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BRIDGES

Maine

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BANGOR-BREWER BRIDGE LOCATION AND FEASIBILITY STUDY

SUMMARY REPORT

Prepared For The
MAINE DEPARTMENT OF TRANSPORTATION
AUGUSTA, MAINE



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1975

BY
FAY, SPOFFORD & THORNDIKE, INC.
BOSTON, MASSACHUSETTS

MAY, 1975

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**BANGOR-BREWER BRIDGE
LOCATION AND FEASIBILITY
STUDY**

**Prepared For The
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AUGUSTA, MAINE**

**MR. ROGER L. MALLAR
COMMISSIONER OF TRANSPORTATION**



BY

**FAY, SPOFFORD & THORNDIKE, INC.
BOSTON, MASSACHUSETTS**

MAY, 1975

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Roger L. Mallar	Commissioner
Richard A. Leuttich	Deputy Commissioner
Daniel J. Webster, Jr.	Director, Bureau of Planning
Gedeon G. Picher	Assistant Director, Bureau of Planning
Paul J. Minor	Study Director

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Richard H. Alley	Mrs. Jean Lyford
Talbot Averill	Eric MacDougall
Ronald F. Clark	Lendal Mahoney
Galen L. Cole	John J. Mooney
Arthur P. Doe	Gedeon G. Picher
Dr. Richard V. Duffey	Richard P. Ruhlin
Willard C. Farnham	Allan J. Schiro
Merle F. Goff	Earle D. Stevens
Richard Gray	Lloyd E. Willey
Theodore Jellison	Mrs. George Wood
David P. Koman	Francis J. Woodhead

FAY, SPOFFORD & THORNDIKE, INC.

Edward C. Keane	Project Manager
Bertram Berger	Assistant Project Manager
Rodney P. Plourde	Project Engineer
John C. Yaney	Assistant Project Engineer
Richard W. Albrecht	Structural Department Head
Robert T. Loney	Structural Engineer

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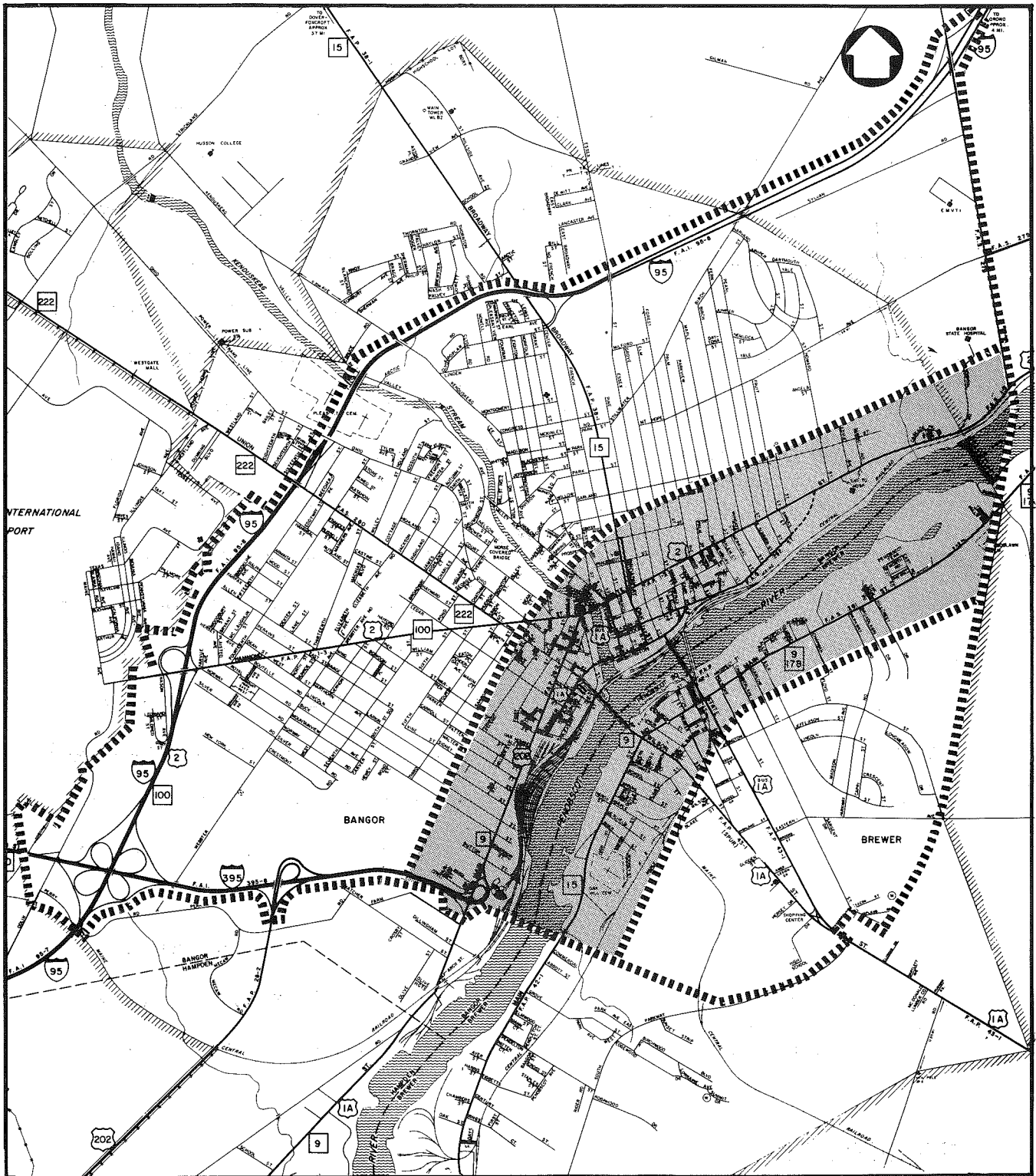
INTRODUCTION

In 1973, the Maine legislature passed, and the governor approved, "An Act Providing for a Study to Determine the Feasibility and Location of a New Bridge across the Penobscot River" (Legislative Document No. 307; S.P. 130). This act (see Appendix) "authorized and directed" the Maine Department of Transportation "to conduct a study, in cooperation with the Cities of Bangor and Brewer in the County of Penobscot, to determine the feasibility and location of a new bridge across the Penobscot River between the Cities of Bangor and Brewer."

Present river-crossing capacity is provided by two highway bridges (see Figure 1), both two-lane facilities: the Penobscot Bridge, built in 1908, and the Chamberlain Bridge, built in 1955.

In accordance with the charge of the legislature, the Maine Department of Transportation directed Fay, Spofford & Thorndike, Inc. in June of 1973 to investigate feasible methods and locations (see Figure 1) for providing additional highway bridge capacity over the Penobscot River between the Cities of Bangor and Brewer, Maine. This study culminated in a draft report, dated January, 1974, which recommended that consideration be given to the construction of two bridge facilities in the future between Bangor and Brewer, one between the downtown areas of the two cities to replace the aged Penobscot Bridge and one as an extension of Interstate Route 395 from Bangor to Brewer.

A presentation of these findings to a special citizens' group created for this study, the Bangor-Brewer Bridge Citizens' Advisory Committee, revealed their concern relative to the recommended sequence of implementation of the two bridge facilities, namely, a downtown bridge in



LEGEND

----- LIMITS OF GENERAL STUDY AREA

▨ BRIDGE LOCATION STUDY CORRIDOR

0 0.1 0.2 0.3 0.4 0.5
SCALE IN MILES

Figure 1
STUDY AREA

the late 1970's and an Interstate 395 bridge in the late 1980's or early 1990's. Specific questions raised concerned the feasibility of maintaining the Penobscot Bridge in operation for a minimum additional period of ten years; the feasibility of implementing moderate traffic improvements to the approaches of the existing two bridges to reduce traffic congestion and to ensure that present bridge capacity is utilized to its maximum, including the feasibility of widening the existing Chamberlain Bridge to provide an additional travel lane; and the financial feasibility of implementing one or both bridge facilities in the future.

The Maine Department of Transportation subsequently directed Fay, Spofford & Thorndike, Inc. in June, 1974 to perform supplemental studies to resolve the issues dealing with improvements to the existing bridges and approaches, while the Department itself proceeded to assess the bridge(s) finance issue. The result was a draft supplemental report in November, 1974 summarizing the findings of these investigations, and presentations to the Bangor-Brewer Citizens' Advisory Committee, city officials, and the public in general in December, 1974 and January, 1975 on the final study recommendations.

This summary report presents the findings and recommendations of all of the above study efforts which dealt with relieving river-crossing needs and traffic congestion between the Cities of Bangor and Brewer.

STUDY OBJECTIVES

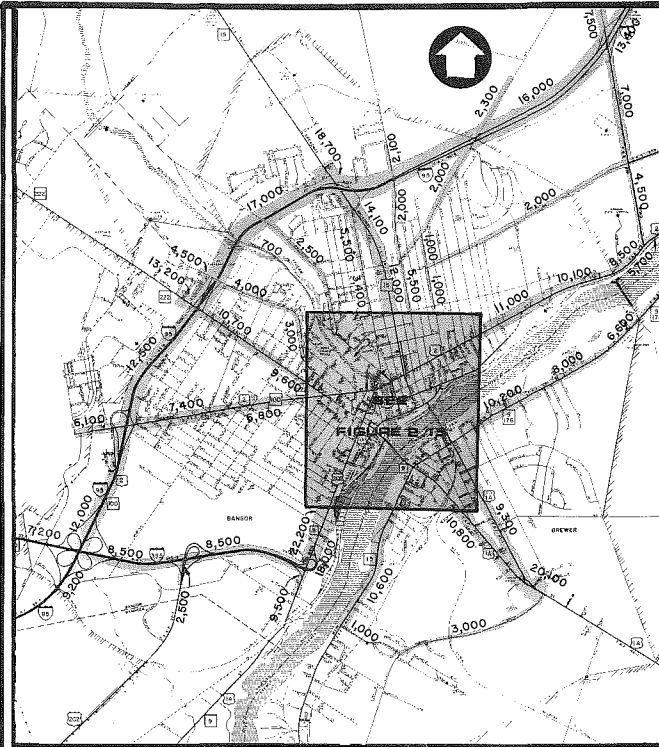
Summarizing the previous discussion, the objectives of this study were fourfold:

- (1) Investigate feasible new bridge facilities and locations which would provide additional river-crossing capacity between Bangor and Brewer;
- (2) Assess the feasibility of maintaining the existing Penobscot Bridge in operation for a minimum additional period of ten years;
- (3) Develop a program of traffic improvements to the approaches of the existing Penobscot and Chamberlain Bridges which will reduce traffic congestion and ensure that present bridge capacity is utilized to its maximum; this program should also consider the feasibility of widening the Chamberlain Bridge; and
- (4) Evaluate the financial feasibility of implementing one, and possibly two, new bridge facilities in the future.

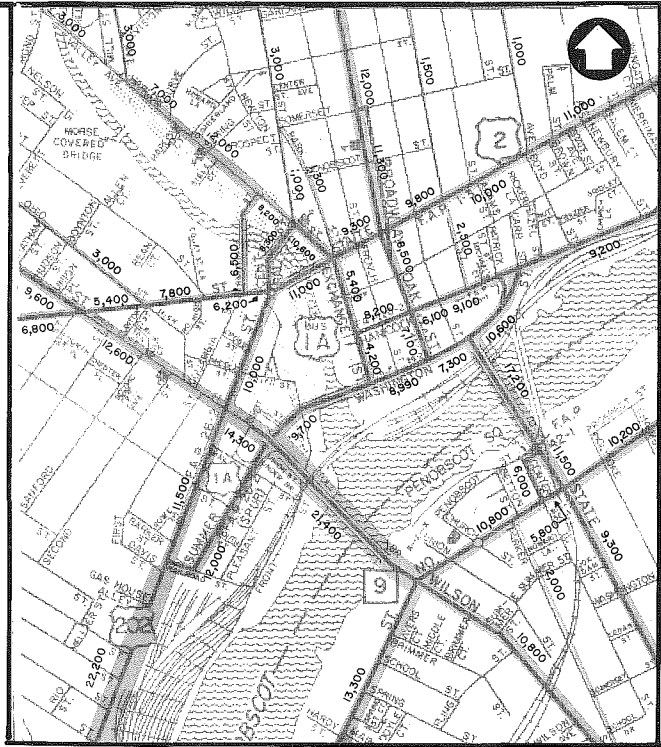
RIVER-CROSSING TRAVEL PATTERNS

A total of 38,600 vehicles per day were found to be crossing the Penobscot River between Bangor and Brewer in 1973. Fifty-five per cent of total crossings, or 21,400 vehicles per day, were via the Chamberlain Bridge, and forty-five per cent, or 17,200 vehicles per day, were via the Penobscot Bridge (see Figure 2). Five per cent of total traffic was trucks. The predominant trip purpose of travelers crossing the river was work and business, at 57 per cent of total, followed by social and recreational, at 25 per cent of total. At least 78 per cent of total river crossings had either a trip origin, trip destination, or both, within the municipal boundaries of Bangor and Brewer.

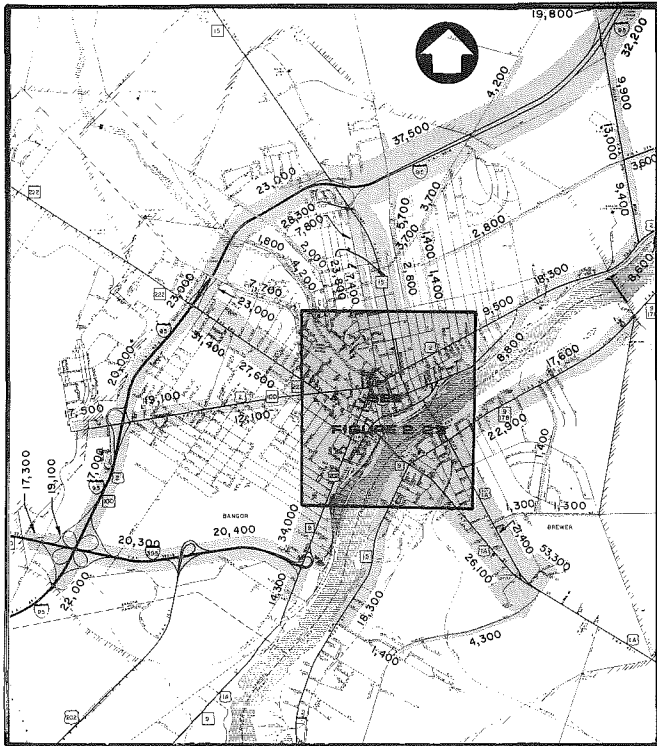
Total river-crossing traffic desires were forecast to increase by 110 per cent between 1973 and 1993, to 80,300 vehicles per day. If traffic were allowed to travel unimpeded by capacity constraints on the approaches to the existing two bridges, and on the bridges themselves, it was found that the Chamberlain Bridge would experience a 150 per cent increase in traffic during the 20-year period, to 53,100 vehicles per day by 1993 (see Figure 2). The Penobscot Bridge would experience a 60 per



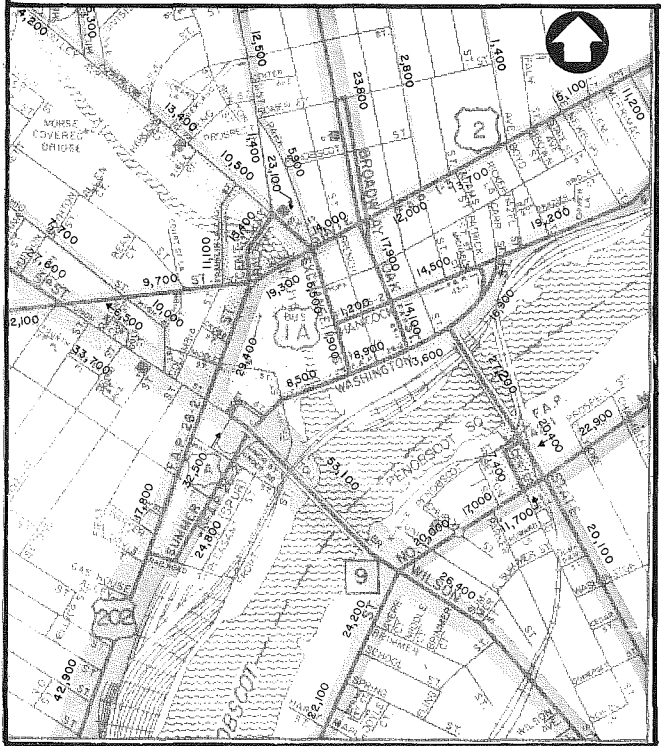
1973- OUTER AREA



1973- DOWNTOWN AREA



1993- OUTER AREA



1993- DOWNTOWN AREA

LEGEND
AADT VOLUMES

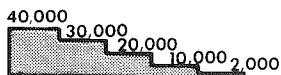


Figure 2

**1973 - 1993 ANNUAL AVERAGE
DAILY TRAFFIC VOLUMES**

cent increase in traffic during that same time period, to 27,200 vehicles per day. The majority of total river-crossing trips would still continue to be locally oriented, at minimum consisting of at least 63 per cent of total crossings.

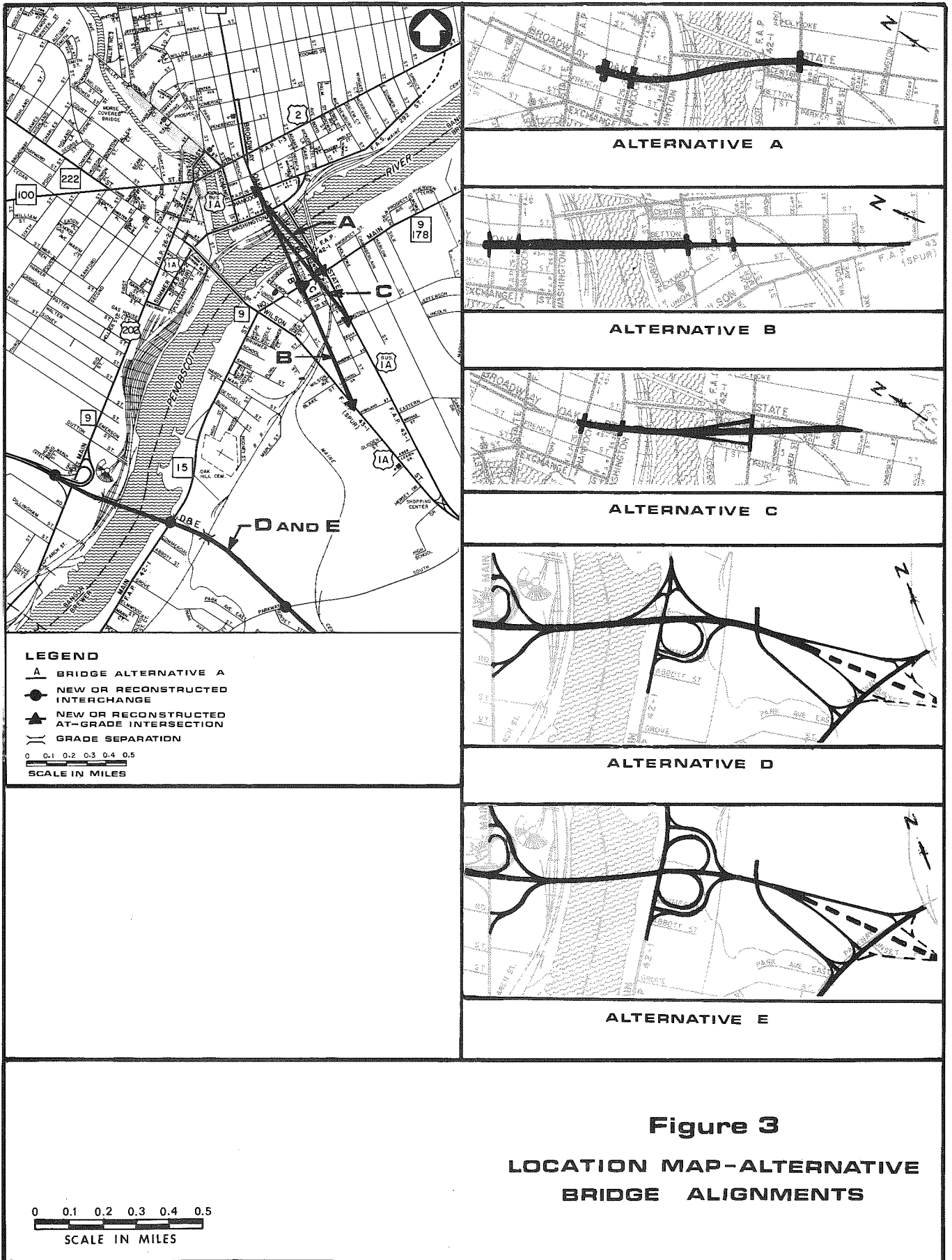
A comprehensive analysis of the existing and future river-crossing traffic patterns summarized above, and their impacts on major highway routes and the existing two bridges, revealed that highway and bridge capacity deficiencies exist. More specifically, the total river-crossing travel desires would equal and exceed the combined capacities of the existing two bridges by 1976. At least two or more lanes of additional bridge capacity would be needed to accommodate the forecasted travel need during the study period.

Through examination of the service areas of the existing two bridges, it was found that the Chamberlain Bridge at present serves, and was forecast to continue to serve in the future, the greater proportion of total river-crossing traffic originating from, or bound through, the Bangor- Brewer area. That is, more river-crossing traffic generally originates from or passes through Bangor west of the Kenduskeag Stream than east of the Kenduskeag Stream, and more river-crossing traffic generally originates from or passes through Brewer via Wilson Street (U.S. Route 1A) and streets to the west than via State Street (U.S. Business Route 1A) and streets to the east. The general recommendation was that any completely new structure in a new location providing additional river-crossing capacity should be located somewhere between the general vicinity of the existing bridges in the downtown areas of Bangor and Brewer and the vicinity of the Interstate Route 395 industrial spur to the south. Ideally, it should lie south of the existing Chamberlain Bridge.

ALTERNATIVE BRIDGE FACILITIES DESCRIPTION

Five feasible alternative bridge facilities were generated and evaluated for their ability to satisfy the basic river-crossing capacity and location needs (see Figure 3). Three alternatives were examined in the downtown area and two alternatives were examined in the vicinity of the Interstate Route 395 industrial spur in Bangor. All five alternatives have basic bridge cross sections consisting of a four-lane divided roadway.

Alternatives A through C, the downtown alternatives, all originate from the same terminus in Bangor, namely the intersection of Oak and York Streets; extend southward along the general right-of-way corridor of Oak Street; extend southward generally through the right-of-way corridor within the downtown Bangor urban renewal area reserved by the Bangor Urban Renewal Authority for a new river crossing; and begin then to diverge as they pass over existing Washington Street and the Maine Central Railroad tracks in Bangor, and over the Penobscot River, into Brewer. In Brewer, Alternative A terminates at grade at the existing intersection of State and North Main Streets (U.S. Business Route 1A and Routes 9 and 178); Alternative B meets the existing intersection of Parker and North Main Streets at grade, and then proceeds on a reconstructed Parker Street southward to terminate at grade at Wilson Street (Route 1A); Alternative C crosses Penobscot Square and North Main Street on a grade-separated structure (with ramps connected to North Main Street, however), and proceeds southward and terminates at grade at the existing intersection of State and Washington Streets. Two options each were evaluated for Alternatives B and C, so-called "high" and "low" profile alignments which either bridged or eliminated an infrequently used rail spur in the vicinity of



Penobscot Square in Brewer. All three downtown alternatives were designed as replacement facilities for the existing Penobscot Bridge, which would be closed once the new facility was opened.

Alternatives D and E, the outer alternatives, both originate at a reconstructed interchange of the Interstate Route 395 Industrial Spur with Main Street (U.S. Route 1A and State Route 9) in Bangor, extend southeast on a grade-separated structure over the Maine Central Railroad tracks in Bangor and cross the Penobscot River into Brewer. Both interchange, but by means of different grade-separation configurations, with South Main Street (Route 15) in Brewer and then generally follow the reserved Interstate Route 395 right-of-way corridor through the Brewer Industrial Park to Parkway South. Both terminate at Parkway South by means of partial diamond interchanges, with provisions for ultimate future extensions southward to Route 1A. Two options each were evaluated for Alternatives D and E, the first as a non-toll facility and the second as a toll facility.

COMPARISON OF ALTERNATIVE BRIDGE FACILITIES

For comparative purposes, the river-crossing alternatives were first evaluated on the premise that a new bridge facility must provide sufficient capacity and traffic service to permit the eventual replacement of the Penobscot Bridge. These alternatives should also reduce traffic congestion in Bangor and Brewer, should maximize benefits to motorists in terms of travel time and operating cost savings, and should minimize community and environmental impacts. Facility costs and financing were also assessed. A summary of this comparative analysis is contained in Table 1.

TABLE 1

COMPARISON OF RIVER-CROSSING ALTERNATIVES

1. Total Project Cost (1975 Conditions)

Downtown Alternatives:	\$9.4 Million (Alt. B, Low Profile) to \$18.8 Million (Alt. C, High Profile)
I-395 Alternatives:	\$20.5 Million (Alt. D) to \$21.9 Million (Alt. E)
	Toll Facilities - add approximately 15 per cent
2. 1993 Traffic Volumes (without Penobscot Bridge)

Downtown Alternatives:	55,700 vpd (24,600 vpd residual traffic on Chamberlain Bridge)
I-395 Alternatives:	55,800 vpd (24,500 vpd residual traffic on Chamberlain Bridge)
3. More favorable travel time savings to motorists: I-395 alternatives
4. More favorable operating costs savings to motorists: Downtown alternatives
5. Net travel time and operating cost savings: Approximately equal for downtown and I-395 alternatives
6. More favorable ratios of user benefits to costs: Downtown alternatives
7. Greater relief of traffic congestion: I-395 alternatives
8. More adverse impacts on man-made environment, including displacements of homes and businesses: Downtown alternatives
9. More adverse impacts on natural environment: I-395 alternatives
10. Favorable impacts on land-use and economic development:

Revitalization of downtown areas - Downtown alternatives
New area development - I-395 alternatives

Project costs (construction costs and construction-related costs, such as engineering, right-of-way, and contingencies) for the downtown alternatives are lower than those of the Interstate Route 395 alternatives, primarily due to the longer main bridge spans and longer approaches on the Brewer side of the river for the latter. These varied from \$9.4 million to \$18.8 million for the downtown alternatives and from \$20.5 million to \$21.9 million for the Interstate Route 395 alternatives, based on 1975 conditions. Approximately an additional 15 per cent in cost would be incurred if the latter (Interstate Route 395) facilities were to be constructed as toll facilities.

The traffic service characteristics of the downtown alternatives in 1993 were estimated to be similar to those of the Interstate Route 395 alternatives; namely, with the Penobscot Bridge removed, both the downtown and Interstate Route 395 alternatives would accommodate approximately 55,000 to 56,000 vehicles per day in 1993, leaving 24,000 to 25,000 vehicles per day on the Chamberlain Bridge, which is higher than existing (1973) traffic on the bridge (21,400 vehicles per day) and close to its ultimate traffic capacity. Translated into user benefits, in terms of travel time and operating cost savings, the Interstate Route 395 alternatives would result in greater savings in motorists' travel time, because traffic would be drawn out of the congested downtown areas, while the downtown alternatives would result in lower vehicle operating costs, because the river-crossing routes were more direct and shorter. Net user benefits, however, were approximately equal for the downtown and Interstate Route 395 alternatives, due to the offsetting effects of travel time and operating cost savings. All alternatives, downtown and at Interstate

Route 395, yielded favorable ratios of user benefits to facility costs, the downtown alternatives being higher, however, due to lower facility costs. Not included for the downtown alternatives were the costs to improve arterial roadways in the downtown areas so that they could accommodate the increases in traffic.

The downtown alternatives would tend to have more adverse impacts on the man-made environment, such as on displacements of homes and businesses, than would the Interstate Route 395 alternatives, which would have more impacts on the natural environment. Favorably though, the downtown alternatives should tend to have a revitalizing effect on businesses and commercial activities in the downtown areas of Bangor and Brewer, especially within the downtown Bangor Urban Renewal Project Area. Conversely, the Interstate Route 395 alternatives should tend to stimulate new development to occur in outer areas, such as within the Brewer industrial park.

Quite expectedly, it was found that a new bridge facility at Interstate Route 395 together with continuance of the Penobscot Bridge in operation, along with the Chamberlain Bridge, in the downtown area would result in motorists' benefits, both in terms of travel time and operating cost savings, being maximized. Long-term benefits to the community were also anticipated to result, such as revitalization of business activity in the downtown areas, while at the same time promoting new development to occur in the outer areas, such as the Brewer industrial park.

The type of relief which could be expected on the existing two bridges in the downtown area with a new bridge facility at Interstate

Route 395 is indicated by means of the following average daily traffic volumes:

<u>Bridge</u>	1973	<u>1973</u>	<u>1980</u>	<u>1993</u>	1993
	<u>w/o I-395</u>				<u>w/o I-395</u>
Penobscot	17,200	10,800	15,000	21,000	27,200
Chamberlain	21,400	11,200	16,000	24,500	53,100
I-395	N.A.	16,600	22,000	34,800	N.A.
Total	38,600	38,600	53,000	80,300	80,300

The first column represents actual 1973 traffic volumes on the existing two bridges. These volumes also represented 1973 traffic desires, as the traffic-carrying capacities of the existing two bridges were not exceeded. It is obvious that more traffic "desires" existed in 1973 to cross the Chamberlain Bridge than to cross the Penobscot Bridge.

Similarly, the last column represents forecast 1993 traffic desires on the existing two bridges without a new bridge facility. These desires exceed the traffic-carrying capacities of the existing two bridges, especially the Chamberlain Bridge, which, if the traffic desires could materialize, would accommodate almost twice as much traffic as would the Penobscot Bridge in 1993, and almost 2.5 times the amount of traffic it carried in 1973.

The traffic impact of a third bridge facility at Interstate Route 395 is obvious upon comparison of river-crossing traffic with the new facility to river-crossing traffic without (i.e., columns 2, 3 and 4 to columns 1 and 5). A bridge at Interstate Route 395 in 1973 would have resulted in significant reductions in traffic on the two existing downtown bridges, especially on the Chamberlain Bridge, where average daily traffic

would have dropped from 21,400 to 11,200. By 1980, traffic on both downtown bridges, with a new facility at Interstate Route 395, would still be less than actual 1973 traffic on the two downtown facilities. Only by 1993 would the capacities of the existing two downtown facilities be strained, with a third facility at Interstate Route 395, at which time the need for a new downtown facility would be apparent. Even at that, the new facility at Interstate Route 395 would have still reduced traffic desires on the Chamberlain Bridge by more than one-half in 1993.

Finally, an evaluation of the Interstate Route 395 alternatives as toll facilities indicated that the forecasted toll revenue would be insufficient to cover total facility costs over a 40-year economic life of such a facility. A toll rate of 30 cents per vehicle would be necessary to break even in 1978 alone, assuming no traffic diversion to the "free" (Chamberlain) Bridge.

SHORT-TERM MAINTENANCE OF PENOBSCOT BRIDGE OPERATION

A detailed field inspection and analysis of the structural condition of the Penobscot Bridge indicated that the bridge in its present condition required improvements to assure continued service at an acceptable vehicle loading level. It was determined to be structurally feasible to repair and modify the bridge to adequately carry current legal highway loads of the State of Maine for a minimum ten-year period at a cost of approximately \$800,000, based on 1974 conditions. This cost was based on the bridge being closed to traffic during rehabilitation. In view of this large expenditure of money and the undesirability of closing the bridge during repairs, and considering that the Chamberlain Bridge was

available to carry current legal loads, the practicality of repairing and modifying the Penobscot Bridge to carry less than legal loads was investigated.

It was found structurally and economically feasible to repair and modify the bridge so that it would be adequate to carry vehicles weighing less than the current legal loads. Repairs could be accomplished without requiring that the bridge be closed, although one-lane traffic conditions would be necessary during portions of the repairs. These repairs would allow the Penobscot Bridge to accommodate 12-ton single-unit vehicles and 20-ton combination vehicles at an estimated cost of \$200,000, based on 1974 cost conditions.

Until any such repairs as described above were completed, it was recommended that the bridge be posted for a seven (7) ton limit (the bridge was actually posted on December 27, 1974).

TRAFFIC IMPROVEMENTS TO EXISTING BRIDGE APPROACHES

The feasibility of widening the existing Chamberlain Bridge to add a third traffic lane and traffic improvements to the approaches of the existing Chamberlain and Penobscot Bridges were investigated to increase present river-crossing capacity and decrease traffic congestion.

It was concluded that strengthening the existing Chamberlain Bridge to provide for the additional traffic lane would be both impractical and costly. The only practical solution would be in effect to construct a new bridge alongside the existing bridge, and to connect the two to provide for the necessary lane capacity. A conservative estimate of the construction costs for such a widening is \$2,500,000 based on 1974 cost conditions. These costs do not include the costs for major traffic

improvements and right-of-way acquisition at either end of the structure, which would be required to assure that the additional bridge capacity would be attained, and would only offer short-term traffic relief with regard to total river-crossings for the dollars spent.

Relative to improvements to the approaches of the existing bridges (see Figure 4) which would improve traffic flow such that the maximum traffic capacities of the existing bridges would be attained, a program of improvements was developed having a total cost of \$1,158,800, based on 1974 cost conditions, exclusive of costs related to right-of-way acquisition. Right-of-way costs should not be major, as no takings of buildings or structures are required in the recommended program. This program of traffic improvements is summarized in Table 2. The traffic improvements include such measures as the provision of additional traffic lanes, new or modified traffic signalization, intersection traffic signal synchronization, improved pavement markings and curbing, and channelization. Approximately \$524,700 in costs would be associated with improving four intersections and approaches to the Chamberlain Bridge in Bangor and Brewer. Approximately \$634,100 in costs would be incurred in improving eleven intersections and approaches to the Penobscot Bridge in Bangor and Brewer.

NEW BRIDGE FACILITY FINANCING

The total project costs being considered for financing a new river-crossing facility vary from \$9.4 million to \$18.8 million for the downtown alternatives and from \$20.5 million to \$21.9 million for the Interstate Route 395 alternatives, based on 1975 cost conditions. Two avenues exist

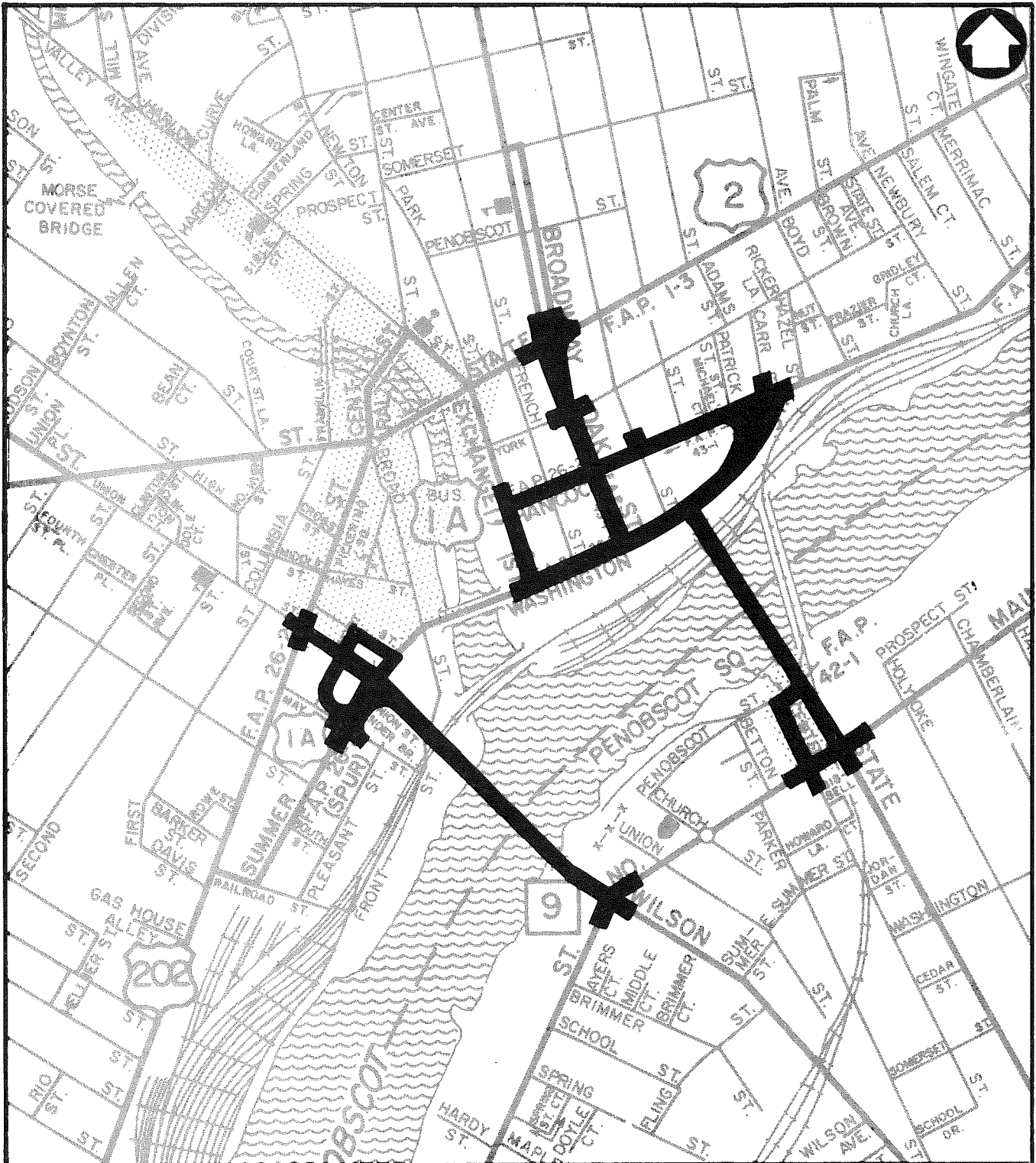
TABLE 2

	Summary of Recommended Improvements and Preliminary Estimate of Project Costs*	
INTERSECTION	IMPROVEMENTS	COST
1. Union Street and Main Street (Bangor)	Provide additional signal heads and controller dials. Relocate signal equipment and curbing. Widen pavement and curb radii. Provide pavement markings and traffic signs.	\$ 228,900
2. Union Street and Short Street (Bangor)	Improve channelization and increase curb radii, provide pavement markings and traffic signs and widen pavement south of Union Street. Extend Short Street north of Union Street to provide for a longer off-ramp to Summer Street and provide pavement markings and traffic signs.	149,900
3. Bridge Ramps at May Street and Summer Street (Bangor)	Improve channelization. Widen pavement and increase curb radii. Provide pavement markings, lighting and traffic signs.	71,400
4. Chamberlain Bridge, North Main Street, South Main Street, and Wilson Street (Brewer)	Install fully-actuated traffic control system with additional signal heads and posts. Widen the bridge approach to include a free right turn lane and provide pavement markings and traffic signs.	74,500
5. Penobscot Bridge and Washington Street (Bangor)	Improve channelization and traffic signs. Provide pavement markings.	14,000
6. Washington Street and Oak Street (Bangor)	Provide channelizing islands, pavement markings, and traffic signs. Widen both streets, install new curbing and sidewalks and increase curb radii.	88,100
7. Hancock Street, Washington Street and Carr Street (Bangor)	Channelize the intersections by providing pavement markings and traffic signs. Improve lane widths and increase corner radii. Provide new curbing and sidewalks.	20,700
8. Pine Street and Hancock Street (Bangor)	Provide traffic signs and pavement markings. Improve corner radii.	6,900
9. Oak Street and Hancock Street (Bangor)	Upgrade signal heads and other equipment. Widen northern approach of Oak Street. Install new curbing and sidewalks. Provide new pavement markings and traffic signs. Modify curb corner radii.	60,600

TABLE 2 (Continued)

INTERSECTION	IMPROVEMENTS	COST
10. Oak Street, York Street and Broadway (Bangor)	Widen and realign approaches on Oak Street and Broadway. Increase corner radii and provide new curbing and sidewalks. Construct a protected parallel-parking bay on Broadway. Provide pavement markings, traffic signs, and lighting fixtures.	\$ 74,700
11. Broadway and State Street (Bangor)	Upgrade existing traffic signal installation by providing additional signal heads and controller dials. Provide interconnection device, conduit, and cable to Oak Street and Hancock Street intersection. Provide new pavement markings and traffic signs. Provide a median island on the southern approach of Broadway. Construct a protected parallel-parking bay and install new curbing on Broadway. Improve curb corner radii and improve alignment of approaches. Provide lighting fixtures.	172,300
12. Washington Street and Exchange Street (Bangor)	Realign Washington Street and widen its eastern approach to improve geometrics. Provide pavement markings and traffic signs. Increase curb corner radii and improve channelization. Furnish lighting fixtures.	44,000
13. State Street and Penobscot Square (Brewer)	Upgrade signal equipment by providing additional signal heads and controller dials. Provide interconnect devices. Widen approaches and modify channelization. Provide new pavement markings, curbing and traffic signs. Modify curb corner radii.	39,000
14. State Street and North Main Street (Brewer)	Widen the north and south approaches of State Street and increase corner radii on all approaches. Provide new curbing and sidewalks. Upgrade signal equipment by providing additional signal heads, posts, controller dials, and interconnect devices. Provide pavement markings and traffic signs. Relocate and reconstruct retaining wall.	90,900
15. North Main Street and Center Street (Brewer)	Upgrade signal equipment by providing additional heads, posts, controller dials, and interconnect devices. Provide new pavement markings and traffic signs.	22,900
TOTAL PROJECT COSTS		\$1,158,800

*Based on 1974 prices and exclusive of right-of-way costs.



LEGEND



**BRIDGE
APPROACHES**



Figure 4

**INTERSECTION AND
ROADWAY APPROACHES
TO EXISTING BRIDGES**

to finance one or both facilities: state revenues and federal financial assistance. The Maine Department of Transportation explored the prospects of applying both methods of financing, either singly or in combination, to both a new downtown bridge facility and to an Interstate Route 395 facility. (The feasibility of toll financing for the Interstate Route 395 alternatives was previously investigated. The forecast toll revenues were found insufficient to cover total facility costs over a forty-year period. The toll option as a method of financing was therefore eliminated.)

As of early 1975, federal funds available to the State of Maine for highway purposes exceed the state's capability for providing the matching funds necessary for their complete expenditure in financing highway improvements. The short-range prospects of generating new state revenues to match all of the federal highway funds available are also uncertain due to the demands placed upon the state government and the continuing revenue gap caused by inflation increasing more rapidly than revenues, which has been further compounded by the energy crisis.

In the light of this, it is important to use available state monies at the highest possible matching ratio.

Interstate system funds are additional to the normal funds made available to each state for their regular Federal-Aid Highway Program by the Federal Government. Additionally, interstate funds allow a 90-10 matching ratio as opposed to a 70-30 matching ratio for the regular Federal-Aid Highway Program. Interstate funding could apply only to the Interstate Route 395 bridge alternatives. Only normal Federal-Aid funding would apply to the downtown alternatives.

The Maine Department of Transportation has requested the United States Department of Transportation, Federal Highway Administration, to designate an extension of Interstate Route 395 from Bangor to U.S. Route 1A in Brewer, as part of the Interstate System, to make it eligible for 90-10 federal-state matching funds, rather than 70-30. Such a designation would result in the state's share of the total cost of either of the two alternatives at Interstate Route 395 considered in this study, at a 90-10 matching ratio, being less than that of the state's share for any of the downtown alternatives, at a 70-30 matching ratio. (The state's share for Interstate Route 395 Alternatives D or E would be \$2,050,000 or \$2,190,000, respectively, versus \$2,820,000 for the least-cost downtown alternative. The state's share for extension of an Interstate Route 395 alternative beyond Parkway South to Route 1A in Brewer would still be less expensive, at approximately \$2,300,000.) An interstate designation would provide additional funds to the State, and would also have the added advantage of allowing the use of the regular Federal-Aid funding for other locations in the state, as a downtown facility would not be necessary until later.

Whether or not such an interstate designation will be obtainable is not yet known, and is a complex determination of which the State of Maine has no control. Total interstate mileage in the United States is fixed by federal law. The availability of an interstate designation for additional route mileage in Maine may be contingent in part, therefore, on the release of a similar amount of mileage from another state.

The other possible source of funding is the use of state financing, which may involve the issuance of bonds by the state to cover the partial or total costs of one or both bridge facilities.

From a consideration of the state and federal funding availability, it is evident that both bridge facilities cannot be implemented within an immediate future time frame due to financial considerations. The pivotal financial factor behind the choice of which bridge to implement first is whether or not an interstate designation of a bridge facility at Interstate Route 395 will be obtained, which, in early 1975, is still indeterminate.

RECOMMENDATIONS

In light of the present uncertainty relative to an interstate designation and federal funds for a new bridge facility at Interstate Route 395, and in light of the analyses and findings summarized in this report, two alternative courses of action are recommended, contingent on whether or not the interstate designation for a bridge facility at Interstate Route 395 is obtained.

If an interstate designation for a bridge facility at Interstate Route 395 is obtained, the following program of improvements is recommended:

- (1) Institute a program of immediate (1975) repairs to the Penobscot Bridge to accommodate 12-ton single-unit vehicles and 20-ton combination vehicles, at an estimated cost of \$200,000, based on 1974 cost conditions. Action on this recommendation was initiated in December, 1974.
- (2) Select from the two bridge alternatives at Interstate Route 395 a bridge facility for implementation. Proceed into the final planning and design stages for the selected facility at Interstate Route 395 for an earliest possible opening date.

- (3) Once the Interstate Route 395 bridge facility is open to the public, reassess the options available with regard to the Penobscot and Chamberlain Bridges. Options which may be available at that time include replacing the Penobscot Bridge with either a new two-lane or a new four-lane facility, adding an additional travel lane to the Chamberlain Bridge, or effecting further repairs to the Penobscot Bridge, in addition to routine maintenance.
- (4) Traffic improvements to the approaches of the existing two bridges should be considered by the Maine Department of Transportation when developing its future biennial highway improvement programs.

If an interstate designation for a bridge facility at Interstate Route 395 is not obtained, the following alternative program of improvements is recommended:

- (1) As in (1) above (i.e., with an interstate designation), institute a program of immediate (1975) repairs to the Penobscot Bridge to accommodate 12-ton single-unit vehicles and 20-ton combination vehicles, at an estimated cost of \$200,000, based on 1974 cost conditions. Again, action on this recommendation was initiated in December, 1974.
- (2) Select from the three downtown bridge alternatives a bridge facility for implementation, which will also serve as a replacement facility for the Penobscot Bridge. Proceed into the final planning and design stages for the selected downtown facility for an earliest possible opening date. Once this new facility is opened, the Penobscot Bridge will be demolished.
- (3) Before the end of the study period, re-evaluate the then existing and anticipated future river-crossing and associated arterial capacity needs. If additional capacity is needed, possible options could include a new bridge facility at Interstate Route 395 or adding a third travel lane to the Chamberlain Bridge.
- (4) As for (4) above (i.e., with an interstate designation), traffic improvements to the approaches of the existing two bridges should be considered by the Maine Department of Transportation when developing its future biennial highway improvement programs.

APPENDIX

LEGISLATIVE DOCUMENT NO. 307; S.P. 130

STATE OF MAINE

IN THE YEAR OF OUR LORD NINETEEN HUNDRED SEVENTY-THREE

S. P. 130 — L. D. 307

AN ACT Providing for a Study to Determine the Feasibility and Location of a New Bridge across the Penobscot River.

Emergency preamble. Whereas, Acts of the Legislature do not become effective until 90 days after adjournment unless enacted as emergencies; and

Whereas, in the interest of the citizens of the State of Maine, in general, and the citizens of the Cities of Bangor and Brewer, in particular, additional river crossing capability is desirable; and

Whereas, the following legislation is vitally necessary in the interests of safety; and

Whereas, in the judgment of the Legislature, these facts create an emergency within the meaning of the Constitution of Maine and require the following legislation as immediately necessary for the preservation of the public peace, health and safety; now, therefore,

Be it enacted by the People of the State of Maine, as follows:

Sec. 1. Study. The Maine Department of Transportation is authorized and directed to conduct a study, in cooperation with the Cities of Bangor and Brewer in the County of Penobscot, to determine the feasibility and location of a new bridge across the Penobscot River between the Cities of Bangor and Brewer. The Department of Transportation is further directed to report the results of said study to the first special or regular session of the Legislature convening after January 1, 1974.

Sec. 2. Allocation. There is allocated from the income of the General Highway Fund the sum of \$45,000 for the fiscal year ending June 30, 1974, to carry out the purpose of this Act. Any unexpended balance shall not lapse until the purpose of this Act has been accomplished.

Emergency clause. In view of the emergency cited in the preamble, this Act shall take effect when approved.

IN HOUSE OF REPRESENTATIVES,.....1973

Read twice and passed to be enacted.

.....*Speaker*

IN SENATE,.....1973

Read twice and passed to be enacted.

.....*President*

Approved.....1973

.....*Governor*