2-DIST	B.I.N.	BR. DEPT. NO.
05	437	C-07-001

UNDERWATER OPERATIONS TEAM
ROUTINE UNDERWATER INSPECTION REPORT

CITY/TOWN	8-STRUCTURE NO.	LEVEL OF INSPECTION	93B-DATE INSPECTED
CHATHAM	C07001-437-MUN-NBI	II	NOV 30, 2010

07-FACILITY CARRIED	ACCESS TO BRIDGE	UNDERWATER OPERATIONS ENGINEER
HWY BRIDGE ST	EMBANKMENT	JOHN B. DESMOND

06-FEATURES INTERSECTED	DEPTH	VISIBILITY	TEAM LEADER (DIVE MASTER)	Report submitted by:
WATER MITCHELL RIVER	4 m	3 m	RANDI E. BONICA	R. Bonica

BOTTOM CONDITION	CURRENT	TEAM MEMBERS
SAND, GRAVEL, SHELLS	TIDAL	SEE GENERAL REMARKS

ITEM 60 SUBSTRUCTURE — 4

		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	4	
a. Pile Caps	N	-
b. Piles	4	S-A
c. Diagonal Bracing	4	S-A
d. Horizontal Bracing	4	S-P
e. Fasteners	3	S-A
UNDERMINING (Y/N)		N

ITEM 61 CHANNEL & CHANNEL PROTECTION — 4

		DEF
1. Channel Scour	7	-
2. Embankment Erosion	7	-
3. Debris	7	-
4. Vegetation	7	-
5. Utilities	7	-
6. Rip-Rap/Slope Protection	7	-
7. Aggradation	7	-
8. Fender System	2	S-A
a. Piles	N	-
b. Diagonal Bracing	N	-
c. Horizontal Bracing	3	S-P
d. Vertical Members	2	S-A
e. Fasteners	5	M-P
f. Ladders	N	-
9.	N	-

ITEM 59 SUPERSTRUCTURE

		DEF
	N	-
	N	-
	N	-

ITEM 62 CULVERTS — N

		DEF
1. Roof	N	-
2. Floor	N	-
3. Walls	N	-
4. Headwall	N	-
5. Wingwall	N	-
6. Pipe	N	-
7. Protective Coating	N	-
8. Embankment	N	-
9. Wearing Surface	N	-
10. Railing	N	-
11. Sidewalks	N	-
12. Utilities	N	-
13. Member Alignment	N	-
14. Deformation	N	-
15. Scour	N	-
16. Settlement	N	-
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.]

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

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
CHATHAM	437	C-07-001	C07001-437-MUN-NBI	NOV 30, 2010

REMARKS

GENERAL REMARKS

Structure consists of eleven timber pile bents. Bents have a varied number of piles (see Plan View).

Orientation:

Bents are numbered from right (West) to left (East), looking downstream. Bents are numbered to be consistent with construction plans. Stub abutments are labeled left and right, looking downstream. Piles are lettered from upstream (North) to downstream (South). The draw span is between Bents #7A and #8.

There is evidence of extensive marine borer damage to timber piles, bracing, and the fender system, mostly in the tidal zone.

The following divers participated in this inspection.
11/23/10 Bonica, Colleran, Broz, Fitzgerald, Bondeson
11/29/10 Bonica, Desmond, Colleran, Broz, Fitzgerald
11/30/10 Bonica, Desmond, Colleran, Broz, Fitzgerald

ITEM 60 - SUBSTRUCTURE

Item 60.1 - Abutments

Stub abutments are dry at low tide and were not inspected for this report.

Item 60.3 - Pile Bents

Item 60.3.b - Piles

A repair has previously been made to 12 piles (See sketch). This repair consists of wrapping piles with a plastic wrap held on by stainless steel bands. The wrap starts about 0.5' above the mudline and continues above the tidal zone. Most of the wrapped piles appeared to be of an older vintage.

Timber piles appear to be two different vintages. The older-looking piles are bleached above the tidal zone and have little or no creosote protection remaining. These piles are in poor condition with advanced brooming and signs of deterioration in the tidal zone. Newer-looking piles have much more creosote visible above the tidal zone. These piles are in fair condition with minor to moderate brooming in the tidal zone. All piles had heavy barnacle growth in the tidal zone. Below the tidal zone the piles had marine growth.

Marine borer activity was previously noticed within the tidal zone in the piles that were wrapped. Most damage was visible at and in empty bolt holes through the piles. These holes were probably from deteriorated or removed bolts previously used to attach bracing to the piles. Some visible damage at the outside face of the piles due to marine borers was substantially greater than the original hole diameter. Some piles appeared to be partially hollow in the center of the pile at the open holes.

Teredo worms were visible in numerous piles during this inspection. The teredo worms have not noticably caused significant damage to the piles they were observed in. They were prevalent mostly in the barnacles in the tidal zone and few holes in the timber piles were found.

Item 60.3.c - Diagonal Bracing

There is diagonal bracing between Bents #2 and #3, Bents #5 and #6A, and Bents #8 and #9.

Diagonal bracing has extensive deterioration in the lower ends of the timbers, in the tidal zone. Splits, marine borer damage, and holes are prevalent. Some bracing is broken or missing.

Item 60.3.d - Horizontal Bracing

There is some deterioration in the ends of the timber horizontal bracing at Bent #9.

Item 60.3.e - Fasteners

Fasteners used to attach bracing to the piles are in poor condition with up to 100% section loss in the tidal zone. Following the 2002 underwater inspection, MHD divers placed bolts into the holes mentioned above. Some of these bolts had no threaded nuts installed due to the bracing blocking one side of the pile. The bolts were an attempt to limit access to the center of the piles by marine borers. Several of these bolts are severely deteriorated or missing.

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
CHATHAM	437	C-07-001	C07001-437-MUN-NBI	NOV 30, 2010

REMARKS

ITEM 61 - CHANNEL AND CHANNEL PROTECTION

Item 61.5 - Utilities
At the upstream end of Bent #7 and #8 there is a cable encased in plastic pipe which is in good condition.

Item 61.8 - Fender System
Horizontal timber members supporting the vertical timber fender members are attached directly to piles at Bent #7A and Bent #8. Newer pressure treated horizontal planks on either side of the vertical fender members hold the vertical timbers in place.

Item 61.8.c - Horizontal Bracing
There is extensive deterioration, splits, holes, and marine borer damage with up to 100% section loss in the timbers attached to the piles. This deterioration is in the tidal zone.

Item 61.8.d - Vertical Members
The vertical fender members have extensive deterioration and marine borer damage below the upper tidal zone. They are in critical condition with up to 100% section loss and would probably have failed if pressure treated planks were not added to both sides of the vertical timbers. The lower part of the vertical timbers are missing due to deterioration/marine borers.

Item 61.8.e - Fasteners
Fasteners have heavy surface rust and are deteriorated within the tidal zone.

Sketch / Chart Log
Sketch 1 : PLAN VIEW (NTS)
Chart 1 : SCOUR MONITORING CHART (DOWNSTREAM END)
Chart 2 : TIMBER PILE CONDITION (See Pg 7 for pile descriptions)
Chart 3 : TIMBER PILE CONDITION - DESCRIPTION

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
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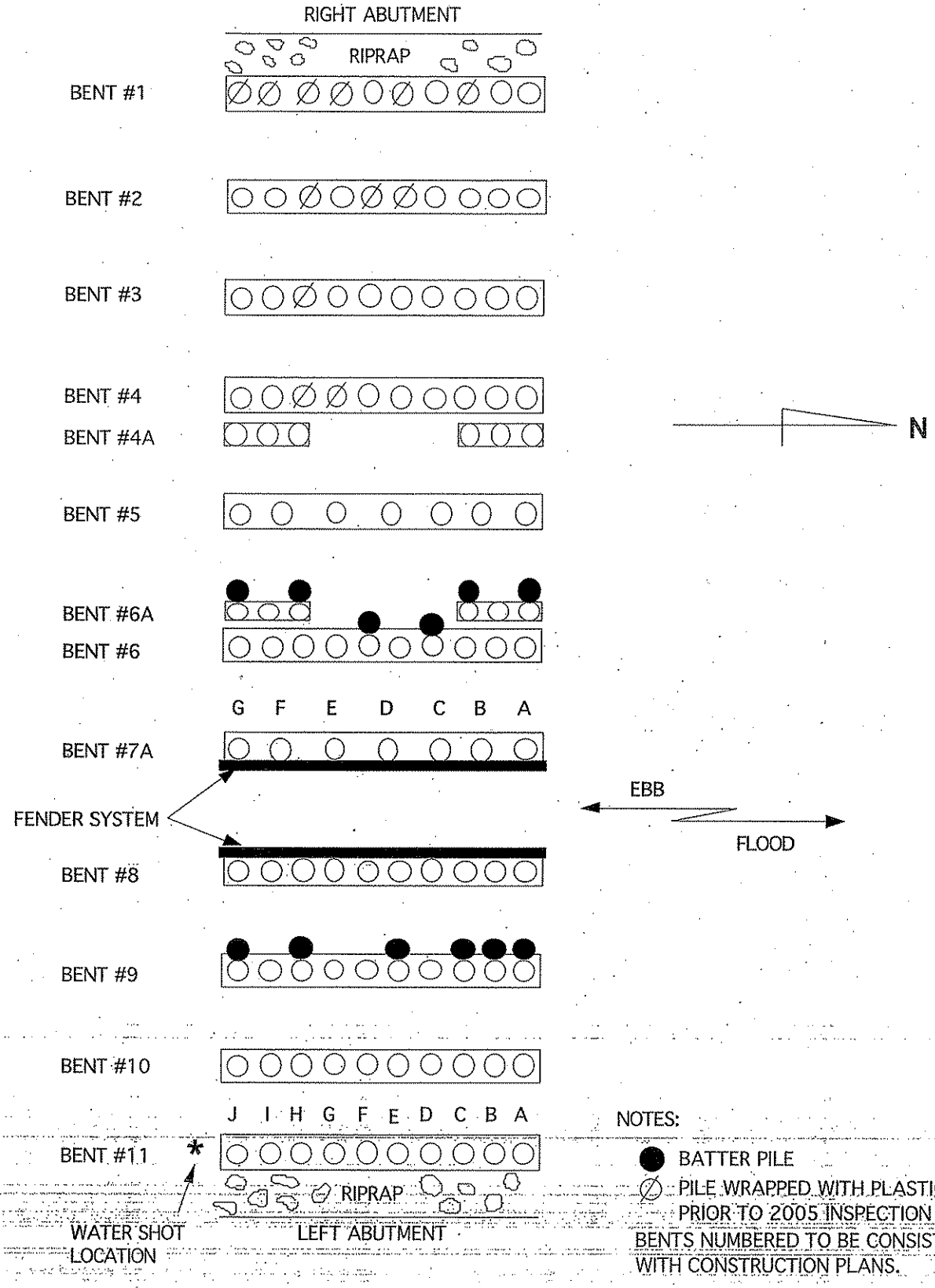
SKETCHES



NOTES:

● BATTER PILE

∅ PILE WRAPPED WITH PLASTIC PRIOR TO 2005 INSPECTION

BENTS NUMBERED TO BE CONSISTENT WITH CONSTRUCTION PLANS.

Sketch 1: PLAN VIEW (NTS)

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
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CHARTS

SCOUR MONITORING CHART @ DOWNSTREAM END

	12/8/95	3/25/03	1/23/04	2/4/05	2/15/06	1/24/07	1/10/08
BENT #1	3.8'	4.6'	4.2'	4.0'	4.1'	4.1'	3.8'
BENT #2	5.1'	5.6'	5.4'	5.4'	5.7'	5.6'	5.3'
BENT #3	6.2'	6.6'	6.3'	6.4'	6.5'	6.4'	6.2'
BENT #4	7.6'	7.9'	7.9'	8.0'	8.2'	8.5'	8.0'
BENT #5	9.4'	10.8'	10.1'	10.2'	10.4'	10.6'	10.1'
BENT #6	10.2'	10.8'	10.7'	10.6'	11.0'	10.8'	10.5'
BENT #7A	10.3'	11.5'	11.3'	11.1'	11.2'	10.9'	11.0'
BENT #8	10.4'	11.2'	11.2'	11.1'	11.1'	10.9'	11.0'
BENT #9	8.9'	9.8'	9.8'	9.6'	9.7'	9.7'	9.6'
BENT #10	7.9'	8.2'	7.9'	8.0'	8.0'	8.0'	8.0'
BENT #11	4.6'	4.6'	4.7'	4.6'	4.5'	4.5'	4.6'
Y	5.5'	9.6'	4.6'	8.8'	6.2'	7.4'	6.4'
CORRECTION FACTOR	-	+4.1'	-0.9'	+3.3'	+0.7'	+1.9'	+0.9'

	1/8/09	1/6/10					
BENT #1	3.8'	3.9'					
BENT #2	5.4'	5.7'					
BENT #3	6.1'	6.6'					
BENT #4	8.0'	7.7'					
BENT #5	10.0'	10.2'					
BENT #6	10.6'	10.9					
BENT #7A	11.0'	11.1'					
BENT #8	10.8'	11.1					
BENT #9	9.4'	9.8'					
BENT #10	8.0'	8.1'					
BENT #11	4.5'	4.8'					
Y	6.6'	7.7'					
CORRECTION FACTOR	+1.1'	+2.2'					

Notes

1. Water control shot (Y) = Waterline to bottom of bent cap at downstream end of Bent #11.
2. For comparison all soundings are adjusted to 1995 water level.

Chart 1: SCOUR MONITORING CHART (DOWNSTREAM END)

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
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CHARTS

TIMBER PILE CONDITION

	PILE 'A'	PILE 'B'	PILE 'C'	PILE 'D'	PILE 'E'	PILE 'F'	PILE 'G'	PILE 'H'	PILE 'I'	PILE 'J'
BENT #1	2	2	W	1	W	1*	W	W	W	W
BENT #2	1	1	1*	1	W	W	1	W	1	1*
BENT #3	1	1	1*	1	2*	1	2	W	2	2*
BENT #4	2	2	1*	1	1	1	W	W	1	1*
BENT #4A	1	1	1*	---	---	---	---	1	1	3
BENT #5	1	1	1	1	1*	1	1	---	---	---
BENT #6A	1	1	1	---	---	---	---	1	1*	1
	BAT 1*		BAT 1*					BAT 1*		BAT 1*
BENT #6	1	1	3	1	1	2	2	1	1	1
				BAT 1*		BAT 1				
BENT #7A	1	1	1	1	1	1	1	---	---	---

CHANNEL

BENT #8	1	1	1	1	3*	1	1	1	1*	1
BENT #9	2	1	1	1	1	2*	1	1	2	2
	BAT 1	BAT 2	BAT 2*		BAT 1			BAT 1*		BAT 2*
BENT #10	1	1	1	1	1	1	1	1	1	1
BENT #11	2*	1	1*	1*	1*	1*	1*	1	1	1

Chart 2: TIMBER PILE CONDITION (See Pg 7 for pile descriptions)

CITY/TOWN	B.I.N.	BR. DEPT. NO.	8.-STRUCTURE NO.	INSPECTION DATE
CHATHAM	437	C-07-001	C07001-437-MUN-NBI	NOV 30, 2010

CHARTS

General Notes:

1. Bents are numbered from right to left, looking downstream.
2. Piles are lettered from upstream to downstream.
3. Batter piles (BAT) are next to adjacent vertical pile.
4. Evidence of marine borer activity in the pile is indicated by (*).
5. Pile previously wrapped in plastic is indicated by (W).
6. General Condition of Piles:
   1. Minor checks (<0.1' Wide), delamination (<0.1' Pen).
   2. Checks (0.1' Wide), delamination (0.1' - 0.3' Pen).
   3. Larger checks and splits, extensive delamination.

Specific Notes:

1. Marine borer activity observed throughout the timber pile, from mudline to upper tidal zone.
   - Bent #2 - Pile 'C'
   - Bent #3 - Pile 'E'
   - Bent #4A - Pile 'C'
   - Bent #6A - Batter Pile 'C'
   - Bent #6 - Pile 'G'
   - Bent #9 - Batter Pile 'H'
2. Marine borer activity observed in the tidal zone.
   - Bent #1 - Pile 'F'
   - Bent #2 - Pile 'J'
   - Bent #3 - Pile 'C'
   - Bent #4 - Pile 'C', 'J'
   - Bent #5 - Pile 'E'
   - Bent #6A - Batter Pile 'A'
   - Bent #6 - Batter Pile 'D'
   - Bent #8 - Pile 'E', 'I'
   - Bent #9 - Pile 'F'; Batter Pile 'C', 'J'
   - Bent #11 - Pile 'A', 'C', 'D', 'E', 'F', 'G'
3. Marine borer activity at the mudline.
   - Bent #3 - Pile 'J'
   - Bent #6A - Pile 'I'; Batter Pile 'H', 'J'
4. Condition (3) Piles:
   - Bent #4A - Pile 'J', Split at top of pile, estimated 0.4' wide
   - Bent #6 - Pile 'C', Saw-cut at top of pile, split above the cut to the cap
   - Bent #8 - Pile 'E', 80% section loss due to marine borers, 1 1/2"-2" diameter hole in tidal zone

Chart 3: TIMBER PILE CONDITION - DESCRIPTION

Element Data Collection Form

UNDERWATER OPERATIONS DOT

Month	Day	Year
11	30	2010

Bridge Number: C-07-001

Town: CHATHAM

BIN: 437

District: 5

Bridge Key Number: C07001 437 MUN NBI

Inspectors: BONICA — 11/23 COLLERAN, BROZ, FITZGERALD, BONDESON

Leader — 11/29, 30 DESMOND, COLLERAN, BROZ, FITZGERALD

Elem. #	Element Name	Units	Env-iron.	Total Quantity	Condition States (Quantity or Percent) * 1	2	3	4	5	Q or P *
228	SUBMERGED PILES	EA	3	128			128			Q

** It is okay to switch between Quantity and Percent for different Elements.*