
Cecil County
Department of Public Works
Engineering & Construction Division



2016 BRIDGE INSPECTION REPORT
March 18, 2016



BRIDGE NO. CE0079001
BREWSTER BRIDGE ROAD
OVER
BIG ELK CREEK

Prepared by



SABRA, WANG & ASSOCIATES, INC.

Cecil County
Department of Public Works
Engineering & Construction Division
2016 BRIDGE INSPECTION REPORT

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OVER

BIG ELK CREEK

Prepared by



SABRA, WANG & ASSOCIATES, INC.

Inspection Team Leader: THOMAS SCHILPP

6/10/16

Date

Quality Assurance: Dustin Schilpp, P.E.

6/10/16

Date

Professional Engineer: David D. Wang, P.E.



6/10/16

Date

I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the state of Maryland, License No. 14714, Expiration Date: December 11, 2017.

**CECIL COUNTY
2016 BRIDGE INSPECTION REPORT**

BRIDGE NO. CE-0079

BREWSTER BRIDGE ROAD OVER BIG ELK CREEK

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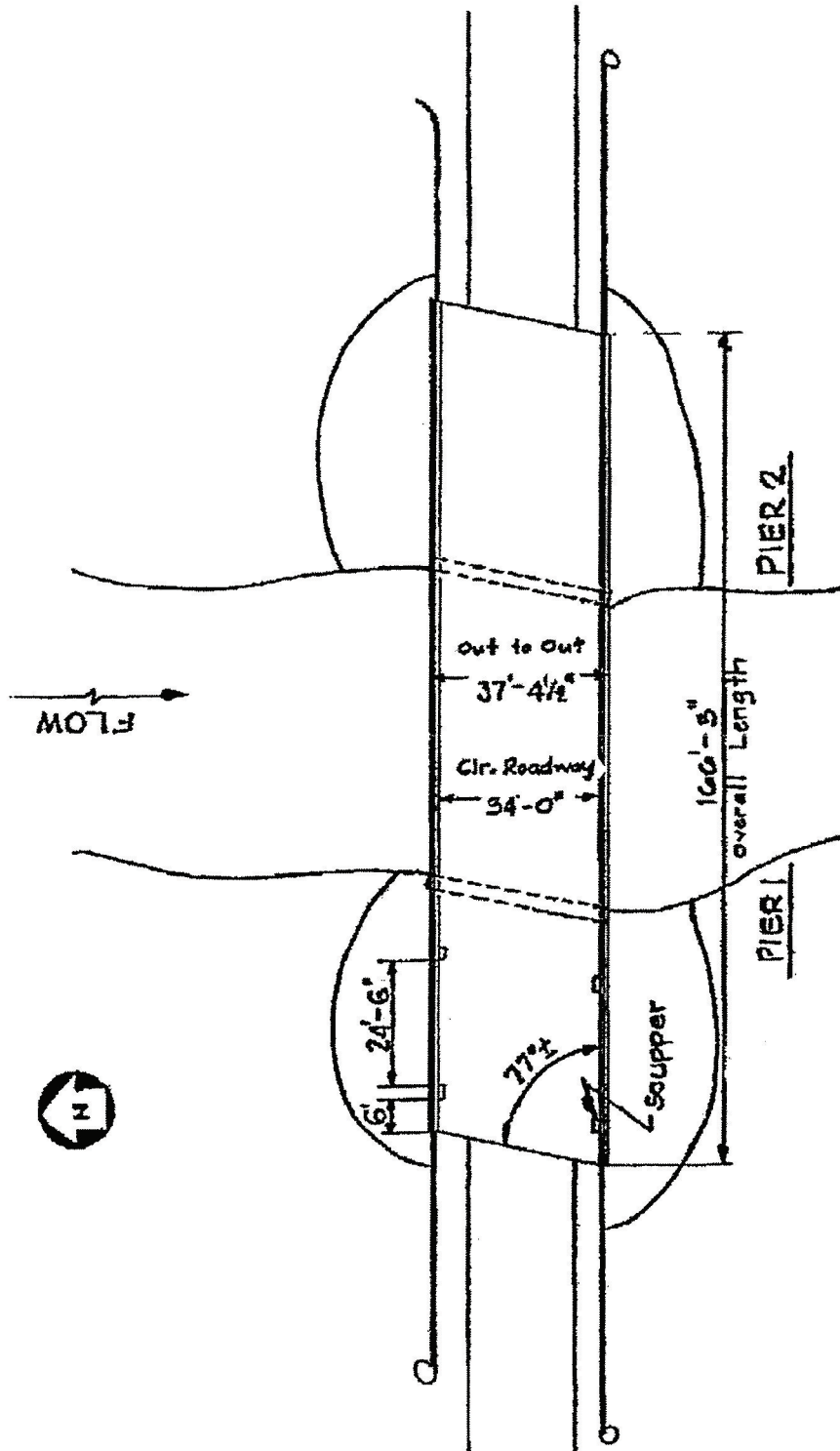


Bridge No. CE0079001
Brewster Bridge Rd.
over Big Elk Creek

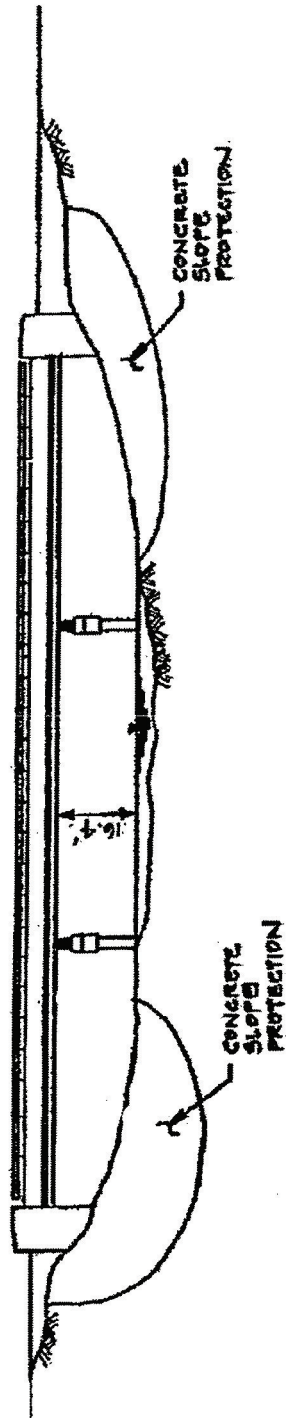
LOCATION MAP

Not to Scale

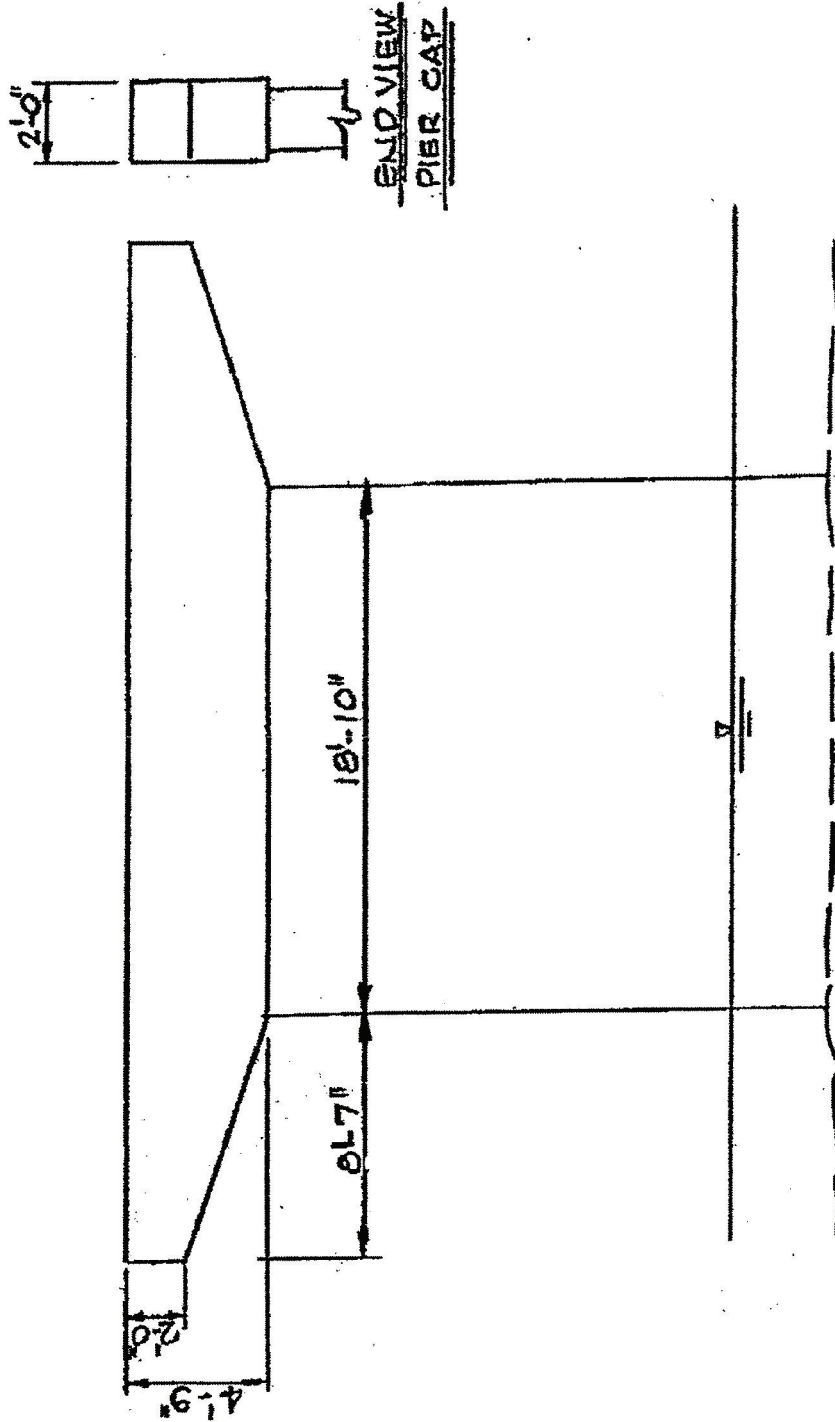
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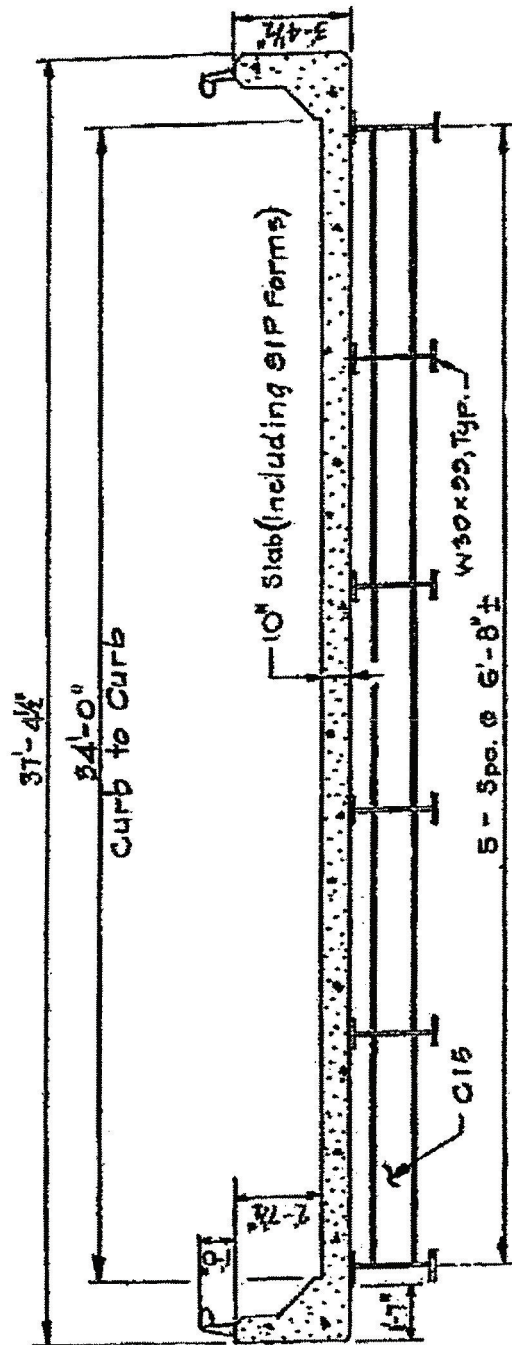
CECIL COUNTY, DEPARTMENT OF PUBLIC WORKS
 BRIDGE NO. CE-0079
 BREWSTER BRIDGE ROAD over BIG ELK CREEK
 PLAN



CECIL COUNTY, DEPARTMENT OF PUBLIC WORKS
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BREWSTER BRIDGE ROAD over BIG ELK CREEK
ELEVATION



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 BREWSTER BRIDGE ROAD over BIG ELK CREEK
 PIER ELEVATION



CECIL COUNTY, DEPARTMENT OF PUBLIC WORKS
 BRIDGE NO. CE-0079
 BREWSTER BRIDGE ROAD over BIG ELK CREEK
 TYPICAL SECTION

REPORT SUMMARY

BRIDGE DESCRIPTION SUMMARY

Bridge No. CE0079001 is a three-span, multiple steel-beam bridge constructed in 1972 (See Photograph Nos. 1-6). The structure has span lengths of 52'-2", 62'-2", and 52'-2" for an overall length of 166'-3". The out-to-out superstructure width is 37'-5" and the clear roadway width is 34'-0" between parapets. The superstructure in all spans consists of six painted W30 x 99 steel beams, spaced at 6'-8" on-center, that support a 10" thick reinforced concrete deck. The substructure consists of reinforced concrete stub abutments, concrete wing walls, and two solid-stem hammerhead piers. The structure is a two-lane bridge carrying two-way traffic. The traffic barrier system on the bridge consists of reinforced concrete parapets with steel W-beam approach traffic barriers. The bridge abutments are skewed approximately 13° to the roadway, and are parallel to the waterway.

Big Elk Creek flows from north to south. The streambed consists primarily of sandy silt, gravel, small to medium cobbles, and a few boulders. There is concrete slope protection in place at both abutments.

The east and west approaches are straight with minor downhill grades. The structure is near the bottom of a vertical sag curve. Sight distance is adequate and no speed reduction is required. W-beam approach traffic barriers are in place at all four corners of the bridge. The bridge is currently not posted.

CONDITION SUMMARY

Bridge No. CE-0079 was inspected by Thomas Schilpp and Erin Collins of Sabra, Wang & Associates, Inc. on March 18, 2016. The numbering convention for reporting purposes is from the north and west. Overall, the bridge is in satisfactory condition. The following is a summary of the bridge inspection findings:

1. The deck is in overall satisfactory condition. There are multiple patches, hollow sounding areas and random cracking throughout the deck. There is a failing patch with up to 3/4" deep spalling in the westbound lane in Span No. 2 (see Photograph No. 7). The spall with exposed reinforcement in the westbound lane in Span No. 2 has been patched since the previous inspection (see Photograph No. 8). There is a 1'-0" diameter x 1/2" deep spall in the eastbound lane over Pier No. 2 (see Photograph No. 9).

2. The painted steel beams are in satisfactory condition. The beams typically exhibit areas of paint failure along the edges of the top flange plates in all spans (see Photograph No. 10). There are random areas of flaking and peeling paint on the webs and bottom flanges throughout (see Photograph No. 11). There is graffiti on the beams in Span Nos. 1 and 3. There are random areas of minor web pitting on the exterior beam fascia in a few locations (see Photograph No. 12).

There is minor sag in Beam No. 1 at Splice No. 2 and in Beam No. 6 at Splice No. 1 in Span No. 2 (see Photograph No. 13). Beam No. 6 exhibits a 1/2" diameter hole in an area of painted over pitting at the west abutment.

There are random areas of paint failure on the splice plates throughout, resulting in minor surface corrosion (see Photograph No. 14). There are a few missing nuts and/or bolts at the diaphragm connections.

3. The piers are in good condition. There are a few small spalls and hairline cracks throughout both pier caps.

4. The concrete abutments are in good condition. The abutment stems exhibit random up to 1/16" wide cracks. At the east abutment, there is a 1/16" wide horizontal crack and a 1/16" wide vertical crack with rust staining in the south face of Pedestal Nos. 3 and 4 (see Photograph No. 15).

5. The concrete slope protection slabs are in fair condition. There is typical vegetation growth in the joints between the concrete panels. Both slope protections exhibit up to 4" of settlement with adjacent panels, particularly adjacent to the abutments (see Photograph No. 16). There are up to 1/4" wide cracks and spalling throughout both slope protections (see Photograph No. 17).

The bottom panel where the slope protection for the west abutment and southwest embankment meet has heaved up to 5" out of alignment (see Photograph No. 18). Adjacent to the northeast wing wall, the slope protection is cracked up to 1/2" wide, undermined, and there are hollow sounding areas at the lower edge of the slope protection adjacent to the wing wall (see Photograph No. 19). The east abutment slope protection exhibits a 2'-0" wide x 1'-6" high imminent spall at the top of the south embankment (see Photograph No. 20).

The slope protection settlement appears to have stabilized overall, but should continue to be monitored.

6. The bearings at the abutments are in good condition. Bearing No. 6 at the east abutment exhibits minor to moderate corrosion (see Photograph No. 21). The bearings at Pier 1 are in satisfactory condition. A few bearing components at Pier No.

1 exhibit scattered paint failure with light surface corrosion.

7. The compression joints are in good condition. Both joint seals exhibit minor areas of up to 1/2" depression (see Photograph No. 22).

7. The roadway approach transitions are in satisfactory condition. Both transitions have settled up to 1" and exhibit up to 1/2" wide cracking (see Photograph No. 23). Both approach roadways exhibit up to 1/4" wide map cracks (see Photograph No. 24).

8. The severe area of erosion along the southwest approach embankment has been filled with rip rap (see Photograph No. 25).

9. The northeast and southwest approach traffic barrier end treatments do not meet current MDSHA standards. The approach traffic barrier transitions at all four corners of the bridge are not adequately stiffened (see Photograph No. 26).

10. The scuppers have been cleared since the previous inspection. The second scupper from the west end has a broken grate.

11. The stream channel is in satisfactory condition. At the east bank, about 100' upstream, there is a vertical cut up to 10'-0" high with exposed tree roots (see Photograph No. 27). The east slope behind Pier No. 2 exhibits heavy ongoing erosion. Rip rap is partially displaced and coverage is not adequate.

For a more detailed description of the condition of each bridge element, see the Bridge Elements form.

REVIEW OF PREVIOUS REPORT

The 2014 Bridge Inspection Report was available and used for comparison purposes. The overall condition of the structure is similar to that noted in the previous report with the following exceptions:

1. There are additional spalls and cracks in the concrete deck.
2. The spall with exposed reinforcement in the westbound lane in Span No. 2 has been patched since the previous inspection.
3. There is a 1/2" diameter hole in Beam No. 6 in an area of painted over pitting at the west abutment.
4. The peeling paint and minor corrosion of the beams has progressed.
5. There is noticeable sag in Beam No. 1 at Splice No. 2 in Span No. 2.
6. Horizontal cracks are evident in Pedestal No. 1 at the west abutment.
7. The cracking and spalling of the concrete slope protections has progressed.
8. Both compression joint seals exhibit minor areas of up to 1/2" depression.
9. Bearing No. 6 at the east abutment exhibit minor to moderate corrosion.
10. The settlement of both approach transitions have progressed from 3/4" to 1".
11. The cracking in the approach roadways has progressed.
12. The scuppers have been cleared since the previous inspection.

REVIEW OF ITEM 113 - SCOUR POTENTIAL RATING

Item 113 was originally rated 6U. The rating has been changed to 5A. This implies that foundations determined to be stable due to assessment. No scour has been found during any inspection of this bridge and no actions are planned over the monitoring.

LOAD RATING SUMMARY

Maryland Legal Vehicle	Gross Vehicle Weight (Tons)	Inventory Rating (Tons)	Operating Rating (Tons)
H-15	15	20	34
HS-20	36	37	62

Type 3	33	43	72
Type 3S2	40	45	75

Green Denotes Pass, Red Denotes Fail.

The load ratings summarized above are based on load rating calculations performed by others and supplied by Cecil County. After a review of these ratings, we determined that no significant changes in condition have occurred since the load ratings were prepared; therefore, revising the load rating results for the structure is not warranted. Our review of these ratings was not a check of the means or methods used to determine the load ratings, but was limited to a comparison of the structure condition. Sabra, Wang & Associates, Inc. assumes no responsibility for the correctness or accuracy of these previous load rating calculations.

REPAIR RECOMMENDATIONS AND ESTIMATED COSTS

DESCRIPTION	PONTIS ITEM	UNITS	QUANTITY	UNIT COST	TOTAL COST
Immediate Repairs					
Replace/reinstall the traffic barrier transitions in accordance with SHA standards.	8322	EA	4	\$2600	\$10,400
Install MDSHA Type C approach W-beam end treatments at the northeast and southwest approaches.	8322	EA	2	\$2800	\$5,600
Repair spalls and failed repair patches on the deck riding surface.	12	LS	1	\$1000	\$1,000
Subtotal for Immediate Repairs =					\$17,000
Short Term Repairs					
Patch the spalls and seal the cracks at least 1/16" wide in the substructure units.	210	LS	1	\$2500	\$2,500
Subtotal for Short Term Repairs =					\$2,500
Long Term Repairs					
Repair the cracked and undermined concrete slope protection slabs around abutments and wing walls.	8260	LS	1	\$8000	\$8,000
Install adequate erosion countermeasures around Pier No. 2.	8365	LS	1	\$2000	\$2,000
Zone paint areas of paint failure at the beam splices.	107	LS	1	\$1000	\$1,000
Mill and repave both roadway approaches.	8322	TON	30	\$450	\$13,500
Subtotal for Long Term Repairs =					\$24,500
Routine Repairs					
Monitor the waterway channel widening and deepening trend.	8365		0		\$0

Monitor the concrete slab settlement of the east and west protected slopes.	8260		0		\$0
Subtotal for Routine Repairs =					\$0
Total for Maintenance Repairs =					\$44,000

Note: Estimated Costs include labor, equipment and material.

VISUAL INSPECTION NOTE

The condition ratings and evaluation presented herein are based upon a visual inspection of accessible portions of the existing structure. Sabra, Wang & Associates, Inc. assumes no responsibility for the presence of latent structural defects that cannot be detected by such visual inspection.

BRIDGE SKETCHES NOTE

The bridge sketches and location map included in this report were previously prepared by others and are reproduced herein from materials furnished by Cecil County. No responsibility is assumed by Sabra, Wang & Associates, Inc. for the accuracy of these sketches, location map and the correctness of any detail dimensions.

Bridge Inspection Report Element Form

Bridge No: CE0079001

Inspection Date: 03/18/2016

BREWSTER BRIDGE ROAD OVER BIG ELK CREEK

Milepoint: 0000710

(58) Deck

(59) Superstructure

(60) Substructure

(61) Channel

(62) Culvert

Element

Environment	Total Quantity	Units	Condition State 1	Condition State 2	Condition State 3	Condition State 4
1 - Ben.	6214	sq. ft.	5664	400	150	0

12 - Reinforced Concrete Deck

Eng Req FYI District Inaccessible? Eng Comments

The deck is in overall satisfactory condition. The deck surface exhibits uniform general wear with random fine to hairline cracking throughout. There is a 12'-0" long x 6'-0" wide hollow sounding area in the eastbound lane, in Span No. 1, adjacent to the south parapet between the scuppers. There is a failing patch with up to 3/4" deep spalling in the westbound lane in Span No. 2. The spall with exposed reinforcement in the westbound lane in Span No. 2 has been patched since the previous inspection. There is a 1'-0" diameter x 1/2" deep spall in the eastbound lane over Pier No. 2. The repair patches adjacent to the east backwall are failing in the westbound lane.

The soffit is not visible due to SIP forms. The SIP forms are generally in satisfactory condition. The exposed soffit (at the overhangs) is in satisfactory condition and exhibits random hairline transverse cracks with light efflorescence in several locations. The concrete end diaphragms exhibits hairline map cracks and 1" diameter pop out spalls with exposed reinforcing steel in Bay Nos. 3 and 5 at both abutments.

107 - Steel Open Girder/Beam

1 - Ben.	996	ft.	946	50	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The painted steel beams are in satisfactory condition. The end 10' at the abutments have been painted prior to the 2014 Bridge Inspection. The beams typically exhibit areas of paint failure along the edges of the top flange plates in all spans. There are random areas of flaking and peeling paint on the webs and bottom flanges throughout, particularly in Span No. 2. There is graffiti on the beams in Span Nos. 1 and 3 and there are random areas of minor web pitting on the exterior beam fascia in a few locations.

West Abutment: Previously reported south face of the web on Beam 1 with a 1'-0" long x 6" high area of heavy corrosion up to 50% section loss; north face of the web on Beam 6 with a 6" wide x full-height area of heavy surface corrosion up to 25% section loss has been painted over. Previously reported up to 1/16" section loss from the end of the interior beams to about 2'-0" beyond the centerline of bearing, including the bearing stiffeners has been painted over. The paint is in good condition with no active corrosion.

East Abutment: Previously reported south face of the web on Beam 1 with a 4" wide x 6" high area of heavy corrosion adjacent to the concrete end diaphragm up to 1/8" section loss; the north face of the Beam 6 web with a 6" wide x full-height area of heavy corrosion up to 1/8" section loss has been painted over. Previously reported Beam 5, 1'-0" wide x 6" high area of minimal section loss on both sides of the web below the concrete end diaphragm has been painted over. The paint is in good condition with no active corrosion.

Bridge Inspection Report Element Form

Bridge No: CE0079001

Inspection Date: 03/18/2016

BREWSTER BRIDGE ROAD OVER BIG ELK CREEK

Milepoint: 0000710

(58) Deck
(61) Channel

(59) Superstructure
(62) Culvert

(60) Substructure

There is minor sag in Beam No. 1 at Splice No. 2 and in Beam No. 6 at Splice No. 1 in Span No. 2. There are random areas of paint failure on the splice plates throughout, resulting in minor surface corrosion. Beam No. 6 exhibits a 1/2" diameter hole in an area of painted over pitting at the west abutment.

There are missing nuts and/or bolts at the diaphragm connections in the following locations: Span No. 3, Bay No. 5 at the intermediate diaphragm connection; and Bay Nos. 3 and 4 at the Pier No. 2 diaphragm. The missing nuts and/or bolts may not be a concern since the full height of the channel is welded to the beam web.

515 - Steel Protective Coating

	7449	sq. ft.	2234	2980	2235	0
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Eng Req FYI District Inaccessible? Eng Comments

210 - Reinforced Concrete Pier Wall

1 - Ben.	38	ft.	38	0	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The piers are in good condition. The stems exhibit random hairline cracks.

215 - Reinforced Concrete Abutment

1 - Ben.	78	ft.	73	5	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The concrete abutments are in good condition. The stems exhibit random hairline cracks. There are up to 1/16" wide cracks in the east abutment stem below Bay No. 3. Partial pedestal reconstruction is evident at Pedestal Nos. 1, 2, and 5 at the east abutment and Pedestal Nos. 2, 3, 4, and 5 at the west abutment. There are hairline horizontal cracks in Pedestal No. 1 at the west abutment. At the east abutment, there is a 1/16" wide horizontal crack and a 1/16" wide vertical crack with rust staining in the south face of Pedestal Nos. 3 and 4.

234 - Reinforced Concrete Pier Cap

1 - Ben.	72	ft.	70	2	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The pier caps are in satisfactory condition. There is random hairline map cracking on both sides of Pier No. 1. There is a 4" long x 2" wide x 1/2" deep spall with exposed reinforcement on the pier cap at the north end of Pier No. 2 at Bay No. 1. There is a 5" diameter x 1" deep spall at mid-height of the west face of the Pier No. 2 cap, along with a diagonal hairline crack below Bay No. 1.

The bearing pedestals are in satisfactory condition. At Pier No. 1, the bearing pedestals typically exhibit up to 1/16" wide vertical cracks on the north and south faces.

302 - Compression Joint Seal

1 - Ben.	78	ft.	58	20	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The compression joints are in good condition. Both joint seals exhibit minor areas of up to 1/2" depression. Both joint

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(58) Deck

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(60) Substructure

(61) Channel

(62) Culvert

armors exhibit gouges throughout with minor corrosion for a 4'-0" length at each end. The east abutment joint seal has several up to 6" long areas of adhesion failure.

311 - Movable Bearing

1 - Ben.	18	each	14	3	1	0
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Eng Req FYI District Inaccessible? Eng Comments

The bearings at the abutments are in good condition. The bearings at the abutments have been cleaned and painted prior to the 2014 Bridge Inspection. The bearing plates at both abutments have previously reported up to 3/16" section loss that has been painted over. Bearing No. 6 at the east abutment exhibits minor to moderate active corrosion. Several of the anchor bolts for the west abutment bearings are bent to the east.

The bearings at Pier No. 2 are in satisfactory condition. A few bearing components at Pier No. 2 exhibit scattered paint failure with light surface corrosion.

515 - Steel Protective Coating

	32	sq. ft.	22	4	0	6
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Eng Req FYI District Inaccessible? Eng Comments

313 - Fixed Bearing

1 - Ben.	6	each	0	6	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The bearings at Pier No. 1 are in satisfactory condition. A few bearing components at Pier No. 1 exhibit scattered paint failure with light surface corrosion.

515 - Steel Protective Coating

	12	sq. ft.	8	2	0	2
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Eng Req FYI District Inaccessible? Eng Comments

330 - Metal Bridge Railing

1 - Ben.	332	ft.	332	0	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The single-strand aluminum parapet railings are in good condition. There are a few surface gouges and scrape marks throughout both railings. There is minor impact damage at the 8th post from the west end and the front bolts at Post Nos. 8 and 9 are bent at the south railing.

331 - Reinforced Concrete Bridge Railing

1 - Ben.	332	ft.	332	0	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The concrete parapets are in satisfactory condition. There are random hairline cracks throughout. There are a few scattered pop-outs and a few repaired pop-outs, some of which are failing. The epoxy coating is deteriorated and failing on the south parapet.

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(61) Channel

(62) Culvert

8251 - Wingwalls, Reinforced Concrete

1 - Ben.	70	Ft.	70	0	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The concrete wing walls are in good condition. All wing walls exhibit hairline map cracking throughout.

8257 - Reinforced Concrete Abutment Backwall

1 - Ben.	78	Ft.	78	0	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The concrete abutment backwalls are in good condition. Both backwalls exhibit random hairline cracks with rust staining. Minor spalling was observed along the top of the east abutment backwall adjacent to the joint and approach armor angles.

8260 - Slope, Protected

1 - Ben.	2	Each	0	1	0	1
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Eng Req FYI District Inaccessible? Eng Comments

The concrete slope protection slabs are in fair condition. There is typical vegetation growth in the joints between the concrete panels.

There are random 1/4" wide cracks in the west abutment slope protection. There is a 9" wide x 4" high x 3" deep spall at a joint in the west slope protection under Bay No. 5. The slope protection exhibits minimal settlement at the west abutment. There is up to 3" of differential settlement between the main slope protection in front of the west abutment and the north embankment slope protection. The bottom panel where the slope protection for the west abutment and southwest embankment meet has heaved up to 5" out of alignment.

The east abutment slope protection exhibits up to 3 1/2" of general uniform settlement which is evident at the upper slab section joints, adjacent to the abutment stems. The north embankment slope protection at the east abutment exhibits differential settlement of up to 4" in the vertical (upslope) joint between adjacent slab panels. Adjacent to the northeast wing wall, the slope protection is cracked up to 1/2" wide, undermined, and there are hollow sounding areas at the lower edge of the slope protection adjacent to the wing wall. The east abutment slope protection exhibits a 2'-0" wide x 1'-6" high imminent spall at the top of the south embankment.

The slope protection settlement appears to have stabilized overall, but should continue to be monitored.

8322 - Roadway Approach Transition

1 - Ben.	2	Each	0	0	2	0
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Eng Req FYI District Inaccessible? Eng Comments

The roadway approach transitions are in satisfactory condition. The west approach transition has settled up to 1". There are up to 1/4" wide map cracks in the west approach roadway pavement. The east approach roadway transition has settled up to 1" with adjacent up to 1/2" wide transverse cracks in the roadway pavement. The eastbound shoulder

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of the east approach roadway exhibits a 1'-6" wide area of up to 1/4" map cracking, starting 10'-0" from the bridge.

The severe area of erosion along the southwest embankment has been filled with rip rap since the previous inspection.

The northeast and southwest approach traffic barrier end treatments do not meet current MDSHA standards. The approach traffic barrier transitions at all four corners of the bridge are not adequately stiffened. Post No. 8 of the northeast approach traffic barrier is twisted. There is minor impact damage at the southwest approach traffic barrier.

8344 - Drainage Devices

1 - Ben.	1	Entire Bridge	0	0	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The scuppers have been cleared since the previous inspection. The second scupper from the west end has a broken grate.

8345 - Stream Channel

1 - Ben.	1	Entire Bridge	0	0	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The stream channel is in satisfactory condition. The streambed consists of sandy silt, gravel, small to medium cobbles, and a few boulders. At the east bank, approximately 100' upstream, there is a vertical cut up to 10'-0" high with exposed tree roots. There is an accumulation of timber debris at the upstream west embankment and under Span No. 2.

The channel has also exhibited a widening trend toward the east over the past 10 years. No undermining of the pier foundations is occurring at this time. The channel behavior should continue to be monitored.

8363 - Slope Erosion

1 - Ben.	1	Each	1	0	0	0
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Eng Req FYI District Inaccessible? Eng Comments

The east slope behind Pier No. 2 exhibits heavy ongoing erosion. Rip rap is partially displaced and coverage is not adequate.

**CECIL COUNTY, MARYLAND
BRIDGE INSPECTION REPORT**

BRIDGE NO. CE-0079 - BREWSTER BRIDGE ROAD OVER BIG ELK CREEK



1. West Approach Looking East



2. East Approach Looking West

**CECIL COUNTY, MARYLAND
BRIDGE INSPECTION REPORT**

BRIDGE NO. CE-0079 - BREWSTER BRIDGE ROAD OVER BIG ELK CREEK



3. North Elevation



4. South Elevation

**CECIL COUNTY, MARYLAND
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BRIDGE NO. CE-0079 - BREWSTER BRIDGE ROAD OVER BIG ELK CREEK



5. Looking North (Upstream)



6. Looking South (Downstream)

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7. Failing patch in westbound lane of Span No. 2



8. Patched spall in westbound lane of Span No. 2

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9. Spall in eastbound lane over Pier No. 2



10. Typical peeling paint along the top flange (Beam No. 3, Span No. 1 shown)

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11. Typical flaking and peeling paint of beams (Beam No. 6, Span No. 1 shown)



12. Typical peeling paint with minor corrosion on exterior fascia (Beam No. 6 shown)

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13. Sag in Beam No. 6 at Span No. 2



14. Typical minor corrosion and pack rust at beam splices (Beam No. 1, Splice No. 1 shown)

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15. Cracking at Pedestal No. 4 of the east abutment



16. Typical settlement of the concrete slope protection (east slope protection shown)

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17. Typical cracks and spalls in slope protection (west slope protection shown)



18. West slope protection heaved at the southwest embankment

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19. Cracked and undermined slope protection at the northeast wing wall



20. Imminent spall at the top of the southeast embankment slope protection

**CECIL COUNTY, MARYLAND
BRIDGE INSPECTION REPORT**

BRIDGE NO. CE-0079 - BREWSTER BRIDGE ROAD OVER BIG ELK CREEK



21. Corrosion of Bearing No. 6 at the east abutment



22. Typical roadway joint (east joint shown)

**CECIL COUNTY, MARYLAND
BRIDGE INSPECTION REPORT**

BRIDGE NO. CE-0079 - BREWSTER BRIDGE ROAD OVER BIG ELK CREEK



23. East approach transition settlement and adjacent cracking



24. Cracking in the west approach roadway

**CECIL COUNTY, MARYLAND
BRIDGE INSPECTION REPORT**

BRIDGE NO. CE-0079 - BREWSTER BRIDGE ROAD OVER BIG ELK CREEK



25. Erosion filled with rip rap at the southwest approach embankment



26. Inadequately stiffened approach traffic barrier transition (northwest approach shown)

**CECIL COUNTY, MARYLAND
BRIDGE INSPECTION REPORT**

BRIDGE NO. CE-0079 - BREWSTER BRIDGE ROAD OVER BIG ELK CREEK



27. Northeast embankment erosion

STRUCTURE INVENTORY AND APPRAISAL REPORT

BRIDGE NUMBER: CE0079001

IDENTIFICATION

FORM 1 OF 13

(8) STRUCTURE NUMBER: Major Structure Major Structure > 20' 0" Single Structure

(8) FHWA NUMBER:

(7) FACILITY CARRIED:

(6) FEATURE INTERSECTED:

(255) FEDERAL SUBMITTAL INDICATOR: No

(262) NAME OF STRUCTURE:

(27) YEAR BUILT: (106) YEAR RECONSTRUCTED:

(263) ADDITIONAL RECONSTRUCTION YEARS:

(1) STATE CODE: Maryland (2) DISTRICT CODE: 02

(3) COUNTY CODE: CECIL (4) PLACE CODE:

(5) INVENTORY ROUTE: Route carried "on" the structure County Route (Route Prefix) Mainline (Level of Service) (Number) Always (Direction)

(9) LOCATION:

(11) MILEPOINT:

(12) BASE HIGHWAY NETWORK: Inv. Route is NOT on the Base Network

(266) GIS ROUTE ID:

(267) GIS MILEPOINT:

(268) SCENIC ROUTE:

(13) LRS INVENTORY ROUTE, SUBROUTE NUMBER:

(16) LATITUDE: (A) (B) (C) (D)

(17) LONGITUDE: (A) (B) (C) (D)

(28) LANES ON: LANES UNDER:

(42) TYPE OF SERVICE ON: Highway

TYPE OF SERVICE UNDER: Waterway

(98) BORDER STATE: BORDER STATE'S SHARE %:

(99) BORDER STATE'S NUMBER:

CLASSIFICATION

FORM 2 OF 13

(104) HWY SYSTEM: No, Inventory Route is not on the NHS (103) TEMPORAY STRUCTURE:

(105) FEDERAL LANDS HWYS: Not applicable (110) NATIONAL NETWORK: No, the inventory route is not part of the national network for trucks.

(26) FUNCTIONAL CLASS: Rural Minor Collector (20) TOLL: On free road

(100) DEFENSE HWY: The inventory route is not a STRAHNET route (21) MAINTENANCE: County Highway Agency

(101) PARALLEL STRUCTURE: No parallel structure (22) OWNER: County Highway Agency

(102) DIRECTION: 2-way traffic (37) HISTORICAL SIGNIFICANCE: Not eligible

BRIDGE NUMBER: CE0079001

TRAFFIC

FORM 3 OF 13

(19) DETOUR: 03
(29) ADT: 001400
(114) FUTURE ADT: 002000

(109) TRUCK ADT %: 05
(30) ADT YEAR: 2015
(115) FUTURE ADT YEAR: 2035

STRUCTURE TYPE AND MATERIAL

FORM 4 OF 13

(43) STRUCT TYPE: D Steel Continuous 02 Stringer/Multibeam or Girder
(44) STRUCT TYPE - APPR: 0 Not Applicable 00 Other
(232) BOX CULVERT ON PILES: 0 None
(208) STRUCT TYPE - WIDENED/EXTENDED: N N N
(219) SLOPE PROTECTION: 1 Concrete
(228) FOOTING - ABUTMENT: 3 Other 8 Other 0 Entire Structure
(229) SUBSTRUCT ABUTMENT: 1 Concrete 1 Pedestal 0 Entire Structure
(230) FOOTING - PIER: 3 Other 4 Steel Pipe/Cylinder 0 Entire Structure
(231) PIER TYPE: 1 Concrete 6 Hammerhead 0 Entire Structure
(242) BEARING TYPE: C Steel curved plates N None or N/A N None or N/A
(108) WEARING SURFACE: 0 None 0 None 0 None
(243) JOINT TYPE: E Compression Seal N None N None
(206) STRUCT SUBTYPE - MAIN: N Not Applicable (207) STRUCT SUBTYPE - APPR: N Not Applicable
(257) SCOUR PROTECTION: 9 (270) CONC. DECK SPECIAL TYPE: N Not Applicable
(221) STRUCTURAL STEEL: 02 A 36 (233) DECK - COMP/NON-COMP: 1 Composite
(107) DECK STRUCTURE TYPE: 1 Concrete Cast-in-Place (259) STAY-IN-PLACE FORMS: Y
(235) PARAPET: 01 Jersey/F-Shape
(236) RAILING: 4 Aluminum 5 - One Strand (structural) 0 None 0 - None
(237) FENCING: 0 None 0 - None
(278) PAINT SYSTEM: N Not Applicable N Not Applicable
(344) PAINT COLOR/NUMBER: N Not Applicable
(345) YEARS PAINTED: 2013

BRIDGE NUMBER: CE0079001

GEOMETRICS

FORM 5 OF 13

(112) NBIS BRIDGE LENGTH:	<input type="text" value="Y"/>	(49) STRUCTURE LENGTH:	<input type="text" value="0001660"/>
(210) NUMBER OF SPANS:	<input type="text" value="0003"/>	(45) # SPANS IN MAIN UNIT:	<input type="text" value="003"/>
(46) # APPROACH SPANS:	<input type="text" value="0000"/>	(209) CONTINUOUS SPANS:	<input type="text" value="Y"/>
(48) LENGTH MAX SPAN:	<input type="text" value="0062"/>	(238) # STRINGERS - ORIGINAL:	<input type="text" value="06"/>
(240) SPACING - ORIGINAL:	<input type="text" value="4"/>	(239) # STRINGERS - WIDENED:	<input type="text" value="00"/>
(241) SPACING - WIDENED:	<input type="text" value="N"/>	(33) BRIDGE MEDIAN:	<input type="text" value="0"/>
(50) CURB/SIDEWALK WIDTHS:	<input type="text" value="000"/> <input type="text" value="000"/>	(205) MEDIAN WIDTH:	<input type="text" value="000"/>
(51) DECK CURB-CURB WIDTH:	<input type="text" value="0340"/>	(32) APPROACH ROAD WIDTH:	<input type="text" value="00"/> <input type="text" value="023"/> <input type="text" value="00"/>
(52) DECK OUT-OUT WIDTH:	<input type="text" value="0374"/>	(10) INVENT ROUTE, MIN VERT CLEAR:	<input type="text" value="9999"/>
(53) BRIDGE ROADWAY, MIN VERT CLEAR:	<input type="text" value="9999"/>	(47) INVENT ROUTE, TOTAL HORIZ CLEAR:	<input type="text" value="340"/>
(54) MIN. VERT. UNDERCLEARANCE:	<input type="text" value="N"/> Feature not a highway or a railroad	<input type="text" value="B"/> 10' to < 20'	
(55) MIN. LAT. CLEARANCE (RIGHT):	<input type="text" value="N"/> Feature not a highway or a railroad	<input type="text" value="999"/>	
(56) MIN. LAT. CLEARANCE (LEFT):	<input type="text" value="000"/>	(342) HORIZ CLEARANCE (ON):	<input type="text" value="03400"/> <input type="text"/>
(34) SKEW, IN DEGREES:	<input type="text" value="13"/>	(280) HORIZ CLEARANCE (UNDER):	<input type="text" value="N"/> <input type="text"/>
(35) STRUCTURE FLARED:	<input type="text" value="N"/>	(253) NUMBER OF CELLS:	<input type="text" value="N"/>
(256) SPAN OF CELLS:	<input type="text" value="N"/>	(254) RISE:	<input type="text" value="N"/>
		(258) EARTH FILL:	<input type="text" value="N"/>
		(343) CENTERLINE LENGTH (Culverts/Pipes):	<input type="text" value="N"/>
(223) SHOULDER WIDTHS:	<input type="text" value="N"/> <input type="text" value="N"/> <input type="text" value="N"/> <input type="text" value="N"/>		
(264) TYPE AND SPAN:	<input type="text" value="SB 62', 62', 62'"/>		

BRIDGE NUMBER: CE0079001

LOAD RATINGS AND POSTINGS

- (41) STATUS: Open, no restriction
- (31) DESIGN LOAD: HS 20
- (398) PEDESTRIAN LOADING:
- (399) RAILROAD LOADING:
- (70) POSTING: Equal to or above legal loads
- (65) METHOD USED TO DETERMINE INVENTORY RATING: 1 Load Factor (LF)
- (63) METHOD USED TO DETERMINE OPERATING RATING: 1 Load Factor (LF)

(224) WEIGHT POSTED:

(New Split)

(66) INVENTORY RATING:

(64) OPERATING RATING:

(400) DATE OF RATING:

FORM 6 OF 13

	INVENTORY RATING	OPERATING RATING
HL-93 Vehicle	(402)	(401)
H-15 Vehicle	(404) 205	(403) 345
T3 (Dump Truck) Vehicle	(406) 435	(405) 725
T4 Reduced Lift Axle Vehicle	(408) 445	(407) 740
HS Vehicle	(410) 370	(409) 620
3S2 Vehicle	(412) 450	(411) 750
150K Vehicle	(414) 445	(413) 745
90K Permit Combination Vehicle	(416) 440	(415) 730
90K Mobile Crane Vehicle	(418) 520	(417) 865
90K Cargo Vehicle	(420) 460	(419) 770
80K Cargo Vehicle	(422) 505	(421) 840
120K Vehicle	(424) 450	(423) 750
108K Mobile Crane Vehicle	(426) 505	(425) 845
120K Mobile Crane Vehicle	(428) 530	(427) 880

- (225) SPEED LIMIT ON STRUCTURE:
- (226) MIN VERT CLEARANCE OVER ROADWAY POSTED: Posting signs not required
- (227) MIN VERT UNDERCLEARANCE POSTED: Posting signs not required

CONDITION INSPECTION

FORM 7 OF 13

Routine Inspection Inspection Month (91) Frequency Due Date (90) Inspection Date (290) Inspection Report Completion Date
 Routine Inspection 03 24 03/18/2018 03/18/2016 06/03/2016

Critical Feature Inspections	(291) Inspection Month	(92) Frequency	Due Date	(93) Critical Feature Inspection Date
(A) Fracture Critical Members		N		
(B) Underwater Inspection		N		
(C) Special Inspection		N		
(D) Hands-on Railroad		N		
(E) Confined Space		N		
(F) Ultrasonic Testing (UT) Pin		N		
(G) Ultrasonic Testing (UT) Anchor		N		
(H) Post Tensioning Bar		N		
(I) Cathodic Protection		N		
(J) Consultant		N		
(K) Movable Bridge		N		
(L) Suspension Bridge		N		
(M) Cable		N		
(N) Monitor		N		
(P) Flood				
(Q) Damages				
(R) Inquires				

(58) DECK: Satisfactory Condition (59) SUPERSTRUCTURE: Satisfactory Condition
 (60) SUBSTRUCTURE: Satisfactory Condition (61) CHANNEL/PROTECTION: Bank slump, widespread minor damage
 (62) CULVERTS: Not Applicable
 (310) INSPECTION DATA UPDATE DATE: (312) LEAD INSPECTOR:
 (311) INSPECTION TEAM: (313) BRIDGE INSPECTOR:
 (314) HOURS TO INSPECT: (316) DECK PLANKING %: (315) DECK PUNCTURES %:
 (317) DECK PATCHING %: (318) BLOCKING: (319) POWER WASHING:
 (320) IDENTIFICATION NO.: (321) INVENTORY DIRECTION: (323) PERMIT:
 (324) NIGHT WORK: (325) WEEKEND WORK:
 (322) LOOKING TOWARD:
 (326) MAINTENANCE OF TRAFFIC STANDARDS:
 (327) MOT COMMENTS:
 (328) LOCATION OF MIN. VERT. UNDERCLEARANCE:

BRIDGE NUMBER: CE0079001

(329A) CRITICAL FINDINGS: N (329B) CRITICAL FINDINGS DATE:

(330) CRITICAL FINDINGS COMMENTS:

(331) CAUTION COMMENTS:

(332) UNDERCLEARANCE POSTING SIGNS: Posting signs not required

(340) INSPECTION EQUIPMENT:

<input type="checkbox"/> L	Ladder	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> W	Waders	<input type="text"/>	<input type="text"/>
<input type="checkbox"/> S	Snooper	<input type="text"/>	

(333) MHOI: N (334) MHOI LOCATIONS:

(335) ADVANCED NOTIFICATION: N

(336) ADVANCED NOTIFICATION COMMENTS:

BRIDGE NUMBER: CE0079001

APPRAISAL

FORM 8 OF 13

(67) STRUCTURAL EVALUATION:	<input type="text" value="6"/>	BSR	(68) DECK GEOMETRY:	<input type="text" value="6"/>
(69) UNDERCLEARANCE:	<input type="text" value="N"/>	98.7	(72) APPROACH ALIGNMENT:	<input type="text" value="7"/>
(71) WATERWAY ADEQUACY:	<input type="text" value="7"/>			
(36) TRAFFIC SAFETY FEATURES	RAILINGS:	<input type="text" value="1"/> Meets Standards		
	TRANSITIONS:	<input type="text" value="0"/> Does NOT meet Standards		
	APPROACH BARRIER:	<input type="text" value="1"/> Meets Standards		
	APPROACH BARRIER ENDS:	<input type="text" value="0"/> Does NOT meet Standards		
(113) SCOUR EVALUATION:	<input type="text" value="7"/>	Countermeasures have been installed to mitigate a previously existing problem with scour and to reduce the risk of bridge failure during or immediately after a flood event.		
(DT) DEDUCT CODE:	<input type="text" value="Z"/>	<input type="text"/>		
(STAT) STATUS:	<input type="text" value="0"/>	Not Deficient		

NAVIGATION

FORM 9 OF 13

(38) NAVIGATION CONTROL:	<input type="text" value="0"/>	(39) NAV VERT CLEARANCE:	<input type="text" value="000"/>
(40) NAV HORIZONTAL CLEARANCE:	<input type="text" value="0000"/>		
(111) PIER/ABUTMENT PROTECTION:	<input type="text"/>		
(116) MIN NAV VERT CLEARANCE, VERT LIFT BRIDGE:	<input type="text"/>		
(247) DESIGN YEAR STORM:	<input type="text"/>	(248) RUN-OFF Q:	<input type="text"/>
(249) DRAINAGE AREA:	<input type="text"/>	(250) STRUCTURE IN TIDAL AREA:	<input type="text" value="N"/> No
(251) HIGH WATER ELEVATION:	<input type="text"/>		
(252) YEAR HIGH WATER ELEVATION - LATEST:	<input type="text"/>		

HISTORY AND PROPOSED IMPROVEMENTS

FORM 10 OF 13

(201) CONTRACT NUMBERS:	<input type="text"/>	<input type="text"/>	
(203) SHA SPEC- YEAR:	<input type="text" value="1968"/> <input type="text" value="N"/> <input type="text" value="N"/> <input type="text" value="N"/>		
(204) AASHTO SPEC-YEAR:	<input type="text" value="1969"/> <input type="text" value="N"/> <input type="text" value="N"/> <input type="text" value="N"/>		
(75) TYPE OF PROPOSED WORK:	<input type="text" value="38"/> <input type="text" value="2"/>	(76) LENGTH OF IMPROVEMENT:	<input type="text" value="000200"/>
(94) BRIDGE IMPROVE COST:	<input type="text" value="000012"/>	(95) ROADWAY IMPROVE COST:	<input type="text" value="000005"/>
(96) TOTAL PROJECT COST:	<input type="text" value="000017"/>	(97) YEAR OF IMPROVEMENT:	<input type="text" value="01"/>

BRIDGE NUMBER: CE0079001

MISCELLANEOUS

FORM 11 OF 13

(244) SIGNS ON STRUCTURE: No

(245) BRIDGE ROADWAY LIGHTING: No

(246) PROVISION FOR ROADWAY LIGHTING: No

(260) UTILITIES - ON:

(261) UTILITIES - UNDER:

- Not Applicable
- Not Applicable
- Not Applicable
- Not Applicable
- Not Applicable

- Not Applicable
- Not Applicable
- Not Applicable
- Not Applicable
- Not Applicable

REMARKS:

Empty rectangular box for remarks.

NOISE BARRIER

FORM 12 OF 13

(501) TYPE:

(502) ALIGNMENT:

(503) LENGTH: (504) MAXIMUM HEIGHT:

(505) FOUNDATION TYPES: (506) FOUNDATION LENGTH:

(507) PANEL WIDTH: (508) NUMBER OF SPECIAL PANEL(S):

(509) PANEL MATERIAL: (510) FACING (Acoustic Treatment):

(511) PANEL FINISH: (512) PANEL COLOR:

(513) FEDERAL COLOR: (514) STACKED PANELS:

(515) NOISE BARRIER POST MATERIAL: (516) ACCESS DOORS:

(517) FIRE HYDRANTS: (518) RETROFITS:

RETAINING WALL

FORM 13 OF 13

(550) TYPE: (551) ALIGNMENT:

(552) SEGMENT LENGTH(S): (553) MAX. EXPOSED HEIGHT:

(554) FOUNDATION TYPES: (555) TIEBACK:

(556) FACING: (557) WITH FENCE OR RAIL:

(558) WITH NOISE BARRIER: (559) PURPOSE:

Structure Inventory and Appraisal Sheet

NATIONAL BRIDGE INVENTORY -----

STRUCTURE INVENTORY AND APPRAISAL

IDENTIFICATION

(1) STATE NAME:..... **Maryland** CODE..... **243**
 (8) STRUCTURE NO:..... **2-00000-CE-0079-01-0**
 (5) INV RTE (ON/UNDER):..... **1-4-1-00184-0**
 (2) STATE HIGHWAY DEPARTMENT DISTRICT:..... **02**
 (3) COUNTY CODE:..... **015** (4) STATE CODE: **00000**
 (6) FTR INTRS:..... **BIG ELK CREEK**
 (7) FACILITY CARRIED:..... **BREWSTER BRIDGE ROAD**
 (9) LOCATION:..... **0.71 MI E OF ELK MILLS RD**
 (11) MILEPOINT:..... **0000710**
 (12) BASE HIGHWAY NETWORK:..... **0**
 (16) LATITUDE **39400368**. (17) LONGITUDE:.. **075493411**
 (98) BORDER BRIDGE STATE % Share.....
 (99) BORDER BRIDGE STRUCT NO.....

STRUCTURE TYPE AND MATERIAL

(43) STRUCTURE TYPE MAIN: MATERIAL
 TYPE..... CODE..... **D 02**
 (44) STRUCTURE TYPE APPR: MATERIAL
 TYPE..... CODE..... **0 00**
 (45) NUMBER OF SPANS IN MAIN UNIT:..... **003**
 (46) NUMBER OF APPROACH SPANS:..... **0000**
 (107) DECK STRUCTURE TYPE..... **1**
 (108) WEARING SURFACE/PROTECTIVE SYSTEM:
 A) TYPE WEARING SURFACE: CODE:..... **0**
 B) TYPE MEMBRANE: CODE:..... **0**
 C) TYPE DECK PROTECTION: CODE:..... **0**

AGE AND SERVICE

(27) YEAR BUILT:..... **1972**
 (106) YEAR RECONSTRUCTED..... **0000**
 (42) TYPE OF SERVICE: ON:
 UNDER..... CODE..... **1 5**
 (28) LANES: ON STRUCT **02** UNDER STRUCT: **00**
 (29) AVERAGE DAILY TRAFFIC:..... **001400**
 (30) YEAR OF ADT:..... **2015** (109) TRUCK ADT:..... **05**
 (19) BYPASS, DETOUR LENGTH:..... **03**

GEOMETRIC DATA

(48) LENGTH OF MAXIMUM SPAN:..... **0062**
 (49) STRUCTURE LENGTH:..... **0001660**
 (50) CURB/SIDEWALK: LFT **000** FT RGT: **000** FT
 (51) BRDG RDWY WIDTH CURB TO CURB..... **0340** FT
 (52) DECK WIDTH OUT TO OUT..... **0374** FT
 (32) APPR RDWY WIDTH: **00 023 00** FT
 (33) BRIDGE MEDIAN:..... **0**
 (34) SKEW: **13** DEG (35) STRUCT FLARE: **N**
 (10) INV RTE MIN VERTICAL CLEAR:..... **9999** FT
 (47) INV RTE TOT HORIZONTAL CLEAR:.. **340** FT
 (53) MIN VERT CLEAR OVER BRDG RDW **9999** FT
 (54) MIN VERT UNDERCLEAR **N B** FT

SUFFICIENCY RATING = **98.7**

STATUS = **0**

CLASSIFICATION

(112) NBIS BRIDGE LENGTH:..... **Y**
 (104) HIGHWAY SYSTEM:..... **N**
 (26) FUNCTIONAL CLASS:..... **08**
 (100) DEFENSE HIGHWAY:..... **0**
 (101) PARALLEL STRUCTURE:..... **N**
 (102) DIRECTION OF TRAFFIC:..... **2**
 (103) TEMPORARY STRUCTURE:.....
 (110) DESIGNATED NATIONAL NETWORK:..... **N**
 (20) TOLL:..... **3**
 (21) MAINTENANCE:..... **02**
 (22) OWNER:..... **02**
 (37) HISTORICAL SIGNIFICANCE:..... **5**

CONDITION

(58) DECK:..... **6**
 (59) SUPERSTRUCTURE:..... **6**
 (60) SUBSTRUCTURE:..... **6**
 (61) CHANNEL AND CHANNEL PROTECTION:..... **6**
 (62) CULVERTS:..... **N**

LOAD RATING AND POSTING

(31) DESIGN LOAD:..... **5**
 (64) OPERATING RATING:..... **620**
 (66) INVENTORY RATING:..... **370**
 (70) BRIDGE POSTING:..... **5**
 (41) STRUCTURE OPEN, POSTED, OR CLOSED:..... **A**

APPRAISAL

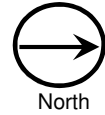
(67) STRUCTURAL EVALUATION:..... **6**
 (68) DECK GEOMETRY:..... **6**
 (69) UNDERCLEARANCES, VERT AND HOR:..... **N**
 (71) WATERWAY ADEQUACY:..... **7**
 (72) APPROACH ROADWAY ALIGNMENT:..... **7**
 (36) TRAFFIC SAFETY FEATURES:..... **1 0 1 0**
 (113) SCOUR CRITICAL BRIDGES:..... **7**

PROPOSED IMPROVEMENTS

(75) TYPE OF WORK:..... **38 2**
 (76) LENGTH OF IMPROVEMENT:..... **000200**
 (94) BRIDGE IMPROVEMENT COST:..... **12,000**
 (95) ROADWAY IMPROVEMENT COST:..... **5,000**
 (96) TOTAL PROJECT COST:..... **17,000**
 (97) YEAR OF IMPROVEMENT COST EST:..... **01**
 (114) FUTURE ADT:..... **002000**
 (115) YEAR OF FUTURE ADT:..... **35**

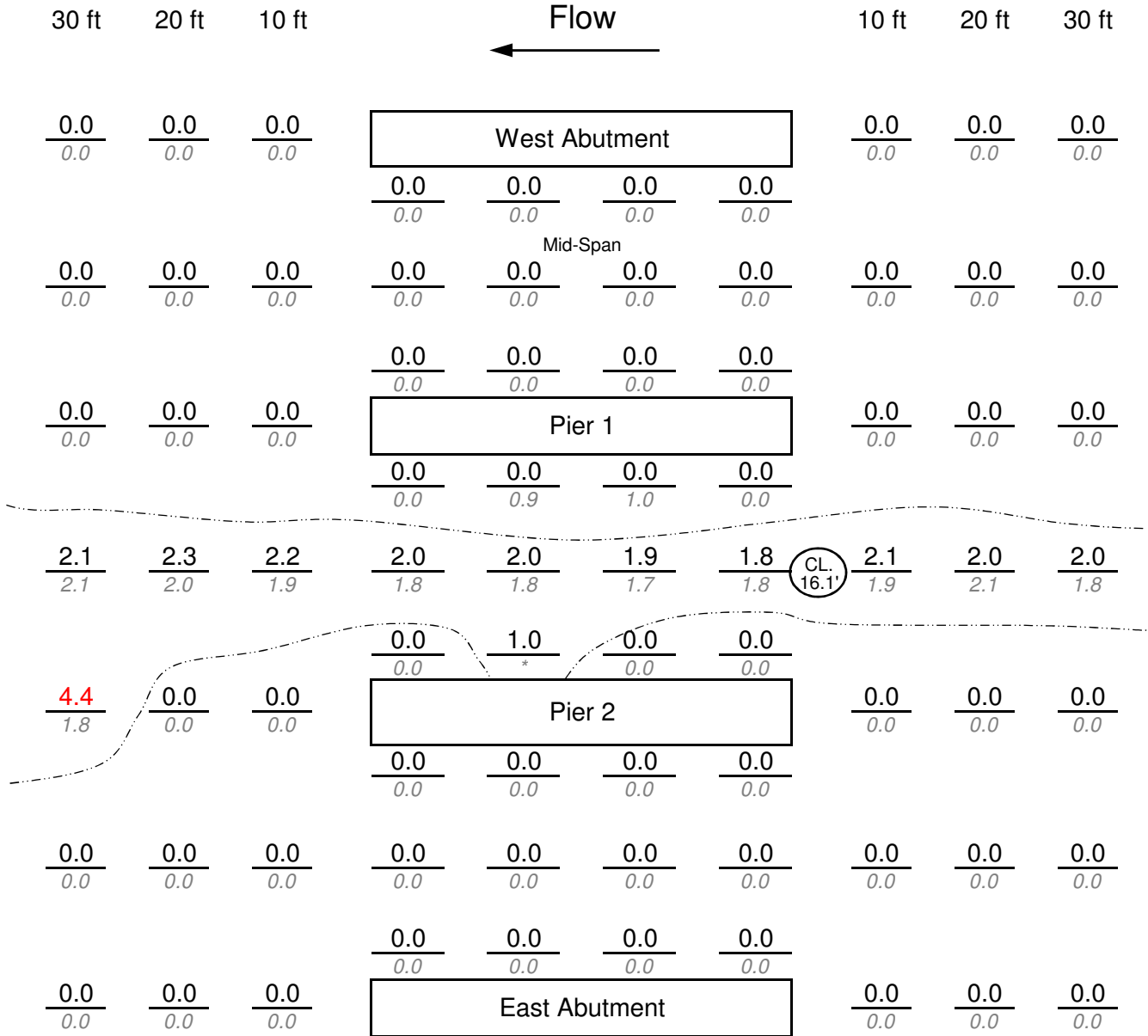
SOUNDING SHEET

(All measurements are in feet)



Clearance Location: Bottom of Beam No 1 at midspan of Span No. 2
Clearance is the distance measured from the water surface to the clearance location.

Inspectors: TS/EC



Streambed composition: Rocks and silt

Legend: $\frac{X.X}{X.X}$ - Current soundings
 $\frac{X.X}{X.X}$ - 2001 Base Year Sounding (Adjusted for difference in water surface elevation)

(CL. X.X') - Clearance

--- - Edge of Stream

* - Dry during Base Year Sounding

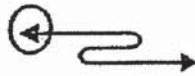


Base Year SOUNDING SHEET

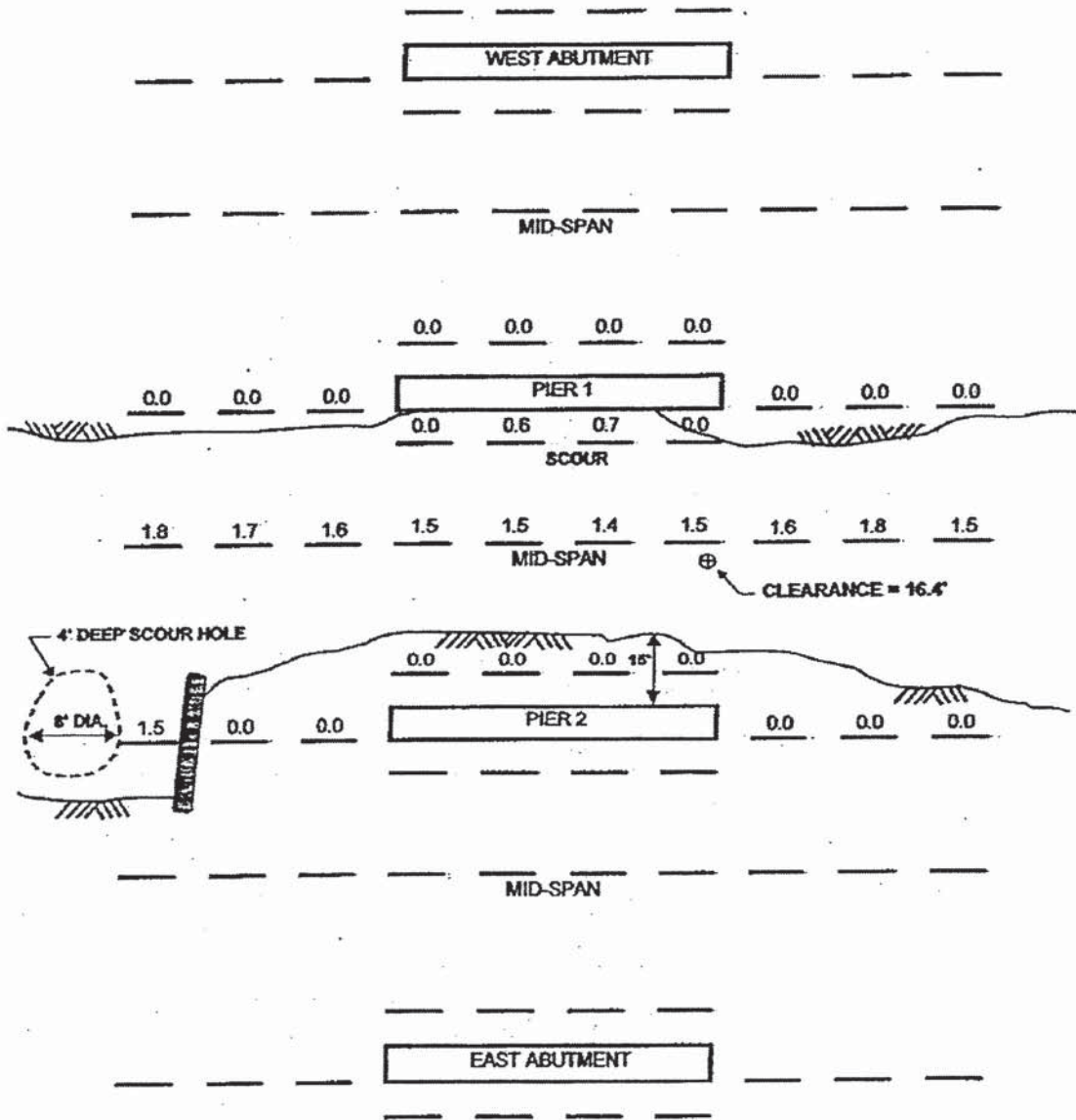
BRIDGE NO. CE-079
DATE: 11/15/01

SHEET NO. 1 OF 1
CLEARANCE LOCATION: L/S SIDE @ MIDSPAN
SPAN 2

All soundings in decimal feet.



30' 20' 10'
FLOW
10' 20' 30'



The bottom is rocky and hard with some soft, silty areas.

LOAD RATING
CALCULATION
FOR BRIDGE
CE0079001

Vehicle	INV. (Tons)	OPR. (Tons)
HL-93	-	-
H-15	20.5	34.5
T-3	43.5	72.5
T-4	44.5	74.0
HS-20	37.0	62.0
3S2	45.0	75.0
150K	44.5	74.5
90K COMB.	44.0	73.0
90K CRANE	52.0	86.5
90K CARGO	46.0	77.0
80K CARGO	50.5	84.0
120K SPEC.	45.0	75.0
108K CRANE	50.5	84.5
120K CRANE	53.0	88.0

Date: October, 2013

Load Rating Standard Summary Sheet

Bridge No.: CE0079001 on Brewster Bridge Rd. over Big Elk Creek

Date of Rating: 10/31/2013 LARS Program: Yes No Program Used: _____

Rating Method: LRFR LFR ASR Engineering Judgment Load Testing HMA Wearing Surface (in.) 0

Rating Type: As-Built As Inspected Condition Report Date: 06/25/2012 N/A if rating type is As-Built

Comments/Defects/Assumptions: _____

*All legal and permit vehicles must be completed, regardless of the rating method. The HL-93 is only rated for LRFR.

**For LRFR there is no Inventory Rating for Legal and Permit Loads. Enter the Operating Limit State in the Inventory column for Legal Loads, set Inventory to zero for Permit Loads.

***LRFR Design/Load Rating Vehicle (Limit States are Strength I for all materials, Service II for Steel only, or Service III for prestressed concrete Inventory only)**

Truck/ Axle/ Tons	Rating Details		Inventory	Operating
	Controlling Member		Limit State	Limit State
	Controlling Stress (Moment, Shear, Service)		Rating Factor	Rating Factor
HL-93/3/36 Tons			Limit State	Limit State
	Select the Controlling Stress			

Legal Loads (For LRFR the Limit States are Strength I for all materials or Service II for steel only)

Truck/ Axle/ Tons	Controlling Member		**Inventory or Limit State	Operating
	Controlling Stress (Moment, Shear, Service)		Tons (XX.X)	Tons (XX.X)
H-15 / 2 / 15	Three Span Cont., Int. Beam		205	345
	Moment			
T-3 / 3 / 33	Three Span Cont., Int. Beam		435	725
	Moment			
T-4 / 4 / 35	Three Span Cont., Int. Beam		445	740
	Moment			
HS-20 / 3 / 36	Three Span Cont., Int. Beam		370	620
	Moment			
3S2 / 5 / 40	Three Span Cont., Int. Beam		450	750
	Moment			

If rating in LRFR, enter Oper. Limit State.

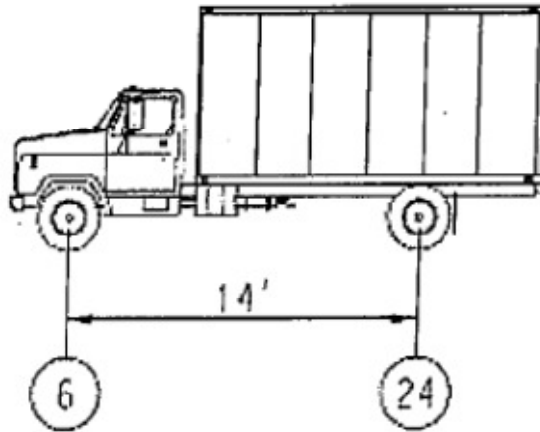
Permit Loads - (For LRFR the Limit State is Strength II)

Truck/ Axle/ Tons	Controlling Member		**Inventory	Operating
	Controlling Stress (Moment, Shear, Service)		Tons (XX.X)	Tons (XX.X)
150K / 8 / 75	Three Span Cont., Int. Beam		445	745
	Moment			
90K Comb./ 5 / 45	Three Span Cont., Int. Beam		440	730
	Moment			
90K Crane/ 4 / 45	Three Span Cont., Ext. Beam		520	865
	Moment			
90 Cargo/ 5 / 45	Three Span Cont., Int. Beam		460	770
	Moment			
80 Cargo/ 5 / 40	Three Span Cont., Int. Beam		505	840
	Moment			
120K Spec./ 5 / 60	Three Span Cont., Int. Beam		450	750
	Moment			
108K Crane/ 5 / 54	Three Span Cont., Ext. Beam		505	845
	Moment			
120 Crane/ 5 / 60	Three Span Cont., Ext. Beam		530	880
	Moment			

If rating in LRFR, set Inv. to zero.

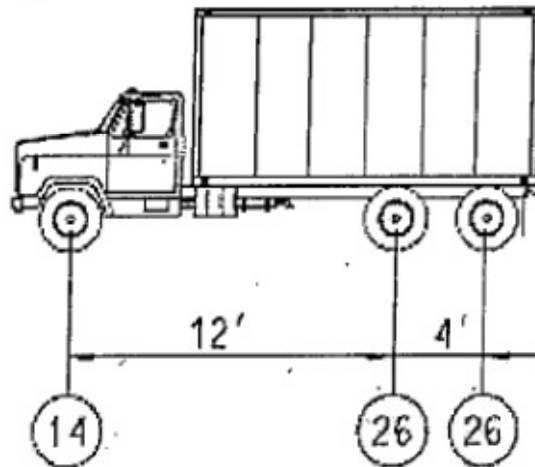
LOAD RATING VEHICLES

(All numbers in circles are axle loads in 1,000 lbs.)



H-15 VEHICLE

30,000 POUNDS

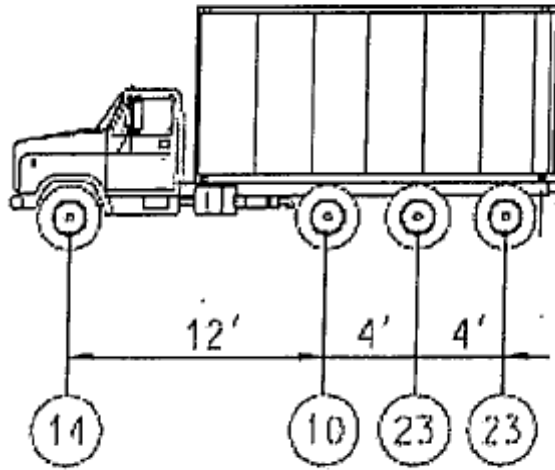


TYPE 3 VEHICLE

66,000 POUNDS

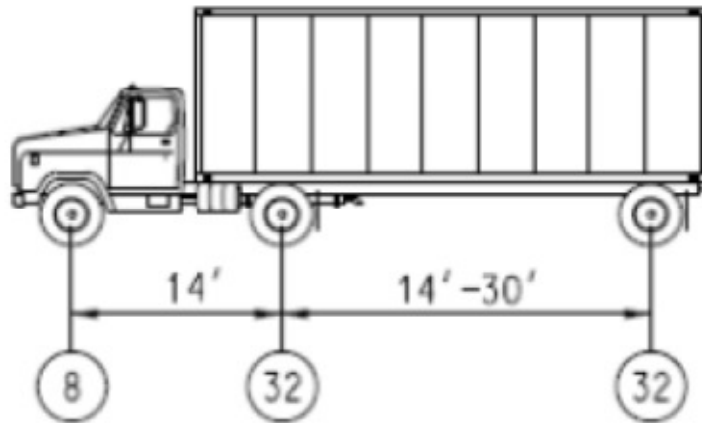
LOAD RATING VEHICLES

(All numbers in circles are axle loads in 1,000 lbs.)



TYPE 4 VEHICLE

70,000 POUNDS

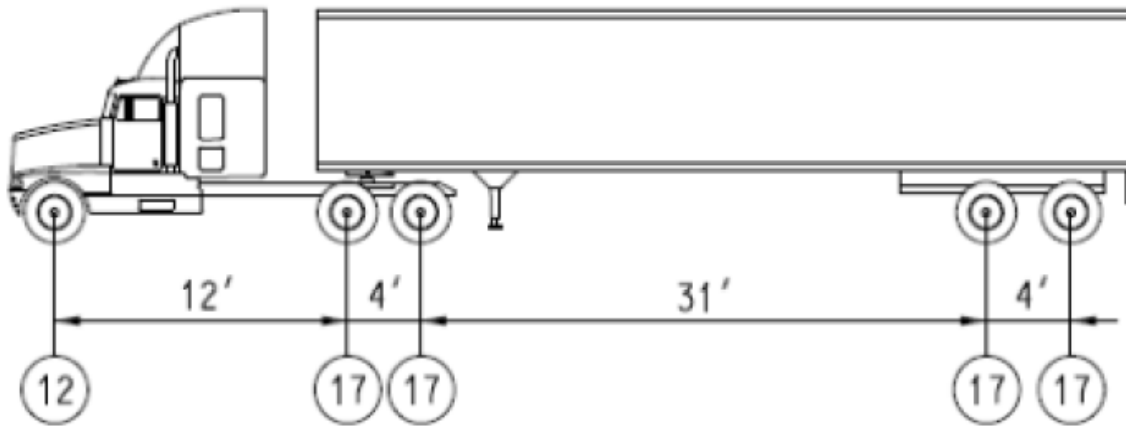


HS-20 VEHICLE

72,000 POUNDS

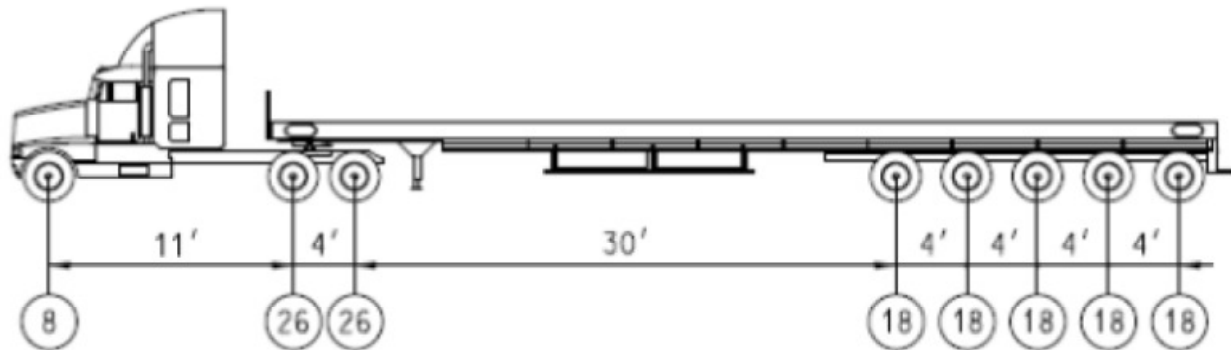
LOAD RATING VEHICLES

(All numbers in circles are axle loads in 1,000 lbs.)



3S2 VEHICLE

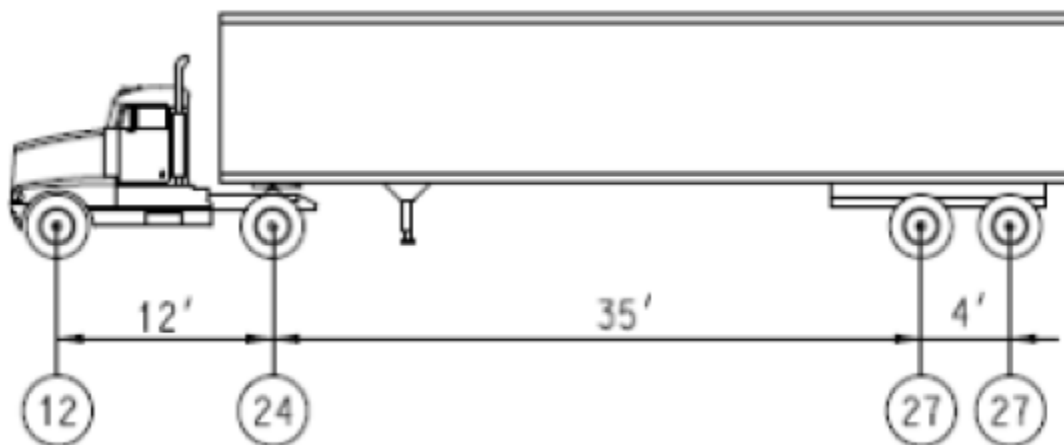
80,000 POUNDS



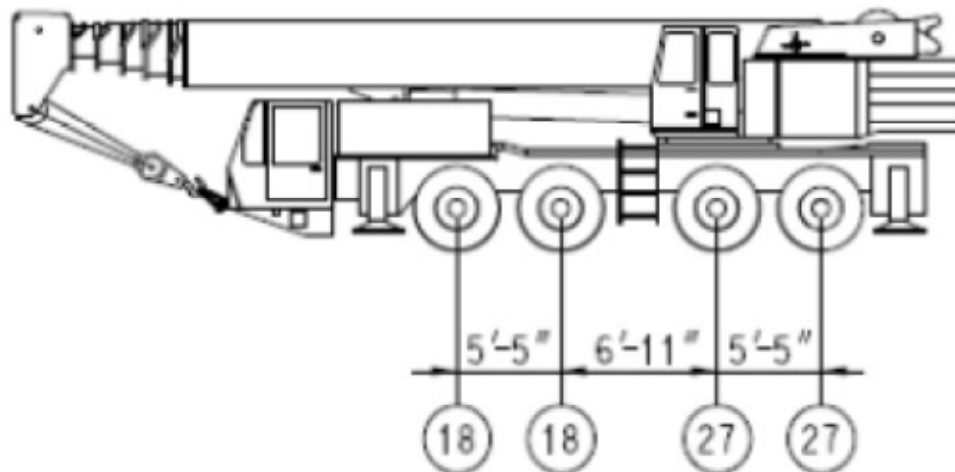
150,000 POUND VEHICLE

LOAD RATING VEHICLES

(All numbers in circles are axle loads in 1,000 lbs.)



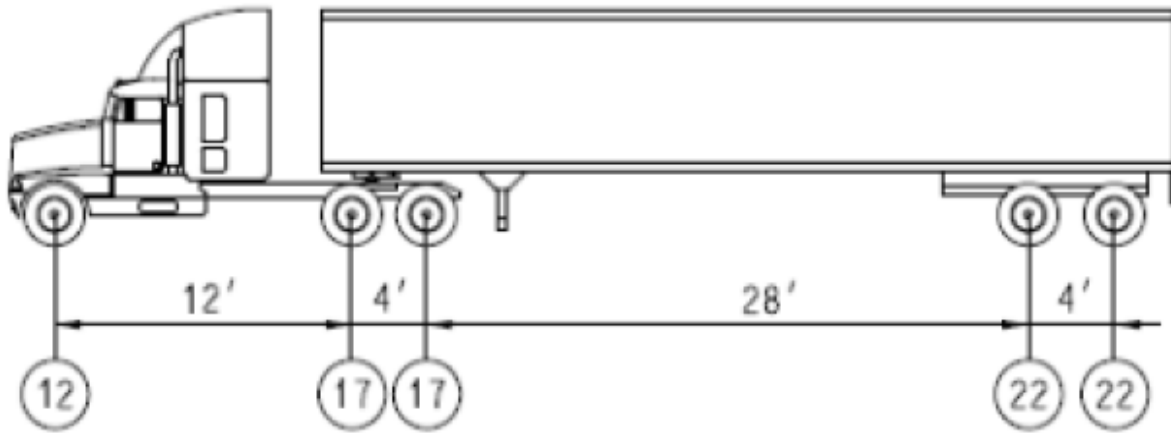
90,000 POUND PERMIT COMBINATION VEHICLE



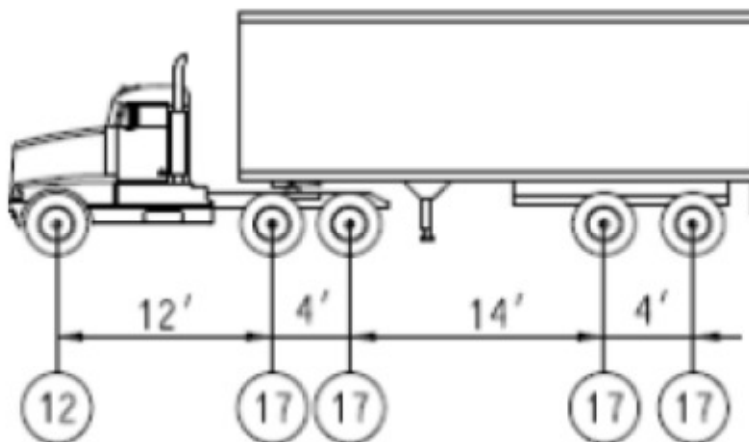
90,000 POUND MOBILE CRANE VEHICLE

LOAD RATING VEHICLES

(All numbers in circles are axle loads in 1,000 lbs.)



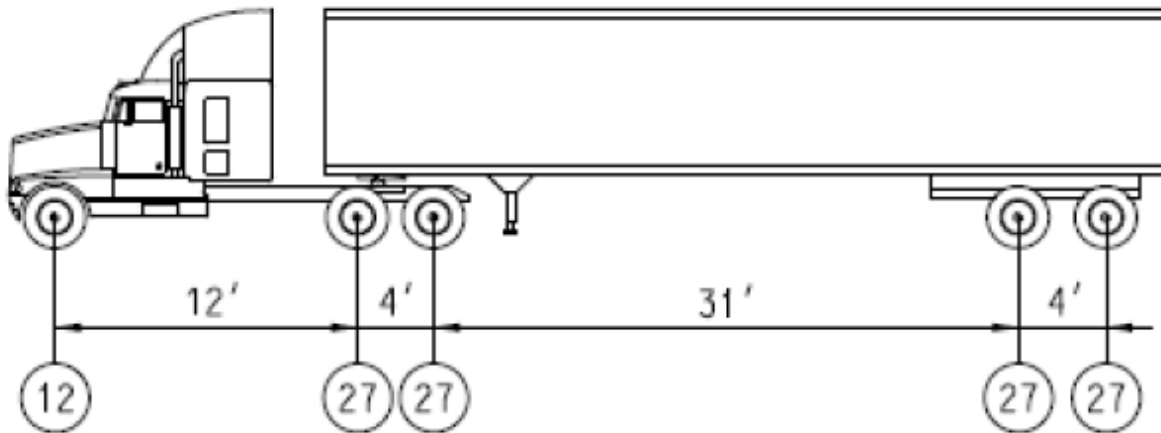
90,000 POUND CARGO VEHICLE



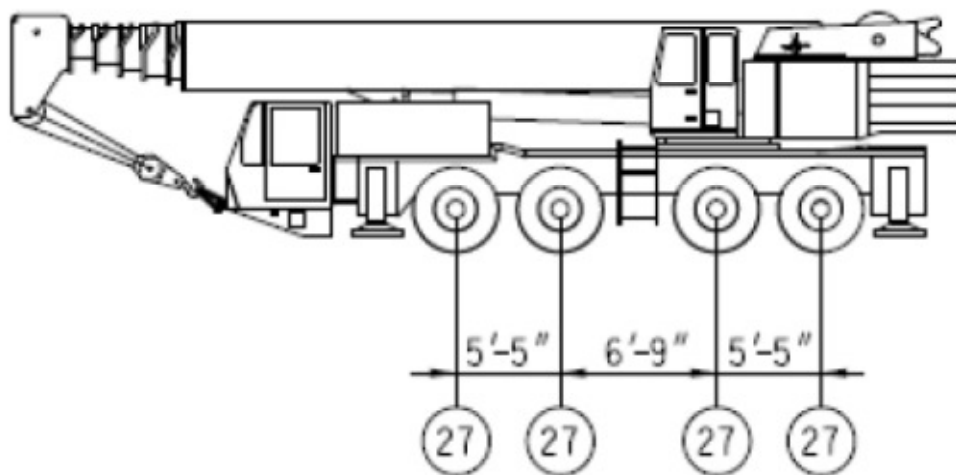
80,000 POUND CARGO VEHICLE

LOAD RATING VEHICLES

(All numbers in circles are axle loads in 1,000 lbs.)



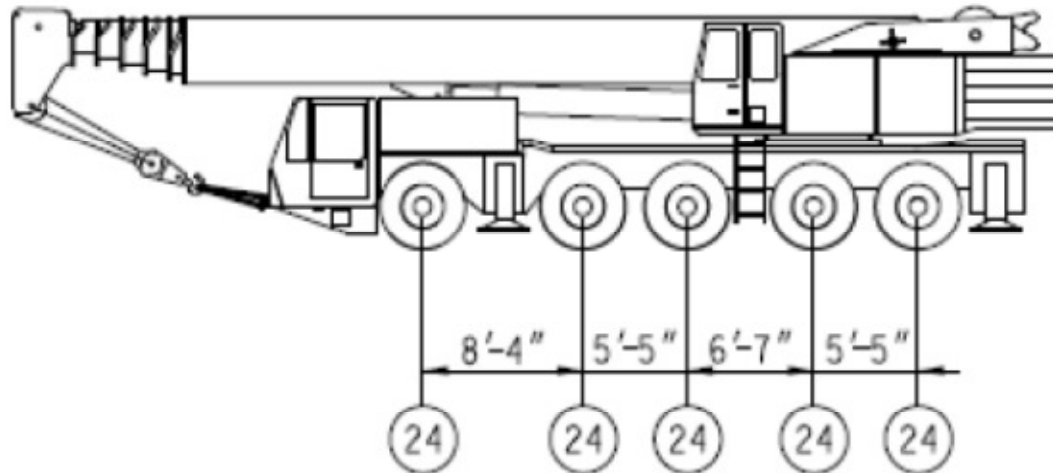
120,000 POUND COMBINATION VEHICLE



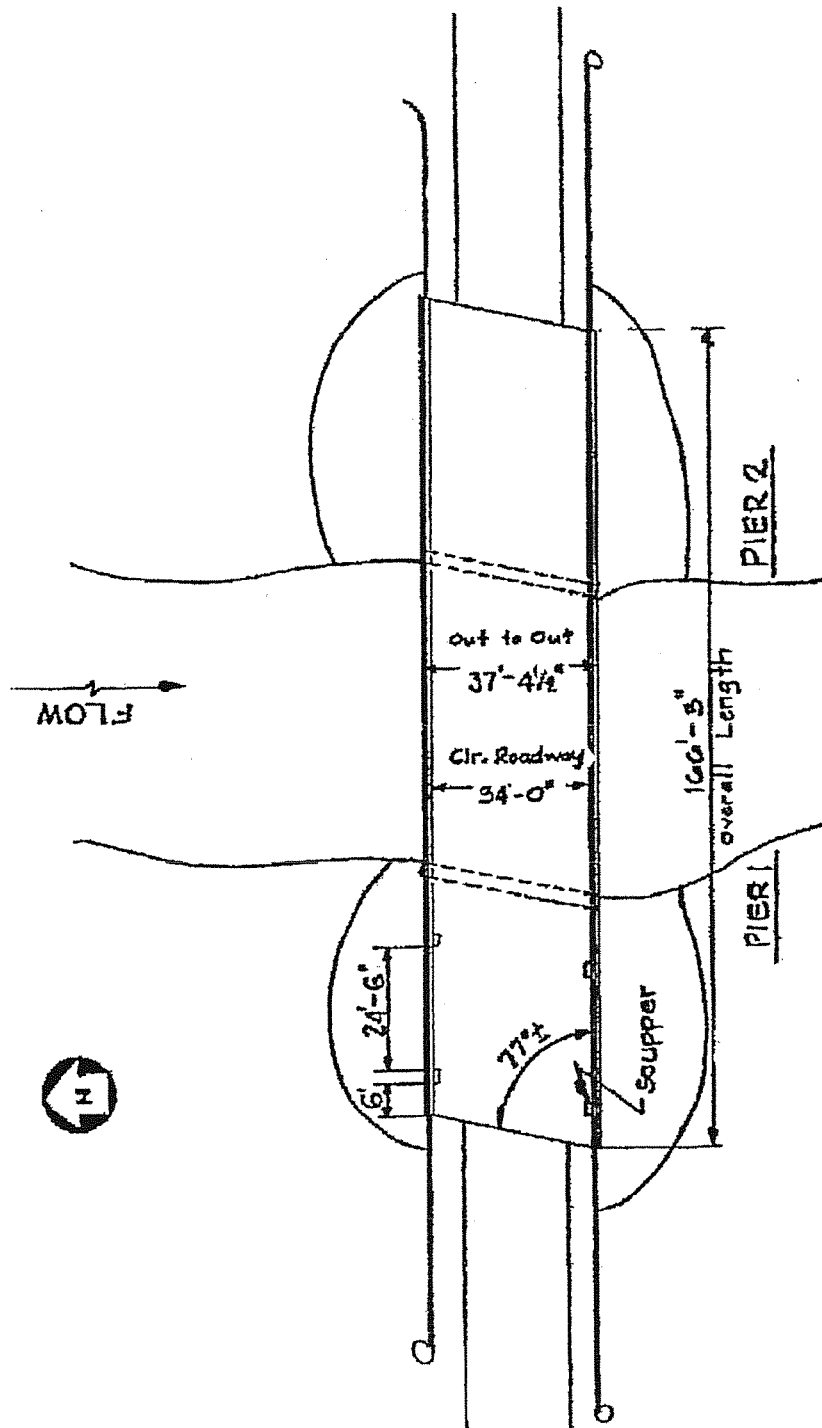
108,000 POUND MOBILE CRANE VEHICLE

LOAD RATING VEHICLES

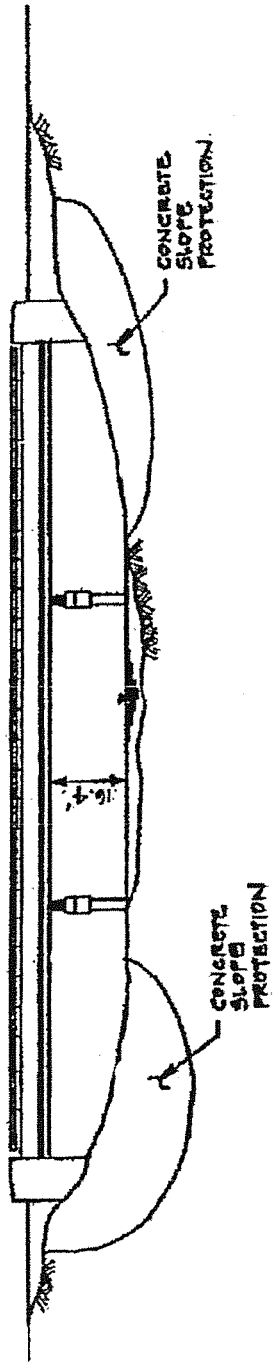
(All numbers in circles are axle loads in 1,000 lbs.)



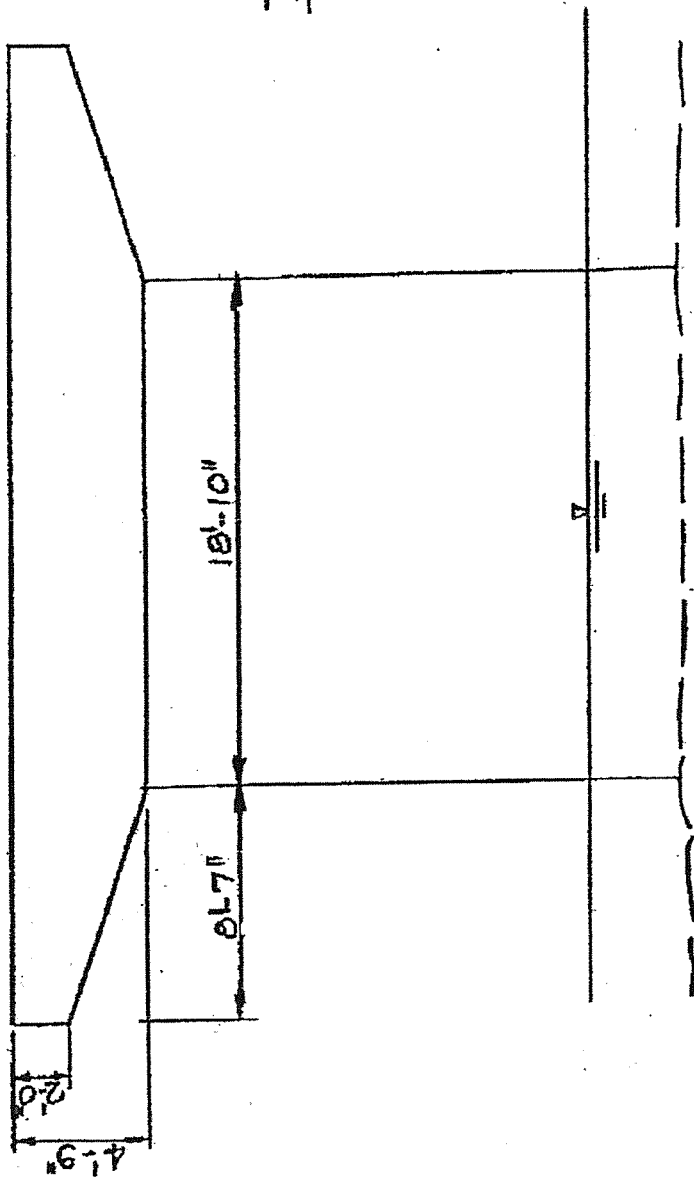
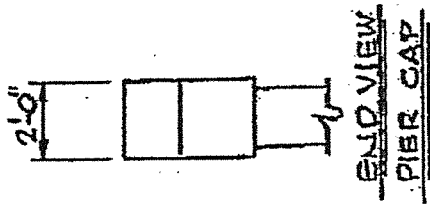
120,000 POUND MOBILE CRANE VEHICLE



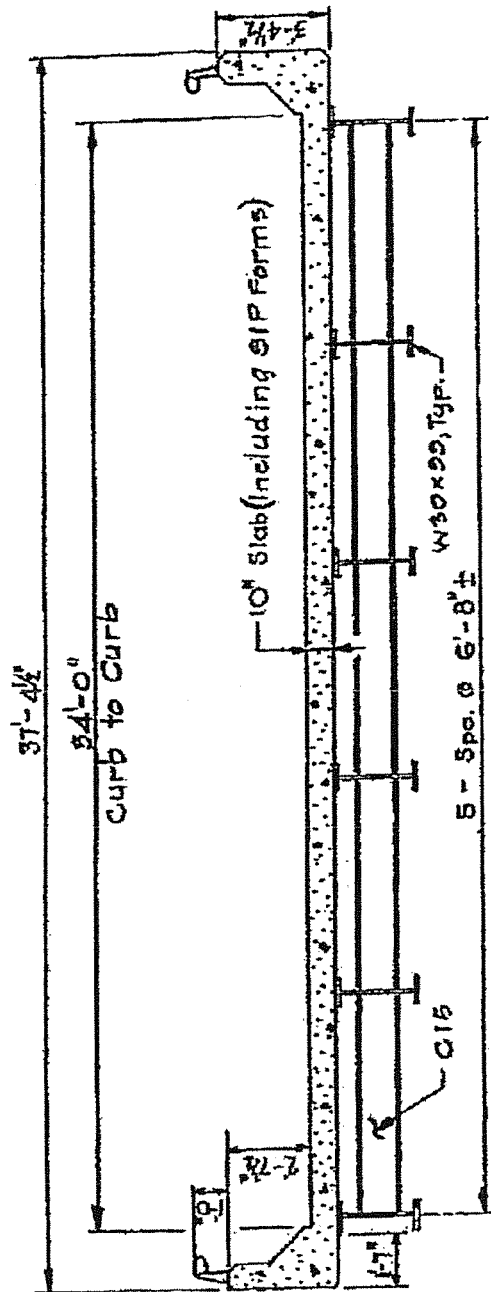
CECIL COUNTY, DEPARTMENT OF PUBLIC WORKS
 BRIDGE NO. CE-0079
 BREWSTER BRIDGE ROAD over BIG ELK CREEK
 PLAN



CECIL COUNTY, DEPARTMENT OF PUBLIC WORKS
BRIDGE NO. CE-0079
BREWSTER BRIDGE ROAD over BIG ELK CREEK
ELEVATION



CECIL COUNTY, DEPARTMENT OF PUBLIC WORKS
 BRIDGE NO. CE-0079
 BREWSTER BRIDGE ROAD over BIG ELK CREEK
 PIER ELEVATION



CECIL COUNTY, DEPARTMENT OF PUBLIC WORKS
 BRIDGE NO. CE-0079
 BREWSTER BRIDGE ROAD over BIG ELK CREEK
 TYPICAL SECTION

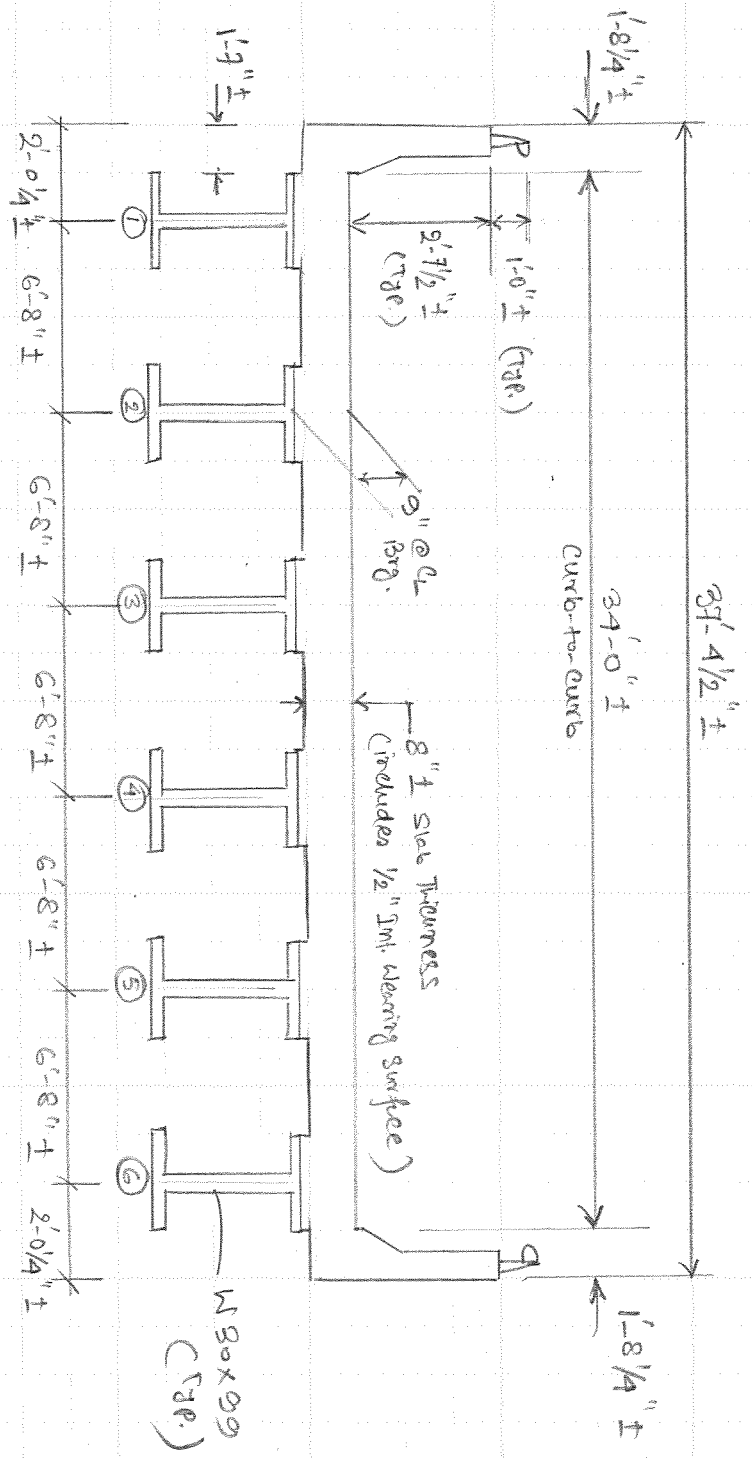
Assumptions

1. Plans are not available for this bridge. The rating is based on the 2012 Bridge Inspection Report, previous load rating by Wallace, Montgomery & Associates dated 2-26-86, and field measurement of beam bottom plates by Gannett Fleming, Inc.
2. The bridge is rated as existing condition. The exterior beams are in fair condition as per the 2012 inspection report with flaking paint, heavy corrosion and section loss near the beam ends for the exterior beams 1 and 6. Detailed section losses for the exterior beams are estimated in the following pages. Interior beams are in satisfactory condition with paint failures and minor section loss. As the section loss is minimal, no defect is taken into account for the interior beams.
3. Load Factor Design method followed in the rating calculation.
4. Span lengths are taken from the 2012 bridge Inspection Report.
5. Plates are present at top and bottom of the beam at the pier locations. The dimension of the plates and their extents are not available. Hence, bottom plates near the piers are field measured. Top plates could not be measured in the field as it is inside the deck. It is assumed that the top plates are similar as bottom plates.
6. The girders are assumed to act compositely with the deck from previous rating and SI&A Item No. 233.
7. Weight of metal railing on top of concrete parapet (each side) assumed as 10 plf (Previous rating took the weight as 9 plf).
8. Detailed dimension of the concrete parapet is not available. Previous rating took parapet weight as 468 plf which is same as the weight of a 34" straight back F-shape parapet (load calculation attached). Considering the available dimensions, this weight seemed reasonable and used for the rating analysis.
9. SIP forms are present from photos and sketches from the Inspection Report. A load of 15 psf is used for analysis.
10. Future wearing surface (FWS) is not present and not applied in the LARS analysis.
11. The yield strength of the steel, $F_y = 36$ ksi is assumed for the analysis which is consistent with the previous rating calculation and SI&A Item No. 221 (A-36 steel).
12. Concrete f'_c is assumed as 3 ksi from previous rating.
13. Slab thickness of 8" is used from previous rating calculation. A haunch thickness of 1" and integral wearing surface of 1/2" is assumed for analysis.
14. Diaphragm spacing is unknown. The diaphragm spacing is assumed as 17.39' (three equal spaces) for Spans 1 & 3 and 20.72' (three equal spaces) for span 3.
15. Deck reinforcement (details and extents) is unknown and is not taken in the LARS analysis.

Approx. Cross-Section:

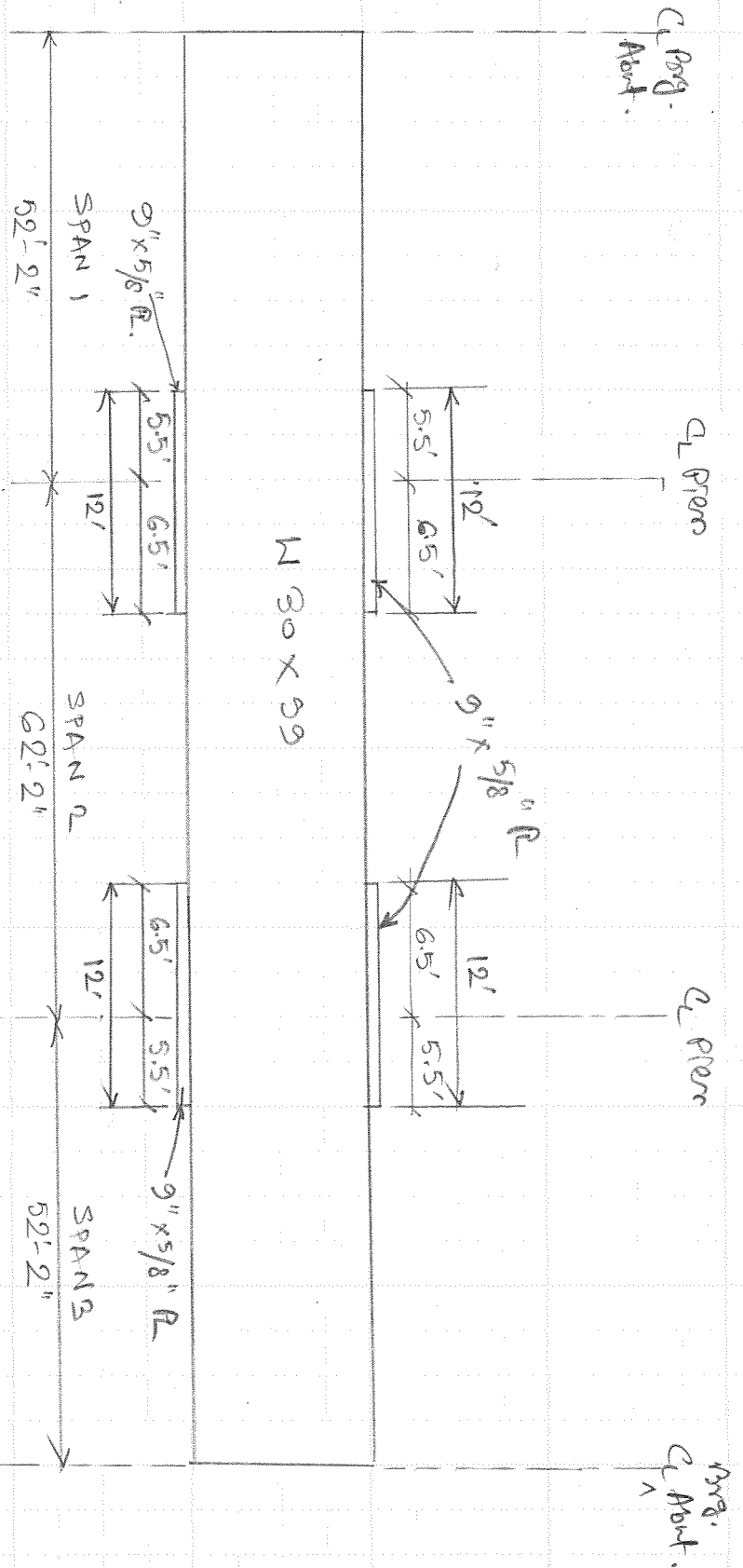
Notes:
 --- Slab thickness = 8" assumed from prev. load rating.
 --- 1/2" Integral wearing surface assumed.
 --- 1" Haunch thickness assumed.
 --- Facepelt weight of F68 pty assumed from previous rating (similar to 34" high straight base F-shape barriers).
 --- Conc. deck assumed to act compositely with beams (refer previous rating & S18 & Item No. 233).
 --- All dimension shown above is approximate.
 --- Drawing not to scale.

Cross Section

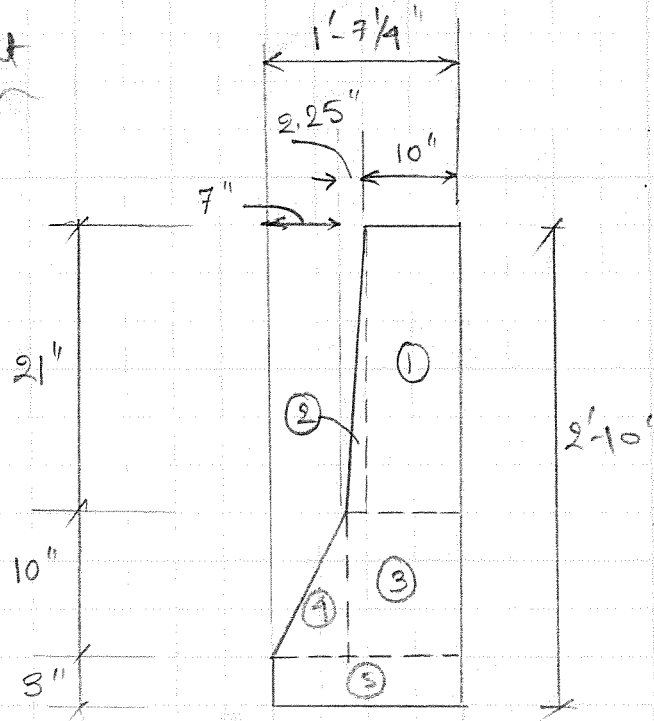


Beam Details:

- Notes:
- Span lengths are from 2012 Bridge Impairment Report.
 - The bottom plate length, width & thickness are measured in the field.
 - Top plates assumed same as bottom plates.
 - Drawing not to scale.



Parapet Height



- ① $10'' \times 21'' = 210 \text{ in}^2$
- ② $0.5 \times 2.25'' \times 21'' = 23.7 \text{ in}^2$
- ③ $12.25'' \times 10'' = 122.5 \text{ in}^2$
- ④ $0.5 \times 7'' \times 10'' = 35 \text{ in}^2$
- ⑤ $19.25'' \times 3'' = 57.8 \text{ in}^2$

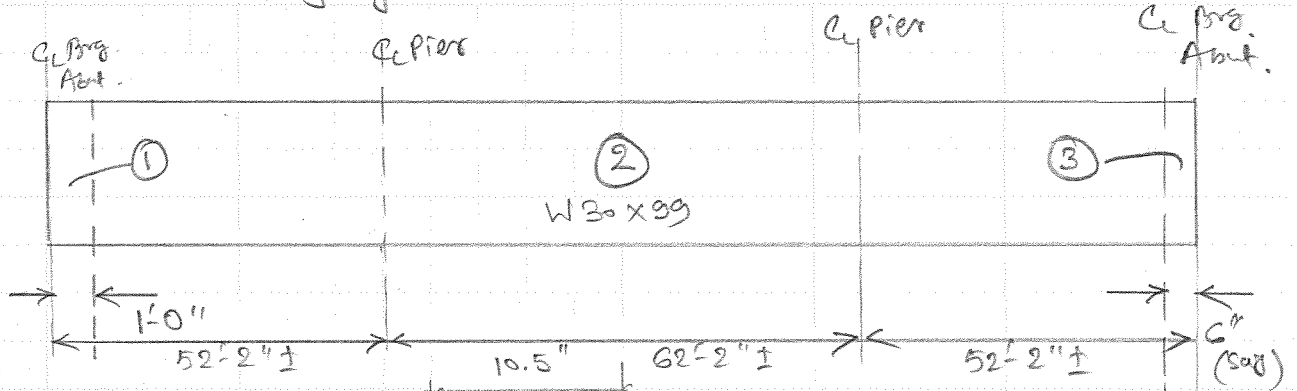
$$\begin{aligned} &\underline{\Sigma 449 \text{ in}^2} \\ &\approx 3.12 \text{ ft}^2 \\ &\Rightarrow 3.12 \times 150 \\ &= 468 \text{ \# / ft.} \\ &\approx \underline{470 \text{ \# / ft. (5\%)}} \end{aligned}$$

34" Straight Back F-Shape Parapet

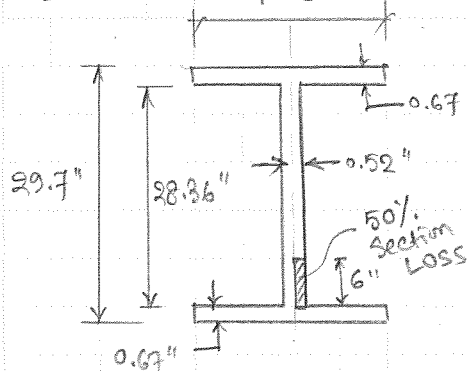
Section Loss Calculation:

BEAM 1 (G01):

At west abutment, beam web exhibits 1' long x 6" high area of heavy corrosion (prev. reported as 50% section loss). At east abutment, beam web exhibits a 4" wide x 6" high area of heavy corrosion. The section loss for the web appears to be up to 1/8" based on visual observation & judgement.



Section 1



Eqv. web thickness:

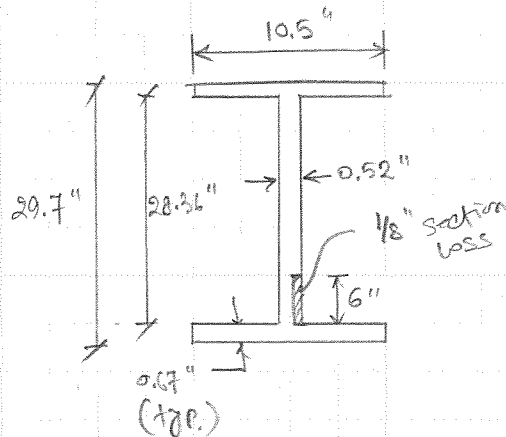
$$\frac{22.36 \times 0.52 + 6 \times 0.26}{28.36}$$

$\approx \underline{\underline{0.465}} \text{ (say)}$

Section 2

No section loss, Use full W30 x 99

Section 3



Eqv. web thickness:

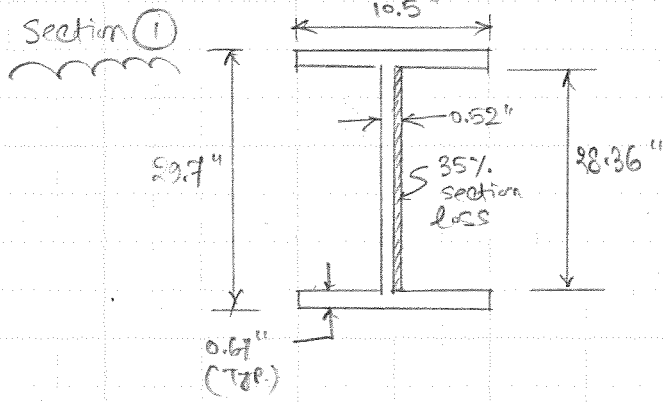
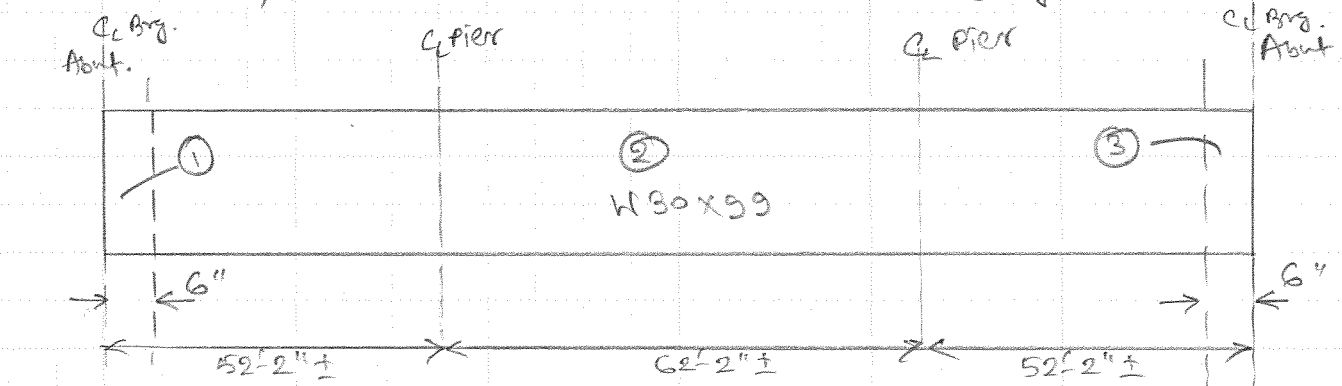
$$\frac{22.36 \times 0.52 + 6 \times 0.395}{28.36}$$

$\approx \underline{\underline{0.494}} \text{ (say)}$

Section Loss Calculation; (contd.)

BEAM 6 (G02):

At west abutment, Beam 6 exhibits a 6" wide x full ht. area of heavy surface corrosion. The section loss appears significant (previously reported as 25%) and should be precisely measured. Assume 35% section loss for this analysis. At east abutment, Beam 6 web exhibits 6" wide x full ht. area of heavy corrosion. The section loss appears to be up to 1/8" based on visual observation & judgement.

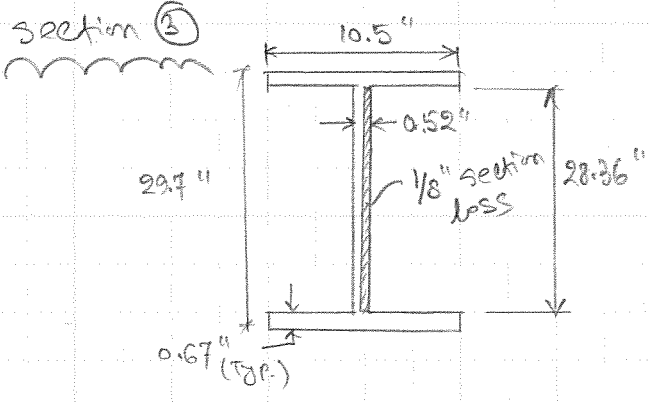


Eqv. web thickness:

$$t_{eq} = 0.52 \times 0.65$$

$$= 0.338"$$

Section ② No section loss, Use full W30x99



Eqv. web thickness:

$$t_{eq} = 0.52 - 1/8"$$

$$= 0.395"$$

PROJECT CECIL COUNTY LOAD RATING

SUBJECT Bridge No. CE079

JOB 54759 TASK 2

BY AB DATE 10/31/2013 REV. DATE

CHK. DATE CHK. DATE

G01 Girder **G01** Int (I) or Ext (E)? **E**

Girder in plan 1

Length 166.50 ft. (52.17'+62.16'+52.17')

Girder Description **Rolled Beam with C.P.** For Rolled Beams with or without Cover Plates:

Girder Weight	105.0 lbs/ft.	Width	Thk.	Length	Area	Weight	
Left Parapet Wt.	478 lbs/ft.	Beam W 30x99	-	-	-	99.0 lb/ft	
Right Parapet Wt.	478 lbs/ft.	Beam			-	0.0 lb/ft	
No. of Girders	6	Cov Pl. 1	9	0.625	48	5.625	6 lb/ft
Misc. Steel Percent	10 %	Cov Pl. 2				0	0 lb/ft
SIP	15 psf	Cov Pl. 3				0	0 lb/ft
FWS	0 psf						105.0 lb/ft

Eff. Length Left 2.021 ft. (OH)

Eff. Length Right 3.333 ft.

Slab, f'c 3000 psi Diaphragm Spacings:

Steel, Fy 36000 psi (Assumed)

t_{slab}, total 8 in. Spans 1 & 3 17.39 ft.

t_{integral wearing surface} 0.5 in. Span 2 20.72 ft.

Stage I Load

SIP	50.00 lbs/ft.	
Misc. Steel	10.50 lbs/ft.	
Σ	60.50 lbs/ft.	
=	65 lbs/ft.	(say)

Super Imposed Dead Load

FWS	0 lbs/ft.	
Parapet	159.3 lbs/ft.	
Σ	159.33 lbs/ft.	
=	160 lbs/ft.	(say)

DF _{INT} =	N/A
DF _{EXT} =	1.176

PROJECT CECIL COUNTY LOAD RATING

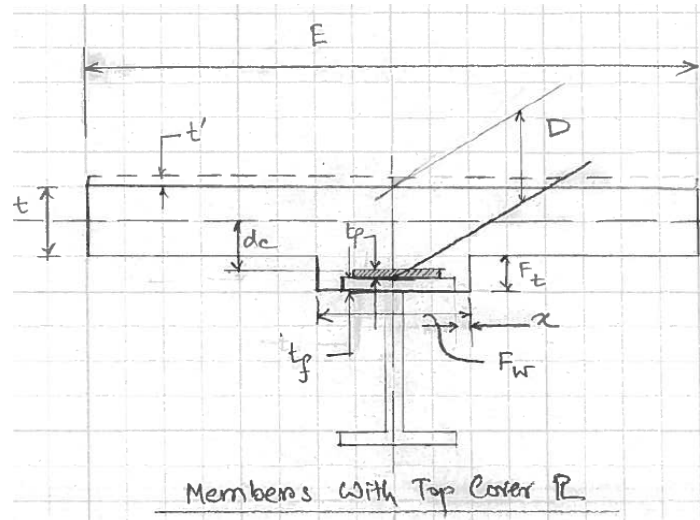
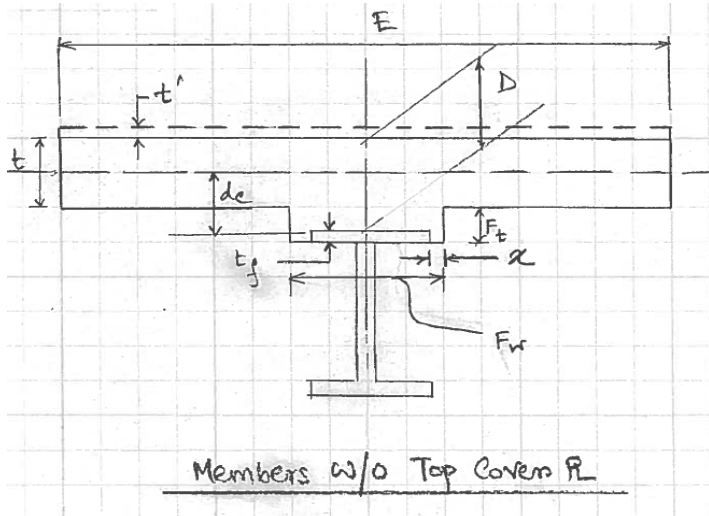
SUBJECT Bridge No. CE079

JOB 54759 TASK 2

BY AB DATE 10/31/2013 REV. DATE

CHK. DATE CHK. DATE

Girder G01



	t_f (in.)	b_f (in.)	D (in.)	t_p (in.)	x (in.)	t (in.)	t' (in.)	F_w (in.)	F_t (in.)	d_c (in.)	E (in.)
section 1	0.67	10.5	8.5	0	0	7.5	0.5	10.500	1.670	4.750	64.25
section 2	0.67	10.5	8.5	0.625	0	7.5	0.5	10.500	1.670	4.125	64.25
section 3											
section 4											
section 5											
section 6											

t_f = Top Flange Thickness, in.

b_f = Top Flange Width, in.

D = Dist. From top of slab (effective) to top of web, in.

t_p = Thickness of top flange plate (if any), in.

x = Extension of concrete fillet on one side of top flange, in.

PROJECT CECIL COUNTY LOAD RATING

SUBJECT Bridge No. CE079

JOB 54759 TASK 2

BY AB DATE 10/31/2013 REV. DATE

CHK. DATE CHK. DATE

G02 Girder **G02** Int (I) or Ext (E)? **E**

Girder in plan **6**

Length **166.50 ft. (52.17'+62.16'+52.17')**

Girder Description **Rolled Beam with C.P.** For Rolled Beams with or without Cover Plates:

Girder Weight	105.0 lbs/ft.	Width	Thk.	Length	Area	Weight	
Left Parapet Wt.	478 lbs/ft.	Beam W 30x99	-	-	-	99.0 lb/ft	
Right Parapet Wt.	478 lbs/ft.	Beam			-	0.0 lb/ft	
No. of Girders	6	Cov Pl. 1	9	0.625	48	5.625	6 lb/ft
Misc. Steel Percent	10 %	Cov Pl. 2				0	0 lb/ft
SIP	15 psf	Cov Pl. 3				0	0 lb/ft
FWS	0 psf						<u>105.0 lb/ft</u>

Eff. Length Left **3.333 ft.**

Eff. Length Right **2.021 ft. (OH)**

Slab, f'c **3000 psi** Diaphragm Spacings:

Steel, Fy **36000 psi** (Assumed)

t_{slab}, total **8 in.** Spans 1 & 3 **17.39 ft.**

t_{integral wearing surface} **0.5 in.** Span 2 **20.72 ft.**

Stage I Load

SIP	50.00 lbs/ft.	
Misc. Steel	10.50 lbs/ft.	
Σ	60.50 lbs/ft.	
=	65 lbs/ft.	(say)

Super Imposed Dead Load

FWS	0 lbs/ft.	
Parapet	159.3 lbs/ft.	
Σ	159.33 lbs/ft.	
=	160 lbs/ft.	(say)

DF _{INT} =	N/A
DF _{EXT} =	1.176

PROJECT CECIL COUNTY LOAD RATING

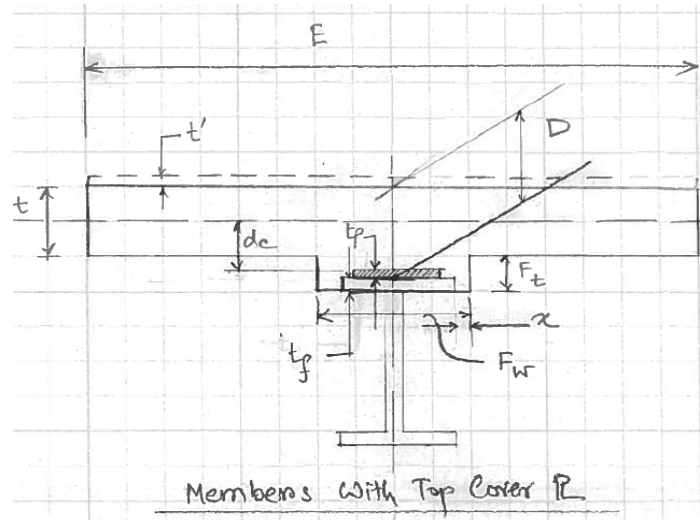
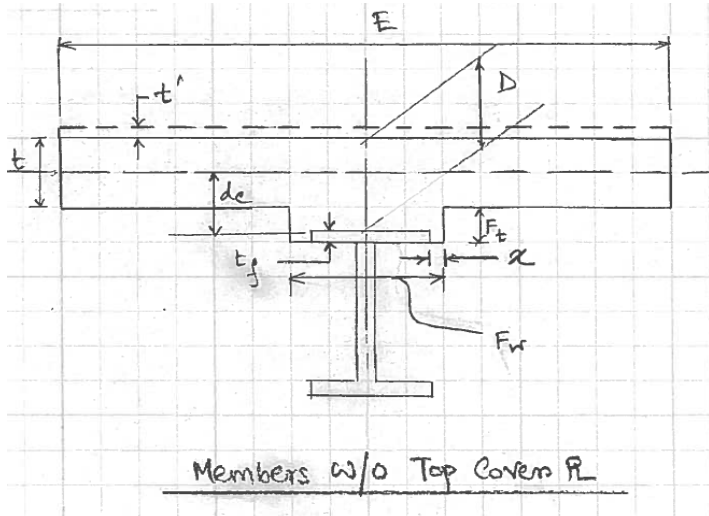
SUBJECT Bridge No. CE079

JOB 54759 TASK 2

BY AB DATE 10/31/2013 REV. DATE

CHK. DATE CHK. DATE

Girder G02



	t_f (in.)	b_f (in.)	D (in.)	t_p (in.)	x (in.)	t (in.)	t' (in.)	F_w (in.)	F_t (in.)	d_c (in.)	E (in.)
section 1	0.67	10.5	8.5	0	0	7.5	0.5	10.500	1.670	4.750	64.25
section 2	0.67	10.5	8.5	0.625	0	7.5	0.5	10.500	1.670	4.125	64.25
section 3											
section 4											
section 5											
section 6											

t_f = Top Flange Thickness, in.

b_f = Top Flange Width, in.

D = Dist. From top of slab (effective) to top of web, in.

t_p = Thickness of top flange plate (if any), in.

x = Extension of concrete fillet on one side of top flange, in.

PROJECT CECIL COUNTY LOAD RATING

SUBJECT Bridge No. CE079

JOB 54759 TASK 2

BY AB DATE 10/31/2013 REV. DATE

CHK. DATE CHK. DATE

G03 Girder **G03** Int (I) or Ext (E)? **I**

Girder in plan **6**

Length **166.50 ft. (52.17'+62.16'+52.17')**

Girder Description **Rolled Beam with C.P.** For Rolled Beams with or without Cover Plates:

Girder Weight	105.0 lbs/ft.	Width	Thk.	Length	Area	Weight	
Left Parapet Wt.	478 lbs/ft.	Beam W 30x99	-	-	-	99.0 lb/ft	
Right Parapet Wt.	478 lbs/ft.	Beam			-	0.0 lb/ft	
No. of Girders	6	Cov Pl. 1	9	0.625	48	5.625	6 lb/ft
Misc. Steel Percent	10 %	Cov Pl. 2				0	0 lb/ft
SIP	15 psf	Cov Pl. 3				0	0 lb/ft
FWS	0 psf						<u>105.0 lb/ft</u>

Eff. Length Left **3.333 ft.**

Eff. Length Right **3.333 ft.**

Slab, f'c **3000 psi** Diaphragm Spacings:

Steel, Fy **36000 psi** (Assumed)

t_{slab}, total **8 in.** Spans 1 & 3 **17.39 ft.**

t_{integral wearing surface} **0.5 in.** Span 2 **20.72 ft.**

Stage I Load

SIP	100.00 lbs/ft.	
Misc. Steel	10.50 lbs/ft.	
Σ	110.50 lbs/ft.	
=	115 lbs/ft.	(say)

Super Imposed Dead Load

FWS	0 lbs/ft.	
Parapet	159.3 lbs/ft.	
Σ	159.33 lbs/ft.	
=	160 lbs/ft.	(say)

DF _{INT} =	1.212
DF _{EXT} =	N/A

PROJECT CECIL COUNTY LOAD RATING

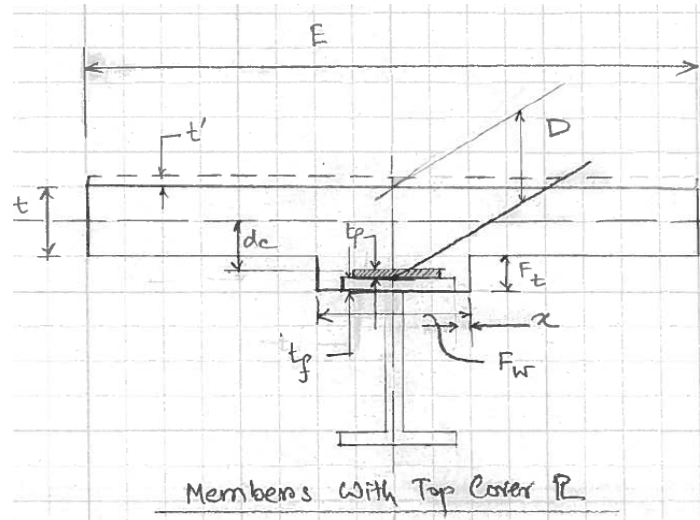
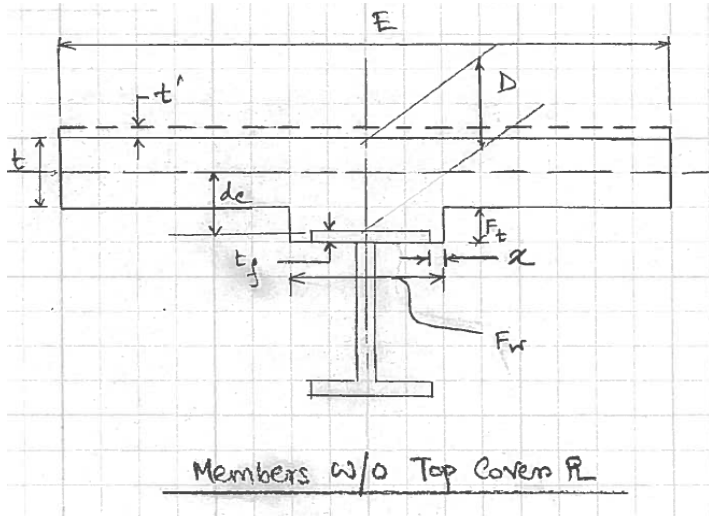
SUBJECT Bridge No. CE079

JOB 54759 TASK 2

BY AB DATE 10/31/2013 REV. DATE

CHK. DATE CHK. DATE

Girder G03



	t_f (in.)	b_f (in.)	D (in.)	t_p (in.)	x (in.)	t (in.)	t' (in.)	F_w (in.)	F_t (in.)	d_c (in.)	E (in.)
section 1	0.67	10.5	8.5	0	0	7.5	0.5	10.500	1.670	4.750	80.00
section 2	0.67	10.5	8.5	0.625	0	7.5	0.5	10.500	1.670	4.125	80.00
section 3											
section 4											
section 5											
section 6											

t_f = Top Flange Thickness, in.

b_f = Top Flange Width, in.

D = Dist. From top of slab (effective) to top of web, in.

t_p = Thickness of top flange plate (if any), in.

x = Extension of concrete fillet on one side of top flange, in.

PROJECT CECIL COUNTY LOAD RATING

SUBJECT Bridge No. CE079

JOB 54759 TASK 2

BY AB DATE 10/31/2013 REV. DATE

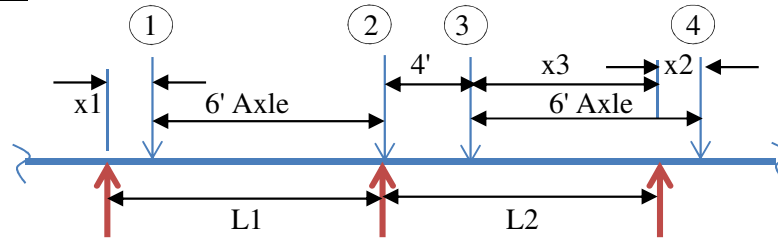
CHK. DATE CHK. DATE

Shear Distribution Factor (DF) Calculation:

[Refer AASHTO 3.23.1]

Interior Girder:

(G03)



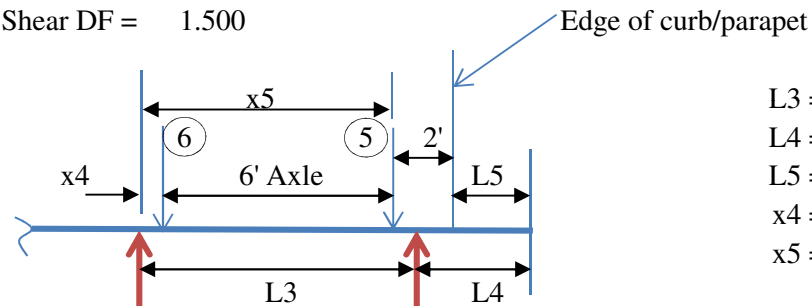
L1 = 6.667 ft.
 L2 = 6.667 ft.
 x1 = 0.667 ft.
 x2 = -3.333 ft.
 x3 = 2.667 ft.

Wheel	1	2	3	4
Fraction	0.100	1.00	0.400	0

Shear DF = 1.500

Exterior Girder:

(G01, G02)



L3 = 6.667 ft.
 L4 = 2.021 ft.
 L5 = 1.688 ft.
 x4 = -1.000 ft.
 x5 = 5.000 ft.

Wheel	5	6
Fraction	0.750	0.00

Shear DF = 0.750

Summary:

$DF_{\text{shear_Int.}}$	=	1.500
$DF_{\text{shear_Ext.}}$	=	0.750

BRIDGE / MEMBER DATA

SUMMARY REPORT

Bridge ID CE0079

Facility Carried BREWSTER BRIDGE ROAD

Feature Intersected BIG ELK CREEK

Material of Construction CSC

Year of Construction 1972

Roadway Width 0.000

Number of Spans 3

Live Load Distribution Factor 1.176

Shear Live Load Dist. Factor 0.750

Comments:

Member ID G01 EXT. BEAM 1

Symmetry:

Span Length:	Span 1	Span 2	Span 3	Span 4	Span 5
	52.170	62.160	52.170	0.000	0.000

Moment

C.P.		Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV. Truck:	H15		
		1.58	H 23.68	23.7
1.400	INV. Truck:	T-3		
		1.47	0.00	48.6
1.400	INV. Truck:	T-4		
		1.45	0.00	50.6
2.000	INV. Truck:	HS20		
		1.18	HS 23.68	42.6
2.000	INV. Truck:	M3S2		
		1.29	0.00	51.5
2.000	OPER. Truck:	H15		
		2.63	H 39.46	39.5
1.400	OPER. Truck:	T-3		
		2.45	0.00	81.0
1.400	OPER. Truck:	T-4		
		2.41	0.00	84.3
2.000	OPER. Truck:	HS20		
		1.97	HS 39.46	71.0
2.000	OPER. Truck:	M3S2		
		2.15	0.00	85.9

			Shear			
C.P.			Rating Factor (-)	Factor (+)	Rating Value	Load Capacity
2.000	INV.	Truck:	H15			
			7.25	309.64	HS108.81	108.80
2.000	INV.	Truck:	T-3			
			4.18	177.40	0.00	137.90
2.000	INV.	Truck:	T-4			
			4.03	171.32	0.00	141.20
2.000	INV.	Truck:	HS20			
			4.12	177.60	HS 82.45	148.40
3.000	INV.	Truck:	M3S2			
			5.48	66.78	0.00	219.40
2.000	OPER.	Truck:	H15			
			12.09	516.07	HS181.35	181.40
2.000	OPER.	Truck:	T-3			
			6.96	295.67	0.00	229.80
2.000	OPER.	Truck:	T-4			
			6.72	285.53	0.00	235.30
2.000	OPER.	Truck:	HS20			
			6.87	295.99	HS137.42	247.40
3.000	OPER.	Truck:	M3S2			
			9.14	111.29	0.00	365.60

Serviceability

C.P.			Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV.	Truck:	H15		
			2.12	HS 31.83	31.8
1.400	INV.	Truck:	T-3		
			1.31	0.00	43.3
1.400	INV.	Truck:	T-4		
			1.29	0.00	45.1
1.400	INV.	Truck:	HS20		
			1.44	HS 28.87	52.0
2.000	INV.	Truck:	M3S2		
			1.73	0.00	69.3
2.000	OPER.	Truck:	H15		
			3.54	HS 53.05	53.0
1.400	OPER.	Truck:	T-3		
			2.19	0.00	72.2
1.400	OPER.	Truck:	T-4		
			2.15	0.00	75.1
1.400	OPER.	Truck:	HS20		
			2.41	HS 48.12	86.6
2.000	OPER.	Truck:	M3S2		
			2.89	0.00	115.4

BRIDGE / MEMBER DATA

SUMMARY REPORT

Bridge ID CE0079
 Facility Carried BREWSTER BRIDGE ROAD
 Feature Intersected BIG ELK CREEK

Material of Construction CSC
 Year of Construction 1972
 Roadway Width 0.000
 Number of Spans 3

Live Load Distribution Factor 1.176

Shear Live Load Dist. Factor 0.750

Comments:

Member ID G02 EXT. BEAM 6

Symmetry:

Span Length:	Span 1	Span 2	Span 3	Span 4	Span 5
	52.170	62.160	52.170	0.000	0.000

Moment

C.P.			Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV.	Truck:	H15		
			1.58	H 23.68	23.7
1.400	INV.	Truck:	T-3		
			1.47	0.00	48.6
1.400	INV.	Truck:	T-4		
			1.45	0.00	50.6
2.000	INV.	Truck:	HS20		
			1.18	HS 23.68	42.6
2.000	INV.	Truck:	M3S2		
			1.29	0.00	51.5
2.000	OPER.	Truck:	H15		
			2.63	H 39.46	39.5
3.600	OPER.	Truck:	T-3		
			2.45	0.00	81.0
1.400	OPER.	Truck:	T-4		
			2.41	0.00	84.3
2.000	OPER.	Truck:	HS20		
			1.97	HS 39.46	71.0
2.000	OPER.	Truck:	M3S2		
			2.15	0.00	85.9

			Shear			
C.P.			Rating Factor (-)	Rating Factor (+)	Rating Value	Load Capacity
1.000	INV.	Truck:	H15			
			45.07	4.57	HS 68.47	68.50
1.000	INV.	Truck:	T-3			
			27.16	2.42	0.00	79.90
1.000	INV.	Truck:	T-4			
			26.11	2.38	0.00	83.20
1.000	INV.	Truck:	HS20			
			26.71	2.51	HS 50.14	90.20
1.000	INV.	Truck:	M3S2			
			37.26	3.49	0.00	139.70
1.000	OPER.	Truck:	H15			
			75.12	7.61	HS114.12	114.10
1.000	OPER.	Truck:	T-3			
			45.27	4.04	0.00	133.20
1.000	OPER.	Truck:	T-4			
			43.52	3.96	0.00	138.70
1.000	OPER.	Truck:	HS20			
			44.52	4.18	HS 83.56	150.40
1.000	OPER.	Truck:	M3S2			
			62.10	5.82	0.00	232.80

Serviceability

C.P.			Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV.	Truck:	H15		
			2.12	HS 31.83	31.8
1.400	INV.	Truck:	T-3		
			1.31	0.00	43.3
1.400	INV.	Truck:	T-4		
			1.29	0.00	45.1
1.400	INV.	Truck:	HS20		
			1.44	HS 28.87	52.0
2.000	INV.	Truck:	M3S2		
			1.73	0.00	69.3
2.000	OPER.	Truck:	H15		
			3.54	HS 53.05	53.1
3.600	OPER.	Truck:	T-3		
			2.19	0.00	72.2
1.400	OPER.	Truck:	T-4		
			2.15	0.00	75.1
1.400	OPER.	Truck:	HS20		
			2.41	HS 48.12	86.6
2.000	OPER.	Truck:	M3S2		
			2.89	0.00	115.4

BRIDGE / MEMBER DATA

SUMMARY REPORT

Bridge ID CE0079
 Facility Carried BREWSTER BRIDGE ROAD
 Feature Intersected BIG ELK CREEK

Material of Construction CSC
 Year of Construction 1972
 Roadway Width 0.000
 Number of Spans 3

Live Load Distribution Factor 1.212

Shear Live Load Dist. Factor 1.500

Comments:

Member ID G03 INT. BEAM

Symmetry:

Span Length:	Span 1	Span 2	Span 3	Span 4	Span 5
	52.170	62.160	52.170	0.000	0.000

Moment

C.P.			Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV.	Truck:	H15		
			1.38	H 20.76	20.8
2.000	INV.	Truck:	T-3		
			1.32	0.00	43.6
2.000	INV.	Truck:	T-4		
			1.27	0.00	44.5
2.000	INV.	Truck:	HS20		
			1.04	HS 20.76	37.4
2.000	INV.	Truck:	M3S2		
			1.13	0.00	45.2
2.000	OPER.	Truck:	H15		
			2.31	H 34.59	34.6
2.000	OPER.	Truck:	T-3		
			2.20	0.00	72.7
2.000	OPER.	Truck:	T-4		
			2.12	0.00	74.1
2.000	OPER.	Truck:	HS20		
			1.73	HS 34.59	62.3
2.000	OPER.	Truck:	M3S2		
			1.88	0.00	75.3

			Shear			
C.P.			Rating Factor (-)	Factor (+)	Rating Value	Load Capacity
2.000	INV.	Truck:	H15			
			3.52	158.03	HS 52.84	52.80
2.000	INV.	Truck:	T-3			
			2.03	90.54	0.00	66.90
2.000	INV.	Truck:	T-4			
			1.96	87.44	0.00	68.50
2.000	INV.	Truck:	HS20			
			2.00	90.64	HS 40.04	72.10
3.000	INV.	Truck:	M3S2			
			2.67	34.09	0.00	106.70
2.000	OPER.	Truck:	H15			
			5.87	263.39	HS 88.06	88.10
2.000	OPER.	Truck:	T-3			
			3.38	150.90	0.00	111.60
2.000	OPER.	Truck:	T-4			
			3.26	145.73	0.00	114.20
2.000	OPER.	Truck:	HS20			
			3.34	151.07	HS 66.73	120.10
3.000	OPER.	Truck:	M3S2			
			4.45	56.82	0.00	177.90

Serviceability

C.P.			Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV.	Truck:	H15		
			1.91	HS 28.66	28.7
1.400	INV.	Truck:	T-3		
			1.23	0.00	40.4
1.400	INV.	Truck:	T-4		
			1.20	0.00	42.1
1.400	INV.	Truck:	HS20		
			1.35	HS 26.97	48.6
2.000	INV.	Truck:	M3S2		
			1.56	0.00	62.4
2.000	OPER.	Truck:	H15		
			3.18	HS 47.77	47.8
1.400	OPER.	Truck:	T-3		
			2.04	0.00	67.4
1.400	OPER.	Truck:	T-4		
			2.01	0.00	70.2
1.400	OPER.	Truck:	HS20		
			2.25	HS 44.96	80.9
2.000	OPER.	Truck:	M3S2		
			2.60	0.00	104.0

BRIDGE / MEMBER DATA

SUMMARY REPORT

Bridge ID CE0079
 Facility Carried BREWSTER BRIDGE ROAD
 Feature Intersected BIG ELK CREEK

Material of Construction CSC
 Year of Construction 1972
 Roadway Width 0.000
 Number of Spans 3

Live Load Distribution Factor 1.176

Shear Live Load Dist. Factor 0.750

Comments:

Member ID G01 EXT. BEAM 1

Symmetry:

Span Length:	Span 1	Span 2	Span 3	Span 4	Span 5
	52.170	62.160	52.170	0.000	0.000

Moment

C.P.		Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV. Truck:	150K		
		0.81	0.00	61.1
2.000	INV. Truck:	90K		
		1.12	0.00	50.2
1.400	INV. Truck:	CR90		
		1.16	0.00	52.1
2.000	INV. Truck:	CG90		
		1.18	0.00	53.0
2.000	INV. Truck:	CG80		
		1.44	0.00	57.7
2.000	INV. Truck:	120K		
		0.86	0.00	51.6
2.000	INV. Truck:	C108		
		0.94	0.00	50.8
2.000	INV. Truck:	C120		
		0.88	0.00	53.0
2.000	OPER. Truck:	150K		
		1.36	0.00	101.8
2.000	OPER. Truck:	90K		
		1.86	0.00	83.7

1.400	OPER.	Truck:	CR90		
			1.93	0.00	86.8
2.000	OPER.	Truck:	CG90		
			1.96	0.00	88.3
2.000	OPER.	Truck:	CG80		
			2.40	0.00	96.2
2.000	OPER.	Truck:	120K		
			1.43	0.00	86.0
2.000	OPER.	Truck:	C108		
			1.57	0.00	84.7
2.000	OPER.	Truck:	C120		
			1.47	0.00	88.3

Shear

C.P.			Rating Factor (-)	Rating Factor (+)	Rating Value	Load Capacity
3.000	INV.	Truck:	150K			
			2.91	33.38	0.00	218.20
3.000	INV.	Truck:	90K			
			4.20	52.88	0.00	188.90
2.000	INV.	Truck:	CR90			
			3.18	131.88	0.00	143.20
3.000	INV.	Truck:	CG90			
			4.37	58.41	0.00	196.60
2.000	INV.	Truck:	CG80			
			4.12	177.56	0.00	164.70
3.000	INV.	Truck:	120K			
			3.50	45.71	0.00	210.00
2.000	INV.	Truck:	C108			
			2.70	110.52	0.00	145.70
2.000	INV.	Truck:	C120			
			2.59	106.11	0.00	155.30
3.000	OPER.	Truck:	150K			
			4.85	55.64	0.00	363.70
3.000	OPER.	Truck:	90K			
			6.99	88.13	0.00	314.80
2.000	OPER.	Truck:	CR90			
			5.30	219.80	0.00	238.60
3.000	OPER.	Truck:	CG90			
			7.28	97.35	0.00	327.70
2.000	OPER.	Truck:	CG80			
			6.86	295.93	0.00	274.50
3.000	OPER.	Truck:	120K			
			5.83	76.19	0.00	350.00
2.000	OPER.	Truck:	C108			
			4.50	184.21	0.00	242.80
2.000	OPER.	Truck:	C120			
			4.31	176.84	0.00	258.80

Serviceability

C.P.			Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV.	Truck:	150K		
			0.92	0.00	68.7
1.400	INV.	Truck:	90K		
			1.44	0.00	64.6
1.400	INV.	Truck:	CR90		
			1.03	0.00	46.4
3.000	INV.	Truck:	CG90		

			1.58	0.00	71.2
1.400	INV.	Truck:	CG80		
			1.52	0.00	60.9
2.000	INV.	Truck:	120K		
			1.16	0.00	69.4
1.400	INV.	Truck:	C108		
			0.88	0.00	47.8
1.400	INV.	Truck:	C120		
			0.89	0.00	53.4
2.000	OPER.	Truck:	150K		
			1.53	0.00	114.5
1.400	OPER.	Truck:	90K		
			2.39	0.00	107.7
1.400	OPER.	Truck:	CR90		
			1.72	0.00	77.4
3.000	OPER.	Truck:	CG90		
			2.64	0.00	118.7
1.400	OPER.	Truck:	CG80		
			2.54	0.00	101.4
2.000	OPER.	Truck:	120K		
			1.93	0.00	115.6
1.400	OPER.	Truck:	C108		
			1.47	0.00	79.6
1.400	OPER.	Truck:	C120		
			1.48	0.00	89.0

BRIDGE / MEMBER DATA

SUMMARY REPORT

Bridge ID CE0079

Facility Carried BREWSTER BRIDGE ROAD

Feature Intersected BIG ELK CREEK

Material of Construction CSC

Year of Construction 1972

Roadway Width 0.000

Number of Spans 3

Live Load Distribution Factor 1.176

Shear Live Load Dist. Factor 0.750

Comments:

Member ID G02 EXT. BEAM 6

Symmetry:

Span Length:	Span 1	Span 2	Span 3	Span 4	Span 5
	52.170	62.160	52.170	0.000	0.000

Moment

C.P.		Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV. Truck:	150K 0.81	0.00	61.1
2.000	INV. Truck:	90K 1.12	0.00	50.2
1.400	INV. Truck:	CR90 1.16	0.00	52.1
2.000	INV. Truck:	CG90 1.18	0.00	53.0
2.000	INV. Truck:	CG80 1.44	0.00	57.7
2.000	INV. Truck:	120K 0.86	0.00	51.6
2.000	INV. Truck:	C108 0.94	0.00	50.8
2.000	INV. Truck:	C120 0.88	0.00	53.0
2.000	OPER. Truck:	150K 1.36	0.00	101.8
2.000	OPER. Truck:	90K 1.86	0.00	83.7

1.400	OPER.	Truck:	CR90		
			1.93	0.00	86.8
2.000	OPER.	Truck:	CG90		
			1.96	0.00	88.3
2.000	OPER.	Truck:	CG80		
			2.40	0.00	96.2
2.000	OPER.	Truck:	120K		
			1.43	0.00	86.0
2.000	OPER.	Truck:	C108		
			1.57	0.00	84.7
2.000	OPER.	Truck:	C120		
			1.47	0.00	88.3

Shear

C.P.			Rating Factor (-)	(+)	Rating Value	Load Capacity
1.000	INV.	Truck:	150K			
			20.10	1.89	0.00	141.60
1.000	INV.	Truck:	90K			
			31.31	2.54	0.00	114.10
1.000	INV.	Truck:	CR90			
			20.19	1.91	0.00	86.20
1.000	INV.	Truck:	CG90			
			31.34	2.77	0.00	124.60
1.000	INV.	Truck:	CG80			
			26.03	2.64	0.00	105.60
1.000	INV.	Truck:	120K			
			24.65	2.26	0.00	135.70
1.000	INV.	Truck:	C108			
			16.96	1.65	0.00	89.10
1.000	INV.	Truck:	C120			
			15.92	1.64	0.00	98.50
1.000	OPER.	Truck:	150K			
			33.50	3.15	0.00	236.10
1.000	OPER.	Truck:	90K			
			52.17	4.23	0.00	190.20
1.000	OPER.	Truck:	CR90			
			33.64	3.19	0.00	143.60
1.000	OPER.	Truck:	CG90			
			52.24	4.61	0.00	207.60
1.000	OPER.	Truck:	CG80			
			43.39	4.40	0.00	176.00
1.000	OPER.	Truck:	120K			
			41.08	3.77	0.00	226.20
1.000	OPER.	Truck:	C108			
			28.26	2.75	0.00	148.60
1.000	OPER.	Truck:	C120			
			26.53	2.74	0.00	164.20

Serviceability

C.P.			Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV.	Truck:	150K		
			0.92	0.00	68.7
1.400	INV.	Truck:	90K		
			1.44	0.00	64.6
1.400	INV.	Truck:	CR90		
			1.03	0.00	46.4
3.000	INV.	Truck:	CG90		

			1.58	0.00	71.2
1.400	INV.	Truck:	CG80		
			1.52	0.00	60.9
2.000	INV.	Truck:	120K		
			1.16	0.00	69.4
1.400	INV.	Truck:	C108		
			0.88	0.00	47.8
1.400	INV.	Truck:	C120		
			0.89	0.00	53.4
2.000	OPER.	Truck:	150K		
			1.53	0.00	114.5
1.400	OPER.	Truck:	90K		
			2.39	0.00	107.7
1.400	OPER.	Truck:	CR90		
			1.72	0.00	77.4
3.000	OPER.	Truck:	CG90		
			2.64	0.00	118.7
1.400	OPER.	Truck:	CG80		
			2.54	0.00	101.4
3.000	OPER.	Truck:	120K		
			1.93	0.00	115.6
1.400	OPER.	Truck:	C108		
			1.48	0.00	79.6
1.400	OPER.	Truck:	C120		
			1.48	0.00	89.0

BRIDGE / MEMBER DATA

SUMMARY REPORT

Bridge ID CE0079

Facility Carried BREWSTER BRIDGE ROAD

Feature Intersected BIG ELK CREEK

Material of Construction CSC

Year of Construction 1972

Roadway Width 0.000

Number of Spans 3

Live Load Distribution Factor 1.212

Shear Live Load Dist. Factor 1.500

Comments:

Member ID G03 INT. BEAM

Symmetry:

Span Length:	Span 1	Span 2	Span 3	Span 4	Span 5
	52.170	62.160	52.170	0.000	0.000

Moment

C.P.		Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV. Truck:	150K 0.60	0.00	44.8
2.000	INV. Truck:	90K 0.98	0.00	44.0
1.400	INV. Truck:	CR90 1.16	0.00	52.3
2.000	INV. Truck:	CG90 1.03	0.00	46.4
2.000	INV. Truck:	CG80 1.26	0.00	50.6
2.000	INV. Truck:	120K 0.75	0.00	45.2
1.400	INV. Truck:	C108 1.00	0.00	53.9
2.000	INV. Truck:	C120 0.94	0.00	56.5
3.000	OPER. Truck:	150K 1.00	0.00	74.7
2.000	OPER. Truck:	90K 1.63	0.00	73.3

1.400	OPER.	Truck:	CR90		
			1.94	0.00	87.2
2.000	OPER.	Truck:	CG90		
			1.72	0.00	77.4
2.000	OPER.	Truck:	CG80		
			2.11	0.00	84.3
2.000	OPER.	Truck:	120K		
			1.26	0.00	75.4
1.400	OPER.	Truck:	C108		
			1.66	0.00	89.8
2.000	OPER.	Truck:	C120		
			1.57	0.00	94.1

Shear

C.P.			Rating Factor (-)	(+)	Rating Value	Load Capacity
3.000	INV.	Truck:	150K			
			1.42	17.04	0.00	106.20
3.000	INV.	Truck:	90K			
			2.04	27.00	0.00	91.90
2.000	INV.	Truck:	CR90			
			1.54	67.31	0.00	69.50
3.000	INV.	Truck:	CG90			
			2.13	29.82	0.00	95.70
2.000	INV.	Truck:	CG80			
			2.00	90.62	0.00	80.00
3.000	INV.	Truck:	120K			
			1.70	23.34	0.00	102.20
2.000	INV.	Truck:	C108			
			1.31	56.41	0.00	70.70
2.000	INV.	Truck:	C120			
			1.26	54.15	0.00	75.40
3.000	OPER.	Truck:	150K			
			2.36	28.41	0.00	176.90
3.000	OPER.	Truck:	90K			
			3.40	44.99	0.00	153.10
2.000	OPER.	Truck:	CR90			
			2.58	112.18	0.00	115.90
3.000	OPER.	Truck:	CG90			
			3.54	49.71	0.00	159.40
2.000	OPER.	Truck:	CG80			
			3.33	151.04	0.00	133.30
3.000	OPER.	Truck:	120K			
			2.84	38.90	0.00	170.30
2.000	OPER.	Truck:	C108			
			2.18	94.01	0.00	117.90
2.000	OPER.	Truck:	C120			
			2.10	90.26	0.00	125.70

Serviceability

C.P.			Rating Factor	Rating Value	Load Capacity (tons)
2.000	INV.	Truck:	150K		
			0.82	0.00	61.9
1.400	INV.	Truck:	90K		
			1.34	0.00	60.4
1.400	INV.	Truck:	CR90		
			0.96	0.00	43.4
2.000	INV.	Truck:	CG90		

			1.42	0.00	64.1
1.400	INV.	Truck:	CG80		
			1.42	0.00	56.9
2.000	INV.	Truck:	120K		
			1.04	0.00	62.5
1.400	INV.	Truck:	C108		
			0.83	0.00	44.6
1.400	INV.	Truck:	C120		
			0.83	0.00	49.9
2.000	OPER.	Truck:	150K		
			1.38	0.00	103.1
1.400	OPER.	Truck:	90K		
			2.23	0.00	100.6
1.400	OPER.	Truck:	CR90		
			1.61	0.00	72.3
2.000	OPER.	Truck:	CG90		
			2.38	0.00	106.9
1.400	OPER.	Truck:	CG80		
			2.37	0.00	94.8
2.000	OPER.	Truck:	120K		
			1.74	0.00	104.1
1.400	OPER.	Truck:	C108		
			1.38	0.00	74.4
1.400	OPER.	Truck:	C120		
			1.38	0.00	83.1