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Maine State Highway Commission

AUGUSTA, MAINE 04330



BRIDGE STUDY
FOR
NEW MEADOWS RIVER BRIDGE
BETWEEN
WEST BATH & BRUNSWICK

AUGUSTA, MAINE

DECEMBER 1968

COMMISSIONERS
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STEVEN D. SHAW

SYLVESTER L. POOR
CHIEF ENGINEER



Maine State Highway Commission

AUGUSTA, MAINE 04330

January 8, 1969

To the Honorable Senate and
House of Representatives of the
One Hundred and Fourth Legislature

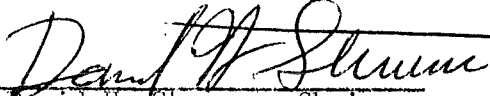
Transmitted herewith is a report entitled "Bridge Study for
New Meadows River Bridge".

This report is being submitted in accordance with the provisions
of the Resolves of the One Hundred and Third Legislature,
Chapter 10, a copy of which is included and made a part of this
report.

The report was prepared by the Maine State Highway Commission,
Bridge Division.

Respectfully,

MAINE STATE HIGHWAY COMMISSION


David H. Stevens, Chairman


Bertrand A. Lacharite, Member


Steven D. Shaw, Member

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SUMMARY

In compliance with a resolve passed by the 103rd Legislature, the Maine State Highway Commission has prepared this report based on engineering aspects of a highway bridge and spillway across New Meadows River to remedy conditions of pollution that now exist.

The existing bridge is a small reinforced concrete span and spillway built into a stone and earth fill causeway serving as a dam to impound a portion of New Meadows River.

The stream flow in New Meadows River is very small in relation to the volume of impounded water and as a consequence the area above the dam remains in a stagnant condition at all times with attendant disagreeable odors, appearance and danger to health.

The Bridge Division of the Maine State Highway Commission has prepared estimates of the cost of replacing the existing bridge and spillway structure with structures sufficient in size to create a definite improvement in the existing pollution.

Route US-1, which originally crossed this bridge, has been relocated one half mile upstream. With the Route US-1 traffic removed, the traffic at this location remains high as shown by estimated traffic at present and projection for a twenty year period. Traffic estimates are as follows:

Year 1969 - Estimated Average Daily Traffic in 24 hour period - 3880 vehicles
Year 1989 - Estimated Average Daily Traffic in 24 hour period - 7760 vehicles

This high volume of traffic requires a much wider bridge roadway than that afforded by the existing structure. Present standards for bridge widths indicate a roadway on the structure 44 ft. between railings in place of the 29 ft. afforded by the existing structure.

Estimates have been prepared showing the cost of replacing the existing bridge with: (1) A structure providing the same roadway as at present. (2) A structure conforming to requirements of present traffic, with a minimum of approach work. (3) A full width bridge structure, including widening the approach causeway through its entire length of about 400 ft.

A structure providing the same roadway as at present could be widened at some time in the future but would be much more expensive than if done when the spillway is constructed as the work would be in tidewater requiring elaborate cofferdams.

The estimated costs of construction are as follows:

Spillway and Bridge with 29' Wide Roadway	\$ 160,000.
Spillway and Bridge with 44' Wide Roadway	210,000.
Spillway and Bridge with 44' Wide Roadway and Widened Causeway	245,000.

Since Route US-1 has now been relocated, reconstruction of the bridge is no longer eligible for Federal Aid, and as the route remains a part of the State Highway system, it cannot be considered under the provisions of the Bridge Act.

NEW MEADOWS RIVER - BRIDGE STUDY

INTRODUCTION

The State of Maine Legislature, meeting in 103rd regular session, enacted a resolve authorizing and directing the State Highway Commission to study the desirability of replacing the existing bridge across New Meadows River between the towns of Brunswick and West Bath and to report the results of the study to the next regular session of the Legislature. A full copy of the resolve follows.

- - - - -

Chapter 10 - Resolves, 1967

RESOLVE, Authorizing State Highway Commission to Study Desirability of Bridge Across New Meadows River.

Bridge across New Meadows River, study authorized. Resolved: That the State Highway Commission is authorized and directed to make a study of the need and cost of a highway bridge with necessary highway approaches thereto across New Meadows River on now or formerly Route 1 between the towns of Brunswick and West Bath, in the County of Sagadahoc, to provide better drainage of water from New Meadows Lake and thereby terminating a polluted condition now existent; and be it further

Resolved: That the State Highway Commission is authorized and directed to make a study of the need and cost of enlarging the opening in the causeway and bridge across New Meadows River on Route 1A between the town of Brunswick and the city of Bath which is a contributing factor to the polluted water of New Meadows Lake; and be it further

Resolved: That the commission shall report the results of its study at the next regular session of the Legislature.

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In response to the above Resolve, the State Highway Commission has conducted a study based on need, cost and other engineering aspects of a bridge across New Meadows River.

ENGINEERING CONSIDERATIONS

Figure 1, Page 7, is a location map of the general vicinity showing the site of the proposed bridge and spillway.

EXISTING STRUCTURE AND CONDITIONS.

The existing structure was built in 1937 to carry Route US-1 across the New Meadows River which was essentially a tidal estuary. The structure consists of a rock and earthfill causeway, serving as a dam, and a reinforced concrete bridge structure, of 15 ft. clear span, with a spillway incorporated into the substructure. The spillway was built to an elevation somewhat above mean high tide, thus excluding all but the very highest tides. A small gate was constructed in the spillway for the purpose of allowing some additional water to flow into and out of the ponded area.

The dam impounds an area of approximately three tenths of a square mile at high tide elevation and was intended to create a pond of largely fresh water, keeping covered the large areas of mud flats which were exposed at low tide.

The drainage area above the dam is extremely limited, and as a consequence the supply of fresh water is inadequate to properly flush the ponded area and it has become stagnant and polluted. The volume of the total annual rainfall on the drainage area, deducting surface evaporation, probably does not exceed twice the volume of the impounded water. Furthermore, the spillway, with gate, is entirely inadequate to exchange any appreciable volume of water.

PROPOSED STRUCTURE

It is evident that the only remedy to the pollution situation is to provide a constant major exchange of water into and out of the impounded area.

For this purpose a large spillway is proposed, with its crest one or two feet below mean high tide elevation, so that a major volume of water can enter at all high tides except a few very neap tides.

Since the outside tidewater would normally be colder than that in the ponded area, it appears that the entering water would sink to the deeper part of the pond and the outflow would then consist of the lighter surface water, producing a definite exchange of water. At mean height of tide, 5% or more of the total ponded volume would be exchanged during one tide. At extreme high tides possibly as much as 20% of the volume would be exchanged.

Fluctuation in the elevation of the pond would be less than one half foot at normal high tide. During a period of extremely high tides, such as

in a severe storm, the change in elevation might be as much as 1 1/2 ft.

Route US-1 has recently been relocated to a crossing about one half mile upstream from the dam structure. Approximately one fourth of the ponded area lies downstream from the new crossing, the remaining three fourths upstream. The opening under the new structures is fairly limited and consequently the improvement in condition of the water in the area above these structures would be somewhat less than that in the area close to the spillway.

Should a spillway as described be constructed, it would be necessary to excavate the stream bed under the new Route US-1 structures and place a stone blanket to prevent erosion during extremely high tides. Excessive velocity is not anticipated at this point except at the flood of very high tides.

The structure as contemplated in this study would be at the location of the present spillway. The new spillway would be 50 ft. long with its crest about 2 ft. below mean high tide. The existing concrete slab span would be removed, together with one abutment and the existing spillway.

The new spillway would be spanned by a steel stringer bridge structure with a reinforced concrete deck. An estimate has been prepared for a structure providing a 29' clear roadway between railings, the same as the present structure. This would be a 65' span between abutment bearings, supported on the easterly end by the existing easterly abutment. A new abutment supported on steel piles would be built at the westerly end. The bridge structure could be widened in the future to accommodate traffic requirements. Widening at some future date would be unreasonably expensive as the work would be in tidewater requiring elaborate and expensive cofferdams.

Figure 2, Page 8, shows a plan sketch of the Proposed Bridge and Spillway and Figure 3, Page 9, shows a sketch of the Plan, Elevation and Transverse Section of the Proposed Bridge and Spillway.

The estimated cost of the spillway with a bridge structure of 65' span and 29' roadway is as follows:

Bridge Structure	\$ 50,000.
Spillway Structure	88,000.
Removal of Existing Bridge & Spillway	13,000.
Erosion Protection at Route US-1 Crossing	<u>9,000.</u>
Total	\$ 160,000.

An additional estimate has been made for a bridge structure with a 44' clear roadway between railings which would be adequate to serve traffic requirements at present and in the future. This would be an 80' span between abutment bearings. It appears to be more economical to construct

a new abutment on the easterly end, set slightly shoreward from the existing easterly abutment. The existing easterly abutment would continue to serve as an end wall for the spillway. A new abutment supported on steel piles would be built at the westerly end. A minimum amount of approach work is included to provide transition to the narrower remaining causeway.

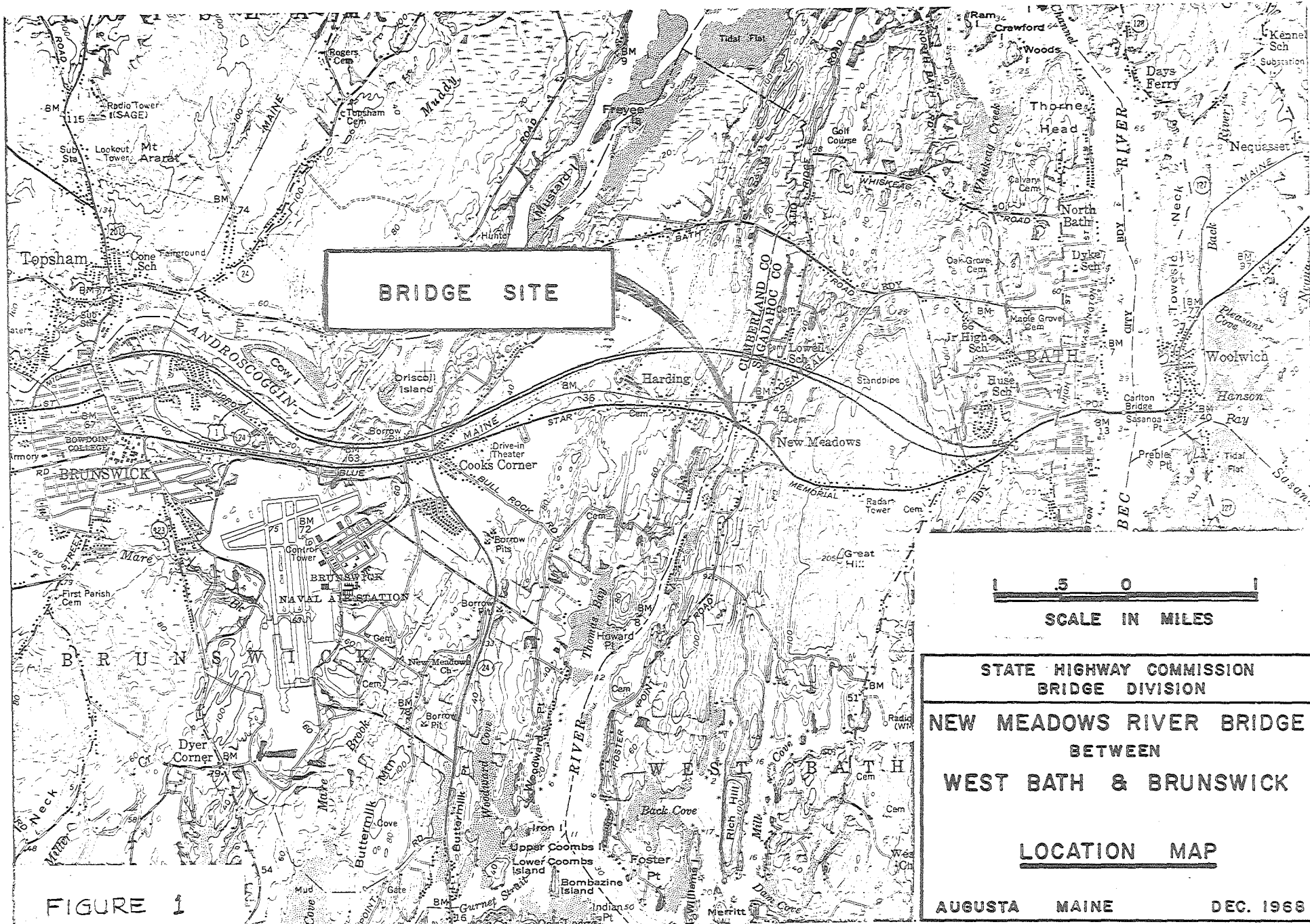
Figure 2, Page 8, shows a plan sketch of the Proposed Bridge and Spillway; and Figure 4, Page 10, shows a sketch of the Plan, Elevation and Transverse Section of the Proposed Bridge and Spillway.

The estimated cost of the spillway with a bridge structure of 80' span and 44' roadway is as follows:

Bridge Structure	\$ 89,000.
Approaches	11,000.
Spillway Structure	88,000.
Removal of Existing Bridge & Spillway	13,000.
Erosion Protection at Route US-1 Crossing	<u>9,000.</u>
Total	\$ 210,000.

The entire length of the causeway, about 400', could be widened at an additional estimated cost of \$35,000. This could be done at the same time as the bridge and spillway construction or at some future date without material change in cost.

More intensive study of tidal flow and hydraulic characteristics of a structure as outlined may result in some adjustment of spillway height and general dimensions but would not materially effect the cost of the project.



BRIDGE SITE



SCALE IN MILES

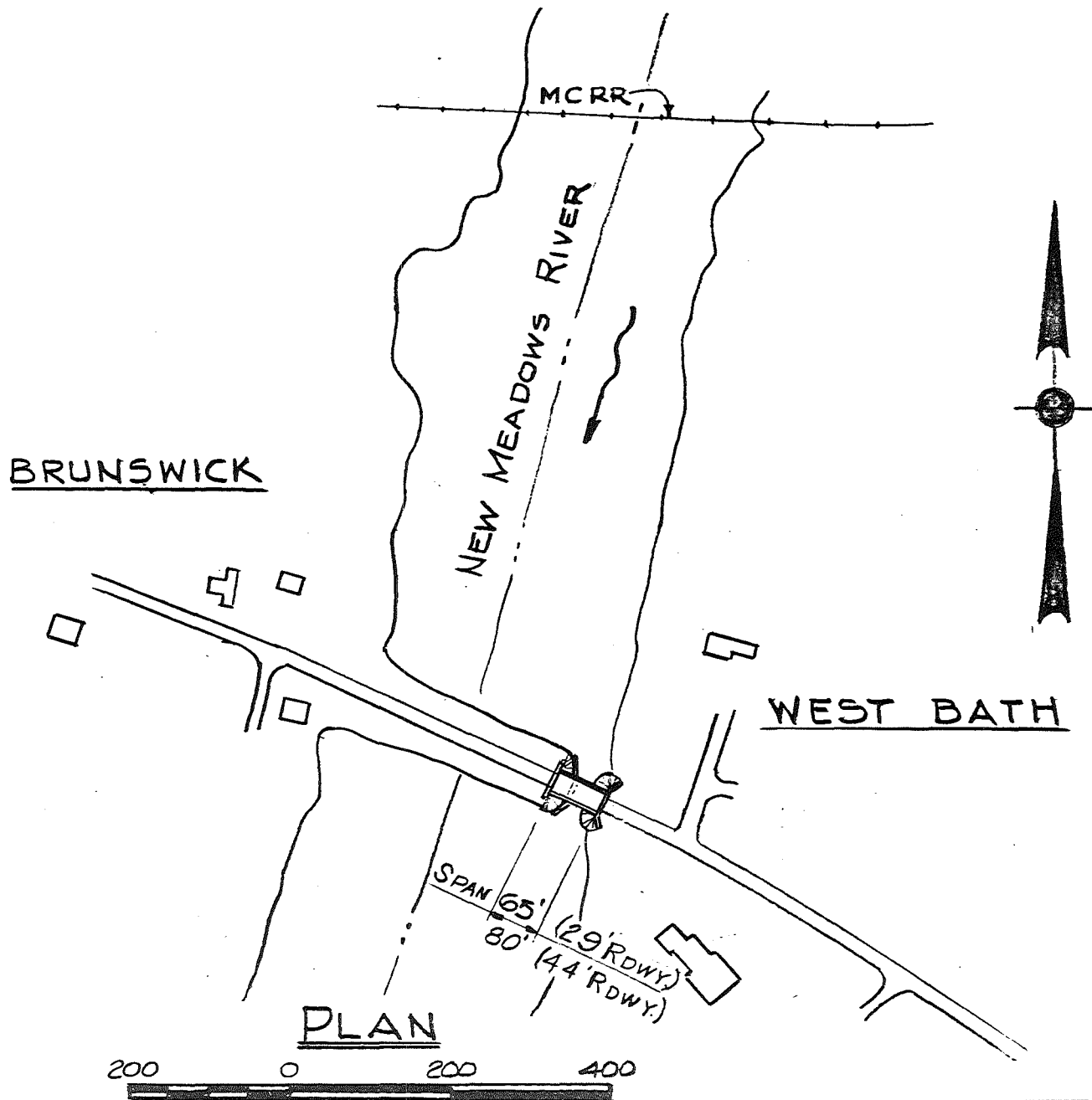
STATE HIGHWAY COMMISSION
BRIDGE DIVISION

**NEW MEADOWS RIVER BRIDGE
BETWEEN
WEST BATH & BRUNSWICK**

LOCATION MAP

AUGUSTA MAINE DEC. 1968

FIGURE 1



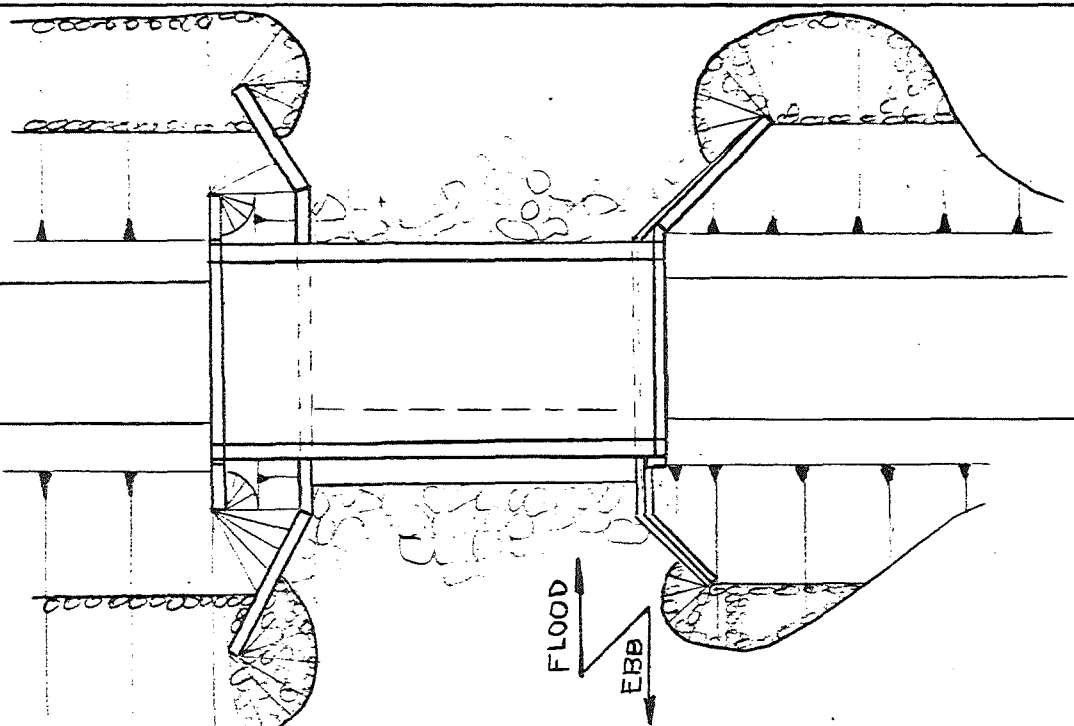
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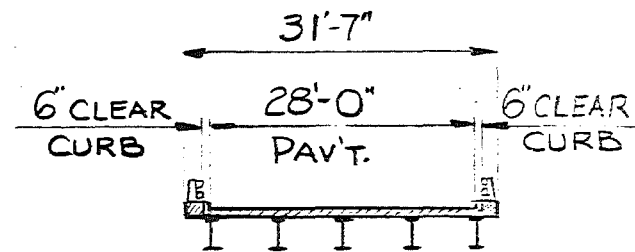
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STATE HIGHWAY COMMISSION BRIDGE DIVISION
<u>NEW MEADOWS RIVER BRIDGE</u>
BETWEEN
<u>WEST BATH & BRUNSWICK</u>
<u>PROPOSED STRUCTURE</u>

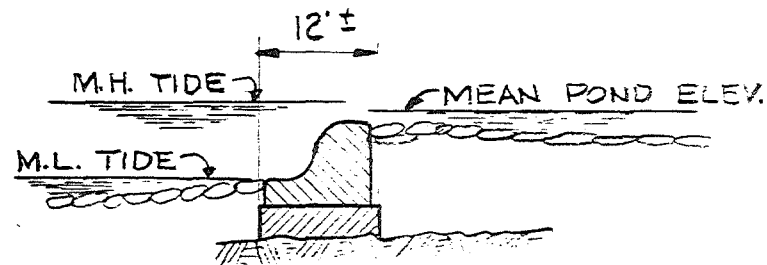
FIGURE 2



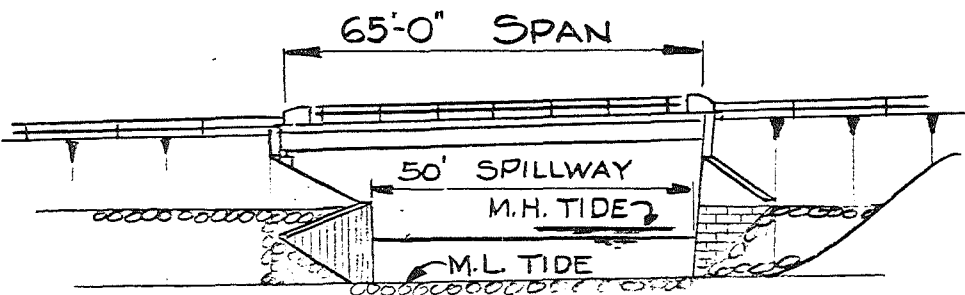
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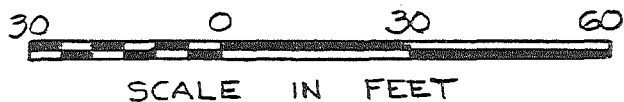
BRIDGE SECTION



SPILLWAY SECTION



PROFILE

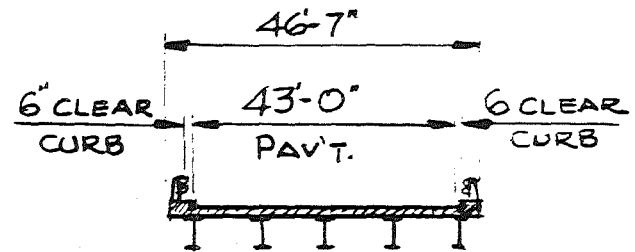
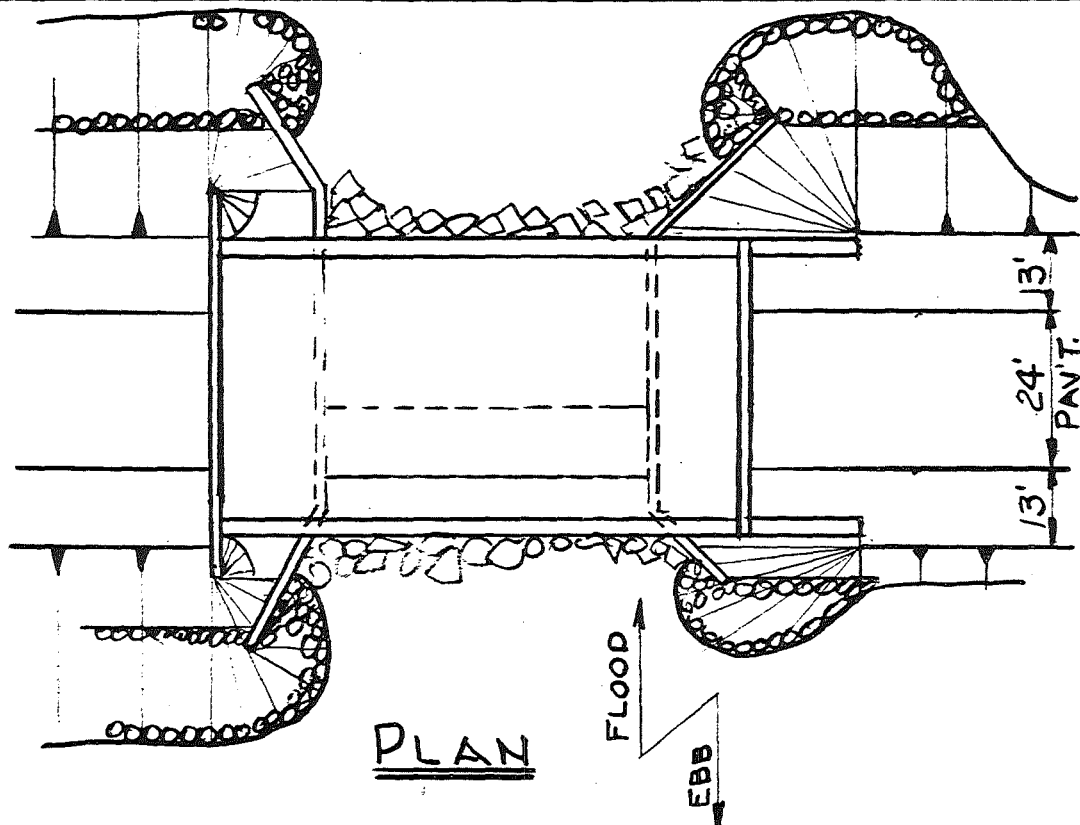


STATE HIGHWAY COMMISSION
 BRIDGE DIVISION
 NEW MEADOWS RIVER BRIDGE
 BETWEEN
 WEST BATH & BRUNSWICK
STRUCTURE DETAILS

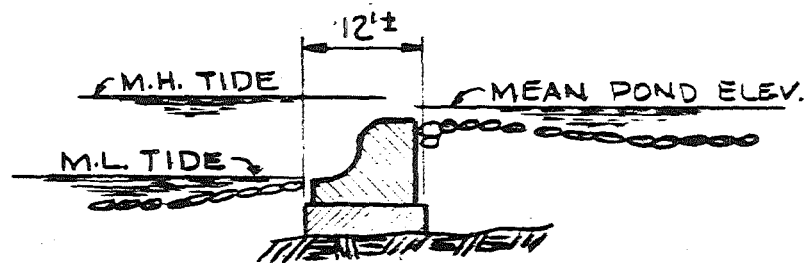
FIGURE 3

AUGUSTA MAINE

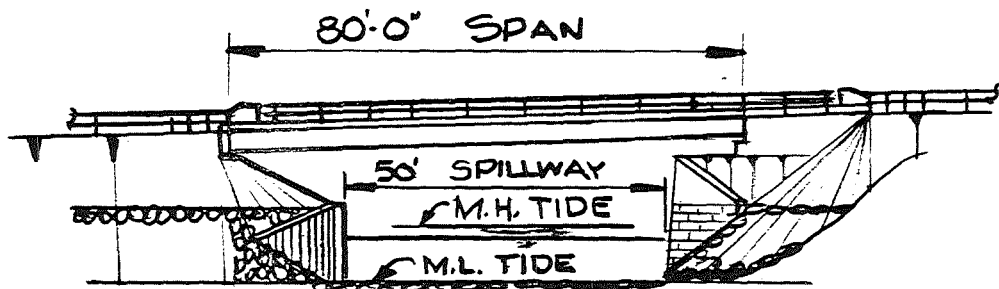
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BRIDGE SECTION



SPILLWAY SECTION



PROFILE



STATE HIGHWAY COMMISSION
BRIDGE DIVISION

NEW MEADOWS RIVER BRIDGE
BETWEEN
WEST BATH & BRUNSWICK

STRUCTURE DETAILS

FIGURE 4

AUGUSTA MAINE

DEC. 1968