

STRUCTURES INSPECTION FIELD REPORT

CULVERT INSPECTION

BR. DEPT. NO.

B-07-005

2-DIST
04

B.I.N.
7XR

CITY/TOWN BELMONT	8-STRUCTURE NO. B07005-7XR-MUN-BRI	11-Kilo. POINT 000.000	41-STATUS A:OPEN	90-ROUTINE INSP. DATE FEB 3, 2022
07-FACILITY CARRIED HWY BRIGHTON ST	MEMORIAL NAME/LOCAL NAME	27-YR BUILT 1850	106-YR REBUILT 1900	YR REHAB'D (NON 106) 0000
06-FEATURES INTERSECTED WATER WINNS BROOK	26-FUNCTIONAL CLASS Urban Minor Arterial	DIST. BRIDGE INSPECTION ENGINEER J. Dideo		
43-STRUCTURE TYPE 119 : Concrete Culvert	22-OWNER Town Agency	21-MAINTAINER Town Agency	TEAM LEADER O. Moustafa	
107-DECK TYPE N : Not applicable	WEATHER Cloudy	TEMP. (air) 4°C	TEAM MEMBERS P. BURKE <i>Patrick Burke</i>	

TYPE OF CULVERT:

SHAPE:	FOUR SIDED BOX
MATERIAL:	CONCRETE
COATING:	NONE

BARRELS: (In Meters)

SIZE:	3.00Wx2.00H	NUMBER:	1
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DEPTH OF COVER (To the nearest tenth of a meter)

N	S
1.5	1.5

CURB REVEAL (In millimeters)

127	133
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ITEM 62 CULVERT & RETAINING WALLS

5

162 (Dive Report):

N

162 (This Report):

5

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

ITEM 61 CHANNEL & CHANNEL PROTECTION

7

STREAM FLOW VELOCITY:

Tidal () High () Moderate () Low (X)

APPROACH CONDITION

	Dive This Rpt.	DEF		Dive This Rpt.	DEF																				
1. Channel Scour	N	7	-	5. Utilities	N	N	-	ITEM 61 (Dive Report):	N																
2. Embankment Erosion	N	N	-	6. Rip-Rap/Slope Protection	N	N	-		ITEM 61 (This Report):	7															
3. Debris	N	6	M-P	7. Aggradation	N	7	-	93b- U/W INSP DATE:		00/00/0000															
4. Vegetation	N	7	-					<table border="1"> <tr> <th colspan="2">At bridge</th> <th colspan="2">Advance</th> </tr> <tr> <td>E</td> <td>W</td> <td>E</td> <td>W</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </table>		At bridge		Advance		E	W	E	W								
At bridge		Advance																							
E	W	E	W																						

WEIGHT POSTING

Not Applicable X

Actual Posting	H	3	3S2	Single
	N	N	N	N
Recommended Posting	N	N	N	N
Waived Date:	00/00/0000	EJDMT Date:	00/00/0000	

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

ITEM 36 TRAFFIC SAFETY

ACCESSIBILITY (Y/N/P):

TOTAL HOURS 16

	36	COND	DEF	Needed	Used	Needed	Used
A. Bridge Railing	N	N	-	Ladder	N	N	Other:
B. Transitions	N	N	-	Boat	N	N	N
C. Approach Guardrail	N	N	-	Waders	Y	Y	
D. Approach Guardrail Ends	N	N	-				

PLANS (Y/N): N

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

TAPE#: _____

RATING

Rating Report (Y/N): N

Date: 00/00/0000

Inspection data at time of existing rating
162: - Date: 00/00/0000

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

If YES please give priority:

HIGH () MEDIUM () LOW ()

REASON: _____



X=UNKNOWN

N=NOT APPLICABLE

H=HIDDEN/INACCESSIBLE

R=REMOVED

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REMARKS, PHOTOS & SKETCHES

BRIDGE ORIENTATION

Bridge No. B-07-005 (7XR) carries Brighton Street over Winn Brook in Belmont, Massachusetts. The bridge is orientated east and west. Winn Brook flows from south to north. **See Sketch 1.**

GENERAL REMARKS

Bridge Description

The bridge is a four sided cast in place concrete box culvert. Stationing baseline starts at 0+00 from the north end of the west wall of the culvert and the underside deficiency locations are referenced by stationing.

To the north and south of the culvert, there are abutting four sided cast in place concrete box culverts. The north portal end is located 333' from the north end of the bridge. The scope of this inspection is limited to the culvert under Brighton Street from station 0+00 to 0+66 only as defined by the construction joints.

Access Notes

The culvert was accessed from the north portal. Waders were required for the inspection.

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	Advanced 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.)

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REMARKS

ITEM 62 - CULVERT

Item 62.1 - Roof

The roof has areas of severe spalling with exposed and corroded reinforcing, areas of heavy scaling and delamination, and construction joints with rust staining, efflorescence, and active leakage. See **Sketch 2** for the roof deficiencies.

Specific deficiencies are:

- Between Station (00+08) and Station (00+14), there is 6'-3" long x full width x 2.5" deep area of spalling with exposed and rusted rebars in both directions with typically 50% section loss. At Station (00+12), the exposed rebars have up to 100% section loss. **Photo 1.**
- Between Station (00+18) and Station (00+30), there is a 12' long x full width area of delamination and intermittent heavy scaling up to 1" deep. There are also multiple spalls, up to 3' long x 4'-8" wide x 1.5" deep with exposed and rusted rebars. **Photo 2.**
- At Station (00+25), there is active leakage at the construction joint with heavy efflorescence and rust staining. **Photo 3.**
- At Station (00+31), there is 2.5' long x full width x 4" deep spall with exposed and rusted rebars. There is also heavy rust staining and active leakage around the incased steel pipe inside the roof. **Photo 4.**
- At Station (00+47), there is 2'-2" long x 22" wide x 11" deep spall with exposed and rusted rebars with 100% section loss around the utility pipe. **Photo 5.**

Item 62.2 - Floor

There are isolated areas of scaling up to 1/4" deep. At the northeast corner, there is a 3' wide x 2.5' mass of concrete cast onto the floor. **Photo 6.**

Item 62.3 - Walls

Both walls have intermittent scaling on the upper half full length typically 1/8" deep and up to 3/8" deep. The west wall has isolated areas of scaling at the waterline up to 15" long x 5" high x 2" deep.

Additional deficiencies include:

West Wall:

- At the north fascia, there is a full height x full width x up to 11" deep spall with exposed and corroded reinforcing. **Photo 7.**
- From Station (00+00) to Station (00+25) approximately 2' from the top, there are intermittent longitudinal hairline cracks.
- At station (00+06), there is a full height x 4" wide x 2.5" deep spall, heavy rust staining and a full height x 1/8" wide crack that extends into the roof with light efflorescence. **Photo 8.**
- At Station (00+17) around the 12" diameter RCP, there is a 2.5' high x 3.5' long x 2.5" deep area of scaling. **Photo 9.**
- At Station (00+25) at the bottom, there is 2'-0" high x 8" wide x 2" deep area of scaling.
- At Station (00+27) around the steel utility pipe, there is a 2'-4" high x 2'-8" wide x 3" deep area of scaling with active leakage at the bottom. Extending from the bottom of the blockout, there is a 2' long vertical hairline crack with efflorescence. **Photo 10.**

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REMARKS

- At Station (00+40) below the 24" diameter utility, there is a 2'-3" high x 20" wide x 5" deep area of scaling and active leakage. **Photo 11.**
- At Station (00+47) at the bottom of the construction joint, there is a 2.5' high x 9" wide x 2.5" deep area of honeycombing.
- At Station (00+54) below the 24" diameter utility, there is an 8" long x 4" high x 1-1/2" deep area of scaling.
- At the south end at the bottom of the construction joint, there is a 18" high x 2" long x 2" deep area of scaling.

East wall:

- At the north end, there is a full height x full width x 7" deep spall with exposed and rusted rebars. **Photo 12.**
- Approximately 2.5' from the top, there is a full length, 1/8" wide horizontal crack with areas of efflorescence and water staining. **Photo 13.**
- At Station (00+12), there is a full height x 1/16" wide vertical crack.
- At Station (00+28.5) below the outfall of the 12" diameter RCP, there is a full height x 12" wide x 1/2" deep area of scaling with rust staining and active water leakage at the top.
- At Station (00+32) below steel utility pipe, there is a 2.5' high x 2' wide x up to 3" deep area of heavy scaling and water leakage. **Photo 14.**
- At Station (00+33), there is a full height vertical crack with heavy efflorescence. **Photo 14.**
- From Station (00+39) to Station (00+45) at the waterline, there is a 6" high x 2-1/2" deep area of heavy scaling.
- At Station (00+47) at the construction joint, there is an area of rust staining and active water leakage with light efflorescence. **Photo 15.**

Item 62.9 - Wearing Surface

There are multiple sealed cracks and map cracking in both lanes.

There is a minor depression and a 7' long x 2.5' wide patch on the eastbound lane. **Photo 16.**

Item 62.10 - Railing

- There is no bridge railing.

Item 62.11 - Sidewalks

- There are concrete sidewalks at both north and south sides. Both sidewalks were covered by snow at the time of the inspection. **Photo 17.**

Item 62.12 - Utilities

- From station 0+27 in the east wall to station 0+32 in the west wall there is a 12" diameter steel utility spanning the culvert with surface corrosion.
- At Station (00+28.5), there is a 12" diameter RCP in the east wall with a full perimeter crack 12" into the pipe.
- At Station (00+31), there is an incased steel pipe inside the roof with heavy rust staining and active leakage around the pipe. **Photo 4.**
- At Station (00+47) in the roof adjacent to the west wall, there is a 12" diameter steel utility with surface corrosion.

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REMARKS

ITEM 61 - CHANNEL AND CHANNEL PROTECTION

Item 61.3 - Debris

At the northeast corner of the culvert, there is a 3' wide x 2.5' mass of concrete cast onto the floor. **Photo 7.**

APPROACHES

Approaches a - Appr. pavement condition

- There are multiple sealed longitudinal and transverse cracks in both lanes of both approaches and there is a 3.5' long 2' wide patch near the north curb. **Photo 18.**

Approaches d - Appr. Sidewalk Condition

Both approaches sidewalks were covered by snow at the time of the inspection. **Photo 17.**

TRAFFIC SAFETY

Item 36a - Bridge Railing

There is no bridge railing.

Item 36b - Transitions

There are no transitions.

Item 36c - Approach Guardrail

There is no approach guardrail.

Item 36d - Approach Guardrail Ends

There are no approach guardrail ends.

Sketch / Photo Log

- Sketch 1 : General Plan
 Sketch 2 : Roof Deficiencies.
 Photo 1 : Station (00+08) to Station (00+14), 6'-3" long x full width x 2.5" deep area of spalling with exposed, rusted rebars and up to 100% section loss.
 Photo 2 : Station (00+18) to Station (00+30), 12' L x full width area of delamination, heavy scaling and multiple spalls, up to 3' L x 4'-8" W x 1.5" D with exposed and rusted rebars.
 Photo 3 : Station (00+25), active leakage at the construction joint with heavy efflorescence and rust staining.
 Photo 4 : Station (00+31), 2.5' L x full width x 4" D spall with exposed and rusted rebars in both direction. There is heavy rust staining and active leakage around the incased steel pipe inside the roof.
 Photo 5 : Station (00+47), 2'-2" L x 22" W x 11" D spall with exposed and rusted rebars with 100% section loss around the utility pipe.
 Photo 6 : Floor, northeast corner, there is a 3' wide x 2.5' mass of concrete cast onto the floor.
 Photo 7 : West wall, north fascia, full height x full width x up to 11" D spall with exposed and rusted rebars.
 Photo 8 : West wall, Station (00+06), full height x 4" W x 2.5" D spall, heavy rust staining and a full height x 1/8" W crack that extends into the roof with light efflorescence.
 Photo 9 : West wall, Station (00+17) around the 12" diameter RCP, 2.5' H x 3.5' L x 2.5" D area of scaling.
 Photo 10 : West wall, Station (00+27) around the steel utility pipe, 2'-4" H x 2'-8" W x 3" D scaling with active leakage and 2' long vertical hairline crack with efflorescence.

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REMARKS

- Photo 11 : West wall, Station (00+40) below the 24" diameter utility, 2'-3" H x 20" W x 5" D area of scaling and active leakage.
- Photo 12 : East wall, north end, full H x full width x 7" D spall with exposed and rusted rebars.
- Photo 13 : East wall, full length, 1/8" wide horizontal crack with areas of efflorescence and water staining.
- Photo 14 : East wall, Station (00+32) below steel utility pipe, 2.5' H x 2' W x up to 3" D area of heavy scaling and water leakage. Also note the full height vertical crack with heavy efflorescence.
- Photo 15 : East wall, Station (00+47) at the construction joint, area of rust staining and active water leakage with light efflorescence.
- Photo 16 : Eastbound lane, minor depression and a 7' L x 2.5' W patch.
- Photo 17 : Sidewalks were covered by snow at the time of the inspection.
- Photo 18 : Multiple sealed longitudinal and transverse cracks in both lanes and 3.5' L x 2' W patch near the north curb. (West approach shown).

CITY/TOWN
BELMONT

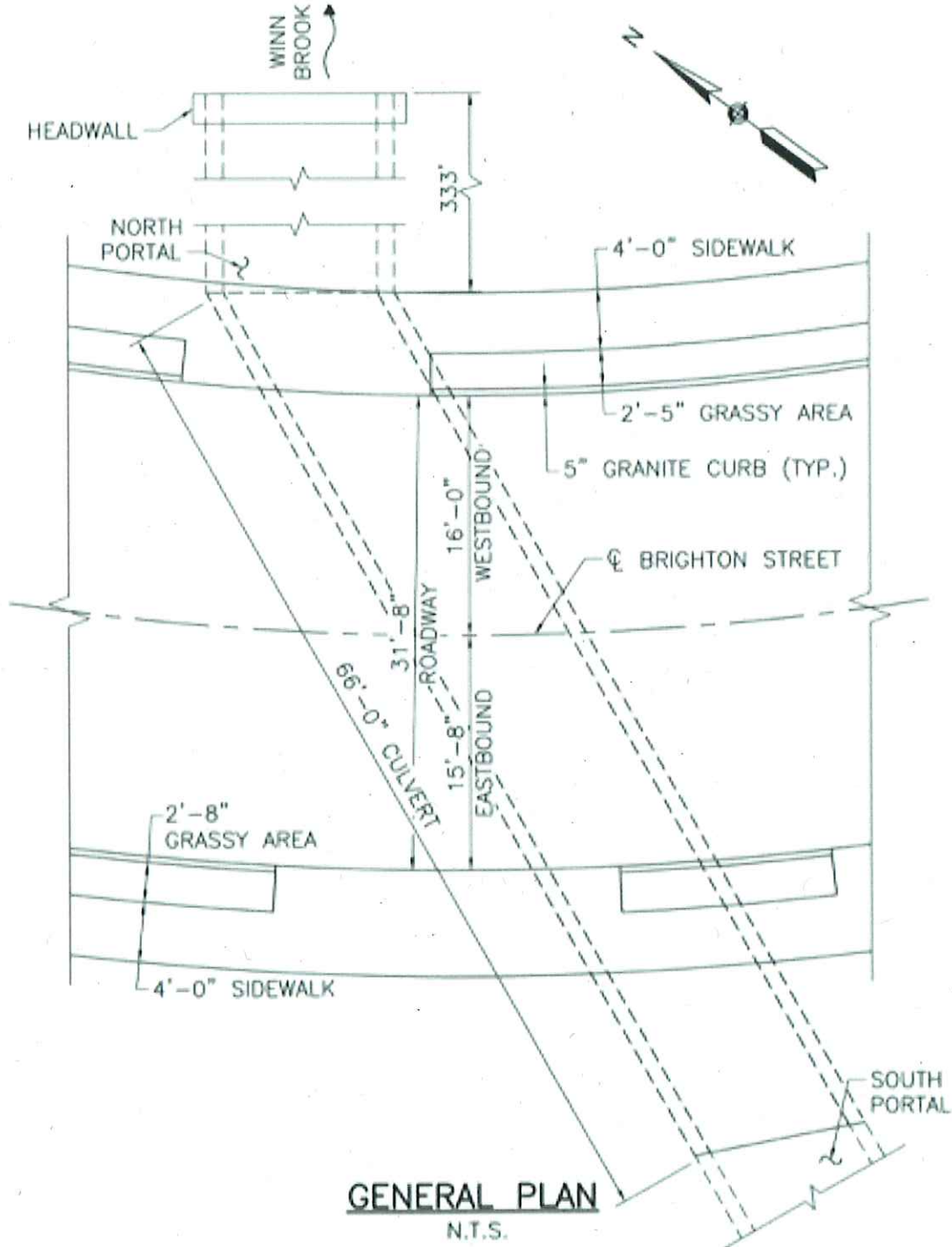
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SKETCHES

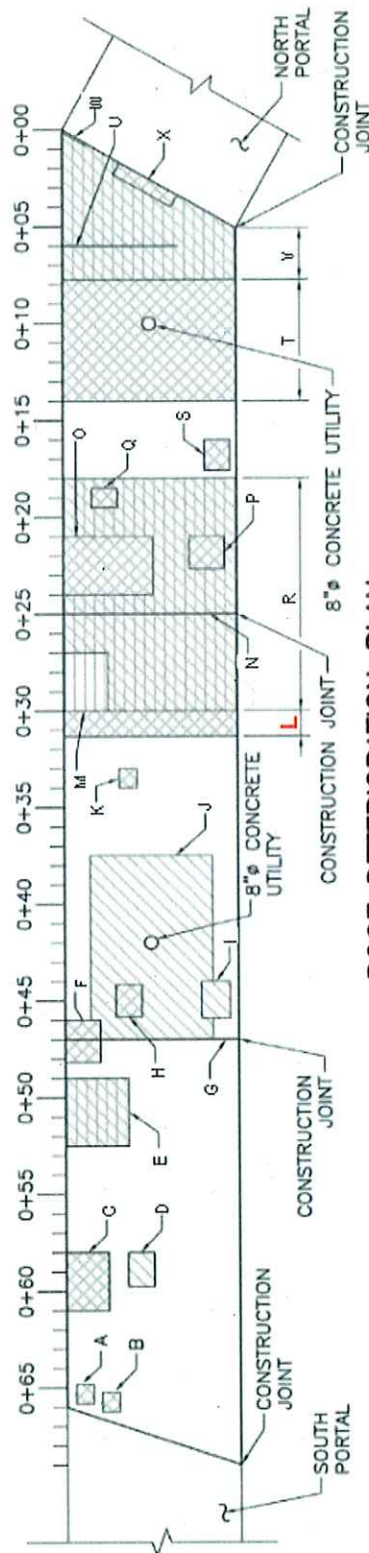
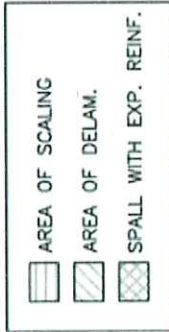


Sketch 1: General Plan

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SKETCHES

LEGEND:



ROOF DETERIORATION PLAN

N.T.S.

NOTES:

- A. 1.5'L x 6'10" W x 1.5" D SPALL WITH EXP. REINF. WITH UP TO 100% SECTION LOSS.
- B. 1.5'L x 1.5'10" W x 1.5" D SPALL WITH EXP. REINF. WITH UP TO 100% SECTION LOSS.
- C. 3'-0" L X 2'-3" W X 1 1/2" D SPALL WITH EXP. REINF.
- D. 21" L X 16" W AREA OF DELAM.
- E. 3'-6" L X 3'-4" W AREA OF DELAM. AND SCALING UP TO 1/2"
- F. 2'-2" L X 22" W X 1 1/2" D SPALL AT UTILITY WITH EXP. REINF.
- G. WITH UP TO 100% SECTION LOSS
- H. CONSTRUCTION JOINT WITH RUST STAINING, AND ACTIVE LEAKAGE
- I. 20" L X 16" W X 1 1/2" D SPALL WITH EXP. REINF.
- J. 23" L X 18" W AREA OF DELAM.
- K. 9'-6" L X 16" W AREA OF DELAM.
- L. 12" L X 11" W X 1" D SPALL WITH EXP. REINF.
- M. 2.5' L X 4" W X 4" D SPALL WITH EXP. REINF. AND ACTIVE WATER LEAKAGE, HEAVY RUST STAINING AROUND THE INCASED STEEL PIPE.
- N. CONSTRUCTION JOINT WITH FW ACTIVE LEAKAGE, LIGHT RUST STAINING, AND HEAVY EFFLORESCENCE.
- O. 3'-0" L X 4'-8" W X 1 1/2" D SPALL WITH EXP. REINF.
- P. 20" L X 22" W X 2" D SPALL WITH EXP. REINF.
- Q. 12" L X 16" W X 2" D SPALL WITH EXP. REINF.
- R. 12' L X FW AREA OF DELAM. AND INTERMITTENT HEAVY SCALING UP TO 1" D.
- S. 19" L X 16" W X 2" D SPALL WITH EXP. REINF.
- T. 6'-3" L X FW X 2.5" D SPALL WITH EXP. REINF. TRANS. BAR AT STATION 0+12 WITH 100% SECTION LOSS. TYPICAL EXPOSED BARS IN SPALL WITH APPROXIMATELY 50% LOSS
- U. 6'-0" L LINE OF RUST STAINING, WATER LEAKAGE, AND EFFLORESCENCE.
- V. 5'-0" AREA OF DELAM. AND SCALING.
- W. ROOF FASCIA WITH 4" H X 16" W X 1 1/2" D AREA OF SCALING.
- X. ROOF FASCIA WITH 4" H X 3'-5" W X 5" D SPALL WITH EXP. REINF.

****Deficiencies updates in RED.**

Sketch 2: Roof Deficiencies.

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PHOTOS

Photo 1: Station (00+08) to Station (00+14), 6'-3" long x full width x 2.5" deep area of spalling with exposed, rusted rebar and up to 100% section loss.



Photo 2: Station (00+18) to Station (00+30), 12' L x full width area of delamination, heavy scaling and multiple spalls, up to 3' L x 4'-8" W x 1.5" D with exposed and rusted rebar.

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PHOTOS

Photo 3: Station (00+25), active leakage at the construction joint with heavy efflorescence and rust staining.



Photo 4: Station (00+31), 2.5' L x full width x 4" D spall with exposed and rusted rebars in both direction. There is heavy rust staining and active leakage around the incased steel pipe inside the roof.

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PHOTOS

Photo 5: Station (00+47), 2'-2" L x 22" W x 11" D spall with exposed and rusted rebars with 100% section loss around the utility pipe.



Photo 6: Floor, northeast corner, there is a 3' wide x 2.5' mass of concrete cast onto the floor.

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PHOTOS

Photo 7: West wall, north fascia, full height x full width x up to 11" D spall with exposed and rusted rebar.



Photo 8: West wall, Station (00+06), full height x 4" W x 2.5" D spall, heavy rust staining and a full height x 1/8" W crack that extends into the roof with light efflorescence.

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PHOTOS

Photo 9: West wall, Station (00+17) around the 12" diameter RCP, 2.5' H x 3.5' L x 2.5" D area of scaling.



Photo 10: West wall, Station (00+27) around the steel utility pipe, 2'-4" H x 2'-8" W x 3" D scaling with active leakage and 2' long vertical hairline crack with efflorescence.

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PHOTOS

Photo 11: West wall, Station (00+40) below the 24" diameter utility, 2'-3" H x 20" W x 5" D area of scaling and active leakage.



Photo 12: East wall, north end, full H x full width x 7" D spall with exposed and rusted rebar.

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PHOTOS

Photo 13: East wall, full length, 1/8" wide horizontal crack with areas of efflorescence and water staining.



Photo 14: East wall, Station (00+32) below steel utility pipe, 2.5' H x 2' W x up to 3" D area of heavy scaling and water leakage. Also note the full height vertical crack with heavy efflorescence.

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PHOTOS

Photo 15: East wall, Station (00+47) at the construction joint, area of rust staining and active water leakage with light efflorescence.



Photo 16: Eastbound lane, minor depression and a 7' L x 2.5' W patch.

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PHOTOS

Photo 17: Sidewalks were covered by snow at the time of the inspection.

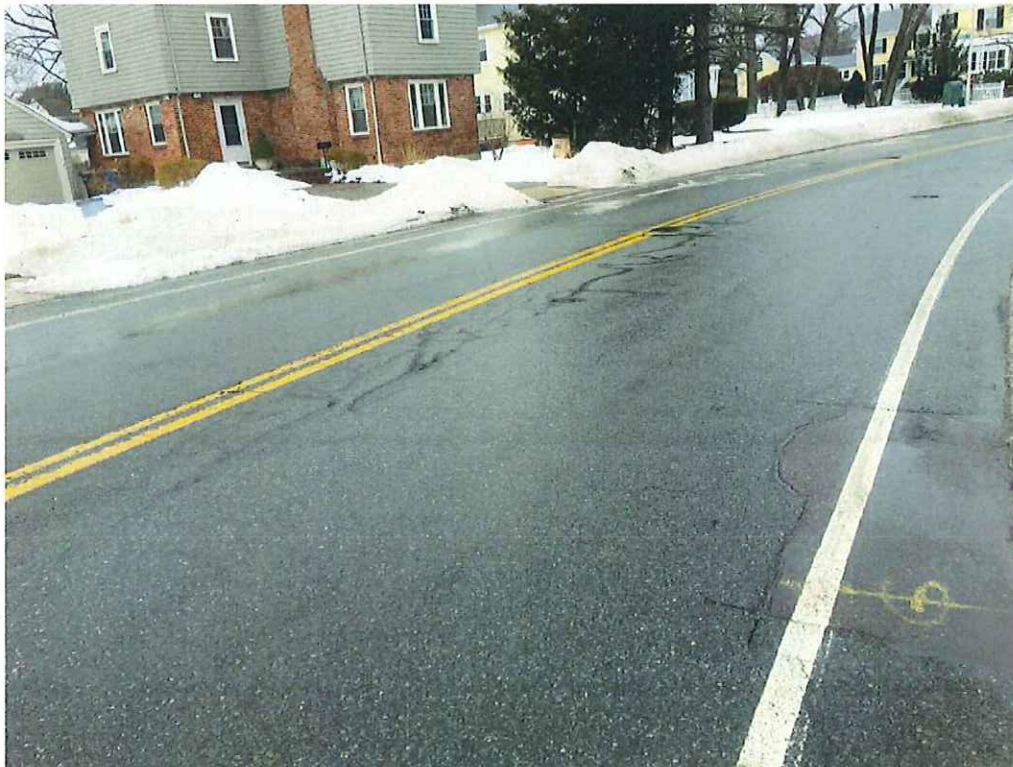


Photo 18: Multiple sealed longitudinal and transverse cracks in both lanes and 3.5' L x 2' W patch near the north curb. (West approach shown).