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Route 25 Corridor Study, Portland to Gorham, Maine : Conceptual Location Analysis and Environmental Review

Vanesse Hangen Brustlin, Inc

Conceptual Location Analysis and Environmental Review

Route 25 Corridor Study

Portland to Gorham, Maine

Prepared for **Maine Department of Transportation**

Prepared by **Vanasse Hangen Brustlin, Inc.**
Watertown, Massachusetts

November 1993

CONCEPTUAL LOCATION ANALYSIS AND ENVIRONMENTAL REVIEW

ROUTE 25 CORRIDOR STUDY
Portland to Gorham, Maine
P.I.N. 4078.00

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INTRODUCTION

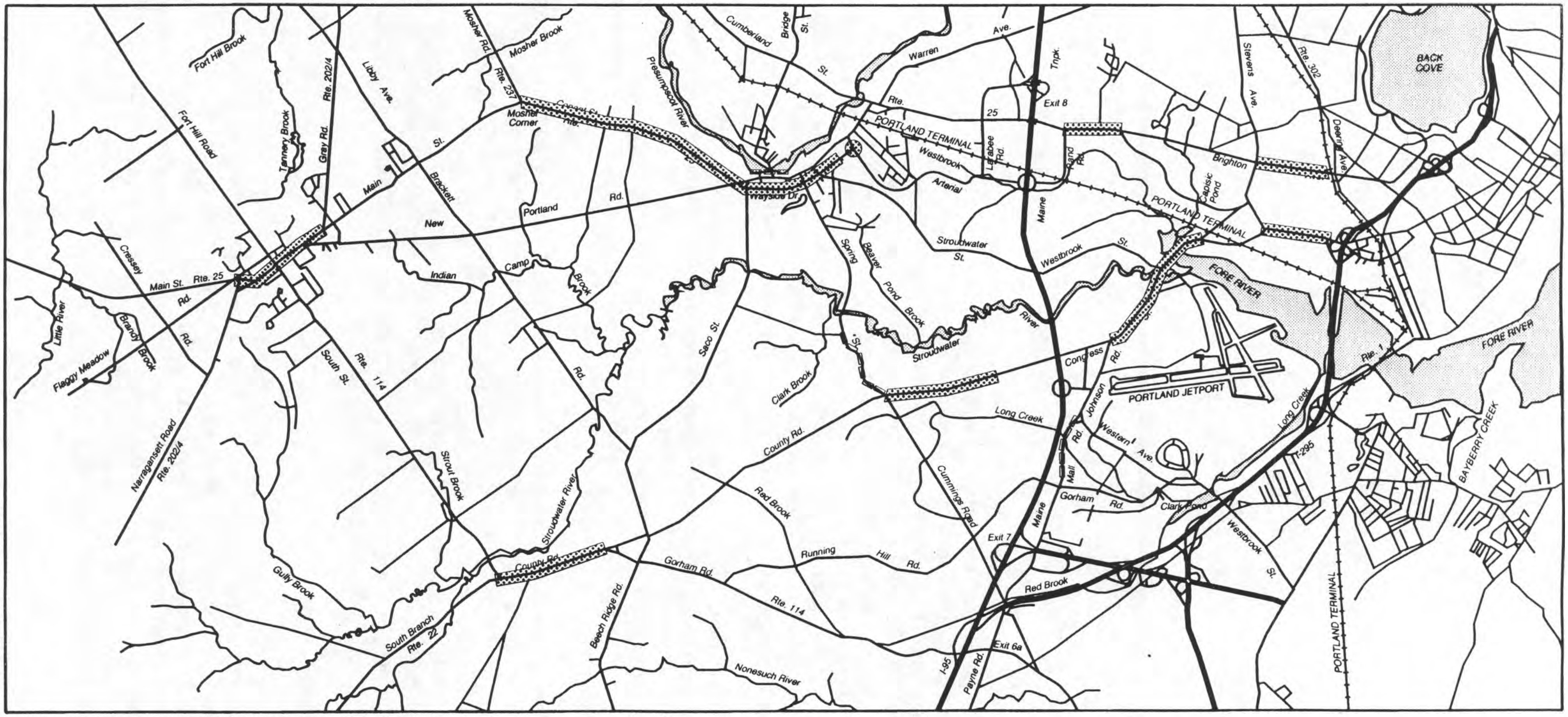
The purpose of the Route 25 Corridor Study is to evaluate the need, location, and design features of transportation alternatives targeted at providing long-term improved east-west traffic service in the study area. The study area includes the communities of Portland, Scarborough, South Portland, Westbrook, Windham, Gorham, Buxton, and Standish. Alternatives that are primarily directed toward improving the east-west movement of traffic in the study area were evaluated to determine their economic and environmental feasibility as well as their traffic effectiveness. These include upgrading existing roads, building new roads, or providing a combination of both.

Under Maine's Sensible Transportation Policy Act, rules and regulations have been promulgated to direct future transportation studies to consider alternative measures such as travel demand management (TDM) actions and public transit in lieu of major roadway improvements which may require adding capacity or lanes to existing roads. A study of alternative transportation actions was not contemplated nor included in the scope of this study.

The end product of this study is an evaluation of various roadway improvement alternatives. The evaluation includes information on the transportation benefits of each alternative and their potential environmental and social impacts. This evaluation can be used in subsequent studies to further narrow the range of alternatives to be studied in greater detail. This final report does not include a recommendation for a particular alternative, but rather provides a broad base of information to aid in identifying future corridor priorities and the potential scope of isolated transportation improvements.

Needs Assessment

A highway needs analysis was undertaken which identified existing and projected capacity deficiencies at several locations in the study area. These are the roadway segments or intersections that would experience unacceptable levels of congestion and delay without improvements. Planned roadway and intersection improvements were taken into consideration when determining future needs. Twelve road segments along Route 25 and Route 22 (including intersections) are projected to be deficient by the year 2010. These deficient segments are listed below and are shown in Figure A.



Route 25 and Route 22 Roadway Deficiences

Other Study Area Roadway Deficiences

· Volume to Capacity Ratio (V/C) Greater than 0.90

0 2000 4000 Feet

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Figure A

Year 2010
Roadway Deficiencies

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- Route 25 in Gorham Village between Route 202/4 west of the village and South Street (Route 114).

- Route 25 between South Street (Route 114) in Gorham Village and Route 202/4 east of the village.

- Route 22 in South Gorham between South Street (Route 114) and Gorham Road (Route 114) in Scarborough.

- Route 25 between Route 237 in Gorham and Main Street in Westbrook.

- Route 25, Wayside Drive in Westbrook between Main Street and Stroudwater Street,

- The intersection of Wayside Drive and the Westbrook Arterial in Westbrook.

- Route 22, County Road in Westbrook between Spring Street and the Portland city line.

- Route 25, Brighton Avenue in Portland between Rand Road and Capisic Street.

- Route 25, Brighton Avenue in Portland between Stevens Avenue and Deering Avenue.

- Route 22, Congress Street in Portland between Johnson Road and Westbrook Street.

- Route 22, Congress Street in Portland between Westbrook Street and Frost Street.

- Route 22, Congress Street in Portland between Stevens Avenue and Interstate 295.

Development of Alternatives

The goal of the roadway improvement alternatives was to eliminate the deficient sections of roadway along Route 25 or Route 22 projected to operate at or over capacity in the year 2010. These are the sections that would experience unacceptable levels of congestion and delay without improvements.

Potential roadway improvements fall into two categories: upgrades and new roads. The first category is designed to eliminate deficiencies by providing increased capacity at deficient locations. The second category would provide additional capacity on new roadways that would be designed to divert sufficient traffic from existing roadways to eliminate the deficiencies. New roadways could be provided as local bypasses around deficient locations or as entirely new roadway alignments through most of the study area.

Seventeen alternatives for providing additional roadway capacity are identified and evaluated along with the No-Build Alternative. The alternatives were developed in consultation with the Project Advisory Committee (PAC) established by the Maine Department of Transportation and contain elements suggested by committee members. To address committee concerns that traffic benefits be balanced against environmental, engineering and economic costs, a wide variety of options, ranging from exclusively upgrading existing roadways to providing entirely new roadway alignments, were considered. The majority of the alternatives represent various combinations of new road segments and upgrades.

DESCRIPTION OF ALTERNATIVES

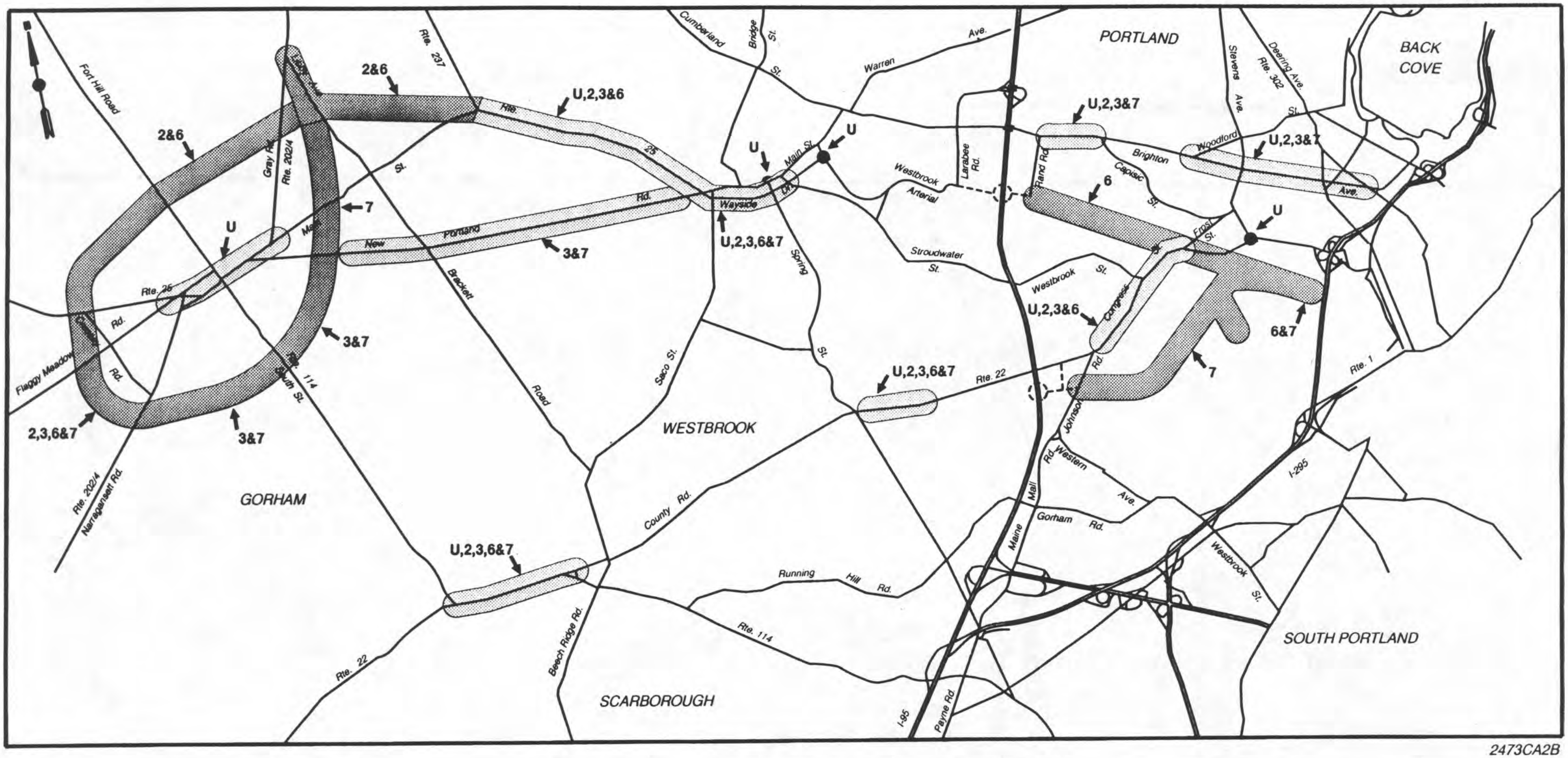
In addition to the No-Build action, the seventeen alternatives evaluated include an upgrade of existing roads, constructing six new roads, and ten alternatives which combined upgrades and new roads. Upgrades generally consist of adding one travel lane in each direction along deficient roadway segments. The exception is in Gorham Village where two additional lanes in each direction are required to eliminate the deficiency. New road segments are limited-access four-lane divided roadways. Interchanges could be provided at locations where the new road intersects a major existing road.

The Upgrade Alternative and four combination alternatives (2, 3, 6, and 7) are shown on Figure B. The Upgrade Alternative consists of roadway widenings on deficient sections of existing roadways in Gorham Village, South Gorham, Westbrook, and Portland. The four combination alternatives consist principally of upgrades in combination with bypasses of Gorham and bypass connections between I-295 and the proposed new turnpike interchanges. Alternatives 1, 5, and 8, which consist primarily of combinations of bypasses, are shown on Figure C. Figure D shows Alternative 9 and Figure E shows Alternatives 10 and 11. The two new road alternatives developed during this study (4 and 12) are shown on Figure F and the four new road alternatives adapted from a previous study by the Maine Turnpike Authority known as the "Westerly Connector Study" (Alternatives 13, 14, 15, and 16) are shown on Figure G. A detailed description of each alternative is presented in the Detailed Analysis of Alternatives section of this report.

EVALUATION OF ALTERNATIVES

Transportation impacts of each alternative were quantified by using traditional transportation measures and ranking each alternative for each measure. The transportation measures include deficiencies on Routes 25 and 22, vehicle miles of travel (VMT), vehicle hours of delay (VHD), and average volume to capacity (v/c) ratio. Traffic volume changes on individual roadways was not included because there is no method to categorize all the changes in volume throughout the study area in a single measure. Further, volume is indirectly included as part of the volume-to-capacity ratio used to identify deficiencies. Deficiencies on roads other than Route 25 and Route 22 were not included because the focus of the study is on east-west travel which is primarily handled in the study area by Routes 25 and 22.

The evaluation matrix which is presented in Table A, ranks each alternative 1 through 4 for each measure of effectiveness. A ranking of 4 indicates the best results for a measure and 1 indicates the worst results.



Notes: Schematic Only

Alternatives do not provide access to Flaggy Meadow Rd. or Libby Ave.

Bypass/New Road

Upgrade Roadway

● Upgrade Intersection

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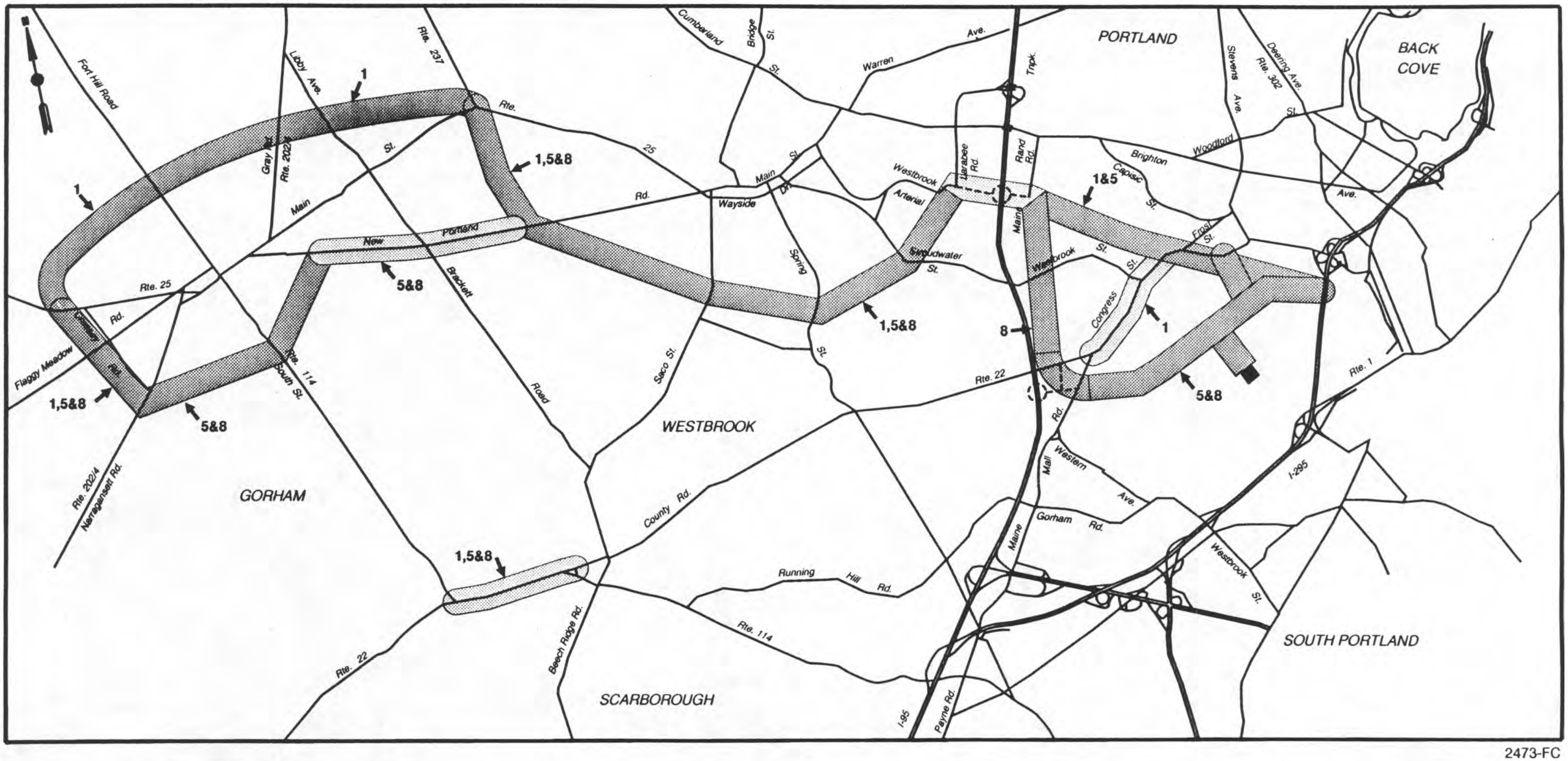
Figure B

Upgrade and Alternatives 2,3,6&7



Notes: Schematic Only
Not to Scale

Alternatives do not provide access to Flaggy Meadow Rd. or Westbrook St.

Bypass/New Road

Upgrade

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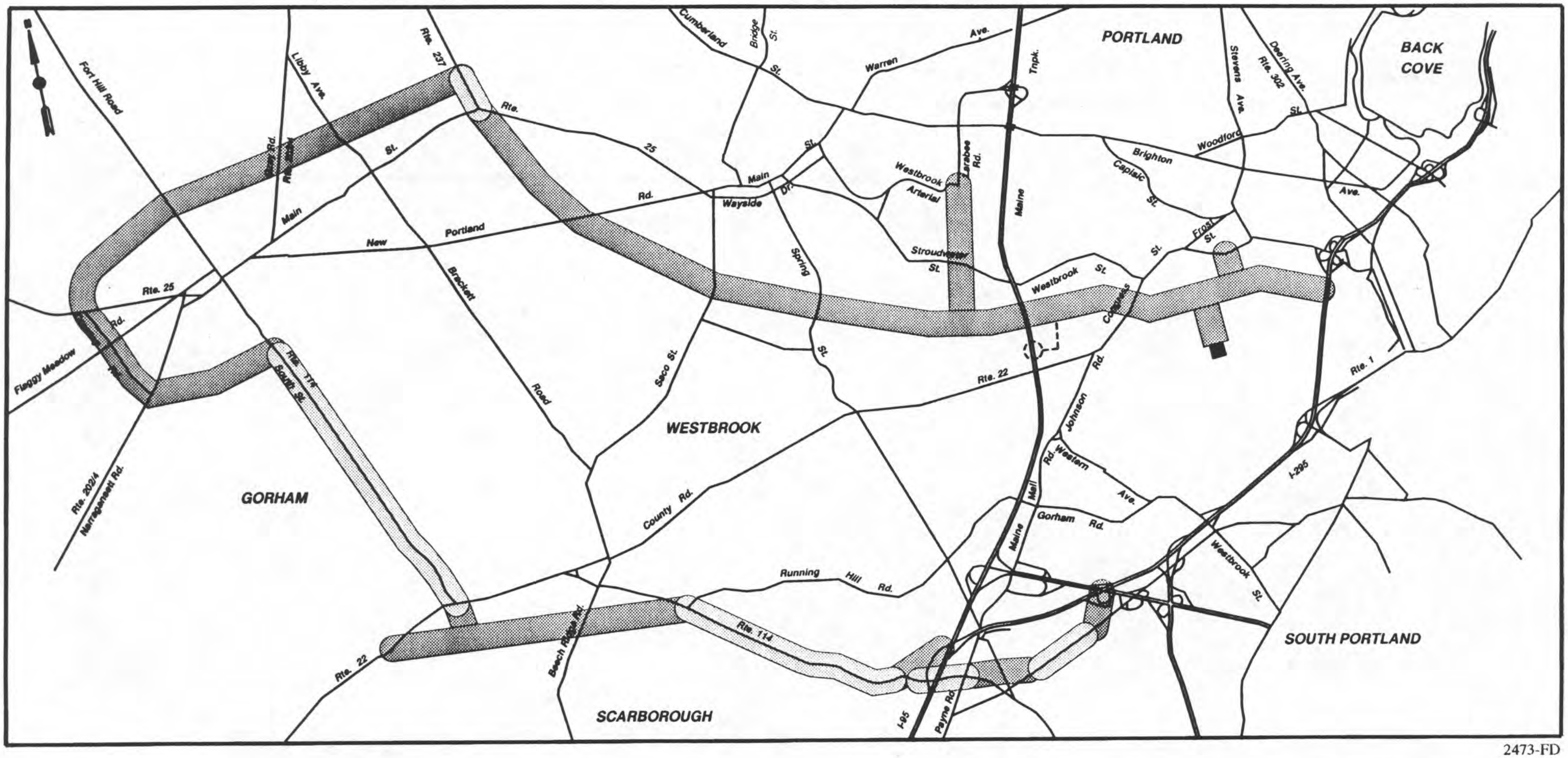
Figure C

2010 Daily Traffic Volumes
Alternatives 1,5,&8



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Notes: Schematic Only
Not to Scale

Alternative 9 does not provide access to Flaggy Meadow Rd. or Stroudwater St.

Bypass/New Road

Upgrade

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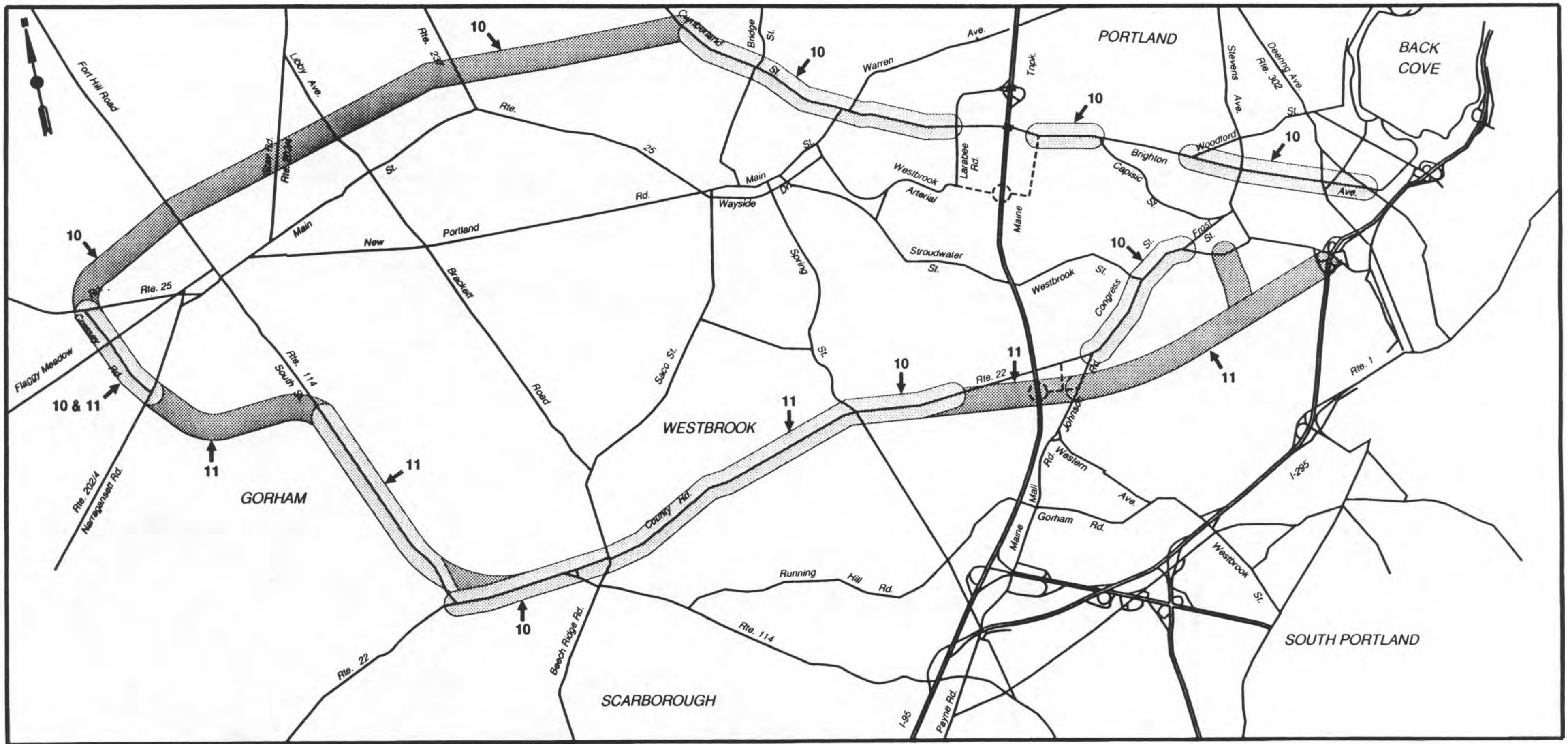
Figure D

Alternative 9



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Notes: Schematic Only
Not to Scale

Alternatives do not provide access to Flaggy Meadow Rd. or Libby Ave.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

New Road

Upgrade

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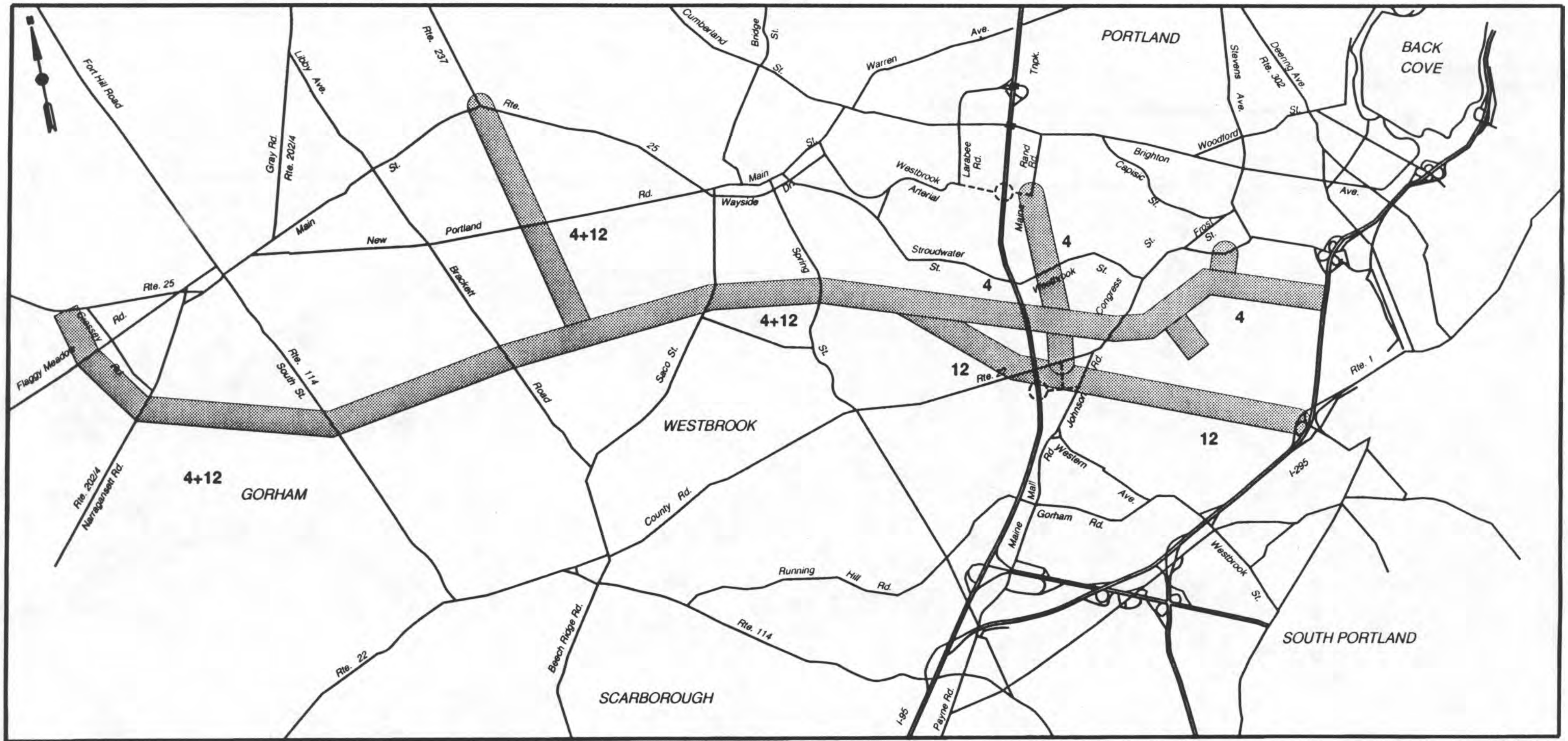
Figure E

Alternatives 10 & 11



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Notes: Schematic Only
Not to Scale

Alternatives do not provide access to Flaggy Meadow Rd., New Portland Rd., or Westbrook St.

Bypass/New Road

Upgrade

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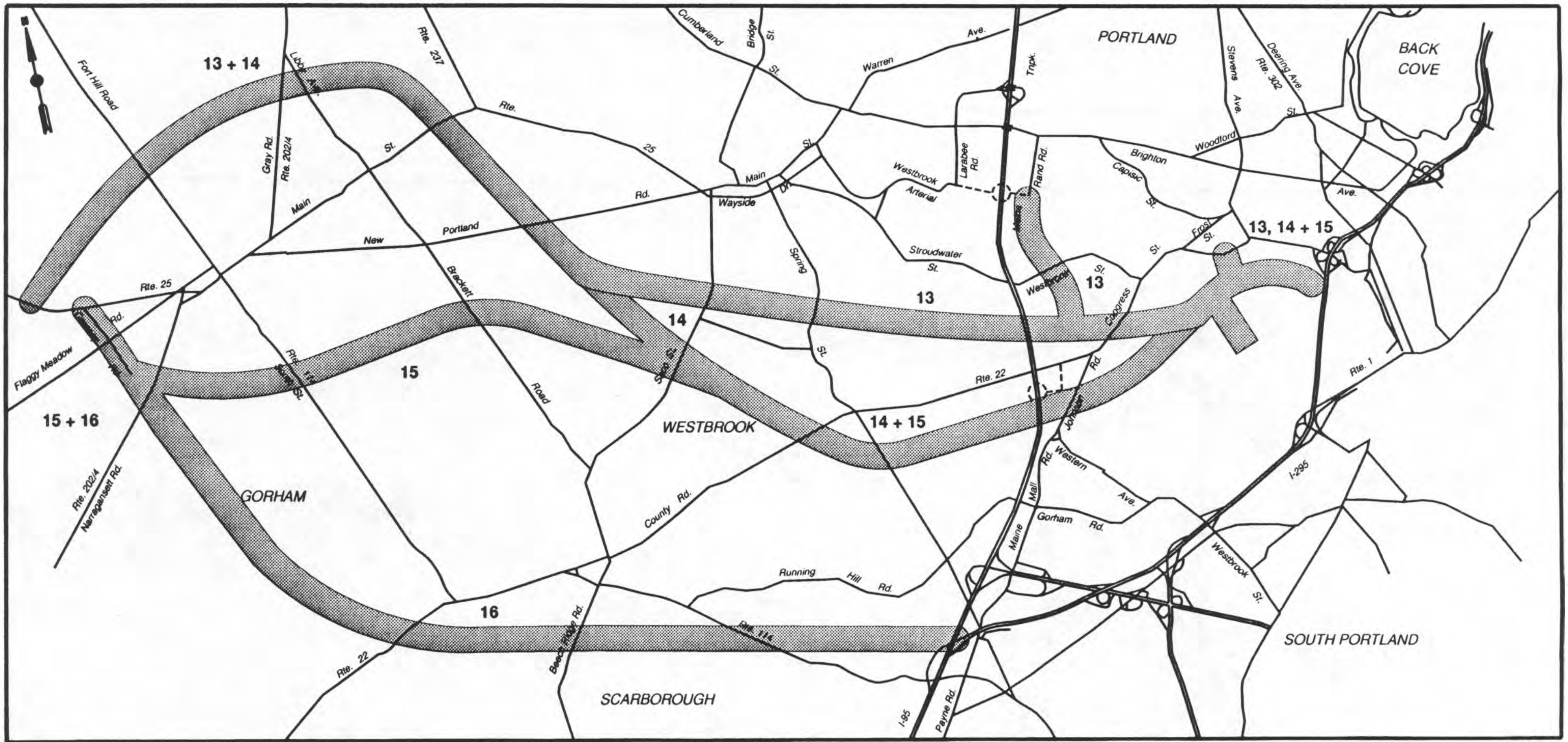
Figure F

Alternatives 4 & 12



2473-FG

Notes: Schematic Only
Not to Scale

Alternatives do not provide access to Libby Ave. or Westbrook St.

Bypass/New Road

Upgrade

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Figure G

Alternatives 13, 14, 15 & 16

Table A EVALUATION MATRIX

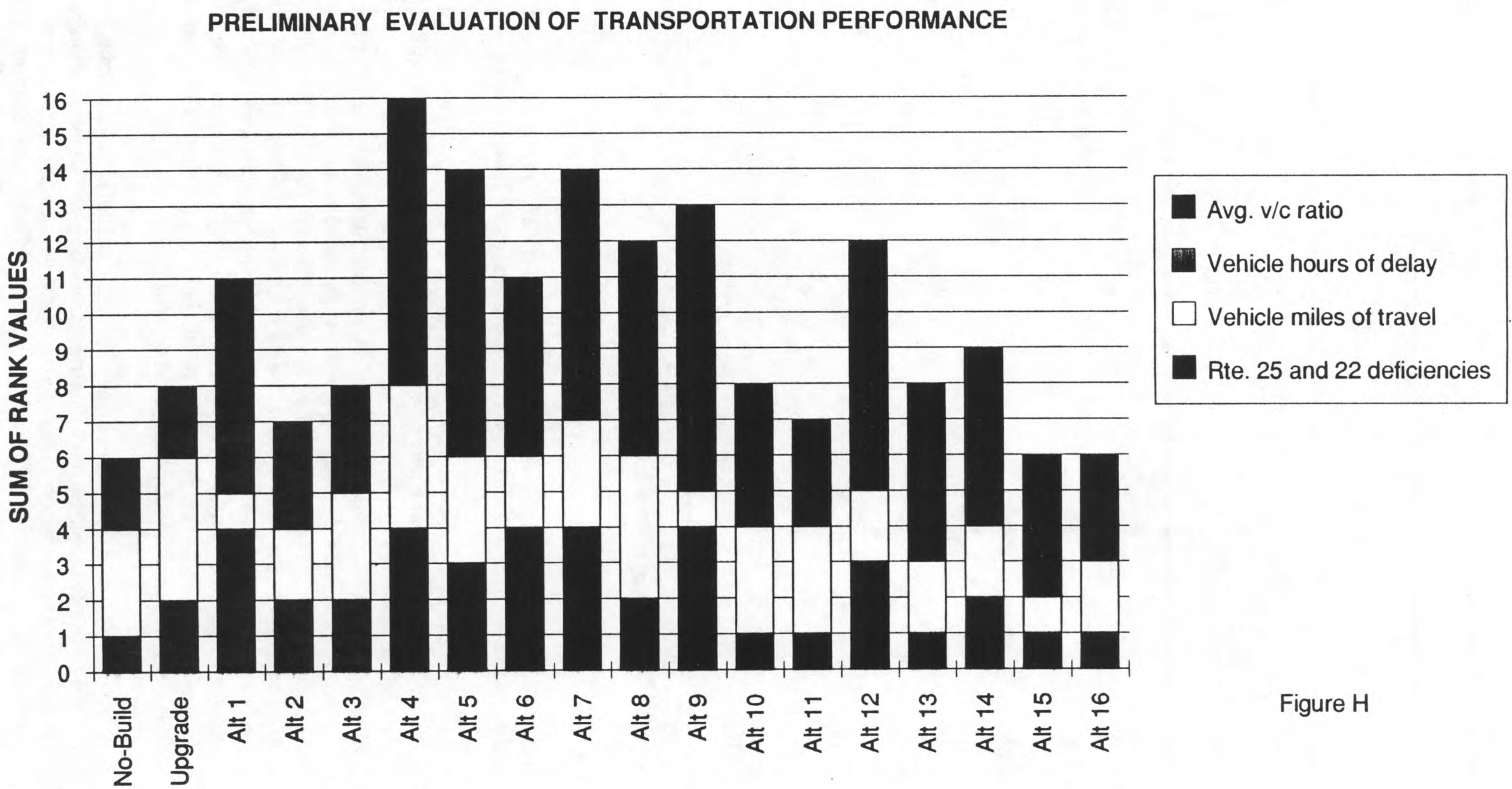
Alternatives	Total Rank Score* Deficiencies on Routes 25 and 22	Vehicle Miles of Travel	Vehicle Hours of Delay	Average V/C Ratio	Total
No-Build	1	3	1	1	6
Upgrade	2	4	1	1	8
1	4	1	3	3	11
2	2	2	1	2	7
3	2	3	1	2	8
4	4	4	4	4	16
5	3	3	4	4	14
6	4	2	2	3	11
7	4	3	3	4	14
8	2	4	3	3	12
9	4	1	4	4	13
10	1	3	2	2	8
11	1	3	2	1	7
12	3	2	4	3	12
13	1	2	3	2	8
14	2	2	3	2	9
15	1	1	2	2	6
16	1	2	2	1	6

* Scoring: 4=best results; 1=worst results.
See Tables 47, 49, and 50 for scoring criteria.

The evaluation matrix is also represented in a bar chart in Figure H which sums the scores of each alternative for each measure of effectiveness.

Based on the evaluation matrix, Alternative 4 yields the best overall results for the transportation measures of effectiveness. It falls into the highest ranking for all four measures presented and is among the most effective of all the alternatives in eliminating deficiencies, reducing vehicle miles of travel, reducing delay, and decreasing the average v/c ratio on study area links. Although other alternatives may be more effective for specific measures, Alternative 4 is the only alternative to rank near the top for each of the four measures. Alternative 4 is a new road alternative with a general alignment between Routes 25 and 22. This alternative may be the most effective in addressing overall transportation needs because it appears to most closely follow the general desire line for east-west traffic.

Alternatives 5 and 7 are tied as the second most effective alternatives with regard to the transportation measures according to the evaluation matrix. Both rank in the top for two measures and in the second to top for two other measures. Alternative 5 consists principally of new road segments which form bypasses of Gorham Village, Westbrook, Congress Street and Brighton Avenue.



PRELIMINARY EVALUATION OF TRANSPORTATION PERFORMANCE
SUM OF RANK VALUES
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
No-Build
Upgrade
Alt 1
Alt 2
Alt 3
Alt 4
Alt 5
Alt 6
Alt 7
Alt 8
Alt 9
Alt 10
Alt 11
Alt 12
Alt 13
Alt 14
Alt 15
Alt 16
Avg. v/c ratio
Vehicle hours of delay
Vehicle miles of travel
Rte. 25 and 22 deficiencies

Figure H

Alternative 7 consists principally of upgrades, but includes an extensive southern bypass of Gorham Village and a bypass of Congress Street.

Alternative 9, which also includes extensive new road segments, is the third most effective alternative based on the evaluation matrix. It falls into the top ranking in three of the four transportation measures. In the fourth measure (VMT), however, it falls to the bottom. A higher ranking in this measure would have tied it with, or placed it ahead of, Alternatives 5 and 7 as the second most effective alternative.

The No-Build Alternative and Alternatives 15 and 16 are the least effective overall. The No-Build Alternative falls into the lowest ranking for three of the measures and into the next-to-highest ranking for the remaining measure (VMT). Alternatives 15 and 16 fall into the lowest and next-to-lowest ranking for all measures. Alternatives 15 and 16 are the southernmost new road alignments and it appears they are too far removed from the overall desire lines of travel to be effective in addressing transportation needs.

Summary of Potential Environmental and Social Impacts

Measures of impact considered critical to a project's feasibility have been applied in this preliminary level of corridor identification and analysis. All seventeen alternative alignments, including the Upgrade alternative, were superimposed on environmental resource maps. The linear distance of crossing was then measured for major environmental features.

The following is a description of the potential environmental and social impacts for each of ten environmental resource categories evaluated as part of this study.

Surficial Geology: Unstable Deposits.

Most of the alternatives lie in an area of unstable geologic deposits. The broadest expanses of unstable deposits occur north of Gorham and in Westbrook and Portland. Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas, as could any heavy grading.

Steep Slopes / Erodible Soils.

Moderate to steep slopes occur along most of the major streams and rivers in the study area. Principal areas of concern are the crossings of the Stroudwater River and its tributaries, and the crossing of the Fore River estuary. A lengthy crossing of Tannery Brook north of Gorham would also be required for an inner bypass of Gorham. With proper design and application of erosion and sedimentation controls impacts will be minimized to an acceptable level.

Farmland Soils.

Loss of farmland containing "Prime Farmland Soils" and "Additional Farmland Soils of Statewide Importance" would be greatest in the area north of Gorham. Some alternatives would also impact large farms on Stroudwater Street/Westbrook Street with associated loss of Prime Farmland soils.

Sand and Gravel Aquifers.

The bypass segments southwest of Gorham (near Narragansett Road), and the road segments in South Gorham and Scarborough intersect a moderate yield aquifer area. Two groundwater contamination sites, an auto junkyard and sand excavation site, already occur in the Gorham bypass area. The northern-most Gorham bypass passes near a groundwater contamination site off Libby Avenue. Roadway designers should be aware of these potential problems if they still exist at the time of design. The South Gorham and North Scarborough segments (new roads and upgrades) lie within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area.

Surface Water Resources.

Surface waters which would be potentially affected by the alternatives include:

- Presumpscot River watershed: Little River, Brandy Brook, Tannery Brook and Mosher Brook, Presumpscot River

- Stroudwater River watershed: Gully Brook, Indian Camp Brook, and Beaver Pond Brook, South Branch, and Stroudwater River

- Nonesuch River watershed: unnamed tributaries to Nonesuch River in North Scarborough

- Coastal watershed: Red Brook, Long Creek, and the Fore River

The number of stream crossings is highly variable between the alternatives (2 to 21); most are in the Stroudwater Basin. Many of these are crossings greater than or equal to 20 feet in width. These larger crossings such as the Fore River in Portland, and the Stroudwater in Westbrook, pose relatively greater engineering and environmental permitting efforts, compared to the narrower crossings.

Floodplains.

The total floodplain crossing distance of the alternatives ranges from 500 feet to 10,800 feet. The multiple new road crossings of the Stroudwater River and the new road crossing of the Fore River estuary constitute the majority of floodplain crossings. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands.

Wetland impacts of the alternatives range from 1,300 to 21,300 feet of crossing. The presence of extensive hydric soils south of Gorham and Westbrook suggests wetlands are more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland impact would be in the areas south of Gorham, Tannery Brook (inner bypass only), the Stroudwater River crossings south of Westbrook, and the new crossings of the Fore River estuary and headwaters. Each of these sites pose regulatory constraints with regard to wetland permitting. Structural engineering solutions and careful choice of crossing locations will minimize the impacts associated with any wetland crossings. Erosion and sedimentation controls and the use of stormwater best management practices will be used to minimize wetland impacts.

Fish and Wildlife Resources.

The bypasses of Gorham and Westbrook cross a number of streams and rivers with state designated fisheries. The highest value designated fisheries occur along the Little, Presumpscot and Stroudwater Rivers. These crossings should have no significant impact on the fisheries with the application of available engineering solutions.

The new crossings of the Fore River estuary also pose concerns for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of the crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use.

Impacts to existing land uses are highest for alternatives with major road upgrade components, and lowest for those alternatives which rely on new roads. The alternatives would cross between zero and 26,300 feet of high and moderate density residential land use, and between 2,400 feet and 15,250 feet of low density residential land use. The total crossing of commercial and industrial land uses would be between 400 feet and 12,300 feet. Most impacts would be associated with new road interchanges and upgrade segments. These impacts include direct property loss as well as potential traffic related impacts such as noise and air pollution.

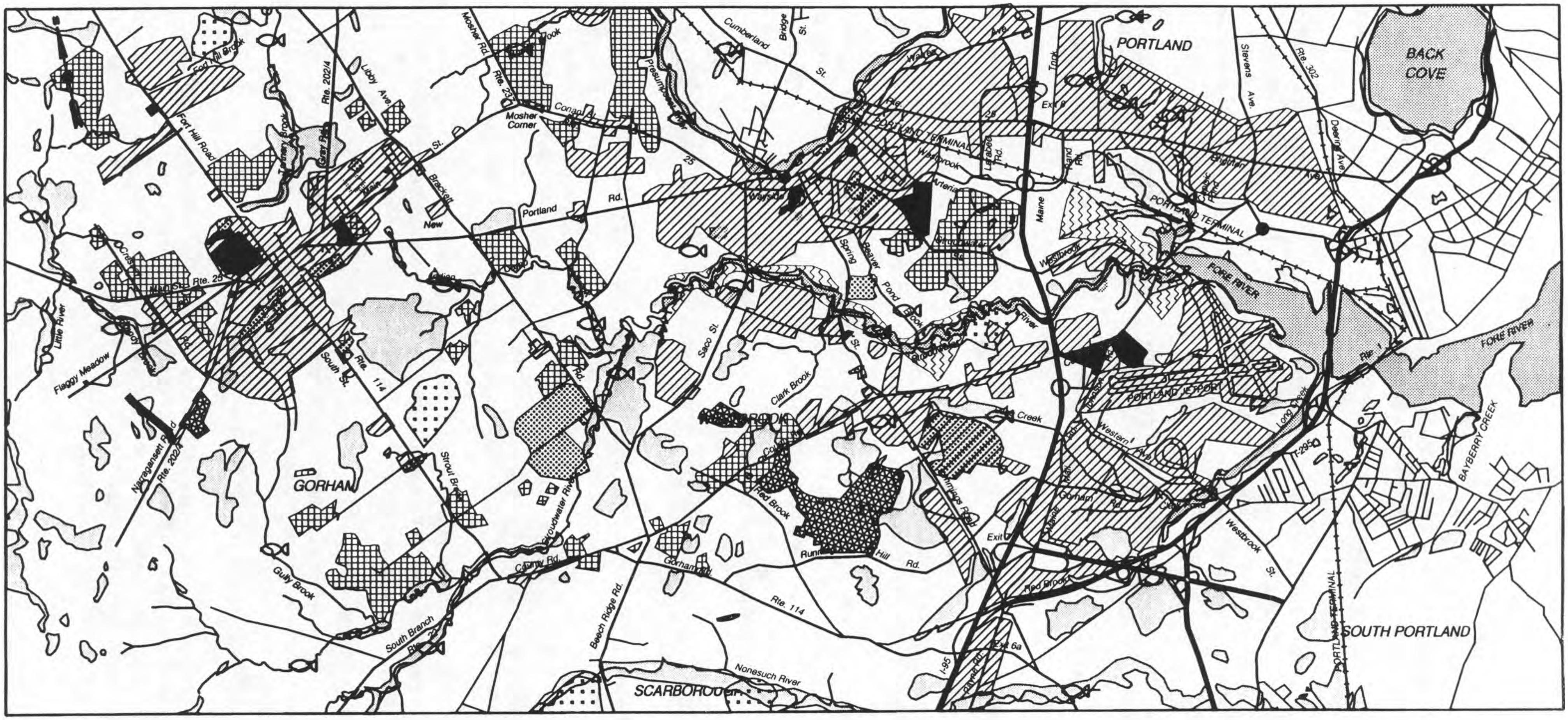
Cultural Resources.

The principal areas of cultural resource impact are associated with upgrade segments and new road crossings of the Fore River estuary as they relate to the Stroudwater Historic District. Although few structures would be directly impacted, their historical significance would require that efforts be taken to avoid and minimize impacts. Avoidance options are limited, due to the proximity of the historic structures to the existing roadway.

Additional historic resources are located in downtown Gorham and Westbrook, and along Brighton Avenue. Gorham poses potential problems for an upgrade alternative due to the proximity of structures to the existing road.

Along with basic land use concerns, the alternatives which include local road upgrades may pose impacts to historic resources. Development of those alternatives would require close coordination between designers and the Maine Historic Preservation Commission (MHPC) in order to identify the design alternatives which minimize impacts to historic properties.

Figure I is a resource map for the entire study. This figure indicates major areas of potential conflict between road improvement alternatives and environmental resources. Table B provides a quantification of the different alternative's environmental, social and engineering impact on various study area features. Table B also shows estimated construction costs for each



Dense combinations of residential, commercial or institutional areas)	Park and Recreation Area Public Facilities
Cemetery/Institution	Active Farmland
Identified Wetland and Surface Water	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)
Waste Site (includes Junk Yards)	Wildlife Resource
Fishery	

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure I

Composite Environmental Base Map

alternative. Detailed descriptions of individual alternatives are presented in the chapter titled "Detailed Analysis of Alternatives".

The following items highlight major environmental impacts associated with the alternatives:

- Road upgrades typically pose the greatest impacts to adjacent land uses, including historic resources; new roads typically pose the greatest impacts to natural resources such as wetlands.

- Northern bypasses of Gorham Village are generally more desirable than southern bypasses because of fewer impacts to water resources, and wetlands.

- The "outer" bypass analyzed north of Gorham is more desirable than the "inner" bypass because it has a better location for crossing Tannery Brook.

- Both Westbrook bypasses are likely to involve a number of environmental permitting issues related to wetlands, floodplains, water resources, and wildlife/fisheries habitat because of their Stroudwater River crossings.

- Any crossing of the Fore River estuary will involve multiple environmental permit issues related to wetlands, floodplains, water resources and shorebird/wildlife habitat.

TABLE B COMPARISON OF ENVIRONMENTAL , SOCIAL & ECONOMIC IMPACTS

ALTERNATIVE	Length of new roads Only (miles)	Total Length ** (miles)	Wetlands (feet) ***	Floodplains < 500 year (feet)	Surface Water (Stream crossings) (number)	Fish and Wildlife Resources (feet)	Park and Recreational Land * (feet)	Historical Resources (feet)	Sensitive Cultural Features (feet)	Residential Commercial/ Industrial ROW (feet)	Construction Cost ($ millions)
UPGRADE		8.0	4,000	700	5	0	400	4,400	1,400	a. 33,300 b. 12,350 c. 15,000	14.7
1	11.2 to 13.6	13.2 to 15.6	8,550 to 12,600	3,900 to 7,300	12 to 15	50 to 2,100	1,700 to 4,900 *	0	400 to 1,150	a. 2,500 - 3,100 b. 4,200 - 5,550 c. 400 - 1,000	87.2 to 97.7
2	3.7 to 5.5	9.7 to 10.8	2,250 to 4,150	600 to 1,000	2 to 5	0	400	3,800	1,300 - 2,000	a. 22,100 - 22,200 b. 8,600 - 9,700 c. 10,700 - 10,900	42.0 to 49.2
3	3.5 to 5.0	11.6 to 11.8	5,550 to 8,000	1,450 to 1,800	2 to 4	50 to 2,380	400	4,000	900 - 950	a. 22,000 b. 12,350 - 12,650 c. 11,800	37.5 to 43.1
4	12.9 to 13.8	12.9 to 13.8	7,200 - 8,700	4,700 - 5,900	11 to 13	5,050 - 5,150	3,100 to 6,300	300	0	a. 2,000 b. 2,200 - 2,500 c. 1,100	121.8 to 123.2
5	13.5 to 15.7	16.2 to 17.0	16,350 - 20,950	4,950 - 8,700	14	2,500 - 6,880	0	0	0 to 50	a. 1,300 - 1,800 b. 5,550 - 6,150 c. 2,100 - 2,500	135.7 to 141.8
6	6.6 to 8.4	12.2 to 13.9	7,350 - 10,150	3,200 to 6,400	5 to 8	0 to 2,000	400	3,800	950 - 1,600	a. 11,000 - 11,600 b. 8,600 - 9,700 c. 10,700 - 11,300	61.9 to 69.2
7	7.1 to 9.8	14.2 to 16.9	9,100 - 11,300	2,400 - 2,750	4 to 8	2,450 - 4,780	400	3,400	1,350	a. 25,400 b. 13,850 - 15,250 c. 11,900 - 12,300	95.1 to 104.9
8	13.8 to 15.3	15.6 to 16.5	12,700 - 16,350	3,550 - 4,600	15	3,700 - 5,330	1,700 to 4,600	0	400 - 450	a. 2,600 b. 4,850 - 5,450 c. 2,600	126.1 to 127.9
9	17.6 to 18.2	18.1 to 18.7	10,550 - 11,950	5,800 - 6,400	17	2,450 - 2,500	4,100 to 7,300	600	300	a. 4,100 b. 14,450 - 14,750 c. 1,900	141.5 to 143.3
10	5.3 to 7.1	11.9 to 13.7	3,350 - 5,250	2,900	2 to 5	0	800	4,500	1,150 - 1,800	a. 26,200 - 26,300 b. 7,500 - 8,550 c. 9,700 - 9,900	43.0 to 50.2
11	6.3 to 8.0	11.6 to 12.2	8,700 - 9,400	2,100 - 2,700	5	2,450 - 2,500	0	0	100 to 150	a. 2,950 b. 10,200 - 10,600 c. 6,100	75.4 to 75.6
12	14.4	14.4	8,900 - 9,350	2,550 - 2,950	11	3,000 - 3,050	3,500	0	0 to 50	a. 600 b. 2,400 c. 3,700	90.5
13	13.2	13.2	19,500	5,300	20	2,500	300	650	0	a. 2,200 b. 5,800 c. 2,000	120.8
14	11.7	11.7	17,600	7,000	18	2,450	1,000	0	1,900	a. 2,300 b. 4,900 c. 3,000	99.7
15	10.7	10.7	21,300	9,800	21	2,550	1,000	0	1,900	a. 2,900 b. 4,000 c. 3,000	92.2
16	7.7	7.7	9,600	10,800	15	650	0	0	0	a. 0 b. 3,100 c. 700	45.7

a. high and moderate density residential
b. low density residential
c. commercial and industrial

* Includes Resource Protection Zones and Wildlife Preserves
** Length of new roads and upgraded roads

*** Linear feet of contact is unit used to measure potential impact

WHAT'S NEXT

One of the more significant findings of the Route 25 Corridor Study is that projected growth in the study area by the year 2010 will significantly increase traffic congestion along Route 25 and Route 22. Already congested roadways and intersections will deteriorate further resulting in longer delays and some new locations currently operating at acceptable levels will become congested.

This study has analyzed seventeen alternatives for adding roadway capacity to eliminate or lessen traffic congestion during peak travel periods. Another study, undertaken by the Portland Area Comprehensive Transportation Study (PACTS) has been evaluating actions that could possibly reduce travel demand and travel behavior during peak traffic periods without widening existing roads or building new roads. These actions are commonly referred to as Transportation Demand Management (TDM) actions. TDM includes activities such as carpooling and van pooling, public transportation, variable work hours and park and ride programs.

The next step in the process of developing a transportation plan for improving east-west travel in the study area will require a decision on how to best meet the transportation needs of the area and, at the same time, meet the requirements of the state's Sensible Transportation Policy Act. A decision is required on whether TDM actions alone or in concert with roadway improvements can achieve an acceptable level of traffic. Although this study does not make any recommendations, it will provide a strong resource base for decision-making regarding tradeoffs between roadway improvement choices and potential environmental, social and economic impacts.

INTRODUCTION

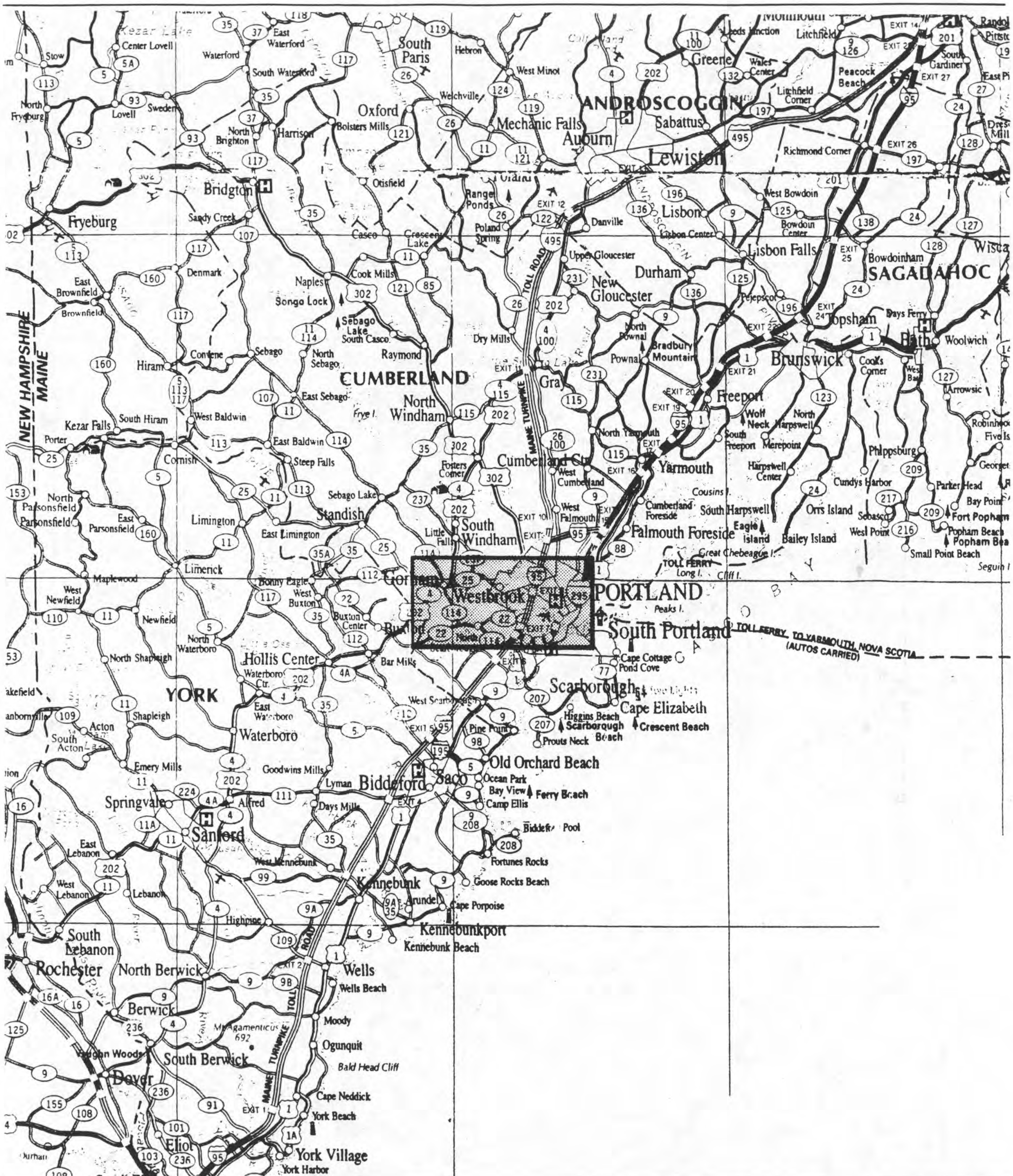
The concept of providing improved east-west access to Portland dates back to 1952. Later, in the 1970s and 1980s, several studies were completed with recommendations for improved east-west access to Portland from Gorham and Westbrook. In order to continue to pursue an objective examination of ways to meet the transportation needs of the Greater Portland area, the Maine Department of Transportation (MDOT) decided to undertake a new study that would do more than just update these previous efforts.

The goal of the current Route 25 Corridor Study is to evaluate the need, location, and design features of transportation alternatives targeted at providing long-term improved east-west traffic service in the study area. Although the study area includes the communities of Portland, Scarborough, South Portland, Westbrook, Windham, Gorham, Buxton, and Standish, the primary areas are Portland, Westbrook and Gorham (see Figures 1 and 2). Alternatives that are primarily directed toward improving the east-west movement of traffic in the study area were evaluated to determine their economic and environmental feasibility as well as their traffic effectiveness. These include upgrading existing roads, building new roads, or providing a combination of both. A program of transportation demand management (TDM) strategies for reducing congestion may also be a viable alternative alone or in combination with other alternatives. Under Maine's Sensible Transportation Policy Act, rules and regulations have been promulgated to direct future transportation studies to consider TDM measures as alternatives to proposed improvement projects which may require adding capacity or lanes to existing roads. Such a study was not contemplated nor included in the scope of this study.

BACKGROUND

In 1970 the Portland Area Comprehensive Transportation Study (PACTS) evaluated the need for a new east-west highway and recommended a general alignment for the Westbrook Arterial. Although the portion from Wayside Drive to Larrabee Road in Westbrook was opened in 1975, plans to complete the Westbrook Arterial were put on hold when environmental issues and financial considerations resulted in a decision to suspend completion of the section from the Larrabee Road terminus to I-295 in Portland.

In 1979, MDOT completed a planning study for PACTS that addressed existing and future transportation needs of Gorham and Westbrook. Several recommendations to increase capacity at deficient intersections in Gorham and Westbrook have been implemented and plans for reconstruction of Congress Street are ongoing.



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Study Location Map **Figure 1**

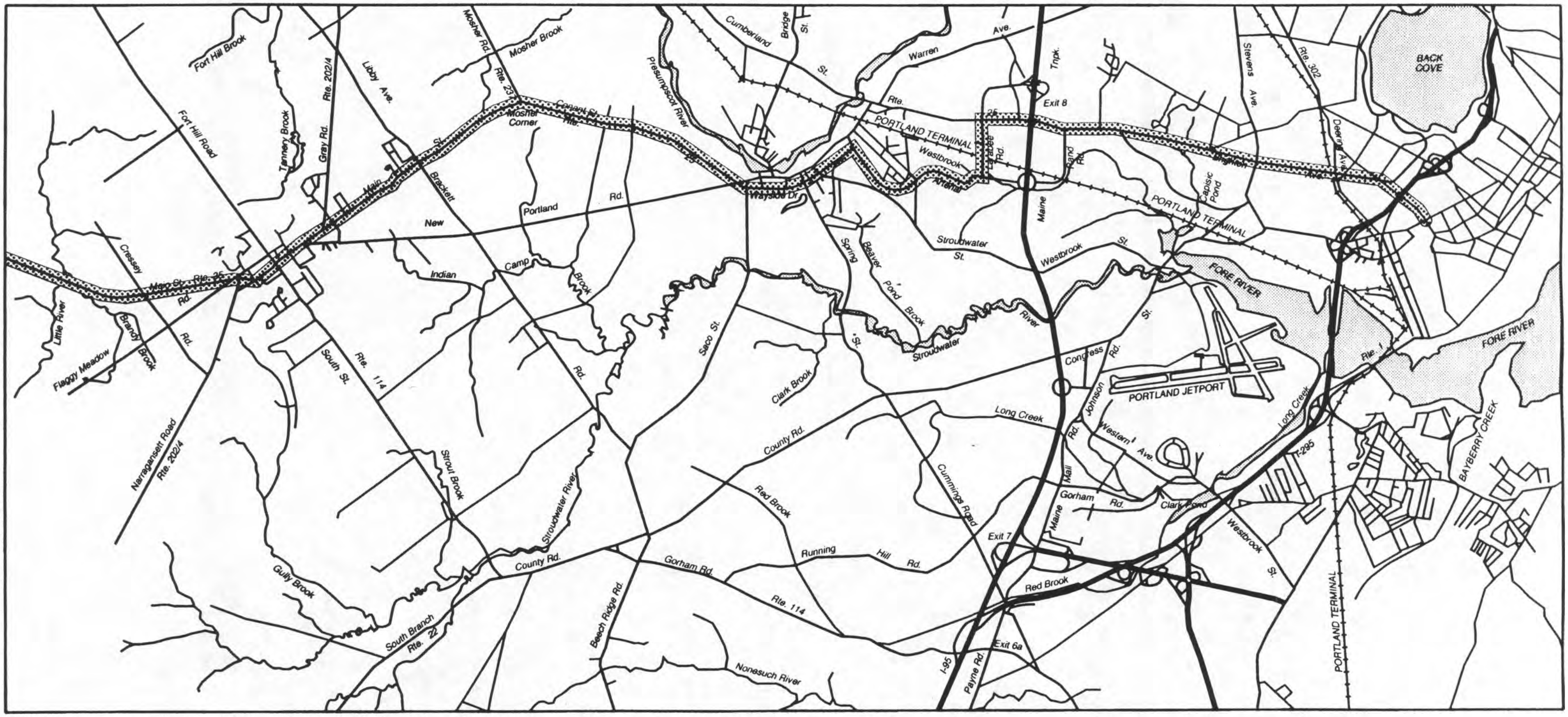

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Figure 2

Primary Study Area

0 2000 4000 Feet

PSA-BASE

In 1987 the PACTS Arterials Study Phase I[1] was completed, updating the 1979 study and expanding the assessment of area transportation needs to all of the PACTS area. This study focused on determining deficiencies on the existing system if no improvements were made during the following twenty years. Subsequent studies, such as the PACTS Maine Mall/Jetport Study,[2] made more specific recommendations to address the forecasted deficiencies by examining intersection, corridor, and land use access needs and developing concept plans. Some of these recommendations are programmed into MDOT's Capital Improvement Program.

The most recently completed study, the Westerly Connector Study,[3] was undertaken by the Maine Turnpike Authority in 1988 and studied two possible east/west tollway corridors, one from Gorham to Portland, and a second from Portland to Windham connecting Route 302 to the Turnpike. This study met strong opposition within the affected communities. MDOT decided to include any further evaluation of these alternatives within a more comprehensive east/west study. The Route 25 Corridor Study was designed to identify the long-range needs of the area and develop reasonable alternative improvements that meet these transportation needs in a way which responds to sensitive environmental, social, and economic issues.

The history of studies to improve east/west access between Portland and Gorham is typical of others throughout the northeast and elsewhere in the country. The late 1950s and early 1960s were boom times for the construction of new highways. However, projects that were not constructed by the 1970s came under scrutiny with the new focus on environmental, social, and economic impacts. The 1980s were a time of re-evaluation of priorities and need. New studies continue to be undertaken to re-assess transportation need, environmental impacts, and project costs. Today's standards require that, in the early planning stages, all reasonable alternatives be evaluated from an environmental, social, economic, and transportation standpoint. The objective is to reach a decision on needed improvements based on public concerns over a wide range of issues, not only transportation needs.

STUDY OVERVIEW

The steps involved in this study were:

- Define present and future transportation problems
- Define the need for improvements
- Identify improvement alternatives to be evaluated
- Examine alternative actions for improvements in transportation service
- Quantify environmental and land use impacts of each improvement

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1 PACTS Arterials Study, Vanasse Hangen Brustlin, Inc. (September 1987).
2 PACTS Maine Mall/Jetport Area Traffic Study, Vanasse Hangen Brustlin, Inc. (September 1988).
3 Westerly Connector Study, Preliminary Engineering Report, Howard Needles Tammen & Bergendoff and Wilbur Smith Associates (April 1988).

- Develop cost estimates for each improvement
- Significantly involve the community throughout the process

The end product of this process is an evaluation of the various alternatives analyzed. This evaluation can be used in subsequent studies to further narrow the range of alternatives to be studied in greater detail. This final report does not include a recommendation for a particular alternative, but rather provides a broad base of information to aid in identifying future corridor priorities and scope of isolated transportation improvements.

As shown in Figure 3, six tasks defined the scope of this study. In Task 1 the nature and magnitude of the problem were defined and the need for improvements established. Strategies to address the long-range needs were determined in Task 2. Potential environmental resources were documented in Task 3. Alternatives that would meet the needs of the area were screened in terms of their potential social, economic, and environmental impacts in Tasks 4 and 5. In Task 4, alternative improvements that could be made to the existing road systems to meet the forecasted needs, were identified and evaluated. This became the "upgrade alternative". In Task 5, potential locations for new roadways and combinations of new roadways and upgrades were identified. The initial consideration of these improvement strategies was based on the understanding of travel patterns and needs developed in Tasks 1 and 2. This information is documented in Technical Memorandum Number 1[4] and summarized in the "Transportation Systems Analysis" section of this report. Engineering features and costs associated with each alternative were also evaluated in Tasks 4 and 5. Those alternatives that met the transportation needs of the area and appeared to be the most feasible based on the environmental screening process and community input, were documented in Task 6 with the production of this report, the Conceptual Location and Environmental Review.

The study was comprehensive in nature in that all feasible alternatives were evaluated. These alternatives involved upgrading existing roads, building a new road, and developing a combination of these. Transportation demand management (TDM) strategies such as ridesharing and public transit are being studied by the Portland Area Comprehensive Transportation Study (PACTS) and the Greater Portland Council of Governments (COG). Because PACTS and COG are studying the applicability of TDM measures to the Greater Portland Program, that work was excluded from the Route 25 study. Alternatives from previous studies were also considered but were reviewed under the same criteria as all new alternatives. No reasonable alternative for meeting the area's needs was discounted. MDOT recognized that any major transportation study must involve all concerns. Therefore, all pertinent information was considered and there was opportunity for community input throughout the process through the Project Area Committee created for this project.

In November of 1991 the Sensible Transportation Policy Act was approved in a statewide referendum. It resulted in the adoption of new rules and regulations for the development of major transportation projects. The new policies will require a greater consideration of alternative transportation strategies. Projects

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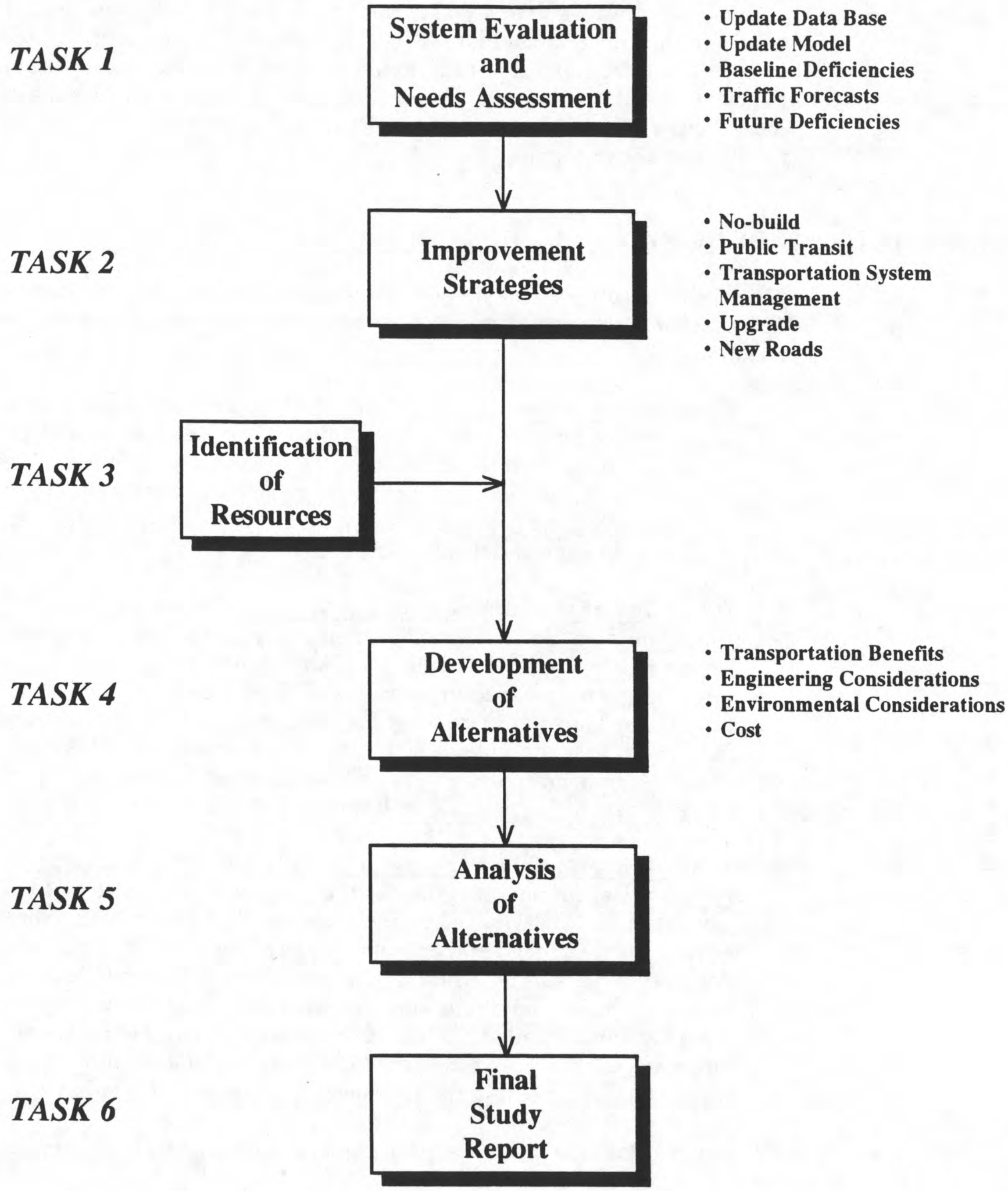
4 System Evaluation and Needs Study, "Technical Memorandum Number 1", Route 25 Corridor Study, Vanasse Hangen Brustlin, Inc, February 1991.



Work Program **Figure 3**

which would increase the capacity of a road by adding more lanes now require a study of alternatives that would consider methods to reduce the demand for travel on that road or corridor. MDOT has already determined that a project like the Route 25 Corridor Study would be affected by the new transportation policy and would require additional studies of alternatives, including multi-modal options and travel demand options. The joint PACTS/COG study is in response to the new policy.

DESCRIPTION OF STUDY REPORT

This report documents the process and findings of the Route 25 Corridor Study. The content of this report responds to study objectives which can be summarized as follows:

- Define the need for a project--There was a local perception that there is an existing need for a new east-west highway between Portland and Gorham based on "today's" traffic congestion. Therefore, a determination was made to first analyze present and future deficiencies as a prerequisite to understanding the need for additional roadway capacity within the study area and the type of improvement that would satisfy this need.

- Determine what improvements should be built and what functional type they should be--Serious consideration was given to upgrading (i.e. reconstructing) existing roads, constructing new roads and combinations of upgrading and constructing new roads. Upgrades refer to methods and procedures aimed at increasing the effectiveness and capacity of existing facilities rather than planning on major new construction. Alternatives requiring new construction were specified in terms of a broad corridor where a new highway could be located.

- Examine appropriate corridors for new alignments and quantify impacts--Depending upon the need for improvements, alternatives on new location may be warranted in one of the corridors evaluated. Potential environmental, social and economic impacts were identified to assist decision-makers in determining if one or more of the build alternatives presents a reasonable solution. The product of this study would form the basis for more detailed studies which would be required for those alternatives that were considered the most reasonable, in terms of their impacts and addressing the transportation needs of the area.

The report is divided into six sections and an appendix as described below.

The Introduction section provides the background for this study, how the study was conducted and how the public participation element of the study was implemented.

The section on Transportation Systems Analysis describes the existing and projected future conditions in the study area and presents the methodology used for evaluating the need for improvements to the existing road system. It summarizes the findings of Technical Memorandum 1, which documented base (1988) traffic conditions and projected conditions for the forecast year (2010). This memorandum also:

- Reviewed previous traffic studies and updated the data base

- Reviewed and updated the Portland Area Comprehensive Transportation Study (PACTS) travel demand model
- Defined existing deficiencies
- Forecasted 2010 traffic volumes
- Identified future deficiencies

Throughout this report reference is made to the findings and recommendations from Technical Memorandum Number 1. Information from that memorandum is summarized in this report to enable this report to stand alone as a comprehensive evaluation of both the need for improvements within the study area and the alternatives proposed to address those needs.

The Environmental Resources section describes the procedures used to develop a resource map for the entire study area. Environmental and social features relevant to the development of new roads or the upgrading of existing roads within the study area are discussed.

The section on the Development of Alternatives describes the alternatives evaluated. Eighteen alternatives, including the No-Build condition, were developed for evaluation based on transportation, environmental and engineering criteria. This section describes the approach taken to identify the alternatives that are evaluated in subsequent sections. In addition to No-Build, alternatives include an upgrade alternative, six new road alternatives, and ten alternatives which incorporate various combinations of upgrades and bypasses.

The Detailed Analysis of Alternatives section describes the process used to test alternatives and presents detailed results for each of the alternatives developed to address projected 2010 study area deficiencies. The alternatives analyzed include upgrades of existing roadways, bypasses, and entirely new road alignments.

PUBLIC PARTICIPATION PROGRAM

The Route 25 Corridor Study was designed to involve the public in meaningful and direct ways throughout the study. The main focus of this effort was the establishment of a Project Area Committee (PAC). The PAC members were selected by each of the study area communities and represented a wide range of interests. The study team and PAC met on a regular basis to explore and discuss study area transportation needs and a full range of alternative strategies and solutions to address the projected corridor transportation needs.

The study team met with the PAC 12 times during the study. The public involvement process also included meetings with local community groups, local officials and interested citizens. One public forum was held to discuss the project, and a project newsletter was issued at the beginning of the project to inform the public about the study, the issues being addressed and what activities the public could expect during the study. Each element of the public participation process helped to direct the study toward the development of a wide range of solutions to the forecasted problems within the study area.

The public involvement process also included a telephone survey of residents in the Route 25 corridor to understand the concerns and attitudes with regard to the possible transportation alternatives.

The survey of study area residents was conducted with the following objectives:

- Gauge the overall public reaction to, and satisfaction with, existing transportation systems operating in the study area
- Identify the perceived need, if any, for transportation improvements
- Determine the role of transit (public or private) in satisfying transportation needs
- Test the relative importance of a series of environmental issues including wetlands, historic preservation, and community impacts
- Determine how informed the public is of the study, its objectives, and the range of options under consideration
- Determine the best means of communicating with the public as well as their overall interest in meetings and newsletters

The results of the survey provided a measurement of baseline attitudes of residents in the area served by the Route 25 corridor.

Six hundred and two residents of the Greater Portland area were surveyed by telephone between November 2 and December 12, 1989. The residents chosen for the survey lived within an area identified as including the greatest percentage of residents who would use Route 25 for either local or commuting travel.

The survey included questions on the following issues:

- Current means of transportation and commuting patterns
- Current dissatisfactions with transportation and roads including specific segments of Route 25
- Suggestions for improving east/west travel between Portland and Gorham and preferences for new roads, upgrades to current roads, or no changes at all
- Willingness to accept a variety of outcomes, ranging from temporary inconveniences to permanent environmental disruptions, in order to achieve improvements in transportation
- Residents' awareness of the current study and its perceived impact on them
- Preferred sources for keeping informed of the study
- Demographics, including age, household size, and length of residency in Maine

Key findings from the survey[5] indicated that:

- There exist strong perceptions of problems with Route 25, with Gorham Village emerging as the source of greatest dissatisfaction.
- The majority of residents in the study area desire improvements in east/west travel, even if that means traffic slowdowns and temporary disruptions of neighborhoods while the improvements are being made.
- Area residents are most in favor of upgrading the existing road system with the possible addition of a bypass around Gorham Village.
- Although the majority of residents are willing to accept temporary disruptions to accomplish the desired improvements, most are opposed to any changes which could threaten wildlife habitats or wetlands, negatively impact historical areas, or require persons to move.
- Most residents view MDOT as being willing to listen and respond to their concerns. Most residents would prefer to learn about the progress of the study from newspapers and, possibly, local access programming.

A complete list of survey results are included in the Technical Memorandum 1 for the Route 25 study.

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5 "Survey of Residents in the Route 25 Corridor," Market Decisions, Inc., January, 1990.

TRANSPORTATION SYSTEM ANALYSIS

INTRODUCTION

This section presents an analysis of the base year (1988) and forecast year (2010) traffic conditions. At the time the study was initiated, 1988 was the latest year for which areawide traffic data were generally available. The Maine Department of Transportation supplied input to the study, including reports and information on planned improvements and projects currently in the design phase, aerial photographs and historic traffic volume data. Traffic operating data for 1988 and 2010 no-build conditions were previously developed and documented in Technical Memorandum 1.

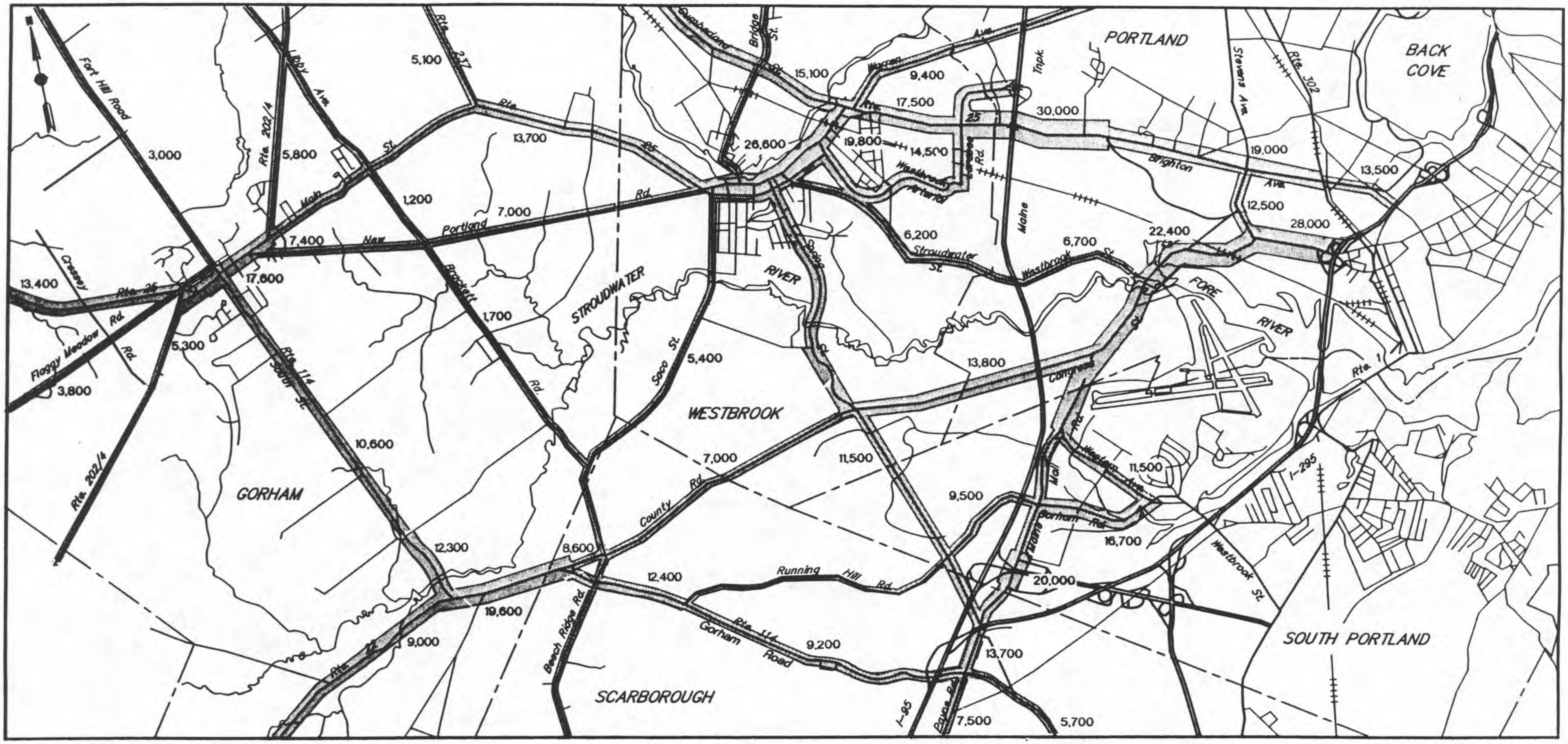
The assessment of the need for improvements in the transportation system included a review and evaluation of existing and future traffic conditions within the study area. Previously published reports (principally the PACTS Arterials Study and the Maine Mall/Jetport Area Traffic Study) were reviewed to identify existing safety and level-of-service deficiencies. The findings documented in these reports were updated based upon recent field observations. As a result, some previously reported deficiencies have been eliminated because of recent roadway improvements. No new analyses were conducted to document the exact extent to which conditions have changed. The criteria used in the previous studies to define the deficiencies reported here are presented below with minor modification.

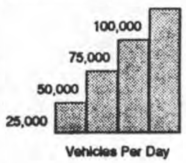
The components required to develop the 2010 forecast volumes included the planned future roadway network, model enhancements and updated demographic forecasts. The description of future conditions and deficiencies, more specifically, sets the stage for the identification and evaluation of improvement strategies in a latter section of this report.

BASELINE CONDITIONS

Base year (1988) deficiencies were identified relative to mobility, safety, and design. Mobility criteria were based upon a volume-to-capacity analysis, safety criteria were based upon accident experience, and design criteria were based upon field observations. Base year traffic volumes shown in Figure 4 were based on the PACTS Surveillance Report and other independent traffic studies.

Capacity and safety deficiencies were compiled from reports previously published and updated to reflect current conditions. As shown in Figure 5, existing capacity deficiencies are concentrated in the center of Gorham, the center of Westbrook, and along Maine Mall Road. Isolated intersection





Notes:
1. Corridors with fewer than 5,000 trips are represented as 5,000 trips

2. Volumes on the Maine Turnpike and I-295 are not represented here but are presented in Table 3

0 2000 4000 Feet

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Figure 4

Base Year Traffic Volumes

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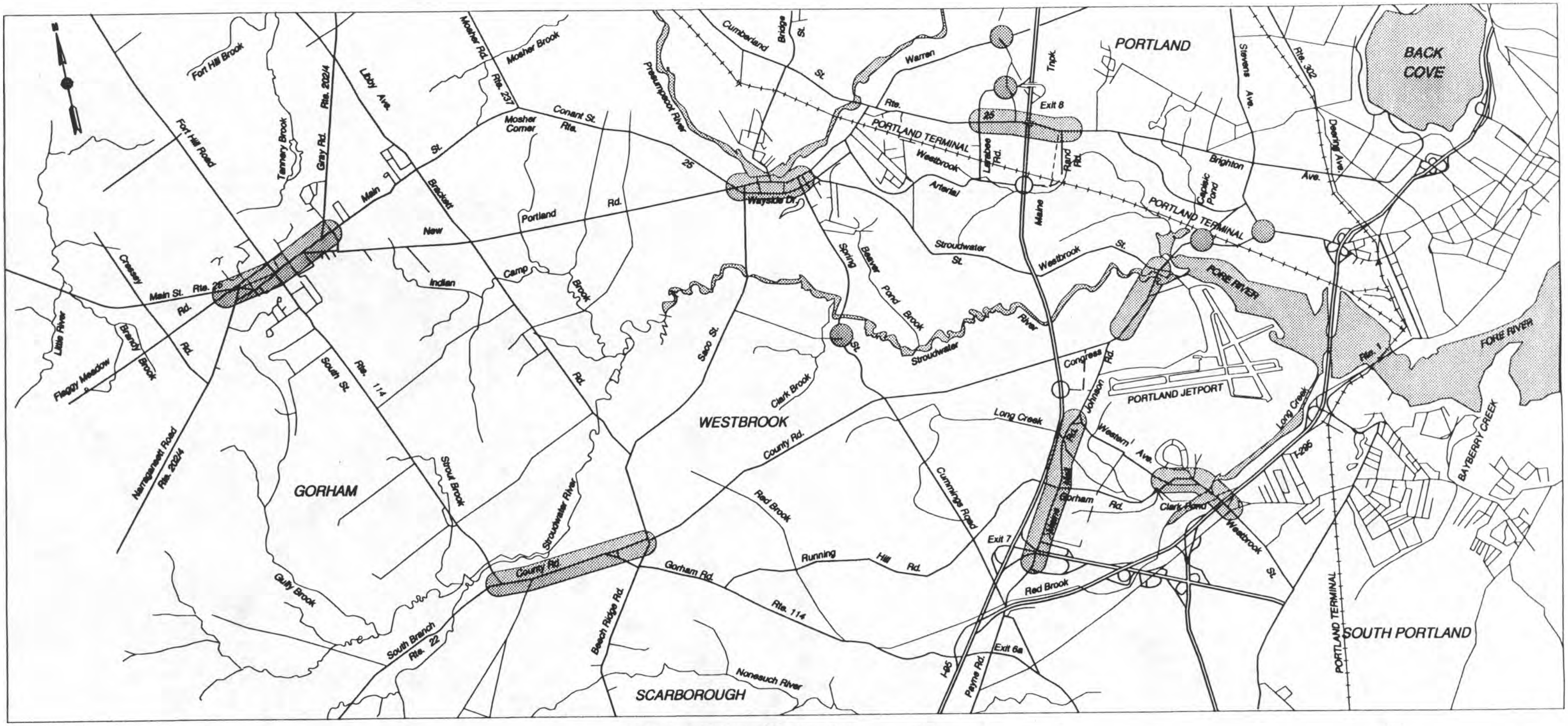

Isolated Deficiences

Deficiency Areas

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Figure 5

Level Of Service
Deficiency Summary
Existing Conditions

deficiencies exist today on Congress Street in Portland. The segment of Brighton Avenue east of Larrabee Road in Portland and Route 22 between South Street in Gorham and Saco Street in Scarborough are also deficient. In general, safety deficiencies exist along the same corridors as the capacity deficiencies.

Public transportation service in the study area is provided by the following:

- Greater Portland Transit District (METRO)
- The University of Southern Maine (USM)
- Regional Transportation Program (RTP)

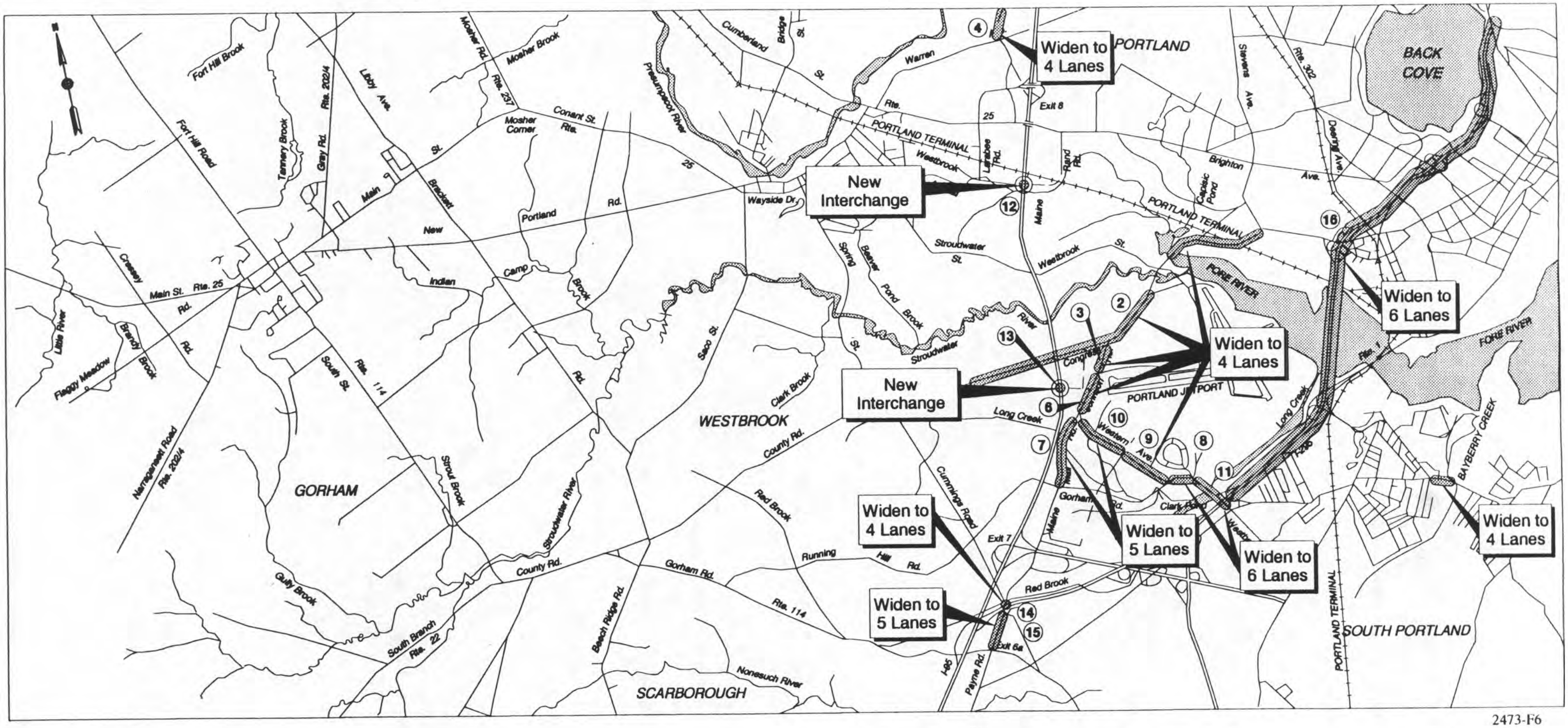
The METRO has two areas of service--within Portland and between Portland and Westbrook. The USM provides shuttle service for its students between the Portland and Gorham campuses; the RTP paratransit system provides service to the handicapped, low-income residents, and the elderly. Overall, public transportation service between communities in the study area is very limited. Total annual ridership on METRO Route 4 (Westbrook/Exit 8) was approximately 320,000 and ridership on the USM shuttle was approximately 240,000 in 1990. Annual RTP ridership for all of Cumberland county was 154,000.

FUTURE CONDITIONS

The PACTS MicroTRIPS transportation demand model, which utilizes the traditional modelling activities of trip generation, trip distribution, and traffic assignment, was used to forecast 2010 daily traffic volumes. The current model (utilizing 1985 socioeconomic data) was calibrated to 1985 traffic conditions and compared with results from a limited origin-destination survey conducted in June, 1990. The origin-destination survey results generally confirmed the travel patterns exhibited in the model. Several segments in the study area which are anticipated to be improved by 2010 were included in the 2010 model system. All the alternatives studied include the planned roadway projects assumed to be part of the No-Build network. These projects are listed in Table 1 and shown on Figure 6.

Forecasted 2010 Volumes

Forecasted 2010 daily traffic volumes (see Figure 7) were compared with 1988 daily traffic volumes to determine if the level of growth was commensurate with the level of socio-economic growth anticipated in the area. In addition, the forecast volumes were reviewed for logical assignment patterns. Generally, the forecast daily traffic volumes were reasonable and, therefore, were used without manual adjustment to determine system deficiencies.



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(#) Reference to Table 1

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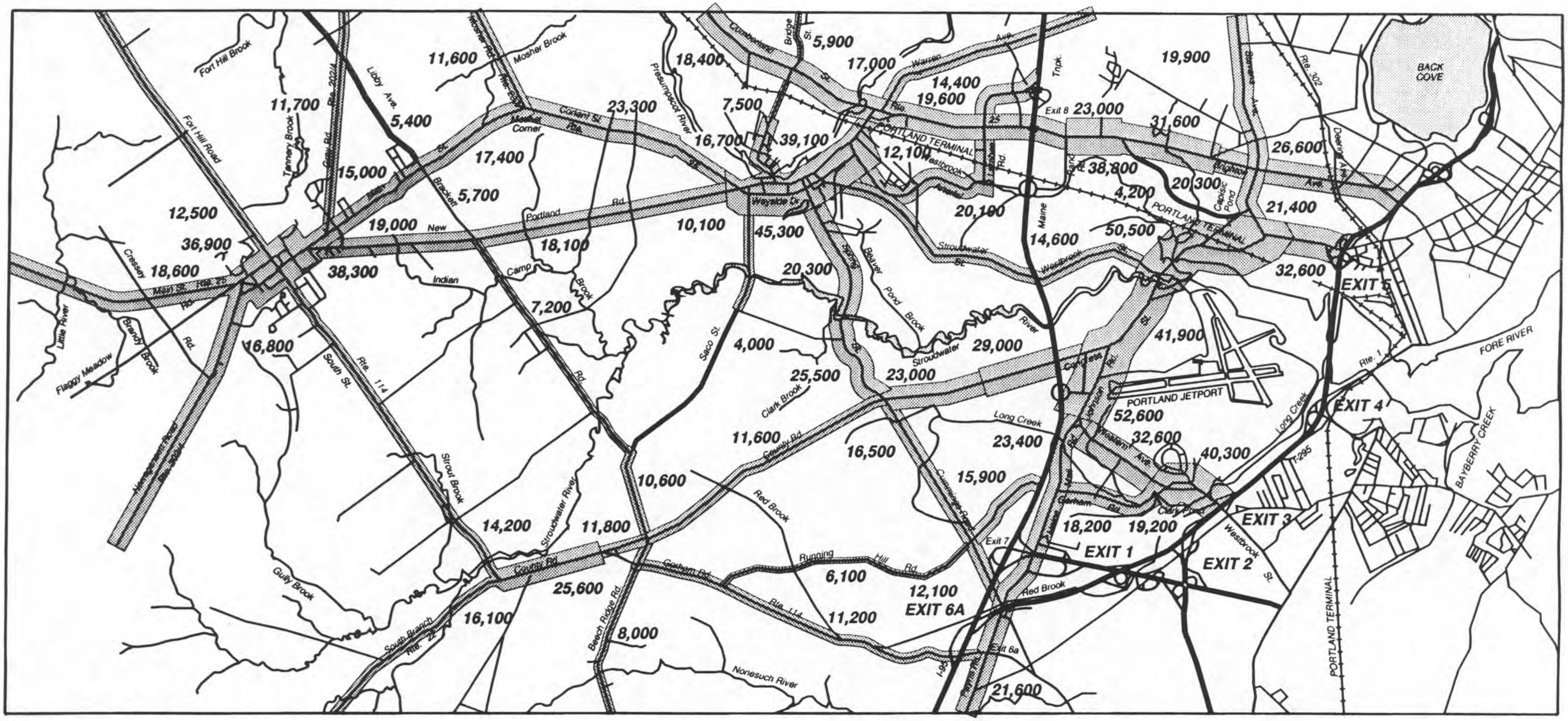
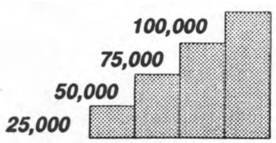
Figure 6

Planned Roadway Network Improvements





Vehicles Per Day

Notes:

1. Volumes on the Maine Turnpike and I-295 are not represented here but are presented in Table 3

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Figure 7

2010 Base Daily Traffic Volumes

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Table 1 2010 PLANNED ROADWAY NETWORK IMPROVEMENTS IN PACTS AREA

Roadway	Fig. 6 Ref. No.	Limits	Improvement
Portland:			
Bishop Street	*	Bishop Street to Warren Avenue	New two-lane extension
Congress Street	1	Stevens Avenue to Waldo Street	Widen to four lanes
	2	Garrison Street to Westbrook town line	Widen to four lanes
Johnson Road	3	Congress Street to S. Portland city line	Widen to four lanes
Riverside Avenue	4	Warren Avenue to Forest Avenue	Widen to four lanes
Maine Turnpike	12	South of Exit 8	New interchange and two-lane access road to Brighton Avenue Westbrook Arterial
Maine Turnpike	13	North of Exit 7	New interchange and two-lane access road to Congress Street and Maine Mall Road
South Portland:			
Broadway	5	Evans Street to Lincoln Street	Widen to four lanes
Johnson Road	6	Portland city line to Western Avenue	Widen to four lanes
Maine Mall Road	7	Gorham Road to Western Avenue	Widen to five lanes
Western Avenue	8	Westbrook Street to Gorham Road	Widen to six lanes
	9	Gorham Road to Foden Road	Widen to four lanes
	10	Foden Road to Johnson Road	Widen to five lanes
[6~Westbrook Street	11	Broadway to Western Avenue	Widen to six lanes
Scarborough:			
Gorham Road (Route 114)	*	Oak Hill Road to Sawyer Road	Widen to three lanes
Maine Turnpike	*	South of Exit 6A	New interchange (Exit 6)
Maine Turnpike Authority (MTA) Connector Road	*	U.S. Route 1 to new turnpike interchange (above)	New two-lane roadway
Payne Road	14	Southborough Road to Spring Street	Widen to four lanes
	15	Spring Street to Gorham Road (Route 114)	Widen to five lanes

* Roadway segment not in Route 25 study area.

Table 1 **2010 PLANNED ROADWAY NETWORK IMPROVEMENTS IN PACTS AREA (Continued)**

Roadway	Fig. 6 Ref. No.	Limits	Improvement
US Route 1	*	Old Blue Point Road (north of Saco city line) to Sunset Drive (south of the Scarborough Connector)	Widen to five lanes
Windham:			
US Route 302	*	Routes 35/115 to Whites Bridge Road	Widen to five lanes
I-295	16	Westbrook Street to Tukey Bridge	Widen to six lanes

* Roadway segment not in the Route 25 study area.
Source: Maine Department of Transportation.

As shown in Table 2, volume on Route 25 in the study area is projected to increase between 12 and 118 percent by the year 2010. The largest growth on Route 25 occurs in Gorham east of Route 114 where traffic increases from 17,600 to 38,300 vehicles per day. The only Route 25 road segment which is projected to experience a volume reduction is between Larrabee Road and the proposed interchange access road (from 30,000 to 23,000 vehicles per day) due to a diversion of traffic to the Westbrook Arterial and the new interchange access road.

Traffic volumes on Route 22 (excluding Congress Street) are projected to increase between 31 and 79 percent by the year 2010. The greatest increases occur west of Route 114 in South Gorham (from 9,000 to 16,100 vehicles per day) and east of Spring Street in Westbrook (from 13,800 to 23,000 vehicles per day). Volumes on other arterials in the study area are projected to experience percentage increases similar to these.

Traffic volumes on the Maine Turnpike (see Table 3) are forecast to increase by more than 100 percent, while volume on I-295 north of turnpike Interchange 6 is forecast to increase almost 60 percent by the year 2010. Volume on the Turnpike between the two proposed new interchanges in Portland is expected to increase the most (53,400 vehicles per day). Maine Turnpike volume north of Exit 10 is expected to increase the least (23,700 vehicles per day).

Table 2 COMPARISON OF 1988 AND 2010 DAILY TRAFFIC VOLUMES

Location	1988 Volume	2010 Volume	Increase/ (Decrease)	Percent Increase
Route 25 west of Gorham	13,400	18,600	5,200	39
Route 25 east of Route 114	17,600	38,300	20,700	118
Route 25 east of Route 237	13,700	23,300	9,600	70
Route 25 east of Warren Avenue	17,500	19,600	2,100	12
Route 25 east of Riverside Road	30,000	23,000	(7,000)	-23
Route 25 east of Route 302	13,500	26,100	12,600	93
Route 114 south of Route 25	10,600	14,200	3,600	34
Route 114 west of Running Hill Road	12,400	15,300	2,900	23
Route 22 west of Route 114	9,000	16,100	7,100	79
Route 22 east of Route 114	19,600	25,600	6,000	31
Route 22 east of Saco Street	7,000	11,600	4,600	66
Route 22 east of Spring Street	13,800	23,000	9,200	67
Congress Street north of Westbrook Street	22,400	50,500	28,100	125
Congress Street east of Stevens Avenue	28,000	32,300	4,300	15
New Portland Road east of Brackett Road	7,000	18,100	11,100	59
Brackett Road south of New Portland Road	1,700	7,200	5,500	324
Saco Street south of Wayside Drive	5,400	10,100	4,700	87
Spring Street south of County Road	11,500	16,500	5,000	43
Stroudwater Street south of Wayside Drive	6,200	14,000	7,800	126
Westbrook Street east of Maine Turnpike	6,700	14,600	7,900	118
Running Hill Road at Maine Turnpike	9,500	15,900	6,400	67
Gorham Road east of Maine Mall Road	16,700	19,200	2,500	15
Western Avenue east of Maine Mall Road	11,500	21,500	10,000	87

Table 3 **COMPARISON OF 1988 AND 2010 DAILY TRAFFIC VOLUMES--MAINE TURNPIKE AND I-295**

Location	1988 Volume	2010 Volume	Increase	Percent Increase
Maine Turnpike:				
South of Exit 6	39,600	83,300	43,700	110
Between Exits 6 and 6A	39,600	85,400	45,800	116
Between Exits 6A and 7	26,700	65,300	38,600	145
Between Exits 7 and 7A	28,600	67,500	38,900	136
Between Exits 7A* and 8A**	28,600	82,000	53,400	187
Between Exits 8A and 8	28,600	74,200	45,600	159
Between Exits 8 and 9	26,100	69,800	43,700	167
Between Exits 9 and 10	18,400	46,600	28,200	153
North of Exit 10	18,000	41,700	23,700	132
I-295:				
North of Maine Turnpike Exit 6A	12,800	20,100	7,300	57
South of Congress Street (I-295 Exit 5)	51,500	63,400	11,900	23

* North of Exit 7.
** South of Exit 8.

Roadway Deficiency Criteria

Analysis of future conditions was limited to the mobility criteria. Daily traffic volumes produced by the model were converted to peak hour volumes and used as the basis for the analysis of 2010 conditions. A volume-to-capacity (v/c) analysis of road segments under 2010 volume loadings and the anticipated roadway capacity was conducted to evaluate the adequacy of the 2010 road network and to identify specific road segment deficiencies. In addition, future conditions on the Maine Turnpike and I-295 were not evaluated because the Maine Department of Transportation is currently evaluating I-295 capacity needs, and the Turnpike Authority is evaluating Turnpike needs as part of its ongoing interchange program.

The daily volume output from the model was converted to an hourly volume by multiplying by a peak hour percentage. A peak hour percentage of 10 percent was determined from a review of existing count data for the area which indicates that peak hour percentages generally range from 8 percent to 12 percent of daily usage. For multi-lane roadways the peak hour two-way volume was further multiplied by 60 percent to obtain peak hour directional volumes. This factor was not applied to two-lane roadways because they were analyzed using two-way capacities. The determination of the peak hour directional distribution and peak hour percentage was based on review of existing traffic data.

Capacities were calculated based upon procedures outlined in the 1985 Highway Capacity Manual for roadway segments analyzed in the study area. Three distinct roadway types were identified for the purpose of assigning roadway link capacities and calculating deficiencies:

- Two-lane rural roadway
- Urban/suburban arterial with at-grade intersections
- Expressway with grade-separated interchanges

Volume-to-capacity (v/c) ratios were calculated for major roadway segments in the study area by dividing projected peak hour volumes by the hourly capacity of the roadways. The resulting ratios were used for identifying deficiencies. The following sections describe the capacities used for various types of roadway segments.

Two-Lane Rural Roadway

Capacities for two-lane rural roadways were calculated based upon several variables, some of which, for the purpose of this study, were fixed as listed below:

- 100 percent no passing zones

- 5 percent trucks (includes recreational vehicles)

- 12-foot lanes

Other roadway attributes such as terrain and lateral clearance were identified for each segment and the appropriate factors applied in accordance with procedures in the 1985 HCM to determine the hourly capacity for the given conditions. The resulting capacity matrix for rural two-lane roads is presented in Table 4.

Table 4 **HOURLY CAPACITY - RURAL TWO-LANE ROAD***

	Shoulder Width		
Terrain	None	Narrow	Wide
Level	2,200	2,400	2,500
Rolling	1,900	2,100	2,200
Mountainous	1,500	1,600	1,700

* Two-way capacity.
Source: 1985 Highway Capacity Manual, Chapter 8, two-lane highways.

Urban/Suburban Arterial

Since capacities of urban/suburban roadways in the study area are restricted by traffic signals, the link capacities were calculated based upon the roadway capacities at intersections. An ideal capacity of 1800 vehicles per hour per lane was assumed as a base and a green time percentage, based upon the relationship between projected 2010 main street and minor street link volumes, was applied to this base.

It was also necessary to account for parking maneuvers on some segments (such as Main Street in Westbrook) and the lack of left-turn lanes at intersections (such as on Wayside Drive). Examination of the 1985 Highway Capacity Manual indicates that a 15 percent capacity reduction is appropriate for situations where there are 10 parking maneuvers per hour. In addition, the document titled "Calibration and Adjustment of System Planning Models" indicates that a 15 percent reduction in capacity is likely due to the lack of left-turn lanes at an intersection. Finally, there are urban/suburban arterials in the study area with adjacent land uses which can reduce traffic flow, such as those areas with strip development or several driveways within a short distance. A 15 percent reduction was applied to the base capacity to account for this type of condition. For roadways with a continuous center left-turn lane, capacity was increased by 5 percent. The range of hourly capacities available for application to urban/suburban roads is presented in Table 5.

Table 5 **HOURLY CAPACITY - URBAN/SUBURBAN ROAD***

Lanes	No Parking	Parking	No Left-Turn Lanes
One (50% green time)	900	765	N/A
One (60% green time)	1,080	900	N/A
Two (50% green time)	1,800	N/A	1,530
Two (60% green time)	2,160	N/A	1,840
Three (50% green time)	2,700	N/A	N/A
Three (60% green time)	3,240	N/A	N/A

* One-way capacity, based on 1,800 vehicles per lane per hour of green time from 1985 Highway Capacity Manual, Chapter 9, signalized intersections.

Expressway

Expressways, such as the Westbrook Arterial, are limited access roads with no intersections or traffic signals; therefore, the capacities previously described for urban/suburban arterials do not apply. A capacity of 1,900 vehicles per hour per lane was assigned to each one-way segment. This is based upon the 1985 Highway Capacity Manual and is the capacity assuming level terrain and 5 percent trucks.

Volume-to-capacity ratios were categorized as either being under capacity (less than 0.80), near capacity (0.80 to 0.90), or at/over capacity (greater than 0.90). A v/c ratio greater than 0.90 was considered deficient.

Near capacity (v/c ratio 0.80-0.90) represents a condition of increasing congestion and restricted maneuvering. This condition borders on unstable flow. Minor roadside disruptions can cause breakdown of flow and result in queuing.

At or over capacity (v/c ratio >0.90) is a condition of generally unstable flow. Volume-to-capacity ratios between 0.90 and 1.0 represent capacity flow where maneuverability is limited. Minor disturbances or the addition of a small increment of traffic can cause conditions to deteriorate to stop-and-go flow. Volume-to-capacity ratios greater than 1.0 represent over-capacity conditions with forced flow. Stop-and-go operations are prevalent.

Intersection Deficiency Criteria

Because intersections are often the capacity constraint in urban corridors, key intersections were also evaluated. The analysis identified additional lane requirements at intersections and formed the basis of the Upgrade Alternative which is discussed in the section, "Development of Alternatives." Year 2010 daily turning movement volumes projected by the travel demand model were converted to morning and evening peak hour volumes. These volumes were used to determine and evaluate needed intersection improvements.

Peak hour volumes for intersections were derived in the same manner as roadway peak hour volumes. The 1985 Highway Capacity Manual intersection planning analysis technique was used to evaluate intersection improvements. This analysis is a simplified approach used to determine the overall lane requirements and capacity level for an intersection for planning purposes. Data inputs required are lane geometry and peak hour traffic volumes.

As shown in Table 6, three capacity levels (under, near, and over) are used to describe conditions for the planning analysis and are based upon the sum of critical lane volumes at the intersection. Critical lane volume refers to opposing flows which move through an intersection during the same signal phase. The flow requiring the greater amount of green time is "critical". The critical flows for each phase are summed and compared to the criteria in the table to determine if the volume of traffic is under, near, or over the intersection capacity.

Improvements were designed to provide a capacity level in the "near" category based on projected 2010 volumes. Additional improvements were not evaluated if the number of vehicles exceeding 1400 (capacity) was very small.

Table 6 **PLANNING ANALYSIS INTERSECTION CAPACITY LEVELS**

Sum of Critical Lane Volumes (vehicles per hour)	Capacity Level
0 to 1,200	under capacity
1,201 to 1,400	near capacity
greater than 1,400	over capacity

Roadway Deficiencies

The needs analysis identified projected capacity deficiencies in fifteen specific locations in the study area, of which twelve were on either Route 25 or Route 22. These deficiencies included all roadway links that are projected to operate at or over capacity (with projected volume greater than 90 percent of capacity). The goal of the improvement alternatives (including the upgrade) was to eliminate all twelve deficient sections of roadway along Route 25 or Route 22 projected to operate at or over capacity in the year 2010. These are the sections that would experience unacceptable levels of congestion and delay without improvements. Those road segments which were projected to be deficient (v/c ratio greater than 0.90) are presented in Figure 8.

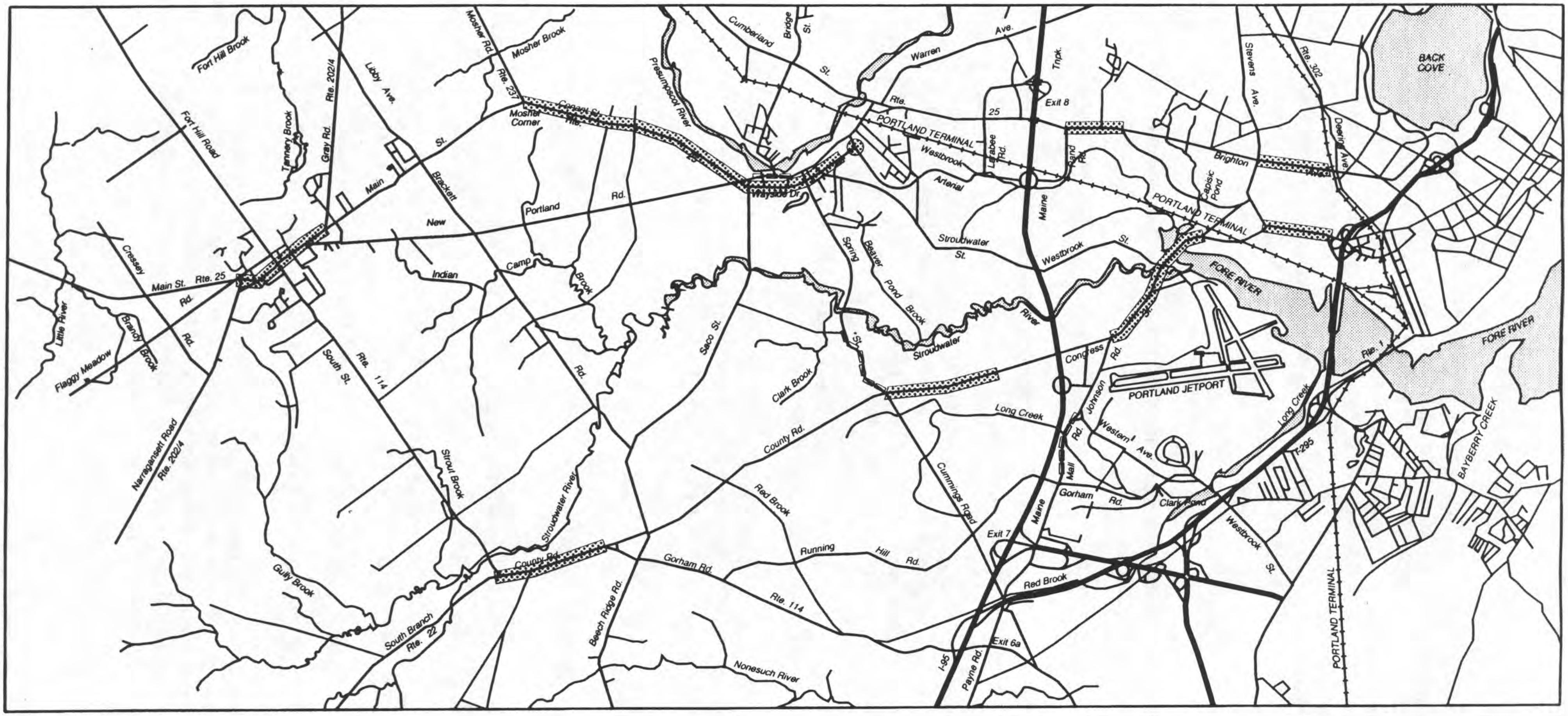
Projected hourly traffic volumes were compared with hourly roadway capacity to determine the existence of deficiencies. Unlike the existing conditions analysis which used capacity, speed, and safety to identify deficiencies, the only measure available in the future analysis was capacity. If a segment was deficient under existing conditions, the deficiency was usually made worse in the future by the addition of traffic volume.

One exception occurs on Brighton Avenue between Larrabee Road and the interchange access road where the addition of a proposed turnpike interchange reduced the traffic volume in this segment in the future. The primary deficiencies forecasted by community are summarized below:

Gorham

- Route 25 in Gorham Village between Route 202/4 west of the village and South Street (Route 114)
- Route 25 between South Street (Route 114) in Gorham Village and Route 202/4 east of the village.
- Route 22 in South Gorham between South Street (Route 114) and Gorham Road (Route 114) in Scarborough.
- Route 25 between Route 237 in Gorham and Main Street in Westbrook.

The existing intersection deficiencies along Main Street in Gorham center were projected to worsen. Traffic volume on Main Street west of South Street is expected to exceed roadway capacity (v/c ratio of 1.63) while traffic volume east



Route 25 and Route 22 Roadway Deficiences

Other Study Area Roadway Deficiences

· Volume to Capacity Ratio (V/C) Greater than 0.90

0 2000 4000 Feet

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Figure 8

Year 2010
Capacity Deficiencies

2473-F8

of South Street was more than twice the capacity primarily due to the significant increase in volume (approximately 20,700) forecast for 2010. Other road segments near the center of Gorham forecasted to be near capacity included Route 25 west of College Avenue, Route 202/4, and New Portland Road. Route 25 east of Route 237 is forecast to be over capacity (v/c ratio of 1.06). In south Gorham, the segment of Route 22 between South Street and Gorham Road (in Scarborough), previously reported nearing capacity, was forecast to be about 7 percent over capacity.

Westbrook

- Route 25, Wayside Drive in Westbrook between Main Street and Stroudwater Street.
- The intersection of Wayside Drive and the Westbrook Arterial.
- Route 22, County Road in Westbrook between Spring Street and the Portland city line.

Existing operational problems along Wayside Drive and Main Street in Westbrook worsened due to the nearly 50 percent increase in volume through the area. Road segments on Wayside Drive between Saco Street and Stroudwater Street were forecast to be over capacity with v/c ratios greater than 1.0. Main Street between Bridge Street and Spring Street was forecast to be over capacity, while Main Street between Route 25 and Bridge Street was projected to be near capacity (v/c ratio 0.82).

Spring Street south of Wayside Drive to Eisenhower Drive was projected to be near capacity (v/c ratio of 0.84). Spring Street from Eisenhower Drive to County Road was projected to be over capacity (v/c ratio of 1.21).

Portland

- Route 25, Brighton Avenue in Portland between Rand Road and Capisic Street.
- Route 25, Brighton Avenue in Portland between Stevens Avenue and Deering Avenue.
- Route 22, Congress Street in Portland between Johnson Road and Westbrook Street.
- Route 22, Congress Street between Westbrook Street and Frost Street.
- Route 22, Congress Street between Stevens Avenue and Interstate 295.

The addition of a proposed new interchange south of existing Exit 8 changed travel patterns in the Portland area. These changes resulted in a significant volume decrease on Brighton Avenue between Larrabee Road and the proposed interchange access road. This volume decrease may relieve existing congestion on that segment of Brighton Avenue.

Volume on Brighton Avenue east of the proposed new interchange access road was projected to increase by 30 percent from 1988 levels. This resulted in a capacity deficiency (v/c ratio 1.07). Route 25 from Capisic Street to Stevens Avenue was also projected to be near capacity, with v/c ratios ranging from 0.85 to 0.89. The segment of Route 25 east of Stevens Avenue was projected to be over capacity.

Stevens Avenue north and south of Brighton Avenue was projected as being near capacity, with v/c ratios of 0.83 and 0.89, respectively.

Operational deficiencies at the Congress Street intersections with Frost Street and Stevens Avenue worsened due to the significant increase in traffic. In addition, the segment from Johnson Road to Westbrook Street was projected to have a v/c ratio of 1.16 as a result of a volume increase of 19,500 vehicles per day. The deficiency on the segment of Congress Street from Stevens Avenue to I-295 was not anticipated to be as severe, with a v/c ratio of 0.91.

South Portland

Several planned projects in South Portland were included in the 2010 roadway network, such as widening Maine Mall Road, Western Avenue, Westbrook Street, and Johnson Road. In addition, a new interchange is proposed for a location north of existing Exit 7. Traffic volume on roadways in the vicinity of the proposed interchange was expected to increase as a result of improved access to the Maine Turnpike. For this reason Johnson Road south of the Jetport access road is expected to be deficient. The volume-to-capacity ratio was forecast at 1.46.

Scarborough

Payne Road was projected to experience volume growth which contributed to future deficiencies on that roadway. The projected v/c ratio for the segment south of Route 114 was 0.90, which is just below the threshold level for a deficiency.

Travel Patterns

Using the MicroTRIPS model, travel patterns were identified for the trips on the deficient and non-deficient segments in the study area. This information is summarized in Figure 9 and Table 7. Travel was classified as local (both origin and destination within the core area)[6] , regional (either origin or destination within the core area), or through (neither origin nor destination within the core area). Patterns indicate that through trips constituted the major pattern of traffic on the links evaluated west of the Maine Turnpike (35 to 63 percent of total volume on a link). Regional trips were the largest share on Congress Street north of Westbrook Street (55 percent). Local trips composed no more than 27 percent of the traffic on any particular road link. These data were helpful in determining the level of improvement (upgrade or new road) which would be most effective in meeting transportation system needs.

6 Core area refers to the Route 25 and Route 22 Corridor west of I-295.

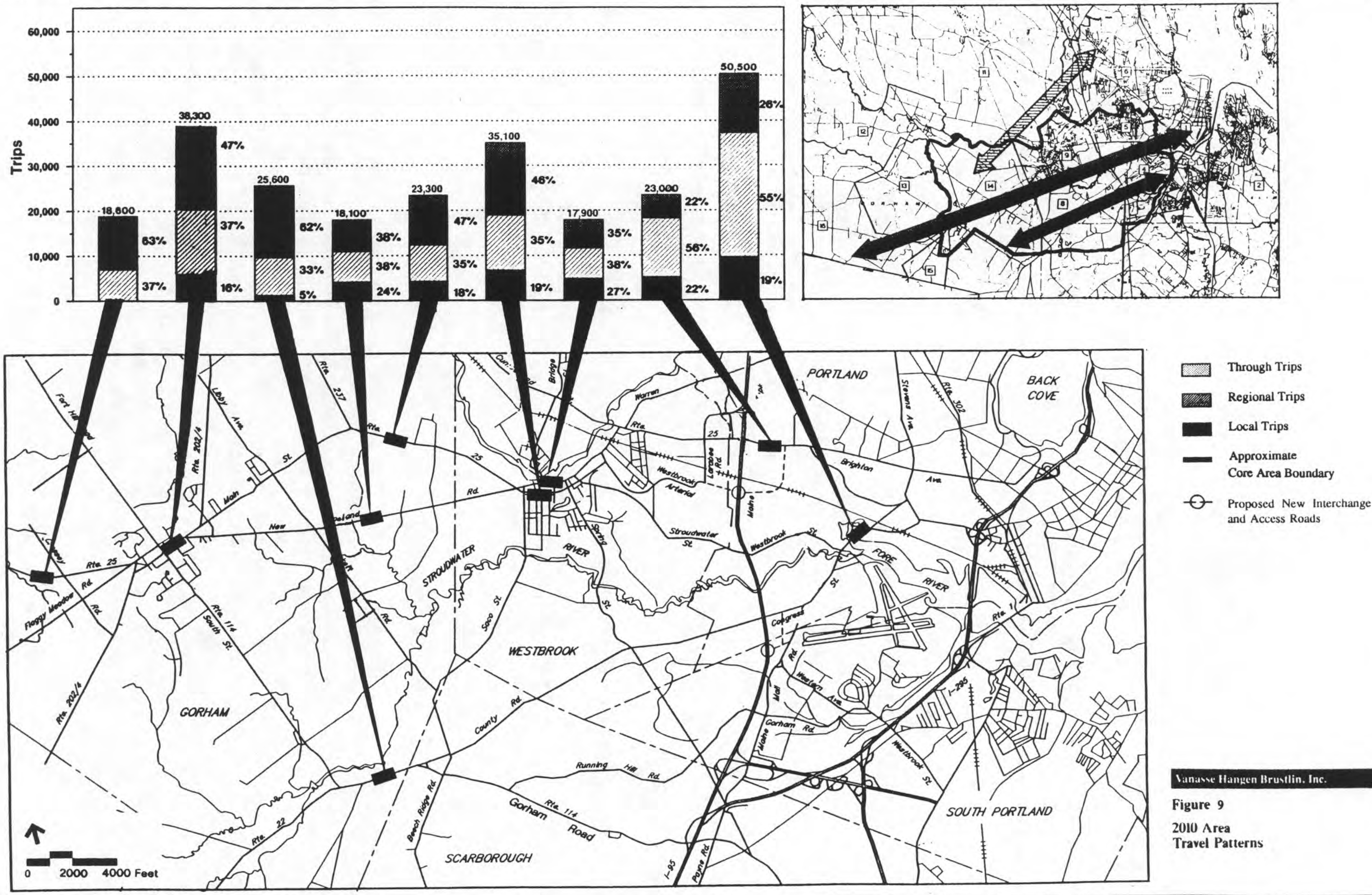

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Figure 9

2010 Area Travel Patterns

Table 7 **2010 TRAVEL PATTERN SUMMARY**

Location	Total Daily Trips	Through Trips		Regional Trips		Local Trips	
		Volume	Percentage	Volume	Percentage	Volume	Percentage
Route 25 west of Gorham Center	18,600	11,700	63	6,900	37	0	0
Route 25 east of South Street	38,300	18,000	47	14,200	37	6,100	16
Route 22 between South Street and Gorham Road	25,600	15,900	62	8,400	33	1,300	5
New Portland Road east of Libby Avenue	18,000	6,900	38	6,900	38	4,200	24
Route 25 east of Route 237	23,300	10,900	47	8,200	35	4,200	18
Wayside Drive between Saco Street and Spring Street	35,100	16,200	46	12,200	35	6,700	19
Main Street (Westbrook) between Bridge Street and Spring Street	17,900	6,300	35	6,800	38	4,800	27
Route 25 east of Riverside Street	23,000	5,100	22	12,800	56	5,100	22
Congress Street north of Westbrook Street	50,500	13,100	26	27,800	55	9,600	19

Travel patterns on several other study roadways were explored relative to the development of improvement alternatives. In addition to classifying types of trips, specific origin and destination pairs were reviewed to formulate a strategy for alleviating the forecasted deficiencies. The deficiency analysis and preliminary review of travel patterns, described herein, were the basis for the evaluation of the improvement alternatives which are discussed in the section, entitled Comparison of Alternatives, presented later in this report.

INTRODUCTION

The environmental and social resources to the development of new or upgraded roadways within the project area were identified and used for the preliminary evaluation of alternatives. Environmental features relevant to the development of new or improved roadways include physical features (such as unstable soils), socially significant features (such as residential neighborhoods), and protected environmental or cultural features (such as wetlands and historic areas). By mapping these resources early in the planning process corridors were identified that could avoid or minimize adverse impacts. This also allows the impacts of alternative roadway corridors to be quantified and compared, thus providing a framework for a more informed decision on the selection of reasonable alternatives.

RESOURCE MAPPING PROCESS

The resources listed in Table 8 was developed through discussions with MDOT, other state agencies, and local officials. It is also based on experience with similar projects elsewhere in the northeast.

Table 8 **MAPPED RESOURCES**

- Surficial Geology: Unstable Deposits
- Steep Slopes/Erodible Soils
- Farmland Soils
- Sand and Gravel Aquifers
- Surface Water Resources
- Floodplains
- Wetlands
- Vegetative Cover
- Fish and Wildlife Resources
- Land Use
- Cultural Resources

Figure 10 shows the boundaries of the resource analysis area. Figure 10 is a resource map for the entire study. This figure indicates major areas of potential conflict between road improvement alternatives and environmental resources. A USGS map was used as the base map upon which all data was shown. A separate map has been made for each major category. All maps have been

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Route 25 Corridor Study
Portland to Gorham

Environmental Analysis
Study Area

Figure 10

prepared at a scale of 1-inch = 1,000 feet. This map scale was used for data analysis and the identification of alternative corridors. These maps were photographically reduced to a scale of 1-inch = 4,000 feet. Both the 1,000 foot and 4,000 foot scale maps are available within MDOT's Office of Environmental Services for further evaluation. Resource information used to produce these maps were gathered from various sources, including published maps and reports, aerial photograph interpretation, limited field visits, and interviews with public officials. Once the information was gathered it was translated to the 1-inch = 1,000 foot scale map.

Within a given resource category, attributes of the resource were grouped into one of three subcategories: High, Moderate, and Low. For example, a dense residential land use is rated High while a resource extraction (gravel pit) land use is rated Low. The reason for assigning a High, Moderate, or Low rating to a particular attribute is to indicate the potential severity, or magnitude of the constraint relative to roadway development. Typically, the rating level is based on the level of regulatory protection afforded to a resource (e.g., wetlands) or the potential magnitude of the impact (e.g., disruption of a residential neighborhood). The assignment of High, Moderate, and Low to attributes within a given category is presented and explained in the next section of this chapter.

STUDY AREA RESOURCES

This section describes the reasons why a particular resource category is important with respect to roadway planning. The regulatory and institutional aspects of each resource attribute is discussed. This section also provides a general discussion of an observation of the various resources which were used in the evaluation of each alternative.

Surficial Geology: Unstable Deposits

Surficial geology refers to the soil deposits that overlay the bedrock. It affects drainage, erosion, and the bearing strength of the land. Well sorted, sandy deposits such as glacial outwash drain quickly and are not prone to erosion. Glacial till, a mixture of particle sizes from clay to boulders, drains more slowly and may present erosion hazards. Silt and clay, deposited in oceans or lakes or along rivers, drain very slowly and tend to be quite erodible. Deep peat deposits are unstable. Marine clay, due to its chemical composition, tends to be extremely unstable and prone to landslides and liquification. When saturated, marine clay often liquefies under any pressure, even the weight of overlying deposits. Slopes undercut by waves or streams tend to fail and the material often cannot support any considerable weight.

While relatively uncommon in the northeastern United States, an extensive deposit of marine clay (Presumpscot Formation) is found in southeastern Maine. This area was inundated by the rising ocean during the latest glacial retreat. When the weight of the ice was gone, the land rebounded above sea level leaving deposits of marine clay. The Westbrook Comprehensive Plan refers to marine clay deposits and reports landslides, slumps, and problems constructing buildings larger than three stories, due to the "toothpaste" like consistency of the clay. In developing roads, such deposits would constrain the development of support structures, such as bridge footings. The high erosion and sedimentation potential could pose threats to sensitive aquatic habitats.

The Presumpscot Formation consists of two types, Qp and Qps. The Qp type consists of marine silt and clay and represents the most likely material to fail under pressure. The Qps type contains larger amounts of sand, possibly underlain by silt and clay. It is regarded as a potentially unstable deposit.

Presumpscot deposits pose engineering constraints to the construction of roads and bridges. The Qp deposits represent the most severe risk, due to their high clay content and as such pose a High constraint. These marine clay deposits pose the most severe constraint near streams and steep slopes due to the increased chance of slope failure. Structures must be designed to compensate for the lack of bearing strength, and roads should not be located directly above or below steep slopes of marine clay, to avoid damage by landslides or slumps. The proximity of marine clay to many streams also raises the potential of sedimentation into aquatic habitats. Where the Presumpscot deposits are flat, they pose little risk of slumping.

While the Qps deposits contain more sand, they still pose potential risks because they may be underlain by clay-rich deposits. The Qps deposits therefore pose a Moderate level of constraint. Peat deposits are also a Moderate constraint because they pose a potential risk of locally unstable soils, if the deposits are deep. However, many of the mapped peat deposits appear to be associated with recently developed wetlands and would pose little constraint.

The areas not mapped as Qp or Qps contain glacial till, outwash and stream deposits. These are stable deposits and pose no structural constraint.

Observations

The study area is dominated by Presumpscot Formation deposits. The northern and eastern two-thirds of the Presumpscot is generally Qp, while Qps is predominant in the south and west.

The most clay-rich type, Qp, often appears as dendritic (branching) channels along streams. Very steep slopes and erodible soils are located along certain streams and rivers. These observations reflect the tendency toward slope failure in marine clay deposits. Where streams undercut the Presumpscot River, the slopes would cave in, forming steep walled gullies. The presence of Qp in gullied stream beds surrounded by Qps deposits suggest that marine clay does, in fact, underlie sand in the Qps deposits.

The Presumpscot Formation exhibits a generally flat topography. The large amount of hydric and potentially hydric soils may reflect the extensive poorly draining, flat-lying silt and clay of this formation.

Areas mapped as outwash and till generally occur as uplands. These are probably remnants of elevated features such as drumlins, moraine ridges, outwash terraces and eskers, which would not have have been inundated with the rising sea level.

Areas mapped as modern alluvial deposits, Qal (not distinguished here from outwash and till), generally occur along rivers. Areas mapped as peat occur in low wetlands.

Waste Storage Yards

Waste storage yards presents constraints to road construction and should be avoided where possible. An operating landfill provides a necessary public service. It would be much less problematic to relocate a proposed road than an operating landfill, due to the space and complex permitting requirements of the landfill. Construction of a road across a closed landfill would pose difficulties of potentially unstable substrate. Construction across a junkyard would require removing the automobiles and restoring the landscape to the extent necessary for road construction. In addition, landfills and junkyards pose risks of contaminated soil and other hazardous wastes, which would require considerable effort by MDOT to clean up.

Observations

Three waste storage locations are found in the study area. One, a former landfill is located between County Road and Running Hill Road and occupies land in South Portland, Scarborough, and Westbrook. Two junkyards are found in the study area - one off Saco Road in Westbrook and one on Narragansett Road in Gorham.

Steep Slopes And Erodible Soils

Construction on steep slopes or highly erodible soils can lead to soil loss and siltation into surface waters, and therefore requires costly preventative measures. The inclusion of permanent protection and the proper application of erosion and sedimentation controls during construction can provide an adequate level of environmental protection.

Observations

Areas with steep slopes and/or erodible soils (identified as High and Moderate constraints) generally occur in the study area on a few isolated hillsides and along streams and rivers. The areas of greatest soil limitations generally occur adjacent to streams and rivers, where the use of erosion control measures will be especially important for protection of the water resources. Relatively widespread areas of very steep slopes and/or erodible soils near water bodies occur along Beaver Pond, the Stroudwater River, Long Creek, and the Presumpscot River. Smaller areas of very steep slopes and/or erodible soils near water bodies include the portions of the Nonesuch River, Strout Brook, and the South Branch of the Stroudwater River. Relatively small isolated areas of very steep slopes and/or erodible soils on moderate slopes that are not along water bodies are scattered throughout the study area. Throughout the remainder of the study area, large areas are characterized by moderate to gentle topography posing minimal to no soil limitations.

Farmland Soils

The Farmland Protection Policy Act of 1981 discourages the irreversible conversion of significant agricultural lands to non-agricultural uses. For highway projects receiving federal aid, the regulations promulgated under this Act require the state highway authority (in this case MDOT) to coordinate with the U.S.D.A. Soil Conservation Service (SCS). As the federal funding authority, the Federal Highway Administration (FHWA) is ultimately responsible for compliance with the Act and its regulations. SCS lists the soil units which constitute "Prime Farmlands" and additional "Farmland of Statewide Importance". These soil types should be avoided where practicable. Compliance with the Act involves preparation and processing of Department of Agriculture forms which document impacts to farmland. Evaluation of alternatives which minimize farmland impacts and consideration of measures to mitigate farmland impacts are also part of the required process.

The Farmland Protection Policy Act was established to minimize permanent conversion of farmland to non-agricultural uses. If a proposed highway project would involve federal funds, it would be required to comply with the Act. The Act and its regulations require identification of alternative corridors that minimize direct impacts to farmland (inclusion within road right-of-way) and indirect impacts (such as potential induced population growth). The regional Soil Conservation Service office would review the acreage of impacts in proposed corridors.

Compliance with the Farmland Protection Policy Act would require that MDOT and SCS coordinate with each other in the evaluation of farmland conversion impacts. This process would entail the completion of standard U.S. Department of Agriculture forms which quantify farmland impacts of the alternatives. The final decision on impacts and mitigation would be coordinated by MDOT with the FHWA Division Administrator. No permit is required, but documentation of compliance must be included in the applicable environmental document prepared pursuant to the National Environmental Policy Act. Compliance with the Act and its regulations is only required for federal aid projects.

Prime Farmlands are considered most important to preserve, and thus pose a High constraint. However, where Prime Farmlands have already been converted to non-agricultural uses (urban uses), the Act does not apply.

Farmlands of Statewide Importance pose limitations that make them less than ideal for farming (such as steeper slopes than Prime Farmlands); they represent a Moderate constraint. However, the Act applies even where the land has been converted to urban uses. In its report, the SCS will also identify farmlands that are actively used for agriculture, a factor that will be considered in identifying the best corridor.

Observations

In the study area, Portland and South Portland will pose little constraint. There is little farmland in the two cities, and much of the area of mapped farmland soil has been converted to urban uses. A band through southern Westbrook and northern Scarborough poses low constraint levels overall, showing a few scattered pockets of High and Moderate rated farmland soil. Along the southern edge of the project area, in Scarborough, large areas of High rated farmland soils are found. The western portion of the study area will pose the most constraints, with considerable amounts of High and Moderate constraint farmland located both north and west of the village of Gorham, and to the southwest of South Gorham.

Sand And Gravel Aquifers

Sand and gravel aquifers are large underground deposits of sand and gravel containing groundwater. Because the water can flow relatively quickly through the sand and gravel, these high yield aquifers provide a suitable source for public groundwater supply. Groundwater contamination can also spread more quickly in these highly transmissive aquifers, a fact which makes them "sensitive areas" from a land use planning perspective. Also, groundwater discharge maintains stream base flows during dry periods, thereby helping to maintain aquatic plant and animal species.

The state's most important use of groundwater is as a source of drinking water. The presence of public wells therefore poses a High constraint because of potential impacts to well water quality. High yield aquifers also pose a High constraint because of similar water quality concerns and because they are potential future public water supplies. Severely contaminated groundwater sites are rated High because of potential environmental risks associated with construction in these areas and the liabilities of right-of-way ownership.

Moderate yield aquifers pose a Moderate level constraint because they are less suitable for development of a large water supply than high yield aquifers, but they are still a potentially valuable drinking water resource. Groundwater contamination sites not rated high (severely contaminated) include some salt storage and junkyard sites. These are rated Moderate.

Certain activities taking place in the vicinity of public wells can raise concerns which need to be worked out on a case by case basis. Salt and sand storage is regulated by the Maine Department of Environmental Protection (MDEP), as is blasting within 300 feet of community water supplies (serving more than 25 people). Sole source aquifers receive special protection from the U.S. Environmental Protection Agency (EPA), but none have been delineated in the study area.

Maine has classified all groundwater as "GA" or suitable for drinking and may not be degraded. Groundwater areas under pollutant sources such as salt piles or solid waste landfills are assumed to be unpotable and, thus, not in compliance with standards.

The Federal Safe Drinking Water Act Amendments of 1986 required the states to adopt a program to protect wellhead areas. Section 1428 of the Act requires that the State develop a wellhead protection program. Maine is in the process of developing such a program.

Observations

The highest constraint indicated here will be the public wells. One well in the study area serves 500 people or more and would therefore require hydrologic investigation to determine the boundaries of Zones 1 and 2. Several smaller wells serving less than 500 people are located in the study area and will have a protection Zone 1 with a 300 foot radius, Zone 2 of 1,000 foot radius. The only high yield aquifer is a relatively small area found along the Gorham - Scarborough town line in the southwest portion of the study area.

Most of the study area is served by either individual private wells, or by the Portland Water District, which draws water from Sebago Lake and a well north of the study area. Several public wells are scattered throughout the area, but they are quite small. The largest serves 900 people in a trailer park. Other wells serve trailer parks, businesses, golf courses, restaurants and generally serve 100 people or less. (Several wells have not been mapped due to insufficient data, but they are small and associated with existing businesses).

A moderate yield sand/gravel aquifer (Moderate constraint) occurs in a band beginning south of Gorham center and continuing along the southern portion of the study area. This band coincides with the sandier Presumpscot Formation type Qps

Activities associated with groundwater contamination (Low constraint) are scattered through the study area. These include uncovered salt storage piles, landfills, junkyards and certain industrial sites. The extent of groundwater contamination is assumed to be twice the area occupied by each landfill and 10 acres for salt storage piles and hazardous waste storage.

Surface Water Resources

Surface water is used for public drinking water supplies, swimming, fishing, and boating. Surface water is the medium for all aquatic and marine life.

The Federal Clean Water Act and the EPA regulations which implement the Act call for the protection of surface waters from pollution. The State of Maine MDEP implements water quality standards and state regulations designed to protect water resources. If not handled properly, roadway runoff can pollute surface waters. Drainage design and engineering controls can reduce roadway impacts on water quality. Road design should consider effects within watersheds, as well as directly adjacent to streams or rivers.

The constraint levels are based on the amount of protection afforded by permitting processes and water quality standards implemented by MDEP. MDEP has assigned the highest level of protection (High constraint) to Outstanding Rivers, surface water supplies, Great Ponds, ponds, tidally influenced waters, and class AA waters. Of these, the study area includes:

- ponds, into which discharge will not be permitted, and
- tidally influenced waters, which will be regulated as: Class I wetlands, requiring a high degree of mitigation (replication or enhancement at a ratio of 2:1)

A Moderate level of constraint was applied to all other surface waters, which are all regulated as protected resources under the state's Natural Resources Protection Act.

All point source discharges to surface waters will have to comply with water quality standards. Within the study area, the strictest are in Scarborough, where the Nonesuch River is designated Class A. Discharges to these waters must be of equal or greater quality than the receiving waters. All other study area waters are designated class B or C or SB or SC, allowing varying qualities of discharge that do not degrade habitat for indigenous species.

Observations

Within the High constraint category, the study area contains no Class AA, Outstanding Rivers or Great Ponds. However, it does contain the tidally influenced waters of Fore River, Long Creek, and Back Cove, as well as a few fresh water ponds. Clark Pond in South Portland is the largest pond. No public surface water supplies have been identified in the study area. Much of the study area is served by the Portland Water District, which draws water from Sebago Lake, northwest of the study area.

The other surface water bodies fall within the Moderate constraint category.

The study area contains five major watersheds with numerous tributary streams. The watersheds generally drain eastward towards the coast. Four watersheds center around rivers: (from north to south)

- Presumpscot River watershed - is the largest watershed in the study area, containing the urban areas of Gorham and Westbrook. The Presumpscot River is designated as Class C within the study area, reflecting mill activity. Its tributaries are Class B.

- Stroudwater River watershed - is contained almost entirely within the study area. The Stroudwater River and its tributaries are designated Class B to the confluence with Indian Camp Brook at approximately the Westbrook/Gorham town line, west of Saco Road, beyond which they are designated as Class C.

- Nonesuch River watershed - drains much of the southern portion of the study area. It empties south of the study area into the tidal reaches of the Scarborough River. The water quality of the Nonesuch River through Scarborough is Class A. Where it drains from South Portland, it is designated Class B with a Class C tributary.

- Scarborough River watershed - crosses the very southern edge of the study area and drains south. Its water quality is Class A, supporting important clam beds in its tidal waters.

The rest of the study area drains heavily urbanized land and empties directly to coastal waters. Red Brook and Long Creek empty to Long Creek tidal waters (part of the Fore River). Red Brook and Long Creek are designated as Class B, while the remaining coastal waters are Class SC or C.

Floodplains

Floodplains are flat, low-lying areas adjacent to streams and rivers. They provide a natural means of detaining floodwaters and thereby protecting downstream properties from damage. Development in the floodplain reduces this flood storage capability and places the development in the floodplain and downstream properties at risk. Avoidance of development in floodplains is federal policy as set forth in Executive Order 11988 and the regulations of the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA). The State of Maine DEP regulates floodplain wetlands as protected resources under the Natural Resources Protection Act (NRPA) (discussed in the Wetlands section).

Alterations within the 100 year floodplain require careful design to retain the flood storage capacity. Executive Order 11988 requires all federal agencies to avoid impacts to floodplains whenever possible, and to minimize floodplain impacts where such impacts are unavoidable. The FHWA requires projects in floodplains which result in a one foot or greater increase in floodwater elevation to provide compensating floodwater storage in the vicinity of the impacted area. MDOT has followed a policy of ensuring that floodwaters increase less than one foot in elevation. Such protection is especially important in floodplains of major rivers and coastal areas, where the effects of flooding are most dramatic. The 100 year floodplains of rivers and coastal areas thus represent a High constraint.

The 500 year floodplains constitute a Low constraint. They have been identified to allow analysis of their role in flood control and determination of appropriate mitigation.

Observations

Floodplains of major waterbodies (High constraint) are located along Back Cove, the Fore River, Long Creek tidal waters, Little River (in northern Gorham), and along the three major rivers (Presumpscot, Stroudwater, and Nonesuch). A portion of the Stroudwater in Gorham, and many tributaries that flow into major rivers, are flanked by narrower 100 year floodplains. The study area contains a few 500 year floodplains (Low constraint), generally located at the extreme upper reaches or edges of 100 year floodplains.

Wetlands

Wetlands can perform a number of functions such as flood protection, pollutant filtration, and provision of valuable fish and wildlife habitat. Wetlands are protected pursuant to the federal Clean Water Act section 404, and the state's Natural Resources Protection Act (NRPA). Actions which impact wetlands under state or federal jurisdiction must receive a permit prior to construction from the U.S. Army Corps of Engineers (Corps) for federally regulated wetlands, and Maine DEP for state regulated wetlands.

Two separate wetland types have been evaluated: (1) Identified Wetlands, and (2) Hydric (wet) or Potentially Hydric Soils. Identified Wetlands include wetlands mapped by the U.S. Fish and Wildlife Service National Wetlands Inventory program and those mapped by the State of Maine (Maine Geologic Survey) from aerial photographs and site visits. They also include wetlands identified in this study through aerial photograph interpretation and limited site reconnaissance. Hydric/Potentially Hydric Soils represent soils defined as hydric by the USDA Soil Conservation Service (SCS) or soils that exhibit some characteristics of hydric soils. Hydric soils correspond to federally regulated wetlands under most circumstances.

At this preliminary phase of analysis, constraint levels were based on the likelihood that the areas identified will exhibit enough characteristics to qualify as a regulated wetland. Any impacts to regulated wetlands will receive close scrutiny by permitting authorities (Army Corps of Engineers, Maine DEP). Assessment of individual wetland functions and values throughout the study area is not possible at this preliminary stage of analysis. During subsequent, more detailed levels of analysis, such functions and values will be evaluated in order to best avoid, minimize and mitigate wetland impacts.

The Maine DEP regulates certain activities in wetlands pursuant to the Wetland Protection Rules (Chapter 310) of the NRPA. The method for determining wetland boundaries is consistent with the federal method described in: Federal Manual for Identifying and Delineating Jurisdictional Wetlands (U.S. Army Corps of Engineers, U.S. EPA, U.S. Fish and Wildlife Service, U.S.D.A. SCS, January 10, 1989). The federal method for wetland identification requires that wetlands exhibit the following three characteristics under normal circumstances: hydric soils, wetland hydrology, and wetland vegetation. While the state and federal governments use a consistent method for identifying wetlands, their jurisdiction is different, as described below.

State jurisdiction pursuant to the NRPA Wetland Protection Rules includes:

- Coastal Wetlands - all tidal and subtidal lands, including areas of salt-tolerant vegetation within salt water or estuarine habitats.

- Floodplain Wetlands - "The lands adjacent to a river, stream or brook which are inundated with flood water during a 100-year flood event and which under normal circumstances support a prevalence of wetland vegetation typically adapted for life in saturated soils" (NRPA Sec. 1, C.7.).

- Freshwater Wetlands - wetlands of 10 or more contiguous acres, or of less than 10 acres and adjacent to a surface water body (excluding rivers, streams or brooks) such that the combined area of wetland and water body is in excess of 10 acres, and not considered as part of a great pond, coastal wetland, river, stream or brook.

- Great Ponds - inland bodies of water in excess of 10 acres (and artificially created/increased water bodies in excess of 30 acres).

These state jurisdictional wetlands are classified as Class I, II or III wetlands in accordance with NRPA Chapter 310, Section 1, D. Class I wetlands include all coastal wetlands and great ponds and other wetlands with important habitats as defined by the regulations. Class II wetlands are located within 250 feet of coastal wetlands, lakes or ponds classified as GPA, or contiguous rivers, streams and brooks, but do not contain characteristics of Class I wetlands. Class II wetlands also include floodplain wetlands, peat bogs, and wetlands with at least 20,000 square feet of aquatic vegetation, emergent marsh vegetation, or open water. Class III wetlands are all other wetlands not defined as Class I or II. Standards for the permitting of regulated activities are related to the wetland classification. Applications for a NRPA permit and 401 Water Quality Certification involving wetland alterations are required to submit specific information on the proposed alteration, wetland impacts, alternatives which avoid or minimize impacts, and compensatory measures.

In contrast to state jurisdiction, federal wetland jurisdiction extends to all areas which meet the criteria identified in the federal manual on wetland delineation. This includes small, relatively isolated wetlands not under state jurisdiction. However, while the state regulates a broad range of activities, federal jurisdiction applys only to activities which include the discharge of dredged or fill material into waters of the United States. The U.S. Army Corps of Engineers processes federal wetland permit applications pursuant to section 404 of the Clean Water Act and associated regulations. The U.S. EPA has a review role in federal wetland permitting.

Identified Wetlands pose the highest constraint due to the likelihood that they represent regulated and/or important wetlands. Wetlands mapped by the state of Maine are regulated by the state and federal government. Wetlands mapped by the National Wetlands Inventory are all regulated by the federal government, and most will be regulated by the state as well. Wetlands identified by aerial photograph interpretation are also very likely to fall under federal jurisdiction. Moreover, these obvious wetlands are likely to exhibit the functional values traditionally ascribed to wetlands. For these reasons, Identified Wetlands constitute a High constraint.

Hydric soils, as identified by the U. S. Soil Conservation Service (SCS), are a strong indicator of wetlands regulated under federal law. The larger hydric soil areas are also likely to fall under state jurisdiction. The listed hydric soils are considered a Moderate constraint because experience shows that identified hydric soils tend to exhibit wetland hydrology, as well. Hydric soils are not assigned to a High constraint category because: 1) due to accuracy limitations of the SCS soils maps, not all areas mapped as having hydric soils will actually exhibit those hydric soil properties, and 2) field inspection shows that hydric soils areas, outside of identified wetlands, are very widespread, common, and exhibit marginal wetland characteristics. This is a generalization, however, and it should be recognized that detailed wetland delineation and inspection in the field may reveal some of these hydric soils areas include wetlands of varying value.

Potentially hydric soils exhibit some of the characteristics of designated hydric soils. Field investigation in the study area has shown that this category is often, but not always associated with wetland vegetation. These potentially hydric soils may contain regulated wetlands. As such they constitute a Low constraint. Areas not designated as hydric or potentially hydric probably do not contain hydric soils and represent likely upland areas. For both designated hydric and potentially hydric soils, careful field investigation will be required 1) to confirm the presence of wetland characteristics and 2) delineate the exact boundaries of wetlands. Field inspection will also be used to help evaluate specific wetland functions and values. This field inspection will be conducted at a later time, once the range of reasonable alternatives has been identified.

Observations: Identified Wetlands

Dominant wetland system types within the study area are:

- Palustrine - fresh water wetlands dominated by trees, shrubs, or emergent vegetation; or non-vegetated wetlands meeting certain size criteria (less than 20 acres, and less than 2 meters deep) that lack wave-formed or bedrock shoreline features. This category includes a wide variety of fresh water wetlands, including forested and shrub swamps, marshes, and small open water habitats.

- Riverine - fresh water wetlands and deepwater habitats contained within a channel, which are not dominated by trees, shrubs, emergent vegetation, lichens, or emergent mosses.

Secondary wetland system types within the study area are:

- Estuarine - deepwater tidal habitats and adjacent tidal wetlands, involving mixing of sea water and fresh water that produces salinities of 0.5 parts per thousand or greater.

- Lacustrine - wetlands and deepwater habitats that are situated in a topographic depression or a dammed river channel, in which vegetation covers less than 30 percent of the wetland, and which are greater than 20 acres.

The following wetland system descriptions are provided by geographic area.

Portland

Portland contains few wetlands due to its high level of urban development. However, isolated areas of palustrine deciduous and emergent wetland do exist, as well as an emergent mixed forested shrub wetland complex abutting Route 95.

Back Cove and the northern portion of the Fore River is the only estuarine system in the study area. The Fore River is characterized primarily as estuarine intertidal flat and estuarine emergent. Back Cove is primarily estuarine emergent, with some intertidal flat and estuarine open water as well.

South Portland

The major freshwater wetland system in South Portland is part of the Red Brook system (riverine) which flows from Scarborough into the Clark Pond wetland system. Wetlands draining to Red Brook are primarily forested palustrine areas. Clark Pond (lacustrine) flows into Long Creek and then into the Fore River estuarine system. The Fore River and portions of Long Creek are estuarine wetland systems consisting of emergent, intertidal flat, and open water areas.

Scarborough

The wetlands of Scarborough commonly occur as complexes rather than isolated areas. The Nonesuch River system supports a diverse wetland complex of deciduous/mixed forested wetland in addition to shrub and emergent wetland. North and south of the Nonesuch River, isolated coniferous wetlands occur.

The only lacustrine wetlands in the study area are located in North Scarborough. These lacustrine areas occur as four isolated open water areas west of Red Brook and a lacustrine open water/coniferous wetland complex east of Red Brook.

Westbrook

The two major wetland systems identified in the Westbrook area are: (1) the Stroudwater River (riverine) and its tributary, Beaver Pond Brook; (2) the Presumpscot River (riverine) and its tributary, Mill Brook. These riverine systems support palustrine deciduous shrub and emergent wetland along the river banks.

A secondary wetland system in Westbrook is associated with a Palustrine evergreen wetland which flows into Long Creek and eventually into Clark Pond in South Portland.

<u>Gorham</u>

The wetlands in Gorham occur primarily as palustrine coniferous and shrub wetlands bordering Indian Camp Brook and Fort Hill Brook. The wetland complex associated with the Tannery Brook supports a linear wetland complex of coniferous shrub, emergent and open water wetland. In addition to these complexes, there are isolated evergreen, emergent and shrub wetlands.

<u>South Gorham</u>

The major wetland system in this area is the South Branch of the Stroudwater River with extensive linear palustrine shrub, emergent wetland, and coniferous wetlands bordering the riverbanks.

Observations: Hydric/Potentially Hydric Soils

Hydric soils constitute a Moderate constraint for the purposes of this study. The predominant hydric soils in the Portland to Gorham Study area are Swanton (Sz) and Scantic (Sn). Swanton soils are poorly drained and are formed in moderately coarse textured sediments of glaciofluvial origin over fine textured sediments of marine and lacustrine sediments. The water table is at one foot during most of the year. Scantic soils are also poorly drained and are formed in marine and lacustrine sediments. The water table is also at one foot during most of the year. These two hydric soils, both associated with marine and lacustrine sediments, are characteristic of the coastal, eastern, and central parts of the county.

Portland and South Portland, as well as Westbrook and Gorham, contain substantial areas of Au Gres hydric soil. This soil is somewhat poorly drained.

In addition to these hydric soils, each town consists of various secondary amounts of other hydric and potentially hydric soils.

Vegetative Cover

Vegetative cover refers to the broad range of vegetation types that exist over the landscape. As used in this analysis, vegetative cover is not, by itself, considered a constraint. Rather, it is included in this analysis as supplemental information to Wetland resources and Fish and Wildlife resources. Therefore, no constraint levels have been assigned to vegetative cover attributes.

Vegetative cover is a general indicator of the type and diversity of plants and animal populations that are likely to occur within an area. These resources vary in their types of value, such as recreational, economic, social, and are also valued as biological resources to be conserved and protected. By identifying the types of vegetative cover that exist within the study area and combining it with information collected through various state and federal agencies, Vegetative cover serves to locate the types and diversity of biological resources present in the study area.

Vegetative cover is an indicator of general habitat type. Vegetative cover types will indicate both the plant and animal communities that are likely to occur there. Rare habitats and complexes of interspersed, diverse habitat types contribute to the value of an area's biological resources. Certain habitats and rare or endangered species are protected under state and federal laws (see section on Fish and Wildlife Resources).

Observations

The dominant vegetative cover throughout the study area is evergreen forest. However, large expanses of mixed evergreen/decidous forest occur within and/or surrounding the evergreen areas. This seems to signify that second growth areas, which result from logging, have replaced the mature evergreen stands as a mixed second growth forest community. Decidous forest occurs along most of the streams and major waterways on linear strips following the lower-lying topography of the floodplains and depressional areas. Approximately half of these deciduous forested areas appear to be associated with shrub swamp and/or emergent marsh complexes.

It is important to note that the forested areas, especially in the western portion of the study area, are comprised of dense corridors with moderate vegetative interspersion. Unbroken forested corridors provide wildlife with travel routes which are not subject to human disturbance.

The dominant wetland vegetative cover type is also evergreen forest. The study area is characterized by numerous first and second order streams[7] and their tributaries, which generally flow in a south and eastward direction through the large expanses of evergreen forests.

The northwestern portion of the study area contains the highest level of vegetative diversity containing large tracts of evergreen forest mixed with evergreen/decidous and deciduous forest. The areas of decidous forest are generally located near streams and rivers and also incorporate smaller areas of shrub swamp.

The northwestern and southwestern portion of the study area contain evergreen and decidous forest with shrub swamps and stream channels interspersed through the forested areas.

Successional areas occur more commonly in the eastern portion of the study area. Successional areas generally seem to result from recent forest cutting for recreational or economic oriented land uses. These areas are characterized by sparse/scattered shrubs, and meadow/grass species.

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7 Stream order reflects the number of times a stream has joined with a tributary of equal or greater magnitude. A first order mapped stream is the headwaters, having joined with no other streams. A second order stream is a combination of first order streams. A third order stream is the combination of two or more second order streams.

Fish & Wildlife Resources

Significant fish and wildlife resources have been identified by the Maine Department of Inland Fish and Wildlife (MDIFW). This classification of species as "significant" is specific to MDIFW and state permits and does not refer to "significance" as defined by regulations implementing the National Environmental Policy Act (NEPA). Although values placed on these resources very widely among individuals, there are certain basic resources which must be identified and studied, such as state and federal regulated areas of rare, threatened, and endangered plants/animals, wetland areas of outstanding habitat diversity - designated critical areas, deer wintering areas, and designated fisheries. These areas support resources valued for their economic or recreational uses, or recognized biological importance. The State of Maine has recognized the significance of the areas, affording regulatory protection to those resources officially designated as "high" or "moderate" value

Within the study area no areas of rare, threatened, and endangered plants/animals, or wetland areas of outstanding habitat diversity (designated critical areas) were identified. The types of fish and wildlife habitats identified in the area were:inland fisheries, inland and coastal wetlands, deer wintering area, and shorebird roosting sites.

Significant Fish and Wildlife Habitat within the study area are viewed by MDIFW as areas which merit special consideration and protection from changes in existing land use. May areas involve an additional level of constraint from a jurisdictional standpoint. For example, wetlands are classified as Class I if they contain High or Moderate value habitats such as waterfowl, wading bird, or shorebird habitats, deer wintering areas, and critical spawning and nursery areas for Atlantic sea run salmon. Alterations to these areas must be minimized, and compensation of 2:1 would be required for any alterations that degrade or reduce wetland functions.

Observations

Coordination with the U.S. Fish and Wildlife Service and MDIFW indicated that federally listed threatened or endangered species are not found within the study area. Areas of MDIFW Significant Fish and Wildlife Habitat are described by geographic area below.

Portland

Inland fisheries identified for Portland consist primarily of unknown value areas located near one of the unnamed tributaries to the Fore River in the Deering section, along the Presumpscot River south of Riverton Bridge, and north of Presumpscot Falls along the Presumpscot River. Low value areas occur along a tributary to the Fore River near Masons Corner and Capisic Pond. Moderate value fishery areas were identified on Fall Brook and south of the Riverside Golf Course.

There is one deer wintering area in Portland. It is located along the Stroudwater River north of Congress Street and west of the turnpike. This area was rated Low Value.

Marine wildlife habitat and shorebird feeding/roosting areas occurs within Back Cove and the Fore River north of Veterans Memorial Bridge. These areas are rated High and Moderate, respectively.

Inland and coastal wetlands identified by MDIFW as fish and wildlife habitats are predominantly Low valued areas which occur along a tributary to the Fore River adjacent to railroad northwest of Congress Street.

South Portland

The inland fisheries identified for South Portland consist primarily of unknown and Low value areas. One Moderate value area is located along Red Brook near Clark Pond near the intersection of I-295 and Western Avenue.

There are no deer wintering areas in South Portland.

Marine wildlife habitats and shorebird feeding and roosting sites were identified along the tidal flats of the Fore River. This was rated with a Moderate value.

Inland and coastal wetlands identified by MDIFW as fish and wildlife habitats are predominantly Low value areas. These occur along Barberry Creek east of the Forest City Cemetery, and along Long Creek west of Western Avenue.

Scarborough

Within the study area, Scarborough contains the largest number of Fish and Wildlife resources. They are located generally along the Nonesuch River near Fogg Hill in western Scarborough and extending south from Holmes Road near the Maine Turnpike and Eight Corners (the intersection of Mussey Road, Gorham Road and Spring Street).

The inland fisheries in Scarborough are numerous and range from High to Low values. The highest values for fisheries were along Silver Brook in western Scarborough and along the Nonesuch River. Moderate value fisheries occur along Fogg Brook, Red Brook, Willow Brook and the Scarborough River. Low value fisheries occur along Beech Ridge Brook, along unnamed tributaries to the Nonesuch River, and on the South Branch of the Stroudwater River.

Three High value deer wintering areas identified in Scarborough are; (1) west of Silver Brook; (2) along the Nonesuch River; and (3) southwest of Beech Ridge Road along the Nonesuch River. Moderate value deer wintering areas occur south of the Nonesuch River and south of Eight Corners. Low value deer wintering areas occur north and south of Old Blue Point Road.

Within the study area, Scarborough contains no Shorebird feeding/roasting areas or Marine Wildlife Habitat areas.

Most of the inland and coastal wetlands areas identified by MDIFW as fish and wildlife habitats are rated of unknown value, including Scottow Bog. Low rated wetland areas occur east and west of the turnpike, and two moderate value areas occur north of eight corners along the Nonesuch River and south of Old Blue Point Road.

Westbrook

The inland fisheries in Westbrook primarily consist of Low value areas which are located along the Stroudwater River. There are three High value fisheries - two are associated with the Stroudwater River and one with Mill Brook. Unknown value fisheries occur along the Presumpscot and the Stroudwater Rivers.

There is one High value deer wintering area which is located along the Stroudwater River; and one deer wintering area of unknown value along Beaver Pond Brook.

Within Westbrook there are no Shorebird feeding/roasting areas or Marine Wildlife Habitat areas.

Inland and coastal wetlands identified by MDIFW as fish and wildlife habitats are predominantly Low valued areas which occur north of Westbrook center adjacent to a tributary of the Presumpscot River and in the center of Westbrook associated with Beaver Pond.

Gorham

There are numerous High and Moderate value inland fishery areas in Gorham. These areas are associated with the Stroudwater River, (its south branch as well), and the Presumpscot River. A few Low value fisheries exist north of Mosher Corner along Mosher Brook.

There are three deer wintering areas within Gorham. One area is located south of Day Road and east of South Street and another is located just east of Fort Hill. Both are rated as unknown value. The third area occurs along the Nonesuch River and is rated High value.

Within Gorham there are no Shorebird feeding/roasting areas or Marine Wildlife Habitat areas.

The inland wetlands identified by MDIFW as fish and wildlife habitats occur primarily as Low value areas. One of these areas is located north east of Gully Brook, another just south of Flaggy Meadow Road (associated with Brandy Brook) and a third is located just west of the Westbrook City Boundary (associated with Indian Camp Brook and the Stroudwater River). There is one Moderate value wetland and this is associated with Tannery Brook.

Land Use

The study area contains a mixture of diverse land uses. Existing land use provides a picture of how an area functions today and a view of how it may change in the future. A map of existing and proposed land uses can help determine the potential for roadway impacts such as those related to: noise, air pollution, neighborhood disruption, local economy, and visual appearance.

The constraint levels reflect the social and economic costs and/or engineering difficulty of disturbing land uses to locate a road. The most densely developed areas receive the highest constraint level. Major road projects through such areas would require considerable expense to compensate landowners for condemned property and would disrupt neighborhoods and activities. Certain land uses, such as public recreation sites, are legally protected as well (see Cultural Resources).

Rural residential areas were assigned a Moderate level of constraint because they pose many of the social and engineering problems as High constraint land uses, but to a lesser degree. These less intense uses present less of an impact per acre than High constraint land uses.

Other public lands, extraction sites and active farmland pose a Low constraint to roadway development. These areas are relatively large and are in a relatively low intensity use. Roadways can often intersect such areas without significant disruption of the existing land use.

Observations

The most densely concentrated land uses occur in the eastern and northern portions of the study area. The eastern and northern portion of the study area therefore pose the highest constraint level, due to the high density of development. Portland and South Portland are extensively developed. The other three municipalities contain urban centers with a considerable amount of undeveloped land. Approximately one fourth of the undeveloped land in these areas is used as farmland. The general land use patterns and locations of proposed development indicate that considerable growth is occurring in the southeast portion of the study area. The land use resources are described by geographic area (city/town) below:

<u>Portland</u>:

Portland is a highly concentrated area of urban land uses. The original city center lies between the Fore River and Back Cove. This area is chiefly characterized by high and moderate density residential and mixed urban uses, with industrial uses along the Fore River and the railroad. Recent commercial and industrial development has been occurring along the Maine Turnpike (Route I-95). Parks are scattered throughout the city center. New industrial development is being directed north of the city center along Route 95; southwest of the city along Congress Street; and near Thompson's Point north of the Portland Jetport.

<u>South Portland</u>:

South Portland is also intensely developed. A considerable amount of recent commercial, industrial, and office park development has occurred north of Route I-295. This recent growth is concentrated near the jetport, along Running Hill Road, and near Interstate 95 and Interstate 295 interchanges. Older naval housing (Red Bank neighborhood) is also found in this area. The central and northeast portion of the city is characterized by moderate to high density residential and mixed urban uses. Route 1 is a corridor of primarily commercial uses with areas of Route 1 being redeveloped to motels. Commercial /office /multi-family developments are slated near the Maine Mall and along Running Hill Road. Industrial uses are located along the Portland Terminal railroad and Fore River with additional industrial development occurring along Broadway and near the railroad yard. Recreation areas, except for a municipal golf course, are mostly associated with schools.

Scarborough:

Scarborough is much less densely developed than Portland or South Portland, containing a considerable amount of undeveloped land. The town presently contains few concentrations of commercial or industrial uses within the study area. However, commercial and industrial growth is occurring east of the Maine Turnpike. Several motels and commercial/office/industrial developments have been proposed near Eight Corners and along Gorham Road near Hunnewell Hill. The area west of the Maine Turnpike is still characterized by rural land uses.

Westbrook:

Much of Westbrook extends north of the study area but the urban center is located within the study area, centered on the Presumpscot River. The original city center is mostly characterized by moderate density residential areas, small commercial uses, and municipal offices. The center is anchored at either end by historic mills along the river. Recent commercial and industrial growth has occurred along Warren Road, Route 25, and the Westbrook Arterial between Portland and Westbrook. A large quarry is located along Route 25, near the Maine Turnpike. Two sewage treatment plants are located adjacent to the Presumpscot River on the eastern side of the City.

Residential neighborhoods are concentrated north of the city center. The area south of the city center is much more rural, but commercial and industrial growth is occurring along County Road and in an industrial park between Cummings and Saco Roads.

Gorham:

Gorham contains mostly rural land with a considerable amount of undeveloped land and active farms. Residential areas are generally low to moderate density, and small commercial or industrial uses are scattered along the roads. The center of Gorham contains the most concentrated development of the town, with moderate density residential areas, commercial uses, public offices, the University of Southern Maine, and a golf course. A growing industrial park lies between Route 25 and New Portland Road, near the Gorham - Westbrook town line. Other industrial uses and two waste processing facilities have been proposed along Route 25 between Gorham and Westbrook center. A commercial development has been proposed for the former raceway along Narragansett Road (Route 202/4). The time frame for construction of the proposed waste processing site and commercial development is uncertain at this time.

Cultural Resources

Cultural Resources include historic sites, parks and resources identified as sensitive or valuable through special zoning or other designations. Designated historic sites and public parks receive special consideration under federal laws which FHWA must implement. Special zoning designations do not receive the same level of protection under federal regulation, but they represent features valued by the communities. They should receive special consideration, in order to maintain the qualities protected by zoning where possible.

The constraint levels are based, first, on regulatory protection afforded certain types of sites in federal highway projects and, second, on constraint level defined by municipalities such as through zoning. All attributes designated "high constraint" are legally protected in transportation projects. Section 6(f) of the Land and Water Conservation Funds Act protects public recreation or open space sites purchased with Land and Water Conservation funds. A 6(f) site may be only a portion of a larger identified property, e.g., the tennis courts in a recreation center. Section 4(f) of the DOT Act protects historic sites and public recreation or wildlife sites. Sites on or eligible for the National Register of Historic Places are protected by Section 4(f). All sites within the study area that are identified as 6(f) properties are public recreation sites and are, thus, protected under section 4(f) of the DOT Act, as well. Proposed transportation projects that would affect 6(f) or 4(f) sites require full assessment and minimization of impacts in order to be approved.

The other resources identified reflect historic sites that are potentially eligible for the National Register and/or 4(f) protection and local priorities for protection. Resource protection and open space/recreation zoning reflect the highest level of protection a municipality can assign without actually purchasing the property. Much of the open space zoning refers to parks or cemeteries generally representing high levels of land use constraints.

The Moderate constraint sites (zoning districts) generally occur adjacent to areas that present other categories of resources, as well, such as parks, cemeteries, and heavily developed areas. For instance, many historic sites on or eligible for the National Register occur in high constraint urban centers.

The Mandatory Shoreland Zoning Act requires municipal Shoreland Protection Zones regulating land use activities within 250 feet of great ponds, rivers, freshwater and coastal wetlands, and tidal waters; and within 75 feet of all streams that are shown as second order or greater on 7 1/2 minute U.S. Geological Survey topographic maps (scale 1:24,000). (See "Vegetative Cover" for a definition of second order streams.) MDOT activities are not regulated under the Shoreland Protection Zones, but MDOT complies with the recommended environmental protection practices within these areas to the extent practicable.

The Low level of constraint includes farmland (or rural use) zoning and proposed public access points. The former reflects a commitment, locally, to maintaining the rural character. The latter reflects valued sites that have not yet received legal protection through acquisition or zoning. These last two attributes reflect local concerns regarding the preservation of these areas.

Observations

The western third of the study area contains a few historic sites and parks centered in Gorham Village. Three large areas of farmland zoning dominate this section, including much of Scarborough, South Gorham, and a large area northwest of Gorham Village.

In the central portion of the study area, historic sites occur not only in the urban center of Westbrook, but also scattered along roads radiating from Westbrook center. Historic sites in the city center include public buildings and two mill complexes. The historic Cumberland Oxford Canal northwest of Westbrook center along the Presumpscot River has been placed on the National Register of

Historic Places. Remnants of the canal have been identified southwesterly from Westbrook center to the Fore River near Thompson's Point. This section of the canal has been disturbed and is not eligible for the Register. The City of Westbrook contains several public park and recreation areas located within and on the fringes of the urban center. These include a golf course, some small parks, and ballfields associated with schools. Westbrook has established an extensive farming zone north of the city center and small farming zones south of the city center. In the southern portion of this section, the area generally west of the Maine Turnpike and along the Nonesuch River is zoned for rural use.

The eastern section of the study area includes the cities of Portland and South Portland. Downtown Portland contains several historic sites. Parks and recreation areas and cemeteries (zoned for open space) provide public access to open land in the urban environment. Clustered at the head of the Fore River are the Stroudwater historic district, the Maine Audubon Society Estuary Sanctuary and remnants of the historic Cumberland Oxford canal. Portland is planning a linked trailway system to provide public access to the shores of its rivers, ponds, and marine environments. South Portland has several public parks and recreation areas and a cluster of historic sites near the State School for Boys. The city has zoned three areas within the study area for farming and rural use.

USE OF RESOURCE MAPS TO IDENTIFY ALTERNATIVE CORRIDORS

Once the resource information was gathered the information was evaluated for areas of involvement. Areas with the fewest resources became the initial location for considering alternatives suited to meeting the transportation needs identified in the previous chapter of this report. The combination of the various maps did not reveal one or more clear corridors that had no resources present. Most of the study area has some type of resource. It therefore became a matter of identifying alternative corridors with the fewest High rated resources.

Alternative corridors will pose different trade-offs with respect to resources and transportation effectiveness. For example, one alternative might have few impacts on residential neighborhoods, but have major impacts on wetlands. Another corridor might encounter few resources overall, but might also be less effective in meeting the transportation needs of the region. Agency and public evaluation of these alternatives, their costs, impacts, and effectiveness will lead to the identification of reasonable alternatives.

It is important to note that Task 3, Identification of Resources, involved a broad-scale analysis. Its purpose was to identify general areas suitable for roadway development. In order to analyze a large area, this task used a large amount of information from published materials. These materials generally involved a map scale too small to distinguish exact boundaries (e.g., property lines, jurisdictional wetland boundaries). The maps are therefore suitable for broad-scale planning analysis and are generally not suitable for site specific evaluation. Although the identification, evaluation and screening of preliminary alternatives is completed in this study, the most reasonable alternatives will require a more detailed evaluation.

DEVELOPMENT OF ALTERNATIVES

Seventeen alternatives were developed for evaluation based on transportation, environmental and engineering criteria. This section describes the approach taken to identify the alternatives that are evaluated in subsequent sections.

Alternatives include an Upgrade Alternative, six new road alternatives, and ten alternatives which incorporate various combinations of upgrades and bypasses. The six new road and ten combination alternatives are designated as Alternatives 1 through 16.

All the alternatives include the planned roadway projects assumed to be part of the No-Build network. These projects, which are listed in Table 1 and shown on Figure 6 presented earlier, include two proposed Turnpike interchanges south of Congress Street and Brighton Avenue. The only exception is Alternative 9 which replaces the two new No-Build Turnpike interchanges with a single interchange between Congress Street and Westbrook Street.

OBJECTIVES

The needs analysis presented earlier identified projected capacity deficiencies in several locations in the study area. These deficiencies included all roadway links that are projected to operate near capacity (with projected volume between 80 and 90 percent of capacity) and at or over capacity (with projected volume greater than 90 percent of capacity). The goal of the improvement alternatives, including the upgrade, is to eliminate deficient sections of roadway along Route 25 and Route 22 projected to operate at or over capacity in the year 2010. These are the sections that would experience unacceptable levels of congestion and delay without improvements.

Potential roadway improvements fall into two categories: upgrades and new roads. The first category, upgrades, were developed to eliminate deficiencies by providing increased capacity at deficient locations to meet projected demand. The second category would provide additional capacity on new roadways that would be developed to divert sufficient traffic from existing roadways to eliminate or reduce the deficiencies. New roadways could be provided as local bypasses around deficient locations or as entirely new roadway alignments through most of the study area.

As noted above, seventeen alternatives for providing additional roadway capacity are identified and evaluated along with the No-Build Alternative. The alternatives were developed in consultation with the Project Advisory Committee established by the Maine Department of Transportation and contain elements suggested by committee members. To address committee concerns that traffic benefits be balanced against environmental, engineering and economic costs, a wide variety of options, ranging from exclusively upgrading existing roadways to providing entirely new roadway alignments, was considered. The majority of the alternatives represent various combinations of new road segments and upgrades.

DESCRIPTION OF ALTERNATIVES

Upgrades generally consist of adding one travel lane in each direction except in Gorham Village where two additional lanes in each direction are required to eliminate the deficiency. New road segments are limited-access four-lane divided roadways.

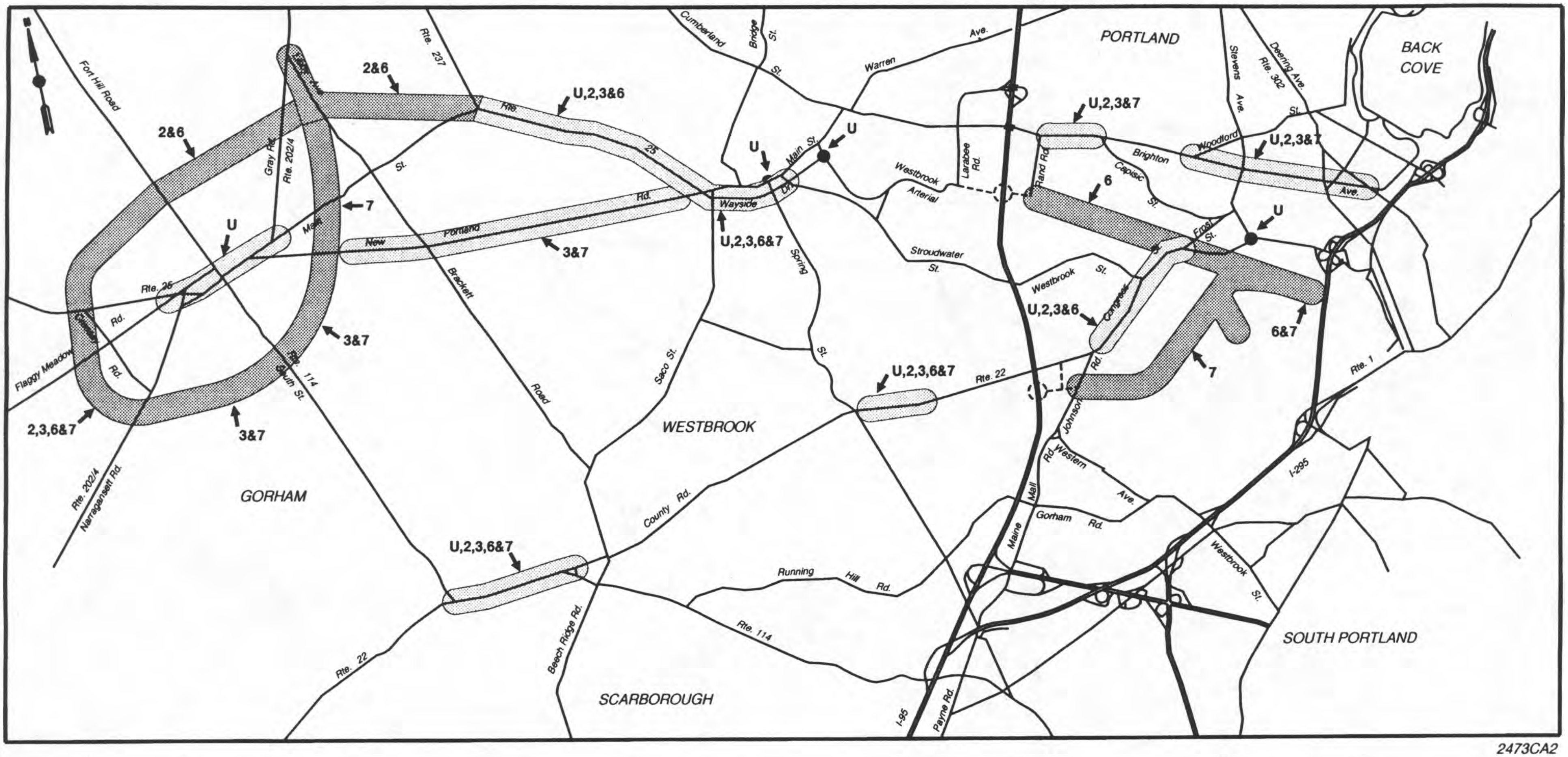
The Upgrade Alternative and four combination alternatives (2, 3, 6, and 7) are shown on Figure 11. The Upgrade Alternative consists of roadway widenings on deficient sections of existing roadways in Gorham Village, South Gorham, Westbrook, and Portland. The four combination alternatives consist principally of upgrades in combination with bypasses of Gorham and bypass connections between I-295 and the new turnpike interchanges. Alternatives 1, 5, and 8, which consist primarily of combinations of bypasses, are shown on Figure 12. Figure 13 shows Alternative 9 and Figure 14 shows Alternatives 10 and 11. The two new road alternatives developed during this study (4 and 12) are shown on Figure 15 and the four new road alternatives adapted from the Westerly Connector Study (13, 14, 15, and 16) are shown on Figure 16. A detailed description of each alternative is presented in the Detailed Analysis of Alternatives section.

UPGRADES

One obvious approach to eliminating deficiencies is simply to increase the capacity of existing roadways to meet demand. At a minimum, this approach would typically involve intersection improvements such as new signals or additional approach lanes to eliminate intersection congestion. Where projected volumes exceed general roadway capacity, upgrades could also involve widening roadways to provide additional travel lanes.

Improving existing facilities is often the least expensive method of providing additional capacity, especially if the existing right-of-way is sufficient to accommodate the needed roadway expansion and the amount of expansion needed is minimal. This approach, however, can have serious impacts on adjacent properties, particularly in built-up locations where the existing roadway right-of-way is the minimum necessary to accommodate the existing facility. In such cases, an upgrade may result in property takings, reduction of setbacks from the roadway for existing buildings, or displacement/relocation of existing homes and businesses.

Upgrades of existing roadways were developed for each area projected to be deficient under No-Build conditions (see page 25). Improvements were generally designed to increase capacity to reduce volume-to-capacity (v/c) ratios in deficient areas to less than 0.90. However, in order to strike a balance between



Notes: Schematic Only

Alternatives do not provide access to Flaggy Meadow Rd. or Libby Ave.

Bypass/New Road

Upgrade Roadway

● Upgrade Intersection

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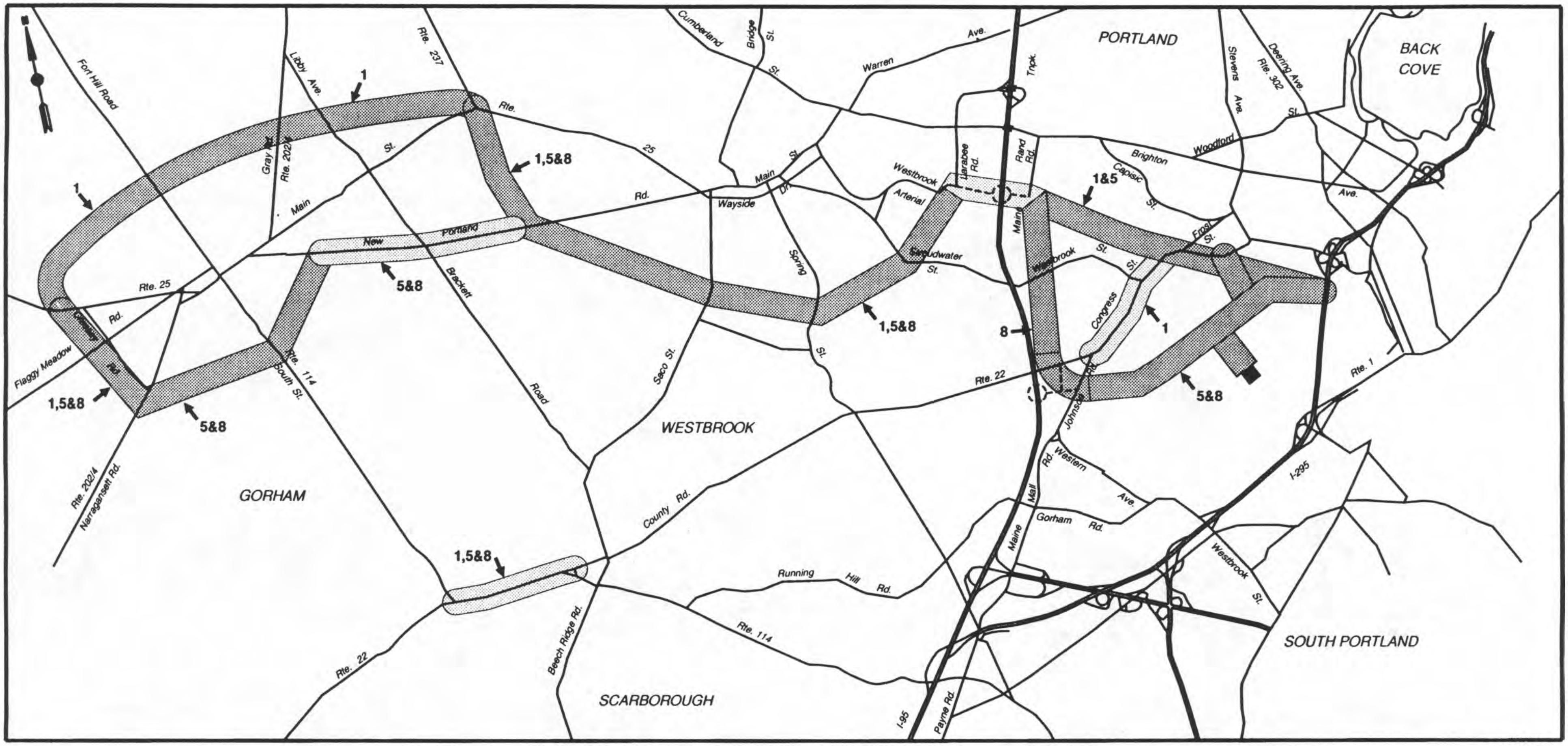
Figure 11

Upgrade and Alternatives 2,3,6&7



Notes: Schematic Only
Not to Scale

Alternatives do not provide access to Flaggy Meadow Rd. or Westbrook St.

Bypass/New Road

Upgrade

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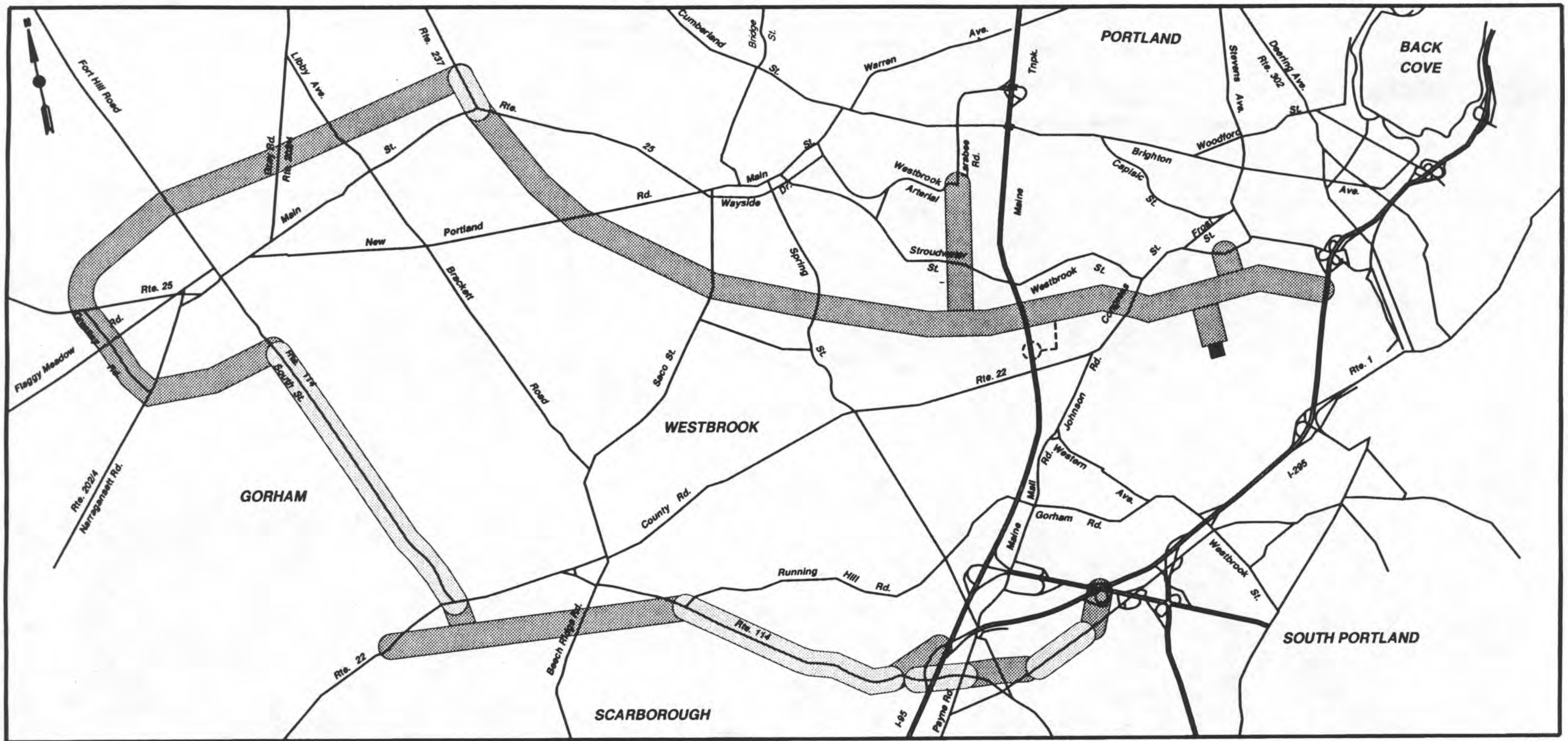
Figure 12

2010 Daily Traffic Volumes
Alternatives 1,5,&8



2473-F13

Notes: Schematic Only
Not to Scale

Alternative 9 does not provide access to Flaggy Meadow Rd. or Stroudwater St.

Bypass/New Road

Upgrade

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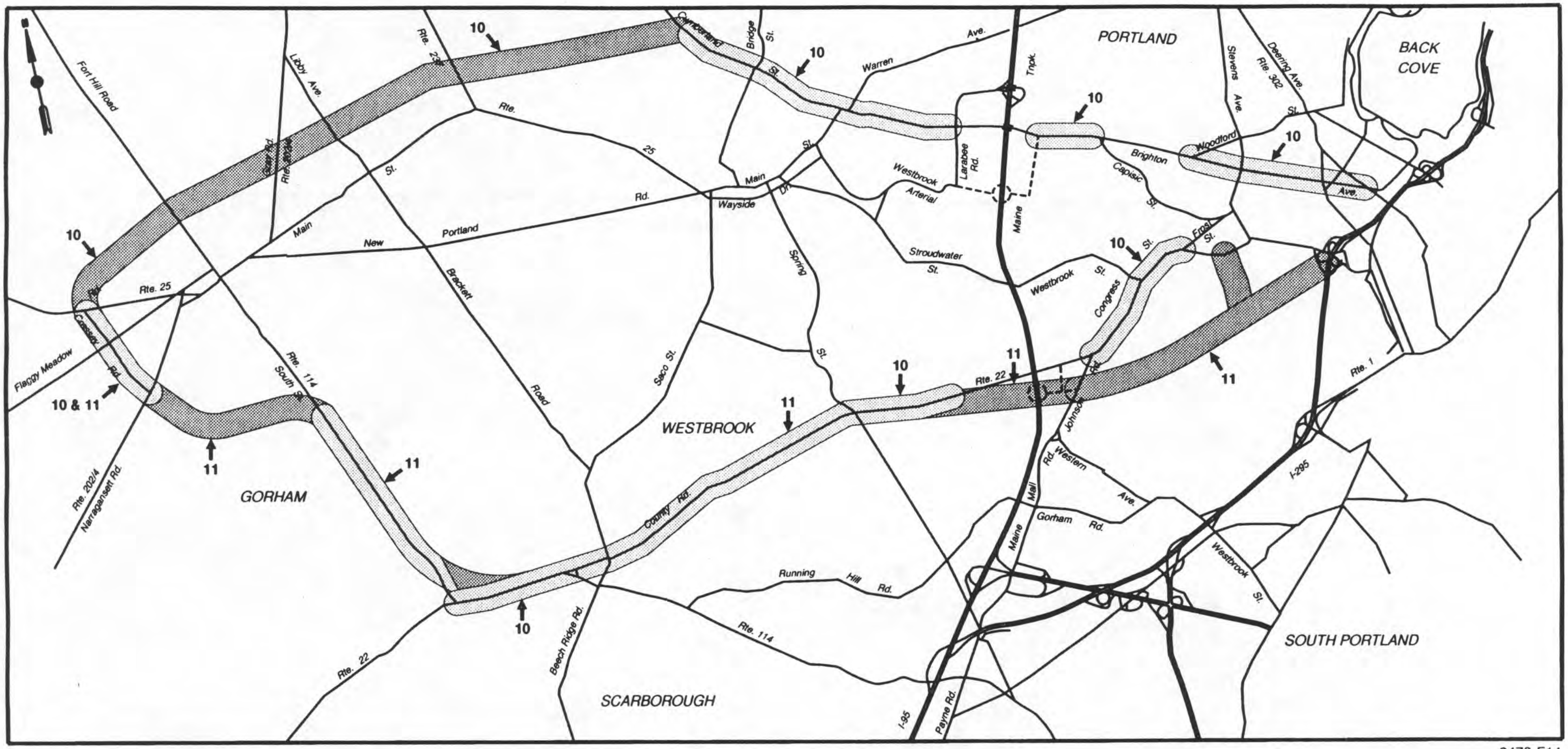
Figure 13

Alternative 9



2473-F14

Notes: Schematic Only
Not to Scale

Alternatives do not provide access to Flaggy Meadow Rd. or Libby Ave.

New Road

Upgrade

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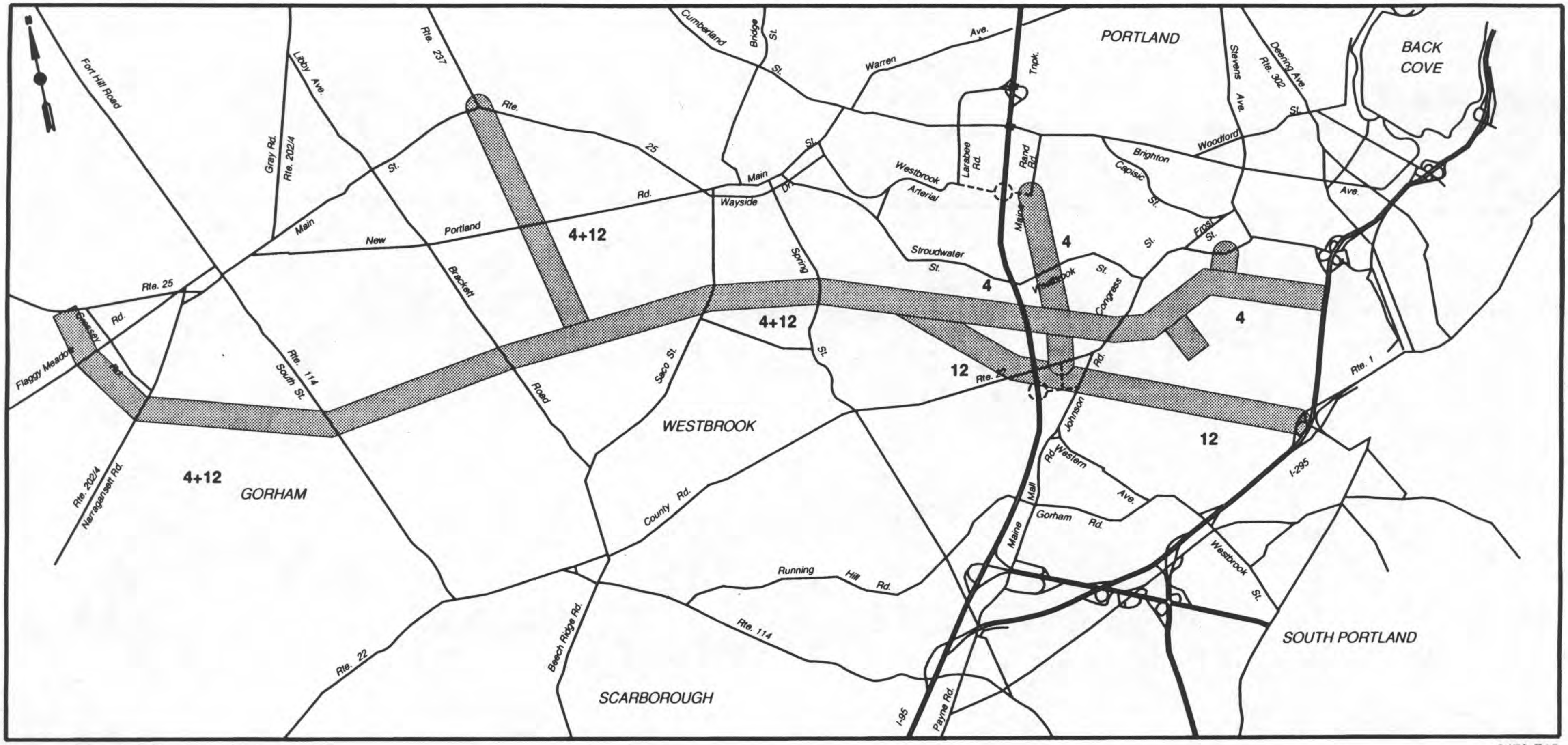
Figure 14

Alternatives 10 & 11



2473-F15

Notes: Schematic Only
Not to Scale

Alternatives do not provide access to Flaggy Meadow Rd., New Portland Rd., or Westbrook St.

Bypass/New Road

Upgrade

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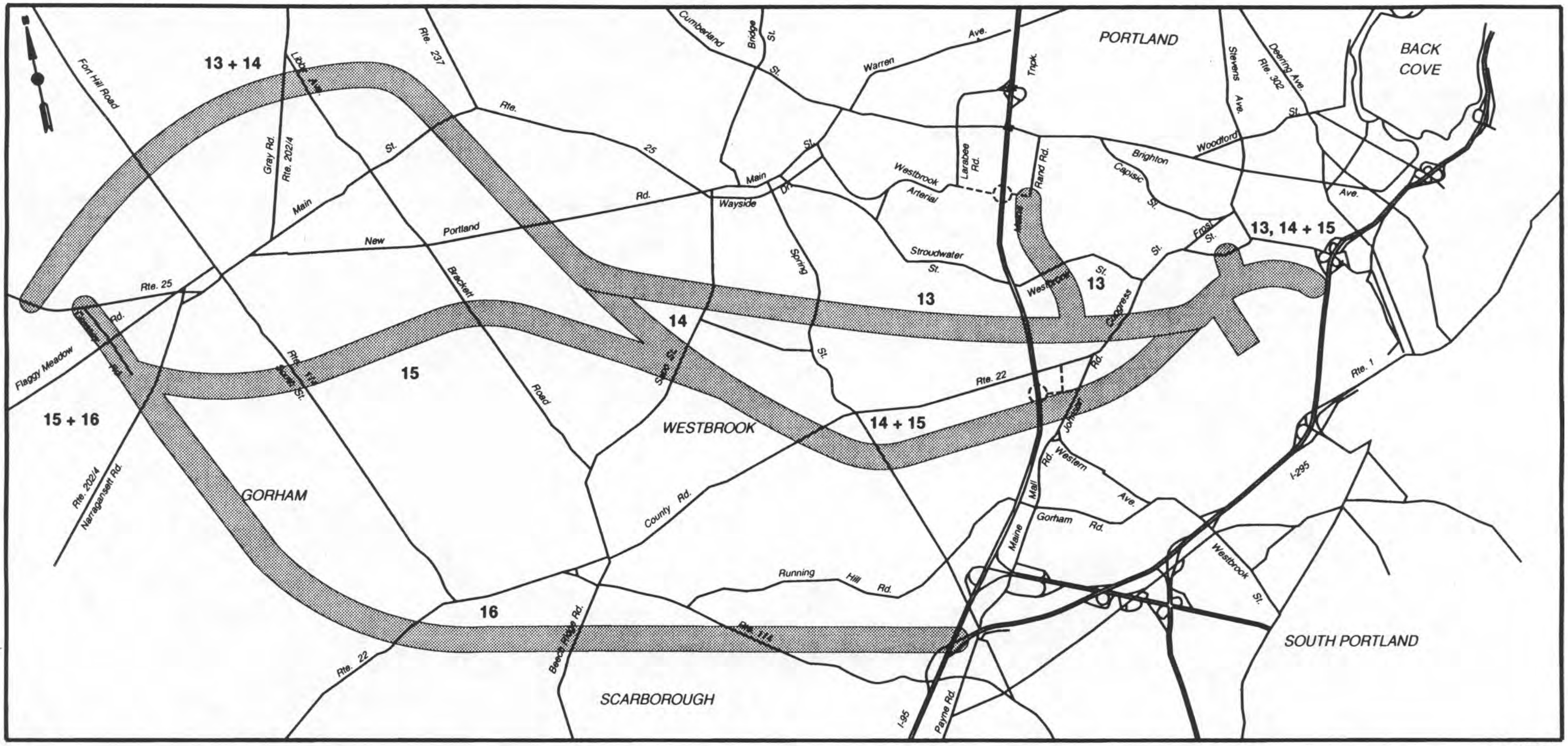
Figure 15

Alternatives 4 & 12



2473-F16

Notes: Schematic Only
Not to Scale

Alternatives do not provide access to Libby Ave. or Westbrook St.

Bypass/New Road

Upgrade

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Figure 16

Alternatives 13, 14, 15 & 16

the competing needs to increase capacity and minimize impacts on adjacent properties, less extensive improvements were identified in some instances. This was done when a significant reduction in impacts could be achieved while maintaining the v/c ratio in the 0.90 to 0.95 range based on No-Build volumes.

Eleven of the eighteen alternatives include upgrades of deficient segments. Ten of these consist of a combination of upgrades in some areas and new road segments in other areas. One alternative, designated as the Upgrade Alternative, consists solely of upgrades. This alternative was defined to provide an improvement option that did not include any new roadway segments.

Upgrades were designed to eliminate the following twelve projected roadway and intersection deficiencies along Route 25 and Route 22:

- Route 25 in Gorham Village between Route 202/4 west of the village and Route 114 (South Street).

- Route 25 between Route 114 (South Street) in Gorham Village and Route 202/4 east of the village.

- Route 22 in South Gorham between South Street (Route 114) and Gorham Road (Route 114) in Scarborough.

- Route 25 between Route 237 in Gorham and Main Street in Westbrook.

- Route 25, Wayside Drive in Westbrook between Main Street and Stroudwater Street,

- The intersection of Wayside Drive and the Westbrook Arterial in Westbrook.

- Route 22, County Road in Westbrook between Spring Street and the Portland city line.

- Route 25, Brighton Avenue in Portland between Rand Road and Capisic Street.

- Route 25, Brighton Avenue in Portland between Stevens Avenue and Deering Avenue.

- Route 22,Congress Street in Portland between Johnson Road and Westbrook Street.

- Route 22, Congress Street in Portland between Westbrook Street and Frost Street.

- Route 22, Congress Street in Portland between Stevens Avenue and Interstate 295.

The upgrades generally consisted of adding one travel lane in each direction (to the existing or planned roadway cross-section), except in Gorham Village where two additional travel lanes were needed in each direction. In Gorham Village and Westbrook, alternative approaches were also developed which involved developing a one-way pair to serve projected demand. The one-way pair option in each of these areas had potentially less damaging but was also less effective than maintaining the existing circulation pattern and adding capacity. As a result, only the upgrades of the existing systems were used for the Route 25 alternatives analysis.

BYPASSES

As an alternative to providing upgrades through built-up areas, new roadways which bypass deficient areas were also analyzed. These bypass corridors included:

- Gorham Village:
  - -- A full bypass around the entire Village
  - -- A partial bypass to the south
  - -- A partial bypass to the north
- A southern bypass of Westbrook
- Portland:
  - -- A bypass south of, and parallel to, Brighton Avenue between a proposed Turnpike interchange at Rand Road and I-295
  - -- A bypass south of, and parallel to, Congress Street between a proposed Turnpike interchange at Johnson Road and I-295
  - -- A bypass south of the airport between a proposed Turnpike interchange at Johnson Road and I-295

The tansportation effectiveness of the bypass corridors was tested individually. Based on the test results, combinations of the bypass corridors and upgrades were used to define various alternatives. All of the bypass corridors, except the full bypass of Gorham Village, were incorporated into at least one of the ten combination alternatives. Although the full bypass of Gorham Village removed the greatest volume of traffic from Route 25 through the Village, a bypass either to the north or to the south would reduce Route 25 traffic sufficiently to eliminate the projected deficiency in the Village. Because the partial bypasses remove the deficiency, require less new roadway, and have fewer impacts, the full bypass was not included in any of the alternatives.

Testing of various northerly bypass corridors (including an outlying route) around Gorham Village indicated that because of the added travel time associated with the more northerly bypass only a close-in corridor south of Fort Hill between Route 202/4 west of the Village and Mosher Corner (intersection of Routes 25 and 237) was effective in eliminating the deficiency in the Village center. Two southern bypass corridors were also found to be effective. Both have their western terminus at Route 25. The eastern terminus of one of the southern bypass corridors is at Route 25 and the other connects to Route 202/4 (Gray Road).

For travel demand modeling purposes, it was not necessary to develop an engineered corridor alignment to test the transportation effects of a bypass. General corridor locations were identified by utilizing the study area resource mapping to minimize environmental impacts, but located sufficiently close to bypassed areas to provide an effective alternative travel route. Bypasses were coded into the travel demand model as controlled-access highways with two travel lanes in each direction. Connections to the bypasses were provided only at major cross streets via grade-separated interchanges. Overall operating speeds were set at 50 miles per hour.

NEW ROADS

The six new road alternatives consist of entirely new alignments through the study area. Four alignments from the Westerly Connector Study[8] were refined and included in this analysis. They include Alternatives 6, 7, 9, and 10 which correspond, respectively, to Alternatives 13, 14, 15, and 16 of this study. Two additional new road alternatives (4 and 12) were developed and evaluated during the course of this study. As with the bypasses, new roads were coded as four-lane controlled-access roadways in the travel demand model with grade-separated connections at major crossroads and operating speeds of 50 miles per hour (mph).

8 Westerly Connector Study, Howard Needles Tammen & Bergendoff, April 1988

DETAILED ANALYSIS OF ALTERNATIVES

This section describes the process used to evaluate alternatives, presents a comparison of the seventeen Build alternatives plus the No-Build alternative. Detailed results are presented for each alternative. The alternatives analyzed include upgrades of existing roadways, bypasses, and entirely new road alignments.

This section also includes a discussion of the measures of effectiveness used to evaluate the alternatives, a detailed description of each alternative, and a presentation of the results of the transportation, environmental, social, and engineering evaluation of each alternative. The transportation results are based on the PACTS travel demand model volume outputs for each alternative and the No-build condition. Environmental and social impacts are based on resource map analysis and limited field reconnaissance. Engineering results are based on MDOT's criteria for the design of new roads or reconstruction of existing roads.

The presentation of each alternative's transportation and traffic-related impacts includes a description of the alternative, a summary of the projected volumes associated with the alternative, and an evaluation of the effect of the alternative on No-build deficiencies and volume-to-capacity (v/c) ratios. For each alternative, two figures are presented which compare No-Build and Build volumes and show changes in projected deficiencies compared to the No-Build condition. No-Build volumes and deficiencies were presented earlier in Figures 7 and 8, respectively.

A table is also presented for each alternative which shows a comparison of four measures of effectiveness: vehicle miles of travel (VMT), vehicle hours of travel (VHT), vehicle hours of delay (VHD), and average v/c ratio.

The presentation of environmental impacts for each alternative includes a figure showing the alternative's alignment on a study area map which highlights certain important resource features. A table quantifying potential impacts is also presented for each alternative, along with a brief narrative describing major impacts.

Transportation Measures

Based on year 2010 model outputs, the following measures of effectiveness (evaluation criteria) were used for the transportation evaluation and comparison to the No-Build Alternative for the seventeen Build alternatives:

- Traffic Volumes
- Changes in Deficiencies on Route 25 and Route 22
- Changes in Deficiencies on Other Roadways
- Vehicle Miles of Travel (VMT)
- Vehicle Hours of Travel (VHT)
- Vehicle Hours of Delay (VHD)
- Average Change in v/c Ratio on Key Roadway Links

The first three measures are presented graphically on the project area base map for each alternative. Unlike the remaining four measures they cannot be reduced to a single value in any meaningful way. Therefore, a volume graphic and a deficiencies graphic are presented for each alternative. The last four measures will be represented by a single value that can be compared with other alternatives and the No-Build condition. The values for these measures for each alternative are summarized in an evaluation matrix presented in the Comparison of Alternatives section of this report.

Environmental, Social and Engineering Measures

Simple measures of environmental, social and engineering impact (ESE) have been applied in this preliminary level of corridor identification and analysis. Alternative alignments were superimposed on the various environmental resource maps previously described. The linear distance of crossing was then measured for major environmental features.

Categories of Impacts

The comparison of alternatives includes consideration of an alternative's impact on the local community and the natural environment. The impacts evaluated in this report have been grouped into the following categories: Environmental, Social, and Engineering. The categories may overlap, as noted below. The effects of such impacts on a highway location and design project include requirements or restrictions imposed by regulatory agencies and cost factors related to engineering, impact minimization, and mitigation.

Environmental. These impacts include effects to resources such as:

- Wetlands;
- Floodplains;
- Groundwater aquifers;
- Water bodies;
- Other habitats designated as important by regulatory agencies; and
- Soils especially suited for agriculture;
- Areas containing hazardous materials.

Activities affecting these resources are often regulated by federal and state agencies, as described in more detail below. The agencies often require measures to minimize adverse impacts include avoidance through selection of alternatives and minimization/mitigation through use of engineering practices.

Social. These include disruption to communities, condemnation of properties, and potentially adverse impacts to "sensitive" land uses such as parks, historic sites, schools, and churches. In federally funded highway projects, activities affecting parks and historic sites are regulated under Section 4(f) of the DOT Act and Section 6(f) of the Land and Water Conservation Funds act. These regulations require avoidance, minimization of adverse impact through planning and design, and mitigation for adverse impacts.

Regulations and requirements related to other social impacts are less restrictive in their requirements. The NEPA review process requires consideration of such impacts and consideration of mitigation for adverse impacts to air quality and noise levels. Condemnation of property requires compensation and relocation, affecting the cost of a project.

Engineering. Engineering related considerations discussed in this report include soil/subsoil stability, slope, and erodibility. Such characteristics are not regulated per se but may influence the design of the roadway and thus the cost. In addition, measures to minimize environmental and social impacts may involve engineering solutions. For example, mitigation for wetland impacts may include use of a bridge or minimization of a fill slope; minimization of noise impacts may include the use of noise barriers.

Measures of Impact

Measures of impact considered critical to a project's feasibility have been applied in this preliminary level of corridor identification and analysis. All seventeen alternative alignments, including the Upgrade alternative, were superimposed on the various environmental resource maps previously described. The linear distance of crossing was then measured for major environmental features.

The use of linear distance of crossing as a measure of impact was considered appropriate for this stage of analysis for several reasons:

- it matches the level of engineering analysis, which is still very preliminary and conceptual,

- roadways are basically linear, to estimate area impacts one can multiply linear distance by an assumed road or right-of- way width (note that interchange impacts were not calculated in this analysis); future studies will identify whether an interchange or at-grade intersection (with traffic controls) will be needed and where,

- it provides a uniform and unbiased measure of relative impact with a reasonable level of effort

A number of field reviews were conducted during the process of corridor identification and refinement. Most, but not all, of the upgrade and new road alternative alignments were field reviewed at some point during this study.

This field experience also contributed to the comparative evaluation of alternatives, and is reflected in the following narratives. However, it should be noted that more detailed surveys will be necessary in all categories to determine specific degrees of impact of roadway alteration as design progresses.

UPGRADE ALTERNATIVE

Examination of 2010 No-Build deficiencies indicates that additional capacity is required to maintain an acceptable level of traffic flow on various road segments in 2010. Upgrades provide the additional capacity at the locations where the deficiencies occur. The objective of the upgrade alternative is to identify the minimum intersection and road-segment improvements necessary to provide an acceptable level of service at critical intersections and on deficient road segments. Capacity on upgraded sections was increased by adding one travel lane in each direction except in Gorham Village where two additional lanes in each direction were added.

The upgrade alternative represents a combination of individual upgrades for the various deficient sections on Routes 25 and 22 as shown in Figure 17 and listed below:

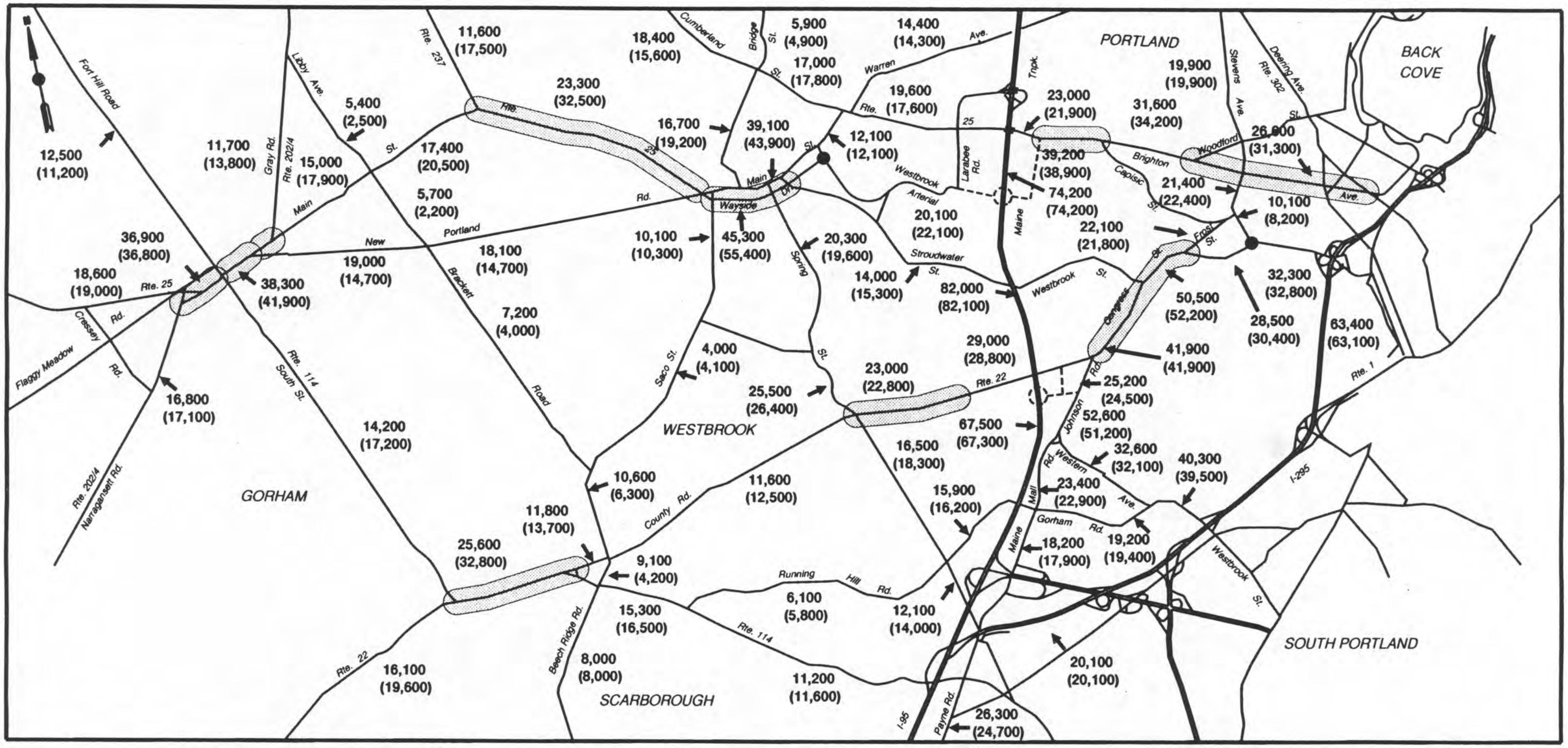
- Gorham Village:
  - -- Widen Route 25 to four lanes between Route 202/4 (Narragansett Road) and Route 114 (South Street/School Street)
  - -- Widen Route 25 to six lanes between Route 114 and New Portland Road
  - -- Widen Route 25 to four lanes between New Portland Road and Route 202/4 (Gray Road)
- South Gorham:
  - -- Widen Route 22 to four lanes between South Street (Route 114) and Gorham Road (Route 114)
- Westbrook:
  - -- Widen Route 25 to four lanes between Route 237 (Mosher Corner, Gorham) and Main Street/Wayside Drive
  - -- Widen Wayside Drive to six lanes between Main Street and Stroudwater Street
  - -- Provide intersection improvements at Wayside Drive/Stroudwater Street, Wayside Drive/Westbrook Arterial, and Main Street/Spring Street
  - -- Widen County Road between Spring Street and the Portland city line to four lanes (this is a continuation of a planned No-Build project, which is listed in Table 1 and shown on Figure 6 presented earlier, to widen Congress Street to four lanes between Johnson Road and the Westbrook city line)
- Portland:
  - -- Widen Brighton Avenue to six lanes between the proposed Turnpike interchange access road and Capisic Street

-- Widen Brighton Avenue between Woodford Street and Deering Avenue to four lanes. Provide additional through and turn lanes at the intersection with Stevens Avenue

-- Widen Congress Street to six lanes between Johnson Road and Frost Street, and improve the intersection at Stevens Avenue and Congress Street

The travel demand model was run with the roadway network modified to incorporate the capacity increases associated with the proposed upgrade improvements listed above. The resulting upgrade traffic volumes were compared with the No-Build volumes to determine changes in travel patterns and shifts in traffic volumes which would be expected with improvements to the existing roadways. Projected upgrade volumes were also compared to capacities for the upgrade alternative to identify any projected deficiencies, including deficiencies which might be added to the system because of shifts in traffic volumes.

No-Build and Upgrade traffic volumes are shown in Figure 17 and a comparison of No-Build volumes with Upgrade volumes on Routes 25 and 22 is presented in Table 9. As shown in the table, the widened segment of Route 25 east of Route 237 is projected to experience the largest percentage increase (39.5 percent). In Portland, the widened segment of Brighton Avenue between Woodford Street and Stevens Avenue is projected to increase by 10.3 percent (2,100 vpd). Volume on Route 25 east of Warren Avenue is projected to decrease by 10.2 percent as a result of volume shifting to other roads. On Route 22 in Gorham (between Route 114 and Gorham Road), daily volume is projected to increase by 7,200 to 32,800 vehicles per day as a result of additional capacity.



Notes: Schematic Only
Not to Scale

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

Upgrade Roadway

Upgrade Intersection

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Figure 17

2010 Daily Traffic Volumes
Upgrade Alternative

Table 9

YEAR 2010 NO-BUILD AND UPGRADE VOLUME COMPARISON

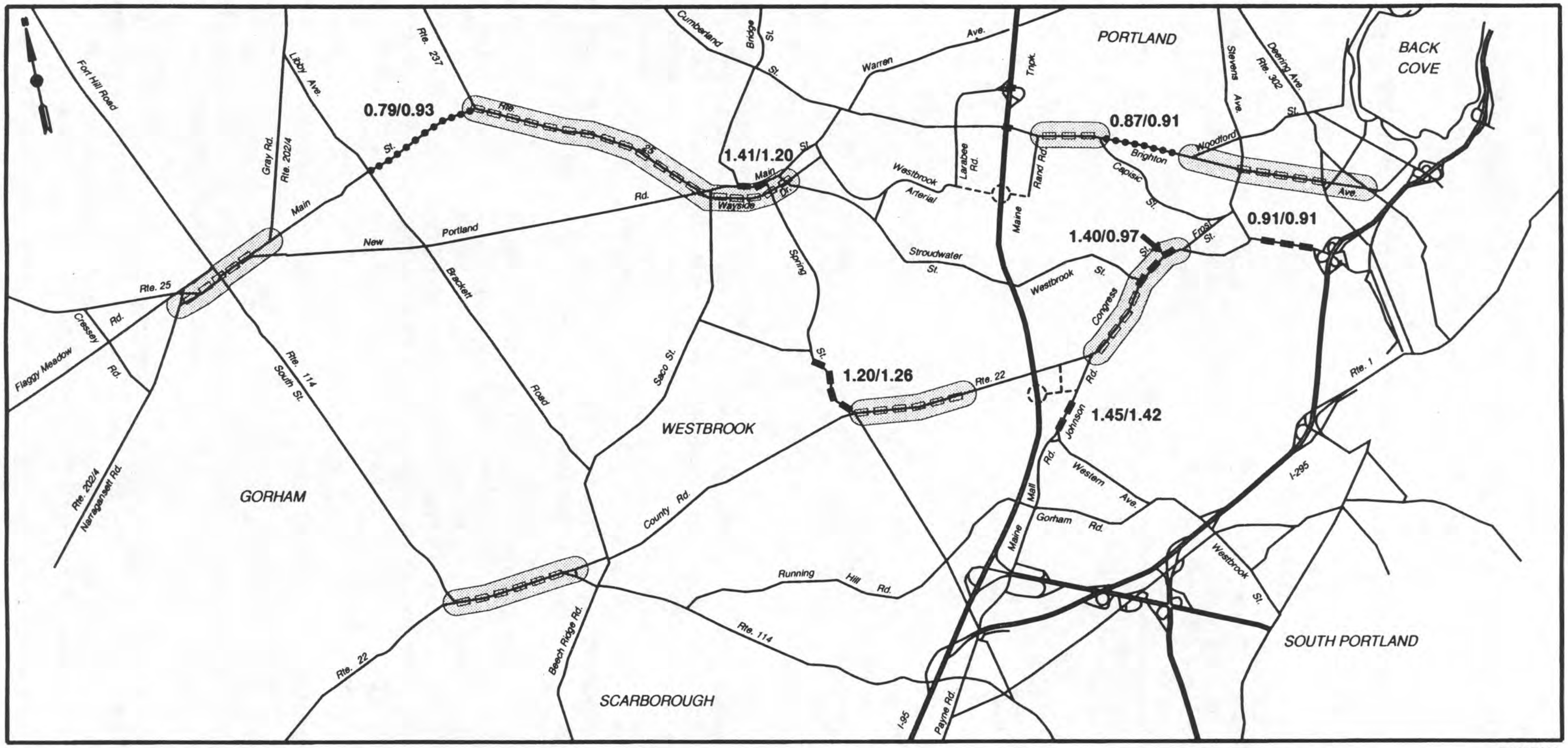
Location	No-Build	Upgrade	Difference	Percent Change
Route 25:				
-- West of Gorham Village	18,600	19,900	1,300	7.0
-- West of Route 114	36,900	36,800	-100	-0.3
-- East of Route 114	38,300	41,900	3,600	9.4
-- East of Route 202/4	15,000	17,900	2,900	19.3
-- East of Route 237	23,300	32,500	9,200	39.5
-- Between Saco Street and Spring Street	45,300	55,400	10,100	22.3
-- East of Warren Avenue	19,600	17,600	-2,000	-10.2
-- East of Maine Turnpike	23,000	21,900	-1,100	-4.8
-- Between Capisic Street and Woodford Street	31,600	34,200	2,600	8.2
-- Between Woodford Street and Stevens Avenue	20,300	22,400	2,100	10.3
-- East of Stevens Avenue	26,600	31,300	4,700	17.7
Route 22:				
-- South Gorham	25,600	32,800	7,200	28.1
-- East of Spring Street	23,000	22,800	-200	-0.9
-- Between Johnson Road and Westbrook Street	41,900	41,900	0	0.0
-- East of Westbrook Street	50,500	52,200	1,700	3.4

Changes in projected deficiencies with the Upgrade Alternative are shown in Figure 18. All projected No-Build deficiencies on Routes 25 and 22, except for two sections of Congress Street, are expected to be eliminated. The exceptions include the six-lane section of Congress Street between Westbrook Street and Frost Street where a projected daily volume of 52,200 would result in a v/c ratio of 0.97 (down from 1.40 in the No-Build condition). Also, Congress Street west of I-295 would remain deficient with no change in the projected v/c ratio of 0.91.

With the Upgrade Alternative, two sections of Route 25 would become deficient due to increased traffic volume. Brighton Avenue between Capisic Street and Woodford Street would experience a small increase in the v/c ratio from 0.87 to 0.91. Route 25 west of Route 237 in Gorham would experience a volume increase of 3,200 vehicles daily, resulting in an increase in the v/c ratio from 0.79 to 0.91. The resulting v/c ratios on these links just meet the threshold to be considered deficient.

Three projected No-Build deficiencies on other roadways would remain with the Upgrade Alternative. These include Main Street between Bridge Street and Spring Street in Westbrook, Spring Street north of County Road, and Johnson Road south of the airport access road. Figure 18 shows the No-Build and Build v/c ratios for all links that are deficient with the Upgrade Alternative.

Table 10 compares four transportation measures of effectiveness for the Upgrade Alternative with the No-Build case. VHT declines by 12,800 hours (4.1 percent) and VHD declines by 12,300 hours (11.2 percent). The average v/c ratio for the selected Route 25 and Route 22 links declines 17.6 percent from 0.85 to 0.70.



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Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

- ▭▭▭ Deficiency Eliminated
- ▬ ▬ ▬ Deficiency Remains
- ●●●●● Deficiency Added
- XX.X/YY.Y No Build V/C Ratio / Upgrade V/C Ratio
- ▭ Upgrade

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Figure 18

2010 Capacity Deficiency Comparison
Upgrade Alternative

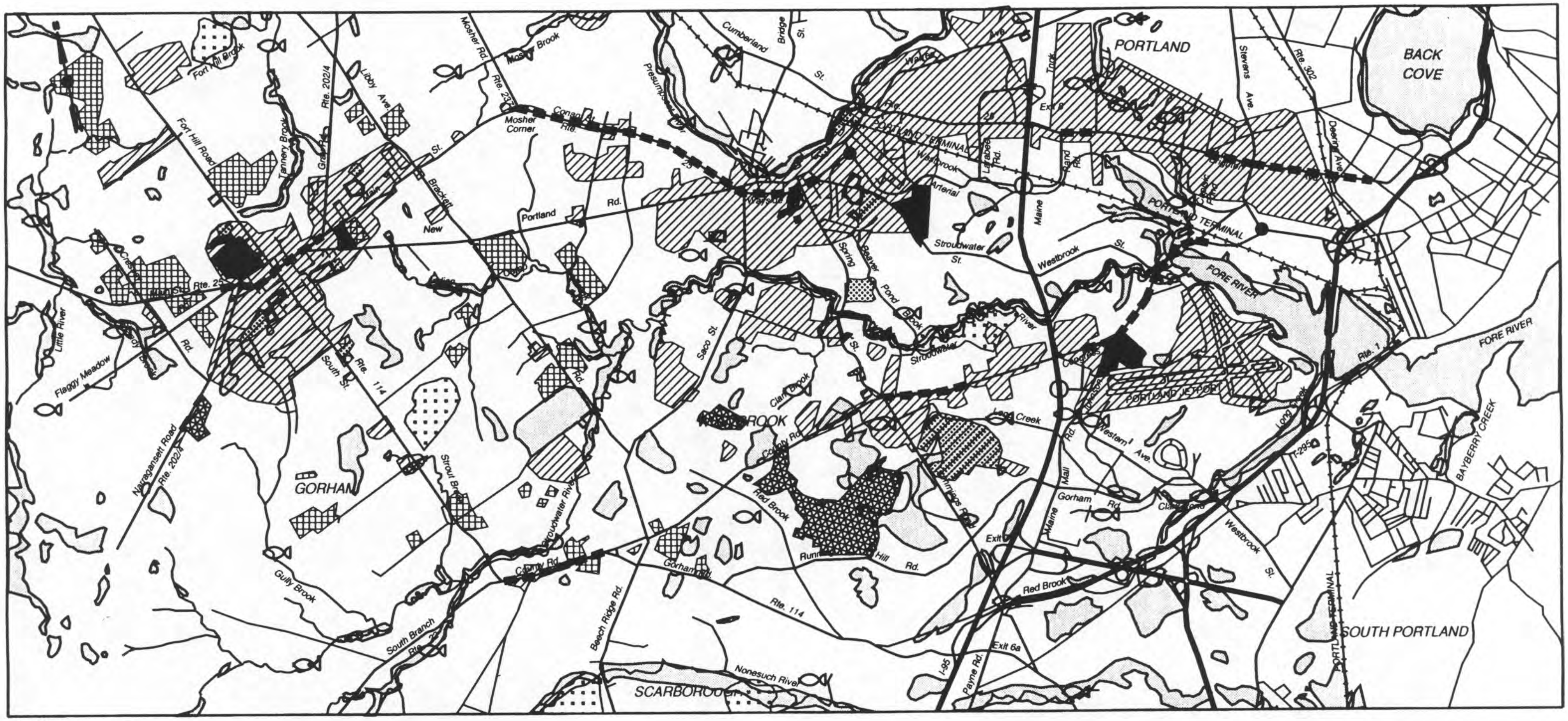
Table 10 **MEASURES OF EFFECTIVENESS FOR UPGRADE ALTERNATIVE**

Measure*	No-Build	Upgrade Alternative	Change	
			Number	Percent
VMT	7,443,400	7,434,300	-9,100	-0.1
VHT	315,000	302,200	-12,800	-4.1
VHD	109,600	97,300	-12,300	-11.2
V/C	0.85	0.70	-0.15	-17.6

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

Environmental, Social and Engineering Impacts

Figure 19 shows the alignment of the Upgrade Alternative on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 11 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of the Upgrade Alternative is 14.7 million dollars. The following text describes these impacts, highlighting any major problem areas.



Dense combinations of residential, commercial or institutional areas)

Cemetery/Institution

Identified Wetland and Surface Water

Park and Recreation Area Public Facilities

Active Farmland

Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)

Waste Site (includes Junk Yards)

Wildlife Resource

Fishery

New Road

Upgrade Intersection

Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure 19

Environmental Constraints Upgrade Alternative

BASE-17

Table 11

UPGRADE ALTERNATIVE--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF CONTACT)

	Upgrade Segments
Land Use:	
High-Mod Res/Mixed	33,300
Commercial/Industrial	15,000
Low Density Residential	12,350
Farmland	3,200
Sensitive Land Use:	
Parks	400
Historic	4,400
Institutional	1,400
Resource Protection	0
Floodplains	700
Stream Crossings	5
Identified Wetlands	4,000
Fish/Wildlife Areas	0
Sand/Gravel Aquifers	0
Hydric Soils:	
Hydric	16,550
Potentially Hydric	16,400
Surficial Geo. High-Mod	52,050
Steep Slopes:	
High	3,000
Moderate	3,450
Farmland Soils:	
Prime	10,850
Statewide Importance	8,100

Surficial Geology: Unstable Deposits

Unstable deposits pose little constraint to the development of the upgrade alternative. They occur throughout the study area, particularly north of Gorham, and in most of Westbrook and Portland. Upgrade along Congress Street poses the most concern due to the combination of steep slopes and unstable deposits. Geotechnical evaluation at the time of upgrade design will identify any such specific problems so that engineering solutions may be applied.

Steep Slopes/Erodible Soils

The principal area of concern with this alternative is along Congress Street near the Stroudwater and Fore Rivers. Proper application of erosion and sedimentation controls during and after construction would minimize impacts to an acceptable level.

Farmland Soils

This alternative poses minimal direct impact to the loss of Prime Farmland Soils or Additional Farmland Soils of Statewide Importance because impacted soils are along existing roadsides.

Sand and Gravel Aquifers

Only the South Gorham upgrade segment lies within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area.

Surface Water Resources

The primary surface waters in the vicinity of the upgrade segments are the Fore River, Stroudwater River and its tributaries, and the Presumpscot River (Westbrook segment). The upgrade alternative has relatively few stream crossings (5) compared to other alternatives. The Congress Street upgrade is the only major river crossing (Stroudwater River and Fore River). Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long-term effects to surface waters.

Floodplains

This alternative poses the lowest floodplain crossing distance (700 feet) of all alternatives studied. The Congress Street crossing of the Stroudwater River and Fore River constitutes the only major floodplain crossing associated with this alternative. Any upgrade in this area will have to be designed so it withstands flooding and does not increase 100-year flood elevations more than a minor amount.

Wetlands

Direct wetland losses due to upgrading would be minor. The total length of roadside wetlands along upgrade segments is approximately 4,000 feet. This is low when compared with other alternatives. Erosion and sedimentation controls and the use of stormwater best management practices would provide an adequate level of protection in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetative cover along upgrade segments is almost entirely urban or suburban in character. As such, impacts to natural vegetation would be minimal. MDOT would coordinate with property owners concerning loss of major landscaping vegetation.

Fish and Wildlife Resources

The upgrade of Congress Street in the vicinity of the Fore River estuary poses the only major concern for fish or wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

The upgrade alternative poses the potential for substantial impacts to existing land uses adjacent to upgrade segments. The downtown Gorham, Westbrook and Brighton Avenue segments pose the greatest impact due to the proximity of structures to the existing road. An evaluation conducted by MDOT revealed the Upgrade Alternative would require the displacement of 20 residences and 19 businesses. A relocation study would be conducted at the appropriate time. Affected property owners would be compensated for any relocation or loss of property/access. In addition, minor property takings along the upgrade segments would lead to loss of front yards and shade trees, and would bring traffic closer to adjacent structures.

Cultural Resources

The principal area of cultural resource impact with the Upgrade Alternative is the Congress Street upgrade through the Stroudwater Historic District. Although few structures would be directly impacted, their historical significance under Section 106 or 4(f) may require that efforts be taken to avoid and minimize impacts. Avoidance options are limited, due to the proximity of the historic structures to the existing roadway. Historic resources in the Stroudwater Historic District may be so great that upgrade of this segment may be difficult to implement as currently envisioned in the upgrade alternative due to the requirements for approval under Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

Historic resources in downtown Gorham and Westbrook also pose constraints to the development of upgrade solutions. Gorham poses major potential problems for an upgrade due to the proximity of structures to the existing road.

Along with basic land use concerns, the Upgrade Alternative poses substantial impacts to historic resources. Development of this alternative would require close coordination between designers and MHPC.

ALTERNATIVE 1

This alternative provides new road segments to bypass three of the deficient sections of Route 25 and upgrades along two deficient sections of Route 22. It includes the following improvements (see Figure 20):

- A northern bypass of Gorham Village between Route 202/4 west of the village and the intersection of Routes 25 and 237 east of the village (Mosher Corner). Access to the Gorham bypass is provided at Route 202/4 (both locations), Route 25, Route 114, and Mosher Corner.

- A southern bypass of Westbrook between Mosher Corner and the intersection of the Westbrook Arterial and Larrabee Road. Access to the bypass is provided at Mosher Corner, New Portland Road, Saco Street, Spring Street, Stroudwater Street, and the Westbrook Arterial.

- A bypass parallel to Brighton Avenue between the proposed Turnpike interchange at Rand Road and I-295. Access is provided at the Turnpike interchange, Congress Street west of Stevens Avenue, and I-295.

- An upgrade of Route 22 in South Gorham to four lanes between South Street (Route 114 in Gorham) and Gorham Road (Route 114 in Scarborough).

- An upgrade of County Road to four lanes between Spring Street and the Portland city line.

- An upgrade of Congress Street to six lanes between Johnson Road and Frost Street.

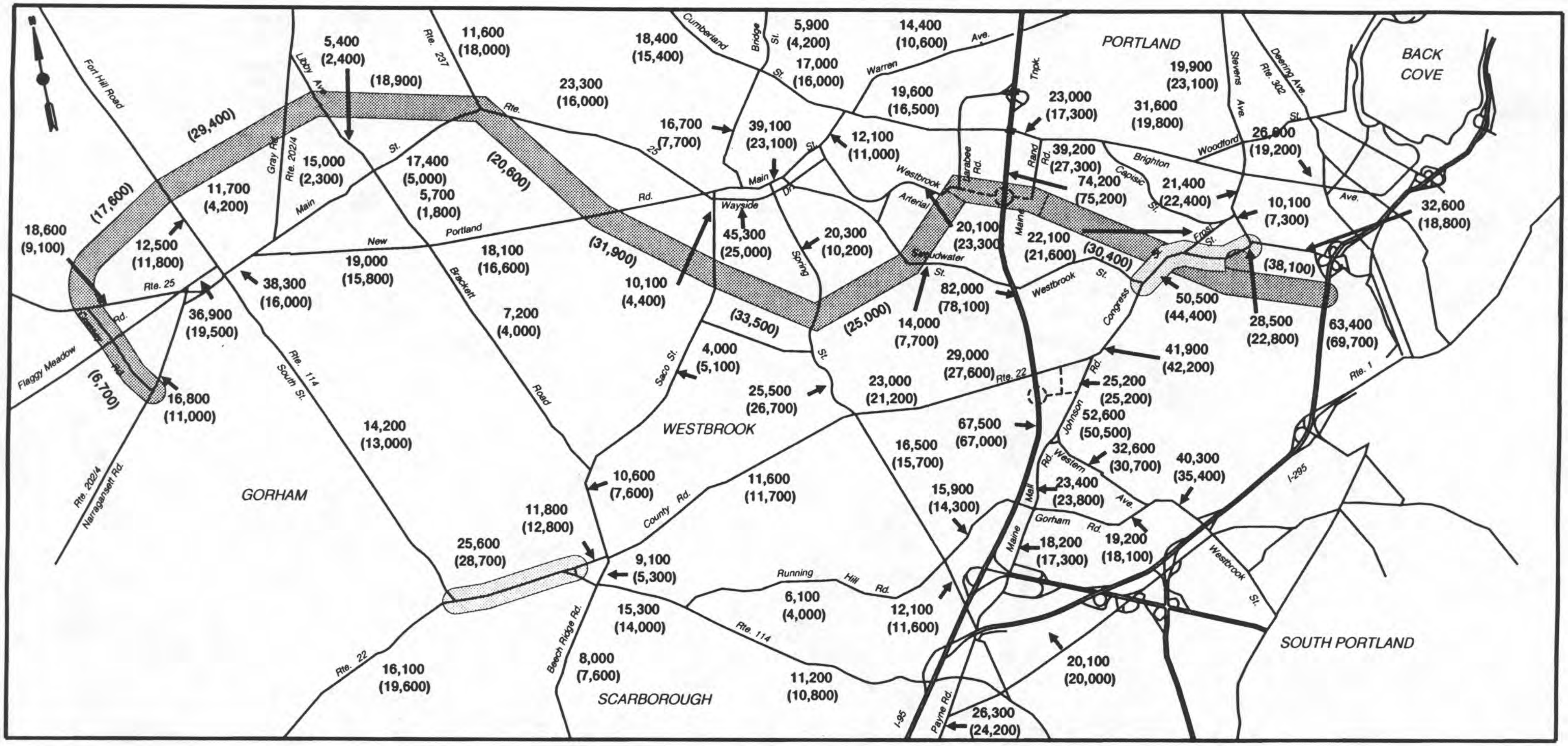
Figure 20 shows Alternative 1 and No-Build volumes on major roadway segments throughout the study area. The new road segments attract a minimum of 6,700 daily trips at Route 202/4 west of Gorham Village to a maximum of 38,100 daily trips west of I-295.

Because of the attraction of traffic to the bypasses, volumes at key locations where deficiencies were identified on the No-Build network decline substantially. Projected 2010 volume on Route 25 in the center of Gorham Village is reduced by more than 22,000 trips and the total volume on Wayside Drive and Main Street west of Spring Street in Westbrook is reduced by more than 20,000 vehicles daily. There is a smaller reduction of almost 12,000 trips on the deficient section of Brighton Avenue west of Capisic Street in Portland.

The expanded capacity provided by the upgraded portions of roadways has a mixed effect on traffic volumes. On the upgraded portion of Route 22 in South Gorham volume increases by 3,100 trips, but on Congress Street north of Westbrook Street volume declines by approximately 6,000.

The effects of this alternative on deficiencies, including changes in v/c ratios on segments which would remain deficient under Alternative 1, are shown in Figure 21. Alternative 1 is projected to eliminate all but one No-Build deficiency (v/c ratio greater than 0.90) along Routes 25 and 22 (the major focus of the study). The remaining deficiency would be on the two-lane section of County Road east of Spring Street.

Three projected No-Build deficiencies are expected to remain on other roadways, including Main Street in Westbrook between Bridge Street and Spring Street, Spring Street north of County Road, and Johnson Road south of the airport access road. The Main Street location would experience a substantial reduction



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Notes: Schematic Only
Not to Scale

Alternative 1 does not provide access to Flaggy Meadow Rd., Libby Ave., or Congress St. west of Stevens Ave.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

Bypass/New Road

Upgrade

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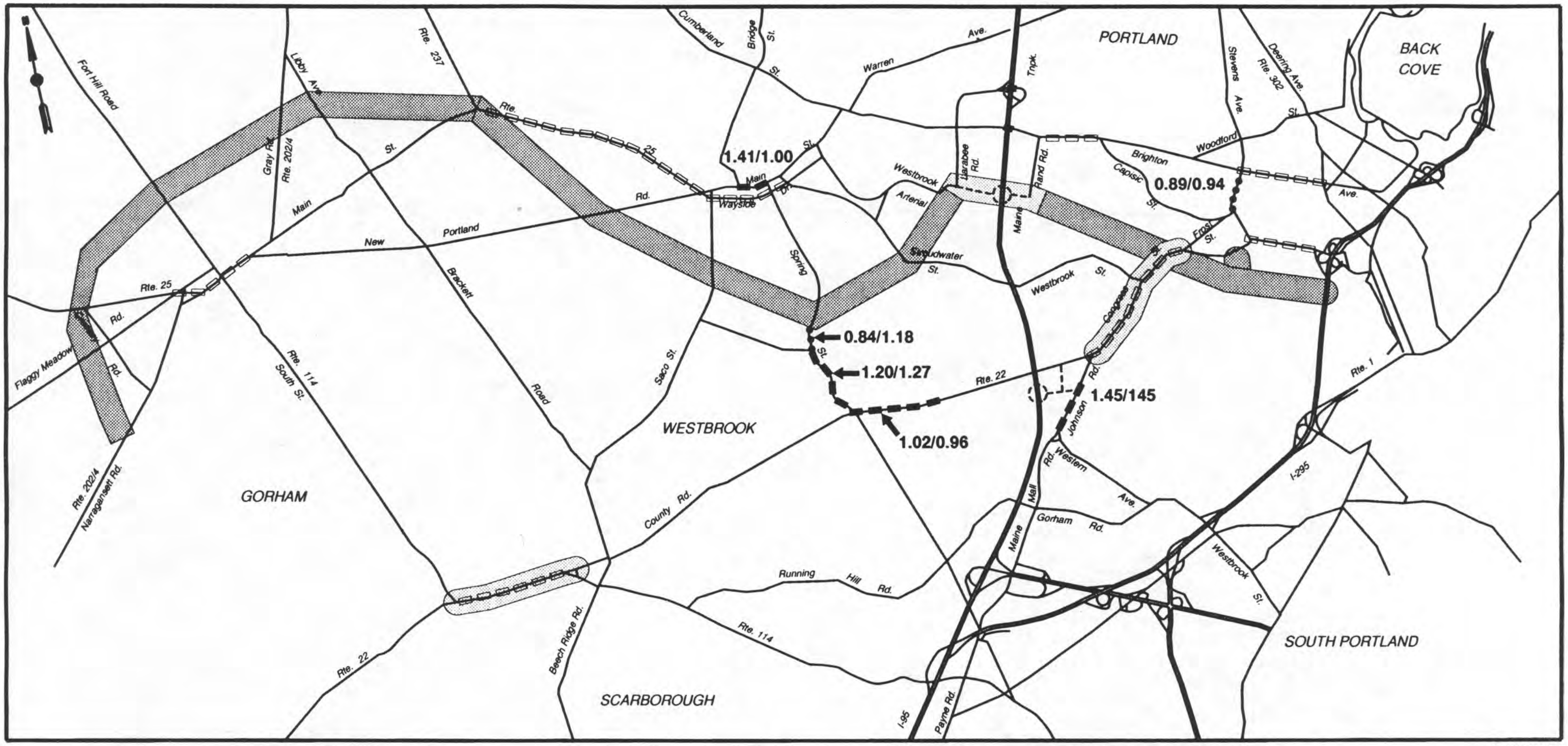
Figure 20

2010 Daily Traffic Volumes Alternative 1



Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 1 does not provide access to Flaggy Meadow Rd., Libby Ave., or Congress St. west of Frost St.

▭▭▭	Deficiency Eliminated
▬▬▬	Deficiency Remains
●●●●●	Deficiency Added
XX.X/YY.Y	No Build V/C Ratio / Atllernative 1 V/C Ratio
▭	Upgrade
▭	Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 21

2010 Capacity Deficiency Comparison
Alternative 1

in v/c ratio from 1.41 to 1.00. Because this road is also a key link for north-south traffic as well as east-west traffic, increased capacity on a bypass to accommodate east-west flows does not provide for total relief to this segment. The deficient segment on Johnson Road is largely unaffected by the alternative and would experience a small improvement in its v/c ratio.

The deficient Spring Street segment would see an increase in v/c ratio and a deficiency would be added on Spring Street between Eisenhower Drive and the bypass road. This is due to traffic accessing the new bypass route along Spring Street. This deficiency could be eliminated by upgrading Spring street between the bypass and County Road to four lanes. A second deficiency is added on Stevens Avenue south of Brighton Avenue due to a small increase in traffic volume.

Table 12 compares the four transportation measures of effectiveness for Alternative 1 with the No-build case. VHT declines by approximately 18,600 hours (5.9 percent) and VHD declines by approximately 16,900 hours (15.4 percent). The average v/c ratio for selected links declines 32.9 percent from 0.85 to 0.57.

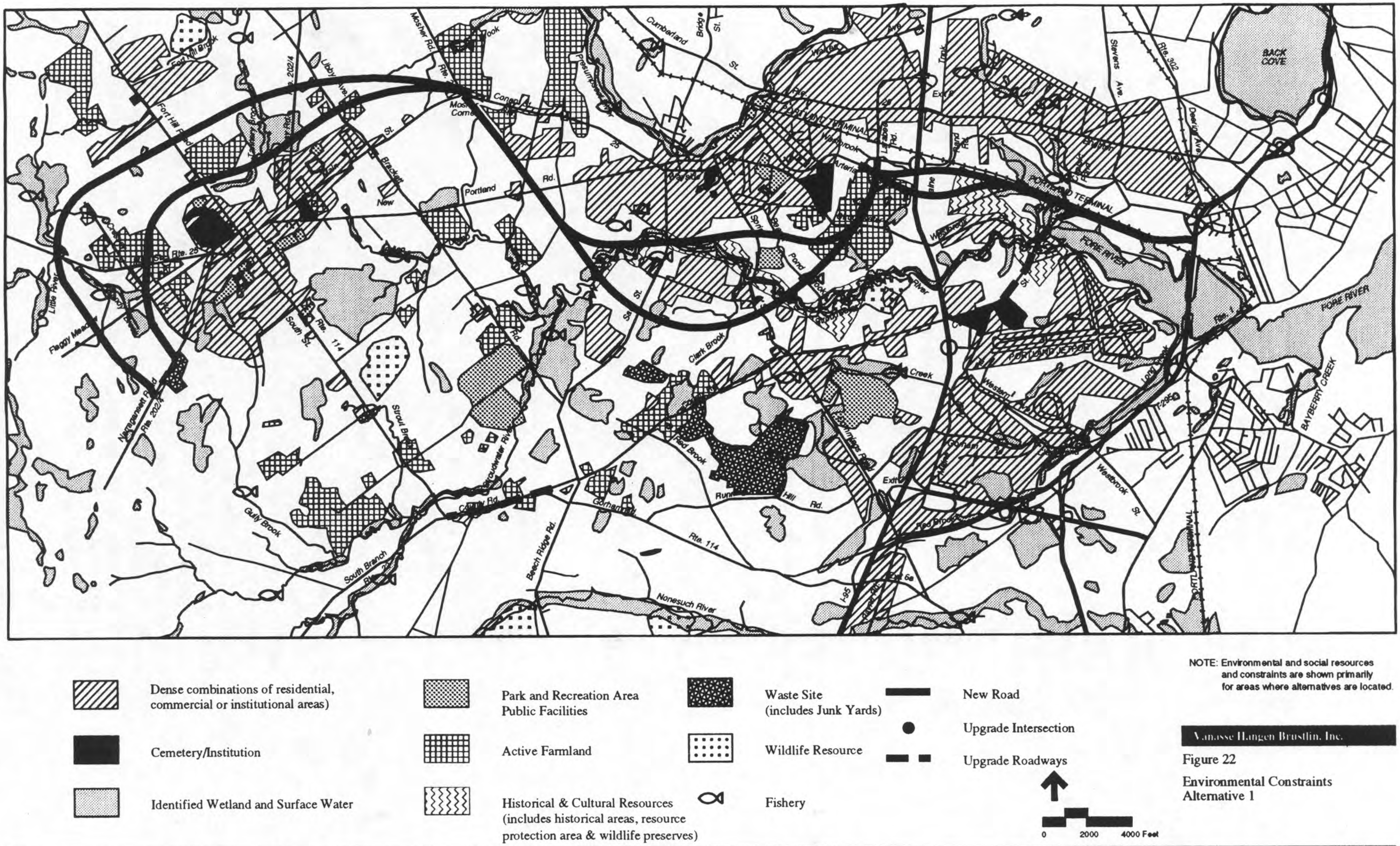
Table 12 **MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 1**

			Change	
Measure*	No-Build	Alternative 1	Number	Percent
VMT	7,443,400	7,454,100	10,700	0.1
VHT	315,000	296,400	-18,600	-5.9
VHD	109,600	92,700	-16,900	-15.4
V/C	0.85	0.57	-0.28	-32.9

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

Environmental, Social and Engineering Impacts

Figure 26 shows the alignment of Alternative 1 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Note that alternative routes are shown for each of the major transportation options. For example, two alternative routes are shown for a bypass roadway north of Gorham. These alternatives present trade-offs between transportation effectiveness, cost, and environmental/social impacts. Table 13 provides a quantification of the alternative's impact on various study area features. Ranges of values in Table 13 show the effect of different route alternatives shown in Figure 22. In addition, the estimated construction cost of Alternative 1 is between 87.2 and 97.7 million dollars. The following text describes these impacts, highlighting any major problem areas.



NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure 22

Environmental Constraints Alternative 1

Table 13 **ALTERNATIVE 1--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	1,900	1,900	600	1,200	2,500	3,100
Commercial/Industrial	200	200	200	800	400	1,000
Low Density Residential	1,500	1,500	2,700	4,050	4,200	5,550
Farmland	1,600	1,600	3,500	7,100	5,100	8,700
Sensitive Land Use:						
Parks	0	0	0	0	0	0
Historic	0	0	0	0	0	0
Institutional	400	400	0	750	400	1,150
Resource Protection	0	0	1,700	4,900	1,700	4,900
Floodplains	0	0	3,900	7,300	3,900	7,300
Stream Crossings (Number)	*	*	*	*	12	15
Identified Wetlands	0	0	8,550	12,600	8,550	12,600
Fish/Wildlife Areas	0	0	50	2,100	50	2,100
Sand/Gravel Aquifers	4,800	4,800	0	2,450	4,800	7,250
Hydric Soils:						
Hydric	600	600	20,250	25,350	20,850	25,950
Potentially Hydric	2,800	2,800	15,050	24,250	17,850	27,050
Surficial Geo. High-Mod.	4,700	4,700	46,500	60,200	51,200	64,900
Steep Slopes:						
High	0	0	4,000	6,900	4,000	6,900
Moderate	300	300	4,400	8,200	4,700	8,500
Farmland Soils:						
Prime	0	0	16,850	27,200	16,850	27,200
Statewide Importance	900	900	9,280	13,700	10,180	14,600

* No differentiation between upgrade and new.

Surficial Geology: Unstable Deposits

Almost all of this alternative lies in an area of unstable geologic deposits (51,200 to 64,900 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge construction costs could be higher in the areas with unstable geologic deposits, compared to areas with stable deposits.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along much of this alternative's alignment. Principal areas of concern are the Stroudwater River crossings south of Westbrook and the new road/upgrade segments crossing the Fore River estuary. Steep slopes and erodible soils associated with Tannery Brook north of Gorham would be most affected by the alternative alignment closest to the town center. The outer (northern) bypass is more favorable. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (16,850 to 27,200 linear feet) and Additional Farmland Soils of Statewide Importance (10,180 to 14,600 feet) would be greatest in the area north of Gorham where active farms occur. The inner bypass option would pose the most impacts in this respect. The Westbrook bypasses may also impact a large farm on Stroudwater Street with associated loss of Prime Farmland soils.

Sand and Gravel Aquifers

The northern-most Gorham bypass is near a groundwater contamination site off Libby Avenue. Roadway designers should be aware of this potential problem if it still exists at the time of design. Only the South Gorham upgrade segment lies within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area.

Surface Water Resources

The primary surface waters in the vicinity of this alternative are the Fore River, Stroudwater River, its tributaries, and Brandy and Tannery Brooks (tributaries to the Presumpscot River). This alternative has numerous stream crossings (12-15) compared to other alternatives. Major surface water crossings include:

- Tannery Brook (Gorham bypass)
- Stroudwater River (multiple crossings south of Westbrook)
- Fore River estuary headwaters (new road options between Maine Turnpike, railroad and Congress Street)
- Stroudwater River and Fore River (Congress Street upgrade)

The inner Gorham bypass's crossing of Tannery Brook is longer and involves more associated wetlands than the outer (northern) bypass option. Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative poses a relatively high total floodplain crossing distance (3,900 to 7,300 feet). The multiple new road crossings of the Stroudwater River and the upgrade/new road crossings of the Fore River estuary constitute the majority of floodplain crossings associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

Wetland impacts of this alternative range from 8,550 feet to 12,600 feet, about average compared with other alternatives. The presence of extensive hydric soils south of Westbrook suggests wetlands are more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland loss would be the Tannery Brook crossing (of the inner Gorham bypass), Stroudwater River crossings south of Westbrook, and the new road segments in the Fore River estuary headwaters area previously described. The inner Gorham bypass crosses a state designated wetland of medium importance (pending official designation). Each of these sites pose potential regulatory constraints with regard to wetland permitting. Structural engineering solutions and careful choice of crossing locations would minimize the impacts associated with these crossings. Erosion and sedimentation controls and the use of stormwater best management practices will be particularly important in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with bypasses north of Gorham is largely evergreen forest with scattered tracts of mixed evergreen/deciduous forest, successional (old field) and pasture. The lands crossed by alternatives south of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses. The new road segments from Westbrook to Portland could impact a substantial amount of salt marsh.

Fish and Wildlife Resources

The outer Gorham bypass crosses Brandy Brook--a state designated fishery of medium importance. With appropriate design, this crossing should have no significant impact on the fishery. This crossing is less desirable than the northern or outer bypass option.

South of Westbrook, the inner (northern) option impacts a fishery of high importance, but otherwise avoids designated fisheries and deer wintering areas potentially impacted by the outer (southern) bypass option.

The new road options and upgrade of Congress Street in the vicinity of the Fore River estuary pose major concerns for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of these crossings would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are average compared with other alternatives. This alternative would cross between 2,500 and 3,100 feet of high and moderate density residential land use, and between 4,200 feet and 5,550 feet of low density residential land use. The total crossing of commercial and industrial land uses would be between 400 feet and 1000 feet, low compared to other alternatives. Most impacts would be associated with new road interchanges and upgrade segments. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The only known area of cultural resource impact with the Alternative 1 is the Congress Street upgrade through the Stroudwater Historic District. Although few structures would be directly impacted, their historical significance would require that efforts be taken to avoid and minimize impacts. Avoidance options are limited, due to the proximity of the historic structures to the existing roadway. Historic resources in the Stroudwater Historic District may be so great that an upgrade of this segment may be difficult to implement as currently envisioned due to the requirements for approval under Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

A potential historic site is also located just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist.

ALTERNATIVE 2

This alternative is the same as the Upgrade Alternative, except that a northern bypass of Gorham Village is included in place of an upgrade through the Village. All other locations have the same upgrades as the Upgrade Alternative.

Alternative 2 includes the following improvements (see Figure 23):

- A northern bypass of Gorham Village between Route 202/4 west of the village and the intersection of Routes 25 and 237 east of the village (Mosher Corner). Access to the Gorham bypass is provided at Route 202/4 (both locations), Route 25, Route 114, and Mosher Corner.

- South Gorham:

  - Widen Route 22 to four lanes between South Street (Route 114) and Gorham Road (Route 114)

- Westbrook:

  - Widen Route 25 to four lanes between Route 237 (Mosher Corner, Gorham) and Main Street/Wayside Drive

  - Widen Wayside Drive to six lanes between Main Street and Stroudwater Street

-- Provide intersection improvements at Wayside Drive/Stroudwater Street, Wayside Drive/Westbrook Arterial, and Main Street/Spring Street

-- Widen County Road between Spring Street and the Portland city line to four lanes (this is a continuation of a planned No-Build project, which is listed in Table 1 and shown on Figure 6 presented earlier, to widen Congress Street to four lanes between Johnson Road and the Westbrook city line)

- Portland:

-- Widen Brighton Avenue to six lanes between the proposed Turnpike interchange access road and Capisic Street

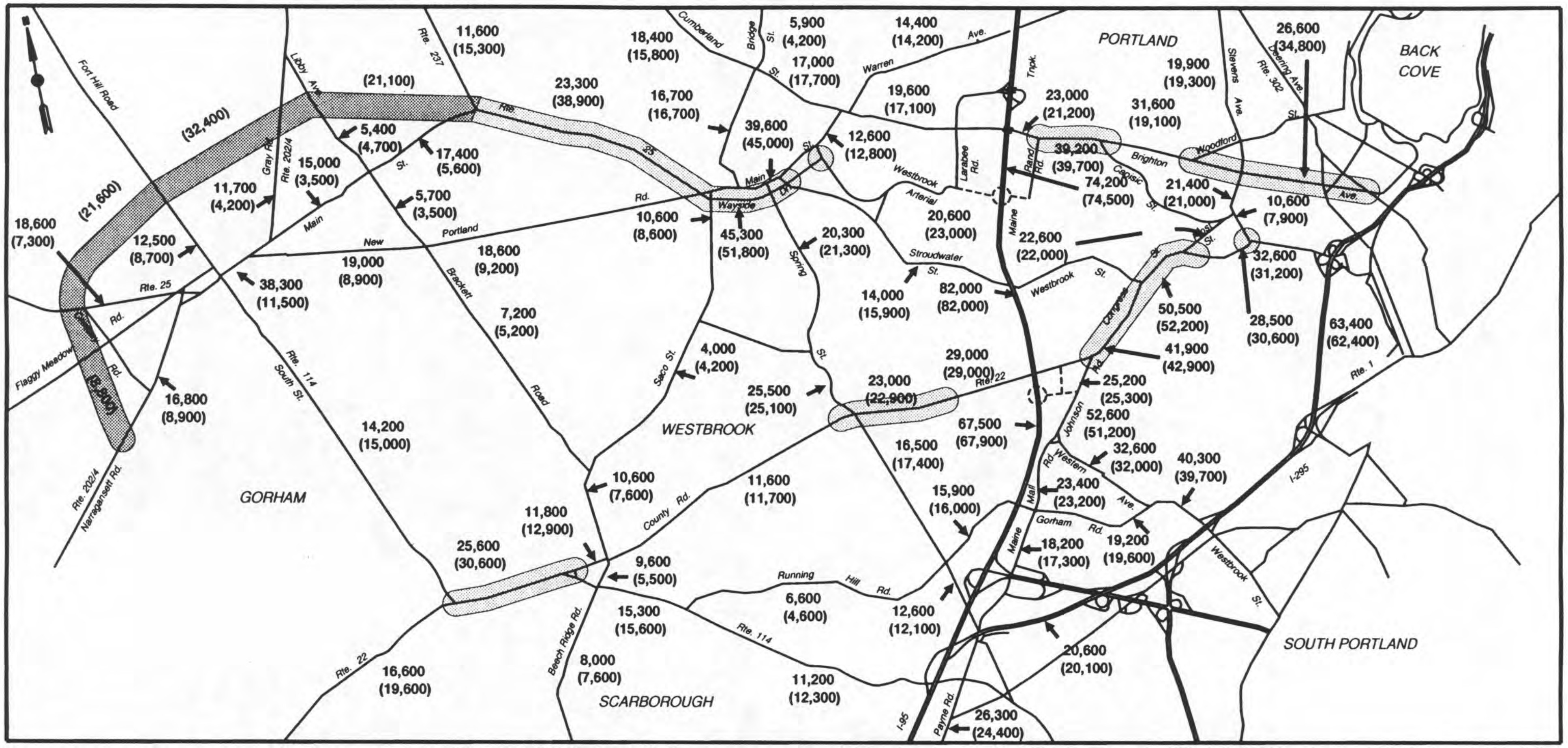
-- Widen Brighton Avenue between Woodford Street and Deering Avenue to four lanes. Provide additional through and turn lanes at the intersection with Stevens Avenue

-- Widen Congress Street to six lanes between Johnson Road and Frost Street, and improve the intersection at Stevens Avenue and Congress Street

Figure 23 shows Alternative 2 and No-Build volumes on major roadway segments throughout the study area. The new road segments that form the bypass of Gorham Village carry volumes ranging from 8,800 at Route 202/4 west of the Village to 32,400 east of Fort Hill Road. This results in a reduction of 26,800 vehicles daily in the center of Gorham Village. Volumes along the upgrade segments of Route 25 are generally higher than with the Upgrade Alternative, while volumes along Route 22 are similar for the two alternatives.

The effects of Alternative 2 on projected No-Build deficiencies are shown in Figure 24. Three projected No-Build deficiencies would remain and one deficiency would be added on Routes 25 and 22. All would have v/c ratios of 0.97 or lower. The largest decline would be on Congress Street between Westbrook Street and Frost Street where the v/c ratio would decline from 1.40 to 0.97. Smaller declines would occur on Brighton Avenue between Stevens Avenue and Deering Avenue and on Route 25 between Mosher Corner and Main Street Westbrook. Brighton Avenue between Capisic Street and Woodford Street would experience an increase in the v/c ratio from 0.87 to 0.94.

Three projected No-Build deficiencies are expected to remain on other roadways, including Main Street in Westbrook between Bridge Street and Spring Street, Spring Street north of County Road, and Johnson Road south of the airport access road. The Main Street location would experience a substantial reduction in v/c ratio from 1.41 to 1.07 because of increased capacity with the widening of Main Street and Spring street as part of the upgrade portion of this alternative. The deficient segments on Spring Street and Johnson Road are largely unaffected by the alternative and would experience small changes in v/c ratios. A deficiency is added on Stevens Avenue south of Brighton Avenue due to a small increase in traffic volume (v/c increases from 0.89 to 0.91).



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Notes: Schematic Only
Not to Scale

Alternative 6 does not provide access to Flaggy Meadow Rd., Libby Ave., or Congress St. west of Frost St.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

Bypass/New Road

Upgrade

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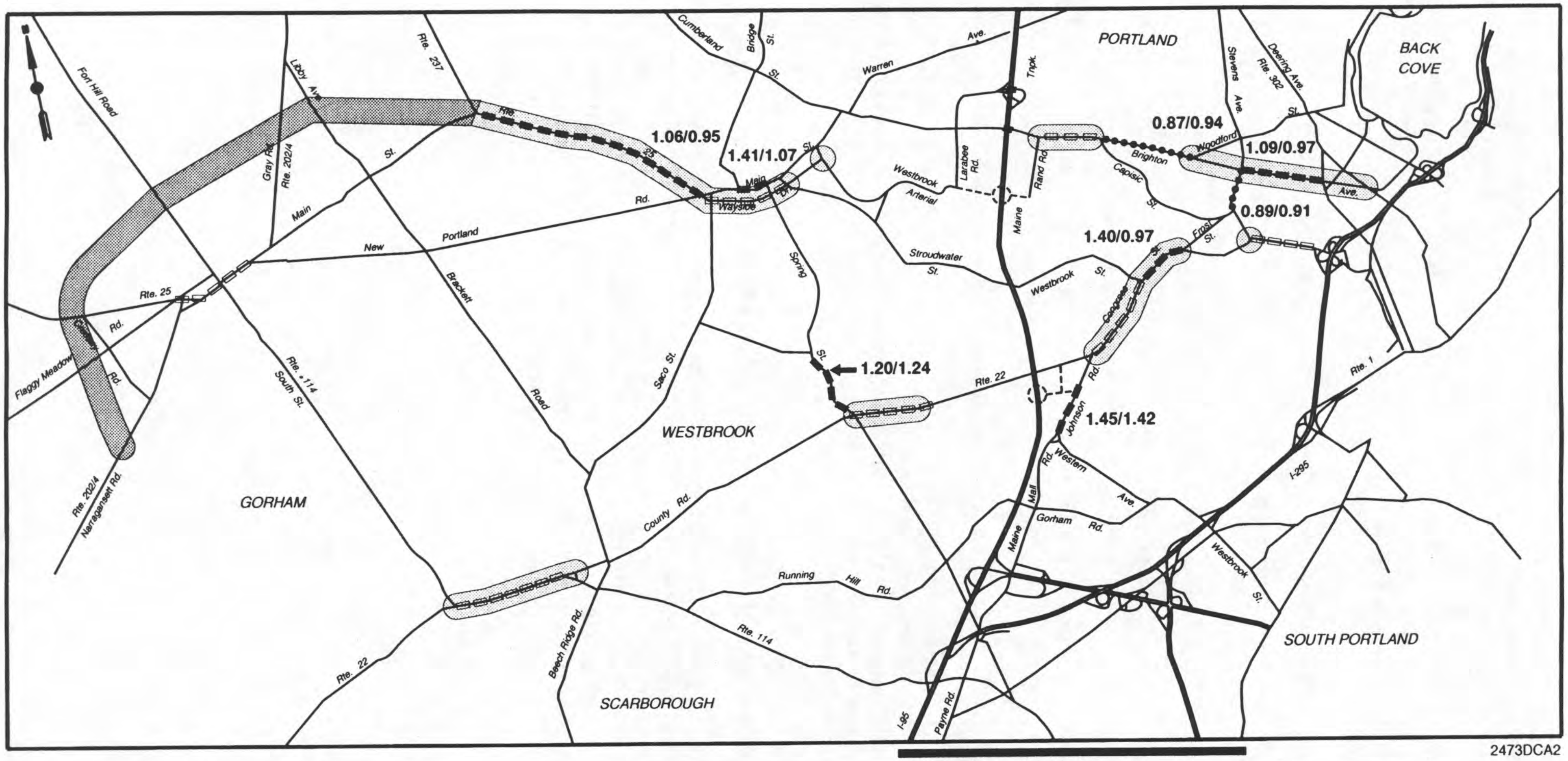
Figure 23

2010 Daily Traffic Volumes Alternative 2



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Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 2 does not provide access to Flaggy Meadow Rd. or Libby Ave.

Deficiency Eliminated

Deficiency Remains

Deficiency Added

XX.X/YY.Y No Build V/C Ratio / Atlternative 3 V/C Ratio

Upgrade

Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 24

2010 Capacity Deficiency Comparison
Alternative 2

Table 14 compares the four transportation measures of effectiveness for Alternative 2 with the No-Build case. Alternative 2 produces a small increase in total VMT (3,100 miles or less than 0.1 percent). VHT declines by approximately 13,200 hours (4.2 percent) and VHD declines by approximately 12,500 hours (11.4 percent). The average v/c ratio for selected links declines 29.4 percent from 0.85 to 0.60.

Table 14

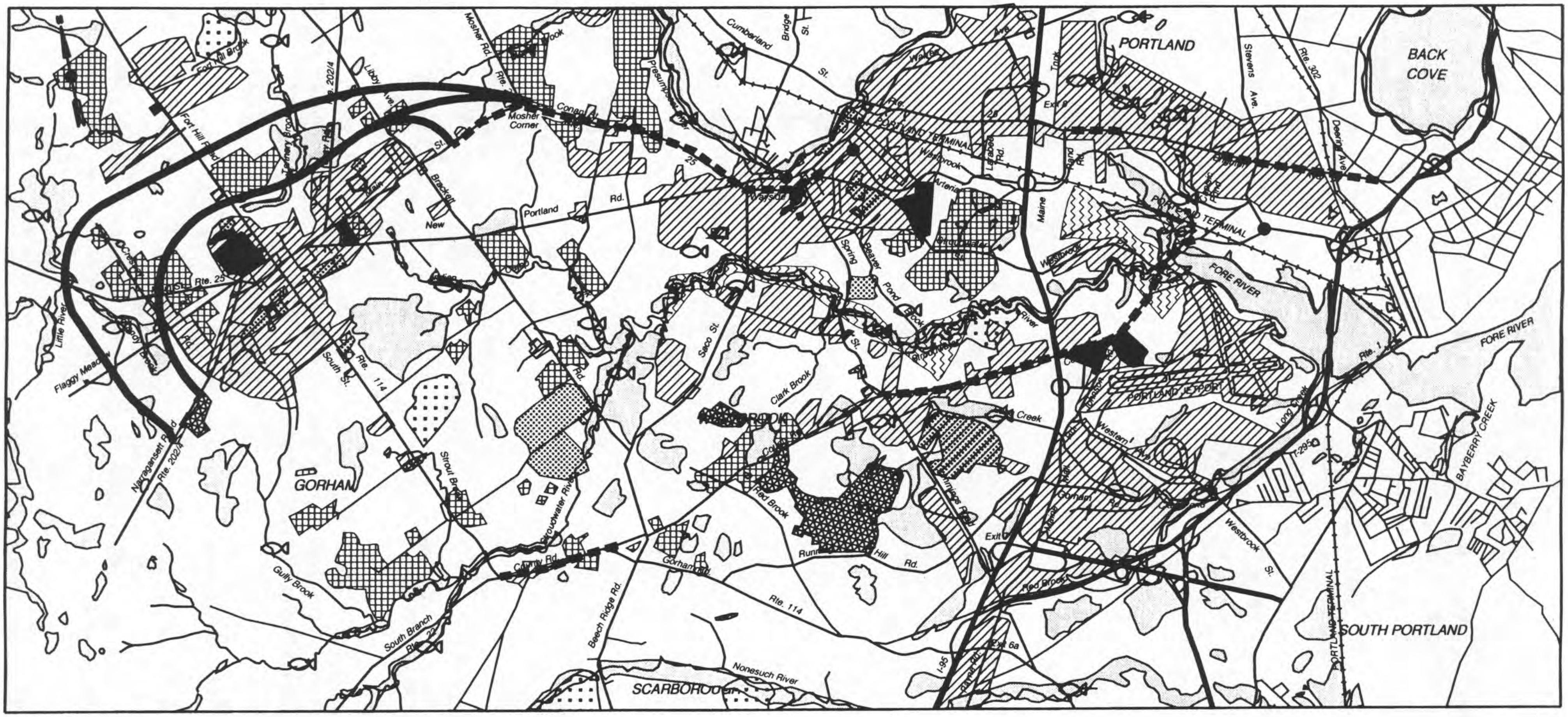
MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 2

Measure*	No-Build	Alternative 2	Change Number	Change Percent
VMT	7,443,400	7,446,500	3,100	0.0**
VHT	315,000	301,800	-13,200	-4.2
VHD	109,600	97,100	-12,500	-11.4
V/C	0.85	0.60	-0.25	-29.4

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.
** Less than 0.05

Environmental, Social and Engineering Impacts

Figure 25 shows the alignment of Alternative 2 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 15 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 2 is between 42.0 and 49.2 million dollars. The following text describes these impacts, highlighting major problem areas.



Dense combinations of residential, commercial or institutional areas)

Cemetery/Institution

Identified Wetland and Surface Water

Park and Recreation Area Public Facilities

Active Farmland

Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)

Waste Site (includes Junk Yards)

Wildlife Resource

Fishery

New Road

Upgrade Intersection

Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

Vanasse Hangen Brustlin, Inc.

Figure 25

Environmental Constraints Alternative 2

Table 15 **ALTERNATIVE 2--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	22,100	22,100	0	100	22,100	22,200
Commercial/Industrial	10,700	10,700	0	200	10,700	10,900
Low Density Residential	6,800	6,800	1,800	2,900	8,600	9,700
Farmland	3,550	3,550	500	2,700	4,050	6,250
Sensitive Land Use:						
Parks	400	400	0	0	400	400
Historic	3,800	3,800	0	0	3,800	3,800
Institutional	1,300	1,300	0	700	1,300	2,000
Resource Protection	0	0	0	0	0	0
Floodplains	200	200	400	800	600	1,000
Stream Crossings (Number)	*	*	*	*	2	5
Identified Wetlands	1,400	1,400	850	2,750	2,250	4,150
Fish/Wildlife Areas	0	0	0	0	0	0
Sand/Gravel Aquifers	4,800	4,800	0	2,450	4,800	7,250
Hydric Soils:						
Hydric	10,500	10,500	2,000	6,300	12,500	16,800
Potentially Hydric	13,100	13,100	2,400	10,000	15,500	23,100
Surficial Geo. High-Mod.	28,000	28,000	10,000	22,300	38,000	50,300
Steep Slopes:						
High	2,400	2,400	0	1,000	2,400	3,400
Moderate	2,650	2,650	3,000	3,900	5,650	6,550
Farmland Soils:						
Prime	7,150	7,150	6,750	16,600	13,900	23,750
Statewide Importance	5,800	5,800	5,780	7,300	11,580	13,100

* No differentiation between upgrade and new.

As previously mentioned, this alternative is the same as the Upgrade Alternative with the exception that a northern bypass of Gorham replaces the downtown Gorham upgrade segment.

Surficial Geology: Unstable Deposits

Unstable deposits pose minor constraints to the development of this alternative. These deposits occur throughout the study area, particularly north of Gorham, and in most of Westbrook and Portland. New road crossings of Brandy and Tanner Brooks, and the upgrade along Congress Street pose the most concern due to the combination of steep slopes and unstable deposits. Geotechnical evaluation at the time of design will identify any such specific problems so that engineering solutions may be applied.

Steep Slopes/Erodible Soils

The principal areas of concern with this alternative are along Congress Street near the Stroudwater and Fore Rivers, and the multiple crossings of Tannery Brook north of Gorham. Steep slopes and erodible soils associated with Tannery Brook north of Gorham would be most affected by the alternative alignment closest to the Gorham town center. The outer (northern) bypass option is more favorable. Proper application of erosion and sedimentation controls during and after construction would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (13,900 to 23,750 linear feet) and Additional Farmland Soils of Statewide Importance (11,580 to 13,100 linear feet) would be greatest in the area north of Gorham where active farms occur. The inner bypass option would pose the most impacts in this respect. Upgrade segments pose minimal direct impact to the loss of Prime Farmland Soils or Additional Farmland Soils of Statewide Importance because impacted soils are along existing roadsides.

Sand and Gravel Aquifers

The northern-most Gorham bypass passes near a groundwater contamination site off Libby Avenue. Roadway designers should be aware of this potential problem if it still exists at the time of design. Only the South Gorham upgrade segment lies within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area.

Surface Water Resources

The primary surface waters in the vicinity of the upgrade segments are the Fore River, Stroudwater River and its tributaries, and the Presumpscot River (Westbrook segment). This alternative has relatively few stream crossings (two to five) compared to other alternatives. The Congress Street upgrade is the only major river crossing (Stroudwater River and Fore River). The crossing of Tannery Brook by the inner Gorham bypass also involves a broad width of associated wetlands at this location. Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative poses the lowest floodplain crossing distance (600 feet to 1,000 feet) of all alternatives except the Upgrade Alternative. The Congress Street crossing of the Stroudwater River and Fore River constitutes the only major floodplain crossing associated with this alternative. Any upgrade in this area should be designed so it withstands flooding and does not increase 100-year flood elevations more than a minor amount.

Wetlands

Direct wetland losses associated with this alternative would be relatively low (2,250 to 4,150 linear feet of crossing) compared to other alternatives. The principal area of wetland loss would be the Tannery Brook crossing (inner bypass). The inner Gorham bypass also crosses a state designated wetland of medium importance (pending official designation). Erosion and sedimentation controls and the use of stormwater best management practices would provide an adequate level of protection in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with bypasses north of Gorham is largely evergreen forest with scattered tracts of mixed evergreen/deciduous forest, successional (old field) and pasture. Vegetative cover along upgrade segments is almost entirely urban or suburban in character. As such, impacts to natural vegetation would be minimal.

Fish and Wildlife Resources

The outer Gorham bypass crosses Brandy Brook--a state designated fishery of medium importance. With appropriate design, this crossing would have no significant impact on the fishery. This crossing is less desirable than the northern or outer bypass option.

The upgrade of Congress Street in the vicinity of the Fore River estuary poses the only major concern for fish or wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are relatively high compared with other alternatives. This alternative would cross between 22,100 and 22,200 feet of high and moderate density residential land use, and between 8,600 feet and 9,700 feet of low density residential land use. The total crossing of commercial and industrial land uses would be between 10,700 feet and 10,900 feet. Most impacts would be associated with upgrade segments. The downtown Westbrook and Brighton Avenue segments pose the greatest impact due to the proximity of structures to the existing road. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The principal area of cultural resource impact with Alternative 2 is the Congress Street upgrade through the Stroudwater Historic District. Although few structures would be directly impacted, their historical significance may require that efforts be taken to avoid and minimize impacts. Avoidance options are limited, due to the proximity of the historic structures to the existing roadway. Historic resources in the Stroudwater Historic District may be so great that an upgrade of this segment may be difficult to implement as currently envisioned due to the requirements for approval under Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act. Historic resources in downtown Westbrook also pose constraints to the development of upgrade solutions. There is also a potential historic site located just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist. Development of this alternative would require close coordination between designers and MHPC.

ALTERNATIVE 3

This alternative provides one new roadway segment to bypass the deficient sections of Route 25 in Gorham Village and upgrades along deficient sections of Route 22. It includes the following improvements:

- A southern bypass of Gorham Village between Route 25 west of the village and New Portland Road east of the village. Access to the Gorham bypass is provided at Route 25, Route 202/4, Route 114 and New Portland Road.

- An upgrade of New Portland Road in Gorham and Westbrrok to four lanes between the intersection with the new southern bypass of Gorham and Main Street in Westbrook.

- An upgrade of Route 22 in South Gorham to four lanes between South Street (Route 114 in Gorham) and Gorham Road (Route 114 in Scarborough).

- Upgrade of Route 25 to four lanes between Route 237 (Mosher Corner, Gorham) and Main Street/Wayside Drive

- Upgrade of Wayside Drive to six lanes between Main Street and Stroudwater Street, including intersection improvements at:

  Wayside Drive/Stroudwater Street,
  Wayside Drive/Westbrook Arterial, and
  Main Street/Spring Street

- Upgrade County Road between Spring Street and the Portland city line to four lanes (this is a continuation of a planned No-Build project, which is listed in Table 1 and shown on Figure 6 presented earlier, to widen Congress Street to four lanes between Johnson Road and the Westbrook city line)

- Upgrade Brighton Avenue to six lanes between the proposed Turnpike interchange access road and Capisic Street

- Upgrade Brighton Avenue between Woodford Street and Deering Avenue to four lanes. Provide additional through and turn lanes at the intersection with Stevens Avenue

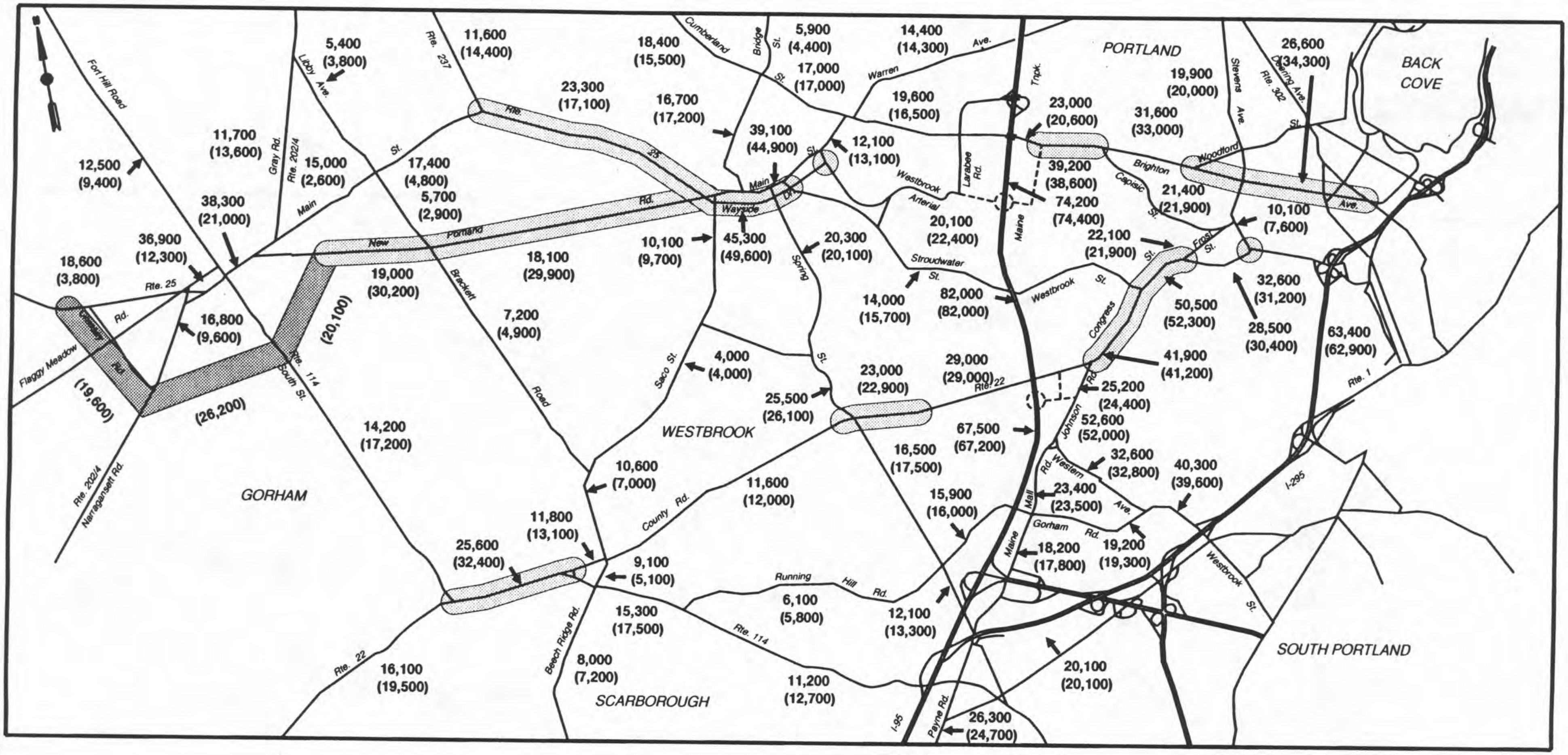
- Upgrade Congress Street to six lanes between Johnson Road and Frost Street, and improve the intersection at Stevens Avenue and Congress Street

As shown on Figure 26, the effects of this alternative on traffic volumes are very similar to Alternative 2, except on Route 25 west of Westbrook and on New Portland Road. Segments of the southern bypass of Gorham Village carry between 19,600 and 26,200 vehicles daily. As a result, volume on Route 25 in the Village west of Route 114 is reduced by a larger amount (24,600 compared to 21,500) than with Alternative 2. East of Route 114 the reduction is smaller (17,300 compared to 26,900). Similarly, instead of increasing traffic on Route 25 east of Route 237, Alternative 3 reduces volume by 6,200 while increasing volume on New Portland Road by 11,800.

The effects of Alternative 3 on projected No-Build deficiencies are shown in Figure 27. Three projected No-Build deficiencies would remain and one deficiency would be added on Routes 25 and 22. In Gorham Village, Route 25 east of Route 114 would remain deficient with a v/c ratio of 1.16 (down from 2.14 under No-build conditions). Congress Street between Westbrook Street and Frost Street would experience a decline in the v/c from 1.40 to 0.97, while Brighton Avenue between Stevens Avenue and Deering Avenue would experience a decline from 1.09 to 0.95. Brighton Avenue between Capisic Street and Woodford Street would experience an increase in the v/c ratio from 0.87 to 0.92.

Three projected No-Build deficiencies are expected to remain on other roadways, including Main Street in Westbrook between Bridge Street and Spring Street, Spring Street north of County Road, and Johnson Road south of the airport access road. The Main Street location would experience a substantial reduction in v/c ratio from 1.41 to 1.09 because of increased capacity which is partially offset by increased volume attracted to the upgrade. The deficient segments on Spring Street and Johnson Road are largely unaffected by the alternative and would experience small changes in v/c ratios. A deficiency is added on Bridge Street north of Main Street in Westbrook due to a small increase in traffic volume (v/c increases from 0.86 to 0.91).

Table 16 compares the four transportation measures of effectiveness for Alternative 3 with the No-build case. Except for VMT, the effects of this alternative are very similar to Alternative 2. Alternative 3 produces a decrease in total VMT of 7,200 miles. Similar to Alternative 2, it results in a comparatively small reduction in VHT and VHD. VHT declines by approximately 13,400 hours (4.3 percent) and VHD declines by approximately 12,500 hours (11.4 percent). The average v/c ratio for selected links declines 28.2 percent from 0.85 to 0.61.



2473CA3

Notes: Schematic Only
Not to Scale

Alternative 3 does not provide access to Flaggy Meadow Rd.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

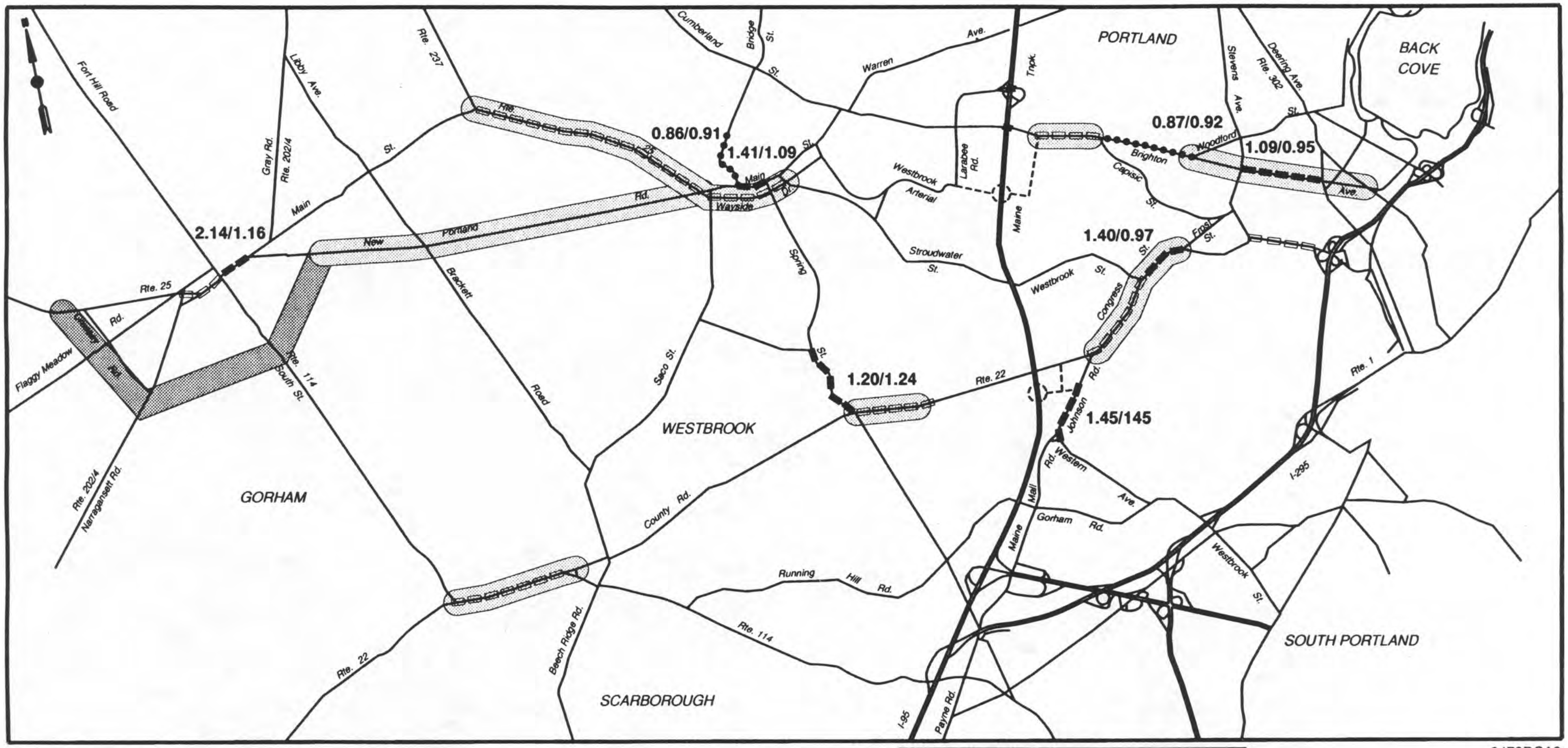
Bypass/New Road

Upgrade

Vanasse Hangen Brustlin, Inc.

Figure 26

2010 Daily Traffic Volumes
Alternative 3



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Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 3 does not provide access to Flaggy Meadow Rd.

▭▭▭	Deficiency Eliminated
▬ ▬ ▬	Deficiency Remains
●●●●●	Deficiency Added
XX.X/YY.Y	No Build V/C Ratio / Atlternative 3 V/C Ratio
(light shading)	Upgrade
(dark shading)	Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 27

2010 Capacity Deficiency Comparison Alternative 3

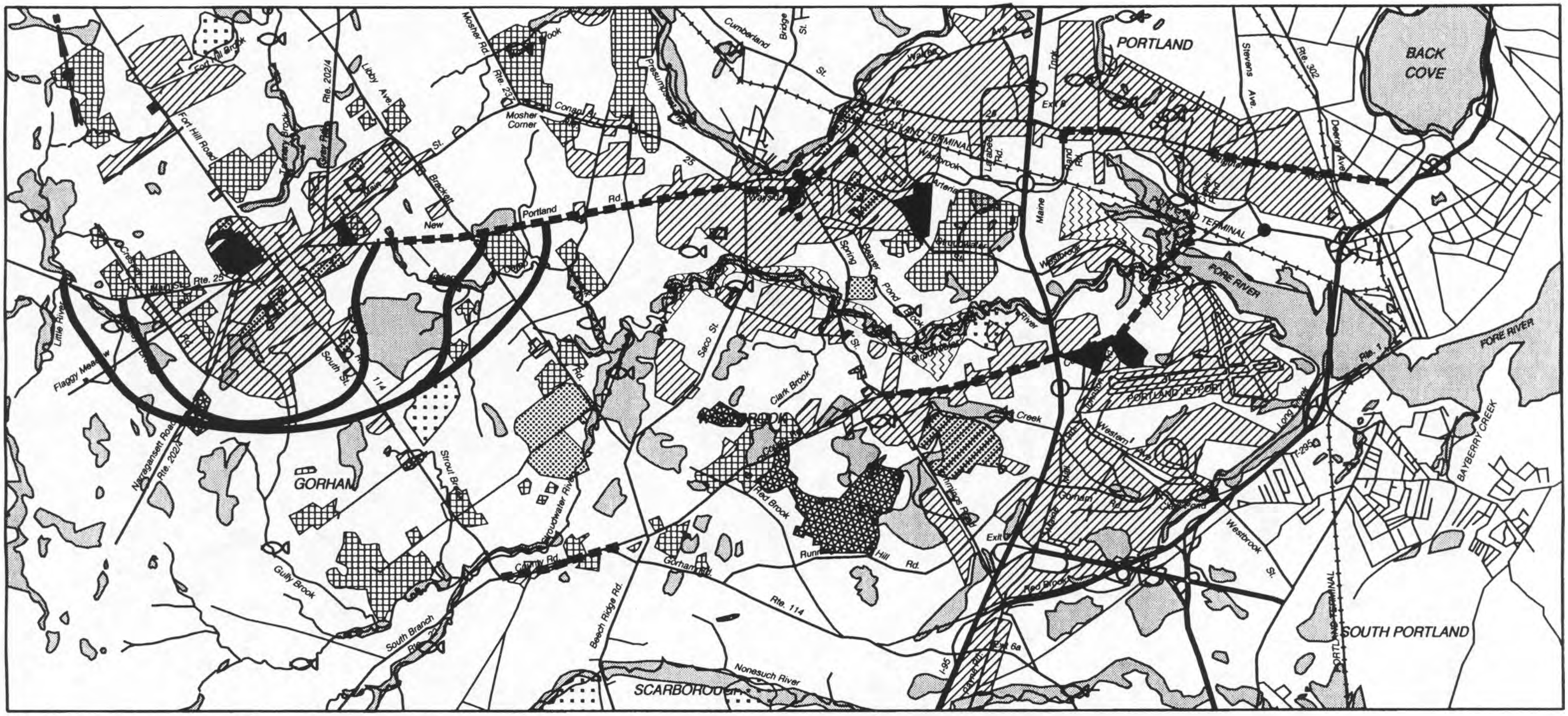
Table 16 **MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 3**

Measure*	No-Build	Alternative 3	Change Number	Change Percent
VMT	7,443,400	7,436,200	-7,200	-0.1
VHT	315,000	301,600	-13,400	-4.3
VHD	109,600	97,100	-12,500	-11.4
V/C	0.85	0.61	-0.24	-28.2

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.
** Less than 0.1

Environmental, Social and Engineering Impacts

Figure 28 shows the alignment of Alternative 3 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. In addition, the estimated construction cost of Alternative 3 is between 37.5 and 43.1 million dollars. Table 17 provides a quantification of the alternative's impact on various study area features. The following text describes these impacts, highlighting major problem areas.



Dense combinations of residential, commercial or institutional areas)	Park and Recreation Area Public Facilities
Cemetery/Institution	Active Farmland
Identified Wetland and Surface Water	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)
Waste Site (includes Junk Yards)	New Road
Wildlife Resource	Upgrade Intersection
Fishery	Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

Vanasse Hangen Brustlin, Inc.

Figure 28

Environmental Constraints Alternative 3

Table 17 **ALTERNATIVE 3--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	22,000	22,000	0	0	22,000	22,000
Commercial/Industrial	11,800	11,800	0	0	11,800	11,800
Low Density Residential	11,850	11,850	500	800	12,350	12,650
Farmland	3,200	3,200	1,300	1,300	4,500	4,500
Sensitive Land Use:						
Parks	400	400	0	0	400	400
Historic	4,000	4,000	0	0	4,000	4,000
Institutional	900	900	0	50	900	950
Resource Protection	0	0	0	0	0	0
Floodplains	900	900	550	900	1,450	1,800
Stream Crossings (Number)	*	*	*	*	2	4
Identified Wetlands	4,000	4,000	1,550	4,000	5,550	8,000
Fish/Wildlife Areas	0	0	50	2,380	50	2,380
Sand/Gravel Aquifers	4,800	4,800	7,100	7,250	11,900	12,050
Hydric Soils:						
Hydric	14,750	14,750	11,900	15,200	26,650	29,950
Potentially Hydric	15,700	15,700	2,700	9,000	18,400	24,700
Surficial Geo. High-Mod.	34,450	34,450	16,500	22,800	50,950	57,250
Steep Slopes:						
High	2,500	2,500	0	700	2,500	3,200
Moderate	3,450	3,450	1,250	3,300	4,700	6,750
Farmland Soils:						
Prime	9,550	9,550	1,500	10,350	11,050	19,900
Statewide Importance	8,100	8,100	1,150	4,950	9,250	13,050

* No differentiation between upgrade and new.

As previously mentioned, this alternative is the same as the Upgrade Alternative with the exception that a southern bypass of Gorham replaces the downtown Gorham upgrade segment. It also includes the upgrade of New Portland Road from the southern bypass east to Westbrook.

Surficial Geology: Unstable Deposits

Unstable deposits pose minor constraints to the development of this alternative. These deposits occur throughout the study area, particularly north of Gorham, and in most of Westbrook and Portland. The bypass alternatives south of

Gorham are generally better than the northern bypass alternatives in this respect. Still, southern bypasses will also encounter some areas of unstable deposits. New road crossings of Gully and Indian Camp Brooks, and the upgrade along Congress Street also pose concern due to the combination of steep slopes and unstable deposits. Geotechnical evaluation at the time of design will identify any such specific problems so that engineering solutions may be applied.

Steep Slopes/Erodible Soils

The principal areas of concern with this alternative are along Congress Street near the Stroudwater and Fore Rivers, and the crossings of Gully and Indian Camp Brooks south of Gorham. Steep slopes and erodible soils are more abundant in the area affected by the alternative alignment farthest from the Gorham town center. The innermost bypass option is more favorable. Proper application of erosion and sedimentation controls during and after construction would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (11,050 to 19,900 linear feet) and Additional Farmland Soils of Statewide Importance (9,250 to 13,050 feet) would be greatest in the area south of Gorham. However, few active farms occur there. The outermost bypass option would have the most impact in this respect. Upgrade segments pose minimal direct impact to the loss of Prime Farmland Soils or Additional Farmland Soils of Statewide Importance because impacted soils are along existing roadsides.

Sand and Gravel Aquifers

The bypass segments southwest of Gorham (near Narragansett Road) intersect an area of moderate yield aquifer. Two groundwater contamination site occur in this area as well (auto junkyard and sand excavation site). Roadway designers should be aware of these potential problem areas if they still exists at the time of design. The South Gorham upgrade segment also lies within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area. In total, between 11,900 and 12,050 linear feet of moderate yield aquifer is crossed by this alternative.

Surface Water Resources

The primary surface waters in the vicinity of the upgrade segments are the Fore River, Stroudwater River and its tributaries, and the Presumpscot River (Westbrook segment). Indian Camp Brook would be impacted by upgrade and new road segments. Gully Brook would be crossed by southern bypasses of Gorham. This alternative has the fewest stream crossings (two to four) of all alternatives. The Congress Street upgrade is the only major river crossing (Stroudwater River and Fore River). The crossings of Gully and Indian Camp Brooks also involve steep slopes.

Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative poses the second lowest floodplain crossing distance (1,450 to 1,800 feet) of all alternatives except the Upgrade Alternative. The Congress Street crossing of the Stroudwater River and Fore River constitutes the only major floodplain crossing associated with this alternative. Any upgrade in this area should be designed so it withstands flooding and does not increase 100-year flood elevations more than a minor amount.

Wetlands

Direct wetland losses associated with this alternative would be about average (5,550 to 8,000 linear feet of crossing) compared to other alternatives. Note, however, that hydric soil mapping and limited field inspections suggest jurisdictional wetlands may be much more extensive south of Gorham than indicated by NWI or state wetlands mapping. The principal areas of wetland loss would be the Gully Brook and Indian Camp Brook crossings. The outer bypass crosses State designated wetland of low importance (pending official designation) south of Day Road. Impacts to the periphery of a large evergreen forest wetland north of Day Road and tributary to Indian Camp Brook would also occur with the inner and middle bypasses southeast of Gorham.

Erosion and sedimentation controls and the use of stormwater best management practices would provide an adequate level of protection in wetland areas. Steep slopes associated with Gully and Indian Camp Brooks makes sound erosion control practices particularly important.

Vegetative Cover

Vegetation associated with bypasses south of Gorham is largely evergreen forest with scattered tracts of mixed evergreen/deciduous forest. Vegetative cover along upgrade segments is almost entirely urban or suburban in character. As such, impacts to natural vegetation would be minimal.

Fish and Wildlife Resources

The inner bypass southwest of Gorham crosses Brandy Brook--a State designated fishery of medium importance. With appropriate design, this crossing should have no significant impact on the fishery. The middle and outermost bypasses southeast of Gorham cross the edge of a State designated deer wintering area of indeterminate importance just south of Day Road. The middle bypass also crosses a designated fishery of medium importance (Indian Camp Brook headwaters). These crossings are less desirable than the innermost bypass option southeast of Gorham.

The upgrade of Congress Street in the vicinity of the Fore River estuary also poses a concern for fish or wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and

Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are relatively high compared with other alternatives. This alternative would cross 22,000 feet of high and moderate density residential land use, and between 12,350 feet and 12,650 feet of low density residential land use. The total crossing of commercial and industrial land uses would be 11,800 feet. Most impacts would be associated with upgrade segments. The downtown Westbrook and Brighton Avenue segments pose the greatest impact due to the proximity of structures to the existing road. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

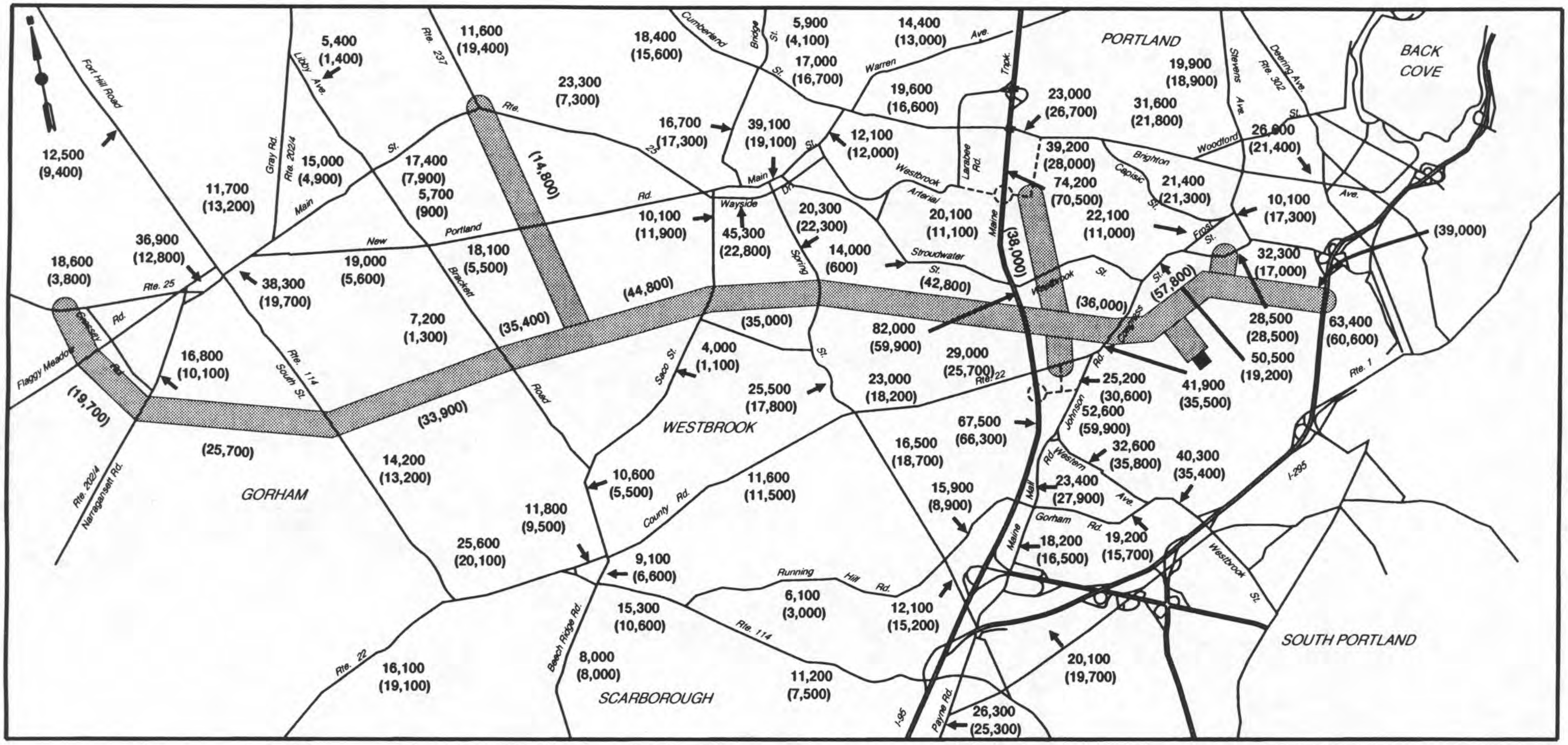
The principal area of cultural resource impact with Alternative 3 is the Congress Street upgrade through the Stroudwater Historic District. Although few structures would be directly impacted, their historical significance may require that efforts be taken to avoid and minimize impacts. Avoidance options are limited, due to the proximity of the historic structures to the existing roadway. Historic resources in the Stroudwater Historic District may be so great that upgrade of this segment may be difficult to implement as currently envisioned due to the requirement for approval under Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act. Historic resources in downtown Westbrook also pose constraints to the development of upgrade solutions. There is also a potential historic site located just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist. Development of this alternative would require close coordination between designers and MHPC.

ALTERNATIVE 4

This alternative is an all new road concept that connects Route 25 west of Gorham to I-295 just south of Congress Street. It passes south of Gorham Village and Westbrook, and connects to a Congress Street bypass in Portland. It also includes connectors between the new road and Route 237 in Gorham and between the new road and the two proposed Turnpike interchanges.

As shown on Figure 29, the new road segments carry volumes ranging from 19,700 west of Gorham Village to 57,800 east of Congress Street near the airport. This results from substantial diversions from existing roadways. Reductions in areas with No-Build deficiencies range from as high as 31,300 on Congress Street north of Westbrook Street to 4,800 on County Road east of Spring Street. Other reductions include: 18,600 on Route 25 in Gorham Village; 12,800 in Westbrook; 11,200 on Brighton Avenue east of the proposed Turnpike interchange access road; and 5,500 on Route 22 in South Gorham.

This alternative eliminates all Route 25 and Route 22 deficiencies except on Main Street east of Route 114 in Gorham Village and Congress Street north of Johnson Road (see Figure 30). The v/c ratio in Gorham village is reduced from



2473CA4

Notes: Schematic Only
Not to Scale

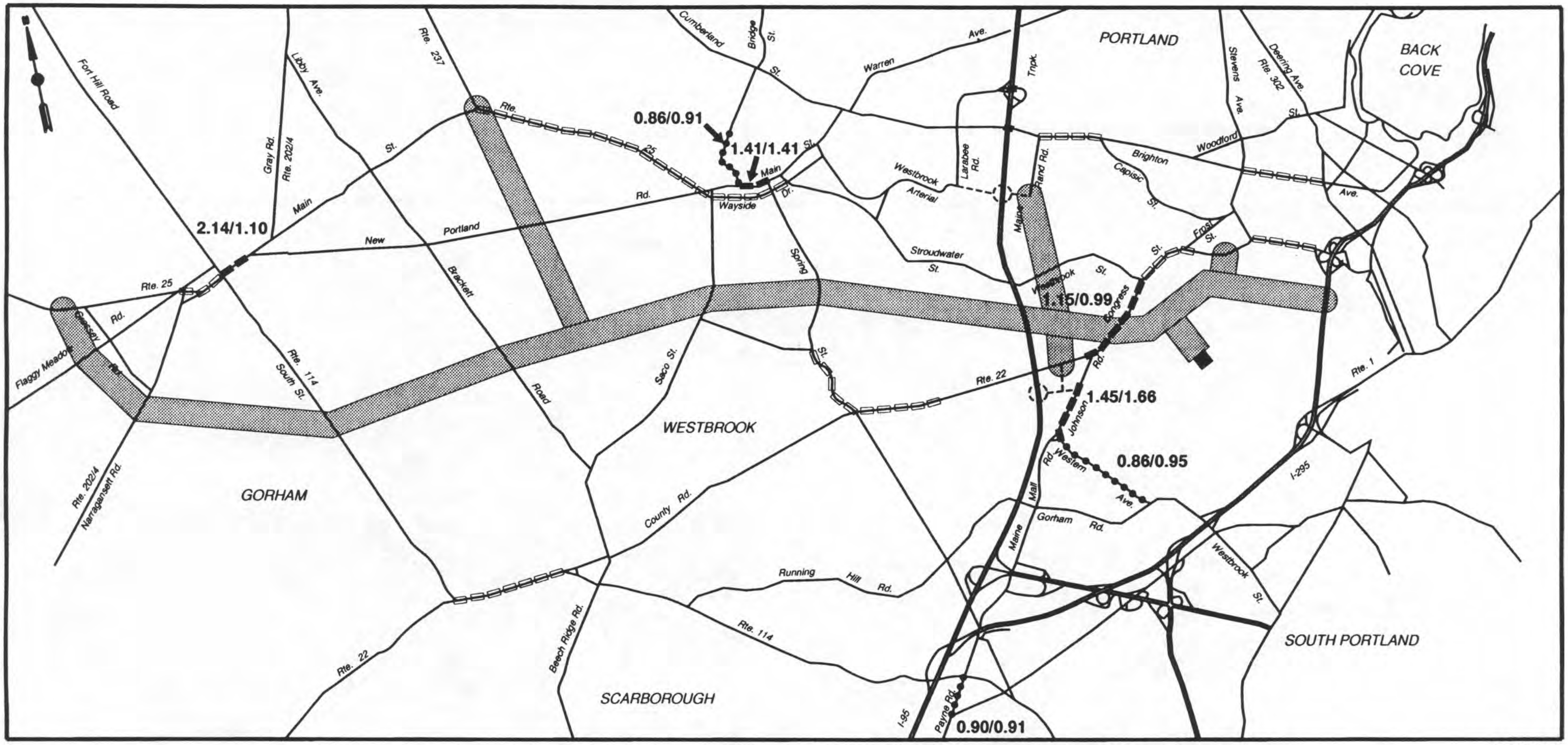
Alternative 4 does not provide access to Flaggy Meadow Rd., New Portland Rd., or Westbrook St.

XX	2010 No-Build Volumes
(YY)	2010 Volumes With Alternative
	Bypass/New Road
	Upgrade

Vanasse Hangen Brustlin, Inc.

Figure 29

2010 Daily Traffic Volumes
Alternative 4



2473DCA4

Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 4 does not provide access to Flaggy Meadow Rd., New Portland Rd., or Westbrook St.

Legend:

- Deficiency Eliminated
- Deficiency Remains
- Deficiency Added
- XX.X/YY.Y — No Build V/C Ratio / Aternative 4 V/C Ratio
- Upgrade
- Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 30

2010 Capacity Deficiency Comparison
Alternative 4

2.14 to 1.10 and the ratio on Congress Street is reduced from 1.15 to 0.99. No deficiencies are added on either Route 25 or Route 22.

Alternative 4 is one of the few alternatives that eliminates the deficiency on Spring Street north of Route 22. Projected deficiencies would remain on Main Street between Bridge Street and Spring Street in Westbrook and Johnson Road south of the airport access road. Johnson Road would experience an increase in v/c ratio. Two minor deficiencies are added on Bridge Street north of Main Street in Westbrook and on Payne Road south of Route 114 in Scarborough. In each case, the v/c ratio is 0.91. A deficiency is also added on Western Avenue which would have a v/c ratio of 0.95.

Table 18 compares the four transportation measures of effectiveness for Alternative 4 with the No-build case. Alternative 4 produces a decrease of 11,500 miles in VMT, the second largest decrease of all alternatives. VHT declines by approximately 22,200 hours (7.0 percent) and the average v/c ratio for selected links declines 37.6 percent from 0.85 to 0.53. VHD declines by approximately 19,500 hours or 17.8 percent.

Table 18

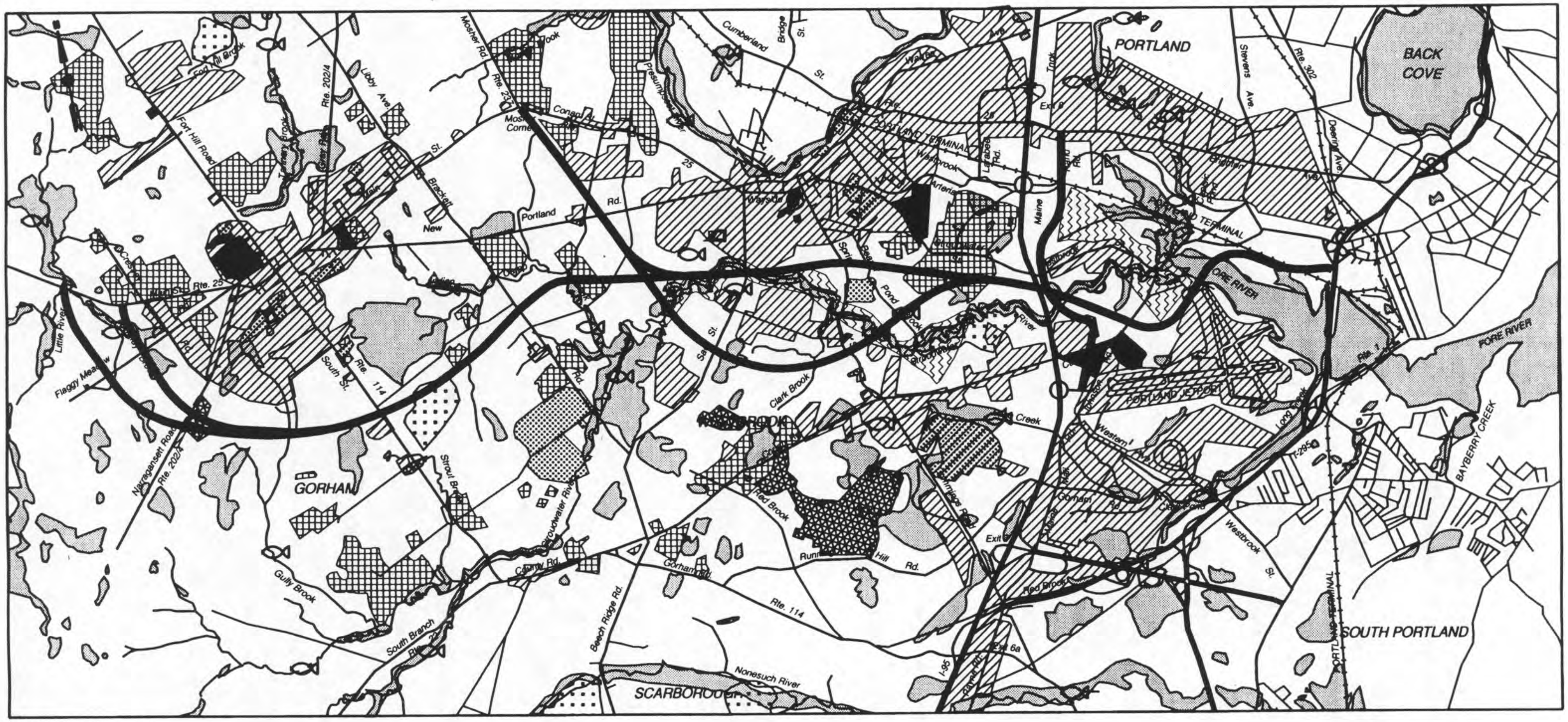
MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 4

			Change	
Measure*	No-Build	Alternative 4	Number	Percent
VMT	7,443,400	7,431,900	-11,500	-0.2
VHT	315,000	292,800	-22,200	-7.0
VHD	109,600	90,100	-19,500	-17.8
V/C	0.85	0.53	-0.32	-37.6

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

Environmental, Social and Engineering Impacts

Figure 31 shows the alignment of Alternative 4 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between new roads and environmental resources. In addition, the estimated construction cost of Alternative 4 is between 121.8 and 123.2 million dollars. Table 19 provides a quantification of the alternative's impact on various study area features. The following text describes these impacts, highlighting major problem areas.



Dense combinations of residential, commercial or institutional areas)	Park and Recreation Area Public Facilities	Waste Site (includes Junk Yards)	New Road
Cemetery/Institution	Active Farmland	Wildlife Resource	Upgrade Intersection
Identified Wetland and Surface Water	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)	Fishery	Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

Vanasse Hangen Brustlin, Inc.

Figure 31

Environmental Constraints Alternative 4

Table 19 **ALTERNATIVE 4--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	--	--	2,000	2,000	2,000	2,000
Commercial/Industrial	--	--	1,100	1,100	1,100	1,100
Low Density Residential	--	--	2,200	2,500	2,200	2,500
Farmland						
Sensitive Land Use:						
Parks	--	--	700	700	700	700
Historic	--	--	300	300	300	300
Institutional			100	150	100	150
Resource Protection	--	--	2,400	5,600	2,400	5,600
Floodplains	--	--	4,700	5,900	4,700	5,900
Stream Crossings	*	*	*	*	11	13
Identified Wetlands	--	--	7,200	8,700	7,200	8,700
Fish/Wildlife Areas	--	--	5,050	5,150	5,050	5,150
Sand/Gravel Aquifers	--	--	7,250	7,400	7,250	7,400
Hydric Soils:						
Hydric	--	--	24,700	25,250	24,700	25,250
Potentially Hydric	--	--	25,750	27,150	25,750	27,150
Surficial Geo. High-Mod.	--	--	63,200	67,800	63,200	67,800
Steep Slopes:						
High	--	--	4,950	6,050	4,950	6,050
Moderate	--	--	8,500	9,900	8,500	9,900
Farmland Soils:						
Prime	--	--	18,900	24,950	18,900	24,950
Statewide Importance	--	--	9,450	11,500	9,450	11,500

* No differentiation between upgrade and new.
-- No upgrade.

As previously mentioned, this alternative consists of all new road segments including alternative bypasses south of Gorham and Westbrook, and a new crossing of the Fore River estuary north of the jetport.

Surficial Geology: Unstable Deposits

Much of this alternative's alignment lies in an area of unstable geologic deposits (63,200 to 67,800 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along much of this alternative's alignment. Principal areas of concern are the Stroudwater River crossings south of Westbrook and the Fore River crossing. The crossings of Gully and Indian Camp Brooks south of Gorham also involve steep slopes. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (18,900 to 24,950 linear feet) and Additional Farmland Soils of Statewide Importance (9,450 to 11,500 feet) would have little impact on active farms.

Sand and Gravel Aquifers

The bypass segments southwest of Gorham (near Narragansett Road) intersect an area of moderate yield aquifer. Two groundwater contamination sites occur in this area as well (auto junkyard and sand excavation site). Roadway designers should be aware of these potential problem areas if they still exists at the time of design. In total, between 7,250 and 7,400 linear feet of moderate yield aquifer is crossed by this alternative.

Surface Water Resources

Numerous surface waters would be crossed by this alternative:

- Stroudwater River and its tributaries (including Gully and Indian Camp Brooks)
- Brandy Brook (tributary to the Presumpscot River)
- Fore River estuary

Overall, this alternative has a high number of stream crossings (11 to 13) compared to other alternatives; most are in the Stroudwater basin. Many of these are major crossings such as the Stroudwater River and the Fore River estuary. The crossings of Gully and Indian Camp Brooks also involve steep slopes.

Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative involves a total floodplain crossing distance of between 4,700 and 5,900 feet. The multiple new road crossings of the Stroudwater River and the new road crossing of the Fore River estuary constitute the majority of floodplain crossings associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

Wetland impacts of this alternative range from 7,200 feet to 8,700 feet, about average compared with other alternatives. The presence of extensive hydric soils south of Gorham and Westbrook suggests wetlands are more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland loss would be in the Gully and Indian Camp Brook watersheds, the Stroudwater River crossings south of Westbrook, and the new crossing of the Fore River. Each of these sites pose regulatory constraints with regard to wetland permitting. The Gorham bypass crosses a wetland of low importance (pending official designation) south of Day Road. Structural engineering solutions and careful choice of crossing locations would minimize the impacts associated with crossings in the Stroudwater River and the Fore River watersheds. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with bypasses south of Gorham is largely evergreen forest. The lands crossed by alternatives south of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses.

Fish and Wildlife Resources

The outer Gorham bypass crosses Brandy Brook--a state designated fishery of medium importance. Assuming proper design, this crossing should have no significant impact on the fishery. The Gorham bypass crosses a state designated deer wintering area south of Day Road.

South of Westbrook, the inner (northern) option impacts a fishery of high importance, but otherwise avoids designated fisheries and deer wintering areas potentially impacted by the outer (southern) bypass option.

The new road crossing the Fore River poses major concerns for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Proper design of the crossing would minimize direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are low compared with other alternatives. This alternative would cross 2,000 feet of high and moderate density residential land use, and between 2,200 feet and 2,500 feet of low density residential land use. The total crossing of commercial and industrial land uses would be approximately 1,100. Most impacts would be associated with new road interchanges. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The only known area of cultural resource impact with Alternative 4 is the Stroudwater Historic District (skirted by this alternative) and a designated historic site just east of the district, near the Fore River. Avoidance options are limited due to the proximity of both the historic resources and the jetport runway. Historic resource in the vicinity of the Stroudwater Historic District may be so great that this segment may be difficult to implement as currently envisioned due to the requirements for approval pursuant to Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

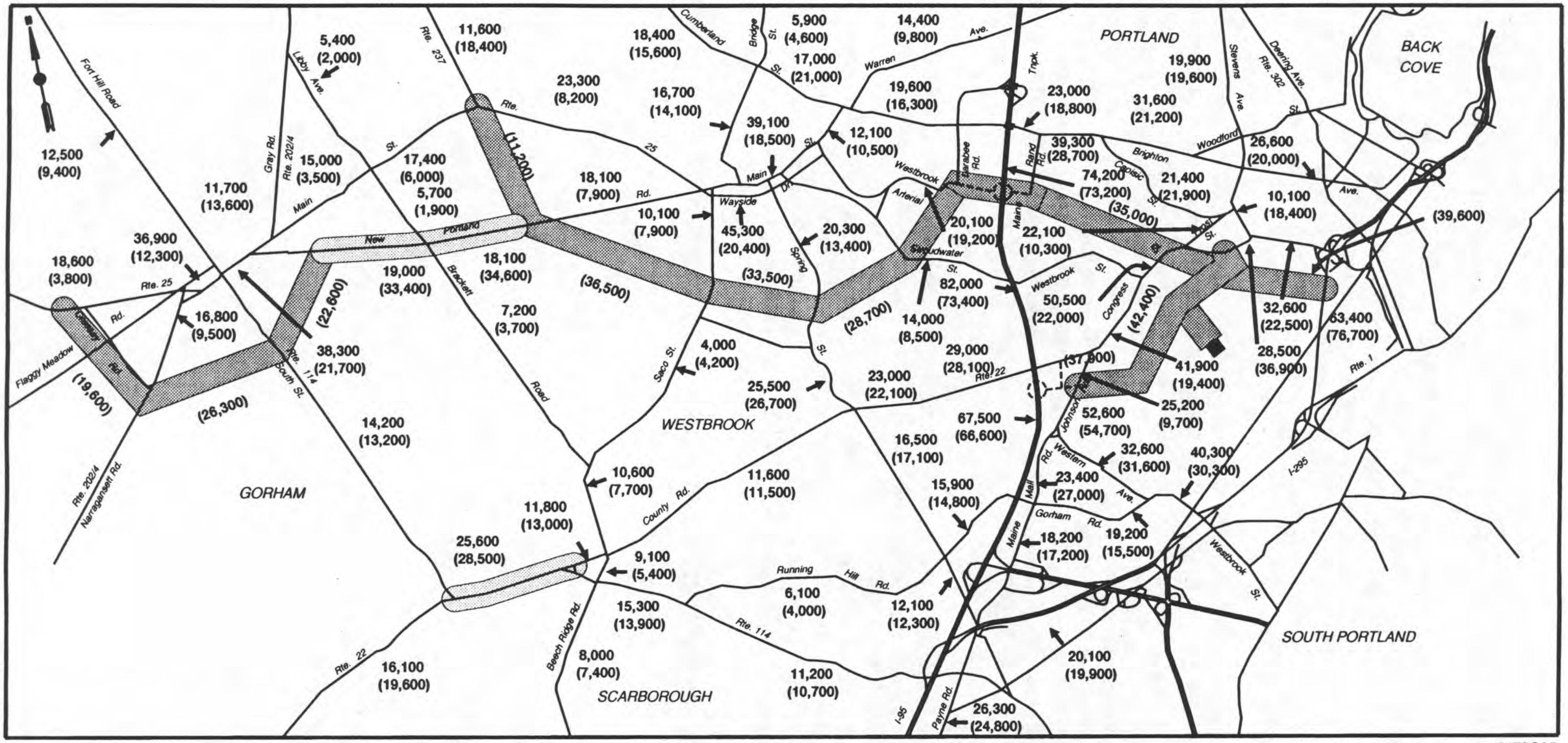
Also noted is a potential historic site just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist.

ALTERNATIVE 5

This alternative is principally a new road concept made up of interconnected bypasses. It includes:

- A partial southern bypass of Gorham Village between Route 25 and New Portland Road
- A southern bypass of Westbrook between Route 25 at Mosher Corner and the intersection of Larrabee Road and the Westbrook Arterial
- A four lane upgrade of New Portland Road between its intersections with the Gorham and Westbrook bypasses
- Congress Street and Brighton Avenue bypasses in Portland
- An upgrade of Route 22 in South Gorham to four lanes between South Street (Route 114 in Gorham) and Gorham Road (Route 114 in Scarborough).

Projected volumes for Alternative 5 are presented in Figure 32. The new road segments carry daily volumes ranging from 11,200 on the segment between Mosher Corner and New Portland Road to 42,400 on the link between the entrance to the airport and Johnson Road. This results from substantial diversions from existing roadways. Reductions in areas with No-Build deficiencies include 28,500 on Congress Street north of Westbrook Street, 16,600 on Route 25 east of Route 114 in Gorham Village; 24,900 in Westbrook; and 10,600 on Brighton Avenue east of the proposed Turnpike interchange access



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Notes: Schematic Only
Not to Scale

Alternative 5 does not provide access to Flaggy Meadow Rd. or Congress St. west of Frost St.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

Bypass/New Road

Upgrade

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Figure 32

2010 Daily Traffic Volumes Alternative 5

road. Volume increases on upgraded sections include 16,500 on new Portland Road east of Bracket Road and 2,900 on Route 22 in South Gorham.

This alternative eliminates all Route 25 and Route 22 deficiencies except on Main Street east of Route 114 in Gorham Village and County Road east of Spring Street. As shown in Figure 33, the v/c ratio in Gorham village is reduced from 2.14 to 1.21 and the v/c ratio on County Road is reduced slightly from 1.02 to 1.00. The only deficiency added on either Route 25 or Route 22 is on Congress Street between the connector to the new road and Stevens Avenue where the projected v/c ratio is 1.02.

Deficiencies are also added on the upgraded portions of New Portland Road connecting the Gorham and Westbrook bypasses. The projected v/c ratios are 0.93 west of Brackett Road and 0.96 east of Brackett Road. A minor increase in the v/c ratio on Stevens Avenue south of Brighton Avenue results in a deficiency. Projected deficiencies would remain on Main Street between Bridge Street and Spring Street in Westbrook, Spring Street north of County Road and Johnson Road south of the airport access road. The Main Street location would experience a substantial decline in the v/c ratio from 1.41 to 1.03. The v/c ratios at the Spring Street and Johnson Road locations would increase to 1.27 and 1.52, respectively.

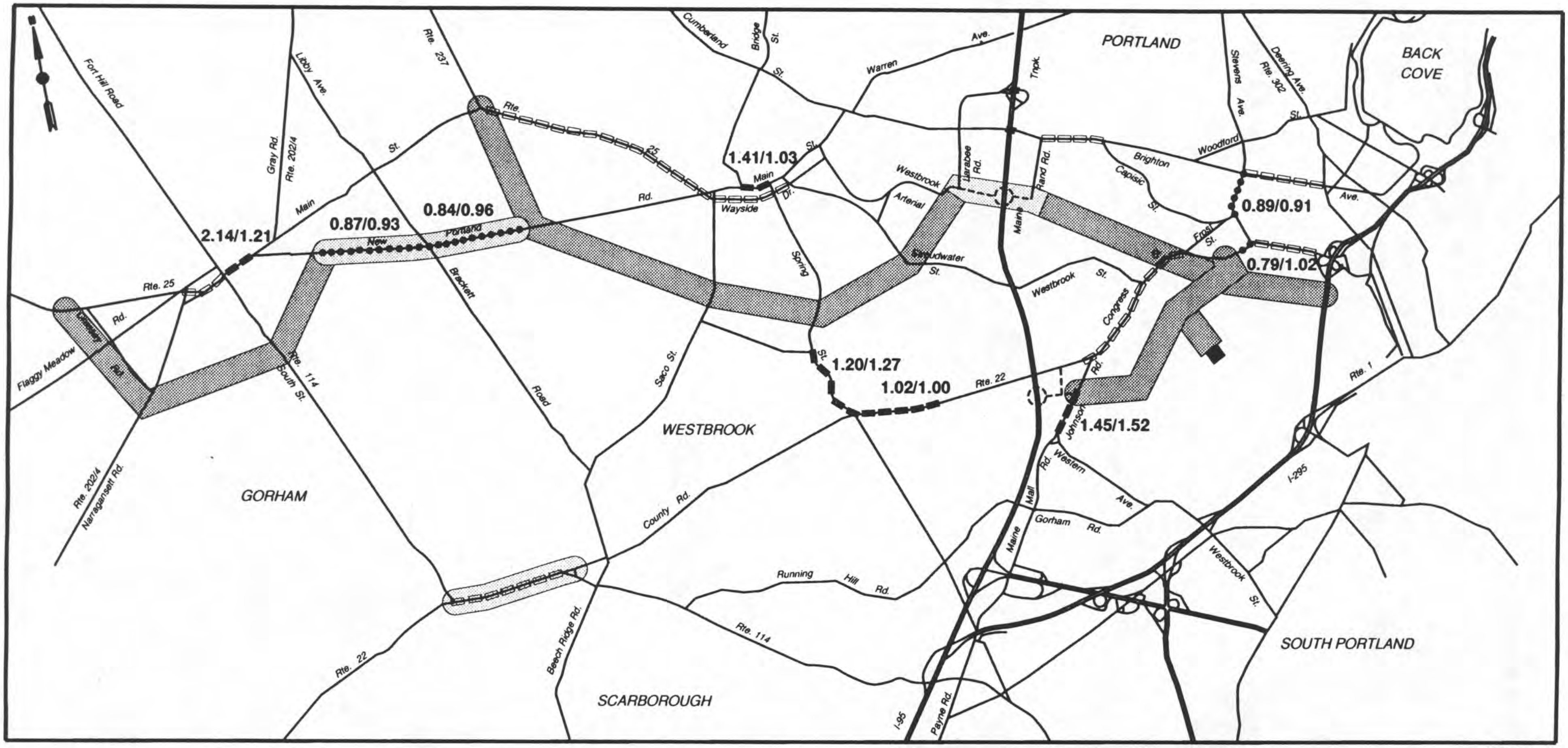
Table 20 compares the four transportation measures of effectiveness for Alternative 5 with the No-build case. Although Alternative 5 produces a small increase in total VMT of 3,000 miles (less than 0.05 percent), it results in a significant reduction in VHT, VHD, and average v/c ratio. VHT declines by approximately 21,600 hours (6.9 percent) and VHD declines by approximately 19,300 hours (17.6 percent). The average v/c ratio for selected links declines 35.3 percent from 0.85 to 0.55 (the third lowest average v/c ratio).

Table 20

MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 5

			Change	
Measure*	No-Build	Alternative 5	Number	Percent
VMT	7,443,400	7,440,400	3,000	0.0**
VHT	315,000	293,400	-21,600	-6.9
VHD	109,600	90,300	-19,300	-17.6
V/C	0.85	0.55	-0.30	-35.3

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.
** Less than 0.05



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Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 5 does not provide access to Flaggy Meadow Rd. or Congress St. west of Frost St.

▭▭▭	Deficiency Eliminated
▬ ▬ ▬	Deficiency Remains
●●●●●	Deficiency Added
XX.X/YY.Y	No Build V/C Ratio / Alternative 5 V/C Ratio
(light shade)	Upgrade
(dark shade)	Bypass/New Road

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Figure 33

2010 Capacity Deficiency Comparison Alternative 5

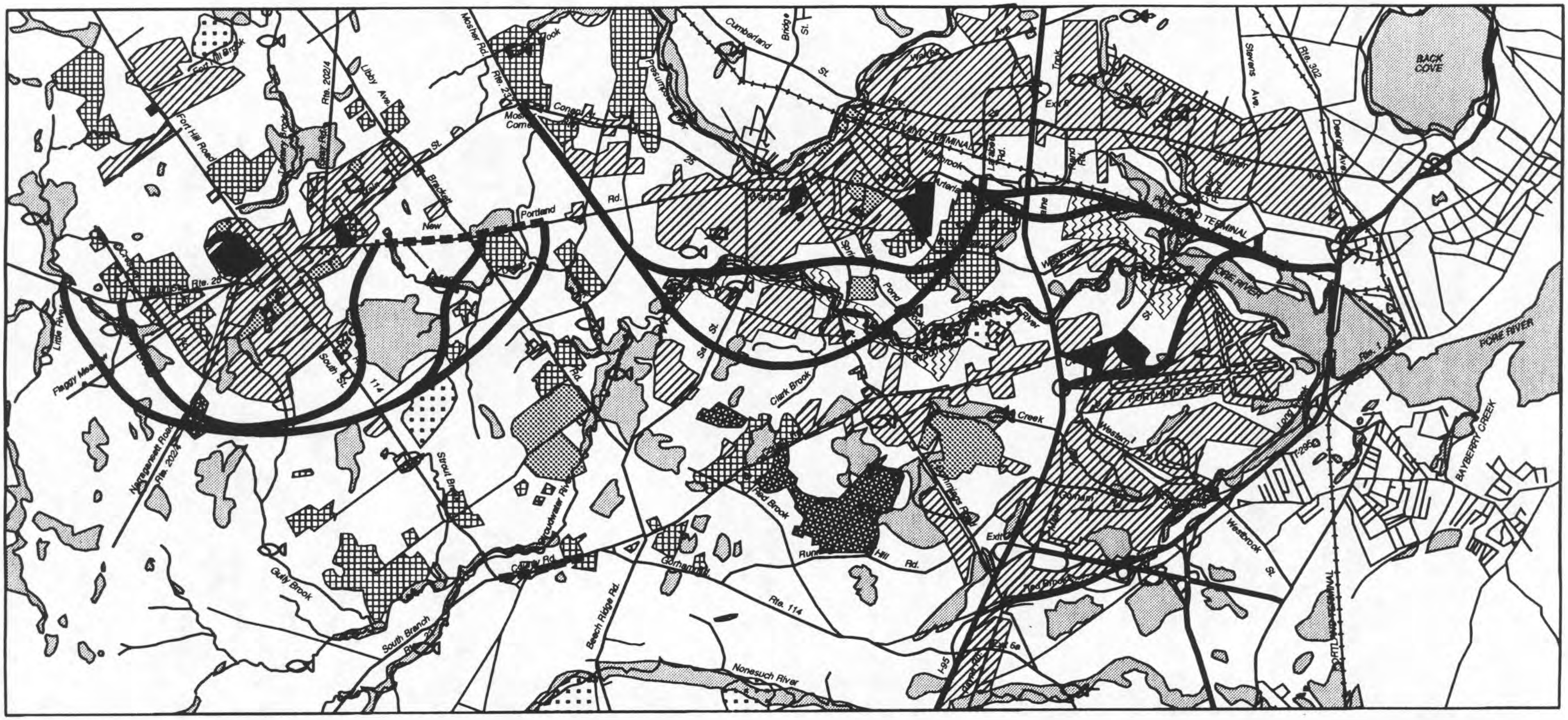
Environmental, Social and Engineering Impacts

Figure 34 shows the alignment of Alternative 5 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. In addition, the estimated construction cost of Alternative 5 is between 135.7 and 141.8 million dollars. Table 21 provides a quantification of the alternative's impact on various study area features.

Table 21 **ALTERNATIVE 5--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	0	0	1,300	1,800	1,300	1,800
Commercial/Industrial	1,500	1,500	600	1,000	2,100	2,500
Low Density Residential	4,150	4,150	1,400	2,000	5,550	6,150
Farmland	1,250	1,250	3,600	5,700	4,850	6,950
Sensitive Land Use:						
Parks	0	0	0	0	0	0
Historic	0	0	0	0	0	0
Institutional	0	0	0	50	0	50
Resource Protection	0	0	3,500	6,700	3,500	6,700
Floodplains	0	0	4,950	8,700	4,950	8,700
Stream Crossings (Number)	*	*	*	*	14	14
Identified Wetlands	2,600	2,600	13,750	18,350	16,350	20,950
Fish/Wildlife Areas	0	0	2,500	6,880	2,500	6,880
Sand/Gravel Aquifers	4,800	4,800	7,100	7,250	11,900	12,050
Hydric Soils:						
Hydric	3,100	3,100	27,200	33,150	30,300	36,250
Potentially Hydric	4,100	4,100	19,150	27,550	23,250	31,650
Surficial Geo. High-Mod.	8,350	8,350	63,800	74,200	72,150	82,550
Steep Slopes:						
High	100	100	4,900	7,500	5,000	7,600
Moderate	700	700	12,500	17,450	13,200	18,150
Farmland Soils:						
Prime	2,800	2,800	15,300	25,850	18,100	28,650
Statewide Importance	1,600	1,600	8,050	14,750	9,650	16,350

* No differentiation between upgrade and new.
-- No upgrade.



Dense combinations of residential, commercial or institutional areas)	Park and Recreation Area Public Facilities
Cemetery/Institution	Active Farmland
Identified Wetland and Surface Water	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)

Waste Site (includes Junk Yards)

Wildlife Resource

Fishery

New Road

Upgrade Intersection

Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure 34

Environmental Constraints Alternative 5

This alternative is similar to Alternative 4 except that, with Alternative 5 the connection between Gorham and Westbrook bypasses is via an upgraded segment of New Portland Road; and the connection between the Westbrook bypass and Portland is north of Westbrook Street, near the railroad. This alternative includes three optional bypass routes south of Gorham, two bypass options south of Westbrook, two options between the Westbrook arterial and Portland, and a new road alongside the jetport which crosses the Fore River estuary. The following text describes the impacts of this alternative, highlighting major problem areas.

Surficial Geology: Unstable Deposits

Much of this alternative's alignment lies in an area of unstable geologic deposits (72,150 to 82,550 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along much of this alternative's alignment. Principal areas of concern are the Stroudwater River crossings south of Westbrook and the crossings of the Fore River estuary. The crossings of Gully and Indian Camp Brooks south of Gorham also involve steep slopes. Steep slopes and erodible soils are more abundant in the area affected by the alternative alignment farthest from the Gorham town center. The innermost bypass option is therefore more favorable. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (18,100 to 28,650 linear feet) and Additional Farmland Soils of Statewide Importance (9,650 to 16,350 feet) would have little overall impact on active farms. The Westbrook bypasses would, however, impact a large farm on Stroudwater Street with associated loss of Prime Farmland soils. The outermost bypass option would have the most impact in this respect.

Sand and Gravel Aquifers

The bypass segments southwest of Gorham near Narragansett Road intersect an aquifer area of moderate yield. Two groundwater contamination sites occur in this area as well (auto junkyard and sand excavation site). Roadway designers should be aware of these potential problem areas if they still exist at the time of design. In total, between 11,900 and 12,050 linear feet of moderate yield aquifer is crossed by this alternative.

Surface Water Resources

Numerous surface waters would be crossed by this alternative, including:

- Stroudwater River and its tributaries (including Gully and Indian Camp Brooks)
- Brandy Brook (tributary to the Presumpscot River)
- Fore River estuary (two crossings)

This alternative has a high number of stream crossings (14) compared to other alternatives; most are in the Stroudwater basin. Many of these are major crossings, such as the Stroudwater River in Westbrook and the Fore River estuary in Portland. South of Gorham, the crossings of Gully and Indian Camp Brooks also involve steep slopes.

Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long-term effects to surface waters.

Floodplains

This alternative involves a total floodplain crossing distance of between 4,950 and 8,700, one of the highest levels of floodplain impact of all alternatives. The multiple new road crossings of the Stroudwater River and the two new road crossing of the Fore River estuary constitute the majority of floodplain crossings associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

Wetland impacts of this alternative range from 16,350 feet to 20,950 feet of crossing, one of the highest levels of wetland impact of all alternatives. The presence of extensive hydric soils south of Gorham and Westbrook suggests wetlands are even more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland loss would be in the Gully and Indian Camp Brook watersheds, the Stroudwater River crossings south of Westbrook, and particularly, the two new crossings of the Fore River. Each of these sites pose regulatory constraints with regard to wetland permitting. The outer bypass crosses State designated wetland of low importance (pending official designation) south of Day Road. Structural engineering solutions and careful choice of crossing locations would minimize the impacts associated with crossings in the Stroudwater River and Fore River watershed. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with bypasses south of Gorham is largely evergreen forest. The lands crossed by alternatives south of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses. The Westbrook to Portland segments south of the railroad could impact a salt marsh.

Fish and Wildlife Resources

The inner bypass southwest of Gorham crosses Brandy Brook--a State designated fishery of medium importance. With appropriate design, this crossing should have no significant impact on the fishery. The middle and outermost bypasses southeast of Gorham cross the edge of a State designated deer wintering area of indeterminate importance just south of Day Road. The middle bypass also crosses a designated fishery of medium importance (Indian Camp Brook headwaters). These crossings are less desirable than the innermost bypass option southeast of Gorham.

South of Westbrook, the inner (northern) option impacts a fishery of high importance, but otherwise avoids designated fisheries and deer wintering areas potentially impacted by the outer (southern) bypass option.

The two new crossings of the Fore River estuary also poses a concern for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are low compared with other alternatives. This alternative would cross 1,300 to 1,800 feet of high and moderate density residential land use, and between 5,550 to 6,150 feet of low density residential land use. The total crossing of commercial and industrial land uses would be between 2,100 and 2,500 feet. Most impacts would be associated with new road interchanges. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The only known area of cultural resource impact with Alternative 5 is the Stroudwater Historic District (skirted by this alternative) and a designated historic site just east of the district, near the Fore River. Avoidance options are limited due to the proximity of both the historic resources and the jetport runway. Historic resources in the vicinity of the Stroudwater Historic District may be so great that this segment may be difficult to implement as currently envisioned due to the requirements for approval under Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

A potential historic site is also located just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist.

ALTERNATIVE 6

This alternative is the same as Alternative 2 except that the upgrade of Brighton Avenue is replaced with a new road connection parallel to Brighton Avenue between I-295 and the proposed Turnpike interchange south of Brighton Avenue. As with Alternative 2, Alternative 6 includes:

- A northern bypass of Gorham Village between Route 202/4 west of the village and the intersection of Routes 25 and 237 east of the village (Mosher Corner). Access to the Gorham bypass is provided at Route 202/4 (both locations), Route 25, Route 114, and Mosher Corner.

- A bypass parallel to Brighton Avenue between the proposed Turnpike interchange at Rand Road and I-295. Access is provided at the Turnpike interchange, Congress Street west of Stevens Avenue, and I-295.

- An upgrade of Route 22 in South Gorham to four lanes between South Street (Route 114 in Gorham) and Gorham Road (Route 114 in Scarborough).

- Upgrade of Route 25 to four lanes between Route 237 (Mosher Corner, Gorham) and Main Street/Wayside Drive

- Upgrade of Wayside Drive to six lanes between Main Street and Stroudwater Street, including intersection improvements at:

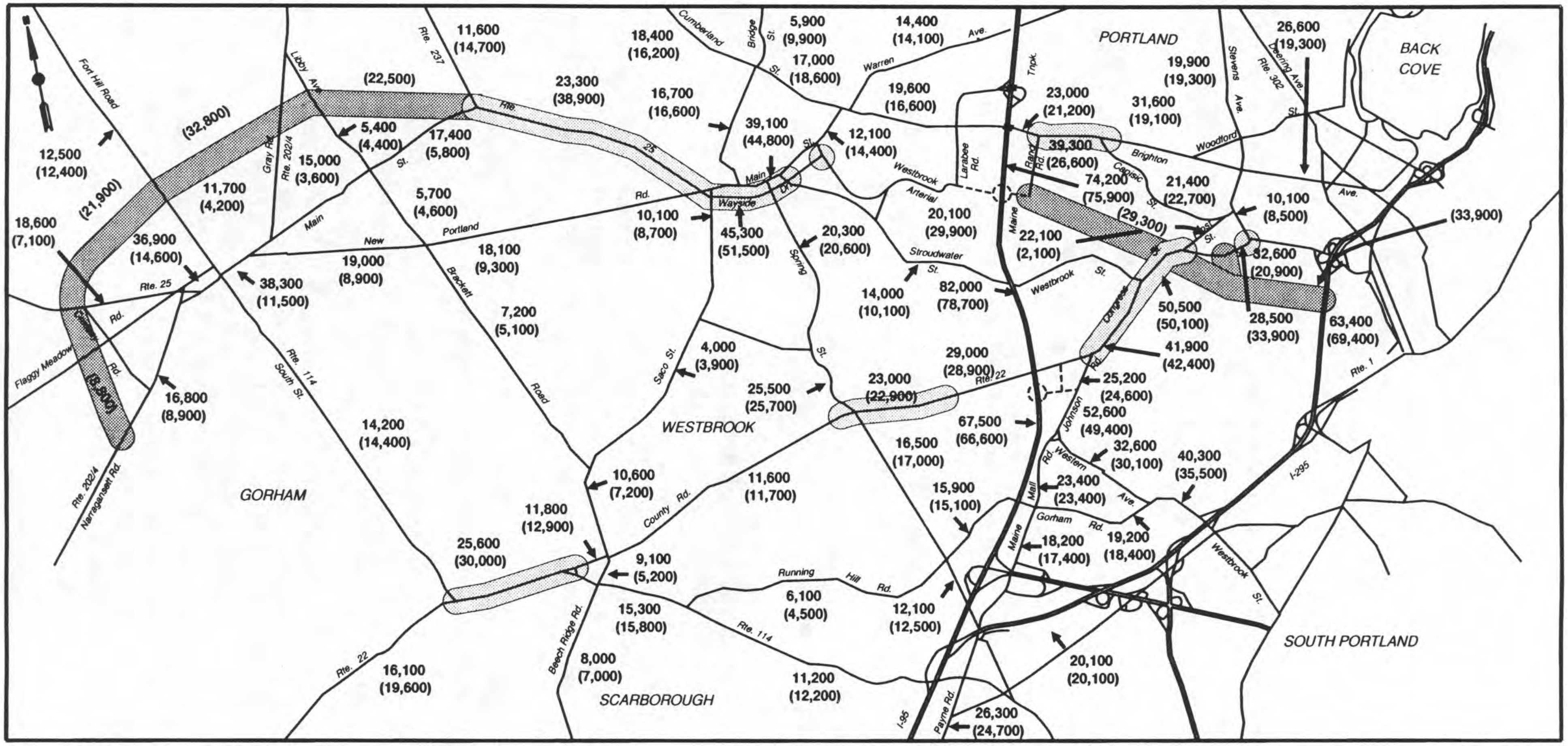
  Wayside Drive/Stroudwater Street,
  Wayside Drive/Westbrook Arterial, and
  Main Street/Spring Street

- Upgrade County Road between Spring Street and the Portland city line to four lanes (this is a continuation of a planned No-Build project, which is listed in Table 1 and shown on Figure 6 presented earlier, to widen Congress Street to four lanes between Johnson Road and the Westbrook city line)

- Upgrade Brighton Avenue to six lanes between the proposed Turnpike interchange access road and Capisic Street

- Upgrade Congress Street to six lanes between Johnson Road and Frost Street, and improve the intersection at Stevens Avenue and Congress Street

Figure 35 shows Alternative 6 and No-Build daily volumes on major roadway segments throughout the study area. Except in the vicinity of Brighton Avenue, the results for Alternative 6 are almost identical to the results for Alternative 2. The new road segments that form the bypass of Gorham Village carry volumes ranging from 8,800 trips per day at Route 202/4 west of the Village to 32,800 trips per day east of Fort Hill Road. This results in a reduction of 26,800 vehicles daily in the center of Gorham Village. Volumes along the upgraded segments increase from the No-Build. Route 25 east of Route 237 increases by 15,600 trips and Route 22 in South Gorham increases by 4,400 daily trips. The



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Notes: Schematic Only
Not to Scale

Alternative 6 does not provide access to Flaggy Meadow Rd., Libby Ave., or Congress St. west of Frost St.

XX	2010 No-Build Volumes
(YY)	2010 Volumes With Alternative
[shaded]	Bypass/New Road
[light]	Upgrade

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Figure 35

2010 Daily Traffic Volumes
Alternative 6

new road segment parallel to Brighton Avenue is projected to carry 29,300 daily trips partially as a result of the diversion of 12,700 trips from Brighton Avenue east of the access road to the proposed Turnpike interchange.

The effects of Alternative 6 on projected No-Build deficiencies are shown in Figure 36. Two projected No-Build deficiencies would remain on Routes 25 and 22 (compared with three for Alternative 2, which would also add a deficiency). Both deficient locations would experience a decline in v/c ratios. The largest decline would be on Congress Street between Westbrook Street and Frost Street where the v/c ratio would decline from 1.40 to 0.92. The ratio on Route 25 between Mosher Corner and Main Street Westbrook would decline from 1.06 to 0.94.

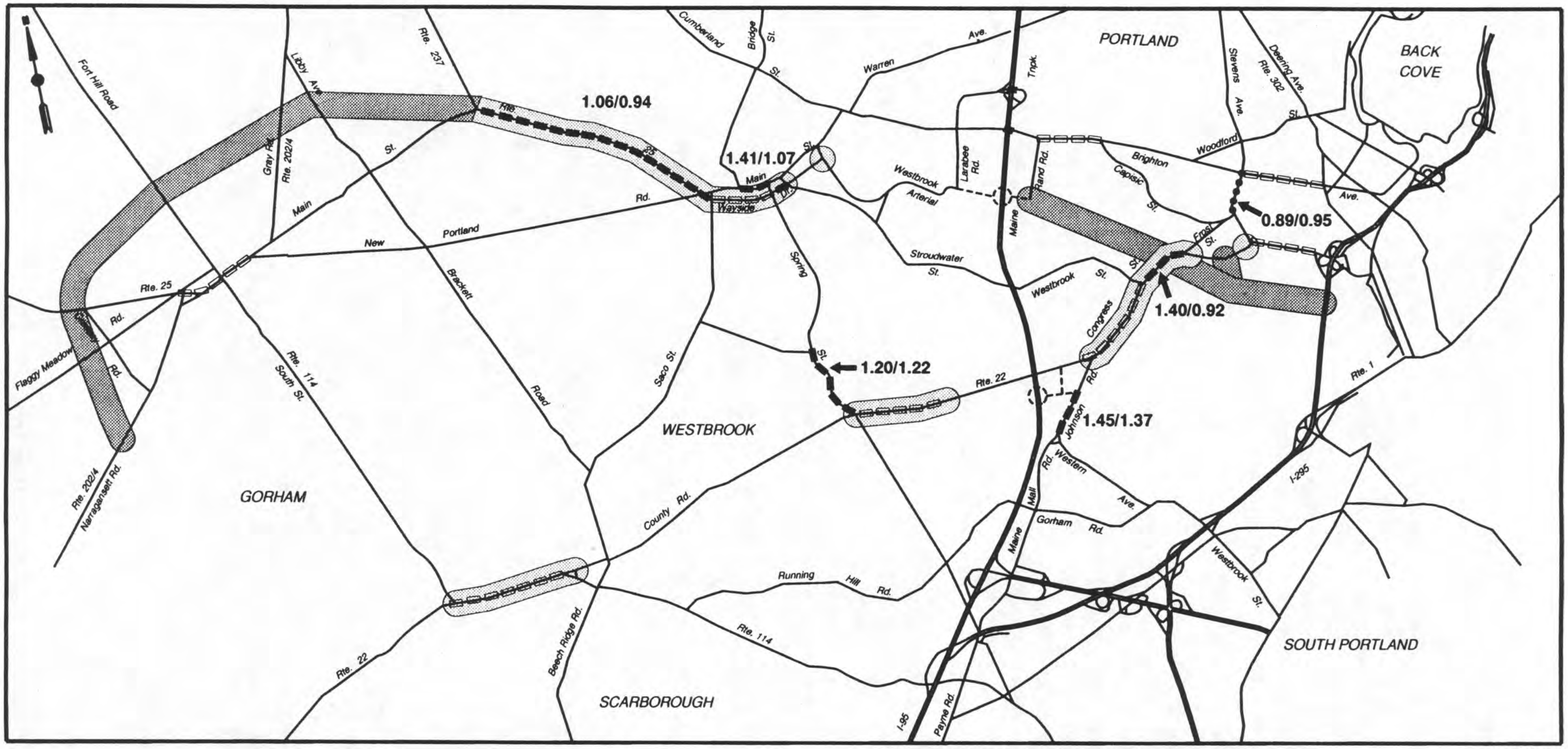
As with Alternative 2, a deficiency would be added on Stevens Avenue south of Brighton Avenue and three projected No-Build deficiencies are expected to remain on other roadways, including Main Street in Westbrook between Bridge Street and Spring Street, Spring Street north of County Road, and Johnson Road south of the airport access road. The Main Street location would experience a substantial reduction in v/c ratio from 1.41 to 1.07 because of increased capacity which is partially offset by increased volume attracted to the upgrade. There would be a small increase in the v/c ratio on Spring Street and a modest decline on Johnson Road.

Table 22 compares the four transportation measures of effectiveness for Alternative 6 with the No-build case. Alternative 6 performs better than Alternative 2 in each category. It produces a minor increase in total VMT (1,200 miles or less than 0.05 percent), and a moderate reduction in VHT, VHD, and average v/c. VHT declines by approximately 15,900 hours (5.0 percent) and VHD declines by approximately 14,700 hours (13.4 percent). The average v/c ratio for selected links declines 31.8 percent from 0.85 to 0.58.

Table 22 **MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 6**

Measure*	No-Build	Alternative 6	Change Number	Change Percent
VMT	7,443,400	7,444,600	1,200	0.0**
VHT	315,000	299,100	-15,900	-5.0
VHD	109,600	94,900	-14,700	-13.4
V/C	0.85	0.58	-0.27	-31.8

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.
** Less than 0.05



Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 6 does not provide access to Flaggy Meadow Rd., Libby Ave., or Congress St. west of Frost St.

Deficiency Eliminated

Deficiency Remains

Deficiency Added

XX.X/YY.Y No Build V/C Ratio / Altenative 6 V/C Ratio

Upgrade

Bypass/New Road

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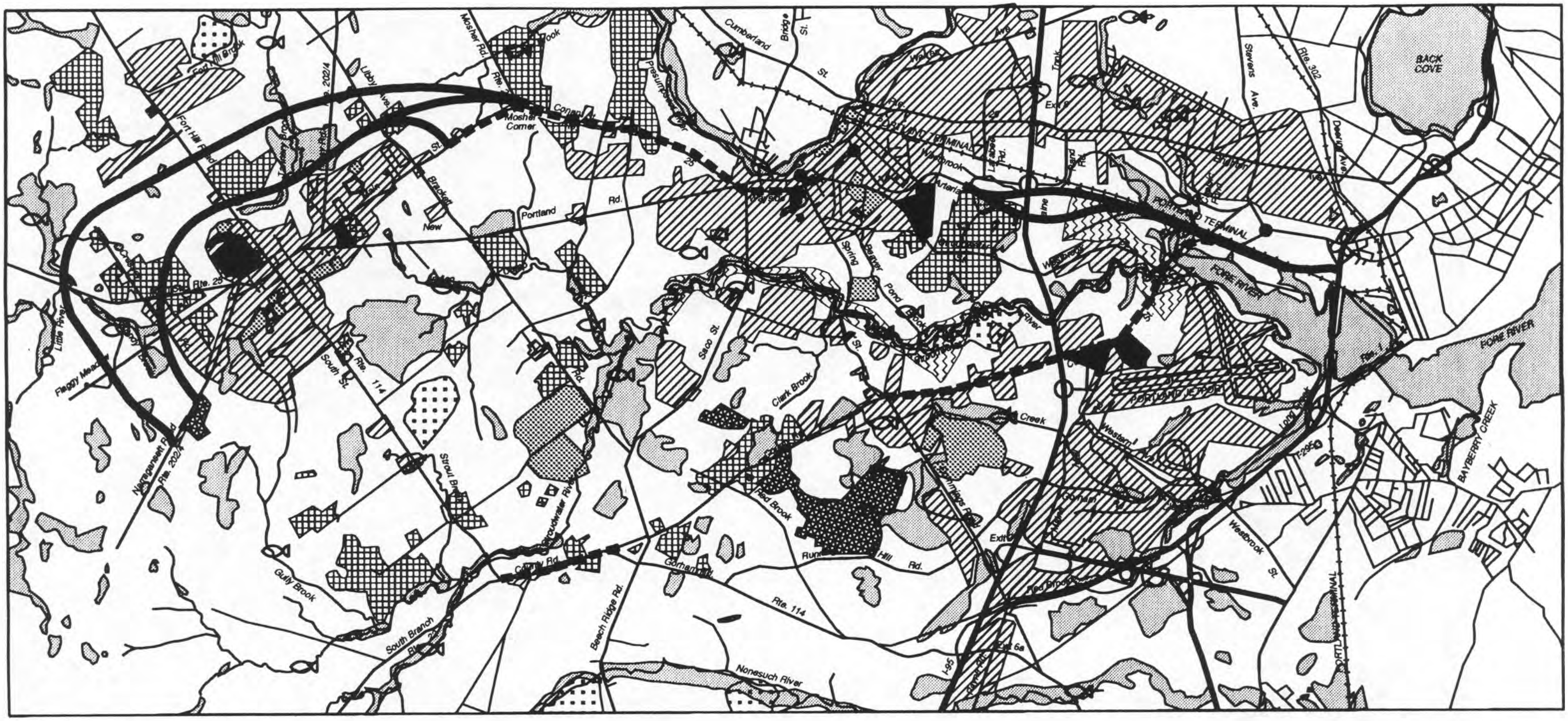
Figure 36

2010 Capacity Deficiency Comparison Alternative 6

Environmental, Social and Engineering Impacts

Figure 37 shows the alignment of Alternative 6 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 23 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 6 is between 61.9 and 69.2 million dollars. As previously mentioned, Alternative 6 is similar to Alternative 2 except that the upgrade of Brighton Avenue is replaced with a new road. The following text describes these impacts, highlighting major problem areas.



[pattern]	Dense combinations of residential, commercial or institutional areas)	[pattern]	Park and Recreation Area Public Facilities	[pattern]	Waste Site (includes Junk Yards)	[line]	New Road
[pattern]	Cemetery/Institution	[pattern]	Active Farmland	[pattern]	Wildlife Resource	[dot]	Upgrade Intersection
[pattern]	Identified Wetland and Surface Water	[pattern]	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)	[symbol]	Fishery	[dashed line]	Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure 37

Environmental Constraints Alternative 6

Table 23 **ALTERNATIVE 6--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	10,400	10,400	600	1,200	11,000	11,600
Commercial/Industrial	10,700	10,700	0	600	10,700	11,300
Low Density Residential	6,800	6,800	1,800	2,900	8,600	9,700
Farmland	3,550	3,550	800	3,900	4,350	7,450
Sensitive Land Use:						
Parks	400	400	0	0	400	400
Historic	3,800	3,800	0	0	3,800	3,800
Institutional	900	900	50	700	950	1,600
Resource Protection	0	0	0	0	0	0
Floodplains	900	900	2,300	5,500	3,200	6,400
Stream Crossings (Number)	*	*	*	*	5	8
Identified Wetlands	1,400	1,400	5,950	8,750	7,350	10,150
Fish/Wildlife Areas	0	0	0	2,000	0	2,000
Sand/Gravel Aquifers	4,800	4,800	0	2,450	4,800	7,250
Hydric Soils:						
Hydric	10,100	10,100	8,050	13,800	18,150	23,900
Potentially Hydric	11,900	11,900	5,000	14,300	16,900	26,200
Surficial Geo. High-Mod.	24,000	24,000	14,400	29,400	38,400	53,400
Steep Slopes:						
High	2,400	2,400	1,500	4,000	3,900	6,400
Moderate	2,650	2,650	3,400	6,400	6,050	9,050
Farmland Soils:						
Prime	7,150	7,150	8,500	19,250	15,650	26,400
Statewide Importance	4,900	4,900	7,280	10,300	12,180	15,200

* No differentiation between upgrade and new.

Surficial Geology: Unstable Deposits

Unstable deposits pose minor constraints to the development of this alternative. These deposits occur throughout the study area, particularly north of Gorham, and in most of Westbrook and Portland. New road crossings of Brandy and Tanner Brooks, and the Fore River estuary Fore River estuary Fore River segments pose the most concern due to the combination of steep slopes and unstable deposits. Geotechnical evaluation at the time of design will identify any such specific problems so that engineering solutions may be applied.

Steep Slopes/Erodible Soils

The principal areas of concern with this alternative are along new road and upgrade segments near the Stroudwater and Fore Rivers, and the multiple crossings of Tannery Brook north of Gorham. Steep slopes and erodible soils associated with Tannery Brook would be most affected by the alternative alignment closest to the Gorham town center. The outer (northern) bypass option is more favorable. In Portland, the new road segments south of the railroad, at the headwaters of the Fore River estuary, are in an area of high erosion potential. Proper application of erosion and sedimentation controls during and after construction would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (15,650 to 26,400 linear feet) and Additional Farmland Soils of Statewide Importance (12,180 to 15,200 feet) would be greatest in the area north of Gorham where active farms occur. The inner bypass option would receive the most impact in this respect. Upgrade segments pose minimal direct impact to the loss of Prime Farmland Soils or Additional Farmland Soils of Statewide Importance because impacted soils are along existing roadsides.

Sand and Gravel Aquifers

The northern-most Gorham bypass passes near a groundwater contamination site off Libby Avenue. Roadway designers should be aware of this potential problem if it still exists at the time of design. Only the South Gorham upgrade segment lies within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area.

Surface Water Resources

The primary surface waters in the vicinity of the upgrade segments are the Fore River, Stroudwater River and its tributaries, and the Presumpscot River (Westbrook segment). This alternative has an average number of stream crossings (5 to 8) compared to other alternatives. The Congress Street upgrade involves major river crossings (Stroudwater River and Fore River). The new road segment which crosses the headwaters of the Fore River near Congress Street is also likely to involve impacts to estuarine surface waters. The crossing of Tanner Brook by the inner Gorham bypass is also involves a broad width of associated wetlands at this location. Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative crosses 3,200 feet to 6,400 feet of floodplain, about average when compared to other alternatives. The Portland segments crossing the Stroudwater River and Fore River constitute the only major floodplain crossings associated with this alternative. Any alternative in this area should be designed so it withstands flooding and does not increase 100-year flood elevations more than a minor amount.

Wetlands

Direct wetland losses associated with this alternative would be about average (7,350 to 10,150 linear feet of crossing) compared to other alternatives. The principal areas of wetland loss would be the Tannery Brook crossing (inner bypass), and the Fore River estuary marshes (either new road option). The inner Gorham bypass crosses a state designated wetland of medium importance (pending official designation). Widening associated with upgrade segments could cause a relatively low marginal decrease in wetland values. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with bypasses north of Gorham is largely evergreen forest with scattered tracts of mixed evergreen/deciduous forest, successional (old field) and pasture. Vegetative cover along upgrade segments is almost entirely urban or suburban in character. New road segments in Portland could pose impacts to natural salt marsh vegetation at the headwaters of the Fore River estuary.

Fish and Wildlife Resources

The outer Gorham bypass crosses Brandy Brook--a State designated fishery of medium importance. Assuming proper design, this crossing should have no significant impact on the fishery. This crossing is less desirable than the northern or outer bypass option.

The new road and upgrade segments in the vicinity of the Fore River estuary pose major concerns for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of these crossings would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are relatively high compared with other alternatives. This alternative would cross between 11,000 and 11,600 feet of high and moderate density residential land use, and between 8,600 feet and 9,700 feet of low density residential land use. The total crossing of commercial and industrial land uses would be between 10,700 feet and 11,300 feet. Most impacts would be associated with upgrade segments. The downtown Westbrook segment poses the greatest impact due to the proximity of structures to the existing road. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The principal area of cultural resource impact with Alternative 6 is the Congress Street upgrade through the Stroudwater Historic District. Although few structures would be directly impacted, their historical significance would require that efforts be taken to avoid and minimize impacts. Avoidance options are limited, due to the proximity of the historic structures to the existing roadway. Historic resources in the Stroudwater Historic District may be so great that upgrade of this segment may be difficult to implement as currently envisioned to the requirements for approval under Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act. Historic resources in downtown Westbrook also pose constraints to the development of upgrade solutions. A potential historic site is located just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist. Development of this alternative would require close coordination between designers and MHPC.

ALTERNATIVE 7

This alternative is similar to Alternative 3. The two differences are the more extensive southern bypass of Gorham village and the replacement of the upgrade of Congress Street with a new road connection parallel to Congress Street between I-295 and the proposed Turnpike interchange at Johnson Road. The southern bypass differs from Alternative 3 in that it extends northward from New Portland Road across Route 25 to Route 202/4. As with Alternative 3, Alternative 7 includes:

- A southern bypass of Gorham Village between Route 25 west of the village and Route 202/4 and Libby Avenue east of the village. Access to the Gorham bypass is provided at Route 25, Route 202/4 (west of the village), Route 114, New Portland Road, Route 25 (Main Street), and Route 202/4 east of the village.

- An upgrade of New Portland Road in Gorham and Westbrook to four lanes between the intersection with the new southern bypass of Gorham and Main Street in Westbrook.

- An upgrade of Route 22 in South Gorham to four lanes between South Street (Route 114 in Gorham) and Gorham Road (Route 114 in Scarborough).

- Upgrade of Route 25 to four lanes between Route 237 (Mosher Corner, Gorham) and Main Street/Wayside Drive

- Upgrade of Wayside Drive to six lanes between Main Street and Stroudwater Street, including intersection improvements at:

  Wayside Drive/Stroudwater Street,
  Wayside Drive/Westbrook Arterial, and
  Main Street/Spring Street

- Upgrade County Road between Spring Street and the Portland city line to four lanes (this is a continuation of a planned No-Build project, which is listed in Table 1 and shown on Figure 6 presented earlier, to widen

Congress Street to four lanes between Johnson Road and the Westbrook city line)

- Upgrade Brighton Avenue to six lanes between the proposed Turnpike interchange access road and Capisic Street

- Upgrade Brighton Avenue between Woodford Street and Deering Avenue to four lanes. Provide additional through and turn lanes at the intersection with Stevens Avenue

Figure 38 shows Alternative 7 and No-Build volumes on major roadway segments throughout the study area. Except in the vicinity of Gorham Village and along Congress Street, the results for Alternative 7 are very similar to the results for Alternative 3. The new road segments that form the bypass of Gorham Village carry volumes ranging from 13,100 at Route 202/4 east of the Village to 33,100 west of South Street. This results in a reduction of 25,000 vehicles daily in the center of Gorham Village, compared to a reduction of 17,300 trips daily with the less extensive bypass in Alternative 3. Route 25 east of Route 237 decreases by 6,900 trips due to the diversion of trips to New Portland Road which increases by 12,100 trips east of Brackett Road. As a result of this diversion, Route 25 east of Route 237 would not require the four-lane upgrade included in this alternative.

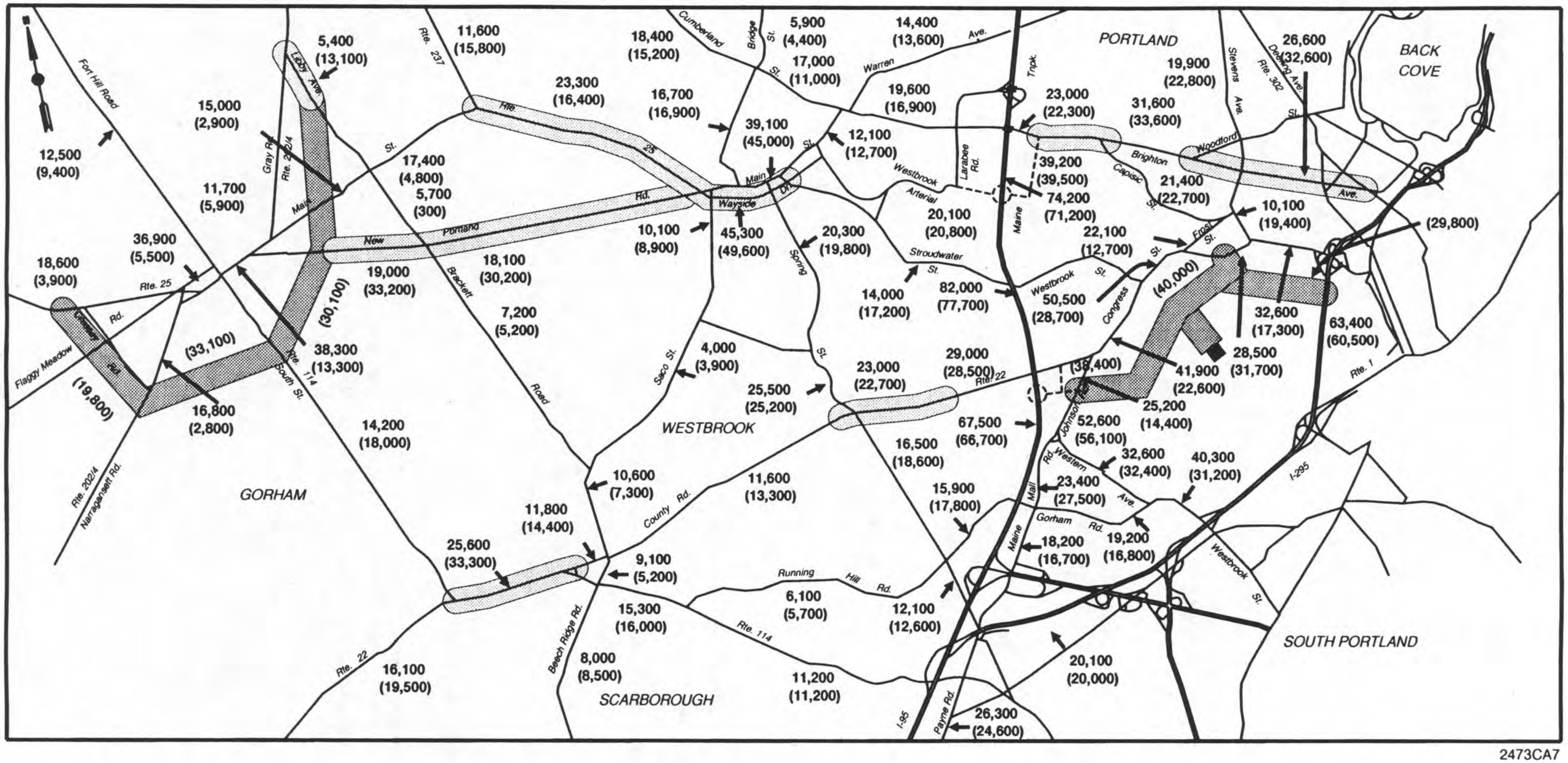
The new road segment parallel to Congress Street is projected to carry 40,000 daily trips partially as a result of the diversion of 21,800 trips from Congress Street north of Westbrook Street. The upgraded segments of roadway generally attract increased volume compared to the No-Build condition. Route 22 in South Gorham increases by 6,800 daily trips and Brighton Avenue east of Stevens Street increases by 6,000 trips.

The effects of Alternative 7 on projected No-Build deficiencies are shown in Figure 39. One projected No-Build deficiency would remain on Routes 25 and 22 and one deficiency would be added. In comparison, three deficiencies would remain and one would be added for Alternative 3 which is similar. The one remaining deficiency would be on Brighton Avenue east of Stevens Avenue, where the v/c ratio would decline from 1.09 to 0.91. The added deficiency would also be on Brighton Avenue east of Capisic Street where the v/c ratio would increase from 0.87 under No-build conditions to 0.93.

Added deficiencies would also occur on Stevens Avenue and New Portland Road. These locations would have v/c ratios of 0.95 and 0.92, respectively.

Three projected No-Build deficiencies are expected to remain on other roadways, including Main Street in Westbrook between Bridge Street and Spring Street, Spring Street north of County Road and Johnson Road south of the airport access road. The Main Street location would experience a substantial reduction in v/c ratio from 1.41 to 1.06 because of the volume attracted to the upgrade of Wayside Drive. There would be essentially no change in the v/c ratio on Spring Street, while Johnson Road would experience a modest increase. As noted above, the reduction of volume on Route 25 east of Route 237 would eliminate the need for the four-lane upgrade on that section of road which was included in the model run for this alternative.

Table 24 compares the four transportation measures of effectiveness for Alternative 7 with the No-build case. Compared with all other alternatives,



Notes: Schematic Only
Not to Scale

Alternative 7 does not provide access to Flaggy Meadow Rd.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

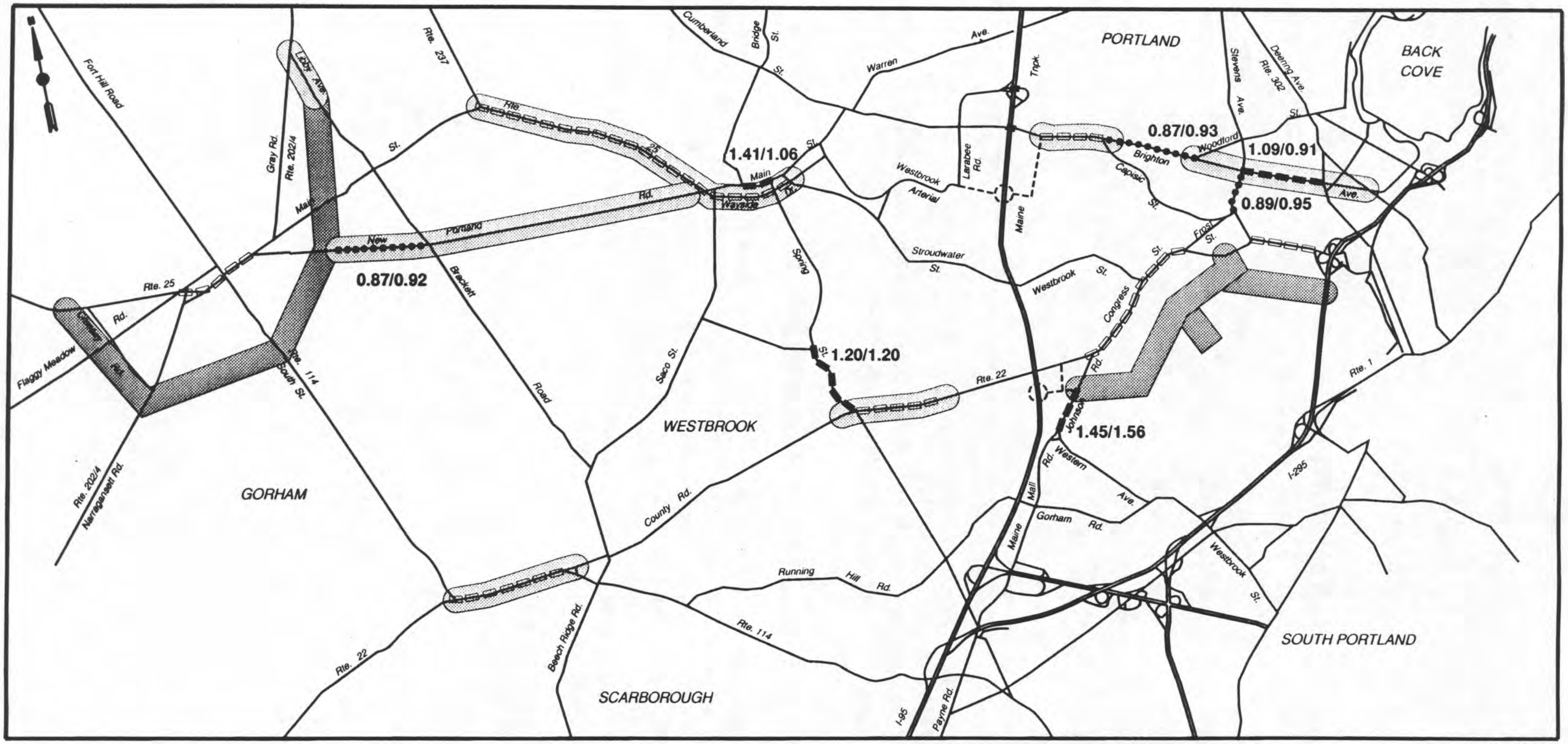
Bypass/New Road

Upgrade

Vanasse Hangen Brustlin, Inc.

Figure 38

2010 Daily Traffic Volumes
Alternative 7



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Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 7 does not provide access to Flaggy Meadow Rd.

□□□ Deficiency Eliminated

▬ ▬ ▬ Deficiency Remains

••••• Deficiency Added

XX.X/YY.Y No Build V/C Ratio / Alternative 7 V/C Ratio

Upgrade

Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 39

2010 Capacity Deficiency Comparison Alternative 7

Alternative 7 produces a modest reduction in VMT, VHT, VHD, and average v/c ratio. VMT declines by approximately 5,400 miles (0.1 percent), VHT declines by approximately 18,900 hours (6.0 percent), and VHD declines by approximately 17,500 hours (16.0 percent). The average v/c ratio for selected links declines 34.1 percent from 0.85 to 0.56.

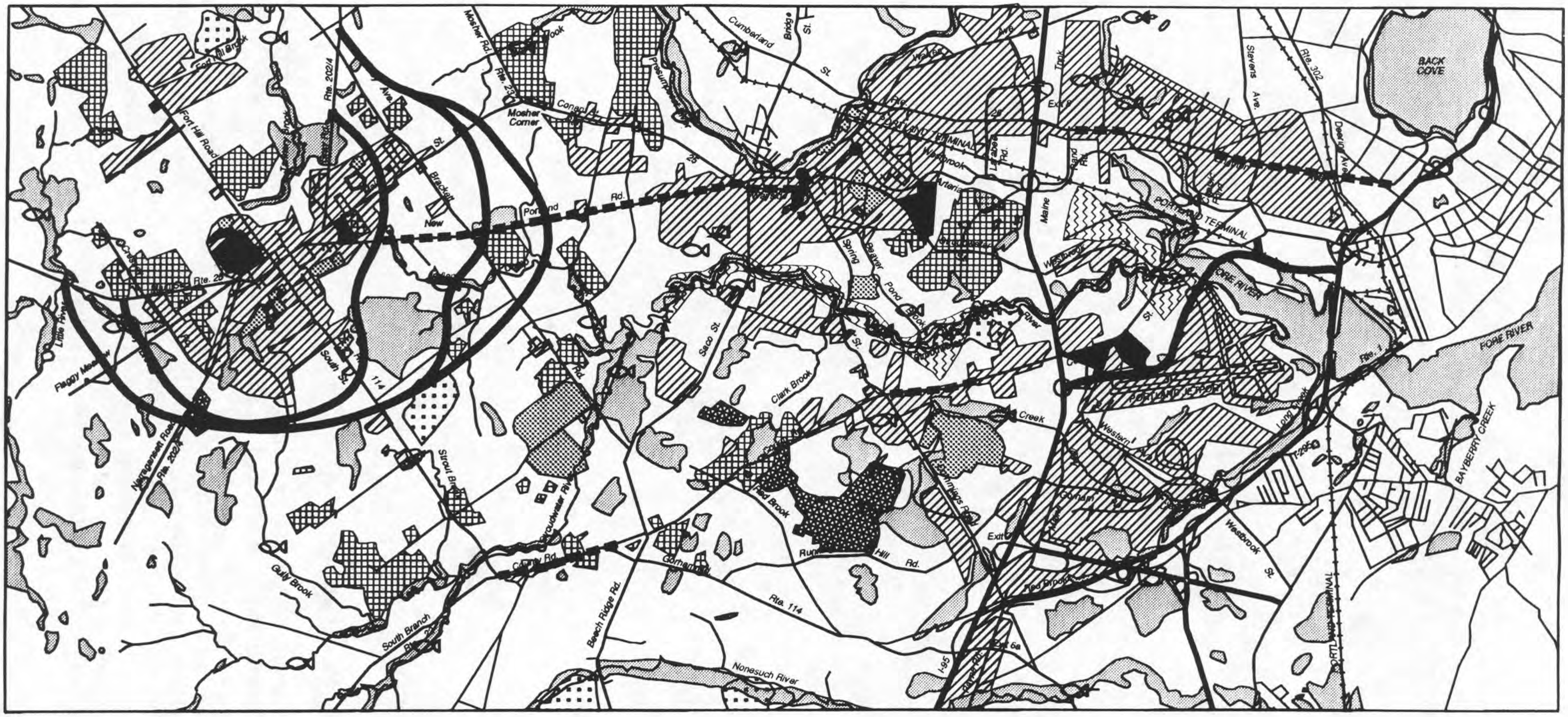
Table 24 **MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 7**

Measure*	No-Build	Alternative 7	Change	
			Number	Percent
VMT	7,443,400	7,438,000	-5,400	0.1
VHT	315,000	296,100	-18,900	-6.0
VHD	109,600	92,100	-17,500	-16.0
V/C	0.85	0.56	-0.29	-34.1

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

Environmental, Social and Engineering Impacts

Figure 40 shows the alignment of Alternative 7 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 25 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 7 is between 95.1 and 104.9 million dollars. The following text describes these impacts, highlighting major problem areas.



Dense combinations of residential, commercial or institutional areas)	Park and Recreation Area Public Facilities
Cemetery/Institution	Active Farmland
Identified Wetland and Surface Water	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)
Waste Site (includes Junk Yards)	New Road
Wildlife Resource	Upgrade Intersection
Fishery	Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure 40
Environmental Constraints
Alternative 7

Table 25 ALTERNATIVE 7--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	24,700	24,700	700	700	25,400	25,400
Commercial/Industrial	11,400	11,400	500	900	11,900	12,300
Low Density Residential	12,450	12,450	1,400	2,800	13,850	15,250
Farmland	4,800	4,800	600	1,300	5,400	6,100
Sensitive Land Use:						
Parks	400	400	0	0	400	400
Historic	3,400	3,400	0	0	3,400	3,400
Institutional	1,300	1,300	50	50	1,350	1,350
Resource Protection	0	0	0	0	0	0
Floodplains	200	200	2,200	2,550	2,400	2,750
Stream Crossings (Number)	*	*	*	*	4	8
Identified Wetlands	2,600	2,600	6,500	8,700	9,100	11,300
Fish/Wildlife Areas	0	0	2,450	4,780	2,450	4,780
Sand/Gravel Aquifers	4,800	4,800	7,100	7,250	11,900	12,050
Hydric Soils:						
Hydric	15,050	15,050	25,400	34,450	40,450	49,500
Potentially Hydric	16,700	16,700	7,750	19,200	24,450	35,900
Surficial Geo. High-Mod.	29,750	29,750	20,600	34,200	50,350	63,950
Steep Slopes:						
High	1,800	1,800	900	1,600	2,700	3,400
Moderate	2,250	2,250	4,950	8,050	7,200	10,300
Farmland Soils:						
Prime	9,550	9,550	6,450	21,300	16,000	30,850
Statewide Importance	7,300	7,300	5,550	9,550	12,850	16,850

* No differentiation between upgrade and new.

Surficial Geology: Unstable Deposits

Unstable deposits pose minor constraints to the development of this alternative. These deposits occur throughout the study area, particularly north of Gorham, and in most of Westbrook and Portland. The bypass alternatives south of Gorham are generally better than the northern bypass alternatives in this respect. Still, southern bypasses will also encounter some areas of unstable deposits. New road crossings of Gully and Indian Camp Brooks, and the new Fore River crossing pose the most concern due to the combination of steep slopes and unstable deposits. Geotechnical evaluation at the time of design will identify any such specific problems so that engineering solutions may be applied.

Steep Slopes/Erodible Soils

The principal areas of concern with this alternative are the Fore River crossing in Portland, and the crossings of Gully and Indian Camp Brooks south of Gorham. Steep slopes and erodible soils are more abundant in the area affected by the alternative alignment farthest from the Gorham town center. The innermost bypass option is more favorable. Proper application of erosion and sedimentation controls during and after construction would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (16,000 to 30,850 linear feet) and Additional Farmland Soils of Statewide Importance (12,850 to 16,850 feet) would be greatest in the area south of Gorham, and along Brackett Road. However, few active farms occur there. The outermost bypass option would pose the most impacts in this respect. Upgrade segments pose minimal direct impact to the loss of Prime Farmland Soils or Additional Farmland Soils of Statewide Importance because impacted soils are along existing roadsides.

Sand and Gravel Aquifers

The bypass segments southwest of Gorham near Narragansett Road (Route 202/4) intersect an area of moderate yield aquifer. Two groundwater contamination sites occur in this area as well (auto junkyard and sand excavation site). Roadway designers should be aware of these potential problem areas if they still exists at the time of design. The South Gorham upgrade segment also lies within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area. In total, between 11,900 and 12,050 linear feet of moderate yield aquifer is crossed by this alternative.

Surface Water Resources

The primary surface waters in the vicinity of the upgrade segments are the Fore River, Stroudwater River and its tributaries, and the Presumpscot River (Westbrook segment). Indian Camp Brook would be impacted by upgrade and new road segments. Gully Brook would be crossed by southern bypasses of Gorham. The only major surface water crossing would be of the Fore River near Congress Street. This alternative has a low to average number of stream crossings (4 to 8) compared to other alternatives.

The crossing of the Fore River estuary is a constraint due to the multiple resources which would be impacted. As a major crossing, cost will also be a constraint. The crossings of Gully and Indian Camp Brooks also involve steep slopes.

Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative poses a relatively low total floodplain crossing distance (2,400 to 2,750 feet) compared to the other alternatives. The crossing of the Fore River constitutes the only major floodplain crossing associated with this alternative. Any crossing in this area should be designed so it withstands flooding and does not increase 100-year flood elevations more than a minor amount.

Wetlands

Direct wetland losses associated with this alternative would be about average (9,100 to 11,300 linear feet of crossing) compared to other alternatives. Note, however, that hydric soil mapping and limited field inspections suggest jurisdictional wetlands may be much more extensive south of Gorham than indicated by NWI or state wetlands mapping. The principal areas of wetland loss would be the Fore River estuary crossing in Portland, and the Gully Brook and Indian Camp Brook crossings in Gorham. The outer bypass crosses State designated wetland of low importance (pending official designation) south of Day Road. Impacts to the periphery of a large evergreen forest wetland north of Day Road and tributary to Indian Camp Brook would also occur with the inner and middle bypasses southeast of Gorham.

Erosion and sedimentation controls and the use of stormwater best management practices would provide an adequate level of protection in wetland areas. Steep slopes along the Fore River, Gully Brook and Indian Camp Brook makes sound erosion control practices particularly important.

Vegetative Cover

Vegetation associated with bypasses south of Gorham is largely evergreen forest with scattered tracts of mixed evergreen/deciduous forest. Vegetative cover along upgrade segments is almost entirely urban or suburban in character. The Fore River estuary crossing could impact salt marsh vegetation occurring as relatively narrow bands along the shore.

Fish and Wildlife Resources

The inner bypass southwest of Gorham crosses Brandy Brook--a State designated fishery of medium importance. Assuming proper design, this crossing should have no significant impact on the fishery. The middle and outermost bypasses southeast of Gorham cross the edge of a State designated deer wintering area of indeterminate importance just south of Day Road. The middle bypass crosses a designated fishery of medium importance (Indian Camp Brook headwaters). These crossings are less desirable than the innermost bypass option southeast of Gorham.

The new crossing of the Fore River estuary also poses a concern for fish or wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are the second highest of all other alternatives. This alternative would cross 25,400 feet of high and moderate density residential land use, and between 13,850 and 15,250 feet of low density residential land use. The total crossing of commercial and industrial land uses would be between 11,900 feet and 12,300 feet. Most impacts would be associated with upgrade segments. The downtown Westbrook and Brighton Avenue segments pose the greatest impact due to the proximity of structures to the existing road. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

One major area of cultural resource impact with Alternative 7 is the Stroudwater Historic District (skirted by this alternative) and a designated historic site just east of the district, by the Fore River. Avoidance options are limited due to the proximity of both the historic resources and the jetport runway. Historic resources in the vicinity of the Stroudwater Historic District may be so great that this segment may be difficult to implement as currently envisioned due to the requirement for approval under Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act. Historic resources in downtown Westbrook also pose a constraint to the development of upgrade solutions. Development of this alternative would require close coordination between designers and MHPC in order to identify the least impactive design.

ALTERNATIVE 8

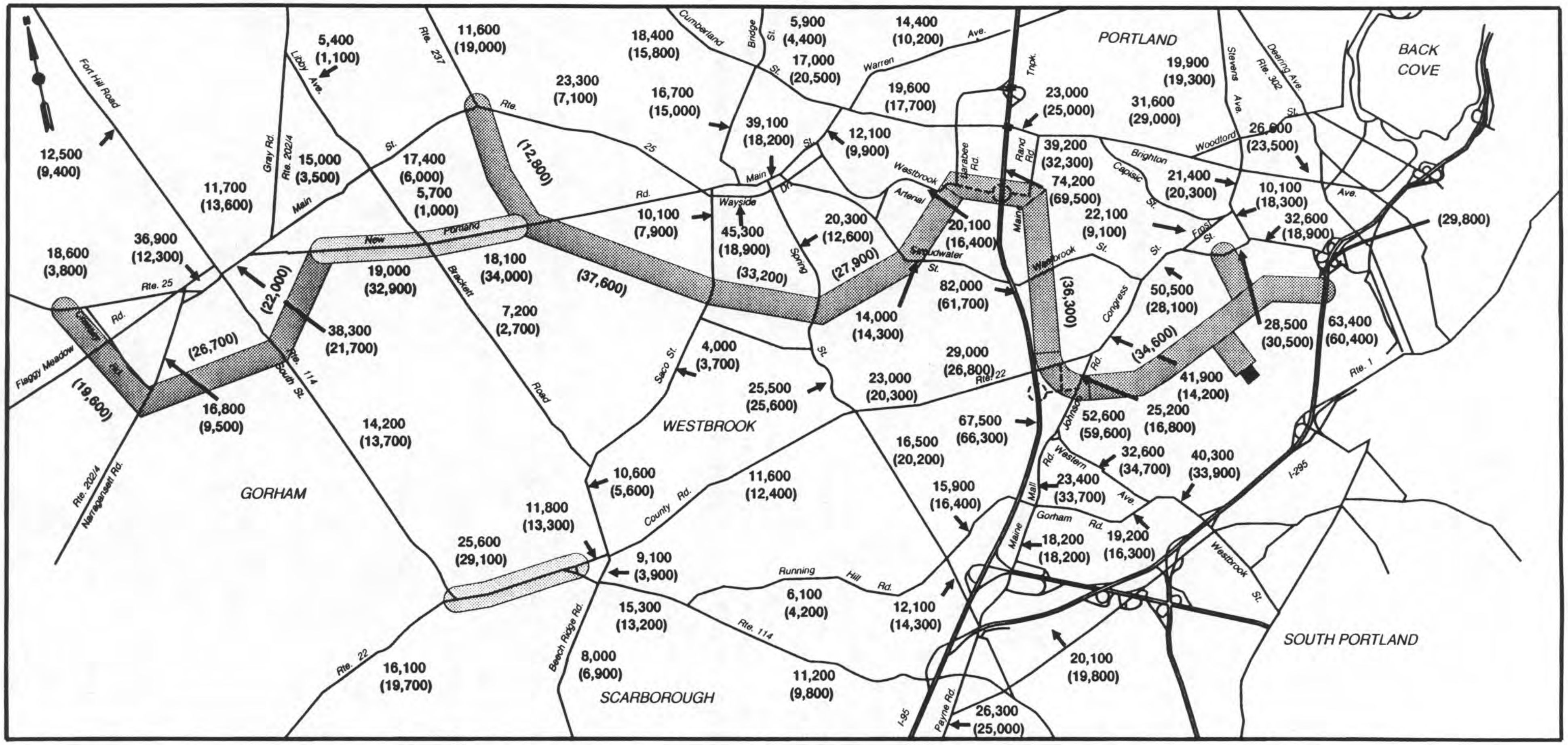
This alternative is the same as Alternative 5 except for the Brighton Avenue bypass which is eliminated and replaced by a connector roadway between the two proposed Turnpike interchanges. In addition to the connector roadway, this alternative includes: a partial southern bypass of Gorham Village, and a southern bypass of Westbrook.

It includes the following upgrade improvements:

- An upgrade of New Portland Road in Gorham and Westbrook to four lanes between the intersection with the new southern bypass of Gorham and the intersection with the new southern bypass in Westbrook.

- An upgrade of Route 22 in South Gorham to four lanes between South Street (Route 114 in Gorham) and Gorham Road (Route 114 in Scarborough).

Projected volumes for Alternative 8 are presented in Figure 41. The new road segments west of the Turnpike carry daily volumes similar to those for Alternative 5. These range from 12,800 on the segment between Mosher Corner



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Notes: Schematic Only
Not to Scale

Alternative 8 does not provide access to Flaggy Meadow Rd. or Westbrook St.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

Bypass/New Road

Upgrade

Vanasse Hangen Brustlin, Inc.

Figure 41

2010 Daily Traffic Volumes
Alternative 8

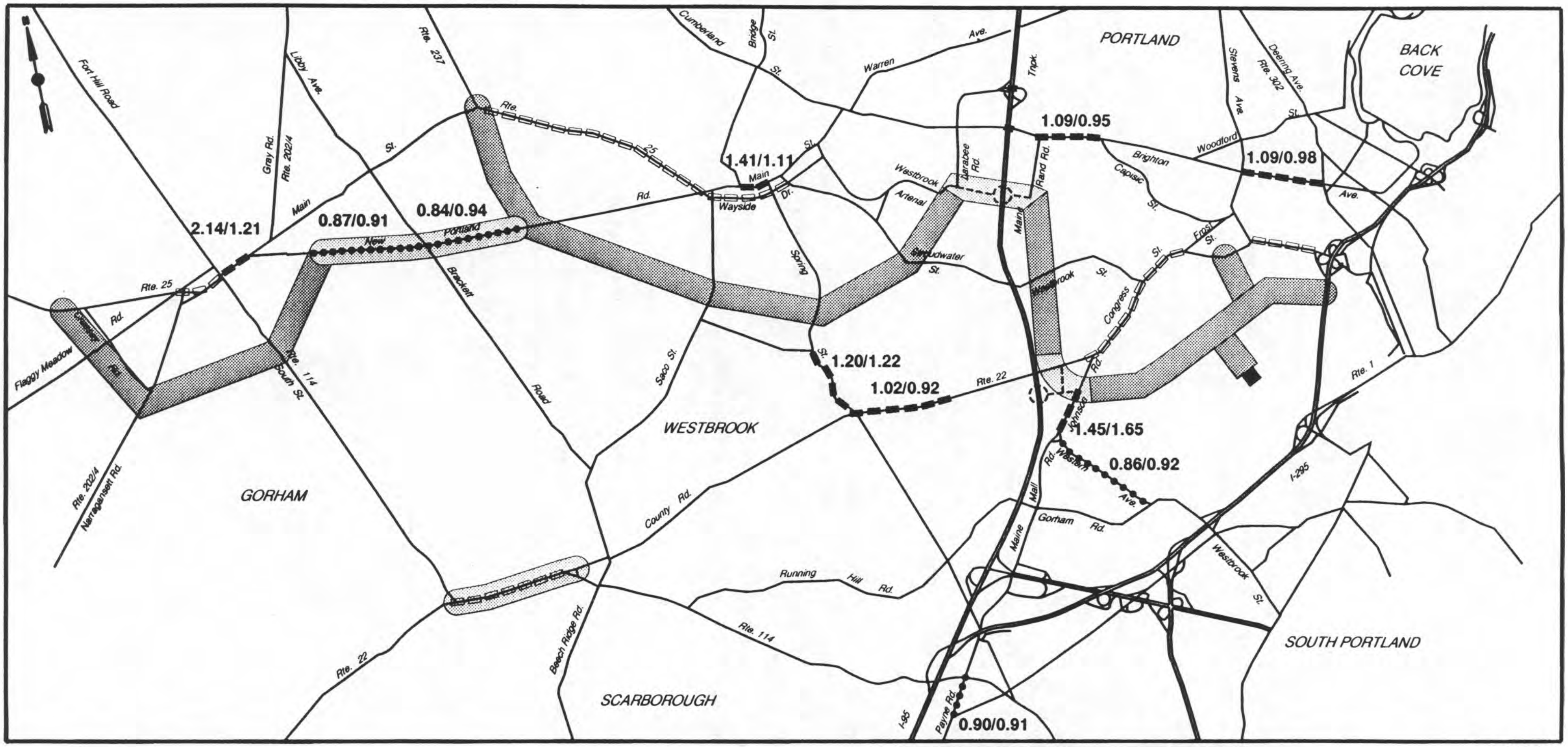
and New Portland Road to 37,600 on the link between New Portland Road and Saco Street. The Congress Street bypass carries 34,600 trips (compared to 42,400 for Alternative 5) and the connector between the Turnpike interchanges carries 36,300 (the parallel segment of the turnpike experiences a reduction of 10,300 vehicles).

These volumes result from substantial diversions from existing roadways. Reductions in areas with No-Build deficiencies include 26,400 on Wayside Drive in Westbrook; 22,400 on Congress Street north of Westbrook Street; 16,600 on Route 25 in Gorham Village; and 6,900 on Brighton Avenue east of the proposed Turnpike interchange access road. Volume increases on upgraded sections include 15,900 on New Portland Road east of Bracket Road and 3,500 on Route 22 in South Gorham.

As with Alternative 5, the partial southern bypass of Gorham Village does not eliminate deficiencies on Main Street east of Route 114 in Gorham Village. Also this alternative does not eliminate the deficiency on County Road east of Spring Street (see Figure 42). It also does not eliminate deficiencies on Brighton Avenue east of the Turnpike interchange access roadway and east of Stevens Avenue. The v/c ratios are reduced from 2.14 to 1.21 in Gorham Village and to less than 1.00 at the other three locations. No deficiencies are added on either Route 25 or Route 22. Deficiencies are added on the upgraded portions of New Portland Road connecting the Gorham and Westbrook bypasses and on Western Avenue.

Projected deficiencies would remain on Main Street between Bridge Street and Spring Street in Westbrook, Spring Street north of County Road, County Road east of Spring Street and Johnson Road south of the airport access road. The Main Street location would experience a substantial decline in the v/c ratio from 1.41 to 1.11 and County Road would experience a decline from 1.02 to 0.92. The Spring Street v/ ratio would remain virtually unchanged while the v/c ratio at Johnson Road would increase to 1.65. The projected v/c ratios range from 0.91 to 0.94.

Table 26 compares the four transportation measures of effectiveness for Alternative 8 with the No-build case. Alternative 8 results in a significant reduction in all four measures. The reduction in VMT for Alternative 8 is 20,500 miles (0.3 percent), the largest reduction for any alternative. VHT declines by approximately 21,200 hours (6.7 percent) and VHD declines by approximately 18,700 hours (17.1 percent). The average v/c ratio for selected links declines 32.9 percent from 0.85 to 0.57.



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Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 8 does not provide access to Flaggy Meadow Rd. or Westbrook St.

- Deficiency Eliminated
- Deficiency Remains
- Deficiency Added
- XX.X/YY.Y — No Build V/C Ratio / Alternative 8 V/C Ratio
- Upgrade
- Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 42

2010 Capacity Deficiency Comparison
Alternative 8

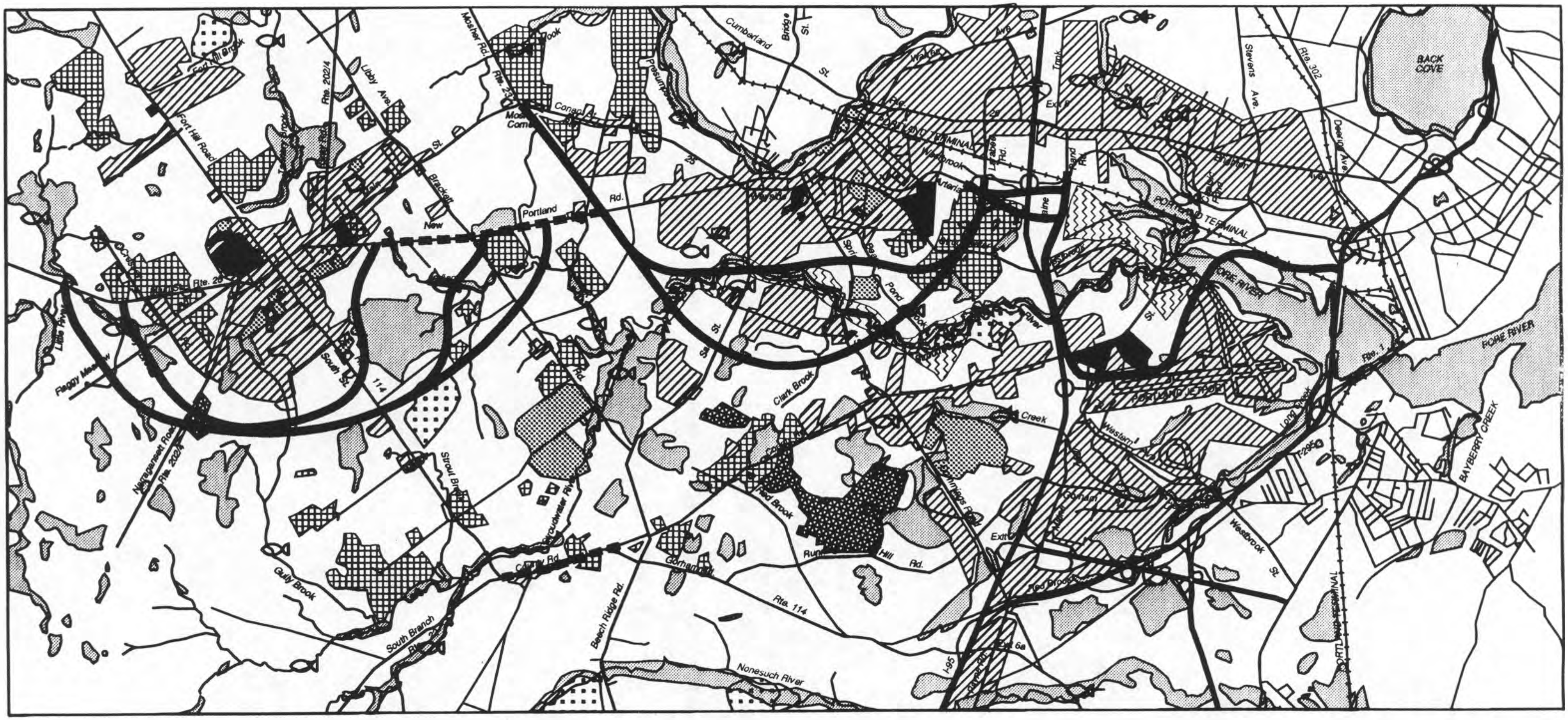
Table 26 **MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 8**

Measure*	No-Build	Alternative 8	Change	
			Number	Percent
VMT	7,443,400	7,422,900	-20,500	0.3
VHT	315,000	293,800	-21,200	-6.7
VHD	109,600	90,900	-18,700	-17.1
V/C	0.85	0.57	-0.28	-32.9

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

Environmental, Social and Engineering Impacts

Figure 43 shows the alignment of Alternative 8 on an environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 27 provides a quantification of the alternative's impact on various study area features. This alternative is the same as Alternative 5 except: Alternative 8 does not include an innermost Gorham bypass option; and Alternative 8 would include a new road paralleling the Maine Turnpike to connect new roads north of Westbrook Street with a new road adjacent to the jetport instead of the Alternative 5 option of a new road alongside the railroad in the Fore River estuary. The estimated construction cost of Alternative 8 is between 126.1 and 127.9 million dollars. The following text describes the impacts of this alternative, highlighting major problem areas.



Dense combinations of residential, commercial or institutional areas)

Cemetery/Institution

Identified Wetland and Surface Water

Park and Recreation Area Public Facilities

Active Farmland

Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)

Waste Site (includes Junk Yards)

Wildlife Resource

Fishery

New Road

Upgrade Intersection

Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

Vanasse Hangen Brustlin, Inc.

Figure 43

Environmental Constraints Alternative 8

Table 27 **ALTERNATIVE 8--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	1,900	1,900	700	700	2,600	2,600
Commercial/Industrial	1,500	1,500	1,100	1,100	2,600	2,600
Low Density Residential	2,850	2,850	2,000	2,600	4,850	5,450
Farmland	2,350	2,350	4,400	7,200	6,750	9,550
Sensitive Land Use:						
Parks	0	0	0	0	0	0
Historic	0	0	0	0	0	0
Institutional	400	400	0	50	400	450
Resource Protection	0	0	1,700	4,600	1,700	4,600
Floodplains	0	0	3,550	4,600	3,550	4,600
Stream Crossings (Number)	*	*	*	*	15	15
Identified Wetlands	1,500	1,500	11,200	14,850	12,700	16,350
Fish/Wildlife Areas	0	0	3,700	5,330	3,700	5,330
Sand/Gravel Aquifers	4,800	4,800	7,250	7,400	12,050	12,200
Hydric Soils:						
Hydric	2,000	2,000	26,850	32,100	28,850	34,100
Potentially Hydric	5,400	5,400	20,450	25,650	25,850	31,050
Surficial Geo. High-Mod.	9,450	9,450	63,600	69,700	73,050	79,150
Steep Slopes:						
High	100	100	4,550	5,300	4,650	5,400
Moderate	1,000	1,000	7,000	8,400	8,000	9,400
Farmland Soils:						
Prime	1,500	1,500	19,200	24,900	20,700	26,400
Statewide Importance	2,100	2,100	9,250	13,150	11,350	15,250

* No differentiation between upgrade and new.

Surficial Geology: Unstable Deposits

Much of this alternative's alignment lies in an area of unstable geologic deposits (73,050 to 79,150 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along much of this alternative's alignment. Principal areas of concern are the Stroudwater River crossings (south of Westbrook east of the Maine Turnpike), and the crossing of the Fore River estuary. The crossings of Gully and Indian Camp Brooks south of Gorham also involve steep slopes. Steep slopes and erodible soils and more abundant in the area affected by the alternative alignment farthest from the Gorham town center. The innermost bypass option is more favorable. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (20,700 to 26,400 linear feet) and Additional Farmland Soils of Statewide Importance (11,350 to 15,250 feet) would have little overall impact on active farms. The alternative would, however, impact large farms on Stroudwater Street/Westbrook Street with associated loss of Prime Farmland soils. The outermost bypass of Westbrook would be the most impacted in this respect.

Sand and Gravel Aquifers

The bypass segments southwest of Gorham near Narragansett Road intersect an aquifer area of moderate yield. Two groundwater contamination sites occur in this area as well (auto junkyard and sand excavation site). Roadway designers should be aware of these potential problem areas if they still exists at the time of design. In total, between 12,050 and 12,200 linear feet of moderate yield aquifer is crossed by this alternative.

Surface Water Resources

Surface waters which would be crossed by this alternative include:

- Stroudwater River and its tributaries (including Gully and Indian Camp Brooks)
- Brandy Brook (tributary to the Presumpscot River)
- Fore River estuary

This alternative has a high number of stream crossings (15) compared to other alternatives; most are in the Stroudwater basin. Many of these are major crossings such as the Stroudwater River and Fore River estuary. South of Gorham, the crossings of Gully and Indian Camp Brooks also involve steep slopes.

Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative involves a total floodplain crossing distance of between 3,550 to 4,600 feet, about average compared to other alternatives. The multiple new road crossings of the Stroudwater River and the new road crossing of the Fore River estuary constitute the majority of floodplain crossings associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

Wetland impacts of this alternative range from 12,700 feet to 16,350 feet of crossing, one of the higher levels of wetland impact among the alternatives. The presence of extensive hydric soils south of Gorham and Westbrook suggests wetlands are even more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland loss would be in the Gully and Indian Camp Brook watersheds, the Stroudwater River crossings south of Westbrook, and particularly, the new crossing of the Fore River. Each of these sites pose regulatory constraints with regard to wetland permitting. The outer bypass crosses State designated wetland of low importance (pending official designation) south of Day Road. Structural engineering solutions and careful choice of crossing locations would minimize the impacts associated with crossings. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with bypasses south of Gorham is largely evergreen forest. The lands crossed by alternatives south and east of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses. The Fore River estuary crossing could impact shoreline bands of salt marsh.

Fish and Wildlife Resources

The inner bypass southwest of Gorham crosses Brandy Brook--a State designated fishery of medium importance. Assuming proper design, this crossing should have no significant impact on the fishery. The middle and outermost bypasses southeast of Gorham cross the edge of a State designated deer wintering area of indeterminate importance just south of Day Road. The middle bypass crosses a designated fishery of medium importance (Indian Camp Brook headwaters). These crossings are less desirable than the innermost bypass option southeast of Gorham.

South of Westbrook, the inner (northern) option impacts a fishery of high importance, but otherwise avoids designated fisheries and deer wintering areas potentially impacted by the outer (southern) bypass option. The crossing of the Stroudwater River east of the Maine Turnpike is in an area designated as a fishery of high relative importance.

The new crossing of the Fore River estuary also poses a concern for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are low compared with other alternatives. This alternative would cross 2,600 feet of high and moderate density residential land use, and between 4,850 to 5,450 feet of low density residential land use. The total crossing of commercial and industrial land uses would be 2,600 feet. Most impacts would be associated with new road interchanges. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

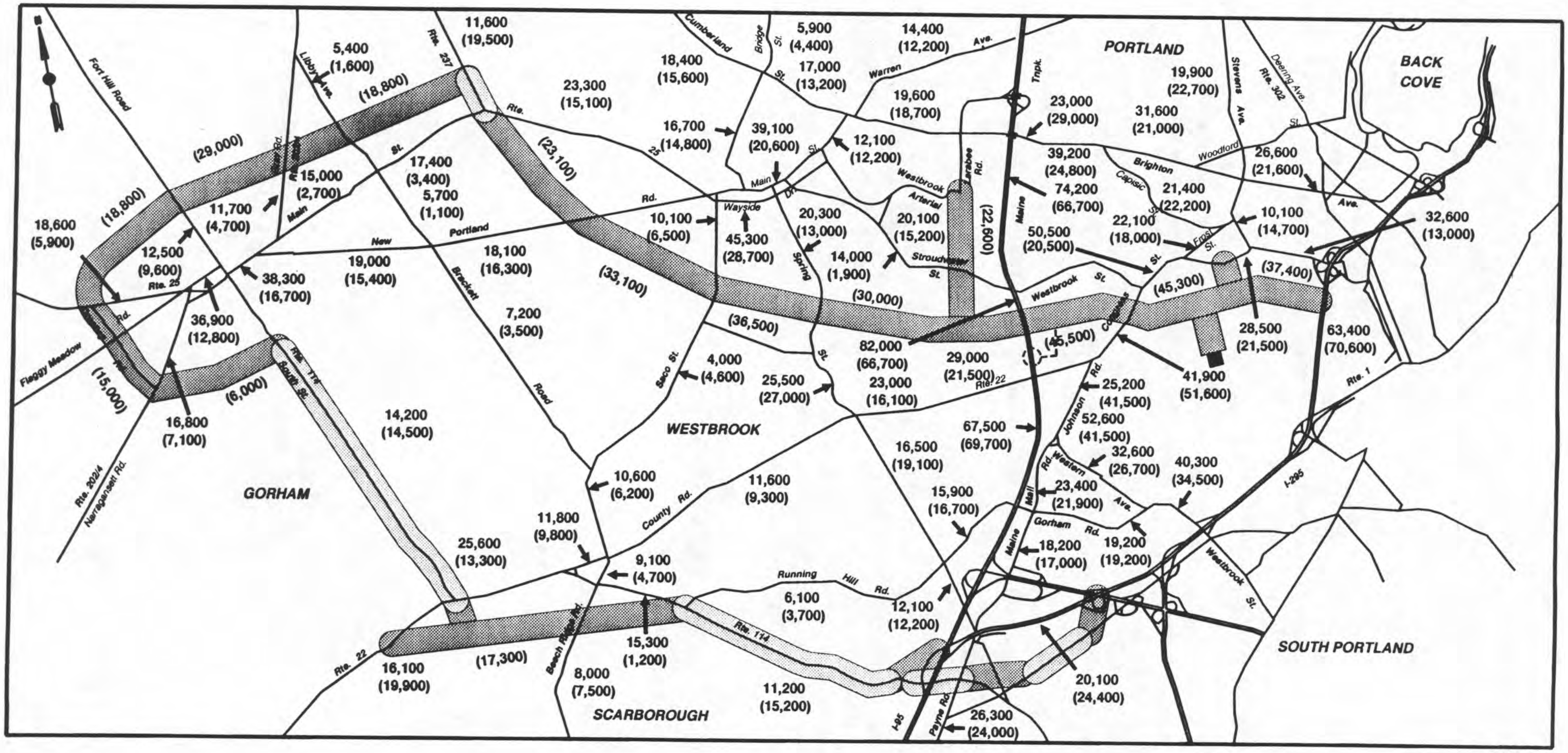
The only known area of cultural resource impact with Alternative 8 is the Stroudwater Historic District (skirted by this alternative) and a designated historic site just east of the district, near the Fore River. Avoidance options are limited due to the proximity of both the historic resources and the jetport runway. Historic resources in the vicinity of the Stroudwater Historic District may be so great that this segment may be difficult to implement as currently envisioned due to the requirements for approval under Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

A potential historic site is also located just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist.

ALTERNATIVE 9

Alternative 9 is a unique alternative because it contains two distinct sets of improvements serving the northern and southern parts of the study area and includes several elements not found in other alternatives. To the north, it provides a new road alignment from Mosher Corner to I-295 which runs south of Westbrook and parallel to Congress Street and includes a spur to Larrabee Road and the Westbrook Arterial. To the south, it includes upgrades and bypasses of various segments of Route 114 to four lanes between Gorham Village and I-295, including connections between Route 114 and I-295. It also includes a bypass of Gorham Village which circles the southwest, northwest, and northeast quadrants of the Village center, connecting Route 114 south of the Village to Route 237 east of the Village. Finally, it contains one new Turnpike interchange between Westbrook Street and Congress Street instead of the two new locations included in all other alternatives.

Volumes on the bypass segments around Gorham Village range from 6,000 between Route 114 and Route 202/4 to 29,000 east of Route 114 north of the Village (see Figure 44). The new road segments between Mosher Corner and I-295 carry volumes ranging from 23,100 at Mosher corner to 45,500 east of the Turnpike interchange. The bypass of Route 22 in South Gorham carries 17,300.



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Notes: Schematic Only
Not to Scale

Alternative 9 does not provide access to Flaggy Meadow Rd. or Stroudwater St.

XX	2010 No-Build Volumes
(YY)	2010 Volumes With Alternative
[shaded box]	Bypass/New Road
[light box]	Upgrade

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Figure 44

2010 Daily Traffic Volumes
Alternative 9

The diversion of traffic to the new road segments results in substantial reductions on existing roadways including: 30,000 on Congress Street north of Westbrook Street, 21,600 on Route 25 in Gorham Village, 14,400 on Brighton Avenue west of Capisic Street, and 12,300 on Route 22 in South Gorham. The upgrade of Route 114 in Scarborough increases traffic volume by 4,000.

As shown in Figure 45, Alternative 9 eliminates all deficiencies along Routes 25 and 22 except in Gorham Village and on Congress Street between Johnson Road and the new road. The deficiency in Gorham Village is almost eliminated with the v/c ratio reduced from 2.14 to 0.93. In contrast, the v/c ratio on Congress Street increases substantially from 1.15 to 1.43.

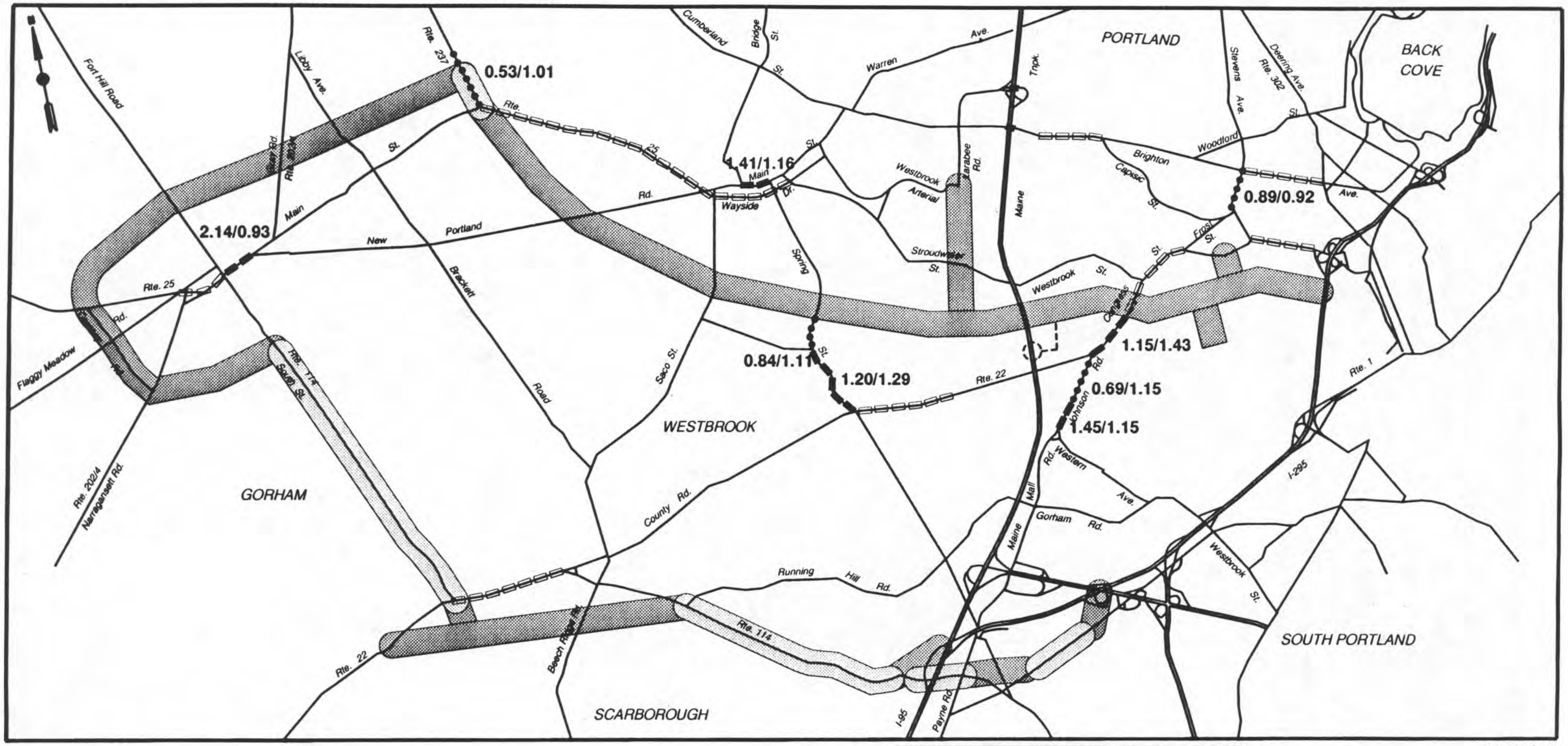
A total of three deficiencies remain on other roadways including Main Street between Bridge Street and Spring Street in Westbrook, Johnson Road north of Western Avenue, and Spring Street north of County Road. The v/c ratios for both Main Street and Johnson Road would experience large declines to 1.16 and 1.15, respectively. Spring Street would experience an increase in its v/c ratio. In addition, the segment of Spring Street between Eisenhower Drive and the new road would become deficient. Other added deficiencies include Route 237 north of Route 25, Johnson Road south of Congress Street, and Stevens Avenue south of Brighton Avenue.

Table 28 compares the four transportation measures of effectiveness for Alternative 9 with the No-build case. Alternative 9, which adds the greatest length of new roads of any alternative, produces an increase in total VMT of 38,100 miles or 0.5 percent. It also results in large reductions in VHT, VHD, and average v/c ratio. VHT declines by approximately 23,000 hours (7.3 percent) and VHD declines by approximately 21,600 hours (19.7 percent). The average v/c ratio for selected links declines 40.0 percent from 0.85 to 0.51.

Table 28 **MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 9**

Measure*	No-Build	Alternative 9	Change Number	Change Percent
VMT	7,443,400	7,481,500	38,100	0.5
VHT	315,000	292,000	-23,000	-7.3
VHD	109,600	88,000	-21,600	-19.7
V/C	0.85	0.51	-0.34	-40.0

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.



Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 9 does not provide acess to Flaggy Meadow Rd. or Strandwater St.

- Deficiency Eliminated
- Deficiency Remains
- Deficiency Added
- **XX.X/YY.Y** No Build V/C Ratio / Alternative 9 V/C Ratio
- Upgrade
- Bypass/New Road

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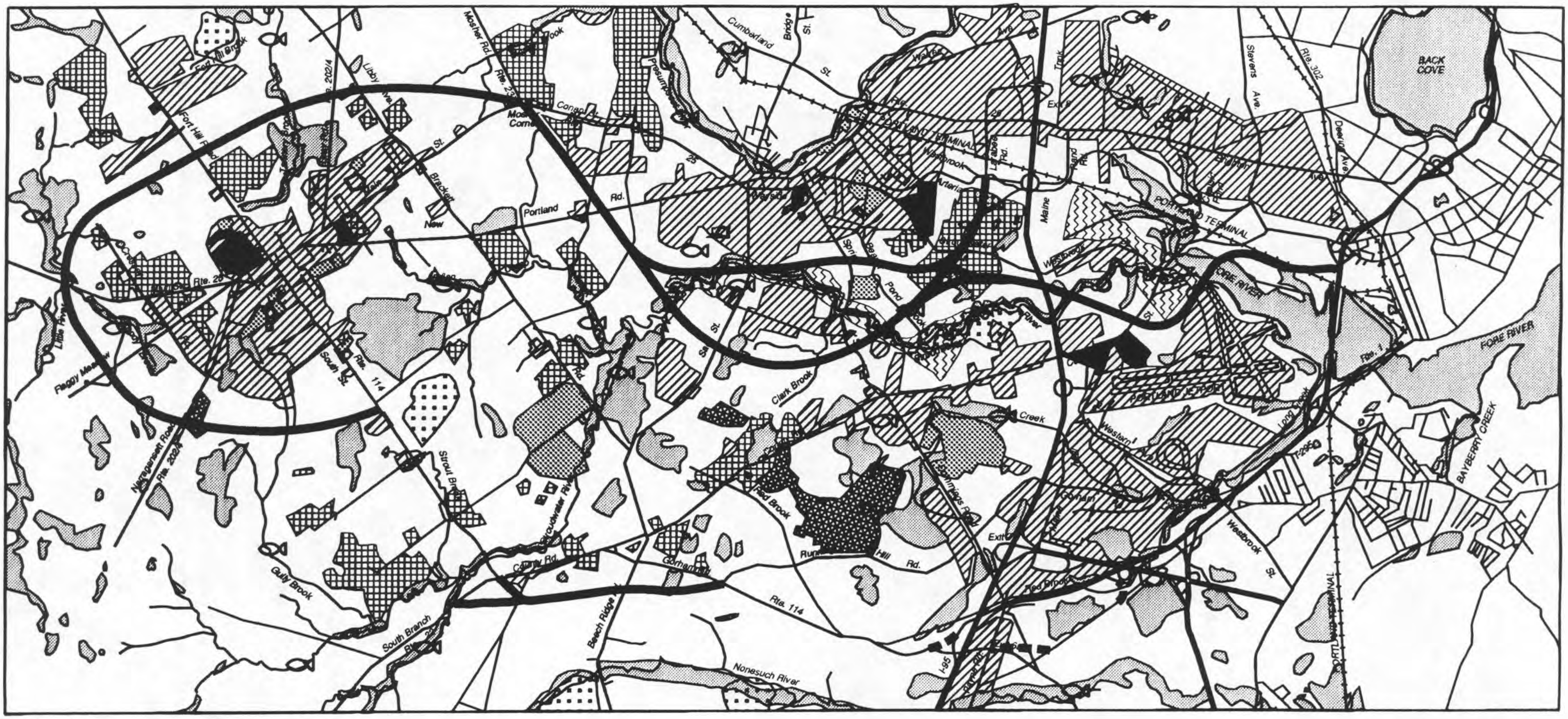
Figure 45

2010 Capacity Deficiency Comparison
Alternative 9

Environmental, Social and Engineering Impacts

Figure 46 shows the alignment of Alternative 9 on an environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. As previously mentioned, Alternative 9 is rather unique, containing elements or segments not included in any other alternative. Table 29 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 9 is between 141.5 and 143.3 million dollars. The following text describes the impacts of this alternative, highlighting major problem areas.



(hatched)	Dense combinations of residential, commercial or institutional areas)	(dotted grey)	Park and Recreation Area Public Facilities	(dark dotted)	Waste Site (includes Junk Yards)	(thick line)	New Road
(black)	Cemetery/Institution	(grid)	Active Farmland	(dots)	Wildlife Resource	(dot)	Upgrade Intersection
(light grey)	Identified Wetland and Surface Water	(wavy)	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)	(fish)	Fishery	(dashed)	Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure 46
Environmental Constraints
Alternative 9

Table 29 **ALTERNATIVE 9--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	1,800	1,800	2,300	2,300	4,100	4,100
Commercial/Industrial	700	700	1,200	1,200	1,900	1,900
Low Density Residential	9,250	9,250	5,200	5,500	14,450	14,750
Farmland	4,200	4,200	4,500	6,100	8,700	10,300
Sensitive Land Use:						
Parks	1,700	1,700	700	700	2,400	2,400
Historic	300	300	300	300	600	600
Institutional	50	50	250	250	300	300
Resource Protection	0	0	1,700	4,900	1,700	4,900
Floodplains	1,100	1,100	4,700	5,300	5,800	6,400
Stream Crossings (Number)	*	*	*	*	17	17
Identified Wetlands	1,000	1,000	9,550	10,950	10,550	11,950
Fish/Wildlife Areas	0	0	2,450	2,500	2,450	2,500
Sand/Gravel Aquifers	12,900	12,900	16,850	16,850	29,750	29,750
Hydric Soils:						
Hydric	10,800	10,800	26,500	28,150	37,300	38,950
Potentially Hydric	4,700	4,700	31,200	32,000	35,900	36,700
Surficial Geo. High-Mod.	23,100	23,100	85,300	88,000	108,400	111,100
Steep Slopes:						
High	1,300	1,300	3,800	4,400	5,100	5,700
Moderate	3,000	3,000	12,800	15,100	15,800	18,100
Farmland Soils:						
Prime	5,800	5,800	29,400	31,050	35,200	36,850
Statewide Importance	500	500	15,000	15,000	15,500	15,500

* No differentiation between upgrade and new.

Surficial Geology: Unstable Deposits

Much of this alternative's alignment lies in an area of unstable geologic deposits (108,400 to 111,100 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along much of this alternative's alignment. Principal areas of concern are the Stroudwater River crossings (south of Westbrook east of the Maine Turnpike), and the crossing of the Fore River estuary. The crossing of Gully Brook south of Gorham also involves steep slopes. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (35,200 to 36,850 linear feet) and Additional Farmland Soils of Statewide Importance (15,500 feet) would be greatest in the area north of Gorham where active farms occur. The alternative would also impact large farms on Stroudwater Street/Westbrook Street with associated loss of Prime Farmland soils.

Sand and Gravel Aquifers

The bypass segment southwest of Gorham (near Narragansett Road), and the road segments in South Gorham and Scarborough intersect an aquifer area of moderate yield. Two groundwater contamination sites occur in the Gorham bypass area (auto junkyard and sand excavation site). The northern-most Gorham bypass passes near a groundwater contamination site off Libby Avenue. Roadway designers should be aware of these potential problems if they still exist at the time of design. The South Gorham and North Scarborough new road and upgrade segment lie within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area. The total of 29,750 linear feet of moderate yield aquifer crossed by this alternative, is the second highest crossing distance of all alternatives.

Surface Water Resources

Surface waters crossed by this alternative include:

- Stroudwater River and its tributaries (including Gully Brook)
- Brandy, Tannery and Mosher Brooks (tributaries to the Presumpscot River)
- Fore River estuary

This is one of the few alternatives with new road segments which would cross the Nonesuch River watershed. The Nonesuch River is a class A waterbody in that reach. This alternative has a high number of stream crossings (17) compared to other alternatives; most are in the Stroudwater River watershed. Many of these are major crossings such as the Stroudwater River and Fore River estuary. South of Gorham, the crossing of Gully Brook also involves steep slopes.

Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative involves a total floodplain crossing distance of between 5,800 to 6,400 feet, average compared to other alternatives. The multiple new road crossings of the Stroudwater River and the new road crossing of the Fore River estuary constitute the majority of floodplain crossings associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

Wetland impacts of this alternative range from 10,550 feet to 11,950 feet of crossing, an average level of wetland impact among the alternatives. The presence of extensive hydric soils south of Gorham and Westbrook suggests wetlands are even more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland loss would be in the Gully Brook watershed, the Stroudwater River crossings south of Westbrook, and particularly, the new crossing of the Fore River. Each of these sites pose regulatory constraints with regard to wetland permitting. New road segments in Scarborough lie adjacent to Red Brook a small wetland of indeterminate importance inside the Maine Turnpike-I-295 ramp. Structural engineering solutions and careful choice of crossing locations would minimize the impacts associated with crossings. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with bypasses of Gorham is largely evergreen forest, with scattered tracts of deciduous forest, old field and pasture. The lands crossed by alternatives south and east of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses. The Fore River estuary crossing could impact shoreline bands of salt marsh.

Fish and Wildlife Resources

The bypass west of Gorham crosses Brandy Brook--a State designated fishery of medium importance. Assuming proper design, this crossing should have no significant impact on the fishery. South of Westbrook, the inner (northern) option impacts a fishery of high importance, but otherwise avoids designated fisheries and deer wintering areas potentially impacted by the outer (southern) bypass option. The crossing of the Stroudwater River east of the Maine Turnpike is in an area designated as a fishery of high importance.

The new crossing of the Fore River estuary also poses a concern for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area.

Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

New road segments in Scarborough lie adjacent to Red Brook, a designated fishery of medium importance. Proper erosion and sedimentation controls will minimize impacts to these resources.

Land Use

This alternative's impacts to residential properties are average to high compared to other alternatives. This alternative would cross 4,100 feet of high and moderate density residential land use, and between 14,450 to 14,750 feet of low density residential land use. The total crossing of commercial and industrial land uses would be 1,900 feet. Most impacts would be associated with new road interchanges and southern upgrade segments. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The only known area of cultural resource impact with Alternative 9 is the Stroudwater Historic District (skirted by this alternative) and a designated historic site just east of the district, near the Fore River. Avoidance options are limited, due to the proximity of both the historic resources and the jetport runway. Historic resources in the vicinity of the Stroudwater Historic District may be so great that this segment may be difficult to implement as currently envisioned due to the requirements for approval pursuant to Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

Also of note is a potential historic site located just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist.

ALTERNATIVE 10

This alternative is the same as Alternative 2 except that the upgrade of Wayside Drive in Westbrook is replaced with a northern bypass of Westbrook which connects the northern bypass of Gorham to an upgraded Cumberland Street west of Bridge Street in Westbrook. As with Alternative 2, this alternative includes:

- A northern bypass of Gorham Village between Route 202/4 west of the village and Route 237 east of the village (Mosher Corner) with an extension of the new road to Cumberland Street in Westbrook. Access to the Gorham bypass is provided at Route 202/4 (both locations), Route 25, Route 114, Mosher Corner and Cumberland Street.

- An upgrade of Route 22 in South Gorham to four lanes between South Street (Route 114 in Gorham) and Gorham Road (Route 114 in Scarborough).

- Upgrade of Cumberland Street to four lanes between the new northern bypass and Larabee Road in Westbrook

- Upgrade County Road between Spring Street and the Portland city line to four lanes (this is a continuation of a planned No-Build project, which is listed in Table 1 and shown on Figure 6 presented earlier, to widen Congress Street to four lanes between Johnson Road and the Westbrook city line)

- Upgrade Brighton Avenue to six lanes between the proposed Turnpike interchange access road and Capisic Street

- Upgrade Brighton Avenue between Woodford Street and Deering Avenue to four lanes. Provide additional through and turn lanes at the intersection with Stevens Avenue

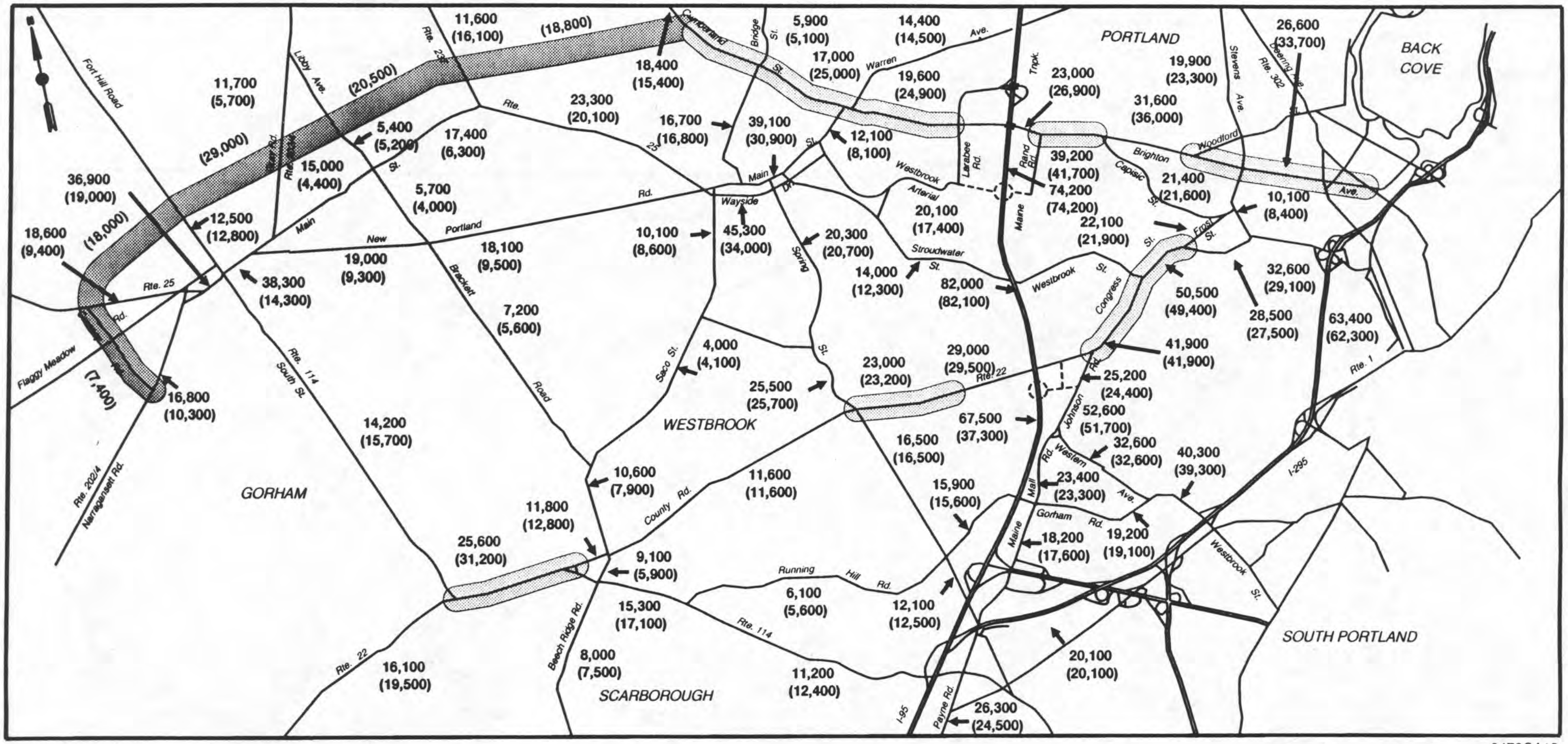
- Upgrade Congress Street to six lanes between Johnson Road and Frost Street, and improve the intersection at Stevens Avenue and Congress Street

As shown in Figure 47, volumes on new road segments of the northern Gorham and Westbrook bypasses range from 7,400 west of Gorham Village to 29,000 between Fort Hill Road and Route 202. The connecting segment between Route 237 and Cumberland Street carries a daily volume of 18,800. These bypasses reduce daily traffic in Gorham Village by 24,000 and on Main Street and Wayside Drive in Westbrook by 11,300.

Volumes along Route 22 and Route 25 east of the Turnpike are similar to Alternative 2 with upgraded links receiving increased traffic volume compared to the No-Build condition. Increases include 5,600 on Route 22 in South Gorham, 2,500 on Brighton Avenue east of the Turnpike access road, and 7,100 on Brighton Avenue east of Stevens Avenue. Volumes on several segments of congress Street remain essentially unchanged.

This alternative leaves several deficiencies on Routes 25 and 22 including Route 25 between Mosher Corner (Route 237) and Main Street, Wayside Drive between Main Street and Spring Street, Congress Street north of Westbrook Street, and Brighton Avenue east of Stevens Avenue (see Figure 48). The v/c ratios at all of these locations are reduced to 0.97 or less. A deficiency is added to Brighton Avenue east of Capisic Street where the v/c ratio increases to 1.00. Deficiencies remain on Main Street in Westbrook, Spring Street and Johnson Road. Except for the Main Street location where there is a decline in the v/c ratio from 1.41. to 1.33, there are essentially no changes in v/c ratios at the other locations.

Table 30 compares the four transportation measures of effectiveness for Alternative 10 with the No-build case. Alternative 10 produces a small decrease in total VMT of 1,200 miles (less than 0.05 percent) and a comparatively modest reduction in VHT, VHD, and average v/c ratio. VHT declines by approximately 15,400 hours (4.9 percent) and VHD declines by approximately 14,700 hours (13.4 percent). The average v/c ratio for selected links declines 28.2 percent from 0.85 to 0.61.



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Notes: Schematic Only
Not to Scale

Alternatives do not provide access to Flaggy Meadow Rd. or Libby Ave.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

New Road

Upgrade

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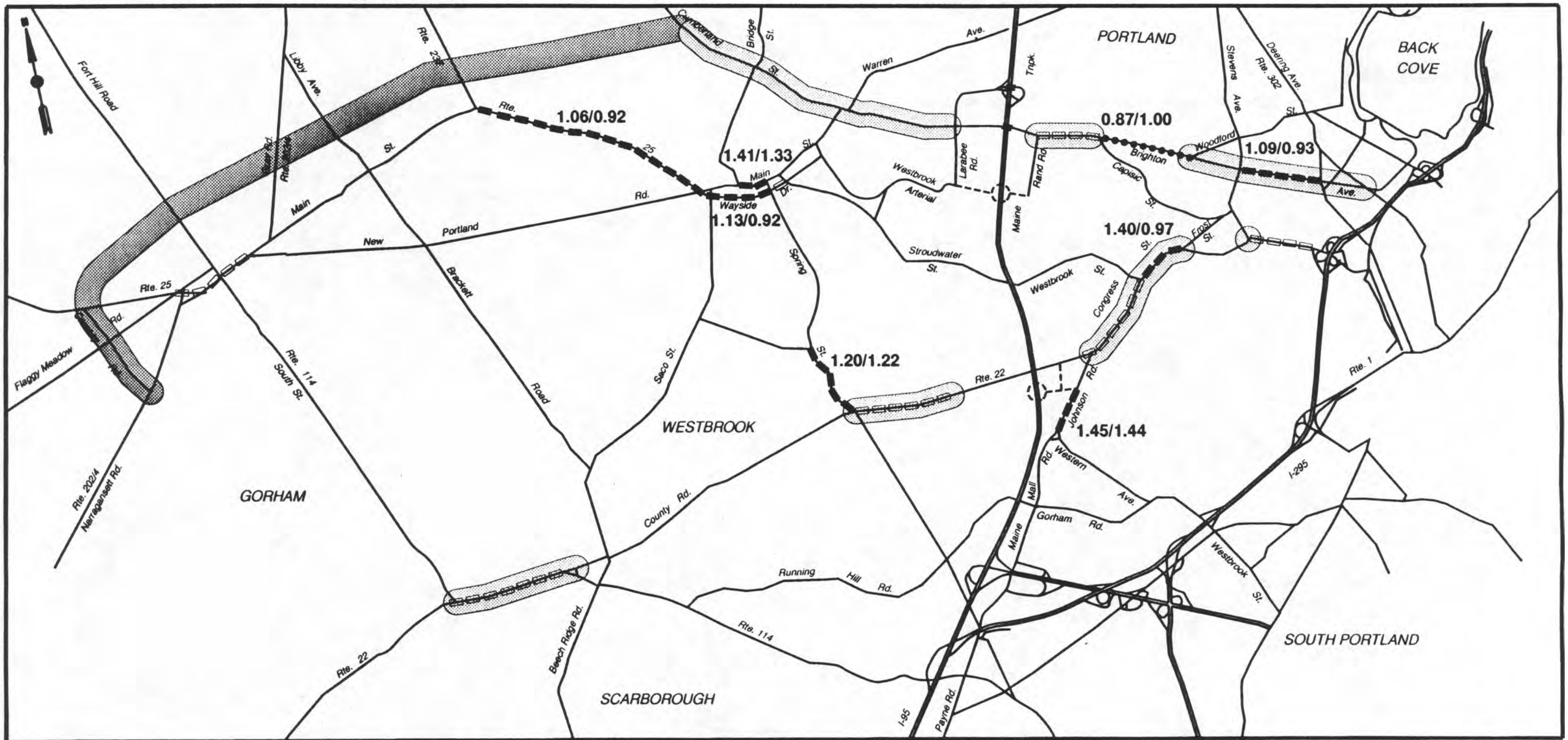
Figure 47

2010 Daily Traffic Volumes Alternative 10



Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 10 does not provide access to Flaggy Meadow Rd. or Libby Ave.

▭▭▭	Deficiency Eliminated
■ ■ ■	Deficiency Remains
•••••	Deficiency Added
XX.X/YY.Y	No Build V/C Ratio / Alternative 10 V/C Ratio
(light shading)	Upgrade
(dark shading)	Bypass/New Road

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Figure 48

2010 Capacity Deficiency Comparison
Alternative 10

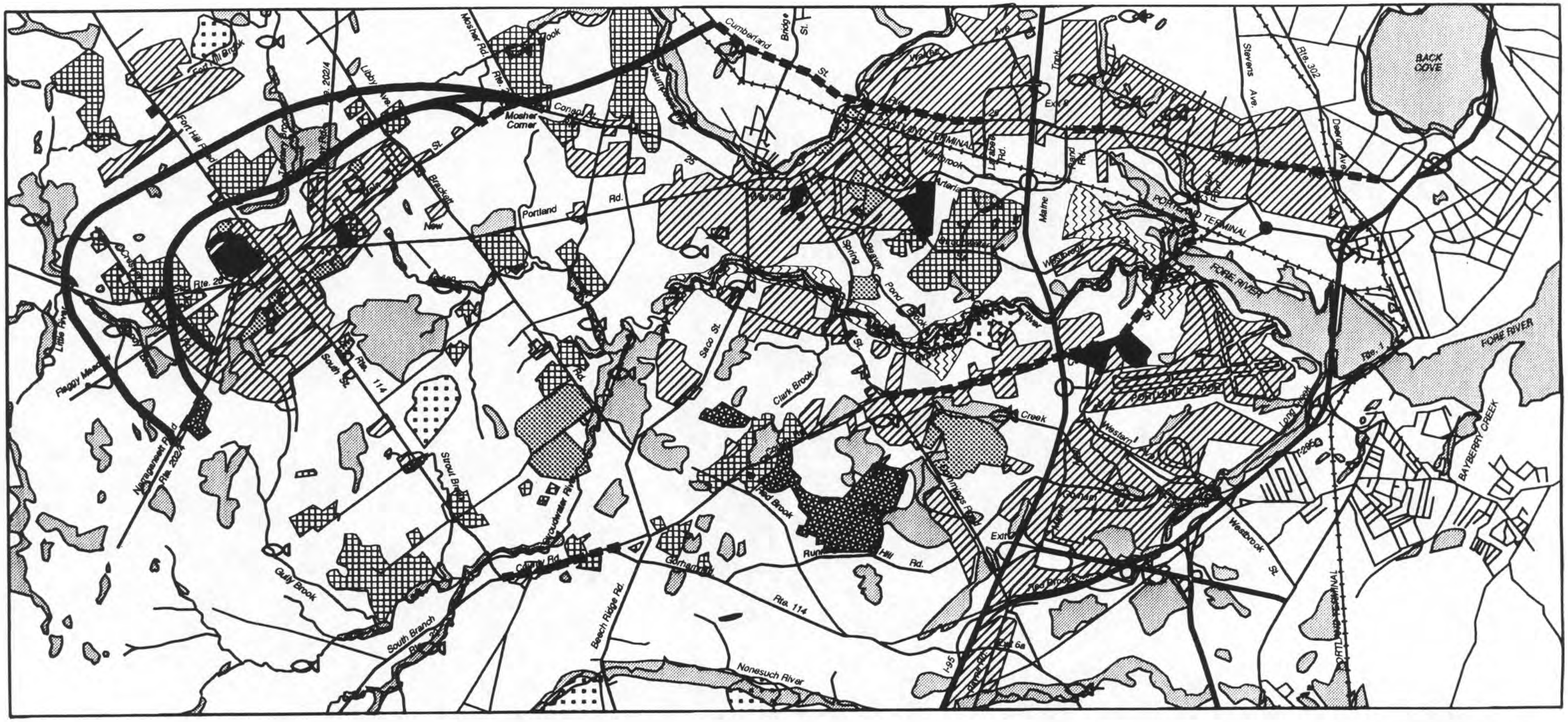
Table 30 **MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 10**

Measure*	No-Build	Alternative 10	Change Number	Change Percent
VMT	7,443,400	7,442,200	-1,200	0.0**
VHT	315,000	299,600	-15,400	-4.9
VHD	109,600	94,900	-14,700	-13.4
V/C	0.85	0.61	-0.24	-28.2

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.
** Less than 0.05

Environmental, Social and Engineering Impacts

Figure 49 shows the alignment of Alternative 10 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 31 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 10 is between 43.0 and 50.2 million dollars. The following text describes these impacts, highlighting major problem areas.



Dense combinations of residential, commercial or institutional areas)	Park and Recreation Area Public Facilities
Cemetery/Institution	Active Farmland
Identified Wetland and Surface Water	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)
Waste Site (includes Junk Yards)	New Road
Wildlife Resource	Upgrade Intersection
Fishery	Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

Vanasse Hangen Brustlin, Inc.

Figure 49

Environmental Constraints Alternative 10

Table 31 **ALTERNATIVE 10--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	26,200	26,200	0	100	26,200	26,300
Commercial/Industrial	9,700	9,700	0	200	9,700	9,900
Low Density Residential	5,500	5,500	2,000	3,050	7,500	8,550
Farmland	1,600	1,600	3,600	5,800	5,200	7,400
Sensitive Land Use:						
Parks	0	0	0	0	0	0
Historic	3,700	3,700	800	800	4,500	4,500
Institutional	1,100	1,100	50	700	1,150	1,800
Resource Protection	0	0	800	800	800	800
Floodplains	1,300	1,300	1,600	1,600	2,900	2,900
Stream Crossings (Number)	*	*	*	*	2	5
Identified Wetlands	1,800	1,800	1,550	3,450	3,350	5,250
Fish/Wildlife Areas	0	0	0	0	0	0
Sand/Gravel Aquifers	4,800	4,800	2,450	2,450	7,250	7,250
Hydric Soils:						
Hydric	4,000	4,000	4,200	6,300	8,200	10,300
Potentially Hydric	10,400	10,400	2,900	10,000	13,300	20,400
Surficial Geo. High-Mod.	22,700	22,700	19,600	29,200	42,300	51,900
Steep Slopes:						
High	3,200	3,200	1,000	2,000	4,200	5,200
Moderate	2,000	2,000	4,700	5,600	6,700	7,600
Farmland Soils:						
Prime	5,000	5,000	8,800	17,700	13,800	22,700
Statewide Importance	4,900	4,900	6,780	8,300	11,680	13,200

* No differentiation between upgrade and new.

As previously mentioned, this alternative is the same as Alternative 2 with the exception that the northern bypass of Gorham extends to Cumberland Street, and an upgrade of Cumberland Street replaces the Mosher Road (Route 25) Gorham upgrade segment. A significant feature of this alternative would be a new crossing of the Presumpscot River.

Surficial Geology: Unstable Deposits

Unstable deposits pose minor constraints to the development of this alternative. These deposits occur throughout the study area, particularly north of Gorham, and in most of Westbrook and Portland. The new crossing of the Presumpscot River may face major geotechnical constraints due to unstable deposits and steep slopes along the river. New road crossings of Brandy and Tanner Brooks, and the upgrade along Congress Street also pose concerns due to the combination of steep slopes and unstable deposits. Geotechnical evaluation at the time of design will identify any such specific problems so that engineering solutions may be applied.

Steep Slopes/Erodible Soils

The principal areas of concern with this alternative are the new Presumpscot River crossing, along Congress Street near the Stroudwater and Fore Rivers, and the multiple crossings of Tannery Brook north of Gorham. Steep slopes and erodible soils associated with Tannery Brook would be most affected by the alternative alignment closest to the Gorham town center. The outer (northern) bypass option is more favorable. Proper application of erosion and sedimentation controls during and after construction would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (13,800 to 22,700 linear feet) and Additional Farmland Soils of Statewide Importance (11,680 to 13,200) would be greatest in the area north of Gorham where active farms occur. The inner bypass option would pose the most impacts in this respect. The segment of new road from Mosher Corner to Cumberland Street would bisect a large farming area. Upgrade segments pose minimal direct impact to the loss of Prime Farmland Soils or Additional Farmland Soils of Statewide Importance because impacted soils are along existing roadsides.

Sand and Gravel Aquifers

The outer northern Gorham bypass is near a groundwater contamination site off Libby Avenue. Roadway designers should be aware of this potential problem if it still exists at the time of design. Only the South Gorham upgrade segment lies within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area.

Surface Water Resources

This alternative has relatively few stream crossings (two to five) compared to other alternatives. However, it includes a new major crossing of the Presumpscot River as well as with the Congress Street upgrade major crossings of the Stroudwater River and Fore River. The crossing of Tannery Brook by the inner Gorham bypass also involves a broad width of associated wetlands at this location. The primary surface waters in the vicinity of the upgrade segments are the Fore River, Stroudwater River and its tributaries, and the Presumpscot

River (Westbrook segment). Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative poses a relatively low floodplain crossing distance (2,900 feet) compared to other alternatives. It includes, however, two major crossings: the Presumpscot River and the Congress Street crossing of the Stroudwater River and Fore River. Any upgrade in these areas should be designed so it withstands flooding and does not increase 100-year flood elevations more than a minor amount.

Wetlands

Direct wetland losses associated with this alternative would be relatively low (3,350 to 5,250 linear feet of crossing) compared to other alternatives. The principal area of wetland loss would be the Tannery Brook crossing (inner bypass), and possibly along the banks of the Presumpscot River (depending on bridge design). The inner Gorham bypass crosses a State designated wetland of medium importance (pending official designation). Large areas of hydric soils occur along the Presumpscot River crossing segment. Erosion and sedimentation controls and the use of stormwater best management practices would provide an adequate level of protection in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with bypasses north of Gorham is largely evergreen forest with scattered tracts of mixed evergreen/deciduous forest, successional (old field) and pasture. Vegetative cover along upgrade segments is almost entirely urban or suburban in character. As such, impacts to natural vegetation would be minimal.

Fish and Wildlife Resources

The outer Gorham bypass crosses Brandy Brook--a State designated fishery of medium importance. Assuming proper design, this crossing should have no significant impact on the fishery. This crossing is less desirable than the northern or outer bypass option. At the point of crossing, upstream and downstream reaches of the Presumpscot River are State designated fisheries of high importance. Proper design and construction can effectively preclude adverse impacts to this fishery.

The upgrade of Congress Street in the vicinity of the Fore River estuary poses the only major concern for fish or wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are the second highest of all alternatives. This alternative would cross between 26,200 and 26,300 feet of high and moderate density residential land use, and between 7,500 feet and 8,550 feet of low density residential land use. The total crossing of commercial and industrial land uses would be between 9,700 feet and 9,900 feet. Most impacts would be associated with upgrade segments. The Cumberland Avenue and Brighton Avenue segments pose the greatest impact due to the proximity of structures to the existing road. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The principal areas of cultural resource impact with Alternative 10 are the Cumberland Avenue and the Congress Street upgrades. Of all alternatives studied, this alternative has the greatest distance crossing areas of known historic resources. Although few structures would be directly impacted, their historical significance would require that efforts be taken to avoid and minimize impacts. Avoidance options are limited due to the proximity of the historic structures to the existing roadway. Historic resources in the Stroudwater Historic District may be so great that upgrade of this segment may be difficult to implement as currently envisioned due to the requirements for approval pursuant to Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

Historic resources along Cumberland Avenue also pose substantial constraints to the development of upgrade solutions. A potential historic site is also located just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist. Development of this alternative would require close coordination between designers and MHPC in order to identify the least impactive design.

ALTERNATIVE 11

Alternative 11 is a combination of upgrades and new road segments that provide improvements in the southern portion of the study area along Routes 114 and 22. This alternative includes:

- A southern Gorham bypass between Route 25 west of the Village and Route 114 south of the Village;
- An upgrade of Route 114 south of Gorham village to four lanes;
- A bypass of Route 22 between South Street in Gorham and Route 114 in Scarborough;
- An upgrade of County Road to a four-lane divided roadway with controlled access and increased operating speed between Saco Street and the Westbrook-Portland City Line; and
- A Congress Street bypass between the Turnpike interchange and I-295.

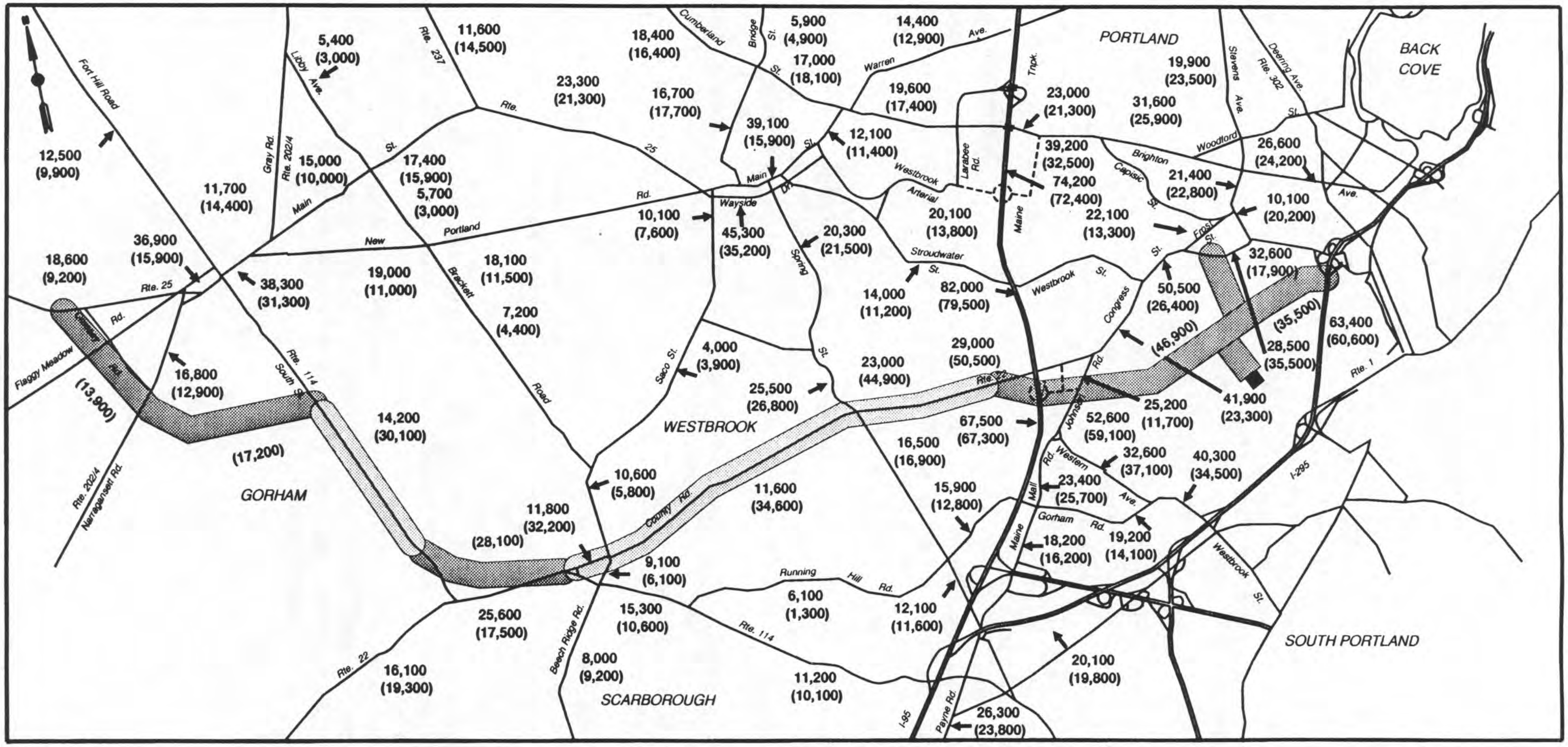
New road segments are projected to carry the following daily volumes: 13,900 west of Gorham Village, 28,100 on the Route 22 bypass, and 46,900 east of the airport (see Figure 50). Daily traffic volume on the upgraded portion of Route 114 is 30,100 and the volume on the upgraded portions of Route 22 is 34,600 west of Spring Street and 44,900 east of Spring Street. The Route 22 volumes represent increases of approximately 23,000 and 21,900, respectively. These volume increases are the result of both increased capacity and increased speed along the upgraded roadway which were designed to attract traffic from alternative roadways. The largest reduction in volume on existing roadways is 24,100 on Congress Street north of Westbrook Street. Other volume decreases on Route 25 and 22 include: 7,000 on Route 25 in Gorham Village, 10,100 on Main Street and Wayside Drive in Westbrook, 6,700 on Brighton Avenue east of the Turnpike access road, and 8,100 on Route 22 in South Gorham.

A modified version of this alternative was also tested but later eliminated. The modification added a direct connection between Route 114 and I-295 at the Turnpike for eastbound traffic only. With the modification daily volume on Route 114 east of Running Hill Road increased by 1,400 while volume on County Road between Saco Street and the Portland city line decreased by 1,300. The largest volume increase was on I-295 between the Turnpike and the South Portland Turnpike connector where volume increased by 3,700 vehicles per day. There was a small increase of 400 trips per day on Congress Street north of Johnson Road and no changes on Route 22 in South Gorham or Route 25 in Gorham Village. Because this represents only a minor effect on traffic volumes, this connection was dropped from further consideration.

The effects of this alternative include the elimination of deficiencies on Wayside Drive, Congress Street, part of Brighton Avenue, and Route 22 in South Gorham (see Figure 51). Deficiencies remain on Route 25 in Gorham Village east and west of Route 114, on Route 25 between Route 237 and Main Street in Westbrook, on County Road east of Spring Street, and on Brighton Avenue east of Stevens Avenue. At all but one of the remaining deficient locations, the v/c ratio would be reduced to 1.01 or lower. In Gorham Village east of Route 114, the v/c ratio would 1.74.

Deficiencies would also remain on Spring Street north of County Road and Johnson Road south of the Turnpike access. Both locations would experience increases in v/c ratios. Deficiency would be added on Stevens Avenue south of Brighton Avenue and on Western Avenue.

Table 32 compares the four transportation measures of effectiveness for Alternative 11 with the No-build case. Alternative 11 produces a small decrease in total VMT of 5,300 miles (approximately 0.1 percent) and comparatively modest reductions in VHT, VHD, and average v/c ratio. VHT declines by approximately 16,200 hours (5.1 percent) and VHD declines by approximately 14,200 hours (13.0 percent). The average v/c ratio for selected links declines 22.4 percent from 0.85 to 0.66.



2473CA11

Notes: Schematic Only
Not to Scale

Alternative 11 does not provide access to Flaggy Meadow Rd.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

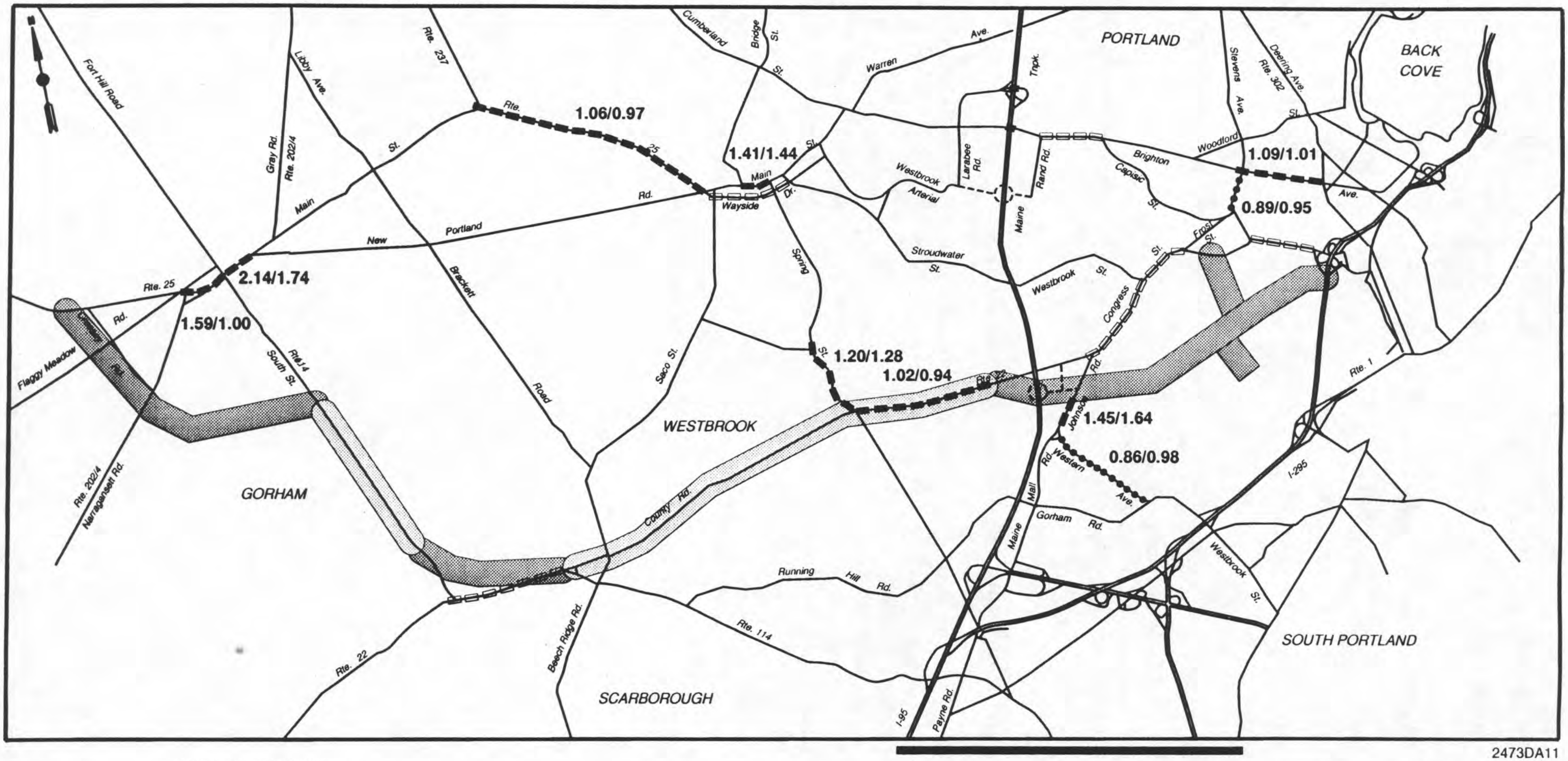
Bypass/New Road

Upgrade

Vanasse Hangen Brustlin, Inc.

Figure 50

2010 Daily Traffic Volumes Alternative 11



Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 11 does not provide access to Flaggy Meadow Rd.

- ▭▭▭ Deficiency Eliminated
- ▬ ▬ ▬ Deficiency Remains
- ••••• Deficiency Added
- XX.X/YY.Y No Build V/C Ratio / Alternative 11 V/C Ratio
- Upgrade
- Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 51

2010 Capacity Deficiency Comparison
Alternative 11

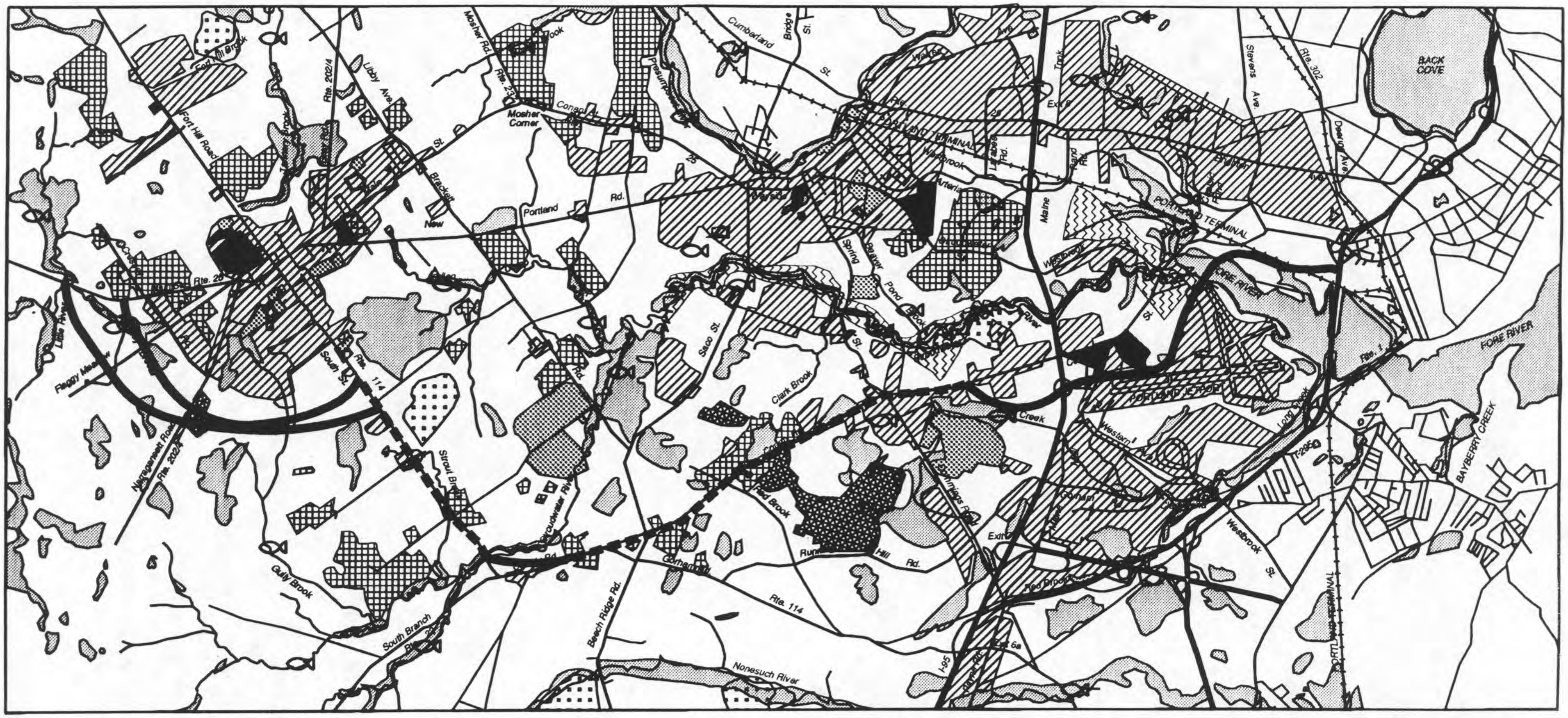
Table 32 **MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 11**

Measure*	No-Build	Alternative 11	Change	
			Number	Percent
VMT	7,443,400	7,438,100	-5,300	-0.1
VHT	315,000	298,800	-16,200	-5.1
VHD	109,600	95,400	-14,200	-13.0
V/C	0.85	0.66	-0.19	-22.4

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

Environmental, Social and Engineering Impacts

Figure 52 shows the alignment of Alternative 11 on an environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 33 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 11 is between 75.4 and 75.6 million dollars. The following text describes the impacts of this alternative, highlighting major problem areas.



Dense combinations of residential, commercial or institutional areas)	Park and Recreation Area Public Facilities
Cemetery/Institution	Active Farmland
Identified Wetland and Surface Water	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)

Waste Site (includes Junk Yards)	New Road
Wildlife Resource	Upgrade Intersection
Fishery	Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

Vanasse Hangen Brustlin, Inc.

Figure 52

Environmental Constraints Alternative 11

Table 33 **ALTERNATIVE 11--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use						
High-Mod Res/Mixed	2,250	2,250	700	700	2,950	2,950
Commercial/Industrial	5,700	5,700	400	400	6,100	6,100
Low Density Residential	9,200	9,200	1,000	1,400	10,200	10,600
Farmland	9,700	9,700	600	1,300	10,300	11,000
Sensitive Land Use						
Parks	0	0	0	0	0	0
Historic	0	0	0	0	0	0
Institutional	100	100	0	50	100	150
Resource Protection	0	0	0	0	0	0
Floodplains	400	400	1,700	2,300	2,100	2,700
Stream Crossings (Number)	*	*	*	*	5	5
Identified Wetlands	2,100	2,100	6,600	7,300	8,700	9,400
Fish/Wildlife Areas	0	0	2,450	2,500	2,450	2,500
Sand/Gravel Aquifers	9,700	9,700	10,300	10,450	20,000	20,150
Hydric Soils						
Hydric	9,700	9,700	10,550	10,850	20,250	20,550
Potentially Hydric	5,350	5,350	7,650	10,150	13,000	15,500
Surficial Geo. High-Mod.	21,200	21,200	31,400	34,000	52,600	55,200
Steep Slopes						
High	2,000	2,000	1,300	2,000	3,300	4,000
Moderate	0	0	6,200	6,250	6,200	6,250
Farmland Soils						
Prime	2,800	2,800	8,150	13,150	10,950	15,950
Statewide Importance	1,300	1,300	5,950	7,100	7,250	8,400

* No differentiation between upgrade and new.

Surficial Geology: Unstable Deposits

Much of this alternative's alignment lies in an area of unstable geologic deposits (52,600 to 55,200 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater River, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along this alternative's alignment at the following crossing locations:

- Brandy Brook (inner bypass only)
- Gully Brook
- Stroudwater River in South Gorham
- Fore River estuary

Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (10,950 to 15,950 linear feet) and Additional Farmland Soils of Statewide Importance (7,250 to 8,400 feet) would pose negligible impact on active farms.

Sand and Gravel Aquifers

The bypass segment southwest of Gorham near Narragansett Road, and the road segments in South Gorham and Scarborough intersect an aquifer area of moderate yield. Two groundwater contamination sites occur in the Gorham bypass area (auto junkyard and sand excavation site). Roadway designers should be aware of these potential problems if they still exist at the time of design. The South Gorham and North Scarborough new road and upgrade segments lie within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area. In total, 20,000 to 20,150 linear feet of moderate yield aquifer is crossed by this alternative.

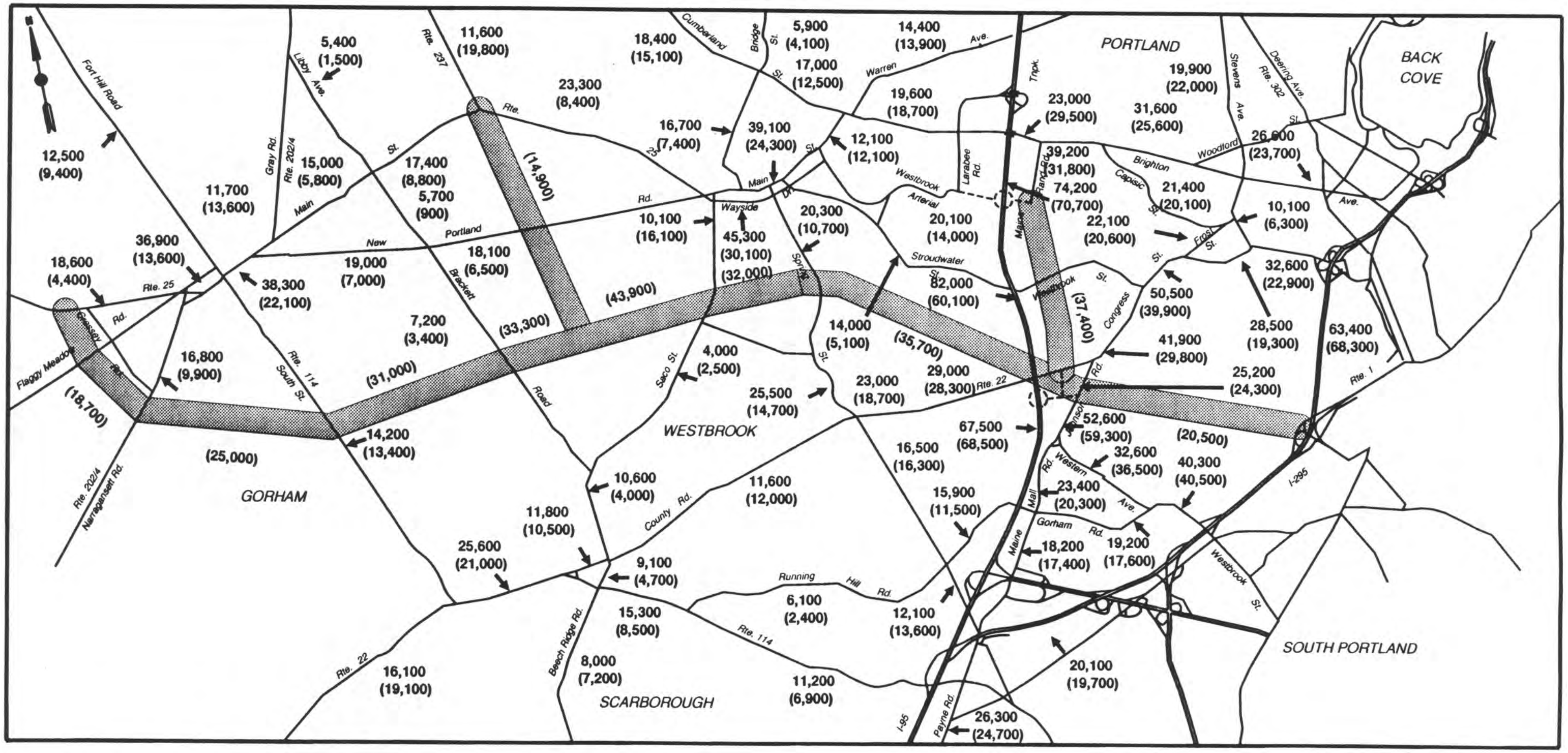
Surface Water Resources

Surface waters crossed by this alternative would include:

- Brandy Brook (tributary to the Presumpscot River)
- Stroudwater River and its tributaries (including Gully Brook)
- Fore River estuary

This alternative has a relatively low number of stream crossings (5) compared to other alternatives with most located in the Stroudwater basin. The new crossing of the Fore River in Portland poses potential impacts, suggesting major engineering and regulatory constraints to implementation. South of Gorham, the crossings of the Stroudwater River and Gully Brook also involve steep slopes.

Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.



Notes: Schematic Only
Not to Scale

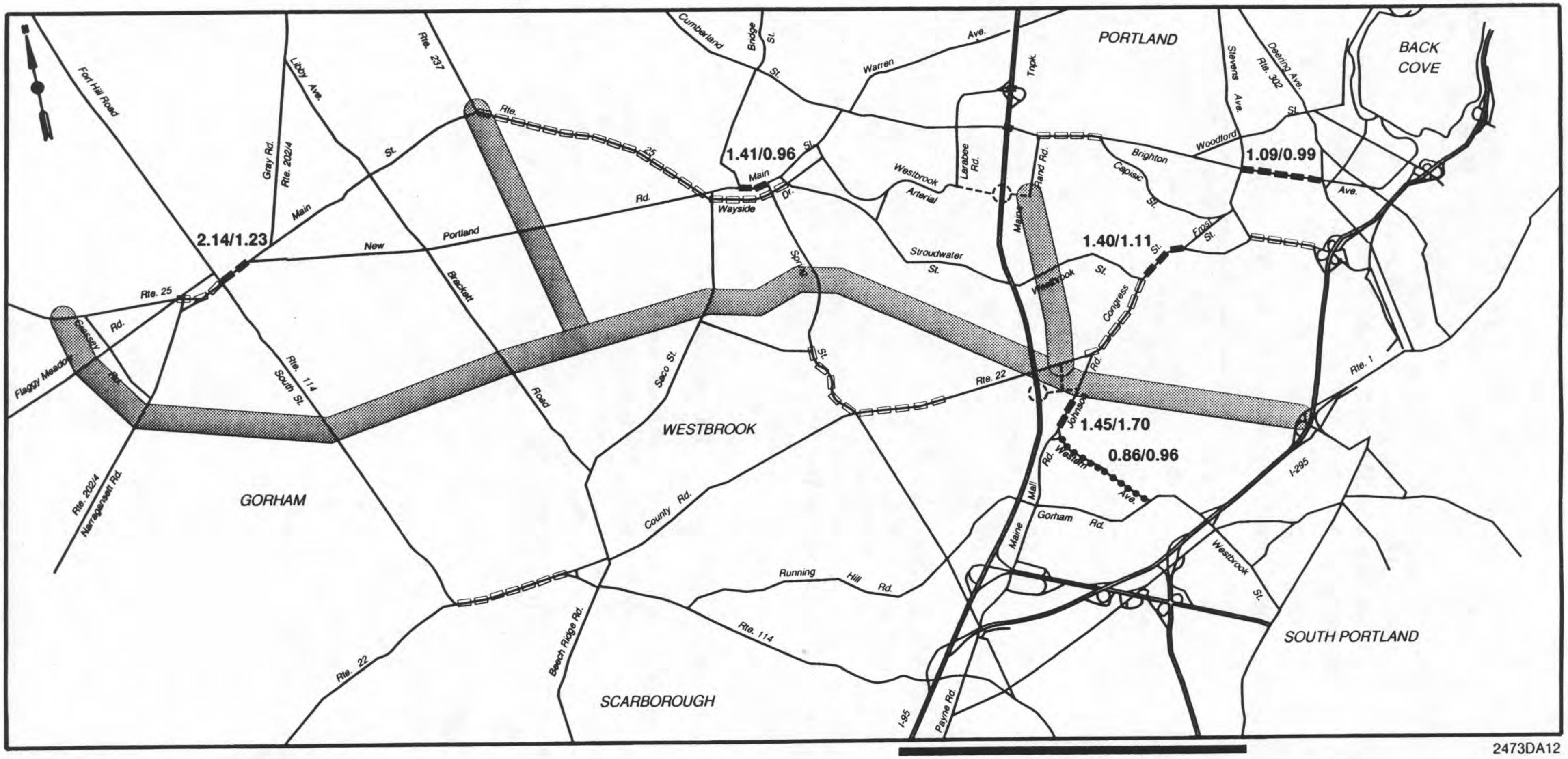
No connection to New Portland Rd., Westbrook St., or Johnson Rd.

XX	2010 No-Build Volumes
(YY)	2010 Volumes With Alternative
[shaded box]	Bypass/New Road
[light shaded box]	Upgrade

Vanasse Hangen Brustlin, Inc.

Figure 53

2010 Daily Traffic Volumes
Alternative 12



Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

No connection to New Portland Rd., Westbrook St., or Johnson Rd.

▭▭▭ Deficiency Eliminated

▬▬▬ Deficiency Remains

●●●●● Deficiency Added

XX.X/YY.Y No Build V/C Ratio / Alternative 12 V/C Ratio

Upgrade

Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 54

2010 Capacity Deficiency Comparison
Alternative 12

Table 34 compares the four transportation measures of effectiveness for Alternative 12 with the No-build case. Although Alternative 12 produces a very small increase in total VMT of 600 miles (less than 0.05 percent), it results in a significant reduction in VHT, VHD, and average v/c ratio. It has the third largest decline in VHT (approximately 21,800 hours or 6.9 percent) and the second largest decline in VHD (approximately 19,600 hours or 17.9 percent). The average v/c ratio for selected links declines 31.8 percent from 0.85 to 0.58.

Table 34

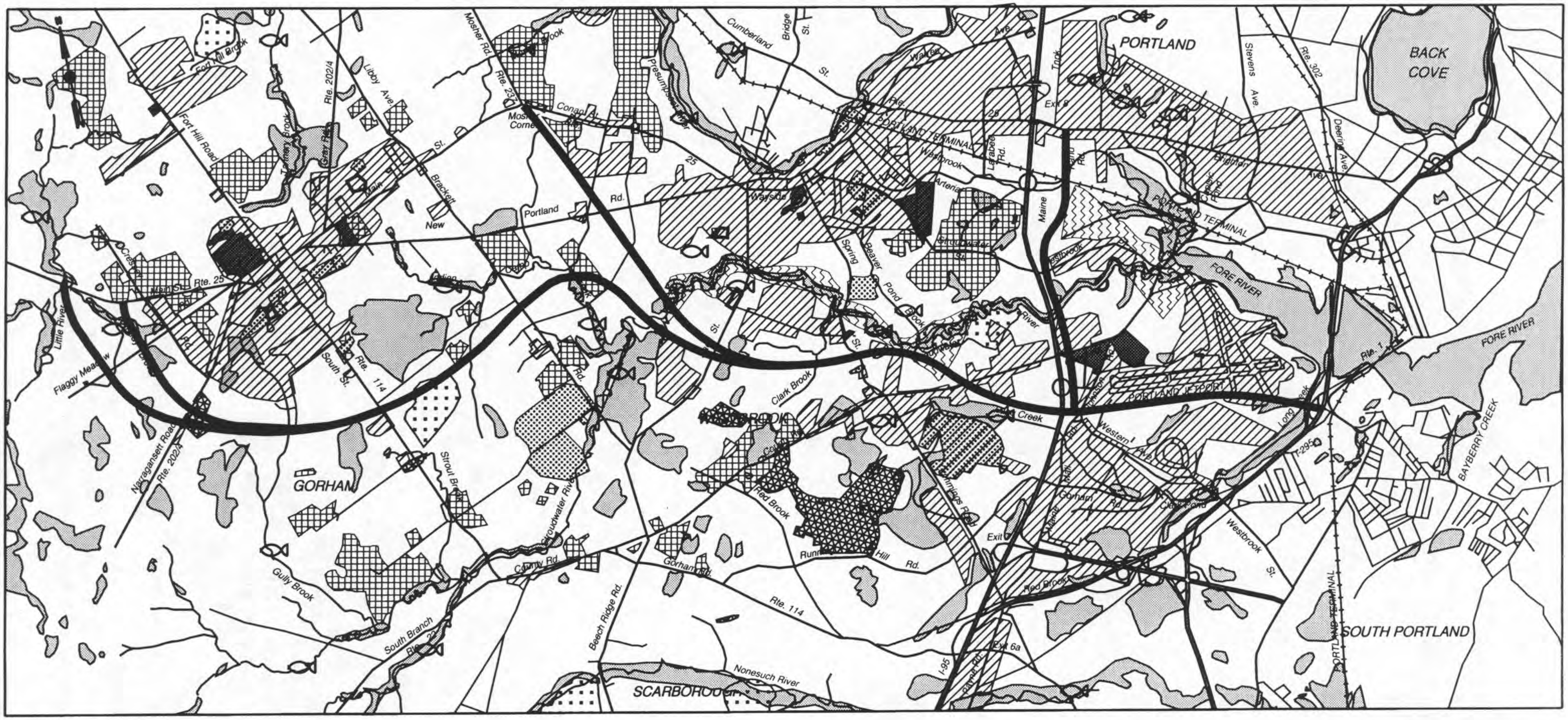
MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 12

Measure*	No-Build	Alternative 12	Change	
			Number	Percent
VMT	7,443,400	7,444,000	600	0.0**
VHT	315,000	293,200	-21,800	-6.9
VHD	109,600	90,000	-19,600	-17.9
V/C	0.85	0.58	-0.27	-31.8

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.
** Less than 0.05

Environmental, Social and Engineering Impacts

Figure 55 shows the alignment of Alternative 12 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between new roads and environmental resources. Table 35 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 12 is 90.5 million dollars. The following text describes these impacts, highlighting major problem areas.



Dense combinations of residential, commercial or institutional areas)	
Cemetery/Institution	
Identified Wetland and Surface Water	
Park and Recreation Area Public Facilities	
Active Farmland	
Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)	
Waste Site (includes Junk Yards)	
Wildlife Resource	
Fishery	
New Road	
Upgrade Intersection	
Upgrade Roadways	

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure 55

Environmental Constraints Alternative 12

Table 35 **ALTERNATIVE 12--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	--	--	600	600	600	600
Commercial/Industrial	--	--	3,700	3,700	3,700	3,700
Low Density Residential	--	--	2,400	2,400	2,400	2,400
Farmland	--	--	4,100	4,500	4,100	4,500
Sensitive Land Use:						
Parks	--	--	500	500	500	500
Historic	--	--	0	0	0	0
Institutional	--	--	0	50	0	50
Resource Protection	--	--	3,000	3,000	3,000	3,000
Floodplains	--	--	2,550	2,950	2,550	2,950
Stream Crossings (Number)	--	--	11	11	11	11
Identified Wetlands	--	--	8,900	9,350	8,900	9,350
Fish/Wildlife Areas	--	--	3,000	3,050	3,000	3,050
Sand/Gravel Aquifers	--	--	7,250	7,400	7,250	7,400
Hydric Soils:						
Hydric	--	--	27,400	28,500	27,400	28,500
Potentially Hydric	--	--	25,600	27,100	25,600	27,100
Surficial Geo. High-Mod.	--	--	69,300	73,300	69,300	73,300
Steep Slopes:						
High	--	--	5,100	5,800	5,100	5,800
Moderate	--	--	5,350	5,450	5,350	5,450
Farmland Soils:						
Prime	--	--	18,800	24,600	18,800	24,600
Statewide Importance	--	--	6,750	7,900	6,750	7,900

* No differentiation between upgrade and new.
-- No upgrade.

This alternative consists of all new road segments including alternative bypasses south of Gorham and Westbrook, and a new crossing of the Long Creek, a tributary to the Fore River, south of the jetport. As previously mentioned, except for the segment between the Maine Turnpike and Route I-95, this alternative is identical to Alternative 4.

Surficial Geology: Unstable Deposits

Much of this alternative's alignment lies in an area of unstable geologic deposits (69,300 to 73,300 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater River), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along much of this alternative's alignment. Principal areas of concern are the Stroudwater River crossings south of Westbrook and the Long Creek crossing. The crossings of Gully and Indian Camp Brooks south of Gorham also involve steep slopes. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (18,800 to 24,600 linear feet) and Additional Farmland Soils of Statewide Importance (6,750 to 7,900 feet) would have little impact on active farms.

Sand and Gravel Aquifers

The bypass segments southwest of Gorham (near Narragansett Road) intersect an area of moderate yield aquifer. Two groundwater contamination sites occur in this area as well (auto junkyard and sand excavation site). Roadway designers should be aware of these potential problem areas if they still exists at the time of design. In total, between 7,250 and 7,400 linear feet of moderate yield aquifer is crossed by this alternative.

Surface Water Resources

Surface waters crossed by this alternative include:

- Stroudwater River and its tributaries (including Gully and Indian Camp Brooks)
- Brandy Brook (tributary to the Presumpscot River)
- Long Creek (Fore River tributary)

This alternative has a high number of stream crossings (11) compared to other alternatives with most in the Stroudwater basin. Many of these are major crossings. The crossing of Long Creek in Portland poses potential impacts to the Fore River estuary, but it appears more desirable to the alternative Fore River crossing near Congress Street. Both Westbrook bypasses include major crossings of the Stroudwater River. The crossings of Gully and Indian Camp Brooks also involve steep slopes.

Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative involves a total floodplain crossing distance of between 2,550 feet and 2,950 feet. The multiple new road crossings of the Stroudwater River constitute the majority of floodplain crossings associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

Wetland impacts of this alternative range from 8,900 feet to 9,350 feet, about average compared with other alternatives. The presence of extensive hydric soils south of Gorham and Westbrook suggests wetlands are more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland loss would be in the Gully and Indian Camp Brook watersheds, the Stroudwater River crossings south of Westbrook, and the new crossing of Long Creek. Each of these sites pose regulatory constraints with regard to wetland permitting. The Gorham bypass crosses a wetland of low importance (pending official designation) south of Day Road. Structural engineering solutions and careful choice of crossing locations would minimize the impacts associated with these crossings. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas such as Long Creek.

Vegetative Cover

Vegetation associated with bypasses south of Gorham is largely evergreen forest. The lands crossed by alternatives south of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses.

Fish and Wildlife Resources

The outer Gorham bypass crosses Brandy Brook--a State designated fishery of medium importance. Assuming proper design, this crossing should have no significant impact on the fishery. The Gorham bypass crosses a State designated deer wintering area south of Day Road.

South of Westbrook, the inner (northern) option impacts a fishery of high importance, but otherwise avoids designated fisheries and deer wintering areas potentially impacted by the outer (southern) bypass option. The Maine Turnpike crossing is also in the area of an unnamed tributary to Long Creek designated as a fishery of indeterminate significance.

The new crossing of Long Creek poses concerns for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat of National or State Significance. Design of the crossing would minimize direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are low compared with other alternatives. This alternative would cross only 600 feet of high and moderate density residential land use, and 2,400 feet of low density residential land use. The total crossing of commercial and industrial land uses would be 3,700 feet. Most impacts would be associated with new road interchanges. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The only known area of cultural resource impact with Alternative 12 is a cluster of potential historic sites at the State School for Boys, south of the Jetport. Avoidance options appear limited due to the proximity of both the historic resources and the jetport runway.

Also of note is a potential historic site located just northeast of Mosher Corner. In this case, avoidance opportunities appear to exist.

ALTERNATIVE 13

Alternative 13 is a new road alternative which is a similar to Alternative 6 from the Westerly Connector Study.[9] This new road alignment connects Route 25 west of Gorham Village to I-295 just south of Congress Street. As shown on Figure 56, the corridor alignment passes north of Gorham Village, south of Westbrook, north of the proposed Turnpike interchange at Johnson Road, and parallel to Congress Street between Johnson Road and I-295. There is also a north-south spur parallel to the Turnpike connecting the new road to the new interchange south of Brighton Avenue. This alternative is generally the northernmost alignment of any new road alternative.

Daily traffic volumes on the new road range from 15,700 between Route 25 and Fort Hill Road in Gorham to 55,300 between Congress Street and the airport. The spur to the proposed Turnpike interchange at the Westbrook Arterial carries 19,600 vehicles. Daily traffic volume diversions from existing roadways include: 13,800 vehicles in Gorham Village, 19,100 in Westbrook, 11,300 on Brighton Avenue east of the proposed Turnpike interchange, 35,000 on Congress Street north of Westbrook Street, and 3,500 on Route 22 in South Gorham.

Figure 57 presents projected roadway deficiencies with this alternative. Five roadway segments along Routes 25 and 22 will remain deficient with this alternative. These include Route 25 east and west of Route 114 in Gorham Village, Brighton Avenue east of Stevens Street, Congress Street between the new road and Johnson Road, and Route 22 in South Gorham. The v/c ratio at the Congress Street location will increase from 1.15 to 1.74 because of an increase in traffic volume to 62,700. In Gorham Village the v/c ratios will decline to 1.06 and 1.36, respectively, west and east of Route 114. The Brighton Avenue and Route 22 locations are barely deficient with the v/c ratios declining to 0.91 and 0.92, respectively

No-Build deficencies will also remain in four other locations not on Route 25 or 22. These include Main Street in Westbrook, Spring Street north of County Road and Johnson Road south of the proposed Turnpike interchange. In each case the v/c ratio will increase somewhat or remain unchanged. Deficiencies will be added on Johnson Road north of the proposed Turnpike interchange and Route 202/4 north and south of Libby Avenue. The projected v/c ratios are 1.09 on Johnson Road and 0.95 or less on the Route 202/4 segments.

Table 36 compares the four transportation measures of effectiveness for Alternative 13 with the No-build case. Alternative 13 produces an increase in total VMT of 6,400 miles (approximately 0.1 percent) and a reduction in VHT,

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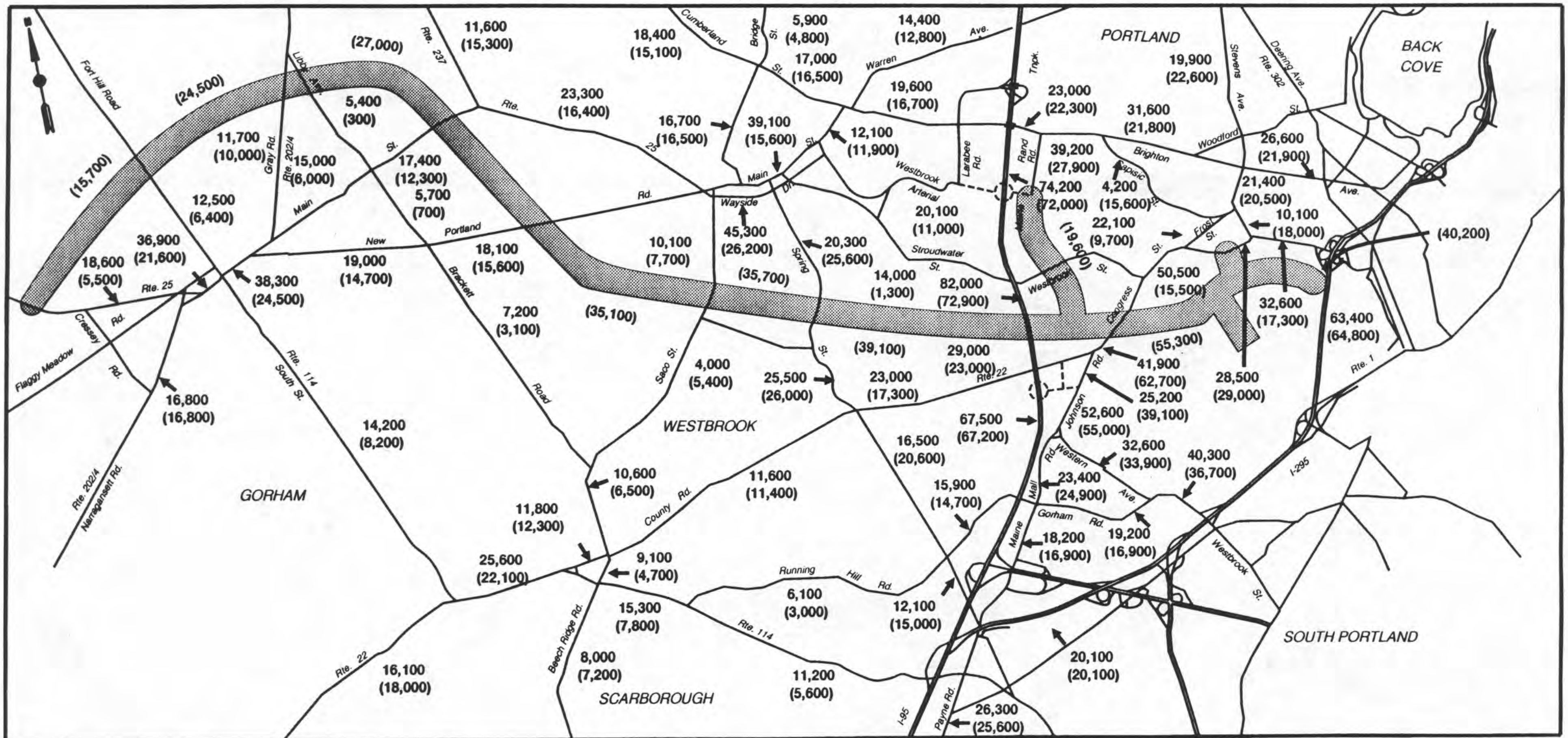
9 Westerly Connector Study, Howard Needles Tammen & Bergendoff and Wilbur Smith Associates, April 1988.



2473CA13

Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 13 does not provide access to Libby Ave. or Westbrook St.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

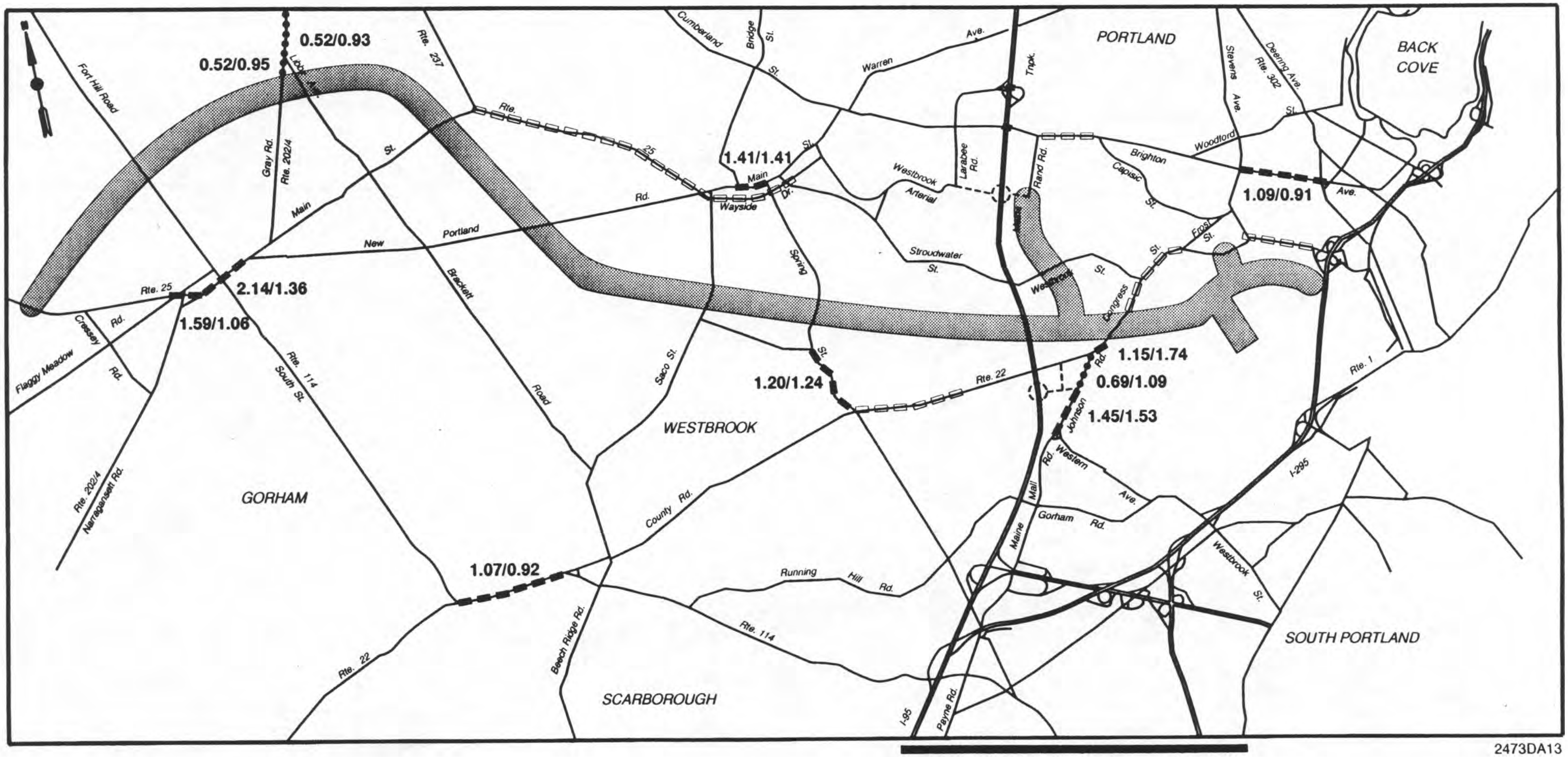
Bypass/New Road

Upgrade

Vanasse Hangen Brustlin, Inc.

Figure 56

2010 Daily Traffic Volumes
Alternative 13



Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 13 does not provide access to Libby Ave. or Westbrook St.

Deficiency Eliminated

Deficiency Remains

Deficiency Added

XX.X/YY.Y No Build V/C Ratio / Altenative 14 V/C Ratio

Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 57

2010 Capacity Deficiency Comparison Alternative 13

VHD, and average v/c ratio. VHT declines by approximately 17,300 hours (5.5 percent) and VHD declines by approximately 15,400 hours (14.1 percent). The average v/c ratio for selected links declines 24.7 percent from 0.85 to 0.64.

Table 36

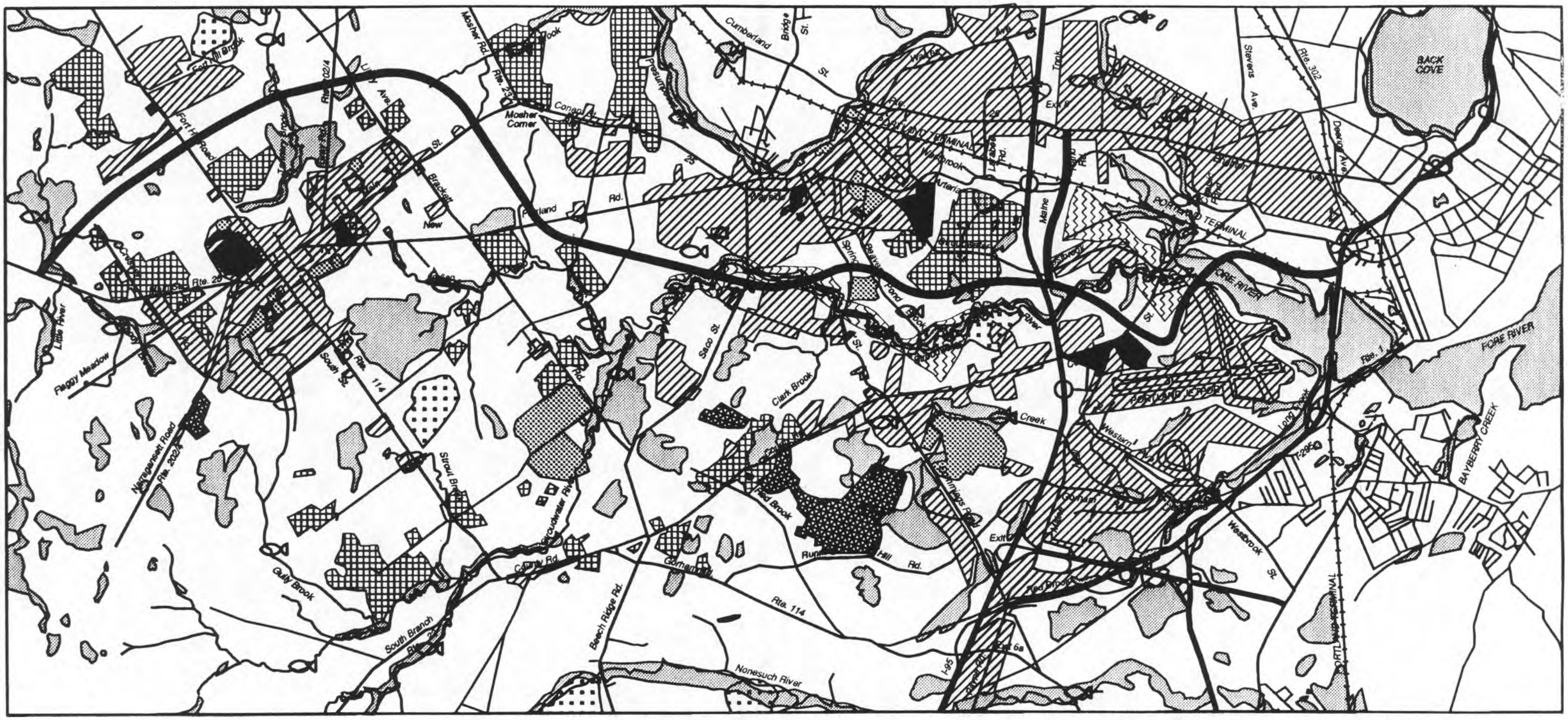
MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 13

Measure*	No-Build	Alternative 13	Change Number	Change Percent
VMT	7,443,400	7,449,800	6,400	0.1
VHT	315,000	297,700	-17,300	-5.5
VHD	109,600	94,200	-15,400	-14.1
V/C	0.85	0.64	-0.21	-24.7

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

Environmental, Social and Engineering Impacts

Figure 58 shows the alignment of Alternative 13 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 37 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 13 is 120.8 million dollars. The following text describes these impacts, highlighting any major problem areas.



Dense combinations of residential, commercial or institutional areas)	Park and Recreation Area Public Facilities
Cemetery/Institution	Active Farmland
Identified Wetland and Surface Water	Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)
Waste Site (includes Junk Yards)	New Road
Wildlife Resource	Upgrade Intersection
Fishery	Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

Vanasse Hangen Brustlin, Inc.

Figure 58
Environmental Constraints Alternative 13

Table 37 ALTERNATIVE 13--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	--	--	2,200	2,200	2,200	2,200
Commercial/Industrial	--	--	2,000	2,000	2,000	2,000
Low Density Residential	--	--	5,800	5,800	5,800	5,800
Farmland	--	--	13,100	13,100	13,100	13,100
Sensitive Land Use:						
Parks	--	--	0	0	0	0
Historic	--	--	300	300	300	300
Institutional	--	--	0	0	0	0
Resource Protection	--	--	3,000	3,000	3,000	3,000
Floodplains	--	--	5,300	5,300	5,300	5,300
Stream Crossings (Number)	--	--	20	20	20	20
Identified Wetlands	--	--	19,500	19,500	19,500	19,500
Fish/Wildlife Areas	--	--	2,450	2,450	2,450	2,450
Sand/Gravel Aquifers	--	--	0	0	0	0
Hydric Soils:						
Hydric	--	--	41,600	41,600	41,600	41,600
Potentially Hydric	--	--	32,000	32,000	32,000	32,000
Surficial Geo. High-Mod.	--	--	102,800	102,800	102,800	102,800
Steep Slopes:						
High	--	--	6,000	6,000	6,000	6,000
Moderate	--	--	27,000	27,000	27,000	27,000
Farmland Soils:						
Prime	--	--	33,500	33,500	33,500	33,500
Statewide Importance	--	--	16,000	16,000	16,000	16,000

-- No upgrade.

Surficial Geology: Unstable Deposits

Almost all of this alternative lies in an area of unstable geologic deposits, and it crosses more of these deposits than any other alternative (102,800 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater and Fore Rivers), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along much of this alternative's alignment. Principal areas of concern are the numerous river crossings, including Little River, Tannery Brook, Stroudwater River, and the Fore River. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (33,500 linear feet) and Additional Farmland Soils of Statewide Importance (16,000 feet) would be greatest in the area where active farms occur: north of Gorham, and south of Stroudwater Street in Westbrook.

Sand and Gravel Aquifers

This alternative passes near groundwater contamination sites off Libby Avenue and Longfellow Road in Gorham. Roadway designers should be aware of this potential problem if it still exists at the time of design. None of the new road segments lie within an identified aquifer area.

Surface Water Resources

The primary surface waters in the vicinity of this alternative are:

- Little River, Tannery Brook, Fort Hill Brook (tributaries to the Presumpscot River)
- Stroudwater River and tributaries
- Fore River

This alternative has the second highest number of stream crossings (20) of all alternatives. The crossing of Little River west of Gorham is the major crossing in this Town. Multiple crossings of the Stroudwater River south of Westbrook and just east of the Maine Turnpike, and the new crossing of the Fore River in Portland pose engineering and regulatory constraints to implementation. Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative poses an above average level of total floodplain crossing distance (5,300 feet). The multiple new road crossings of the Stroudwater River and the new crossing of the Fore River estuary constitute the majority of floodplain impacts associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

This alternative crosses 19,500 feet of identified wetland, the second highest level of wetland impact of all alternatives studied. The presence of extensive hydric soils south of Westbrook suggests wetlands are more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland loss would be the Little River crossing, Stroudwater River crossings south of Westbrook, and the Fore River estuary. Each of these sites pose regulatory constraints with regard to wetland permitting. Structural engineering solutions and careful choice of crossing locations would minimize wetland impacts. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with segments north of Gorham is largely evergreen forest with scattered tracts of mixed evergreen/deciduous forest, successional (old field) and pasture. The lands crossed south of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses. The Fore River estuary crossing could impact marginal bands of salt marsh.

Fish and Wildlife Resources

The Gorham bypass crosses Little River--a State designated fishery of high importance. Assuming proper design, this crossing should have no significant impact on the fishery. South of Westbrook, and east of the Maine Turnpike, the crossing of the Stroudwater River impact designated fisheries of high importance. The alternative also crosses Beaver Pond Brook, a designated fishery of indeterminate importance.

The new crossing of the Fore River estuary poses a concern for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are average to low compared with other alternatives. This alternative would cross 2,200 feet of high and moderate density residential land use, and between 5,800 feet of low density residential land use. The total crossing of commercial and industrial land uses would be 2,000 feet. Most impacts would be associated with new road interchanges. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The only known area of cultural resource impact with Alternative 13 is the Stroudwater Historic District (barely skirted by this alternative) and a designated historic site just east of the district, near the Fore River. Avoidance options are limited, due to the proximity of both the historic resources and the jetport runway. Historic resources in the vicinity of the Stroudwater Historic District may be so great that this segment may be difficult to implement as currently envisioned due to the requirements for approval pursuant to Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

ALTERNATIVE 14

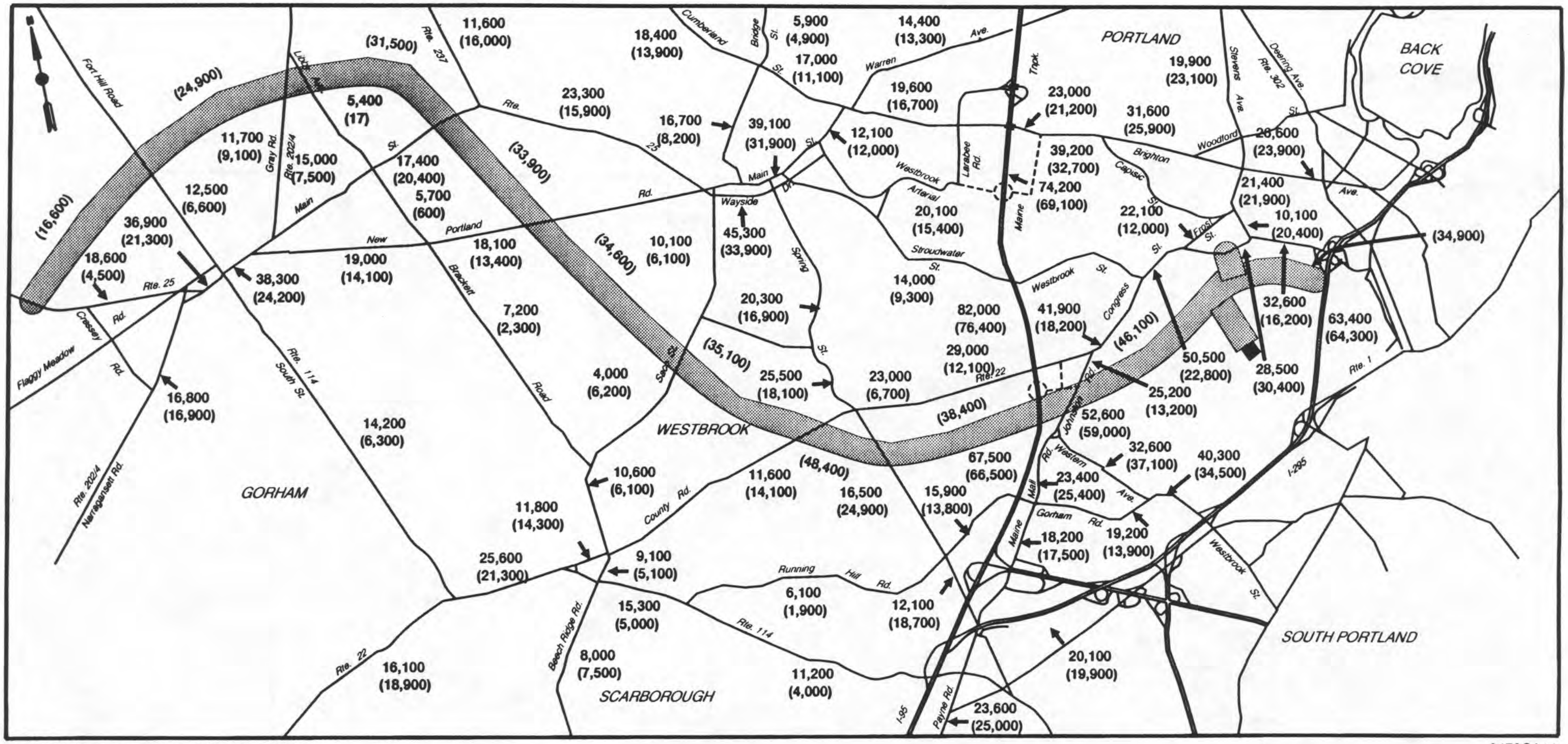
Alternative 14 is a new road alternative which is a similar to Alternative 7 from the Westerly Connector Study.[10] This new road alignment is similar to Alternative 13 and connects Route 25 west of Gorham Village to I-295 just south of Congress Street. As shown on Figure 59, the corridor alignment passes north of Gorham Village, south of Westbrook, south of the proposed Turnpike interchange at Johnson Road, and parallel to Congress Street between Johnson Road and I-295. In Westbrook it follows a more southerly alignment than Alternative 13, passing south of Eisenhower Drive and south of County Road west of Spring Street. Unlike Alternative 13, Alternative 14 does not include a spur parallel to the Turnpike connecting to the new interchange south of Brighton Avenue.

Daily traffic volumes on the new road are similar to Alternative 13 and range from 16,600 between Route 25 and Fort Hill Road in Gorham to 48,400 between County road and Spring Street. East of Congress Street this alternative carries 46,100 vehicles compared to 55,300 for Alternative 13. Projected traffic volume diversions from existing roadways include: 14,100 vehicles in Gorham Village, 11,400 in Westbrook, 6,500 on Brighton Avenue east of the proposed Turnpike interchange, 27,700 on Congress Street north of Westbrook Street, and 4,300 on Route 22 in South Gorham. Because of the more southerly route in Westbrook, Alternative 14 has somewhat lower diversions from existing roadways in Westbrook and Portland.

Four roadway segments along Routes 25 and 22 will remain deficient with this alternative as shown on Figure 60. These include Route 25 east and west of Route 114 in Gorham Village, and Brighton Avenue east of the proposed Turnpike interchange and east of Stevens Street. In Gorham Village the v/c ratios will decline to 1.00 and 1.34, respectively, west and east of Route 114. Brighton Avenue east of the Turnpike interchange is barely deficient with the v/c ratios declining to 0.91. The v/c ratio at the Brighton Avenue location east of Stevens Avenue will decline to 0.99.

No-Build deficencies will also remain in two locations not on Route 25 or 22. These include Main Street in Westbrook and Johnson Road south of the proposed Turnpike interchange. On Main Street the v/c ratio will decline from 1.41 to 1.35 and on Johnson Road the v/c ratio will increase from 1.45 to 1.64. Deficiencies will be added at four locations including Stevens Avenue south of

10 Westerly Connector Study, Howard Needles Tammen & Bergendoff and Wilbur Smith Associates, April 1988.



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Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 14 does not provide access to Libby Ave.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

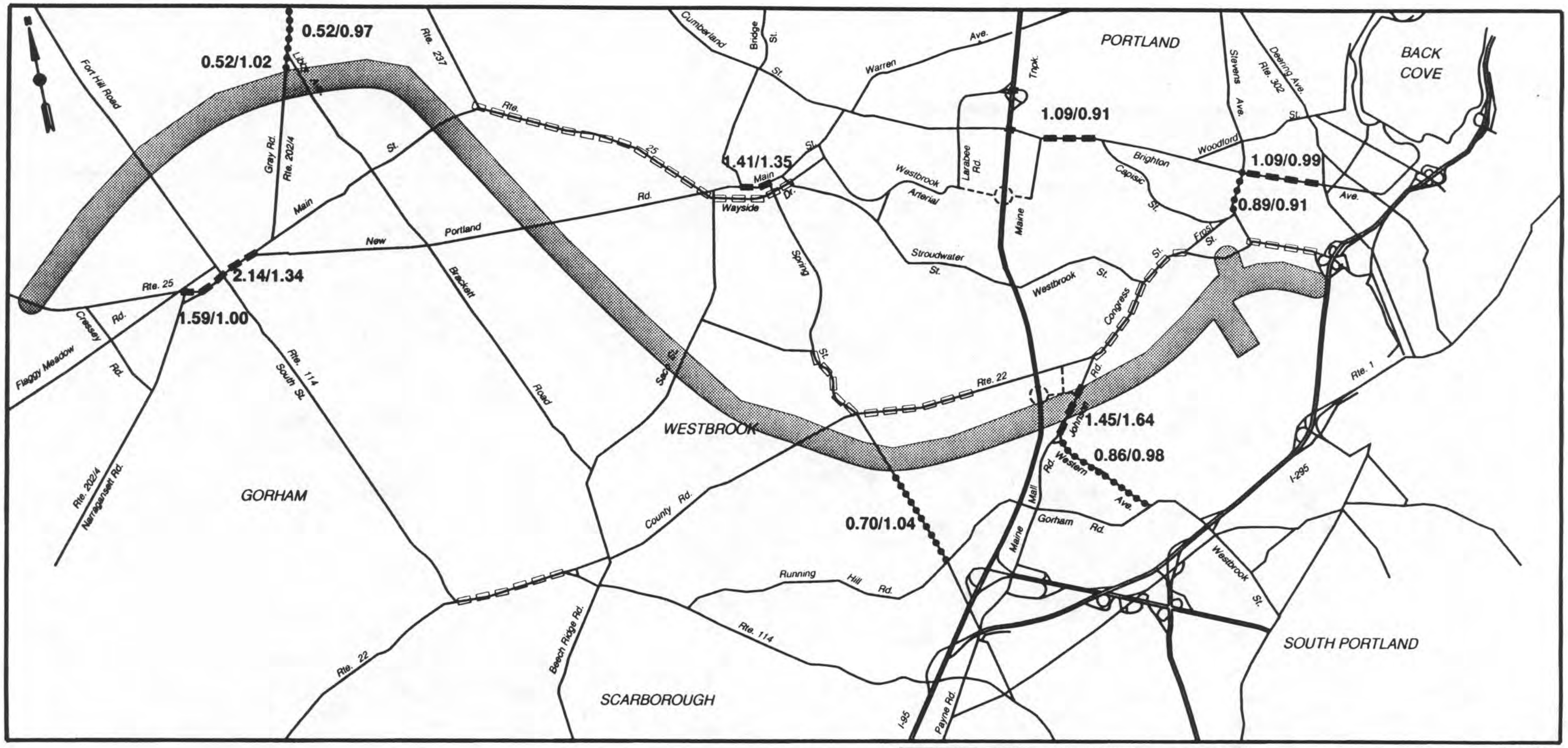
Bypass/New Road

Upgrade

Vanasse Hangen Brustlin, Inc.

Figure 59

2010 Daily Traffic Volumes
Alternative 14



2473DA14

Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 14 does not provide access to Libby Ave.

▭▭▭	Deficiency Eliminated
▬ ▬ ▬	Deficiency Remains
●●●●●	Deficiency Added
XX.X/YY.Y	No Build V/C Ratio Alternative 14 V/C Ratio
▒	Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 60

2010 Capacity Deficiency Comparison
Alternative 14

Brighton Avenue, Spring Street north of Running Hill Road, Route 202/4 north and south of Libby Avenue, and Western Avenue. Stevens Avenue will be barely deficient with a v/c ratio of 0.91. The other locations will have ratios in the range from 0.97 to 1.04.

Table 38 compares the four transportation measures of effectiveness for Alternative 14 with the No-build case. Although Alternative 14 produces a comparatively large increase in total VMT of 9,300 miles (approximately 0.1 percent), it results in a comparatively large reduction in VHT and VHD. VHT declines by approximately 20,200 hours (6.4 percent) and VHD declines by approximately 18,200 hours (16.6 percent). The average v/c ratio for selected links experiences a comparatively small decline of 25.9 percent from 0.85 to 0.63.

Table 38

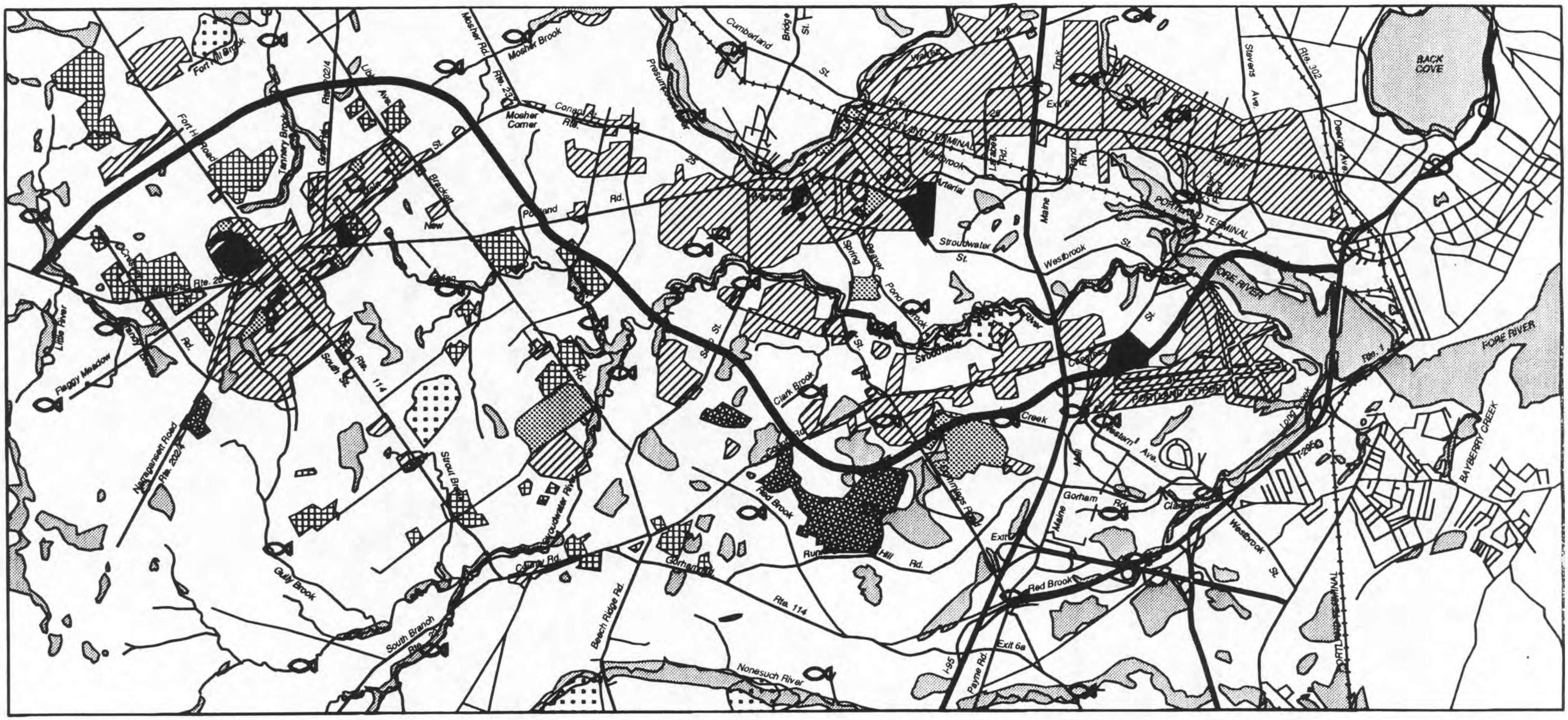
MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 14

Measure*	No-Build	Alternative 14	Change	
			Number	Percent
VMT	7,443,400	7,452,700	9,300	0.1
VHT	315,000	294,800	-20,200	-6.4
VHD	109,600	91,400	-18,200	-16.6
V/C	0.85	0.63	-0.22	-25.9

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

Environmental, Social and Engineering Impacts

Figure 61 shows the alignment of Alternative 14 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 39 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 14 is 99.7 million dollars. The following text describes these impacts, highlighting any major problem areas.



	Dense combinations of residential, commercial or institutional areas)		Park and Recreation Area Public Facilities		Waste Site (includes Junk Yards)		New Road
	Cemetery/Institution		Active Farmland		Wildlife Resource		Upgrade Intersection
							Upgrade Roadways
	Identified Wetland and Surface Water		Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)		Fishery		

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

Vanasse Hangen Brustlin, Inc.

Figure 61

Environmental Constraints Alternative 14

Table 39 **ALTERNATIVE 14--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	--	--	2,300	2,300	2,300	2,300
Commercial/Industrial	--	--	3,000	3,000	3,000	3,000
Low Density Residential	--	--	4,900	4,900	4,900	4,900
Farmland	--	--	10,000	10,000	10,000	10,000
Sensitive Land Use:						
Parks	--	--	1,000	1,000	1,000	1,000
Historic	--	--	100	100	100	100
Institutional	--	--	1,900	1,900	1,900	1,900
Resource Protection	--	--	0	0	0	0
Floodplains	--	--	7,000	7,000	7,000	7,000
Stream Crossings (Number)	--	--	18	18	18	18
Identified Wetlands	--	--	17,600	17,600	17,600	17,600
Fish/Wildlife Areas	--	--	2,450	2,450	2,450	2,450
Sand/Gravel Aquifers	--	--	0	0	0	0
Hydric Soils:						
Hydric	--	--	36,900	36,900	36,900	36,900
Potentially Hydric	--	--	34,400	34,400	34,400	34,400
Surficial Geo. High-Mod.	--	--	82,900	82,900	82,900	82,900
Steep Slopes:						
High	--	--	5,000	5,000	5,000	5,000
Moderate	--	--	9,000	9,000	9,000	9,000
Farmland Soils:						
Prime	--	--	29,900	29,900	29,900	29,900
Statewide Importance	--	--	16,000	16,000	16,000	16,000

-- No upgrade.

Surficial Geology: Unstable Deposits

Almost all of this alternative lies in an area of unstable geologic deposits (82,900 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater River, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along much of this alternative's alignment. Principal areas of concern are the numerous river crossings, including Little River, Tannery Brook, Stroudwater River, and the Fore River. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (29,900 linear feet) and Additional Farmland Soils of Statewide Importance (16,000 feet) would be greatest in the area north of Gorham where active farms occur.

Sand and Gravel Aquifers

This alternative passes near groundwater contamination sites off Libby Avenue in Gorham and Saco Street in Westbrook. Roadway designers should be aware of this potential problem if it still exists at the time of design. None of the new road segments lie within an identified aquifer area.

Surface Water Resources

The primary surface waters in the vicinity of this alternative are:

- Little River, Tannery Brook, Fort Hill Brook (tributaries to the Presumpscot River)
- Stroudwater River and tributaries
- Long Creek
- Fore River

This alternative has the third highest number of stream crossings (18) of all alternatives. The crossing of Little River west of Gorham, the Stroudwater River southwest of Westbrook, and the new crossing of the Fore River in Portland poses engineering and regulatory constraints to implementation. Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative poses an above average level of total floodplain crossing distance (7,000 feet). The crossings of the Stroudwater River and the Fore River estuary constitute the majority of floodplain impacts associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

This alternative crosses 17,600 feet of identified wetland, the third highest level of wetland impact of all alternatives studied. The presence of extensive hydric soils south of Westbrook suggests wetlands are more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland loss would be the Little River crossing, Stroudwater River crossings south of Westbrook, and the Fore River estuary. Each of these sites pose regulatory constraints with regard to wetland permitting. Structural engineering solutions and careful choice of crossing locations would minimize the impacts associated with these crossings. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with segments north of Gorham is largely evergreen forest with scattered tracts of mixed evergreen/deciduous forest, successional (old field) and pasture. The lands crossed south of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses. The Fore River estuary crossing could impact marginal bands of salt marsh.

Fish and Wildlife Resources

The western Gorham bypass crosses Little River--a State designated fishery of high importance. Assuming proper design, this crossing should have no significant impact on the fishery. South of Westbrook the crossing of the Stroudwater River impacts a designated fishery of high importance. The alternative also crosses Long Creek, a designated fishery of low importance.

The new crossing of the Fore River estuary poses a concern for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are average to low compared with other alternatives. This alternative would cross 2,300 feet of high and moderate density residential land use, and 4,900 feet of low density residential land use. The total crossing of commercial and industrial land uses would be 2,000 feet. Most impacts would be associated with new road interchanges. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The only known area of cultural resource impact with Alternative 14 is the Stroudwater Historic District (skirted by this alternative) and a designated historic site just east of the district, near the Fore River. Avoidance options are limited, due to the proximity of both the historic resources and the jetport runway. Historic resources in the vicinity of the Stroudwater Historic District may be so great that this segment may be difficult to implement as currently envisioned due to the requirements for approval pursuant to Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

ALTERNATIVE 15

Alternative 15 is a new road alternative which is a similar to Alternative 9 from the Westerly Connector Study.[11] This new road alignment connects Route 25 west of Gorham Village to I-295 just south of Congress Street. East of Saco Street, the corridor alignment is exactly the same as Alternative 14 (see Figure 62). West of Saco Street, the alignment bypasses Gorham Village to the south rather than to the north as with Alternative 14. It is generally the southernmost alignment of any new road alternative that connects with I-295 just south of Congress Street.

Daily traffic volumes on the new road range from 14,400 between Route 25 and Route 202/4 in Gorham to 47,800 between Johnson Road and the airport. Daily traffic volume diversions from existing roadways include: 10,900 vehicles in Gorham Village, 11,600 in Westbrook, 5,000 on Brighton Avenue east of the proposed Turnpike interchange, 23,100 on Congress Street north of Westbrook Street, and 5,400 on Route 22 in South Gorham. All these diversions, except the one on Route 22 in South Gorham, are smaller with this alternative than with Alternative 14.

Four roadway segments along Routes 25 and 22 will remain deficient with this alternative. As shown in Figure 63, these include Route 25 east of Route 114 in Gorham Village, Brighton Avenue east of the proposed Turnpike interchange access road and east of Stevens Street, and Route 25 east of Route 237 in Gorham. The v/c ratios at all four locations will decrease with all but Gorham Village being 0.99 or lower. In Gorham Village the v/c ratio will decline from 2.14 to 1.52. A minor deficiency (0.92 v/c ratio) will be added on Congress Street between Stevens Avenue and the connector to the new road.

No-Build deficiencies will also remain in three locations not on Route 25 or 22. These include Main Street in Westbrook, Spring Street north of County Road and Johnson Road south of the proposed Turnpike interchange. The v/c ratio on Johnson Road will increase to 1.63. The ratios on Main Street and Spring Street will decline to 1.36 and 1.07, respectively. Deficiencies will be added on Stevens Avenue south of Brighton Avenue and on Western Avenue.

Table 40 compares the four transportation measures of effectiveness for Alternative 15 with the No-build case. Alternative 15 produces the second largest increase in total VMT (20,200 miles or approximately 0.3 percent). It results in relatively modest reductions in VHT, VHD, and average v/c ratio.

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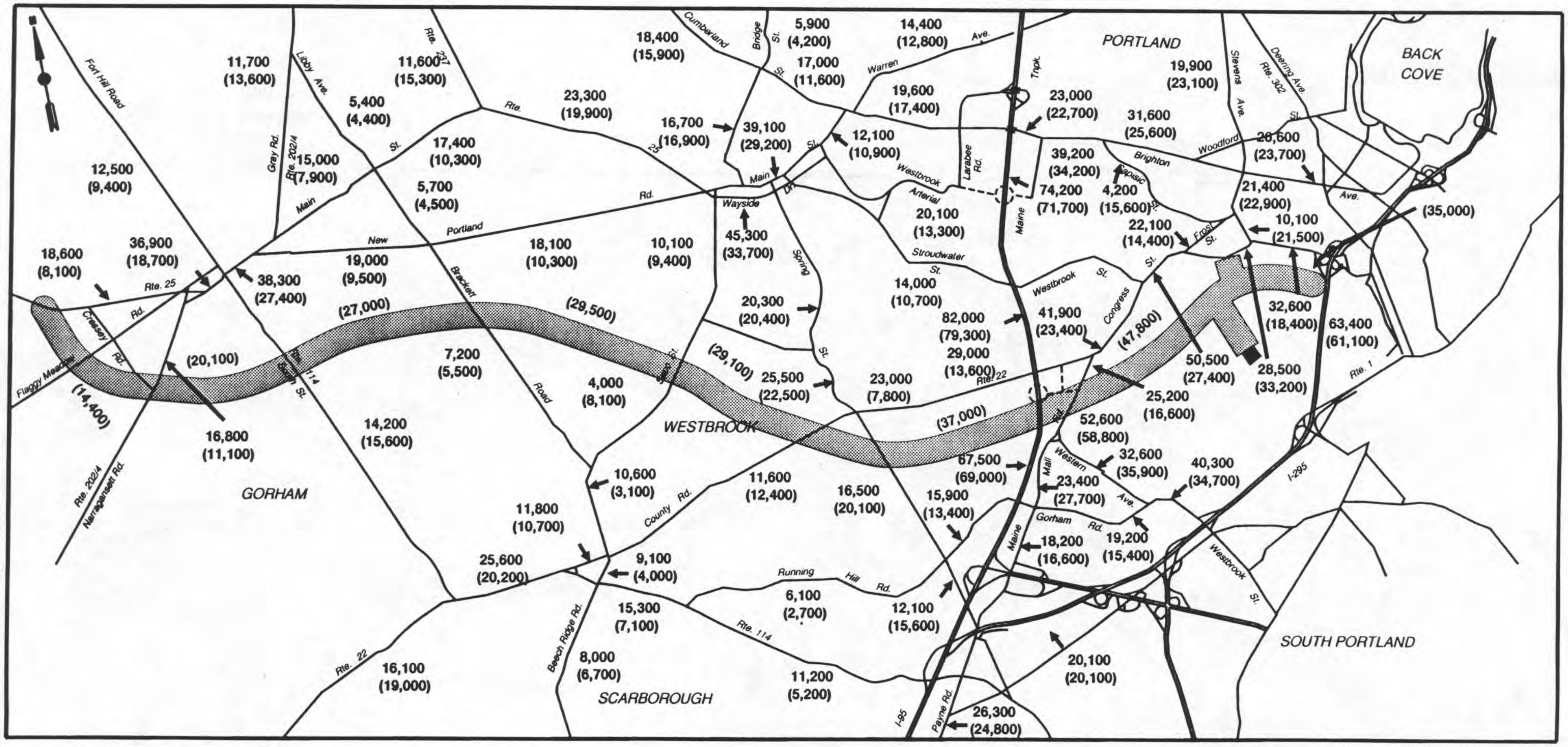
11 Westerly Connector Study, Howard Needles Tammen & Bergendoff and Wilbur Smith Associates, April 1988.



2473CA15

Notes: Schematic Only
Not to Scale

Alternative 15 does not provide access to Flaggy Meadow Rd.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

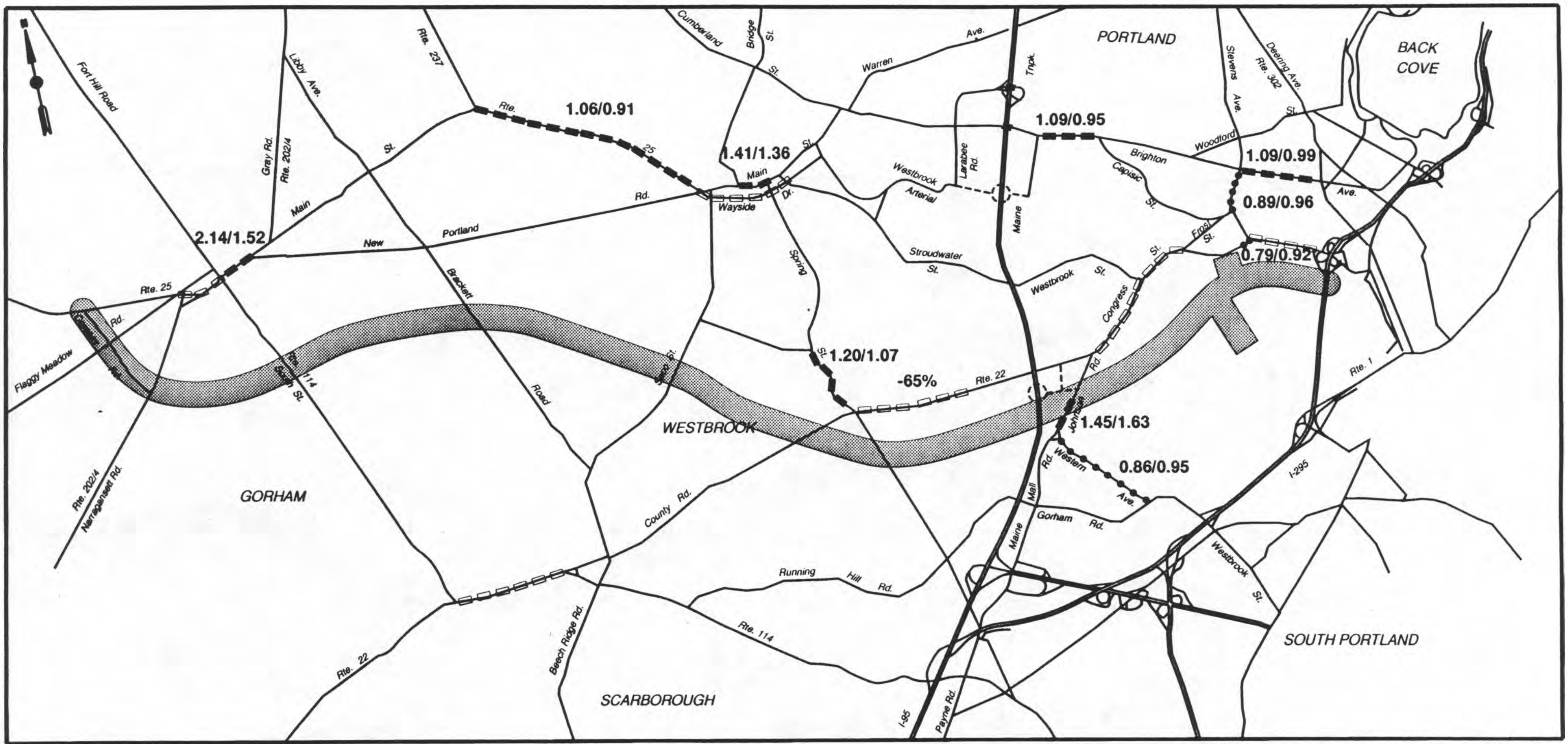
Bypass/New Road

Upgrade

Vanasse Hangen Brustlin, Inc.

Figure 62

2010 Daily Traffic Volumes
Alternative 15



Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 15 does not provide access to Flaggy Meadow Rd.

▭▭▭	Deficiency Eliminated
▬ ▬ ▬	Deficiency Remains
●●●●●	Deficiency Added
XX.X/YY.Y	No Build V/C Ratio/ Alternative 15 V/C Ratio
▒	Bypass/New Road

Vanasse Hangen Brustlin, Inc.

Figure 63

2010 Capacity Deficiency Comparison
Alternative 15

VHT declines by approximately 15,300 hours (4.9 percent) and VHD declines by approximately 14,000 hours (12.8 percent). The average v/c ratio for selected links declines 27.1 percent from 0.85 to 0.62.

Table 40

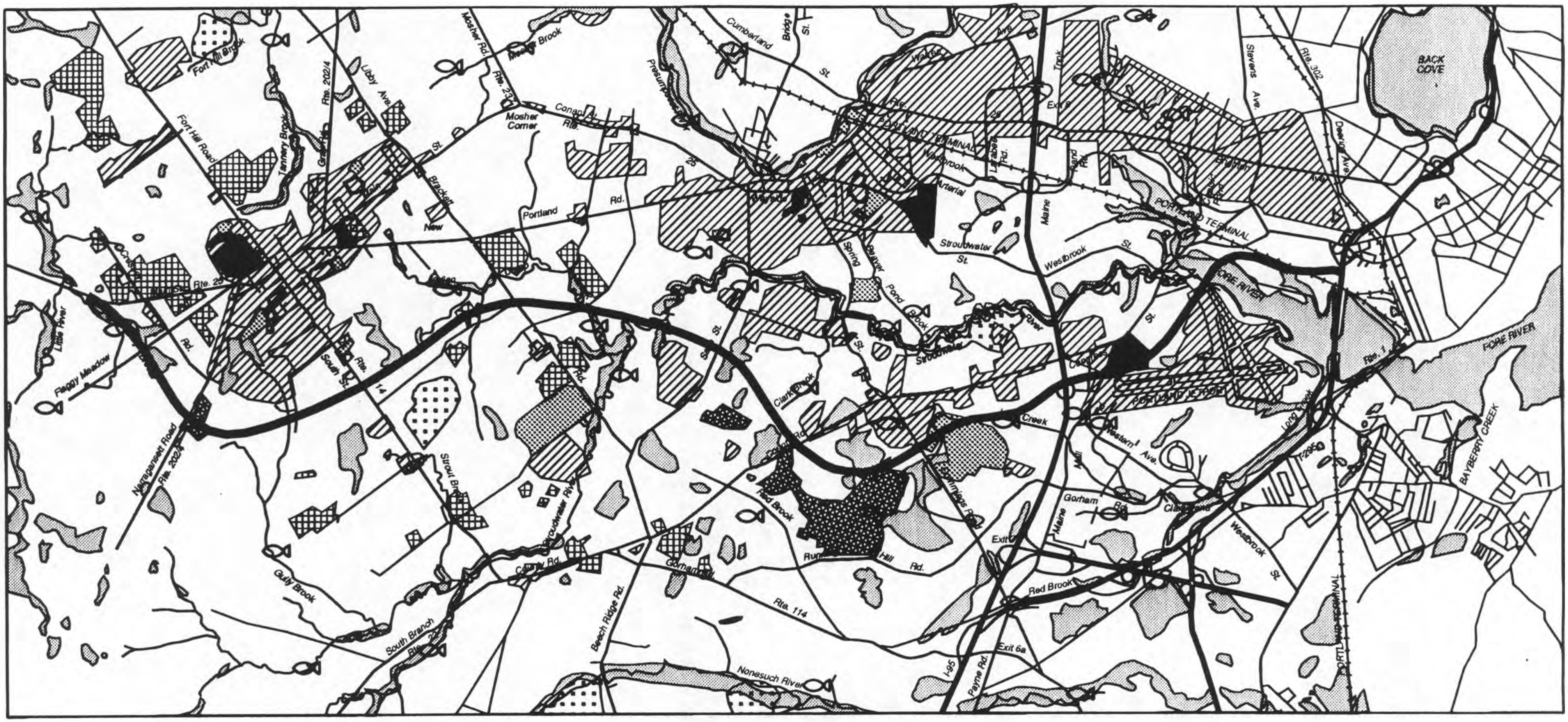
MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 15

			Change	
Measure*	No-Build	Alternative 15	Number	Percent
VMT	7,443,400	7,464,200	20,800	0.3
VHT	315,000	299,700	-15,300	-4.9
VHD	109,600	95,600	-14,000	-12.8
V/C	0.85	0.62	-0.23	-27.1

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

Environmental, Social and Engineering Impacts

Figure 64 shows the alignment of Alternative 15 on a simplified environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 41 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 15 is 92.2 million dollars. The following text describes these impacts, highlighting any major problem areas.



- Dense combinations of residential, commercial or institutional areas)
- Cemetery/Institution
- Identified Wetland and Surface Water
- Park and Recreation Area Public Facilities
- Active Farmland
- Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)
- Waste Site (includes Junk Yards)
- Wildlife Resource
- Fishery
- New Road
- Upgrade Intersection
- Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure 64

Environmental Constraints Alternative 15

Table 41 **ALTERNATIVE 15--POTENTIAL ENVIRONMENTAL IMPACTS**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use						
High-Mod Res/Mixed	--	--	2,900	2,900	2,900	2,900
Commercial/Industrial	--	--	3,000	3,000	3,000	3,000
Low Density Residential	--	--	4,000	4,000	4,000	4,000
Farmland	--	--	9,900	9,900	9,900	9.900
Sensitive Land Use						
Parks	--	--	1,000	1,000	1,000	1,000
Historic	--	--	100	100	100	100
Institutional	--	--	1,900	1,900	1,900	1,900
Resource Protection	--	--	0	0	0	0
Floodplains	--	--	9,800	9,800	9,800	9,800
Stream Crossings	--	--	21	21	21	21
Identified Wetlands	--	--	21,300	21,300	21,300	21,300
Fish/Wildlife Areas	--	--	2,550	2,550	2,550	2,550
Sand/Gravel Aquifers	--	--	10,300	10,300	10,300	10,300
Hydric Soils						
Hydric	--	--	39,500	39,500	39,500	39,500
Potentially Hydric	--	--	26,100	26,100	26,100	26,100
Surficial Geo. High-Mod.	--	--	70,600	70,600	70,600	70,600
Steep Slopes						
High	--	--	3,000	3,000	3,000	3,000
Moderate	--	--	7,000	7,000	7,000	7,000
Farmland Soils						
Prime	--	--	15,400	15,400	15,400	15,400
Statewide Importance	--	--	12,900	12,900	12,900	12,900

-- No upgrade.

Surficial Geology: Unstable Deposits

Much of this alternative lies in an area of unstable geologic deposits (70,600 linear feet). Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Moderate to steep slopes occur along much of this alternative's alignment. Principal areas of concern are the numerous river crossings, including Brandy Brook, Gully Brook, Indian Camp Brook, Stroudwater River, Long Creek and the Fore River. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (15,400 linear feet) and Additional Farmland Soils of Statewide Importance (12,900 feet) would be of minor impact to active farms.

Sand and Gravel Aquifers

The bypass segments southwest of Gorham near Narragansett Road intersect an area of moderate yield aquifer. Two groundwater contamination sites occur in this area as well (auto junkyard and sand excavation site). Roadway designers should be aware of these potential problem areas if they still exists at the time of design. In total, 10,300 linear feet of moderate yield aquifer is crossed by this alternative.

Surface Water Resources

The primary surface waters in the vicinity of this alternative are:

- Stroudwater River and its tributaries (including Gully and Indian Camp Brooks)
- Brandy Brook (tributary to the Presumpscot River)
- Long Creek
- Fore River

This alternative has highest number of stream crossings (21) of all alternatives. The numerous stream and river crossings in Gorham and Westbrook and the new crossing of the Fore River in Portland pose engineering and regulatory constraints to implementation. Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term to surface waters.

Floodplains

This alternative has the second highest total floodplain crossing distance (9,800 feet) of all alternatives. The crossing of the Stroudwater River and the Fore River estuary constitute the majority of floodplain impacts associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

This alternative crosses 21,000 feet of identified wetland, the highest level of wetland impact of all alternatives studied. The presence of extensive hydric soils south of Westbrook suggests wetlands are even more extensive than indicated by NWI or state wetland mapping. The principal areas of wetland loss would be associated with the crossings of Gully Brook, Indian Camp Brook, Stroudwater River, and the Fore River estuary. Each of these sites pose regulatory constraints with regard to wetland permitting. Structural engineering solutions and careful choice of crossing locations would minimize the impacts associated with these crossings. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas such as the Fore River estuary.

Vegetative Cover

Vegetation associated with segments south of Gorham is largely evergreen forest. The lands crossed south of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses. The Fore River estuary crossing could impact marginal bands of salt marsh.

Fish and Wildlife Resources

The Gorham bypass crosses Brandy Brook and Indian Camp Brook, State designated fisheries of medium importance. Assuming proper design, these crossings should have no significant impact on the fisheries. South of Westbrook the crossing of the Stroudwater River impacts a designated fishery of high importance. The alternative also crosses Long Creek, a designated fishery of low importance.

The new crossing of the Fore River estuary poses a concern for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of this crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use

This alternative's impacts to residential properties are average to low compared with other alternatives. This alternative would cross 2,900 feet of high and moderate density residential land use, and 4,000 feet of low density residential land use. The total crossing of commercial and industrial land uses would be 3,000 feet. Most impacts would be associated with new road interchanges. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

The only known area of cultural resource impact with Alternative 15 is the Stroudwater Historic District (skirted by this alternative) and a designated historic site just east of the district, near the Fore River. Avoidance options are limited due to the proximity of both the historic resources and the jetport runway. Historic resources in the vicinity of the Stroudwater Historic District may be so great that this segment may be difficult to implement as current envisioned due to the requirements for approval pursuant to Section 106 of the National Historic Preservation Act and Section 4(f) of the DOT Act.

ALTERNATIVE 16

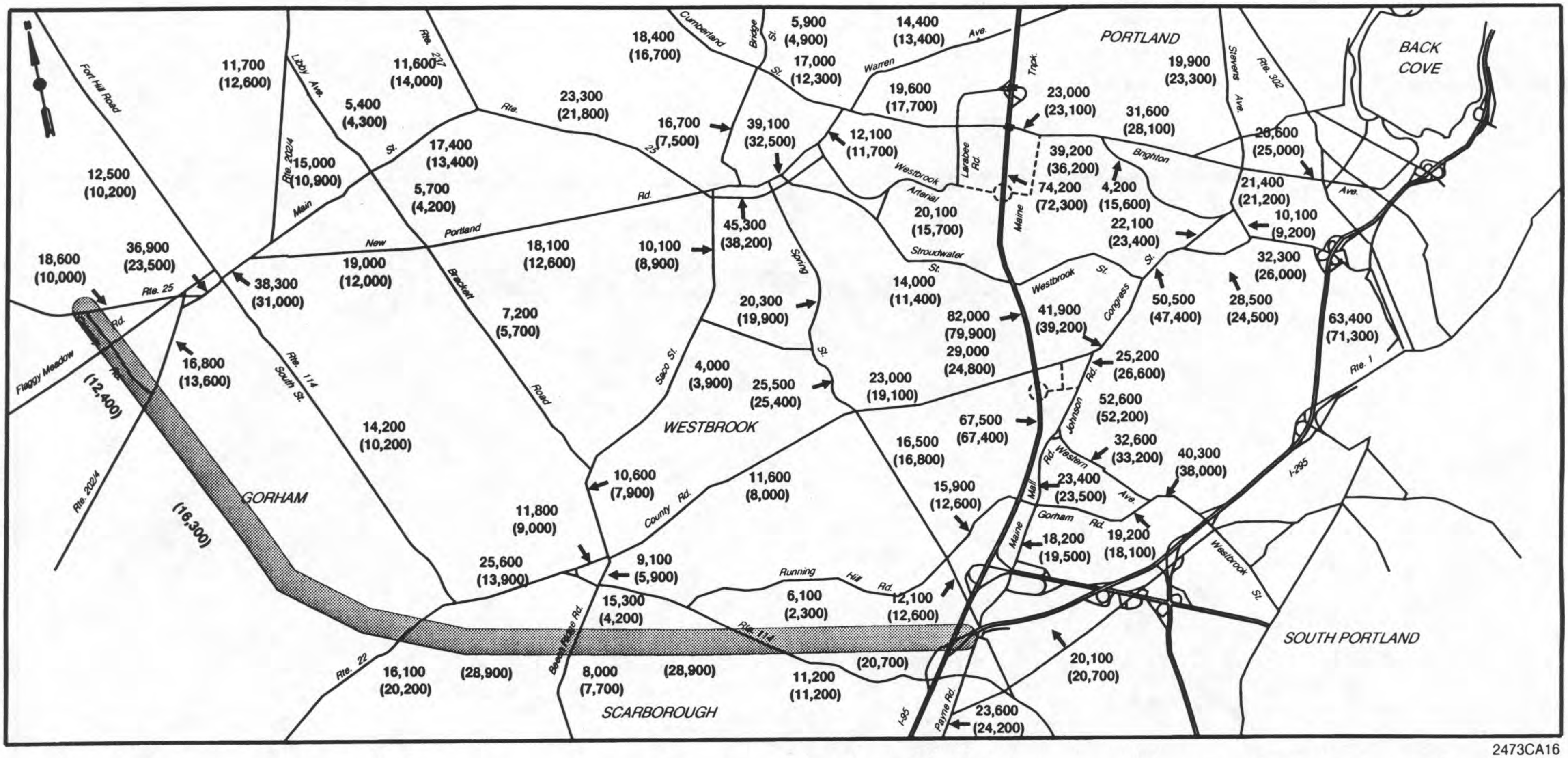
Alternative 16 is a new road alternative which is a similar to Alternative 10 from the Westerly Connector Study.[12] This new road alignment connects Route 25 west of Gorham Village to I-295 at its junction with the Turnpike. The corridor alignment passes west of Gorham Village and runs parallel to Route 114 (see Figure 65). South of Route 22 it turns east, crosses Route 114 south of Running Hill Road and connects with I-295 at the Turnpike. It does not include a direct connection to the Turnpike interchange. Alternative 16 is generally the southern and westernmost alignment of any new road alternative.

Daily traffic volumes on the new road range from 12,400 between Route 25 and Route 202/4 in Gorham to 28,900 between Route 22 and Route 114. Daily traffic volume diversions from existing roadways include: 7,300 vehicles in Gorham Village, 7,100 in Westbrook, 3,000 on Brighton Avenue east of the proposed Turnpike interchange, 3,100 on Congress Street north of Westbrook Street, and 11,700 on Route 22 in South Gorham. Because the alternative is located so far west and south in the study area, the largest diversion of traffic is from Route 22 in South Gorham. The smallest diversions occur on Brighton Avenue and Congress Street which are on the opposite sides of the study area.

Because of limited diversions from existing roadways, only five deficient segments along Routes 25 and 22 will be eliminated with this alternative (see Figure 66). These include two segments of Wayside Drive in Westbrook, Congress Street east of Stevens Street, County Road east of Spring Street, and Route 22 in South Gorham. The other Route 25 and 22 locations experience small declines in v/c ratios except in Gorham Village where the v/c ratios decline to 1.05 and 1.72, respectively, west and east of Route 114. No deficiencies are eliminated on other roadways and a deficiency is added on Frost Street where the v/c ratio rises to 0.94.

Table 42 compares the four transportation measures of effectiveness for Alternative 16 with the No-build case. Alternative 16 produces a small increase in total VMT of 2,900 miles (less than 0.1 percent) and comparatively small reductions in VHT, VHD, and average v/c ratio. VHT declines by approximately 15,100 hours (4.8 percent) and VHD declines by approximately 13,800 hours (12.6 percent). The average v/c ratio for selected links declines 16.5 percent from 0.85 to 0.71, the smallest decline of any alternative.

12 Westerly Connector Study, Howard Needles Tammen & Bergendoff and Wilbur Smith Associates, April 1988.



2473CA16

Notes: Schematic Only
Not to Scale

Alternative 16 does not provide access to Flaggy Meadow Rd. or to Maine Turnpike at I-295.

XX 2010 No-Build Volumes

(YY) 2010 Volumes With Alternative

Bypass/New Road

Upgrade

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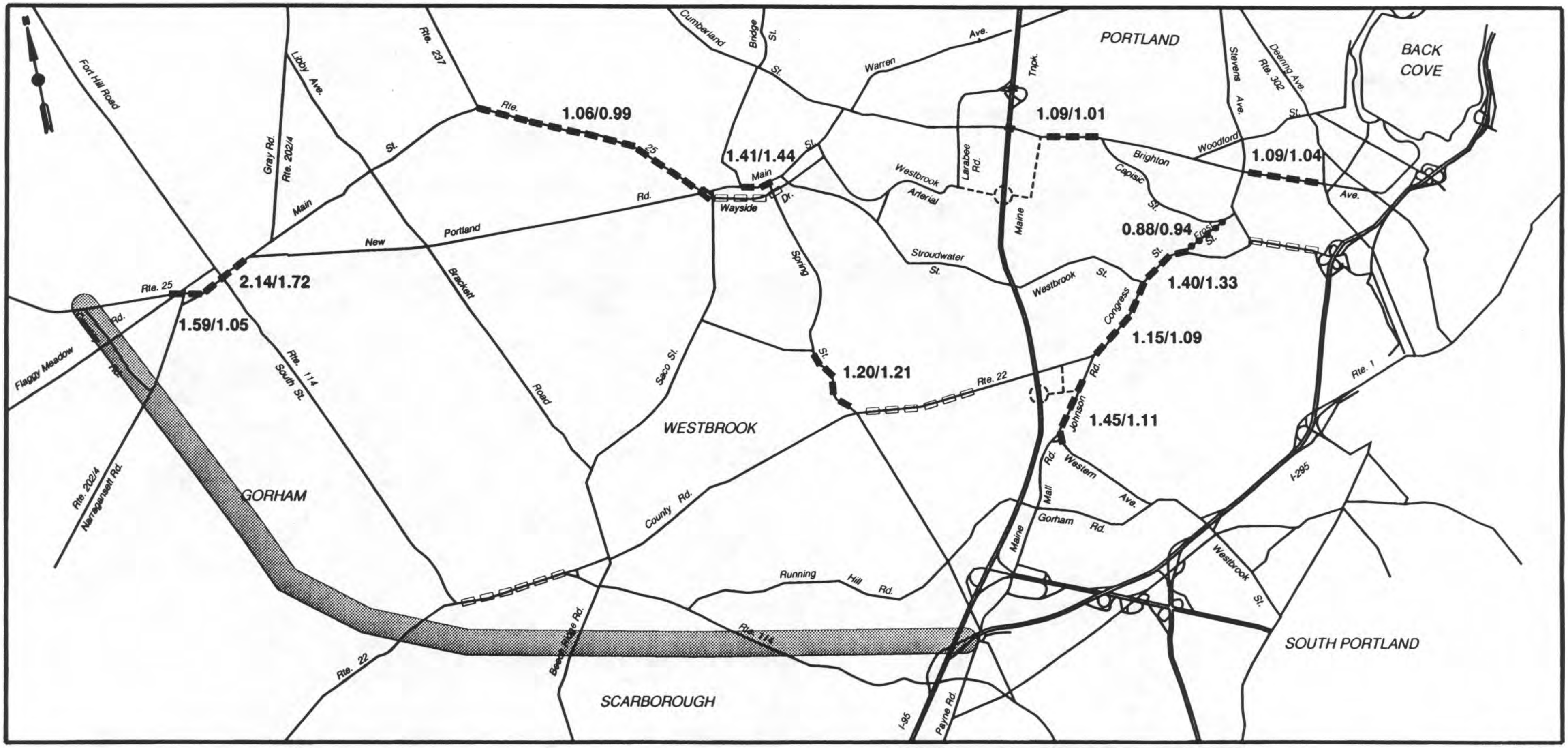
Figure 65

2010 Daily Traffic Volumes
Alternative 16



Notes: Schematic Only
Not to Scale

Deficiences include only those links with a volume-to-capacity (v/c) ratio greater than 0.90 (at/over capacity).

Alternative 16 does not provide access to Flaggy Meadow Rd or to Maine Turnpike at I-295.

▭ ▭ ▭	Deficiency Eliminated
■ ■ ■	Deficiency Remains
•••••	Deficiency Added
XX.X/YY.Y	No Build V/C Ratio/ Alternative 16 V/C Ratio
▨	Bypass/New Road

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Figure 66

2010 Capacity Deficiency Comparison Alternative 16

Table 42 **MEASURES OF EFFECTIVENESS FOR ALTERNATIVE 16**

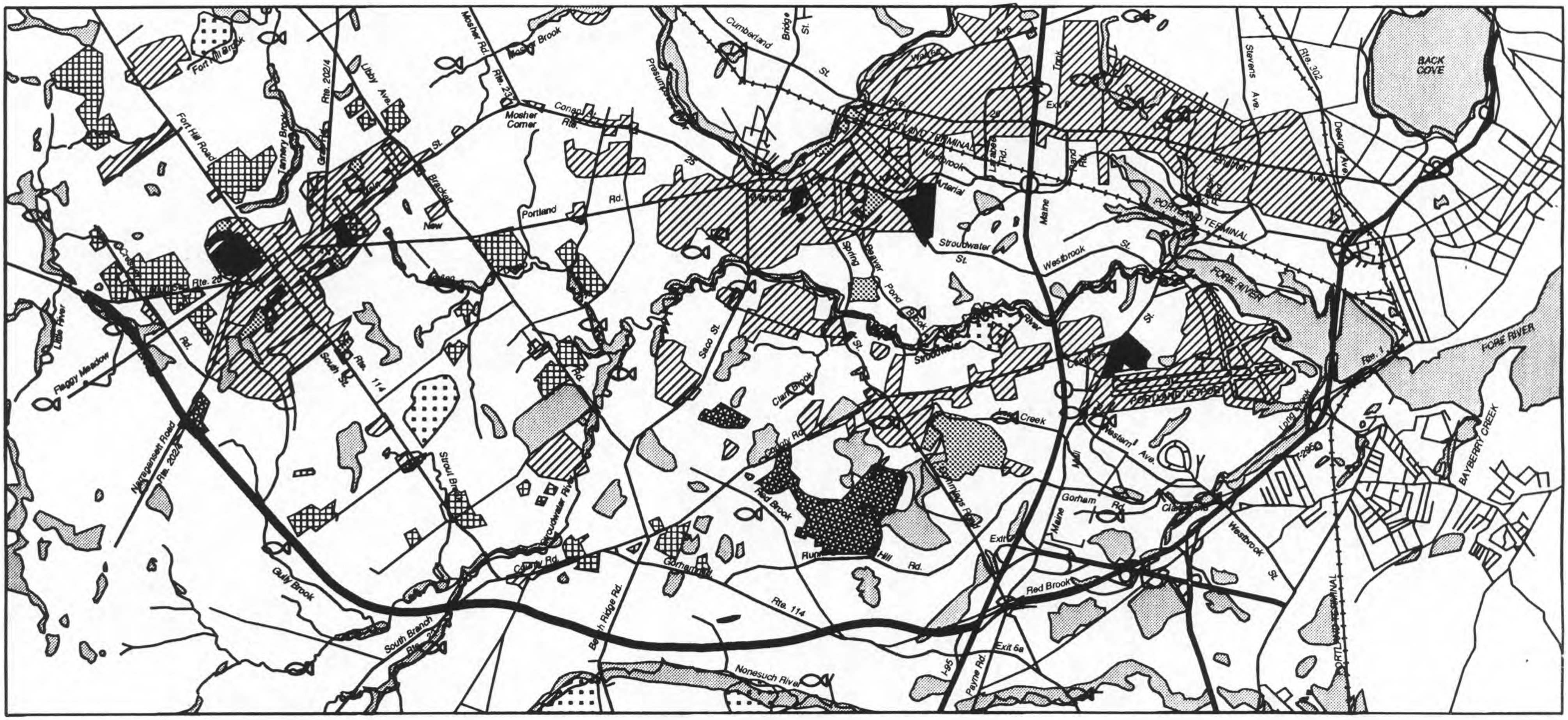
Measure*	No-Build	Alternative 16	Change Number	Change Percent
VMT	7,443,400	7,446,300	2,900	0.0**
VHT	315,000	299,900	-15,100	-4.8
VHD	109,600	95,800	-13,800	-12.6
V/C	0.85	0.71	-0.14	-16.5

* VMT--vehicle miles of travel
VHT--vehicle hours of travel
VHD--vehicle hours of delay
V/C--average v/c ratio for thirty-six roadway segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

** Less than 0.05

Environmental, Social and Engineering Impacts

Figure 67 shows the alignment of Alternative 16 on an environmental base map of the study area. This figure indicates major areas of potential conflict between road improvement and environmental resources. Table 43 provides a quantification of the alternative's impact on various study area features. In addition, the estimated construction cost of Alternative 16 is 45.7 million dollars. The following text describes the impacts of this alternative, highlighting major problem areas.



Dense combinations of residential, commercial or institutional areas)

Cemetery/Institution

Identified Wetland and Surface Water

Park and Recreation Area Public Facilities

Active Farmland

Historical & Cultural Resources (includes historical areas, resource protection area & wildlife preserves)

Waste Site (includes Junk Yards)

Wildlife Resource

Fishery

New Road

Upgrade Intersection

Upgrade Roadways

0 2000 4000 Feet

NOTE: Environmental and social resources and constraints are shown primarily for areas where alternatives are located.

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Figure 67

Environmental Constraints Alternative 16

Table 43 **ALTERNATIVE 16--POTENTIAL ENVIRONMENTAL IMPACTS (LINEAR FEET OF IMPACT)**

	Upgrade Segments		New Segments		Total	
	Low	High	Low	High	Low	High
Land Use:						
High-Mod Res/Mixed	--	--	0	0	0	0
Commercial/Industrial	--	--	700	700	700	700
Low Density Residential	--	--	3,100	3,100	3,100	3,100
Farmland	--	--	8,500	8,500	8,500	8,500
Sensitive Land Use:						
Parks	--	--	0	0	0	0
Historic	--	--	0	0	0	0
Institutional	--	--	0	0	0	0
Resource Protection	--	--	0	0	0	0
Floodplains	--	--	10,800	10,800	10,800	10,800
Stream Crossings (Number)	--	--	15	15	15	15
Identified Wetlands	--	--	9,600	9,600	9,600	9,600
Fish/Wildlife Areas	--	--	650	650	650	650
Sand/Gravel Aquifers	--	--	30,300	30,300	30,300	30,300
Hydric Soils:						
Hydric	--	--	25,300	25,300	25,300	25,300
Potentially Hydric	--	--	28,400	28,400	28,400	28,400
Surficial Geo. High-Mod.	--	--	58,100	58,100	58,100	58,100
Steep Slopes:						
High	--	--	0	0	0	0
Moderate	--	--	6,000	6,000	6,000	6,000
Farmland Soils:						
Prime	--	--	13,800	13,800	13,800	13,800
Statewide Importance	--	--	49,000	49,000	49,000	49,000

-- No upgrade.

Surficial Geology: Unstable Deposits

Much of this alternative's alignment lies in an area of potentially unstable geologic deposits (58,100 linear feet). Where these deposits occur in areas with steep slopes (along Gully and Red Brooks and the Stroudwater and Nonesuch Rivers), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas.

Steep Slopes/Erodible Soils

Steep slopes occur along this alternative's alignment at Brandy and Gully Brooks and the Stroudwater River. Proper design and application of erosion and sedimentation controls would minimize impacts to an acceptable level.

Farmland Soils

Loss of Prime Farmland Soil (13,800 linear feet) and Additional Farmland Soils of Statewide Importance (49,000 feet) would be greatest in the South Gorham area where active farms occur.

Sand and Gravel Aquifers

The bypass segment southwest of Gorham near Narragansett Road, and the road segments in South Gorham and Scarborough intersect an aquifer area of moderate yield. In total, 30,300 linear feet of moderate yield aquifer is crossed by this alternative (the highest crossing distance of all alternatives). A groundwater contamination site occurs in the Gorham bypass area (auto junkyard). Roadway designers should be aware of these potential problems if they still exist at the time of design.

Surface Water Resources

Surface waters crossed by this alternative include:

- Brandy Brook (tributary to the Presumpscot River)
- Stroudwater River and its tributaries (including Gully Brook)
- unnamed tributaries to the Nonesuch River
- Red Brook
- Fore River

This is one of the few alternatives which would cross the Nonesuch River watershed (the Nonesuch is a class A waterbody in that reach). This alternative has a high number of stream crossings (15) compared to other alternatives; most are in the Stroudwater basin. The biggest crossings appear to be at the Stroudwater River-South Branch confluence. Also, this alternative closely parallels Gully Brook, the Nonesuch River, and Red Brook over relatively long distances. Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains

This alternative involves a total floodplain crossing distance of 10,800 feet, the highest crossing distance of all alternatives. The multiple new road crossings of the Stroudwater River tributaries in South Gorham, and the new road paralleling Red Brook in Scarborough constitute the majority of floodplain crossings associated with this alternative. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands

Wetland impacts of this alternative are 9,600 feet of crossing, an average level of wetland impact among the alternatives. The presence of extensive hydric soils south of Gorham suggests wetlands are even more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland loss would be in the Gully Brook watershed, the Stroudwater River-South Branch crossings south of Gorham, and in the Red Brook riparian corridor. Each of these sites pose regulatory constraints with regard to wetland permitting. Structural engineering solutions and careful choice of crossing locations would minimize the impacts associated with these crossings. Erosion and sedimentation controls and the use of stormwater best management practices would be particularly important in wetland areas.

Vegetative Cover

Vegetation associated with new roads in Gorham is largely evergreen forest, with scattered tracts of deciduous forest, old field and pasture. The lands crossed by this alternative in Scarborough have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses.

Fish and Wildlife Resources

The bypass west of Gorham crosses Brandy and Gully Brooks--state designated fisheries of medium importance. Assuming proper design, these crossings should have no significant impact on the fisheries. South of Gorham, the alternative impacts a fishery of medium importance-South Branch. Also, the segments which parallel Red Brook might impact that high importance fishery. Proper erosion and sedimentation controls would minimize impacts to protect these resources.

Land Use

This alternative's land use impacts are relatively low compared to other alternatives. This alternative crosses no high and moderate density residential land use, and about 3,100 feet of low density residential land use. The total crossing of commercial and industrial land uses would be only 700 feet. Most impacts would be associated with new road interchanges. These impacts include direct property loss as well as traffic related impacts.

Cultural Resources

There are no known cultural resource impacts associated with this alternative. However, more detailed research of potential cultural resource sites would need to be conducted if this alternative was advanced to the design stage.

Traffic Volumes

Traffic volumes are a major indicator of the effects of an alternative and determine the number of travel lanes that are needed to achieve the stated transportation objective. Volumes are presented on the study area base map for key links throughout the area. Both No-Build volumes and volumes for the alternative are presented on a single figure.

As noted above, the volume information cannot be distilled into a single summary statistic. However, Table 44 summarizes traffic volumes on the key links on Route 25 and Route 22 with No-Build deficiencies.

These locations represent critical links in areas projected to have deficiencies under No-Build conditions. The highest volumes are generated by the Upgrade Alternative which attracts traffic to existing roadways because of increased capacity. The lowest volumes are generally found with the new road alternatives which divert traffic from existing roadways onto new roadway segments.

Table 44 — 2010 AVERAGE DAILY TRAFFIC VOLUME COMPARISON

	Location*				
Alternative	Gorham Village	South Gorham	Westbrook	Brighton Avenue	Congress Street
No-Build	38,300	25,600	45,300	39,200	50,600
Upgrade	41,900	32,800	55,400	38,900	52,200
2	11,500	30,600	51,800	39,700	52,200
6	11,500	30,000	51,500	26,600	50,100
3	21,000	32,400	49,600	38,600	52,300
7	13,300	33,300	49,600	39,500	28,700
1	16,000	28,700	15,000	27,300	44,400
5	21,700	28,500	20,400	28,700	22,000
8	21,700	29,100	18,900	32,300	28,100
9	16,700	13,300	28,700	24,800	20,500
10	14,300	31,200	34,000	41,700	49,400
11	31,300	17,500	35,200	32,500	26,400
4	19,700	20,100	32,500	28,000	19,200
12	22,100	21,000	30,100	31,800	39,900
13	24,500	22,100	26,200	27,900	15,500
14	24,200	21,300	33,900	32,700	22,800
15	27,400	20,300	33,700	34,200	27,400
16	31,000	13,900	38,200	36,200	47,900

* Gorham Village--Route 25 east of Route 114.
South Gorham--Route 22 between South Street and Gorham Road.
Westbrook--Combined volume on Wayside Drive and Main Street west of Spring Street.
Brighton Avenue--east of the Turnpike Access Road (Rand Road).
Congress Street--between Westbrook and Frost Streets.

Changes in Deficiencies on Route 25 and Route 22

No-Build deficiencies (presented in Figure 8) were the major indicator of year 2010 needs in the needs assessment for this study. Changes in projected deficiencies on Route 25 and Route 22 for each alternative are also shown on a graphic. No-Build deficiencies which are eliminated, No-Build deficiencies which remain, and new deficiencies which are added are shown. In addition, the No-Build and Build v/c ratios are presented for all links which are projected to be deficient under the Build condition. Only deficiencies with a build v/c ratio greater than 0.90 are depicted because alternatives were developed with the goal of eliminating deficiencies where the v/c ratio is greater than 0.90.

The changes in the number of major roadway segments which are deficient (v/c ratio greater than 0.90) are summarized in Table 45. The number of deficiencies on Routes 25 and 22 and on all other study area roadways are listed separately for each alternative. The alternatives are listed in order from largest to smallest increase in number of deficiencies on Routes 25 and 22. They are also grouped and assigned rankings for use in the evaluation matrix presented in Table 51 at the end of this chapter. Four rankings were used, with the most effective alternatives assigned a score of 4 and the least effective alternatives assigned a score of 1. The four categories are: less than three, three, four, and more than four deficiencies.

As shown in Figure 8 presented previously, twelve deficient segments on Route 25 and Route 22 are expected with the No-Build Alternative. Three deficient segments on other roadways are also expected, resulting in a total of fifteen deficient segments within the study area for the No-Build Alternative.

The number of deficient segments eliminated on Routes 25 and 22 by the seventeen alternatives range from a maximum of eleven to a minimum of five (out of a total of twelve). The number of deficiencies remaining range from one to seven. Alternative 1 is the most effective, resulting in only one deficient segment remaining on Routes 25 and 22. Alternatives 4, 6, 7, and 9 are almost as effective, resulting in two deficiencies each. The alternative with the most remaining deficient segments on Routes 25 and 22 is Alternative 16 with seven deficiencies.

Table 45 **SUMMARY OF DEFICIENCIES***

Alternatives	Route 25 and 22 Number	Route 25 and 22 Change from No-Build	Route 25 and 22 Score	Other Number	Other Change from No-Build	Total Deficiencies Number	Total Deficiencies Change from No-Build
1	1	-11	4	5	+2	6	-9
4	2	-10	4	4	+1	6	-9
6	2	-10	4	4	+1	6	-9
7	2	-10	4	5	+2	7	-8
9	2	-10	4	7	+4	9	-6
5	3	-9	3	6	+3	9	-6
12	3	-9	3	3	-0	6	-9
Upgrade	4	-8	2	3	0	7	-8
2	4	-8	2	4	+1	8	-7
3	4	-8	2	4	+1	8	-7
8	4	-8	2	7	+4	11	-4
14	4	-8	2	7	+4	11	-4
10	5	-7	1	3	0	8	-7
11	5	-7	1	5	+2	10	-5
13	5	-7	1	6	+3	11	-4
15	5	-7	1	5	+2	10	-5
16	7	-5	1	4	+1	11	-4
No-Build	12	--	1	3	--	15	--

* Roadway segments with v/c ratios greater than 0.90.

Changes in Deficiencies on Other Roadways

Any deficiencies eliminated or added to roadways other than Route 25 and Route 22 are also noted. Localized deficiencies may be created on existing roadways at their approaches to intersections with new roadway segments. In other cases, deficiencies may be eliminated by diverting traffic to the alternative. These cases would constitute an unintended additional benefit.

When the total number of deficiencies in the study area are considered, the results vary from those for Routes 25 and 22 only. Four alternatives (Alternatives 1, 4, 6 and 12) with a total of six deficient locations each in the study area, have the least number of deficiencies. These include Alternative 1, the alternative with the least number of deficient segments on Routes 25 and 22, and Alternatives 4 and 6 which have only two deficiencies on Routes 25 and 22. Alternatives 8, 13, 14 and 16 had the most total number of deficiencies with eleven each.

Other Transportation Measures Of Effectiveness

A comparison of the four remaining measures of effectiveness for all alternatives is presented in Table 46. The measures included in the table are VMT, VHT, VHD, and average v/c ratio for selected study area roadway links. A discussion of each of these measures follows and includes a table showing the ranking of alternatives from most effective to least effective.

A rank score from 1 (lowest) to 4 (highest) was assigned to each alternative. The score was determined by subdividing the alternatives into four groups according to their ranking. An attempt was made to cluster alternatives into groups with similar results while also providing four groups of approximately the same size. Where both goals could not be accomplished, preference was given to placing all alternatives with similar results in the same group. As a result, the break points between groups are not set to create equal divisions.

Table 46 **SUMMARY OF VMT, VHT, VHD, AND AVERAGE V/C**

	Vehicle Miles of Travel		Vehicle Hours of Travel		Vehicle Hours of Delay		Average V/C Ratio*	
Alternative	Number	Change	Number	Change	Number	Change	Number	Change
No-Build	7,443,400	0	315,000	0	109,600	0	0.85	0
Upgrade	7,434,300	-9,100	302,200	-12,800	97,300	-12,300	0.70	-0.15
1	7,454,100	10,700	296,400	-18,600	92,700	-16,900	0.57	-0.28
2	7,446,500	3,100	301,800	-13,200	97,100	-12,500	0.60	-0.25
3	7,436,200	-7,200	301,600	-13,400	97,100	-12,500	0.61	-0.24
4	7,431,900	-11,500	292,800	-22,200	90,100	-19,500	0.53	-0.32
5	7,440,400	-3,000	293,400	-21,600	90,300	-19,300	0.55	-0.30
6	7,444,600	1,200	299,100	-15,900	94,900	-14,700	0.58	-0.27
7	7,438,000	-5,400	296,100	-18,900	92,100	-17,500	0.56	-0.29
8	7,422,900	-20,500	293,800	-21,200	90,900	-18,700	0.57	-0.28
9	7,481,500	38,100	292,000	-23,000	88,000	-21,600	0.51	-0.34
10	7,442,200	-1,200	299,600	-15,400	94,900	-14,700	0.61	-0.24
11	7,438,100	-5,300	298,800	-16,200	95,400	-14,200	0.66	-0.19
12	7,444,000	600	293,200	-21,800	90,000	-19,600	0.58	-0.27
13	7,449,800	6,400	297,700	-17,300	94,200	-15,400	0.64	-0.21
14	7,452,700	9,300	294,800	-20,200	91,400	-18,200	0.63	-0.22
15	7,464,200	20,800	299,700	-15,300	95,600	-14,000	0.62	-0.23
16	7,446,300	2,900	299,900	-15,100	95,800	-13,800	0.71	-0.14

* Average ratio for thirty-six segments on Route 25, Route 22, New Portland road, the Westbrook Arterial, and Main Street in Westbrook.

Vehicle Miles of Travel

Vehicle Miles of Travel (VMT) is one measure of effectiveness in providing the most direct connection between origins and destinations. Further, changes in VMT can be related to changes in air quality and accidents and provide an indirect measure of impacts in these areas.

VMT is the sum of the products of distance and volume for every link in the network and is produced by the model. Because the total VMT is for the entire PACTS area, it is a large number that has only a small percentage variation among alternatives. To make this measure more useful, the change in VMT from the No-Build Alternative is presented.

The number of vehicle miles of travel for each alternative is presented in Table 47. VMT represents the total daily vehicle miles traveled within the entire region covered by the PACTS model. Total VMT for the No-Build condition is 7,443,400 miles. The amount of change from the No-Build ranges from a decrease of 20,500 miles to an increase of 38,100 miles. Although the changes listed represent only a small percentage of the PACTS area total (less than 0.5 percent for the largest changes), they represent significant changes for the Route 25 study area.

Alternative 8 has the largest decrease in VMT (20,500), which is almost twice the amount of the next largest decrease of 11,500 for Alternative 4. The Upgrade Alternative has a decrease of 9,100 miles. Eight of the alternatives show a decrease in VMT while nine show an increase. The largest increase is with Alternative 9 (38,100), followed by increases of 20,800 and 10,700 for Alternatives 15 and 1, respectively.

Table 47 **COMPARISON OF VEHICLE MILES OF TRAVEL**

Alternative	Vehicle Miles of Travel	Change from No-Build Alternative	Rank Score*
8	7,422,900	-20,500	4
4	7,431,900	-11,500	4
Upgrade	7,434,300	-9,100	4
3	7,436,200	-7,200	3
7	7,438,000	-5,400	3
11	7,438,100	-5,300	3
5	7,440,400	-3,000	3
10	7,442,200	-1,200	3
No-Build	7,443,400	0	3
12	7,444,000	600	2
6	7,444,600	1,200	2
16	7,446,300	2,900	2
2	7,446,500	3,100	2
13	7,449,800	6,400	2
14	7,452,700	9,300	2
1	7,454,100	10,700	1
15	7,464,200	20,800	1
9	7,481,500	38,100	1

*

Ranking Category	Change in VMT
4	< to 9,000
3	-9,000 to 0
2	0 to 10,000
1	>10,000

Vehicle Hours of Travel

Vehicle Hours of Travel (VHT) is a measure of the effectiveness of an alternative in providing the shortest travel time between origins and destinations. It is also reported in the model summary along with VMT and represents the sum of the products of link travel time and traffic volume for every link in the network. As with VMT, the change in VHT compared to the No-Build condition is presented.

As shown in Table 48, vehicle hours of travel decline for all alternatives compared to the No-Build Alternative with 315,000 hours. The declines ranged from a high of 23,000 (7.3 percent) for Alternative 9 to a low of 12,800 (4.1 percent) for the Upgrade Alternative. Alternatives 4, 5, 8, and 12 also have large declines ranging from 21,200 to 22,200. The five alternatives with the largest declines are new road alternatives or combination alternatives consisting principally of new bypasses. The smallest declines are associated with alternatives that consist primarily of upgrades and have few, if any, new road segments.

Table 48

COMPARISON OF VEHICLE HOURS OF TRAVEL

Alternative	Vehicle Hours of of Travel	Change from No-Build Alternative	Rank Score*
9	292,000	-23,000	4
4	292,800	-22,200	4
12	293,200	-21,800	4
5	293,400	-21,600	4
8	293,800	-21,200	4
14	294,800	-20,200	3
7	296,100	-18,900	3
1	296,400	-18,600	3
13	297,700	-17,300	3
11	298,800	-16,200	2
6	299,100	-15,900	2
10	299,600	-15,400	2
15	299,700	-15,300	2
16	299,900	-15,100	2
3	301,600	-13,400	1
2	301,800	-13,200	1
Upgrade	302,200	-12,800	1
No-Build	315,000	0	1

* Ranking Category	Change in VHT
4	<-21,000
3	-17,000 to -21,000
2	-14,000 to -17,000
1	>-14,000

Vehicle Hours of Delay

Vehicle Hours of Delay (VHD) is another summary statistic produced by the model that represents the total of the delay for each link weighted by the length of the link and the volume of traffic it carries. It is a measure of the extent to which congestion impedes the free flow of traffic. Change in VHD from the No-Build alternative provides a measure of how well an alternative addresses the needs presented for the No-Build condition. It reflects the impact of the elimination of deficiencies and the reductions in v/c ratios on deficient links.

VHD is calculated as the sum of the products of the difference between free flow speed and the final assigned speed times the volume for each link.

The results for vehicle hours of delay, which are very similar to the results for vehicle hours of travel, are shown in Table 49. All alternatives decline from the No-Build with Alternative 9 experiencing the largest decline. VHD for Alternative 9 declines by 21,600 hours or 19.7 percent of the No-build total of 109,600 hours. The next four alternatives with the largest decreases are the same four alternatives with the largest declines in VHT. As with VHT, the Upgrade Alternative has the smallest decrease in VHD.

Table 49

COMPARISON OF VEHICLE HOURS OF DELAY

Alternative	Vehicle Hours of Delay	Change from No-Build Alternative	Rank Score*
9	88,000	-21,600	4
12	90,000	-19,600	4
4	90,100	-19,500	4
5	90,300	-19,300	4
8	90,900	-18,700	3
14	91,400	-18,200	3
7	92,100	-17,500	3
1	92,700	-16,900	3
13	94,200	-15,400	3
6	94,900	-14,700	2
10	94,900	-14,700	2
11	95,400	-14,200	2
15	95,600	-14,000	2
16	95,800	-13,800	2
2	97,100	-12,500	1
3	97,100	-12,500	1
Upgrade	97,300	-12,300	1
No-Build	109,600	0	1

* Ranking Category	Change in VHD
4	<-19,000
3	-15,000 to 19,000
2	-15,000 to 13,000
1	>-13,000

Average Change in V/C Ratio on Key Roadway Links

The percentage change in v/c ratio from the No-Build condition was calculated for an extensive set of representative links on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook. The percentage change for thirty-six selected links was averaged to present the general change in overall conditions on Route 25 and parallel routes. For each alternative analyzed, the change in average v/c ratio provides information relative to improvements in conditions on non-deficient as well as deficient links.

The ranking of each alternative from lowest average v/c ratio to highest is presented in Table 50. Alternative 9 produces the lowest average v/c ratio for thirty-six selected roadway segments in the study area. Its average v/c ratio is 0.51 compared to the No-Build average of 0.85. All alternatives show a decline in the average v/c ratio. Listed in ascending order, Alternatives 4, 5, 7, 1, 8, 6, and 12 produce ratios less than 0.60. The Upgrade Alternative and Alternative 16 produce the largest ratios (0.70 and 0.71, respectively).

Table 50 **COMPARISON OF VOLUME-TO-CAPACITY RATIOS**

Alternative	Average V/C Ratio*	Change from No-Build Alternative	Rank Score**
9	0.51	-0.34	4
4	0.53	-0.32	4
5	0.55	-0.30	4
7	0.56	-0.29	4
1	0.57	-0.28	3
8	0.57	-0.28	3
6	0.58	-0.27	3
12	0.58	-0.27	3
2	0.60	-0.25	2
3	0.61	-0.24	2
10	0.61	-0.24	2
15	0.62	-0.23	2
14	0.63	-0.22	2
13	0.64	-0.21	2
11	0.66	-0.19	1
Upgrade	0.70	-0.15	1
16	0.71	-0.14	1
No-Build	0.85	0	1

* Average ratio for thirty-six segments on Route 25, Route 22, New Portland Road, the Westbrook Arterial, and Main Street in Westbrook.

**

Ranking Category	Average V/C
4	<0.57
3	0.57 to 0.59
2	0.60 to 0.65
1	>0.65

The evaluation matrix which is presented in Table 51, ranks each alternative 1 through 4 for each measure of effectiveness. A ranking of 4 indicates the best results for a measure and 1 indicates the worst results. The evaluation matrix was also represented in a bar chart in the Executive Summary (Figure H) which sums the scores of each alternative for each measure of effectiveness.

Based on the evaluation matrix, Alternative 4 yields the best overall results for the transportation measures of effectiveness. It falls into the highest ranking for all four measures presented and is among the most effective of all the alternatives in eliminating deficiencies, reducing vehicle miles of travel, reducing delay, and decreasing the average v/c ratio on study area links. Although other alternatives may be more effective for specific measures, Alternative 4 is the only alternative to rank near the top for each of the four measures. Alternative 4 is a new road alternative with a general alignment between Routes 25 and 22. This alternative may be the most effective in

addressing overall transportation needs because it appears to most closely follow the general desire line for east-west traffic.

Table 51 **EVALUATION MATRIX**

Alternatives	Total Rank Score*				
	Deficiencies on Routes 25 and 22	Vehicle Miles of Travel	Vehicle Hours of Delay	Average V/C Ratio	Total
No-Build	1	3	1	1	6
Upgrade	2	4	1	1	8
1	4	1	3	3	11
2	2	2	1	2	7
3	2	3	1	2	8
4	4	4	4	4	16
5	3	3	4	4	14
6	4	2	2	3	11
7	4	3	3	4	14
8	2	4	3	3	12
9	4	1	4	4	13
10	1	3	2	2	8
11	1	3	2	1	7
12	3	2	4	3	12
13	1	2	3	2	8
14	2	2	3	2	9
15	1	1	2	2	6
16	1	2	2	1	6

* Scoring: 4=best results; 1=worst results.
See Tables 47, 49, and 50 for scoring criteria.

Alternatives 5 and 7 are tied as the second most effective alternatives with regard to the transportation measures according to the evaluation matrix. Both rank in the top ranking for two measures and in the second to top ranking for two other measures. Alternative 5 consists principally of new road segments which form bypasses of Gorham Village, Westbrook, Congress Street and Brighton Avenue. Alternative 7 consists principally of upgrades, but includes an extensive southern bypass of Gorham Village and a bypass of Congress Street.

Alternative 9, which also includes extensive new road segments, is the third most effective alternative based on the evaluation matrix. It falls in the top three of the four transportation measures. In the fourth measure (VMT), however, it falls to the bottom. A higher ranking in this measure would have tied it with, or placed it ahead of, Alternatives 5 and 7 as the second most effective alternative.

The No-Build Alternative and Alternatives 15 and 16 are the least effective overall. The No-Build Alternative falls into the lowest ranking for three of the measures and into the next-to-highest for the remaining measure (VMT).

Alternatives 15 and 16 fall into the lowest and next-to-lowest ranking for all measures. Alternatives 15 and 16 are the southernmost new road alignments and it appears they are too far removed from the overall desire lines of travel to be effective in addressing transportation needs.

Environmental Regulations and Considerations

Surficial Geology: Unstable Deposits. Engineering consideration with no related regulations or permits.

Most of the alternatives lie in an area of unstable geologic deposits. The broadest expanses of unstable deposits occur north of Gorham and in Westbrook and Portland. Where these deposits occur in areas with steep slopes (along major rivers such as the Stroudwater, and the Fore River estuary), geotechnical evaluations will be required to provide input to the roadway structural design. All else being equal, bridge costs could be higher in these areas, as could any heavy grading.

Steep Slopes / Erodible Soils. Engineering Consideration - Related laws/regulations/permits:

- National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit required for construction of 5 acres or more. Includes requirements for erosion control.

- NRPA permits required for disturbance of protected resources. Includes requirements for erosion control.

Moderate to steep slopes occur along most of the major streams and rivers in the study area. Principal areas of concern are the crossings of the Stroudwater River and its tributaries, and the crossing of the Fore River estuary. A lengthy crossing of Tannery Brook north of Gorham would also be required for an inner bypass of Gorham. With proper design and application of erosion and sedimentation controls impacts will be minimized to an acceptable level.

Farmland Soils. Environmental Consideration - Related laws/regulations/permits:

- The Farmland Protection Policy Act of 1981 - For federally funded highway projects, compliance involves minimizing impacts to significant farmlands (e.g., Prime or "Statewide Importance" Farmland Soils), prepared and submitted Department of Agriculture forms (1006) to document farmland impacts and coordinating with the USDA Soil Conservation Services.

Loss of farmland containing Prime Farmland Soils and Additional Farmland Soils of Statewide Importance would be greatest in the area north of Gorham. Some alternatives would also impact large farms on Stroudwater Street/Westbrook Street with associated loss of Prime Farmland soils.

Sand and Gravel Aquifers. Environmental Consideration - Related laws/regulations/permits:

- The Federal Safe Drinking Water Act Amendments of 1986 required the states to adopt a program to protect wellhead areas. Section 1428 of the Act requires that the State develop a wellhead protection program. Maine is in the process of developing such a program.

The bypass segments southwest of Gorham near Narragansett Road, and the road segments in South Gorham and Scarborough intersect a moderate yield aquifer area. Two groundwater contamination sites, an auto junkyard and sand excavation site, already occur in the Gorham bypass area. The northern-most Gorham bypass passes near a groundwater contamination site off Libby Avenue. Roadway designers should be aware of these potential problems if they still exist at the time of design. The South Gorham and North Scarborough segments (new roads and upgrades) lie within an identified aquifer area. Two wells, each serving about 25 people, use this moderate yield aquifer in the South Gorham-North Scarborough area.

Surface Water Resources. Environmental Consideration - Related laws/regulations/permits:

- A Permit from the U.S. Army Corps of engineers is required for filling in "waters of the United States" pursuant to Section 404 of the Federal Clean Water Act. The Section 404 permitting process involves interagency coordination and review. Section 404 requires impacts be (1) avoided; (2) minimized; and (3) mitigated.

- Water quality certification is required pursuant to Section 401(b) of the Federal Clean Water Act in conjunction with certain permits required under Section 404(c). Surface water quality must not be degraded below water quality standards.

- NPDES stormwater discharge permits are required for construction that disturbs 5 acres or more of soil. Where stormwater will discharge into Municipal Separate Storm Sewer Systems, coordination with the municipality may be required.

- The State Natural Resources Protection Act prohibits discharges to ponds and requires a permit for alterations to waterbodies, wetlands, adjacent uplands, and other protected resources.

Surface waters which would be potentially affected by the alternatives include:

- Presumpscot River watershed: Little River, Brandy, Tannery and Mosher Brooks, Presumpscot River

- Stroudwater River watershed: Gully Brook, Indian Camp Brook, and Beaver Pond Brook, South Branch, and Stroudwater River

- Nonesuch River watershed: unnamed tributaries to Nonesuch River in North Scarborough

- Coastal Basin Watershed: Red Brook, Long Creek, Fore River

The number of stream crossings is highly variable between the alternatives (2 to 21); most are in the Stroudwater Basin. Many of these are major crossings (>=20 feet in width). These larger crossings such as the Fore River in Portland, and the Stroudwater River in Westbrook, pose relatively greater engineering and environmental permitting efforts, compared to the narrower crossings.

Erosion and sedimentation controls during construction would minimize adverse impacts to downstream waters. Increased traffic, which would occur along new road and upgrade segments, has been shown to lead to increased pollutant loading. (Gupta, M.K., R.W. Agnew, and N.P. Kobriger, 1981) Drainage improvements and the use of stormwater best management practices would minimize long term effects to surface waters.

Floodplains. Environmental Consideration - Related laws/regulations/permits:

- Avoidance of development in floodplains is federal policy as set forth in Executive Order 11988. FHWA has developed related guidelines and regulations that pertain to federally funded highway projects.

- The MDEP requires a permit for development in floodplains, which are regulated under NRPA as protected resources.

The total floodplain crossing distance of the alternatives ranges from 500 feet to 10,800 feet. The multiple new road crossings of the Stroudwater River and the new road crossing of the Fore River estuary constitute the majority of floodplain crossings. Any alternatives in these or other floodplain areas should be designed so they withstand flooding and do not increase 100-year flood elevations more than a minor amount.

Wetlands. Environmental Consideration - Related laws/regulations/permits:

- Federal Regulatory Agencies consider wetlands as "waters of the United States". Filling of wetlands thus requires a permit from the Army Corps of Engineers pursuant to Section 404(c) of the Federal Clean Water Act.

- Wetlands are regulated as protected resources under the NRPA. Development in or adjacent to wetlands requires a permit from the state of Maine DEP.

Wetland impacts of the alternatives range from 1,300 to 21,300 feet of crossing. The presence of extensive hydric soils south of Gorham and Westbrook suggests wetlands are more extensive than indicated by NWI and state wetland mapping. The principal areas of wetland impact would be in the areas south of Gorham, Tannery Brook (inner bypass only), the Stroudwater River crossings south of Westbrook, and the new crossings of the Fore River estuary and headwaters. Each of these sites pose regulatory constraints with regard to wetland permitting. Structural engineering solutions and careful choice of crossing locations will minimize the impacts associated with any wetland crossings. Erosion and sedimentation controls and the use of stormwater best management practices will be used to minimize wetland impacts.

Vegetative Cover. Environmental Consideration with no laws/regulations/permits related specifically to vegetative cover:

- Vegetation associated with bypasses of Gorham is largely evergreen forest, with scattered tracts of deciduous forest, old field and pasture. The lands crossed by alternatives south and east of Westbrook have a similar vegetative makeup, but the tracts are smaller and more highly interspersed with urban and suburban land uses. The Fore River estuary crossings might impact a salt marsh.

Fish and Wildlife Resources. Environmental Consideration - Related laws/regulations/permits:

- Certain fish and wildlife resources mapped by the State of Maine, Division of Inland Fish and Wildlife (MDIFW), are regulated under the NRPA. If fish and wildlife resources identified by MDIFW as "High" or "Moderate" value are located in wetlands, Maine DEP applies its highest level of wetland standards in reviewing permit applications.

The bypasses of Gorham and Westbrook cross a number of streams and rivers with state designated fisheries. The highest value designated fisheries occur along the Little, Presumpscot and Stroudwater Rivers. These crossings should have no significant impact on the fisheries with the application of available engineering solutions.

The new crossings of the Fore River estuary also pose concerns for fish and wildlife resources. This area includes intertidal salt marsh and mud flats, and is a designated Marine Wildlife Habitat and Shorebird Feeding/Roosting Area. Design of any crossing would avoid direct habitat loss, and maintain tidal flushing of the upper estuary where possible.

Land Use. Social Consideration - Land use is not a regulated resource, except for cultural resources described below. Land use impacts involve other considerations discussed above.

Impacts to existing land uses are highest for alternatives with major road upgrade components, and lowest for those alternatives which rely on new roads. The alternatives would cross between zero and 26,300 feet of high and moderate density residential land use, and between 2,400 feet and 15,250 feet of low density residential land use. The total crossing of commercial and industrial land uses would be between 400 feet and 12,300 feet. Most impacts would be associated with new road interchanges and upgrade segments. These impacts include direct property loss as well as traffic related impacts.

A relocation study would also be conducted at the time of initial design. Affected property owners would be compensated for any relocation or loss of property/access.

Cultural Resources. Social Consideration - Related laws/regulations/permits:

- Section 4(f) of the DOT Act of 1966 requires federally funded highway projects to avoid, minimize and mitigate for adverse impacts to significant historic sites, public parks, public recreation areas and publicly owned wildlife refuges. Section 4(f) requires coordination with the State Historic Preservation Officer (SHPO) and with officials responsible for the parks and wildlife areas in order to identify significant resources and avoidance/mitigation strategies. Lands purchased with funds pursuant to Section 6(f) of the Land and Water Conservation Funds Act and rivers designated under the Wild and Scenic Rivers Act are also regulated under Section 4(f).

- Under requirements of Section 106 of the National Historic Preservation Act, Federal Involvement requires coordination with the SHPO to document impacts to historic resources. Federal involvement includes FHWA funding as well as the issuance of federal permits such as a Section 404 wetland permit.

- The Clean Air Act Amendments (CAAA) of 1990 mandate new pollution control strategies to be adopted by states through State Implementation Plans (SIPs). Maine is in the process of revising its SIP to ensure statewide compliance with the National Ambient Air Quality Standard (NAAQS) for ozone. It is likely that a project, such as described in this report, would be required to show that the recommended alternative has lower emissions than the No-Build alternative.

  Regulations are contained in Title 23 Code of Federal Regulations (CFR) Part 772, "Procedures for Abatement of Highway Noise and Construction Noise". The regulations require that a noise analysis be conducted for every roadway project involving federal funding. Noise-sensitive land uses in the vicinity of a the roadway must be identified, and future design year noise levels from the roadway must be predicted and compared with national standards.

  Detailed environmental studies conducted at the time of preliminary design would quantify these air and noise impacts to representative "sensitive receptors" (residences, schools, hospitals and others).

The principal areas of cultural resource impact are associated with upgrade segments and new road crossings of the Fore River estuary as they relate to the Stroudwater Historic District. Although few structures would be directly impacted, their historical significance would require that efforts be taken to avoid and minimize impacts. Avoidance options are limited, due to the proximity of the historic structures to the existing roadway.

Additional historic resources are located in downtown Gorham and Westbrook, and along Brighton Avenue. Gorham poses potential problems for an upgrade due to the proximity of structures to the existing road.

Along with basic land use concerns, the alternatives which include local road upgrades may pose impacts to historic resources. Development of those alternatives would require close coordination between designers and the Maine Historic Preservation Commission (MHPC) in order to identify the design alternatives which minimize impacts to historic properties.

APPENDIX

The intent is to include the following document in the Appendix:

- A copy of the Attitudinal Survey Report prepared by Market Decisions.

SURVEY OF RESIDENTS

IN THE

ROUTE 25 CORRIDOR

MARKET
DECISIONS
Research & Planning

SURVEY OF RESIDENTS

IN THE

ROUTE 25 CORRIDOR

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January 1990

SURVEY OF RESIDENTS IN THE ROUTE 25 CORRIDOR

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EXECUTIVE SUMMARY

Key Findings

The results of the survey of residents in the Route 25 Corridor indicate that:

- There exist strong perceptions of problems with Route 25, with Gorham Village emerging as the source of greatest dissatisfaction.
- The majority of residents in the study area desire improvements in east-west travel, even if that means traffic slowdowns and temporary disruptions of neighborhoods while the improvements are being made.
- Area residents were most in favor of upgrading the existing road system with the possible addition of a bypass around Gorham Village.
- Although the majority of residents are willing to accept temporary disruptions to accomplish the desired improvements, most are opposed to any changes which could threaten wildlife habitats or wetlands, negatively impact historical areas or require persons to move.
- Most residents view MDOT as being willing to listen and respond to their concerns. Most residents would prefer to learn about the progress of the study from newspapers, and possibly, local access programming.

Summary of Results

Among residents in the study area there exists a strong perception of Route 25 problems, especially with that segment of the road which runs through Gorham Village. Two out of three (65%) residents surveyed indicated they were dissatisfied with the flow of traffic and safety on this segment of the road with dissatisfaction running especially high among residents in Gorham (78%) and towns west of Gorham (77%). Even among those residents who would not ordinarily use this part of Route 25, there was a strong perception of dissatisfaction with the flow of traffic and safety in that area. Brighton Avenue was also viewed with considerable dissatisfaction (41%) while dissatisfaction levels were notably lower for Main Street in Westbrook and Route 25 between Westbrook and Gorham (both received dissatisfaction ratings of 27%). Residents of the study area were considerably more satisfied (43%) than dissatisfied (19%) with the Ossipee Trail.

In addition to their more specific concerns with Route 25, residents of the study area indicated moderately strong levels of dissatisfaction with the conditions of roads in their area during tourist season (46% dissatisfied) as well as the ease of east - west travel in general (38%). Additionally, towns west of Westbrook were notably dissatisfied with the availability of public transit in the greater Portland area, with half (50%) expressing their dissatisfaction with this aspect of travel. Greater levels of satisfaction did not, however, necessarily coincide with higher levels of ridership. In Portland, where public transit was available and only 8% indicated dissatisfaction with the availability of public transit, only 16% used the bus at all, and only 5% used it for more than 10 trips per month.

Residents of the study area were frequent users of Route 25. Almost all (96%) of the residents within the study area said they used Route 25, with half (49%) of those who commuted to work typically traveling on at least some part of this road to their work destination. Two thirds (68%) of the residents in the Route 25 corridor said they used at least some part of Route 25 at least once a week for non-work related travel. Gorham residents were especially strong users of Route 25 for non-work related travel with 82% claiming that they used the road, which runs through the center of the village, at least once a week.

Among those who commuted to work, use of Route 25 was especially high among workers living in Gorham (63%) and the towns west of Gorham (58%). Almost half (45%) of those who traveled via Route 25 to work commuted to a job in Portland, while 18% worked in Westbrook, 15% worked in Gorham, 8% in South Portland and 6% west of Gorham. With the exception of its own residents (61% of whom commuted within Portland to their place of work), Portland drew a constant percentage of 40% of the commuters from the other towns.

More than half (58%) of the residents surveyed sometimes used alternate routes to avoid Route 25. Roads most commonly traveled in place of Route 25 were Route 22 (23% overall, and 45% among residents of the western towns) and Route 114 (16% overall and 33% among residents of Gorham). Other roads mentioned as alternate routes were Route 202 (6%), New Portland Road (5%), and Route 302 / Forest Avenue (5%). The primary reasons cited for using an alternate route to Route 25 focused on convenience (93%). Most of the alternate route users felt that the alternate road was easier to use and had fewer traffic problems (72%), it was faster or generally more convenient (37%), there was no construction (7%) or there were fewer lights on the alternate route (5%).

Most of the residents had experienced problems on Route 25, with the segment through Gorham Village emerging as the source for many problems, especially among those residents who lived in Gorham and in the towns west of Gorham. Among those who traveled on any part of Route 25 at least once a week, 89% said they had encountered problems. The majority of these travelers mentioned that congestion (65%) was a problem, with one in four (27%) specifically mentioning Gorham as the source of major traffic congestion. Congestion in Westbrook was also mentioned, but at a much lower level (5%). Traffic congestion on Route 25 was especially a problem among those who resided in Gorham (74%) and in towns west of Gorham (68%).

Other problems encountered on Route 25 involved safety (28%), including the perceived need for more and synchronized traffic lights (8%), problems with speeders and reckless drivers (7%), generally unsafe conditions (6%) and lanes being too narrow (6%). Concerns with safety were more pronounced among Portland residents (35%). One in four (24%) weekly travelers of Route 25 also mentioned having encountered problems with the condition of the road, with one in ten (9%) feeling that the road was in need of repair. Others cited slowdowns from construction (7%), bridge construction (6%), and construction in Gorham (5%). Difficulties with turning on and off Route 25 (12%) were also mentioned.

Just as most of the residents who used Route 25 on a regular basis had encountered problems with the road, many (86%) had ideas for how the road could be improved. The focus of their suggestions centered on upgrading the road (40%), building or providing a new road or bypass (40%), and improving the safety of the road (29%). The idea of a bypass was most popular among residents living in Gorham (58%) and in towns west of Gorham (43%). One in four (24%) residents of the study area who traveled Route 25 at least weekly suggested a bypass around Gorham, a suggestion that was strongly endorsed by Gorham (41%) and western town (31%) residents. Other comments relating to a new road or bypass included building a turnpike spur from Portland west (4%). Most of the residents who mentioned upgrading the roads discussed widening the present lanes, or providing more lanes for travel (30%), filling potholes (8%) or making general improvements/upgrades to the road (7%). Those who mentioned the need for improved safety suggested improved signage (12%) or more and synchronized traffic lights (10%). The need for more/synchronized lights was suggested more frequently among Portland (14%) and Westbrook (12%) residents.

It appears that the majority of residents would favor upgrading of the current road system, possibly in combination with a limited bypass of Gorham Village, as the most desirable approach to transportation improvements. In addition to providing suggestions for possible transportation improvements which could be made for east - west travel, residents were asked if they would prefer to see a new road, upgrades of current roads, a combination of new roads and upgrades, or no changes at all. Their responses indicated that although there was strong desire for road improvements, this did not extend to a new road altogether. In fact, only 14% of the residents surveyed thought that a new road was preferable, while 40% favored a combination of new road and upgrades, and 37% favored upgrades without construction of new roads. Only 5% felt that no changes were required. Their reasons for preferring the options were as follows:

Combination of Upgrades and New Roads (40%)

- Current roads could be upgraded (54%)
- Need to alleviate traffic (35%)
- Bypass needed for congested towns (16%)
- Upgrades by themselves cannot alleviate traffic problems (13%)
- More economical in the long run (9%)

Upgrades (37%)

- New roads not needed (48%)
- Upgrading is less expensive (24%)
- New roads pose a threat to the environment (19%)
- Upgrading is not as disrupting as construction of new roads (14%)
- Upgrading presents less of a threat to residents (12%)
- Present roads can be widened to bring about the desired changes (9%)

New Roads (14%)

- Alleviate traffic, helping residents of area to get around more freely (40%)
- Upgrading would not be feasible (31%)
- Bypass needed to help congested towns (28%)
- New road would be more economical in the long run (8%)
- More direct east-west routes are needed (6%)

No changes (8%)

- No changes are needed -- roads are fine as they are (57%)
- Concerns with cost (14%)
- Concerns about over-development (12%)

The degree of preference for the options varied by community. Gorham residents were twice as likely (26%) as residents of other areas to prefer a new road, while Portland residents as well as those of the towns west of Gorham tended to show more interest in a combination of roads and upgrades. Westbrook residents showed the strongest interest for upgrades without new roads. Preference also varied by residents' willingness to accept changes in order to achieve road improvements. Generally, the more willing residents were to accept changes such as increased growth in business and residential development, the more interest they showed in a new road. Those residents who were least willing to accept changes were strongly in favor of upgrades or no changes at all.

Few (9%) of the residents in the study area had heard a lot about MDOT's study of transportation needs between Portland and Gorham, while 37% mentioned they had heard "something" about it. More than half (54%) admitted having heard nothing about the study. Gorham residents were most aware of the study with 61% having heard something (39%) or a lot (22%) about the study. Although a large percentage of the residents of the Route 25 Corridor are aware that "a study" is being conducted, there is a strong need for MDOT to clearly differentiate the scope of the present study from previous studies and to identify, as soon as is reasonable, the options under consideration. Among those who had heard at least something about the study, half (54%) recounted rumors they had heard regarding a proposed bypass. The majority of these comments (38%) focused on a bypass of Gorham, a rumor which was especially prominent among residents of Gorham (54%) and the towns west of Gorham (52%). Many of the residents (53%) mentioned having heard general rumors about the study, such as changes in east-west roads (19%), a study to assess needs for change (17%), turnpike additions (14%), general talk about the need for a new east-west road (12%), and talk of the effect on land and businesses (6%).

The majority (65%) of those who claimed to be familiar with the study had heard about it from the news media with newspapers (52%) being the greatest source of information, followed by T.V. and radio (18%). Half (56%) of the residents indicated that they had heard about the study by word of mouth, including 10% who learned of the study through town council and citizen meetings. In Gorham, one in four (23%) of those aware of the study had heard about it in town council or other citizen meetings.

Newspapers, and possibly local access programming available on cable television, emerged as the most popular vehicles for communicating information about the study to area residents. Maine DOT may want to consider submitting weekly or biweekly articles to area newspapers on the study's progress. As a means for learning about the study, residents overwhelmingly favored regular newspaper articles (71%) to other communication efforts including a telephone line (9%), meetings with MDOT (8%), mailed leaflets (6%) or regular meetings (4%). In addition, half (49%) of the area residents have cable and watch local access programming, which could provide updates to viewers on the study's progress.

Residents for the most part view MDOT as being considerate of their concerns, and are receptive to the intentions of the study as long as MDOT shows that it will listen to residents, and keep them informed. When residents were asked how important they thought the attitudes of the residents would be to the final decisions reached by the study, only 14% felt that their attitudes would be unimportant to MDOT in making their decisions while half (47%) felt their attitudes would be somewhat important and 38% thought their attitudes would be very important in shaping the outcome of the study.

More than half (55%) of the residents offered specific concerns about the possible changes that could be made as a result of the study of transportation needs between Portland and Gorham. The leading concern was that there would be disruption (24%), including disruption of residential areas such that families would be forced to leave their homes (12%), disruption to the environment (6%), and disruption of the local, small-town atmosphere (6%). In addition to concerns with disruption, some (19%) of the residents mentioned personal concerns including fears that nothing would happen and that the situation would get worse (8%), fears that changes would not help the situation (5%), or fears that there would be disregard for safety issues (4%). Twelve percent (12%) of the residents focused on concerns relating to development and possible increases in tourism and traffic. Other concerns voiced by residents centered on inconvenience and slowdowns in traffic as a result of construction (7%), and cost concerns (7%).

To understand the extent to which residents would be willing to make trade-offs in order to accomplish road improvements, residents were given eight possible scenarios which could occur should road improvements be initiated. The possible scenarios included traffic slowdowns, disruption of wetlands and wildlife habitats, new access to currently undeveloped areas, growth in new businesses, disruption to neighborhoods, threats to historical areas, and relocation of households. The results indicate that when improving current east - west roads it will be important to acknowledge that the majority of residents are very concerned about the environment, and that many are unwilling to have road improvements if they threaten wildlife habitats (72%), negatively impact historical areas (58%), require residents to move (58%) or disrupt wetlands (46%). On the other hand, the majority are willing to experience traffic slowdowns (68%) and disruption in their neighborhoods (54%) while improvements were being made in order to have the desired changes. Gorham residents are, overall, significantly more willing to accept disruption of all types, with the exception of threats to historical areas, than residents of other areas. While residents oppose violations of the environment, but are willing to put up with traffic tie-ups and disruptions to achieve transportation improvements, there was much less consensus on opening up areas to new residential (38% willing, 31% unwilling) or business (47% willing, 28% unwilling) growth. Here, residents divided into two opposing camps; those who viewed change as a threat to Maine's way of life, and those who viewed change as a necessary component of growth and progress.

INTRODUCTION

Background

The Maine Department of Transportation (MDOT) has contracted with Vanasse Hangen Brustlin, Inc. (VHB) to conduct a study of the need for transportation improvements within an existing corridor presently served by Route 25, from I-295 in Portland to Gorham. To understand the concerns and attitudes of those residents who could be affected by possible transportation alternatives, MDOT authorized a survey of residents in the study area to be conducted to provide them with a profile of attitudes on a wide range of issues. To assist them in this effort, VHB subcontracted with Market Decisions (MDI) to provide consumer research services.

Objectives of the Research

The survey of study area residents was conducted with the following objectives:

(1) Gauge the overall public reaction to, and satisfaction with, existing transportation systems operating in the study area;

(2) Gauge the perceived need, if any, for transportation improvements;

(3) Determine the role of transit (public or private) in satisfying transportation needs;

(4) Test the relative importance of a series of environmental issues, including wetlands, historic preservation, and community impacts;

(5) Determine how informed the public is of the study, its objectives, and the range of options under consideration; and

(6) Determine the best means of communicating with the public as well as their overall interest in meetings and newsletters.

METHODOLOGY

Six hundred, two (602) residents of the greater Portland area were surveyed by telephone between November 2 and December 12, 1989, on their use and satisfaction with Route 25, as well as other transportation issues. The residents chosen for the survey lived within an area identified as including the greatest percentage of residents who would use Route 25 for either local or commuting travel.

The results of this survey represent a measurement of the baseline attitudes of residents in the study area. A follow-up survey will be conducted one year from now to assess any changes in attitudes which may have occurred. The sample size of 602 study area residents allows for a 4% maximum margin of error with 95% confidence, with selected subsegments (such as the larger towns within the study area) of the total sample providing large enough bases to provide for reliable estimates.

Sample Selection

Within the area agreed upon as the study area by MDOT, VHB and Market Decisions, a random sample of households was drawn so that every household with a telephone within the study area had an equal chance of being in the sample. The sample was designed to accurately represent three groups of the public: those who commute via Route 25 or alternate routes, those who use Route 25 for local travel, and those who live in areas that may be impacted by possible traffic/roadway improvements. Applying these parameters, the sample was constructed from households in the following geographic areas:

- All of Westbrook, Gorham, Standish, Limington, Buxton and Hollis
- The Brighton Ave. / Congress Street area of Portland
- South Portland west of I-295
- Scarborough west of the Maine Turnpike
- Windham within a small defined area just north of Gorham and west of Westbrook

A standard sampling procedure for selecting the adult respondent within each sample household was used to ensure an unbiased and representative sample of residents. All interviewing was carried out at Market Decisions' Rockland telephone interviewing center by trained and specially briefed interviewers. Contact with those residents who had been identified for the sample and who qualified (i.e., were in the defined study area and were reached at non-business numbers) was attempted at least six times before replacement. This method ensured that the representativeness of the sample was maintained and not biased as a result of reaching a disproportionate number of residents who spend more time in the home.

To evaluate the representativeness of the sample interviewed, the demographic characteristics of the survey respondents were compared to estimates available for the study area, which included: the 1980 Census (for population by town and gender), Maine Department of Human Services (DHS) 1987 population estimates (for age distribution), and The People of Maine Survey that Market Decisions conducted in January 1989 for the Commission on Maine's Future (for length of Maine residency). The comparisons (shown in Tables i and ii following) indicate that the sample provides a sound representation of the study area in terms of these measurable characteristics.

Survey Instrument

Market Decisions worked closely with VHB and MDOT to construct and finalize the survey instrument. The survey instrument included questions on the following:

- Current means of transportation and commuting patterns
- Current dissatisfactions with transportation and roads, including the specific segments of Route 25
- Suggestions for improving east-west travel between Portland and Gorham and preference for a new road, upgrades to current road, or no changes at all
- Willingness to accept a variety of outcomes, ranging from temporary inconveniences to permanent environmental disruptions, in order to achieve improvements in transportation.
- Residents' awareness of the current study and its perceived impact on them
- Preferred sources for keeping informed of the study
- Demographics including age, household size and length of residency in Maine

The questionnaire was pretested on October 31, and changes were made to shorten the interview time, while maintaining the quality of the information attained. The final interview averaged 15 minutes in length.

All completed questionnaires were coded and edited within 48 hours of the interview, and respondents were recontacted when answers were found to be missing or out of range. Survey responses were entered into the computer twice for verification and computer tabulations for each question were run with meaningful cross-breaks.

Table i

DISTRIBUTION OF SAMPLE BY TOWNS WITHIN STUDY AREA

TOWN	ROUTE 25 SURVEY # HOUSEHOLDS	ROUTE 25 SURVEY %	1980 CENSUS %
Westbrook	146	24%	25%
Portland (Census tracts 16,17, 19, 20.01 and 20.02)	145	24%	26%
Gorham	101	17%	15%
Buxton/Hollis	90	15%	13%
Standish	46	8%	9%
South Portland (Partial)*	28	5%	5%
Scarborough (Partial)*	17	3%	3%
Limington	17	3%	3%
Windham (Partial)*	12	2%	2%
TOTAL	**602**	**100%**	**100%**

* Estimates calculated for 1980 Census figures

Table ii

RESPONDENT CHARACTERISTICS

	ROUTE 25 SURVEY (602)	1980 CENSUS
GENDER		
Men	46%	45%
Women	54%	55%

	ROUTE 25 SURVEY (602)	DHS PROJECTIONS
AGE		
18-44	60%	59%
45-54	26%	24%
65 and over	13%	17%

	ROUTE 25 SURVEY (602)	PEOPLE OF MAINE SURVEY (CUMBERLAND CO.)
YEARS IN MAINE		
0 - 5	6%	10%
6 - 20	19%	21%
21 +	74%	69%

Response to Survey

The overall response to the survey was quite good. Of all qualified residents selected for the sample, 78% completed the interview. The response rates were particularly high in Gorham (87%) and in the towns west of Gorham (92%), while they were more toward the norm for surveys of this type in Portland (70%) and Westbrook (68%).

Respondents overwhelmingly (94%) agreed to be re-interviewed in a year's time on the subject, and generally found the topic interesting and pertinent.

DETAILED FINDINGS

I. Transportation Behavior of Residents in the Route 25 Corridor

Current Modes of Travel and Time Spent in Travel

Almost all residents living within the Route 25 corridor study area had use of a car (97%), while only 7% used the bus for at least some of their travel. Bus travel was used only by those residents of Portland (16%) and Westbrook (7%) with very little use of it occurring elsewhere. In addition to being used by only a small percentage of the residents, bus travel, for the most part, was depended on only for infrequent travel; the majority (65%) of those who used the bus, used it for 10 or fewer trips per month. (Table 1)

On average, residents of the defined study area spent 11 hours traveling either in car or bus, with 59% spending 10 or fewer hours on the road per week. Of these 11 hours, 3 hours on average were spent commuting, 4 hours, 15 minutes were spent doing errands, and 3 hours, 40 minutes were spent visiting or in recreational travel. The total amount of time spent traveling varied by the town of residence, with residents of the western towns (Standish, Limington, Buxton and Hollis) spending, on average, 12 hours on the roads per week, and residents of Gorham spending an average of 10 hours traveling. (Tables 2, 3)

Of those respondents who commuted to work, one in three (34%) spent two hours or less per week commuting to work, while 15% spent 7 hours or more. On average, commuters spent four hours, ten minutes per week traveling between home and work. Among the residents in the western towns, 60% spent five or more hours commuting to work, vs. 28% of those residing in Westbrook, 26% of those in Portland and 42% in Gorham. In general, the further out from Portland, the longer the time spent commuting to work. (Table 4)

Route 25 Travel Patterns

Almost all (96%) the residents of the study area said they used Route 25, with 35% typically using it to travel to work and 95% using it for non-work related trips. Most (68%) of the residents used some part of Route 25 at least once a week for non-work related travel. Gorham residents were especially strong users of Route 25 for non-work related travel with 82% claiming that they used the road at least once a week. This is understandable since Route 25 goes right through Gorham village. (Table 5)

Table 1

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Use of Automobile and Public Transit

	TOTAL	TOWN OF RESIDENCE: WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
HAVE USE OF CAR	581 97%	140 96%	140 97%	98 97%	147 96%
USE BUS	43 7%	10 7%	23 16%	1 1%	3 2%
1 TO 5 TRIPS/MONTH	18 3%	3 2%	10 7%	1 1%	1 1%
6 TO 10 TRIPS/MONTH	10 2%	1 1%	6 4%	- -	2 1%
MORE THAN 10 TRIPS PER MONTH	15 2%	6 4%	7 5%	- -	- -

Prepared by Market Decisions, Inc., January 1990

Table 2

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Total Hours per Week Spent Traveling in Car or Bus

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
Less than 5 hours	81 13%	19 13%	26 18%	19 19%	7 5%
5 - 7 hours	123 20%	32 22%	32 22%	23 23%	24 16%
8 - 10 hours	159 26%	31 21%	37 26%	26 26%	56 37%
11 - 15 hours	132 22%	33 23%	26 18%	19 19%	39 25%
16 - 20 hours	51 8%	15 10%	9 6%	8 8%	11 7%
21 - 30 hours	42 7%	12 8%	13 9%	4 4%	11 7%
More than 30 hours	14 2%	4 3%	2 1%	2 2%	5 3%
Average hours per week traveling	10.96	11.31	10.32	9.86	12.05

Prepared by Market Decisions, Inc., January 1990

Table 3

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Average Hours per Week Spent Traveling by Car or Bus

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
AVERAGE HOURS SPENT COMMUTING TO WORK	3.00	3.08	2.52	2.67	3.88
AVERAGE HOURS SPENT RUNNING ERRANDS	4.26	4.27	3.97	4.38	4.23
AVERAGE HOURS SPENT VISITING/RECREATION	3.70	3.95	3.83	2.81	3.95
TOTAL AVERAGE HOURS SPENT TRAVELING	10.96	11.31	10.32	9.86	12.05

Prepared by Market Decisions, Inc., January 1990

Table 4

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Hours per Week Spent Commuting to and from Work by Car or Bus

Base: Residents who travel by car or bus to work

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	432 100%	113 100%	96 100%	68 100%	121 100%
1 - 2 HOURS / WEEK	148 34%	52 46%	39 41%	23 34%	22 18%
3 - 4 HOURS / WEEK	118 27%	29 26%	33 34%	16 24%	27 22%
5 - 6 HOURS / WEEK	100 23%	14 12%	12 13%	24 35%	47 39%
7 OR MORE HOURS/WEEK	66 15%	18 16%	12 13%	5 7%	25 21%
AVERAGE HOURS SPENT COMMUTING TO WORK	4.18	3.98	3.80	3.97	4.90

Prepared by Market Decisions, Inc., January 1990

Table 5

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Use of Rt. 25 for Work and Non-work Related Trips

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
USE RT. 25 FOR ANY TRAVEL	575 96%	137 94%	141 97%	98 97%	148 97%
TRAVEL ON RT. 25 FOR NON-WORK TRIPS:	570 95%	136 93%	140 97%	98 97%	145 95%
DAILY	129 21%	32 22%	33 23%	37 37%	25 16%
SEVERAL TIMES/WEEK	128 21%	33 23%	28 19%	22 22%	38 25%
ONCE OR TWICE/WEEK	157 26%	36 25%	34 23%	23 23%	49 32%
MORE THAN ONCE A MONTH	61 10%	13 9%	17 12%	8 8%	18 12%
ABOUT ONCE A MONTH	42 7%	9 6%	15 10%	2 2%	6 4%
LESS THAN ONCE A MONTH	53 9%	13 9%	13 9%	6 6%	9 6%
TYPICALLY TRAVEL TO WORK ON RT. 25:	213 35%	57 39%	36 25%	43 43%	70 46%

Prepared by Market Decisions, Inc., January 1990

Among those residents who commuted to work, half (49%) typically traveled on at least some part of Route 25 to reach their work destination with the majority of these (35%) traveling this route daily. Use of Route 25 to get to work was especially high among workers living in Gorham (63%) and the western towns (58%). (Table 6)

As shown in Figure 1 below, almost half (45%) of those who traveled via Route 25 to work commuted to a job in Portland, while 18% worked in Westbrook, 15% worked in Gorham, 8% in South Portland and 6% west of Gorham. With the exception of its own residents (61% of whom commuted within Portland to their place of work), Portland drew a constant percentage of 40% of the commuters from the other towns. (Table 7)

Figure 1
Work Destination of Route 25 Commuters

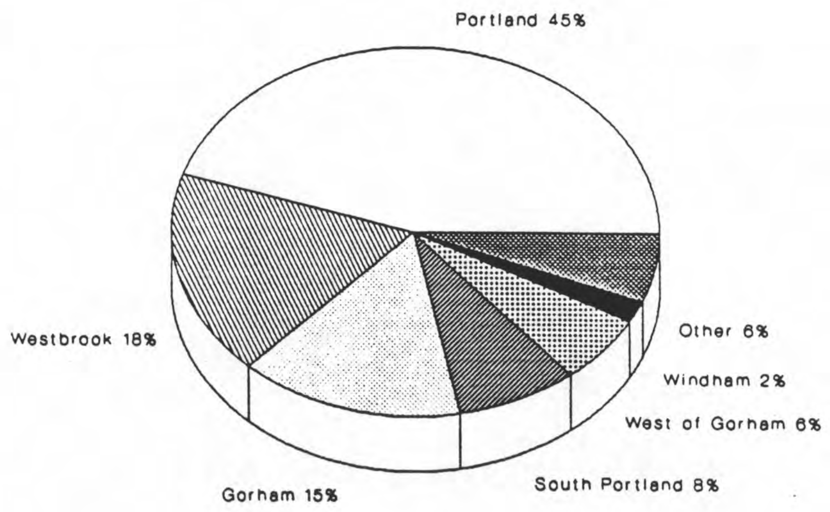


Table 6

SURVEY OF ROUTE 25 CORRIDOR RESIDENTS

Use of Route 25 for Work Among Residents who Commute to Work

Base: Residents who travel by car or bus to work

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	432 100%	113 100%	96 100%	68 100%	121 100%
TYPICALLY TRAVEL TO WORK ON RT. 25	210 49%	56 50%	34 35%	43 63%	70 58%
DAILY	145 34%	39 35%	21 22%	32 47%	48 40%
SEVERAL TIMES/WEEK	48 11%	14 12%	5 5%	11 16%	17 14%
ONCE OR TWICE/WEEK	14 3%	3 3%	7 7%	- -	3 2%
LESS OFTEN	3 1%	- -	1 1%	- -	2 2%

Table 7

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Destination for Work

Base: Typically travel on Rt. 25 to work

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	213 100%	57 100%	36 100%	43 100%	70 100%
PORTLAND	95 45%	23 40%	22 61%	17 40%	28 40%
WESTBROOK	39 18%	16 28%	3 8%	5 12%	13 19%
GORHAM	33 15%	7 12%	6 17%	8 19%	12 17%
SOUTH PORTLAND	16 8%	6 11%	1 3%	6 14%	3 4%
WEST OF GORHAM	12 6%	2 4%	1 3%	- -	9 13%
WINDHAM	4 2%	1 2%	1 3%	1 2%	1 1%
OTHER CUMBERLAND COUNTY	4 2%	2 4%	- -	2 5%	- -
OTHER MAINE	4 2%	- -	1 3%	2 5%	1 1%
SCARBOROUGH	2 1%	- -	- -	1 2%	1 1%
OTHER YORK COUNTY	2 1%	- -	- -	- -	2 3%
OUT OF STATE	2 1%	- -	1 3%	1 2%	- -

Prepared by Market Decisions, Inc., January 1990

II. Satisfaction with Current Travel

Overall Satisfaction with Availability of Transit and Condition of Roads in Area

Survey respondents were asked to rate their overall satisfaction with the roads and transportation in their area on a one to five scale where "1" indicated they were very satisfied, and "5" indicated they were very dissatisfied. Residents indicated moderately strong levels of dissatisfaction with the conditions of roads in their area during tourist season (46% dissatisfied) as well as with the ease of east-west travel in general (38%). Fewer than one half (47%) indicated they were very or somewhat satisfied with road conditions in the off season. (Figure 2, Table 8)

Figure 2

Satisfaction with Area Roads

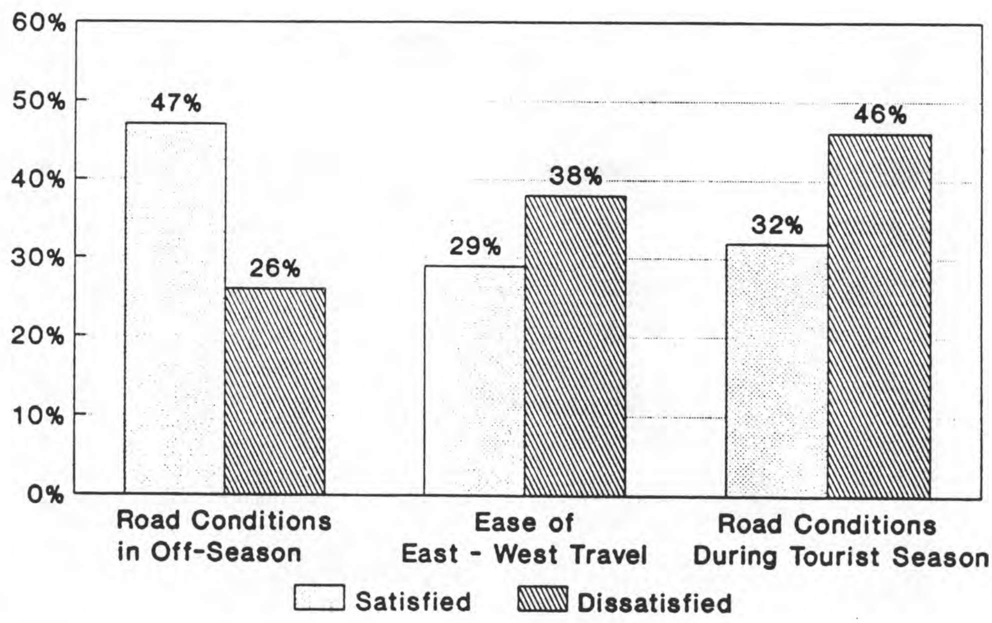


Table 8

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Overall Satisfaction with Availability of Transit and Road Conditions

Ratings of satisfaction where 1 = very satisfied and 5 = very dissatisfied

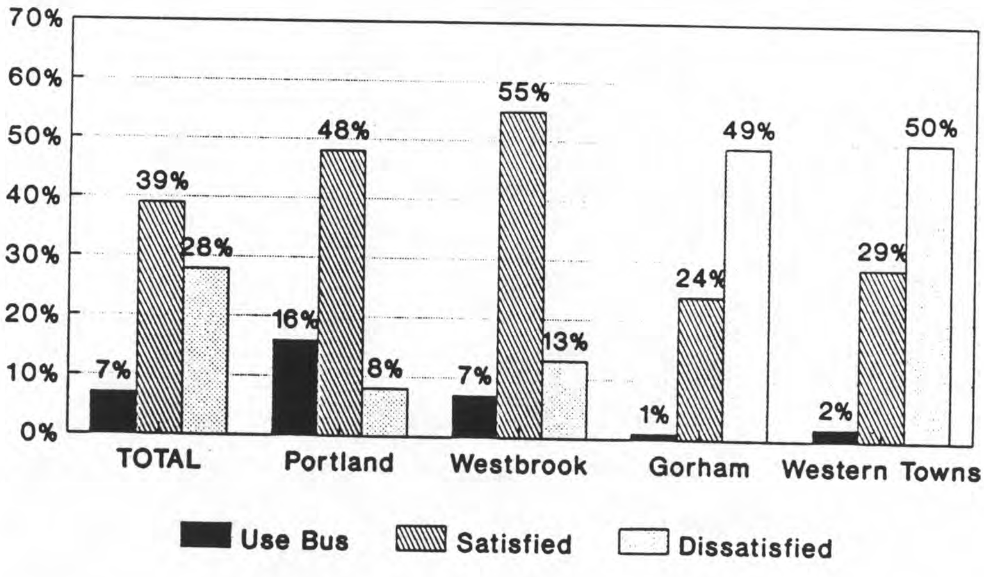
		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
ROAD CONDITIONS IN OFF SEASON					
Satisfied (1,2)	47%	50%	44%	36%	54%
Dissatisfied (4,5)	26%	21%	24%	39%	22%
Mean Rating	2.74	2.60	2.74	3.16	2.57
AVAILABILITY OF PUBLIC TRANSIT					
Satisfied (1,2)	39%	55%	48%	24%	29%
Dissatisfied (4,5)	28%	13%	8%	49%	50%
Mean Rating	2.84	2.23	2.20	3.51	3.47
ROAD CONDITIONS IN TOURIST SEASON					
Satisfied (1,2)	32%	26%	35%	21%	46%
Dissatisfied (4,5)	46%	45%	36%	65%	33%
Mean Rating	3.25	3.27	3.06	3.79	2.86
EASE OF EAST-WEST TRAVEL					
Satisfied (1,2)	29%	27%	33%	27%	29%
Dissatisfied (4,5)	38%	37%	34%	40%	38%
Mean Rating	3.20	3.13	3.10	3.33	3.24

Prepared by Market Decisions, Inc., January 1990

Geography was a strong differentiator of satisfaction with the various aspects of travel tested. Gorham residents were most dissatisfied with the condition of roads during the tourist season (65% dissatisfied), as they were with the condition of roads during the off-season (39% compared to 26% dissatisfied overall). (Table 8)

Satisfaction with the availability of public transit, understandably, depended on where it was available. Residents of Westbrook and Portland indicated moderate satisfaction (55% in Westbrook and 48% in Portland) with public transit in the Greater Portland area, while residents of Gorham (24% satisfied) and of towns west of Gorham (29%) were understandably less satisfied with public transit in the Portland area. Half of the Gorham (49%) and western town (50%) residents said they were very dissatisfied with public transit in the Greater Portland area. As Figure 3 shows, however, greater levels of satisfaction did not coincide with higher ridership. In Portland, where public transit was available, 48% said they were satisfied with public transit, but only 16% used the bus, and most of these (11%) used it 10 or fewer trips per month.

Figure 3
Public Transportation Usage and Satisfaction



Satisfaction with Route 25

As with general aspects of transportation in the Greater Portland area, survey respondents were asked to rate their satisfaction with the various segments of Route 25 on a one to five scale where "1" indicated they were very satisfied, and "5" indicated they were very dissatisfied. As Figure 4 below shows, Route 25 through Gorham Village emerged as the source of greatest dissatisfaction with 59% indicating they were dissatisfied (of whom 37% were very dissatisfied). Brighton Avenue, though not to the same degree as Gorham Village, was also viewed with some dissatisfaction. Only 4% said they were very satisfied with this part of the road, while 38% said they were dissatisfied. Main Street in Westbrook and Route 25 between Westbrook and Gorham were generally perceived as being "okay," while there was considerably more satisfaction (34%) than dissatisfaction (15%) with the Ossipee Trail. (Table 9)

Figure 4
Satisfaction with Segments of Route 25

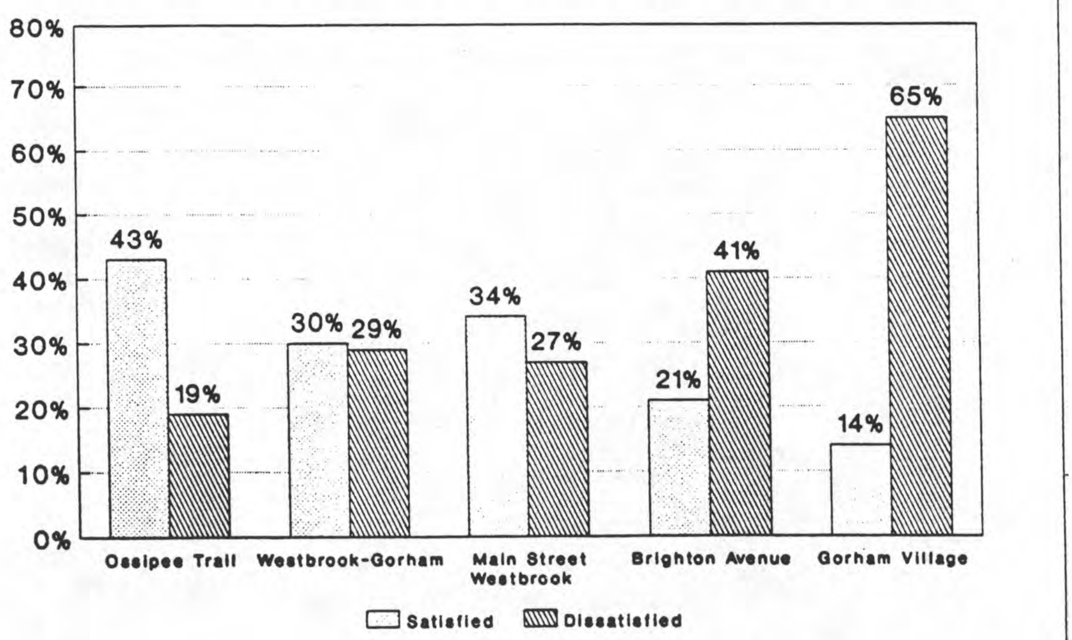


Table 9

SURVEY OF RT. 25 CORRIDOR RESIDENTS

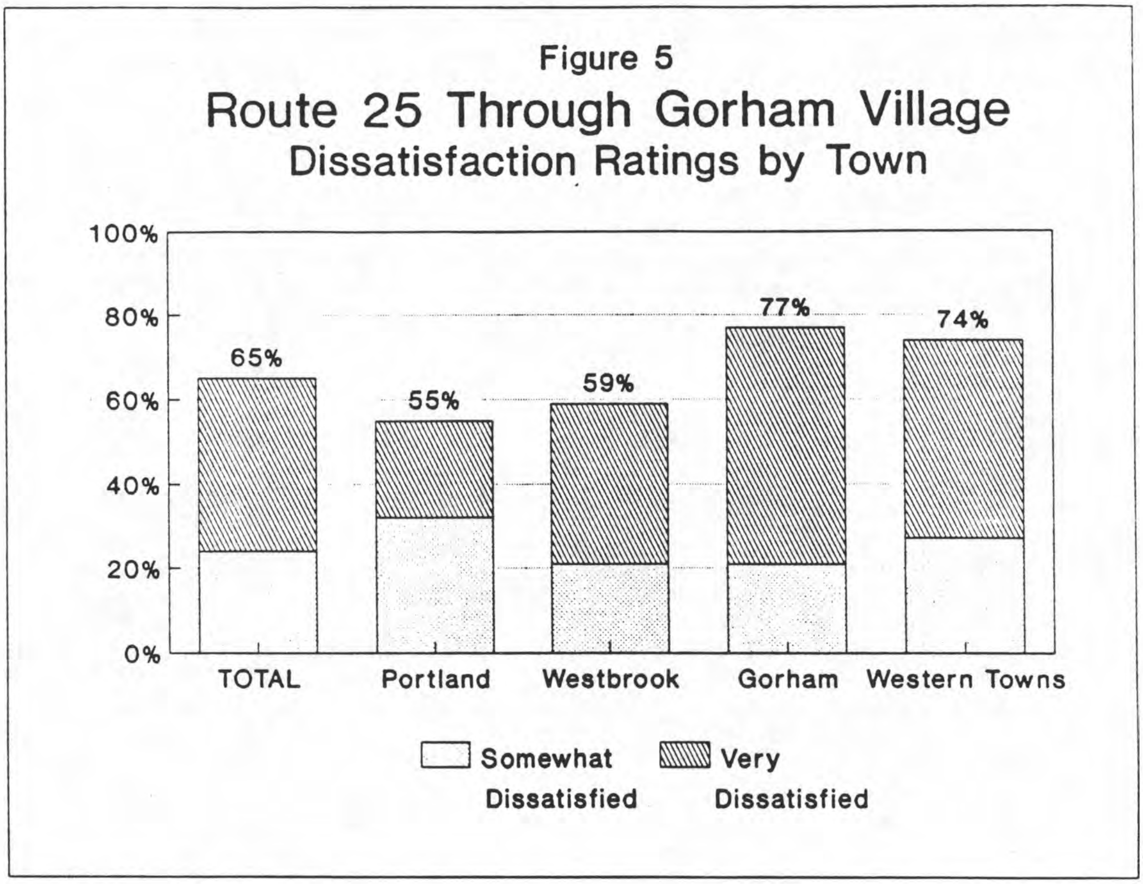
Average Ratings of Satisfaction with Flow of Traffic and Safety on Segments of Rt. 25

Ratings of Satisfaction where 1 = very satisfied and 5 = very dissatisfied

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
OSSIPEE TRAIL					
Satisfied (1,2)	34%	32%	33%	25%	44%
Dissatisfied (4,5)	15%	11%	8%	32%	18%
Mean Rating	2.71	2.71	2.42	3.19	2.62
MAIN ST. IN WESTBROOK					
Satisfied (1,2)	30%	34%	26%	31%	31%
Dissatisfied (4,5)	24%	32%	19%	24%	22%
Mean Rating	2.95	3.02	2.92	2.99	2.85
RT. 25 BETWEEN WESTBROOK AND GORHAM					
Satisfied (1,2)	36%	42%	36%	41%	27%
Dissatisfied (4,5)	27%	25%	12%	33%	42%
Mean Rating	2.97	2.81	2.63	3.03	3.34
BRIGHTON AVENUE					
Satisfied (1,2)	21%	25%	22%	18%	18%
Dissatisfied (4,5)	38%	40%	41%	31%	33%
Mean Rating	3.28	3.24	3.32	3.21	3.29
GORHAM VILLAGE					
Satisfied (1,2)	13%	16%	12%	8%	10%
Dissatisfied (4,5)	59%	55%	41%	77%	75%
Mean Rating	3.89	3.76	3.57	4.24	4.12

Prepared by Market Decisions, Inc., January 1990

Dissatisfaction with Route 25 through Gorham Village was especially high among residents in Gorham (77% dissatisfied) and towns west of Gorham (74%). Only 9% of the residents in these areas indicated that they were satisfied with that section of the road in its current condition. (Figure 5, Table 9)



III. **Residents' Experiences with Route 25**

Problems Encountered with Route 25

Most of the residents in the study area had experienced problems while traveling on Route 25, with the segment through Gorham Village emerging as the source for many problems, especially among those residents who lived in Gorham and in the towns west of Gorham. Among those who traveled on any part of Route 25 at least once a week, 89% had encountered problems. The majority of these travelers mentioned that congestion (65%) was a problem, with one in four (27%) specifically mentioning Gorham as the source of major traffic congestion. Congestion in Westbrook was also mentioned, but at a much lower level (5%). Traffic congestion on Route 25 was especially a concern for residents of Gorham (74%) and of towns west of Gorham (68%). (Table 10)

Table 10

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Problems Encountered While Traveling on Any Part of Rt. 25

Base: Use Rt. 25 for any travel

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	575 100%	137 100%	141 100%	98 100%	148 100%
HAVE ENCOUNTERED PROBLEMS ON RT 25	**483** **84%**	**113** **82%**	**114** **81%**	**89** **91%**	**131** **89%**
CONGESTION (NET)	358 62%	78 57%	82 58%	73 74%	100 68%
CONGESTED TRAFFIC IN GENERAL	194 34%	43 31%	46 33%	46 47%	46 31%
CONGESTION IN GORHAM	146 25%	26 19%	29 21%	27 28%	52 35%
CONGESTION IN WESTBROOK	26 5%	12 9%	9 6%	4 4%	1 1%
CONGESTED AT RUSH HOUR IN GENERAL	18 3%	3 2%	5 4%	4 4%	5 3%
CONCERNS WITH SAFETY (NET)	152 26%	37 27%	50 35%	21 21%	28 19%
SPEEDERS/RECKLESS DRIVERS	42 7%	10 7%	15 11%	4 4%	9 6%
NEED MORE/IN SYNC TRAFFIC LIGHTS	40 7%	13 9%	13 9%	5 5%	4 3%
UNSAFE CONDITIONS IN GENERAL	35 6%	5 4%	12 9%	5 5%	9 6%
LANES TOO NARROW	33 6%	7 5%	13 9%	5 5%	6 4%
UNSAFE TO WALK, BIKE OR PARK	10 2%	5 4%	3 2%	- -	1 1%
NEED MORE/BETTER TRAFFIC SIGNS	9 2%	3 2%	3 2%	- -	1 1%

Table 10 (cont.)

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Problems Encountered While Traveling on Any Part of Rt. 25

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
ROAD CONDITIONS (NET)	126 22%	30 22%	24 17%	24 24%	37 25%
ROAD IN NEED OF REPAIRS	49 9%	17 12%	12 9%	5 5%	8 5%
GENERAL SLOWDOWNS FROM CONSTRUCTION	33 6%	8 6%	7 5%	6 6%	8 5%
BRIDGE CONSTRUC-TION	27 5%	3 2%	1 1%	11 11%	12 8%
CONSTRUCTION IN GORHAM	26 5%	4 3%	6 4%	2 2%	12 8%
TURNING PROBLEMS (NET)	61 11%	17 12%	14 10%	7 7%	17 11%
GETTING ON OR OFF RT. 25 IN GENERAL	25 4%	5 4%	7 5%	2 2%	9 6%
TURNS AT INTER-SECTIONS	16 3%	2 1%	5 4%	4 4%	3 2%
INTERSECTION OF 114/25 - GORHAM	11 2%	4 3%	- -	1 1%	5 3%
NO PROBLEMS WITH RT.25	**91** **16%**	**23** **17%**	**27** **19%**	**9** **9%**	**17** **11%**

Prepared by Market Decisions, Inc., January 1990

Twenty-eight percent (28%) of the residents also mentioned problems with safety, including the need for more and synchronized traffic lights (8%), problems with speeders and reckless drivers (7%), unsafe conditions in general (6%) and lanes being too narrow (6%). Concern with safety was most pronounced among Portland residents, one-third (35%) of whom mentioned safety as a concern when traveling on Route 25. (Table 10)

One in four (24%) weekly travelers of Route 25 mentioned the condition of the road as a problem, with one in ten (9%) feeling that the road was in need of repair, 7% mentioning the slowdowns from construction, 6% citing bridge construction, and 5% mentioning construction in Gorham. Other problems mentioned focused on turning (12%), with most of these concerns relating to getting on and off Route 25 in general (6%). (Table 10)

Improvements Suggested for Route 25

Just as most of the residents who used Route 25 on a regular basis had encountered problems with the road, just as many (86% of weekly users) had ideas for how the road could be improved. The focus of their suggestions centered on upgrading the road (40%), building or providing a new road or bypass (40%), and improving the safety of the road (29%). Only 15% of the regular (at least weekly) travelers felt that no improvements were needed on the Route 25. (Table 11)

The idea of a bypass was most popular among residents living in Gorham (58%) and in towns west of Gorham (43%). The leading suggestion among these residents was to build a bypass around the village of Gorham (24% among all who traveled on any part of Route 25 at least once a week, 41% among Gorham residents, and 31% among residents of towns west of Gorham). Other comments relating to a new road or bypass were needing a new road in general (7%), putting in an unspecified bypass (5%), building a turnpike spur from Portland west (4%), or the need for a road with more limited access (4%). (Table 11)

Most of the residents who mentioned upgrading the roads discussed widening the present lanes, or providing more lanes for travel (30%). Other comments were that potholes should be filled in (8%) or that general improvements/upgrades should be made to the road (7%). (Table 11)

Of the 29% who mentioned safety as a need for improvement, 12% indicated the need for improved signage as well as visibility, 10% mentioned more and synchronized traffic lights, while 4% mentioned the need to improve the flow of traffic. The need for more/synchronized lights was suggested more frequently among Portland (14%) and Westbrook (12%) residents. (Table 11)

Table 11

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Suggestions for Improving East-West Travel

		TOWN OF RESIDENCE				TRAVEL RT. 25	
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS	AT LEAST WEEKLY	LESS OFTEN
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%	442 100%	160 100%
NO ANSWER	3 *	1 1%	1 1%	- -	- -	- -	3 2%
HAVE SUGGESTIONS FOR IMPROVEMENTS	**487** **81%**	**113** **77%**	**122** **84%**	**85** **84%**	**130** **85%**	**381** **86%**	**106** **66%**
UPGRADE ROADS (NET)	228 38%	57 39%	53 37%	34 34%	64 42%	178 40%	50 31%
WIDEN/PROVIDE MORE LANES	170 28%	37 25%	39 27%	30 30%	50 33%	132 30%	38 24%
FILL POT HOLES AND RE-PAVE	43 7%	15 10%	11 8%	4 4%	7 5%	34 8%	9 6%
UPGRADE / IMPROVE ROADS (GENERAL)	37 6%	14 10%	7 5%	3 3%	10 7%	30 7%	7 4%
PROVIDE BYPASS OR NEW ROAD (NET)	218 36%	42 29%	40 28%	59 58%	66 43%	176 40%	42 26%
BYPASS GORHAM VILLAGE	127 21%	25 17%	12 8%	41 41%	47 31%	105 24%	22 14%
NEED NEW ROAD (GENERAL)	43 7%	9 6%	12 8%	11 11%	11 7%	32 7%	11 7%
PUT IN BYPASS (GENERAL)	28 5%	6 4%	7 5%	6 6%	6 4%	20 5%	8 5%
TURNPIKE SPUR TO WEST FROM PORTLAND	23 4%	2 1%	5 3%	5 5%	6 4%	16 4%	7 4%
NEED ROADS WITH LIMITED ACCESS	16 3%	2 1%	8 6%	1 1%	4 3%	16 4%	- -

Table 11 (cont.)

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Suggestions for Improving East-West Travel

		TOWN OF RESIDENCE				TRAVEL RT. 25	
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS	AT LEAST WEEKLY	LESS OFTEN
IMPROVE SAFETY (NET)	167 28%	45 31%	46 32%	21 21%	42 27%	127 29%	40 25%
IMPROVE SIGNAGE AND VISIBILITY	74 12%	22 15%	11 8%	16 16%	21 14%	55 12%	19 12%
MORE/SYNCHRONIZED TRAFFIC LIGHTS	59 10%	18 12%	21 14%	4 4%	11 7%	44 10%	15 9%
IMPROVE SAFETY (GENERAL)	21 3%	3 2%	8 6%	2 2%	7 5%	15 3%	6 4%
IMPROVE FLOW OF TRAFFIC	20 3%	6 4%	5 3%	- -	6 4%	18 4%	2 1%
MORE ROAD PATROL	16 3%	1 1%	10 7%	2 2%	2 1%	11 2%	5 3%
OTHER SUGGESTIONS	34 6%	9 6%	10 7%	2 2%	10 7%	28 6%	6 4%
NO IMPROVEMENTS NEEDED ON RT. 25	**121** **20%**	**36** **25%**	**23** **16%**	**17** **17%**	**26** **17%**	**66** **15%**	**55** **34%**

Prepared by Market Decisions, Inc., January 1990

Awareness and Use of Alternate Routes

More than half (58%) of the residents surveyed used alternate routes to Route 25 at least some of the time. Most (25%) of the non-users of alternate routes were aware of other routes they could take, while 7% indicated they had no choice but to travel Route 25 and 10% were not aware of other roads they could use. (Table 12, 13)

Roads most commonly traveled in place of Route 25 were Route 22 (23% overall, and 45% among residents of the western towns) and Route 114 (16% overall and 33% among residents of Gorham). Other roads mentioned as alternative routes to Route 25 were Route 202 (6%), New Portland Road (5%), Route 302 / Forest Avenue (5%), Route 237 (3%), New Gorham Road in Westbrook (3%), and River Road in Windham (3%). Other roads, each receiving 2% of mentions were Stroudwater in Westbrook and Route 100. Route 117 and Route 35 were used by 5% each of residents in the towns west of Gorham. One in ten (10%) mentioned that they used other back roads or roads that they did not know the names of. (Table 12)

Residents who did not use alternates to Route 25 were, for the most part, aware of other roads they could use, with 59% indicating at least one other road they could use in place of Route 25. Some (16%), however, felt there were no other roads they could use instead of Route 25 for their travel, while 25% did not know what other roads they could use. Awareness of roads they could use paralleled the use of these routes as alternates with strongest awareness of Route 22 (25%), Route 114 (14%), Route 302 (12%) and Route 202 (4%). (Table 13)

The primary reasons cited for using an alternate route to Route 25 focused on convenience (93%). Most of the alternate route users felt that the alternate road was easier to use and had fewer traffic problems (72%), it was faster or more convenient in general (37%), there was no construction on the alternate route (7%) or there were fewer lights on the alternate route (5%). Other reasons for using alternate routes centered on the greater safety of the alternate route (9%) or personal reasons (7%), including a change in scenery (5%). (Table 14)

IV. Knowledge and Perceptions of Maine DOT Study

Knowledge of Study

Respondents were told that MDOT was studying ways to better meet the transportation needs of those people who travel along east-west roads between Portland and Gorham. Respondents were then asked if they had heard about the study, and, if so, what they had heard and where they heard it. In reviewing these results, it is important to keep in mind that a number of similar transportation studies have been conducted

Table 12

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Use of Alternate Routes to Rt. 25

		TOWN OF RESIDENCE				TRAVEL RT. 25	
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS	AT LEAST WEEKLY	LESS OFTEN
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%	442 100%	160 100%
USE ALTERNATE ROUTES	**350** **58%**	**72** **49%**	**68** **47%**	**68** **67%**	**116** **76%**	**282** **64%**	**68** **43%**
RT. 22	140 23%	13 9%	28 19%	22 22%	69 45%	113 26%	27 17%
RT. 114	99 16%	13 9%	11 8%	36 36%	31 20%	83 19%	16 10%
RT. 202	34 6%	2 1%	- -	10 10%	18 12%	27 6%	7 4%
NEW PORTLAND ROAD	30 5%	14 10%	- -	14 14%	2 1%	26 6%	4 3%
RT. 302 / FOREST AVE.	30 5%	12 8%	10 7%	2 2%	3 2%	25 6%	5 3%
RT. 237	21 3%	6 4%	1 1%	6 6%	5 3%	19 4%	2 1%
NEW GORHAM RD. - WESTBROOK	17 3%	10 7%	1 1%	4 4%	1 1%	11 2%	6 4%
RIVER RD. - WINDHAM	17 3%	9 6%	2 1%	5 5%	- -	12 3%	5 3%
STROUDWATER - WESTBROOK	14 2%	7 5%	7 5%	- -	- -	11 2%	3 2%
RT. 100	11 2%	8 5%	1 1%	- -	- -	9 2%	2 1%
RT. 117	9 1%	- -	1 1%	- -	8 5%	7 2%	2 1%
RT. 112	9 1%	- -	- -	2 2%	7 5%	7 2%	2 1%
RT. 35	8 1%	- -	- -	- -	8 5%	7 2%	1 1%
OTHER ROADS/BACK ROADS DON'T KNOW NAMES	62 10%	4 3%	19 13%	12 12%	21 14%	56 13%	6 4%
DON'T USE ALTERNATE ROUTES	**252** **42%**	**74** **51%**	**77** **53%**	**33** **33%**	**37** **24%**	**160** **36%**	**92** **58%**

Table 13

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Awareness of Alternate Routes to Rt. 25 Among Those Who Do Not Currently Use Alternate Routes

Base: Does not use alternate route(s) to Rt. 25

	TOWN OF RESIDENCE					TRAVEL RT. 25	
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS	AT LEAST WEEKLY	LESS OFTEN
TOTAL	252 100%	74 100%	77 100%	33 100%	37 100%	160 100%	92 100%
RT. 22	63 25%	11 15%	23 30%	13 39%	13 35%	44 28%	19 21%
RT. 114	35 14%	8 11%	7 9%	10 30%	8 22%	29 18%	6 7%
RT. 302 / FOREST AVE	30 12%	11 15%	15 19%	1 3%	- -	18 11%	12 13%
RT. 202	9 4%	- -	- -	4 12%	5 14%	4 3%	5 5%
NEW PORTLAND ROAD	6 2%	4 5%	- -	2 6%	- -	3 2%	3 3%
RT. 100	5 2%	1 1%	3 4%	- -	- -	3 2%	2 2%
OTHER ROADS /BACK ROADS/NAME UNKNOWN	22 9%	4 5%	3 4%	5 15%	9 24%	16 10%	6 7%
CAN'T USE ALTERNATE ROUTES/MUST USE 25	**40 16%**	**18 24%**	**10 13%**	**5 15%**	**2 5%**	**28 18%**	**12 13%**
DON'T KNOW WHAT ROUTES COULD USE	**63 25%**	**19 26%**	**20 26%**	**2 6%**	**5 14%**	**28 18%**	**35 38%**

Prepared by Market Decisions, Inc., January 1990

Table 14

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Reasons for Traveling Alternate Routes to Rt. 25

Base: Use alternate route(s) to Rt. 25

		TOWN OF RESIDENCE				ALTERNATE ROUTES TRAVELED	
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS	ROUTE 22	ROUTE 114
TOTAL	350 100%	72 100%	68 100%	68 100%	116 100%	140 100%	99 100%
NO ANSWER	3 1%	2 3%	- -	- -	1 1%	1 1%	- -
CONVENIENCE (NET)	327 93%	68 94%	61 90%	62 91%	110 95%	133 95%	93 94%
FEWER TRAFFIC SLOWDOWNS	251 72%	46 64%	50 74%	48 71%	88 76%	112 80%	69 70%
FASTER, MORE CONVENIENT (GENERAL)	130 37%	31 43%	27 40%	24 35%	36 31%	52 37%	36 36%
NO CONSTRUCTION ON ALTERNATE RT.	24 7%	5 7%	1 1%	7 10%	11 9%	6 4%	14 14%
FEWER LIGHTS ON ALTERNATE RT.	18 5%	4 6%	7 10%	1 1%	6 5%	9 6%	3 3%
SAFETY (NET)	31 9%	8 11%	6 9%	6 9%	10 9%	8 6%	5 5%
BETTER MAINTAINED	13 4%	5 7%	2 3%	1 1%	5 4%	3 2%	2 2%
SAFER ROAD (GENERAL)	10 3%	- -	4 6%	1 1%	4 3%	2 1%	2 2%
PERSONAL REASONS (NET)	25 7%	2 3%	8 12%	7 10%	7 6%	9 6%	8 8%
CHANGE OF SCENERY	18 5%	1 1%	7 10%	4 6%	6 5%	7 5%	5 5%

Prepared by Market Decisions, Inc., January 1990

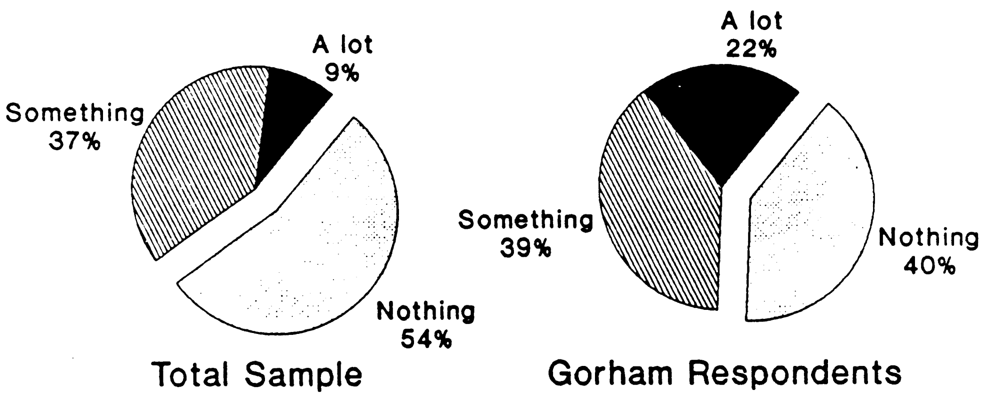
within the area west of Portland, and that it is not unlikely that respondents' comments may reflect their knowledge of other studies, and not necessarily this one.

Few (9%) of the residents in the study area had heard a lot about Maine DOT's study of transportation needs between Portland and Gorham, while 37% mentioned they had heard "something" about it. More than half (54%) admitted having heard nothing about the study. As Figure 6 shows,Gorham residents were most aware of the study with 61% having heard something (39%) or a lot (22%) about the study. (Table 15)

Figure 6

Knowledge of MDOT Study

How much residents have heard



Among those who had heard at least something about the study, half (54%) recounted rumors they had heard regarding a proposed bypass. The majority of these comments (38%) focused on a bypass of Gorham, a rumor which was especially prominent among residents of Gorham (54%) and the towns west of Gorham (52%). Many of the residents (53%) mentioned having heard general rumors about the study, such as changes in east-west roads (19%), a study to assess needs for change (17%), talk about a need for a new east-west road (12%), and talk of the effect on land and businesses (6%). Also mentioned were rumors about turnpike changes among 16% of the residents who claimed to have heard something about the study. (Table 16)

Table 15

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Familiarity with Maine D.O.T. Study of Transportation Needs Between Portland and Gorham

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
HEARD A LOT	55 9%	17 12%	6 4%	22 22%	7 5%
HEARD SOMETHING	222 37%	48 33%	50 34%	39 39%	58 38%
HEARD NOTHING	325 54%	81 55%	89 61%	40 40%	88 58%

Prepared by Market Decisions, Inc., January 1990

Table 16

SURVEY OF RT. 25 CORRIDOR RESIDENTS

What Residents Have Heard about Study

Base: Those who have heard a lot or something about study

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	277 100%	65 100%	56 100%	61 100%	65 100%
RUMORS ABOUT A PROPOSED BYPASS (NET)	150 54%	34 52%	22 39%	42 69%	38 58%
TALK ABOUT A BYPASS OF GORHAM	104 38%	22 34%	11 20%	33 54%	34 52%
TALK ABOUT A BYPASS (GENERAL)	50 18%	12 18%	11 20%	12 20%	5 8%
TALK ABOUT A BYPASS OF WINDHAM	9 3%	4 6%	1 2%	- -	4 6%
GENERAL RUMORS (NET)	148 53%	33 51%	37 66%	29 48%	32 49%
CHANGES TO E/W ROADS (GENERAL)	52 19%	13 20%	9 16%	14 23%	11 17%
STUDY TO ASSESS NEED FOR CHANGES	47 17%	11 17%	16 29%	6 10%	12 18%
TALK ABOUT NEED FOR NEW E/W ROAD	34 12%	6 9%	11 20%	6 10%	7 11%
TALK OF EFFECT ON LAND/BUSINESSES	16 6%	6 9%	7 13%	1 2%	- -
TALK ABOUT PROBLEMS W/ E/W RTS.	12 4%	2 3%	- -	5 8%	3 5%
TALK OF COST FOR ROAD IMPROVEMENTS	7 3%	1 2%	1 2%	2 3%	1 2%
RUMORS ABOUT TURNPIKE CHANGES (NET)	45 16%	16 25%	12 21%	7 11%	5 8%
TALK ABOUT TURNPIKE ADDITIONS	39 14%	15 23%	9 16%	7 11%	4 6%
TALK ABOUT T'PIKE CHANGES (GENERAL)	8 3%	2 3%	3 5%	- -	1 2%
HEARD DOT MAY CONSIDER RESIDENTS	14 5%	4 6%	5 9%	- -	2 3%

Prepared by Market Decisions, Inc., January 1990

The majority (65%) of residents who claimed to be familiar with the study had heard about it through the news media with newspapers (52%) being the greatest source of information, followed by T.V. and radio (18%). Half (56%) of the residents indicated that they had heard about the study by word of mouth, including 10% who learned of the study through town council and citizen meetings. In Gorham, one in four (23%) of those aware of the study had heard about it in town council or other citizen meetings. (Table 17)

Perceptions of MDOT's Concerns for Residents

To gauge residents' receptivity to the study, respondents were asked how important they thought the attitudes of the residents of the area to be affected by this study would be to the final decisions reached by the study. Residents, for the most part, view MDOT as being considerate of their concerns. Only 14% felt that their attitudes would be unimportant to MDOT in making their decisions while half (47%) felt their attitudes would be somewhat important and 38% thought their attitudes would be very important in shaping the outcome of the study. (Table 18)

Additionally, respondents were asked to rate their level of agreement/disagreement with the following statement on a one to five scale where "1" indicated that they agreed strongly with the statement and "5" indicated that they disagreed strongly with the statement:

> *Maine Department of Transportation tries to incorporate public views in their decision making process.*

The responses to this question were not as positive. Overall, 44% of the residents agreed with this statement, and 14% agreed strongly. Twenty percent (20%), however, disagreed that Maine DOT incorporates public views, with 9% disagreeing strongly. Disagreement with the statement was meaningfully stronger among Gorham residents (mean of 2.9 on a five point scale where "1" is strongly agrees and "5" is strongly disagrees) than among residents of other areas, most notably Portland (mean of 2.5). (Table 18)

Desired Communication Vehicles

Newspapers, and possibly local access programming available on cable television, emerged as the most popular vehicles for communicating information about the study to area residents. Residents overwhelmingly favored regular newspaper articles (71%) to other communication efforts including a telephone line (9%), meetings with MDOT (8%), mailed leaflets (6%) or regular meetings (4%). In addition, half (49%) of the area residents have cable and watch local access programming, which could provide updates to viewers on the study's progress. (Table 19)

Table 17

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Sources of Information on Maine D.O.T. Study

Base: Those who have heard a lot or something about study

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	277 100%	65 100%	56 100%	61 100%	65 100%
NEWS MEDIA (NET)	184 66%	44 68%	38 68%	40 66%	42 65%
NEWSPAPERS (GENERAL)	159 57%	39 60%	37 66%	34 56%	33 51%
T.V./ RADIO NEWS	50 18%	8 12%	11 20%	12 20%	12 18%
RECEIVED INFORMATION IN MAIL	4 1%	1 2%	- -	3 5%	- -
WORD OF MOUTH (NET)	154 56%	32 49%	28 50%	38 62%	41 63%
WORD OF MOUTH (GENERAL)	87 31%	14 22%	17 30%	18 30%	27 42%
TOWN COUNCIL / CITIZEN MEETINGS	27 10%	6 9%	6 11%	14 23%	- -
FAMILY/FRIENDS	21 8%	9 14%	2 4%	4 7%	6 9%
CO-WORKERS	18 6%	5 8%	1 2%	2 3%	8 12%
INSIDE INFO/ WORK IN TRANSPORTATION	9 3%	1 2%	2 4%	2 3%	2 3%

Prepared by Market Decisions, Inc., January 1990

Table 18

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Perceptions of Maine DOT's Consideration of Residents When Making Final Decisions

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
VERY IMPORTANT	230 38%	53 36%	53 37%	41 41%	65 42%
SOMEWHAT IMPORTANT	283 47%	71 49%	68 47%	45 45%	69 45%
NOT IMPORTANT	84 14%	22 15%	22 15%	13 13%	19 12%

Rating on Statement:

Maine Department of Transportation tries to incorporate public views in their decision making process.

	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
"1" STRONGLY AGREE	84 14%	20 14%	29 20%	5 5%	21 14%
"2"	180 30%	44 30%	40 28%	34 34%	46 30%
"3"	220 37%	58 40%	52 36%	39 39%	56 37%
"4"	64 11%	14 10%	16 11%	10 10%	14 9%
"5" STRONGLY DISAGREE	54 9%	10 7%	8 6%	13 13%	16 10%
MEAN	2.71	2.66	2.54	2.92	2.73

Prepared by Market Decisions, Inc., January 1990

Table 19

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Preferred Sources for Keeping Informed of the Rt. 25 Corridor Study

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
NO ANSWER	2 *	1 1%	- -	- -	- -
REGULAR NEWSPAPER ARTICLES	426 71%	105 72%	115 79%	59 58%	107 70%
TELEPHONE NUMBER	55 9%	11 8%	11 8%	12 12%	19 12%
MEETINGS W/D.O.T.	51 8%	15 10%	12 8%	10 10%	9 6%
MAILED LEAFLETS	34 6%	9 6%	7 5%	7 7%	8 5%
REGULAR MEETINGS	25 4%	5 3%	- -	11 11%	7 5%

Prepared by Market Decisions, Inc., January 1990

V. Concerns with Study and Possible Resulting Changes

Concerns with Possible Changes

More than half (55%) of the residents offered specific concerns about the possible changes that could be made as a result of the study of transportation needs between Portland and Gorham. The leading concern was that there would be disruption (24%), including disruption of residential areas and required relocation of households (12%), disruption to the environment including wildlife habitats and wetlands (6%), disruption of the local, small-town atmosphere (6%) and disruption of farmland and open spaces (2%). (Table 20)

In addition to concerns with disruption, some (19%) of the residents mentioned personal concerns including fears that nothing would happen and that the situation would get worse (8%), fears that changes would not help the situation (5%), or fears that there would be disregard for safety issues (4%). Twelve percent of the residents focused on concerns relating to development including concerns that changes would increase tourism and traffic (5%), that they would reduce business to village areas (2%), or there would be more residential growth (2%) or development in general (2%). (Table 20)

Other concerns voiced by residents centered on inconvenience (7%), specifically in terms of slowdowns in traffic as a result of construction, and cost concerns (7%). A few (2%) were also concerned that the study would be incomplete. (Table 20)

Acceptable Trade-offs

A major objective of the study was to learn what residents may be willing to give up in order to have improvements on roads through their areas. To assess this, residents were read the following:

> ***Change in today's world almost always involves trade-offs. Nowhere is this felt more acutely than when we decide to improve our road system. In fact, we usually have to make compromises. If there is a need to make improvements now or in the future, I'd like to understand how willing you would be to make certain compromises that might be necessary to provide for smoother and safer traffic flow on east-west roads.***
>
> ***For each of the following trade-offs, please rate your willingness on a scale of 1 to 5 where 1 means you are very willing and 5 means you are very unwilling to make each of the following trade-offs.***

Table 20

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Concerns with Changes Which Could be Made as a Result of the Study

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
HAVE SPECIFIC CONCERNS	**334** **55%**	**84** **58%**	**83** **57%**	**58** **57%**	**81** **53%**
DISRUPTION (NET)	146 24%	36 25%	35 24%	30 30%	31 20%
DISRUPT RESIDENTIAL AREAS/TAKE HOMES	73 12%	14 10%	19 13%	20 20%	13 8%
DISRUPT WILDLIFE, WETLANDS	39 6%	14 10%	10 7%	5 5%	5 3%
DISRUPT LOCAL ATMOSPHERE	34 6%	6 4%	6 4%	10 10%	10 7%
DISRUPT FARMLAND, OPEN SPACES	14 2%	7 5%	2 1%	2 2%	3 2%
PERSONAL (NET)	116 19%	24 16%	33 23%	21 21%	29 19%
FEAR NOTHING WILL HAPPEN, GET WORSE	48 8%	10 7%	16 11%	10 10%	11 7%
FEAR CHANGES WON'T HELP SITUATION	30 5%	5 3%	10 7%	4 4%	8 5%
FEAR DISREGARD FOR SAFETY ISSUES	26 4%	8 5%	8 6%	2 2%	4 3%
WANT BYPASS OR IMPROVEMENTS	13 2%	1 1%	1 1%	4 4%	7 5%
DEVELOPMENT (NET)	75 12%	14 10%	23 16%	7 7%	21 14%
INCREASED TOURISM AND TRAFFIC	33 5%	8 5%	14 10%	3 3%	6 4%
MORE RESIDENTIAL GROWTH	15 2%	1 1%	4 3%	1 1%	6 4%
DEVELOPMENT (GENERAL)	15 2%	1 1%	3 2%	2 2%	6 4%
REDUCED BUSINESS TO DOWNTOWNS	11 2%	4 3%	2 1%	1 1%	2 1%

Table 20 (cont.)

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Concerns with Changes Which Could be Made as a Result of the Study

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
FINANCIAL (NET)	42 7%	13 9%	9 6%	11 11%	4 3%
COST CONCERNS (GENERAL)	23 4%	9 6%	4 3%	6 6%	2 1%
INCREASED TAXES	18 3%	4 3%	5 3%	4 4%	2 1%
INCONVENIENCE (NET)	40 7%	6 4%	14 10%	2 2%	16 10%
TRAFFIC SLOWDOWNS FROM CONSTRUCTION	35 6%	5 3%	14 10%	1 1%	13 8%
STUDY WILL BE INCOMPLETE	11 2%	4 3%	4 3%	1 1%	2 1%
DON'T KNOW	70 12%	16 11%	15 10%	10 10%	22 14%
NO CONCERNS	**198** **33%**	**46** **32%**	**47** **32%**	**33** **33%**	**50** **33%**

Prepared by Market Decisions, Inc., January 1990

Residents were given eight possible scenarios which could occur should road improvements be initiated. The possible scenarios included traffic slowdowns, disruption of wetlands and wildlife habitats, new access to currently undeveloped areas, growth in new businesses, disruption to neighborhoods, threats to historical areas, and need for people to leave their homes.

Most of the residents indicated they were unwilling to disrupt wildlife habitats (72%), negatively impact historical areas (58%) or require residents to move (58%) in order to achieve desirable transportation conditions. The majority were, however, willing to experience traffic slowdowns (68%) and disrupt neighborhoods (54%) while improvements were being made. There was much less consensus on construction of a new road which provides access to currently undeveloped areas, and thus may lead to new residential (38% willing, 31% unwilling) or business (47% willing, 28% unwilling) growth. (Figure 7, Table 21)

Figure 7

Acceptable Trade-offs for Improvements in East-West Travel

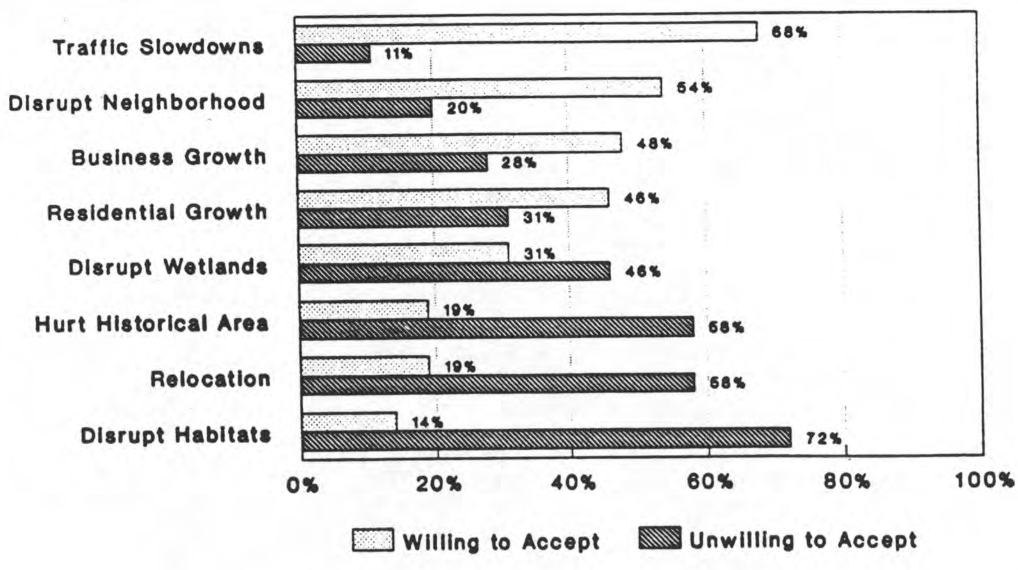


Table 21

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Willingness to Accept Changes in order to Have Improvements in Area Roads

Percent rating willing / not willing to except changes

		TOWN OF RESIDENCE				ATTITUDE TOWARD CHANGE	
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS	POSITIVE	NEGATIVE
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%	186 100%	180 100%
TRAFFIC SLOWDOWNS							
Willing (1,2)	68%	66%	66%	68%	71%	78%	60%
Not Willing (4,5)	11%	12%	10%	10%	12%	9%	13%
Mean	2.12	2.18	2.17	2.06	2.09	1.91	2.28
DISRUPT NEIGHBORHOOD							
Willing (1,2)	54%	55%	52%	59%	51%	68%	47%
Not Willing (4,5)	20%	20%	18%	18%	25%	12%	27%
Mean	2.55	2.57	2.59	2.37	2.63	2.22	2.74
BUSINESS GROWTH							
Willing (1,2)	47%	39%	46%	51%	54%	63%	35%
Not Willing (4,5)	28%	32%	31%	27%	24%	17%	42%
Mean	2.73	2.98	2.76	2.58	2.57	2.30	3.19
RESIDENTIAL GROWTH							
Willing (1,2)	38%	47%	44%	54%	38%	57%	31%
Not Willing (4,5)	31%	29%	29%	25%	35%	17%	50%
Mean	2.80	2.81	2.83	2.53	2.93	2.41	3.32
DISRUPT WETLANDS							
Willing (1,2)	31%	32%	25%	42%	33%	35%	28%
Not Willing (4,5)	46%	46%	52%	31%	43%	42%	50%
Mean	3.31	3.32	3.53	2.91	3.20	3.18	3.50
EMINENT DOMAIN							
Willing (1,2)	20%	16%	17%	26%	21%	19%	19%
Not Willing (4,5)	58%	66%	59%	47%	55%	60%	60%
Mean	3.68	3.84	3.77	3.42	3.61	3.76	3.77
HISTORICAL NEGATIVE							
Willing (1,2)	19%	17%	20%	17%	20%	19%	14%
Not Willing (4,5)	58%	63%	59%	49%	58%	60%	64%
Mean	3.69	3.80	3.69	3.56	3.71	3.81	3.88
DISRUPT HABITATS							
Willing (1,2)	13%	12%	11%	23%	13%	13%	13%
Not Willing (4,5)	72%	75%	78%	54%	74%	73%	76%
Mean	4.07	4.10	4.21	3.62	4.10	4.08	4.19

Prepared by Market Decisions, Inc., January 1990

Gorham residents were, overall, significantly more willing to accept disruption of all types, with the exception of threats to historical areas, than residents of other areas. Those who indicated a greater willingness for change were far more likely than those with negative attitudes toward change to accept residential growth, business growth, disruption of neighborhoods and traffic slowdowns. **Those who were positive toward change did not vary, however, from those negative toward change on the environmental issues, or the relocation of households.** The overall attitude toward change was measured by residents' reactions to three key statements from the People of Maine Survey (see Appendix). (Table 21, 22)

VI. Preference for Type of Road Improvement

Overall Preference

Residents were asked if they would prefer to see a new road for east-west travel between Portland and Gorham, upgrading of current east-west roads, or a combination of construction of new roads and upgrading of current roads, or no changes at all. From their responses, it would appear that the majority of residents would favor upgrading of the current road system, possibly in combination with a limited bypass of Gorham Village. Although there was a strong desire for road improvements, this did not extend to a new road altogether. Only 14% thought that a new road was the best option, while 40% favored a combination of new road and upgrades, and 37% favored upgrades without construction of new roads. Only 8% said they preferred no changes at all. (Figure 8, Table 23)

Figure 8
Preference for Type of Road Improvement

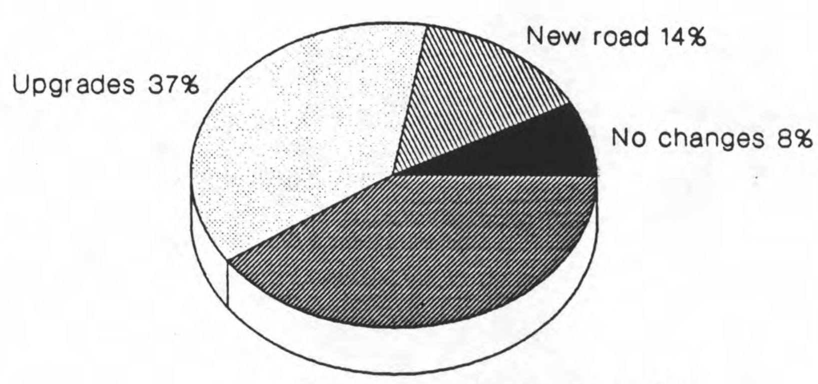


Table 22

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Overall Willingness to Make Trade-offs

		TOWN OF RESIDENCE				ATTITUDE TOWARD CHANGE	
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS	POSITIVE	NEGATIVE
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%	186 100%	180 100%
Very Willing to Accept Changes	47 8%	9 6%	10 7%	10 10%	13 8%	17 9%	11 6%
Somewhat Willing to Accept Changes	129 21%	31 21%	27 19%	31 31%	33 22%	51 27%	25 14%
Non-committal about Accepting Changes	174 29%	39 27%	44 30%	29 29%	42 27%	56 30%	44 24%
Somewhat Unwilling to Accept Changes	177 29%	46 32%	42 29%	24 24%	50 33%	47 25%	58 32%
Very Unwilling to Accept Changes	75 12%	21 14%	22 15%	7 7%	15 10%	15 8%	42 23%

Prepared by Market Decisions, Inc., January 1990

Table 23

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Preference for Type of Road Improvement

		TOWN OF RESIDENCE				ATTITUDE TOWARD CHANGE	
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS	POSITIVE	NEGATIVE
TOTAL	602	146	145	101	153	186	180
	100%	100%	100%	100%	100%	100%	100%
NO ANSWER	7	3	2	-	-	2	2
	1%	2%	1%	-	-	1%	1%
PREFER COMBINATION	238	50	66	34	67	80	57
	40%	34%	46%	34%	44%	43%	32%
PREFER UPGRADING	223	61	51	35	50	66	72
	37%	42%	35%	35%	33%	35%	40%
PREFER NEW ROAD	83	15	13	26	23	24	28
	14%	10%	9%	26%	15%	13%	16%
PREFER NO CHANGES	51	17	13	6	13	14	21
	8%	12%	9%	6%	8%	8%	12%

Prepared by Market Decisions, Inc., January 1990

The degree of preference for the options varied by community as well as residents' attitudes toward change in general. Gorham residents were twice as likely (26%) as residents of other areas to prefer a new road, while Portland residents as well as those of the towns west of Gorham tended to show more interest in a combination of roads and upgrades. Westbrook residents showed the strongest interest for upgrades without new roads. Preference also varied by residents' willingness to accept changes in order to achieve road improvements. Generally, the more willing residents were to accept changes, the more interest they showed in a new road. Those residents who were least willing to accept changes were strongly in favor of upgrades or no changes at all. (Tables 23, 24)

Reasons for Preference

Reasons for preferring a combination of upgrades and new roads centered on the ability to upgrade current roads (54%) and the general need to alleviate traffic to help the residential areas (35%). Those who preferred upgrading did so primarily because they felt that new roads were not needed (48%). Among those who indicated they would prefer a new road to upgrading, the leading reasons were that new roads would alleviate the traffic, hence helping the residents in those areas to get around more freely (40%) and the feeling that upgrading would not be feasible (31%). Most of those who would prefer no changes did so because they felt no changes were needed (57%).

Reasons for Road Improvement Preference

Combination of Upgrades and New Roads (40%)

- Current roads could be upgraded (54%)
- Need to alleviate traffic (35%)
- Bypass needed for congested towns (16%)
- Upgrades by themselves cannot alleviate traffic problems (13%)
- More economical in the long run (9%)

Upgrades (37%)

- New roads not needed (48%)
- Upgrading is less expensive (24%)
- New roads pose a threat to the environment (19%)
- Upgrading is not as disrupting as construction of new roads (14%)
- Upgrading presents less of a threat to residents (12%)
- Present roads can be widened to bring about the desired changes (9%)

Reasons for Road Improvement Preference (Cont.)

New Roads (14%)

- Alleviate traffic, helping residents of area to get around more freely (40%)
- Upgrading would not be feasible (31%)
- Bypass needed to help congested towns (28%)
- New road would be more economical in the long run (8%)
- More direct east-west routes are needed (6%)

No changes (8%)

- No changes are needed -- roads are fine as they are (57%)
- Concerns with cost (14%)
- Concerns about over-development (12%)

VII. Profile of Residents Surveyed

(See Table 25 for characteristics of residents surveyed)

Table 24

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Preference for Type of Road Improvement by Willingness to Accept Changes

		WILLINGNESS TO ACCEPT CHANGES				
	TOTAL	VERY WILLING	SOMEWHAT WILLING	NON-COMMITAL	SOMEWHAT UNWILLING	VERY UNWILLING
TOTAL	602 100%	47 100%	129 100%	174 100%	177 100%	75 100%
NO ANSWER	7 1%	- -	1 1%	2 1%	2 1%	2 3%
PREFER COMBINATION	238 40%	22 47%	60 47%	82 47%	63 36%	11 15%
PREFER UPGRADING	223 37%	6 13%	34 26%	59 34%	84 47%	40 53%
PREFER NEW ROAD	83 14%	16 34%	29 22%	20 11%	13 7%	5 7%
PREFER NO CHANGES	51 8%	3 6%	5 4%	11 6%	15 8%	17 23%

Prepared by Market Decisions, Inc., January 1990

Table 25

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Profile of Residents Surveyed

	TOTAL	TOWN OF RESIDENCE: WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602	146	145	101	153
TOWN OF RESIDENCE:					
WESTBROOK	24%	100%	-	-	-
PORTLAND	24%	-	100%	-	-
GORHAM	17%	-	-	100%	-
BUXTON/HOLLIS	15%	-	-	-	59%
STANDISH	8%	-	-	-	30%
SOUTH PORTLAND	5%	-	-	-	-
SCARBOROUGH	3%	-	-	-	-
LIMINGTON	3%	-	-	-	11%
WINDHAM	2%	-	-	-	-
AGE:					
18 - 24 YRS.	7%	10%	6%	2%	8%
25 - 34 YRS.	26%	31%	22%	26%	31%
35 - 44 YRS.	27%	21%	21%	34%	31%
45 - 54 YRS.	12%	11%	16%	9%	10%
55 - 64 YRS.	14%	15%	17%	15%	10%
65 - 74 YRS.	9%	8%	13%	9%	5%
75 YRS. OR OLDER	4%	3%	4%	6%	3%
GENDER:					
MALE	46%	46%	45%	47%	48%
FEMALE	54%	54%	55%	53%	52%
RESIDENCY IN MAINE:					
LESS THAN 2 YEARS	2%	3%	2%	1%	3%
2 TO 5 YEARS	4%	2%	6%	2%	5%
6 TO 10 YEARS	7%	6%	7%	7%	7%
11 TO 15 YEARS	6%	4%	9%	6%	7%
16 TO 19 YEARS	4%	5%	4%	2%	5%
20 YEARS OR MORE	76%	79%	72%	82%	72%

Prepared by Market Decisions, Inc., January 1990

Table 25 (cont.)

SURVEY OF RT. 25 CORRIDOR RESIDENTS

Profile of Residents Surveyed

		TOWN OF RESIDENCE			
	TOTAL	WESTBROOK	PORTLAND	GORHAM	WESTERN TOWNS
TOTAL	602 100%	146 100%	145 100%	101 100%	153 100%
SIZE OF HOUSEHOLD:					
1 RESIDENT	19%	21%	26%	18%	11%
2 RESIDENTS	34%	34%	38%	27%	35%
3 RESIDENTS	19%	19%	17%	20%	19%
4 RESIDENTS	20%	17%	14%	20%	27%
5 RESIDENTS	7%	6%	5%	14%	7%
6 OR MORE RESIDENTS	1%	2%	-	2%	1%
PRESENCE OF CHILDREN IN HOUSEHOLD:					
NO CHILDREN	56%	58%	70%	46%	48%
HAVE CHILDREN	43%	42%	30%	54%	51%
1 CHILD	16%	16%	14%	17%	19%
2 CHILDREN	20%	18%	13%	23%	26%
3 CHILDREN	7%	8%	3%	14%	6%
4 OR MORE CHILDREN	*	1%	-	1%	-
WORKERS IN HOUSEHOLD:					
NO WORKERS IN HOUSEHOLD	17%	14%	17%	23%	12%
1 WORKER	33%	34%	41%	27%	29%
2 WORKERS	44%	45%	36%	44%	53%
3 WORKERS	5%	5%	6%	6%	4%
4 OR MORE WORKERS	1%	2%	1%	1%	2%

Prepared by Market Decisions, Inc., January 1990

FINAL

SURVEY OF RT. 25 CORRIDOR RESIDENTS

MARKET DECISIONS   PROJECT #89.214   OCT.-NOV.,1989

I.D. #: ____ ____ ____ ____

RANGE: ___ ___ ___ ___

PHONE #	INT	DAY	DATE	START	FIN	DISP	MINS	SLOT

Hello, this is [INTERVIEWER NAME] calling from Market Decisions in Rockland. We have been asked by the Maine Department of Transportation to conduct a survey among residents in your area concerning transportation concerns and to assess the attitudes of people in your area toward changes that may take place to improve road conditions in your area. We would appreciate your help.

Have I reached you at your home telephone?

(1) YES ----------> CONTINUE
(2) NO ----------> THANK AND EXIT

Is this where you live most of the year?

(1) YES -----------> CONTINUE
(2) NO -----------> THANK AND EXIT

As I mentioned, we are conducting this study for the Maine Department of Transportation, and they are particularly interested in the responses of residents who live in certain areas of Greater Portland. What town do you live in?

(1) GORHAM
(2) BUXTON / HOLLIS
(3) STANDISH
(4) LIMINGTON
(5) SCARBOROUGH
(6) SO. PORTLAND
(7) WESTBROOK
(8) WINDHAM

(9) PORTLAND ------------> ASK S1 - S3

S1. Do you live in that part of Portland that is on the peninsula, that is, between Interstate 295 and the water?

(1) NO ---->CONTINUE.
(2) YES ----->THANK & EXIT.

S2. If you were to travel west toward Westbrook from your home, would you, at some point, travel on or cross Forest Avenue?

(1) NO ---->CONTINUE.
(2) YES ----->THANK & EXIT.

S3. Do you live to the north of Evergreen Cemetery or Walton Avenue, that is, on the Morrill's Corner side of the cemetery?

(1) NO ---->CONTINUE.
(2) YES ----->THANK & EXIT.

USE STANDARD SELECTION PROCEDURE TO GET RANDOM ADULT RESIDENT (REINTRODUCE SELF AND STUDY IF APPROPRIATE.)

Thank you for taking the time to talk with me. Your answers to the survey will be kept strictly confidential. No attempt can, or will, be made to associate your answers with you personally.

1. Do you usually have an automobile available to you when you need to go somewhere?

   (1) YES
   (2) NO

2. Do you ever use the public buses that are available in your area?

   (1) YES---->How many times a month? ____ ____
   (2) NO

3. * In a typical week, about how many hours do you spend traveling either in a car or bus:

   a) * Going to and from work? ____________

   b) * Doing regular day-to-day errands like grocery shopping, taking kids to school and other activities, etc?

   ____

   c) * To visit friends or family, or other recreational outings?

   ____

4. **Next, I would like you to tell me how satisfied you are with the roads and transportation in your area. For each of the following, please indicate your level of satisfaction on a scale of 1-to-5, where 1 means that you are very satisfied, and 5 means that you are very dissatisfied with that aspect of transportation in your area.**

   *** On that 1-to-5 scale, where 1 means that you are very satisfied, and 5 means that you are very dissatisfied,** how **would you rate:**

   a. * **the availability of public transit in your area?** ____

   b. * **the traffic conditions of the major roads in your area during the summer months when there are more out-of-town drivers?** ____

* On that 1-to-5 scale, where 1 means that you are very satisfied, and 5 means that you are very dissatisfied, how would you rate:

c. * the traffic conditions of the major roads in your area during non-summer months? _____

d. * the ease of east-west travel in the greater Portland area ? _____

5. Do you typically travel on any part of Route 25, including Brighton Avenue, Main Street in Westbrook and Gorham, and State Street and the Ossipee Trail leading out to Standish and Limington to go to work?

(1) YES -------------> ASK Q5a AND Q5b
(2) NO -------------> SKIP TO Q6

5a. Where is your destination ? ____________________________

5a2. Do you travel there:

(1) daily;
(2) several times a week;
(3) once or twice a week;
(4) more than once a month;
(5) about once a month;
(6) or, less than once a month?

5b. For non-work related trips, do you usually travel on any part of Route 25 (including Brighton Avenue, Main Street in Westbrook and Gorham, and State Street and the Ossipee Trail leading out to Standish and Limington):

(1) daily;
(2) several times a week;
(3) once or twice a week;
(4) more than once a month;
(5) about once a month;
(6) less than once a month;
(7) or, never?

6. * On that same 1-to-5 scale that we used before, where 1 means that you are very satisfied, and 5 means that you are very dissatisfied, how would you rate each of the following streets with respect to your overall satisfaction with the existing flow of traffic and safety?

   a.* Brighton Avenue in Portland east of the turnpike? _____

   b.* Main Street in Westbrook _____

   c.* Rt. 25 between Westbrook and Gorham _____

   d.* Gorham village _____

   e.* That section of Rt. 25 which runs from downtown Gorham west through Standish and Limington (also called Ossipee Trail and State Street) _____

7. What, if any, particular problems have you encountered while traveling on any part of Rt. 25? (PROBE 3)

INTERVIEWER: IF INTERSECTION PROBLEMS MENTIONED, PROBE TO DETERMINE WHICH INTERSECTION!!!

____

____

____

8. Do you ever choose to travel an alternate route to Route 25? (INTERVIEWER: IF R NOT CLEAR, RESTATE WHAT RT. 25 INCLUDES)

   (1) YES----->ASK 8a & 8b.
   (2) NO------>SKIP TO 9.

   8a. Which alternate routes do you travel? (PROBE THREE.)

   1._______________________________________

   2._______________________________________

   3._______________________________________

8b. Why do you travel alternate routes? (PROBE THREE.)

1. ______________________________

2. ______________________________

3. ______________________________

SKIP TO Q 10

INTERVIEWER: ASK Q.9 ONLY AMONG THOSE WHO DO NOT USE ALTERNATE ROUTES IN Q8.

9. If you had to choose an alternate route, which roads **could** you use in place of Rt.25, including Brighton Ave. and Main Street in Westbrook and Gorham?

1. ______________________________

2. ______________________________

3. ______________________________

10. What improvements would you like to see in order to have better transportation on east-west routes, such as Rt. 25 and Rt. 22? (PROBE 3)

____

____

____

11. Next, I would like to get your reaction to a brief series of statements about life in Maine. For each of the statements, please indicate your level of agreement on a scale of 1-to-5, where 1 means that you strongly agree, and 5 means that you strongly disagree with the statement.

*** On that 1-to-5 scale, where 1 means you strongly agree, and 5 means that you strongly disagree, how would you rate the statement:**

a. * Maine is generally a better place to live today than it was 10 years ago. _____

b. * It is healthy to have new people moving into Maine, because they bring new ideas and new ways of looking at things. _____

* On that 1-to-5 scale, where 1 means you strongly agree, and 5 means that you strongly disagree, how would you rate the statement:

c. * Government does mostly what big corporations want it to do. _____

d. * People like me are unable to affect, or change, the policies of government. _____

e. * The state bureaucracy is so strong that things will stay pretty much the same, no matter whom we elect to office. _____

f. * When I think of the future, and all of the changes it will bring, I am excited by the prospect. _____

g. * Maine Department of Transportation tries to incorporate public views in their decision making process. _____

12. As you may, or may not, have heard, the Maine Department of Transportation is studying ways to better meet the transportation needs of those people who travel along east-west roads between Portland and Gorham. Have you heard a lot about that study, something about it, or is this the first time you have heard about that study?

(1) A LOT---------------| ASK
(2) SOMETHING-----------| 12a.AND 12b
(3) FIRST HEARD---------->SKIP TO 13.

12a. What have you heard about that study? (PROBE THREE.)

1. ______________________________

2. ______________________________

3. ______________________________

12b. Where did you hear about that study? (PROBE THREE.)

1. ______________________________

2. ______________________________

3. ______________________________

13. Do you think that the attitudes of the residents of the area to be affected by this study will be very important, somewhat important, or not at all important to the final decisions reached by the study?

(1) VERY IMPORTANT
(2) SOMEWHAT IMPORTANT
(3) NOT AT ALL IMPORTANT

14. What specific concerns do you have with possible changes that could be made as a result of this study? (PROBE 3)

1.____

2.____

3.____

15. Change in today's world almost always involves trade-offs. Nowhere is this felt more acutely than when we decide to improve our road system. In fact, we usually have to make compromises. If there is a need to make improvements now or in the future, I'd like to understand how willing you would be to make certain compromises that might be necessary to provide for smoother and safer traffic flow on east-west roads.

For each of the following trade-offs, please rate your willingness on a scale of 1 to 5 where 1 means you are very willing and 5 means you are very unwilling to make each of the following trade-offs.

* On that scale of 1 to 5, how would you rate your willingness to accept:

a.* Improvements on current major east-west roads which would cause significant slow down of traffic while construction is going on. _____

b.* Construction of a new east-west road which requires disruption of wetlands. _____

c.* Construction of a new road which provides access to currently undeveloped areas, and thus may lead to new residential growth in certain areas. _____

d.* Improvements on current east-west roads which disrupts your own neighborhood while those improvements are taking place. _____

* On that scale of 1 to 5, how would you rate your willingness to accept:

e.* Improvements on current roads or construction of a new east-west connector if it means historical areas are negatively affected. ____

f.* Construction of a new east-west road if it required that some of the residents in your neighborhood had to move. ____

g.* Construction of a new road which provides access to currently undeveloped areas, and thus may lead to growth of new businesses in certain areas. ____

h.* Construction of a new east-west road which requires disruption of wildlife habitats. ____

16. If given the choice, would you prefer to see a new road for east-west travel between Portland and Gorham, or upgrading of current east-west roads, or a combination of construction of new roads and upgrading of current roads, or no changes at all?

(1) PREFER NEW ROAD
(2) PREFER UPGRADES
(3) COMBINATION
(4) NO CHANGES AT ALL

17. Why is that? (PROBE 3)

1. ____________________

2. ____________________

3. ____________________

18. It is important to Maine Department of Transportation that they keep you informed as best as possible about the Rt. 25 Corridor Study they are conducting. Which of the following would you find most helpful for providing you with information on the progress of the study?

(1) Regularly scheduled meetings to discuss progress of the study

(2) Articles in your local newspaper on a regular basis

(3) A phone number you can call to ask questions

(4) Small meetings with Maine Department of Transportation officials in your neighborhood

(5) OTHER: ________________________________

19. Do you ever watch local access channel programming available through your cable service, or do you not have cable?

(1) YES
(2) NO
(3) DON'T SUBSCRIBE TO CABLE TV

20. Finally, just a few questions about yourself. Altogether, how many years have you lived in Maine?

____ ____ YEARS

21. How many children under 18 years of age live in your household?

____ ____ CHILDREN

22. How many members of your household work outside of the home?

_____

23. **And lastly, in what year were you born? ____ ____**

That's all the questions I have. Thank you for taking the time to talk with me.

GENDER (1) MALE (2) FEMALE

INTERVIEWER: ____ ____ LENGTH: ____ ____ MINUTES

DATE: ___ ___/___ ___ HHLD SIZE: ____ ____