\$10,836</b>	
				<b>TOTAL =</b>	<b>\$43,671</b>	
				<b>CALL =</b>	<b>\$44,000</b>	

**RECOMMENDED REPAIRS ONLY**

NONE

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-018  
October 31, 2007**

<b>TOWN</b>	Acton	<b>CLASS</b>	-
<b>STATION</b>	N/A	<b>ROAD</b>	Concord Road
<b>TYPE</b>	Conc. Box Culvert	<b>ROADWAY</b>	24'-0"
<b>SPAN</b>	2 - 9'-0"	<b>LENGTH</b>	21'-6"
		<b>OVER</b>	Nashoba Brook
		<b>WALKS</b>	1 - 7'-0"
		<b>CL. UNDER BR.</b>	N/A

**FULL REPAIR LIST**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION/MAINTENANCE**

			<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-018		
992.11	1	LS	Mobilization	\$900	\$900
	5	UD	Safety Controls for Construction Operations	\$200	\$1,000
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	125	DD	Reflectorized Drums	\$0.50	\$63
	12	CY	Tremie Concrete for Repairs	\$700	\$8,400
	10	FT	Bonded Closed Cell Joint System	\$50	\$500
	5	SF	Cementitious Mortar for Patching	\$50	\$250
	1	LS	Control of Water Structure No. A-02-018	\$15,000	\$15,000
	5	UD	Police Officer	\$300	\$1,500
					<b>SUBTOTAL =</b>
				<b>Contingency - 33% =</b>	<b>\$9,970</b>
				<b>TOTAL =</b>	<b>\$40,183</b>
				<b>CALL =</b>	<b>\$41,000</b>

**RECOMMENDED REPAIRS ONLY**

NONE

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-020  
October 31, 2007**

<b>TOWN</b>	Acton	<b>CLASS</b>	-
<b>STATION</b>	(at Merriam Lane)	<b>ROAD</b>	River Street
<b>TYPE</b>	Steel Pipe Culvert	<b>ROADWAY</b>	26'-0"
<b>SPAN</b>	2 - 10'-0"	<b>LENGTH</b>	25'-0"
		<b>OVER</b>	Fort Pond Brook
		<b>WALKS</b>	None
		<b>CL. UNDER BR.</b>	N/A

**FULL REPAIR LIST**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u>			
		<u>REHABILITATION OF BRIDGE STRUCTURE</u>			
		<u>BRIDGE NO. A-02-020</u>			
992.11	1	LS	Selective Clearing and Grubbing	\$200	\$200
	1	LS	Mobilization	\$2,500	\$2,500
	5	UD	Safety Controls for Construction Operations	\$200	\$1,000
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	125	DD	Reflectorized Drums	\$0.50	\$63
	75	SY	Repointing Stone Masonry Walls	\$50	\$3,750
	5	CY	Pressure Injected Grout	\$750	\$3,750
	3200	SF	Clean and Coat Corrugated Steel	\$15	\$48,000
	125	LB	Corrugated Steel Plate	\$10	\$1,250
	32	TON	Riprap	\$65	\$2,080
	1	LS	Control of Water Structure No. A-02-020	\$16,000	\$16,000
	5	UD	Police Officer	\$300	\$1,500
				<b>SUBTOTAL =</b>	<b>\$82,693</b>
				<b>Contingency - 33% =</b>	<b>\$27,289</b>
				<b>TOTAL =</b>	<b>\$109,981</b>
				<b>CALL =</b>	<b>\$110,000</b>

**RECOMMENDED REPAIRS ONLY**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u>			
		<u>REHABILITATION OF BRIDGE STRUCTURE</u>			
		<u>BRIDGE NO. A-02-020</u>			
992.11	1	LS	Mobilization	\$2,200	\$2,200
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	5	CY	Pressure Injected Grout	\$750	\$3,750
	3200	SF	Clean and Coat Corrugated Steel	\$15	\$48,000
	32	TON	Riprap	\$65	\$2,080
	1	LS	Control of Water Structure No. A-02-020	\$16,000	\$16,000
				<b>SUBTOTAL =</b>	<b>\$74,630</b>
				<b>Contingency - 33% =</b>	<b>\$24,628</b>
				<b>TOTAL =</b>	<b>\$99,258</b>
				<b>CALL =</b>	<b>\$100,000</b>

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-021  
October 31, 2007**

<b>TOWN</b>	Acton	<b>CLASS</b>	-
<b>STATION</b>	(at Vanderbilt Rd.)	<b>ROAD</b>	River Street
<b>TYPE</b>	Steel Pipe Arches	<b>ROADWAY</b>	23'-0"
<b>SPAN</b>	2 - 6'-3"	<b>LENGTH</b>	22'-6"
		<b>OVER</b>	Fort Pond Brook
		<b>WALKS</b>	None
		<b>CL. UNDER BR.</b>	N/A

**FULL REPAIR LIST**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-021			
992.11	1	LS	Selective Clearing and Grubbing	\$150	\$150
	1	EA	Steel W-Beam Terminal Section (Single Faced)	\$60	\$60
	5	CY	Stone Masonry Wall Rebuilt	\$500	\$2,500
	1	LS	Mobilization	\$1,900	\$1,900
	10	UD	Safety Controls for Construction Operations	\$200	\$2,000
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	250	DD	Reflectorized Drums	\$0.50	\$125
	75	SY	Repointing Stone Masonry Walls	\$50	\$3,750
	5	CY	Pressure Injected Grout	\$750	\$3,750
	1930	SF	Clean and Coat Corrugated Steel	\$15	\$28,950
	65	LB	Corrugated Steel Plate	\$5	\$325
	23	TON	Riprap	\$65	\$1,495
	1	LS	Control of Water Structure No. A-02-021	\$14,000	\$14,000
	10	UD	Police Officer	\$300	\$3,000
				<b>SUBTOTAL =</b>	<b>\$64,605</b>
				<b>Contingency - 33% =</b>	<b>\$21,320</b>
				<b>TOTAL =</b>	<b>\$85,925</b>
				<b>CALL =</b>	<b>\$86,000</b>

**RECOMMENDED REPAIRS ONLY**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-021			
992.11	5	CY	Stone Masonry Wall Rebuilt	\$500	\$2,500
	1	LS	Mobilization	\$1,600	\$1,600
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	5	CY	Pressure Injected Grout	\$750	\$3,750
	1930	SF	Clean and Coat Corrugated Steel	\$15	\$28,950
	23	TON	Riprap	\$65	\$1,495
	1	LS	Control of Water Structure No. A-02-021	\$14,000	\$14,000
				<b>SUBTOTAL =</b>	<b>\$54,895</b>
				<b>Contingency - 33% =</b>	<b>\$18,115</b>
				<b>TOTAL =</b>	<b>\$73,010</b>
				<b>CALL =</b>	<b>\$74,000</b>

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-022  
October 31, 2007**

<b>TOWN</b>	Acton	<b>CLASS</b>	-
<b>STATION</b>	N/A	<b>OVER</b>	Fort Pond Brook
<b>ROAD</b>	Stow Street	<b>WALKS</b>	None
<b>TYPE</b>	Conc. Encased Steel Beams	<b>ROADWAY</b>	24'-5"
<b>SPAN</b>	2 - 10'-10"	<b>LENGTH</b>	25'-11"
		<b>CL. UNDER BR.</b>	N/A

**FULL REPAIR LIST**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-022			
992.11	5	CY	Concrete Excavation	\$1,000	\$5,000
	1	EA	Steel Thrie Beam Terminal Section	\$85	\$85
	1	LS	Mobilization	\$1,400	\$1,400
	5	UD	Safety Controls for Construction Operations	\$200	\$1,000
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	125	DD	Reflectorized Drums	\$0.50	\$63
	5	CY	Tremie Concrete for Repairs	\$700	\$3,500
	290	SF	Cementitious Mortar for Patching	\$50	\$14,500
	1	LS	Clean and Paint (Overcoat) Steel Bridge No. A-02-022	\$3,000	\$3,000
	22	TON	Riprap	\$65	\$1,430
	1	LS	Control of Water Structure No. A-02-022	\$13,000	\$13,000
	5	UD	Police Officer	\$300	\$1,500
				<b>SUBTOTAL =</b>	<b>\$47,078</b>
				<b>Contingency - 33% =</b>	<b>\$15,536</b>
				<b>TOTAL =</b>	<b>\$62,613</b>
				<b>CALL =</b>	<b>\$63,000</b>

**RECOMMENDED REPAIRS ONLY**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-022			
992.11	5	CY	Concrete Excavation	\$1,000	\$5,000
	1	LS	Mobilization	\$600	\$600
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600
	5	CY	Tremie Concrete for Repairs	\$700	\$3,500
	150	SF	Cementitious Mortar for Patching	\$50	\$7,500
				<b>SUBTOTAL =</b>	<b>\$19,200</b>
				<b>Contingency - 33% =</b>	<b>\$6,336</b>
				<b>TOTAL =</b>	<b>\$25,536</b>
				<b>CALL =</b>	<b>\$26,000</b>

**TOWN OF ACTON  
DEPARTMENT OF PUBLIC WORKS**

**BRIDGE NO.  
A-02-023  
October 31, 2007**

<b>TOWN</b>	Acton		<b>CLASS</b>	-	
<b>STATION</b>	N/A	<b>ROAD</b>	Martin Street	<b>OVER</b>	Fort Pond Brook
<b>TYPE</b>	Steel Pipe Arches	<b>ROADWAY</b>	26'-0"	<b>WALKS</b>	1 - 6'-0"
<b>SPAN</b>	2 - 8'-10"	<b>LENGTH</b>	21'-0"	<b>CL. UNDER BR.</b>	N/A

**FULL REPAIR LIST**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-023				
992.11	1	LS	Mobilization	\$2,100	\$2,100	
	5	UD	Safety Controls for Construction Operations	\$200	\$1,000	
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600	
	125	DD	Reflectorized Drums	\$0.50	\$63	
	30	SY	Repointing Stone Masonry Walls	\$50	\$1,500	
	5	CY	Pressure Injected Grout	\$750	\$3,750	
	1800	SF	Clean and Coat Corrugated Steel	\$15	\$27,000	
	370	LB	Corrugated Steel Plate	\$5	\$1,850	
	15	CY	Reinforced Concrete Paved Invert	\$825	\$12,375	
	20	TON	Riprap	\$65	\$1,300	
	1	LS	Control of Water Structure No. A-02-023	\$15,000	\$15,000	
	5	UD	Police Officer	\$300	\$1,500	
				<b>SUBTOTAL =</b>	<b>\$70,038</b>	
				<b>Contingency - 33% =</b>	<b>\$23,112</b>	
				<b>TOTAL =</b>	<b>\$93,150</b>	
				<b>CALL =</b>	<b>\$94,000</b>	

**RECOMMENDED REPAIRS ONLY**

**ESTIMATE OF QUANTITIES AND COST OF REHABILITATION**

		<u>BREAKDOWN OF ALL MAINTENANCE ITEMS</u> REHABILITATION OF BRIDGE STRUCTURE BRIDGE NO. A-02-023				
992.11	1	LS	Mobilization	\$2,000	\$2,000	
	130	SF	Safety Signing for Construction Operations	\$20	\$2,600	
	5	CY	Pressure Injected Grout	\$750	\$3,750	
	1800	SF	Clean and Coat Corrugated Steel	\$15	\$27,000	
	370	LB	Corrugated Steel Plate	\$5	\$1,850	
	15	CY	Reinforced Concrete Paved Invert	\$825	\$12,375	
	20	TON	Riprap	\$65	\$1,300	
	1	LS	Control of Water Structure No. A-02-023	\$15,000	\$15,000	
				<b>SUBTOTAL =</b>	<b>\$65,875</b>	
				<b>Contingency - 33% =</b>	<b>\$21,739</b>	
				<b>TOTAL =</b>	<b>\$87,614</b>	
				<b>CALL =</b>	<b>\$88,000</b>	



**APPENDIX B**

**CURRENT MASSHIGHWAY BRIDGE  
INSPECTION REPORTS**

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**ROUTINE INSPECTION**

2-DIST  
**03**

B.I.N.  
**23X**

BR. DEPT. NO.  
**A-02-007**

CITY/TOWN <b>ACTON</b>		8-STRUCTURE NO. <b>A02007-23X-MUN-NBI</b>		11-Kilo POINT <b>000.032</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>JAN 24, 2006</b>
07-FACILITY CARRIED <b>HWY LAWSBROOK RD</b>		MEMORIAL NAME/LOCAL NAME		27-YR BUILT <b>1928</b>	106-YR REBUILT <b>0000</b>	YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER FORT POND BROOK</b>		26-FUNCTIONAL CLASS <b>Urban Collector</b>		DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Concrete Tee Beam</b>		22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>S. A. Begley</b>		
107-DECK TYPE <b>Concrete Cast-in-Place</b>		WEATHER <b>Clear</b>	TEMP. (air) <b>2°C</b>	TEAM MEMBERS <b>E. P. TERNOSKY</b>		

<b>ITEM 58</b>	<b>6</b>	
<b>DECK</b>		<b>DEF</b>
1. Wearing surface	7	-
2. Deck Condition	6	M-A
3. Stay in place forms	N	-
4. Curbs	5	M-P
5. Median	N	-
6. Sidewalks	N	-
7. Parapets	5	S-P
8. Railing	6	M-P
9. Anti Missile Fence	N	-
10. Drainage System	N	-
11. Lighting Standards	N	-
12. Utilities	N	-
13. Deck Joints	N	-
14.	N	-
15.	N	-
16.	N	-

CURB REVEAL (In millimeters)	E	W
	50	75

<b>APPROACHES</b>		<b>DEF</b>
a. Appr. pavement condition	7	-
b. Appr. Roadway Settlement	7	-
c. Appr. Sidewalk Settlement	N	-
d.	N	-

<b>OVERHEAD SIGNS</b> (Attached to bridge)	(Y/N)	<b>N</b>
		<b>DEF</b>
a. Condition of Welds	N	-
b. Condition of Bolts	N	-
c. Condition of Signs	N	-

<b>ITEM 59</b>	<b>6</b>	
<b>SUPERSTRUCTURE</b>		<b>DEF</b>
1. Stringers	N	-
2. Floorbeams	N	-
3. Floor System Bracing	N	-
4. Girders or Beams	6	M-P
5. Trusses - General	N	-
a. Upper Chords	N	-
b. Lower Chords	N	-
c. Web Members	N	-
d. Lateral Bracing	N	-
e. Sway Bracings	N	-
f. Portals	N	-
g. End Posts	N	-
6. Pin & Hangers	N	-
7. Conn Pl'ts, Gussets & Angles	N	-
8. Cover Plates	N	-
9. Bearing Devices	N	-
10. Diaphragms/Cross Frames	N	-
11. Rivets & Bolts	N	-
12. Weids	N	-
13. Member Alignment	8	-
14. Paint/Coating	N	-
15.	N	-

Year Painted	N
--------------	---

**COLLISION DAMAGE:** *Please explain*  
None (X) Minor ( ) Moderate ( ) Severe ( )

**LOAD DEFLECTION:** *Please explain*  
None (X) Minor ( ) Moderate ( ) Severe ( )

**LOAD VIBRATION:** *Please explain*  
None (X) Minor ( ) Moderate ( ) Severe ( )

Any Fracture Critical Member: (Y/N) **N**

Any Cracks: (Y/N) **N**

<b>ITEM 60</b>	<b>6</b>			
<b>SUBSTRUCTURE</b>		<b>DEF</b>		
1. Abutments	Dive	Cur	7	
a. Pedestals	N	N		-
b. Bridge Seats	N	7		-
c. Backwalls	N	6		M-P
d. Breastwalls	7	7		-
e. Wingwalls	7	7		-
f. Slope Paving/Rip-Rap	N	7		-
g. Pointing	N	N		-
h. Footings	H	H		-
i. Piles	N	N		-
j. Scour	6	7		-
k. Settlement	8	8		-
l.	N	N		-
m.	N	N		-
2. Piers or Bents			N	
a. Pedestals	N	N		-
b. Caps	N	N		-
c. Columns	N	N		-
d. Stems/Webs/Pierwalls	N	N		-
e. Pointing	N	N		-
f. Footing	N	N		-
g. Piles	N	N		-
h. Scour	N	N		-
i. Settlement	N	N		-
j.	N	N		-
k.	N	N		-
3. Pile Bents			N	
a. Pile Caps	N	N		-
b. Piles	N	N		-
c. Diagonal Bracing	N	N		-
d. Horizontal Bracing	N	N		-
e. Fasteners	N	N		-

**UNDERMINING (Y/N)** If YES please explain **N**

**COLLISION DAMAGE:**  
None (X) Minor ( ) Moderate ( ) Severe ( )

**SCOUR:** *Please explain*  
None (X) Minor ( ) Moderate ( ) Severe ( )

I-80 (Dive Report): **6**      I-80 (This Report): **6**

93B-U/W (DIVE) Insp **04/13/2004**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23X</b>	BR. DEPT. NO. <b>A-02-007</b>	8.-STRUCTURE NO. <b>A02007-23X-MUN-NBI</b>	INSPECTION DATE <b>JAN 24, 2006</b>
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**ITEM 61** 6

**CHANNEL & CHANNEL PROTECTION**

	Dive	Cur	DEF
1. Channel Scour	6	6	M-P
2. Embankment Erosion	7	6	M-P
3. Debris	6	6	M-P
4. Vegetation	7	7	-
5. Utilities	X	X	-
6. Rip-Rap/Slope Protection	N	N	-
7. Aggradation	7	7	-
8. Fender System	N	N	-

**STREAM FLOW VELOCITY:**  
Tidal ( ) High ( ) Moderate (  ) Low ( ) None ( )

ITEM 61 (Dive Report):  ITEM 61 (This Report)

93b-UW INSP. DATE:

**ITEM 36 TRAFFIC SAFETY**

	36	COND	DEF
A. Bridge Railing	0	6	M-P
B. Transitions	0	7	-
C. Approach Guardrail	1	7	-
D. Approach Guardrail Ends	0	7	S-P

**WEIGHT POSTING** Not Applicable

	H	3	3S2	Single
Actual Posting	N	N	N	N
Recommended Posting	N	N	N	N

Waived Date:  EJDMT Date:

At bridge		Other Advance	
N	S	N	S
/	/	/	/

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

**CLEARANCE POSTING** Not Applicable

	E		W		meter
	ft	in	ft	in	
Actual Field Measurement	0		0		
Posted Clearance	0		0		

At bridge		Advance	
E	W	E	W
N	N	N	N
/	/	/	/

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

**ACCESSIBILITY (Y/N/P)**

	Needed	Used
Lift Bucket	N	N
Ladder	N	N
Boat	N	N
Waders	Y	Y
Inspector 50	N	N
Rigging	N	N
Staging	N	N
Traffic Control	N	N
RR Flagger	N	N
Police	N	N
Other:		
	N	N

**TOTAL HOURS**

**PLANS (Y/N):**

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

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

*List of field tests performed:*

**RATING**

Rating Report (Y/N)

Date:

(To be filled out by DBIE) Request for Rating or Rerating (Y/N)

REASON: \_\_\_\_\_

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

**CONDITION RATING GUIDE**  
(For Items 58, 59, 60 and 61)

CODE	CONDITION	DEFECTS
N	NOT APPLICABLE	
G 9	EXCELLENT	Excellent condition.
G 8	VERY GOOD	No problem noted.
G 7	GOOD	Some minor problems.
F 6	SATISFACTORY	Structural elements show some minor deterioration.
F 5	FAIR	All primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
P 4	POOR	Advance section loss, deterioration, spalling or scour.
P 3	SERIOUS	Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
C 2	CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C 1	"IMMINENT" FAILURE	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put it back in light service.
0	FAILED	Out of service - beyond corrective action.

**DEFICIENCY REPORTING GUIDE**

**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.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23X</b>	BR. DEPT. NO. <b>A-02-007</b>	8.-STRUCTURE NO. <b>A02007-23X-MUN-NBI</b>	INSPECTION DATE <b>JAN 24, 2006</b>
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## REMARKS

### BRIDGE ORIENTATION

The approaches are South and North and the elevations are West and East. There are 7 concrete Tee Beams and 6 bays numbered from West to East. The brook flows from West to East.

### GENERAL REMARKS

District III Team C camera does not work in the cold. Pictures were taken with an alternative camera during inspection that did not include the date.

There is one small drain at the South end of the deck that does not appear to be active.

### ITEM 58 - DECK

#### Item 58.2 - Deck Condition

There is a 1 1/2 ft. diameter x 3 inch deep spall/pop out to the underside of the concrete deck in bay #5. There is a piece of wood, rusting reinforcement, and rust leaching in this spall. **See photo 1.** The deck in bay # 6 has a 6 inch diameter spall/pop out with rusting rebar.

#### Item 58.4 - Curbs

Both curbs were spot checked. Comments are from inspection of 01-29-2004 due to heavy snow and ice. The East concrete curb has minor spalling throughout. The steel edging along the East curb is bent, broken and corroded throughout. The West curb steel edging is heavily surface rusted throughout.

#### Item 58.7 - Parapets

The East parapet has concrete deterioration 9 ft. long x full height x 3 in. deep with exposed rusting rebar at midspan. This scaling is undermining 1/2 of the steel bridgerail post and exposing two anchor bolts at this location. **See photo 2.** The East parapet also has efflorescence leaching throughout.

#### Item 58.8 - Railing

Both bridgerails consist of single panel "SS" type guardrail w/steel posts. The East rail posts are twisted slightly. The West rail posts are bent towards the North 4 inches to 5 inches. The West rail has minor movement. The post @ center of East rail is undermined approx. 50% (See Item #58.7). The steel "SS" type panels on both sides of the bridge are in good condition.

### APPROACHES

#### Approaches a - Appr. pavement condition

The North approach pavement has been re-paved since last inspection. There is a full width transverse construction joint in the North approach where the existing and new pavement were joined. This joint has opened up.

### ITEM 59 - SUPERSTRUCTURE

#### Item 59.4 - Girders or Beams

The West face of beam #1 has 5 minor vertical spalls with exposed rusting reinforcing. There is a small area of scaling at the bottom Southwest end with delamination cracking above. **See photo 3.**

Beam #3 has minor honeycombing along both faces and a minor pop out at the Northeast end.

Beam #4 has a 2 ft. long delamination crack 1/3 out from its' Northeast face.

Beam #5 has a 3 ft. long delamination crack to its' bottom Northeast end and a vertical pop out 1 ft. high x 3 inches wide with exposed stirrup reinforcing.

The Southwest end of beam #6 has a 1 ft. and a 4 ft. long delamination crack and two small vertical pop outs up to 6 inches high with exposed rusting rebar. There is a rectangular hole/spall to the West face

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## REMARKS

### Item 59.4 - Girders or Beams (Cont'd)

below the spall in the deck of bay #5, 4 to 5 inches high x 3 inches deep with exposed rusting rebar. See photo 4.

The bottom Southeast end of beam #7 has a 2 1/2 ft. long x 7 inches wide x 2 inches deep area of scaling with exposed rusting reinforcement ( See photo 5 ) and a 22 inches long x 2 inches high x 1 inch deep spall. Midspan there is a 6 1/2 ft. long x 7 inches wide x 4 inches deep area of scaling with exposed rusting reinforcement. See photo 2. The bottom North end of beam #7 has delamination cracking up to the scaled area at midspan.

Most of the pop outs are caused by the reinforcing being placed too close to the surface. All beams have minor honeycombing.

### ITEM 60 - SUBSTRUCTURE

#### Item 60.1.c - Backwalls

The North backwall of Bay # 1 has two 1 1/2 ft. long x 2 inch high horizontal spalls with exposed reinforcing. The North backwall of bay #3 has a 6 inches x 1 1/2 inches high x 1/2 inch deep pop out. The South backwall in bay #4 has a horizontal pop out 1 ft. long x up to 6 inches high with exposed rusting reinforcing. The North backwall in bay #4 has a two horizontal pop outs 1 1/2 ft. long x up to 6 inches deep. See photo 6. The South backwall in bay #5 has a full length delamination crack. The North has three horizontal pop outs up to 1 ft. long x 6 inches high with exposed rusting reinforcing. See photo 7. The North backwall of bay #6 has a 4 inch diameter pop out with rusting reinforcing

#### Item 60.1.d - Breastwalls

Both breastwalls have minor waterline abrasion.

### ITEM 61 - CHANNEL AND CHANNEL PROTECTION

#### Item 61.1 - Channel Scour

The timber sheeting along the South abutment is exposed for a length of 27 ft. with a maximum height of 2 1/2 ft. The timber sheeting along the North abutment is exposed for a length of 26 ft. with a maximum height of 1 1/2 ft. See Underwater Inspection Report report dated 04-13-2004.

#### Item 61.2 - Embankment Erosion

There is embankment erosion behind the Northeast wingwall with penetrations up to 3 ft. deep.

#### Item 61.3 - Debris

There is debris at the Northwest wingwall/abutment. See photo 8.

### TRAFFIC SAFETY

#### Item 36a - Bridge Railing

See Item #58.8.

#### Item 36b - Transitions

Transitions are single panel "SS" type guardrail which are not stiffened.

#### Item 36d - Approach Guardrail Ends

The Southwest, Northwest, and Southeast are terminal ends not turned away. The Northeast is a buried end.

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**REMARKS****Photo Log**

- Photo 1 : Spall to the deck in bay #5.
- Photo 2 : Scaling to the East parapet at midspan.
- Photo 3 : Scaling and delamination cracking to the Southwest end of beam #1.
- Photo 4 : Hole/spall in the West face of beam #6.
- Photo 5 : Scaling to the bottom Southeast end of beam #7.
- Photo 6 : Pop outs in the North backwall of bay #4. Typical.
- Photo 7 : Pop outs in the backwall of bay #5.
- Photo 8 : Debris at the Northwest wingwall/abutment.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23X</b>	BR. DEPT. NO. <b>A-02-007</b>	8.-STRUCTURE NO. <b>A02007-23X-MUN-NBI</b>	INSPECTION DATE <b>JAN 24, 2006</b>
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**PHOTOS**

**Photo 1: Spall to the deck in bay #5.**



**Photo 2: Scaling to the East parapet at midspan.**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23X</b>	BR. DEPT. NO. <b>A-02-007</b>	8.-STRUCTURE NO. <b>A02007-23X-MUN-NBI</b>	INSPECTION DATE <b>JAN 24, 2006</b>
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**PHOTOS**

**Photo 3: Scaling and delamination cracking to the Southwest end of beam #1.**



**Photo 4: Hole/spall in the West face of beam #6.**

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**PHOTOS**

**Photo 5: Scaling to the bottom Southeast end of beam #7.**



**Photo 6: Pop outs in the North backwall of bay #4. Typical.**

CITY/TOWN  
**ACTON**

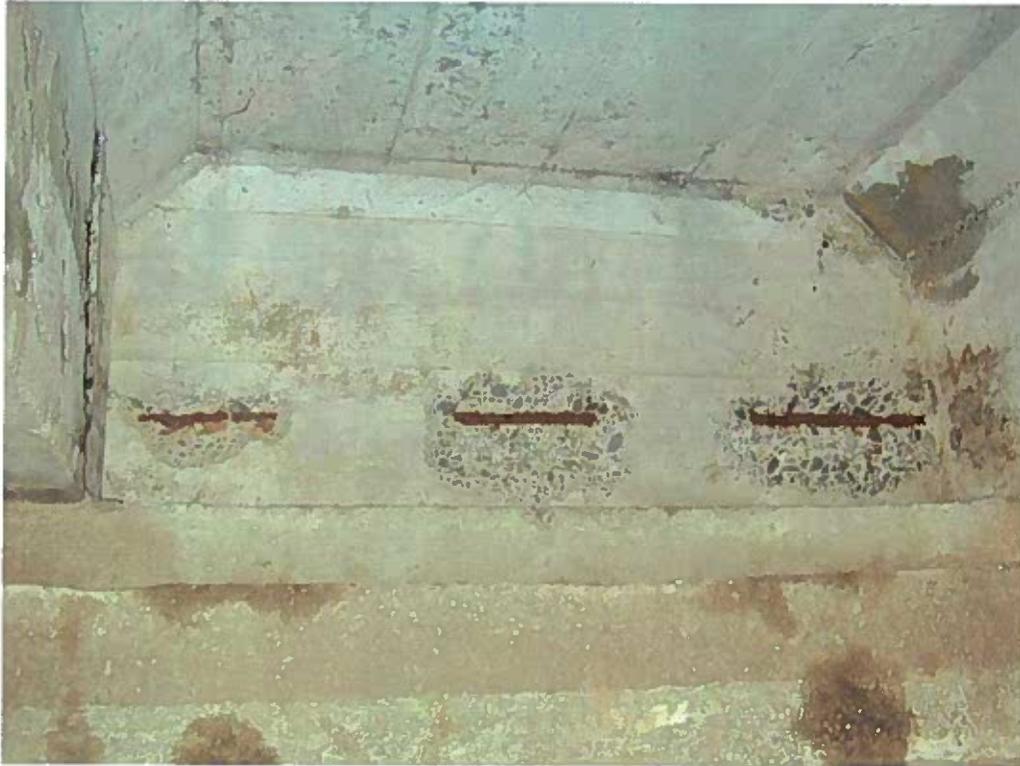
B.I.N.  
**23X**

BR. DEPT. NO.  
**A-02-007**

8.-STRUCTURE NO.  
**A02007-23X-MUN-NBI**

INSPECTION DATE  
**JAN 24, 2006**

**PHOTOS**



**Photo 7: Pop outs in the backwall of bay #5.**



**Photo 8: Debris at the Northwest wingwall/abutment.**



CITY/TOWN <b>ACTON</b>	B.I.N. <b>23X</b>	BR. DEPT. NO. <b>A-02-007</b>	8.-STRUCTURE NO. <b>A02007-23X-MUN-NBI</b>	INSPECTION DATE <b>MAR 21, 2007</b>
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**REMARKS****GENERAL REMARKS**

This structure is a single span bridge supported by concrete abutments and footings.

- 1) Orientation - Abutments are labeled left and right when facing downstream.
- 2) Sta 10+00 is at the upstream end.

**ITEM 60 - SUBSTRUCTURE****Item 60.1 - Abutments****Item 60.1.d - Breastwalls**

Both breastwalls have minor waterline abrasion with some small random ratholes having penetrations up to 0.2'. Timber sheeting was exposed only along the Left Abutment and is severely deteriorated. Maximum exposure of the sheeting was 1.5'.

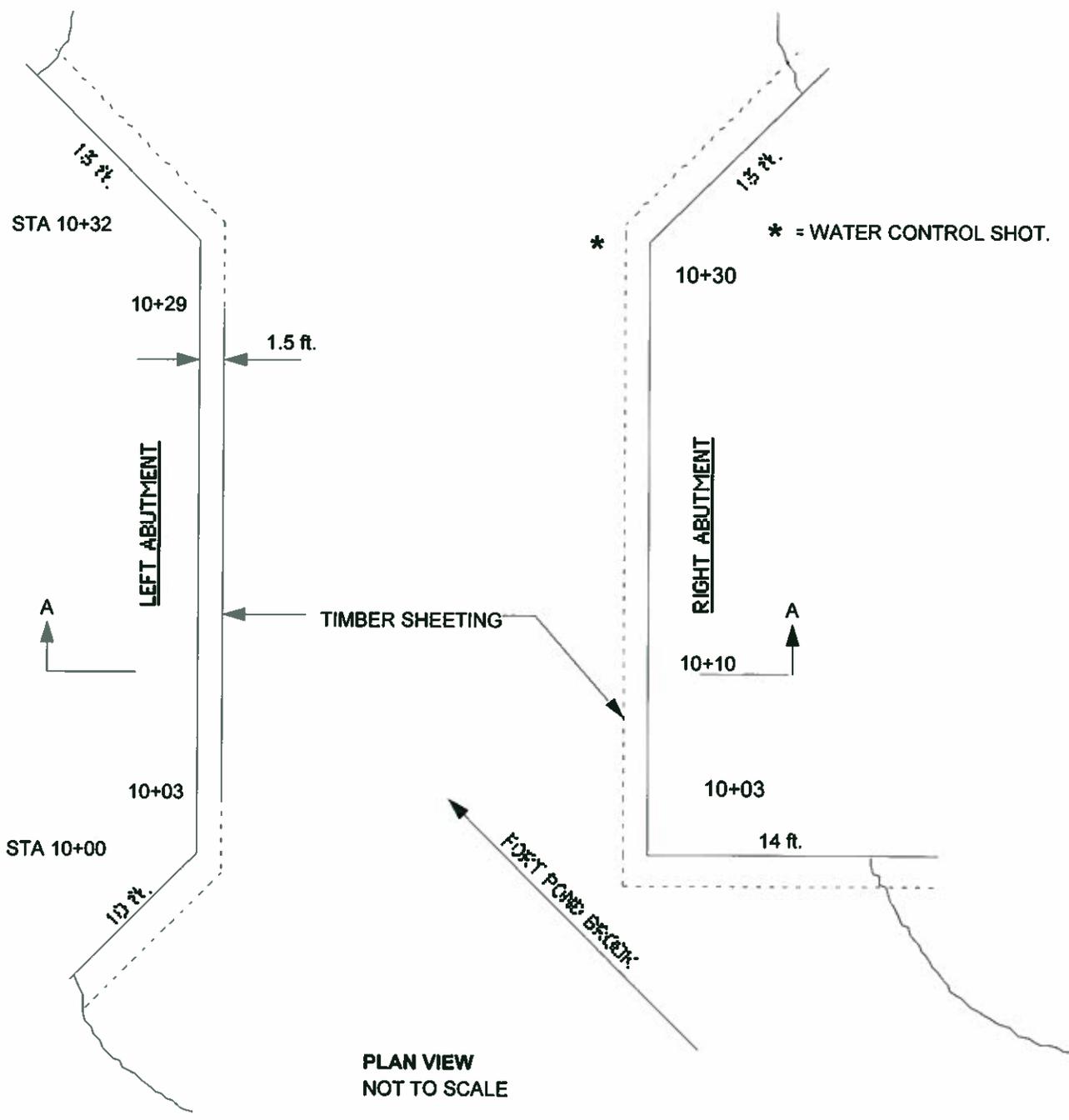
**Sketch / Chart Log**

Sketch 1 : PLAN

Chart 1 : SCOUR MONITORING

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23X</b>	BR. DEPT. NO. <b>A-02-007</b>	8-STRUCTURE NO. <b>A02007-23X-MUN-NBI</b>	INSPECTION DATE <b>MAR 21, 2007</b>
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**SKETCHES**



**Sketch 1: PLAN**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23X</b>	BR. DEPT. NO. <b>A-02-007</b>	8.-STRUCTURE NO. <b>A02007-23X-MUN-NBI</b>	INSPECTION DATE <b>MAR 21, 2007</b>
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## CHARTS

### SCOUR MONITORING CHART @ STA 10+10 SECTION A-A

OFFSETS	4/28/95	4/23/98	4/9/01	4/13/04	3/21/07
LT ABUT(INSIDE SHEETING)	3.0'	3.0'	3.0'	2.5'	2.2
LT ABUT(OUTSIDE SHEETING)	3.6'	3.6'	3.6'	3.6'	3.3
5' OFF LT ABUT	3.3'	3.3'	3.0'	3.6'	3.2
CENTER SPAN	3.3'	3.3'	3.0'	3.6'	2.8
5' OFF RT ABUT	1.6'	3.0'	4.3'	4.1'	2.3
RT ABUT(OUTSIDE SHEETING)	2.3'	2.3'	3.6'	3.1'	-
RT ABUT(INSIDE SHEETING)	1.3'	1.6'	2.3'	1.7'	1.6
Y	4.8'	3.9'	1.9'	3.0'	2.9
CORRECTION	---	-0.9'	-2.8'	-1.8'	-1.9

#### Notes

1. Water control shot (Y) = Waterline to bottom of downstream fascia beam at right abutment.
2. For comparison all soundings are adjusted to 1995 water level.
3. Station 10+00 is located at the upstream end.

**Chart 1: SCOUR MONITORING**

State Information			
BDEPT#	A02007	Agency Br.No.	
Town	Acton		
B.I.N#	23X	AASHTO#	076.0
		FHWA Select List#	Y
Identification			
Structure Number	A0200723XMUNNBI		
(5) Inventory Route	151000000		
(2) State Highway Department District	03		
(3) County Code	017	(4) Place code	00380
(6) Features Intersected	WATER FORT POND BROOK		
(7) Facility Carried	HWY LAWSBROOK RD		
(9) Location	.6MI.S.OF ST.2		
(11) Kilometerpoint	0000.032		
(12) Base Highway Network	N		
(13) LRS Inventory Route & Subroute	000000000000		
(16) Latitude	42 DEG 27 MIN	49.50 SEC	
(17) Longitude	71 DEG 25 MIN	22.60 SEC	
(96) Border Bridge State Code	Share	%	
(99) Border Bridge Structure No. #			
Structure Type and Material			
(43) Structure Type Main:	Concrete	Code	104
Tee Beam	Jointless bridge type:	Not applicable	
(44) Structure Type Appr:	Other	Code	000
(45) Number of spans in main unit	001		
(46) Number of approach spans	0000		
(107) Deck Structure Type -	Concrete Cast-in-Place	Code	1
(106) Wearing Surface / Protective System:			
A) Type of wearing surface -	Bituminous	Code	6
R) Type of membrane -	None	Code	0
Type of deck protection -	None	Code	0
Age and Service			
(27) Year Built	1926		
(106) Year Reconstructed	0000		
(42) Type of Service: On -	Highway		
Under -	Waterway	Code	15
(26) Lanes: On Structure	02	Under structure	00
(29) Average Daily Traffic	003300		
(30) Year of ADT	2006	(109) Truck ADT	06 %
(18) Bypass, detour length	005 KM		
Geometric Data			
(48) Length of maximum span	0007.0 M		
(49) Structure Length	00007.9 M		
(50) Curb or sidewalk:	Left	00.1 M	Right 00.1 M
(51) Bridge Roadway Width Curb to Curb	007.9 M		
(52) Deck Width Out to Out	008.7 M		
(32) Approach Roadway Width (w/shoulders)	007.3 M		
(33) Bridge Median -	No median	Code	0
(34) Skew	00 DEG	(35) Structure Flared	N
(10) Inventory Route MIN Vert Clear	99.99 M		
(47) Inventory Route Total Horiz Clear	07.9 M		
(53) Min Vert Clear Over Bridge Rdwy	99.99 M		
(54) Min Vert Underclear ref	N	00.00 M	
(55) Min Lat Underclear RT ref	N	00.0 M	
(56) Min Lat Underclear LT	00.0 M		
Navigation Data			
(3) Navigation Control -	No navigation control on waterway	Code	0
(4) Pier Protection		Code	
(39) Navigation Vertical Clearance	000.0 M		
(116) Vert-lift Bridge Nav Min Vert Clear	M		
(40) Navigation Horizontal Clearance	0000.0 M		

Classification		Code	
(112) NBIS Bridge Length			Y
(104) Highway System			N
(26) Functional Class -	Urban Collector		17
(100) Defense Highway			0
(101) Parallel Structure			N
(102) Direction of Traffic -	2-way traffic		2
(103) Temporary Structure			N
(105) Federal Lands Highways			0
(110) Designated National Network			N
(20) Toll -	On free road		3
(21) Maintain -	Town Agency		03
(22) Owner -	Town Agency		03
(37) Historical Significance	undetermined		
Condition		Code	
(58) Deck			6
(59) Superstructure			6
(60) Substructure			6
(61) Channel & Channel Protection			6
(62) Culverts			N
Load Rating and Posting		Code	
(31) Design Load -	Other/Unknown		0
(83) Operating Rating Method -	Load Factor (LF)		1
(64) Operating Rating			55.0
(65) Inventory Rating Method -	Load Factor (LF)		1
(66) Inventory Rating			50.0
(70) Bridge Posting			5
(41) Structure -	Open		A
Appraisal		Code	
(67) Structural Evaluation			6
(66) Deck Geometry			3
(69) Underclearances, vert. and horiz.			N
(71) Waterway adequacy			7
(72) Approach Roadway Alignment			6
(36) Traffic Safety Features		0 0 1 0	
(113) Scour Critical Bridges			3
Inspections			
(90) Inspection Date	01/24/06	(91) Frequency	24 MO
(92) Critical Feature Inspection:	(93) CFI DATE		
(A) Fracture Critical Detail	N 00	MO A)	00/00/00
(B) Underwater Inspection	Y 36	MO B)	03/21/07
(C) Other Special Inspection	N 00	MO C)	00/00/00
(*) Other Inspection (Flood)	N 00	MO *)	10/31/05
(*) Closed Bridge	N 00	MO *)	00/00/00
(*) UW Special Inspection	N 00	MO *)	00/00/00
(*) Damage Inspection		MO *)	00/00/00
Rating Loads			
Report Date	12/02/97	H20	Type 3 Type 3S2 Type HS
Operating		35.0	50.0 55.0 56.0
Inventory		25.0	30.0 35.0 0.0
Field Posting			
Status	LEGAL	Posting Date	03/14/63
	2 Axle	3 Axle	5 Axle
Actual			
Recommended			
Missing Signs	N		
Misc.			
Bridge Name			
N Anti-missile fence	N Acrow Panel	N Jointless Bridge	
Freeze/Thaw	N : Not Applicable		
	Accessibility (Needed/Used)		
N / N Liftbucket	N / N Rigging		Inspection
N / N Ladder	N / N Staging		Hours: 006
N / N Boat	N / N Traffic Control		
Y / Y Wader	N / N RR Flagperson		
N / N Inspector 50	N / N Police		

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**ROUTINE ARCH INSPECTION**

2-DIST  
**03**

B.I.N.  
**255**

BR. DEPT. NO.  
**A-02-008**

CITY/TOWN <b>ACTON</b>	8-STRUCTURE NO. <b>A02008-255-MUN-NBI</b>	11-Kilo. POINT <b>001.288</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>DEC 5, 2005</b>
07-FACILITY CARRIED <b>HWY RIVER ST</b>	MEMORIAL NAME/LOCAL NAME	27-YR BUILT <b>1937</b>	106-YR REBUILT <b>0000</b>	YR REHABD (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER FORT POND BROOK</b>	26-FUNCTIONAL CLASS <b>Urban Local</b>	DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Steel Arch - Deck</b>	22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>J. Read</b>	PROJ MGR <b>Transystems</b>
107-DECK TYPE <b>Not applicable</b>	WEATHER <b>Cloudy</b>	TEMP. (air) <b>-5°C</b>	TEAM MEMBERS <b>T. TAYLOR</b>	

<b>ITEM 58</b>	<b>N</b>	
<b>DECK</b>		<i>DEF</i>
1. Wearing surface	7	-
2. Deck Condition	N	-
3. Spandrel Fill	7	-
4. Curbs	6	M-P
5. Median	N	-
6. Sidewalks	N	-
7. Parapets	7	-
8. Railing	7	-
9. Anti Missile Fence	N	-
10. Drainage System	N	-
11. Lighting Standards	N	-
12. Utilities	N	-
13. Deck Joints	N	-
14.	N	-
15.	N	-
16.	N	-

CURB REVEAL (In millimeters)

N	S
0	25

<b>APPROACHES</b>		<i>DEF</i>
a. Appr. pavement condition	7	-
b. Appr. Roadway Settlement	8	-
c. Appr. Sidewalk Settlement	N	-
d. Approach Utilities	H	-

<b>OVERHEAD SIGNS</b> (Attached to bridge)	(Y/N)	<b>N</b>
		<i>DEF</i>
a. Condition of Welds	N	-
b. Condition of Bolts	N	-
c. Condition of Signs	N	-

<b>ITEM 59</b>	<b>7</b>	
<b>SUPERSTRUCTURE</b>		<i>DEF</i>
1. Arch/Arch Ring	7	-
2. Keystone Area	N	-
3. Stringers	N	-
4. Floorbeams	N	-
5. Spandrel Walls	7	-
6. Spring Lines	6	M-P
7. Diaphragms/Cross Frames	N	-
8. Conn Plt's, Gussets & Angles	N	-
9. Pin & Hangers	N	-
10. Masonry Joints	7	-
11. Rivets & Bolts	6	M-P
12. Welds	N	-
13. Deformation/Flattening	7	-
14. Member Alignment	7	-
15. Paint/Coating	7	-
16.	N	-

Year Painted **1990**

COLLISION DAMAGE: Please explain  
 None (  ) Minor ( ) Moderate ( ) Severe ( )

LOAD DEFLECTION: Please explain  
 None (  ) Minor ( ) Moderate ( ) Severe ( )

LOAD VIBRATION: Please explain  
 None (  ) Minor ( ) Moderate ( ) Severe ( )

Any Fracture Critical Member: (Y/N) **N**

Any Cracks: (Y/N) **N**

<b>ITEM 60</b>	<b>7</b>			
<b>SUBSTRUCTURE</b>		<i>DEF</i>		
<b>1. Abutments</b>	Dive	Cur	7	
a. Pedestals	N	N		-
b. Bridge Seats	N	N		-
c. Backwalls	N	N		-
d. Breastwalls	N	7		-
e. Wingwalls	N	6		M-P
f. Slope Paving/Rip-Rap	N	N		-
g. Pointing	N	6		M-P
h. Footings	N	7		-
i. Piles	N	N		-
j. Scour	N	7		-
k. Settlement	N	8		-
l.	N	N		-
m.	N	N		-
<b>2. Piers or Bents</b>			N	
a. Pedestals	N	N		-
b. Caps	N	N		-
c. Columns	N	N		-
d. Stems/Webs/Pierwalls	N	N		-
e. Pointing	N	N		-
f. Footing	N	N		-
g. Piles	N	N		-
h. Scour	N	N		-
i. Settlement	N	N		-
j.	N	N		-
k.	N	N		-
<b>3. Pile Bents</b>			N	
a. Pile Caps	N	N		-
b. Piles	N	N		-
c. Diagonal Bracing	N	N		-
d. Horizontal Bracing	N	N		-
e. Fasteners	N	N		-

UNDERMINING (Y/N) If YES please explain **N**

COLLISION DAMAGE:  
 None (  ) Minor ( ) Moderate ( ) Severe ( )

I-60 (Dive Report): **N** I-60 (This Report): **7**

93B-U/W (DIVE) Insp **00/00/00**

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

CITY/TOWN <b>ACTON</b>	B.I.N. <b>255</b>	BR. DEPT. NO. <b>A-02-008</b>	8.-STRUCTURE NO. <b>A02008-255-MUN-NBI</b>	INSPECTION DATE <b>DEC 5, 2005</b>
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**ITEM 61** 7

**CHANNEL & CHANNEL PROTECTION**

	Dive	Cur	DEF
1. Channel Scour	N	7	-
2. Embankment Erosion	N	7	-
3. Debris	N	7	-
4. Vegetation	N	7	-
5. Utilities	N	N	-
6. Rip-Rap/Slope Protection	N	7	-
7. Aggradation	N	7	-
8. Fender System	N	N	-

**STREAM FLOW VELOCITY:**  
Tidal ( ) High ( ) Moderate (X) Low ( ) None ( )

ITEM 61 (Dive Report):  N  ITEM 61 (This Report)  7

93b-UW INSP. DATE:

**ITEM 36 TRAFFIC SAFETY**

	36	COND	DEF
A. Bridge Railing	0	7	-
B. Transitions	0	0	-
C. Approach Guardrail	1	7	-
D. Approach Guardrail Ends	1	7	-

**WEIGHT POSTING** Not Applicable  X

Actual Posting:  H  3  3S2  Single

Recommended Posting:  N  N  N  N

Waived Date:  EJDMT Date:

Signs in Place (Y=Yes, N=No, NR=NotRequired) Legibility/Visibility

At bridge		Other Advance	
E	W	E	W
[ ]	[ ]	[ ]	[ ]

**CLEARANCE POSTING** Not Applicable  X

Actual Field Measurement:  ft  in  meter

Posted Clearance:  ft  in

Signs in Place (Y=Yes, N=No, NR=NotRequired) Legibility/Visibility

At bridge		Advance	
N	S	N	S
[ ]	[ ]	[ ]	[ ]

**ACCESSIBILITY (Y/N/P)**

	Needed	Used
Lift Bucket	N	N
Ladder	N	N
Boat	N	N
Waders	Y	Y
Inspector 50	N	N
Rigging	N	N
Staging	N	N
Traffic Control	N	N
RR Flagger	N	N
Police	N	N
Other:		
	N	N

**TOTAL HOURS**

**PLANS (Y/N):**

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

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

*List of field tests performed:*

**RATING**

Rating Report (Y/N)  (To be filled out by DBIE)

Date:  Request for Rating or Rerating (Y/N)  If YES please give priority: HIGH ( ) MEDIUM ( ) LOW ( )

**REASON:** \_\_\_\_\_

**CONDITION RATING GUIDE**  
(For Items 58, 59, 60 and 61)

CODE	CONDITION	DEFECTS
N	NOT APPLICABLE	
G 9	EXCELLENT	Excellent condition.
G 8	VERY GOOD	No problem noted.
G 7	GOOD	Some minor problems.
F 6	SATISFACTORY	Structural elements show some minor deterioration.
F 5	FAIR	All primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
P 4	POOR	Advance section loss, deterioration, spalling or scour.
P 3	SERIOUS	Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
C 2	CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C 1	"IMMINENT" FAILURE	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put it back in light service.
0	FAILED	Out of service - beyond corrective action.

**DEFICIENCY REPORTING GUIDE**

**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, 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.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>255</b>	BR. DEPT. NO. <b>A-02-008</b>	8.-STRUCTURE NO. <b>A02008-255-MUN-NBI</b>	INSPECTION DATE <b>DEC 5, 2005</b>
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## REMARKS

### BRIDGE ORIENTATION

River Street travels east and west over the Fort Pond Brook which flows from south to north.

### GENERAL REMARKS

The length of bridge rail and wingwalls does not agree with the 1936 plans. The structure has been rehabilitated but the date of rehabilitation is unknown. The corrugated plate arch is galvanized and the length of bridge rails and parapets is more than 25 ft. longer than the length shown on the plans.

### ITEM 58 - DECK

#### Item 58.4 - Curbs

The curbs consist of beveled mortar which is on top of the spandrel wall cap stone. There are a few spot locations where this mortar has broken off exposing the spandrel wall cap stone primarily on the south side. (See Photo 1.) During the day of inspection the edge of roadway on both sides had a covering of snow that hid the curb area. Where the snow cover was removed and the curb was exposed the condition was observed to be similar to that reported in 2003. Therefore the curb reveals reported in 2003 have been carried forward.

The 1936 record plans for this structure indicate the distance from the bottom of the cap stone (on the masonry bridge rail) to the top of the spandrel wall (base of beveled mortar curb) is 2 ft. - 2 in. This distance could be checked and verified during a future inspection, and then used to monitor the addition of dead load due to future pavement overlays.

#### Item 58.8 - Railing

The bridge rails consist of stone masonry blocks set in mortar. There are spot locations of mortar popouts primarily in the south bridge rail. (See Photo 2.)

### APPROACHES

#### Approaches a - Appr. pavement condition

The west approach pavement has two diagonal transverse cracks in the center of the roadway which are parallel to the arch barrel. There are markings on the pavement which indicate that there may be a utility under the pavement in this area. The east approach pavement has a longitudinal crack in the eastbound travel lane which is parallel to and 5 to 6 ft. north of the south edge of pavement.

#### Approaches d - Approach Utilities

On the west approach pavement, utility paint markings were observed on the approach, west of the stone masonry bridge rail ends. The paint markings indicated that the utility alignment diagonally traversed the roadway from south to north when moving east. No determination could be made as to whether the utility crossed the bridge longitudinally in the spandrel fill above the arch.

### ITEM 59 - SUPERSTRUCTURE

#### Item 59.6 - Spring Lines

On the west side in the center of the barrel there is a bow of 1 to 2 in. above the spring line. The steel seat plate for the corrugated plate arch is rusted at the southeast, southwest and northwest quadrants. (See Photo 3.)

#### Item 59.11 - Rivets & Bolts

There are approximately 5 spot locations of bolt and nut rusting throughout the barrel. In one location there is full section loss of the nut. The rest of the bolts are in good condition.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>255</b>	BR. DEPT. NO. <b>A-02-008</b>	8.-STRUCTURE NO. <b>A02008-255-MUN-NBI</b>	INSPECTION DATE <b>DEC 5, 2005</b>
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**REMARKS****ITEM 60 - SUBSTRUCTURE****Item 60.1.e - Wingwalls**

There is an 8 ft. wide and 4 ft. tall area with missing mortar in the northeast wingwall. The voids in the mortar were found to be approximately 1 ft. deep. (See Photo 4.)

**Item 60.1.g - Pointing**

There is an area in the northeast wingwall where the pointing is missing. See Item 60.1.e - Wingwalls.

**TRAFFIC SAFETY****Item 36b - Transitions**

There are no transitions between the approach guardrail and the stone masonry bridge rail.

**Photo Log**

- Photo 1 : South curb center span.
- Photo 2 : South bridge rail, southeast quadrant.
- Photo 3 : Southwest end of barrel.
- Photo 4 : Northeast wingwall.
- Photo 5 : River Street facing east.
- Photo 6 : North elevation.

CITY/TOWN  
ACTON

B.I.N.  
255

BR. DEPT. NO.  
A-02-008

8-STRUCTURE NO.  
A02008-255-MUN-NBI

INSPECTION DATE  
DEC 5, 2005

PHOTOS



Photo 1: South curb center span.



Photo 2: South bridge rail, southeast quadrant.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>255</b>	BR. DEPT. NO. <b>A-02-008</b>	8.-STRUCTURE NO. <b>A02008-255-MUN-NBI</b>	INSPECTION DATE <b>DEC 5, 2005</b>
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**PHOTOS**



**Photo 3: Southwest end of barrel.**



**Photo 4: Northeast wingwall.**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>255</b>	BR. DEPT. NO. <b>A-02-008</b>	8.-STRUCTURE NO. <b>A02008-255-MUN-NBI</b>	INSPECTION DATE <b>DEC 5, 2005</b>
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**PHOTOS**



**Photo 5: River Street facing east.**



**Photo 6: North elevation.**

Report Date: October 23, 2007

State Information		Classification		Code
BDEPT#= A02008	Agency Br.No.	(112) NBIS Bridge Length		Y
Town= Acton		(104) Highway System		N
B.I.N= 255	AASHTO= 069.7	(26) Functional Class - Urban Local		19
	FHWA Select List= Y	(100) Defense Highway		0
Identification		(101) Parallel Structure		N
(b, c) Structure Number	A02008255MUNNBI	(102) Direction of Traffic - 2-way traffic		2
(5) Inventory Route	151000000	(103) Temporary Structure		N
(2) State Highway Department District	03	(105) Federal Lands Highways		0
(3) County Code 017 (4) Place code	00380	(110) Designated National Network		N
(6) Features Intersected	WATER FORT POND BROOK	(20) Toll - On free road		3
(7) Facility Carried	HWY RIVER ST	(21) Maintain - Town Agency		03
(9) Location	0.9 MI. S.E. OF ST-27	(22) Owner - Town Agency		03
(11) Kilometerpoint	0001.288	(37) Historical Significance not eligible		N
(12) Base Highway Network	N	Condition		Code
(13) LRS Inventory Route & Subroute	000000000000	(58) Deck		N
(16) Latitude	42 DEG 27 MIN 24.73 SEC	(59) Superstructure		7
(17) Longitude	71 DEG 26 MIN 14.01 SEC	(60) Substructure		7
(98) Border Bridge State Code	Share %	(61) Channel & Channel Protection		7
(99) Border Bridge Structure No. #		(62) Culverts		N
Structure Type and Material		Load Rating and Posting		Code
(43) Structure Type Main: Steel	Code 311	(31) Design Load - Other/Unknown		0
Arch - Deck	Jointless bridge type: Not applicable	(63) Operating Rating Method - Allowable Stress (AS)		2
(44) Structure Type Appr:		(64) Operating Rating		31.8
Other	Code 000	(65) Inventory Rating Method - Allowable Stress (AS)		2
(45) Number of spans in main unit	001	(66) Inventory Rating		22.7
(46) Number of approach spans	0000	(70) Bridge Posting		4
(107) Deck Structure Type - Not applicable	Code N	(41) Structure - Open		A
(108) Wearing Surface / Protective System:		Appraisal		Code
A) Type of wearing surface - Not applicable=no deck	Code N	(67) Structural Evaluation		6
B) Type of membrane - Not applicable=no deck	Code N	(68) Deck Geometry		2
C) Type of deck protection - Not applicable=no deck	Code N	(69) Underclearances, vert. and horiz.		N
Age and Service		(71) Waterway adequacy		7
(27) Year Built	1937	(72) Approach Roadway Allgntment		7
(106) Year Reconstructed	0000	(36) Traffic Safety Features	0 0 1 1	
(42) Type of Service: On - Highway		(113) Scour Critical Bridges		8
Under - Waterway	Code 15	Inspections		
(28) Lanes: On Structure 02	Under structure 00	(90) Inspection Date 12/05/05	(91) Frequency 24 MO	
(29) Average Daily Traffic	002000	(92) Critical Feature Inspection:	(93) CFI DATE	
(30) Year of ADT 2005 (109) Truck ADT	02 %	(A) Fracture Critical Detail	N 00 MO A) 00/00/00	
(19) Bypass, detour length	003 KM	(B) Underwater Inspection	N 00 MO B) 07/01/85	
Geometric Data		(C) Other Special Inspection	N 00 MO C) 00/00/00	
(48) Length of maximum span	0007.0 M	(*) Other Inspection ()	N 00 MO *) 00/00/00	
(49) Structure Length	00015.8 M	(*) Closed Bridge	N 00 MO *) 00/00/00	
(50) Curb or sidewalk: Left 00.0 M Right 00.0 M		(*) UW Special Inspection	N 00 MO *) 00/00/00	
(51) Bridge Roadway Width Curb to Curb	006.2 M	(*) Damage Inspection	MO *) 00/00/00	
(52) Deck Width Out to Out	007.6 M	Rating Loads		
(32) Approach Roadway Width (w/shoulders)	005.8 M	Report Date 12/01/91	H20 Type 3 Type 3S2 Type HS	
(33) Bridge Median - No median	Code 0	Operating	28.0 32.0 50.0 0.0	
(34) Skew 30 DEG (35) Structure Flared	N	Inventory	20.0 23.0 36.0 0.0	
(10) Inventory Route MIN Vert Clear	99.99 M	Field Posting		
(47) Inventory Route Total Horiz Clear	06.2 M	Status LEGAL	Posting Date 11/03/82	
(53) Min Vert Clear Over Bridge Rdwy	99.99 M	Actual	2 Axle 3 Axle 5 Axle	
(54) Min Vert Underclear ref N	00.00 M	Recommended		
(55) Min Lat Underclear RT ref N	00.0 M	Missing Signs N		
(56) Min Lat Underclear LT	00.0 M	Misc.		
Navigation Data		Bridge Name	N Anti-missile fence N Acrow Panel N Jointless Bridge	
(3) Navigation Control - No navigation control on waterway	Code 0	Freeze/Thaw	N : Not Applicable	
(1) Pier Protection	Code	Accessibility (Needed/Used)		
(39) Navigation Vertical Clearance	000.0 M	N / N Liftbucket	N / N Rigging	Inspection
(116) Vert-lift Bridge Nev Min Vert Clear	M	N / N Ladder	N / N Staging	Hours: 004
(40) Navigation Horizontal Clearance	0000.0 M	N / N Boat	N / N Traffic Control	
		Y / Y Wader	N / N RR Flagperson	
		N / N Inspector 50	N / N Police	

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**CULVERT INSPECTION**

2-DIST  
**03**

B.I.N.  
**23Y**

BR. DEPT. NO.  
**A-02-009**

CITY/TOWN <b>ACTON</b>	8-STRUCTURE NO. <b>A02009-23Y-MUN-NBI</b>	11-Kilo. POINT <b>000.354</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>DEC 5, 2005</b>
07-FACILITY CARRIED <b>HWY BROOK ST</b>	MEMORIAL NAME/LOCAL NAME	27-YR BUILT <b>1938</b>	106-YR REBUILT <b>0000</b>	YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER NASHOBA BROOK</b>	26-FUNCTIONAL CLASS <b>Urban Collector</b>	DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Steel Arch - Deck</b>	22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>J. Read</b>	PROJ MGR <b>Transystems</b>
107-DECK TYPE <b>Not applicable</b>	WEATHER <b>Cloudy</b>	TEMP. (air) <b>-5°C</b>	TEAM MEMBERS <b>T. TAYLOR</b>	

<b>TYPE OF CULVERT:</b>	<b>BARRELS:</b> (In Meters)
SHAPE: <b>BARREL</b>	SIZE: <b>3.30m x 2.20m</b> NUMBER: <b>2</b>
MATERIAL: <b>CORRUGATED STEEL</b>	DEPTH OF COVER (To the nearest tenth of a meter)
COATING: <b>ASPHALTIC</b>	N <b>0.6</b> S <b>0.6</b>
	CURB REVEAL (In millimeters) <b>75 75</b>

**ITEM 62 CULVERT & RETAINING WALLS** 6 162 (Dive Report): 6 162 (This Report): 7

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF	
1. Roof	N	7	-	7. Protective Coating	7	7	-	13. Member Alignment	N	7	-	UNDERMINING (Y/N) If YES please explain <b>N</b>
2. Floor	7	7	-	8. Embankment	7	7	-	14. Deformation	8	7	-	
3. Walls	N	7	-	9. Wearing Surface	N	7	-	15. Scour	7	7	-	COLLISION DAMAGE: <u>Please explain</u> None (X) Minor ( ) Moderate ( ) Severe ( )
4. Headwall	6	6	M-P	10. Railing	N	6	M-P	16. Settlement	7	7	-	
5. Wingwall	N	7	-	11. Sidewalks	N	6	M-P	17.				LOAD VIBRATION: <u>Please explain</u> None (X) Minor ( ) Moderate ( ) Severe ( )
6. Pipe	7	7	-	12. Utilities	N	N	-	18.				

**ITEM 61 CHANNEL & CHANNEL PROTECTION** 7

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF
1. Channel Scour	7	7	-	5. Utilities	N	N	-
2. Embankment Erosion	7	7	-	6. Rip-Rap/Slope Protection	7	N	-
3. Debris	7	7	-	7. Aggradation	8	7	-
4. Vegetation	7	7	-				

STREAM FLOW VELOCITY: Tidal ( ) High ( ) Moderate ( ) Low (X)

ITEM 61 (Dive Report): **7**  
 ITEM 61 (This Report): **7**

93b- U/W INSP DATE: **06/11/2004**

APPROACH CONDITION		DEF
a. Appr. pavement condition	<b>7</b>	-
b. Appr. Roadway Settlement	<b>7</b>	-
c. Appr. Sidewalk Settlement	<b>N</b>	-
d.		

**WEIGHT POSTING**

Actual Posting:  Not Applicable

H	3	3S2	Single
N	N	N	N
N	N	N	N

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

At bridge		Advance	
E	W	E	W

Waived Date: **00/00/00** EJDMT Date: **12/17/1987**

**ITEM 36 TRAFFIC SAFETY**

	36	COND	DEF
A. Bridge Railing	0	6	M-P
B. Transitions	0	0	-
C. Approach Guardrail	1	7	-
D. Approach Guardrail Ends	1	7	-

**ACCESSIBILITY (Y/N/P):**

	Needed	Used	Other:	Needed	Used
Ladder	N	N			
Boat	N	N		N	N
Waders	Y	Y			

TOTAL HOURS: **4**

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

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

TAPE#:

**RATING**

Request for Rating or Rerating (Y/N) **N** If YES please give priority: HIGH ( ) MEDIUM ( ) LOW ( )

Rating Report (Y/N) **Y**

Date: **12/01/1987**

REASON:

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

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23Y</b>	BR. DEPT. NO. <b>A-02-009</b>	8.-STRUCTURE NO. <b>A02009-23Y-MUN-NBI</b>	INSPECTION DATE <b>DEC 5, 2005</b>
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### REMARKS, PHOTOS & SKETCHES

#### **BRIDGE ORIENTATION**

Brook Street travels east and west over the Nashoba Brook which flows from north to south. The culvert barrels are numbered from west to east.

#### **GENERAL REMARKS**

There was a 1 in. snowfall on the night before the inspection which obscured the condition of the top of capstone and the sidewalk. Spot areas were cleaned off and inspected and based on these small areas the condition ratings from the previous report were continued to this report.

#### **ITEM 62 - CULVERT**

##### **Item 62.4 - Headwall**

The north headwall has two areas where the mortar between the masonry blocks is missing. The first area is located at 10:00 o'clock facing south on culvert 1 and measures 26 in. wide and 26 in. tall. The second is at 2:00 o'clock facing south on culvert 2 and measures 24 in. wide and 40 in. tall. The voids in these two areas were up to 1 ft. deep. (See Photo 3.) There is a hairline to narrow crack in the mortar joints between the stones located in the center between the culverts extending vertically from the cap stone to the first area mentioned above. There is an area with efflorescence staining extending from the west headwall end to above the center of culvert 1 from the street level down.

The south headwall has an area of masonry blocks with missing mortar located at 2:30 o'clock facing north on culvert 1. The voids in this area were measured to be up to 9 in. deep. There is another area of missing mortar between the masonry blocks located at 2:30 o'clock facing south on culvert 2. The voids in this area

### CONDITION RATING GUIDE

CODE	CONDITION	DEFECTS
N	NOT APPLICABLE	Use if structure is not a culvert.
G 9	EXCELLENT	No deficiencies.
G 8	VERY GOOD	No noticeable or noteworthy differences which affect the condition of the culvert. Insignificant scrape marks caused by drift.
G 7	GOOD	Shrinkage cracks, light scaling, and insignificant spalling, which does not expose reinforcing steel. Insignificant damage caused by drift with not misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and no pitting.
F 6	SATISFACTORY	Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.
F 5	FAIR	Moderate to major deterioration, or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.
P 4	POOR	Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joints permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting.
P 3	SERIOUS	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls, nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls, or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations.
C 2	CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C 1	"IMMINENT" FAILURE	Bridge closed. Corrective action may put back in light service.
0	FAILED	Bridge closed. Replacement necessary.

### DEFICIENCY REPORTING GUIDE

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

#### **CATEGORIES OF DEFICIENCIES:**

**M= Minor Deficiency** - (Examples include but are not limited to: Spalled concrete, minor to moderate corrosion to steel culverts, minor settlement or misalignment, minor scouring, minor damage to guardrail, etc.)

**S= Severe/Major Deficiency** - (Examples include but are not limited to: Large spalls, wide cracks, moderate to major deterioration in concrete, considerable settlement, considerable scouring or undermining, extensive corrosion and deflection in steel culverts, etc.)

**C-S= Critical Deficiency** - A deficiency in a structural component or element of a bridge that poses an extreme hazard or unsafe condition to the public. (Follow-up Critical Deficiency Report must be submitted separately)

#### **URGENCY OF REPAIR:**

**I = Immediate** - [Inspector(s) stay at the bridge until the District Maintenance crew or the responsible Agency crew (if not a State bridge) show up and corrective action is taken.]

**A = ASAP** - [Action will be taken by the District Maintenance Engineer or the Responsible Agency (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].

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23Y</b>	BR. DEPT. NO. <b>A-02-009</b>	8-STRUCTURE NO. <b>A02009-23Y-MUN-NBI</b>	INSPECTION DATE <b>DEC 5, 2005</b>
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### REMARKS

#### Item 62.4 - Headwall (Cont'd)

were measured to be up to 30 in. deep. There are areas of hairline surface efflorescence in the mortar joints below the street surface in the south headwall primarily on the east side of culvert 2. There is a wide crack in the mortar joints located above culvert 1 and extending vertically from the cap stone to the keystone area. (See Photo 4.)

#### Item 62.6 - Pipe

The asphalt coating is cracked and the steel is rusting in a few spot locations above the waterline and there is rusting at the water level. There are spot locations of delaminating rust in both culverts at the ends just above the waterline.

#### Item 62.7 - Protective Coating

See Item 62.6 Pipe.

#### Item 62.9 - Wearing Surface

The wearing surface has moderate transverse and longitudinal wide cracking primarily in the eastbound travel lane.

#### Item 62.10 - Railing

The north and south bridge rails are made up of random laid up stone mortar with a stone cap. The mortar condition is good. Both have vertical and horizontal cracks in the mortar joints. The cracks are typically 1/8 to 1/4 in. in width. (See Photo 1.) The south bridge rail has a 1 in. wide crack located 16 ft. east of the west end. (See Photo 2.) No through cracks in stones were observed adjacent to or part of the vertical or horizontal cracks. The cap stone in each quadrant is losing mortar at the ends of the headwalls. Some of the cap stone joints are open.

#### TRAFFIC SAFETY

#### Item 36b - Transitions

There are no transitions.

#### Photo Log

- Photo 1 : Northeast bridge rail.
- Photo 2 : South bridge rail center span.
- Photo 3 : North headwall.
- Photo 4 : South end of culvert 1.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23Y</b>	BR. DEPT. NO. <b>A-02-009</b>	8.-STRUCTURE NO. <b>A02009-23Y-MUN-NBI</b>	INSPECTION DATE <b>DEC 5, 2005</b>
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**PHOTOS**



**Photo 1: Northeast bridge rail.**



**Photo 2: South bridge rail center span.**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23Y</b>	BR. DEPT. NO. <b>A-02-009</b>	8.-STRUCTURE NO. <b>A02009-23Y-MUN-NBI</b>	INSPECTION DATE <b>DEC 5, 2005</b>
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**PHOTOS**



**Photo 3: North headwall.**



**Photo 4: South end of culvert 1.**

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**UNDERWATER OPERATIONS TEAM**  
**ROUTINE UNDERWATER INSPECTION REPORT**

2-DIST  
**03**

B.I.N.  
**23Y**

BR. DEPT. NO.  
**A-02-009**

CITY/TOWN <b>ACTON</b>		8-STRUCTURE NO. <b>A02009-23Y-MUN-NBI</b>		LEVEL OF INSPECTION <b>II</b>	93B-DATE INSPECTED <b>APR 25, 2007</b>
07-FACILITY CARRIED <b>HWY BROOK ST</b>		ACCESS TO BRIDGE <b>EMBANKMENT</b>		UNDERWATER OPERATIONS ENGINEER <b>JOHN B. DESMOND</b>	
06-FEATURES INTERSECTED <b>WATER NASHOBA BROOK</b>		DEPTH <b>1.3 m</b>	VISIBILITY <b>1 m</b>	TEAM LEADER (DIVE MASTER) <b>SHARON A. BEGLEY</b>	Report submitted by:
BOTTOM CONDITION <b>GRAVEL</b>		CURRENT <b>MODERATE</b>	TEAM MEMBERS <b>E. P. TERNSKY</b>		

ITEM 60		N	DEF
<b>SUBSTRUCTURE</b>			
<b>1. Abutments</b>	N		
a. Pedestals	N	-	
b. Bridge Seats	N	-	
c. Backwalls	N	-	
d. Breastwalls	N	-	
e. Wingwalls	N	-	
f. Slope Paving/Rip-Rap	N	-	
g. Pointing	N	-	
h. Footings	N	-	
i. Piles	N	-	
j. Scour	N	-	
k. Settlement	N	-	
l.	N	-	
<b>2. Piers or Bents</b>	N		
a. Pedestals	N	-	
b. Caps	N	-	
c. Columns	N	-	
d. Stems/Webs/Pierwalls	N	-	
e. Pointing	N	-	
f. Footing	N	-	
g. Piles	N	-	
h. Scour	N	-	
i. Settlement	N	-	
j.	N	-	
k.	N	-	
<b>3. Pile Bents</b>	N		
a. Pile Caps	N	-	
b. Piles	N	-	
c. Diagonal Bracing	N	-	
d. Horizontal Bracing	N	-	
e. Fasteners	N	-	
UNDERMINING (Y/N)		N	

ITEM 61		7	DEF
<b>CHANNEL &amp; CHANNEL PROTECTION</b>			
1. Channel Scour	7	-	
2. Embankment Erosion	7	-	
3. Debris	7	-	
4. Vegetation	7	-	
5. Utilities	N	-	
6. Rip-Rap/Slope Protection	H	-	
7. Aggradation	8	-	
8. Fender System	N	-	
a. Piles	N	-	
b. Diagonal Bracing	N	-	
c. Horizontal Bracing	N	-	
d. Wales	N	-	
e. Fasteners	N	-	
f. Ladders	N	-	
9.	N	-	
<b>ITEM 59 SUPERSTRUCTURE</b>			
	N	-	
	N	-	
	N	-	
UNDERMINING (Y/N)			N

ITEM 62		6	DEF
<b>CULVERTS</b>			
1. Roof	N	-	
2. Floor	7	-	
3. Walls	N	-	
4. Headwall	6	-	
5. Wingwall	N	-	
6. Pipe	7	-	
7. Protective Coating	7	-	
8. Embankment	7	-	
9. Wearing Surface	N	-	
10. Railing	N	-	
11. Sidewalks	N	-	
12. Utilities	N	-	
13. Member Alignment	N	-	
14. Deformation	8	-	
15. Scour	7	-	
16. Settlement	7	-	
17.	N	-	
18.	N	-	
UNDERMINING (Y/N)			N

**DEFICIENCY REPORTING GUIDE**

**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 scouring, 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 corroding rebars, Deteriorated timber piles, Considerable settlement, Considerable scouring or undermining, 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: Any part of piles or fender system which are projecting outward and may become a safety hazard for the navigational traffic, 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.]

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23Y</b>	BR. DEPT. NO. <b>A-02-009</b>	8.-STRUCTURE NO. <b>A02009-23Y-MUN-NBI</b>	INSPECTION DATE <b>APR 25, 2007</b>
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## REMARKS

### GENERAL REMARKS

- 1) Orientation - Abutments are labeled left and right when facing downstream.
- 2) Sta 10+00 is at the upstream end.
- 3) This structure is a double barrel ACCM culvert.

### ITEM 61 - CHANNEL AND CHANNEL PROTECTION

#### Item 61.6 - Rip-Rap/Slope Protection

There is a small retaining wall located at upstream right with several voids from missing stones.

### ITEM 62 - CULVERT

#### Item 62.2 - Floor

Floors consist of two layers, one each of concrete and bituminous and were mostly visible with small amounts of gravel covering.

#### Item 62.4 - Headwall

Headwall is dry laid below waterline with random missing chinking stones and small voids. See sketch.

#### Item 62.6 - Pipe

Twin ACCM pipes are in generally good condition with several small areas of minor corrosion where coating has deteriorated away .

#### Item 62.7 - Protective Coating

There are several small areas where coating has deteriorated away exposing metal pipes.

#### Item 62.15 - Scour

The river bed covers the invert of the pipe ends resulting in no exposure. There are several voids between pipes and walls at each end. See sketch for locations and dimensions.

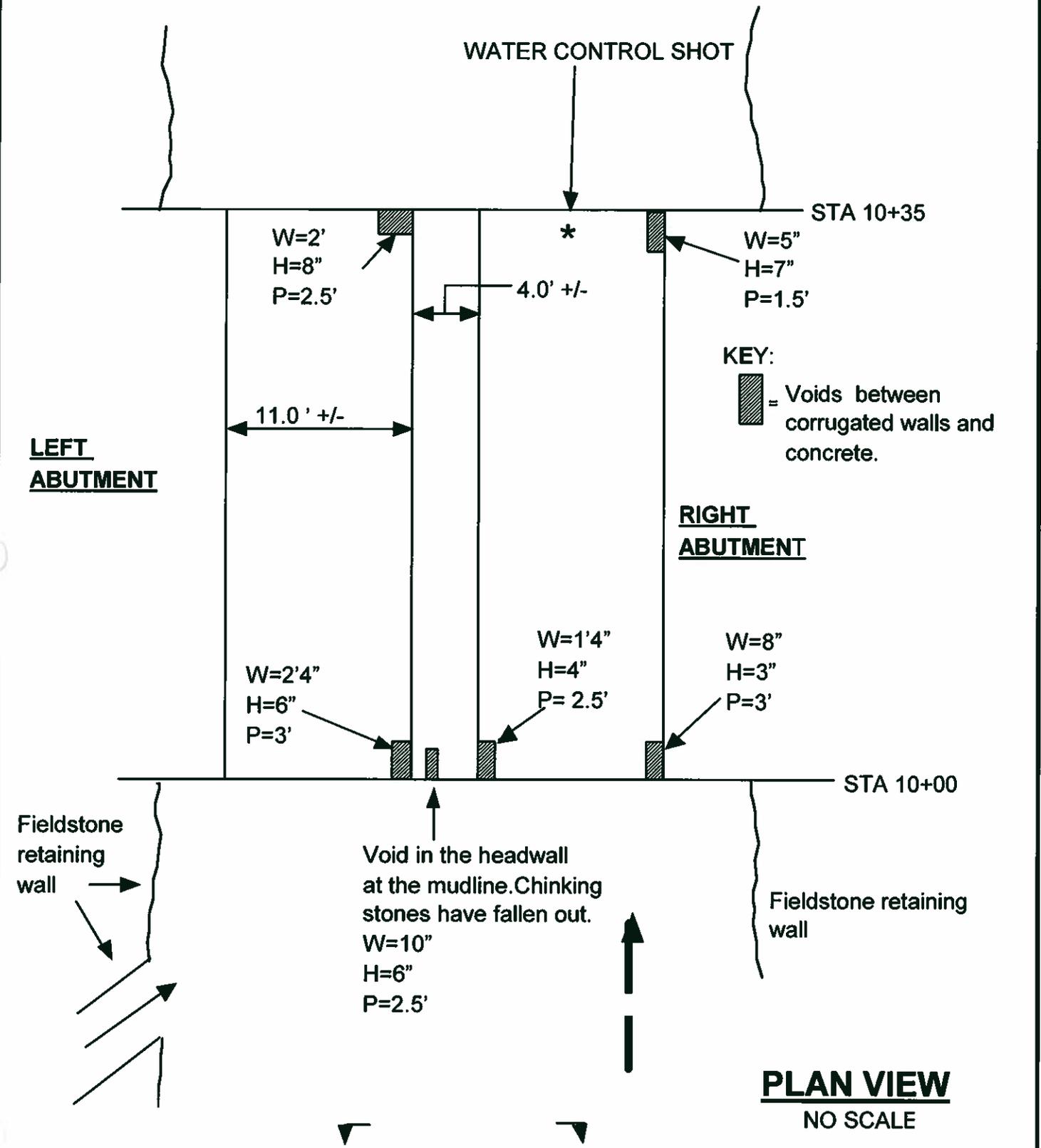
#### Sketch / Chart Log

Sketch 1 : PLAN VIEW

Chart 1 : SCOUR MONITORING

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23Y</b>	BR. DEPT. NO. <b>A-02-009</b>	8.-STRUCTURE NO. <b>A02009-23Y-MUN-NBI</b>	INSPECTION DATE <b>APR 25, 2007</b>
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**SKETCHES**



**PLAN VIEW**  
NO SCALE

Sketch 1: PLAN VIEW

CITY/TOWN <b>ACTON</b>	B.I.N. <b>23Y</b>	BR. DEPT. NO. <b>A-02-009</b>	8.-STRUCTURE NO. <b>A02009-23Y-MUN-NBI</b>	INSPECTION DATE <b>APR 25, 2007</b>
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## CHARTS

### SCOUR MONITORING CHART

OFFSETS	6/22/95	7/28/98	7/5/01	6/11/04	4/25/07	
UPSTREAM LEFT CENTER OF SPAN	2.0	2.0	2.0	2.1	2.1	
UPSTREAM RIGHT CENTER OF SPAN	1.8	2.0	2.0	1.9	1.9	
DOWNSTREAM RIGHT CENTER OF SPAN	2.0 1.8					
DOWNSTREAM LEFT CENTER OF SPAN	1.2 1.5					
Y	4.5	4.4	2.3	3.4	2.8	
CORRECTION	-	-0.1	-2.2	-1.1	-1.7	

#### Notes

1. All soundings and measurements in english.
2. Water control shot (Y) = Waterline to apex of downstream right pipe.
3. For comparison all soundings are adjusted to 1995 water level.
4. Station 1+00 is located at the upstream end.

Chart 1: SCOUR MONITORING

Report Date: October 23, 2007

State Information		Agency Br.No.		Classification		Code	
BDEPT#	A02009			(112) NBIS Bridge Length			Y
Town	Acton			(104) Highway System			N
B.I.N.	23Y	AASHTO=	079.2	(28) Functional Class -	Urban Collector		17
		FHWA Select List=	Y	(100) Defense Highway			0
Structure Number	A0200923YMUNNBI			(101) Parallel Structure			N
(5) Inventory Route	151000000			(102) Direction of Traffic -	2-way traffic		2
(2) State Highway Department District	03			(103) Temporary Structure			N
(3) County Code	017	(4) Place code	00380	(105) Federal Lands Highways			0
(6) Features Intersected	WATER NASHOBA BROOK			(110) Designated National Network			N
(7) Facility Carried	HWY BROOK ST			(20) Toll -	On free road		3
(9) Location	.25 MI. W OF RTE. 2A			(21) Maintain -	Town Agency		03
(11) Kilometerpoint	0000.354			(22) Owner -	Town Agency		03
(12) Base Highway Network	N			(37) Historical Significance	undetermined		
(13) LRS Inventory Route & Subroute	000000000000			Condition			Code
(16) Latitude	42 DEG 29 MIN 36.34 SEC			(58) Deck			N
(17) Longitude	71 DEG 25 MIN 15.25 SEC			(59) Superstructure			N
(98) Border Bridge State Code	Share	%		(80) Substructure			N
(99) Border Bridge Structure No. #				(81) Channel & Channel Protection			7
				(82) Culverts			8
Structure Type and Material				Load Rating and Posting		Code	
(43) Structure Type Main:	Steel	Code	319	(31) Design Load -	Other/Unknown		0
Culvert	Jointless bridge type:		Not applicable	(63) Operating Rating Method -	Allowable Stress (AS)		2
(44) Structure Type Appr:				(64) Operating Rating			44.1
Other		Code	000	(85) Inventory Rating Method -	Allowable Stress (AS)		2
(45) Number of spans in main unit			002	(88) Inventory Rating			32.4
(46) Number of approach spans			0000	(70) Bridge Posting			5
(107) Deck Structure Type -	Not applicable	Code	N	(41) Structure -	Open		A
(108) Wearing Surface / Protective System:				Appraisal			Code
A) Type of wearing surface -	Not applicable=no deck	Code	N	(87) Structural Evaluation			8
B) Type of membrane -	Not applicable=no deck	Code	N	(88) Deck Geometry			2
Type of deck protection -	Not applicable=no deck	Code	N	(89) Underclearances, vert. and horiz.			N
				(71) Waterway adequacy			7
Age and Service				(72) Approach Roadway Alignment			7
(27) Year Built			1938	(36) Traffic Safety Features		0 0 1 1	
(106) Year Reconstructed			0000	(113) Scour Critical Bridges			8
(42) Type of Service: On -	Highway-Ped			Inspections			
Under -	Waterway	Code	55	(90) Inspection Date	12/05/05	(91) Frequency	24 MO
(28) Lanes: On Structure	02	Under structure	00	(92) Critical Feature Inspection:		(93) CFI DATE	
(29) Average Daily Traffic			006500	(A) Fracture Critical Detail	N 00	MO A)	00/00/00
(30) Year of ADT	2005	(109) Truck ADT	08 %	(B) Underwater Inspection	Y 38	MO B)	04/25/07
(19) Bypass, detour length			002 KM	(C) Other Special Inspection	N 00	MO C)	00/00/00
Geometric Data				(*) Other Inspection ()	N 00	MO *)	00/00/00
(48) Length of maximum span			0003.4 M	(*) Closed Bridge	N 00	MO *)	00/00/00
(49) Structure Length			00007.9 M	(*) UW Special Inspection	N 00	MO *)	00/00/00
(50) Curb or sidewalk:	Left 00.7 M	Right	00.9 M	(*) Damage Inspection		MO *)	00/00/00
(51) Bridge Roadway Width Curb to Curb			009.2 M	Rating Loads			
(52) Deck Width Out to Out			010.9 M	Report Date	12/01/87	H20	Type 3 Type 3S2 Type HS
(32) Approach Roadway Width (w/shoulders)			007.9 M	Operating		27.0	34.0 49.0 49.0
(33) Bridge Median -	No median	Code	0	Inventory		20.0	25.0 36.0 36.0
(34) Skew	00 DEG	(35) Structure Flared	N	Field Posting			
(10) Inventory Route MIN Vert Clear			99.99 M	Status	EJDMNT	Posting Date	12/17/87
(47) Inventory Route Total Horiz Clear			08.2 M		2 Axle		3 Axle 5 Axle
(53) Min Vert Clear Over Bridge Rdwy			99.99 M	Actual			
(54) Min Vert Underclear ref	N		00.00 M	Recommended			
(55) Min Lat Underclear RT ref	N		00.0 M	Missing Signs	N		
(56) Min Lat Underclear LT			00.0 M	Misc.			
Navigation Data				Bridge Name			
(7) Navigation Control -	No navigation control on waterway	Code	0	N	Anti-missile fence	N	Acrow Panel N Jointless Bridge
Water Protection		Code		Freeze/Thaw	N	Not Applicable	
(39) Navigation Vertical Clearance			000.0 M	Accessibility (Needed/Used)			
(118) Vert-lift Bridge Nav Min Vert Clear			M	N / N	Liftbucket	N / N	Rigging Inspection
(40) Navigation Horizontal Clearance			0000.0 M	N / N	Ladder	N / N	Staging Hours: 004
				N / N	Boat	N / N	Traffic Control
				Y / Y	Wader	N / N	RR Flagperson
				N / N	Inspector 50	N / N	Police

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**ROUTINE ARCH INSPECTION**

2-DIST  
**03**

B.I.N.  
**256**

BR. DEPT. NO.  
**A-02-010**

CITY/TOWN <b>ACTON</b>	8-STRUCTURE NO. <b>A02010-256-MUN-NBI</b>	11-Kilo. POINT <b>000.241</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>JAN 4, 2006</b>
07-FACILITY CARRIED <b>HWY PARKER ST</b>	MEMORIAL NAME/LOCAL NAME	27-YR BUILT <b>1938</b>	106-YR REBUILT <b>0000</b>	YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER FORT POND BROOK</b>	26-FUNCTIONAL CLASS <b>Urban Collector</b>	DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Steel Arch - Deck</b>	22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>S. A. Begley</b>	
107-DECK TYPE <b>Not applicable</b>	WEATHER <b>Clear</b>	TEMP. (air) <b>1°C</b>	TEAM MEMBERS <b>L. A. GAUTHIER</b>	

<b>ITEM 58</b>	<b>N</b>	
<b>DECK</b>		<i>DEF</i>
1. Wearing surface	7	-
2. Deck Condition	N	-
3. Spandrel Fill	7	-
4. Curbs	6	M-P
5. Median	N	-
6. Sidewalks	N	-
7. Parapets	5	M-P
8. Railing	7	M-P
9. Anti Missile Fence	N	-
10. Drainage System	N	-
11. Lighting Standards	N	-
12. Utilities	N	-
13. Deck Joints	N	-
14.	N	-
15.	N	-
16.	N	-

**CURB REVEAL**  
(In millimeters)

<b>E</b>	<b>W</b>
50	125

<b>APPROACHES</b>		<i>DEF</i>
a. Appr. pavement condition	7	-
b. Appr. Roadway Settlement	7	-
c. Appr. Sidewalk Settlement	N	-
d.	N	-

<b>OVERHEAD SIGNS</b> (Attached to bridge)	(Y/N)	<b>N</b>
		<i>DEF</i>
a. Condition of Welds	N	-
b. Condition of Bolts	N	-
c. Condition of Signs	N	-

<b>ITEM 59</b>	<b>5</b>	
<b>SUPERSTRUCTURE</b>		<i>DEF</i>
1. Arch/Arch Ring	6	M-P
2. Keystone Area	5	S-P
3. Stringers	6	M-P
4. Floorbeams	N	-
5. Spandrel Walls	5	M-P
6. Spring Lines	6	M-P
7. Diaphragms/Cross Frames	N	-
8. Conn Plt's, Gussets & Angles	N	-
9. Pin & Hangers	N	-
10. Masonry Joints	5	M-P
11. Rivets & Bolts	7	M-P
12. Welds	N	-
13. Deformation/Flattening	7	-
14. Member Alignment	7	-
15. Paint/Coating	5	S-P
16.	N	-

**Year Painted** **N**

**COLLISION DAMAGE:** *Please explain*  
 None (  ) Minor (  ) Moderate (  ) Severe (  )

**LOAD DEFLECTION:** *Please explain*  
 None (  ) Minor (  ) Moderate (  ) Severe (  )

**LOAD VIBRATION:** *Please explain*  
 None (  ) Minor (  ) Moderate (  ) Severe (  )

**Any Fracture Critical Member:** (Y/N) **N**

**Any Cracks:** (Y/N) **N**

<b>ITEM 60</b>	<b>5</b>	
<b>SUBSTRUCTURE</b>		<i>DEF</i>
<b>1. Abutments</b>	Dive	Cur
a. Pedestals	N	N
b. Bridge Seats	N	N
c. Backwalls	N	N
d. Breastwalls	N	6
e. Wingwalls	N	5
f. Slope Paving/Rip-Rap	N	N
g. Pointing	N	5
h. Footings	N	N
i. Piles	N	N
j. Scour	N	7
k. Settlement	N	5
l.	N	N
m.	N	N
<b>2. Piers or Bents</b>	N	
a. Pedestals	N	N
b. Caps	N	N
c. Columns	N	N
d. Stems/Webs/Pierwalls	N	N
e. Pointing	N	N
f. Footing	N	N
g. Piles	N	N
h. Scour	N	N
i. Settlement	N	N
j.	N	N
k.	N	N
<b>3. Pile Bents</b>	N	
a. Pile Caps	N	N
b. Piles	N	N
c. Diagonal Bracing	N	N
d. Horizontal Bracing	N	N
e. Fasteners	N	N

**UNDERMINING (Y/N)** If YES please explain **N**

**COLLISION DAMAGE:**  
 None (  ) Minor (  ) Moderate (  ) Severe (  )

I-60 (Dive Report): **N** I-60 (This Report): **5**

**93B-U/W (DIVE) Insp** **00/00/00**

X=UNKNOWN

N=NOT APPLICABLE

H=HIDDEN/INACCESSIBLE

R=REMOVED

CITY/TOWN <b>ACTON</b>	B.I.N. <b>256</b>	BR. DEPT. NO. <b>A-02-010</b>	8.-STRUCTURE NO. <b>A02010-256-MUN-NBI</b>	INSPECTION DATE <b>JAN 4, 2006</b>
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<b>ITEM 61</b>	<b>6</b>	<b>CHANNEL &amp; CHANNEL PROTECTION</b>	
	Dive Cur DEF		
1. Channel Scour	N 7	-	
2. Embankment Erosion	N 8	M-P	
3. Debris	N 7	-	
4. Vegetation	N 6	M-P	
5. Utilities	N N	-	
6. Rip-Rap/Slope Protection	N 7	-	
7. Aggradation	N 7	-	
8. Fender System	N N	-	

**STREAM FLOW VELOCITY:**  
Tidal ( ) High ( ) Moderate (  ) Low ( ) None ( )

ITEM 61 (Dive Report):  N ITEM 61 (This Report)  6

93b-UW INSP. DATE:

<b>ITEM 36 TRAFFIC SAFETY</b>			
	36	COND	DEF
A. Bridge Railing	0	7	M-P
B. Transitions	0	7	M-P
C. Approach Guardrail	1	7	-
D. Approach Guardrail Ends	1	6	M-P

**WEIGHT POSTING** Not Applicable  X

H 3 3S2 Single

Actual Posting:  N  N  N  N

Recommended Posting:  N  N  N  N

Waived Date:  EJDMT Date:

Signs in Place (Y=Yes, N=No, NR=NotRequired) Legibility/Visibility

At bridge		Other Advance	
N	S	N	S
[ ]	[ ]	[ ]	[ ]

**CLEARANCE POSTING**

Not Applicable

Actual Field Measurement:  ft  in

Posted Clearance:  ft  in

Signs in Place (Y=Yes, N=No, NR=NotRequired) Legibility/Visibility

At bridge		Advance	
E	W	E	W
[ ]	[ ]	[ ]	[ ]

<b>ACCESSIBILITY (Y/N/P)</b>	
	Needed Used
Lift Bucket	N N
Ladder	N N
Boat	N N
Waders	Y Y
Inspector 50	N N
Rigging	N N
Staging	N N
Traffic Control	N N
RR Flagger	N N
Police	N N
Other:	N N

**TOTAL HOURS**

**PLANS (Y/N):**

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

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

*List of field tests performed:*

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

(To be filled out by DBIE)  
Request for Rating or Rerating (Y/N)   
**REASON:** \_\_\_\_\_

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

**CONDITION RATING GUIDE**  
(For Items 58, 59, 80 and 61)

CODE	CONDITION	DEFECTS
N	NOT APPLICABLE	
G 9	EXCELLENT	Excellent condition.
G 8	VERY GOOD	No problem noted.
G 7	GOOD	Some minor problems.
F 6	SATISFACTORY	Structural elements show some minor deterioration.
F 5	FAIR	All primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
P 4	POOR	Advance section loss, deterioration, spalling or scour.
P 3	SERIOUS	Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
C 2	CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C 1	"IMMINENT" FAILURE	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put it back in light service.
0	FAILED	Out of service - beyond corrective action.

**DEFICIENCY REPORTING GUIDE**

**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].

CITY/TOWN <b>ACTON</b>	B.I.N. <b>256</b>	BR. DEPT. NO. <b>A-02-010</b>	8.-STRUCTURE NO. <b>A02010-256-MUN-NBI</b>	INSPECTION DATE <b>JAN 4, 2006</b>
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**REMARKS**

**BRIDGE ORIENTATION**  
The approaches are South and North and the elevations are West and East. The brook flows from West to East.

**GENERAL REMARKS**  
Bridge is a single span corrugated steel plate deck arch structure.

**ITEM 58 - DECK**

**Item 58.1 - Wearing surface**  
The wearing surface has minor longitudinal cracking up to 3 ft. long in several locations.

**Item 58.4 - Curbs**  
Both concrete curbs have minor surface scaling and hairline cracks throughout. This condition rating and comment from previous inspection report of 01-05-2004 due to heavy ice and snow cover.

**Item 58.7 - Parapets**  
The East parapet has a 1 ft. long x 3 inch high x 2 inch deep spall at midspan and longitudinal hairline cracking with efflorescence on the exterior face.

**Item 58.8 - Railing**  
The bridge railing consists of double panel "SS" guardrail continuing across both sides of the structure into transitions, approaches, and terminal ends. Three feet of the bridge railing at the Southwest end is not double panel. There is collision damage to the Northwest terminal end.

**APPROACHES**

**Approaches a - Appr. pavement condition**  
The north approach has minor longitudinal cracking at the centerline.

**ITEM 59 - SUPERSTRUCTURE**

**Item 59.1 - Arch/Arch Ring**  
The galvanized steel arch has a partial asphaltic coating along the entire length, partially up both sidewalls for a height of 4 1/2 ft. Most of this coating has minor to moderate surface flaking and corrosion from the waterline down. **See photo 1.**

**Item 59.2 - Keystone Area**  
The stones in the east keystone area are missing. **See photo 2.**

**Item 59.3 - Stringers**  
Both outer edges of the roadway below the bridge rail are supported by several steel stringers, which are encased with only their bottom flanges exposed. The West has minor to moderate surface rusting. The East has moderate to severe surface rusting. **See photo 3.**

**Item 59.5 - Spandrel Walls**  
Both spandrel walls have several loose mortared stones, some missing chinking stones, some cracking of mortar, missing mortar and minor loss of fill. The Southwest spandrel wall has a void above its' arch ring with 31 inches of penetration. **See photo 4.** Also see Item 59.2.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>256</b>	BR. DEPT. NO. <b>A-02-010</b>	8.-STRUCTURE NO. <b>A02010-256-MUN-NBI</b>	INSPECTION DATE <b>JAN 4, 2006</b>
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## REMARKS

### Item 59.6 - Spring Lines

See Item 59.1.

### Item 59.10 - Masonry Joints

See Item 59.5.

### Item 59.11 - Rivets & Bolts

There is minor surface rusting to several of the bolts throughout.

### Item 59.15 - Paint/Coating

See Item 59.1.

## ITEM 60 - SUBSTRUCTURE

### Item 60.1.d - Breastwalls

Condition rating from previous inspection of 01-05-2004 due to high water level. No comments on previous inspection.

### Item 60.1.e - Wingwalls

All four wingwalls consist of mortared granite blocks and fieldstones. The Northeast wingwall is separated 2 inches from the spandrel wall with up to 26 inches of penetration. **See photo 5.** This was not mentioned in the previous inspection report of 01-05-2004. There is a 4 1/2 ft. x 2 ft. high x 2 1/2 ft. deep void at the base of the Northeast wingwall where a stone has fallen out. **See photo 6.** This void extends an additional 2 ft. upstream behind the fascia stones. The stones above this void are cracked. The Northeast wingwall also has several other areas where chinking stones, mortar, and fill are missing with penetrations up to 18 inches deep. There is a 15 inch R.C.P. pipe at the end of the Northeast wingwall that is missing its fill with a penetration of 3 ft. The Northwest and Northeast walls have some settlement up to 2 inches with a few missing chinking stones and some missing mortar. The remaining wingwalls have some missing mortar and cracking at joint locations.

### Item 60.1.g - Pointing

See Item 60.1.e.

### Item 60.1.k - Settlement

See Item 60.1.e.

## ITEM 61 - CHANNEL AND CHANNEL PROTECTION

### Item 61.2 - Embankment Erosion

There is embankment erosion and undercutting at all four corners of the wingwalls.

### Item 61.4 - Vegetation

There is vegetation at all four corners.

## TRAFFIC SAFETY

### Item 36a - Bridge Railing

See Item 58.8.

### Item 36b - Transitions

Transitions are not double panel or stiffened. See Item 58.8 also.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>256</b>	BR. DEPT. NO. <b>A-02-010</b>	8.-STRUCTURE NO. <b>A02010-256-MUN-NBI</b>	INSPECTION DATE <b>JAN 4, 2006</b>
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**REMARKS****Item 36c - Approach Guardrail**

See Item 58.8.

**Item 36d - Approach Guardrail Ends**

There is collision damage to the Northwest terminal end.

**Photo Log**

- Photo 1 : Minor to moderate surface rusting of arch at the waterline.
- Photo 2 : Missing stones at the East keystone area.
- Photo 3 : Surface rusting to East stringer flanges.
- Photo 4 : Void to the Southwest spandrel wall above the arch ring.
- Photo 5 : Two inch separation between the East spandrel wall and Northeast wingwall.
- Photo 6 : Void at the base of the Northeast wingwall.

CITY/TOWN  
ACTONB.I.N.  
256BR. DEPT. NO.  
A-02-0108.-STRUCTURE NO.  
A02010-256-MUN-NBIINSPECTION DATE  
JAN 4, 2006

## PHOTOS



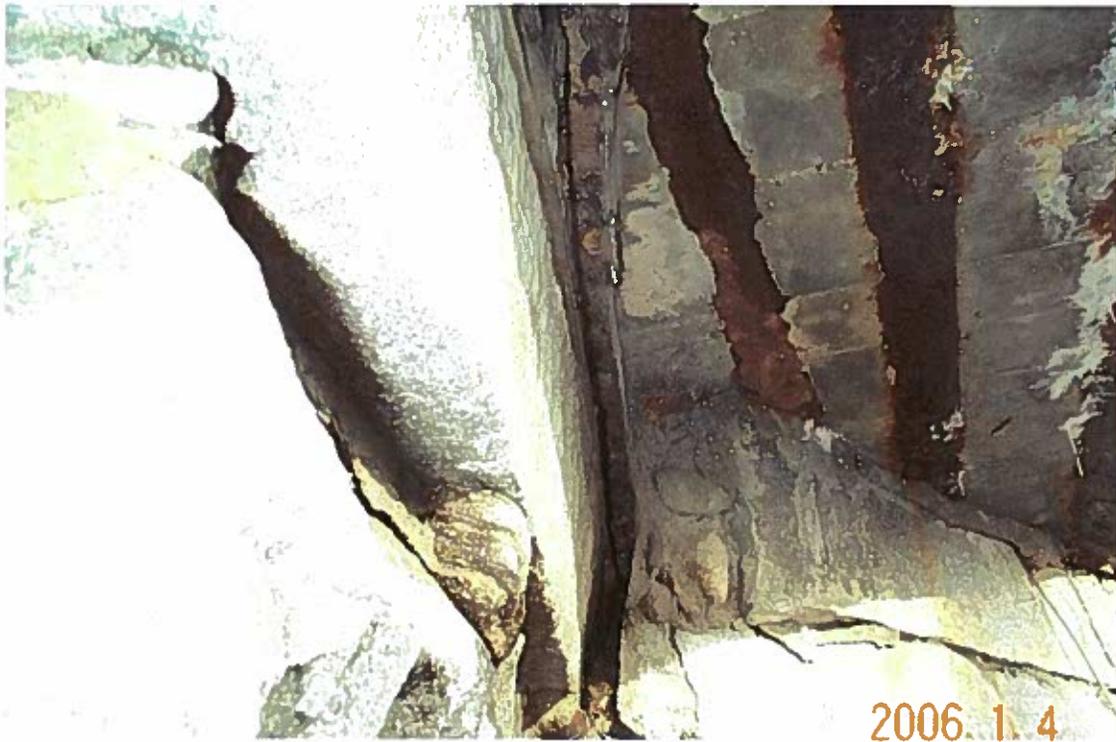
**Photo 1: Minor to moderate surface rusting of arch at the waterline.**



**Photo 2: Missing stones at the East keystone area.**

CITY/TOWN  
ACTONB.I.N.  
256BR. DEPT. NO.  
A-02-0108.-STRUCTURE NO.  
A02010-256-MUN-NBIINSPECTION DATE  
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## PHOTOS



**Photo 3: Surface rusting to East stringer flanges.**



**Photo 4: Void to the Southwest spandrel wall above the arch ring.**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>256</b>	BR. DEPT. NO. <b>A-02-010</b>	8.-STRUCTURE NO. <b>A02010-256-MUN-NBI</b>	INSPECTION DATE <b>JAN 4, 2006</b>
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**PHOTOS**

**Photo 5: Two inch separation between the East spandrel wall and Northeast wingwall.**



**Photo 6: Void at the base of the Northeast wingwall.**

Report Date: October 23, 2007

State Information				Classification				Code	
BDEPT#	A02010	Agency Br. No.		(112) NBIS Bridge Length				Y	
Town	Acton			(104) Highway System				N	
B.I.N.	256	AASHTO=	060.6	(26) Functional Class -	Urban Collector			17	
Identification				FHWA Select List=	N	(100) Defense Highway		0	
(1) Structure Number	A02010256MUNNBI			(101) Parallel Structure				N	
(5) Inventory Route	151000000			(102) Direction of Traffic -	2-way traffic			2	
(2) State Highway Department District	03			(103) Temporary Structure				N	
(3) County Code	017	(4) Place code	00380	(105) Federal Lands Highways				0	
(6) Features Intersected	WATER FORT POND BROOK			(110) Designated National Network				N	
(7) Facility Carried	HWY PARKER ST			(20) Toll -	On free road			3	
(9) Location	CORNER OF CLOVER HILL RD			(21) Maintain -	Town Agency			03	
(11) Kilometerpoint	0000.241			(22) Owner -	Town Agency			03	
(12) Base Highway Network	N			(37) Historical Significance	undetermined				
(13) LRS Inventory Route & Subroute	000000000000			Condition				Code	
(16) Latitude	42 DEG 27 MIN 26.66 SEC			(56) Deck				N	
(17) Longitude	71 DEG 26 MIN 03.71 SEC			(59) Superstructure				5	
(98) Border Bridge State Code	Share	%		(80) Substructure				5	
(99) Border Bridge Structure No. #				(81) Channel & Channel Protection				6	
Structure Type and Material				Load Rating and Posting				Code	
(43) Structure Type Main:	Steel	Code	311	(31) Design Load -	Other/Unknown			0	
Arch - Deck	Jointless bridge type:	Code	Not applicable	(63) Operating Rating Method -	Allowable Stress (AS)			2	
(44) Structure Type Appr:	Other	Code	000	(64) Operating Rating				31.8	
(45) Number of spans in main unit		Code	001	(65) Inventory Rating Method -	Allowable Stress (AS)			2	
(46) Number of approach spans		Code	0000	(66) Inventory Rating				22.7	
(107) Deck Structure Type -	Not applicable	Code	N	(70) Bridge Posting				4	
(108) Wearing Surface / Protective System:				(41) Structure -	Open			A	
A) Type of wearing surface -	Bituminous	Code	6	Appraisal				Code	
B) Type of membrane -	Not applicable=no deck	Code	N	(67) Structural Evaluation				5	
Type of deck protection -	Not applicable=no deck	Code	N	(68) Deck Geometry				4	
Age and Service				(69) Underclearances, vert. and horiz.				N	
(27) Year Built			1938	(71) Waterway adequacy				6	
(106) Year Reconstructed			0000	(72) Approach Roadway Alignment				6	
(42) Type of Service: On -	Highway			(36) Traffic Safety Features				0 0 1 1	
Under -	Waterway	Code	15	(113) Scour Critical Bridges				U	
(26) Lanes: On Structure	02	Under structure	00	Inspections					
(29) Average Daily Traffic		Code	001600	(90) Inspection Date	01/04/06	(91) Frequency	24	MO	
(30) Year of ADT	2004	(109) Truck ADT	06 %	(92) Critical Feature Inspection:		(93) CFI DATE			
(19) Bypass, detour length			003 KM	(A) Fracture Critical Detail	N 00	MO A)		00/00/00	
Geometric Data				(B) Underwater Inspection	N 00	MO B)		07/01/85	
(48) Length of maximum span			0006.4 M	(C) Other Special Inspection	N 00	MO C)		00/00/00	
(49) Structure Length			00009.6 M	(*) Other Inspection (Flood)	N 00	MO *)		11/01/05	
(50) Curb or sidewalk:	Left	00.0 M	Right	(*) Closed Bridge	N 00	MO *)		00/00/00	
(51) Bridge Roadway Width Curb to Curb			007.3 M	(*) UW Special Inspection	N 00	MO *)		00/00/00	
(52) Deck Width Out to Out			007.9 M	(*) Damage Inspection		MO *)		00/00/00	
(32) Approach Roadway Width (w/shoulders)			007.3 M	Rating Loads					
(33) Bridge Median -	No median	Code	0	Report Date	03/01/82	H20	Type 3	Type 3S2	Type HS
(34) Skew	30 DEG	(35) Structure Flared	N	Operating		26.0	32.0	50.0	0.0
(10) Inventory Route MIN Vert Clear			99.99 M	Inventory		20.0	23.0	36.0	0.0
(47) Inventory Route Total Horiz Clear			07.3 M	Field Posting					
(53) Min Vert Clear Over Bridge Rdwy			99.99 M	Status	LEGAL	Posting Date	06/18/82		
(54) Min Vert Underclear ref	N		00.00 M	Actual		2 Axle	3 Axle	5 Axle	
(55) Min Lat Underclear RT ref	N		00.0 M	Recommended					
(56) Min Lat Underclear LT			00.0 M	Missing Signs	N				
Navigation Data				Misc.					
(39) Navigation Vertical Clearance	000.0 M			Bridge Name					
(118) Vert-lift Bridge Nav Min Vert Clear	M			N	Anti-missile fence	N	Acrow Panel	N	Jointless Bridge
(40) Navigation Horizontal Clearance	0000.0 M			Freeze/Thaw	N	Not Applicable			
(3) Navigation Control -	No navigation control on waterway	Code	0	Accessibility (Needed/Used)					
(4) Navigation Protection		Code		N / N	Liftbucket	N / N	Rigging	Inspection	
(39) Navigation Vertical Clearance				N / N	Ladder	N / N	Staging	Hours:	008
(118) Vert-lift Bridge Nav Min Vert Clear				N / N	Boat	N / N	Traffic Control		
(40) Navigation Horizontal Clearance				Y / Y	Wader	N / N	RR Flagperson		
				N / N	Inspector 50	N / N	Police		

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**CULVERT INSPECTION**

2-DIST **03** B.I.N. **257**

BR. DEPT. NO.  
**A-02-011**

CITY/TOWN <b>ACTON</b>	8-STRUCTURE NO. <b>A02011-257-MUN-NBI</b>	11-Kilo. POINT <b>000.338</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>JAN 12, 2006</b>
07-FACILITY CARRIED <b>HWY WETHERBEE ST</b>	MEMORIAL NAME/LOCAL NAME	27-YR BUILT <b>1997</b>	106-YR REBUILT <b>0000</b>	YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER NASHOBA BROOK</b>	26-FUNCTIONAL CLASS <b>Urban Local</b>	DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Concrete Culvert</b>	22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>R. C. Angell</b>	
107-DECK TYPE <b>Not applicable</b>	WEATHER <b>Sunny</b>	TEMP. (air) <b>12°C</b>	TEAM MEMBERS <b>P. J. LEOVICH</b>	

<b>TYPE OF CULVERT:</b> <table border="1"> <tr><td>SHAPE:</td><td><b>RECTANGULAR</b></td></tr> <tr><td>MATERIAL:</td><td><b>CONCRETE</b></td></tr> <tr><td>COATING:</td><td><b>NONE</b></td></tr> </table>	SHAPE:	<b>RECTANGULAR</b>	MATERIAL:	<b>CONCRETE</b>	COATING:	<b>NONE</b>	<b>BARRELS:</b> (In Meters) <table border="1"> <tr> <td>SIZE: <b>2.40mx3.00m</b></td> <td>NUMBER: <b>3</b></td> </tr> </table> <b>DEPTH OF COVER</b> (To the nearest tenth of a meter) <table border="1"> <tr> <td><b>E</b></td> <td><b>W</b></td> </tr> <tr> <td><b>0.3</b></td> <td><b>0.3</b></td> </tr> </table> <b>CURB REVEAL</b> (In millimeters) <table border="1"> <tr> <td><b>125</b></td> <td><b>125</b></td> </tr> </table>	SIZE: <b>2.40mx3.00m</b>	NUMBER: <b>3</b>	<b>E</b>	<b>W</b>	<b>0.3</b>	<b>0.3</b>	<b>125</b>	<b>125</b>
SHAPE:	<b>RECTANGULAR</b>														
MATERIAL:	<b>CONCRETE</b>														
COATING:	<b>NONE</b>														
SIZE: <b>2.40mx3.00m</b>	NUMBER: <b>3</b>														
<b>E</b>	<b>W</b>														
<b>0.3</b>	<b>0.3</b>														
<b>125</b>	<b>125</b>														

**ITEM 62 CULVERT & RETAINING WALLS** **7** 162 (Dive Report): **7** 162 (This Report): **7**

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF	
1. Roof	<b>6</b>	<b>7</b>	-	7. Protective Coating	<b>N</b>	<b>N</b>	-	13. Member Alignment	<b>7</b>	<b>7</b>	-	UNDERMINING (Y/N) If YES please explain <b>N</b>
2. Floor	<b>8</b>	<b>H</b>	-	8. Embankment	<b>7</b>	<b>7</b>	-	14. Deformation	<b>N</b>	<b>8</b>	-	
3. Walls	<b>7</b>	<b>7</b>	<b>M-P</b>	9. Wearing Surface	<b>N</b>	<b>7</b>	-	15. Scour	<b>7</b>	<b>7</b>	-	COLLISION DAMAGE: <u>Please explain</u> None ( <input checked="" type="checkbox"/> ) Minor ( ) Moderate ( ) Severe ( )
4. Headwall	<b>7</b>	<b>7</b>	-	10. Railing	<b>N</b>	<b>7</b>	<b>M-P</b>	16. Settlement	<b>8</b>	<b>7</b>	-	
5. Wingwall	<b>8</b>	<b>7</b>	-	11. Sidewalks	<b>N</b>	<b>7</b>	-	17. Culvert Joints	<b>N</b>	<b>6</b>	<b>M-P</b>	LOAD VIBRATION: <u>Please explain</u> None ( <input checked="" type="checkbox"/> ) Minor ( ) Moderate ( ) Severe ( )
6. Pipe	<b>N</b>	<b>N</b>	-	12. Utilities	<b>N</b>	<b>N</b>	-	18.				

**ITEM 61 CHANNEL & CHANNEL PROTECTION** **7** STREAM FLOW VELOCITY: Tidal ( ) High ( ) Moderate ( ) Low (  ) **APPROACH CONDITION**

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF
1. Channel Scour	<b>7</b>	<b>7</b>	-	5. Utilities	<b>N</b>	<b>N</b>	-
2. Embankment Erosion	<b>7</b>	<b>7</b>	-	6. Rip-Rap/Slope Protection	<b>8</b>	<b>7</b>	-
3. Debris	<b>8</b>	<b>7</b>	-	7. Aggradation	<b>7</b>	<b>7</b>	-
4. Vegetation	<b>6</b>	<b>7</b>	-				

**ITEM 61 (Dive Report):** **8** **ITEM 61 (This Report):** **7**

93b- U/W INSP DATE: **07/08/2004**

a. Appr. pavement condition	<b>7</b>	-
b. Appr. Roadway Settlement	<b>7</b>	-
c. Appr. Sidewalk Settlement	<b>7</b>	-
d.		

**WEIGHT POSTING**

Actual Posting:  Not Applicable

H	3	3S2	Single
<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>
<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>

Recommended Posting: **N N N N**

Valved Date: **00/00/00** EJDMT Date: **00/00/00**

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

At bridge		Advance	
<b>N</b>	<b>S</b>	<b>N</b>	<b>S</b>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**ITEM 36 TRAFFIC SAFETY** **ACCESSIBILITY (Y/N/P):** **TOTAL HOURS** **8**

	36	COND	DEF	Needed	Used	Needed	Used
A. Bridge Railing	<b>1</b>	<b>7</b>	<b>M-P</b>	<b>N</b>	<b>N</b>		
B. Transitions	<b>1</b>	<b>7</b>	-	<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>
C. Approach Guardrail	<b>1</b>	<b>5</b>	<b>S-P</b>	<b>Y</b>	<b>Y</b>		
D. Approach Guardrail Ends	<b>0</b>	<b>5</b>	<b>S-P</b>				

Other: **Ladder** **Boat** **Waders**

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

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

TAPE#:

**RATING** Request for Rating or Rerating (Y/N) **N** If YES please give priority: HIGH ( ) MEDIUM ( ) LOW ( )

Rating Report (Y/N) **Y**

Date: **07/01/1999**

REASON:

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

CITY/TOWN <b>ACTON</b>	B.I.N. <b>257</b>	BR. DEPT. NO. <b>A-02-011</b>	8.-STRUCTURE NO. <b>A02011-257-MUN-NBI</b>	INSPECTION DATE <b>JAN 12, 2006</b>
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### REMARKS, PHOTOS & SKETCHES

#### BRIDGE ORIENTATION

The approaches are S to N and the elevations are W to E. This is a three span box culvert. The spans are numbered from S to N. The brook flows from W to E.

#### ITEM 62 - CULVERT

##### Item 62.1 - Roof

There is minor leakage to several culvert sections along roof joints.

##### Item 62.2 - Floor

The floors are inaccessible due to high water.

##### Item 62.4 - Headwall

Both concrete headwalls show two full height hairline cracks with light efflorescence stains.

##### Item 62.5 - Wingwall

The SW wingwall has some minor honeycombing & minor efflorescence near center.

##### Item 62.10 - Railing

There is a chain link bridgerail fence behind both "SS" type Steel guardrails. Most of the top vertical post caps, on both fences, are missing.

### CONDITION RATING GUIDE

	CODE	CONDITION	DEFECTS
	N	NOT APPLICABLE	Use if structure is not a culvert.
	G	9 EXCELLENT	No deficiencies.
	G	8 VERY GOOD	No noticeable or noteworthy differences which affect the condition of the culvert. Insignificant scrape marks caused by drift.
	G	7 GOOD	Shrinkage cracks, light scaling, and insignificant spalling, which does not expose reinforcing steel. Insignificant damage caused by drift with not misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and no pitting.
	F	6 SATISFACTORY	Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.
	F	5 FAIR	Moderate to major deterioration, or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.
	P	4 POOR	Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joints permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting.
	P	3 SERIOUS	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls, nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls, or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations.
	C	2 CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
	C	1 "IMMINENT" FAILURE	Bridge closed. Corrective action may put back in light service.
		0 FAILED	Bridge closed. Replacement necessary.

### DEFICIENCY REPORTING GUIDE

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

#### **CATEGORIES OF DEFICIENCIES:**

**M= Minor Deficiency** - (Examples include but are not limited to: Spalled concrete, minor to moderate corrosion to steel culverts, minor settlement or misalignment, minor scouring, minor damage to guardrail, etc.)

**S= Severe/Major Deficiency**- (Examples include but are not limited to: Large spalls, wide cracks, moderate to major deterioration in concrete, considerable settlement, considerable scouring or undermining, extensive corrosion and deflection in steel culverts, etc.)

**C-S= Critical Deficiency** - A deficiency in a structural component or element of a bridge that poses an extreme hazard or unsafe condition to the public. (Follow-up Critical Deficiency Report must be submitted separately)

#### **URGENCY OF REPAIR:**

**I = Immediate**- (Inspector(s) stay at the bridge until the District Maintenance crew or the responsible Agency crew(if not a State bridge) show up and corrective action is taken.)

**A = ASAP**- (Action will be taken by the District Maintenance Engineer or the Responsible Agency (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.)

CITY/TOWN <b>ACTON</b>	B.I.N. <b>257</b>	BR. DEPT. NO. <b>A-02-011</b>	8.-STRUCTURE NO. <b>A02011-257-MUN-NBI</b>	INSPECTION DATE <b>JAN 12, 2006</b>
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### REMARKS

**Item 62.13 - Member Alignment**

All three box culvert sections are slightly out of alignment. This mis-alignment is unchanged since the Initial Routine Inspection done on 1/23/98.

**Item 62.17 - Culvert Joints**

The grout is falling out in several areas of the center and N barrels.

**ITEM 61 - CHANNEL AND CHANNEL PROTECTION**

**Item 61.7 - Aggradation**

There is a build up of sand and silt up to 1 ft. deep in the left box. This remark taken from 7/8/04 Routine Underwater Inspection report, due to high water.

**TRAFFIC SAFETY**

**Item 36a - Bridge Railing**

The bridgerails consist of steel "SS" type guardrails that extend across culvert and into traffic safety feature areas. There is a chain link pedestrian fence over culvert, at both sides.

**Item 36c - Approach Guardrail**

There is severe collision damage to NW approach guardrail. Two guardrail panels and two posts are bent and there is a small tear to top of guardrail in this collision area. See photo #1.

**Item 36d - Approach Guardrail Ends**

The NW & NE terminal ends are boxing glove ends not buried or sufficiently turned from traffic. The NE terminal end shows severe collision denting. See photo #2.

**Photo Log**

Photo 1 : Collision damage to NW approach guardrail.

Photo 2 : Collision damage to NE terminal end.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>257</b>	BR. DEPT. NO. <b>A-02-011</b>	8.-STRUCTURE NO. <b>A02011-257-MUN-NBI</b>	INSPECTION DATE <b>JAN 12, 2006</b>
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**PHOTOS**



**Photo 1: Collision damage to NW approach guardrail.**



**Photo 2: Collision damage to NE terminal end.**

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**UNDERWATER OPERATIONS TEAM**  
**ROUTINE UNDERWATER INSPECTION REPORT**

2-DIST  
**03**

B.I.N.  
**257**

BR. DEPT. NO.  
**A-02-011**

CITY/TOWN <b>ACTON</b>		8-STRUCTURE NO. <b>A02011-257-MUN-NBI</b>		LEVEL OF INSPECTION <b>II</b>	93B-DATE INSPECTED <b>JUL 9, 2007</b>
07-FACILITY CARRIED <b>HWY WETHERBEE ST</b>		ACCESS TO BRIDGE <b>EMBANKMENT</b>		UNDERWATER OPERATIONS ENGINEER <b>JOHN B. DESMOND</b>	
06-FEATURES INTERSECTED <b>WATER NASHOBA BROOK</b>		DEPTH <b>1 m</b>	VISIBILITY <b>0.5 m</b>	TEAM LEADER (DIVE MASTER) <b>JOHN B. DESMOND</b>	Report submitted by:
BOTTOM CONDITION <b>SILT, GRAVEL</b>		CURRENT <b>NIL</b>	TEAM MEMBERS <b>E. P. TERNSKY</b>		

ITEM 60		N	
SUBSTRUCTURE		DEF	
1. Abutments	N		
a. Pedestals	N		
b. Bridge Seats	N		
c. Backwalls	N		
d. Breastwalls	N		
e. Wingwalls	N		
f. Slope Paving/Rip-Rap	N		
g. Pointing	N		
h. Footings	N		
i. Piles	N		
j. Scour	N		
k. Settlement	N		
l.	N		
2. Piers or Bents	N		
a. Pedestals	N		
b. Caps	N		
c. Columns	N		
d. Stems/Webs/Pierwalls	N		
e. Pointing	N		
f. Footing	N		
g. Piles	N		
h. Scour	N		
i. Settlement	N		
j.	N		
k.	N		
3. Pile Bents	N		
a. Pile Caps	N		
b. Piles	N		
c. Diagonal Bracing	N		
d. Horizontal Bracing	N		
e. Fasteners	N		
UNDERMINING (Y/N)		N	

ITEM 61		7	
CHANNEL & CHANNEL PROTECTION		DEF	
1. Channel Scour	7		
2. Embankment Erosion	7		
3. Debris	8		
4. Vegetation	6		
5. Utilities	N		
6. Rip-Rap/Slope Protection	8		
7. Aggradation	6		
8. Fender System	N		
a. Piles	N		
b. Diagonal Bracing	N		
c. Horizontal Bracing	N		
d. Wales	N		
e. Fasteners	N		
f. Ladders	N		
9.	N		
ITEM 59 SUPERSTRUCTURE			
	N		
	N		
	N		
UNDERMINING (Y/N)			

ITEM 62		7	
CULVERTS		DEF	
1. Roof	N		
2. Floor	8		
3. Walls	7		
4. Headwall	N		
5. Wingwall	8		
6. Pipe	N		
7. Protective Coating	N		
8. Embankment	7		
9. Wearing Surface	N		
10. Railing	N		
11. Sidewalks	N		
12. Utilities	N		
13. Member Alignment	7		
14. Deformation	8		
15. Scour	7		
16. Settlement	8		
17.	N		
18.	N		
UNDERMINING (Y/N)			N

**DEFICIENCY REPORTING GUIDE**

**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 scouring, 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 corroding rebars, Deteriorated timber piles, Considerable scouring or undermining, 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: Any part of piles or fender system which are projecting outward and may become a safety hazard for the navigational traffic, 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.]

CITY/TOWN <b>ACTON</b>	B.I.N. <b>257</b>	BR. DEPT. NO. <b>A-02-011</b>	8.-STRUCTURE NO. <b>A02011-257-MUN-NBI</b>	INSPECTION DATE <b>JUL 9, 2007</b>
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## REMARKS

### GENERAL REMARKS

- 1) Orientation - Abutments are labeled left and right when facing downstream.
- 2) Sta 10+00 is at the upstream end.
- 3) This is a three span precast concrete box culvert built in 1997.

### ITEM 61 - CHANNEL AND CHANNEL PROTECTION

#### Item 61.1 - Channel Scour

The lip of the concrete floor is intermittently exposed along upstream right box, 4" height.

#### Item 61.4 - Vegetation

Vegetation is growing in the brook at the upstream end of the culvert and has the potential of restricting flow in the future.

#### Item 61.7 - Aggradation

There is a build up of sand and silt up to 3' deep in the left box. The right & center boxes are clean. See sketch.

### ITEM 62 - CULVERT

#### Item 62.2 - Floor

The floor is mostly exposed in center and right boxes and is in good condition. There is a small section of exposed floor at the upstream end of the left box along the pier wall.

#### Item 62.3 - Walls

The cement filler between the box sections in the pier walls at the upstream end is missing from ML to WL with over 3' of penetration. There is also a spall at upstream end of pier wall between center and right boxes. See sketch for dimensions.

#### Item 62.15 - Scour

The lip of the concrete floor is intermittently exposed along upstream right box, 4" height.

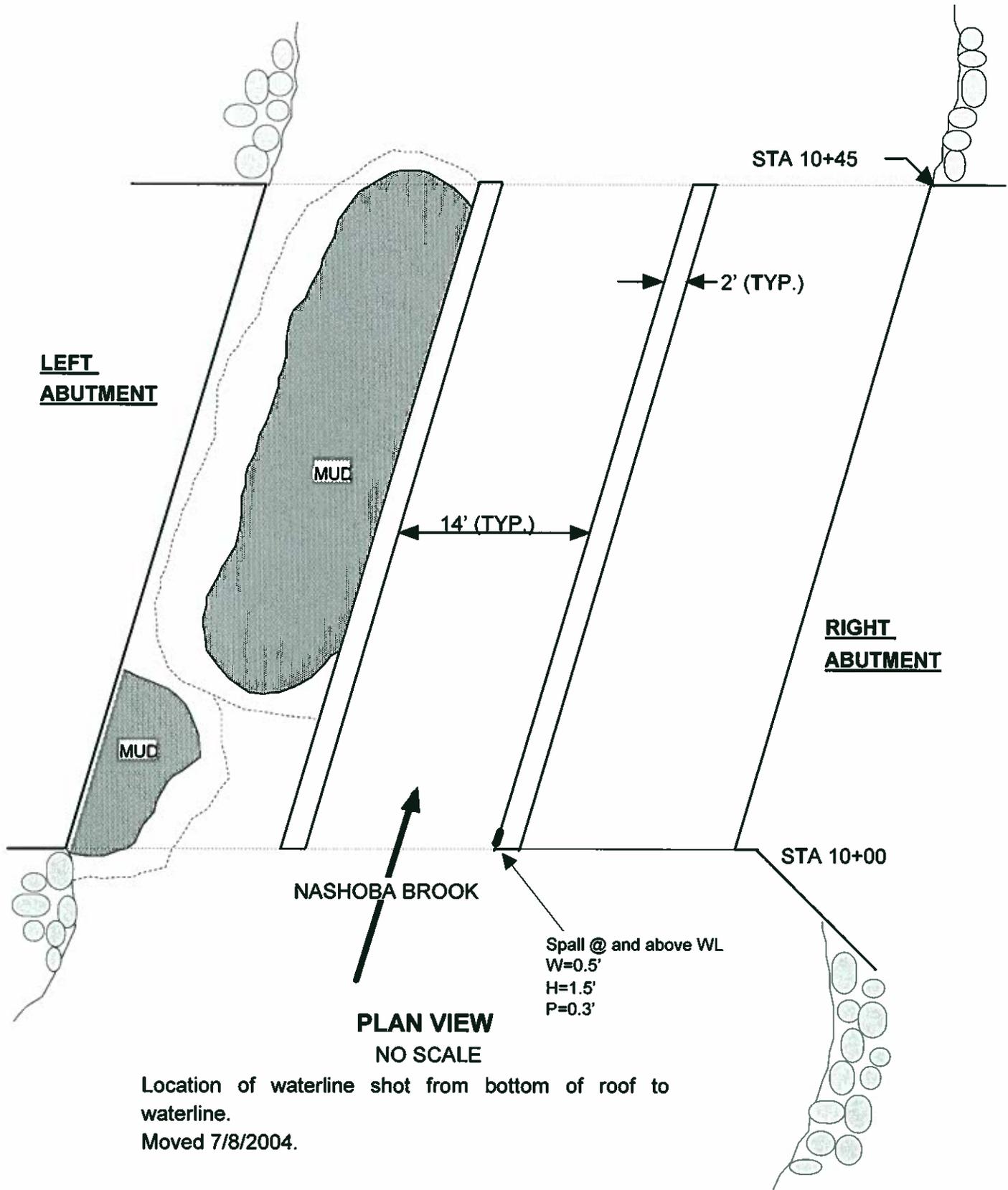
#### Sketch / Chart Log

Sketch 1 : PLAN

Chart 1 : SCOUR MONITORING

CITY/TOWN <b>ACTON</b>	B.I.N. <b>257</b>	BR. DEPT. NO. <b>A-02-011</b>	8.-STRUCTURE NO. <b>A02011-257-MUN-NBI</b>	INSPECTION DATE <b>JUL 9, 2007</b>
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**SKETCHES**



Location of waterline shot from bottom of roof to waterline.  
Moved 7/8/2004.

**Sketch 1: PLAN**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>257</b>	BR. DEPT. NO. <b>A-02-011</b>	8.-STRUCTURE NO. <b>A02011-257-MUN-NBI</b>	INSPECTION DATE <b>JUL 9, 2007</b>
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## CHARTS

### SCOUR MONITORING CHART @ STA 10+00

OFFSETS	7/28/98	7/5/01	7/8/04	7/9/07	
CENTER SPAN LEFT BOX	1.7	2.7	1.4	2.2	
CENTER SPAN MIDDLE BOX	2.1	3.1	3.4/2.7	3.4/2.8	
CENTER SPAN RIGHT BOX	3.1	3.5	3.3/3.2	3.4/3.3	
Y	4.66	5.08	5.8	5.5	
CORRECTION	-	+0.42	+1.1	+0.8	

#### Notes

1. All soundings and measurements are in feet.
2. Water control shot (Y) = Waterline to bottom of roof of right box.
3. For comparison all soundings are adjusted to 1998 water level.
4. Station 10+00 is located at the upstream end.

**Chart 1: SCOUR MONITORING**

Report Date: October 23, 2007

State Information				Classification				Code			
BDEPT#	A02011	Agency Br. No.		(112) NBIS Bridge Length				Y			
Town	Acton			(104) Highway System				N			
B.I.N.	257	AASHTO	084.1	(26) Functional Class -	Urban Local			19			
Identification				FHWA Select List	N	(100) Defense Highway		0			
(5) Structure Number	A02011257MUNNBI			(101) Parallel Structure				N			
(5) Inventory Route	151000000			(102) Direction of Traffic -	2-way traffic			2			
(2) State Highway Department District	03			(103) Temporary Structure				N			
(3) County Code	017	(4) Place code	00380	(105) Federal Lands Highways				0			
(6) Features Intersected	WATER NASHOBA BROOK			(110) Designated National Network				N			
(7) Facility Carried	HWY WETHERBEE ST			(20) Toll -	On free road			3			
(9) Location	0.5MI N OF RT.2			(21) Maintain -	Town Agency			03			
(11) Kilometerpoint	0000.336			(22) Owner -	Town Agency			03			
(12) Base Highway Network	N			(37) Historical Significance	historic area			A			
(13) LRS Inventory Route & Subroute	000000000000			Condition				Code			
(16) Latitude	42 DEG 26 MIN 30.05 SEC			(56) Deck				N			
(17) Longitude	71 DEG 24 MIN 41.31 SEC			(59) Superstructure				N			
(98) Border Bridge State Code	Share %			(60) Substructure				N			
(99) Border Bridge Structure No. #				(61) Channel & Channel Protection				7			
Structure Type and Material				(62) Culverts				7			
(43) Structure Type Main:	Concrete	Code	119	Load Rating and Posting				Code			
Culvert	Jointless bridge type:	Not applicable		(31) Design Load -	HS 20=MS 18			5			
(44) Structure Type Appr:	Other	Code	000	(63) Operating Rating Method -	Load Factor (LF)			1			
(45) Number of spans in main unit	003			(64) Operating Rating				59.8			
(46) Number of approach spans	0000			(65) Inventory Rating Method -	Load Factor (LF)			1			
(107) Deck Structure Type -	Not applicable	Code	N	(66) Inventory Rating				35.7			
(108) Wearing Surface / Protective System:				(70) Bridge Posting				5			
A) Type of wearing surface -	Not applicable=no deck	Code	N	(41) Structure -	Open			A			
B) Type of membrane -	Not applicable=no deck	Code	N	Appraisal				Code			
C) Type of deck protection -	Not applicable=no deck	Code	N	(67) Structural Evaluation				7			
Age and Service				(88) Deck Geometry				4			
(27) Year Built	1997			(69) Underclearances, vert. and horiz.				N			
(106) Year Reconstructed	0000			(71) Waterway adequacy				8			
(42) Type of Service: On -	Highway			(72) Approach Roadway Alignment				6			
Under -	Waterway	Code	15	(36) Traffic Safety Features				1 1 1 0			
(26) Lanes: On Structure	02	Under structure	00	(113) Scour Critical Bridges				8			
(29) Average Daily Traffic	000780			Inspections							
(30) Year of ADT	2008	(109) Truck ADT	03 %	(90) Inspection Date	01/12/06	(91) Frequency	24 MO				
(19) Bypass, detour length	003 KM			(92) Critical Feature Inspection:		(93) CFI DATE					
Geometric Data				(A) Fracture Critical Detail	N 00	MO A)	00/00/00				
(48) Length of maximum span	0003.0 M			(B) Underwater Inspection	Y 36	MO B)	07/09/07				
(49) Structure Length	00014.6 M			(C) Other Special Inspection	N 00	MO C)	00/00/00				
(50) Curb or sidewalk:	Left	00.2 M	Right	(*) Other Inspection ()	N 00	MO *)	00/00/00				
(51) Bridge Roadway Width Curb to Curb	007.5 M			(*) Closed Bridge	N 00	MO *)	00/00/00				
(52) Deck Width Out to Out	009.8 M			(*) UW Special Inspection	N 00	MO *)	00/00/00				
(32) Approach Roadway Width (w/shoulders)	007.5 M			(*) Damage Inspection		MO *)	00/00/00				
(33) Bridge Median -	No median	Code	0	Rating Loads							
(34) Skew	45 DEG	(35) Structure Flared	N	Report Date	07/01/99	H20	Type 3	Type 3S2	Type HS		
(10) Inventory Route MIN Vert Clear	99.99 M			Operating		36.0	51.0	75.0	55.0		
(47) Inventory Route Total Horiz Clear	07.5 M			Inventory		25.0	36.0	53.0	39.0		
(53) Min Vert Clear Over Bridge Rdwy	99.99 M			Field Posting							
(54) Min Vert Underclear ref	N		00.00 M	Status	LEGAL	Posting Date		03/14/00			
(55) Min Lat Underclear RT ref	N		00.0 M	Actual		2 Axle	3 Axle	5 Axle			
(56) Min Lat Underclear LT			00.0 M	Recommended							
Navigation Data				Missing Signs	N	Misc.					
(3) Navigation Control -	No navigation control on waterway	Code	0	Bridge Name							
(4) Navigation Vertical Clearance		Code		N	Anti-missile fence	N	Acrow Panel	N	Jointless Bridge		
(116) Vert-lift Bridge Nav Min Vert Clear		M		Freeze/Thaw	N : Not Applicable			Accessibility (Needed/Used)			
(40) Navigation Horizontal Clearance		0000.0 M		N / N	Liftbucket	N / N	Rigging	Inspection			
				N / N	Ladder	N / N	Staging	Hours:		008	
				N / N	Boat	N / N	Traffic Control				
				Y / Y	Wader	N / N	RR Flagperson				
				N / N	Inspector 50	N / N	Police				

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**CULVERT INSPECTION**

2-DIST **03** B.I.N. **240**

BR. DEPT. NO.  
**A-02-018**

CITY/TOWN <b>ACTON</b>	8-STRUCTURE NO. <b>A02018-240-MUN-NBI</b>	11-Kilo. POINT <b>000.161</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>JAN 2, 2007</b>
07-FACILITY CARRIED <b>HWY CONCORD RD</b>	MEMORIAL NAME/LOCAL NAME	27-YR BUILT <b>1994</b>	106-YR REBUILT <b>0000</b>	YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER NASHOBA BROOK</b>	26-FUNCTIONAL CLASS <b>Urban Minor Arterial</b>	DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Concrete Culvert</b>	22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>G. B. Harrington</b>	
107-DECK TYPE <b>Not applicable</b>	WEATHER <b>Sunny</b>	TEMP. (air) <b>7°C</b>	TEAM MEMBERS <b>Z. S. GIKAS</b>	

<b>TYPE OF CULVERT:</b>	<b>BARRELS:</b> (In Meters)
SHAPE: <b>RECTANGULAR</b>	SIZE: <b>2.75mx1.80m</b> NUMBER: <b>2</b>
MATERIAL: <b>REINF. CONCRETE</b>	DEPTH OF COVER (To the nearest tenth of a meter) N: <b>1.2</b> S: <b>1.2</b>
COATING: <b>NONE</b>	CURB REVEAL (In millimeters) <b>110</b> <b>170</b>

**ITEM 62 CULVERT & RETAINING WALLS** 7 i62 (Dive Report): 7 i62 (This Report): 7

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF	
1. Roof	7	7	-	7. Protective Coating	N	N	-	13. Member Alignment	7	7	-	UNDERMINING (Y/N) if YES please explain <b>N</b>
2. Floor	H	H	-	8. Embankment	7	8	-	14. Deformation	N	8	-	
3. Walls	7	8	-	9. Wearing Surface	N	8	-	15. Scour	8	8	-	COLLISION DAMAGE: <u>Please explain</u> None (X) Minor ( ) Moderate ( ) Severe ( )
4. Headwall	N	6	M-P	10. Railing	N	8	-	16. Settlement	7	8	-	
5. Wingwall	6	8	-	11. Sidewalks	N	8	-	17. Curbs	N	7	-	LOAD VIBRATION: <u>Please explain</u> None (X) Minor ( ) Moderate ( ) Severe ( )
6. Pipe	N	N	-	12. Utilities	N	N	-	16.			-	

**ITEM 61 CHANNEL & CHANNEL PROTECTION** 7

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF
1. Channal Scour	8	8	-	5. Utilities	N	N	-
2. Embankment Erosion	7	8	-	6. Rip-Rap/Slope Protection	7	8	-
3. Debris	8	8	-	7. Aggradation	8	8	-
4. Vegetation	7	8	-				

STREAM FLOW VELOCITY: Tidal ( ) High ( ) Moderate ( ) Low (X)

APPROACH CONDITION

a. Appr. pavement condition	8	-
b. Appr. Roadway Settlement	8	-
c. Appr. Sidewalk Settlement	8	-
d.		

ITEM 61 (Dive Report): 7  
ITEM 61 (This Report): 7

93b-U/W INSP DATE: **08/23/2006**

**WEIGHT POSTING**

Actual Posting  Not Applicable

H	3	3S2	Single
N	N	N	N
N	N	N	N

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

At bridge		Advance	
E	W	E	W

Waived Date: **00/00/00** EJDMT Date: **00/00/00**

**ITEM 36 TRAFFIC SAFETY**

	36 COND	DEF
A. Bridge Railing	1 8	-
B. Transitions	1 8	-
C. Approach Guardrail	1 8	-
D. Approach Guardrail Ends	1 8	-

**ACCESSIBILITY (Y/N/P):**

	Needed	Used	Other:	Needed	Used
Ladder	N	N			
Boat	N	N		N	N
Waders	Y	N			

TOTAL HOURS **8**

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

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

TAPE#:

**RATING**

Request for Rating or Rerating (Y/N) **N** If YES please give priority: HIGH ( ) MEDIUM ( ) LOW ( )

Rating Report (Y/N) **N**

Date: **00/00/00**

REASON:

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

CITY/TOWN <b>ACTON</b>	B.I.N. <b>240</b>	BR. DEPT. NO. <b>A-02-018</b>	8.-STRUCTURE NO. <b>A02018-240-MUN-NBI</b>	INSPECTION DATE <b>JAN 2, 2007</b>
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### REMARKS, PHOTOS & SKETCHES

#### BRIDGE ORIENTATION

The approaches are West and East and the elevations are South and North. This is a two barrel precast segment reinforced concrete box culvert bridge, with barrels referenced as West and East. The brook flows from the North to the South.

#### GENERAL REMARKS

**Note:** There is only 1 ft. of clearance from the water line to the roof of the culvert. The water flow is low, and there is a single box culvert (Bri.) approximately 40 ft. to the East, which will help relieve high water conditions because of its' higher clearance (see photo 1).

#### ITEM 62 - CULVERT

##### Item 62.1 - Roof

The roof segments are placed slightly uneven.

##### Item 62.2 - Floor

The culvert floor is inaccessible due to the small rip rap placed along the entire length of both barrels, high water.

##### Item 62.3 - Walls

Condition based on visible area above water.

### CONDITION RATING GUIDE

	CODE	CONDITION	DEFECTS
	N	NOT APPLICABLE	Use if structure is not a culvert.
G	9	EXCELLENT	No deficiencies.
G	8	VERY GOOD	No noticeable or noteworthy differences which affect the condition of the culvert. Insignificant scrape marks caused by drift.
G	7	GOOD	Shrinkage cracks, light scaling, and insignificant spalling, which does not expose reinforcing steel. Insignificant damage caused by drift with not misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and no pitting.
F	6	SATISFACTORY	Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.
F	5	FAIR	Moderate to major deterioration, or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.
P	4	POOR	Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joints permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting.
P	3	SERIOUS	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls, nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls, or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations.
C	2	CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C	1	"IMMINENT" FAILURE	Bridge closed. Corrective action may put back in light service.
	0	FAILED	Bridge closed. Replacement necessary.

### DEFICIENCY REPORTING GUIDE

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

#### **CATEGORIES OF DEFICIENCIES:**

**M= Minor Deficiency** - (Examples include but are not limited to: Spalled concrete, minor to moderate corrosion to steel culverts, minor settlement or misalignment, minor scouring, minor damage to guardrail, etc.)

**S= Severe/Major Deficiency** - (Examples include but are not limited to: Large spalls, wide cracks, moderate to major deterioration in concrete, considerable settlement, considerable scouring or undermining, extensive corrosion and deflection in steel culverts, etc.)

**C-S= Critical Deficiency** - A deficiency in a structural component or element of a bridge that poses an extreme hazard or unsafe condition to the public. (Follow-up Critical Deficiency Report must be submitted separately)

#### **URGENCY OF REPAIR:**

**I = Immediate-** Inspector(s) stay at the bridge until the District Maintenance crew or the responsible Agency crew(if not a State bridge) show up and corrective action is taken.)

**A = ASAP-** (Action will be taken by the District Maintenance Engineer or the Responsible Agency (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).

CITY/TOWN <b>ACTON</b>	B.I.N. <b>240</b>	BR. DEPT. NO. <b>A-02-018</b>	8.-STRUCTURE NO. <b>A02018-240-MUN-NBI</b>	INSPECTION DATE <b>JAN 2, 2007</b>
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### REMARKS

**Item 62.4 - Headwall**

There is a crack 10 ft. long x up to 1/2 in. wide at the top of the South headwall (see photo 2). There is a minor hairline vertical crack near the centerline of the South headwall (see photo 3).

**Item 62.9 - Wearing Surface**

The wearing surface has been resurfaced since the previous inspection.

**Item 62.17 - Curbs**

There is a minor crack in the curb above the South headwall.

**APPROACHES**

**Approaches a - Appr. pavement condition**

Both approaches have been resurfaced since the previous inspection.

**Photo Log**

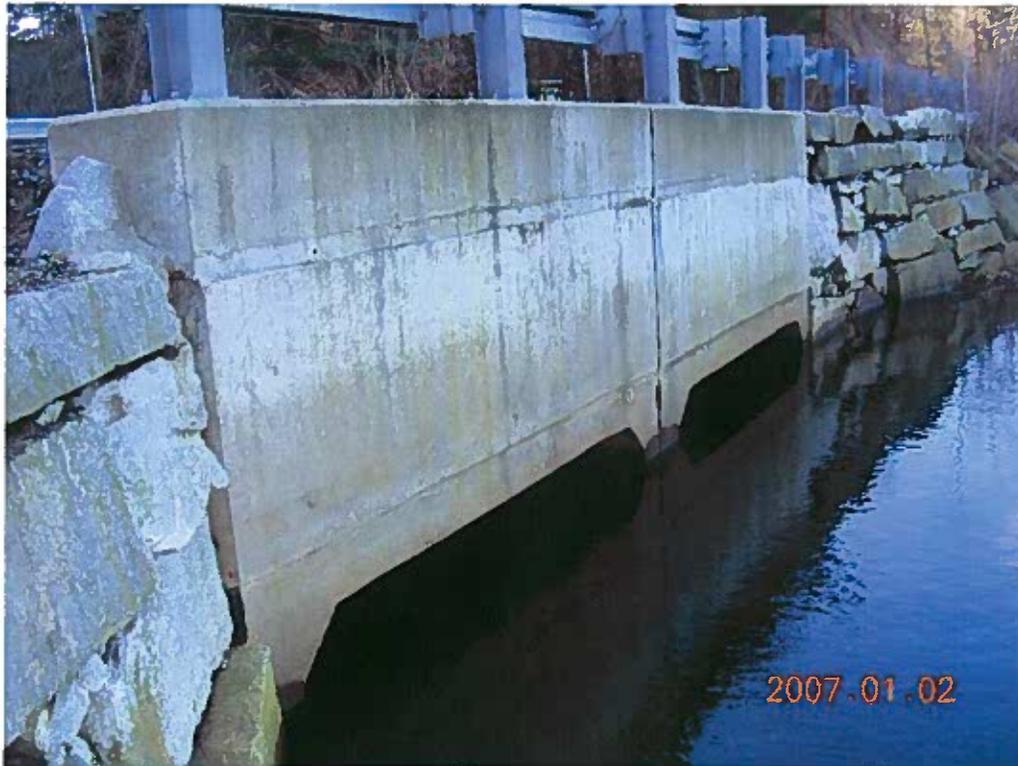
Photo 1 : North headwall with a 1 ft. clearance.

Photo 2 : A crack 10 ft. long x up to 1/2 in. wide at the top of the South headwall.

Photo 3 : Vertical hairline crack near the centerline of the South headwall.

CITY/TOWN ACTON	B.I.N. 240	BR. DEPT. NO. A-02-018	8.-STRUCTURE NO. A02018-240-MUN-NBI	INSPECTION DATE JAN 2, 2007
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## PHOTOS



**Photo 1:** North headwall with a 1 ft. clearance.



**Photo 2:** A crack 10 ft. long x up to 1/2 in. wide at the top of the South headwall.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>240</b>	BR. DEPT. NO. <b>A-02-018</b>	8-STRUCTURE NO. <b>A02018-240-MUN-NBI</b>	INSPECTION DATE <b>JAN 2, 2007</b>
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**PHOTOS**



**Photo 3: Vertical hairline crack near the centerline of the South headwall.**

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**UNDERWATER OPERATIONS TEAM**  
**ROUTINE UNDERWATER INSPECTION REPORT**

2-DIST  
**03**

B.I.N.  
**240**

BR. DEPT. NO.  
**A-02-018**

CITY/TOWN <b>ACTON</b>		8-STRUCTURE NO. <b>A02018-240-MUN-NBI</b>	LEVEL OF INSPECTION <b>II</b>	93B-DATE INSPECTED <b>AUG 23, 2006</b>
07-FACILITY CARRIED <b>HWY CONCORD RD</b>		ACCESS TO BRIDGE <b>EMBANKMENT</b>	UNDERWATER OPERATIONS ENGINEER <b>JOHN B. DESMOND</b>	
06-FEATURES INTERSECTED <b>WATER NASHOBA BROOK</b>		DEPTH <b>0.5 m</b>	VISIBILITY <b>0.5 m</b>	TEAM LEADER (DIVE MASTER) <b>EDWARD P. TERNSKY</b>
BOTTOM CONDITION <b>DUMPED STONE</b>		CURRENT <b>SLIGHT</b>	TEAM MEMBERS <b>S. A. BEGLEY</b>	

ITEM 60		N	
SUBSTRUCTURE		DEF	
1. Abutments	N		
a. Pedestals	N	-	
b. Bridge Seats	N	-	
c. Backwalls	N	-	
d. Breastwalls	N	-	
e. Wingwalls	N	-	
f. Slope Paving/Rip-Rap	N	-	
g. Pointing	N	-	
h. Footings	N	-	
i. Piles	N	-	
j. Scour	N	-	
k. Settlement	N	-	
l.	N	-	
2. Piers or Bents	N		
a. Pedestals	N	-	
b. Caps	N	-	
c. Columns	N	-	
d. Stems/Webs/Pierwalls	N	-	
e. Pointing	N	-	
f. Footing	N	-	
g. Piles	N	-	
h. Scour	N	-	
i. Settlement	N	-	
j.	N	-	
k.	N	-	
3. Pile Bents	N		
a. Pile Caps	N	-	
b. Piles	N	-	
c. Diagonal Bracing	N	-	
d. Horizontal Bracing	N	-	
e. Fasteners	N	-	
UNDERMINING (Y/N)			N

ITEM 61		7	
CHANNEL & CHANNEL PROTECTION		DEF	
1. Channel Scour	8	-	
2. Embankment Erosion	7	-	
3. Debris	8	-	
4. Vegetation	7	-	
5. Utilities	N	-	
6. Rip-Rap/Slope Protection	7	-	
7. Aggradation	8	-	
8. Fender System	N	-	
a. Piles	N	-	
b. Diagonal Bracing	N	-	
c. Horizontal Bracing	N	-	
d. Wales	N	-	
e. Fasteners	N	-	
f. Ladders	N	-	
9.	N	-	

ITEM 59		7	
SUPERSTRUCTURE		DEF	
	N	-	
	N	-	
	N	-	
UNDERMINING (Y/N)			N

ITEM 62		7	
CULVERTS		DEF	
1. Roof	7	-	
2. Floor	H	-	
3. Walls	7	M-P	
4. Headwall	N	-	
5. Wingwall	6	M-P	
6. Pipe	N	-	
7. Protective Coating	N	-	
8. Embankment	7	-	
9. Wearing Surface	N	-	
10. Railing	N	-	
11. Sidewalks	N	-	
12. Utilities	N	-	
13. Member Alignment	7	-	
14. Deformation	N	-	
15. Scour	8	-	
16. Settlement	7	-	
17.	N	-	
18.	N	-	
UNDERMINING (Y/N)			N

**DEFICIENCY REPORTING GUIDE**

**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 scouring, 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 corroding rebars, Deteriorated timber piles, Considerable settlement, Considerable scouring or undermining, 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: Any part of piles or fender system which are projecting outward and may become a safety hazard for the navigational traffic, 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.]

CITY/TOWN <b>ACTON</b>	B.I.N. <b>240</b>	BR. DEPT. NO. <b>A-02-018</b>	8.-STRUCTURE NO. <b>A02018-240-MUN-NBI</b>	INSPECTION DATE <b>AUG 23, 2006</b>
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## REMARKS

### GENERAL REMARKS

This structure consists of a precast concrete, double box culvert. There is a single box culvert 40' to the left of the double box culvert which has the Bridge Department Number A-02-041. The single box culvert is in the dry and was not inspected by the Underwater Operations Team.

- 1) Orientation - Barrels designated left and right when facing downstream. Walls are labeled left and right when facing downstream.
- 2) Sta 10+00 is at the upstream end.

### ITEM 62 - CULVERT

#### Item 62.2 - Floor

The floors are covered with small dumped stone.

#### Item 62.3 - Walls

The vertical joints between precast sections have been previously patched with mortar from the mudline to the upper fillet. All of the joints now have some missing mortar above the waterline with penetrations up to 6 inches.

#### Item 62.5 - Wingwall

All of the wingwalls are dry laid with some loss of fill and penetrations up to 30 inches.

#### Item 62.13 - Member Alignment

There is some misalignment to sections, this appears to have occurred during construction.

#### Sketch / Chart Log

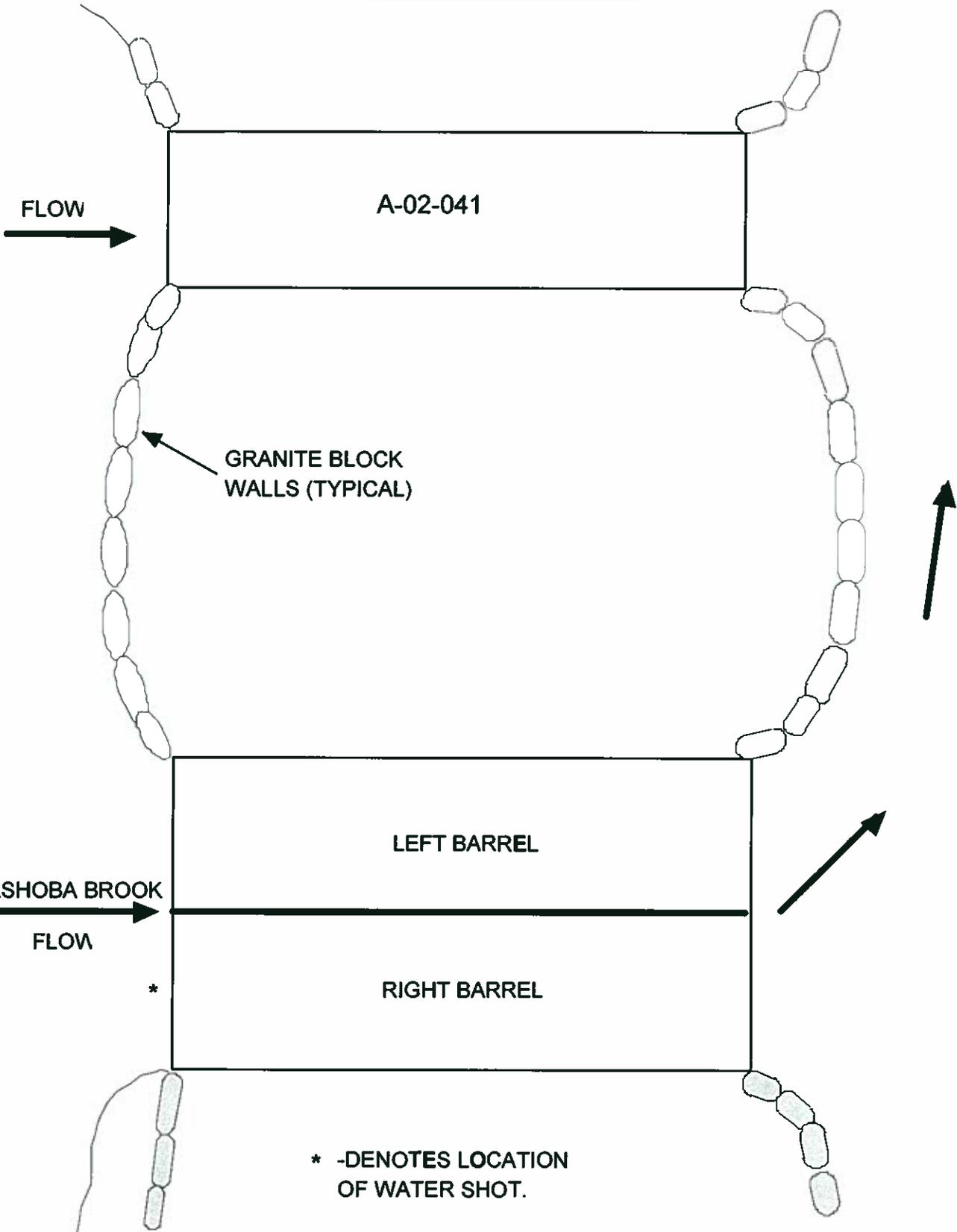
Sketch 1 : PLAN VIEW (NOT TO SCALE)

Sketch 2 : ELEVATION VIEW AT STA 10+00 (NOT TO SCALE)

Chart 1 : SCOUR MONITORING CHART.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>240</b>	BR. DEPT. NO. <b>A-02-018</b>	8.-STRUCTURE NO. <b>A02018-240-MUN-NBI</b>	INSPECTION DATE <b>AUG 23, 2006</b>
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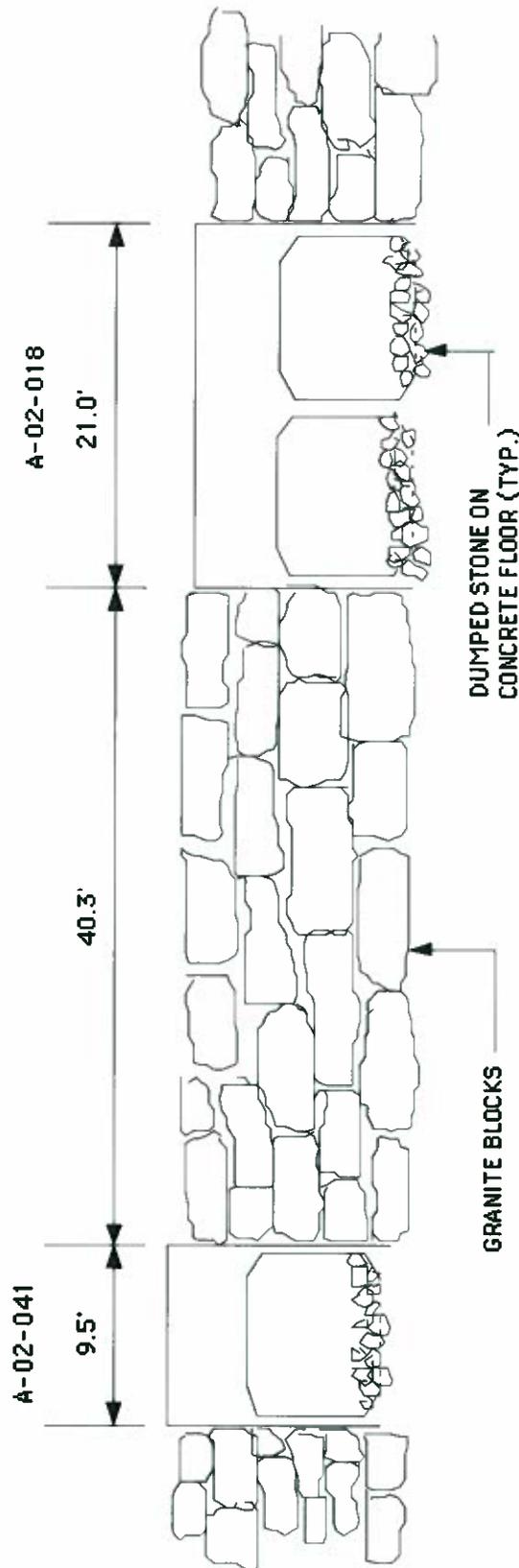
**SKETCHES**



**Sketch 1: PLAN VIEW (NOT TO SCALE)**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>240</b>	BR. DEPT. NO. <b>A-02-018</b>	8.-STRUCTURE NO. <b>A02018-240-MUN-NBI</b>	INSPECTION DATE <b>AUG 23, 2006</b>
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**SKETCHES**



**Sketch 2: ELEVATION VIEW AT STA 10+00 (NOT TO SCALE)**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>240</b>	BR. DEPT. NO. <b>A-02-018</b>	8.-STRUCTURE NO. <b>A02018-240-MUN-NBI</b>	INSPECTION DATE <b>AUG 23, 2006</b>
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## CHARTS

### SCOUR MONITORING CHART @ UPSTREAM END

ENGLISH MEASUREMENT:

OFFSETS	09/23/06	08/23/06			
LEFT SIDE , LEFT BARREL	1.10	1.60			
CL OF LEFT BARREL	1.50	1.60			
CL BARRELS	1.60	1.40			
CL OF RIGHT BARREL	1.70	1.60			
RIGHT SIDE, RIGHT BARREL	1.00	1.50			
Y	3.80	1.75			
CORRECTION	-	-2.05			

**Note:**

1. Water control shot (Y) = Waterline to roof at centerline of right barrel at the upstream end.
2. For comparison all soundings are adjusted to the 2003 water level.
4. Station 10+00 is located at the upstream end.

**Chart 1: SCOUR MONITORING CHART.**

Report Date: October 23, 2007

State Information				Classification				Code	
BDEPT#	A02018	Agency Br. No.		(112) NBIS Bridge Length				Y	
Town	Acton			(104) Highway System				N	
B.I.N.	240	AASHTO	079.6	(26) Functional Class -	Urban Minor Arterial			16	
		FHWA Select List	N	(100) Defense Highway				0	
		Structure Number	A02016240MUNNBI	(101) Parallel Structure				N	
(5) Inventory Route			151000000	(102) Direction of Traffic -	2-way traffic			2	
(2) State Highway Department District			03	(103) Temporary Structure				N	
(3) County Code	017	(4) Place code	00360	(105) Federal Lands Highways				0	
(8) Features Intersected	WATER NASHOBA BROOK			(110) Designated National Network				N	
(7) Facility Carried	HWY CONCORD RD			(20) Toll -	On free road			3	
(9) Location	.1 MI W OF RTE 2A			(21) Maintain -	Town Agency			03	
(11) Kilometerpoint			0000.161	(22) Owner -	Town Agency			03	
(12) Base Highway Network			N	(37) Historical Significance	undetermined				
(13) LRS Inventory Route & Subroute	000000000000			Condition				Code	
(16) Latitude	42 DEG 28 MIN	40.40 SEC		(58) Deck				N	
(17) Longitude	71 DEG 24 MIN	54.84 SEC		(59) Superstructure				N	
(98) Border Bridge State Code		Share	%	(60) Substructure				N	
(99) Border Bridge Structure No. #				(61) Channel & Channel Protection				7	
				(62) Culverts				7	
Structure Type and Material				Load Rating and Posting				Code	
(43) Structure Type Main:	Concrete	Code	119	(31) Design Load -	Other/Unknown			0	
Culvert	Jointless bridge type:	Not applicable		(83) Operating Rating Method -	No rating analysis performed			5	
(44) Structure Type Appr:		Code	000	(64) Operating Rating				44.1	
Other				(65) Inventory Rating Method -	No rating analysis performed			5	
(45) Number of spans in main unit			002	(66) Inventory Rating				32.4	
(46) Number of approach spans			0000	(70) Bridge Posting				5	
(107) Deck Structure Type -	Not applicable	Code	N	(41) Structure -	Open			A	
(108) Wearing Surface / Protective System:				Appraisal				Code	
A) Type of wearing surface -	Not applicable=no deck	Code	N	(67) Structural Evaluation				7	
B) Type of membrane -	Not applicable=no deck	Code	N	(88) Deck Geometry				2	
Type of deck protection -	Not applicable=no deck	Code	N	(69) Underclearances, vert. and horiz.				N	
				(71) Waterway adequacy				8	
Age and Service				(72) Approach Roadway Alignment				8	
(27) Year Built			1994	(36) Traffic Safety Features				1 1 1 1	
(106) Year Reconstructed			0000	(113) Scour Critical Bridges				6	
(42) Type of Service: On -	Highway			Inspections					
Under -	Waterway	Code	15	(90) Inspection Date	01/02/07	(91) Frequency	24	MO	
(28) Lanes: On Structure	02	Under structure	00	(92) Critical Feature Inspection:		(93) CFI DATE			
(29) Average Daily Traffic			007700	(A) Fracture Critical Detail	N 00	MO A)	00/00/00		
(30) Year of ADT	2006	(109) Truck ADT	03 %	(B) Underwater Inspection	Y 36	MO B)	08/23/08		
(19) Bypass, detour length			003 KM	(C) Other Special Inspection	N 00	MO C)	00/00/00		
Geometric Data				(*) Other Inspection ()	N 00	MO *)	00/00/00		
(48) Length of maximum span			0002.7 M	(*) Closed Bridge	N 00	MO *)	00/00/00		
(49) Structure Length			00006.1 M	(*) UW Special Inspection	N 00	MO *)	00/00/00		
(50) Curb or sidewalk:	Left	00.0 M	Right	(*) Damage Inspection		MO *)	00/00/00		
(51) Bridge Roadway Width Curb to Curb			007.3 M	Rating Loads					
(52) Deck Width Out to Out			010.8 M	Report Date	00/00/00	H20	Type 3	Type 3S2	Type HS
(32) Approach Roadway Width (w/shoulders)			007.3 M	Operating		27.0	34.0	49.0	49.0
(33) Bridge Median -	No median	Code	0	Inventory		20.0	25.0	36.0	36.0
(34) Skew	06 DEG	(35) Structure Flared	N	Field Posting					
(10) Inventory Route MIN Vert Clear			99.99 M	Status	DESIGN	Posting Date	10/01/94		
(47) Inventory Route Total Horiz Clear			07.3 M						
(53) Min Vert Clear Over Bridge Rdwy			99.99 M	Actual	2 Axle	3 Axle	5 Axle		
(54) Min Vert Underclear ref	N		00.00 M	Recommended					
(55) Min Lat Underclear RT ref	N		00.0 M	Missing Signs	N				
(56) Min Lat Underclear LT			00.0 M	Misc.					
Navigation Data				Bridge Name					
(3) Navigation Control -	No navigation control on waterway	Code	0	N Anti-missile fence	N Acrow Panel	N Jointless Bridge			
(4) River Protection		Code		Freeze/Thaw	N : Not Applicable				
(39) Navigation Vertical Clearance			000.0 M	Accessibility (Needed/Used)					
(116) Vert-lift Bridge Nav Min Vert Clear			M	N / N	Liftbucket	N / N	Rigging	Inspection	
(40) Navigation Horizontal Clearance			0000.0 M	N / N	Ladder	N / N	Staging	Hours: 008	
				N / N	Boat	N / N	Traffic Control		
				Y / N	Wader	N / N	RR Flagperson		
				N / N	Inspector 50	N / N	Police		

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**CULVERT INSPECTION**

2-DIST **03** B.I.N. **258**

BR. DEPT. NO. **A-02-020**

CITY/TOWN <b>ACTON</b>	8-STRUCTURE NO. <b>A02020-258-MUN-NBI</b>	11-Kilo. POINT <b>001.046</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>JAN 6, 2006</b>
07-FACILITY CARRIED <b>HWY RIVER ST</b>	MEMORIAL NAME/LOCAL NAME	27-YR BUILT <b>1981</b>	106-YR REBUILT <b>0000</b>	YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER FORT POND BROOK</b>	26-FUNCTIONAL CLASS <b>Urban Local</b>	DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Steel Culvert</b>	22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>R. C. Angell</b>	
107-DECK TYPE <b>Not applicable</b>	WEATHER <b>Cloudy</b>	TEMP. (air) <b>1°C</b>	TEAM MEMBERS <b>L. A. GAUTHIER</b>	

<b>TYPE OF CULVERT:</b>		<b>BARRELS:</b> (In Meters)	
SHAPE: <b>ROUND</b>		SIZE: <b>3.00mx3.05m</b>	NUMBER: <b>2</b>
MATERIAL: <b>CORRUGATED STEEL</b>		DEPTH OF COVER (To the nearest tenth of a meter)	
COATING: <b>ASPHALTIC</b>		N <b>0.6</b>	S <b>0.6</b>
		CURB REVEAL (In millimeters)	
		N <b>N</b>	N <b>N</b>

**ITEM 62 CULVERT & RETAINING WALLS** 7 162 (Dive Report): **N** 162 (This Report): **7**

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF	
1. Roof	N	N	-	7. Protective Coating	N	6	M-P	13. Member Alignment	N	8	-	UNDERMINING (Y/N) If YES please explain <b>N</b>
2. Floor	N	N	-	8. Embankment	N	7	-	14. Deformation	N	8	-	
3. Walls	N	N	-	9. Wearing Surface	N	8	-	15. Scour	N	6	S-P	COLLISION DAMAGE: <u>Please explain</u> None (X) Minor ( ) Moderate ( ) Severe ( )
4. Headwall	N	7	-	10. Railing	N	8	-	18. Settlement	N	7	-	
5. Wingwall	N	7	-	11. Sidewalks	N	N	-	17.				LOAD VIBRATION: <u>Please explain</u> None (X) Minor ( ) Moderate ( ) Severe ( )
6. Pipe	N	7	M-P	12. Utilities	N	N	-	18.				

**ITEM 61 CHANNEL & CHANNEL PROTECTION** 7

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF
1. Channel Scour	N	6	S-P	5. Utilities	N	N	-
2. Embankment Erosion	N	7	-	6. Rip-Rap/Slope Protection	N	7	-
3. Debris	N	5	M-P	7. Aggradation	N	7	M-P
4. Vegetation	N	7	-				

STREAM FLOW VELOCITY: Tidal ( ) High ( ) Moderate (X) Low ( )

ITEM 61 (Dive Report): **N**

ITEM 61 (This Report): **7**

93b- U/W INSP DATE: **00/00/00**

APPROACH CONDITION		DEF
a. Appr. pavement condition	<b>7</b>	-
b. Appr. Roadway Settlement	<b>8</b>	-
c. Appr. Sidewalk Settlement	<b>N</b>	-
d.		

**WEIGHT POSTING**

Actual Posting  Not Applicable

Recommended Posting

Waived Date: **00/00/00** EJDMT Date: **00/00/00**

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"/>

**ITEM 36 TRAFFIC SAFETY**

	36	COND	DEF
A. Bridge Railing	<b>1</b>	<b>7</b>	-
B. Transitions	<b>1</b>	<b>7</b>	-
C. Approach Guardrail	<b>1</b>	<b>7</b>	-
D. Approach Guardrail Ends	<b>0</b>	<b>7</b>	S-P

**ACCESSIBILITY (Y/N/P):**

	Needed	Used	Other:	Needed	Used
Ladder	<b>N</b>	<b>N</b>			
Boat	<b>N</b>	<b>N</b>		<b>N</b>	<b>N</b>
Waders	<b>Y</b>	<b>Y</b>			

TOTAL HOURS **8**

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

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

TAPE#:

**RATING**

Request for Rating or Rerating (Y/N) **Y**

Rating Report (Y/N) **N**

Date: **00/00/00**

REASON: **Based on design.**

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

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

CITY/TOWN <b>ACTON</b>	B.I.N. <b>258</b>	BR. DEPT. NO. <b>A-02-020</b>	8.-STRUCTURE NO. <b>A02020-258-MUN-NBI</b>	INSPECTION DATE <b>JAN 6, 2006</b>
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### REMARKS, PHOTOS & SKETCHES

#### BRIDGE ORIENTATION

The approaches are W to E and the elevations are S to N. This is a two span pipe culvert with the barrels numbered from W to E. The brook flows from N to S.

#### ITEM 62 - CULVERT

##### Item 62.6 - Pipe

There are three small holes in the top of the W barrel near the S end, and two small holes in the top of the E barrel near the S end. These holes are a result of the vertical guardrail posts driven into the ground, and through the barrels. All of the holes are approx. 1-1/2 in. in diameter and are blocked with earth and show minor weeping. See photo #1. There are some nuts and bolts missing on the seams throughout both barrels, that were never installed.

##### Item 62.7 - Protective Coating

Asphaltic coating is wearing off on the bottom of both barrels and exposing the steel shell and resulting in some minor surface rusting.

##### Item 62.15 - Scour

Re: Item 61.1.

### CONDITION RATING GUIDE

CODE	CONDITION	DEFECTS
N	NOT APPLICABLE	Use if structure is not a culvert.
G 9	EXCELLENT	No deficiencies.
G 8	VERY GOOD	No noticeable or noteworthy differences which affect the condition of the culvert. Insignificant scrape marks caused by drift.
G 7	GOOD	Shrinkage cracks, light scaling, and insignificant spalling, which does not expose reinforcing steel. Insignificant damage caused by drift with not misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and no pitting.
F 6	SATISFACTORY	Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.
F 5	FAIR	Moderate to major deterioration, or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.
P 4	POOR	Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joints permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting.
P 3	SERIOUS	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls, nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls, or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations.
C 2	CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C 1	"IMMINENT" FAILURE	Bridge closed. Corrective action may put back in light service.
0	FAILED	Bridge closed. Replacement necessary.

### DEFICIENCY REPORTING GUIDE

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

#### **CATEGORIES OF DEFICIENCIES:**

**M= Minor Deficiency** - (Examples include but are not limited to: Spalled concrete, minor to moderate corrosion to steel culverts, minor settlement or misalignment, minor scouring, minor damage to guardrail, etc.)

**S= Severe/Major Deficiency** - (Examples include but are not limited to: Large spalls, wide cracks, moderate to major deterioration in concrete, considerable settlement, considerable scouring or undermining, extensive corrosion and deflection in steel culverts, etc.)

**C-S= Critical Deficiency** - A deficiency in a structural component or element of a bridge that poses an extreme hazard or unsafe condition to the public. (Follow-up Critical Deficiency Report must be submitted separately)

#### **URGENCY OF REPAIR:**

**I = Immediate**- [Inspector(s) stay at the bridge until the District Maintenance crew or the responsible Agency crew (if not a State bridge) show up and corrective action is taken.]

**A = ASAP**- [Action will be taken by the District Maintenance Engineer or the Responsible Agency (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].

CITY/TOWN <b>ACTON</b>	B.I.N. <b>258</b>	BR. DEPT. NO. <b>A-02-020</b>	8.-STRUCTURE NO. <b>A02020-258-MUN-NBI</b>	INSPECTION DATE <b>JAN 6, 2006</b>
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## REMARKS

### ITEM 61 - CHANNEL AND CHANNEL PROTECTION

#### Item 61.1 - Channel Scour

The minor piping behind both barrels of the culvert at the N end, noted on the previous inspection, could not be detected due to the high water level.

#### Item 61.3 - Debris

There is a moderate build up of debris (tree limbs, branches, & leaves) to upstream side of W barrel. See photo #2. There is a minor build up of debris (tree limbs & branches) to downstream side of W barrel. This debris is causing little effect on stream flow.

#### Item 61.7 - Aggradation

There is a minor build up of alluvial material (sand, gravel, & small stones) throughout both barrels. This debris is not restricting the flow.

### TRAFFIC SAFETY

#### Item 36d - Approach Guardrail Ends

The SW, NW, & NE terminal ends are boxing glove ends that are not sufficiently turned from traffic.

#### Photo Log

Photo 1 : Two small holes to S barrel, typical of three small holes in N barrel.

Photo 2 : Debris at upstream side of W culvert barrel.

CITY/TOWN  
ACTONB.I.N.  
258BR. DEPT. NO.  
A-02-0208.-STRUCTURE NO.  
A02020-258-MUN-NBIINSPECTION DATE  
JAN 6, 2006

## PHOTOS



**Photo 1: Two small holes to S barrel, typical of three small holes in N barrel.**



**Photo 2: Debris at upstream side of W culvert barrel.**



**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**CULVERT INSPECTION**

2-DIST **03** B.I.N. **259**

BR. DEPT. NO. **A-02-021**

CITY/TOWN <b>ACTON</b>	8-STRUCTURE NO. <b>A02021-259-MUN-NBI</b>	11-Kilo. POINT <b>000.805</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>JAN 18, 2006</b>
07-FACILITY CARRIED <b>HWY RIVER ST</b>	MEMORIAL NAME/LOCAL NAME	27-YR BUILT <b>1981</b>	106-YR REBUILT <b>0000</b>	YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER FORT POND BROOK</b>	26-FUNCTIONAL CLASS <b>Urban Local</b>	DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Steel Culvert</b>	22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>S. A. Begley</b>	
107-DECK TYPE <b>Not applicable</b>	WEATHER <b>Rain</b>	TEMP. (air) <b>6°C</b>	TEAM MEMBERS <b>M. DYGON</b>	

<b>TYPE OF CULVERT:</b> <table border="1"> <tr><td>SHAPE:</td><td><b>PIPE ARCH</b></td></tr> <tr><td>MATERIAL:</td><td><b>CORRUGATED STEEL</b></td></tr> <tr><td>COATING:</td><td><b>ASPHALTIC</b></td></tr> </table>	SHAPE:	<b>PIPE ARCH</b>	MATERIAL:	<b>CORRUGATED STEEL</b>	COATING:	<b>ASPHALTIC</b>	<b>BARRELS:</b> (In Meters) <table border="1"> <tr><td>SIZE:</td><td><b>2.70mx2.00m</b></td><td>NUMBER:</td><td><b>2</b></td></tr> </table> <b>DEPTH OF COVER</b> (To the nearest tenth of a meter) <table border="1"> <tr><td>N</td><td><b>0.6</b></td><td>S</td><td><b>0.6</b></td></tr> </table> <b>CURB REVEAL</b> (In millimeters) <table border="1"> <tr><td>N</td><td><b>N</b></td></tr> </table>	SIZE:	<b>2.70mx2.00m</b>	NUMBER:	<b>2</b>	N	<b>0.6</b>	S	<b>0.6</b>	N	<b>N</b>
SHAPE:	<b>PIPE ARCH</b>																
MATERIAL:	<b>CORRUGATED STEEL</b>																
COATING:	<b>ASPHALTIC</b>																
SIZE:	<b>2.70mx2.00m</b>	NUMBER:	<b>2</b>														
N	<b>0.6</b>	S	<b>0.6</b>														
N	<b>N</b>																

**ITEM 62 CULVERT & RETAINING WALLS** **7** 162 (Dive Report): **N** 162 (This Report): **7**

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF	
1. Roof	<b>N</b>	<b>7</b>	-	7. Protective Coating	<b>N</b>	<b>5</b>	<b>M-P</b>	13. Member Alignment	<b>N</b>	<b>8</b>	-	UNDERMINING (Y/N) If YES please explain <b>N</b>
2. Floor	<b>N</b>	<b>6</b>	<b>M-P</b>	8. Embankment	<b>N</b>	<b>7</b>	-	14. Deformation	<b>N</b>	<b>7</b>	-	
3. Walls	<b>N</b>	<b>7</b>	-	9. Wearing Surface	<b>N</b>	<b>7</b>	-	15. Scour	<b>N</b>	<b>6</b>	<b>M-P</b>	COLLISION DAMAGE: <u>Please explain</u> None ( <input checked="" type="checkbox"/> ) Minor ( ) Moderate ( ) Severe ( )
4. Headwall	<b>N</b>	<b>6</b>	<b>M-P</b>	10. Railing	<b>N</b>	<b>7</b>	-	16. Settlement	<b>N</b>	<b>7</b>	-	
5. Wingwall	<b>N</b>	<b>N</b>	-	11. Sidewalks	<b>N</b>	<b>N</b>	-	17. Channel Wall	<b>N</b>	<b>5</b>	<b>M-P</b>	LOAD VIBRATION: <u>Please explain</u> None ( <input checked="" type="checkbox"/> ) Minor ( ) Moderate ( ) Severe ( )
6. Pipe	<b>N</b>	<b>N</b>	-	12. Utilities	<b>N</b>	<b>N</b>	-	18.				

**ITEM 61 CHANNEL & CHANNEL PROTECTION** **7**

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF
1. Channel Scour	<b>N</b>	<b>6</b>	<b>M-P</b>	5. Utilities	<b>N</b>	<b>N</b>	-
2. Embankment Erosion	<b>N</b>	<b>7</b>	-	6. Rip-Rep/Slope Protection	<b>N</b>	<b>7</b>	-
3. Debris	<b>N</b>	<b>5</b>	<b>M-P</b>	7. Aggradation	<b>N</b>	<b>7</b>	-
4. Vegetation	<b>N</b>	<b>7</b>	-				

STREAM FLOW VELOCITY: Tidal ( ) High (  ) Moderate ( ) Low ( )

ITEM 61 (Dive Report): **N**  
 ITEM 61 (This Report): **7**

93b- U/W INSP DATE: **00/00/00**

	DEF
a. Appr. pavement condition	<b>7</b> -
b. Appr. Roadway Settlement	<b>7</b> -
c. Appr. Sidewalk Settlement	<b>N</b> -
d.	

**WEIGHT POSTING**

Actual Posting:  Not Applicable

H	3	3S2	Single
<b>N</b>	<b>N</b>	<b>N</b>	<b>N</b>
Recommended Posting	<b>N</b>	<b>N</b>	<b>N</b>

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"/>

Waived Date: **00/00/00** EJDMT Date: **00/00/00**

**ITEM 36 TRAFFIC SAFETY**

	36	COND	DEF
A. Bridge Railing	<b>1</b>	<b>7</b>	-
B. Transitions	<b>1</b>	<b>7</b>	-
C. Approach Guardrail	<b>1</b>	<b>7</b>	-
D. Approach Guardrail Ends	<b>1</b>	<b>5</b>	<b>M-P</b>

**ACCESSIBILITY (Y/N/P):**

	Needed	Used	Other:	Needed	Used
Ladder	<b>N</b>	<b>N</b>			
Boat	<b>N</b>	<b>N</b>		<b>N</b>	<b>N</b>
Waders	<b>Y</b>	<b>Y</b>			

TOTAL HOURS **8**

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

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

TAPE#:

**RATING**

Request for Rating or Rerating (Y/N) **Y** If YES please give priority: HIGH ( ) MEDIUM ( ) LOW (  )

Rating Report (Y/N) **N**

REASON: **Based on Design**

Date: **00/00/00**

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

CITY/TOWN <b>ACTON</b>	B.I.N. <b>259</b>	BR. DEPT. NO. <b>A-02-021</b>	8.-STRUCTURE NO. <b>A02021-259-MUN-NBI</b>	INSPECTION DATE <b>JAN 18, 2006</b>
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### REMARKS, PHOTOS & SKETCHES

#### BRIDGE ORIENTATION

The approaches are West and East and the elevations are South and North. This is a two barrel culvert with the barrels numbered from West to East. The brook flows from South to North.

#### ITEM 62 - CULVERT

##### Item 62.1 - Roof

There is a slight bow, approx. 2 in., in the West barrel. See photo 1.

##### Item 62.2 - Floor

The asphaltic coating is wearing away along both floors, up to the waterline causing surface rusting. See photo 2. 10% of the floor in barrel #1 is covered with gravel. 90% of the floor in barrel #2 is covered with gravel.

##### Item 62.4 - Headwall

The South headwall has minor cracking. There is a 2 1/2 ft. diameter x 2 ft. deep sinkhole in the fill behind the South guardrail above barrel #2, 2 ft. from the back of the headwall. See photo 3.

##### Item 62.7 - Protective Coating

See Item 62.2 for comments.

### CONDITION RATING GUIDE

CODE	CONDITION	DEFECTS
N	NOT APPLICABLE	Use if structure is not a culvert.
G 9	EXCELLENT	No deficiencies.
G 8	VERY GOOD	No noticeable or noteworthy differences which affect the condition of the culvert. Insignificant scrape marks caused by drift.
G 7	GOOD	Shrinkage cracks, light scaling, and insignificant spalling, which does not expose reinforcing steel. Insignificant damage caused by drift with not misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and no pitting.
F 6	SATISFACTORY	Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.
F 5	FAIR	Moderate to major deterioration, or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.
P 4	POOR	Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joints permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting.
P 3	SERIOUS	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls, nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls, or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations.
C 2	CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C 1	"IMMINENT" FAILURE	Bridge closed. Corrective action may put back in light service.
0	FAILED	Bridge closed. Replacement necessary.

### DEFICIENCY REPORTING GUIDE

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

#### **CATEGORIES OF DEFICIENCIES:**

**M= Minor Deficiency** - (Examples include but are not limited to: Spalled concrete, minor to moderate corrosion to steel culverts, minor settlement or misalignment, minor scouring, minor damage to guardrail, etc.)

**S= Severe/Major Deficiency** - (Examples include but are not limited to: Large spalls, wide cracks, moderate to major deterioration in concrete, considerable settlement, considerable scouring or undermining, extensive corrosion and deflection in steel culverts, etc.)

**C-S= Critical Deficiency** - A deficiency in a structural component or element of a bridge that poses an extreme hazard or unsafe condition to the public. (Follow-up Critical Deficiency Report must be submitted separately)

#### **URGENCY OF REPAIR:**

**I = Immediate**- [Inspector(s) stay at the bridge until the District Maintenance crew or the responsible Agency crew (if not a State bridge) show up and corrective action is taken.]

**A = ASAP**- [Action will be taken by the District Maintenance Engineer or the Responsible Agency (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]

CITY/TOWN <b>ACTON</b>	B.I.N. <b>259</b>	BR. DEPT. NO. <b>A-02-021</b>	8.-STRUCTURE NO. <b>A02021-259-MUN-NBI</b>	INSPECTION DATE <b>JAN 18, 2006</b>
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## REMARKS

### Item 62.9 - Wearing Surface

There is a 4 ft. minor transverse crack midspan in the East bound lane.

### Item 62.14 - Deformation

See Item 62.1.

### Item 62.15 - Scour

See Item #61.1

### Item 62.17 - Channel Wall

A 5 ft. high x 4 ft. 4 inches wide x 4 ft. deep section of the Southwest channel wall has collapsed. See photo 4.

## ITEM 61 - CHANNEL AND CHANNEL PROTECTION

### Item 61.1 - Channel Scour

The upstream end is channelized with mortared granite and field stone retaining walls. The steep grade of the channel approach increases the stream flow velocity slightly. There is minor channel scour just below the West barrel at the upstream opening. Taken from previous Inspection report of 01-26-2004 due to debris across both barrels and extreme velocity condition.

### Item 61.3 - Debris

There is debris upstream across both barrels. See photo 5.

### Item 61.7 - Aggradation

See Item 62.2.

## APPROACHES

### Approaches a - Appr. pavement condition

There is a full width 1/4 inch wide transverse crack in the West approach.

## TRAFFIC SAFETY

### Item 36b - Transitions

The Northeast transition rail has minor collision damage.

### Item 36c - Approach Guardrail

The Northeast approach rail has minor collision damage.

### Item 36d - Approach Guardrail Ends

The Southeast terminal end end has moderate collision damage. See photo 6.

## Photo Log

- Photo 1 : Barrel #1 ( West ).
- Photo 2 : Surface rusting to barrel. Typical.
- Photo 3 : Sinkhole above barrel #2. South end.
- Photo 4 : Collapse to the Southwest channel wall.
- Photo 5 : Debris across both barrels at the upstream end.
- Photo 6 : Collision damage to the Southeast terminal end.

CITY/TOWN  
ACTONB.I.N.  
259BR. DEPT. NO.  
A-02-0218.-STRUCTURE NO.  
A02021-259-MUN-NBIINSPECTION DATE  
JAN 18, 2006

## PHOTOS

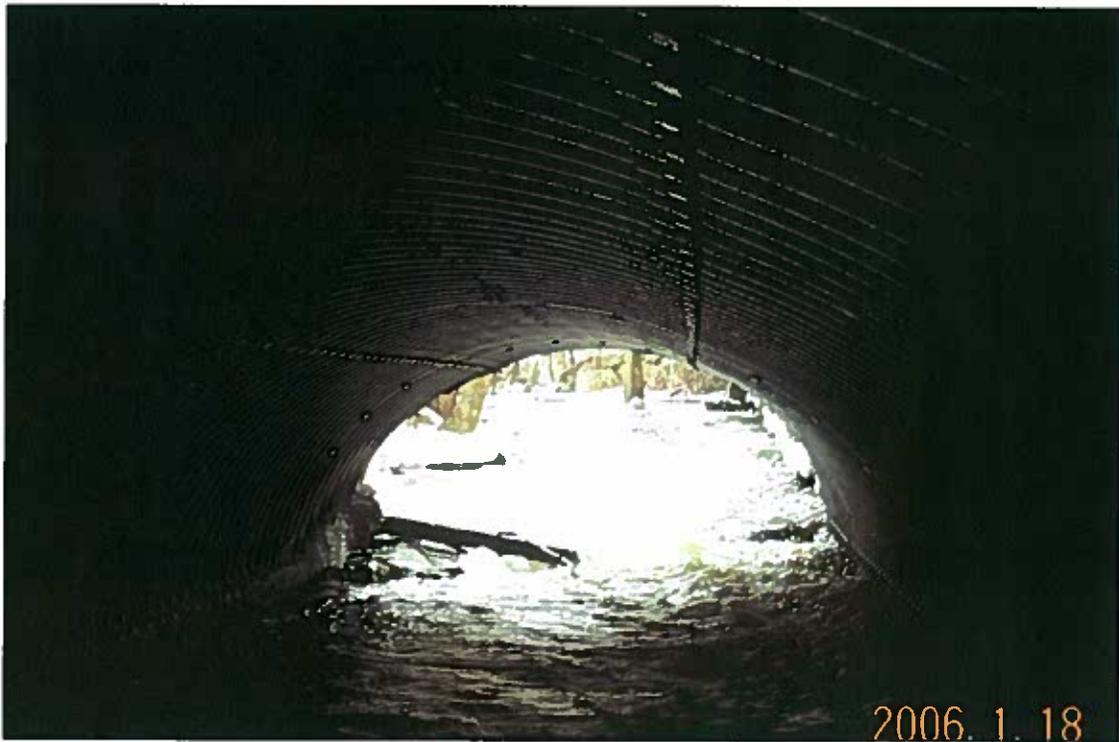


Photo 1: Barrel #1 ( West ).



Photo 2: Surface rusting to barrel. Typical.

CITY/TOWN  
ACTONB.I.N.  
259BR. DEPT. NO.  
A-02-0218-STRUCTURE NO.  
A02021-259-MUN-NBIINSPECTION DATE  
JAN 18, 2006

## PHOTOS



**Photo 3: Sinkhole above barrel #2. South end.**



**Photo 4: Collapse to the Southwest channel wall.**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>259</b>	BR. DEPT. NO. <b>A-02-021</b>	8-STRUCTURE NO. <b>A02021-259-MUN-NBI</b>	INSPECTION DATE <b>JAN 18, 2006</b>
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**PHOTOS**

**Photo 5: Debris across both barrels at the upstream end.**



**Photo 6: Collision damage to the Southeast terminal end.**

Report Date: October 23, 2007

State Information  
 BDEPT# A02021 Agency Br.No.  
 Town Acton  
 B.I.N# 259 AASHTO# 097.4  
 Identification  
 FHWA Select List# N  
 Structure Number A02021259MUNNBI  
 (5) Inventory Route 151000000  
 (2) State Highway Department District 03  
 (3) County Code 017 (4) Place code 00380  
 (6) Features Intersected WATER FORT POND BROOK  
 (7) Facility Carried HWY RIVER ST  
 (9) Location ACROSS FROM VANDERBELT ST  
 (11) Kilometerpoint 0000.805  
 (12) Base Highway Network N  
 (13) LRS Inventory Route & Subroute 000000000000  
 (16) Latitude 42 DEG 27 MIN 33.56 SEC  
 (17) Longitude 71 DEG 26 MIN 34.57 SEC  
 (98) Border Bridge State Code Share %  
 (99) Border Bridge Structure No. #  
 Structure Type and Material  
 (43) Structure Type Main: Steel Code 319  
 Culvert Jointless bridge type: Not applicable  
 (44) Structure Type Appr:  
 Other Code 000  
 (45) Number of spans in main unit 002  
 (46) Number of approach spans 0000  
 (107) Deck Structure Type - Not applicable Code N  
 (108) Wearing Surface / Protective System:  
 A) Type of wearing surface - Not applicable=no deck Code N  
 B) Type of membrane - Not applicable=no deck Code N  
 Type of deck protection - Not applicable=no deck Code N  
 Age and Service  
 (27) Year Built 1981  
 (108) Year Reconstructed 0000  
 (42) Type of Service: On - Highway  
 Under - Waterway Code 15  
 (28) Lanes: On Structure 02 Under structure 00  
 (29) Average Daily Traffic 000600  
 (30) Year of ADT 2002 (109) Truck ADT 15 %  
 (19) Bypass, detour length 003 KM  
 Geometric Data  
 (48) Length of maximum span 0002.7 M  
 (49) Structure Length 00006.8 M  
 (50) Curb or sidewalk: Left 00.0 M Right 00.0 M  
 (51) Bridge Roadway Width Curb to Curb 006.4 M  
 (52) Deck Width Out to Out 011.0 M  
 (32) Approach Roadway Width (w/shoulders) 005.2 M  
 (33) Bridge Median - No median Code 0  
 (34) Skew 41 DEG (35) Structure Flared N  
 (10) Inventory Route MIN Vert Clear 99.99 M  
 (47) Inventory Route Total Horiz Clear 06.4 M  
 (53) Min Vert Clear Over Bridge Rdwy 99.99 M  
 (54) Min Vert Underclear ref N 00.00 M  
 (55) Min Lat Underclear RT ref N 00.0 M  
 (56) Min Lat Underclear LT 00.0 M

Navigation Data  
 (39) Navigation Control - No navigation control on waterway Code 0  
 (40) Navigation Vertical Clearance 000.0 M  
 (118) Vert-lift Bridge Nav Min Vert Clear M  
 (40) Navigation Horizontal Clearance 0000.0 M

Classification Code  
 (112) NBIS Bridge Length Y  
 (104) Highway System N  
 (26) Functional Class - Urban Local 19  
 (100) Defense Highway 0  
 (101) Parallel Structure N  
 (102) Direction of Traffic - 2-way traffic 2  
 (103) Temporary Structure N  
 (105) Federal Lands Highways 0  
 (110) Designated National Network N  
 (20) Toll - On free road 3  
 (21) Maintn - Town Agency 03  
 (22) Owner - Town Agency 03  
 (37) Historical Significance undetermined

Condition Code  
 (56) Deck N  
 (59) Superstructure N  
 (60) Substructure N  
 (81) Channel & Channel Protection 7  
 (82) Culverts 7

Load Rating and Posting Code  
 (31) Design Load - Other/Unknown 0  
 (63) Operating Rating Method - No rating analysis performed 5  
 (84) Operating Rating 44.1  
 (65) Inventory Rating Method - No rating analysis performed 5  
 (66) Inventory Rating 32.4  
 (70) Bridge Posting 5  
 (41) Structure - Open A

Appraisal Code  
 (67) Structural Evaluation 7  
 (86) Deck Geometry 5  
 (89) Underclearances, vert. and horiz. N  
 (71) Waterway adequacy 6  
 (72) Approach Roadway Alignment 6  
 (36) Traffic Safety Features 1 1 1 1  
 (113) Scour Critical Bridges 6

Inspections  
 (90) Inspection Date 01/18/06 (91) Frequency 24 MO  
 (92) Critical Feature Inspection: (93) CFI DATE  
 (A) Fracture Critical Detail N 00 MO A) 00/00/00  
 (B) Underwater Inspection N 00 MO B) 07/01/85  
 (C) Other Special Inspection N 00 MO C) 00/00/00  
 (\*) Other Inspection ( ) N 00 MO \*) 00/00/00  
 (\*) Closed Bridge N 00 MO \*) 00/00/00  
 (\*) UW Special Inspection N 00 MO \*) 00/00/00  
 (\*) Damage Inspection MO \*) 00/00/00

Rating Loads  
 Report Date 00/00/00 H20 Type 3 Type 3S2 Type HS  
 Operating 27.0 34.0 49.0 49.0  
 Inventory 20.0 25.0 36.0 36.0

Field Posting  
 Status DESIGN Posting Date 01/01/81  
 2 Axle 3 Axle 5 Axle  
 Actual  
 Recommended  
 Missing Signs N

Misc.  
 Bridge Name  
 N Anti-missile fence N Acrow Panel N Jointless Bridge  
 Freeze/Thaw N : Not Applicable  
 Accessibility (Needed/Used)  
 N / N Liftbucket N / N Rigging Inspection  
 N / N Ladder N / N Staging Hours: 008  
 N / N Boat N / N Traffic Control  
 Y / Y Wader N / N RR Flagperson  
 N / N Inspector 50 N / N Police

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**ROUTINE INSPECTION**

2-DIST  
**03**

B.I.N.  
**25A**

BR. DEPT. NO.  
**A-02-022**

CITY/TOWN <b>ACTON</b>		8-STRUCTURE NO. <b>A02022-25A-MUN-NBI</b>		11-Kilo. POINT <b>001.207</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>APR 13, 2006</b>
07-FACILITY CARRIED <b>HWY STOW ST</b>		MEMORIAL NAME/LOCAL NAME		27-YR BUILT <b>1924</b>	106-YR REBUILT <b>0000</b>	YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER FORT POND BROOK</b>		26-FUNCTIONAL CLASS <b>Urban Collector</b>		DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Steel Stringer/Girder</b>		22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>J. Long</b>		PROJ MGR <b>BSC Group</b>
107-DECK TYPE <b>Concrete Cast-in-Place</b>		WEATHER <b>PIC</b>	TEMP. (air) <b>18°C</b>	TEAM MEMBERS <b>S. YUNG CHEN</b>		

<b>ITEM 58</b>	<b>6</b>	
<b>DECK</b>		<b>DEF</b>
1. Wearing surface	7	-
2. Deck Condition	6	M-P
3. Stay in place forms	N	-
4. Curbs	5	M-P
5. Median	N	-
6. Sidewalks	N	-
7. Parapets	N	-
8. Railing	8	-
9. Anti Missile Fence	N	-
10. Drainage System	N	-
11. Lighting Standards	N	-
12. Utilities	H	-
13. Deck Joints	N	-
14.	N	-
15.	N	-
16.	N	-
<b>CURB REVEAL</b> (In millimeters)	N 85	S 85

<b>ITEM 59</b>	<b>5</b>	
<b>SUPERSTRUCTURE</b>		<b>DEF</b>
1. Stringers	5	M-P
2. Floorbeams	N	-
3. Floor System Bracing	N	-
4. Girders or Beams	N	-
5. Trusses - General	N	-
a. Upper Chords	N	-
b. Lower Chords	N	-
c. Web Members	N	-
d. Lateral Bracing	N	-
e. Sway Bracings	N	-
f. Portals	N	-
g. End Posts	N	-
6. Pin & Hangers	N	-
7. Conn Pl'ts, Gussets & Angles	N	-
8. Cover Plates	N	-
9. Bearing Devices	H	-
10. Diaphragms/Cross Frames	N	-
11. Rivets & Bolts	H	-
12. Welds	N	-
13. Member Alignment	7	-
14. Paint/Coating	N	-
15. Concrete Encasement	4	S-P
Year Painted	N	

**COLLISION DAMAGE:** *Please explain*  
None (X) Minor ( ) Moderate ( ) Severe ( )

**LOAD DEFLECTION:** *Please explain*  
None (X) Minor ( ) Moderate ( ) Severe ( )

**LOAD VIBRATION:** *Please explain*  
None (X) Minor ( ) Moderate ( ) Severe ( )

**Any Fracture Critical Member:** (Y/N)  N

**Any Cracks:** (Y/N)  N

<b>ITEM 60</b>	<b>6</b>			
<b>SUBSTRUCTURE</b>		<b>DEF</b>		
<b>1. Abutments</b>	Dive	Cur	6	
a. Pedestals	N	N		-
b. Bridge Seats	N	H		-
c. Backwalls	N	H		-
d. Breastwalls	N	6		M-P
e. Wingwalls	N	6		M-P
f. Slope Paving/Rip-Rap	N	N		-
g. Pointing	N	N		-
h. Footings	N	H		-
i. Piles	N	N		-
j. Scour	N	7		-
k. Settlement	N	7		-
l.	N	N		-
m.	N	N		-
<b>2. Piers or Bents</b>			5	
a. Pedestals	N	N		-
b. Caps	N	7		-
c. Columns	N	N		-
d. Stems/Webs/Pierwalls	N	5		S-P
e. Pointing	N	N		-
f. Footing	N	H		-
g. Piles	N	N		-
h. Scour	N	N		-
i. Settlement	N	7		-
j.	N	N		-
k.	N	N		-
<b>3. Pile Bents</b>			N	
a. Pile Caps	N	N		-
b. Piles	N	N		-
c. Diagonal Bracing	N	N		-
d. Horizontal Bracing	N	N		-
e. Fasteners	N	N		-

**UNDERMINING (Y/N)** If YES please explain  N

**COLLISION DAMAGE:**  
None (X) Minor ( ) Moderate ( ) Severe ( )

**SCOUR:** *Please explain*  
None (X) Minor ( ) Moderate ( ) Severe ( )

I-80 (Dive Report):  N I-80 (This Report):  6

93B-U/W (DIVE) Insp  00/00/00

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

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25A</b>	BR. DEPT. NO. <b>A-02-022</b>	8.-STRUCTURE NO. <b>A02022-25A-MUN-NBI</b>	INSPECTION DATE <b>APR 13, 2006</b>
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**ITEM 61** **6**  
**CHANNEL & CHANNEL PROTECTION**

	Dive	Cur	DEF
1. Channel Scour	N	7	-
2. Embankment Erosion	N	5	S-P
3. Debris	N	7	-
4. Vegetation	N	7	-
5. Utilities	N	N	-
6. Rip-Rap/Slope Protection	N	6	M-P
7. Aggradation	N	7	-
8. Fender System	N	N	-

**STREAM FLOW VELOCITY:**  
Tidal ( ) High ( ) Moderate ( ) Low (X) None ( )

ITEM 61 (Dive Report):  N  ITEM 61 (This Report)  6

93b-UW INSP. DATE:

**ITEM 36 TRAFFIC SAFETY**

	38	COND	DEF
A. Bridge Railing	0	8	-
B. Transitions	0	8	-
C. Approach Guardrail	1	8	-
D. Approach Guardrail Ends	0	5	M-P

**WEIGHT POSTING** Not Applicable  X

	H	3	3S2	Single
Actual Posting	N	N	N	N
Recommended Posting	13	27	43	N

Waived Date:  EJDMT Date:

Signs in Place (Y=Yes, N=No, NR=NotRequired) Legibility/Visibility

At bridge		Other Advance	
E	W	E	W
/	/	/	/

**CLEARANCE POSTING** N  X

N		S		
ft	in	ft	in	meter
/	0	/	0	
/	0	/	0	

Signs in Place (Y=Yes, N=No, NR=NotRequired) Legibility/Visibility

At bridge		Advance	
N	S	N	S
/	/	/	/

**ACCESSIBILITY (Y/N/P)**

	Needed	Used
Lift Bucket	N	N
Ladder	N	N
Boat	N	N
Waders	Y	Y
Inspector 50	N	N
Rigging	N	N
Staging	N	N
Traffic Control	N	N
RR Flagger	N	N
Police	N	N
Other:		
	N	N

**TOTAL HOURS** **16**

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

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

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

List of field tests performed:

**RATING**  
Rating Report (Y/N)  Y  N

Date:

(To be filled out by DBIE)  
Request for Rating or Rerating (Y/N)  N  Y

**REASON:** \_\_\_\_\_

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

**CONDITION RATING GUIDE**  
(For Items 58, 59, 60 and 61)

CODE	CONDITION	DEFECTS
N	NOT APPLICABLE	
G 9	EXCELLENT	Excellent condition.
G 8	VERY GOOD	No problem noted.
G 7	GOOD	Some minor problems.
F 6	SATISFACTORY	Structural elements show some minor deterioration.
F 5	FAIR	All primary structural elements are sound but may have minor section loss, cracking, spalling or scour.
P 4	POOR	Advance section loss, deterioration, spalling or scour.
P 3	SERIOUS	Loss of section, deterioration, spalling or scour have seriously affected primary structural components. Local failures are possible. Fatigue cracks in steel or shear cracks in concrete may be present.
C 2	CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C 1	"IMMINENT" FAILURE	Major deterioration or section loss present in critical structural components or obvious vertical or horizontal movement affecting structure stability. Bridge is closed to traffic but corrective action may put it back in light service.
0	FAILED	Out of service - beyond corrective action.

**DEFICIENCY REPORTING GUIDE**

**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].

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25A</b>	BR. DEPT. NO. <b>A-02-022</b>	8.-STRUCTURE NO. <b>A02022-25A-MUN-NBI</b>	INSPECTION DATE <b>APR 13, 2006</b>
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## REMARKS

### **BRIDGE ORIENTATION**

Bridge No. A-02-022 (25A) is a continuous two span concrete encased steel stringer bridge, which carries Stow Street over Fort Pond Brook. Stow Street travels West and East and the brook flows from North to South. The superstructure consists of 9 stringers and 8 bays numbered from South to North. The substructure consists of two concrete gravity abutments and a concrete pierwall.

### **GENERAL REMARKS**

The previous inspection report indicated that plans were available for this bridge. The plans are actually for a replacement bridge, which was never constructed. No plans are on file for the existing bridge.

### **ITEM 58 - DECK**

#### **Item 58.2 - Deck Condition**

The bottom of the deck has areas of efflorescence staining throughout most of the bays. A 12 in. diameter spall with exposed reinforcing is on the bottom of the utility slab near the West end of bay 1 in the West span (See Photo No. 1). Honeycombing exists throughout bay 2 in the West span. A 12 ft. long x 8 in. high x 3 in. deep spall is located along the West end of the North deck slab fascia (See Photo No. 2). The East end of the North deck slab fascia has minor horizontal cracking with efflorescence.

#### **Item 58.4 - Curbs**

A 2 ft. long x 2 in. high x 2 in. deep spall is located at the second rail post from the West on the North concrete curb (See Photo No. 3).

#### **Item 58.8 - Railing**

The thrie beam guardrail, which is used as both bridge and approach railing, is generally in very good condition. The bridge railings do not meet current AASHTO impact criteria.

### **ITEM 59 - SUPERSTRUCTURE**

#### **Item 59.1 - Stringers**

The bottom of the concrete encasement has spalled off the bottom of stringers 3 through 7 and 9 in the West span and stringers 4 through 9 in the East span (See Photo No. 4). Stringer 8 in the West span has delamination along the bottom of the concrete encasement with heavy horizontal cracking for its entire length. All of the exposed bottom flanges have minor rusting. Some of the exposed stringer ends have moderate rusting with less than 10% section loss to the bottom flange. West span stringer 9 has heavy rusting for the entire length of the bottom flange with up to 10% section loss (See Photo No. 5). The North edge of the concrete cover for stringer 3 is spalled with heavy efflorescence in the West span and is delaminated with moderate efflorescence in the East span. The sides of some of the concrete encasements have areas of minor scaling. There is moderate to heavy efflorescence staining adjacent to stringers 3 and 9 in both spans (See Photo No. 6).

#### **Item 59.15 - Concrete Encasement**

See Item No. 59.1 comments.

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25A</b>	BR. DEPT. NO. <b>A-02-022</b>	8.-STRUCTURE NO. <b>A02022-25A-MUN-NBI</b>	INSPECTION DATE <b>APR 13, 2006</b>
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## REMARKS

### ITEM 60 - SUBSTRUCTURE

#### Item 60.1.d - Breastwalls

Minor concrete abrasion exists along the waterline on both abutments. The South end of the West abutment has some moderate cracking with minor spalling. A minor vertical crack is located below bay 2 on the West abutment. There is a minor vertical crack with some minor delamination adjacent to it located below bay 5 on the East abutment. A 1 ft. H x 8 in. W x 4 in. deep spall with a large aggregate stone exposed is located adjacent to stringer 6 in bay 6 of the East abutment (See Photo No. 7).

#### Item 60.1.e - Wingwalls

Both of the wingwalls on the North side of the bridge have minor abrasion at the waterline. There is a minor horizontal crack at the top of the NE wingwall.

#### Item 60.2.d - Stems/Webs/Pierwalls

The pierwall has moderate abrasion along both sides at the waterline. The upstream (North end) nose of the pierwall has heavy abrasion at the waterline (See Photo No. 8). The SW corner has an 18 in. L x 12 in. H x 6 in. D spall (See Photo No. 9). A 2 ft. x 2 ft. area of delamination is located at the SE corner along with a 12 in. L x 6 in. H x 6 in. D spall (See Photo No. 10). A few minor vertical and horizontal cracks are located throughout both sides.

### ITEM 61 - CHANNEL AND CHANNEL PROTECTION

#### Item 61.2 - Embankment Erosion

The embankment at the SE corner of the bridge is heavily eroded and has exposed most of the approach rail end post (See Photo No. 11).

#### Item 61.6 - Rip-Rap/Slope Protection

Most of the slope protection at the SE corner has washed out (See Photo No. 11).

### TRAFFIC SAFETY

#### Item 36a - Bridge Railing

See Item No. 58.8 comments.

#### Item 36d - Approach Guardrail Ends

The ends of the approach railings are boxing glove type and do not meet current AASHTO impact criteria. The SE end has moderate collision damage and has heavy embankment erosion around the post (See Photo No. 11). The NW end shows some minor damage.

#### Photo Log

- Photo 1 : Spall and honeycombing on the bottom of the utility slab near the West end of bay 1 in the West span
- Photo 2 : Spall along the North deck slab fascia in the West span
- Photo 3 : Spall on the North curb
- Photo 4 : Spalling of the concrete encasements in East span looking South
- Photo 5 : Rusting and section loss to bottom flange of stringer 9 in West span
- Photo 6 : Heavy efflorescence along stringer 3 in West span
- Photo 7 : Spall on East abutment adjacent to stringer 6
- Photo 8 : Heavy abrasion to North end of pierwall
- Photo 9 : Abrasion and spalling at SW corner of pierwall
- Photo 10 : Abrasion and spalling at SE corner of pierwall

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25A</b>	BR. DEPT. NO. <b>A-02-022</b>	8.-STRUCTURE NO. <b>A02022-25A-MUN-NBI</b>	INSPECTION DATE <b>APR 13, 2006</b>
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**REMARKS****Photo Log (Cont'd)**

Photo 11 : Collision damage to SE approach rail end and embankment erosion

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25A</b>	BR. DEPT. NO. <b>A-02-022</b>	8.-STRUCTURE NO. <b>A02022-25A-MUN-NBI</b>	INSPECTION DATE <b>APR 13, 2006</b>
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**PHOTOS**

**Photo 1: Spall and honeycombing on the bottom of the utility slab near the West end of bay 1 in the West span**



**Photo 2: Spall along the North deck slab fascia in the West span**

CITY/TOWN  
**ACTON**B.I.N.  
**25A**BR. DEPT. NO.  
**A-02-022**8.-STRUCTURE NO.  
**A02022-25A-MUN-NBI**INSPECTION DATE  
**APR 13, 2006****PHOTOS****Photo 3: Spall on the North curb****Photo 4: Spalling of the concrete encasements in East span looking South**

CITY/TOWN ACTON	B.I.N. 25A	BR. DEPT. NO. A-02-022	8.-STRUCTURE NO. A02022-25A-MUN-NBI	INSPECTION DATE APR 13, 2006
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**PHOTOS**

**Photo 5: Rusting and section loss to bottom flange of stringer 9 in West span**



**Photo 6: Heavy efflorescence along stringer 3 in West span**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25A</b>	BR. DEPT. NO. <b>A-02-022</b>	8.-STRUCTURE NO. <b>A02022-25A-MUN-NBI</b>	INSPECTION DATE <b>APR 13, 2006</b>
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**PHOTOS**

**Photo 7: Spall on East abutment adjacent to stringer 6**



**Photo 8: Heavy abrasion to North end of pierwall**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25A</b>	BR. DEPT. NO. <b>A-02-022</b>	8.-STRUCTURE NO. <b>A02022-25A-MUN-NBI</b>	INSPECTION DATE <b>APR 13, 2006</b>
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**PHOTOS**

**Photo 9: Abrasion and spalling at SW corner of pierwall**



**Photo 10: Abrasion and spalling at SE corner of pierwall**

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25A</b>	BR. DEPT. NO. <b>A-02-022</b>	8.-STRUCTURE NO. <b>A02022-25A-MUN-NBI</b>	INSPECTION DATE <b>APR 13, 2006</b>
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**PHOTOS**

**Photo 11: Collision damage to SE approach rail end and embankment erosion**

Report Date: October 23, 2007

State Information  
 BDEPT# A02022 Agency Br.No.  
 Town Acton  
 B.I.N# 25A AASHTO# 059.6  
 Identification  
 FHWA Select List# N  
 Structure Number A0202225AMUNNBI  
 (5) Inventory Route 151000000  
 (2) State Highway Department District 03  
 (3) County Code 017 (4) Place code 00360  
 (8) Features Intersected WATER FORT POND BROOK  
 (7) Facility Carried HWY STOW ST  
 (9) Location .3MI. W. OF ST-27  
 (11) Kilometerpoint 0001.207  
 (12) Base Highway Network N  
 (13) LRS Inventory Route & Subroute 000000000000  
 (16) Latitude 42 DEG 27 MIN 29.55 SEC  
 (17) Longitude 71 DEG 27 MIN 36.97 SEC  
 (98) Border Bridge State Code Share %  
 (99) Border Bridge Structure No. #  
 Structure Type and Material  
 (43) Structure Type Main: Steel Code 302  
 Stringer/Girder Jointless bridge type: Not applicable  
 (44) Structure Type Appr: Other Code 000  
 (45) Number of spans in main unit 002  
 (46) Number of approach spans 0000  
 (107) Deck Structure Type - Concrete Cast-in-Place Code 1  
 (108) Wearing Surface / Protective System:  
 A) Type of wearing surface - Bituminous Code 6  
 B) Type of membrane - None Code 0  
 Type of deck protection - None Code 0  
 Age and Service  
 (27) Year Built 1924  
 (106) Year Reconstructed 0000  
 (42) Type of Service: On - Highway  
 Under - Waterway Code 15  
 (28) Lanes: On Structure 02 Under structure 00  
 (29) Average Daily Traffic 000860  
 (30) Year of ADT 2008 (109) Truck ADT 01 %  
 (19) Bypass, detour length 002 KM  
 Geometric Data  
 (48) Length of maximum span 0003.0 M  
 (49) Structure Length 00009.1 M  
 (50) Curb or sidewalk: Left 00.0 M Right 00.0 M  
 (51) Bridge Roadway Width Curb to Curb 007.4 M  
 (52) Deck Width Out to Out 008.3 M  
 (32) Approach Roadway Width (w/shoulders) 007.3 M  
 (33) Bridge Median - No median Code 0  
 (34) Skew 20 DEG (35) Structure Flared N  
 (10) Inventory Route MIN Vert Clear 99.99 M  
 (47) Inventory Route Total Horiz Clear 07.4 M  
 (53) Min Vert Clear Over Bridge Rdwy 99.99 M  
 (54) Min Vert Underclear ref N 00.00 M  
 (55) Min Lat Underclear RT ref N 00.0 M  
 (56) Min Lat Underclear LT 00.0 M

Navigation Data  
 (3) Navigation Control - No navigation control on waterway Code 0  
 (1) Pier Protection Code  
 (39) Navigation Vertical Clearance 000.0 M  
 (116) Vert-lift Bridge Nav Min Vert Clear M  
 (40) Navigation Horizontal Clearance 0000.0 M

Classification Code  
 (112) NBIS Bridge Length Y  
 (104) Highway System N  
 (26) Functional Class - Urban Collector 17  
 (100) Defense Highway 0  
 (101) Parallel Structure N  
 (102) Direction of Traffic - 2-way traffic 2  
 (103) Temporary Structure N  
 (105) Federal Lands Highways 0  
 (110) Designated National Network N  
 (20) Toll - On free road 3  
 (21) Maintn - Town Agency 03  
 (22) Owner - Town Agency 03  
 (37) Historical Significance undetermined

Condition Code  
 (58) Deck 6  
 (59) Superstructure 5  
 (60) Substructure 6  
 (61) Channel & Channel Protection 6  
 (62) Culverts N  
 Load Rating and Posting Code  
 (31) Design Load - Other/Unknown 0  
 (63) Operating Rating Method - Allowable Stress (AS) 2  
 (64) Operating Rating 31.9  
 (65) Inventory Rating Method - Allowable Stress (AS) 2  
 (86) Inventory Rating 22.4  
 (70) Bridge Posting 4  
 (41) Structure - Open A

Appraisal Code  
 (67) Structural Evaluation 5  
 (66) Deck Geometry 4  
 (69) Underclearances, vert. and horiz. N  
 (71) Waterway adequacy 7  
 (72) Approach Roadway Alignment 8  
 (36) Traffic Safety Features 0 0 1 0  
 (113) Scour Critical Bridges D

Inspections  
 (90) Inspection Date 04/13/06 (91) Frequency 24 MO  
 (92) Critical Feature Inspection: (93) CFI DATE  
 (A) Fracture Critical Detail N 00 MO A) 00/00/00  
 (B) Underwater Inspection N 00 MO B) 07/01/85  
 (C) Other Special Inspection N 00 MO C) 00/00/00  
 (\*) Other Inspection () N 00 MO \*) 00/00/00  
 (\*) Closed Bridge N 00 MO \*) 00/00/00  
 (\*) UW Special Inspection N 00 MO \*) 00/00/00  
 (\*) Damage Inspection MO \*) 00/00/00

Rating Loads  
 Report Date 12/01/93 H20 Type 3 Type 3S2 Type HS  
 Operating 19.0 39.0 62.0 35.0  
 Inventory 13.0 27.0 43.0 24.0

Field Posting  
 Status WAIVED Posting Date 02/01/95  
 2 Axle 3 Axle 5 Axle  
 Actual  
 Recommended  
 Missing Signs N

Misc.  
 Bridge Name  
 N Anti-missile fence N Acrow Panel N Jointless Bridge  
 Freeze/Thaw N : Not Applicable  
 Accessibility (Needed/Used)  
 N / N Liftbucket N / N Rigging Inspection  
 N / N Ladder N / N Staging Hours: 016  
 N / N Boat N / N Traffic Control  
 Y / Y Wader N / N RR Flagperson  
 N / N Inspector 50 N / N Police

**MASSACHUSETTS HIGHWAY DEPARTMENT**  
**STRUCTURES INSPECTION FIELD REPORT**  
**CULVERT INSPECTION**

2-DIST **03** B.I.N. **25B**

BR. DEPT. NO.  
**A-02-023**

CITY/TOWN <b>ACTON</b>	8-STRUCTURE NO. <b>A02023-25B-MUN-NBI</b>	11-Kilo. POINT <b>000.386</b>	41-STATUS <b>A:OPEN</b>	90-ROUTINE INSP. DATE <b>JAN 6, 2006</b>
07-FACILITY CARRIED <b>HWY MARTIN ST</b>	MEMORIAL NAME/LOCAL NAME	27-YR BUILT <b>1965</b>	106-YR REBUILT <b>0000</b>	YR REHAB'D (NON 106) <b>0000</b>
06-FEATURES INTERSECTED <b>WATER FORT POND BROOK</b>	26-FUNCTIONAL CLASS <b>Urban Local</b>	DIST. BRIDGE INSPECTION ENGINEER <b>L. A. Gauthier</b>		
43-STRUCTURE TYPE <b>Steel Culvert</b>	22-OWNER <b>Town Agency</b>	21-MAINTAINER <b>Town Agency</b>	TEAM LEADER <b>R. C. Angell</b>	
107-DECK TYPE <b>Not applicable</b>	WEATHER <b>Cloudy</b>	TEMP. (air) <b>1°C</b>	TEAM MEMBERS <b>L. A. GAUTHIER</b>	

<b>TYPE OF CULVERT:</b>	<b>BARRELS:</b> (In Meters)
SHAPE: <b>PIPE ARCH</b>	SIZE: <b>1.80mx2.70m</b> NUMBER: <b>2</b>
MATERIAL: <b>CORRUGATED STEEL</b>	DEPTH OF COVER (To the nearest tenth of a meter) E: <b>0.3</b> W: <b>0.6</b>
COATING: <b>ASPHALTIC</b>	CURB REVEAL (In millimeters) N: <b>N</b> N: <b>N</b>

**ITEM 62 CULVERT & RETAINING WALLS** 7 162 (Dive Report): **N** 162 (This Report): **7**

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF	
1. Roof	N	7	-	7. Protective Coating	N	6	M-P	13. Member Alignment	N	7	-	UNDERMINING (Y/N) // YES please explain <b>N</b>
2. Floor	N	6	M-P	8. Embankment	N	7	-	14. Deformation	N	7	-	
3. Walls	N	7	-	9. Wearing Surface	N	8	-	15. Scour	N	7	-	LOAD VIBRATION: <u>Please explain</u> None ( <input checked="" type="checkbox"/> ) Minor ( <input type="checkbox"/> ) Moderate ( <input type="checkbox"/> ) Severe ( <input type="checkbox"/> )
4. Headwall	N	7	M-P	10. Ralling	N	8	-	16. Settlement	N	7	-	
5. Wingwall	N	7	-	11. Sidewalks	N	8	-	17.				
6. Pipe	N	N	-	12. Utilities	N	N	-	18.				

**ITEM 61 CHANNEL & CHANNEL PROTECTION** 7

	Dive This Rpt.	Rpt.	DEF		Dive This Rpt.	Rpt.	DEF
1. Channel Scour	N	7	-	5. Utilities	N	H	-
2. Embankment Erosion	N	6	M-P	8. Rip-Rap/Slope Protection	N	7	-
3. Debris	N	7	-	7. Aggradation	N	7	-
4. Vegetation	N	7	-				

STREAM FLOW VELOCITY: Tidal ( ) High ( ) Moderate (  ) Low ( )

APPROACH CONDITION

a. Appr. pavement condition	<b>8</b>	-
b. Appr. Roadway Settlement	<b>8</b>	-
c. Appr. Sidewalk Settlement	<b>8</b>	-
d.		

ITEM 61 (Dive Report): **N**  
 ITEM 61 (This Report): **7**

93b- U/W INSP DATE: **00/00/00**

**WEIGHT POSTING**

Actual Posting **Not Applicable**  H **N** 3 **N** 3S2 **N** Single **N**

Recommended Posting **17** **23** **36** **N**

Valved Date: **07/21/1982** EJDMT Date: **00/00/00**

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

At bridge		Advance	
N	S	N	S
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**ITEM 36 TRAFFIC SAFETY**

	36	COND	DEF
A. Bridge Railing	<b>1</b>	<b>8</b>	-
B. Transitions	<b>1</b>	<b>8</b>	-
C. Approach Guardrail	<b>1</b>	<b>8</b>	-
D. Approach Guardrail Ends	<b>0</b>	<b>8</b>	-

**ACCESSIBILITY (Y/N/P):**

	Needed	Used	Other:	Needed	Used
Ladder	<b>N</b>	<b>N</b>			
Boat	<b>N</b>	<b>N</b>		<b>N</b>	<b>N</b>
Waders	<b>Y</b>	<b>Y</b>			

TOTAL HOURS **8**

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

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

TAPE#:

**RATING**

Request for Rating or Rerating (Y/N) **N** If YES please give priority: HIGH ( ) MEDIUM ( ) LOW ( )

Rating Report (Y/N) **Y**

Date: **03/01/1982** REASON:

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

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25B</b>	BR. DEPT. NO. <b>A-02-023</b>	8.-STRUCTURE NO. <b>A02023-25B-MUN-NBI</b>	INSPECTION DATE <b>JAN 6, 2006</b>
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### REMARKS, PHOTOS & SKETCHES

#### BRIDGE ORIENTATION

The approaches are S to N and the elevations are W to E. This a two span pipe arch with the barrels numbered from S to N. The brook flows from W to E.

#### ITEM 62 - CULVERT

##### Item 62.2 - Floor

The floors of both barrels show heavy surface rusting and minor to moderate corrosion throughout, from high waterline down. The asphaltic coating has worn off throughout most of both barrel floors. No photo taken due to high water.

##### Item 62.4 - Headwall

There is one granite headwall block missing at the waterline, at the upstream nose, between the two barrels.

##### Item 62.7 - Protective Coating

Re: Item 62.2.

##### Item 62.9 - Wearing Surface

The bit. conc. wearing surface is new since last inspection.

##### Item 62.10 - Railing

There is chain link fence behind "SS" type bridgerail at E side of culvert (sidewalk side). This fence acts as a pedestrian safety barricade. See photo #1.

### CONDITION RATING GUIDE

	CODE	CONDITION	DEFECTS
	N	NOT APPLICABLE	Use if structure is not a culvert.
G	9	EXCELLENT	No deficiencies.
G	8	VERY GOOD	No noticeable or noteworthy differences which affect the condition of the culvert. Insignificant scrape marks caused by drift.
G	7	GOOD	Shrinkage cracks, light scaling, and insignificant spalling, which does not expose reinforcing steel. Insignificant damage caused by drift with not misalignment and not requiring corrective action. Some minor scouring has occurred near curtain walls, wingwalls, or pipes. Metal culverts have a smooth symmetrical curvature with superficial corrosion and no pitting.
F	6	SATISFACTORY	Deterioration or initial disintegration, minor chloride contamination, cracking with some leaching, or spalls on concrete or masonry walls and slabs. Local minor scouring at curtain walls, wingwalls, or pipes. Metal culverts have a smooth curvature, non-symmetrical shape, significant corrosion or moderate pitting.
F	5	FAIR	Moderate to major deterioration, or disintegration, extensive cracking and leaching, or spalls on concrete or masonry walls and slabs. Minor settlement or misalignment. Noticeable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection in one section, significant corrosion or deep pitting.
P	4	POOR	Large spalls, heavy scaling, wide cracks, considerable efflorescence, or opened construction joints permitting loss of backfill. Considerable settlement or misalignment. Considerable scouring or erosion at curtain walls, wingwalls, or pipes. Metal culverts have significant distortion and deflection throughout, extensive corrosion or deep pitting.
P	3	SERIOUS	Any condition described in Code 4 but which is excessive in scope. Severe movement or differential settlement of the segments, or loss of fill. Holes may exist in walls or slabs. Integral wingwalls, nearly severed from culvert. Severe scour or erosion at curtain walls, wingwalls, or pipes. Metal culverts have extreme distortion and deflection in one section, extensive corrosion, or deep pitting with scattered perforations.
C	2	CRITICAL	Advance deterioration of primary structural elements. Fatigue cracks in steel or shear cracks in concrete may be present or scour may have removed substructure support. Unless closely monitored it may be necessary to close the bridge until corrective action is taken.
C	1	"IMMINENT" FAILURE	Bridge closed. Corrective action may put back in light service.
	0	FAILED	Bridge closed. Replacement necessary.

### DEFICIENCY REPORTING GUIDE

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

#### **CATEGORIES OF DEFICIENCIES:**

**M= Minor Deficiency** - (Examples include but are not limited to: Spalled concrete, minor to moderate corrosion to steel culverts, minor settlement or misalignment, minor scouring, minor damage to guardrail, etc.)

**S= Severe/Major Deficiency** - (Examples include but are not limited to: Large spalls, wide cracks, moderate to major deterioration in concrete, considerable settlement, considerable scouring or undermining, extensive corrosion and deflection in steel culverts, etc.)

**C-S= Critical Deficiency** - A deficiency in a structural component or element of a bridge that poses an extreme hazard or unsafe condition to the public. (Follow-up Critical Deficiency Report must be submitted separately)

#### **URGENCY OF REPAIR:**

**I = Immediate**- [Inspector(s) stay at the bridge until the District Maintenance crew or the responsible Agency crew (if not a State bridge) show up and corrective action is taken.]

**A = ASAP**- [Action will be taken by the District Maintenance Engineer or the Responsible Agency (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].

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25B</b>	BR. DEPT. NO. <b>A-02-023</b>	8.-STRUCTURE NO. <b>A02023-25B-MUN-NBI</b>	INSPECTION DATE <b>JAN 6, 2006</b>
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### REMARKS

**Item 62.11 - Sidewalks**

A bit. conc. sidewalk has been installed since last inspection.

**ITEM 61 - CHANNEL AND CHANNEL PROTECTION**

**Item 61.2 - Embankment Erosion**

There is minor to moderate erosion of the channel embankments at the downstream SE corner, approx. 50 ft. downstream of the bridge. This is minor erosion at the SW & NW (upstream) corners that is starting to slightly dislodge several rip rap stones.

**Item 61.3 - Debris**

There is a very minor build up of alluvial material thru-out several areas of both barrels.

**Item 61.5 - Utilities**

The utilities are hidden below channel.

**Item 61.7 - Aggradation**

Re: Item #61.3.

**APPROACHES**

**Approaches a - Appr. pavement condition**

The bit. conc. approach pavement is new since last inspection..

**Approaches b - Appr. Roadway Settlement**

Re: Approaches: a.

**Approaches c - Appr. Sidewalk Settlement**

Re: Item #62.11.

**Photo Log**

Photo 1 : Chain link pedestrian barricade at E side of culvert (sidewalk side)

CITY/TOWN <b>ACTON</b>	B.I.N. <b>25B</b>	BR. DEPT. NO. <b>A-02-023</b>	8.-STRUCTURE NO. <b>A02023-25B-MUN-NBI</b>	INSPECTION DATE <b>JAN 6, 2006</b>
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**PHOTOS**

**Photo 1: Chain link pedestrian barricade at E side of culvert (sidewalk side)**

Report Date: October 23, 2007

State Information				Classification				Code	
BDEPT#	A02023	Agency Br. No.		(112) NBIS Bridge Length				Y	
Town	Acton			(104) Highway System				N	
B.I.N#	26B	AASHTO=	089.7	(26) Functional Class -	Urban Local			19	
Identification				FHWA Select List=	N	(100) Defense Highway		0	
Structure Number	A0202325BMUNNBI			(101) Parallel Structure				N	
(5) Inventory Route	151000000			(102) Direction of Traffic -	2-way traffic			2	
(2) State Highway Department District	03			(103) Temporary Structure				N	
(3) County Code	017	(4) Place code	00360	(105) Federal Lands Highways				0	
(8) Features Intersected	WATER FORT POND BROOK			(110) Designated National Network				N	
(7) Facility Carried	HWY MARTIN ST			(20) Toll -	On free road			3	
(9) Location	0.8MI N OF MAYNARD TWN.LN			(21) Maintain -	Town Agency			03	
(11) Kilometerpoint	0000.386			(22) Owner -	Town Agency			03	
(12) Base Highway Network	N			(37) Historical Significance	built after 1949 presumed to be not eligi			Z	
(13) LRS Inventory Route & Subroute	000000000000			Condition				Code	
(16) Latitude	42 DEG 27 MIN 31.89 SEC			(56) Deck				N	
(17) Longitude	71 DEG 27 MIN 45.00 SEC			(59) Superstructure				N	
(98) Border Bridge State Code	Share	%		(60) Substructure				N	
(99) Border Bridge Structure No. #				(61) Channel & Channel Protection				7	
Structure Type and Material				(62) Culverts				7	
(43) Structure Type Main:	Steel	Code	319	Load Rating and Posting				Code	
Culvert	Jointless bridge type:	Not applicable		(31) Design Load -	H 20=M 16			4	
(44) Structure Type Appr:	Other	Code	000	(63) Operating Rating Method -	Allowable Stress (AS)			2	
(45) Number of spans in main unit			002	(64) Operating Rating				31.7	
(46) Number of approach spans			0000	(65) Inventory Rating Method -	Allowable Stress (AS)			2	
(107) Deck Structure Type -	Not applicable	Code	N	(66) Inventory Rating				22.6	
(108) Wearing Surface / Protective System:				(70) Bridge Posting				4	
A) Type of wearing surface -	Not applicable=no deck	Code	N	(41) Structure -	Open			A	
B) Type of membrane -	Not applicable=no deck	Code	N	Appraisal				Code	
Type of deck protection -	Not applicable=no deck	Code	N	(67) Structural Evaluation				6	
(27) Year Built			1965	(68) Deck Geometry				N	
(106) Year Reconstructed			0000	(69) Underclearances, vert. and horiz.				N	
(42) Type of Service: On -	Highway-Ped			(71) Waterway adequacy				6	
Under -	Waterway	Code	55	(72) Approach Roadway Alignment				7	
(26) Lanes: On Structure	02	Under structure	00	(38) Traffic Safety Features			1 1 1 0		
(29) Average Daily Traffic			003300	(113) Scour Critical Bridges				6	
(30) Year of ADT	2006	(109) Truck ADT	06 %	Inspections					
(19) Bypass, detour length			002 KM	(90) Inspection Date	01/06/06	(91) Frequency	24 MO		
Geometric Data				(92) Critical Feature Inspection:		(93) CFI DATE			
(48) Length of maximum span			0002.7 M	(A) Fracture Critical Detail	N 00	MO A)	00/00/00		
(49) Structure Length			00006.4 M	(B) Underwater Inspection	N 00	MO B)	07/01/65		
(50) Curb or sidewalk:	Left 00.0 M	Right 00.0 M		(C) Other Special Inspection	N 00	MO C)	00/00/00		
(51) Bridge Roadway Width Curb to Curb			000.0 M	(*) Other Inspection ()	N 00	MO *)	00/00/00		
(52) Deck Width Out to Out			000.0 M	(*) Closed Bridge	N 00	MO *)	00/00/00		
(32) Approach Roadway Width (w/shoulders)			007.9 M	(*) UW Special Inspection	N 00	MO *)	00/00/00		
(33) Bridge Median -	No median	Code	0	(*) Damage Inspection		MO *)	00/00/00		
(34) Skew	12 DEG	(35) Structure Flared	N	Rating Loads					
(10) Inventory Route MIN Vert Clear			99.99 M	Report Date	03/01/82	H20	Type 3	Type 3S2	Type HS
(47) Inventory Route Total Horiz Clear			10.4 M	Operating		20.0	32.0	50.0	0.0
(53) Min Vert Clear Over Bridge Rdwy			99.99 M	Inventory		17.0	23.0	36.0	0.0
(54) Min Vert Underclear ref	N		00.00 M	Field Posting					
(55) Min Lat Underclear RT ref	N		00.0 M	Status	WAIVED		Posting Date	07/21/82	
(58) Min Lat Underclear LT			00.0 M	Actual	2 Axle		3 Axle		5 Axle
Navigation Data				Recommended					
(36) Navigation Control -	No navigation control on waterway	Code	0	Missing Signs	N				
(11) Navigation Vertical Clearance		Code		Misc.					
(39) Navigation Vertical Clearance			000.0 M	Bridge Name	N Anti-missile fence	N Acrow Panel	N Jointless Bridge		
(116) Vert-Lift Bridge Nav Min Vert Clear			M	Freeze/Thaw	N : Not Applicable				
(40) Navigation Horizontal Clearance			0000.0 M	Accessibility (Needed/Used)					
				N / N	Liftbucket	N / N	Rigging	Inspection	
				N / N	Ladder	N / N	Staging	Hours:	008
				N / N	Boat	N / N	Traffic Control		
				Y / Y	Wader	N / N	RR Flagperson		
				N / N	Inspector 50	N / N	Police		