2-DIST B.I.N. **7VB** 

# STRUCTURES INSPECTION FIELD REPORT

# SPECIAL MEMBER INSPECTION

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

CITY/TOW	CITY/TOWN 8STRUCTURE NO.   11-Kilo. POINT   90-ROUTINE INSP. DATE   93*-SPEC. MEMB. INSP. DATE							ISP. DATE				
			307015-7VB-MUN-CUL 000.000		May 2, 2022			Nov 14, 2022				
07-FACILITY CARRIED ST 60 TRAPELO RD			MEMORIAL NAME/LOCAL NAME		27-YR BUILT 106-YR REB							
06-FEATURES INTERSECTED WATER BEAVER BROOK				26-FUNCTIONAL CLASS Urban Arterial  DIST.		SPECTION	ON ENG	INEER J	J. Dideo			
43-STRUCTURE TYPE 801:Masonry Slab				22-OWNER Town Agency	21-MAINTAINER Town Agency	TRAM LEADER	M. Come	2	· ·			
107-DECK ТҮРЕ 1 : Concrete Cast-in-Place				WEATHER CLEAR	TEMP. (air) 5°C	TEAM MEMBERS S. GALLAGHER			<b>.</b>			
WEIGH	WEIGHT POSTING Not Applicable X At bridge Advance H 3 3S2 Single Signs In Place E W E W PLANS (Y/N): N											
0.00	Actual Posting N N N N N N N N N N N N N N N N N N N											
RATING									If YES ple	ase give p	riority:	
Rating R	eport (Y/N): N	Date:		Recomme	end for Rating o	r Rerating (Y/N	):	1 [	HIGH ( )	- 1225 25 J <del>288</del> J M J 297 A <b>2</b> S		V ( )
Inspection data at time of existing rating  158: - 159: - 160: - 162: - Date:00/00/0000												
SPECL	AL MEMBER(S):											
	MEMBER	CRACK (Y/N):	WELD'S CONDITION (0-9)	LOCATION OF CORR COLLISION DAMAGE	ROSION, SECTION LO GE, STRESS CONCE	OSS (%), CRACKS, NTRATION, ETC.	COND PREVIOUS (0-9)	PRESENT	INV. RATING FROM RATI	OF MEMB NG ANALYS	BIS Defic	ciencies
	n 58.2 - Deck ndition	N	N	See remarks	in commen	ts section.	3	3	Not	Rated	S	6-A
D	n 59.4 - Girders Seams	N	N	See remarks	in commen	ts section.	3	3	Not	Rated	S	6-A
С						if						
D												
E												
	Hands on inspection						I-62					
					* San a regard	all Previous Co all Current Con		יו	3	3	4	-
DEFICIENCY: A defect in a structure that requires corrective action.												
CATEGO	ORIES OF DEFICIENC	IES:			Mariana ali vertazioni and alternazione							
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												
C-S= Critical Structural Deficiency - Adeficiency 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												
C-S= Critical Structural Deficiency - Adelicency 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.							nples					
E2000000000000000000000000000000000000	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 = Priori	tize- [Shall be prioritized by	-	No. 10 Tel Color	or the Responsible Party (if not a		repairs made when funds	- Educati		vailable].	57.54	PEMOV	

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8STRUCTURE NO.	INSPECTION DATE
BELMONT=WALTHAM	7VB	B-07-015=W-04-039	B07015-7VB-MUN-CUL	NOV 14, 2022

# REMARKS

### BRIDGE ORIENTATION

Structure B-07-015=W-04-039 (7VB) carries ST 60 Trapelo Road over Beaver Brook along the border line between the Town of Belmont and the City of Waltham. The approaches are west and east and the elevations are south and north. Beaver Brook flows from north to south.

### **GENERAL REMARKS**

There are multiple superstructure types for this bridge. There are sixteen (16) granite slabs labeled Slab 1 through 16 from south to north. There are eight (8) steel beams labeled Beam 1 through 8 between Slabs 4 and 5, with a utility main at Beam 5. There is a concrete slab with stay-in- place forms between Slabs 12 and 13. North of Slab 16 there is a concrete extension. The original abutments are comprised of dry laid stone at the south side, and the bridge was widened using cast- in-place concrete abutments on the north side. There is a bituminous wearing surface that has been retrofitted with steel roadway plates that span the length of the superstructure. See Sketches 1 - 3.

### ITEM 58 - DECK

### Item 58.2 - Deck Condition

The roadway plates are designated as P1 through P6 from south to north. See Sketch 1.

There are isolated fully broken tack welds between roadway plates. The plates with broken tack welds typically deflect under live load.

There is typically minor scrapes and gouges on the leading edge of the roadway plates.

There are isolated transverse hairline cracks in the approaches adjacent to the plates.

There is a depressed bituminous patch with radial up to 1/8" cracks at the northeast corner of P5. **See Photo 1**.

### ITEM 59 - SUPERSTRUCTURE

### <u>Item 59.4 - Girders or Beams</u> Granite Slabs:

There are isolated longitudinal and diagonal hairline cracks, some with efflorescence near the abutments. There are several up to full width transverse hairline cracks, some with efflorescence near mid-span. **See Sketch 2**.

The southwest corner of Slab 1 is unsupported for 6".

Slab 4 there is a diagonal hairline crack at the east end. **See Photo 2.** 

Granite slab 6: Transverse split with previous water leakage noted near midspan.

Slab 7 near mid-span has an up to 2" wide x full depth transverse crack, with a 20" long x 13" wide x 2" deep spall at the south edge.

Slab 6 and 7 are monitored with crack gauges. The crack gauges indicated little to no movement since installation. The crack gauge at Slab 7 read 0.05 mm from zero. **See Photos 3 & 4.** 

### REMARKS

### Steel I-Beams:

There is timber shielding between the steel I-beams preventing inspection of the web and top flanges. The beams typically exhibit minor rotation about the longitudinal axis, resulting in the bottom flanges no longer being level. **See Photo 5.** 

There is typically heavy rust and laminated rust throughout the beams. The top and bottom flanges of isolated beams near the abutments and at mid-span have up to 100% section loss x full width. **See Sketch 3 and Photos 6 & 7.** 

### **Reinforced Concrete Slab:**

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

There are two spalls with exposed rebar along the south edge measuring up to 2'-6'' long x 9'' high x 6'' wide. There is a 24'' long x 16'' wide delamination at the northwest corner. **See Photo 8.** 

### Sketch / Photo Log

Sketch 1:	Roadway Plate Conditions
Sketch 2:	Superstructure Conditions
Sketch 3:	Steel Beam Conditions

Photo 1: There is a depressed bituminous patch with radial up to 1/8" cracks at the northeast corner of

Photo 2: Granite Slab 4, there is a diagonal hairline crack at the east end.

Photo 3: Granite Slab 6 crack gauge installed with little to no movement since installation.

Photo 4: Granite Slab 7 crack monitor installed reading 0.05 mm of movement, there has been no chance since the previous inspection.

Photo 5: The beams typically exhibit minor rotation about the longitudinal axis, resulting in the bottom flanges no longer being level (Note the timber shielding in between beams).

Photo 6: Heavy section loss up to 100% at the east end bottom flanges of beams 7-8.

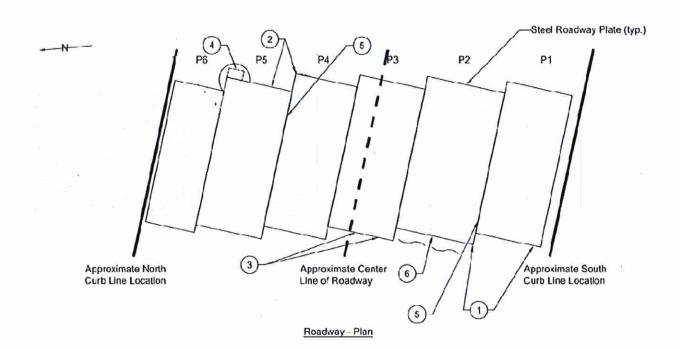
Photo 7: Heavy section loss up to 100% at the west end of the bottom flanges of beams 6-8.

Photo 8: Reinforced concrete slab, There are two spalls with exposed rebar along the south edge

measuring up to 2'-6" long x 9" high x 6" wide.

CITY/TOWN B.I.N. BR. DEPT. NO. 8.-STRUCTURE NO. INSPECTION DATE BELMONT=WALTHAM B-07-015=W-04-039 7VB B07015-7VB-MUN-CUL NOV 14, 2022

# **SKETCHES**



### Legend:

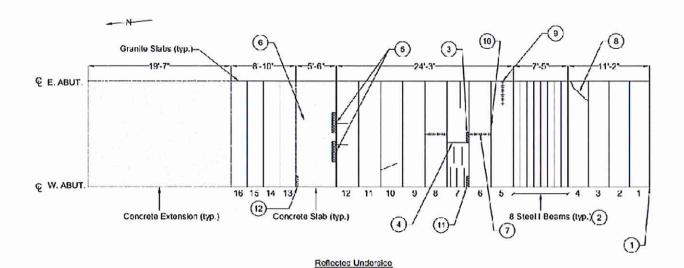
- · Spall (typ.)
- Delamination (typ.)
- Patch
  - Hairline Crack (U.O.N)
- Hermine Hairline Crack with
  - Efflorescence (U.O.N)
- Condition:
  - Southwest corner deflects under live load
  - 2. Northeast corner deflects under live load
  - Minor spalls adjacent to roadway plate 3.
  - 4. 2'-0" W x 7" L depressed bituminous patch with radial cracks  $\frac{1}{8}$ " W 5. Full length broken lack weld (typ. 5' L)

  - 6. Minor scrapes and gouges (typ.)

Sketch 1: **Roadway Plate Conditions** 

CITY/TOWN B.I.N. BR. DEPT. NO. 8.-STRUCTURE NO. INSPECTION DATE BELMONT=WALTHAM B-07-015=W-04-039 7VB B07015-7VB-MUN-CUL NOV 14, 2022

## **SKETCHES**



### Legend

- Spall (typ.)

- Delamination (typ.) Hairline Crack (U.O.N)

+++++ - Hairline Grack with Efforescence (U.O.N)

#### Condition:

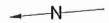
- Granite Stab end unsupported at the SW corner for 6"
- See Sketch 3: Steel Beam Conditions
- Granite Stab with a 20" L x 13" W x 2" D spall
  Granite s ab with up to 2" W x full depth crack. Crack gauge reads 0.05mm.
  Two (2) up to 30" L x 6" W x up to 9" D edge spall with exposed rebar.
- 50% of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

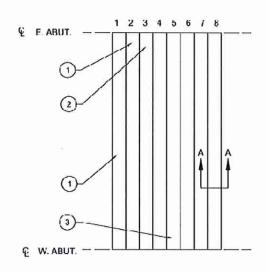
**Superstructure Conditions** Sketch 2:

# **SKETCHES**

### NOTE:

interior web and top flarge inaccessible due to timber shielding. Beams bottom flanges are typically rotated.





100% SL x
REM. WIDTH

100% SL

Timber Shielding (typ.)

100% SL x
1-1/2" W

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

Section A-A Beam 8

### Conditions:

- Bottom Flange: 100% section loss x 1"W at the south leg, <sup>3</sup>/<sub>16</sub>" average remaining x remaining width
- 2. Bottom Flarge: 100% section less x ½" W at legs, 8"
- average remaining x remaining width

  3. Bottom Flange: North Flange 2' W cut out at the west end above the drainage pipe. South Flange 100% section loss x ½" W

Sketch 3: Steel Beam Conditions



Photo 1: There is a depressed bituminous patch with radial up to 1/8" cracks at the northeast corner of P5.



Photo 2: Granite Slab 4, there is a diagonal hairline crack at the east end.



Photo 3: Granite Slab 6 crack gauge installed with little to no movement since installation.



Photo 4: Granite Slab 7 crack monitor installed reading 0.05 mm of movement, there has been no chance since the previous inspection.

CITY/TOWN BELMONT=WALTHAM B.I.N. **7VB**  BR. DEPT. NO. B-07-015=W-04-039 8.-STRUCTURE NO.

B07015-7VB-MUN-CUL

INSPECTION DATE NOV 14, 2022

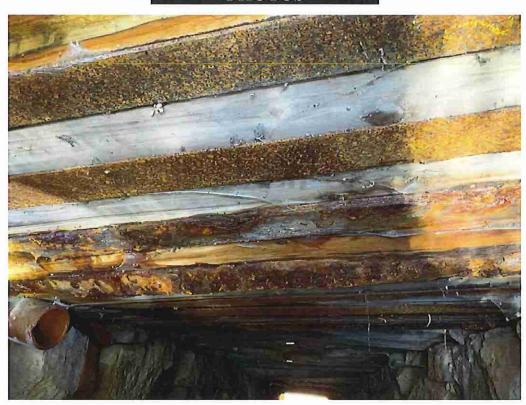


Photo 5: The beams typically exhibit minor rotation about the longitudinal axis, resulting in the bottom flanges no longer being level (Note the timber shielding in between beams).



Photo 6: Heavy section loss up to 100% at the east end bottom flanges of beams 7-8.



Photo 7: Heavy section loss up to 100% at the west end of the bottom flanges of beams 6-8.

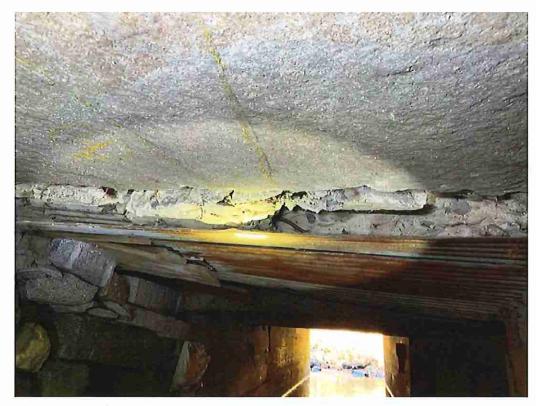


Photo 8: Reinforced concrete slab, There are two spalls with exposed rebar along the south edge measuring up to 2'-6" long x 9" high x 6" wide.

Report Date: October 6, 2022  State Information	ClassificationCode
BDEPT#= B07015=W04039 Agency Br.No.	(112) NBIS Bridge Length N
Town= Belmont=Waitham L.O.	(104) Highway System N
B.I.N= 7VB AASHTO= 002	0 (26) Functional Class - Urban Arterial 14
RANK= 0 H.I.= 90.6 % FHWA Select List= N (6/21/1	7) (100) Defense Highway 1
[8] Structure Number B070157VBMUNCU	(101) Parallel Structure N
(5) Inventory Route 20000000	(100) PL - U - CT - M
	4 (103) Temporary Structure Y
(3) County Code 017 (4) Place code 0503	0 (105) Federal Lands Highways 0
(6) Features Intersected WATER BEAVER BROO	K (110) Designated National Network N
(7) Facility Carried ST 60 TRAPELO R	D (20) Toll - On free road 3
(9) Location	(21) Maintain - Town Agency 03
(11) Kilometerpoint 0000.00	0 (22) Owner - Town Agency 03
(12) Base Highway Network	N (37) Historical Significance undetermined
(13) LRS Inventory Route & Subroute 000000000000	Code
(16) Latitude 42 DEG 23 MIN 25.94 SE	Discount of the control of the contr
(17) Longitude 71 DEG 11 MIN 48.22 SE	
(98) Border Bridge State Code Share %	(60) Substructure 4
(99) Border Bridge Structure No. #	(61) Channel & Channel Protection 6 (62) Culverts N
Structure Type and Material	Load Rating and PostingCode
(43) Structure Type Main: Masonry Code 80	(31) Design Load - Unknown 0
Slab Jointless bridge type: Not applicable	(63) Operating Rating Method - Allowable Stress (AS) 2
(44) Structure Type Appr:	(64) Operating Rating 00.0
Other Code 00	(65) Inventory Rating Method - Allowable Stress (AS) 2
(45) Number of spans in main unit 00	(66) Inventory Rating 00.0
(46) Number of approach spans 000	Victorial resources and the control of the control
	(41) Structure - Open with shoring D
(108) Wearing Surface / Protective System:	AppraisalCode
	(67) Structural Evaluation 2 (68) Deck Geometry 2
E C A C C C C C C C C C C C C C C C C C	(69) Underclearances, vert, and horiz
S/ MESS SESSENSISMS	(71) Waterway adequacy 7
Age and Service	(72) Approach Roadway Alignment 7
(27) Year Built 185	(36) Trainic Salety Features 0 0 0 0
(106) Year Reconstructed 190	(113) Scour Critical Bridges
(42) Type of Service: On - Highway-Ped	Inspections (01) Fraction Date (02)(02)(03)
Under - Waterway Code 55	(90) Inspection Date 05/02/22 (91) Frequency 24 MO (92) Critical Feature Inspection: (93) CFI DATE
The second of th	400
(29) Average Daily Traffic 03300	(2)
(30) Year of ADT 2018 (109) Truck ADT 08 %	(C) Other Special Inspection
(19) Bypass, detour length 005 KN	(c) other inspection () N 00 MO*) 00/00/00
(48) Length of maximum span 0002.01	
(49) Structure Length 00002.91	. (//
(50) Curb or sidewalk: Left 02.7 M Right 00.01	
(51) Bridge Roadway Width Curb to Curb 013.31	Rating Loads
(52) Deck Width Out to Out 023.71	Report Date 00/00/00 H20 Type 3 Type 3S2 Type HS
(32) Approach Roadway Width (w/shoulders) 013.31	Operating 0.0 0.0 0.0 0.0 1.0 1.0 1.0 1.0 1.0 1.0
(33) Bridge Median - No median Code 0	Field Posting
(34) Skew 00 DEG (35) Structure Flared	Status Posting Date 00/00/00
(10) Inventory Route MIN Vert Clear 99.991	
(47) Inventory Route Total Horiz Clear 13.31	Actual
(53) Min Vert Clear Over Bridge Rdwy 99.991	Recommended
(54) Min Vert Underclear ref N 00.001	Missing Signs N
(55) Min Lat Underclear RT ref N 00.01	Misc
(56) Min Lat Underclear LT 00.01	Bridge Name  N Anti-missile fence N Acrow Panel N Jointless Bridge
Navigation Data	Freeze/Thaw N : Not Applicable
(38) Navigation Control - No navigation control on waterway Code 0	# Stairs On/Adjacent 0 Stair Owner(s)
(111) Pier Protection Code	Accessibility (Needed/Used)
(39) Navigation Vertical Clearance 000.0 M	N / N Liftbucket N / N Rigging N / N Other
(116) Vert-lift Bridge Nav Min Vert Clear	N/N Ladder N/N Staging
(40) Navigation Horizontal Clearance 0000.0 N	N / N Boat N / N Traffic Control
	Increation
	Y / Y Wader N / N RR Flagperson Hours: 012

Report Date: December 7, 2022  State Information	Classification ————————————————————————————————————
<b>BDEPT#=</b> B07015=W04039 Agency Br.No.	(112) NBIS Bridge Length N
Town= Belmont=Waltham L.O.	(104) Highway System N
B.I.N= 7VB AASHTO= 002	.0 (26) Functional Class - Urban Arterial 14
RANK= 0 H.I.= 90.6 % FHWA Select List= N (6/21/3	7) (100) Defense Highway 1
Identification	- (101) p. ((10)
(8) Structure Number 80/015/VBMUNC (5) Inventory Route 2000000	(400) Di
(3) Inventory Route	04 (103) Temporary Structure Y
(3) County Code 017 (4) Place code 050	70 (105) Federal Lands Highways 0
	K (110) Designated National Network N
(7) Facility Carried ST 60 TRAPELO F	<b>D</b> (20) Toll - On free road 3
(9) Location	(21) Maintain - Town Agency 03
(11) Kilometerpoint 0000.0	00 (22) Owner - Town Agency 03
(12) Base Highway Network	N (37) Historical Significance undetermined
(13) LRS Inventory Route & Subroute 000000000000	Code
(16) Latitude 42 DEG 23 MIN 25.94 SE	C (58) Deck 3
(17) Longitude 71 DEG 11 MIN 48.22 SE	
(98) Border Bridge State Code Share %	(60) Substructure 4
(99) Border Bridge Structure No. #	(61) Channel & Channel Protection 5
Structure Type and Material	(62) Culverts N Load Rating and Posting Code
(43) Structure Type Main: Masonry Code 80	1 (31) Design Load - Unknown 0
Slab Jointless bridge type: Not applicable	(63) Operating Rating Method - Allowable Stress (AS)
(44) Structure Type Appr:	(64) Operating Rating 00.0
Other Code 00	
(45) Number of spans in main unit 00	(66) Inventory Rating 00.0
(46) Number of approach spans 000	0 (70) Bridge Posting 0
(107) Deck Structure Type - Concrete Cast-in-Place Code	1 (41) Structure - Open with shoring
(108) Wearing Surface / Protective System:	AppraisalCode
A) Type of wearing surface - Bituminous Code	6 (67) Structural Evaluation 2
B) Type of membrane - Unknown Code	(68) Deck Geometry 2
C) Type of deck protection - None Code	(69) Underclearances, vert. and horiz. N (71) Waterway adequacy 7
Age and Service	(71) Waterway adequacy 7  (72) Approach Roadway Alignment 7
(27) Year Built 18	(36) Traffic Safety Features 0 0 0 0
(106) Year Reconstructed 196	
(42) Type of Service: On - Highway-Ped	Inspections
Under - Waterway Code 55	
(28) Lanes: On Structure 04 Under structure	0 (92) Critical Feature Inspection: (93) CFI DATE
(29) Average Daily Traffic 03300	
(30) Year of ADT 2018 (109) Truck ADT 08 9	
(19) Bypass, detour length 005 KI	
Geometric Data	(*) Other Inspection () N 00 MO *) 00/00/0
(48) Length of maximum span 0002.0	, , , , , , , , , , , , , , , , , , , ,
(49) Structure Length 00002.9	A A STATE OF THE PROPERTY AND
(50) Curb or sidewalk: Left 02.7 M Right 00.0	Pating Lands
(51) Bridge Roadway Width Curb to Curb 013.3	Report Date 00/00/00 H20 Type 3 Type 3S2 Type HS
(52) Deck Width Out to Out 023.7	Operating 0.0 0.0 0.0 0.0
(32) Approach Roadway Width (w/shoulders) 013.3	1 Inventory 0.0 0.0 0.0 0.0
(33) Bridge Median - No median Code 0	Field Posting
(34) Skew 00 DEG (35) Structure Flared	N Status Posting Date 00/00/00
(10) Inventory Route MIN Vert Clear 99.99	
(47) Inventory Route Total Horiz Clear 13.3	
(53) Min Vert Clear Over Bridge Rdwy 99.99	Micrina Clana N
(54) Min Vert Underclear ref N 00.00	Misc
(55) Min Lat Underclear RT ref N 00.0	Bridge Name
(56) Min Lat Underclear LT 00.01	N Anti-missile fence N Acrow Panel N Jointless Bridge
Navigation Control - No navigation control on waterway Code 0	Freeze/Thaw N: Not Applicable
38) Navigation Control - No navigation control on waterway Code 0 (111) Pier Protection Code	# Stairs On/Adjacent 0 Stair Owner(s)
39) Navigation Vertical Clearance 000.0 N	Accessibility (Needed/Used)
116) Vert-lift Bridge Nav Min Vert Clear	N / N Liftbucket N / N Rigging N / N Other
No. American Proceedings of the Control of the Cont	N/N Ladder N/N Staging
4U LIVAVIGATION MORIZONIAI CIPARÂNCA NOME NA MARIA NA MAR	N / N Boat N / N Traffic Control
40) Navigation Horizontal Clearance 0000.0 N	Inspection
HU) NAVIGATION HORIZONTAL CLEARANCE 0000.0 N	Y/Y Wader N/N RR Flagperson Hours: 01 N/N Inspector 50 N/N Police