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 • 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 • 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	4 4
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	• Wide transverse crack at the West end of bridge • Several medium to wide random cracks throughout • Light to moderate vegetation growth along South side of roadway • Heavy vegetation growth along North side	3

Superstructure Deficiencies (NBIS Item #59 in Inspection Report)

Element	Deficiency	Reference Photo(s)
Corrugated Steel Barrels	• Light to moderate rusting along the waterline with minor steel delamination and heavier rusting at both ends of both barrels • Areas of peeling protective coating and peeling throughout • 100% section loss at East side of West barrel at South end that measures 9"H x 5" long • 100% section loss at West side of West barrel at South end that measures 11"H x 4" long • Heavy aggradation at the upstream and downstream ends of both barrels • Light to moderate accumulation of sand and debris along the bottom of both barrels	5 6 7 8
North Headwall	• Numerous narrow to medium cracks and separation of mortar between stones, random hairline to narrow cracks and loose stones throughout • Full height, jagged crack with separated stones above West barrel • Dislodged stones at upper West corner of East barrel and upper East corner of West barrel • Void at lower East face of West barrel that measures 20"H x 5"W x up to 18" penetration • Small voids along the East face of East barrel and West face of West barrel at North headwall • Voids along waterline between barrels at North headwall wall that measure full height x up to 3"H x up to 10" penetration	9 10
South Headwall	• Full height, jagged crack with separated stones above West barrel • Void at West face of West barrel that measures 12"H x up to 3.5"W x up to 4.5" of penetration • Minor delamination of stones at upper East corner of East barrel • Void at East face of East barrel that measures 14"H x 2"W x 4" of penetration • Void at West side of East barrel that measures 6"H x 2"W x up to 6" of penetration • Small void between barrels adjacent to West barrel that measures 14"H x up to 6"W x 29" of penetration (at waterline)	1, 11 1 1

	• 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) • Void at waterline between barrels that measures 15"H x 3"W x up to 25" of penetration	1 1

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

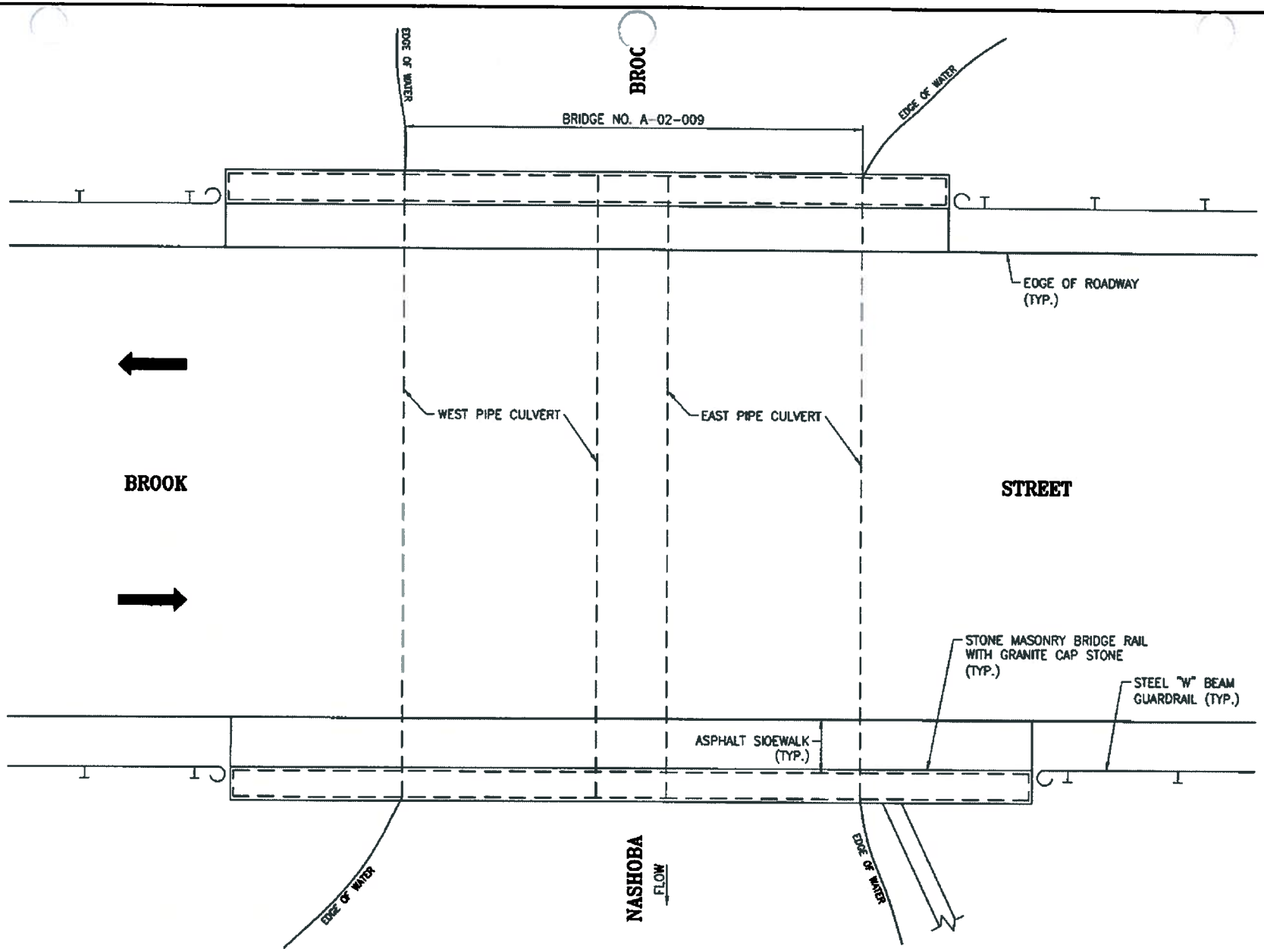
Element	Deficiency	Reference Photo(s)
Wingwalls	• Mortared stone walls that show numerous hairline to narrow random cracks in mortar and minor separation between stones • Light vegetation growth at the Northwest wingwall and moderate to heavy vegetation growth at the Southwest and Southeast wingwalls • Retaining walls at Northeast and Northwest corners show minor voids and/or missing stones throughout	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



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

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

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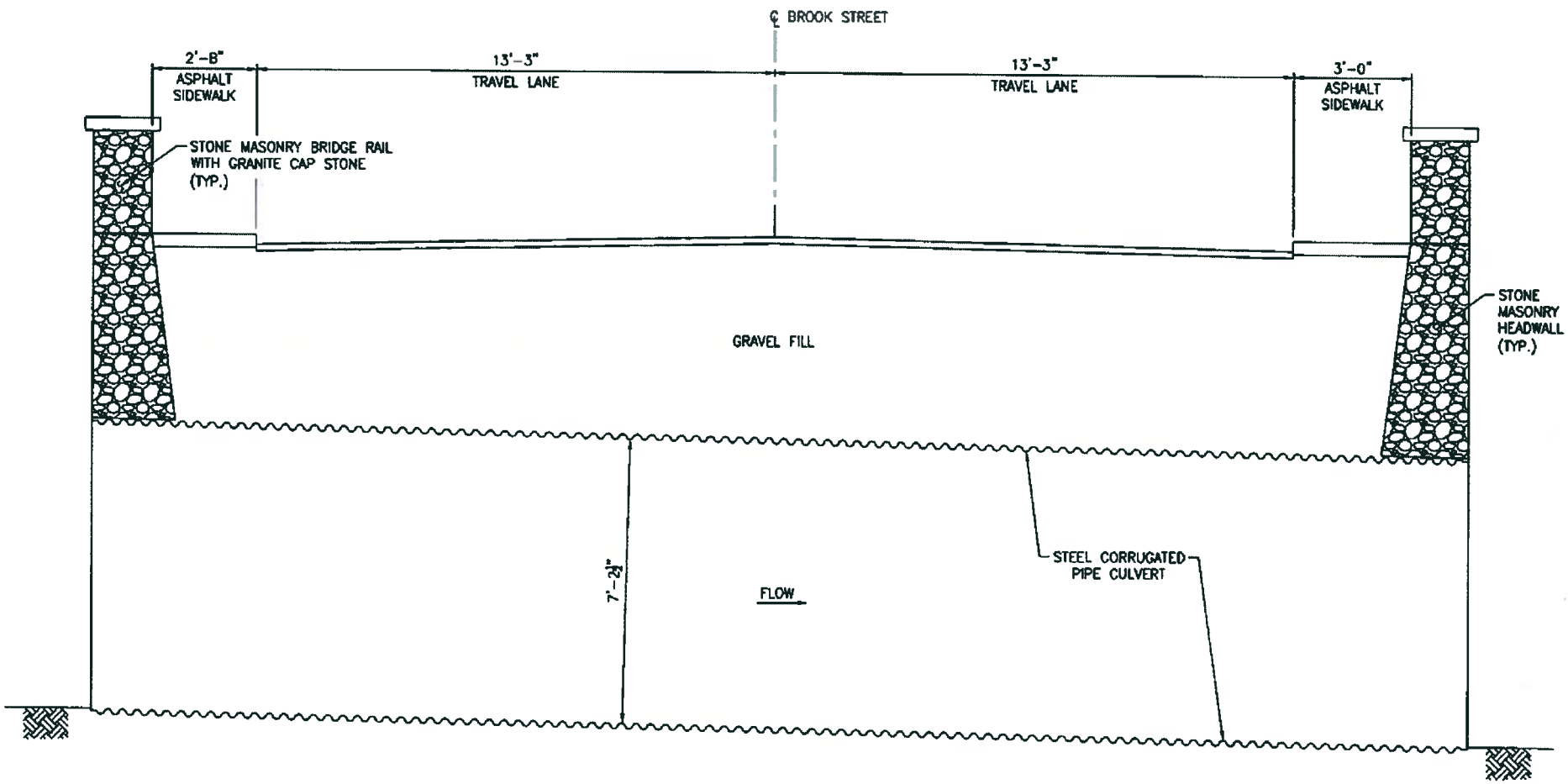

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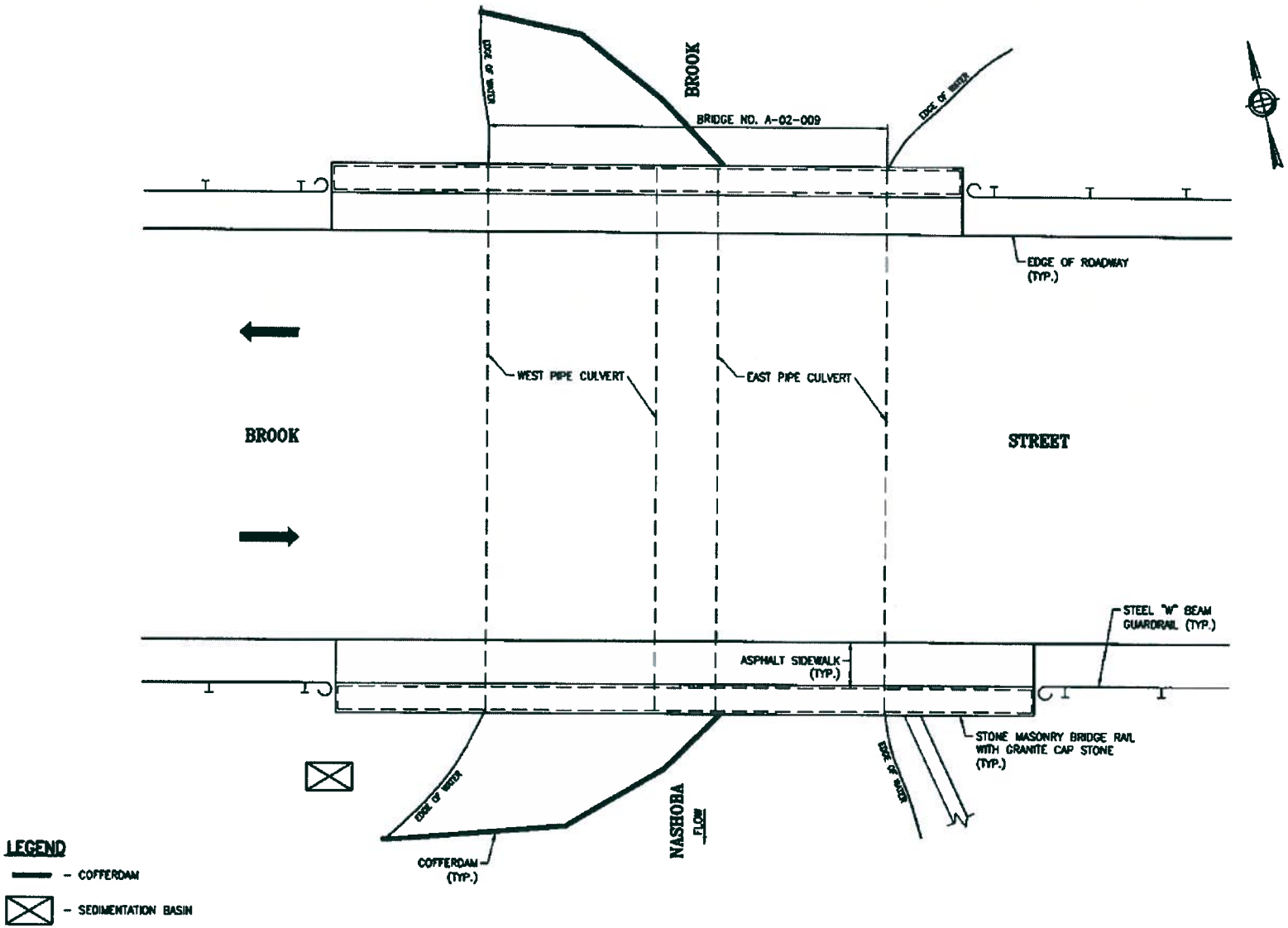
ACTON: BROOK STREET OVER
NASHOBA BROOK, BRIDGE NO. A-02-009
BRIDGE TRANSVERSE SECTION – SCALE: N.T.S.



STAGE I

CHAS. H. SELLS, INC.
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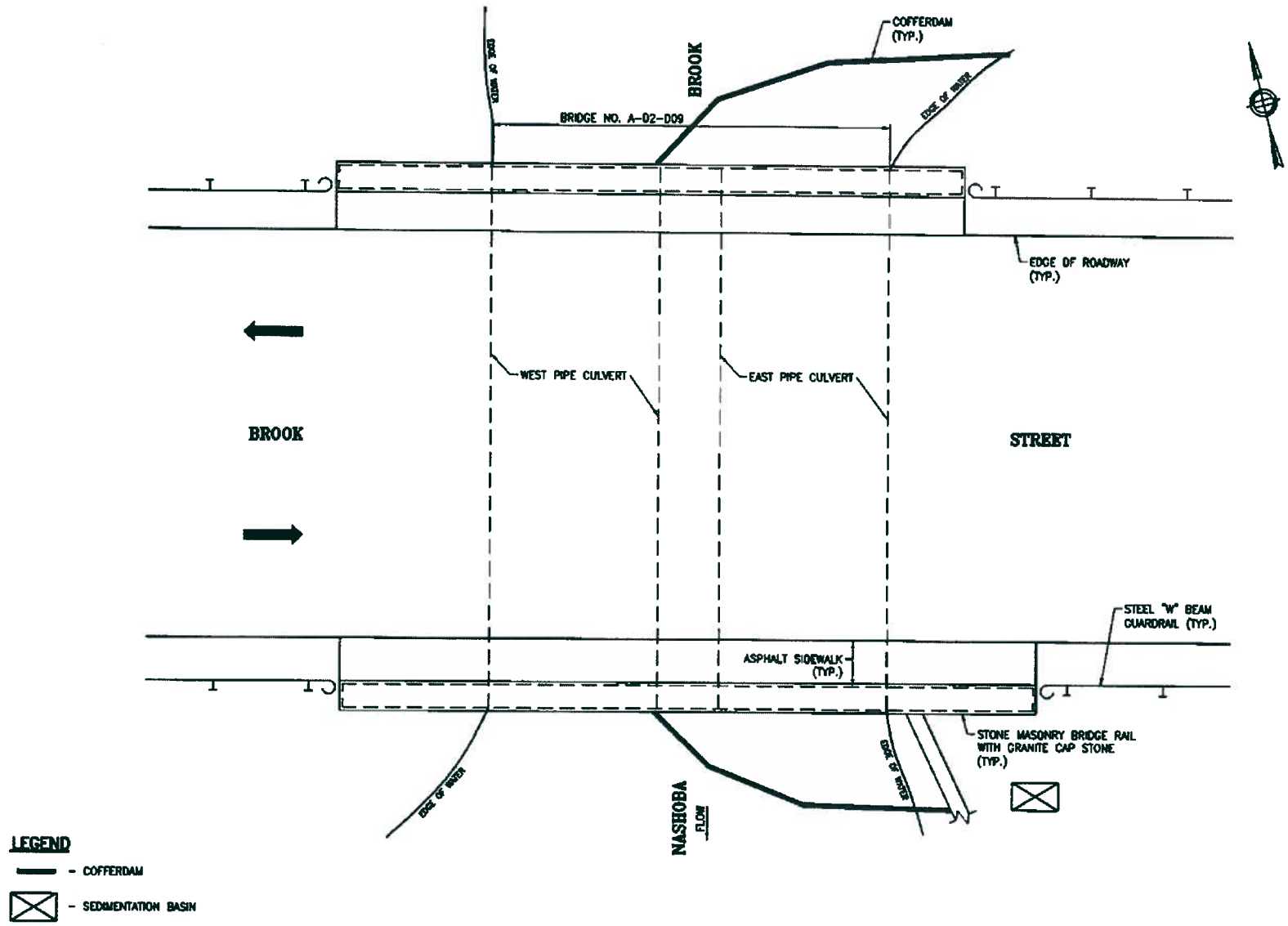
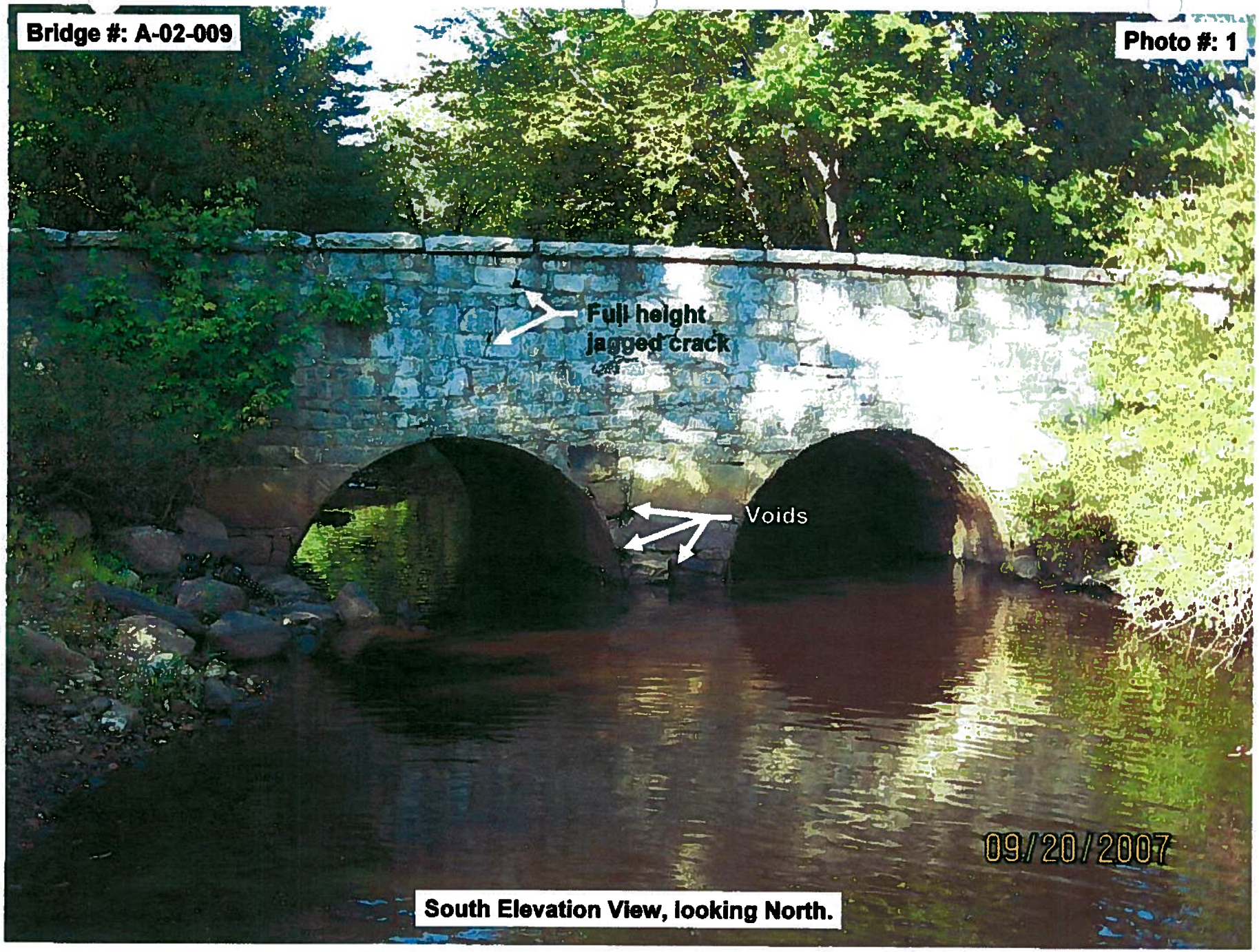
ACTON: BROOK STREET OVER
NASHOBA BROOK, BRIDGE NO. A-02-009
WATER CONTROL PLAN – SCALE: N.T.S.



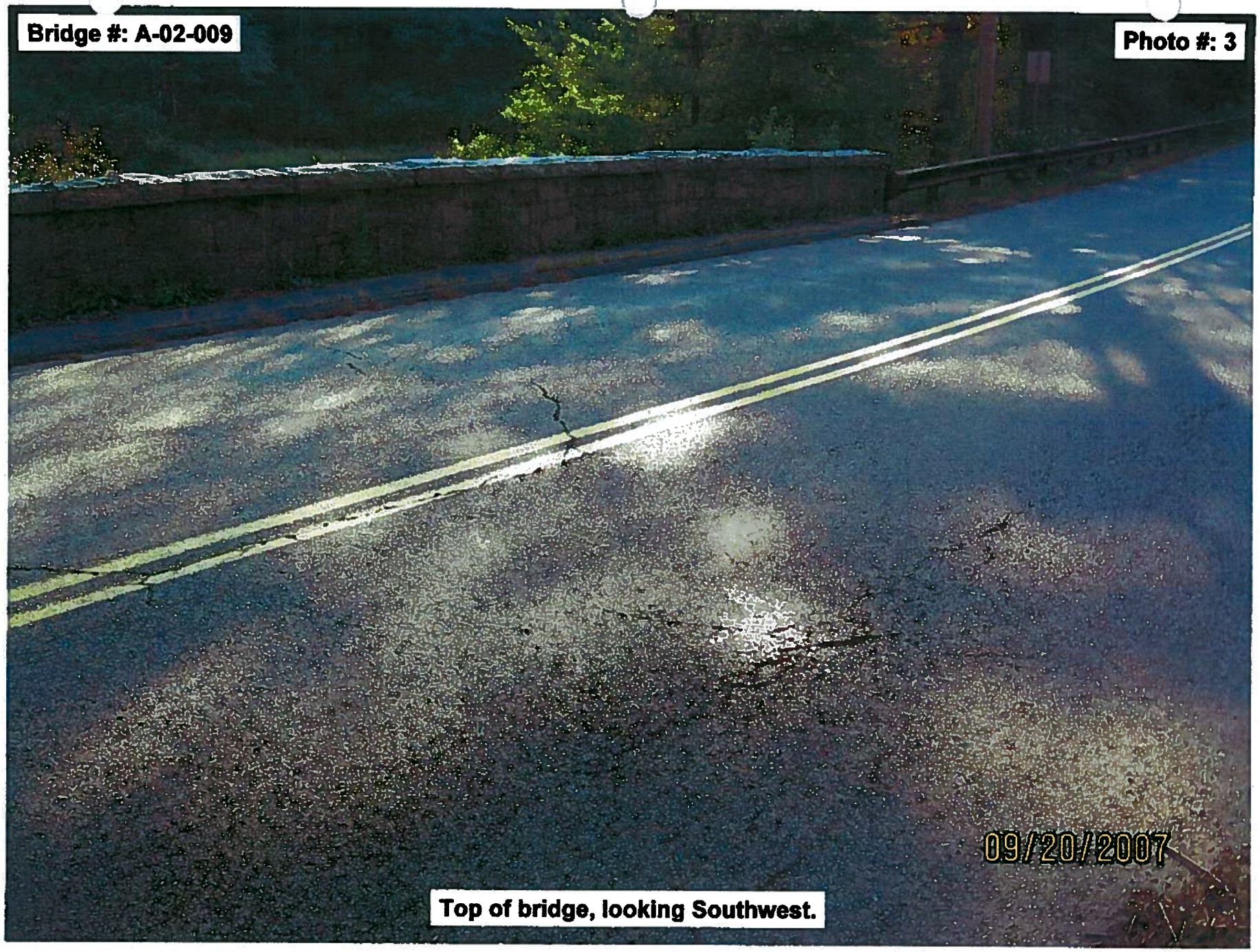
STAGE II

CHAS. H. SELLS, INC.
Consulting Engineers, Surveyors & Environmentalists

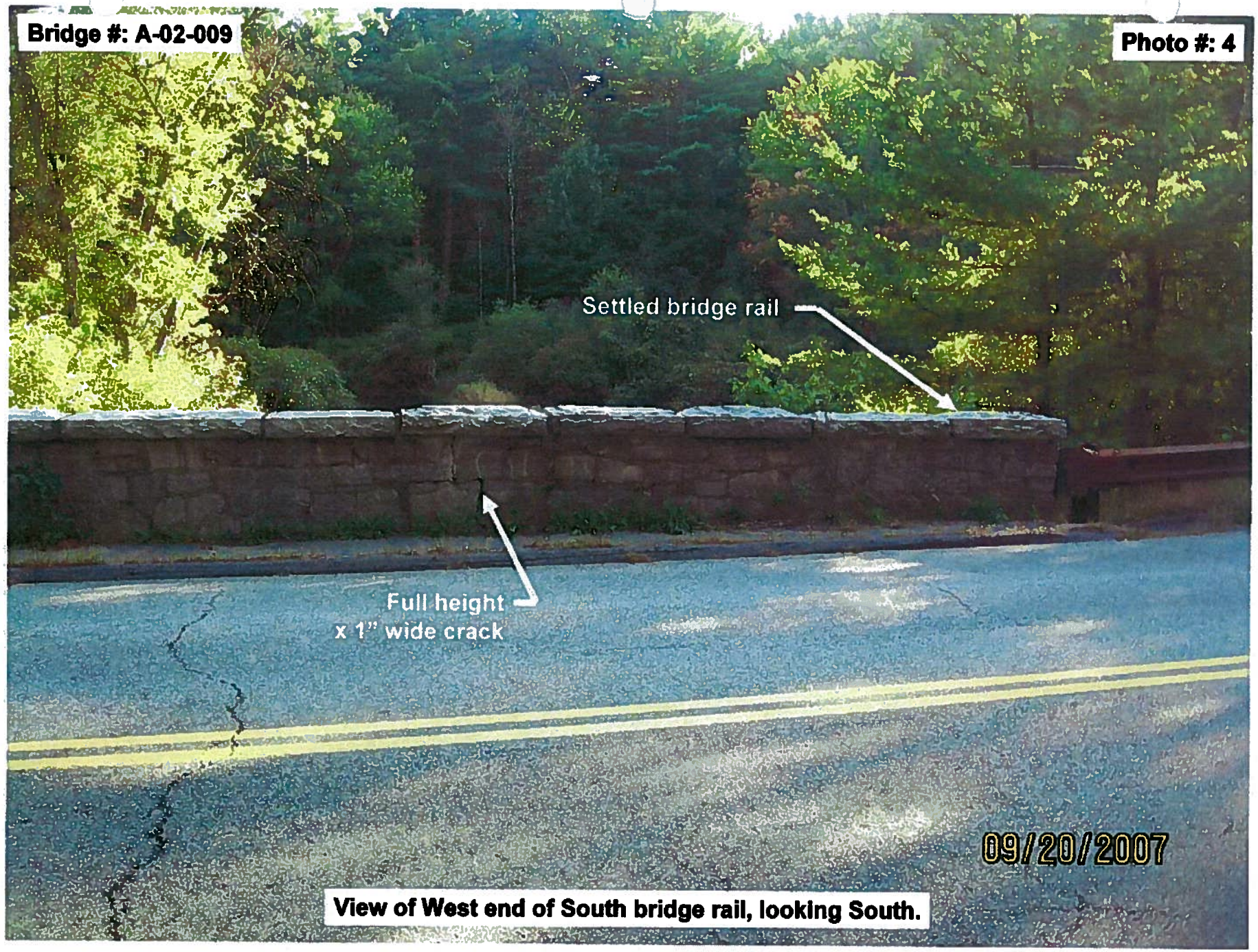
ACTON: BROOK STREET OVER
NASHOBA BROOK, BRIDGE NO. A-02-009
WATER CONTROL PLAN – SCALE: N.T.S.


Bridge #: A-02-009
Photo #: 1
Full height jagged crack
Voids
09/20/2007
South Elevation View, looking North.

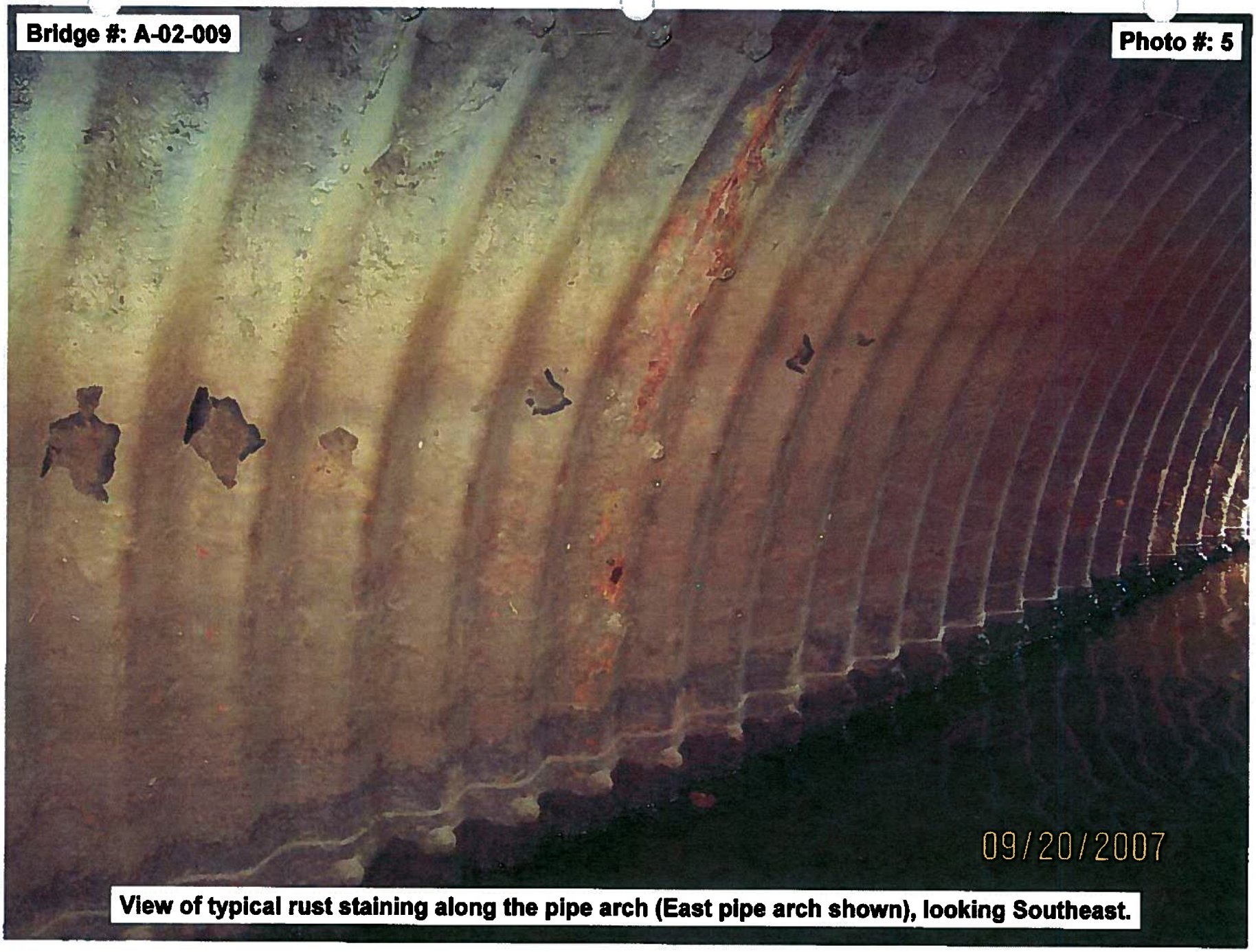
Bridge #: A-02-009
Photo #: 2
View of West approach roadway looking East across bridge.



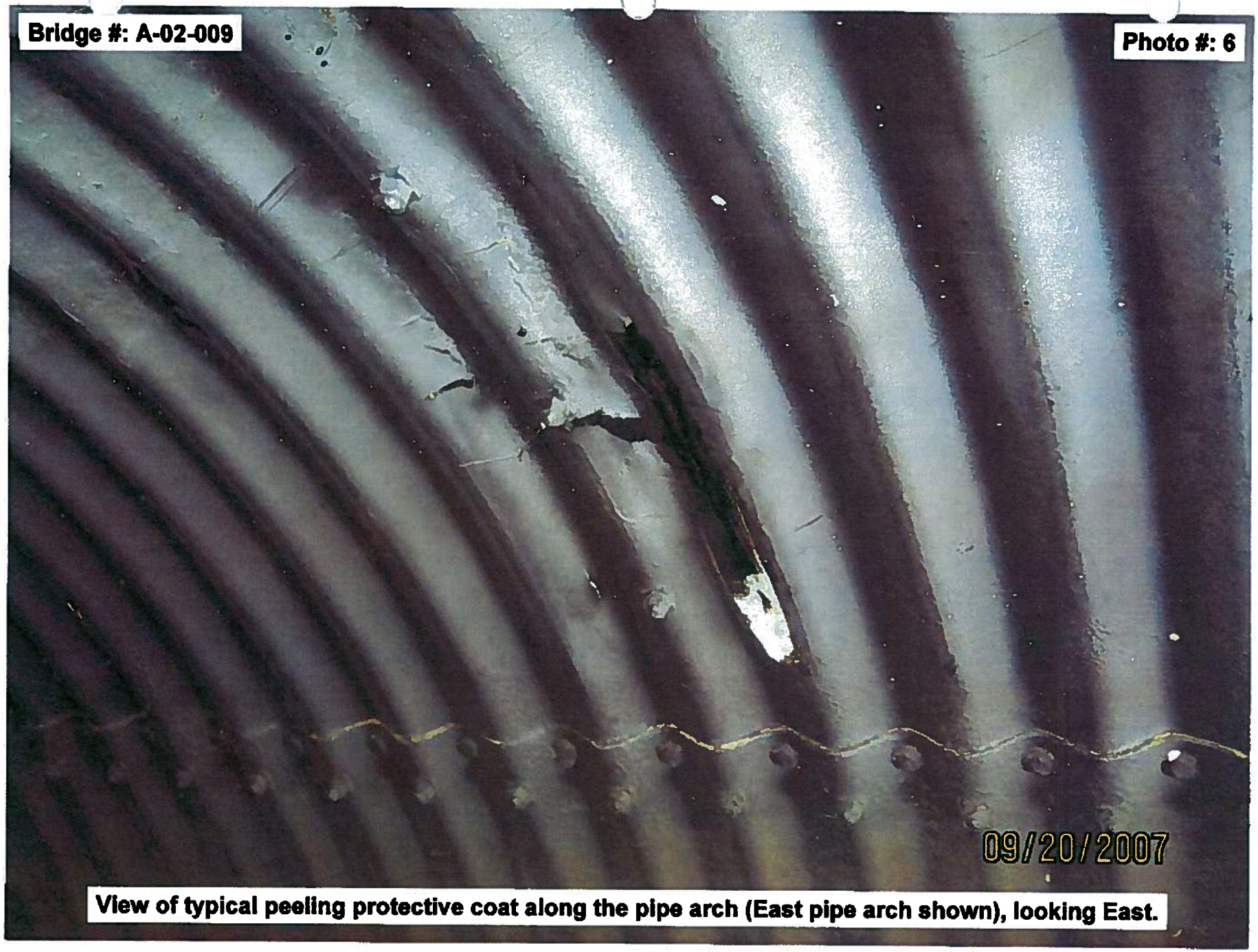
Top of bridge, looking Southwest.



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

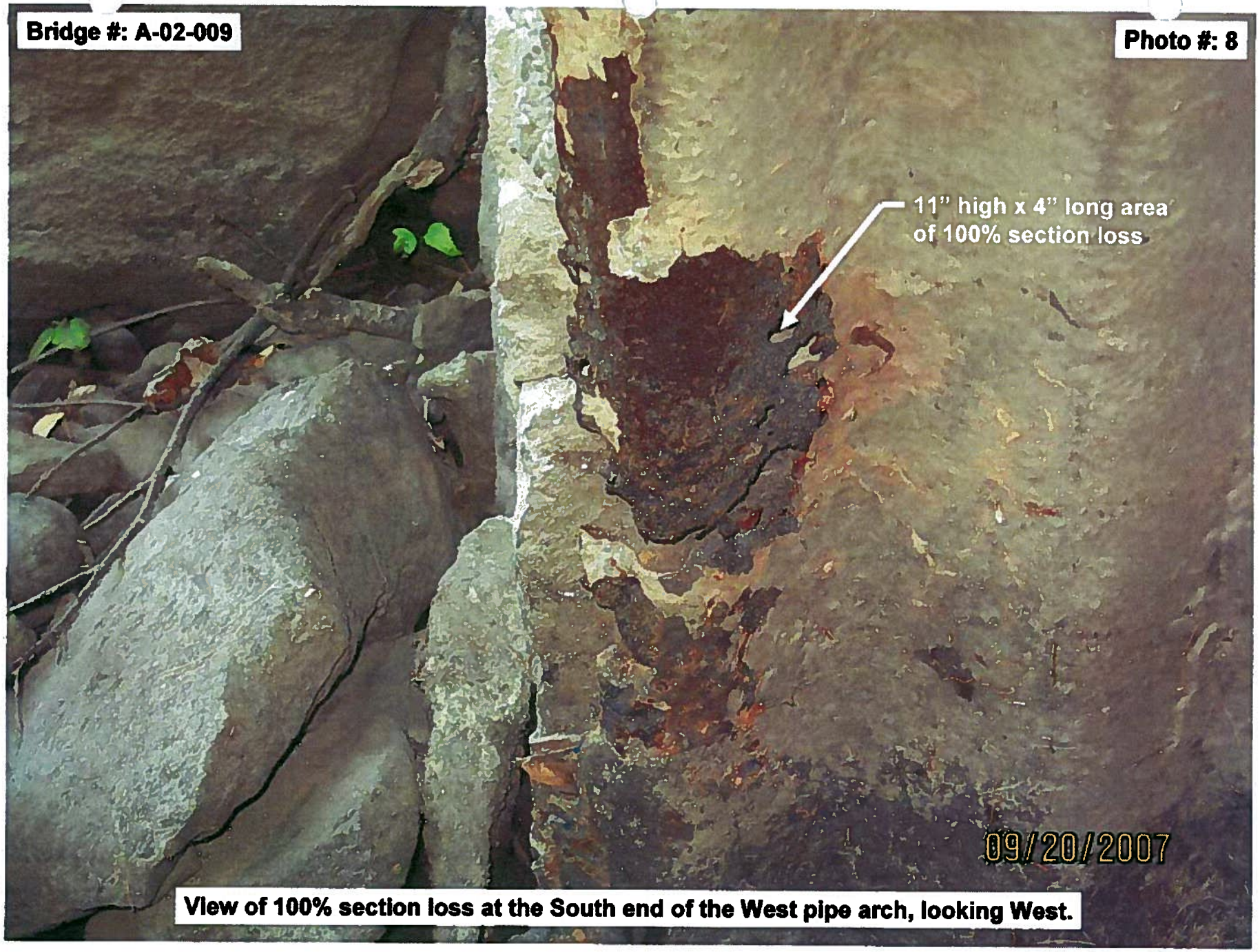


View of typical rust staining along the pipe arch (East pipe arch shown), looking Southeast.

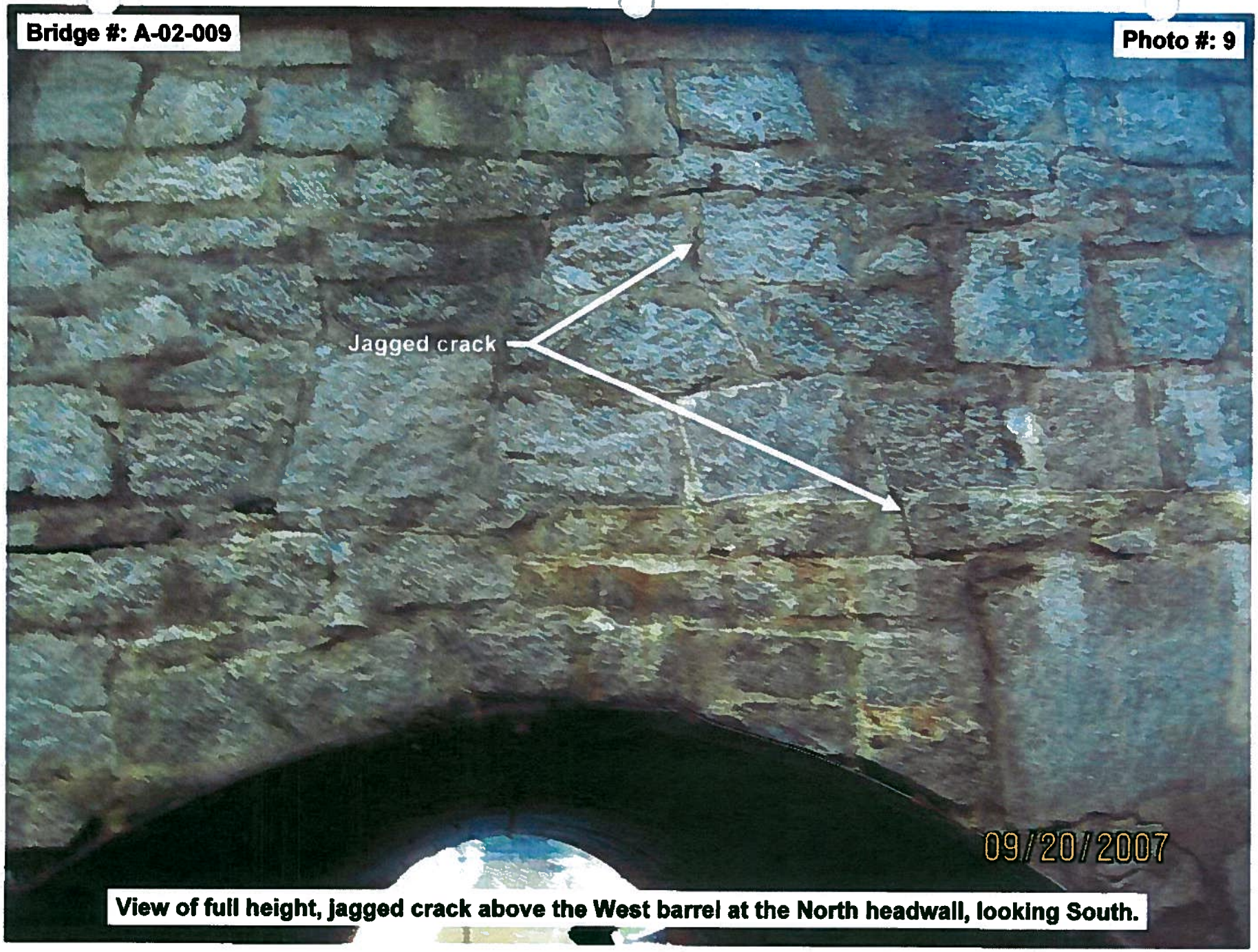


View of typical peeling protective coat along the pipe arch (East pipe arch shown), looking East.

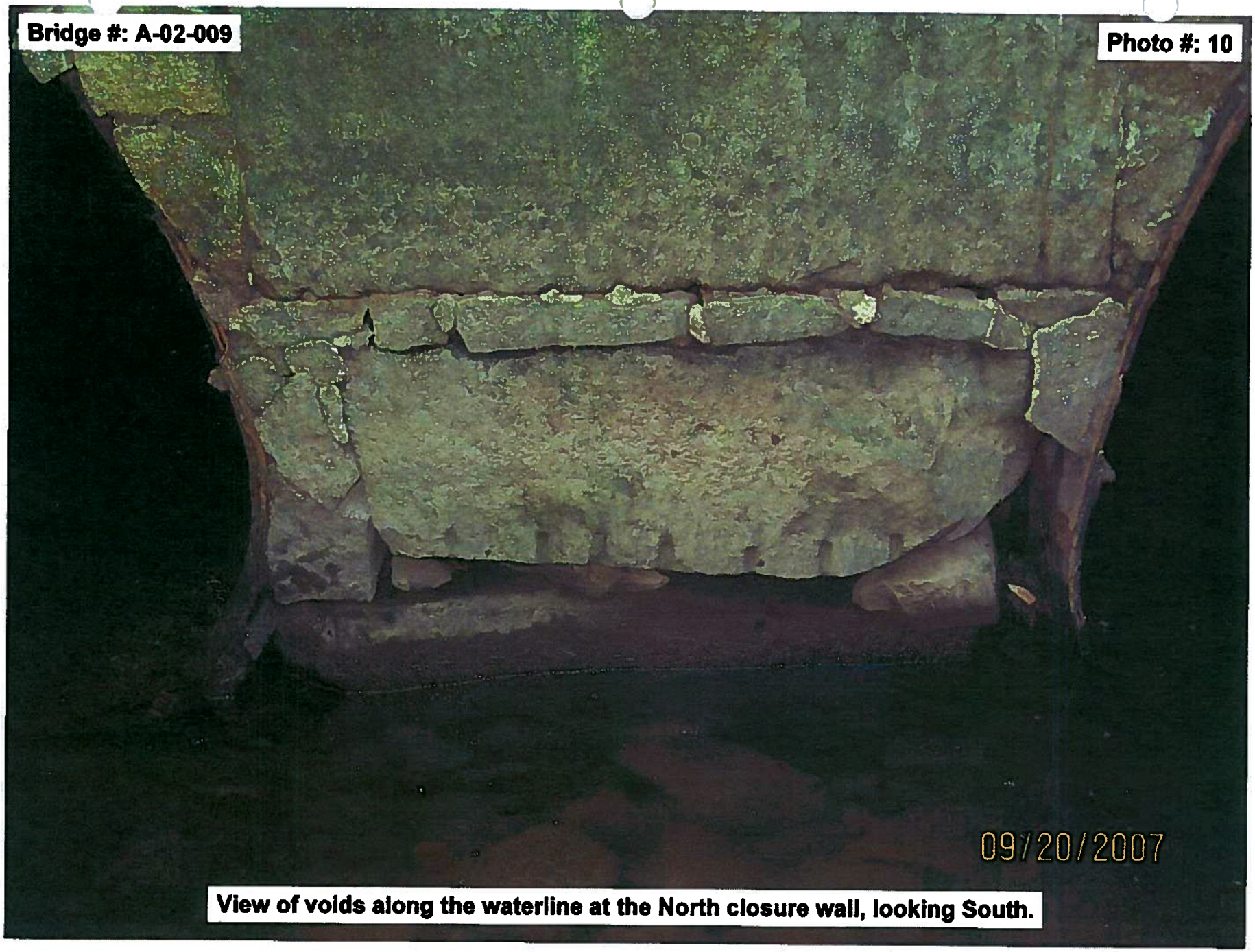
View of 100% section loss at the South end of the West pipe arch, looking East.



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



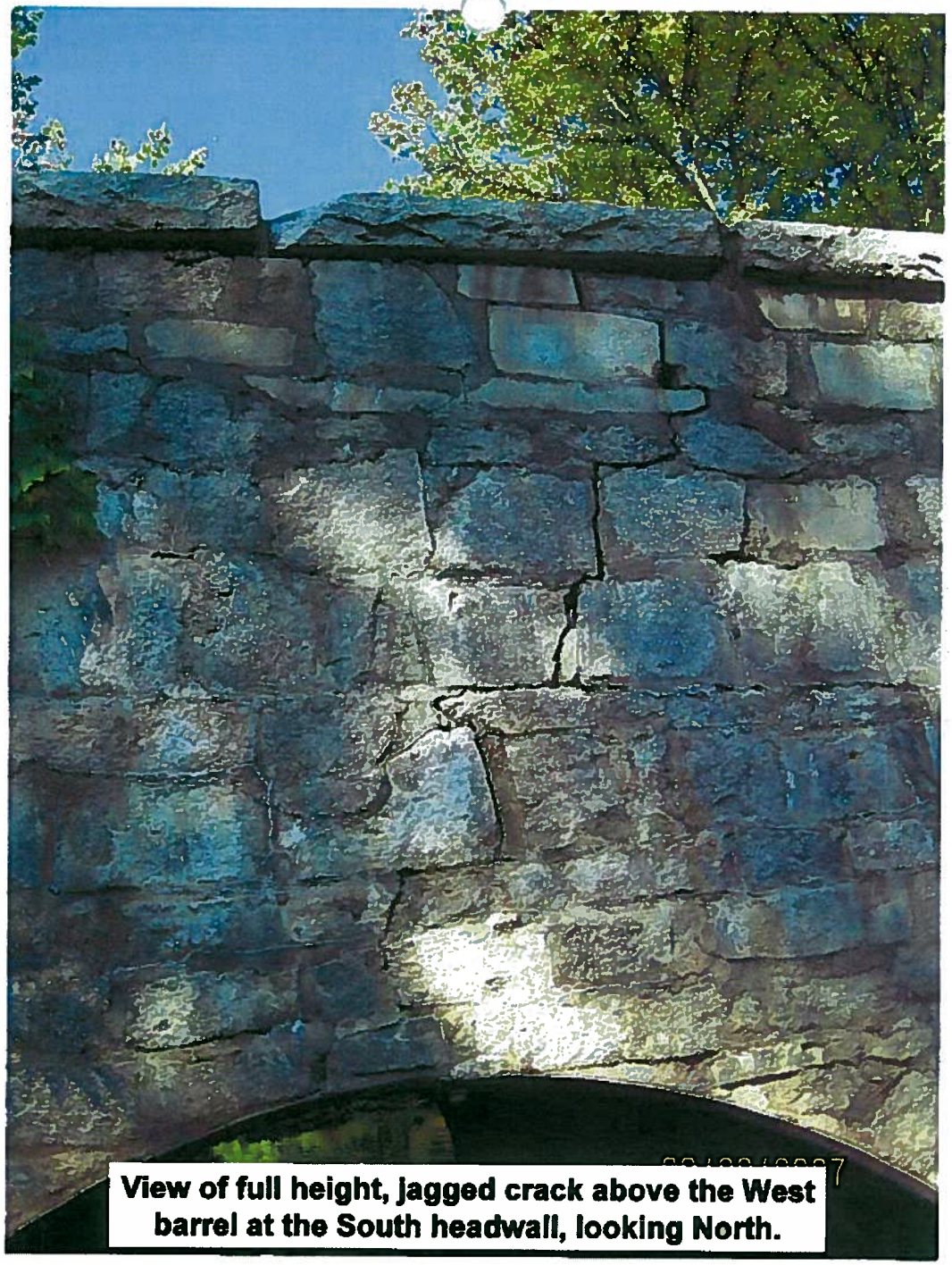
View of full height, jagged crack above the West barrel at the North headwall, looking South.



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.

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