NEW HAMPSHIRE HISTORIC PROPERTY DOCUMENTATION

OSSIPEE BRIDGES 137/297 & 137/299

NH ROUTE 16 OVER BEARCAMP RIVER

NH State No. 744

LOCATION: NH Route 16 & 25 over Bearcamp River, 2.5 miles south of Ossipee-Tamworth town line, Ossipee, Carroll County, New Hampshire.
USGS Ossipee Lake, NH Quadrangle, 1998.
UTM Coordinates: 19.324524.4851668
State Plane Coordinates (NAD 83 feet): x 1,112,416.93, y 473,235.54

DATE BUILT: 1955

BUILDER: New Hampshire Highway Department (NHHD)

ENGINEER: Harold E. Langley, Bridge Engineer, Robert J. Prowse, Assistant Bridge Engineer, NHHD

CONTRACTOR: Peter Salvucci & Sons, Inc., Waltham, MA

OWNER / USE: NHDOT / State highway bridges

SIGNIFICANCE: Ossipee Bridges 137/297 and 137/299, also known as Bearcamp River Bridge and Bearcamp River Relief Bridge, are examples of a continuous I-beam stringer deck highway bridge of an uncommon design that combined simple and continuous beam design. They were designed by Harold E. Langley, Bridge Engineer, and Robert J. Prowse, Assistant Bridge Engineer, noted engineers in the history of the NHHD and may have been the first of their type designed by the department. The bridges retain features representative of mid-20th c. bridges of the type, specifically the H-pile bents of double batter-pile design, the combined open-grid shoulder/steel curb/open-grid sidewalk assembly, and the original steel angle railings. Although these features were once common they may have seen limited use in New Hampshire; the number of intact examples remaining is unknown. The bridges therefore possess distinctive engineering characteristics, represent significant work of two engineers important to New Hampshire bridge engineering history, and may have played an important role in the development of a specialized bridge type in New Hampshire. The bridges retain integrity of location, setting, association, feeling, design, materials and workmanship. They were determined eligible for listing in the National Register under Criteria C. For further information see: Individual Inventory Forms OSS0030 & OSS0031 and associated Determination of Eligibility form (dated 2/26/2013) on file at New Hampshire Division of Historical Resources, Concord.

PROJECT INFORMATION: Ossipee Bridges 137/297 and 137/299 were documented in accordance with the standards of the New Hampshire Division of Historical Resources (NHDHR) and the Historic American Engineering Record in May 2017 by Historic Documentation Company Inc. (HDC), Portsmouth, RI, for the NHDOT Bureau of Environment. The documentation fulfills the Section 106 Memorandum of Agreement between Federal Highway Administration, NH Department of Transportation and the NH State Historic Preservation Office, dated January 18, 2017. The report was written and compiled by Richard M. Casella, Engineering Historian, Historic Documentation Company. Rob Tucher Photographic Documentation, High Bridge, NJ, conducted the large-format black and white film photography.

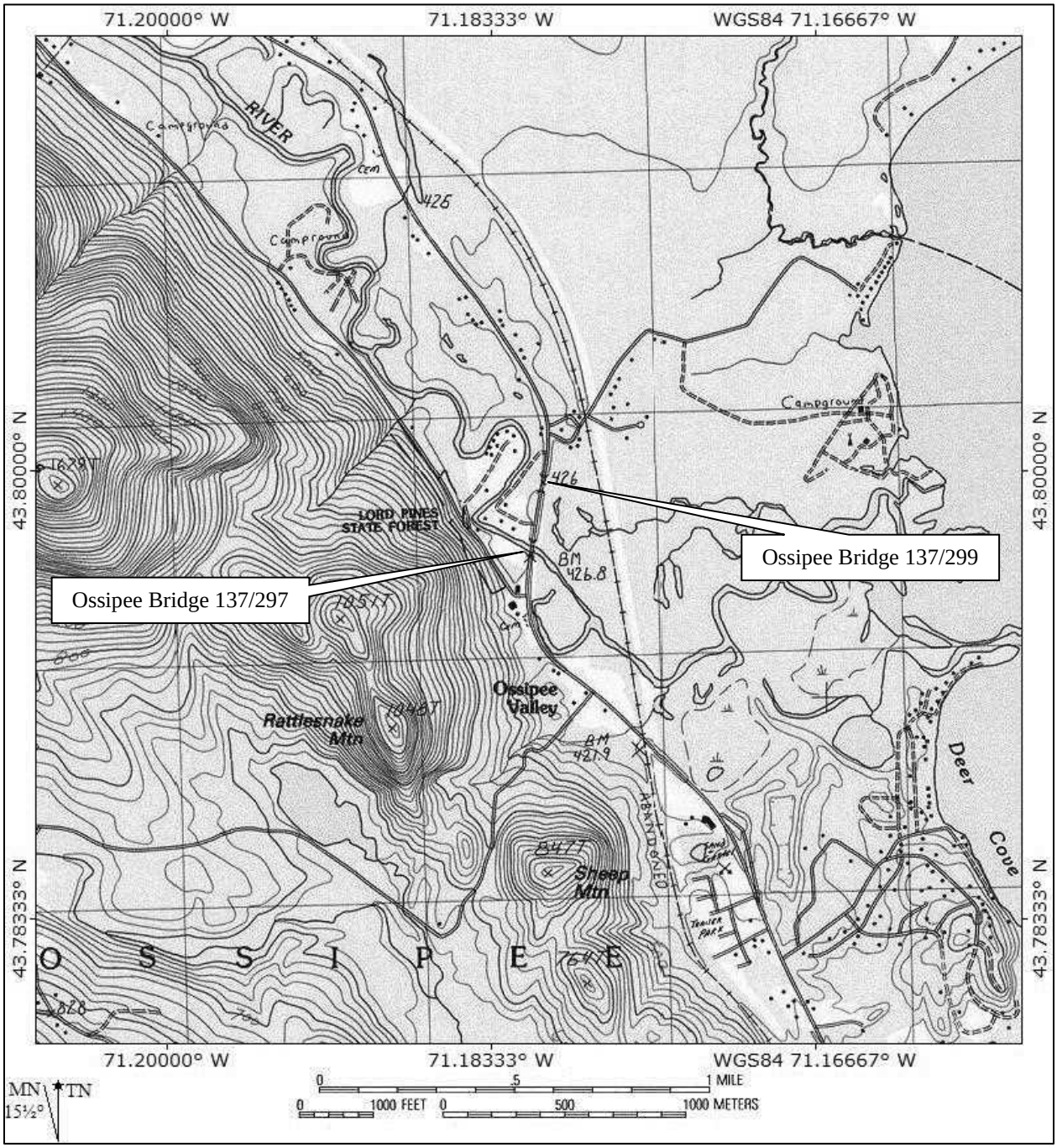


FIGURE 1: Location Map. (USGS Quad: Ossipee Lake, NH 1998).

FIGURE 2: Location Map Detail (Microsoft Bing aerial mapping, 2016).

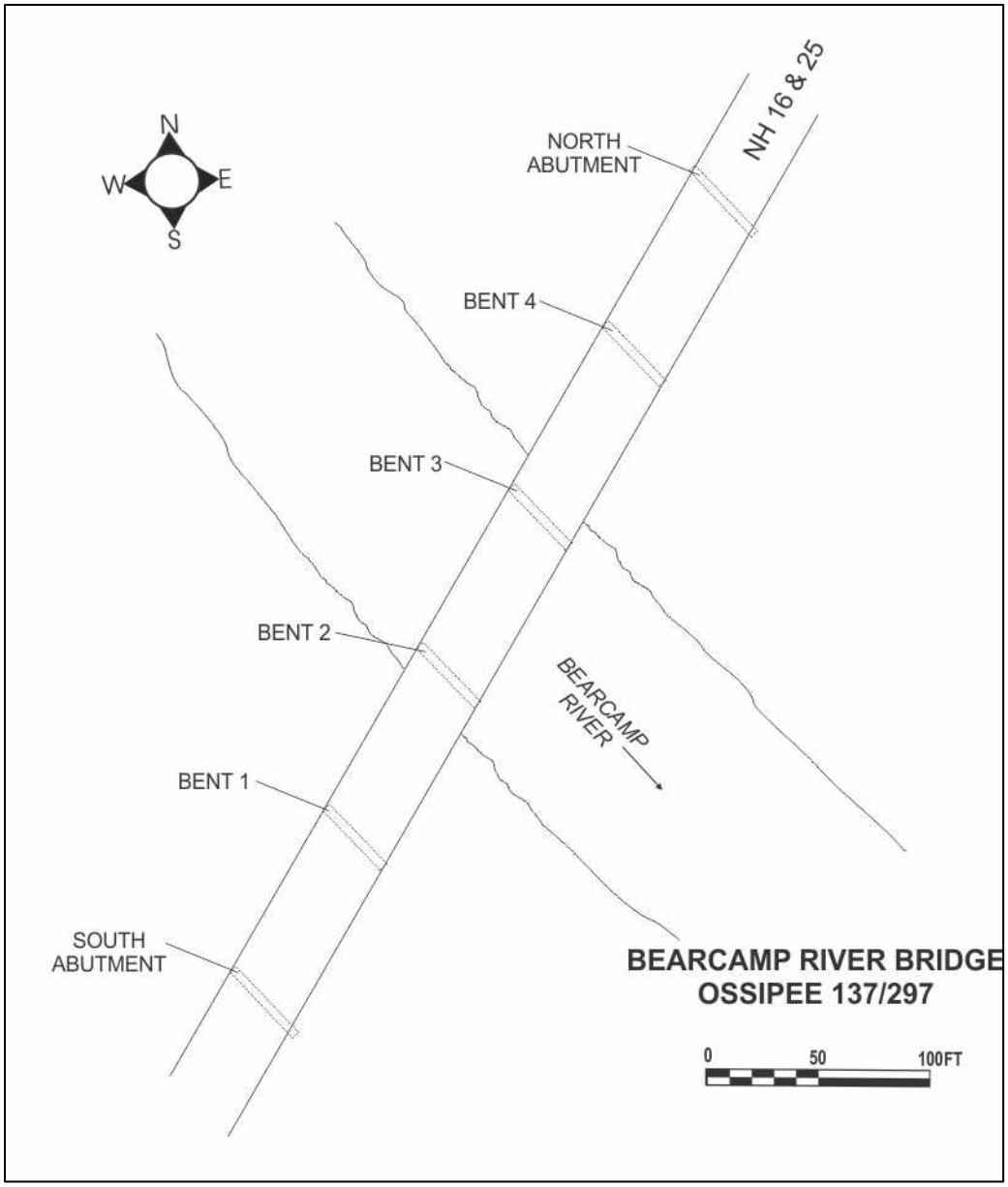


FIGURE 3: Bearcamp River Bridge, Site Sketch

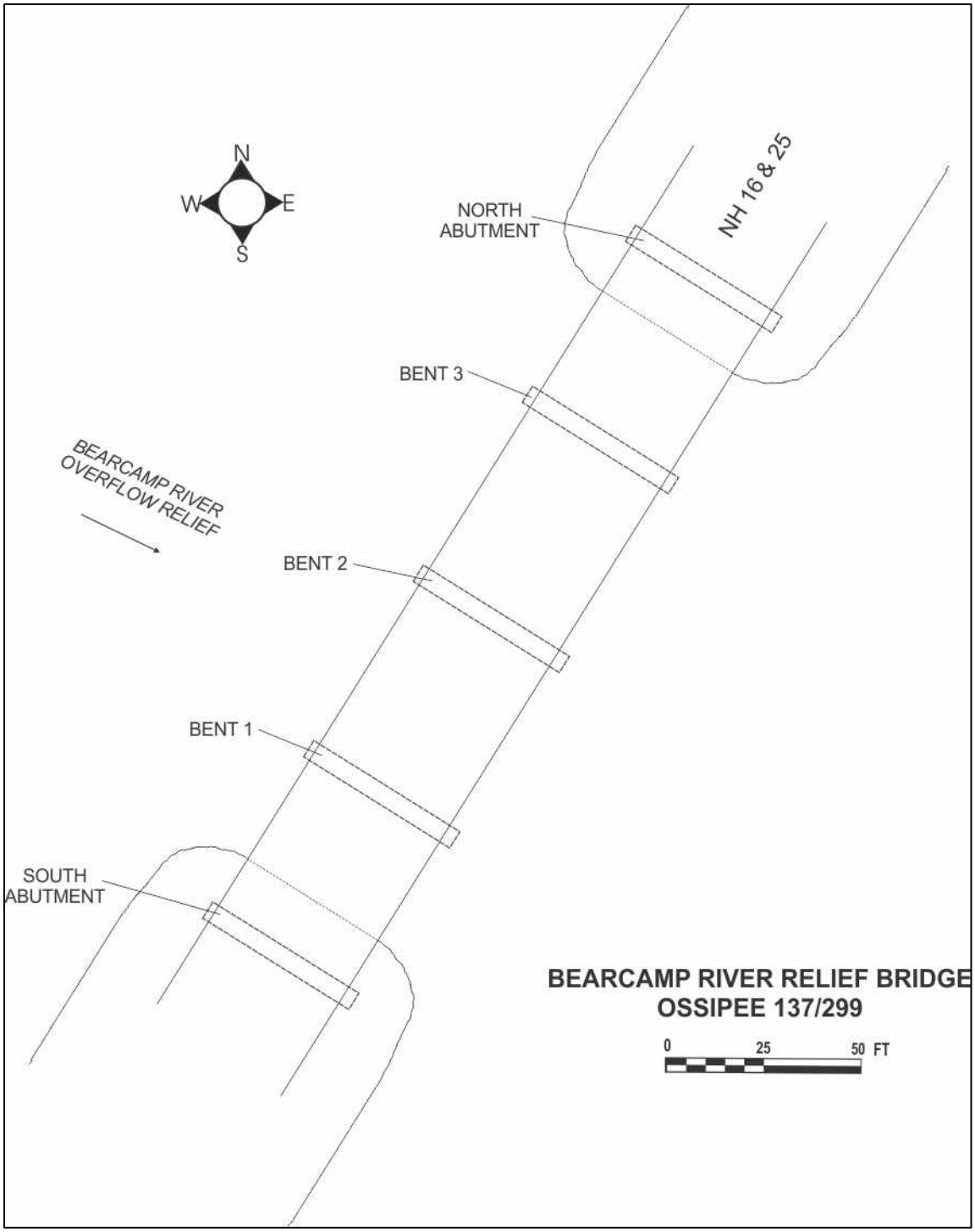


FIGURE 4: Bearcamp River Relief Bridge, Site Sketch

INDEX TO PHOTOGRAPHS

OSSIPEE BRIDGES 137/297 & 137/299
NH ROUTE 16 OVER BEARCAMP RIVER
Ossipee, Carroll County, New Hampshire.
New Hampshire State No. 744
Photographer: Rob Tucher
May 2017

NH-744-1 Bearcamp River Bridge, south approach and view of deck showing slightly arched profile of superstructure most apparent in railing. Looking north.

NH-744-2 Bearcamp River Bridge, oblique view of west (upstream) side of bridge. Looking northeast.

NH-744-3 Bearcamp River Bridge, oblique view of east (downstream) side of bridge. Looking southwest.

NH-744-4 Bearcamp River Bridge, oblique view of east (downstream) side of bridge in context with river channel. Looking southwest.

NH-744-5 Bearcamp River Bridge, north approach, view of deck showing steel grate curb drains and sidewalk. Looking southwest.

NH-744-6 Bearcamp River Bridge, bent 4, elevation, showing battered H-piles, concrete cap girder, rolled I-beam stringers with diaphragm bracing. Looking southwest.

NH-744-7 Bearcamp River Bridge, bent 3, elevation, showing battered H-piles, concrete cap girder, rolled I-beam stringers with diaphragm bracing. Looking southwest.

NH-744-8 Bearcamp River Bridge, north abutment elevation, showing rolled I-beam stringers with diaphragm bracing. Looking northeast.

NH-744-9 Bearcamp River Bridge, bent 4, east side, showing battered H-piles, concrete cap girder equipped with flood-escape ladder rungs and the steel-grate sidewalk and curb assembly above. Looking northeast.

NH-744-10 Bearcamp River Bridge, north abutment, east side, showing abutment back wall, bearing, sidewalk assembly and railing. Looking northwest.

NH-744-11: Bearcamp River Bridge, bent 4, east side, showing detail of welded splice joint joining stringers over bent bearings, made to exact specifications to allow the stringers to function structurally as both simple and continuous beams. Looking northwest.

NH-744-12: Bearcamp River Relief Bridge, north approach with Bearcamp River Bridge visible in distance. Looking southwest.

NH-744-13: Bearcamp River Relief Bridge, oblique view of west (upstream) side of bridge. Looking northeast.

NH-744-14: Bearcamp River Relief Bridge, oblique view of east (downstream) side of bridge. Looking southwest.

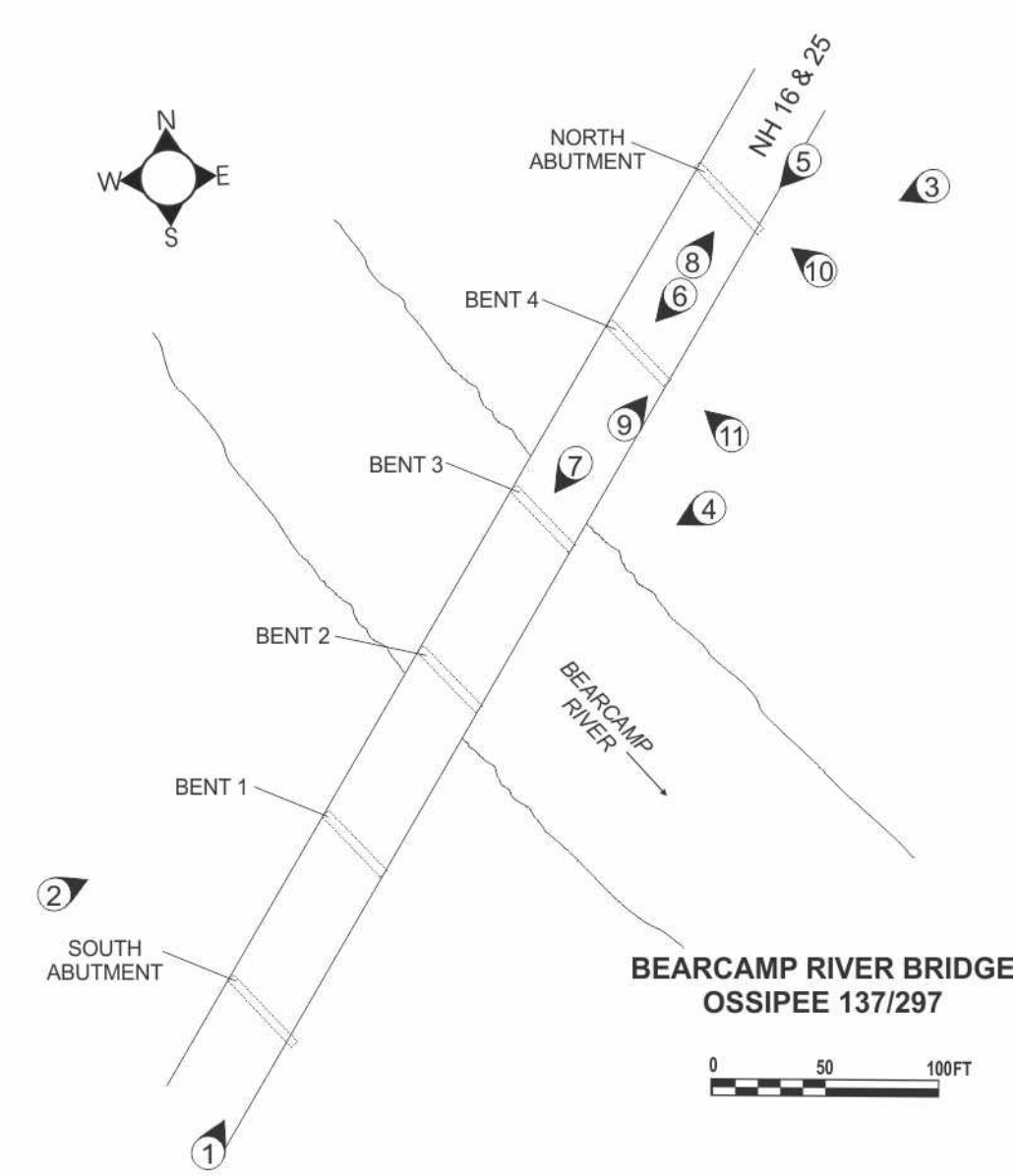
NH-744-15: Bearcamp River Relief Bridge, west (upstream) elevation showing bents 2 and 3. Looking southeast.

NH-744-16: Bearcamp River Relief Bridge, deck view, showing railing, open grate drains and expansion joint visible at right of asphalt patch. Looking south.

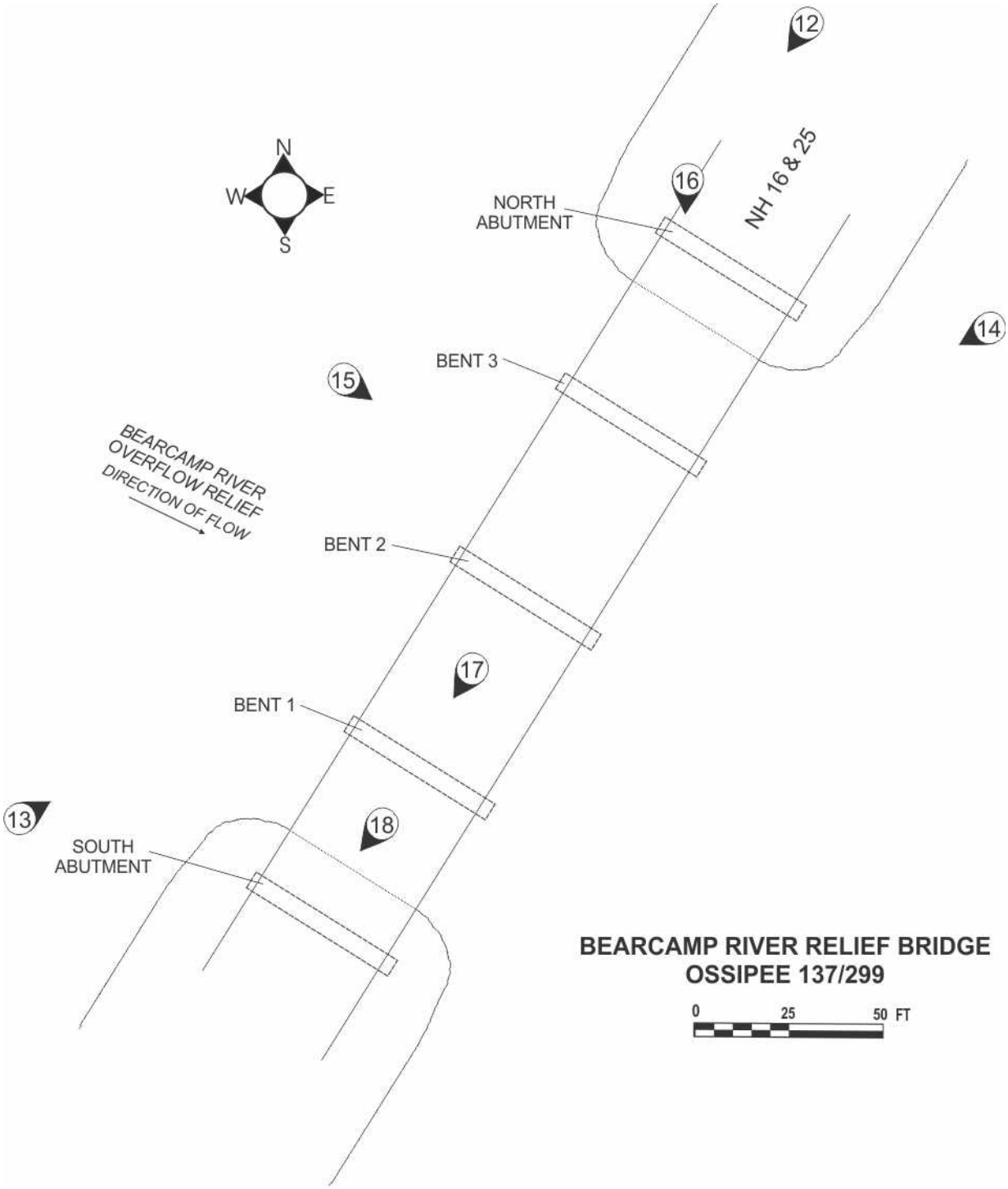
NH-744-17: Bearcamp River Relief Bridge, bent 1, and underside of deck showing stringers and diaphragms. Looking southwest.

NH-744-18: Bearcamp River Relief Bridge, south abutment elevation, showing rolled I-beam stringers with diaphragm bracing. Looking southwest.

OSSIPEE BRIDGES 137/297 & 137/299
NH ROUTE 16 OVER BEARCAMP RIVER
NH STATE No. 744
KEY TO PHOTOGRAPHS 1-11
BEARCAMP RIVER BRIDGE



OSSIPEE BRIDGES 137/297 & 137/299
NH ROUTE 16 OVER BEARCAMP RIVER
NH STATE No. 744
KEY TO PHOTOGRAPHS 12-18
OVERFLOW RELIEF BRIDGE



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INDEX TO ORIGINAL DRAWINGS

OSSIPEE BRIDGES 137/297 & 137/299
NH ROUTE 16 OVER BEARCAMP RIVER
Ossipee, Carroll County, New Hampshire.
New Hampshire State No. 744

Bearcamp River Bridge, Drawing 1-12

NH-744_DRAWING-01	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. General Plan, Sheet 1 of 12, June 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_ DRAWING-02	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Borings, Sheet 2 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_DRAWING-03	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Layout of Steel Bearing Piles, Sheet 3 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_ DRAWING-04	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Abutment Details, Sheet 4 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_ DRAWING-05	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Reinforcing Steel - Abutments, Sheet 5 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_ DRAWING-06	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Typical Bent Details, Sheet 6 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.

NH-744_ DRAWING-07	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Bent Cap Reinforcing, Sheet 7 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_ DRAWING-08	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Bridge Shoe Details, Sheet 8 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_ DRAWING-09	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Framing Plan, Sheet 9 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_ DRAWING-10	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Typical Transverse Section & Details, Sheet 10 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_ DRAWING-11	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Expansion Details, Sheet 11 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.
NH-744_ DRAWING-12	Ossipee-Tamworth Bridge No. 137/297, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Bearcamp River. Slab Reinforcement, Sheet 12 of 12, July 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-2.

Bearcamp River Relief Bridge, Drawing 13-24

NH-744_ DRAWING-13 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. General Plan, Sheet 1 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-14 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Borings, Sheet 2 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-15 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Layout of Steel Bearing Piles, Sheet 3 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-16 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Abutment Details, Sheet 4 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-17 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Abutment Reinforcing Details - Abutments, Sheet 5 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-18 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Typical Bent Details, Sheet 6 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-19 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Bent Cap Reinforcement, Sheet 7 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

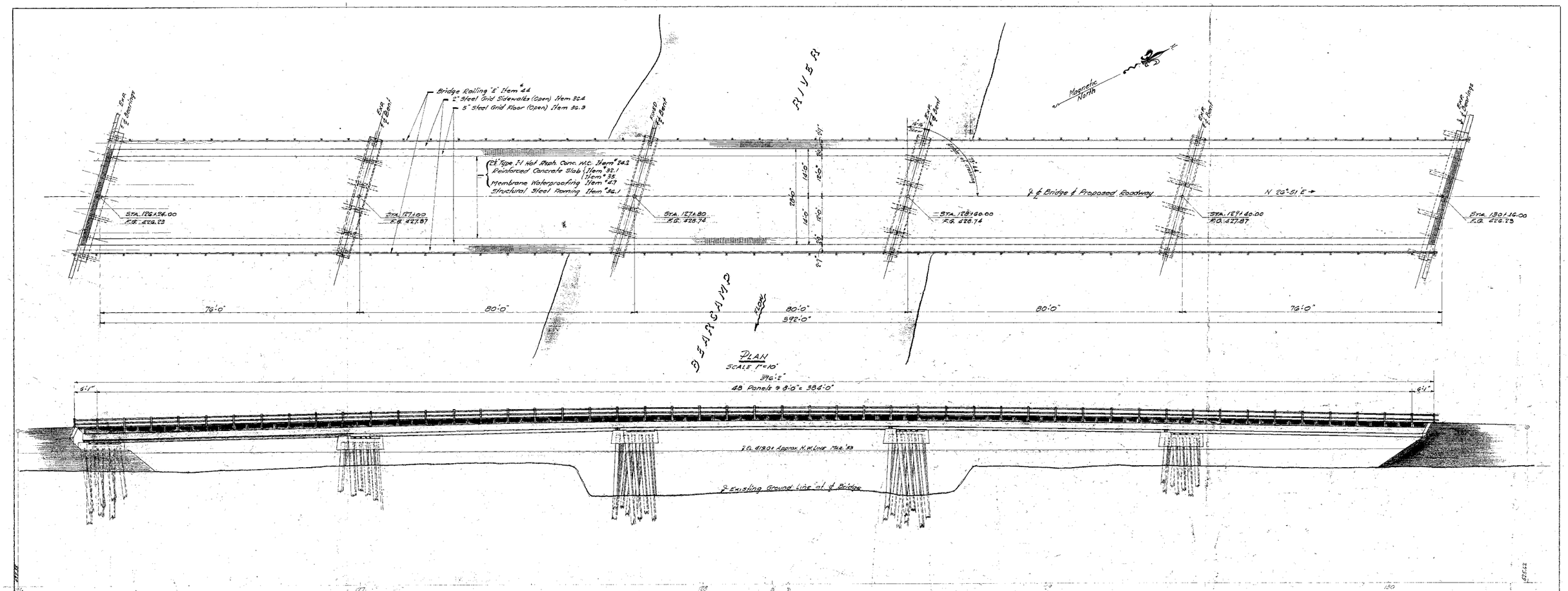
NH-744_ DRAWING-20 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Bridge Shoe Details, Sheet 8 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-21 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Framing Plan, Sheet 9 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-22 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Typical Transverse Section & Details, Sheet 10 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-23 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Expansion Details, Sheet 11 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.

NH-744_ DRAWING-24 Ossipee-Tamworth Bridge No. 137/299, Federal Project No. ER-12, State Project No. P-2738, N.H. Route 16 over Relief Structure. Slab Reinforcement, Sheet 12 of 12, August 1954. Original drawing on file at NH Department of Transportation, Concord. Plan File 3-4-3-5.



DOWNSTREAM ELEVATION

ESTIMATE OF BRIDGE QUANTITIES			
ITEM NO.	DESCRIPTION	QUANTITY	
32.2	Type I-1 Hot Asph. Conc. Wear Course	147	Ton
32.1	Concrete Class A	328	C.Y.
35	Reinforcing Steel	59,000	Lb.
36.1	Structural Steel	600,000	Lb.
36.2	Bridge Shoes	8 ±	Unit
36.3	Steel Grid Floor (open)	1568	Sq. Ft.
36.4	Steel Grid Sidewalk (open)	1578	Sq. Ft.
43.3	Steel Bearing Piles	257,000	Lb.
43.4	Pile Loading Tests	2	Each
43.5	Pile Driving Equipment	8 ±	Each
44	Bridge Railing 'E'	797	L.F.
47	Membrane Waterproofing	1048	S.Y.
* 31 A	Removing Superstructure	1	Unit

* All Structural Steel and all items pertaining to the superstructure, fit for reuse shall be carefully dismantled, cleaned and salvaged to the State. Attention is called to Section 21-3 of Art. 31 of the Std. Specifications - Dept. Pub. Wks. & Highways - 1954 - Bridge Department is to be notified when dismantling and storage is complete.

GENERAL NOTES:-

Design Loading: H 20-S16-44.
Specifications: A.A.S.H.O. 1953 and NHHD 1954.
All concrete shall be Class A.
For Surface Finish of Concrete, see Special Provisions.
Order of placing concrete in superstructure shall meet the approval of the Bridge Engineer.
Main reinforcing steel shall be 2" Clear from surface of concrete unless otherwise noted.
The steel bearing piles are to have a special primer, Koppers Bitumastic Mill Undercoat or equivalent, and two coats of Koppers Bitumastic No. 50 or equivalent as called for on the plans and in the Special Provisions. Materials and application of above primer and protective coatings will not be paid for directly but will be subsidiary to Item 43.3 - Steel Bearing Piles.

Cont
For further information see sheets titled "Addenda to Specifications" attached to Proposal.

REVISIONS			

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

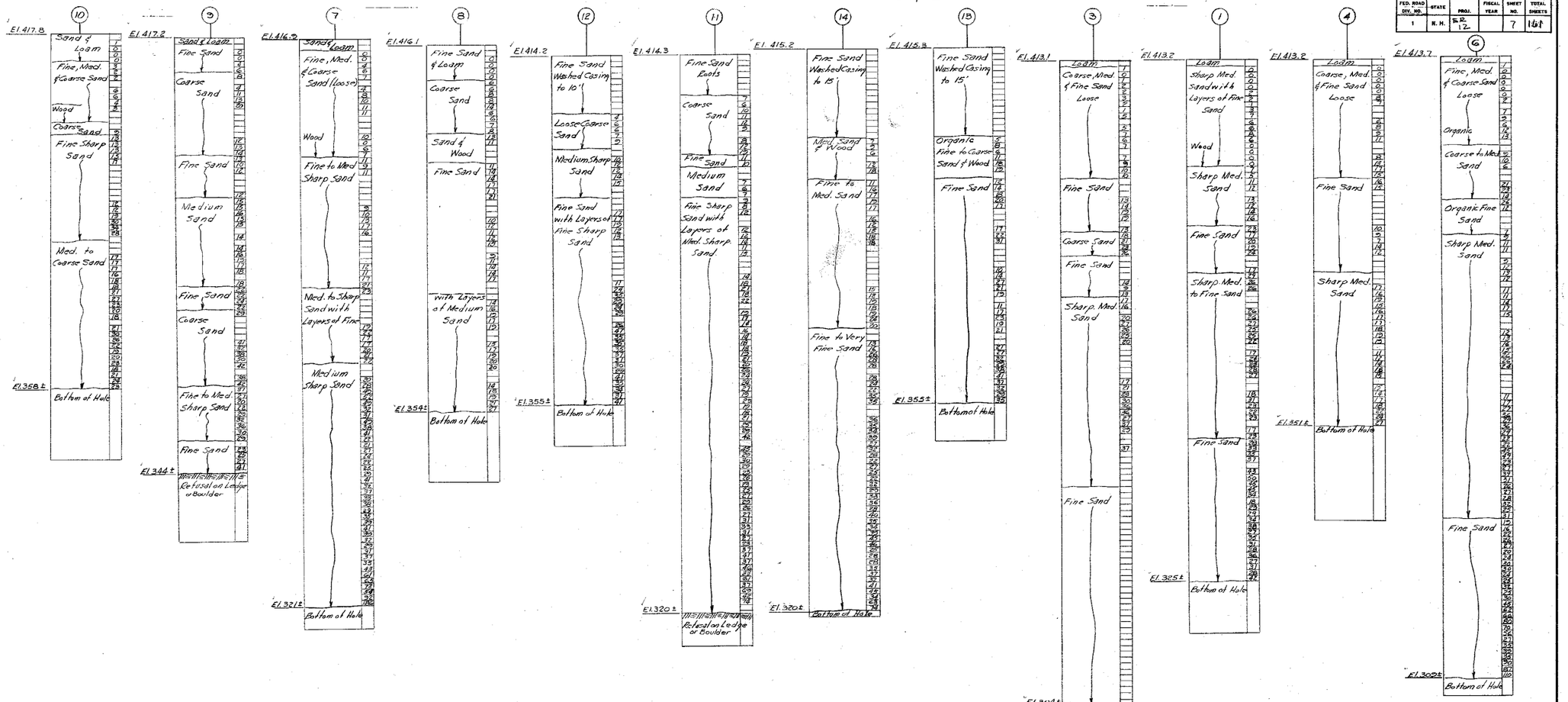
TOWN: OSSIPEE - TAMWORTH — BRIDGE NO. 137/297
FEDERAL PROJECT: BRZ-I — STATE PROJECT: 12730
ROUTE NO.: NH 16 — OVER: BEARCAMP RIVER
LOCATION: APPROX. 2.0 MI. SO. OSSIPEE - TAMWORTH T.L.

GENERAL PLAN

	BY	DATE		BY	DATE	BRIDGE SHEET NO.
DESIGNED	H.E.L.	10/54	CHECKED	E.V.	6/56	1 OF 12
DRAWN	H.E.B.	10/54	CHECKED			
TRACED	J.C.N.	-	CHECKED		6/56	FILE NUMBER
QUANTITIES	F.V.	Nov. 54	CHECKED	J.T.H.	6/56	3-A-3-0

NH-744_DRAWING-01

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER 12		7	159



NOTE:

Borings indicated thus ❶ made by N.H.D.P.W. & Hwys in June 1954. Figures in right hand column indicate the number of blows required to drive 1⅜" pipe one foot using 135# weight falling two feet. Borings are for design and show conditions at boring points only and do not necessarily indicate material to be encountered during construction. Samples taken during the boring operation may be examined at the office of the Bridge Engr., Concord, N.H.

△	DESCRIPTION	BY	DATE
	REVISIONS		

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/297
FEDERAL PROJECT ERIE STATE PROJECT B2738
ROUTE NO. N.H. #16 OVER BEARCAMP RIVER
LOCATION APPROX. 2.0 MI. SO. OSSIPEE-TAMWORTH T.L.

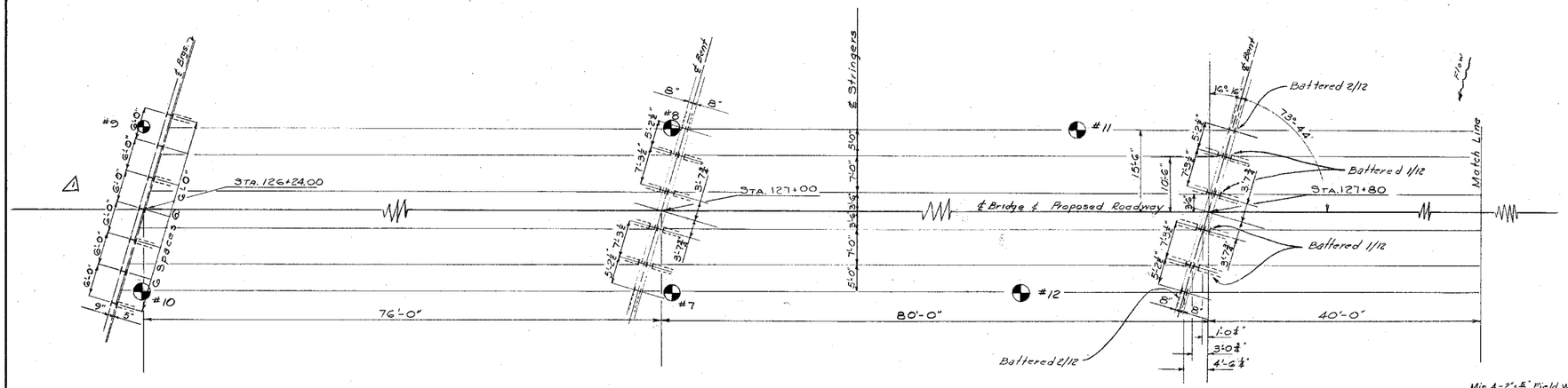
BORINGS

	BY	DATE		BY	DATE
DESIGNED	–	–	CHECKED	–	–
DRAWN	E.V.	7-54	CHECKED	J.T.H	8-54
TRACED	–	–	CHECKED	–	–
QUANTITIES	–	–	CHECKED	–	–

BRIDGE SHEET NO. 2 OF 12
FILE NUMBER 3-4-3-2

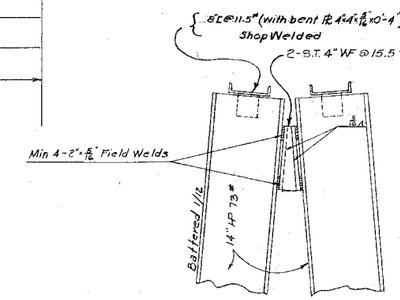
PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	7	159

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER-12		8	180

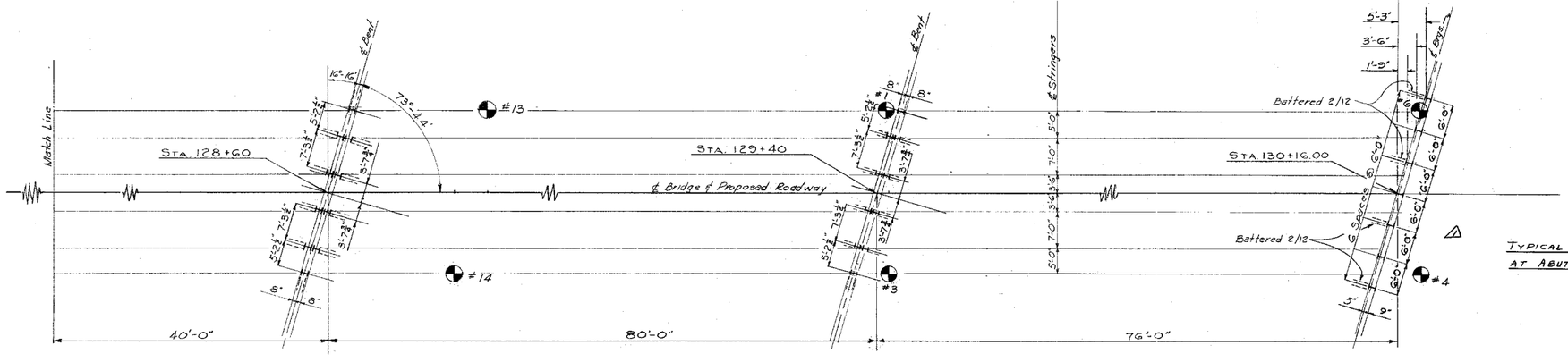


NOTE:-
Two Pile Loading Tests will be required.
Design Load per pile is 28 tons.
All piles to be 14"H@73#
Length of piles for estimating purposes is 65'0". Actual lengths to be determined from tests prior to delivery.
Hammer to be used shall be McKiernan-Terry #10-B3 or equivalent.

TYPICAL LAYOUT AT BENT



PILE TIES AT BENT
Scale 1"=1'-0"



TYPICAL LAYOUT AT ABUTMENT

PILE LAYOUT & LOCATION OF BORINGS
Scale: 1"=10'-0"

8
2.03

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN Ossipee-Tamworth BRIDGE NO. 137/297
FEDERAL PROJECT ER-12 STATE PROJECT 12738
ROUTE NO. N.H. #16 OVER Bearcamp River
LOCATION Approx. 2.0 Mi. So. Ossipee-Tamworth T.L.

'LAYOUT' OF STEEL BEARING PILES

	BY	DATE
DESIGNED	–	–
DRAWN F.Y.		7/84
TRACED	–	–
QUANTITIES F.C.S.		7/84
CHECKED	–	–
CHECKED J.H.		8-84
CHECKED	–	–
CHECKED F.Y.		8-84

BRIDGE SHEET NO. 3 OF 12
FILE NUMBER 3-4-3-2

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	8	180

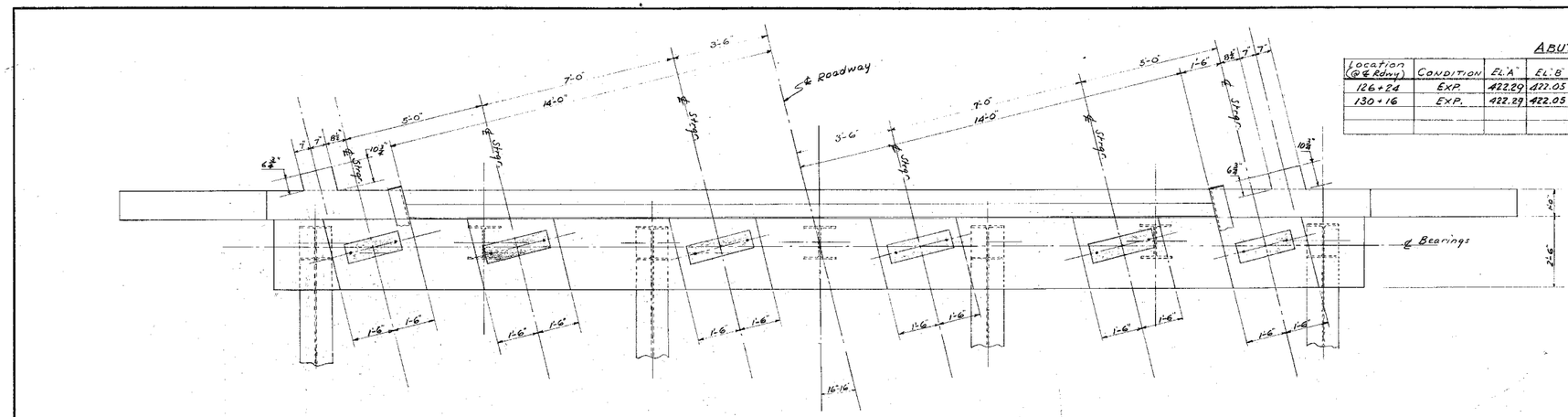
	DESCRIPTION	BY	DATE
2			
1			
△	Chgd Abut. Pile spacing	V.S.B	9/85

REVISIONS

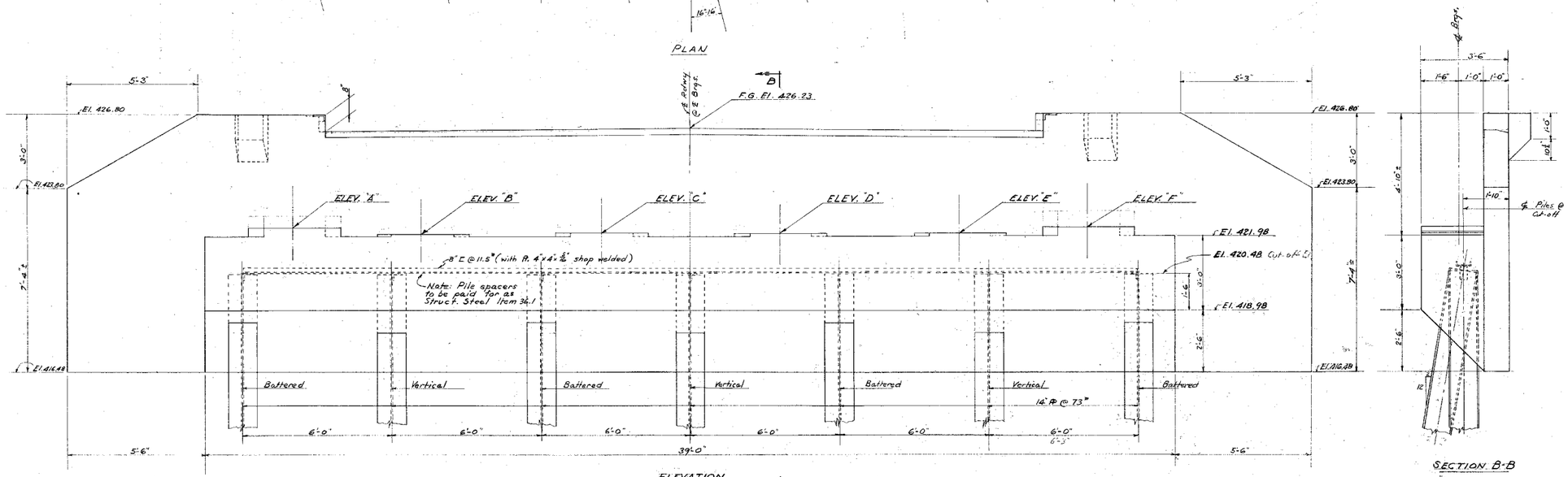
FED. ROAD DIV. NO.	STATE	F.A.P. PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	12		9	161

ABUTMENTS

Location (@ ℄ Rdwy)	Condition	El. A	El. B	El. C	El. D	El. E	El. F			
126+24	EXP.	422.29	422.05	422.15	422.20	422.22	422.53			
130+16	EXP.	422.29	422.05	422.15	422.20	422.22	422.53			



PLAN



ELEVATION

SECTION B-B

Note:-
Details and elevations of both abutments are the same as pictured above.

SHEET SCALE ½"=1'-0"

△	DESCRIPTION	BY	DATE

REVISIONS

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/297
FEDERAL PROJECT ER 12 STATE PROJECT P-7138
ROUTE NO. N.H. #16 OVER BEARCAMP RIVER
LOCATION Approx. 2.0 Mi. So. Ossipee-Tamworth T.L.

ABUTMENT DETAILS

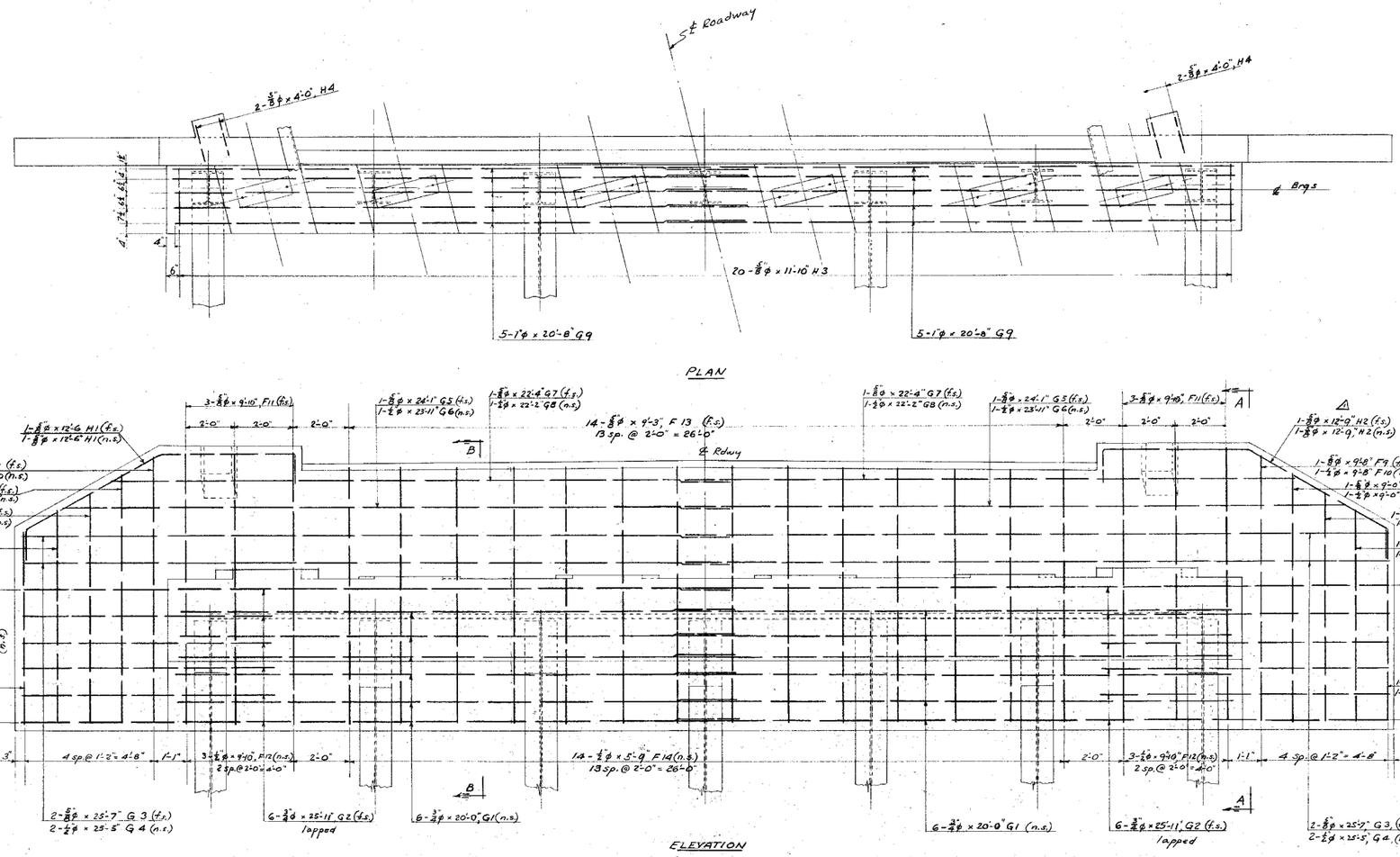
	BY	DATE
DESIGNED	H.F.L.	7/54
DRAWN	J.S.B.	7/54
TRACED	—	—
QUANTITIES	F.C.S.	7/54
CHECKED		—
CHECKED	J.T.H.	8-54
CHECKED	—	—
CHECKED	J.T.H.	8-54

BRIDGE SHEET NO. 4 OF 12
FILE NUMBER 3-4-3-2

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	9	159

9/203

FED. ROAD DIV. NO.	STATE	ER PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	12		10	169



SHEET SCALE ½"=1'-0"

△	Changed bar H2 length	J.T.B	3/55
△	DESCRIPTION	BY	DATE

REVISIONS

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STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE - TAMWORTH BRIDGE NO. 137/297
FEDERAL PROJECT ER 12 STATE PROJECT 02738
ROUTE NO. N.H. #16 OVER BEARCAMP RIVER
LOCATION APPROX. 2.0 MI. SO. OSSIPEE - TAMWORTH T.L.

REINFORCING STEEL - ABUTMENTS

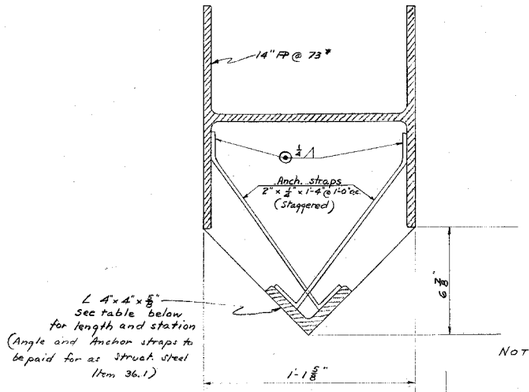
	BY	DATE		BY	DATE
DESIGNED	U.S.B	7/54	CHECKED		
DRAWN	U.S.B	7/54	CHECKED	J.T.H.	8-54
TRACED	—	—	CHECKED	—	—
QUANTITIES	U.S.B	7/54	CHECKED	J.T.H	8-54

BRIDGE SHEET NO. 5 OF 12
FILE NUMBER 3-4-3-2

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER12	10	169

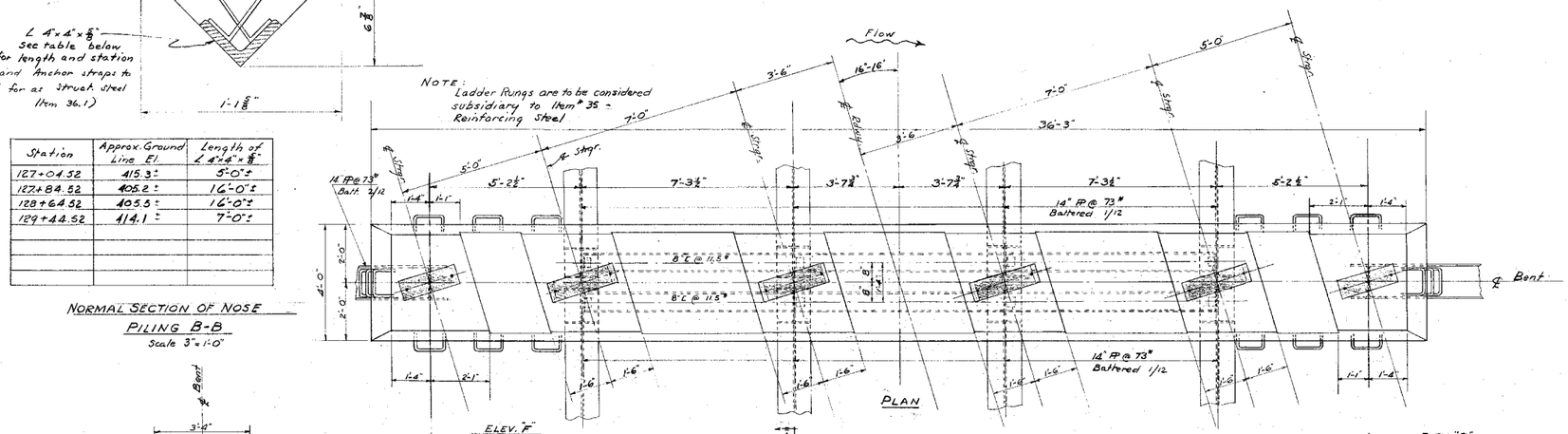
FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER-12		11	166

NOTE: Nose Pilings to be used on upstream side only. See table for lengths and stations.



Station	Approx. Ground Line El.	Length of L 4"x4"x⅝"
127+04.52	415.3 ±	5'-0" ±
127+84.52	405.2 ±	16'-0" ±
128+64.52	405.5 ±	16'-0" ±
129+44.52	414.1 ±	7'-0" ±

NORMAL SECTION OF NOSE
PILING B-B
Scale 3"=1'-0"



BENTS

Location (℄ Rdwy)	Condition	EL."A"	EL."B"	EL."C"	EL."D"	EL."E"	EL."F"	EL."G"	EL."H"	
127+00	Exp.	423.97	423.72	423.79	423.83	423.82	424.12	423.65	422.15	
127+80	Fixed	424.89	424.63	424.68	424.69	424.66	424.98	424.56	423.06	
128+60	Exp.	424.98	424.66	424.69	424.68	424.63	424.89	424.56	423.06	
129+40	Exp.	424.12	423.82	423.83	423.79	423.72	423.97	423.65	422.15	

Sheet Scale ½"=1'-0" except as otherwise noted

△	DESCRIPTION	BY	DATE

REVISIONS

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/297
FEDERAL PROJECT E.R. 12 STATE PROJECT P 2738
ROUTE NO. N.H. # 16 OVER BEARCAMP RIVER
LOCATION APPROX. 2.0 MI. SO. OSSIPEE-TAMWORTH T.L.

TYPICAL BENT DETAILS

	BY	DATE		BY	DATE
DESIGNED	N.E.L.		CHECKED		
DRAWN	V.S.B.	7/58	CHECKED	JTH	8-58
TRACED	—	—	CHECKED	—	—
QUANTITIES	F.C.S.	7/58	CHECKED	JTH	8-58

BRIDGE SHEET NO. 6 OF 12
FILE NUMBER 3-4-3-2

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	11	199

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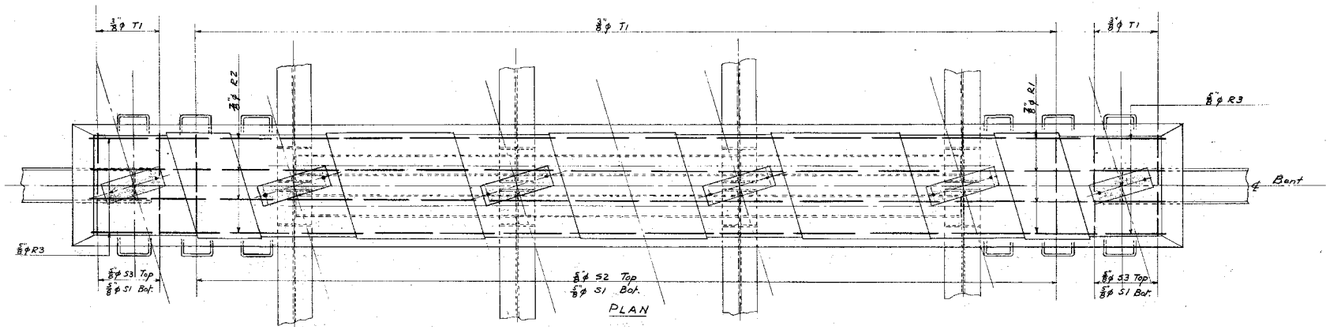
NH-744_DRAWING-06

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER-12		12	160



Sheet Scale ½"=1'-0" except as otherwise noted

△	DESCRIPTION	BY	DATE

REVISIONS

12
203

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE - TAMWORTH BRIDGE NO. 137/297
FEDERAL PROJECT E.R. 12 STATE PROJECT P 2738
ROUTE NO. N.H.# 16 OVER BEARCAMP RIVER
LOCATION APPROX. 2.0 MI. SO. OSSIPEE-TAMWORTH T.L.

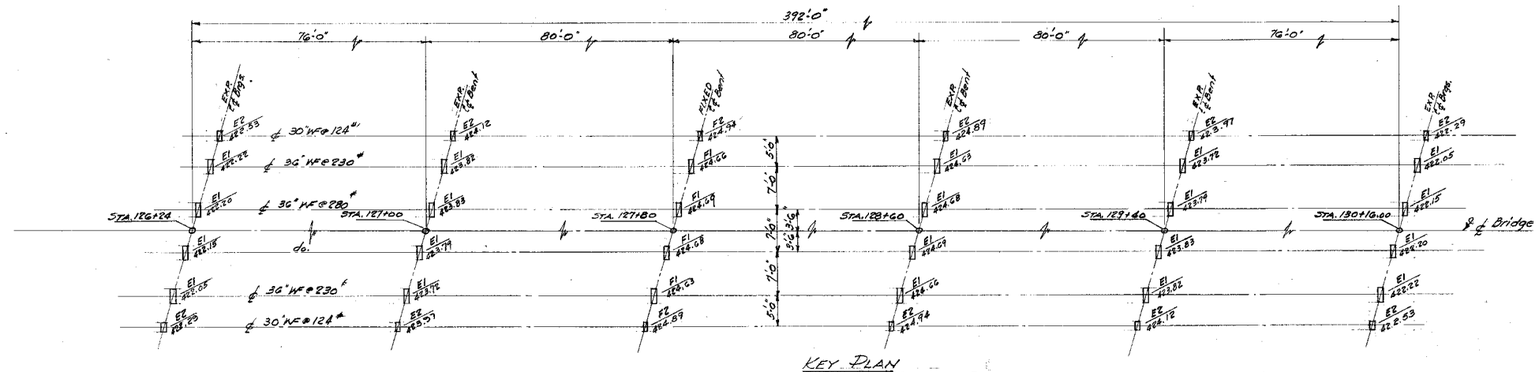
BENT CAP REINFORCING

	BY	DATE		BY	DATE	
DESIGNED	V.S.B.	7/54	CHECKED	J.T.H.	8-54	BRIDGE SHEET NO. 7 OF 12
DRAWN	V.S.B.	7/54	CHECKED	J.T.H.	8-54	
TRACED	—	—	CHECKED	—	—	FILE NUMBER 3-4-3-2
QUANTITIES	V.S.B.	7/54	CHECKED	J.T.H.	8-54	

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	12	159

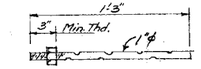
NH-744_DRAWING-07

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER-12		13	164

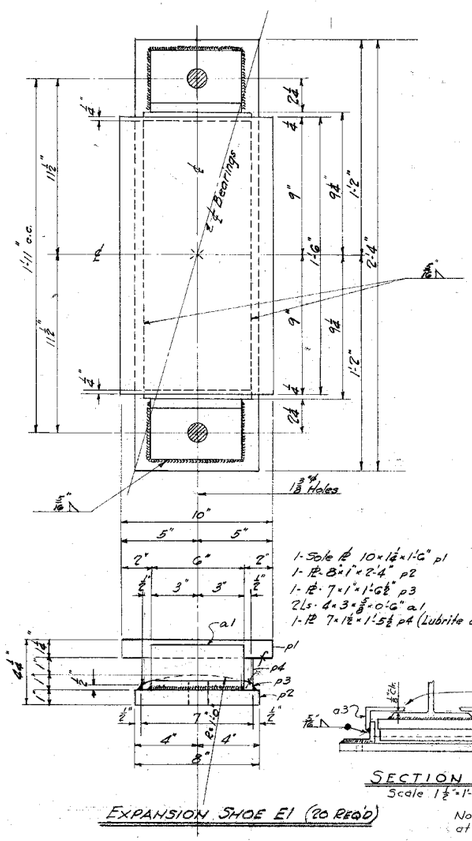


KEY PLAN
SHOWING LOCATION OF BRIDGE SHOES
&
BRIDGE SEAT ELEVATIONS
(N.T.S.)

NOTE:-
All material detailed or indicated on this sheet together with the cost of manufacturing and installing the same shall be considered as "Bridge Shoes Item # 36.2"
All sole plates shall be field welded along the edges of beam flanges with a continuous 5/16" fillet weld after all dead load has been placed on the structure. Cost of field welding will not be paid for directly, but shall be subsidiary to Item # 36.2

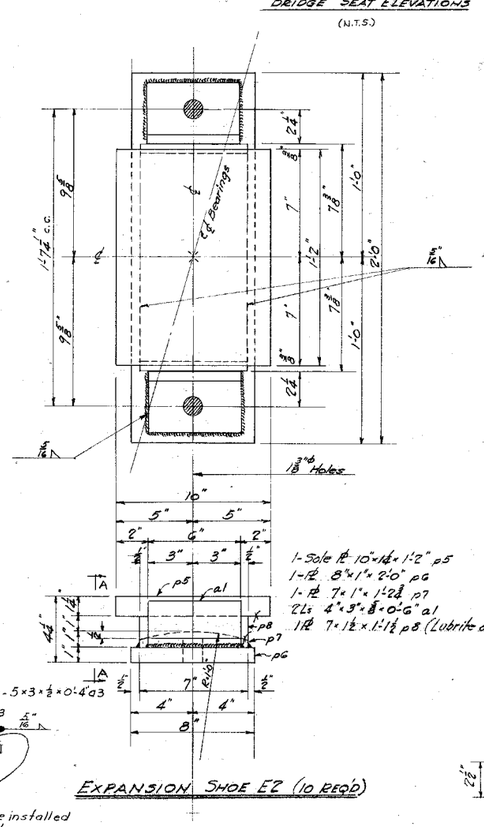


ANCHOR BOLTS (72 REQ'D)
(N.T.S.)

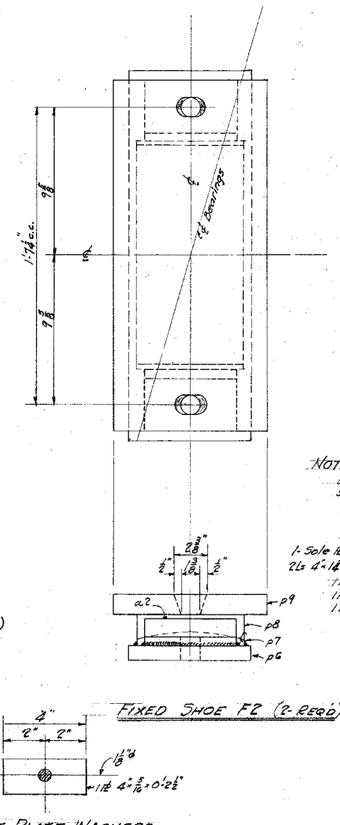


EXPANSION SHOE E1 (20 REQ'D)

SECTION AA
Scale 1 1/2"=1'-0"
Note: To be installed at E2 only



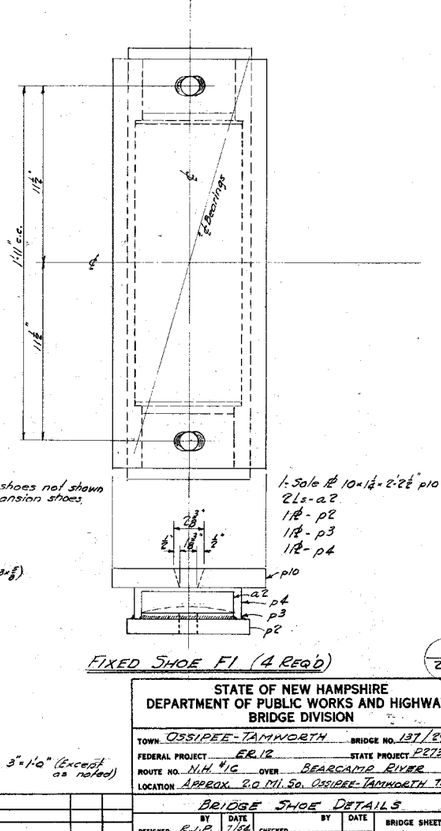
EXPANSION SHOE E2 (10 REQ'D)



NOTE:-
Details of fixed shoes not shown same as for expansion shoes.

FIXED SHOE F2 (2 REQ'D)

DUST PLATE WASHERS
(12 REQ'D)
(N.T.S.)



FIXED SHOE F1 (4 REQ'D)

13
208

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/297
FEDERAL PROJECT ER-12 STATE PROJECT P-2738
ROUTE NO. N.H. #16 OVER BEARCAMP RIVER
LOCATION APPROX. 2.0 MI. SO. OSSIPEE-TAMWORTH T.L.

SHEET SCALE 3"=1'-0" (Except as noted)

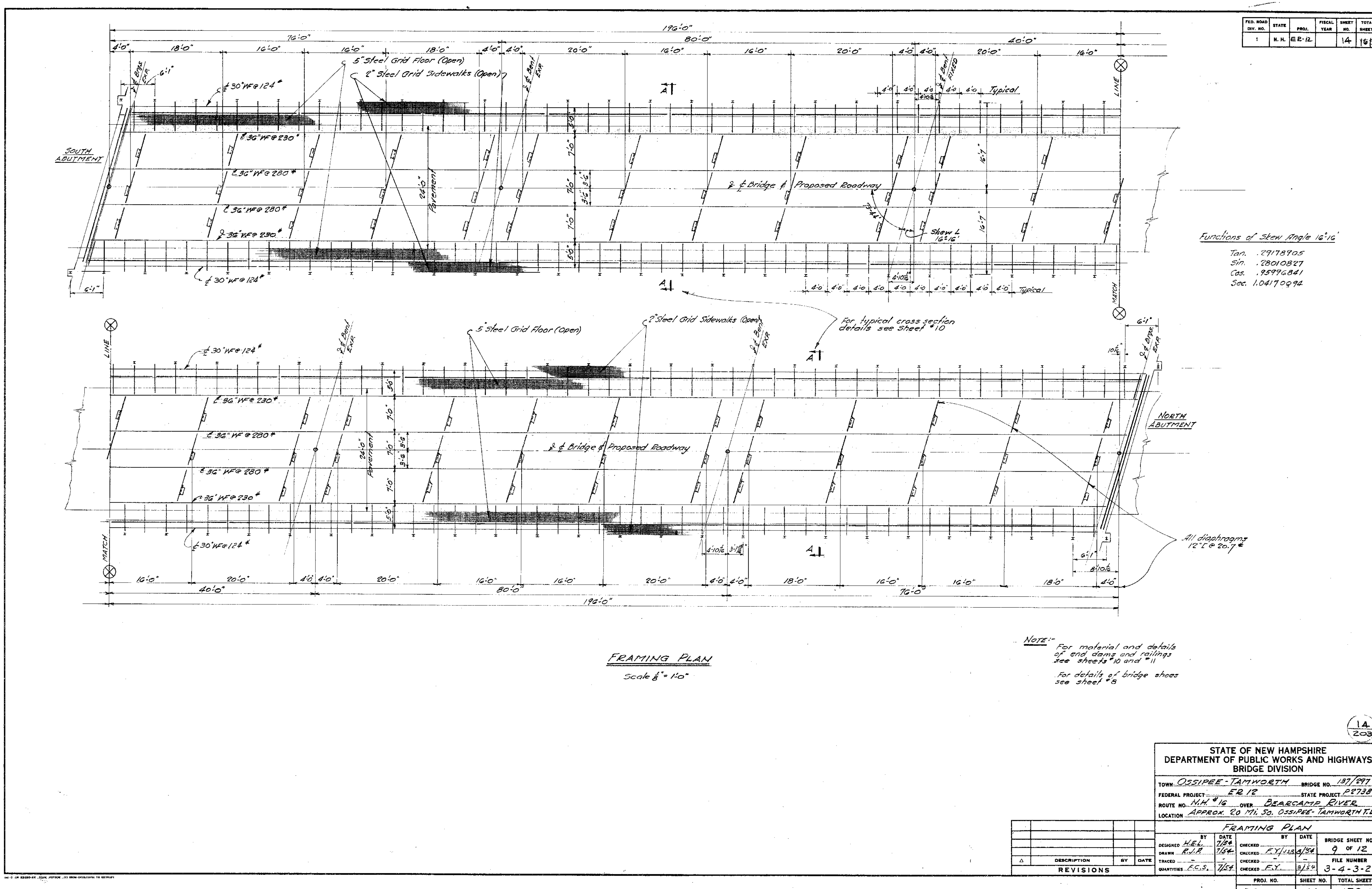
BRIDGE SHOE DETAILS

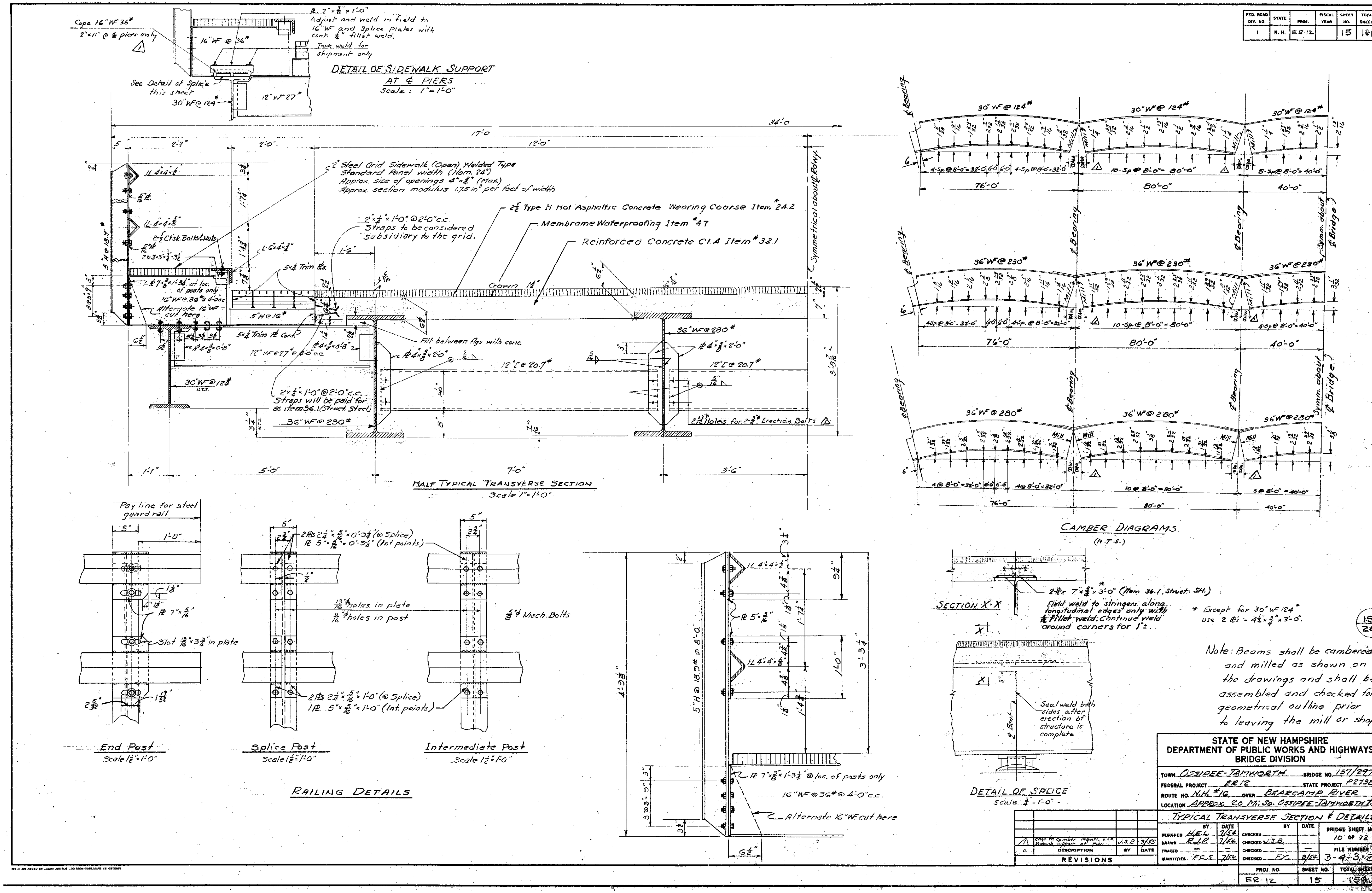
	BY	DATE
DESIGNED	R.J.P.	7/64
DRAWN	G.J.B.	7/64
TRACED	-	-
QUANTITIES	F.C.S.	7/64
CHECKED		
CHECKED	F.Y.	8/64
CHECKED	-	-
CHECKED	F.Y.	8-64

BRIDGE SHEET NO. 8 OF 12
FILE NUMBER 3-4-3-2

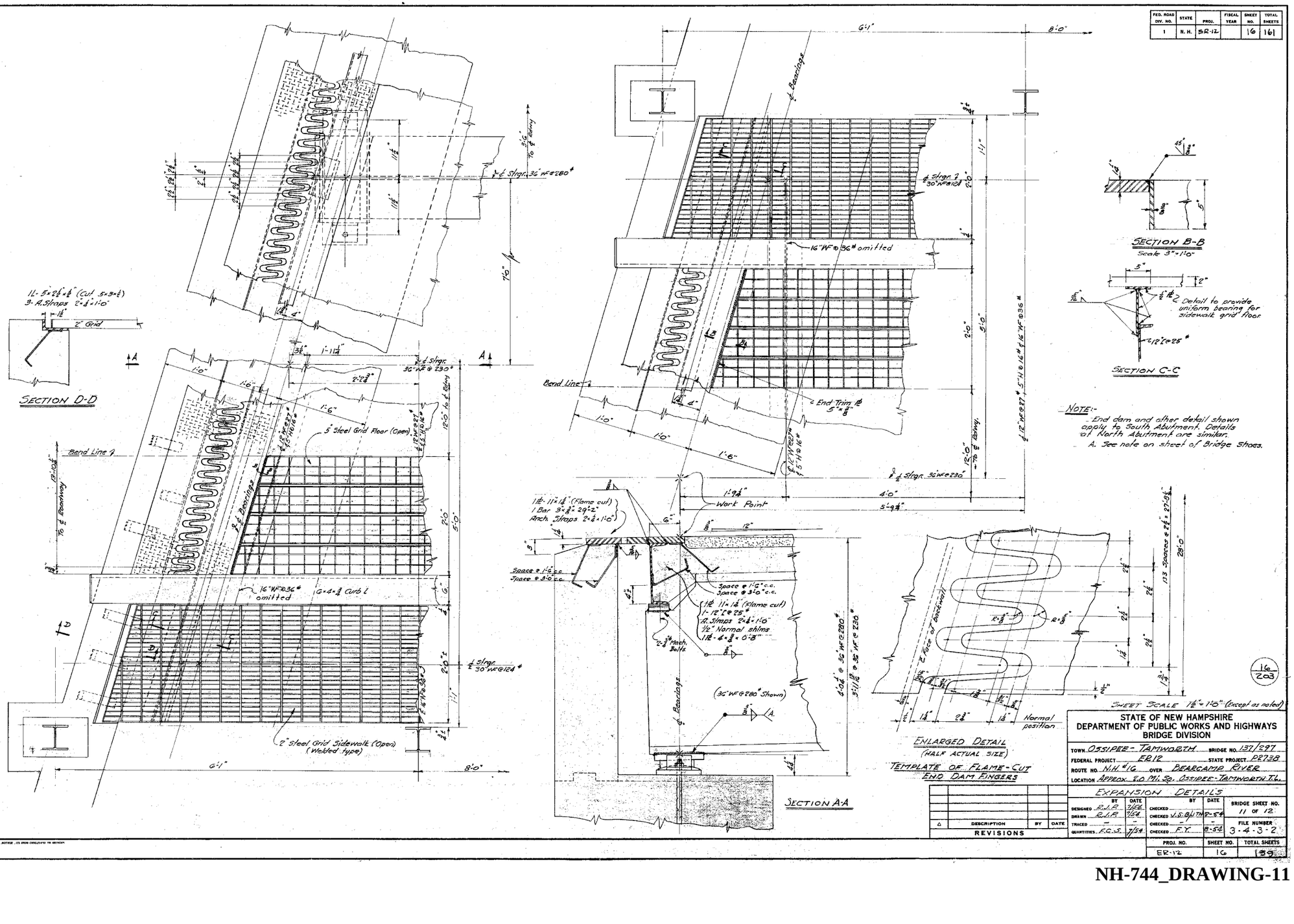
PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	13	189

△	DESCRIPTION	BY	DATE
	REVISIONS		


SOUTH ABUTMENT
NORTH ABUTMENT
5" Steel Grid Floor (Open)
2" Steel Grid Sidewalks (Open)
℄ 30" WF @ 124#
℄ 36" WF @ 230#
℄ 36" WF @ 280#
& ℄ Bridge ℄ Proposed Roadway
Skew L 16°16'
For typical cross section details see sheet #10
All diaphragms 12" [@ 20.7#
196'-0"
80'-0"
76'-0"
40'-0"
Typical
MATCH
LINE
Functions of Skew Angle 16°16'
Tan. .29178905
Sin. .28010827
Cos. .95996841
Sec. 1.04170094
FRAMING PLAN
Scale 1/8" = 1'-0"
NOTE:-
For material and details of end dams and railings see sheets #10 and #11
For details of bridge shoes see sheet #8
STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION
TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/297
FEDERAL PROJECT ER 12 STATE PROJECT P2738
ROUTE NO. N.H. #16 OVER BEARCAMP RIVER
LOCATION APPROX. 2.0 MI. SO. OSSIPEE-TAMWORTH T.L.
FRAMING PLAN
DESIGNED H.E.L. 7/54
DRAWN R.J.R. 7/54
QUANTITIES F.C.S. 7/54
CHECKED F.Y./JSR 8/54
CHECKED F.Y. 8/54
BRIDGE SHEET NO. 9 OF 12
FILE NUMBER 3-4-3-2
REVISIONS
PROJ. NO. ER-12
SHEET NO. 14
TOTAL SHEETS 159


DETAIL OF SIDEWALK SUPPORT AT ℄ PIERS
HALF TYPICAL TRANSVERSE SECTION
CAMBER DIAGRAMS
RAILING DETAILS
End Post
Splice Post
Intermediate Post
SECTION X-X
DETAIL OF SPLICE
Note: Beams shall be cambered and milled as shown on the drawings and shall be assembled and checked for geometrical outline prior to leaving the mill or shop.
STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION
TOWN OSSIPEE-TAMWORTH
BRIDGE NO. 137/297
ROUTE NO. N.H. #16 OVER BEARCAMP RIVER
TYPICAL TRANSVERSE SECTION & DETAILS
REVISIONS

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER-12		16	161



16/203

SHEET SCALE 1½"=1'-0" (Except as noted)

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/297
FEDERAL PROJECT ER12 STATE PROJECT P2738
ROUTE NO. N.H. #16 OVER BEARCAMP RIVER
LOCATION APPROX. 2.0 MI. SO. OSSIPEE-TAMWORTH T.L.

EXPANSION DETAILS

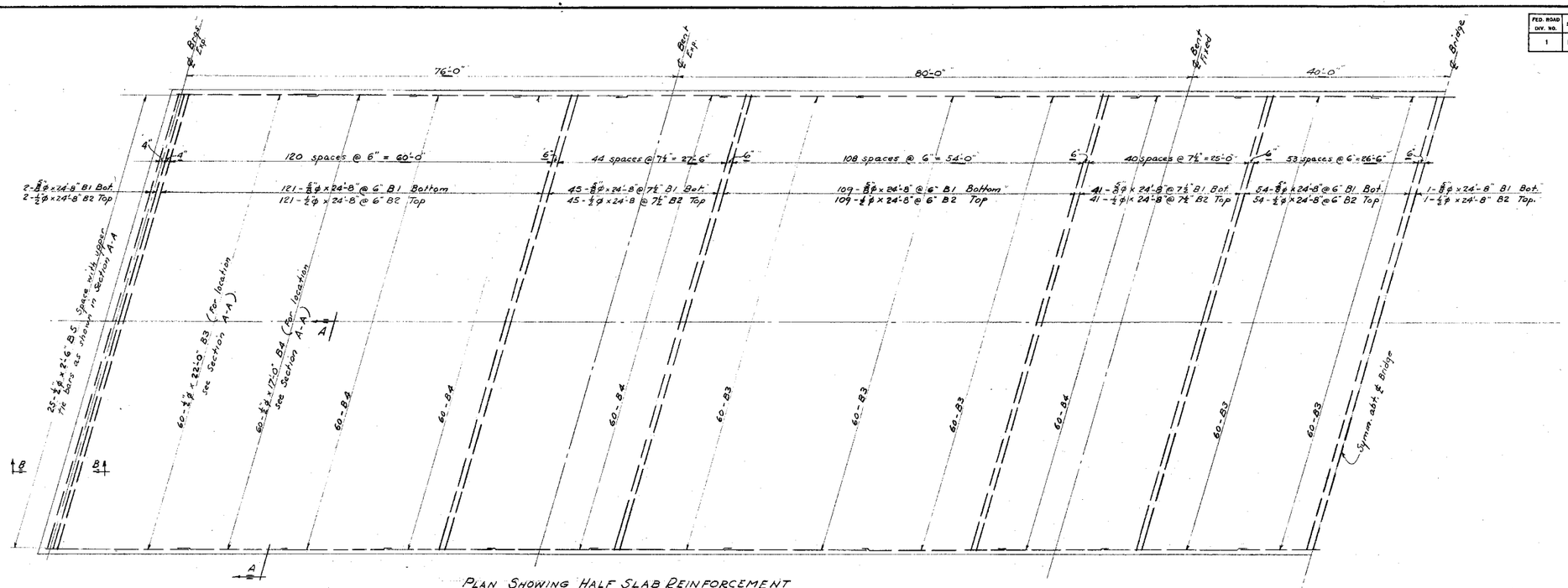
	BY	DATE
DESIGNED	R.J.P.	2/54
DRAWN	R.J.P.	7/54
TRACED	—	—
QUANTITIES	F.G.S.	7/54
CHECKED		
CHECKED	V.S.G.	8-54
CHECKED	—	—
CHECKED	F.Y.	8-54

BRIDGE SHEET NO. 11 OF 12
FILE NUMBER 3-4-3-2

△	DESCRIPTION	BY	DATE
	REVISIONS		

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	16	159

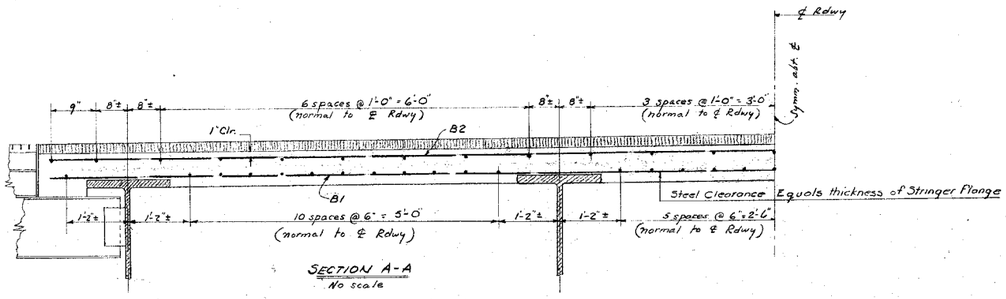
FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER-12		17	159



PLAN SHOWING HALF SLAB REINFORCEMENT

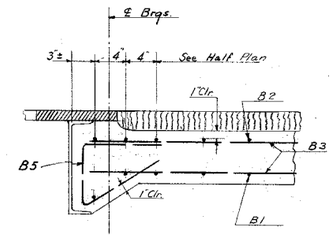
Scale: ⅜" = 1'-0" except underlined dimensions

Note: Steel shown on this drawing for one half slab only.



SECTION A-A

No scale



SECTION B-B

Scale 1½" = 1'-0"

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Δ	DESCRIPTION	BY	DATE

REVISIONS

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

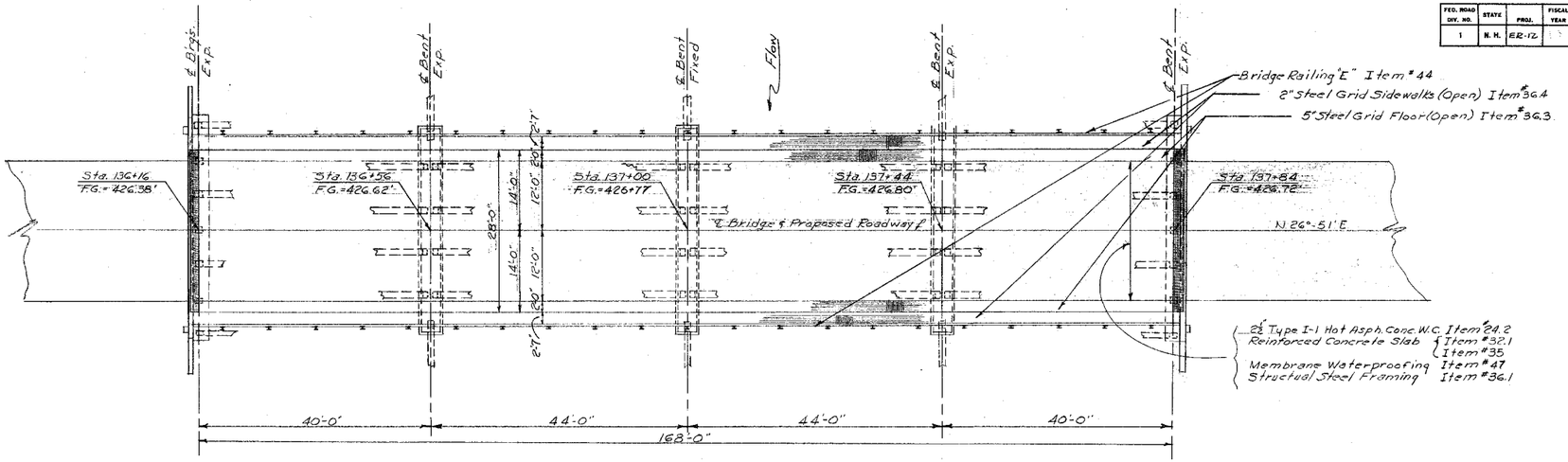
TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/297
FEDERAL PROJECT ER 12 STATE PROJECT P2738
ROUTE NO. N.H. #16 OVER BEARCAMP RIVER
LOCATION APPROX. 2.0 MI. SO. OSSIPEE-TAMWORTH T.L.

SLAB REINFORCEMENT

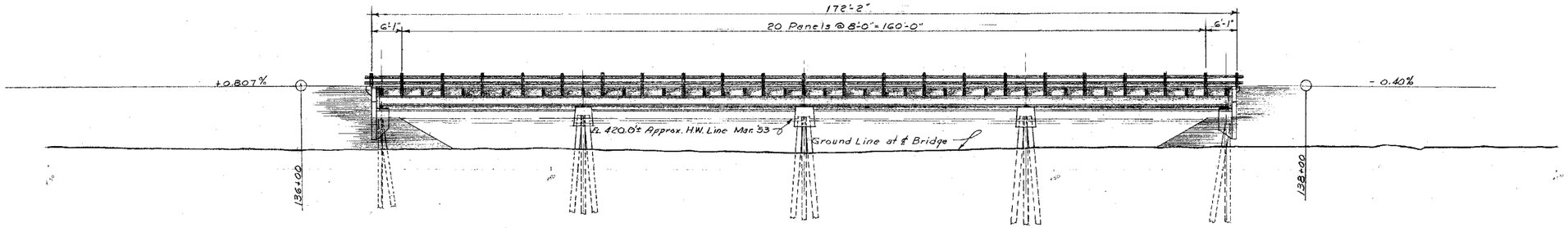
	BY	DATE		BY	DATE	BRIDGE SHEET NO.
DESIGNED	M.E.L.	7/58	CHECKED	J.T.H.	8-58	12 OF 12
DRAWN	J.S.B.	7/58	CHECKED	—	—	
TRACED	—	—	CHECKED	J.T.H.	8-58	FILE NUMBER 3-4-3-2
QUANTITIES	J.S.B.	7/58				

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	17	159

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER-12		18	661



PLAN
Scale 1"=10'



DOWNSTREAM ELEVATION
Scale 1"=10'

SUMMARY of ESTIMATED BRIDGE QUANTITIES			
Item	Description	Quantity	
24.2	Type H Hot Asphaltic Conc. Wear. Cor.	64	Tons
32.1	Class A Concrete (air entrained)	202	C.Y.
35.	Reinforcing Steel	27,100	Lbs.
36.1	Structural Steel	150,000	Lbs.
36.2	Bridge Shoes	4 ±	Unit
36.3	5" Steel Grid Floor (Open)	672	S.F.
36.4	2" Steel Grid Sidewalk (Open)	688	S.F.
43.3	Steel Bearing Piles	209000	Lbs.
43.4	Pile Loading Test	2	Tests
43.5	Pile Driving Equipment	4 ±	Unit
44	Bridge Railing E	348	L.F.
47	Membrane Waterproofing	448	S.Y.

— GENERAL NOTES —

Design Loading: H20-S16-44
Specifications A.A.S.H.O 1953 and N.H.D.P.W.&Hwys. 1954
All Concrete shall be Class A (air entrained)
For Surface Finish of Concrete, see Special Provisions
Order of placing Concrete in superstructure shall meet the approval of the Bridge Engineer
Main reinforcing steel shall be 2" Clear from surface of Concrete unless otherwise noted.
Steel Bearing Piles to have special primer, KOPPER'S BITUMASTIC MILL UNDERCOAT or equivalent and two coats of KOPPER'S BITUMASTIC No. 50 or equivalent as called for on plans and Special Provisions.
Materials and application of above primer and protective coatings will not be paid for directly but will be subsidiary to Item 43.3, Steel Bearing Piles.
For further information, see sheets titled "Addenda to Specifications" attached to Proposal.

△	DESCRIPTION	BY	DATE

REVISIONS

18/203

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN Ossipee-Tamworth BRIDGE NO. 137/299
FEDERAL PROJECT E.R. 12 STATE PROJECT 12738
ROUTE NO. N.H. #16 OVER RELIEF STRUCTURE
LOCATION Approx. 6.0 Mi. So. Ossipee-Tamworth T.L.

GENERAL PLAN

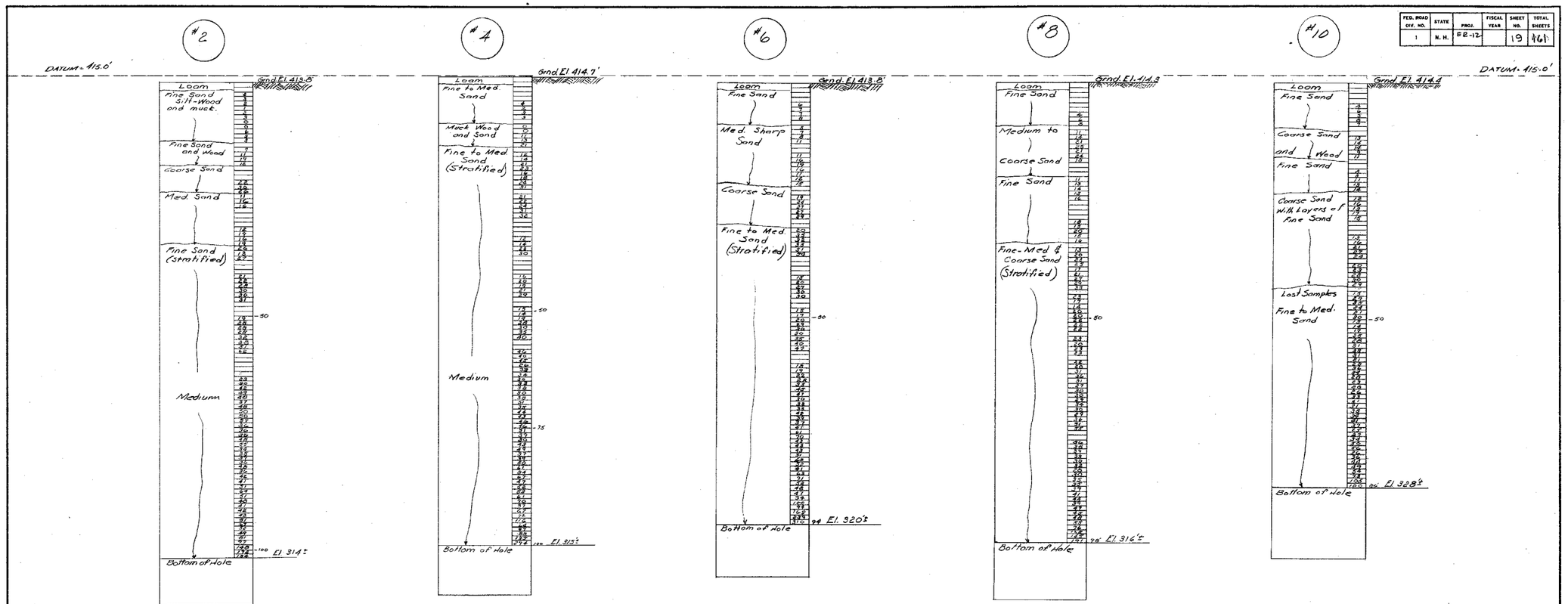
	BY	DATE		BY	DATE
DESIGNED			CHECKED		
DRAWN	F.V.	8/54	CHECKED	J.T.H	9-54
TRACED			CHECKED		
QUANTITIES	F.V.	7/54	CHECKED	J.T.H	8-54

BRIDGE SHEET NO. 1 OF 12
FILE NUMBER 3-4-3-5

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	18	159

NH-744_DRAWING-13

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	EE-12		19	161



Note:

Borings indicated thus ⊕ were made by the N.H.D.P.W.&Hywys. in August 1954. Figures in right hand column indicate the number of blows required to drive a 1⅛" pipe one foot using 135# weight falling two feet. Borings are for design and show conditions of boring points only and do not necessarily indicate material to be encountered during construction. Samples taken during the boring operation may be examined at the office of the Bridge Engineer, Concord, N.H.

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STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137-299 Δ
FEDERAL PROJECT E.R. 12 STATE PROJECT P-2738
ROUTE NO. N.H.# 16 OVER RELIEF STRUCTURE
LOCATION APPROX. 2.0 mi. So. OSSIPEE-TAMWORTH T.L.

BORINGS

	BY	DATE
DESIGNED		
DRAWN	J.T.H	9-26
TRACED		
QUANTITIES		

	BY	DATE
CHECKED		
CHECKED	F.Y.	9-54
CHECKED		
CHECKED		

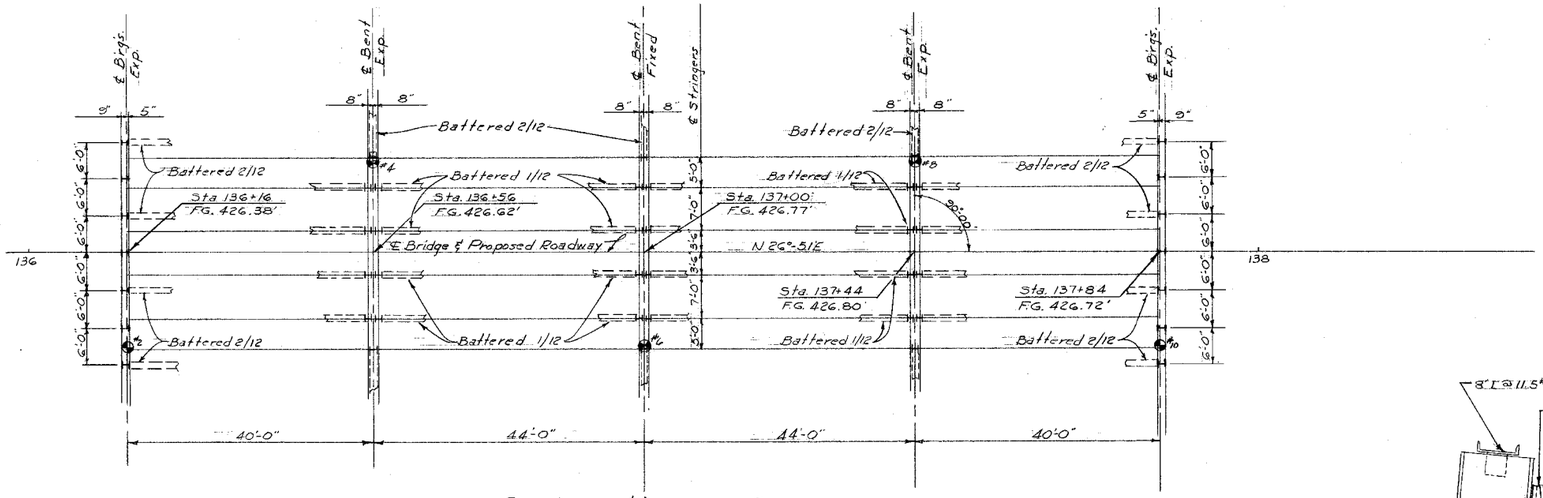
BRIDGE SHEET NO. 2 OF 12
FILE NUMBER 3-4-3-5

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	19	159

	DESCRIPTION	BY	DATE
Δ	Bridge Number	J.T.H	5-4-55
△			

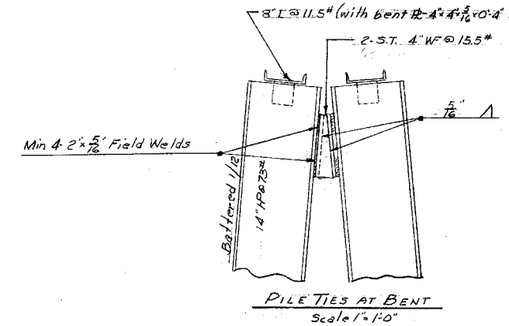
REVISIONS

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER-12		20	161



PILE LAYOUT & LOCATION OF BORINGS
Scale 1"=10'

NOTE:
Two Pile Loading Tests will be required
Design Load per pile is 28 tons.
All piles to be 14"H@73#
Length of piles for estimating purposes is 65'-0". Actual lengths to be determined from tests prior to delivery.
Hammer to be used shall be McKiernan-Terry #10-B3 or equivalent.



PILE TIES AT BENT
Scale 1"=1'-0"

20
2.03

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/299
FEDERAL PROJECT E.R. 12 STATE PROJECT P-2738
ROUTE NO. N.H. #16 OVER RELIEF STRUCTURE
LOCATION APPROX. 2.0 MI. SO. OSSIPEE-TAMWORTH TL

LAYOUT OF STEEL BEARING PILES

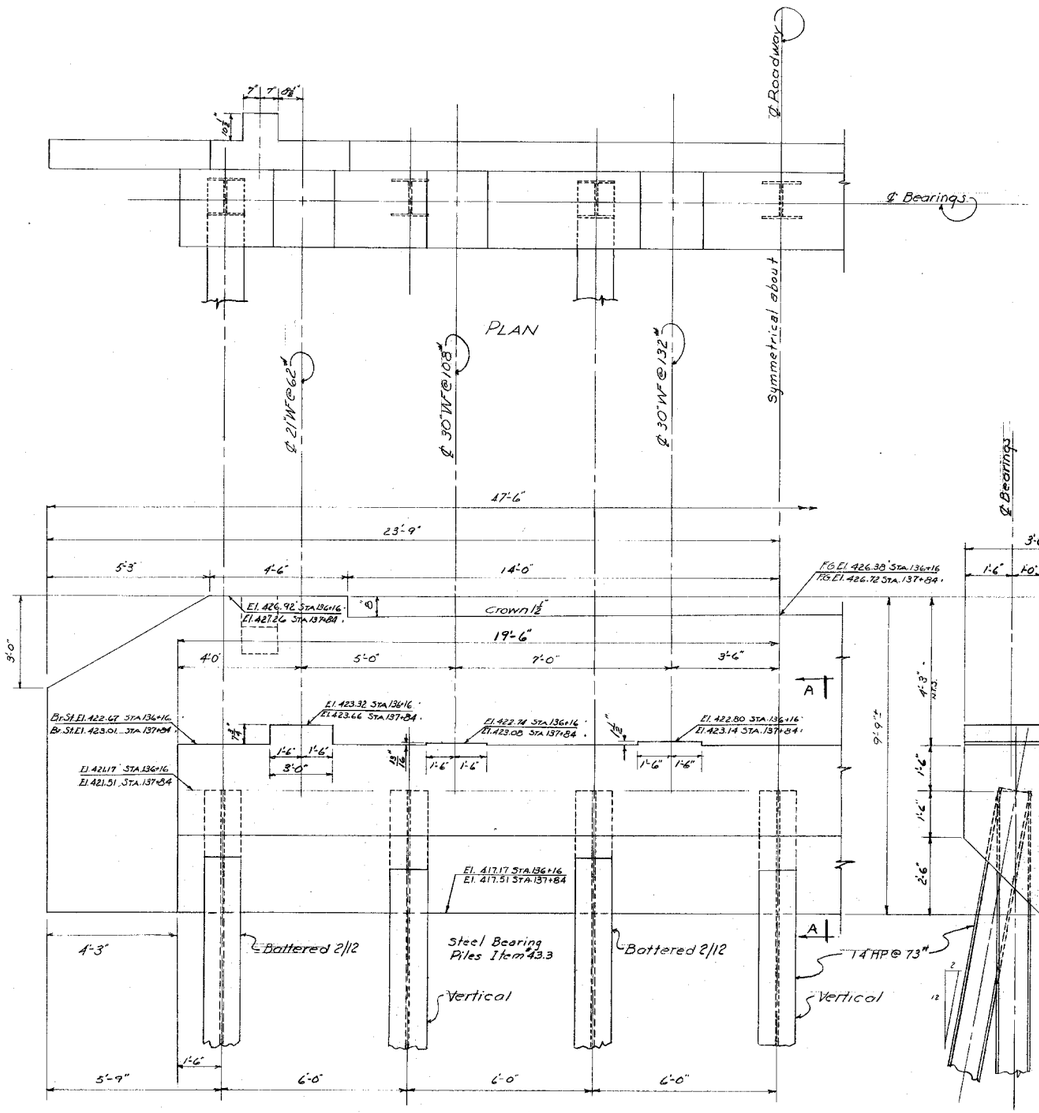
	BY	DATE
DESIGNED		
DRAWN	F.Y.	8-54
TRACED	F.G.S.	8-54
QUANTITIES		
CHECKED		
CHECKED	J.T.H.	7-54
CHECKED	F.Y.	8-54

BRIDGE SHEET NO. 3 OF 12
FILE NUMBER 3-4-3-5

△	DESCRIPTION	BY	DATE
	REVISIONS		

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	20	159

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER-12		21	161



ELEVATION
N.T.S.

SECTION A-A

SHEET SCALE: 1"=1'-0" (except note)

21
2.03

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137-299
FEDERAL PROJECT ER-12 STATE PROJECT 12738
ROUTE NO. N.H. #16 OVER RELIEF STRUCTURE
LOCATION APPROX. 2.0mi. SO. OSSIPEE-TAMWORTH TL.

ABUTMENT DETAILS

	BY	DATE
DESIGNED	H.E.L.	7-54
DRAWN	J.T.H.	8-54
TRACED	—	—
QUANTITIES	F.C.S.	8-54
CHECKED	E.Y.	9-54
CHECKED	—	—
CHECKED	J.T.H.	9-54

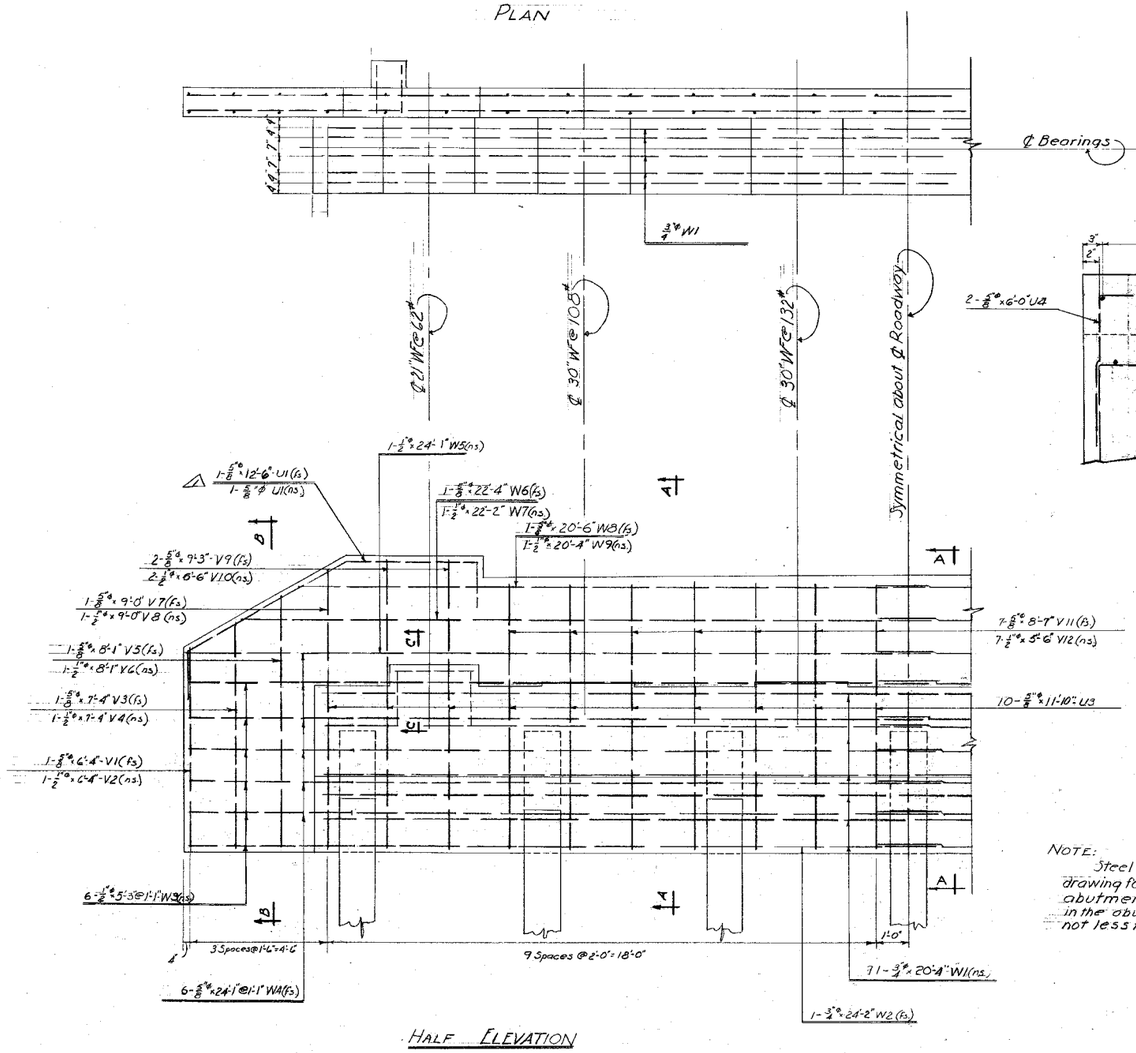
BRIDGE SHEET NO. 4 OF 12
FILE NUMBER 3-4-3-5

△	DESCRIPTION	BY	DATE
	REVISIONS		

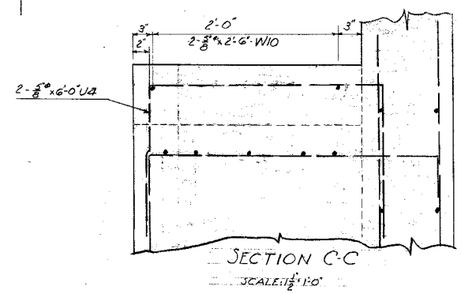
PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	21	159

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	EP-12		22	169

PLAN

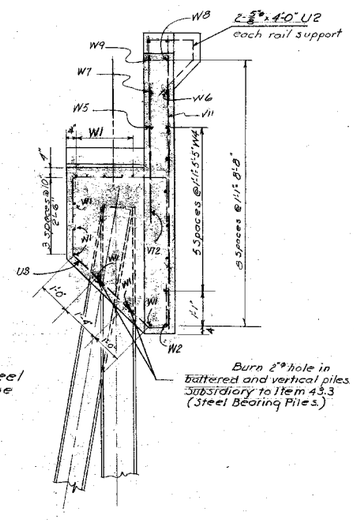


HALF ELEVATION

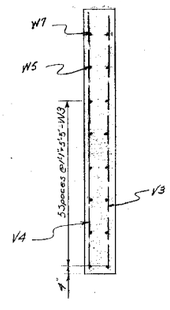


SECTION C-C
SCALE: 1/2" = 1'-0"

NOTE:
Steel shown on this drawing for one half of abutment only. All steel in the abutments shall be not less than 2" clear.



SECTION A-A



SECTION B-B

22
203

SHEET SCALE: 1/2" = 1'-0" (except as noted)

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/299
FEDERAL PROJECT EP-12 STATE PROJECT P2738
ROUTE NO. N.H. "16 OVER RELIEF STRUCTURE
LOCATION APPROX. 2.0 MI. SO. OSSIPEE-TAMWORTH T.L.

ABUTMENT REINFORCING DETAILS

	BY	DATE
DESIGNED V.T.H.		9-54
DRAWN J.T.H.		8-54
TRACED		
QUANTITIES F.Y.		8-54
CHECKED		
CHECKED F.Y.		9-54
CHECKED		
CHECKED V.T.H.		8-54

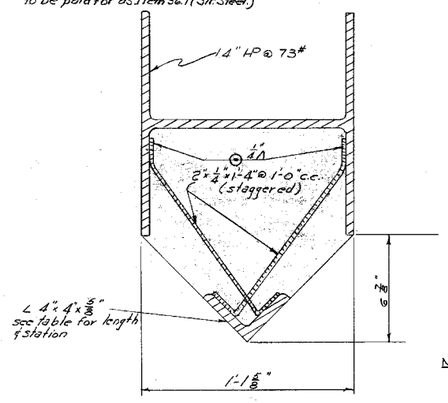
BRIDGE SHEET NO. 5 OF 12
FILE NUMBER 3-4-3-5

REVISIONS			
△	Chgd. bar length U1	J.S.B.	3-55
△	DESCRIPTION	BY	DATE

PROJ. NO.	SHEET NO.	TOTAL SHEETS
EP-12	22	169

FED. ROAD DIV. NO.	STATE	PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	ER 12		23	164

NOTE: Nose Pilings to be used on upstream side only. See table for length & Station. Nose angle and anchor straps to be paid for as Item 36.1 (Str. Steel)



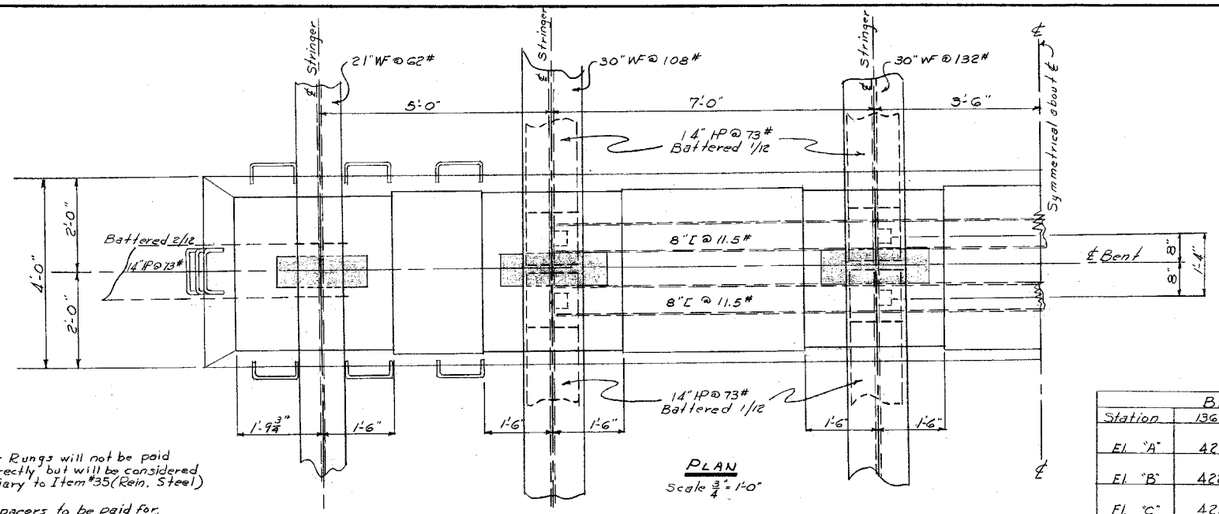
STATION	APPROX. GROUND LINE EL.	LENGTH L 4"x4"x⅝"
136+56	414.0'±	5.5'±
137+00	414.0'±	5.5'±
137+44	415.0'±	4.5'±

NORMAL SECTION OF NOSE PILING B-B
Scale 3"=1'-0"

NOTE: Ladder Rungs will not be paid for directly, but will be considered subsidiary to Item #35 (Rein. Steel)

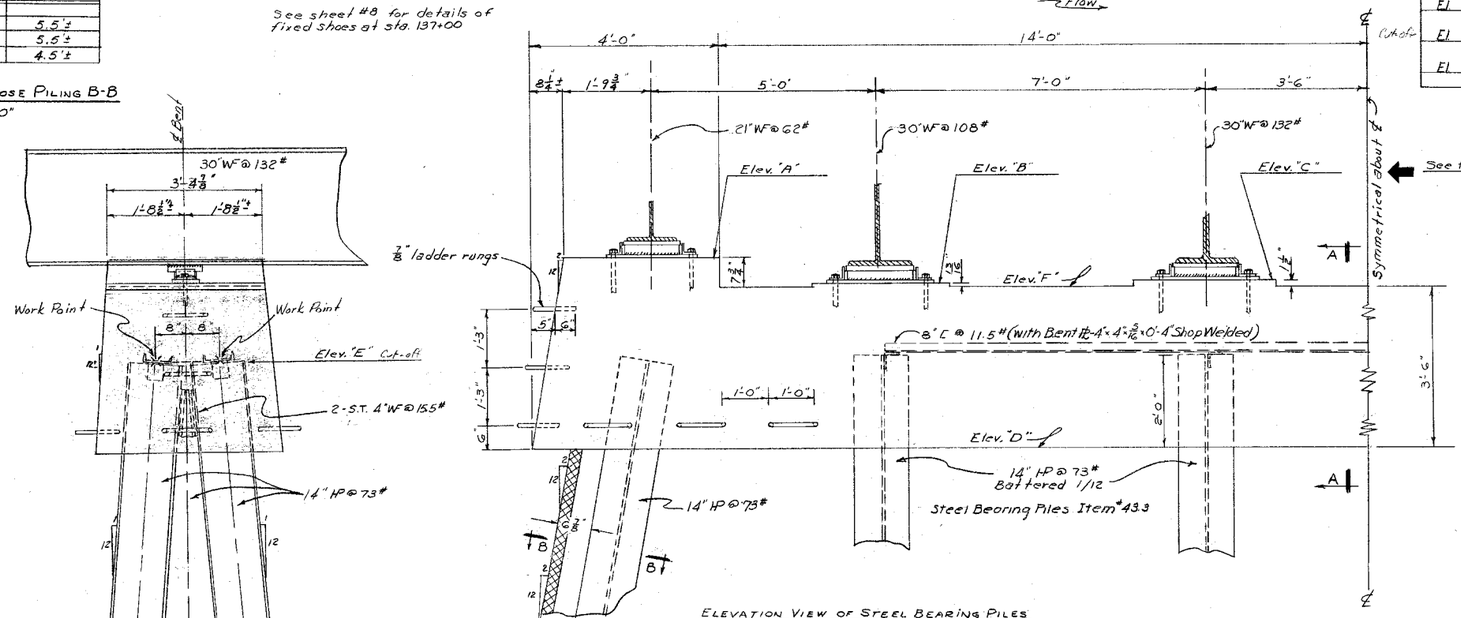
Pile spacers to be paid for as Structural Steel Item #36.1

See sheet #8 for details of fixed shoes at sta. 137+00



PLAN
Scale ¾"=1'-0"

BENT ELEVATIONS			
Station	136+56	137+00	137+44
El. "A"	423.56'	423.71'	423.74'
El. "B"	422.98'	423.13'	423.16'
El. "C"	423.04'	423.18'	423.22'
El. "D"	419.41'	419.56'	419.59'
El. "E"	421.41'	421.56'	421.59'
El. "F"	422.91'	423.06'	423.09'



ELEVATION VIEW OF STEEL BEARING PILES AND CONCRETE BENT CAP
Scale ¾"=1'-0"

SECTION A-A
Scale ¾"=1'-0"

(23/203)

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/299
FEDERAL PROJECT E.R. 12 STATE PROJECT R2738
ROUTE NO. N.H. #16 OVER RELIEF STRUCTURE
LOCATION APPROX 2.0 MI. SO. OSSIPEE-TAMWORTH T.L.

TYPICAL BENT DETAILS

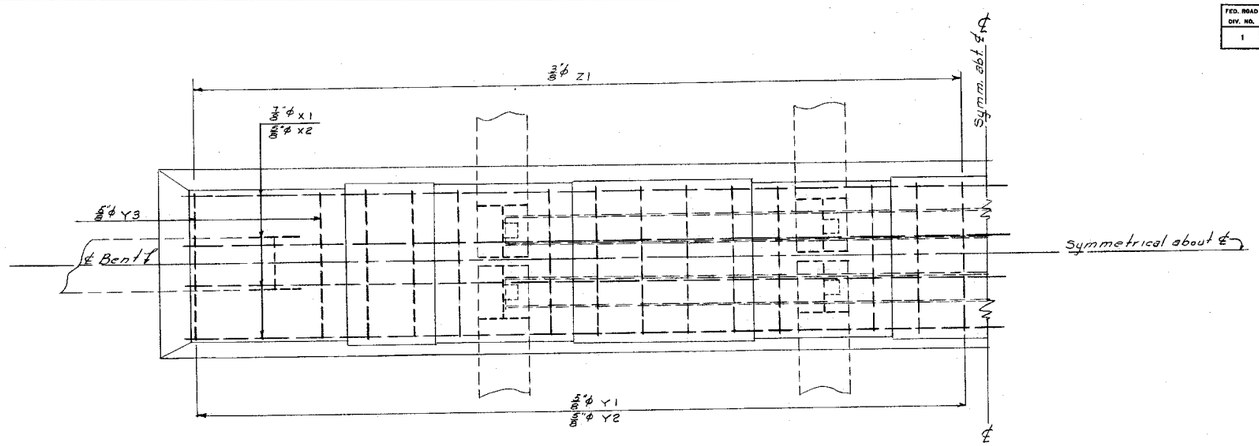
	BY	DATE		BY	DATE
DESIGNED			CHECKED		
DRAWN	F.Y.	8/54	CHECKED	J.T.H.	7-54
TRACED			CHECKED		
QUANTITIES	F.C.S.	8-54	CHECKED	F.Y.	8-54

BRIDGE SHEET NO. 6 OF 12
FILE NUMBER 3-4-3-5

△	DESCRIPTION	BY	DATE
	REVISIONS		

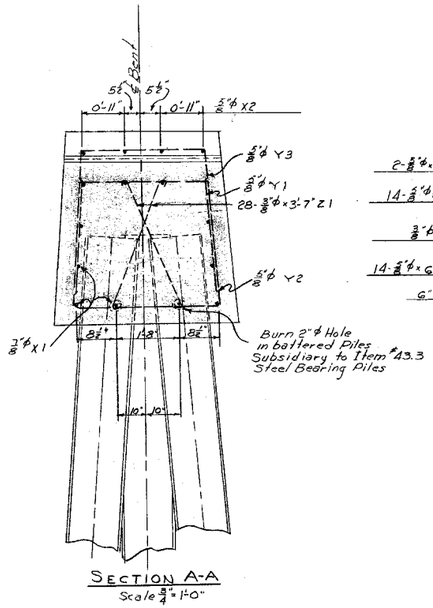
PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	23	159

FED. ROAD DIV. NO.	STATE	E.P. PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	12		24	164

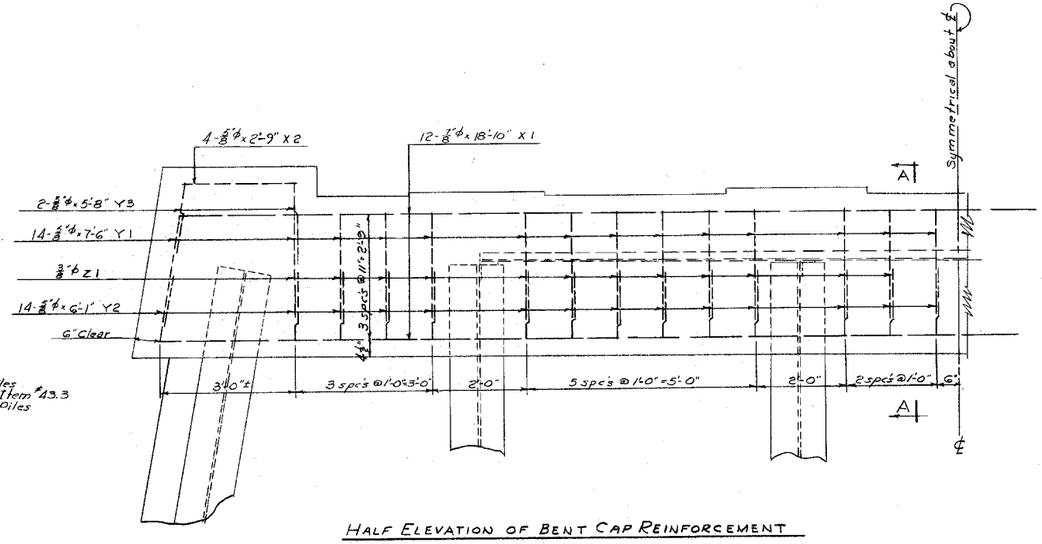


PLAN
Scale ¾"=1'-0"

NOTE:
Reinforcing steel shown on this drawing for one half bent cap only.



SECTION A-A
Scale ¾"=1'-0"



HALF ELEVATION OF BENT CAP REINFORCEMENT
Scale ¾"=1'-0"

2A/203

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN Ossipee-Tamworth.H. BRIDGE NO. 137/297
FEDERAL PROJECT E.P 12 STATE PROJECT 02738
ROUTE NO. N.H. #16 OVER Relief Structure
LOCATION Approx. 2.0 Mi. So. Ossipee-Tamworth T.L.

BENT CAP REINFORCEMENT

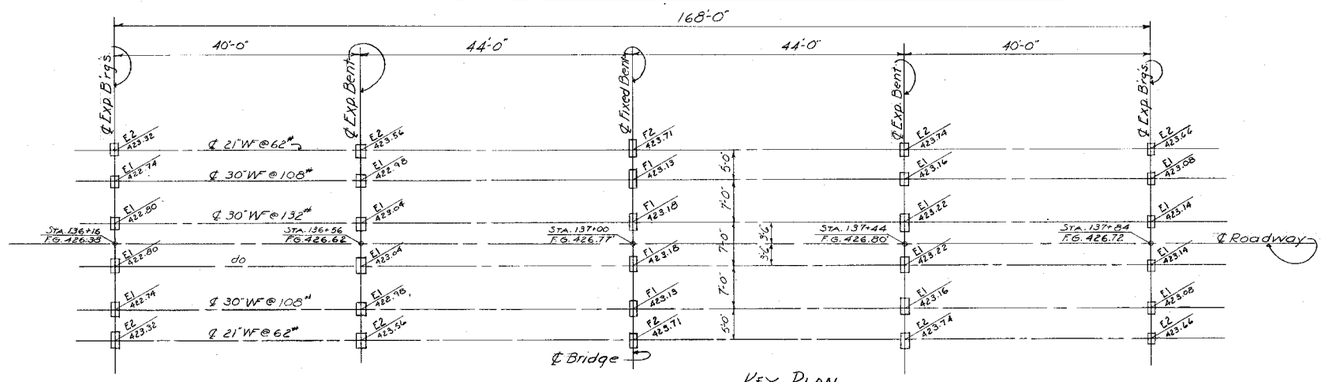
	BY	DATE
DESIGNED	F.Y.	2/54
DRAWN	F.Y.	5/54
TRACED	—	—
QUANTITIES	F.Y.	8-54
CHECKED		
CHECKED	J.T.H.	9-54
CHECKED	—	—
CHECKED	J.T.H.	8-54

BRIDGE SHEET NO. 7 OF 12
FILE NUMBER 3-4-3-5

PROJ. NO.	SHEET NO.	TOTAL SHEETS
E.P. 12	24	159

△	DESCRIPTION	BY	DATE
	REVISIONS		

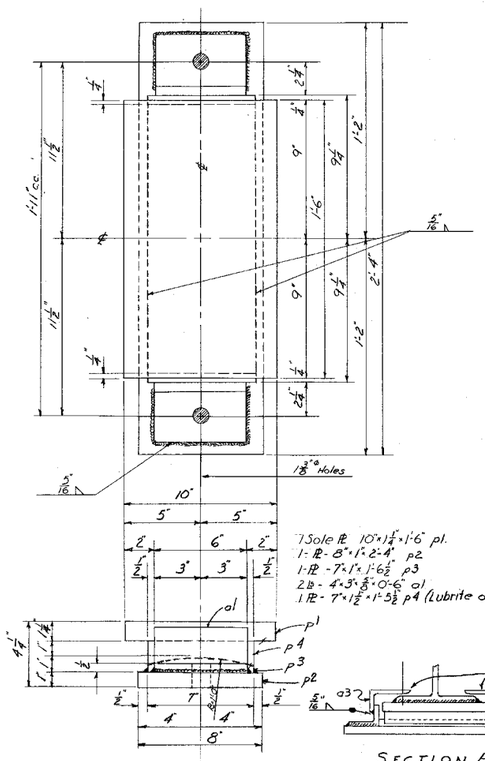
FED. ROAD DIV. NO.	STATE	F R PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	12		25	161



KEY PLAN
SHOWING LOCATION OF BRIDGE SHOES & BRIDGE SEAT ELEVATIONS
SCALE: 1"=10'

NOTE:
All material detailed or indicated on this sheet together with the cost of manufacturing and installing the same shall be considered as "Bridge Shoes Item # 36.2"
All sole plates shall be field welded along the edges of beam flanges with a continuous 5/16 fillet weld after all dead load has been placed on the structure. Cost of field welding will not be paid for directly, but shall be subsidiary to Item #36.2.

ANCHOR BOLTS (60 REQ'D)
(N.T.S.)

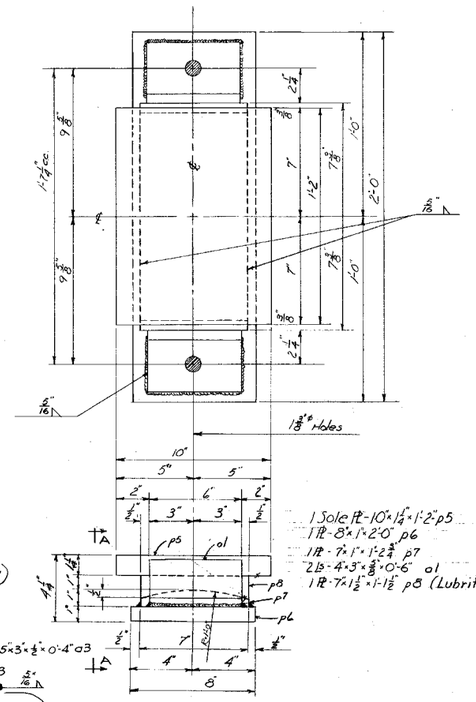


1 Sole Pl 10"×1¼"×1'-6" p1.
1-Pl - 8"×1"×2'-4" p2
1-Pl - 7"×1"×1'-6½" p3
2 Lb - 4"×3"×⅜"×0'-6" a1
1 Pl - 7"×1½"×1'-5½" p4 (Lubrite or equiv)

EXPANSION SHOE E1 (16 REQ'D)

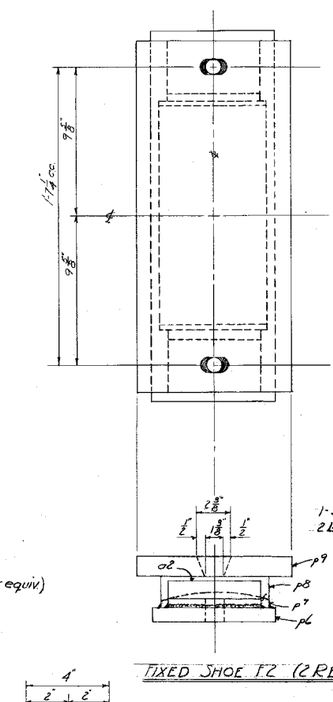
SECTION AA
Scale 1½"=1'-0"

Note: To be installed at E2 only.

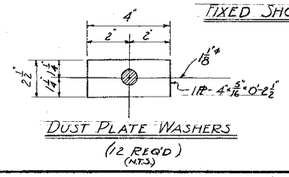


1 Sole Pl-10"×1¼"×1'-2" p5
1 Pl-8"×1"×2'-0" p6
1 Pl-7"×1"×1'-2⅜" p7
2 Lb-4"×3"×⅜"×0'-6" a1
1 Pl-7"×1½"×1'-1½" p8 (Lubrite or equiv)

EXPANSION SHOE E2 (8 REQ'D)



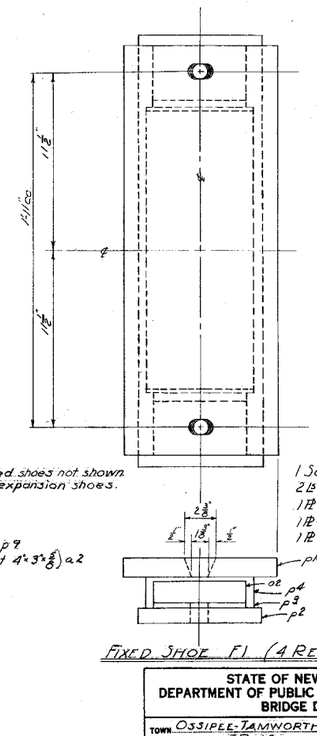
FIXED SHOE F2 (2 REQ'D)



DUST PLATE WASHERS
(12 REQ'D)
(N.T.S.)

NOTE:
Details of Fixed shoes not shown. Same as for expansion shoes.

1-Sole Pl 10"×1¼"×1'-10⅜" p9
2 Lb-4"×1¾"×⅝"×0'-6" (Cut 4"×3"×⅝") a2
1 Pl-p6
1 Pl-p7
1 Pl-p8



1 Sole Pl 10"×1¼"×2'-2½" p10
2 Lb - a2
1 Pl - p2
1 Pl - p3
1 Pl - p4

FIXED SHOE F1 (4 REQ'D)

25/203

SHEET SCALE: 3"=1'-0" (except as noted)

△	DESCRIPTION	BY	DATE

REVISIONS

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

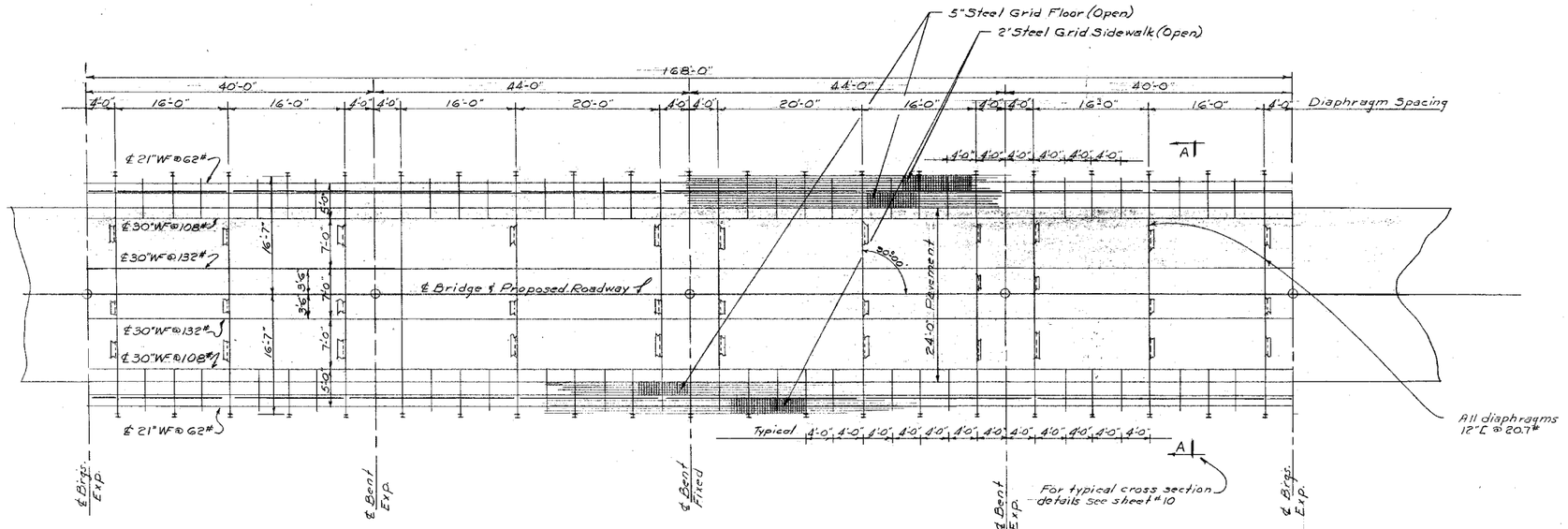
TOWN Ossipee-Tamworth BRIDGE NO. 137/299
FEDERAL PROJECT ER-12 STATE PROJECT P-2738
ROUTE NO. NH "16" OVER Relief Structure
LOCATION Approx. 2.0 mi. So. Ossipee-Tamworth T.L.

BRIDGE SHOE DETAILS

	BY	DATE		BY	DATE	BRIDGE SHEET NO.
DESIGNED	H.E.L.	7-54	CHECKED			8 OF 12
DRAWN	J.J.T.H.	8-54	CHECKED	E.Y.	2-54	
TRACED			CHECKED	—		FILE NUMBER
QUANTITIES	E.G.S.	9-54	CHECKED	E.Y.	9-54	3-4-3-5

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	25	159

FED. ROAD DIV. NO.	STATE	E.R. PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	12		26	161



Note

For materials and details of end dams and railings see sheets #11 and #10

For details of bridge shoes see sheet # 8

26/203

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN Ossipee-Tamworth BRIDGE NO. 137/222
FEDERAL PROJECT E.R. 12 STATE PROJECT P-2738
ROUTE NO. N.H. # 16 OVER Relief Structure
LOCATION Approx. 2.0 Mi. So. Ossipee-Tamworth T.L.

FRAMING PLAN

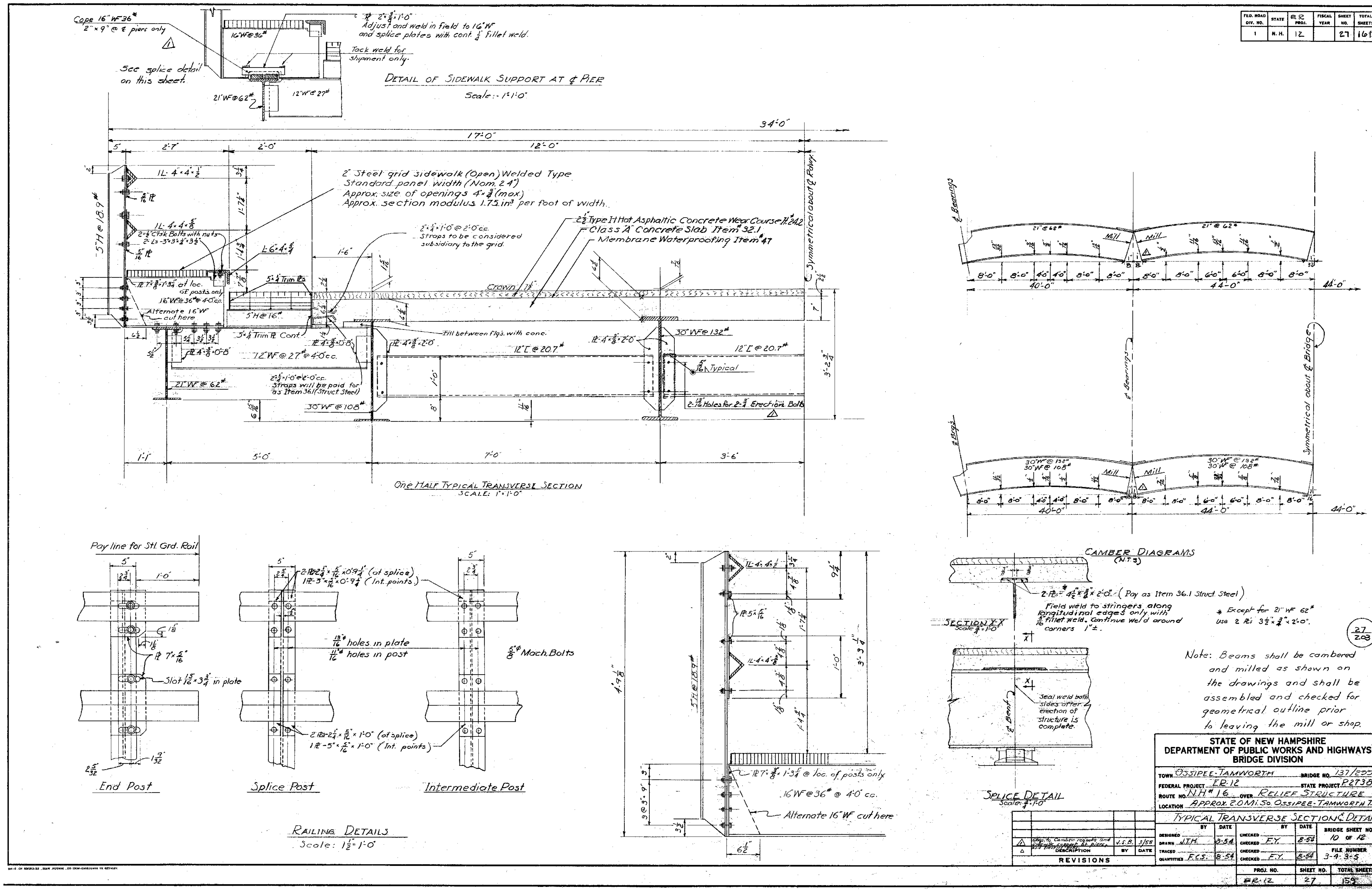
	BY	DATE
DESIGNED		
DRAWN	F.Y.	8-54
TRACED		
QUANTITIES	F.C.S.	8-54

	BY	DATE
CHECKED		
CHECKED	J.T.H.	9-54
CHECKED		
CHECKED	F.Y.	8-54

BRIDGE SHEET NO. 9 OF 12
FILE NUMBER 3-4-3-5

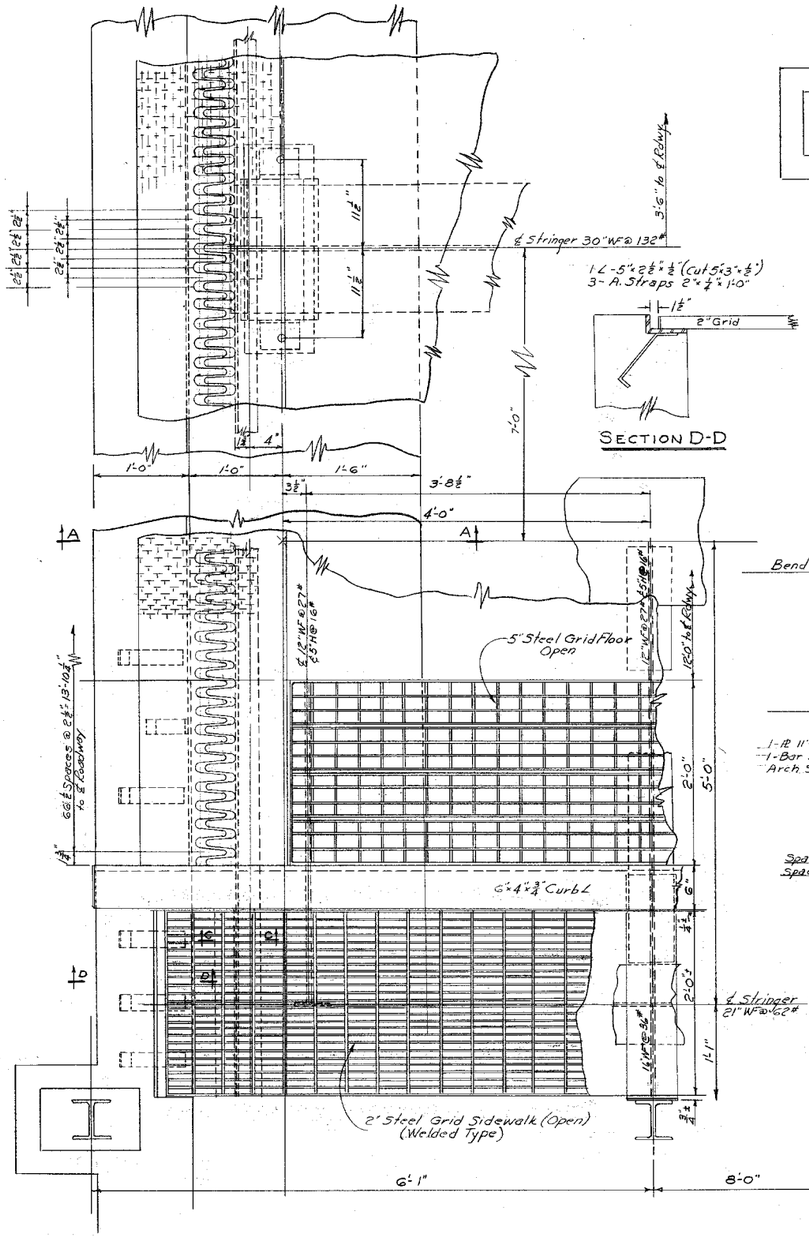
PROJ. NO.	SHEET NO.	TOTAL SHEETS
E.R. 12	26	159

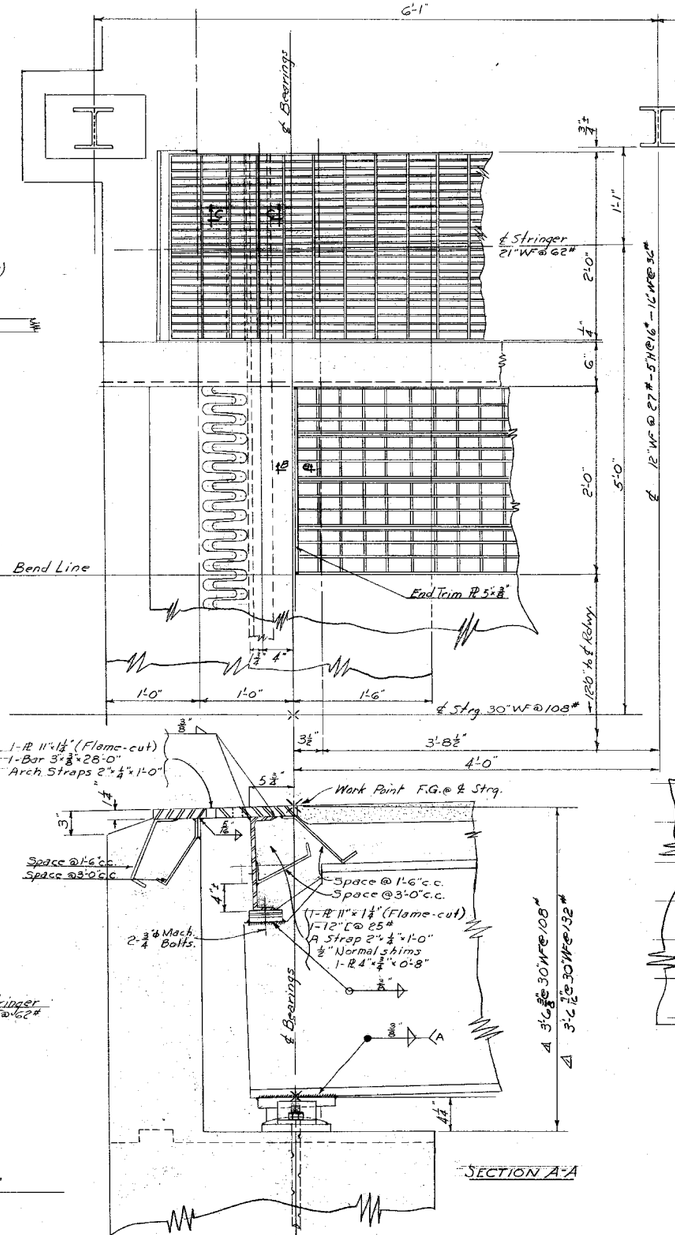
△	DESCRIPTION	BY	DATE
	REVISIONS		

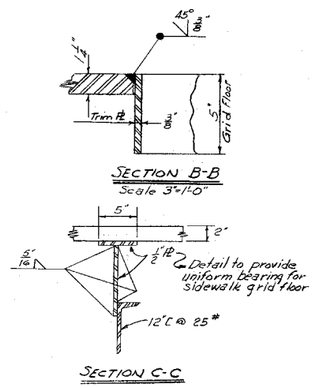


NH-744_DRAWING-22

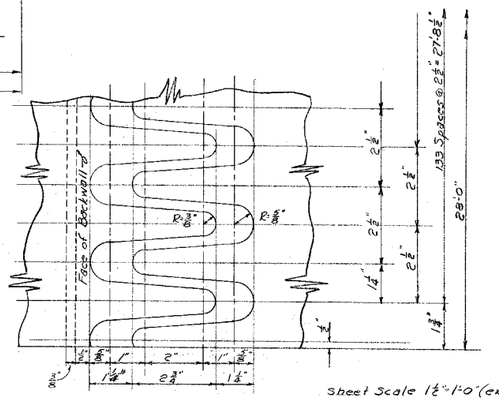
FED. ROAD DIV. NO.	STATE	E.R. PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	12		28	161







NOTE:
End dam and other detail shown apply to South Abutment. Details of North Abutment are similar
A See note on sheet of Bridge Shoes



ENLARGED DETAIL
(Half Actual Size)
TEMPLATE OF FLAME-CUT END DAM FINGERS

28
203

Sheet Scale 1½"=1'-0" (except as noted)

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN Ossipee-Tamworth BRIDGE NO. 137/299
FEDERAL PROJECT E.R. 12 STATE PROJECT 12738
ROUTE NO. N.H. #16 OVER Relief Structure
LOCATION Approx. 2.0 mi. So. Ossipee-Tamworth T.L.

EXPANSION DETAILS

	BY	DATE
DESIGNED	R.W.P.	2/54
DRAWN	F.Y.	2-54
TRACED		
QUANTITIES	F.C.S.	8-54
CHECKED	J.T.H.	8-54
CHECKED	F.Y.	8-54
CHECKED		

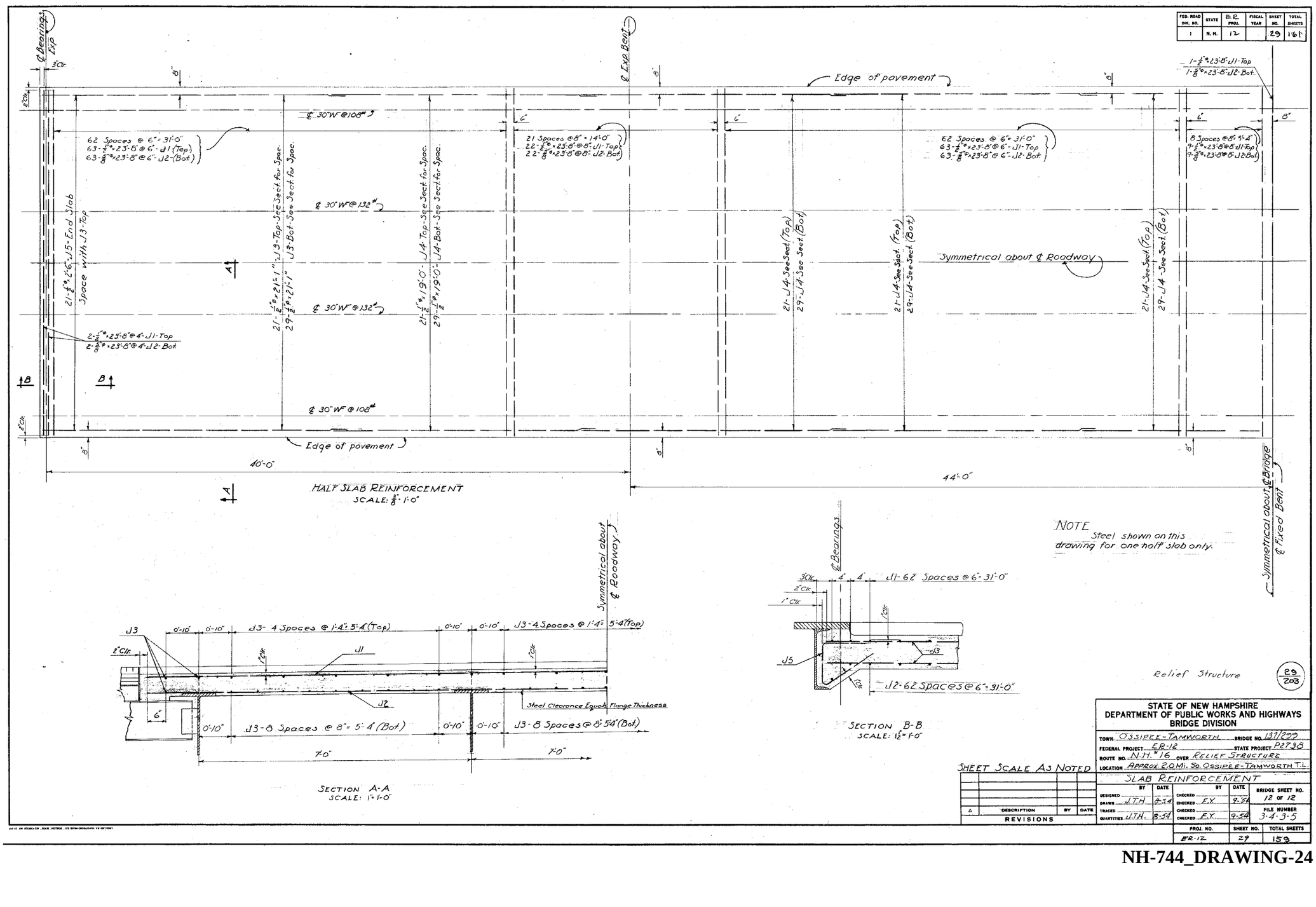
BRIDGE SHEET NO. 11 OF 12
FILE NUMBER 3-4-3-5

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	28	153

△	Chgd. dimensions	V.S.B.	7/56
△	DESCRIPTION	BY	DATE

REVISIONS

FED. ROAD DIV. NO.	STATE	E. P. PROJ.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	N. H.	12		29	161



HALF SLAB REINFORCEMENT
SCALE: ⅜" = 1'-0"

SECTION A-A
SCALE: 1" = 1'-0"

SECTION B-B
SCALE: 1½" = 1'-0"

NOTE
Steel shown on this drawing for one half slab only.

Relief Structure

29/203

SHEET SCALE AS NOTED

Δ	DESCRIPTION	BY	DATE

REVISIONS

STATE OF NEW HAMPSHIRE
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
BRIDGE DIVISION

TOWN OSSIPEE-TAMWORTH BRIDGE NO. 137/299
FEDERAL PROJECT ER-12 STATE PROJECT P2738
ROUTE NO. N.H. "16 OVER RELIEF STRUCTURE
LOCATION APPROX 2.0 Mi. So. OSSIPEE-TAMWORTH T.L.

SLAB REINFORCEMENT

	BY	DATE		BY	DATE
DESIGNED			CHECKED		
DRAWN	J.T.H.	8-54	CHECKED	F.Y.	9-54
TRACED			CHECKED		
QUANTITIES	J.T.H.	8-54	CHECKED	F.Y.	9-54

BRIDGE SHEET NO. 12 OF 12
FILE NUMBER 3-4-3-5

PROJ. NO.	SHEET NO.	TOTAL SHEETS
ER-12	29	159

NH-744_DRAWING-24

INDIVIDUAL INVENTORY FORM

NHDHR INVENTORY # OSS0030

Name, Location, Ownership

1. Historic name: Ossipee Bridge 137/297
2. District or area: n/a
3. Street & number: NH 16 & NH 25 over Bearcamp River
4. City or town: Ossipee
5. County: Carroll
6. Current owner: State of NH

Function or Use

7. Current use(s): State highway bridge, Ossipee 137/297
8. Historic use(s): same

Architectural Information

9. Style: 5-span continuous I-beam stringer with reinforced concrete slab deck
10. Architect/builder: NH Highway Dept./ Peter Salvucci & Sons, Inc. Waltham MA.
11. Source: NHDOT Plans and Records
12. Construction date: 1955
13. Source: NHDOT Plans and Records
14. Alterations, with dates:
15. Moved? no ☒ yes ☐ date:

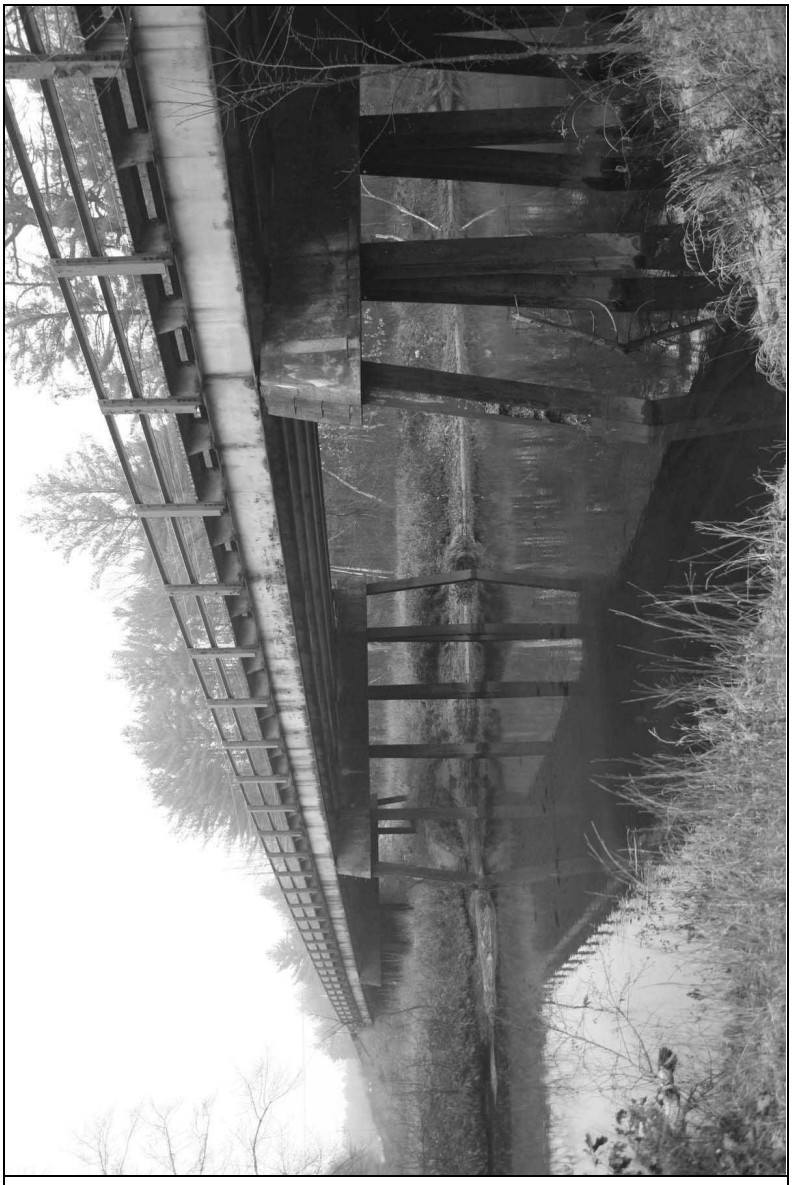
Exterior Features

16. Foundation: concrete abutments; steel H-pile bents
17. Cladding: n/a
18. Roof material: n/a
19. Chimney material: n/a
20. Type of roof: n/a
21. Chimney location: n/a
22. Number of stories: n/a
23. Entry location: n/a
24. Windows: n/a

Replacement? no ☐ yes ☐ date:

Site Features

25. Setting: State highway, wetlands, late 20th c. residential commercial
26. Outbuildings: n/a



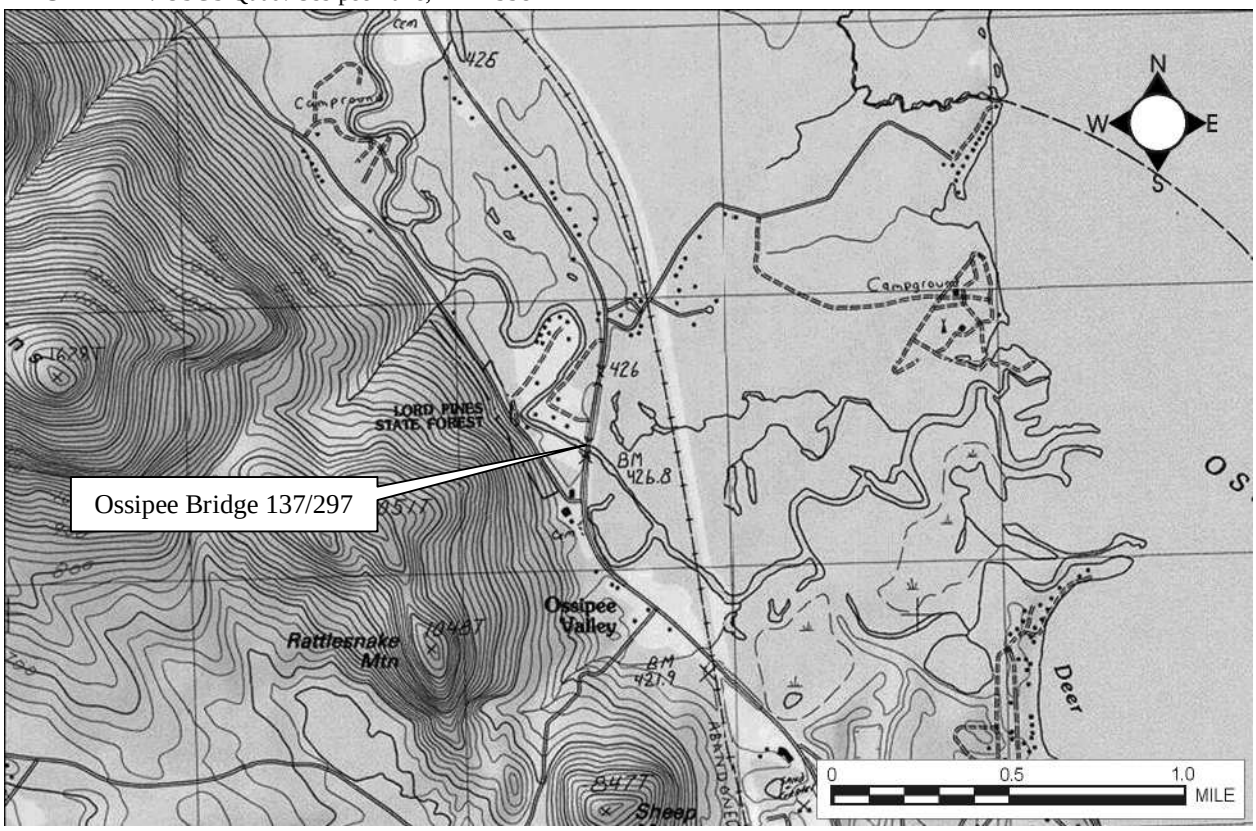
35. Photo # 1 36. Date: 12/04/ 2012
37. Digital Photo File Name: OSS0030_001 Direction E
38. Image stored at: Historic Documentation Co., Inc.
Portsmouth, RI 02871. tel. 401-683-3483

27. Landscape features: open floodplain bordered by woods
28. Acreage: less than 1
29. Tax map/parcel #: n/a
30. UTM reference: 19.324513.4851653
31. USGS quad and scale: Ossipee Lake, NH 1998, 7.5 min

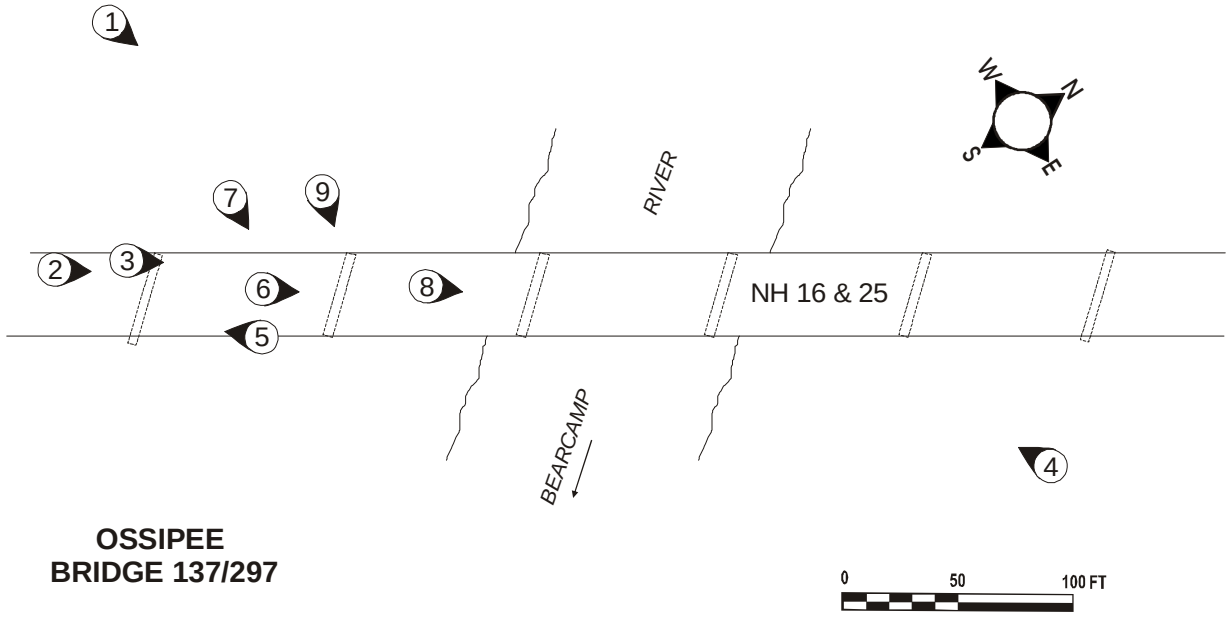
Form prepared by

32. Name: Richard M. Casella
33. Organization: Historic Documentation Company, Inc.
34. Date of Survey: December 2012

39. LOCATION MAP: USGS Quad: Ossipee Lake, NH 1998



40. PROPERTY MAP AND KEY TO PHOTOS:



OSSIPEE
BRIDGE 137/297

41. Historical Background and Role in the Town or City's Development: [1]

Ossipee was incorporated as a town by the NH Legislature in 1785. The initial cutting of the primary roads in the area was substantially accomplished during the 1770s. What is now Route 16 in the vicinity of Ossipee Bridge 152/268 was built in 1776 by Captain John Dudley. It was know as Captain Dudley's Wagon Road, or the Tamworth Road, and ran almost eight miles from Duncan Lake through Center Ossipee to Ossipee Valley. The road was continued north to West Ossipee the following year (1777) by settlers under the direction Colonel Jonathan Moulton.[2]

In 1871 the Portsmouth, Great Falls & Conway Railroad was built through Ossipee, roughly paralleling the Tamworth Road and crossing over it at Ossipee Valley. The development brought by the railroad to the towns along its route, eventually translated to demand for improvement to the Tamworth Road with the growth of the automobile age. In 1903 John Storrs, the first highway engineer of New Hampshire, proposed that the state should "build three roads into the White Mountains…one up the Saco Valley, one up the Merrimack Valley and one up the Connecticut Valley."[3] The system became known as "the triple highway program" and designated "The Trunk Line System" in the states earliest highway legislation enacted between 1905 and 1909 that enabled State Aid for their construction. The three roads were labeled the East Side Road, the Merrimack Valley Road and the West Side Road. By 1910, sections of the East Side Road, including parts of the Tamworth Road through Ossipee were under construction with state aid funding.[4]

In 1922 the state route marking system was adopted by the Highway Commissioners of the New England States and the East Side Road was designated New England Interstate Route 16. It began in Kittery, Maine passing into New Hampshire at Rollinsford and passing through Dover, Rochester, Union, Wakefield, Ossipee, Conway, Berlin to end in Errol.[5] Since then, Route 16 has been rerouted and re-designated entirely a state route and combined in part with NH Route 25. In 1938, the original legislation that created the East Side Road was amended, changing the name to the White Mountain Highway.

Planning for the design of Ossipee Bridge 137/297 began in May and June 1954 with surveys and borings taken by New Hampshire Highway Department forces. The design of the superstructure and steel pile bents was done by the department's [Chief] Bridge Engineer Harold E. Langley and Assistant Bridge Engineer Robert J. Prowse between June and August 1954. John S. Brinkler designed the reinforced concrete pile bent caps and abutments. A total of twelve sheets of plans were prepared (NHDOT File No. 3-4-3-2). The project was assigned Federal Aid Project number ER12 and State Project number P-2738.

Ossipee 137/297 and its companion bridge of the same but smaller design, Ossipee 137/299,[6] were built as part of a new section of highway approximately 2000 feet long that was constructed to straighten White Mountain Highway, eliminate a sharp turn in the road, and replace an existing bridge over Bearcamp River (see Figure 2). The highway and bridges were in turn part a larger project improvement project 5.57 miles long that included paving, a 25' span concrete frame bridge (box culvert) and the moving of five buildings. The contract was won with the low bid of $912,317.40 by Peter Salvucci & Sons, Inc., of Waltham, Mass.[7] Out of that total, Ossipee Bridge 137/297 cost $162,100.45; the smaller Ossipee 137/299 cost $73,146.40.[8] No further information on the construction was obtained other than the overall project was completed in October 1956.[9]

42. Applicable NHDHR Historic Contexts: 84. Automobile highways and culture, 1900-present

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[1] Note: Ossipee Bridge 137/297 was built in conjunction with Ossipee 137/299 (see Inventory Form OSS0031) and shares the same background and construction history.
[2] Cook, 1985, p. 134.
[3] Laraba, 1928, p. 7.
[4] Third Biennial Report of the Governor and Council and State Engineer Relative to Highway Improvement. Concord: 1910. pp. 3, 4, 9.
[5] See "New Hampshire's Road Marking System," *New Hampshire Highways*, September 1923, p. 9.
[6] Ossipee 137/299 is located about 1000 feet north of the subject bridge and carries the highway over the Bearcamp River Relief Structure, a flat flood plain channel constructed to accept Bearcamp River overflow during high water events. The Relief Structure bridge is inventoried on separate Inventory Form OSS0031.
[7] New Hampshire Highways, March-April 1955, p. 8.
[8] Bridge Inventory Cards for respective bridges, on file at NHDOT.
[9] New Hampshire Highways, December 1956, p. 13.

43. Architectural Description and Comparative Evaluation:

Ossipee Bridge 137/297 is a two-lane five-span continuous steel I-beam stringer bridge with a reinforced concrete slab deck (see Figures 3-5). It carries combined NH Routes 16 and 25 over the Bearcamp River in Ossipee NH at a skew angle of roughly 16 degrees. Overall it is 393 feet in length and 32' in width. The bridge is carried on steel H-piles with concrete pile-cap abutments and four concrete pile cap bents. The span lengths and layout are: 76'-80'-80'-80'-76'. The superstructure consists of six lines of wide- flange stringers of various sizes according to the loads they carry: outside stringers 1 and 6 under the sidewalks are 30WF124 (30" deep, 124 pounds per linear foot); stringers 2 and 5 are 36WF230; inside stringers 3 and 4 are 36WF280. The stringers were fabricated in the span lengths listed above and made continuous by field-welding steel splice-plates to the top of the flanges at the end butt-joints over the bents. The stringers were specifically designed to function as simple beams under dead load and continuous beams under live loads (see Figure 6). This sophisticated and possibly uncommon design is further discussed below. The stringers are laterally braced with diaphragms consisting of 12" channels field-bolted to angles that were shop-welded to the stringer webs. The stringers rest on fixed bearing shoes on bents 2 and 3, and on sliding low-friction alloy bearings at all other bearing points, noted on the plans as "Lubrite or equivalent" – Lubrite being one of the brands of so-called "self-lubricating" bridge bearings on the market at the time.

The plans show the reinforced concrete deck to be 6-1/2" thick with a 2-1/2" asphaltic concrete wearing course. Along each side of the two 12'-wide travel lanes are 24" wide open steel grid shoulders, followed by 30" wide open steel grid sidewalks raised 8" above the road. The original steel-angle curbs and steel railings consisting of two lines of angles bolted to H-section posts, remain. At each end of the bridge, attached to and extending across the entire width of the ends of the deck slab and the end dams (abutment backwall), are finger-type steel-plate expansion joints designed specifically for the bridge (see Figure 7).

The abutments are both identical and consist of a straight reinforced concrete bridge seat and backwall cast around seven 14" steel H-pilings spaced on 6' centers. Piles 1, 3, 5, & 7 are battered; 2, 4, & 6 are vertical. Plans show the piles were cut to an even height after driving, interconnected with steel channel spacers and imbedded about 2' into the concrete bridge seat. The abutment piles and about half the height of the bridge seats are buried with earth fill forming the raised approach grades.

The four pile bents are all identical and consist of twin batter piles directly under each of the four 36" deck stringers, and single batter end piles under the two 30" sidewalk stringers. Piles are all 14" x 73 p.l.f. steel H-piles. The end piles are battered 2/12" and provide bent stability lateral to the bridge; steel plate nosing or "ice breakers" are welded to the face of the upstream end piles. The inner twin piles are battered 1/12" opposing, to form a very steep A-frame, aligned with the longitudinal axis of the bridge for stability in that direction. The pile caps are solid reinforced concrete measuring 3-6" high x 3'-4" deep x 36'-3" long with 2/12 and 1/12 battered faces to match the pilings. Flood escape ladder rungs of bent steel rod are imbedded in the ends of the caps.

Comparative Evaluation: [10]

Ossipee Bridge 137/297 possesses several design features of interest based on initial research:

- The *combined simple/continuous beam design* that may have been used rarely by NHHD;
- The *H-pile bents of double batter pile design* and the *combined open-grid shoulder/steel curb/open-grid sidewalk assembly*, which although common to mid-20th century steel deck bridge design may have seen limited use in NH and of which an unknown number of intact examples remain.

The *combined simple/continuous beam design* is a specialized design that utilized off the shelf rolled wide flange girders that were then given a specific camber and the ends milled to a precise angle corresponding to the camber axis. Once each stringer was set in place end to end, steel splice plates were welded to the top of the flanges to join each to the next, forming a continuous top flange member but with a gap between the ends of the lower flanges (see Figure 6). When the dead load was applied (in the form of the reinforced concrete deck, sidewalks and railings) the beams deflected the precisely calculated amount to close the gap, which was then field-welded shut. With just the dead load applied, no loads are carried through the welded joints to the adjacent spans so the spans act as simple beams. When a live load is applied to one of the spans the beams deflect and some of the live load is transmitted to the neighboring spans through the welded joint by the structural principle of continuity. The design was apparently Langley's idea – he is credited as "designer" on the plans. Prowse is

[10] This section is the same as that contained on Form OSS0031 with the exception of the discussion of the companion bridge.

credited with drawing the plans, but considering these were the Number 1 and Number 2 designers in the department, they were undoubtedly advancing the design together, with the Assistant Engineer delegated the important task of putting the idea on paper in a manner that could be both fabricated and constructed in a practical cost-effective manner.

Preliminary research indicates that several other continuous steel I-beam bridges with concrete decks (IB-C) of similar type were built at this time:

Ossipee 137-299, NH 16 & 25 over Bearcamp River Relief Structure – companion structure of identical design except number of spans (4) and lengths of spans (40'-44'-44'-40'). See Inventory Form OSS0031 as previously noted above.

Conway 063/047, River Road over Saco River Overflow, built 1955, 127' length overall consisting of 3-spans, 38'-45'-38'. Bridge card notes the stringers act as simple beams under dead load and continuous beams under live load. It is carried on H-pile bents with single vertical piles, not the double battered A-frame type piles of the subject bridge. The bridge was rehabbed in 2005 but the nature of repairs and current integrity of original design and materials was not determined.

Portsmouth 241/053, NH 1B over Piscataqua Estuary to New Castle, (companion bridge to New Castle 031/142) built 1955, 540' length overall, consisting of 10 spans, grouped 3-continuous, 4 continuous, 3 continuous. Bridge card does not note if spans are simple under dead load. Bridge card photo, 1988, shows H-pile bents, some with double-battered A-frame type piles, steel grid shoulders, sidewalk and railing assembly like the subject bridge. The bridge substructure was repaired in 1988; the current integrity of original design and materials was not determined.

New Castle 031/142, NH 1B over Piscataqua Estuary to Portsmouth, (companion bridge to Portsmouth 241/053) built 1955, 480' length overall, consisting of 9 spans, grouped 3-continuous, 3 continuous, 3 continuous. Bridge card does not note if spans are simple under dead load. Bridge card photo, 1988, shows H-pile bents, some of which have double-battered A-frame type piles, steel grid shoulders, sidewalk and railing assembly like the subject bridge. The bridge substructure was repaired in 1988; current integrity of original design and materials was not determined.

Effingham 110/190, NH 153 over Ossipee River, built 1955, 243' length overall consisting of 3 continuous spans carried on concrete hammerhead-type piers. The design of the shoulders, sidewalk and railing on the Effingham bridge was not determined. The bridge was rehabbed in 2001; current integrity of original design and materials also was not determined. An article on the structure in *New Hampshire Highways* magazine, notes the bridge was designed by Robert J. Prowse, and that a feature of the design was the stringers that acted as simple beams under dead load and as a 3-span continuous beam under live load:

> "This type of design involves precision analysis for individual span cambers so that in the final structure the cambers of all three spans present a clean-cut, continuous, vertical curve. A valuable feature of this type of structure, because of its ease of construction, is its economy, as shown by savings indicated in (1) relatively brief steel erection time, (2) elimination of end dams for expansion at the piers, (3) elimination of extra bridge shoes, and (4) steel, due to continuity of live load." [11]

44. National or State Register Criteria Statement of Significance:

Ossipee Bridge 137/297 is not associated with events important to the broad patterns of our history. The highway improvement project as a whole and the new section of highway containing the two bridges undoubtedly increased driving safety and allowed greater speed for tourists passing through Ossipee on their way to and from the White Mountains, but there is no evidence to suggest that these improvements resulted in any direct and significant effects on the development of the town or the immediate area. The bridge is therefore not eligible for the National Register under Criteria A.

Ossipee Bridge 137/297 is an example of a continuous I-beam stringer deck highway bridge of an uncommon design that combined simple and continuous beam design. The total number of bridges of this type designed by the NHHD and built can not be readily determined since the specific features of the type are not identified in the DOT bridge database. The unique continuous design is not evident in photographs and requires examination of the original plans to be certain. Several other combined simple and continuous beam design bridges were identified with the help of Dave Powellson of NHDOT, but none

[11] New Hampshire Highways, February-March, 1956, pp. 6-7.

possess equivalent features and retain complete integrity of materials and design. The bridge was designed by Harold E. Langley, Bridge Engineer, and Robert J. Prowse, Assistant Bridge Engineer, the most noted engineers in the history of the New Hampshire Highway Department. The design may have been the first of its type designed by the NHHD; the other examples identified thus far, followed it. The merits of the design were described by Prowse in an article on a later bridge, suggesting the initial collaboration with Langley led the way to the subsequent designs, primarily designed by Prowse. It is known that Langley and Prowse collaborated on numerous bridge designs. Further research would be required to determine the exact role the Bearcamp River bridges played in the development and use of the combined simple/continuous beam bridge design.

The bridge retains features representative of mid-20th c. bridges of the type, specifically the H-pile bents of double batter-pile design, the combined open-grid shoulder/steel curb/open-grid sidewalk assembly, and the original steel angle railings. These features were common to mid-20th century steel deck bridge design but may have seen limited use in NH and an unknown number of intact examples remain.

Ossipee Bridge 137/297 possesses distinctive engineering characteristics, is a significant work of two engineers important to New Hampshire bridge engineering history, and may have played a important role in the development of a specialized bridge type in New Hampshire. It is therefore potentially eligible for the National Register under Criteria C.

45. Period of Significance: 1955

46. Statement of Integrity:

The property retains integrity of location, setting, association, feeling, design, materials and workmanship.

47. Boundary Discussion: The boundary of the property is defined by the physical limits of the bridge and its abutments and attached retaining walls.

48. Bibliography and/or References:

Cook, Edward M. *Ossipee, New Hampshire 1785-1985: A History.* Ossipee: Peter E. Randall Published, 1985.

Hurd, D. H. *Town and County Atlas of the State of New Hampshire.* (Philadelphia: D. H. Hurd & Co. 1892).

Laraba, Rae S. "Backbone of New Hampshire's Trunk Line System Originally Planned by John W. Storrs." *New Hampshire Highways*, November 1928, pp. 7-8.

New Hampshire. Sixth Biennial Report of the State Department of Highways. Concord: 1917, pp. 3, 4, 121-123.

NHDOT Bridge Card and Inspection Files. Available at NH Department of Transportation, Bridge Design, Concord.

New Hampshire Highways. [Official Publication of the New Hampshire Good Roads Association.]. Located in NH State Library.

Surveyor's Evaluation:

NR listed:	individual	_____	NR eligible:		NR Criteria:	A	____
	within district	_____	individual	__X___		B	_____
			within district	____		C	___X__
Integrity:	yes	__X__	not eligible	____		D	_____
	no	____	more info needed	_____		E	_____

Photography Statement: I, the undersigned, confirm that the photos in this inventory form have not been digitally manipulated and that they conform to the standards set forth in the NHDHR Digital Photo Policy. These photos were printed with HP Photosmart 7850 Printer, HP Vivera 100 Gray Photo Ink, HP Premium-Plus Photopaper. The digital files are housed at Historic Documentation Company, Inc., Portsmouth, RI.

Richard M. Candee

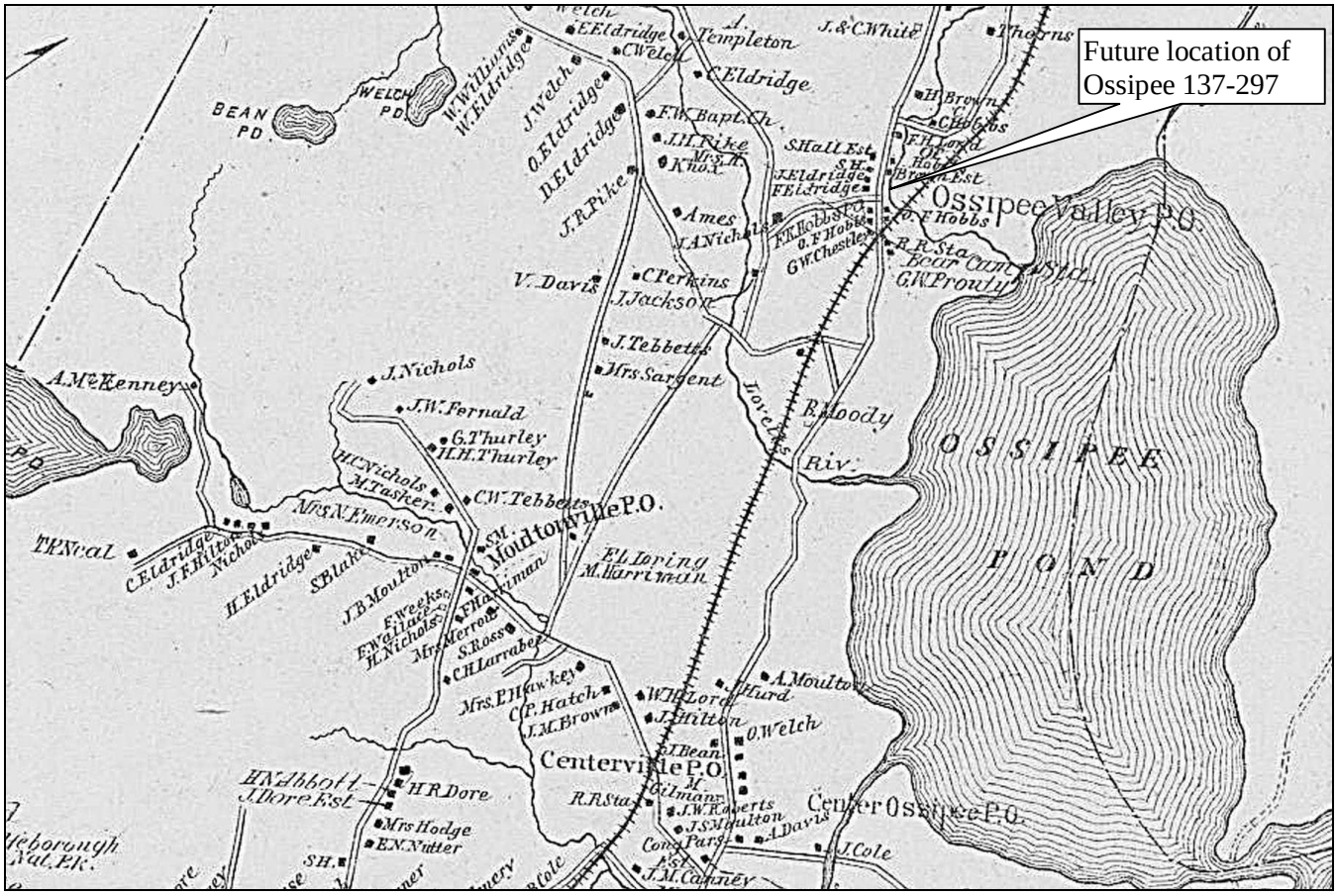


FIGURE 1: Hurd 1892 Atlas, Map of Town of Ossipee.

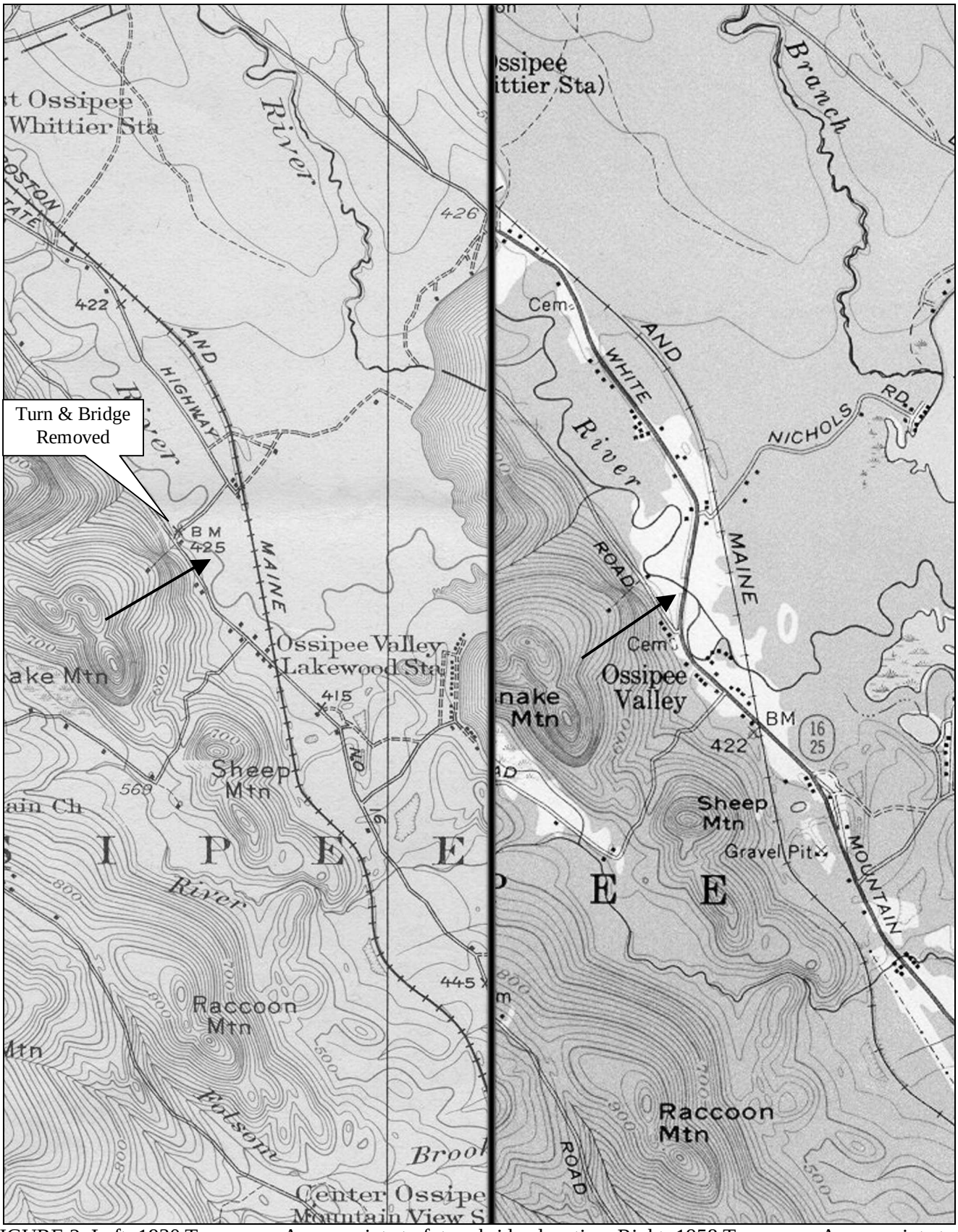


FIGURE 2: Left, 1930 Topo map; Arrow points to future bridge location. Right, 1958 Topo map, Arrow points to bridge location on section of new road built with bridge in 1955 to remove narrow bridge, sharp turn and straighten Rt. 16 White Mountain Highway.

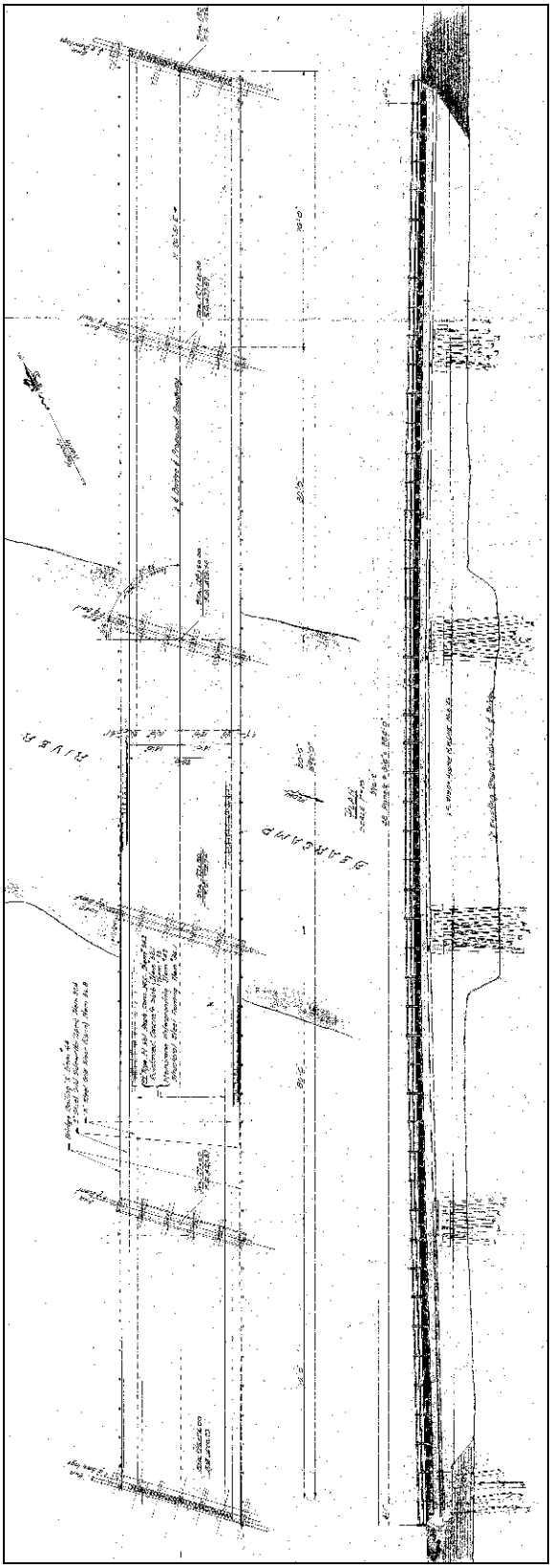


FIGURE 3: Plan of bridge from original drawings (NHDOT File No. 3-4-3-2).

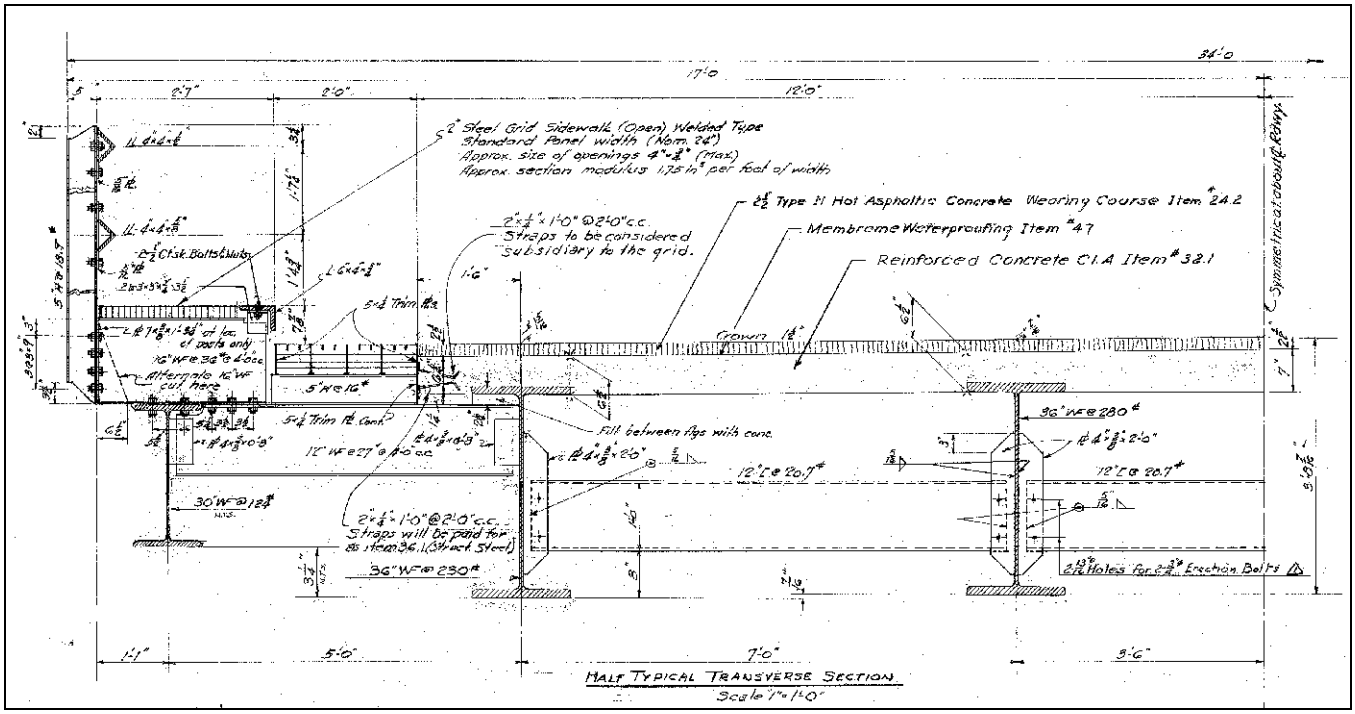


FIGURE 4: Half transverse section of deck and superstructure from original drawings (NHDOT File No. 3-4-3-2).

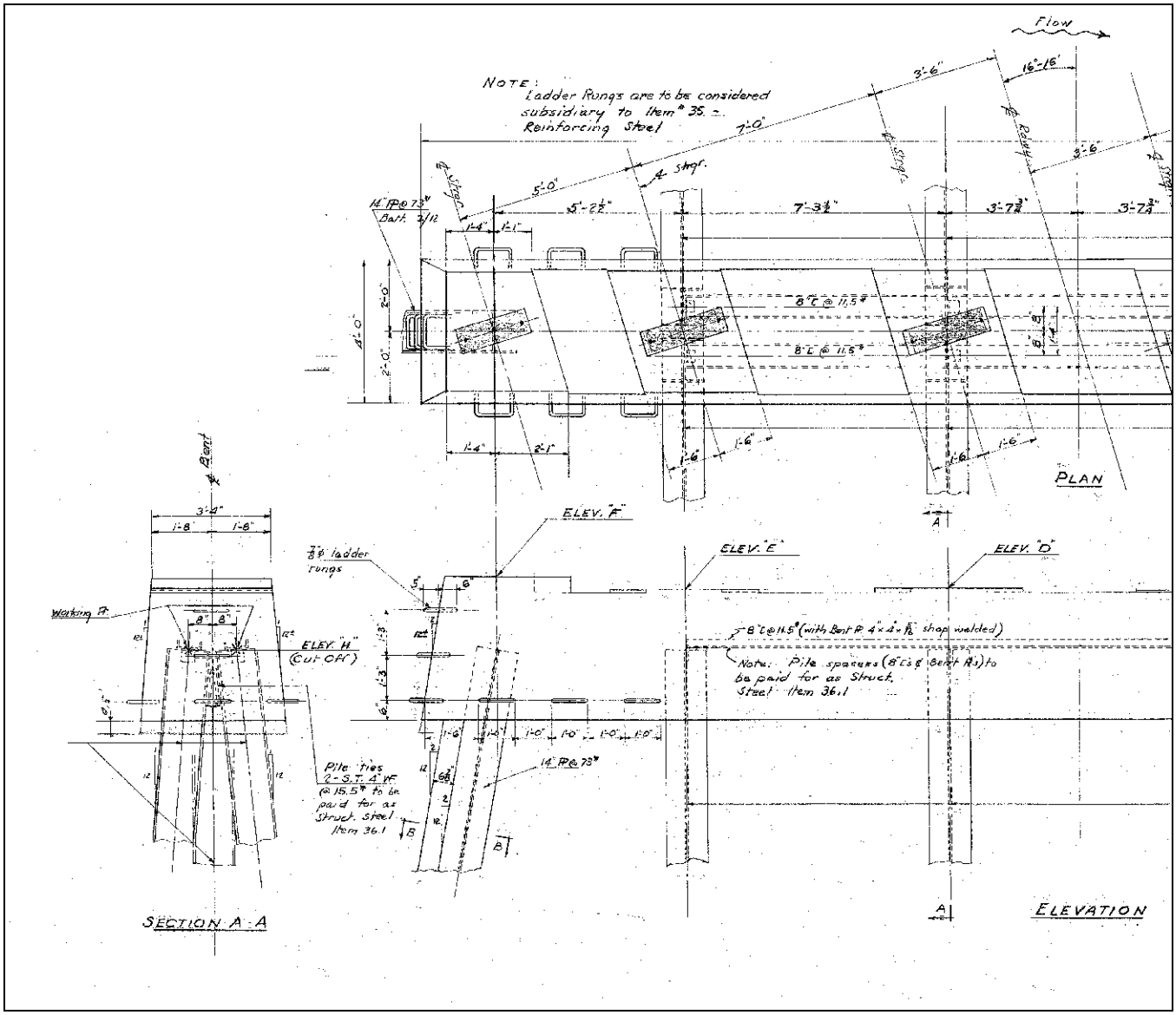


FIGURE 5: Plan, elevations and section of H-pile bent from original drawings (NHDOT File No. 3-4-3-2).

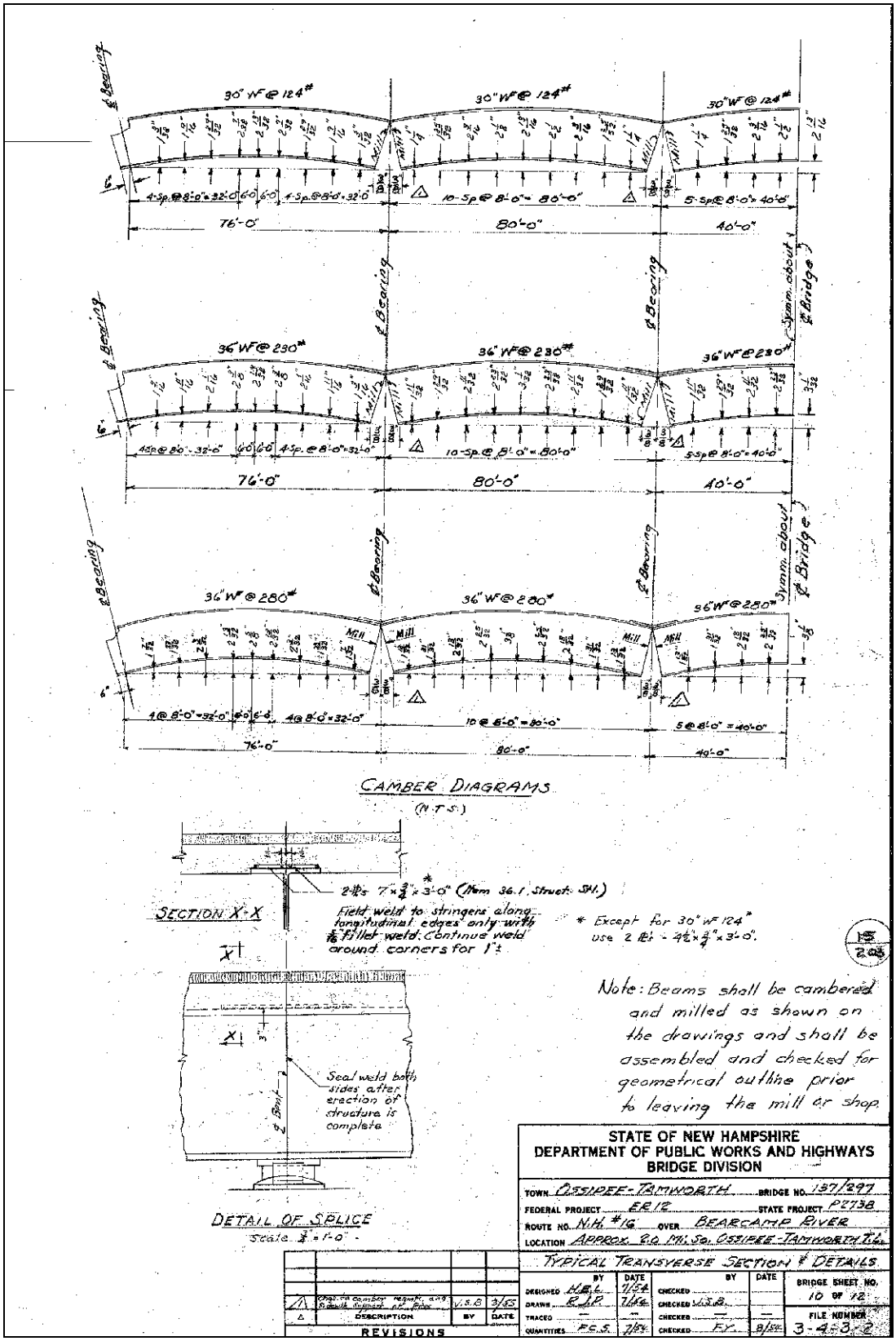


FIGURE 6: Stringer camber and splice details, part of the design that makes the stringers function structurally as both simple and continuous beams (From Sheet 10 of original drawings, NHDOT File No. 3-4-3-2).

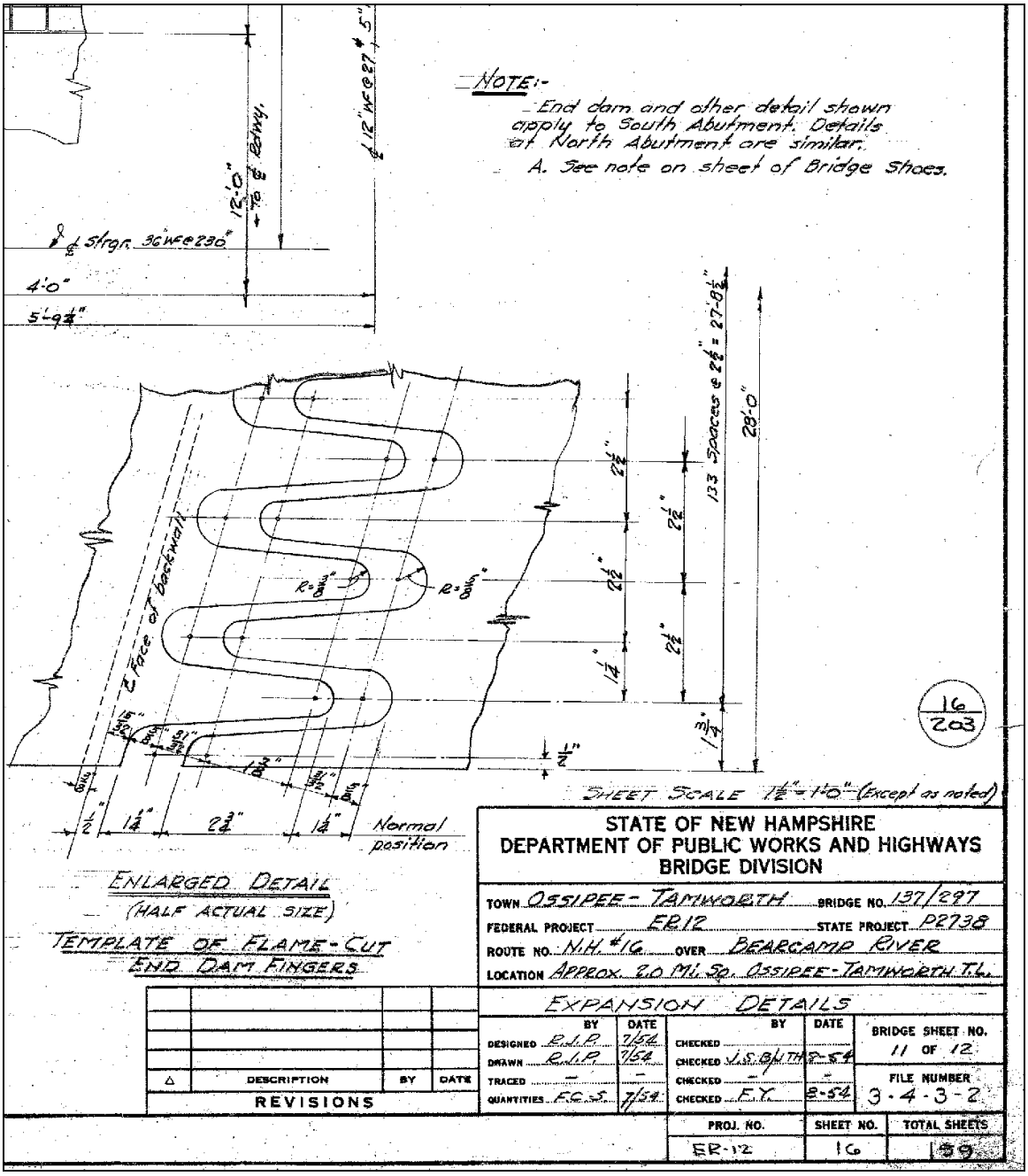


FIGURE 7: Deck expansion joint details showing custom finger-joints designed for skew of bridge by R. J. Prowse. (From Sheet 11 of original drawings, NHDOT File No. 3-4-3-2).

Address: Ossipee Bridge 137/297, Rt. 16 / Bearcamp R. Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 2 description: Roadway view showing deck beam camber.

Digital Photo File Name: OSS0030_02 Direction: NE

Address: Ossipee Bridge 137/297, Rt. 16 / Bearcamp R. Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 3 description: Steel grid shoulder, steel curb, grid sidewalk and heavy angle railing. Note portion of finger expansion joint visible.

Digital Photo File Name: OSS0030_03 Direction: NE

Address: Ossipee Bridge 137/297, Rt. 16 / Bearcamp R. Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 4 description: Overall view of downstream side.

Digital Photo File Name: OSS0030_04 Direction: SW

Address: Ossipee Bridge 137/297, Rt. 16 / Bearcamp R. Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 5 description: Concrete abutment and underside of steel grid shoulders.

Digital Photo File Name: OSS0030_05 Direction: SW

Address: Ossipee Bridge 137/297, Rt. 16 / Bearcamp R. Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 6 description: Underside and H-pile bent.

Digital Photo File Name: OSS0030_06 Direction: NE

Address: Ossipee Bridge 137/297, Rt. 16 / Bearcamp R. Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 7 description: Railing and grid sidewalk assembly.

Digital Photo File Name: OSS0030_07 Direction: E

Address: Ossipee Bridge 137/297, Rt. 16 / Bearcamp R. Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 8 description: Bearcamp River, bent and underside.

Digital Photo File Name: OSS0030_08 Direction: NE

Address: Ossipee Bridge 137/297, Rt. 16 / Bearcamp R. Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 9 description: H-pile bent showing double battered A-frame type piles.

Digital Photo File Name: OSS0030_09 Direction: E

INDIVIDUAL INVENTORY FORM

NHDHR INVENTORY # OSS0031

Name, Location, Ownership

1. Historic name: Ossipee Bridge 137/299
2. District or area: n/a
3. Street & number: NH 16, NH 25 over Relief for Bearcamp River
4. City or town: Ossipee
5. County: Carroll
6. Current owner: State of NH

Function or Use

7. Current use(s): State highway bridge, Ossipee 137/299
8. Historic use(s): same

Architectural Information

9. Style: 4-span continuous I-beam stringer w/rein-concrete slab deck
10. Architect/builder: NH Highway Dept./
11. Source: NHDOT Plans and Records
12. Construction date: 1955
13. Source: NHDOT Plans and Records
14. Alterations, with dates:
15. Moved? no ☒ yes ☐ date:

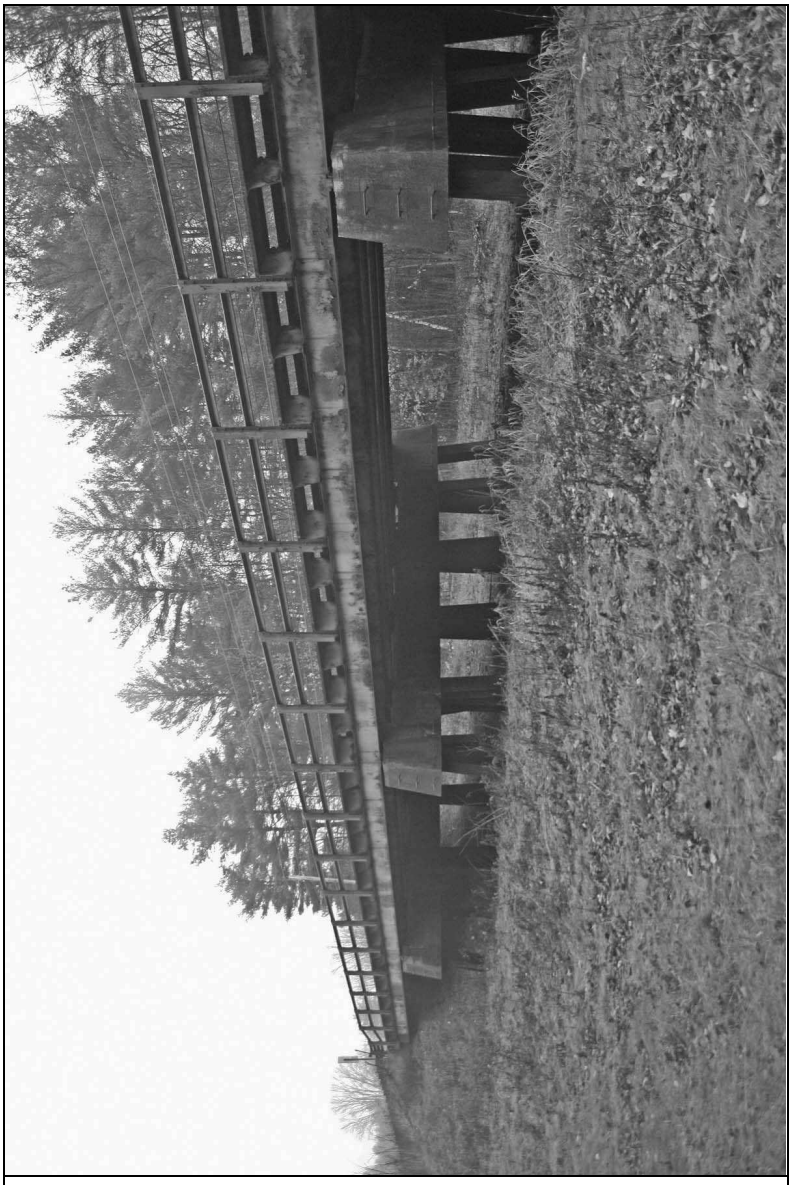
Exterior Features

16. Foundation: concrete abutments; steel H-pile bents
17. Cladding: n/a
18. Roof material: n/a
19. Chimney material: n/a
20. Type of roof: n/a
21. Chimney location: n/a
22. Number of stories: n/a
23. Entry location: n/a
24. Windows: n/a

Replacement? no ☐ yes ☐ date:

Site Features

25. Setting: State highway, wetlands, late 20th c. residential commercial
26. Outbuildings: n/a



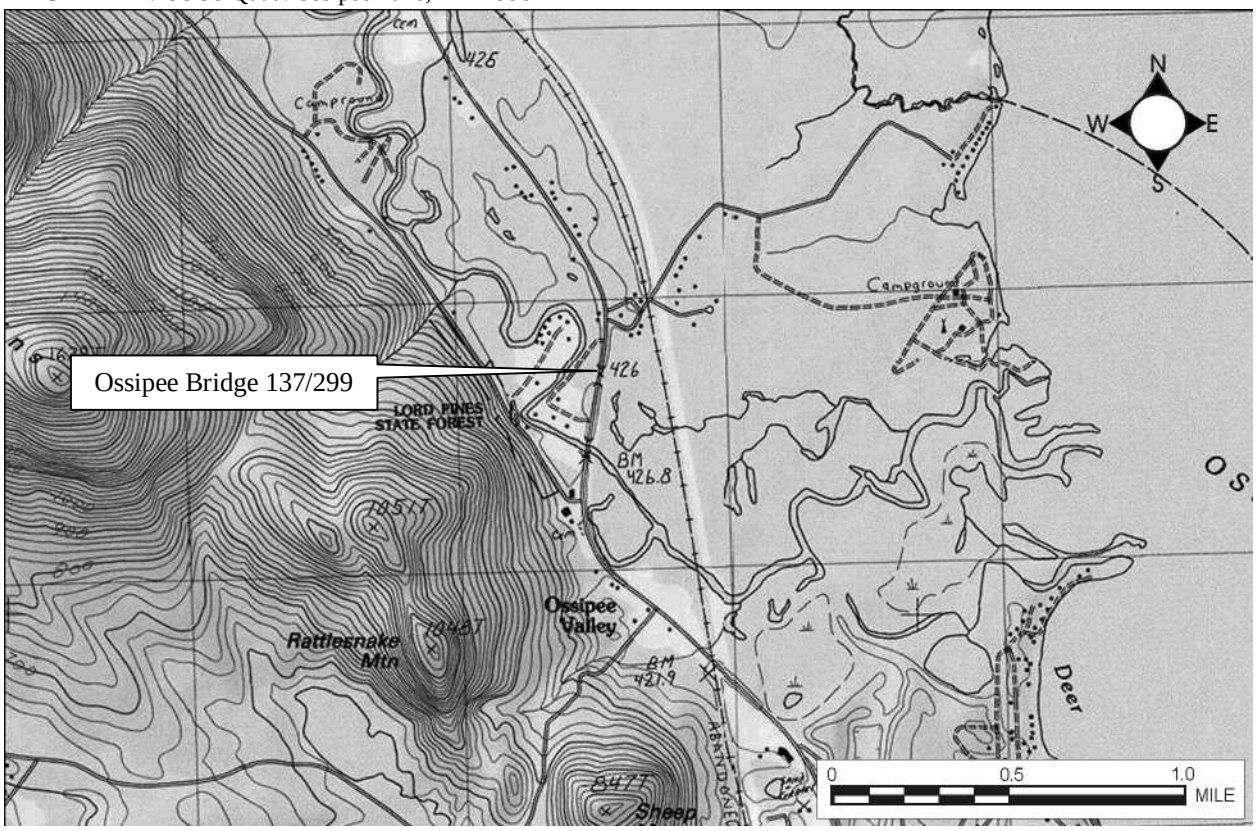
35. Photo # 1 36. Date: 12/04/ 2012
37. Digital Photo File Name: OSS0031_001 Direction E
38. Image stored at: Historic Documentation Co., Inc.
Portsmouth, RI 02871. tel. 401-683-3483

27. Landscape features: Flood plain bordered by woods
28. Acreage: less than 1
29. Tax map/parcel #: n/a
30. UTM reference: 19.324563.4851926
31. USGS quad and scale: Ossipee Lake, NH 1998, 7.5 min

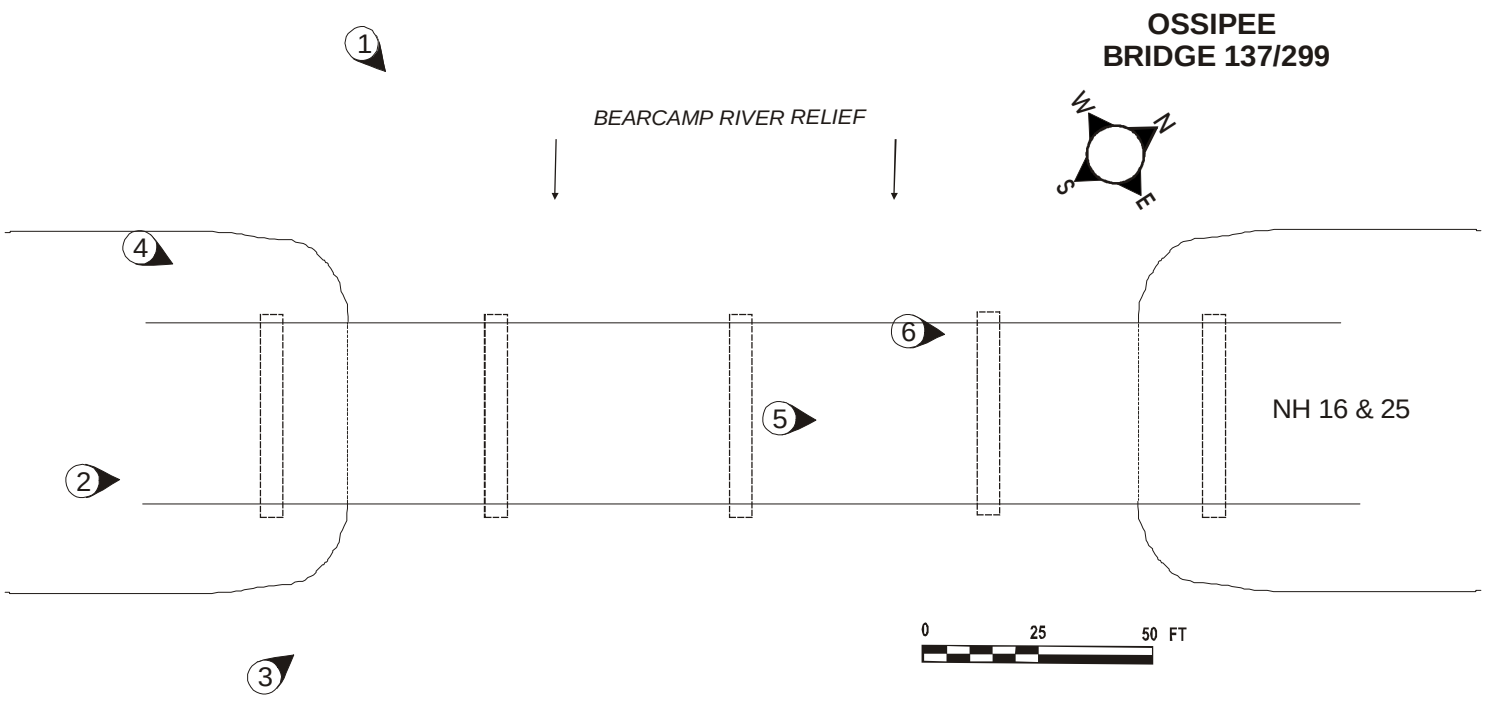
Form prepared by

32. Name: Richard M. Casella
33. Organization: Historic Documentation Company, Inc.
34. Date of Survey: December 2012

39. LOCATION MAP: USGS Quad: Ossipee Lake, NH 1998



40. PROPERTY MAP AND KEY TO PHOTOS:



41. Historical Background and Role in the Town or City's Development: [1]

Ossipee was incorporated as a town by the NH Legislature in 1785. The initial cutting of the primary roads in the area was substantially accomplished during the 1770s. What is now Route 16 in the vicinity of Ossipee Bridge 152/268 was built in 1776 by Captain John Dudley. It was know as Captain Dudley's Wagon Road, or the Tamworth Road, and ran almost eight miles from Duncan Lake through Center Ossipee to Ossipee Valley. The road was continued north to West Ossipee the following year (1777) by settlers under the direction Colonel Jonathan Moulton.[2]

In 1871 the Portsmouth, Great Falls & Conway Railroad was built through Ossipee, roughly paralleling the Tamworth Road and crossing over it at Ossipee Valley. The development brought by the railroad to the towns along its route, eventually translated to demand for improvement to the Tamworth Road with the growth of the automobile age. In 1903 John Storrs, the first highway engineer of New Hampshire, proposed that the state should "build three roads into the White Mountains…one up the Saco Valley, one up the Merrimack Valley and one up the Connecticut Valley."[3] The system became known as "the triple highway program" and designated "The Trunk Line System" in the states earliest highway legislation enacted between 1905 and 1909 that enabled State Aid for their construction. The three roads were labeled the East Side Road, the Merrimack Valley Road and the West Side Road. By 1910, sections of the East Side Road, including parts of the Tamworth Road through Ossipee were under construction with state aid funding.[4]

In 1922 the state route marking system was adopted by the Highway Commissioners of the New England States and the East Side Road was designated New England Interstate Route 16. It began in Kittery, Maine passing into New Hampshire at Rollinsford and passing through Dover, Rochester, Union, Wakefield, Ossipee, Conway, Berlin to end in Errol.[5] Since then, Route 16 has been rerouted and re-designated entirely a state route and combined in part with NH Route 25. In 1938, the original legislation that created the East Side Road was amended, changing the name to the White Mountain Highway.

Planning for the design of Ossipee Bridge 137/299 began in August 1954 with surveys and borings taken by New Hampshire Highway Department forces. The design of the superstructure and steel pile bents was evidently done by the department's [Chief] Bridge Engineer Harold E. Langley and Assistant Bridge Engineer Robert J. Prowse; the two designed the larger companion structure Ossipee 137/297 which is identical except for size. Langley and Prowse are noted on some plan sheets, but on other sheets "Designed by" is blank. It is common that not all sheet in a project will be initialed by those who worked on them. Several sheets were drawn by "F.Y." which is believed to be Faust S. Ystueta who worked in NHHD bridge design in the 1950s. Other sheets were drawn by "J.T.H." – those initials are unknown. A total of twelve sheets of plans were prepared (NHDOT File No. 3-4-3-5). The project was assigned Federal Aid Project number ER12 and State Project number P-2738, the same project under which companion bridge Ossipee 137/297 was built.

Ossipee 137/299 and its companion bridge of the same but larger design, Ossipee 137/297,[6] were built as part of a new section of highway approximately 2000 feet long that was constructed to straighten White Mountain Highway, eliminate a sharp turn in the road, and replace an existing bridge over Bearcamp River (see Figure 2). The highway and bridges were in turn part a larger project improvement project 5.57 miles long that included paving, a 25' span concrete frame bridge (box culvert) and the moving of five buildings. The contract was won with the low bid of $912,317.40 by Peter Salvucci & Sons, Inc., of Waltham, Mass.[7] Out of that total, Ossipee 137/299 cost $73,146.40 (the larger Ossipee Bridge 137/297 cost $162,100.45).[8] No further information on the construction was obtained other than the overall project was completed in October 1956.[9]

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[1] Note: Ossipee Bridge 137/299 was built in conjunction with Ossipee 137/297 (see Inventory Form OSS0030) and shares the same background and construction history.
[2] Cook, 1985, p. 134.
[3] Laraba, 1928, p. 7.
[4] Third Biennial Report of the Governor and Council and State Engineer Relative to Highway Improvement. Concord: 1910. pp. 3, 4, 9.
[5] See "New Hampshire's Road Marking System," *New Hampshire Highways*, September 1923, p. 9.
[6] Ossipee 137/297 is located about 1000 feet south of the subject bridge and carries the highway over the Bearcamp River; see Inventory Form OSS0030.
[7] New Hampshire Highways, March-April 1955, p. 8.
[8] Bridge Inventory Cards for respective bridges, on file at NHDOT.
[9] New Hampshire Highways, December 1956, p. 13.

42. Applicable NHDHR Historic Contexts: 84. Automobile highways and culture, 1900-present

43. Architectural Description and Comparative Evaluation:

Ossipee Bridge 137/299 is a two-lane four-span continuous steel I-beam stringer bridge with a reinforced concrete slab deck (see Figures 3-5). It carries combined NH Routes 16 and 25 over the Bearcamp River Relief Structure in Ossipee NH. The "relief structure" is the opening in the raised earth-fill roadway embankment that crosses the Bearcamp River flood plain channel constructed to accept Bearcamp River overflow during high water events. Overall the bridge is 172 feet in length and 32' in width. The spans are carried on steel H-piles with concrete pile-cap abutments and three concrete pile cap bents. The span lengths and layout are: 40'-44'-44'-40'. The superstructure consists of six lines of wide-flange stringers of various sizes according to the loads they carry: outside stringers 1 and 6 under the sidewalks are 21WF62 (21" deep, 62 pounds per linear foot); stringers 2 and 5 are 30WF108; inside stringers 3 and 4 are 30WF132. The stringers were fabricated in the span lengths listed above and made continuous by field-welding steel splice-plates to the top of the flanges at the end butt-joints over the bents. The stringers were specifically designed to function as simple beams under dead load and continuous beams under live loads (see Figure 6). This sophisticated and possibly uncommon design is further discussed below. The stringers are laterally braced with diaphragms consisting of 12" channels field-bolted to angles that were shop-welded to the stringer webs. The stringers rest on fixed bearing shoes on bent 2, and on sliding low-friction alloy bearings at all other bearing points, noted on the plans as "Lubrite or equivalent" – Lubrite being one of the brands of so-called "self-lubricating" bridge bearings on the market at the time.

The plans show the reinforced concrete deck to be 6-1/2" thick with a 2-1/2" asphaltic concrete wearing course. Along each side of the two 12'-wide travel lanes are 24" wide open steel grid shoulders, followed by 30" wide open steel grid sidewalks raised 8" above the road. The original steel-angle curbs and steel railings consisting of two lines of angles bolted to H-section posts, remain. At each end of the bridge, attached to and extending across the entire width of the ends of the deck slab and the end dams (abutment backwall), are finger-type steel-plate expansion joints designed specifically for the bridge (see Figure 7).

The abutments are both identical and consist of a straight reinforced concrete bridge seat and backwall cast around seven 14" steel H-pilings spaced on 6' centers. Piles 1, 3, 5, & 7 are battered; 2, 4, & 6 are vertical. Plans show the piles were cut to an even height after driving, interconnected with steel channel spacers and imbedded about 2' into the concrete bridge seat. The abutment piles and about half the height of the bridge seats are buried with earth fill forming the raised approach grades.

The four pile bents are all identical and consist of twin batter piles directly under each of the four 36" deck stringers, and single batter end piles under the two 30" sidewalk stringers. Piles are all 14" x 73 p.l.f. steel H-piles. The end piles are battered 2/12" and provide bent stability lateral to the bridge; steel plate nosing or "ice breakers" are welded to the face of the upstream end piles. The inner twin piles are battered 1/12" opposing, to form a very steep A-frame, aligned with the longitudinal axis of the bridge for stability in that direction. The pile caps are solid reinforced concrete measuring 3-6" high x 3'-4" deep x 36'-3" long with 2/12 and 1/12 battered faces to match the pilings. Flood escape ladder rungs of bent steel rod are imbedded in the ends of the caps.

Comparative Evaluation: [10]

Ossipee Bridge 137/299 possesses several design features of interest based on initial research:

- The *combined simple/continuous beam design* that may have been used rarely by NHHD;
- The *H-pile bents of double batter pile design* and the *combined open-grid shoulder/steel curb/open-grid sidewalk assembly*, which although common to mid-20th century steel deck bridge design may have seen limited use in NH and of which an unknown number of intact examples remain.

The *combined simple/continuous beam design* is a specialized design that utilized off the shelf rolled wide flange girders that were then given a specific camber and the ends milled to a precise angle corresponding to the camber axis. Once each stringer was set in place end to end, steel splice plates were welded to the top of the flanges to join each to the next, forming a continuous top flange member but with a gap between the ends of the lower flanges (see Figure 6). When the dead load was applied (in the form of the reinforced concrete deck, sidewalks and railings) the beams deflected the precisely calculated

[10] This section is the same as that contained on Form OSS0030 with the exception of the discussion of the companion bridge.

amount to close the gap, which was then field-welded shut. With just the dead load applied, no loads are carried through the welded joints to the adjacent spans so the spans act as simple beams. When a live load is applied to one of the spans the beams deflect and some of the live load is transmitted to the neighboring spans through the welded joint by the structural principle of continuity. The design was apparently Langley's idea – he is credited as "designer" on the plans. Prowse is credited with drawing the plans, but considering these were the Number 1 and Number 2 designers in the department, they were undoubtedly advancing the design together, with the Assistant Engineer delegated the important task of putting the idea on paper in a manner that could be both fabricated and constructed in a practical cost-effective manner.

Preliminary research indicates that several other continuous steel I-beam bridges with concrete decks (IB-C) of similar type were built at this time:

Ossipee 137-297, NH 16 & 25 over Bearcamp River – companion structure of identical design except number of spans (5) and lengths of spans (76'-80'-80'-80'-76'). See Inventory Form OSS0030 as previously noted above.

Conway 063/047, River Road over Saco River Overflow, built 1955, 127' length overall consisting of 3-spans, 38'-45'-38'. Bridge card notes the stringers act as simple beams under dead load and continuous beams under live load. It is carried on H-pile bents with single vertical piles, not the double battered A-frame type piles of the subject bridge. The bridge was rehabbed in 2005 but the nature of repairs and current integrity of original design and materials was not determined.

Portsmouth 241/053, NH 1B over Piscataqua Estuary to New Castle, (companion bridge to New Castle 031/142) built 1955, 540' length overall, consisting of 10 spans, grouped 3-continuous, 4 continuous, 3 continuous. Bridge card does not note if spans are simple under dead load. Bridge card photo, 1988, shows H-pile bents, some with double-battered A-frame type piles, steel grid shoulders, sidewalk and railing assembly like the subject bridge. The bridge substructure was repaired in 1988; the current integrity of original design and materials was not determined.

New Castle 031/142, NH 1B over Piscataqua Estuary to Portsmouth, (companion bridge to Portsmouth 241/053) built 1955, 480' length overall, consisting of 9 spans, grouped 3-continuous, 3 continuous, 3 continuous. Bridge card does not note if spans are simple under dead load. Bridge card photo, 1988, shows H-pile bents, some of which have double-battered A-frame type piles, steel grid shoulders, sidewalk and railing assembly like the subject bridge. The bridge substructure was repaired in 1988; current integrity of original design and materials was not determined.

Effingham 110/190, NH 153 over Ossipee River, built 1955, 243' length overall consisting of 3 continuous spans carried on concrete hammerhead-type piers. The design of the shoulders, sidewalk and railing on the Effingham bridge was not determined. The bridge was rehabbed in 2001; current integrity of original design and materials also was not determined. An article on the structure in *New Hampshire Highways* magazine, notes the bridge was designed by Robert J. Prowse, and that a feature of the design was the stringers that acted as simple beams under dead load and as a 3-span continuous beam under live load:

> "This type of design involves precision analysis for individual span cambers so that in the final structure the cambers of all three spans present a clean-cut, continuous, vertical curve. A valuable feature of this type of structure, because of its ease of construction, is its economy, as shown by savings indicated in (1) relatively brief steel erection time, (2) elimination of end dams for expansion at the piers, (3) elimination of extra bridge shoes, and (4) steel, due to continuity of live load." [11]

44. National or State Register Criteria Statement of Significance:

Ossipee Bridge 137/299 is not associated with events important to the broad patterns of our history. The highway improvement project as a whole and the new section of highway containing the two bridges undoubtedly increased driving safety and allowed greater speed for tourists passing through Ossipee on their way to and from the White Mountains, but there is no evidence to suggest that these improvements resulted in any direct and significant effects on the development of the town or the immediate area. The bridge is therefore not eligible for the National Register under Criteria A.

[11] New Hampshire Highways, February-March, 1956, pp. 6-7.

Ossipee Bridge 137/299 is an example of a continuous I-beam stringer deck highway bridge of an uncommon design that combined simple and continuous beam design. The total number of bridges of this type designed by the NHHD and built can not be readily determined since the specific features of the type are not identified in the DOT bridge database. The unique continuous design is not evident in photographs and requires examination of the original plans to be certain. Several other combined simple and continuous beam design bridges were identified with the help of Dave Powellson of NHDOT, but none possess equivalent features and retain complete integrity of materials and design. The bridge was evidently designed by Harold E. Langley, Bridge Engineer, and Robert J. Prowse, Assistant Bridge Engineer, the most noted engineers in the history of the New Hampshire Highway Department. The design (done in conjunction with the larger companion bridge spanning the Bearcamp River) may have been the first of its type designed by the NHHD; the other examples identified thus far, followed it. The merits of the design were described by Prowse in an article on a later bridge, suggesting the initial collaboration with Langley led the way to the subsequent designs, primarily designed by Prowse. It is known that Langley and Prowse collaborated on numerous bridge designs. Further research would be needed to determine the exact role the Bearcamp River bridges played in the development and use of the combined simple/continuous beam bridge design.

The bridge retains features representative of mid-20th c. bridges of the type, specifically the H-pile bents of double batter-pile design, the combined open-grid shoulder/steel curb/open-grid sidewalk assembly, and the original steel angle railings. These features were common to mid-20th century steel deck bridge design but may have seen limited use in NH and an unknown number of intact examples remain.

Ossipee Bridge 137/299 possesses distinctive engineering characteristics, is a significant work of two engineers important to New Hampshire bridge engineering history, and may have played a important role in the development of a specialized bridge type in New Hampshire. It is therefore potentially eligible for the National Register under Criteria C.

45. Period of Significance: 1955

46. Statement of Integrity:

The property retains integrity of location, setting, association, feeling, design, materials and workmanship.

47. Boundary Discussion: The boundary of the property is defined by the physical limits of the bridge and its abutments and attached retaining walls.

48. Bibliography and/or References:

Cook, Edward M. *Ossipee, New Hampshire 1785-1985: A History.* Ossipee: Peter E. Randall Published, 1985.

Hurd, D. H. *Town and County Atlas of the State of New Hampshire.* (Philadelphia: D. H. Hurd & Co. 1892).

Laraba, Rae S. "Backbone of New Hampshire's Trunk Line System Originally Planned by John W. Storrs." *New Hampshire Highways*, November 1928, pp. 7-8.

New Hampshire. Sixth Biennial Report of the State Department of Highways. Concord: 1917, pp. 3, 4, 121-123.

NHDOT Bridge Card and Inspection Files. Available at NH Department of Transportation, Bridge Design, Concord.

New Hampshire Highways. [Official Publication of the New Hampshire Good Roads Association.]. Located in NH State Library.

"New Hampshire's Road Marking System," New Hampshire Highways, September 1923, p. 9.

Surveyor's Evaluation:

NR listed:	individual	_____	NR eligible:		NR Criteria:	A	____
	within district	_____	individual	__X___		B	_____
			within district	____		C	___X__
Integrity:	yes	__X__	not eligible	____		D	_____
	no	____	more info needed	_____		E	_____

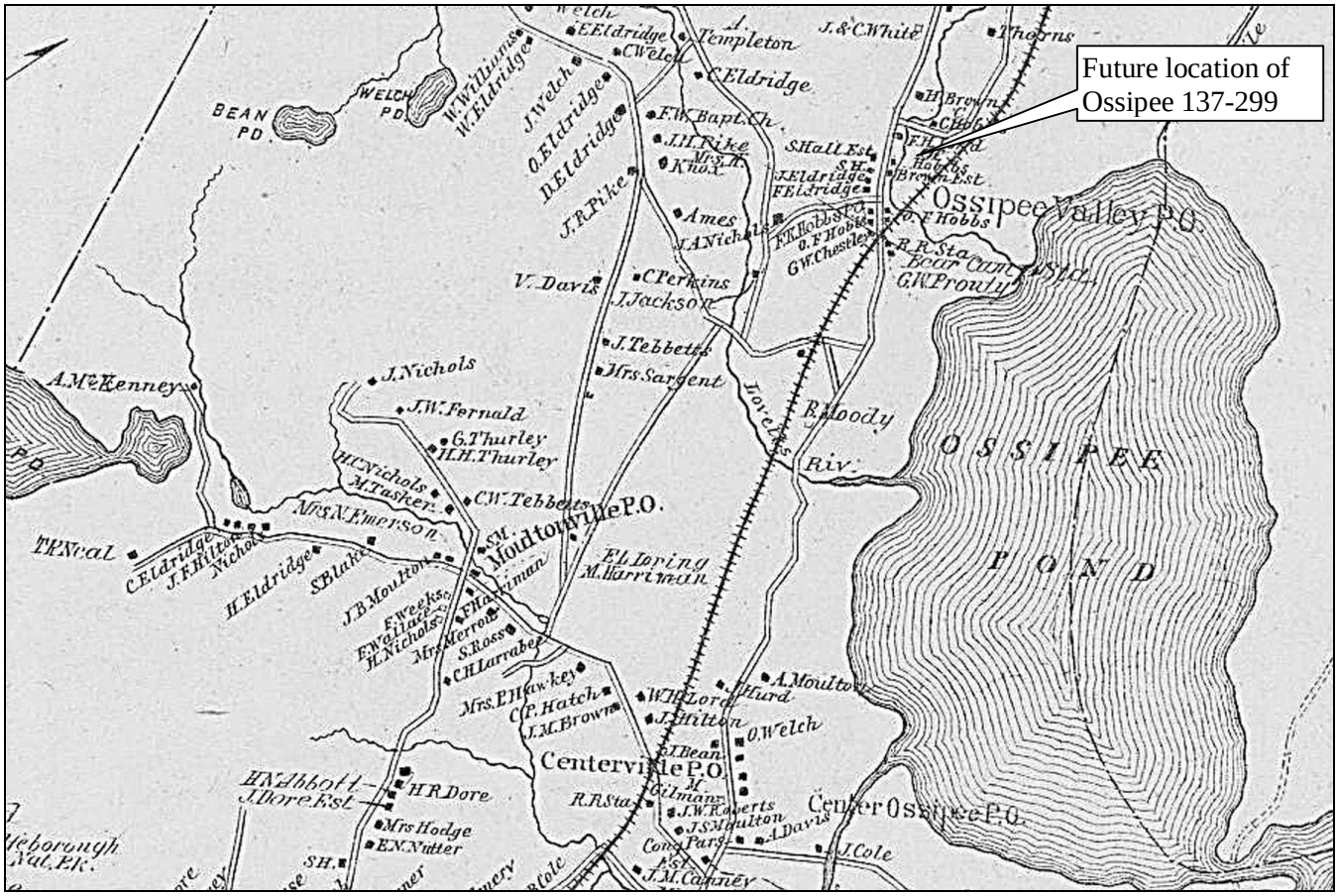

FIGURE 1: Hurd 1892 Atlas, Map of Town of Ossipee.

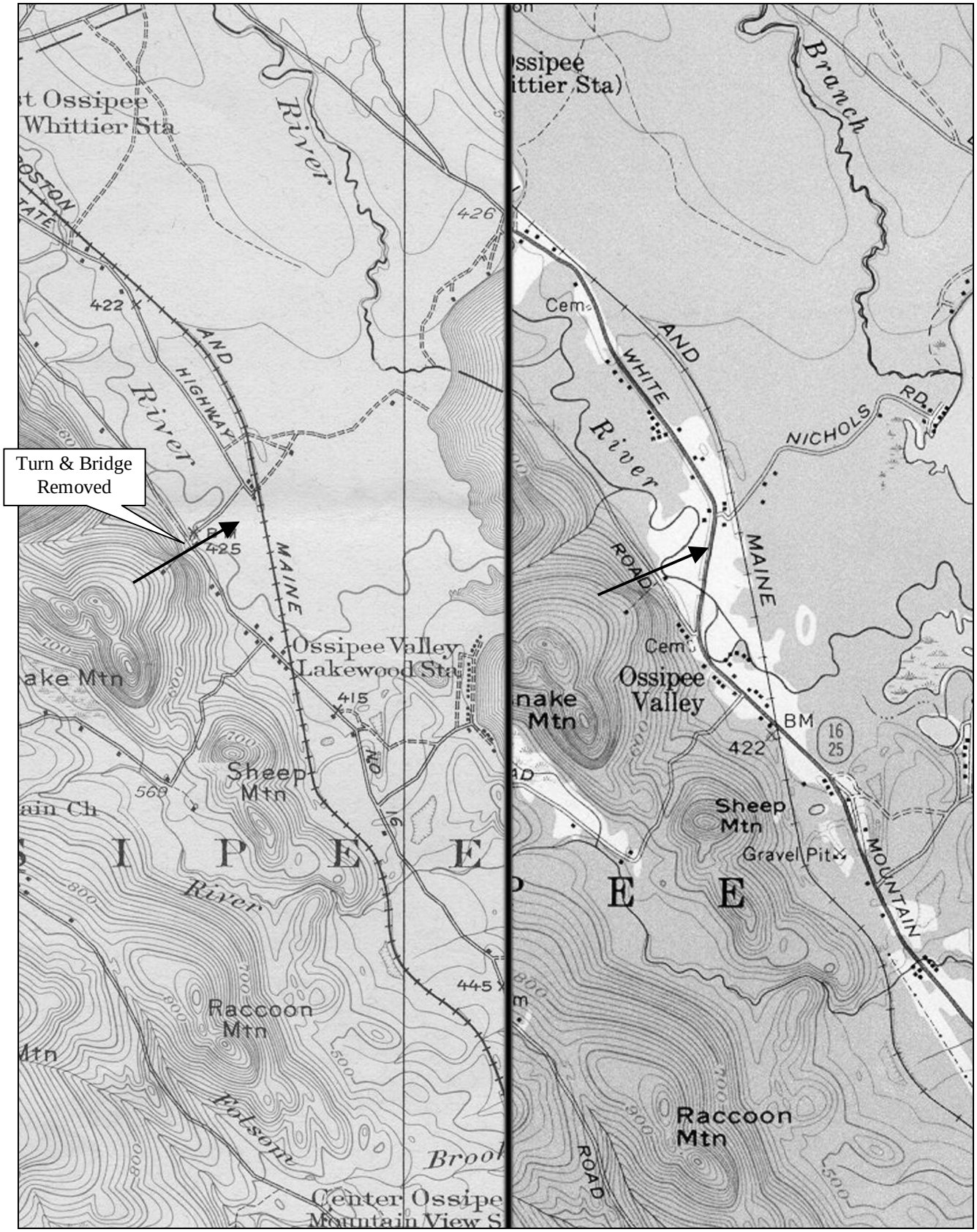

FIGURE 2: Left, 1930 Topo map; Arrow points to future bridge location. Right, 1958 Topo map, Arrow points to bridge location on section of new road built with bridge in 1955 to remove narrow bridge, sharp turn and straighten Rt. 16 highway.

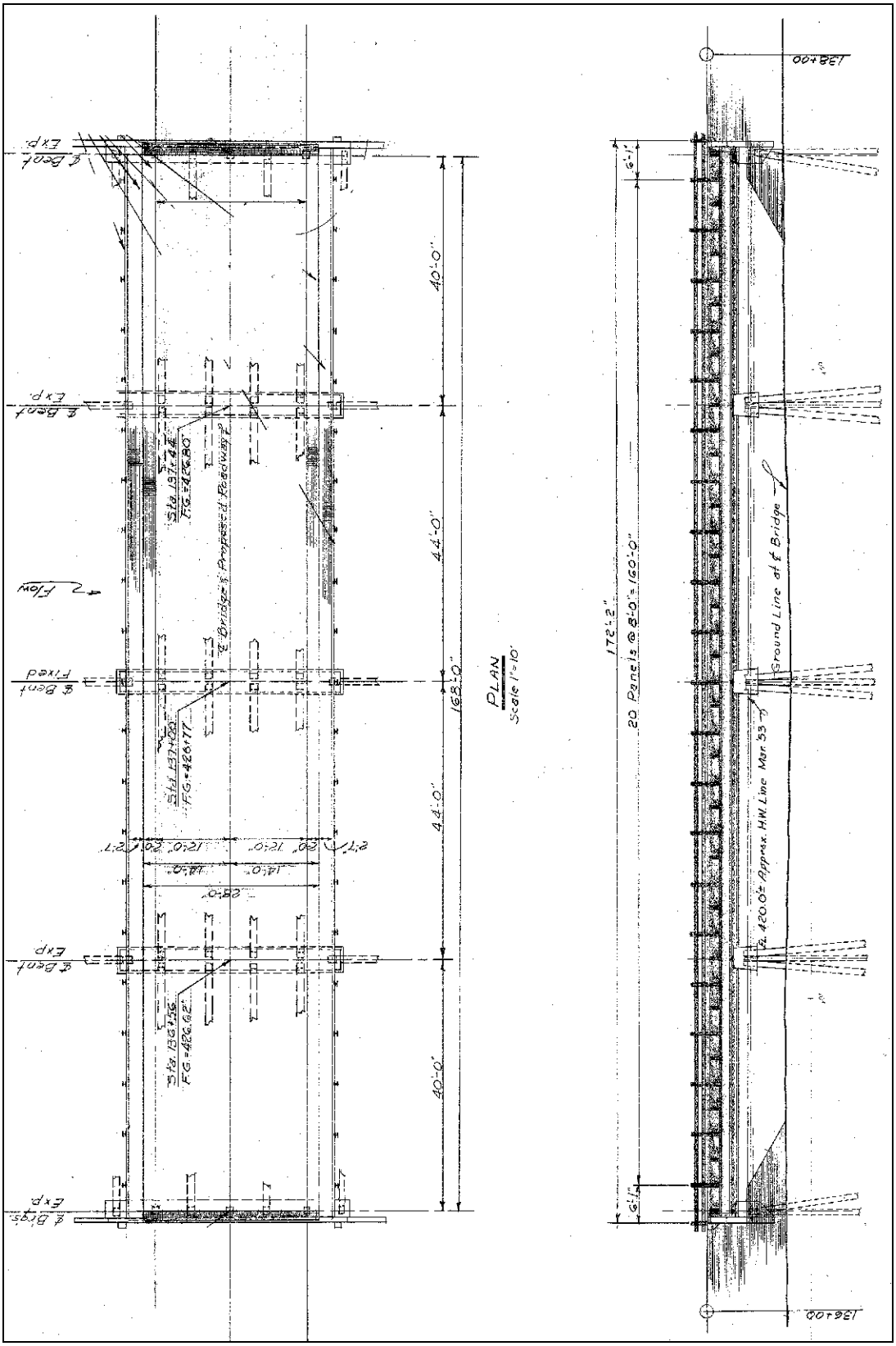

FIGURE 3: Plan and elevation of bridge from original drawings (NHDOT File No. 3-4-3-5). -

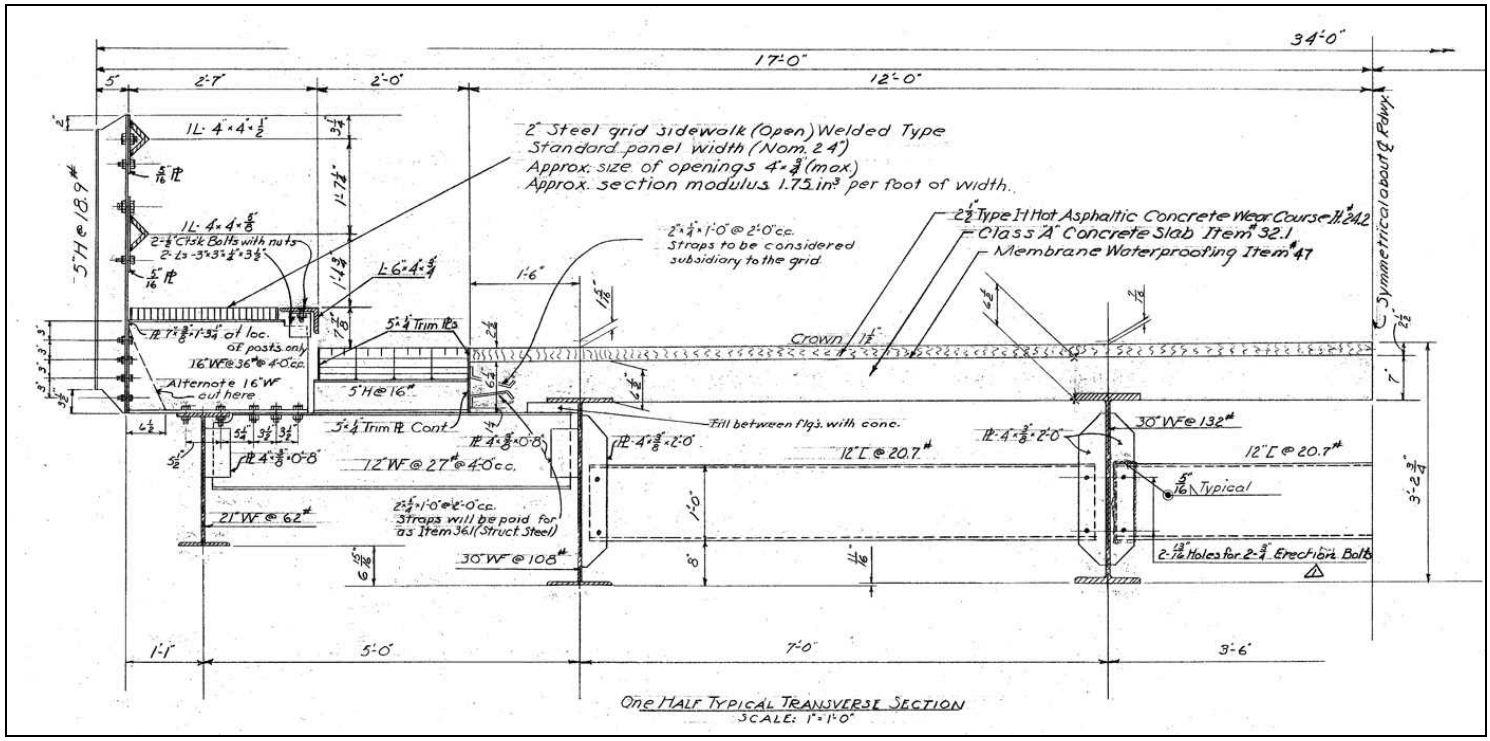

FIGURE 4: Half transverse section of deck and superstructure from original drawings (NHDOT File No. 3-4-3-5).

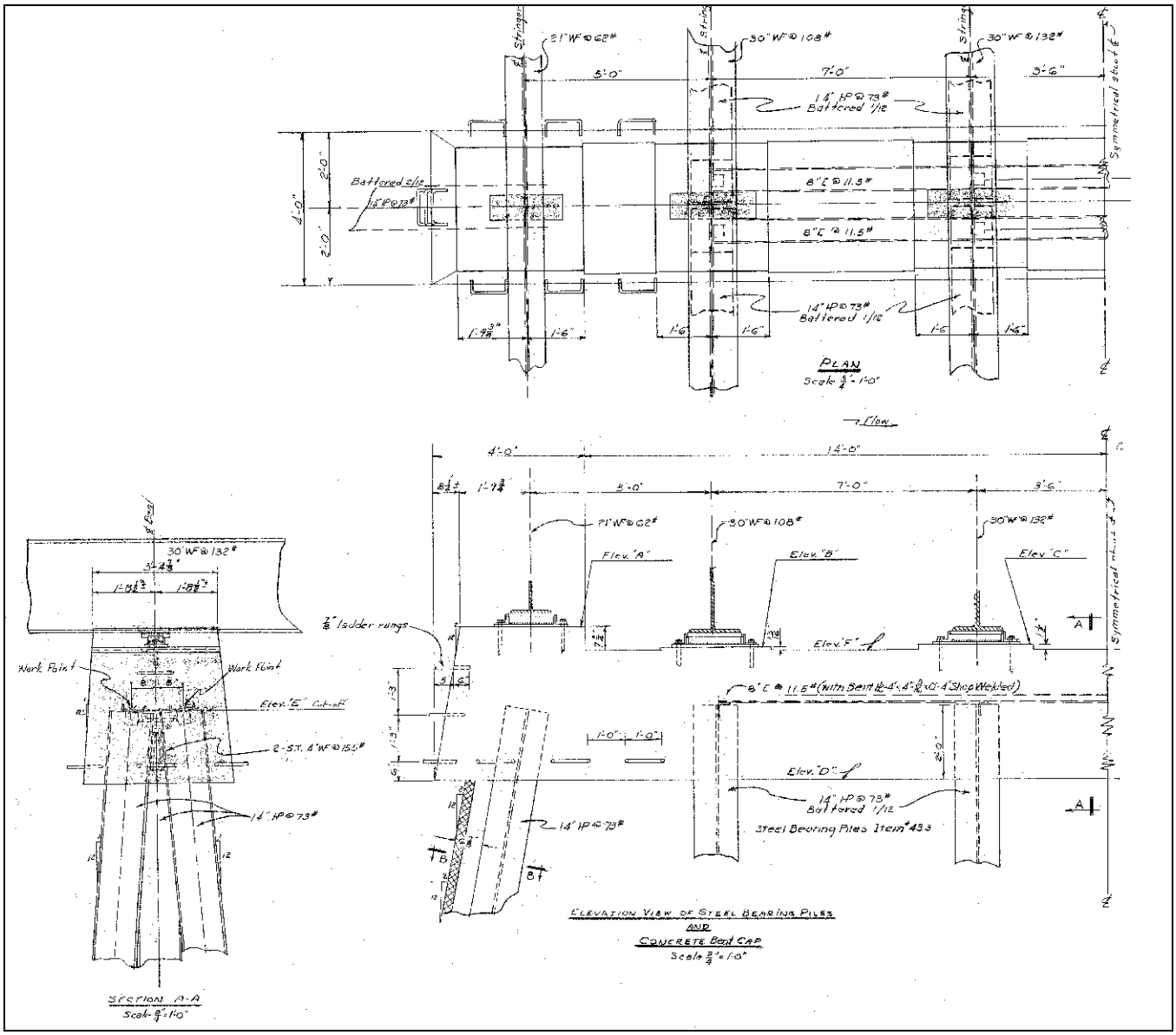

FIGURE 5: Plan, elevations and section of H-pile bent from original drawings (NHDOT File No. 3-4-3-5).

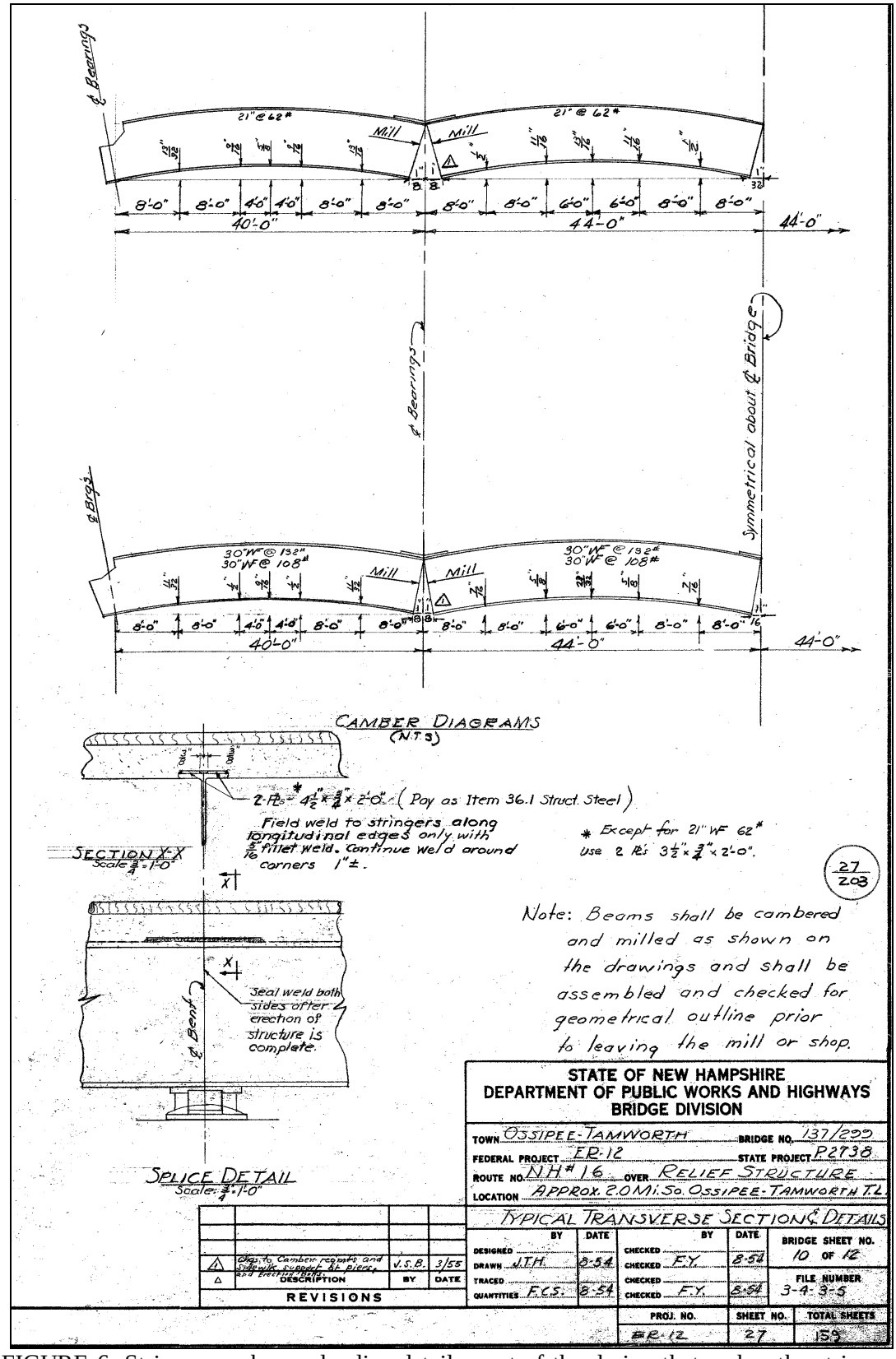

FIGURE 6: Stringer camber and splice details, part of the design that makes the stringers function structurally as both simple and continuous beams (From Sheet 10 of original drawings, NHDOT File No. 3-4-3-5).

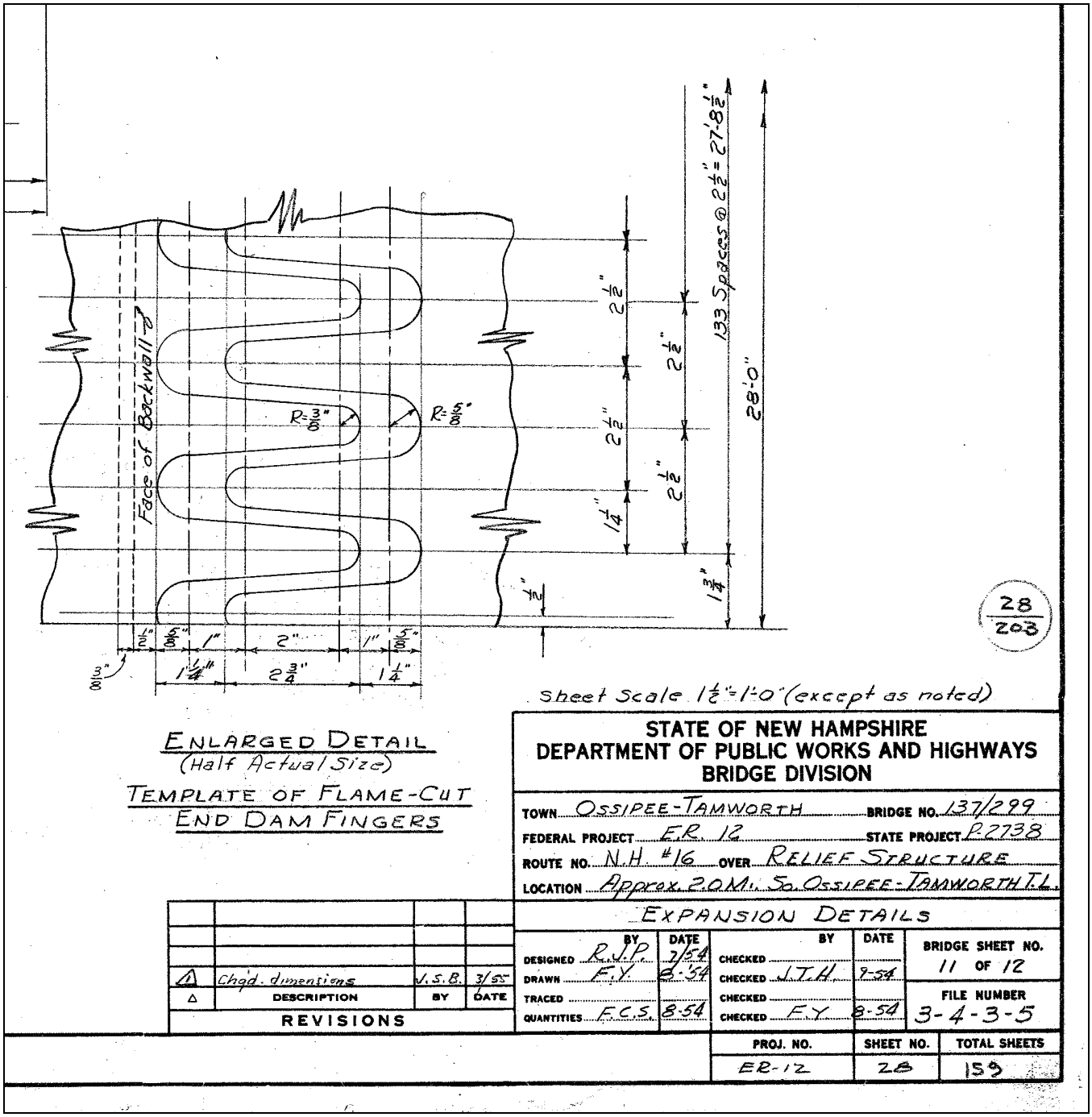

FIGURE 7: Deck expansion joint details showing custom finger-joints designed for bridge by R. J. Prowse. (From Sheet 11 of original drawings, NHDOT File No. 3-4-3-5).

Address: Ossipee Bridge 137/299, Rt. 16 / Bearcamp R. Relief Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 2 description: Overall view at road level from south approach.

Digital Photo File Name: OSS0031_02 Direction: NE

Address: Ossipee Bridge 137/299, Rt. 16 / Bearcamp R. Relief Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 3 description: Downstream (East) elevation.

Digital Photo File Name: OSS0031_03 Direction: N

Address: Ossipee Bridge 137/299, Rt. 16 / Bearcamp R. Relief Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 4 description: Top of abutment, railing and bents.

Digital Photo File Name: OSS0031_04 Direction: SW

Address: Ossipee Bridge 137/299, Rt. 16 / Bearcamp R. Relief Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 5 description: Underside view of deck, stringers, diaphragms, H-pile bent .

Digital Photo File Name: OSS0031_05 Direction: NE

Address: Ossipee Bridge 137/299, Rt. 16 / Bearcamp R. Relief Date: 12/04/2012 Image stored at: HDC Inc.

Photo # 6 description: Underside of steel shoulder and sidewalk assembly, and H-pile bent.

Digital Photo File Name: OSS0031_06 Direction: NE

Photography Statement: I, the undersigned, confirm that the photos in this inventory form have not been digitally manipulated and that they conform to the standards set forth in the NHDHR Digital Photo Policy. These photos were printed with HP Photosmart 7850 Printer, HP Vivera 100 Gray Photo Ink, HP Premium-Plus Photopaper. The digital files are housed at Historic Documentation Company, Inc., Portsmouth, RI.