

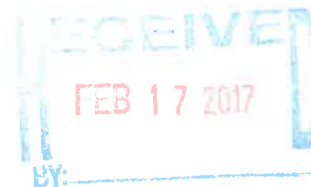


Charles D. Baker, Governor
Karyn E. Polito, Lieutenant Governor
Stephanie Pollack, Secretary & CEO
Thomas J. Tinlin, Administrator



February 15, 2017

Town of Wellfleet
Board of Selectmen
300 Main Street
Wellfleet, MA 02667



Attn: Mark Vincent, Director of Public Works

SUBJECT: NATIONAL BRIDGE INSPECTION STANDARDS (NBIS)
BRIDGE INSPECTION REPORTS

W-14-007

(44B) CHEQUSST NCK / HERRING RIVER

Dated: 06/08/16

Dear Mr. Vincent:

As part of the Massachusetts Bridge Inspection Program, MassDOT - Highway Division performs the inspection of municipally owned bridges that have a clear span of 20 feet or greater. These bridges are scheduled to be inspected every two years or less.

For your records is a copy of recent bridge inspection field report for the referenced municipally owned bridge. Repair, rehabilitation or reconstruction of any bridges to address the deficiencies reported is the owner/custodian's responsibility. Chapter 90 funds may be used for these purposes.

Questions regarding the content of the report may be directed to the District Bridge Inspection Engineer, Grant Simpson, at 508-884-4236.

Sincerely,

Mary-Joe Perry
District 5 Highway Director

GS/mr SMS
cc: DHD, A. Bardow
Enclosure

STRUCTURES INSPECTION FIELD REPORT

2-DIST 05 B.I.N. 44B

CULVERT INSPECTION

BR. DEPT. NO. W-14-007

| | | | | |
|--|---------------------------------------|--|-------------------------|--------------------------------------|
| CITY/TOWN WELLFLEET | 8-STRUCTURE NO. W14007-44B-MUN-NBI | 11-Kilo. POINT 000.483 | 41-STATUS A:OPEN | 90-ROUTINE INSP. DATE JUN 8, 2016 |
| 07-FACILITY CARRIED HWY CHEQUSS NCK | MEMORIAL NAME/LOCAL NAME | 27-YR BUILT 1973 | 106-YR REBUILT 0000 | YR REHAB'D (NON 106) 0000 |
| 06-FEATURES INTERSECTED WATER HERRING RIVER | 26-FUNCTIONAL CLASS Rural Local | DIST. BRIDGE INSPECTION ENGINEER G. Simpson | | |
| 43-STRUCTURE TYPE 119 : Concrete Culvert | 22-OWNER Town Agency | 21-MAINTAINER Town Agency | TEAM LEADER W. Ferry | |
| 107-DECK TYPE N : Not applicable | WEATHER Sunny | TEMP. (air) 28°C | TEAM MEMBERS G. BROZ | |

| | |
|--------------------|--|
| TYPE OF CULVERT: | BARRELS: (In Meters) |
| SHAPE: RECTANGLE | SIZE: 1.80mx1.50m NUMBER: 3 |
| MATERIAL: CONCRETE | DEPTH OF COVER (To the nearest tenth of a meter) E: 3.0 W: 3.0 |
| COATING: NONE | CURB REVEAL (In millimeters) N: N |

ITEM 62 CULVERT & RETAINING WALLS

| | | | | | | | |
|-------------------------|-----------------------------|----------------------------------|---|-------------------------|-----|----------------------|----------------------|
| Dive This Rpt. Rpt. DEF | DEF | Dive This Rpt. Rpt. DEF | DEF | Dive This Rpt. Rpt. DEF | DEF | 162 (Dive Report): 7 | 162 (This Report): 7 |
| 1. Roof 6 6 S-P | 7. Protective Coating N N - | 13. Member Alignment N N - | UNDERMINING (Y/N) If YES please explain N | | | | |
| 2. Floor 7 H - | 8. Embankment 6 6 - | 14. Deformation N N - | COLLISION DAMAGE: Please explain None (X) Minor () Moderate () Severe () | | | | |
| 3. Walls 7 H - | 9. Wearing Surface N 7 M-P | 15. Scour 7 7 - | LOAD VIBRATION: Please explain None (X) Minor () Moderate () Severe () | | | | |
| 4. Headwall 7 7 M-P | 10. Railing N 5 S-P | 16. Settlement 7 7 - | | | | | |
| 5. Wingwall 7 7 - | 11. Sidewalks N N - | 17. Observation platform N 4 S-P | | | | | |
| 6. Pipe N N - | 12. Utilities N N - | 18. N N - | | | | | |

ITEM 61 CHANNEL & CHANNEL PROTECTION

| | | | | | |
|-----------------------------|-------------------------------------|--------------------------|--------------------------|---|-----------------------------------|
| Dive This Rpt. Rpt. DEF | DEF | Dive This Rpt. Rpt. DEF | DEF | STREAM FLOW VELOCITY: Tidal (X) High () Moderate () Low () | APPROACH CONDITION |
| 1. Channel Scour 7 H - | 5. Utilities N X - | ITEM 61 (Dive Report): 7 | ITEM 61 (This Report): 7 | 93b- U/W INSP DATE: 06/17/2014 | a. Appr. pavement condition 7 M-P |
| 2. Embankment Erosion 7 7 - | 6. Rip-Rap/Slope Protection 6 6 M-P | | | | b. Appr. Roadway Settlement 7 - |
| 3. Debris 8 7 - | 7. Aggradation 7 H - | | | | c. Appr. Sidewalk Settlement N - |
| 4. Vegetation 8 7 - | | | | | d. N - |

WEIGHT POSTING

| | | |
|-------------------------|------------------------|---|
| Actual Posting | H 3 352 Single | Signs In Place (Y=Yes, N=No, NR=Not Required) |
| Recommended Posting | N N N N | Legibility/Visibility |
| Waived Date: 00/00/0000 | EJDMT Date: 00/00/0000 | |

ITEM 36 TRAFFIC SAFETY

| | | |
|----------------------------------|----------------------------|-------------------|
| 36 COND DEF | ACCESSIBILITY (Y/N/P): | TOTAL HOURS 6 |
| A. Bridge Railing N N - | Needed Used | PLANS (Y/N): Y |
| B. Transitions N N - | Ladder N N Other: Y Y | (V.C.R.) (Y/N): N |
| C. Approach Guardrail 0 3 S-P | Boat N N DIVE REQUIRED Y Y | TAPE#: |
| D. Approach Guardrail Ends N N - | Waders N N | |

RATING

Rating Report (Y/N): Y

Date: 02/01/1999

Inspection data at time of existing rating I 62: 7 Date: 06/21/1996

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

REASON:

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

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

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

REMARKS, PHOTOS & SKETCHES

BRIDGE ORIENTATION

Chequesset Neck Road has north-south orientation.

Herring River flows tidally east to west through a three-barrel box culvert with attached water control features. See sketches 1-3.

GENERAL REMARKS

Access

- Inspection was done simultaneously with the assistance of the MassDOT's Underwater Operations Team.

West End Barrels Flow Control

- The center and north barrels each have a directional control flapper gate that allows flow toward the downstream end (west).
- The south barrel had an adjustable bidirectional flow control gate that appears to be inoperable due to a severely corroded crank receptacle and a new building built for the U.S Government for water quality control on the west embankment, that is immediately in front of the mechanism, photos 19, 23 & 24.
- An intake pipe has been installed between the center and the south barrel, photos 5 & 20.
- Photos 1, 2, 5-11 are of items in the dive report. Please refer to Routine Underwater Inspection June 8, 2016.

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

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

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 WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

REMARKS

Tide

- The current changed abruptly during this inspection about 2-1/2 hours following the Wellfleet harbor low tide.
- Monitoring equipment is also installed on the bridge to count herring at both ends of each barrel.

ITEM 62 - CULVERT

Item 62.1 - Roof

Upstream, Left Span Extension

Adjacent to steel grate, the roof has light cracking, moderate delamination, and rust staining 3.3' L x 6.0' W.

Downstream, Right Span Extension

Adjacent to steel grate, the roof has a spall 4' L x 5' W with 0.8' maximum penetration adjacent to the left wall. The surrounding delamination has exposed and severely deteriorated rebar, some with up to 100% loss.

Item 62.3 - Walls

See Underwater Inspection.

Item 62.4 - Headwall

The bottom of west headwall north barrel has a spall on bottom with exposed rebar 3' W x 0.3'H x 0.8' D, photo 4.

Item 62.5 - Wingwall

Wingwalls have several cracks, some with light efflorescence.

NW wingwall has a spall 0.5' L x 1' H x 0.2' D at expansion joint.

Wingwall displacements are consistent with settlement /rotation of the spread footing type construction, photo 13.

Wingwall Displacements (at top):

SW 2-1/2"

NW 3"

NE 2-1/2"

SE 1-1/2"

Item 62.8 - Embankment

Both downstream embankments have settlement.

Item 62.9 - Wearing Surface

- Mostly over the north barrel, wide transverse cracks.
- Southbound lane over the south barrel, random cracks and some settlement.
- Minor full width cracks have some sealant.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

REMARKS

Item 62.10 - Railing

Observation Platform:

- The railings are firmly attached but most of the posts are split near the top, some with full height splits most likely to pack rust on the upper bolts, photos 16 & 17.
- West side, 7th timber post from the south has heavy rot with the bottom bolt is missing, photo 15.
- The railings are displaced outward with the wingwalls, photo 13 typical.
- Top rail at the east has been repaired, photo 12.
- Many fasteners have heavy deterioration.
- A top section of the west railing has been repaired, photo 14.

Item 62.17 - Observation platform grating

- Some locations have severely deteriorated steel grating that deflects easily under foot.
- The SE grating has heavy rust at the west side, photo 3.
- The remaining gratings have moderate rust.

ITEM 61 - CHANNEL AND CHANNEL PROTECTION

Item 61.3 - Debris

- Sea grass was removed from west side gratings to facilitate the inspection.
- The wet sea grass over the gratings at the west side indicates that the high tide regularly exceeds the top of the gratings.

Item 61.6 - Rip-Rap/Slope Protection

- SW riprap has 1.5' settlement at the slope top at end of wingwall extension.
- Beyond the SW wing the riprap slope base appears shifted is out about 1.5' with at least 100 sq ft area settled at top of slope.
- NW riprap at end of wing wall has a large area apparently settled 2.5'.

APPROACHES

Approaches a - Appr. pavement condition

South Approach

- Has relatively new wearing surface and is in good condition.

North Approach

- Water retention at curb line is likely due to approach settlement.
- Full width transverse, longitudinal, and map cracks, some are sealed.
- North approach drainage is blocked with ponding evidence to 1" deep.

TRAFFIC SAFETY

Item 36a - Bridge Railing

Type-W approach guardrail carries over.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

REMARKS

Item 36c - Approach Guardrail

- Type-W guardrail carries from approach over bridge.
- Type W guardrail abruptly changes to non-standard cable & post railing.
- NW W-shape end is cantilever 6+ ft presenting a potential impalement condition, photos 21 & 22. This condition is hidden by a post at the end, part of the failed disconnected nonstandard cable system of which the 5th post at the NW is broken.
- SE cable is covered with sand.
- NE cable is only 18" above the berm, the lower cable is loose, and the 3rd post from bridge has exposed rebar.
- Many posts have rusting rebar and cracks.
- Cables are rusty.

Item 36d - Approach Guardrail Ends

- Gloved ends on W-shape guardrail are nonstandard and overlap defunct post and cable system.
- Approach rail changes to cable type at approaches and terminates beyond bridge extent.

Sketch / Photo Log

- Sketch 1 : Google Earth image (east at top).
- Sketch 2 : Cross section looking north
- Sketch 3 : Elevation profile from rating report looking west.
- Photo 1 : Roof of south upstream flume extension.
- Photo 2 : Roof of south upstream flume extension looking west.
- Photo 3 : Grating over south upstream flume extension.
- Photo 4 : Headwall of downstream flume extension has spall.
- Photo 5 : Downstream end, new monitoring pipe installed at end.
- Photo 6 : Spalls on downstream south barrel south wall.
- Photo 7 : Upstream elevation.
- Photo 8 : South barrel looking west.
- Photo 9 : South barrel looking west.
- Photo 10 : Middle barrel looking west.
- Photo 11 : North barrel looking west.
- Photo 12 : Rail has been repaired at east.
- Photo 13 : Typical deflection of rail following settlement of wingwalls on flume extension.
- Photo 14 : Rail at west has been repaired.
- Photo 15 : West side, 7th post from the south has missing anchorage on the bottom.
- Photo 16 : Typical spit in rail post
- Photo 17 : Center post at west has been shored.
- Photo 18 : Topside looking north.
- Photo 19 : New monitoring building property of the U.S. Government.
- Photo 20 : New monitoring duct at the west.
- Photo 21 : NW gloved end is detached from post.
- Photo 22 : NW gloved end and first section of rail is cantilevered (not connected at post at end).
- Photo 23 : SW gate control mechanism appears to be non-functional.
- Photo 24 : Sign on new monitoring building on the west embankment.

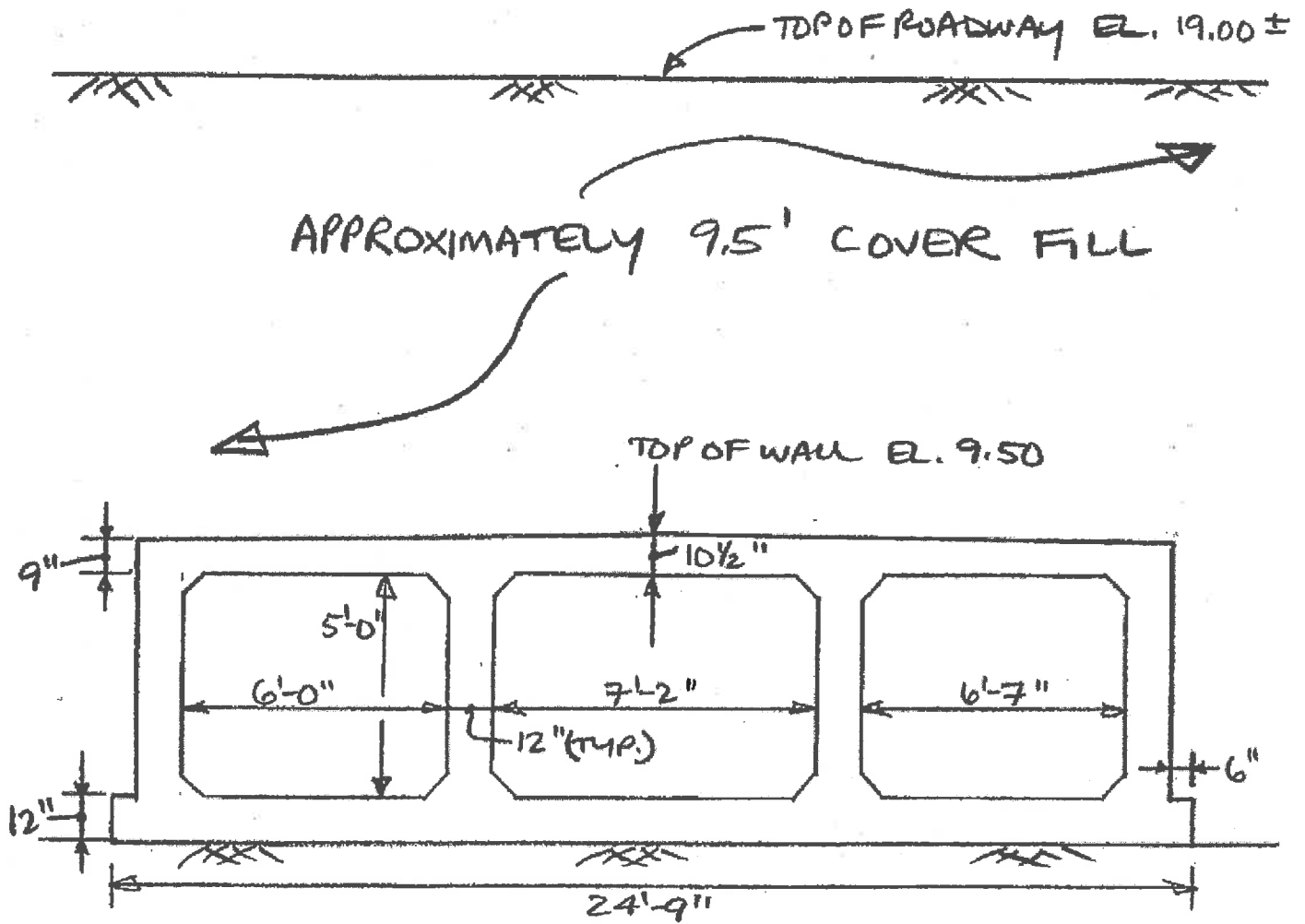
| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

SKETCHES

Sketch 1: Google Earth image (east at top).

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

SKETCHES



SECTION (N.T.S.)

Sketch 3: Elevation profile from rating report looking west.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

PHOTOS



Photo 1: Roof of south upstream flume extension.



Photo 2: Roof of south upstream flume extension looking west.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

PHOTOS



Photo 3: Grating over south upstream flume extension.



Photo 4: Headwall of downstream flume extension has spall.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

PHOTOS

Photo 5: Downstream end, new monitoring pipe installed at end.



Photo 6: Spalls on downstream south barrel south wall.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

PHOTOS



Photo 7: Upstream elevation.



Photo 8: South barrel looking west.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

PHOTOS



Photo 9: South barrel looking west.



Photo 10: Middle barrel looking west.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

PHOTOS



Photo 11: North barrel looking west.



Photo 12: Rail has been repaired at east.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

PHOTOS



Photo 13: Typical deflection of rail following settlement of wingwalls on flume extension.



Photo 14: Rail at west has been repaired.

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

PHOTOS



Photo 15: West side, 7th post from the south has missing anchorage on the bottom.



Photo 16: Typical spit in rail post

CITY/TOWN
WELLFLEETB.I.N.
44BBR. DEPT. NO.
W-14-0078.-STRUCTURE NO.
W14007-44B-MUN-NBIINSPECTION DATE
JUN 8, 2016

PHOTOS



Photo 17: Center post at west has been shored.



Photo 18: Topside looking north.

CITY/TOWN
WELLFLEETB.I.N.
44BBR: DEPT. NO.
W-14-0078.-STRUCTURE NO.
W14007-44B-MUN-NBIINSPECTION DATE
JUN 8, 2016

PHOTOS



Photo 19: New monitoring building property of the U.S. Government.



Photo 20: New monitoring duct at the west.

CITY/TOWN
WELLFLEETB.I.N.
44BBR. DEPT. NO.
W-14-0078.-STRUCTURE NO.
W14007-44B-MUN-NBIINSPECTION DATE
JUN 8, 2016

PHOTOS



Photo 21: NW gloved end is detached from post.



Photo 22: NW gloved end and first section of rail is cantilevered (not connected at end).

| | | | | |
|------------------------|---------------|---------------------------|--|--------------------------------|
| CITY/TOWN WELLFLEET | B.I.N. 44B | BR. DEPT. NO. W-14-007 | 8.-STRUCTURE NO. W14007-44B-MUN-NBI | INSPECTION DATE JUN 8, 2016 |
|------------------------|---------------|---------------------------|--|--------------------------------|

PHOTOS



Photo 23: SW gate control mechanism appears to be non-functional.

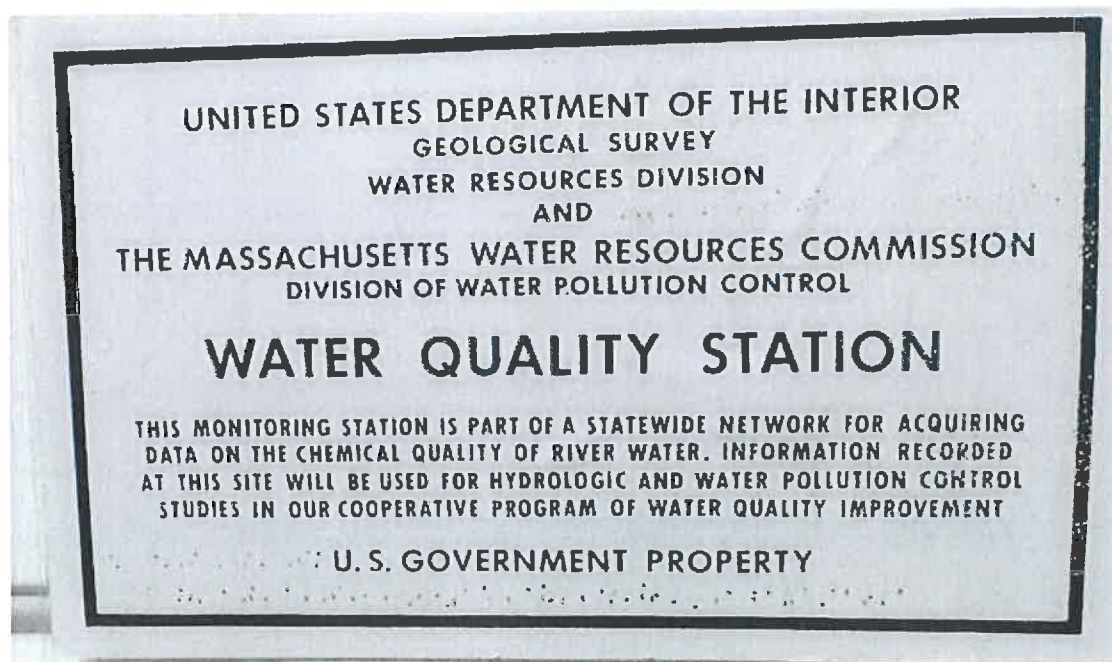


Photo 24: Sign on new monitoring building on the west embankment.