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CAPE COD 1997 REGIONAL TRANSPORTATION PLAN
TECHNICAL APPENDIX

CAPE COD COMMISSION
Transportation Staff

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Prepared in cooperation with the Massachusetts Executive Office of Transportation & Construction, the Massachusetts Highway Department, Massachusetts Department of Environmental Protection, and the United States Department of Transportation - Federal Highway Administration, Federal Transit Administration

Appendix List

Air Quality	• Conformity with Clean Air Act Amendments • Mobile 5 Inputs and Tables
Public Participation	• Public Participation Plan Summary • Workshop Overview • Meeting Notes • Official's Comments • Public Comments • Telephone Comments
Regional Transportation Plan Projects Supporting Analysis	• Memos • Air Quality Summaries
Congestion Management System	Summaries • Roadways • Transit • Park & Rides
Pavement Management System	
Intermodal Management System	• Draft Inventory
Cape Cod Traffic Counting Report 1996	• Extract
Travel Demand Forecasting	
Land Use	
Outer Cape Capacity Study Summary	
Monomoy Capacity Study Summary	
Barnstable-Yarmouth Transportation Study: Travel Demand Management	• Executive Summary
Barnstable-Yarmouth Transportation Study: Short Range Parking Study	• Executive Summary
Transit	
Commuters	
Access Management	
Intelligent Transportation Systems	
Resource Library	

Air Quality

- Conformity with Clean Air Act Amendments
- Mobile 5 Inputs and Tables

1. - Air Quality

This appendix addresses conformance of the Regional Transportation Plan with the requirements of the Clean Air Act Amendments of 1990.

1.1. - Overview of Air Quality Issues

The Commonwealth of Massachusetts is classified as serious non-attainment for ozone. With this non-attainment classification, the 1990 Clean Air Act Amendments (CAAA) require the Commonwealth to reduce its emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx), the two major precursors to ozone formation, to achieve attainment of the ozone standard by 1999.

The CAAA and the Commonwealth acknowledge that mobile sources are among the major sources of emissions of VOCs, and NOx. Prior to the 1990 amendments, the majority of pollution control measures focused on stationary industrial sources. The Massachusetts 1993 Emissions Inventory indicates that on-road mobile sources emit approximately 28% of the total VOCs and 43% of the total NOx emissions (for an average summer day) in the state.

The Commonwealth submitted a revised State Implementation Plan (SIP) to the United States Environmental Protection Agency (EPA) on November 15, 1993. This SIP revision is a strategy of programs to show Reasonable Further Progress of a 15% reduction of VOCs in 1996 toward attainment of the National Ambient Air Quality Standards (NAAQS) for ozone in 1999. A large number of the programs target mobile sources, including an enhanced inspection and maintenance program, reformulated gasoline, and California Low Emissions Vehicle Program. It also included a VOC mobile source emission budget for 1996.

A second major revision to the SIP was submitted to EPA in December, 1994. This submission included programs to provide a further reduction of 9% in NOx emissions. NOx reduction credits will be taken from stationary sources through NOx Reasonably Available Control Technology (RACT), and from mobile sources through the Enhanced Inspection and Maintenance Program, the California Low Emission Vehicle Program, and the Tier I Federal Vehicle Standards. NOx and VOC emission budgets for 1999 and each year thereafter were included in this submission. The 1999 NOx budget was set at 215.298 (or 215) tons per summer day for the Eastern Ozone Non-attainment area of Massachusetts. The 1999 Eastern Non-attainment area VOC budget was set for 105.691 (or 106) tons per summer day. In addition, the 1996 VOC budget was revised to 120.763 (or 121) tons per summer day.

The CAAA revised the requirements for designated non-attainment Metropolitan Planning Organizations (MPO) to perform conformity determinations for their Transportation Plans and Transportation Improvement Programs (TIP). Section 176 of the CAAA defines conformity to a SIP to mean conformity to the plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of the standards. The Cape Cod MPO must certify that all activities outlined in the 1997 Regional Transportation Plan (RTP):

- will not cause or contribute to any new violation of any standard in any area;
- will not increase the frequency or severity of any existing violation of any standard in any area; and
- will not delay the timely attainment of any standard or any required interim emission reductions or other milestones in any area.

The EPA issued final conformity regulations in the November 24, 1993 Federal Register and Massachusetts DEP issued new conformity regulations effective December 30, 1994. They set forth requirements for determining conformity of RTPs, TIPs, and individual projects. The requirements of the conformity analysis are summarized below and will be explained in detail in this conformity determination:

Conformity Criteria

- Horizon Years
- Latest planning assumptions
- Latest emission model used
- Timely implementation of transportation control measures (TCM)
- Conformity in accordance with the consultation procedures and SIP revisions
- Public Participation Procedures
- Financially Constrained Document

Procedures for Determining Regional Transportation Emissions

The Conformity Test

- Contribute to reductions in ozone non-attainment areas
- Consistent with emission budgets set forth in SIP

In addition, the regulations set specific requirements for each time period depending on when the state's SIP was submitted to and approved by EPA. These periods are defined below:

Phase II of the Interim Period is the period of time after the effective date of the conformity regulation lasting until submission to EPA of the relevant

control strategy implementation plan revisions endorsed by the Governor and subject to public hearing or the date which the CAAA requires the relevant strategy to be submitted. Conformity tests in this period include a build/no build (action/baseline) test and emissions lower than the 1990 base emission budget.

Transitional Period is the period of time after state submission of a relevant control strategy and before approval or disapproval of that strategy by EPA. Under the transitional period criteria, the RTP and TIP must demonstrate conformity within 18 months of the SIP submission due date to EPA otherwise conformity status will lapse. Conformity tests in this period include consistency with the 1999 VOC emission budgets and the 1999 NOx emission budget; build/no build (action/baseline) test; and emissions lower than the 1990 base emission budget.

Control Strategy Period is the period of time after EPA approves the control strategy implementation plan revisions containing strategies for controlling CO and ozone. This period ends when a state submits and EPA approves a request for redesignation to an attainment area. The conformity test in this period is consistency with the mobile source emission budget.

Maintenance Period is the period of time beginning when the Commonwealth submits and EPA approves a request for redesignation to an attainment area, and lasting for 20 years. The conformity test in this period is consistency with the mobile source emission budget.

EPA has been unable to approve the SIP revisions for ozone attainment that were submitted by DEP in 1993 and 1994 because some of the requirements of programs included as control strategies have been changed. Proposed revisions to the 1993 and 1994 SIP submissions include changes in the Inspection and Maintenance Program for automobiles and the Low Emissions Vehicle Program. Once EPA approves the SIP revisions, the control strategy period will begin. However, until that time, Massachusetts remains in the Transitional Period for VOCs and NOx.

1.2. - Conformity Determination Criteria

This conformity determination has been prepared in accordance with 310 CMR Part 60.03 - Final Massachusetts Conformity to the SIP of Transportation Plans, Programs, and Projects. It shows that this RTP has been prepared following all the guidelines and requirements of the rule.

1.2.1. - Horizon Year Requirements

Horizon years for regional model analysis have been established following Section 60.03(22)b of the Massachusetts Conformity Regulations. The years for which the model was run are shown below.

- 1990 - Milestone Year - This year has been established as the base year in the SIP for calculation of emission reductions of VOCs and NOx.
- 1999 - Milestone Year - Attainment year
- 2010 - Analysis Year
- 2020 - Analysis Year - forecast year of RTP

1.2.2. - Latest Planning Assumptions

Population, Employment and Traffic Assumptions

Section 60.03(11) of the Massachusetts Conformity Regulations outlines the requirements for the most recent planning assumptions which must be in place at the time of the conformity determination. Assumptions must be derived from the estimates of current and future population, employment, travel, and congestion most recently developed by the MPO. Analyses for the RTP are based on United States Census data, Massachusetts Highway Department data, and other sources listed below. The following is a list of the sources of data used for the Plan analysis.

- Population: Summary Tape Files 1A and 3A data for Massachusetts from the 1990 US Census of Population and Housing.
- Employment: Town-level employment from Massachusetts Department of Employment and Training. Estimates of employment below town level from MacConnell land use data and town parcel maps.
- Population Forecasts: Cape Cod Commission population forecasts based on 1980 to 1994 trends, October 1996.
- Employment Forecasts: Cape Cod Commission employment forecasts based on 1980 to 1994 trends and land use data, October 1996.
- Households: Summary Tape Files 1A and 3A data for Massachusetts from the 1990 US Census for Population and Housing.
- Household Forecasts: Cape Cod Commission household forecasts based on 1980 to 1994 trends, October 1996.
- Vehicle Ownership: Summary Tape File 3A data for Massachusetts from the 1990 US Census of Population and Housing. Census Transportation Planning Package from U.S. Census 1990.
- Traffic Volumes: Massachusetts Highway Department, "1995 Traffic Volumes for the Commonwealth of Massachusetts", 1996. Additional traffic counts taken by Cape Cod Commission, 1984-1996.
- Project-Level Data: Obtained from the responsible implementing agency.

Transit Operating Policy Assumptions
Transit service and ridership statistics presented in the RTP and used in its analysis were obtained from the Cape Cod Regional Transit Authority, the Woods Hole and Martha's Vineyard Steamship Authority, Plymouth and Brockton Street Railway Company and other sources.

The operating policies and assumed transit ridership has been updated based on latest planning data since the conformity determination prepared for the 1994 Regional Transportation Plan and 1997-1999 TIP.

Emission Inventory Assumptions
This RTP will be determining conformity with the Massachusetts SIP revisions submitted in November of 1993 and December of 1994. A VOC mobile source emission budget for 1999 for the Massachusetts Eastern Non-attainment Area has been set at 105.691 (or 106) tons per summer day and the 1999 mobile source budget for NOx is 215.298 (or 215) tons per summer day. The 1990 emission inventory for VOCs and NOx presented in the SIP will also be utilized. The Cape Cod MPO emissions will be combined with the following MPOs/RPAs to show conformity of VOC and NOx emissions with the SIP:

- Metropolitan Area Planning Council
- Central Massachusetts Regional Planning Commission
- Merrimack Valley Planning Commission
- Montachusett Regional Planning Commission
- Northern Middlesex Council of Governments
- Old Colony Planning Council
- Southeastern Regional Planning and Economic Development District
- Martha's Vineyard Commission
- Nantucket Planning and Economic Development Commission

The Executive Office of Transportation and Construction (EOTC) compiled the results from all the MPO's in the Eastern ozone non-attainment area. The air quality analysis has been finalized for all of the MPOs and the EOTC has made the final conformity determination for the ozone non-attainment area.

1.2.3. -Latest Emission Model

Emission factors used for calculating emission changes were determined utilizing MOBILE 5A, the model used by the Massachusetts DEP in calculating the mobile source budget. Emission factors for motor vehicles are specific to each model year, pollutant type, temperature, and travel speed. MOBILE 5A requires a wide range of input parameters including inspection and maintenance program information and other data such as anti-tampering rates, hot/cold start mix, emission failure rates, vehicle fleet mix, fleet age distribution, etc.

The input variables used in this conformity determination were received from DEP. The inputs utilized for the 1990 base case existing network were the same as those used in determining the 1990 Emissions Inventory for the Commonwealth of Massachusetts. The inputs utilized for the years 1999 through 2020 were also received from DEP and include information on programs which have been submitted to EPA as the control strategy for the Commonwealth to obtain ambient air quality standards for 1999.

The input variables used in the model runs for analysis of this RTP are shown in the Appendix. These inputs were determined through the consultation procedures as required by the conformity regulations. The model output provides an estimate of emissions in grams per mile for varying speeds and at varying temperatures for a variety of vehicle types. The emission factors used in this analysis are also provided in the Appendix.

1.2.4. -Timely Implementation of Transportation Control Measures

Transportation control measures (TCM) have been required in the SIP in revisions submitted to EPA in 1979, 1982, and in those submitted as mitigation for the construction of the Central Artery project. Those TCMs included in the 1979 and 1982 submission have all been accomplished through construction or through implementation of ongoing programs.

DEP has submitted their strategy of programs to show Reasonable Further Progress of a 15% reduction of VOCs in 1996 and the further 9% reduction of NOx toward attainment of the NAAQS for ozone in 1999 to EPA. Within that strategy, there are no specific TCM projects. They do call for traffic flow improvements to reduce congestion and, therefore, improve air quality. This RTP has proposed projects for this purpose. Other transportation related projects which have been included in the SIP control strategy are listed below:

- Enhanced Inspection and Maintenance Program
- California Low Emission Vehicle Program
- Reformulated Gasoline for On and Off-Road Vehicles
- Stage II Vapor Recovery at Gasoline Refueling Stations
- Tier I Federal Vehicle Standards

1.2.5. - Consultation Procedures

The final conformity regulations require that the MPO must make a conformity determination according to consultation procedures set out in the final federal regulation and Massachusetts DEP conformity regulation and it must also follow public involvement procedures established by the MPO under federal metropolitan transportation planning regulations.

The consultation requirements of both the state and federal regulations require that the MPO, EOTC/Bureau of Transportation Planning and Development (BTP&D), Massachusetts DEP, EPA - Region 1, and FHWA - Region 1 consult on the following issues:

- Selection of regional emissions analysis models including model development and assessing project design factors for modeling.
- Selection of inputs to the most recent EPA-approved emissions factor model.
- Selection of CO hotspot modeling procedures, as necessary.
- Identification of regionally significant projects to be included in the regional emissions analysis.
- Identification of projects which have changed in design and scope.
- Identification of exempt projects.
- Identification of exempt projects that should be treated as non-exempt because of adverse air quality impacts.
- Identification of the latest planning assumptions and determination of consistency with SIP assumptions.

These issues have all been addressed through consultation of the agencies listed above.

1.2.6. - Public Participation Procedures

Title 23 CFR Section 450.324 and 310 CMR 60.03(6)h requires that the development of the Plan and related certification documents provide an adequate opportunity for public review and comment.

Section 450.316(b) establishes the outline for MPO public participation programs. The Cape Cod MPO's public participation program was formally adopted in July 1994. The development and adoption of this program conforms to the requirements of the section. It guarantees public access to the RTP and all supporting documentation, provides for public notification of the availability of the RTP and the public's right to review the document and comment thereon, and provides a [35] day public review and comment period prior to the adoption of the RTP and related certification documents by the MPO.

In February 1997, a notice was sent to the Cape Cod Times and other local newspapers in the informing the public of its right to comment on the document. In March 1997, the Cape Cod Regional Transit Authority and the Cape Cod Commission recommended that the MPO endorse the RTP and conformity determination as amended. Subsequently, the Cape Cod MPO voted to approve the RTP and conformity determination. This allowed ample opportunity for public comment and MPO review of the draft document. These procedures comply with the associated federal requirements.

1.2.7. - Financially Constrained Document

Title 23 CFR Section 450.324 and 310 CMR 60.03(9) requires the RTP to be "financially constrained by year and include a financial plan that demonstrates which projects can be implemented using current revenue sources and which projects are to be implemented using proposed revenue sources (while the existing transportation system is being adequately operated and maintained)."

The overall RTP, and each fiscal year contained herein, is financially constrained to the annual federal apportionment and projections of state resources reasonably expected to be available during the appropriate time-frame. Projections of federal resources are based upon the estimated apportionment of the federal authorizations contained in ISTEA, as allocated to the region by the Commonwealth or as allocated among the various MPOs according to federal formulae or MPO agreement. Projections of state resources are based upon the allocations contained in the current Transportation Bond Bill and historic trends. Currently existing or accruing state and local revenues are estimated to be sufficient to operate and maintain the current transportation system. Therefore, the 1997 Transportation Plan substantially complies with federal requirements relating to financial constraints.

1.3. - Procedures For Determining Regional Transportation Emissions

The federal conformity regulations set forth specific requirements for determining transportation emissions. A summary of these requirements and the procedures used in this Plan are summarized below.

1.3.1. - Demographic, Employment and Transportation Demand

Specific sources of population, employment and traffic information used in the Transportation Plan have been listed above in Section 2.2. Chapter 6 of this Transportation Plan presents conditions and characteristics of the existing regional transportation system.

Section 2.5 of the Transportation Plan, discusses trends and changing demands that various components of the transportation system will serve in the future years. It discusses the future roles of the highways, transit, pedestrian and bicycle travel and water travel. It also describes the development and evaluation of alternative scenarios that were analyzed to help determine the final recommendations of the Transportation Plan.

Section 4.7 of the Transportation Plan outlines the specific project recommendations that are set forth in the Transportation Plan for the Cape Cod MPO Region through the year 2020. The recommended projects have been included in the Baseline and Action networks for the analyses performed for the conformity determination of this RTP.

Only regionally significant projects are required to be included in the regional modeling efforts. The final federal conformity regulations define regionally significant as follows:

> *Regionally significant*: a transportation project (other than an exempt project) that is on a facility which serves regional transportation needs (such as access to and from the area outside of the region, major activity centers in the region, major planned developments such as new retail malls, sport complexes, etc., or transportation terminals as well as most terminals themselves) and would be included in the modeling of a metropolitan area's transportation network, including at a minimum all principal arterial highways and all fixed guideway transit facilities that offer an alternative to regional highway travel. A listing of projects exempt from any air quality analysis is included in the Appendix.

In addition specific projects have been exempt from regional modeling emissions analysis. The categories of projects include:

- Intersection channelization projects
- Intersection signalization projects at individual intersections
- Interchange reconfiguration projects
- Changes in vertical and horizontal alignment
- Truck size and weight inspection stations
- Bus terminals and transfer points

The Baseline and Action Networks are composed of projects proposed in approved TIPs, the 1997 Transportation Plan. Projects in the Baseline networks consist of the 1990 network plus all projects where one of the following steps has occurred within the last three years:

- Comes from first three years of the previously conforming TIP
- NEPA process completion,
- Start of final design,
- Acquisition of a significant portion of right-of-way, or
- Approval of plans, specifications, and estimates.

One project meets these criteria and is included as part of the 1999 No Build network:

- Route 28 from Old Stage Road to Phinneys Lane improvements.

The following projects were included in the 1999, 2010 and 2020 Build Networks

- Attucks Lane Extension
- Route 132 Boulevard

In addition, the 2020 Build Network includes the following project:

- MacArthur Boulevard redesign as a limited access highway (one possible outcome of the recommended MIS for MacArthur Boulevard)

1.3.2. - Changes in Project Design Since Last Conformity Analysis

The State conformity regulations require that any changes in project design from the previous conformity determination for the region be identified. The last conformity determination was performed on the 1997-1999 TIP. Changes which have occurred since this last conformity determination are as follows:

- Route 132 Boulevard, Attucks Way Extension and MacArthur Boulevard Redesign have been included in future year scenarios.

1.3.3. - Model Specific Information

Section 530910 CMR 60.03(26) of the Massachusetts regulations, outlines requirements to be used in the network-based transportation demand models. These requirements include modeling methods and functional relationships to be used in accordance with acceptable professional practice and reasonable for purposes of emission estimation. The Cape Cod MPO has used the methods described in the conformity regulations in the analysis of this RTP.

1.3.4. - HPMS Monitoring Adjustments

The 1990 Emission Inventory of the State Implementation Plan used the 1990 Highway Performance Monitoring System (HPMS) estimates developed by the Massachusetts Highway Department (Mass Highway) to determine mobile source emissions submitted to EPA in November of 1993. In addition, Mass Highway has provided updated HPMS information for 1993, as well as updated projections through 2010. This information was used by DEP to revise the 1996 VOC emission budget and calculate the 1999 VOC and NOx budgets. These budgets were submitted to EPA in December of 1994. The HPMS information was provided by functional classification of roadway in daily vehicle miles of travel (DVMT). This information was seasonally adjusted utilizing factors developed by Mass Highway to reflect summer and winter traffic conditions. The DVMT was adjusted by a factor of 1.0188 to reflect summer conditions for calculations of emissions of VOC and NOx. VOC and NOx are precursors of ozone, a pollutant of concern during the summer months.

In order to remain consistent with methods utilized in developing the SIP, the results of the model runs used to calculate emissions for the conformity determination of the RTP are usually adjusted to allow for comparison. No adjustment was necessary to the Cape Cod model for seasonal conditions since it was developed as a summer model.

An adjustment was performed to make a comparison of model generated vehicle miles of travel data to the HPMS generated vehicle miles of travel data. This was done by comparing the vehicle miles of travel resulting from the base year 1990 model run to the 1990 HPMS vehicle miles of travel submitted as part of the SIP. The HPMS vehicle miles of travel submitted as part of the SIP was divided by eastern and western non-attainment area. This data was further split up by MPO region for conformity purposes. This 1990 vehicle miles of travel for the Cape Cod MPO area was compared to the 1990 model data. The HPMS data was divided by the model data to determine the adjustment factor to be applied to all modeled scenarios for future years. This calculation is as follows:

$$\frac{\text{1990 HPMS Vehicle Miles of Travel}}{\text{1990 Model Vehicle Miles of Travel}} = \text{Adjustment Factor}$$

$$\frac{\text{5,504,000 miles/day}}{\text{5,820,516 miles/day}} = 0.946$$

1.4. - The Conformity Test

1.4.1. - Contribute to Reductions in Ozone Non-Attainment Areas

The Cape Cod MPO has conducted an air quality analysis of the 1997 Transportation Plan. The purpose of the analysis is to evaluate the RTP's air quality impacts on the Massachusetts SIP. The analysis evaluates the change in ozone precursor (VOCs and NOx) emissions due to implementation of the RTP. The modeling procedures and assumptions utilized in this air quality analysis follow the EPA's final conformity regulations issued on November 24, 1993 and the State Conformity Regulations effective December, 1994. They are also consistent with procedures used by the Massachusetts Department of Environmental Protection to develop Massachusetts' 1990 Base Year Emission Inventory, 1996 Reasonable Further Progress Plan, and the Post-1996 Reasonable Further Progress Plan for the SIP. All consultation procedures were followed to ensure that a complete analysis of the Plan was performed with consistency with the SIP.

One of the criteria for conformity to a SIP in the transitional period is to show that there is a reduction in emissions in the action (build) scenario over the baseline (no

build) scenario. As discussed earlier, the Eastern ozone non-attainment area consists of ten metropolitan planning areas. The Executive Office of Transportation and Construction has compiled the results for VOC and NOx from these MPOs and are displayed in Tables A-1-1 and A-1-2. The results of the air quality analysis from the Eastern ozone non-attainment area demonstrate that the Action scenarios will result in a reduction of VOC and NOx emissions when compared to the Baseline scenarios.

In addition, all scenarios must contribute to a reduction in emissions from 1990 baseline emissions. As shown in Tables A-1-1 and A-1-2, the Eastern non-attainment area VOC and NOx emissions for all years, 1999 through 2020, meet this criterion and, therefore, contribute to reductions in VOCs and NOx in the non-attainment area. Table A-1-3 shows that the Cape Cod MPO Plan generally contributes to reductions from 1990 emissions of VOCs and NOx in the region.

TABLE A-1-1
VOC Emissions Estimates for the Eastern Massachusetts Ozone Non-attainment Area
(all emissions in tons per summer day)

Year	Baseline Emissions	Action Emissions	Difference (Action - Baseline)	Budget	Difference (Action -Budget)
1990	238.878	n/a	n/a	n/a	n/a
1999	99.796	99.738	-0.058	105.691	-5.953
2010	62.831	62.575	-0.256	105.691	-43.116
2020	66.126	65.837	-0.289	105.691	-39.854

TABLE A-1-2
NOx Emissions Estimates for the Eastern Massachusetts Ozone Non-attainment Area
(all emissions in tons per summer day)

Year	Baseline Emissions	Action Emissions	Difference (Action - Baseline)	Budget	Difference (Action - Budget)
1990	306.814	n/a	n/a	n/a	n/a
1999	208.029	208.014	-0.014	215.298	-7.284
2010	167.303	167.091	-0.212	215.298	-48.207
2020	174.405	174.166	-0.239	215.298	-41.132

TABLE A-1-3
Cape Cod VOC and Nox Emissions For 1990, 1999, 2010, and 2020
(all emissions in tons per summer day)

Year		Baseline Emissions	Action w/o CMAQ & off Model	CMAQ & off-Model	Action w/CMAQ & off-Model	Difference (Action - Baseline)
	VOC	13.020				
1990	NOx	13.828	n/a	n/a	n/a	n/a
	VOC	5.564	5.555		5.555	-0.009
1999	NOx	9.534	9.536	n/a	9.536	0.002
	VOC	3.567	3.561		3.561	-0.006
2010	NOx	7.866	7.866	n/a	7.866	0.000
	VOC	3.743	3.733		3.733	-0.010
2020	NOx	8.315	8.286	n/a	8.286	-0.029

The final test to show conformity is to show that the 1997 Transportation Plan is consistent with the emission budgets set forth in the SIP. The Massachusetts Reasonable Further Progress Plan (RFP) has been deemed complete by the EPA in a letter dated January 13, 1995. EPA has made a determination that the 15% RFP SIP submittal contains an adequate mobile source emissions budget to conduct

conformity determinations using the "transitional period" conformity criteria.

The 1999 NOx budget is 215 tons per summer day and the 1999 VOC budget is 106 tons per summer day. The total tons per day of VOCs and NOx for the Eastern Massachusetts non-attainment area from all of the analyzed scenarios are shown in Tables A-1-2 and A-1-2. The results of the air quality analysis demonstrates that the VOC and NOx emissions from all Action scenarios are less than the Massachusetts VOC and Nox budget.

1.5. - Summary of Air Quality Issues

The Clean Air Act Amendments of 1990 established new requirements for transportation plans, programs, and projects. EPA published a final rule in the November 24, 1993 Federal Register on procedures to be followed by the United States Department of Transportation in determining conformity of transportation plans, programs, and projects with the SIP. The Commonwealth of Massachusetts also published their final rule on conformity effective December 30, 1994.

The Cape Cod MPO has conducted an air quality analysis of the 1997 Transportation Plan. The purpose of the analysis is to evaluate the RTP's air quality impacts on the SIP. The analysis evaluates the change in ozone precursor emissions (VOCs and Nox) due to the implementation of the RTP. The modeling procedures and assumptions used in this air quality analysis follow EPA's and the Commonwealth's guidance and are consistent with the procedures used by the Massachusetts DEP to develop Massachusetts' 1990 Base Year Emissions Inventory, 1996 Reasonable Further Progress Plan (RFP), and the Post-1996 Reasonable Further Progress Plan for the SIP.

The Massachusetts RFP was deemed complete by the EPA in a letter dated January 13, 1995. EPA made the determination that the 15 percent RFP SIP submittal contained an adequate mobile source emission budget to conduct conformity determinations using the "transitional period" conformity criteria.

Accordingly, the EOTC has found the emission levels from the Cape Cod MPO 1997 Transportation Plan in combination with the emission levels from the other RPAs in Eastern Massachusetts to be in conformance with the SIP according to transitional period conformity criteria. Specifically, the following conditions are met:

- In the transitional period, VOC and NOx emissions for the Eastern ozone non-attainment area for the Action (Build) scenario are less than the Baseline (No Build) scenario for all analysis years.
- The VOC emissions for the Action (build) scenarios are less than the 1999 VOC mobile source emission budgets for analysis years 1999 through 2020.

- The NOx emissions for the Action (build) scenario are less than the 1999 NOx mobile source emission budget for analysis years 1999 through 2020.
- The Action (Build) scenarios contribute to a reduction from the 1990 emissions inventory for VOC and NOx emissions for all analysis years.

In accordance with Section 176(c)(4) of the Clean Air Act as amended in 1990, the MPO has completed its review and hereby certifies that the 1997 Transportation Plan conditionally conforms with 40 CFR Parts 51 and 93 issued on November 24, 1993 and 310 CMR 60.03 issued on December 30, 1994.

TABLE A-2-1			
Mobile 5A Inputs - Years 1999 through 2020 Summer Conditions			
	VOCs	CO	NOx
Tampering rates	Mobile 5A defaults	Mobile 5A defaults	Mobile 5A defaults
VMT mix	VMFLAG 3, MA specific LDGV - 82.3% LDGT1 - 7.1% LDGT2 - 3.6% HDGV - 1.9% LDDV - 1.1% LDDT - 0.1% HDDV - 3.2% MC - 0.7%	VMFLAG 3, MA specific LDGV - 82.3% LDGT1 - 7.1% LDGT2 - 3.6% HDGV - 1.9% LDDV - 1.1% LDDT - 0.1% HDDV - 3.2% MC - 0.7%	VMFLAG 3, MA specific LDGV - 82.3% LDGT1 - 7.1% LDGT2 - 3.6% HDGV - 1.9% LDDV - 1.1% LDDT - 0.1% HDDV - 3.2% MC - 0.7%
Annual Mileage Accumulation and/or Registration Distribution by Age	Default accumulation rates/Massachusetts specific registration distribution	Default accumulation rates/Massachusetts specific registration distribution	Default accumulation rates/Massachusetts specific registration distribution
Modified Basic Exhaust Emission Rates (BERs)	Mobile 5A defaults	Mobile 5A defaults	Mobile 5A defaults
Inspection and Maintenance 2-Speed I/M	IMFLAG 3, program modeled (two programs)	IMFLAG 3, program modeled (two programs)	IMFLAG 3, program modeled (two programs)
program start year	1983	1983	1983
stringency level	12%	12%	12%
first model year subject to program	1971	1971	1971
last model year subject to program	1980	1980	1980
waiver rate pre -1981	1%	1%	1%
waiver rate 1981 - present	1%	1%	1%
compliance rate	80%	80%	80%
program type	inspection only	inspection only	inspection only
inspection frequency	biennial	biennial	biennial
vehicles subject to inspection	LDGV,LDGV1,LDGV2,HDGV	LDGV,LDGV1,LDGV2,HDGV	LDGV,LDGV1,LDGV2,HDGV
test type	idle	idle	idle
alternative credits	none	none	none
cutpoint for hydrocarbon	220	220	220
cutpoint for carbon monoxide	1.2	1.2	1.2
cutpoint for nitrogen oxides	999	999	999
Enhanced Program			
program start year	1995	1995	1995
stringency level	12%	12%	12%
first model year subject to program	1981	1981	1981
last model year subject to program	2020	2020	2020
waiver rate pre -1981	1%	1%	1%
waiver rate 1981 - present	1%	1%	1%
compliance rate	98%	98%	98%
program type	inspection only	inspection only	inspection only
inspection frequency	biennial	biennial	biennial
vehicles subject to inspection	LDGV,LDGV1,LDGV2.HDGV	LDGV,LDGV1,LDGV2.HDGV	LDGV,LDGV1,LDGV2.HDGV
test type	transient test	transient test	transient test
alternative credits	none	none	none
cutpoint for hydrocarbon	0.8	0.8	0.8
cutpoint for carbon monoxide	15	15	15
cutpoint for nitrogen oxides	2	2	2

Table A-2-1 Mobile 5A Inputs - Years 1999 through 2020 Summer Conditions (Cont.)

Anti-tampering program	ATPFLAG 8 - program modeled	ATPFLAG 8 - program modeled	ATPFLAG 8 - program modeled
program start year	1995	1995	1995
first model year subject to program	1975	1975	1975
last model year subject to program	2020	2020	2020
vehicles subject to program	LDGV,LDGV1,LDGV2,HDGV	LDGV,LDGV1,LDGV2,HDGV	LDGV,LDGV1,LDGV2,HDGV
program type	inspection only	inspection only	inspection only
inspection frequency	biennial	biennial	biennial
compliance rate	98%	98%	98%
inspections performed:			
air system	tested	tested	tested
catalyst	tested	tested	tested
fuel inlet restrictor	tested	tested	tested
tailpipe lead deposit test	not tested	not tested	not tested
EGR system	tested	tested	tested
evaporative system	tested	tested	tested
PCV	tested	tested	tested
gas cap	tested	tested	tested
Pressure data			
program start year	1995	1995	1995
first model year subject to program	1975	1975	1975
last model year subject to program	2020	2020	2020
vehicles subject to inspection	LDGV,LDGV1,LDGV2,HDGV	LDGV,LDGV1,LDGV2,HDGV	LDGV,LDGV1,LDGV2,HDGV
program type	inspection only	inspection only	inspection only
inspection frequency	biennial	biennial	biennial
compliance rate	98%	98%	98%
Purge data			
program start year	1995	1995	1995
first model year subject to program	1975	1975	1975
last model year subject to program	2020	2020	2020
vehicles subject to inspection	LDGV,LDGV1,LDGV2,HDGV	LDGV,LDGV1,LDGV2,HDGV	LDGV,LDGV1,LDGV2,HDGV
program type	inspection only	inspection only	inspection only
inspection frequency	biennial	biennial	biennial
compliance rate	98%	98%	98%
Refueling Emission Factors	flag switch "2"-program modeled	flag switch "2"-program modeled	flag switch "2"
stage II start year	1991	1991	1991
phase in period	3 years	3 years	3 years
system efficiency for light-duty vehicles	84%	84%	84%
system efficiency for heavy-duty vehicles	75%	75%	75%
Local Area Parameter Record	flag switch "2"	flag switch "2"	flag switch "2"
minimum daily temp (°F)	68° F	68° F	68° F
maximum daily temp (°F)	94° F	94° F	94° F
period 1 Reid Vapor Pressure	11.5 psi	11.5 psi	11.5 psi
period 2 Reid Vapor Pressure	8.5 psi	8.5 psi	8.5 psi
period 2 start year	1989	1989	1989
oxygenated fuels flag	flag switch "1"- not modeled	flag switch "1"- not modeled	flag switch "1"- not modeled
diesel sales fraction	flag switch "1"- not modeled	flag switch "1"- not modeled	flag switch "1"- not modeled
reformulated fuel flag	flag switch "2"-modeled	flag switch "2"-modeled	flag switch "2"-modeled
Temperature Values	flag switch "1"- daily average	flag switch "1"- daily average	flag switch "1"- daily average
Composition of Hydrocarbons	flag switch "3" - VOCs	flag switch "1"- No HC calculated	flag switch "1"- No HC calculated
Scenario Section			
region	flag switch "4"- CA LEV Program	flag switch "4"- CA LEV Program	flag switch "4"- CA LEV Program
calendar year of evaluation	run specific	run specific	run specific
average speed	scenario specific	scenario specific	scenario specific
ambient temp (°F)	85.4°F	85.4°F	85.4°F
operating mode fractions	20.6/27.3/20.6	20.6/27.3/20.6	20.6/27.3/20.6
month of evaluation	flag switch "7"-July	flag switch "7"-July	flag switch "7"-July
LEV Program phase-in year	1994	1994	1994
I/M Program for LEV Program	flag switch "1"-standard I/M	flag switch "1"-standard I/M	flag switch "1"-standard I/M

Table A-2-1 Mobile 5A Inputs - Years 1999 through 2020 Winter Conditions

	CO
Tampering rates	Mobile 5A defaults
VMT mix	VMFLAG 3, MA specific LDGV - 82.3% LDGT1 - 7.1% LDGT2 - 3.6% HDGV - 1.9% LDDV - 1.1% LDDT - 0.1% HDDV - 3.2% MC - 0.7%
Annual Mileage Accumulation and/or Registration Distribution by Age	Default accumulation rates/Massachusetts specific registration distribution
Modified Basic Exhaust Emission Rates (BERs)	Mobile 5A defaults
Inspection and Maintenance 2-Speed I/M	IMFLAG 3, program modeled (two programs)
program start year	1983
stringency level	12%
first model year subject to program	1971
last model year subject to program	1980
waiver rate pre -1981	1%
waiver rate 1981 - present	1%
compliance rate	80%
program type	inspection only
inspection frequency	biennial
vehicles subject to inspection	LDGV,LDGV1,LDGV2,HDGV
test type	idle
alternative credits	none
cutpoint for hydrocarbon	220
cutpoint for carbon monoxide	1.2
cutpoint for nitrogen oxides	999
Enhanced Program	
program start year	1995
stringency level	12%
first model year subject to program	1981
last model year subject to program	2020
waiver rate pre -1981	1%
waiver rate 1981 - present	1%
compliance rate	98%
program type	inspection only
inspection frequency	biennial
vehicles subject to inspection	LDGV,LDGV1,LDGV2,HDGV
test type	transient test
alternative credits	none
cutpoint for hydrocarbon	0.8
cutpoint for carbon monoxide	15
cutpoint for nitrogen oxides	2

Table A-2-1 Mobile 5A Inputs - Years 1999 through 2020 Winter Conditions (Cont.)

Anti-tampering program	ATPFLAG 8 - program modeled
program start year	1995
first model year subject to program	1975
last model year subject to program	2020
vehicles subject to program	LDGV,LDGV1,LDGV2,HDGV
program type	inspection only
inspection frequency	biennial
compliance rate	98%
inspections performed:	
air system	tested
catalyst	tested
fuel inlet restrictor	tested
tailpipe lead deposit test	not tested
EGR system	tested
evaporative system	tested
PCV	tested
gas cap	tested
Pressure data	
program start year	1995
first model year subject to program	1975
last model year subject to program	2020
vehicles subject to inspection	LDGV,LDGV1,LDGV2,HDGV
program type	inspection only
inspection frequency	biennial
compliance rate	98%
Purge data	
program start year	1995
first model year subject to program	1975
last model year subject to program	2020
vehicles subject to inspection	LDGV,LDGV1,LDGV2,HDGV
program type	inspection only
inspection frequency	biennial
compliance rate	98%
Refueling Emission Factors	flag switch "2"-program modeled
stage II start year	1991
phase in period	3 years
system efficiency for light-duty vehicles	84%
system efficiency for heavy-duty vehicles	75%
Local Area Parameter Record	flag switch "2"
minimum daily temp (°F)	35° F
maximum daily temp (°F)	45° F
period 1 Reid Vapor Pressure	13.5 psi
period 2 Reid Vapor Pressure	13.5 psi
period 2 start year	1989
oxygenated fuels flag	flag switch "1"- not modeled
diesel sales fraction	flag switch "1"- not modeled
reformulated fuel flag	flag switch "2"-modeled
Temperature Values	flag switch "1"- daily average
Composition of Hydrocarbons	flag switch "1"- No HC calculated
Scenario Section	
region	flag switch "4"- CA LEV Program
calendar year of evaluation	run specific
average speed	scenario specific
ambient temp (°F)	40°F
operating mode fractions	20.6/27.3/20.6
month of evaluation	flag switch "1"-January
LEV Program phase-in year	1994
I/M Program for LEV Program	flag switch "1"-standard I/M

Table A-2-2 - Emission Factors

Speed (mph)	VOC Emission Factors - Mobile 5A (grams/mile)* 1-13-95					
	1990	1995	1996	1999	2010	2020
Idle (gr/hour)	25.57	15.32	11.29	8.72	5.53	5.34
3	17.584	11.602	7.252	5.917	2.894	2.759
4	12.537	8.189	5.452	4.444	2.206	2.105
5	9.819	6.38	4.43	3.614	1.819	1.736
6	8.134	5.271	3.77	3.08	1.57	1.5
7	6.991	4.526	3.308	2.708	1.396	1.334
8	6.324	4.11	3.034	2.492	1.284	1.227
9	5.807	3.787	2.816	2.319	1.196	1.143
10	5.381	3.519	2.631	2.171	1.123	1.073
11	5.02	3.291	2.469	2.042	1.061	1.014
12	4.71	3.093	2.325	1.927	1.007	0.962
13	4.438	2.917	2.196	1.823	0.96	0.918
14	4.197	2.761	2.077	1.727	0.918	0.878
15	3.979	2.619	1.968	1.639	0.881	0.842
16	3.782	2.489	1.866	1.556	0.847	0.81
17	3.6	2.368	1.77	1.478	0.816	0.781
18	3.433	2.257	1.679	1.403	0.787	0.754
19	3.276	2.152	1.592	1.332	0.761	0.729
20	3.147	2.061	1.519	1.271	0.732	0.702
21	3.054	1.993	1.47	1.229	0.707	0.677
22	2.968	1.931	1.425	1.19	0.683	0.655
23	2.888	1.873	1.383	1.155	0.662	0.634
24	2.814	1.819	1.344	1.121	0.642	0.614
25	2.745	1.77	1.307	1.09	0.623	0.597
26	2.68	1.723	1.273	1.061	0.606	0.58
27	2.62	1.679	1.24	1.033	0.59	0.565
28	2.563	1.638	1.21	1.007	0.575	0.55
29	2.509	1.6	1.181	0.982	0.561	0.537
30	2.458	1.563	1.153	0.958	0.547	0.524
31	2.41	1.528	1.127	0.936	0.535	0.512
32	2.365	1.496	1.102	0.915	0.523	0.501
33	2.322	1.464	1.078	0.895	0.512	0.49
34	2.281	1.435	1.055	0.875	0.502	0.48
35	2.242	1.407	1.033	0.857	0.492	0.47
36	2.205	1.38	1.012	0.839	0.482	0.461
37	2.17	1.354	0.992	0.822	0.473	0.453
38	2.137	1.329	0.973	0.805	0.465	0.444
39	2.105	1.306	0.954	0.789	0.456	0.437
40	2.074	1.283	0.936	0.774	0.449	0.429
41	2.045	1.261	0.919	0.759	0.441	0.422
42	2.018	1.24	0.902	0.745	0.434	0.415
43	1.991	1.22	0.886	0.731	0.427	0.409
44	1.966	1.201	0.87	0.718	0.421	0.403
45	1.941	1.182	0.855	0.705	0.415	0.397
46	1.918	1.164	0.84	0.692	0.409	0.391
47	1.895	1.147	0.825	0.68	0.403	0.386
48	1.874	1.13	0.812	0.668	0.397	0.381
49	1.866	1.124	0.81	0.666	0.396	0.379
50	1.859	1.119	0.808	0.664	0.395	0.378
51	1.853	1.114	0.806	0.663	0.394	0.377
52	1.847	1.11	0.804	0.661	0.393	0.376
53	1.841	1.105	0.802	0.659	0.392	0.376
54	1.835	1.101	0.8	0.658	0.391	0.375
55	1.83	1.098	0.799	0.657	0.391	0.374
56	1.876	1.119	0.814	0.668	0.397	0.38
57	1.922	1.14	0.83	0.679	0.403	0.386
58	1.968	1.162	0.846	0.69	0.41	0.392
59	2.015	1.184	0.862	0.701	0.416	0.399
60	2.062	1.206	0.878	0.712	0.423	0.405
61	2.109	1.228	0.894	0.724	0.43	0.411
62	2.156	1.25	0.91	0.735	0.436	0.418
63	2.204	1.273	0.927	0.747	0.443	0.424
64	2.252	1.295	0.943	0.758	0.45	0.431
65	2.3	1.318	0.96	0.77	0.457	0.438

*Idle emission factor is in grams/hour.

Table A-2-2 - Emission Factors

Speed (mph)	NOX Emission Factors - Mobile 5A (grams/mile)* 1-13-95					
	1990	1995	1996	1999	2010	2020
Idle (gr/hour)	8.36	7.11	6.21	5.26	3.89	3.76
3	3.196	2.699	2.359	1.998	1.478	1.427
4	2.996	2.508	2.195	1.859	1.374	1.327
5	2.859	2.384	2.087	1.767	1.306	1.261
6	2.755	2.295	2.009	1.701	1.257	1.214
7	2.672	2.225	1.948	1.65	1.219	1.177
8	2.603	2.169	1.899	1.608	1.189	1.148
9	2.544	2.123	1.858	1.574	1.163	1.123
10	2.492	2.083	1.823	1.544	1.142	1.102
11	2.447	2.049	1.793	1.518	1.123	1.084
12	2.407	2.019	1.766	1.496	1.106	1.068
13	2.372	1.993	1.743	1.476	1.092	1.054
14	2.34	1.969	1.722	1.458	1.079	1.042
15	2.311	1.948	1.704	1.442	1.067	1.031
16	2.286	1.93	1.687	1.428	1.057	1.021
17	2.263	1.913	1.672	1.416	1.048	1.012
18	2.242	1.898	1.658	1.404	1.039	1.004
19	2.223	1.884	1.646	1.394	1.032	0.997
20	2.211	1.878	1.64	1.389	1.029	0.993
21	2.21	1.879	1.641	1.39	1.029	0.994
22	2.209	1.881	1.642	1.39	1.03	0.995
23	2.208	1.882	1.643	1.391	1.03	0.995
24	2.208	1.884	1.644	1.392	1.031	0.996
25	2.208	1.886	1.645	1.392	1.032	0.997
26	2.209	1.888	1.647	1.394	1.033	0.997
27	2.21	1.89	1.648	1.395	1.034	0.998
28	2.212	1.893	1.65	1.396	1.035	0.999
29	2.214	1.895	1.652	1.398	1.036	1.001
30	2.218	1.898	1.655	1.4	1.038	1.002
31	2.221	1.901	1.657	1.402	1.039	1.004
32	2.225	1.905	1.66	1.404	1.041	1.005
33	2.23	1.908	1.663	1.407	1.043	1.007
34	2.236	1.912	1.667	1.41	1.045	1.009
35	2.242	1.917	1.671	1.413	1.047	1.012
36	2.249	1.921	1.675	1.416	1.05	1.014
37	2.256	1.926	1.679	1.42	1.053	1.017
38	2.264	1.932	1.684	1.424	1.055	1.019
39	2.273	1.938	1.689	1.429	1.059	1.022
40	2.283	1.944	1.695	1.433	1.062	1.026
41	2.294	1.951	1.701	1.438	1.066	1.029
42	2.306	1.958	1.707	1.444	1.07	1.033
43	2.318	1.966	1.714	1.45	1.074	1.037
44	2.332	1.974	1.721	1.456	1.078	1.041
45	2.346	1.983	1.729	1.463	1.083	1.046
46	2.362	1.992	1.738	1.47	1.088	1.051
47	2.38	2.002	1.747	1.477	1.094	1.056
48	2.398	2.013	1.757	1.486	1.1	1.062
49	2.484	2.076	1.809	1.527	1.128	1.09
50	2.57	2.141	1.863	1.569	1.158	1.118
51	2.658	2.206	1.917	1.612	1.188	1.147
52	2.748	2.272	1.972	1.655	1.218	1.176
53	2.839	2.339	2.028	1.699	1.249	1.206
54	2.931	2.407	2.084	1.744	1.28	1.236
55	3.026	2.476	2.142	1.79	1.312	1.267
56	3.122	2.546	2.201	1.836	1.345	1.298
57	3.22	2.617	2.261	1.884	1.378	1.33
58	3.32	2.69	2.322	1.932	1.412	1.363
59	3.422	2.764	2.384	1.982	1.447	1.397
60	3.527	2.839	2.448	2.033	1.483	1.431
61	3.635	2.917	2.513	2.085	1.52	1.467
62	3.745	2.996	2.58	2.138	1.557	1.503
63	3.858	3.076	2.649	2.193	1.596	1.54
64	3.974	3.159	2.719	2.25	1.636	1.578
65	4.094	3.244	2.792	2.308	1.677	1.618

* Idle emission factor is in grams/hour.

Table A-2-2 - Emission Factors

	January CO Emission Factors (grams/mile) 1/13/95					
Speed (mph)	1990	1995	1996	1999	2010	2020
Idle (gr/hour)	560.26	309.43	251.14	176.33	120.41	115.78
3	189.321	105.33	85.668	60.386	41.379	39.808
4	144.874	81.954	66.899	47.522	32.798	31.574
5	117.58	67.7	55.51	39.707	27.568	26.554
6	99.104	58.082	47.828	34.433	24.033	23.158
7	85.779	51.15	42.29	30.626	21.478	20.702
8	75.726	45.915	38.105	27.747	19.54	18.84
9	67.883	41.822	34.83	25.492	18.019	17.377
10	61.599	38.535	32.198	23.676	16.792	16.197
11	56.456	35.837	30.035	22.183	15.78	15.223
12	52.172	33.582	28.226	20.932	14.932	14.407
13	48.548	31.671	26.691	19.87	14.21	13.712
14	45.443	30.03	25.373	18.956	13.588	13.114
15	42.753	28.605	24.227	18.162	13.047	12.593
16	40.397	27.357	23.223	17.464	12.572	12.135
17	38.316	26.253	22.335	16.847	12.151	11.73
18	36.463	25.271	21.544	16.297	11.777	11.369
19	34.8	24.39	20.836	15.804	11.44	11.045
20	33.412	23.443	20.019	15.155	10.957	10.578
21	32.225	22.388	19.067	14.361	10.348	9.988
22	31.141	21.428	18.201	13.639	9.794	9.451
23	30.144	20.55	17.409	12.979	9.289	8.961
24	29.225	19.744	16.683	12.373	8.825	8.511
25	28.375	19.002	16.015	11.816	8.398	8.098
26	27.585	18.317	15.398	11.301	8.004	7.716
27	26.85	17.681	14.826	10.823	7.64	7.363
28	26.165	17.091	14.295	10.38	7.302	7.035
29	25.525	16.542	13.801	9.968	6.987	6.73
30	24.927	16.029	13.34	9.583	6.694	6.446
31	24.367	15.55	12.909	9.224	6.42	6.18
32	23.843	15.101	12.506	8.887	6.163	5.931
33	23.353	14.68	12.127	8.572	5.923	5.698
34	22.894	14.285	11.772	8.275	5.696	5.479
35	22.464	13.914	11.438	7.997	5.484	5.273
36	22.062	13.564	11.123	7.734	5.283	5.078
37	21.685	13.235	10.827	7.487	5.094	4.895
38	21.334	12.925	10.547	7.254	4.916	4.722
39	21.005	12.632	10.283	7.033	4.747	4.559
40	20.698	12.355	10.033	6.825	4.587	4.404
41	20.412	12.094	9.797	6.628	4.435	4.257
42	20.145	11.847	9.573	6.441	4.292	4.118
43	19.895	11.613	9.362	6.265	4.155	3.986
44	19.663	11.391	9.161	6.097	4.026	3.861
45	19.446	11.181	8.97	5.938	3.903	3.741
46	19.243	10.982	8.789	5.786	3.786	3.628
47	19.052	10.793	8.617	5.643	3.674	3.52
48	18.872	10.612	8.453	5.506	3.568	3.417
49	18.877	10.616	8.456	5.508	3.569	3.419
50	18.885	10.62	8.46	5.511	3.571	3.421
51	18.894	10.625	8.464	5.514	3.574	3.424
52	18.905	10.631	8.47	5.519	3.578	3.427
53	18.918	10.639	8.477	5.524	3.582	3.431
54	18.933	10.648	8.485	5.531	3.587	3.436
55	18.95	10.659	8.494	5.538	3.592	3.441
56	22.168	11.994	9.476	6.096	3.902	3.736
57	25.388	13.331	10.46	6.655	4.213	4.032
58	28.611	14.669	11.445	7.215	4.525	4.329
59	31.837	16.01	12.432	7.776	4.838	4.627
60	35.065	17.352	13.42	8.338	5.151	4.925
61	38.297	18.696	14.41	8.902	5.466	5.225
62	41.532	20.042	15.402	9.468	5.782	5.526
63	44.771	21.39	16.396	10.035	6.1	5.828
64	48.014	22.741	17.392	10.604	6.418	6.132
65	51.262	24.094	18.39	11.175	6.738	6.437

*Idle emission factor is in grams/hour.

Public Participation

- Public Participation Plan Summary
- Workshop Overview
- Meeting Notes
- Official's Comments
- Public Comments
- Telephone Comments

HIGHLIGHTS of the Public Participation Program (PPP)[1]

The Public Participation Program of July 15, 1994, for the Cape Cod Metropolitan Planning Organization (MPO)[2] programs such as: LRTP, TIP, & MIS requires the following procedures:

30 day notice of discussion regarding development or amendment of LRTPs, TIPs, & MIS to:

- Members of MPO and CCJTC
- CCJTC Agendas Only Mailing List

Announcements of availability of copies of Draft LRTPs, TIPs, & MIS to:

- be published in the CCC Reporter
- press releases to local newspapers and other news media
- CCJTC Agendas Only Mailing List

Copies of Draft LRTPs, TIPs, & MIS to each town's:

- CCJTC representative
- CCRTA representative
- CCC representative
- Chief Elected Official
- main branch of the public library

and Copies of Drafts to:

- Barnstable County Commissioners
- Assembly of Delegates

+Additional Copies will be available at the CCC office.

Public Meetings:

- At least **one** will be held when developing LRTP, TIP, or MIS; (# of meetings in proportion to significance of the item under consideration);
- may be part of a CCJTC meeting
- 30 day notice & mailing as above
- public or interagency comments (EPA conformity review) resulting in significant changes to the Draft LRTP, TIP or MIS will require an additional public meeting; a summary, analysis and report of all significant oral and written comments will be made part of the final LRTP, TIP or MIS.
- once the final LRTP, TIP or MIS is approved any significant amendment requires an additional 30 day review period and one public meeting
- CCC trans. staff available to meet with local officials and others to discuss any LRTP, TIP or MIS.

[1]Amendments to the Public Participation Program requires **45** day mailing and comment period. The MPO will conduct a periodic review of the PPP.

[2]Cape Cod MPO includes CCC, CCRTA, MHD, & EOTC with CCJTC as advisory body.

Copies of Draft LRTPs, TIPs, & MIS to each town's:

- •CCJTC representative
- •CCRTA representative
- •CCC representative
- •Chief Elected Official
- •main branch of the public library

and Copies of Drafts to:

- •Barnstable County Commissioners
- •Assembly of Delegates

+Additional Copies will be available at the CCC office.

Announcements of availability of copies of Draft LRTPs, TIPs, & MIS to:

- •be published in the CCC Reporter
- •press releases to local newspapers and other news media
- •CCJTC Agendas Only Mailing List

October 1996 Public Meetings

Cape Cod Long Range Transportation Plan Update

1. Introduction
2. Overview
3. Goals
   - *The "Right" Transportation System*
   - *Modes not Roads*
   - *Land Use Causes Transportation Causes Land Use*
   - *Traveling Smarter*
   - *Working Together*

4. Discussion
   - Where do you see regional transportation problems?
   - What are your ideas for improvement?

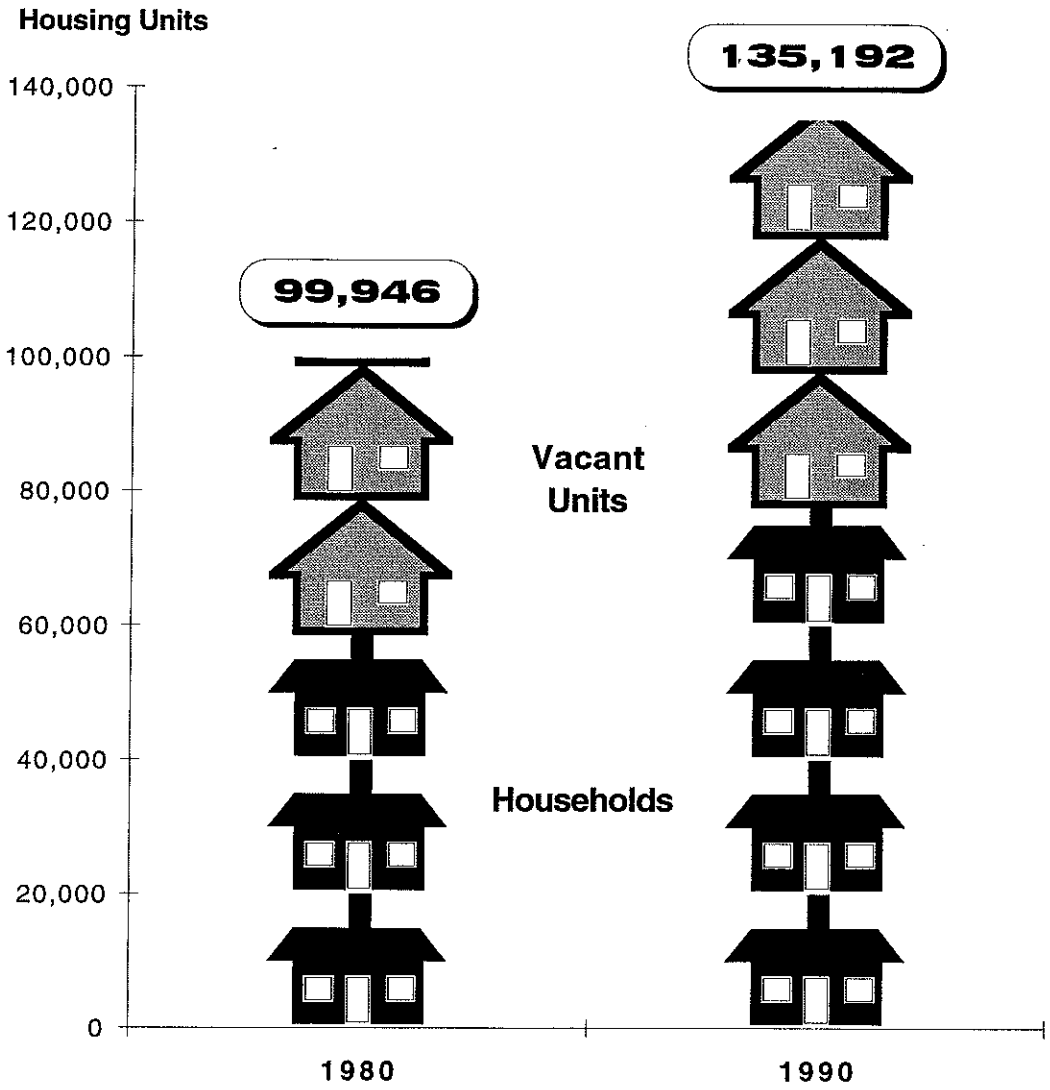
5. Next Steps/Wrap Up

Handouts

Overview
Travel Demand Forecasting
Transit
Land Use
Intelligent Transportation Systems
Pavement Management Systems
Access Management
Residents' Survey Summary
Commuters
Accidents

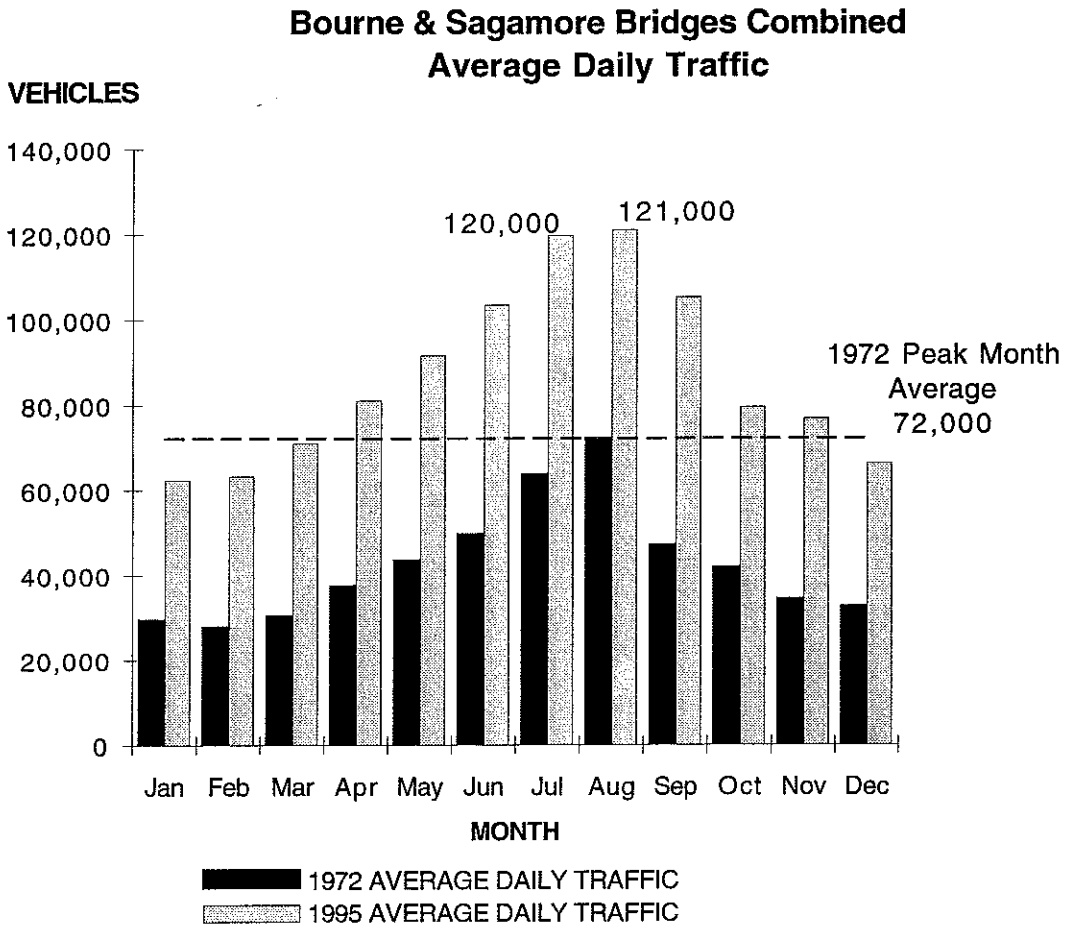
Monday, October 7 - Sandwich, Oakridge School
Tuesday, October 8 - Eastham, Town Hall
Thursday. October 10 - Dennis, Senior Center

More people live on Cape Cod



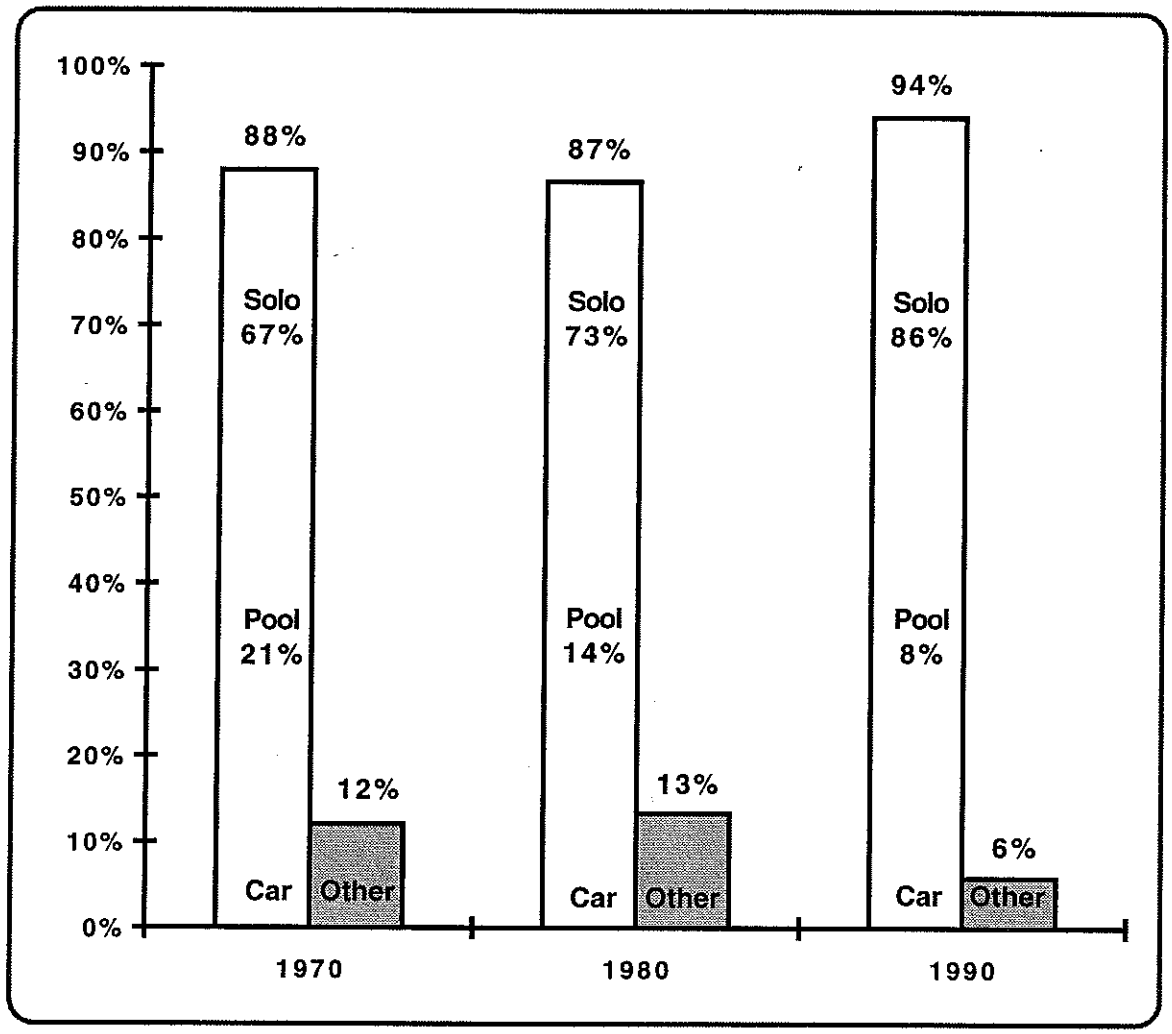
Source: *Cape Trends* 1996, Cape Cod Commission

More people are coming to Cape Cod



Source: Massachusetts Highway Department

Cars continue to be the main mode of travel



Mode to Work - Cape Cod Residents

Sources: 1970 U.S. Census complied by CCPEDC, 1974; County and City Data Book; 1990 Census Transportation Planning Package, Bureau of the Census. Note that "carpool" percentage for 1970 is interpolated from "private auto driver" and "private auto passenger" categories assumming that each car with a passenger held *only* one passenger.

Transportation continues to be a serious public concern

IN OUR VIEW

Needed: traffic relief

■ Tourism is great, if there's road enough for the cars. This summer's tie-ups beg solutions.

LAST winter, when the health of our local economy was suffering the same doldrums as the weather, two editorials were published in this space that issued the same message: tourism is so important to our economy that it can't be allowed to suffer half-hearted planning, half-hearted hospitality or half-hearted marketing.

This summer, tourists and residents alike have been suffering from half-hearted ...tation planning.

It doesn't ...

It's also unfair and counterproduc... blame the weather. Cape Cod isn't ... desert Southwest. We should ex... weather as often as good, and ... should be designed to accom... truth.

There will be no good r... lem that doesn't include ... and solidly-managed ... transportation. Perh... used; perhaps larg... might ... local beaches from ... can park at the mill... ed to their ...

Time to rethink the traffic flow

Francis I. Broadhurst

WHEN I drive through the lovely downtown sections of Chatham and Falmouth, I sense the vitality of the business centers that seems lacking in Hyannis, which has as much or m... offer tourists and year-rour... town. Hy... municip... district. ... Why ... spect... ter? F...

...ner in Centerville where West Main Street begins. Earmarked for modern signalization are key intersections where Route 149, Old Stage Road and Phinney's Lane ... Route 28.

But shouldn't we take ... at the way traffic is h... Downtown Hyann... trict? Why not re... concept of on... do help mov... town but ... talizati... town ... T... h...

...mes traffic one way eastbound. ... Barnstable authorities ... in Street one way ... months turn... fic after ...

TRAFFIC NIGHTMARE

Yarmouthport

To the Editor:

The other day I found it necessary to drive from my home in Yarmouthport to Dennisport. Proceeding south on Union Street and Station Avenue, I managed to dodge the jumpers out of both Route 6 exits and was fourth in the left-hand turn lane at White's Path. Going from White's Path to Great Western, I finally got out at Highbank into a line stretching back to Wilbur Park from the 4-way intersection at Main Street, South Dennis. It suddenly struck me that this is what it is going to be like all the time once Home Depot comes into Yarmouth.

I realize that this is the summer season ...

■ *It's time to hear citizens' ideas about our traffic problems.*

RON MUNKACSI, who lives in Falmouth, called last week to talk about the traffic on Cape Cod this summer. Mr. Munkacsi said he and his family moved to Falmouth from Pompton Plains, N.J., where he worked as a furniture salesman in the Macy's store in Paramus. He has the same position at Macy's in the Cod Mall. "We came here to relocate ... He ha... to retire ... tions ab...

...trances to commerc... some cars to pull out ... thus improve the flow. Another sounds esp... Munkacsi proposes th... perhaps the Cape Cod ... traffic study committee ... zens as well as experts. ... major problem areas ar... recommendations. And why not? The tra... each summer. The year... growing. Citizen input ...

Weld orders survey of Sagamore Rotary traffic

■ *The administration has made an overhaul of the troublesome interchange a priority, a senior state official says.*

IULIA ST. GEORGE
EWRITER

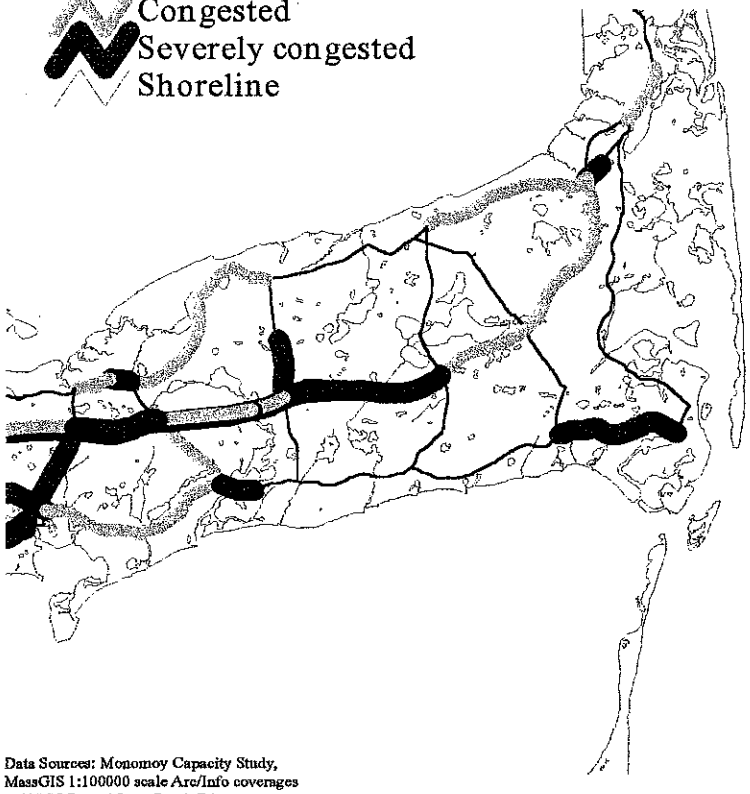
AMORE – While the Sagamore Rotary has many motorists' lists of "things to avoid" over s, it is being put on a new list – one for fixing. ...an overpass connecting Route 3 with the Saga... ...ore Bridge is being considered a priority by Gov. William Weld, said Kevin J. Sullivan, a deputy com... missioner with the Massachusetts Highway Department.

During a news conference inside the state highway garage near the rotary yesterday afternoon, Sullivan said the proposed "flyover" will be made part of the state's transportation improvement pro... and in a sign that things are ...

Left unchecked, current trends of land use and auto use have disturbing implications

SUMMER TRAFFIC IN THE MONOMOY REGION 1990

Not congested
Congested
Severely congested
Shoreline



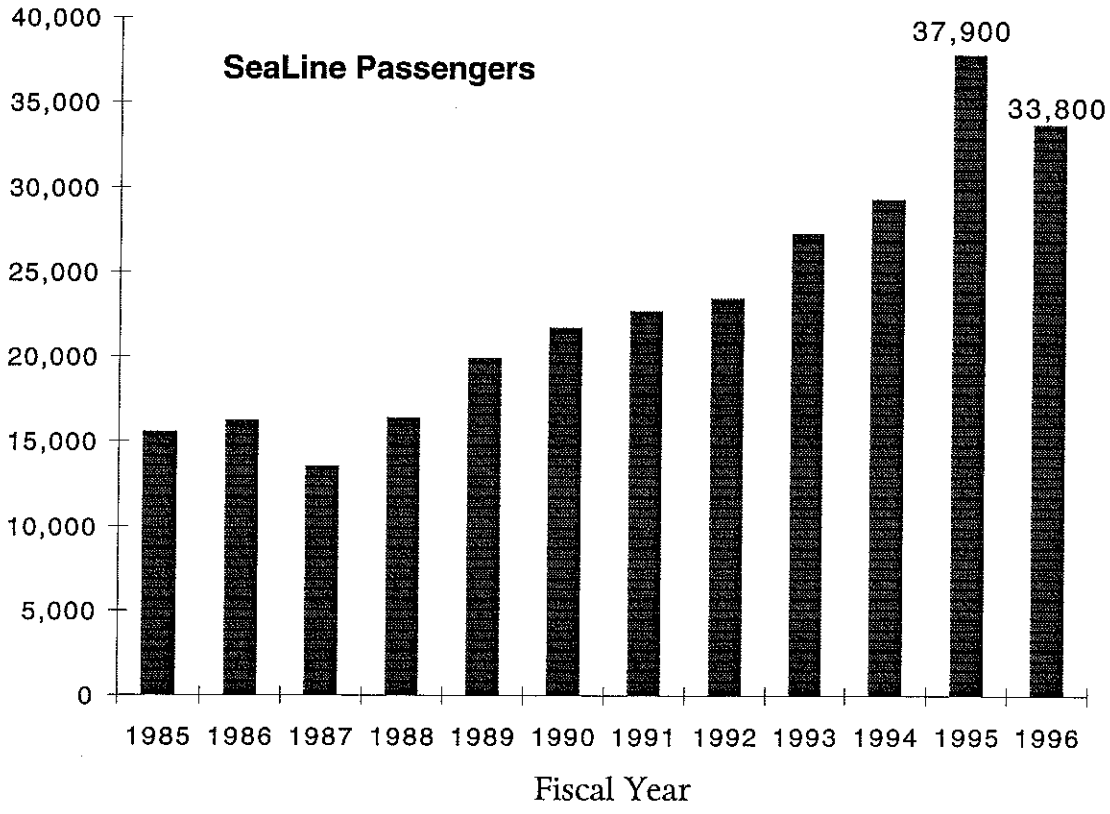
SUMMER TRAFFIC IN THE MONOMOY REGION 2005

Data Sources: Monomoy Capacity Study,
MassGIS 1:100000 scale Arc/Info coverages
of USGS Digital Line Graph Files,
output from regional model in TModel 2 software.

More alternatives to the automobile are being created

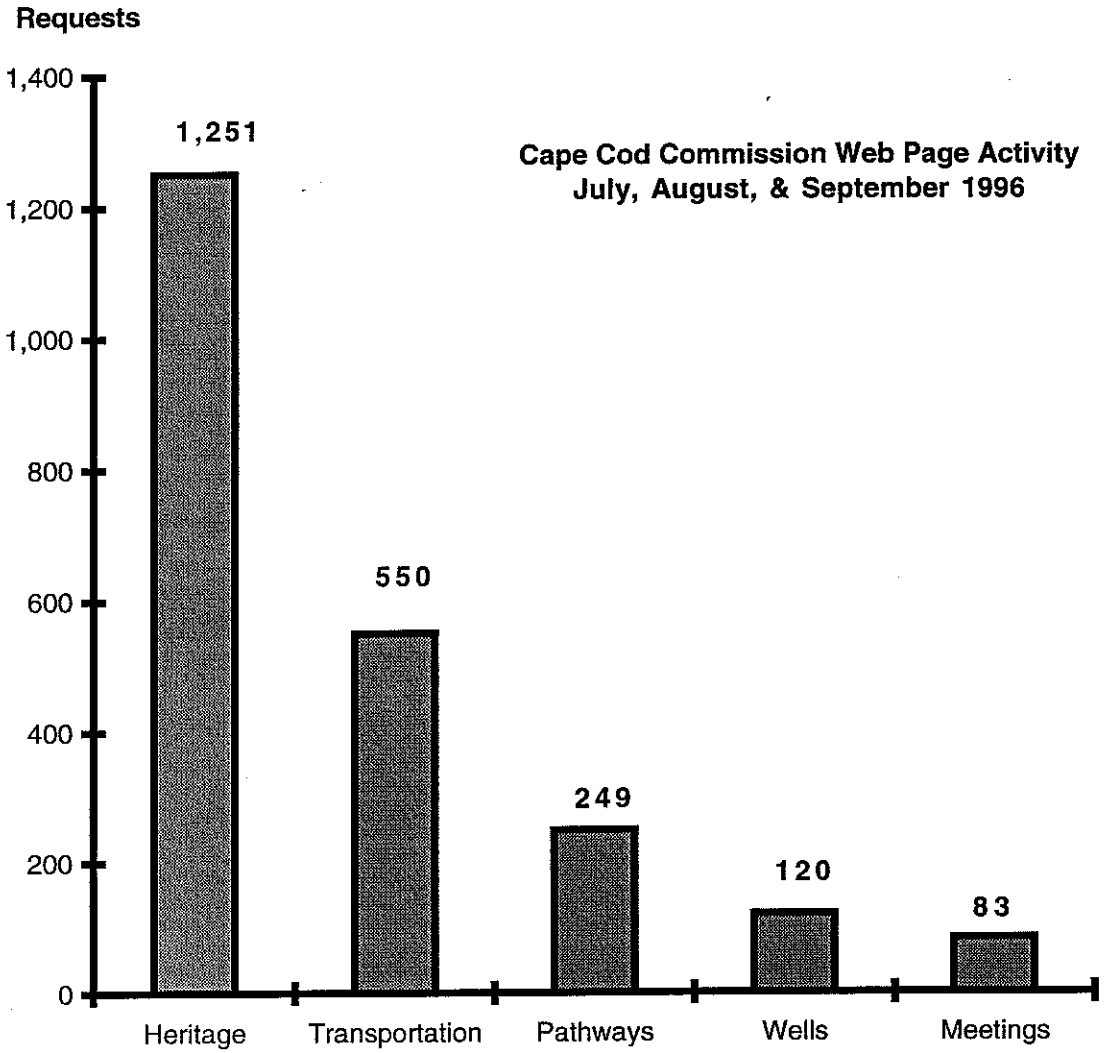
Trolley Service subsidized by the Cape Cod Regional Transit Authority
Summer 1996 (some run all year)

Alternatives may be helping to reduce traffic congestion



Source - Cape Cod Regional Transit Authority

Transportation information is available in more ways than ever



Cape Cod Commission Web Page Activity
July, August, & September 1996

Cape Cod Transportation Information
is available on the World Wide Web:

www.vsa.cape.com/~cccom

Transportation planning on Cape Cod involves many agencies with their own responsibilities...

UNITED STATES DEPARTMENT OF TRANSPORTATION • FEDERAL HIGHWAY ADMINISTRATION • FEDERAL TRANSIT ADMINISTRATION • MASSACHUSETTS EXECUTIVE OFFICE OF TRANSPORTATION AND CONSTRUCTION • MASSACHUSETTS HIGHWAY DEPARTMENT • MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS • MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL MANAGEMENT • EOTC BUREAU OF TRANSPORTATION PLANNING AND DEVELOPMENT • MHD DISTRICT 5 • BARNSTABLE COUNTY ASSEMBLY OF DELEGATES • BARNSTABLE COUNTY BOARD OF COMMISSIONERS • CAPE COD COMMISSION • CAPE COD REGIONAL TRANSIT AUTHORITY • TOWN OF BARNSTABLE • TOWN OF FALMOUTH • TOWN OF YARMOUTH • TOWN OF BOURNE • TOWN OF SANDWICH • TOWN OF DENNIS • TOWN OF HARWICH • TOWN OF BREWSTER • TOWN OF MASHPEE • TOWN OF CHATHAM • TOWN OF ORLEANS • TOWN OF EASTHAM • TOWN OF PROVINCETOWN • TOWN OF WELLFLEET • TOWN OF TRURO

...not to mention elected executives and legislatures, town boards, public interest groups, a variety of transportation providers and - the public

REGIONAL TRANSPORTATION PLAN

PUBLIC MEETING NOTES

Monday, March 3rd 7:00 pm., Barnstable Town Hall, Hyannis, MA

Attendees (partial list)

Rebecca Perry, Centerville
Bob Mumford, Cape Cod Commission
Jeff Levine, Cape Cod Commission
Lev Malakhoff, Cape Cod Commission
Rick Mission, Office of Sen. Therese Murray, Plymouth
David M. Luce, EOTC/MHD
Virginia Anderson, Buzzards Bay
Christopher Lovelock, Eastham
William Dalton, MHD District 5
Francis Worrell, Yarmouthport
Margo Russell, WQRC
Sue Walker, APCC
Hamilton J. Whiting, Buzzards Bay
Ernest Duquet, Yarmouthport
Joseph J. Sorenti, Sagamore
Virginia Stack, East Sandwich
Jane Eshbaugh, Barnstable Town Council
Rep Ruth Provost (Plymouth)
Susan Rohrbach, Centerville
Roy Richardson, Barnstable Town Council
Marilyn Fifield, Barnstable
Rep. Thomas Cahir, Bourne

Comments by Elected Officials

Rep. Tom Cahir

1. A proactive plan is needed
2. We are at the most critical juncture in the history of the state for transportation funding
3. ISTEA reauthorization is likely to decrease funding for transportation in Massachusetts
4. There is a bond cap of $900 million a year in Massachusetts
5. We need to do projects that are "real" eg. Sagamore Rotary
6. A new bridge over the Canal is not "real"
7. Southside Connector is not feasible although it is a good idea; an alternative will be discussed in the next few months
8. Traffic is dangerous on the Scenic Highway; limiting curb cuts is important. Town of Bourne and state have just purchased land near the Scenic Park to prevent three lots from being developed.
9. Changeable lanes are not a good idea at the approaches to the Sagamore Rotary
10. Supports passenger rail to Falmouth but not commuter rail
11. Bicycle/pedestrian facilities are important
12. DCPC's are a good way of controlling growth
13. Commission resources are a good tool
14. Variable message signs are good as well
15. We should look at restricting left turns especially in summer months and in congested areas

Public Comments

Christopher Lovelock, Eastham

1. The bridges should have $2 tolls going southbound with exemptions for Cape residents; this would pay for all of our transportation needs on the Cape

2. Time of day pricing is also possible to spread the peak travel
3. Toll technology is also important to eliminate the need for stopping at toll booths
4. Traveling Smarter is the most important of the goals
5. People don't know of their transportation options
6. Suggests applying for a demonstration grant for ITS this summer. Start with an advisory for traffic conditions. Realtors could help.
7. We need a forecasting model, with a real time view.

Virginia Anderson, Buzzards Bay

1. Bourne has a problem in that its fire and police are on one side of the bridges while residents are on the other. It needs easy access across the canal for emergency vehicles
2. What is the difference between flyovers, new bridges and the Southside Connector?
3. We should explore water transportation to New Bedford or Plymouth as well as within the Cape.
4. Why is the SS Connector not in the plan? It could be paid for with a toll system.
5. Do towns get funding for private toads? Why not?
6. Connecting lots between business is an important way to keep traffic off the roads.

Hamilton Whiting, Buzzards Bay

1. The only solution to the problems of Bourne is the Southside Connector.
2. There are seven rotaries on the Cape, all of which slow down traffic and provide a positive, calming effect; good "safety valves"
3. A new automobile bridge or tunnel is a bad idea.
4. Buzzards Bay is dead due to the flyover at the Bourne Bridge; don't kill the businesses at the Sagamore Rotary too.
5. Are new roads going to increase the population of the Cape? No. It is in a military base.
6. Water problems in the military reservation are in other parts than where the Southside Connector would be, so they are not an issue.
7. Glad to see MacArthur Boulevard in the plan.
8. Doesn't want to see Bourne become an "asphalt town"
9. Traffic congestion on Cape Cod is nothing new.
10. The Southside Connector will work, rotary repairs will not.

Francis Worrell, Yarmouthport

1. Generally very impressed with the plan; important to note that traffic demands are *insatiable* (eg. Turnpike extension and Inner Belt in Boston)
2. Bourne and Sagamore Rotaries need safety improvements but not ones that increase their capacity.
3. Sidewalks are not mentioned until page 48; should be mentioned earlier; more important than that. They allow people to walk to meet needs rather than drive.
4. Should provide for more local convenience stores through zoning so walking trips are more feasible.
5. Traffic impacts of development is important; we should think about levying a traffic tax based on the amount of traffic a property generates, rather than a real estate tax based on property values.

Susan Walker, APCC

1. Likes the five goals, it is important that transportation needs be consistent with the character of the Cape
2. Would like to see a more extensive section on environmental concerns and issues, perhaps a "philosophy" or "narrative" of what is needed.
3. Notes that the respondents to the residents survey were willing to limit growth and create alternatives to the car: "less asphalt and more innovation."
4. Supports deleting the Southside Connector and the Third Bridge.
5. The Environmental Impact Report for the Southside Connector is outdated
6. Northern part of the Military Reservation, where the Connector would go, is needed for the water supply of the Cape in the future, so it is important not to damage water quality there.

7. Concerned about the environmental impacts of Exit 6 1/2, as well as the impacts to the neighborhood and open space. What are the implications for the future?
8. Signs should be limited on the Cape; too much can be confusing.

Susan Rohrbach, Centerville
1. The goals are good.
2. Route 28 in Centerville appears to have been ignored in the plan. Mitigation is limited to bikeways and transit. She is worried that it is either being ignored or given up on.
3. Exit 6 1/2 and Attucks Way worry her as well.
4. Likes the idea of using money to purchase land along roads to prevent overdevelopment.
5. Citizens are interested in what happens to roads around them.

Virginia Stack, East Sandwich
1. Route 6A belongs to East Sandwich, although compromise is part of the picture.
2. Route 6A should accommodate bikes
3. Sidewalks are important too.
4. Don't generally want to have wider roads.
5. Signs at appropriate times (such as variable signs) are important
6. Many tourists don't come to drive, they come to "be" somewhere.

Roy Richardson, Centerville
1. Important to limit dependence on the automobile
2. Personal Rapid Transit is a good potential tool.
3. We need to preserve the beauty that we have.
4. Sidestreets are often used instead of main roads because they are crowded; his side street has 500-700 cars an hour at busy times.
5. Route 28 in Yarmouth is actually a four lane road with Buck Island Rd. serving as lanes 3&4.

Joseph J. Sorenti, Sagamore
1. Why is it all right to use a sewer line running from Otis to the Canal and not a Southside Connector?
2. MacArthur Boulevard: either use the land taken for the additional two lanes or return it to the owners.
3. The Sagamore Rotary is not all that dangerous; of the six most dangerous places in the Town of Bourne that is not one of them.
4. The Bournedale Road light area: it took three years to get the state to paint lines on that road.

Rebecca Perry, Centerville
1. It is good to have a vision of the future, but who oversees it?
2. Mass Highway does not oversee it. The towns don't oversee it.
3. Why won't Mass Highway do things the way the region wants?

William Dalton, Mass Highway District 5
1. If a road is going to be bicycle-accessible, it often needs to be wider.
2. Sidewalks need to be ADA-conforming, it is the law.
3. On Rt 28 in Centerville, Barnstable and the neighborhood disagreed about what should be done and the state agreed with Barnstable.

Ernest Duquette, Yarmouthport
1. Transportation systems are part of a community, not separate.
2. How does the plan fit in with other planning efforts (eg. the LCP and the RPP).
3. Slow down! Safety and character are important.
4. How do we maintain the transportation part of a system?
5. Let's enjoy what we are here for.
6. Emphasize goal #1.

CAPE COD JOINT TRANSPORTATION COMMITTEE

Transportation Advisory Group for the Cape Cod Metropolitan Planning Organization

c/o Cape Cod Commission
P.O. Box 226
Barnstable, Massachusetts 02630

•••••

Telephone: (508) 362-3828
Facsimile: (508) 362-3136
Internet: trans@cape.com
World Wide Web address: http://www.vsa.cape.com/~cccom

excerpt of Minutes - Friday, February 14, 1997

Regional Transportation Plan (RTP) for Cape Cod Comments from CCJTC members and the public include:

1 Cost used in RTP#1012 does not correspond to TIP figure. Consensus was to use RTP figure of $7.5 million.

2 Bill Livingston, Orleans, expressed concern over extensions of the Cape Cod Rail Trail (RTP#1015), when existing trail is in need of maintenance. Mr. Malakhoff responded that improvement to the existing trail is recognized in RTP#1014. A planned bicycle path along the service road in Sandwich was discussed.

3 Greg Taylor, Mashpee, noted that the scoring system used for ranking projects is still subjective. Mr. Malakhoff responded that projects needed to be prioritized using some method and that suggestions to change the current system were welcome. Neil Andres, Bourne, suggested that the link need to be made more strongly between the management systems and the projects chosen. Mr. Malakhoff responded that the management systems data available was incorporated into the analysis, and that data from the pavement management system would be incorporated when the system becomes operational.

4 Greg Taylor commented that Multimodal Advisory Task Force (MAT Force) work should be incorporated into the plan. Mr. Malakhoff noted that no recommendations have come out of the MATForce yet but that the concepts raised by the Task Force were mentioned in the plan.

5 Bob Schernig asked why Exit 6 1/2 is not included in the list of recommended projects. Mr. Malakhoff said that the project (RTP# 1003) is being considered, and that the feasibility study underway would need to be completed before it could be determined that the new interchange is compatible with the goals of the plan. Mr. Schernig replied that if the Exit could not be included in the plan without more study, the plan would be unbalanced it bike paths were listed in the plan that had not been studied yet (e.g., RTP #1032, 1033, 1034).

6 Bill Dalton noted that the MacArthur Boulevard (Rt. 28) Major Investment Study (RTP# 1006) was probably a waste of time since there is unlikely to be any major work done on that road in the next 20 years. He did note, however, that some safety improvements were in the works.

7 Bill Dalton expressed concern over the recommendation to reconfigure Exit 1 (RTP #1008) since it would involve cutting off a whole section of the Cape from the Sagamore Bridge during peak summer hours. Bob Mumford noted that, although the plan did mention closing the westbound on-ramp it was possible that it could simply be redesigned to prevent two lanes of traffic from entering the mainline at the same time.

8 Neil Andres commented that the Upper Cape section did not mention the need to make roadways in the area safe for bicycles and did not talk about the current conditions of the roads.

9 The relationship between the Local Comprehensive Plans' transportation sections and the long range plan was questioned. Mr. Malakhoff noted that the LCPs tended to concentrate on issues within a town while the RTP focuses on the regional roadways.

10 Bob Parady discussed the "Southside Connector" (RTP# 1004) and an additional bridge over the canal. He acknowledged that both projects were unlikely to occur in the next 20 years due to the reluctance of the Army Corps of Engineers to build an additional bridge and the cost of the Southside Connector. David Luce, EOTC, mentioned that the plan needed to be fiscally constrained and that these projects were both outside the likely fiscal constraints of the next 20 years. He did not that these projects could be part of a vision for the region, however.

Public Meeting Summary of Comments

+ = support
- = opposition
c = comment
? = concern

Sandwich 10/7/96:

++	Sagamore Rotary fly-over
+++	commuter & visitor rail to Falmouth, connections to Woods Hole
--	commuter & visitor rail to Sagamore & Hyannis
c	fly-over could help connect Park & Ride to woods hole for weekend day-trippers
?	Traffic backups on 6A in Sagamore
?	after fixing Sag. Rotary where does traffic go?
++	intermodal freight facility in Otis
?	costs of rail expansion ($30 M to Buzzards Bay)
?	rail to Wood's Hole would eliminate bike path
?	rail - $8,700/year cost, $48 K start up cost - per passenger
-	rail, impacts to bus service
-	automobile problems
+	develop alternatives, bikeway network for economic reasons
c	1.5 M people take bike vacations - opportunity for Cape to promote tourism
c	highway standards should protect environment and accommodate bikes
+	alternative standard (10' & 2' shoulder) where necessary
c	MBTA is accommodating commuters w/bikes
c	Rt 28 through Yarmouth into Dennis is good accommodation 3 lanes wide, 2 lanes marked. Rt 6A does not have room
+	4' shoulder on Rt 28 Mashpee to Old Stage Rd in Centerville
c	need to accommodate bikes, need to make exception for Rt 6A, widening would be a determent to character.
cc	CCC is passive on issue of Rt 6A, needs to work w/MHD
c	Sandwich proposal does not include widening except at intersections (including signalization) - re-striping for 2+10+10+2 (w/1' for striping)
c	MAC does not necessarily advocate widening, just accommodation
+	fog line striping be consistent distance from centerline, not edge of pavement
c	edge lines may have contributed to 2 fatalities on Rt 28 in Mashpee, people with poor vision follow fog lines
c	Rt 6A corridor management plan has addressed issue of scenic character
-	bicyclists on Rt 6A a problem
+	bicyclist on Rt 6A need education
+	"share the road" signage, for Rt 6A as a whole
+	bikes on shuttles to cross the canal

Public Meeting Summary of Comments

+ = support
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+	relocate sidewalk on canal bridges to cantilever on the side - wide enough for bikes, w/fencing. This allows wider travel lanes for vehicles
-	south side connector's cost may be prohibitive, environmental issues
+	new northbound lanes for MacArthur Blvd
c	making it easier to commute will create Sandwich-like problems in communities further east
c	learn to live within our own limits
--	Rt 28 in Centerville is a nightmare
-	"big box" stores will attract additional traffic, beyond our capability to handle
-	exit 6 1/2 is in a sensitive area
+	"shrink" zones elsewhere if Hyannis is going to add Mall & roads
+	3 lanes for Rt 28 Centerville (TWLTL)
-	trucks block traffic making deliveries (e.g., Hyannis Main St)
+	create truck loading zones, manage hours of delivery
+	change zoning bylaws Cape-wide to control "big boxes"
c	CCC should back up local authorities when threatened with law suits
+	work with Regional tourist councils to provide information on alternatives to visitors

Eastham 10/8/96

c	public transit needs to be improved on the lower Cape to reduce traffic and allow for mobility of elderly and other non-driving population
c	"land-based myopia" is a problem: need to look at air and water-based transportation solutions or else we are "sentenced to our geography"
+	Air/water service is a good opportunity for lower Cape: could alleviate road pressures and provide teeth to the "Intermodal" concept
?	Need to work more with the FAA and airport commissions in the area
?	Orleans trolley was not well used perhaps because it was not properly "launched"
c	Orleans is a hub-and-spoke town, needs smaller trolleys that go more places, perhaps like a minivan.
+	"Reasonable commuter service" (by bus) to the Barnstable Park and Ride and/or CCCC needed, current service is not enough and is not commuter oriented
+	"Convenient, clever, attractive" alternatives to driving from Hyannis needed

Public Meeting Summary of Comments

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for Outer Cape.

c Route 6 is already too wide in lower Cape.

c If people can't get where they want, they should move

+ Rail Trail should continued to Provincetown although the right-of-ways are not there in Truro anymore.

c Need an alternative to bikes on Route 6, not a good route for them

+ Ferry service along the Bay side from Plymouth to Sandwich to Dennis to Orleans to Wellfleet to Provincetown is a good idea.

+ Freight traffic to Provincetown is worth studying

+ Solid waste could be transferred to train in Yarmouth from town landfills all over the Cape, take trucks off roads.

c National Seashore needs a more complex solution than simply putting all its visitors onto trains and buses. Need to look at economic impacts of changing transportation modes of those people visiting SS. The Cape Cod Commission should look at alternatives that take people to the towns as well as the seashore.

- National Seashore's General Management Plan has bad effects on Provincetown Airport

c Problem with current water service is that it is excursion-only. Operators are not willing to run more service since they use their boats for other things as well.

c Cost is an issue; boat service needs to be less than 10 cents a mile (for miles of driving it avoids) to be used, since that is the cost of driving a family of four around.

c Isolation of lower Cape is a big issue to consider; it is more like the Islands than the rest of the Cape. Need transportation solutions that factor this in.

Dennis 10/10/96:

+++ full cloverleaf needed at Exit 9, Route 6 and Route 134

--- Signals will not help at exit ramps from Route 6 onto Route 134

-- state is still looking at traffic lights for exit 9 ramps but the public is opposed!

---- Route 6 should not be double-barreled from Dennis to Orleans; it would help for awhile and then cause more cars to come; Rt 6 would fill up and bring more cars to town roads

++ need a connected system for bicyclists, come up with a plan and promote it

Public Meeting Summary of Comments

+ = support
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c = comment
? = concern

--	abandoning the rail from east of Union St/Station Ave in Yarmouth to the existing rail trail in Dennis is not a good idea as the railroad is still being used for lumber to the Mid-Cape Center
c	demands of the auto are insatiable; we should consider not building any more roads
++	need new collection points especially in the Lower/Outer Cape [Park & Ride lots]
c	live in Dennis and am a regular commuter on Caravan from the Sagamore lot; it is wonderful
+	need ridesharing system on Cape
+	need more marketing for alternatives on Cape like Caravan
c	In Vineyard Haven the employers give incentives for employees to park out of town
+	need employers to give incentives for employees to park remotely and save from congestion on approach roads and parking spaces downtown
c	most of us are reluctant to give up our [car] keys and use alternatives
+	transit; % of retirees who may have to give up their keys and the older people will need rides
+	maybe the Mall which is planning to double will pay for a shuttle system to get people to and from there for shopping
++	need remote parking lots developed to help alleviate congestion on roadways into downtown areas or to make connections like to the ferries
-	cannot afford to waste money on empty buses, bus which stops along Rt 6A only had about six people, Orleans shuttle was empty
+	Yarmouth summer shuttle was successful
c	need to revise routes, try to find where people want or need to go to devise a transit route system that will be used
c	are the main mode and we need to change that to have another mode; for example in Bermuda the only cars are taxis. Otherwise you walk, use a bicycle or moped to get around Bermuda.
?	If increased ferries, where would they go?
c	ferries could be added to service Provincetown, Sesuit Harbor in Dennis, Barnstable Harbor and possibly Sandwich
++	would like to see a year round ferry service from Barnstable Harbor to Boston for commuters; about 30 people have said that they would use it
-	lacking connections when visitors arrive by ferry from Plymouth or Boston
++	need more intermodal connections, regional nodes so visitor can hopscotch

Public Meeting Summary of Comments

+ = support
- = opposition
c = comment
? = concern

	between destinations
++++	need intermodal center planned for Hyannis, why so long to construct?
++	need neighborhood businesses so people do not have to travel so far for errands
+-	6A shuttle
++	pass system for the local bus services so people could hop on and off and connect with other services
c	service is available for errands; it is the b-bus anyone can ride by arranging 24 hours in advance; my son takes it to and from school daily
c	agree that it is good to have but the b-bus is 24 hours advance notice; what if you run out of milk? With a car it is a split second decision to go get more milk; that is the advantage of the car and there is not a grocery store from Orleans to Provincetown, you need to shop in Orleans
+	might help to connect b-bus with fixed routes
c	with the current budget situation and downsizing in funding assistance from federal & state, need to have more efficient services
c	on the trolleys the wheelchair lifts are dangerous and only one person in a wheelchair can go on the trolley at a time; what if 2 people are out together both in wheelchairs?
--	do not widen roads! Why is widening the only solution for Route 28 in Centerville? and why is the CCC supporting widening there? It is better to have remote lots and make the places where people live more livable
c	Zoning problem, must make connections between plazas so one does not have to drive out on the roadway to connect
-	No exit between 6 & 7, "exit 6 1/2" all other roads in the area will then need to be widened, don't do it
-	blocking Mary Dunn Road to make exit 6 1/2 is not a good idea
-	exit 6 1/2 will not help, it will only bring more cars to a congested area
c	no more discussion of exit 6 1/2, already talking for 20-30 years, make a decision!
++	need more "hubs", beyond Hyannis
--	don't allow the ferries to take cars, just passengers
++	many say that traffic is a problem, the real problem is ZONING. The general public needs to be educated on the land use impacts for zoning changes to be made
+	cost of not providing a transit system compared with cost of having the system should be figured and publicized

Public Meeting Summary of Comments

+ = support
- = opposition
c = comment
? = concern

c	look at other resort areas for ideas and examples to improve the Cape transportation system
c	Newport, RI, has a shuttle system which will take you to the mansions & everywhere once you are there
c	went to regional transit committee meeting and tried to speak and they said talk to your town representative
+++	need bike path completed from Race Lane to Route 28 in Centerville, what happened?
c	live near the Setucket Road bike path in Dennis and the bicyclists are not using it, pedestrians are using it and the bicyclists are in the road. Many of the bicyclists in the road are traveling the wrong way, against traffic, it is dangerous
-	dangerous to have bikes on 6A; they should not come to look at the scenery there, should go elsewhere
+	should have bike registration and ticket those who disobey traffic laws
c	most bicyclists do obey the traffic laws, just like motorists there are a few who do not follow the rules
+	need more sidewalks for people to walk to the beach, school, & other places

Town of Barnstable
Planning Department
230 South Street, Hyannis, Massachusetts 02601
(508) 790-6290 Fax (508) 790-6288

March 13, 1997

Robert Parady, Chairman
Cape Cod Joint Transportation Committee
Cape Cod Regional Transit Authority
3225 Main street
Barnstable, MA 02630-0226

Dear Bob;

The co-signers of this letter serve as the Vice Chairman on the Cape Cod Joint Transportation Committee (JTC) and a member of the Cape Cod Regional Transit Authority (CCRTA) Advisory Board. We have the opportunity and the obligation to advise these two agencies and the Metropolitan Planning Organization (MPO) on the appropriateness of the proposed Draft Regional Transportation Plan (RTP) for Cape Cod. While the RTP is a major accomplishment in summarizing "the Cape Cod MPO's blueprint for transportation in Barnstable County into the next millennium", it is not without fault in some areas that are critical to the provision of a safe and efficient transportation system consistent with the needs of Cape Cod.

Therefore, the following additions or changes to the draft document are recommend for consideration by both the JTC and the CCRTA in their review and approval of this planning document.

1. There needs to be a requirement for consistency between the Regional Policy Plan (RPP) and the RTP.

Section 2.4 does state that the RPP "recognizes the Cape as a fragile and beautiful place", and has "...broad goals which set the direction for future and more detailed policies...". However, the RPP is also a regulatory document with specific Minimum Performance Standards (MPS) for DRI mitigation by private sector development activities and public sector capital facilities, as set forth in the Local Comprehensive Plans (LCP) of all 15 municipalities on the Cape. It is strongly recommended that a Goal of consistency with the RPP, with appropriate policies and strategies be added to the RTP and that this is clearly stated in the Executive Summary. This single action, in addition to the Transportation Improvement Program (TIP), can ensure consistent implementation of the RTP.

2. There needs to be vigorous support for Activity/Growth Centers that have been developed through the Cape Cod Commission workshops and each town's LCP.

The ability to direct growth into compact areas served by the necessary infrastructure is critical the efficiency of the land use pattern and the character of Cape Cod. Section 4.3 does address the interrelationship between land use and transportation, and Policy

4.3.1 recognizes Activity Centers. But there are no strategies that support of the infrastructure needs of Activity Centers. To this end, the RTP should recognize that the existing roadway network and the private automobile is now, and will be in the foreseeable future, the dominant mode of transportation on Cape Cod. The RPP encourages growth/activity centers, the RTP should encourage a transportation system that supports them.

3. EXIT 6 1/2 needs to be included in Table ES-1, Summary of Recommended Projects and in Table 6 of the Main text, and all components of the BYTS should be included the RTP in support of the needs for the Mid-Cape area.

Section 1.4.2 on the Barnstable Yarmouth Transportation Study (BYTS) makes no mention of the Major Investment Study that analyzed all feasible alternatives to reduce congestion and improve air quality in the Mid-Cape area. This work was focused on the need for Exit 6 1/2 and the development of a computer model to analyze future roadway impacts based on land use and transportation activities. The findings and recommendations of this study provided an integration of all modes of transportation into a long-range transportation plan for the towns of Barnstable and Yarmouth. This oversight needs to be corrected in light of the $10 million State Bond Bill specifically allocated to exit 6 1/2 and the current feasibility study being coordinated with the MPO by F. R. Harris. Many of the BYTS recommendations are already included in the TIP, but full implementation is a long-range effort that needs to be supported in the RTP.

4. The Sagamore Rotary project needs to be included in Table ES-1, Summary of Recommended Projects and in Table 6 of the Main Text .

This is a long needed improvement project to improve access to and from the Cape, currently funded by a State Bond Bill. This situation is similar to recommendation 3, above and should not be ignored.

5. A Cape Cod Scenic Roads Standard needs to be included.

Many of the proposed projects in the RTP and in the TIP are on scenic roads, or in order to be consistent with the RPP, need to be given waivers from the Federal paving standard to maintain community character. Section 2.4.2. Scenic and Historic Concerns makes no mention of this issue. Intergovernmental coordination and inclusion in the MPO work plan is recommended.

Sincerely,

Robert P. Schernig, AICP
Planning Director
CCRTA Advisory Board Member

Robert A Burgmann, P. E.
Town Engineer
Vice Chairman, CCJTC

cc: James Tinsley, Acting Town Manager

Received 3/3/97

IT MAY BE A TRIP, BUT IT'S NO JOKE

Comment on the 1997 Regional Transportation Plan

by Alix Ritchie
Provincetown Representative, Cape Cod Commission

Once again, Cape Cod is in the process of developing a so-called "transportation" plan. And, once again, it is driven by pedestrian land-based myopia which doesn't seem to have a clue that part of the answer to projected congestion is to move around-- not through-- it. Once again, what seems to be a mid-Cape stranglehold on the process drives it along a one-way street to congestive failure, ignoring the fact that traditional "hub-and-spoke" transportation planning just doesn't work on this narrow peninsula we call Cape Cod.

Indeed, transportation may very well rival water as a major defining issue on the Cape in the coming decade. We will only begin to address the issue intelligently if we understand that transportation does not mean cars, nor roads. It means moving goods and people from point A to point B as efficiently, as effectively, as safely, and even as pleasantly, as possible. It means managing resources wisely to that end. And, it means thinking outside the box. On Cape Cod--this fragile ribbon of narrow land--it means looking beyond asphalt-based solutions to deal with anticipated and potentially alarming growth.

Here we are, surrounded by water, the most ancient of transportation systems, yet it seems to be a case of 'water, water everywhere' and not a thought to link it with on-Cape transportation solutions. Why should cars have to cross congested bridges to get to island ferries? Why should day-trippers, weekenders and others headed for the Outer Cape have to cross the bridges or add to the traffic on the Mid and Upper Cape? (The plan does mention the idea of an auto ferry, which is interesting and could provide long-term freight alternatives; but wouldn't a park-and-ride linked to a high-speed passenger ferry be more immediately feasible?) Why not, finally, weekend and commuter ferry service between the Outer Cape and Boston? (Astonishingly, the plan maps this out only for Barnstable, not Provincetown, not both.)

The plan forecasts a 250% increase in congestion on Outer Cape roads but relies on land-based solutions such as trolleys and bicycles, rather than water and air. To those who think the solution is to add a third bridge, I'd suggest they look at a map. Unless we plan to use the MWRA Outfall as a return trip tunnel to Boston, the result will be flashing "lots full" signs at the entrance to all three bridges.

Because the plan has to pass through the toll booth set up by the road guys at the Mass. Highway Department before it reaches the federal government, it provides a quick glance but no real vision of effective public transportation alternatives--especially for the Outer Cape. In the latest rendition of 'you can't get there from here,' it mentions commuter service as critical but ignores the fact that there is no viable bus service for those who wish to commute between Provincetown and Boston or for students who need to commute to the community college. (There is service from Orleans, but how do our many residents who don't have cars get there?) And, how 'bout weekender bus service? These are not idle concerns; they carry serious economic consequences. Year-round economic survival needs more than a yellow light.

And, there is a serious safety issue that is acknowledged but not addressed in the plan. The safety hazard brought about by the indiscriminate granting of curb cuts has had deadly consequences, particularly on the Truro-Eastham section of Route 6. We need more than bandaid solutions to these cuts, and we need them before more blood is shed.

Finally--with apologies to some, but with warning signs to those 'let's have more roads and bridges' types--"Don't 28 the Cape." The answer is not paving Cape Cod. The 85 percent of Cape Codders who said they want to see alternative modes of transportation deserve an answer. People come here to be by the sea, not on a sea of asphalt. Further, not only would we strangle the goose that lays the golden egg, we would pave the way to a worse future. We don't need to end up with equally congested, less safe, uglier, six-lane roads going nowhere fast and making most people want to make a U-turn right off the Cape.

The plan says, "decisions are about to be made for Cape Cod, a national treasure, that will make a difference." It's a worthy destination, but many of the signs on the path this plan proposes just will not get us there. Not in any way most of us would want to travel. Especially for those of us on the Outer Cape, we need a vision that is better than a look in the rear view mirror.

INTEROFFICE MEMORANDUM

COPY

TO: Daniel Beagan, Director
B.T.P.D.

THROUGH: Thomas F. Broderick III, P.E.
Chief Engineer

FROM: Bernard McCourt
District Highway Director

DATE: December 23, 1996

SUBJECT: Regional Transportation Plan That Includes the Regional Policy Plan

The Cape Cod Commission's draft document "Cape Cod 1977 Regional Transportation Plan" prepared by the Cape Cod Commission Transportation Staff states on page 58, a Policy Preamble, "It is the policy of the Regional Transportation Plan that transportation solutions be consistent with the Barnstable County Ordinance 96-8, otherwise known as the Cape Cod Commission Regional Policy Plan.

The "Cape Cod Commission Regional Policy Plan" is a 115 page document that fails to recognize the importance of the highway system and attempts to control land use by discouraging simple and efficient highway inmprovements.

The policy plan refers to technical bulletins such as 96-001 "Designing The Future To Honor The Past, Design Guidelines For Cape Cod." This is an 85 page document where widening for bicycles and widening for safety is discouraged. Minor widening for bicycles and other users should be encouraged as should intersection improvements and other structural changes that increase safety and capacity at low cost.

The District strongly recommends that the Regional Transportation Plan not be subject to any other document in a Policy Preamble where the importance of the highway system and the automobile is not recognized.

WHD:pf
cc:BEM
MVC

The Commonwealth of Massachusetts
HOUSE OF REPRESENTATIVES
STATE HOUSE, BOSTON 02133-1054

THOMAS S. CAHIR
3RD BARNSTABLE DISTRICT
STATE HOUSE, ROOM 445
TEL. (617) 722-2460

Chairman
Committee on Transportation

October 7, 1996

Robert Mumford, Transportation Program Manager
Cape Cod Commission
3225 Main Street
Post Office Box 226
Barnstable, MA 02630

Dear Mr. Mumford and Members of the Commission:

I apologize for being unable to attend this evening's hearing, but my attendance was required at another meeting in the district. However, I do have some comments that I would like to share with the Commission regarding the Long Range Transportation Plan for Cape Cod.

As Chairman of the Transportation Committee, it is my responsibility to ensure that the state has enough funding to meet our transportation needs. There are 351 cities and towns in the Commonwealth all vying for limited state and federal funds. However, as a State Representative from the Cape, I recognize that southeastern Massachusetts has been underserved by the state's transportation plans. This inequity is beginning to be addressed by such measures as the resurrection of the Old Colony Line and the completion of the HOV lane. Still, there are two projects of particular interest to me that I feel will greatly enhance transportation to the Cape, and on the Cape.

First, the Sagamore Rotary. On June 26th of this year, the Massachusetts Highway Department voted to award a consulting contract to Rizzo Associates "for the study of alternatives for the rehabilitation of the Sagamore Rotary." The contract was for $495,000. At the end of September, Stanley Wood was named the Project Manager for the rotary. This project is progressing and must continue to do so. The Sagamore Rotary project has been embraced by the Governor, the Secretary of EOTC, and citizens across the state. This has been my legislative priority throughout me tenure and will remain my priority until it is completed.

Second, rail service to Falmouth. The MBTA recently completed the Bourne Commuter Rail Feasibility Study. This study examines the possibility of establishing typical commuter service to the Cape which would travel to Boston via the

Middleborough Branch of the Old Colony Line. The MBTA approached this study with very limited vision, and failed to recognize what would be the most innovative and effective use of rail to the Cape. That is, a commuter service that doesn't focus on your typical commuter, rather a service that focuses more on the summer and weekend visitor to the Cape. The way to achieve this is to establish passenger service to Falmouth that concentrates on mid-day and weekend service. This is an efficient use of equipment that would otherwise be sitting idle during the day. By implementing a coordinated system with the MBTA's train service and the Steamship Authority's maritime service to the Islands, the Cape will not only be able to address the massive traffic problems in Falmouth, but would also be able to attract more visitors who have been reluctant to come to the Cape because of our traffic woes. While there can still be limited commuter service during peak commuting times, the focus should be on the non-traditional commuter.

I am currently developing a detailed plan to establish this rail service and will be submitting the plan to the MBTA within the next three months. This rail project is exciting and sensible, and I am looking forward to working with the Commission, the MBTA, and the residents of the Cape to bring about this passenger service.

Again, I apologize for being unable to attend this evening's hearing. Your attention to the transportation needs of the Cape is greatly appreciated, and I thank you for accepting my comments.

Sincerely yours,

Thomas S. Cahir, Chairman
Committee on Transportation
State Representative

TSC/sr

Lower/Outer Cape
Community Coalition

BL Hathaway, *Coalition Coordinator*

Statement
Long Range Transportation Plan

October 7, 1996
Mary Lou Petitt
Consultant
Lower/Outer Cape Community Coalition

The Lower/Outer Cape Community Coalition has been active in the field of public transportation for over eight years. During that period we have held countless public meetings and workshops; have published and distributed two Lower Cape transportation guides; led the effort to secure Small Cities funding for a Lower Cape Medical Transportation program; and, most recently, coordinated the proposal for a technical assistance grant to Community Transportation Association of America. We were one of five grants awarded in the country and are presently working with the consulting firm, Multisystems, Inc. of Cambridge, to develop a coordinated system of public, private and volunteer transportation for the Lower Cape. This program will also focus on the economic development aspects of transportation which, we feel, are a key component of an effective public transportation system.

Our Transportation Steering Committee represents public, private and volunteer transportation organizations including the Regional Transit Authority, Plymouth and Brockton Railway Company, The American Cancer Society, Cape Cod Hospital, Chamber of Commerce, Representative Shirley Gomes, and consumer representation. These groups represent those involved in transportation services on the Lower Cape - the most rural, isolated and least serviced part of Cape Cod. Based on our experiences, there are several suggestions the Coalition would like to make concerning Long Range Transportation Planning for Cape Cod:

!. It is imperative to include the economic development aspects of transportation in a long-range plan. This means ~~both~~ improving the access by public transportation to employment centers and educational facilities. Those individuals who are economically disadvantaged, disabled, have revoked licenses, are at particular risk for transportation. Also, an expanded, coordinated public transportation system can open up employment opportunities within its own system, provide access to jobs and training, enhance retail, medical, recreational, etc. economic growth.

2. Our growing elderly population - particularly evident on the Lower Cape - has specific transportation needs. The need for public transportation which is easily accessible, not time consuming, has amenities such as sheltered stops, clear, simple and accessible scheduling information, and the most effective routing is obvious. Our retiree population, and our growth in the 85 and over

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EMail: coalition@c4.net
Mail: P.O. Box 797, Eastham, MA 02642
508-255-2163, Fax: 508-255-4928

age group, that means a focus on public transportation from that perspective is critical. Larger road signs which are easier to read, specialized car and van service for those who can no longer drive (a job-growth possibility) are examples of what kinds of planning will be needed. Creative and innovative ways to deal with this are needed, and a long range plan should address the differing demographics and the needs they represent.

3. The need for a coordinated approach among the private and the public providers, levels of government, human service agencies, schools, hospital and medical centers, employment and retail stores etc. has never been more important. More attention needs to be given to this section in a Long Range Plan. The state agencies - Elder Affairs, Economic Development, Tourism, Children, Department of Education - all need to work with us on this coordination - as do our county levels of government. The plan developed for the Lower Cape, with our Technical Assistance Grant, could serve as a model - and there are other examples in the country.

4. All the best planning for public transportation fail if it is not used. Accessibility, affordability, flexibility, user ~~frequency~~ friendly, are all components which need to be pursued. However, without a positive marketing approach this could fail. A Long Range Plan must include a plan for marketing public transportation - all aspects of it - to all segments of the Cape's population. It will insure that any new systems or coordinated systems are used, and it will reduce the number of cars on the road. It's not going to be easy, so it requires our best efforts.

5. The Long Range Transportation Plan, the Regional Policy Plan, and the Local Comprehensive Plans should reflect an integrated, coordinated transportation plan for Cape Cod.

TOWN OF YARMOUTH

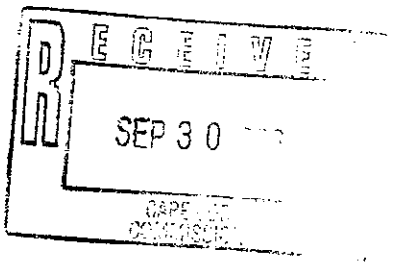
1146 ROUTE 28 SOUTH YARMOUTH MASSACHUSETTS 02664-4492
Telephone (508) 398-2231, Ext. 271, 270 — Fax (508) 398-2365

BOARD OF SELECTMEN

TOWN ADMINISTRATOR
Robert C. Lawton, Jr.

September 26, 1996

Mr. Robert Mumford
Transportation Program Manager
Cape Cod Commission
3225 Main Street
Barnstable, Ma. 02630



Re: Transportation Program

Dear Mr. Mumford:

The Board of Selectmen noted in the "Reporter" Volume 6, #19 dated September 5, 1996, that the Cape Cod Commission was in the process of updating the Long Range Transportation Plan and wished to have comments regarding possible projects and roadway improvements.

The Board of Selectmen is concerned with certain improvements which have in the past been proposed at exit 7 off of the Mid Cape Highway - Route 6. In the past draft plans have been presented to create 1,000 car parking lots, north or south of Route 6 on Willow Street in the Town of Yarmouth. The Board of Selectmen has in the past and continue now to oppose the creation of any park and ride lot in the Town of Yarmouth at exit 7. Such park and ride lots would have a detrimental effect on groundwater in the area as both parking lots are within the zone of contribution for wells within the Town of Yarmouth and the Town of Barnstable. During preliminary discussions regarding the proposed park and ride lots, residents in the area, specifically the Yarmouth Camp Grounds, were also very much opposed to the creation of such facilities as they would adversely affect their properties and change the character of this area of our community.

Please record the Board of Selectmen as opposing any park and ride lots at the exit 7 inter change in the Town of Yarmouth. The Selectmen appreciates the opportunity to comment on the long range plan and the Board as a whole or individual board members may have additional comments concerning other projects at your public hearing on October 10th at the Dennis Senior Center.

Respectfully,

Robert C. Lawton, Jr.
Town Administrator

jd
cc: Board of Selectmen

The Town of Barnstable

Office of Town Manager

367 Main Street, Hyannis MA 02601

Office: 508-790-6205
Fax: 508-790-6226

Warren J. Rutherford
Town Manager

September 11, 1996

Cape Cod Commission
Attn: Lev A. Malakhoff, Senior Transportation Engineer
3225 Main Street
PO Box 226
Barnstable, MA 02630

RE: Response to request for input on the Long Range Transportation Plan

Dear Mr. Malakhoff:

Cape Cod is literally at a cross road. We need to provide a realistic Transportation Improvement Program that responds to existing deficiencies and the future needs identified by the Towns. If we neglect this responsibility then the Long Range Transportation Plan (LRTP) will only provide general policies that that are not backed with the resources necessary to make the needed improvements.

Over the last few years the Towns and the County have developed a Regional Policy Plan (RPP)and a set of Local Comprehensive Plans (LCP). These documents play a critical role in the link between transportation, environment, community character and land use. While the towns are required to have a Capital Improvement Plan (CIP) which identifies basics transportation needs and sources of funding, that are consistent with long range land use plans, the RPP does not make such an identification. Since the RPP does not offer a program of projects and priorities to meet the long range transportation needs of Cape Cod, the towns' Local Comprehensive Plans should be consulted for input into the LRTP. The towns of Barnstable and Yarmouth created the Barnstable-Yarmouth Transportation Study (BYTS) as an integral part of our LCP work.

The BYTS work has addressed the transportation problems of the Mid-Cape area and produced a set of recommended projects necessary to mitigate existing problems and provide for the future growth projected in the Barnstable LCP. The BYTS work should be recognized in the LRTP and generally adopted by reference. The specific sections of the study address the following issues:

1. Public Transportation Ridership and Service Provided
2. Existing Traffic Volumes
3. Accident Analysis
4. Level of Service Analysis
5. Public Participation / Private Sector Input
6. Development of a Transportation Model for Existing and Future Conditions

As a result of the Study , specific recommendations were made in the following areas:

1. BYTS Goals

2. Short Range TDM / TSM Plan
3. Short Range Roadway Plan
4. Short Range Parking Plan
5. Short Range Transit Plan
6. Long Range Parking Plan
7. Future Baseline / Major Investment Analysis
8. Exit 6 1/2 Feasibility Study
9. Intermodal Link Feasibility Study
10. Intermodal Transportation Center Facility Planning and Access Study
11. Overall Roadway Plan

As a result of the short and long range transportation planning accomplished by the BYTS work, and the incorporation of the findings into our LCP, the Town of Barnstable recommends that the following priority projects be included specifically in the LRTP:

1. Attucks Lane Extension
2. CCRTA Intermodal Transportation Facility
3. Route 132 widening (parkway design)
4. Enterprise Road Extension
5. Center Street / Old Colony Road / Ocean Street / South Street, Hyannis redesign
6. Hyannis Walkway to the Sea
7. Rt 28 widening (W. Main Street to Yarmouth)
8. Barnstable Airport Parking Facilities
9. Continuation and expansion of the Hyannis Shuttle / Villager service
10. Downtown Hyannis Parking Facilities (North St. / Town Hall)
11. Exit 6 1/2 off the Mid Cape Highway
12. Satellite Parking Facilities (Rt 132)
13. Attucks Airport Extension
14. Intersection Improvements (signalization / geometry)
15. Pedestrian / Bikeway improvements

We thank you for the opportunity to offer this input into the update of the LRTP and recommend that a section be dedicated to listing the sources of funding that may be used to implement the recommended projects. Without this link to the needed resources for implementation, the LRTP will not be a practical tool for the MPO, County or Towns of Cape Cod.

Sincerely,

Warren J. Rutherford
Town Manager

cc: Robert Schernig, Planning Director
Thomas Mullen, DPW Superintendent
Robert Burgmann

TOWN OF YARMOUTH

DEPARTMENT OF PUBLIC WORKS

1146 ROUTE 28 SOUTH YARMOUTH MASSACHUSETTS 02664-4451

Telephone (508) 398-2231, Ext. 290 — Fax (508) 760-4830

Engineering
Highway
Parks & Cemeteries
Transfer Station
Waste Management
Water

August 22, 1996

Cape Cod Commission
3225 Main Street
Barnstable, MA 02630

AUG 26 1996

Attn: Lev A. Malakhoff, Sr. Transportation Engineer

Re: Long Range Transportation Plan

Dear Mr. Malakhoff:

In response to your letter to Robert C. Lawton, Jr. dated August 12, 1996 regarding the above captioned, the Town of Yarmouth would like to maintain the current list of roadways for the Town of Yarmouth and add the following issues of local and regional concern:

1) Traffic Signal improvements tied in to the Intermodel Center along Route 28 in Yarmouth coupled with an intelligent transportation system to direct traffic away from congested areas. Improvements to Route 28 in Yarmouth should address severe ADA deficiencies of sidewalks adjacent to Route 28 in Yarmouth.

2) Safety improvements and signalization at Exit 7.

3) Bicycle access to and from the Intermodel Center in Barnstable to accommodate the Rail Trail extension through Yarmouth from its current terminus in Dennis.

4) Insure that all transportation improvements to utilize traffic calming measures where speed control is required and consider pedestrians and bicyclists in the designs. Work with MHD to stop requiring clear zones which encourages increased speed.

5) Rehabilitate sidewalk areas along Route 6A which are currently the Town's responsibility to maintain and repair.

Very truly yours,

George R. Allaire, P.E.
Director, DPW

bb
xc: R. C. Lawton, Jr.

TOWN OF BOURNE

24 Perry Avenue
Buzzards Bay, Massachusetts 02532

Scenic Highway/Sagamore Rotary Task Force

March 3, 1995

Mr. Armando Carbonell
Executive Director
Cape Cod Commission
Post Office Box 226
Barnstable, MA 02630

Re: Bourne South Side Connector

Dear Mr. Carbonell

At the last meeting of the town of Bourne's Scenic Highway/Sagamore Rotary Task Force we discussed our concerns for safety on the roadways and the need to explore options. We also reviewed the comments we provided to the Cape Cod Commission, coincidentally exactly a year ago, on the Long Range Transportation plan. We appreciate the Commission's inclusion of some of our suggestions into The Plan.

One of the comments we provided was the construction of the South Side Connector. We understand that to update the original project plans would be an ambitious undertaking, the project nonetheless, deserves consideration.

For your convenience, I've enclosed a full copy of the comments we submitted last year. We look forward to working with the Cape Cod Commission on these and other projects.

Sincerely,

John L. Greene
Chairman

cc: Rep. Thomas S. Cahir
Rep. Charles N. Decas
Senator Therese Murray

TOWN OF BOURNE

24 Perry Avenue
Buzzards Bay, Massachusetts 02532

March 4, 1994

Mr. Armando Carbonell
Executive Director
Cape Cod Commission
Post Office Box 226
Barnstable, MA 02630

Dear Mr. Carbonell;

Enclosed, please find our comments on the Long Range Transportation Plan for Cape Cod. These comments were passed by unanimously voted by the Scenic Highway/Sagamore Rotary Task Force at its meeting on March 4, 1994.

We hope you find these comments useful and we look forward to working with your staff in the future.

Sincerely,

John L. Greene
Chairman

cc: Governor William F. Weld
Secretary James Kerasiotes
Senator Therese Murray
Senator Henri S. Rauschenbach
Representative Thomas S. Cahir
Representative John C. Klimm
Representative Charles N. Decas
Board of Selectmen, Town of Bourne
Bourne Planning Board

Comments To The

Cape Cod Commission

on the

Preliminary Report

for

"A 2020 Vision"

Long Range Transportation Plan For Cape Cod

By

Town Of Bourne
Scenic Highway / Sagamore Rotary Task Force

March 4, 1994

****

Thank you for the opportunity to offer our comments on the Long Range Transportation Plan for Cape Cod, Preliminary Report. The town of Bourne is unique among the other cape towns in that all of the ground transportation must pass through it en route to all other destinations on Cape Cod. Therefore, some of our comments may extend beyond the boundaries of the town of Bourne.

The Scenic highway / Sagamore Rotary Task Force was established by Executive Order in June of 1993. As one of our charges we are "to review alternative solutions to traffic and safety problems proposed by federal, state, regional, local or other governmental agencies" To that end each of our members has reviewed the Preliminary Report and we have solicited the input of our Fire and Police Chiefs. We have consolidated our comments into what we hope is a useful and concise statement.

At the outset there are a couple of technical questions that should be addressed:

1. Does the long range plan take into consideration the workers that commute off cape and off cape residents that commute on cape?

   Figure 4.1 on page 35 would indicate that more people bicycle/walk to work than ride public transportation. We know that thousands of people use public transportation to commute to Boston twice daily. A review of the text on, page 34 of the Preliminary Report, volume I, explains figure 4.1 as "the travel patterns of workers in Barnstable County." This would seem to indicate that non Barnstable County workers have not been considered. If true a substantial segment of our transportation experience has not been accounted for in the report.

2. In Volume III, table C.1 through table C.6, there is no mention of the Sagamore Rotary. Also the Bourne Rotary is referenced in two different geographical locations, (neither is in Sagamore). Table C.4 references Route 6 at Bourne Rotary and table C.5 references the Bourne Rotary at Route 25 ramps and Trowbridge Street, different sides of the canal.

Now for more specific comments;

South Side Connector

The construction of a South-Side Connector from the Bourne Rotary to Route 6 is long overdue, especially since the land necessary is already in public ownership. Having a limited access corridor to route 6 for travelers and freight movement from the west and south without using the local roadways makes sound safety, transportation and environmental sense. While we recognize that the South Side Connector would be a major investment, the benefits would derived would justify the expense. Absent the construction of the South Side Connector improvements to Sandwich Road should be considered.

Route 28 / MacArthur Boulevard

Coupled with the South Side Connector, the plan to improve MacArthur Boulevard should be implemented as well. Like the South Side connector, all the land necessary is already in the public domain to add a new north bound lane. This would provide for a limited access highway for freight movement, motorists and transit vehicles to and from Falmouth and the port of Woods Hole. The existing south bound lane would serve the growing commercial activity along the boulevard.

Sagamore Bridge

As repeatedly mention in the Preliminary report, reported in the general media, and recently recognized by Governor Weld, the Sagamore Rotary is the single most important priority for not only the Town of Bourne but the citizens of the entire Commonwealth. The Town of Bourne has given this a top priority by establishing the task force submitting this report. While this issue has received wide attention, it is of particular importance to Bourne. As a task force we plan to become pro actively involved in an advisory capacity to insure that the local issues of our business and residential community will be addressed in the planned improvements to the approach to and over the Sagamore Rotary.

North Side Connector

Somewhat similar to the South Side Connector, but intended to serve a different objective would be a connection between Route 25 and Route 3 on the north side of the canal. The Scenic Highway will not be able to accommodate the traffic demands of the subdivision plans already approved for the acreage between canal and the Bourne/Plymouth line. The internal roadways within the subdivisions could have direct access to Route 3 on the east and Route 25/495 on the west. The Scenic Highway could then become the scenic roadway serving the residential and tourism activities that it is best suited to it. The scenic vistas along the canal, the campground and rest areas overlooking the Cape Cod Canal are assets that should be made safer and more more accessible to the public for passive recreation.

Intermodal Transportation Center

The proposed Intermodal Transportation Center in Hyannis needs to be expedited. The strategy to connect the Intermodal center to Route 6 (Exit 6 1/2) via a High-Occupancy-Vehicle, HOV, lane has merit. This HOV lane could also be used to bring freight traffic to the Hyannis business district and the Steamship dock. We do not support a transportation center at the Massachusetts Military Reservation. The success of mass transit is predicated on swift service to destinations. A transfer station near the already congested canal area would run counter to good transit planning.

Marine Transportation

We have not capitalized on a very under utilized resource, the deep water access that the Cape Cod Canal offers. Both freight and passenger service could be instituted from Scussett Beach and/or Taylor's Point. Given the pressure for additional steamship parking at both Hyannis and Woods Hole, a Bourne alternative as we suggest, would reduce the number of vehicles on the Cape roadways. The overall travel time to the Islands would be competitive with existing methods and would be a more pleasing and a very marketable mode.

Tolls

We would urge you to reject any consideration for tolls on either of the bridges. The citizens of Bourne use these bridges throughout the day in their daily activities. Most of the land mass is south of the canal while Town Hall, Police and Fire Headquarters are on the north side. Tolls would not only present an undue financial burden, but it would further slow traffic at a time when we need to reduce the traffic that already exists. We would rather see treatments that would expedite traffic flow and improve public safety.

Mass Transportation

Throughout the Preliminary Report much has been said about the need for increased public transportation. We need to create incentives to encourage, acceptance of, and loyalty to, alternate modes of transportation and high occupancy vehicles. To accomplish this we need to alleviate the conditions that create the congestion in the areas that span the Cape Cod Canal. Passenger facilities need to be upgraded and ancillary services to travelers need to be provided for. The report recognizes that the "overall roadway network on Cape Cod is suffering from two major problems; congestion and safety". Mass transit to and from Cape Cod utilizing the best elements that all modes, bus, rail and HOVs have to offer, coupled with a feeder/distributor system would be the most important element in protecting our quality of life.

Massachusetts Military Reservation

As mentioned earlier, we do not support the idea of the locating an intermodal transportation center on the Massachusetts Military Reservation. However, we do believe that it can play a useful role in our transportation infrastructure. The public use of the existing roadway network would offer an east-west corridor that would alleviate the congestion along Route 151 and Route 28.

Bicycles

As an alternate mode of transportation bicycles need to be given more serious consideration. Bicycles offer a clean and inexpensive means of travel. A network of bike routes along main roads throughout the town of Bourne connecting with adjacent towns is probably the most cost effective and environmental friendly transit strategies available.

More Immediate Safety Concerns

Reduced Speed to 40 mph on The Scenic Highway.

Traffic light on Scenic highway at Bourne Campground / Nightingale Pond Road.

On ramp from the Scenic Highway, westbound, to Route 25, northbound to relieve traffic at Belmont Circle.

Thank you for your your time and interest, we remain,

Sincerely,

The Scenic Highway / Sagamore Rotary Task Force
John L. Greene, Chairman
George Jackson, Vice Chairman
Virginia Anderson, Clerk
Ronald Anderson
Ronald Haley
John Harris
William Holden
David McCoy
Joseph Sorenti
Oliver Watka
Hamilton Whiting

Chief Of Police
John A. Ford, Jr.

Chief of Fire/Rescue & Emergency Services
Steven C. Philbrick

TOWN OF BOURNE

24 Perry Avenue
Buzzards Bay, Massachusetts 02532

December 28, 1993

Lev A. Malakhoff,
Senior Transportation Engineer
Cape Cod Commission
3225 Main Street
Post Office Box 226
Barnstable, MA 02630

Re: Long Range Transportation Plan for Cape Cod Preliminary Report

Dear Mr. Malakhoff,

The Town of Bourne has established, by Executive Order, the Scenic Highway/Sagamore Rotary Task Force. I have attached a copy of the executive order for your information. As one of our charges we are "to review alternative solutions to traffic and safety problems proposed by federal, state, regional, local or other governmental agencies."

The Cape Cod Commission has published it's Preliminary Report for the Long Range Transportation Plan for Cape Cod and I'm sure realizes that all transportation must pass through the Town of Bourne to and from the Cape.

Therefore, we are requesting a copy of the above captioned report be provided to each member of the Task Force. If you would kindly forward nine (9) copies, without charge, to us at Bourne Town Hall we would be greatly appreciative.

Sincerely,

John L. Greene
Chairman

432 Main Street
Centerville, MA 02632
March 13, 2997

Mr. Robert L. Mumford
Transportation Program Manager
Cape Cod Commission
P.O. Box 226
Barnstable, MA 02630

Subject: Comments on 1997 Draft Regional Transportation Plan

Dear Bob:

I hope that I remember correctly that you were accepting comments until March 15. I was impressed with many of the concepts in the plan and how they responded to concerns expressed by the citizens of Cape Cod.

However, I have concerns about practice in Barnstable, as I stated in my remarks at the hearing, both in terms of how planned road projects like Route 28, Attucks Way, and Exit 6 1/2 meet the goals expressed in your plan, and about the planning process itself. As you know, the Centerville Civic Association's Route 28 Committee spent a great deal of time and effort trying to work with local, county, and state officials on the replanting of the trees along the road and on the design of the road. We were successful in getting the trees replanted (although now it seems that we may have precluded a sidewalk by doing so), but definitely not nearly as successful in having community concerns integrated into the design of the road.

I think that one of the major problems we faced and which we would like to change, was one of process. Because of the lack of an agreed upon strategy for involving meaningful citizen input early as well as the lack of communication between the various parties, our group went away not only feeling unhappy about the design of the road, but feeling pretty disgusted about the process. A better process, I think, would have produced more agreement over the final results in this situation. There are positive examples of the kind of process I refer to, such as the discussions which resulted in the agreement not to widen Route 6 on the Lower Cape.

Therefore, I'd like to suggest that you put a process goal in the plan, which would provide for both ways of involving affected parties before a project is designed and for resolving disputes between various parties (remember, the CCC legislation "encourages all parties to engage in available dispute resolution mechanisms"). Developing such a

process could be a goal for 1997, and the results could filter down to the towns as well. Despite good intentions, we certainly need help in this area in Barnstable.

I would be very interested in working further on this idea, and I think that some of the other members of our committee in Centerville would also.

Sincerely yours,

Susan H. Rohrbach

Susan H. Rohrbach

Date: 13 March 1997

To: Cape Cod Commission
3225 Main Street
P. O. Box 226
Barnstable, MA 02630

Telephone: (508) 362-3828
Fax: (508) 362-3136

From: Karen A. Wilson
12 Curtis Street, Apartment 2
Falmouth, MA 02540

Telephone: (508) 540-4129
Fax: (508) 540-4129

Number of Pages: 4

12 Curtis Street, Apartment 2
Falmouth, MA 02540
13 March 1997

Cape Cod Commission
3225 Main Street
P. O. Box 226
Barnstable, MA 02630

To Whom It May Concern:

I would like to submit the following comments on the *Cape Cod 1997 Regional Transportation Plan Draft Report:*

1) Editorial and report distribution issues:

Several of the figures included in the report lacked descriptive titles. This made the figures difficult to interpret, even if a discussion of the data was included in the text. For example, in Figure 2.7, the legend includes a line representing "1972 Peak Monthly Average Daily Traffic". The meaning and purpose of presenting these data are unclear.

Numerous quotes are found throughout the Plan and reference to the Intermodal Surface Transportation Efficiency Act of 1991 is made, yet no citations are included in the document. Citations are needed to support the credibility of the statements and references.

Appendices to the report were not available in the Falmouth Public Library. Lack of availability of the Appendices made it difficult for readers to refer to supporting documents.

2) Bicycle travel:

Bicycle travel is offered as a possible alternative mode of transportation. However, time constraints and lack of showering facilities at the rider's destination may make this mode of transportation impractical for transporting riders to work and to many other types of destinations. Additional analyses of bicycle travel may be needed to determine if bicycle facilities would replace auto or other traffic or if use of these facilities would be primarily recreational in nature.

3) Potential impacts of the proposed projects on the residents of Cape Cod, Martha's Vineyard, and Nantucket:

Several of the proposed projects, such as the Rte 132 Boulevard project, are contrary to the wishes Cape Cod residents that oppose widening of roads and intersections and who prefer to reduce the amount of new traffic to the Cape rather than to accommodate it (section 1.2.1). The Plan does not discuss why these projects were proposed in spite of the results of the 1995 Cape

Cod Residents Survey, nor why the potential benefits of these projects outweigh the desires of the residents to minimize new construction and avoid expansion of existing facilities.

The Plan notes that ferry traffic to Martha's Vineyard and Nantucket is expected to increase substantially, yet there is no discussion of whether these small islands can accommodate the increase without sacrificing quality of life or diminishing scenic, historic, and natural resource values. Such analyses should occur before implementing transportation projects that may lead to overcrowding of destination facilities.

Several proposed funding sources, such as betterment districts, impact fees, and a county gas tax would result in Cape residents shouldering the majority of the financial burden for those proposed projects whose primary function is to accommodate the influx of seasonal visitors. A funding mechanism that requires visitors to assume an appropriate proportion of the costs of transportation developments, such as a hotel room tax, should be considered for funding of these projects. In addition, the Plan proposes to scale impact fees higher for "undesirable" development and lower for "desirable" development. The terms "desirable" and "undesirable" are subjective and may unfairly penalize some proponents. An objective system of assessing impact fees is needed.

4) Cost-benefits analyses and potential impacts of the proposed projects on the Cape's unique natural resources:

The report notes that the Plan seeks to protect habitat of endangered species of global significance and to make decisions based on balanced transportation solutions that explicitly address impacts on land use and the environment. Yet Figure 2.5 shows only a composite of natural resources and the scale of this figure is such that the proximity and relationship of the proposed projects to sensitive resources cannot be discerned. In addition, the Plan makes only the most cursory attempt to evaluate compatibility of the proposed projects with the Cape's historic, scenic, and natural resources and does not propose any specific projects or actions that would mitigate impacts to these resources. Although the Plan does propose acquisition of land, the report does not note what criteria will be used to determine which parcels of land will be purchased, who will own and manage the lands purchased, or for what purpose the land will be managed. Finally, the rationale for excluding Camp Edwards and Otis Air National Guard Base (section 2.3.1), which contain valuable open space, from the analysis of land use patterns is not explained.

The Goal Compatibility Analysis Criteria do not provide an adequate analysis of the costs and benefits of the proposed projects. Assignment of values to those criteria that are the results of the regional transportation model are not adequately explained. Several criteria, such as "systems management", appear to be subjective, and there is no verbal description of the benefits represented by the different numerical values assigned to these criteria. In addition, there is no mention of the assignment of negative values to the "environment" criteria, although many of the proposed projects will negatively impact the natural environment at some level. For example, the Rte 28 Boulevard Improvements will likely result in reduction of habitat because existing development west of the road may not accommodate the planned alterations and because the area east of the road is largely forested and undeveloped. In addition, the Bourne-Falmouth Bike Path,

as represented on a map in the Falmouth Public Library, will run through a coastal plain pond; if moved to the opposite side of Rte 28, the path would likely impact rare species habitat as indicated on the 1997-1998 Massachusetts Natural Heritage Atlas. Lack of an objective rating system and lack of detailed information prevent any meaningful analysis of the costs and benefits of the proposed projects at this stage of the planning process.

The Plan does not address nor take advantage of opportunities for transportation-related facilities, such as "park and rides", to be located west of the Cape Cod Canal or in off-Cape communities. Such communities might welcome this type of development within existing heavily developed areas of their towns. Use of off-Cape sites for one or more of the proposed projects could reduce congestion on the Bourne and Sagamore Bridges, provide economic benefits to off-Cape communities, and reduce development pressure on unique habitats, open space, and scenic and historical resources by allowing facilities to be constructed on previously impacted sites. To ignore such opportunities in favor of altering undeveloped areas, whether on or off-Cape, is not in the best interest of the community or of the natural environment.

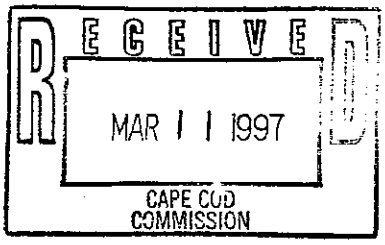
At this point in time I am unable to support or oppose any of the proposed projects because of the lack of detail in the Draft Report. I encourage members of the Cape Cod Commission to include more detailed information in future reports so that readers may make informed decisions about the future of Cape Cod's transportation system.

Sincerely,

Karen A. Wilson

COPY

March 10, 1997



Robert L. Mumford
Transportation Program Manager
Cape Cod Commission
P.O. Box 226
Barnstable, MA 02630-0226

Dear Mr. Mumford,

Cape Cod continues to be developed without the necessary finances to manage this growth. Certainly this lack of finances threatens the Cape's character and charm. It also impacts on the Cape's ability to provide a reasonable living for its residents, maintain adequate public education, maintain and build adequate infrastructure, control crime, and encourage its main sources of income, i.e., tourists, retirees, and second homeowners. We desperately need to address this situation before it is too late.

Neither Federal nor State Government are the solution, as they continue to reduce their spending. Cape real estate taxes are below average for the State, but no elected government officials feel inclined to raise them due to reelection issues. The proposed land bank bill may or may not pass and even if it does, it will not raise enough money to assist with many of the above issues.

The Cape is invaded with huge numbers of visitors, especially in the summer months, who use our fragile land while enjoying their vacation time. The majority of these guests reach the Cape easily. For example an eight hour drive either south or west puts us in easy reach of Philadelphia and Rochester, New York respectively. While we appreciate their business, they do take a "toll" on our property.

A commonsense partial solution to help pay for some of the above mentioned necessities would be the installation of toll gates on the two canal bridges. Tolls are common on many highways, tunnels, and bridges in Massachusetts, New England, and other popular resort areas up and down the Eastern Seaboard. By the Cape Cod Commission's count of 120,000 bridge crossings per month in the summer and an average of 60,000 the balance of the year, we could easily raise over $1,000,000 annually at $2 per car while providing a discount for residents. Traffic flow need not be slowed under the current road structure or under new construction given the new methods of structuring toll booths, i.e., 3 to a lane, electronics, etc.

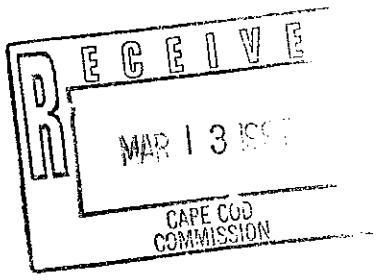
This idea will not be popular in all quarters, however it is both fair and equitable and the situation demands that some action be taken. While this is neither a new idea nor a novel one, it is an idea whose time has come.

Signed,

Brian F. Shortsleeve, Cataumet, MA

Stephen B. Lawson, Hyannisport, MA

PO BOX 447
NO FALMOUTH MA 02556-0447



MARCH 10 1997

TRANSPORTATION PLAN COMMENTS
CAPE COD COMMISSION
PO BOX 226
BARNSTABLE MA 02630-0226

DEAR CAPE COD COMMISSION,

I THINK THAT YOUR CALLING FOR PUBLIC COMMENT ON YOUR TRANSPORTATION PLAN IS THE RIGHT THING TO DO. AFTER ALL WE [THE PUBLIC] WILL BENEFIT FROM WHAT YOU DECIDE.

I HAVE INCLUDED MY REPORT ON THE ECONOMICS OF TRANSPORTATION FOR YOUR CONSIDERATION.

IN READING THE LATEST HUMOR IN THE CAPE COD TIMES, PLEASE DON'T FORGET THE SERIOUS SIDE, WE DON'T NEED A THIRD BRIDGE----WE ALREADY HAVE ONE THAT IS UNDERUTILIZED-----THE RAILROAD BRIDGE!

THANK YOU FOR THE CHANCE TO HELP THE COMMISSION IN PLANNING FOR THE FUTURE.

MOST SINCERELY

Bruce A. Simmons

BRUCE A SIMMONS

ENCLOSURES: 1

ECONOMICS
FOR
RESTORING RAIL SERVICE

RESTORING FULL RAIL SERVICE TO FALMOUTH AND HYANNIS/DENNIS IS ESSENTIAL BECAUSE THEY ARE BOTH PRIMARY ROUTES TO MARTHAS' VINEYARD AND NANTUCKET. THESE TWO TOWNS ARE ALSO THE LARGEST AND SECOND LARGEST BY POPULATION. APPROXIMATELY TWO THIRDS OF THE TRAFFIC COMING OVER THE BRIDGES IS HEADED FOR THE AREA OF THOSE TWO DESTINATIONS.

UNTIL THE MBTA GETS SERVICE TO BUZZARDS BAY, CAPE COD RAILROAD COULD RUN TO MIDDLEBORO TO PICK UP PASSENGERS FROM BOSTON [MBTA] AND FROM NEW YORK [AMTRAK] TO BRING THEM TO BUZZARDS BAY. AT BUZZARDS BAY, THEY COULD SPLIT THE TRAIN IN HALF. HALF WOULD GO TO FALMOUTH AND THE OTHER TO HYANNIS/DENNIS. THIS SOLVES TWO PROBLEMS. FIRST IT KEEPS MORE BUSES AND AUTOS OFF THE ROADS AND SOLVES PARKING LOT PROBLEMS [WE DON'T HAVE ROOM FOR MORE] FOR THE STEAMSHIP AUTHORITY SINCE "THEY" WILL BE COMING DOWN WITHOUT A CAR TO PARK.

ALSO, WHEN THE STEAMSHIP AUTHORITY BUILDS ITS NEW PARKING LOT AT OTIS ANGB, TRAINS CAN SHUTTLE PASSENGERS FROM THERE TO FALMOUTH, THUS KEEPING MORE CARS OFF OUR ALREADY OVER CROWDED ROADS.

WHEN THE MBTA TERMINUS IS EXTENDED FROM MIDDLEBORO TO BUZZARDS BAY, THEN CAPE COD RAILROAD COULD PICK THEM UP THERE FOR TRANSFER TO FALMOUTH/HYANNIS/DENNIS DESTINATIONS.

I THINK THAT WE SHOULD ALSO LOOK AT THE FACT THAT CAPE COD HAS BEEN A "BEDROOM" COMMUNITY FOR BOSTON FOR WELL OVER FIFTEEN YEARS. SOME, FOR WHAT EVER REASON, CHOOSE NOT TO BELIEVE THIS. ALL YOU HAVE TO DO IS STAND AT THE BRIDGES IN THE MORNING AND LISTEN TO THE TRAFFIC REPORTS TO SEE THIS. THE TRAFFIC SERVICE STATES THAT EIGHT TO TEN THOUSAND DAILY COMMUTE OFF CAPE.

OUR ECONOMY DOES NOT INCLUDE FULL TIME, GOOD PAYING JOBS HERE ON THE CAPE AND IN ORDER TO SUPPORT FAMILIES, MOST END UP COMMUTING OFF CAPE JUST TO SURVIVE.

THE RESTORATION OF FULL RAIL SERVICE TO CAPE COD WOULD NOT ONLY HELP THE TOURISM/COMMUTING PROBLEMS, BUT WOULD BE A BOOST TO THESE OTHER AREAS IN OUR ECONOMY:

1. BED AND BREAKFASTS
2. TAXIS
3. TROLLEYS
4. BICYCLE RENTALS
5. CAR RENTALS
6. BUSES

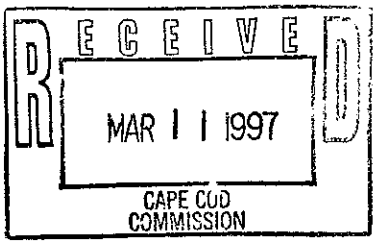
TO SUM UP, THE RESTORATION OF FULL RAIL SERVICE TO THE CAPE CAN BE OF A GREAT ECONOMIC BOOST.

RESPECTFULLY SUBMITTED BY

BRUCE A SIMMONS
PO BOX 447
NO. FALMOUTH, MA. 02556-0447
[508] 563-6157

CC: REPRESENTATIVE THOMAS S CAHIR
EOTC DENNIS COFFEY

7 Millstone Street
No. Falmouth, MA. 02556
[508] 564-5392



March 8, 1997

Transportation Plan Comments
Cape Cod Commission
P O Box 226
Barnstable, MA. 02630-0226

To the Cape Cod Commission:

In regards to your request for public comment for a regional transportation plan, I would like to submit the enclosed for your consideration.

I want to thank you for calling for public comment as we are the ones that will benefit from your request.

Sincerely,

Gerald W. Sylvia

INTER CAPE RAIL SERVICE

One of the great challenges in Cape Transportation is how do we move people around the Cape without their cars once they are here? A way that we could address this problem is with an Inter Cape Rail System. The scheduled construction of the Wye track this year will make this service possible

The beauty of this system is that people could be transported from Falmouth to Hyannis and Dennis and vice versa without use of the roads. This sets it far apart from road transportation. However, complete success of this system depends upon a coordinated connection of Trolleys, B-bus's, Jitneys etc.

Once in place, stops could be made, for example; for connections to Beaches at West Falmouth, Sandwich, West Barnstable. Also, the three largest Bike Trails: Falmouth, Cape Cod Canal and Dennis could be connected by use of this rail system.

I have attached a copy of a article of a similar service that operates in Cape May New Jersey. Cape May, as I'm sure you know, is geographically similar to Cape Cod and they also share in the same type of traffic and transportation problems. However, I believe our traffic problems are far worse.

I believe that this service could be implemented as soon as the Wye track is constructed. Also Cape Cod Railroad

currently has four self-propelled Budd RDC's that could be used.

In closing, I feel that Inter Cape Rail should take priority over bike path construction which is mainly recreational. It is absolutely essential that we concentrate on a core of mass transportation, commuter rail, passenger rail and Inter Cape rail. Then move on to what I call the peripheral modes of transportation/recreation.

Considering that $30 million dollars was spent between 1983-1986 revitalizing the rails from Middleboro to Hyannis, I think these ideas deserve more than a lukewarm response. Instead of building a third bridge, let's just remember the third bridge we already have.

Gerald W. Sylvia
7 Millstone Street
No. Falmouth, MA. 02556
[508] 564-5392

CC: Rep. Thomas S. Cahir
Dennis Coffey [EOTC]

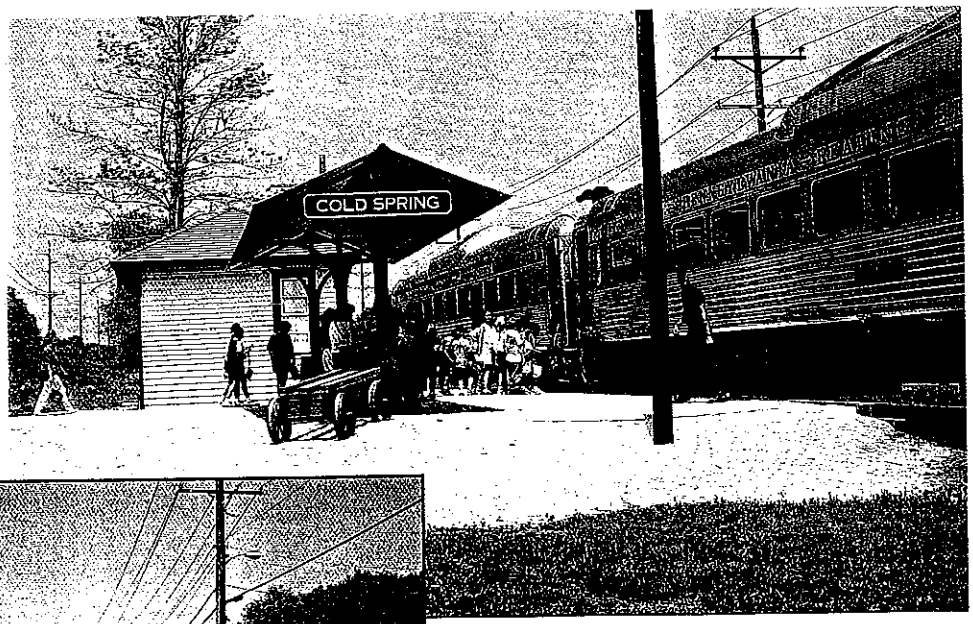
CAPE MAY SEASHORE LINES RDC is seen at the Historic Cold Spring Village station, June 15, 1996. Eight of nine surviving PRSL Budd RDCs are on the property. Kodachrome/Steve Barry

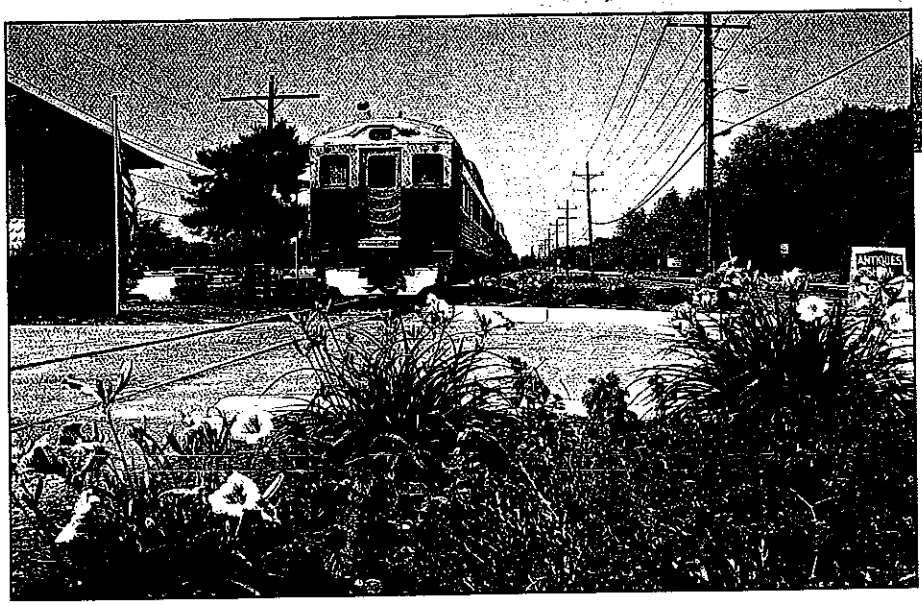
Cape May Seashore Lines Inaugurates Service

by Gerry Williams

CAPE MAY SEASHORE LINES is up and running, with four round trips being offered between a stop adjacent to the Cape May County Park and Zoo north of Cape May Court House, and Cold Spring Village, north of Cape May City. A very attractive timetable has been issued, with a traditional PRSL-style cover (see page 16). Trains leave Cold Spring Village at 11:00 a.m. and 12:30, 2:00, and 3:30 p.m. Return trips leave the County Park stop at 11:45 a.m. and 1:15, 2:45 and 4:15 p.m. Round trip fare is $7.00 for adults, $4.00 for children. Daily service will operate through September 2, with weekend service continuing through December 29. Train an ticket information can be obtained by calling (609) 884-CMSL.

CMSL trains make two intermediate stops, both in Cape May Court House. One stop is at the old





ABOVE: CMSL boarded 150 students from Middle Township Elementary School #2 at Cape May Court House each day, June 13 and 14 and took them for a four hour visit to the historic village and museum at Cold Spring. The students are seen reboarding at Cold Spring Village station. Kodachrome/Art Megraw

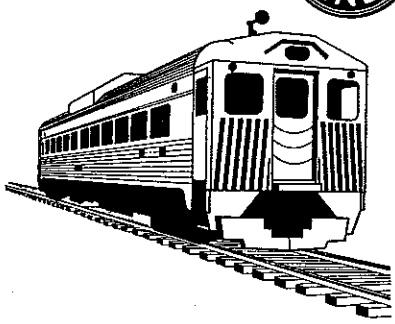
LEFT: CMSL station at Historic Cold Spring Village is the former PRSL Rio Grande depot, seen June 15, 1996. Also on the property is the one-story tower/station formerly located at Woodbine Junction. Kodachrome/Steve Barry

RAIL PAGE MAGAZINE

Train Service for the Jersey Cape

CAPE MAY
COLD SPRING
S. CAPE MAY COURT HOUSE
CAPE MAY COURT HOUSE
COUNTY PARK & ZOO
TUCKAHOE

Cape May Seashore Lines
Timetable



Ride through historic Cape May County on the trains that carried generations of travelers to the Jersey Shore.

PRSL station location at Mechanic Street; the other stop is in south Cape May Court House, off Pacific Avenue behind a school, whose parking lot can be used by train passengers on weekends. A recent weekday visit to the line found a single ex-PRSL Budd car in operation; two cars are regularly used on at least some weekend trips. A free shuttle van service is provided between County Park and Zoo station, and the actual park, about a mile away. Many passengers apparently do take advantage of the train to combine visits to the historically recreated Cold Spring Village and the excellent County Zoo.

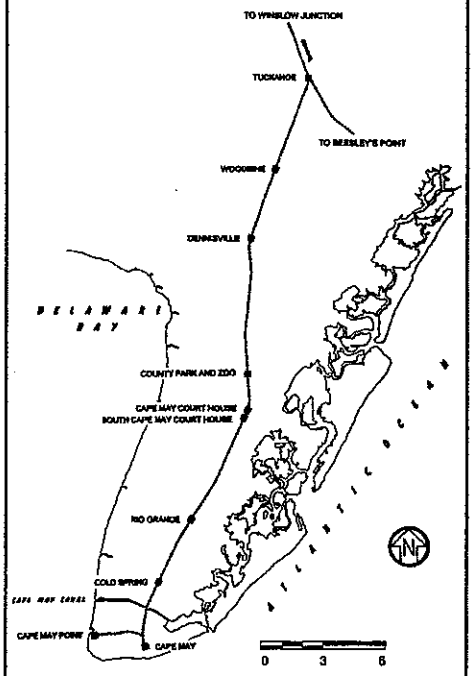
Cape May Seashore Lines expects to extend service northward to Tuckahoe by next summer, although extensive work will be needed to allow regular passenger service on the more than 13 miles of track north of Cape May Court House.

Funding is included in the NJ Transit FY97 capital budget to complete repairs to the Canal Movable Bridge, a swing span over the Cape May Canal, part of the Intercoastal Waterway, just north of Cape May. No target date is specified for completing the bridge work, although CMSL does expect to be running into Cape May City before the end of next summer.

Ultimately, CMSL plans to provide a park-and-ride service for summer visitors to Cape May, helping to relieve some of the near-gridlock traffic conditions that plague the Victorian resort on summer weekends. Visitors will have a choice of CMSL service from Tuckahoe, the Cape May Court House stops, or Cold Spring Village as an alternative to driving into Cape May.

CAPE MAY SEASHORE LINES, INC.
P.O. Box 152 • Tuckahoe, NJ 08250-0152
(609) 884-CMSL (2675)

MAP OF
CAPE MAY
SEASHORE LINES

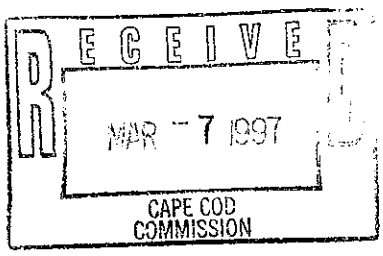


TUCKAHOE to CAPE MAY

SOUTHWARD to CAPE MAY				May 18 through December 29 SATURDAY & SUNDAY ONLY						June 25 through September 2 MONDAY thru FRIDAY ONLY					
Mile Post	Miles	Station	Train No.	301	303	305	307			301	303	305	307		
53.3	0.0	TUCKAHOE													
				AM	PM	PM	PM			AM	PM	PM	PM		
66.9	13.6	County Park & Zoo	Lv.	11.45	1.15	2.45	4.15			11.45	1.15	2.45	4.15		
68.3	1.4	Cape May Court House	"	11.50	1.20	2.50	4.20			11.50	1.20	2.50	4.20		
68.9	0.6	South Cape May Court House	"	11.54	1.24	2.54	4.24			11.54	1.24	2.54	4.24		
77.0	8.1	Cold Spring	Ar.	12.15	1.45	3.15	4.45			12.15	1.45	3.15	4.45		
				PM	PM	PM	PM			PM	PM	PM	PM		
80.0	3.0	CAPE MAY Rail Terminal													

CAPE MAY to TUCKAHOE

NORTHWARD to TUCKAHOE				May 18 through December 29 SATURDAY & SUNDAY ONLY						June 25 through September 2 MONDAY thru FRIDAY ONLY					
Mile Post	Miles	Station	Train No.	300	302	304	306			300	302	304	306		
80.0	0.0	CAPE MAY Rail Terminal													
				AM	PM	PM	PM			AM	PM	PM	PM		
77.0	3.0	Cold Spring	Lv.	11.00	12.30	2.00	3.30			11.00	12.30	2.00	3.30		
68.9	8.1	South Cape May Court House	"	11.21	12.51	2.21	3.51			11.21	12.51	2.21	3.51		
68.3	0.6	Cape May Court House	"	11.25	12.55	2.25	3.55			11.25	12.55	2.25	3.55		
66.9	1.4	County Park & Zoo	Ar.	11.30	1.00	2.30	4.00			11.30	1.00	2.30	4.00		
				AM	PM	PM	PM			AM	PM	PM	PM		
53.3	13.6	TUCKAHOE													



18 Captain Besse Road
South Yarmouth, MA 02664
March 3, 1997

Transportation Plan Commission
Cape Cod Commission
P.O. Box 226,
Barnstable, MA 02630-0226

Regional Transportation Input

I've long felt that transportation was one of the many very important needs of the Cape to be addressed. It's the one reason that we located close to doctors, the hospital, shopping and other activities, although we might have liked to live farther down cape.

I do like to see Route 6A stay as it is, but the decision is only a personal or sentimental one. It seems to be a rendition of the true Cape of long ago and a real plus to keep.

Vacation time on Route 28 is horrendous. A bus schedule on this road at that time must be impossible. Fire and ambulance equipment must meet the same peril. This also must discourage many vacationers, and retail on this route must suffer as well.

I think we should bring Route 6 into service for more than just a swifter way to get from the Cape hub to the outer Cape. There also is MUCH criticism of the tourist stops on this road.

Could we serve two needs by having really useful tourist rest stops every two, or so, exits with an appropriate place at these stops for bus passengers? Perhaps the towns near these stops could also be responsible for a commuter service to the rest stops.

This is just a basic idea, but perhaps a germ of what could be done to utilize Route 6 more. Public transportation is the key to lowering traffic congestion, and it would also be a boon to those who have the problem of being driver dependent.

Of course, any changes will necessitate much discussion and financial responsibility. I wish you much luck and hope the solution can come about with much speed and not too much stress.

IT'S REALLY A VERY IMPORTANT ISSUE.

Very truly yours,

Ruth E. McKinney

Mrs. Richard R. McKinney

Received 3/3/97

l) When are they going to start thinking about the people who live here? In particular I am referring to the residents of Bourne who are the most affected by any traffic. We are affected because our Town is split in two by the Canal. This affects us in terms of fire protection, and local access. We would to make certain there is easy access for our police, which affects our safety. We also want protection for our businesses, because this affects our tax base, which pays for the police and fire services. ALL VEHICLES HAVE TO PASS THROUGH THE TOWN OF BOURNE TO GET TO ANYWHERE ON THE CAPE. ANY EFFORT TO MAKE TRAFFIC MOVE MORE QUICKLY TO THE CAPE IS ONLY GOING TO CAUSE THE REST OF THE CAPE TO SUFFER THE SAME GRID-LOCK AS THE RESIDENTS OF THE TOWN OF BOURNE.

2) What is the difference between "flyovers", a third bridge, Southside Connector, in terms of bringing more people to the Cape?

3) Why don't you focus on using the water for transportation? Maybe you could go from Plymouth to the Islands, Provincetown, etc....

4) Why not connect with New Bedford, Plymouth, Fall River, in terms of water transportation? Don't you think it is time to make this more of a regional approach rather than just a Cape Cod approach?

5) Is there any way of utilizing the median strip (from the "T" in Kingston) to have some type of trolley system to the Canal and possibly beyond in the event something is done with the Bridge?

Eugenia Anderson

Received 3/3/97

Scenic Highway / Sagamore Rotary / South Side Connector Task Force

Resolution: Be It Resolved that, the citizens of the Town of Bourne are committed to improving highway safety along the Bourne Scenic Highway. The Commonwealth of Massachusetts has also recognized the dangerous conditions along this roadway and has undertaken some interim improvements. It has been recognized that the more permanent solution would be the construction of the South Side Connector. Since the Massachusetts Secretary of Transportation has requested that the Cape Cod community to develop a consensus on its preferred approach we offer this resolution.

By vote of this Town Meeting, the Town of Bourne requests that State Representative, the Honorable Charles Decas, in whose district the Scenic Highway lies, to transmit to the Commonwealth of Massachusetts, Secretary of Transportation, James J. Kerasiotes, our desire that the necessary analyses to update the existing South Side Connector plans begin and proceed in an expeditious manner toward construction.

Motion: We so Resolve.

passed at Bourne town meeting
1996

Why is this resolution being ignored by the Cape Cod Commission when it was passed by the town of Bourne at town meeting?

Virginia Anderson

Subject: transportation in Falmouth
Date: Wed, 05 Feb 1997 17:21:06 -0500
From: "Janet J. Fredericks" <jfredericks@whoi.edu>
Organization: Woods Hole Oceanographic Institution
To: trans@cape.com

Since the meeting last November sponsored by the LWV, I have received encouragement from members of the public to continue the push for more public transportation in Falmouth. I was interested in three things specifically:

> Does the CCC consider public transportation as a means to reduce traffic congestion? Is there a threshold population for making public transportation work? I noticed that the Berkshire CO. moves 1 million passengers/year to our 200,000 and the only significant difference in the budget is the few hundred thousand in federal assistance. When our formula for assistance is computed, do They consider our summer crowds?
>
> Does anyone on your staff have information about Agonquit (ME): How does it compare to Falmouth? Is their shuttle service reducing traffic? How much does it cost (to providers and users), etc?
>
> Does the LEXPRESS system (Lexington) relate to our community? (Demographically,etc)

I think often Falmouth is only reguarded as a doormat to the Vineyard. That is one problem, but that is very separate from the other problems that we have. Mr. Malakoff compared us with Orleans (only with the SSA) ... we are nothing like Orleans in my mind. We have lives that center on villages; we have a centralized large employment area (Woods Hole). Beyond that, I'm not that familiar with Orleans. I think that with the new Main Street- we should provide tourists with a way to get off the roads; with so many elderly , I think we should provide them a way to stay out of their cars. What about children? With so many of us working, who can take off to drive them to their after-school activities? WHOOSH worked now what other information can we provide that shows that we are a community who will use public transportation?

It cannot be a 'normal' service, which might be considered for 'them'. The SEALINE has been overlooked by most because they have associated it with the BBUS (they still look alike). WHOOSH was different: it was cute (for us), inexpensive (encouraging) and ran frequently! I noticed a lot of sentiment that if Falmouth gets a service ... then each of the Towns must somehow get the same thing. So, I guess we also need to press how Falmouth is different.

Any comments or suggestions?

-- Thanks --

* Janet Fredericks (jfredericks@whoi.edu) *
778 Palmer Avenue ... Falmouth MA 02540
508-289-2573

11 Old Salt Lane
Yarmouth Port, MA 02675
11 December, 1996

TO: Robert Mumford

I see that the next meeting of CCJTC, this coming Friday, includes on the Agenda "Exit 6 1/2 Feasibility and Alternatives Study". I take it that this is sort of a progress report, rather than a final plan., and of course I do not know what the proposal would be.

I remember that in earlier discussions a part of the proposal was to have Exit 6 1/2 come out at Mary Dunn Road. Part of that proposal was that Mary Dunn Road be closed at that place, thus, among other things, preventing trucks from going to Route 6A along Mary Dunn Road. I believe that an interchange specifically at Mary Dunn Road would be both unnecessary and undesirable.

1. At the earliest stages in the discussions, the industrial park extended beyond Mary Dunn Road, all the way to the Yarmouth town line. The section between Mary Dunn Road and the town line is now a fish and wildlife preserve under state control, and thus no longer a potential industrial development. An interchange at Mary Dunn Road would thus be at the extreme eastern boundary of the industrial park, requiring traffic coming from the west to go the whole length of the industrial park and then turn back to reach their destination. It would be better to have the interchange in the middle of the industrial park. An interchange at Mary Dunn Road is unnecessary.

2. The undesirable feature in the proposal to have an interchange at Mary Dunn Road is the accompanying closure of that road. Mary Dunn Road is the only North-South road between Willow Street and Phinney's Lane-Route 132 connecting Route 6A and Hyannis. People coming from an appreciable distance east, a lesser distance to the west, use this road to go to Cape Cod Mall and other shopping areas in that vicinity. Those from the east would have to go via Willow Street and Iyanough Road, adding to the already bad congestion there. Those from the west would use the already congested Route 132. Any action which increases an existing congestion problem elsewhere is undesirable.

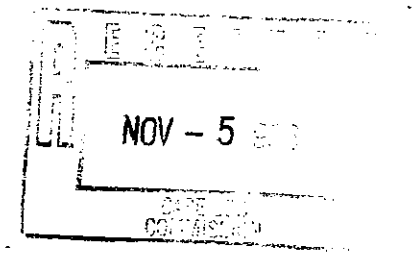
For traffic entering the park from the west, or leaving for the east, the solution is quite straighforward: a service road which leaves the eastbound lane of Route 6 just east of the overpass over Route 132, and rejoins Route 6 just before the overpass over Mary Dunn Road.

For westbound traffic the problem is sticky. I have a suggestion, but I would wish to think it over and perhaps talk with you about it before putting anything in writing.

Yours sincerely,

Francis T. Worrell

Francis T. Worrell



November 4, 1996

76 Cassidy Ave.

South Dennis, MA

02660

Priscilla N. Leclerc

3225 Main Street

Barnstable,Ma 02630

Dear Ms. Leclerc;

My sincere thanks for sending the state bicycle plan literature which we had talked about at the meeting on October 10 at the Dennis Senior Center. I must say that I am truly amazed at the amount of material/data that your office has on file. I can appreciate the many hours of labor involved in the accumulation of all the surveys etc. Perhaps if more citizens knew of the effort put into this type of labor-intense endeavor there would be a lot less complaining and less verbose repetition at meetings such as the ones I have attended.

As you know, my pet gripe is the danger involved in getting across Rte. 134 (pedestrian and biker) at the Patriot Square entrance. Just North of this intersection is the "tunnel to nowhere" which I think provides a better option than crossing 5 lanes of traffic. There is no pedestrian interval in the traffic light configuration and as a consequence, vehicular traffic always presumes to have the right of way. While Harwich must now "mark time" while deciding to have a wood or Steel bridge to eliminate some of the dangerous crossings in that town we in Dennis are content to have a 99% completed concrete tunnel go unused.

When we spoke you said that you were under the impression that the tunnel had been sealed off to keep out the homeless. I checked this out on October 30th and discovered that except for a wooden upright both ends are fully opened. As you are also aware, some Dennis officials feel the tunnel is an attraction for "undesirables". My reply to that is: if it were open and in use this would discourage any delinquent activity. The existing tunnels in Harwich, Brewster, Orleans and Eastham seem to be free of any problems, but they are used and not abandoned. Additionally, the tunnel between the 11th green and the 12th tee at Dennis Highlands alongside Old Bass River Road has not been the site of any wrongdoing.

Another stated reason for not using the tunnel is that a proposed Rte. 134 cloverleaf would mean the tunnel would be eliminated. I have talked to one of the Selectmen, with about 35 years experience in Highway supervision and he said, with regards to the double barreling of Rte. 6 to Orleans and the 134 Cloverleaf :"not in our lifetime". As I said at the meeting, there is also Police Department objection to any 134 redesign especially if there are additional traffic lights in the proposal.

Well, we can rest assured that once a tragedy occurs at that Patriot Square intersection there will be immediate outrage and speedy remedies suggested . In the meantime the tunnel remains a reminder of what comes of all the planning, consulting, and expense of some 12 years ago.

Again, thank you and I am feeling some degree of comfort knowing that my comments are part of a State inventory somewhere, someplace.

Sincerely, Leo Goyette

Leo Goyette

Carol A. Swartz
59 Loomis Lane
Centerville, MA 02632
508-775-5536
fax 508-790-2420

NOV - 4

November 1, 1996

Mr. Robert Mumford
Transportation Manager
Cape Cod Commission
P.O. Box 226
Barnstable, MA 02630

Dear Mr. Mumford:

I am writing in response to the October 10th newspaper article soliciting comments to the Cape Cod Commission re: road widening. As you probably know, I am a member of the Centerville Civic Association Route 28 Committee which has worked for almost a year to seek alternatives to the proposed widening of this highway to 4 lanes with 5 lanes at the intersections. While recognizing that the needs of through traffic on Route 28 need to be addressed, at the same time the widening of the roadway to almost twice its current width going right through Centerville will forever negatively change the center of our village, the site of our post office and shops.

Over and over during our discussions with local and state officials, the CCC 1992 Route 28 and Route 132 traffic study was cited as the "expert" source calling for a 4 lane highway. Our town councillors said we should leave the design of the road to the "experts" and we didn't know enough to object. In this case, it appears all the "experts" are engineers whose primary interest is moving cars the old fashioned way: BUILD MORE.

Repeatedly we asked for alternatives to the widening and none were ever offered. At the Town Council meeting in September when the vote was taken to support the widening, a letter from Armando Carbonell was entered into the record as supporting the project. It was extremely disheartening for us in Centerville to learn just 3 weeks later that the CCC was in process of revising its regional policy plan and road widening was now going to be de-emphasized.

On October 4th I attended a seminar in Cambridge on Building Liveable Communities Through Transportation at which John DeVillars was the keynote speaker. In his speech he mentioned the EPA coalition with the CCC on the outer Cape traffic study as an example of the EPA working with the community to build coalitions for better transportation and liveability. He stated the purpose of ISTEA is to allow communities to tailor projects to fit their needs, to get away from projects that simply move traffic faster. He said, "We don't want to see projects become more if less is better." I would be interested to know how the CCC representatives at the seminar felt the Cape's transportation picture stacked up to what is being done in other communities.

In her letter of September 23, 1996 relative to the Route 28 Centerville widening, Trude Coxe, secretary, Office of Environmental Affairs, strongly recommends that a "significantly pared down alternative" be considered, that community character will be impacted significantly and that the widening has not been demonstrated to improve safety. We have been informed by Tom Mullen, head of DPW, that no alternatives will be considered.

It seems to me that using ISTEA funds for the widening of Route 28 in Centerville, or any other road on Cape Cod, is against the purpose and spirit of the ISTEA program. With the support of the CCC, transportation in our town is still in the hands of the engineers with public opinion meaning absolutely nothing.

Sincerely,

Carol A. Swartz

cc: Lucy Edmonson, US EPA
Senator Henri Rauschenbach
Representative John Klimm
Representative Thomas Cahir

Frank Tassi
209 Thatcher
Flemington, NJ

DEAR SIR: 10/23/96

IN ADDITION TO MY ORIGINAL IDEA RECENTLY CALLED "CAPE COD LOTTERY FOR SAFE DRIVERS" HOWEVER, I DO NOT WANT TO GET INTO THAT.

HOWEVER, IF THE STATES AND CITIES THROUGHOUT THE COUNTRY WOULD MAINTAIN A COMPUTER GIVING A LIST OF ALL DRUNK DRIVERS, PLUS THOSE DRIVING WITH NO INSURANCE AND THOSE DRIVING ON SUSPENDED LIST WITH THREAT OF JAIL-THIS IDEA WOULD REDUCE ROAD TRAFFIC BY AT LEAST 20%.

IT IS TIME SOMETHING IS DONE TO ALLIEVIATE THIS TRAFFIC PROBLEM!

FRANK TASSI

1996

Dear Bob, 16 Oct

Place: Centerville, Great Marsh Road:
Where Camp Opeechee Road connects with Great Marsh Road a short distance east on Great Marsh Road, there is a low area on the road and, if you are turning west into Great Marsh Road and there is a car in the low area, the car can not always be seen. There have been many near misses there. A long time ago there was a child killed on Great Marsh. The speeding is terrible on this road. Maybe speed bumps would slow the idots down, the police never do.

Rod

10-IV-96.

The balancing act between Congestion, Servic, Convenience, Concrete and inconvenience is a delicate one. Only when the Citizens of Barnstable County look this dilemma in the face by accepting 'inconvenience' as a trade off to changing the country atmosphere still prevalent, will there be any chance of resolving our transportation problem.

Only by accepting new routings, one ways, Limited delivery hours in commercially active town areas while providing free intra-city transport, can the congestion, gridlock and noise be kept under acceptable control.

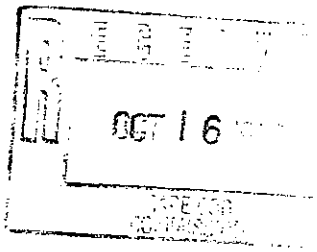
Greed and Failure to confront the reality of uncontrolled growth during the 70's and 80's has led us unmercifully into this transport morass. Will indecision and some inconvenience create another concrete jungle like Long Island, N.Y or will foresight take command?!

Mel Brilliant
Centerville 10-IV-96.

MEL BRILLIANT

74 WARWICK WAY
CENTERVILLE, MA. 02632
(508) 428-7585

Brooke N. Williams Architect
Post Office Box 767
6 Chase Street
West Harwich, Massachusetts 02671
508 432 8101



11 October 1996

Thomas Broderick III
Chief Engineer
Massachusetts Highway Department
10 Park Plaza
Boston, Massachusetts 02116- 3973

RE: Shelters at Route 6 & 132 Park and Ride, Route 6 & 124 and other Cape Cod Locations

Dear Mr. Broderick:

I appreciate the opportunity to comment on the above park and ride areas related to planned Highway Department work at routes 6 & 132 in Barnstable. I wish to thank you and your staff for your work for the Commonwealth.

As a Harwich resident and an architect, I feel that the above bus shelters need immediate attention by the state and other agencies. I use these areas to commute to Boston as well as to travel to Logan Airport. I do not believe that the existing Barnstable or the newly added Harwich shelter are appropriate for the Cape or positively contribute to the environment in support of tourism or transportation alternatives. However, I do feel the landscaping of the Harwich shelter is appropriate to the Cape and Harwich. I enclose two photographs to illustrate my points regarding these facilities. One is of the current shelter at Route 6 & 132. The other picture is of the Brewster Store, another stop for Plymouth & Brockton buses, operated and maintained by the private sector within the King's Highway Historic District on Route 6A. My comments center on three issues:

1. Appearance and construction- The graffiti covered Barnstable shelter is not welcoming to visitors or commuters. The mass- produced design does not relate to Cape Cod Architecture (and the environment). It boils in the Summer and provides for limited numbers of people during inclement weather in the winter. It is also not clear whether this shelter is handicapped accessible.
   The Brewster store is unique to the location, allows for decoration during local events, and provides flexibility and expansion due to its more open design similar to Cape Cod train stations still in existence. Simple signage alerts the traveler to the location of the shelter. Construction shows the influence of local craftsmanship in its details. The store sells postcards and other revenue generating mementos depicting the store (bus shelter).

2. Maintenance- The long-time lack of maintenance of the Barnstable shelter is readily apparent from the Ed King for Governor and Ray Shamie for Senate stickers.
   The shelter smells and garbage is usually overflowing from the oil drum container. At routes 6 and 132, revenue is generated from the sale of newspapers. However, this is clearly not being used for maintenance. The Brewster shelter is well maintained. The garbage container is emptied regularly. I have never seen garbage overflowing there as in Barnstable.

3. Landscaping and Bicycle storage- The Barnstable shelter is surrounded by what appear to be concrete highway light bases and weeds. In addition, bicyclists are forced to use an adjacent telephone pole for storage purposes. The Brewster store is well landscaped and information is available for bicyclists.

I would like to suggest possible approaches to achieve improvements to these areas. Simple individual designs for the shelters could be produced using timber frame and constructed by local craftsmen with adjacent bicycle racks and newspaper vending machines. Donations by local businesses and of labor could reduce costs of producing and maintaining the structures while providing a significant promotional opportunity for businesses. Traveler and local event information could be provided as could information on history and the environment. Revenue could be produced to assist in maintenance by a charge for newspaper sales space as well as allowing local garden clubs or civic associations to assist with planting maintenance. The Highway Department should also review wood structures on Route 3 and at the Rockport and Manchester By the Sea stations of the MBTA Rockport Line. If the state is not interested in maintaining and enhancing the local and state export tourism economy and providing transportation alternatives, the current approach to shelters should be continued. However, I believe that consideration of the improvements mentioned would be a significant step in welcoming tourists and commuters while complementing the environment and encouraging use of alternate forms of transportation.

Thank you again for your attention to this matter.

Sincerely,

Brooke N. Williams

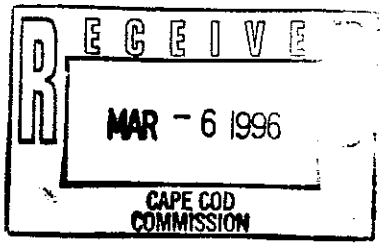
Brooke N. Williams AIA
cc: Cape Cod Commission, other state officials

COPY OF MATERIAL FAXED TO C.C.C. ON 10/12/96.


RESERVED
PARKING

REPS

Responsible Environmental Protection for Sandwich
Box 106, Sandwich, Massachusetts, 02563



Virginia Stack
234 Old County Rd.
East Sandwich, MA 02537
508-888-6943

March 6, 1996

Regional Transit Authority
585 Main Street
Dennis, MA 02638

Dear Helen Anzuoni, of the Plymouth & Brockton Street Railway Co. and To Whom it may concern of the Regional Transit Authority,

Responsible Environmental Protection for Sandwich (REPS) is in favor of pursuing a scheduled bus service along Rt. 6A from Bourne to Barnstable to Hyannis, including a stop in West Barnstable at the Community College and the YMCA. Any reduction in automobile traffic is environmentally a sound idea to investigate.

Better bus service would benefit life in all Cape towns, not soley the towns from Provincetown to Chatham. If a scheduled service were available along Rt. 6A many riders would be served. The same reasons that were given in support for the Lower Cape apply here, plus some additional suggestions:

1. Commuters to school, jobs, government agencies, medical appointments, postal offices, the YMCA, church and club meetings, social gatherings
2. Elderly who may prefer not to drive
3. Youth who do not have a driver's license or who have no vehicle
4. One car families
5. Financial savings
6. Reduce vehicle traffic on Rt. 6A
7. Access to many small businesses
8. Access to conservation areas that are for public use
9. Access to beaches
10. Bicycles racks would help with bicycle safety along Rt. 6A
11. Scenic ride

Better bus service would especially help the young and the elderly to feel more independent, less cut off from community life and services.

Please consider this recommendation. If there are any grants which may apply to a stated need such as better transportation for Cape Codders and visitors, REPS strongly encourages you to seek funding.

Sincerely,

Virginia Stack

Virginia Stack, steering committee, REPS

copies:
Cape Cod Commission
Sandwich Board of Selectmen

TIP Mtg 7/20/95 Meeting Notes Dennis Senior Center DRAFT

STIP FY 95 - FY 97 State Transportation Improvement Program (STIP) was dependent on the passage of the Metropolitan Highway System Bill (MHS) through the state legislature, and federal review did not begin until the Boston MPO revised its TIP to reduce projects and bring their TIP to financially constraint. The Boston MPO meeting was on June 29, 1995, and the federal review period started after that meeting. This review is a minimum of thirty days, thus the word on approval of STIP FY 95 - FY 97 is not expected before August 1, 1995.

Virginia Anderson, resident of Bourne, commented:
More than five years ago the Cape Cod Commission was formed to preserve and enhance the quality of life of the people of Cape Cod. One of the main components of that change is the safety and comfort of its citizens whether it be from pollution or traffic or whatever. Many people believe that Cape Cod begins over the Bourne and Sagamore bridges. Very little is done to dispel this myth. In fact most maps show it thus. But every single thing that is proposed in every single town affects the people on both sides of these bridges. The people of the Town of Bourne. Think of it. Every piece of clothing, every bit of food, all your electricity, gas, fuel, lumber--the list can go on and on. It either goes over or under the bridges. If you build a house in Truro or a restaurant in Provincetown, the people of Bourne are affected. We cannot escape the traffic and all the traffic that comes down 495-195 to go to Truro or Provincetown utilizes one of our two local roads--turned into highways, one 2-lane and the other 4. More than 20 years ago when Route 25 was proposed we were promised the Southside Connector. This Connector would go through the military reservation and hook up with Route 6. There is a plan. This plan is still viable. It would be a highway bothering no one over possibly questionable land anyway. I'm certain this highway would be less intrusive and could even work in conjunction with such things that are proposed there now as a boot camp or prison. Who knows someday that base may not be there as a base anyway. At any rate, I urge you to continue to support and to accelerate your efforts to obtain this Southside Connector and if necessary I will help you to start a grassroots effort in that direction. Thank you.

Ms. Anderson also submitted letters from five people with comments (copies attached).

John Harris, resident of Bourne, questioned why the Sagamore Rotary project listed in Appendix 9 -TIP ATTACHMENT already had a project number. Mr. Harris stated that the Sagamore Rotary Flyover would not alleviate the traffic problems on the Scenic Highway and Sandwich Road because most of the traffic is coming from the west and the gridlock is in Buzzards Bay. The Southside Connector would allow for vehicles to continue eastward after crossing the canal on the Bourne bridge and would reduce vehicles on both the Scenic Highway and Sandwich Road.

Lev Malakhoff responded that the update of the Long Range Transportation Plan for Cape Cod will study the proposed regional projects such as the Southside Connector and the Sagamore Rotary. Mr. Malakhoff said that the Upper Cape is the next focus

→continued TIP Mtg 7/20/95

DRAFT

area.

John Harris had a second question regarding the Buzzards Bay Train Station FY 96 project-- $90,000 for landscaping?

Priscilla Leclerc responded that the Buzzards Bay project is under the Surface Transportation Program Enhancements category, and includes not only landscaping but also improved pedestrian connections in the village to the train station, etc.

John Powers, Hyannisport, mentioned that traffic is increasing everywhere; it is nearly impossible to take a left onto Route 134 from the exit ramps, and he sees people taking rights and making U-turns to avoid the left turns. He suggested that signalization of the off-ramps may help.

P. O. Box 355,
Sagamore Beach, MA. 02562

July 19th, 1995.

Cape Cod Commission,
3225 Main Street,
Barnstable, MA. 02630

Dear Sir/Madam,

I would like to bring to your attention that I am strongly in favor of the Southside Connector in Bourne. The building of this road would alleviate the heavy concentration of traffic which affects the Town of Bourne more than any other town on the Cape.

Yours very truly,

Michael Lynch

Michael Lynch
5 Woodland Road,
Sagamore, MA.

P. O. Box 502,
Sagamore, MA. 02561

July 14th, 1995.

Cape Cod Commission,
Barnstable, MA.

Dear Members of the Cape Cod Commission,

I would like to make the following comments relative to your long-range transportation plan for Cape Cod.

I have been a resident of Sagamore (Bourne) for more than forty years, and have witnessed a number of changes during that period of time.

For almost half that length of time, I have heard about the Southside Connector - a proposed highway between Route 28 on the south side and Route 6. In my opinion, it is now time to take action to alleviate the heavy traffic, both on the Scenic Highway and Sandwich Road in Bourne. Both of these roads were built as local roads to connect the Town of Bourne, and neither of them can accommodate the overburdening of traffic with which they have had to contend in recent years.

At the May 1995 Bourne Town Meeting, a resolution was passed with a unanimous vote, requesting the Town officials to vigorously pursue their efforts on behalf of the Southside Connector. The people of Bourne have spoken. Now, it is time for the Cape Cod Commission to take a firm stand in support of this much needed highway.

You must be well aware of the many tragic accidents which have occurred along the stretch of highway known as the "Scenic Highway". This road was built long before I came to Bourne, when traffic was minimal compared to the number of vehicles on the road in 1995.

This road was not built for high speed traffic. All access roads to the Cape pass through the Town of Bourne. Most of the traffic utilizes either the Scenic Highway (Route 6) or Sandwich Road on the south-side. The amount of vehicular traffic adversely affects the lifestyles of the residents. In addition, bumper-to-bumper traffic creates an enormous amount of pollution.

An effective solution to the problem would be to march forward into the new century and build the long needed Southside Connector. I believe it is time for you, the members of the Cape Cod Commission, to take a firm, positive stand on this issue.

Thankyou for your consideration.

Yours very truly,

Mary Jane Gallerani (MARY JANE GALLERANI)
4 CECILIA Ter.,
SAGAMORE, MA. 02561

212 Old Plymouth Road,
Buzzards Bay, MA. 02532

July 12th, 1995.

Cape Cod Commission,
3225 Main Street,
Barnstable, MA. 02630

Dear Members of the Commission,

I have some concerns about your long-range transportation plan for Cape Cod, and would like to go on record as being strongly supportive of the Southside Connector.

As we approach the end of this century, it would appear to me that the Southside Connector would have to be included in any far sighted transportation plan. It makes sense to think about building it NOW, to alleviate the traffic problems on and off the Cape.

I am particularly concerned about the quality of air with all of the vehicular pollution when the traffic is bumper to bumper, as it is during much of the summer.

The Southside Connector is the solution to many of the problems which confront us, so please give it your support.

Very truly yours,

Michael Bonito

12 Edward Kelly Road,
East Sandwich, MA. 02537

July 11th, 1995

Cape Cod Commission,
3225 Main Street,
Barnstable, MA. 02630

Dear Commission Members,

I am writing to you in order to comment on your long-range transportation plan for Cape Cod.

I feel the Southside Connector would alleviate most of the traffic jams that occur on the Cape, because it is fairly obvious that a lot of the cars going to the lower Cape are coming from Rtes 495 and 195.

Thank you for your consideration.

Yours very truly,

Karl Andersen

7/95

Virginia Erickson et al
210 Old Plymouth Rd
Buzzards Bay Mass
02532

More than 5 years ago the Cape Cod Commission was formed to preserve + enhance the quality of life of the people of Cape Cod.

One of the main components of that charge is the safety + comfort of its citizens whether it be from pollution or traffic or whatever

Many people believe that Cape Cod begins over the Bourne + Sagamore bridges. Very little is done to dispel this myth in fact most maps show it this

But every single thing that is proposed in every single town affects the people on both sides of these bridges

The people of the town of Bourne

Think of it. Every piece of clothing, every bit of food. all your electricity, gas, fuel. lumber. The list can go on ton. It either goes over or under the bridges. If you build a house or a restaurant in Provincetown or Truro. the people of Barnstable are affected.

We cannot escape the traffic and all the traffic that comes down 495-195 to go to Truro or Provincetown utilizes one of our two local roads turned into highways which one is 2 lane and the other 4.

More than 20 years ago when route 25 was proposed we were promised the Southside Connector. This connector would go through the mulberry

7/95

reservation and hook up with still
route 6. There is a plan. This plan would
bothering no one (over possibly ~~[illegible]~~
questionable land anyway. And
I'm certain this highway would be
less intrusive and could even work
in conjunction with such things
that are proposed there now as a boat
camp or prison.

And who knows someday
that base may not be there
as a base anyway.

At any rate I urge you
to continue to support and to
accelerate your efforts to obtain
this southside connector + if necessary
will help you to start a grassroots
effort in that direction

Thank You
Virginia Anderson

March 14, 1995

Dear Commission Members,

This is a note of encouragement to stick to your agenda of protecting Cape Cod from over-development. It seems that the business community will say and do anything to promote their own self-interests. Therefore, most Cape Codders look to you to preserve the environment, the character, and the quality of living that we enjoy but feel slipping away.

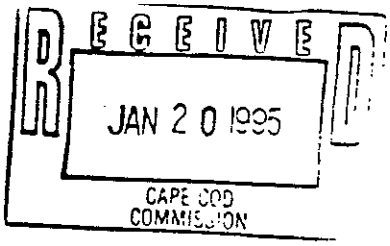
Thank you so much for your dedication.

Sincerely,

Denise and James Maddocks
Maddocks Art Gallery
1283 Main St. Brewster

January 14, 1995

Cape Co _ oint Transportation Committee
Cape Cod Commission
3225 Main Street
PO Box 226
Barnstable, MA 02630



Dear Chairman,

We are unable to send a representative to the meeting scheduled on January 30 but would like to submit our position on the issue under consideration.

Regional planning groups support cycling as a way to improve transportation and preserve Cape Cod's fragile environment. The primary goals of the Cape Cod _ Commission Long Range Transportation Plan for Cape Cod are to foster transportation which is safe, convenient, accessible, economical and consistent with the Cape's historic, scenic and natural resources; and to develop alternate modes of transportation including bicycle and pedestrian travel. The Commission also states, "the importance of a bikeway network to the Cape's economy cannot be overlooked. Bicycling is a common activity for tourists and it places little demand on the Cape's infrastructure. Bicycle touring should be encouraged and coordinated with other modes of transportation as well as lodging."

Specifically, bicycling is important to Cape Cod in the following ways:

- The local economy depends on tourism.
- Bicycling is a fast growing recreation and over 1.5 million Americans take cycling vacations each year.
- Bicycling helps preserve the scenic, historic and recreational resources which support tourism.
- Bicycle encouragement programs can attract regional and national recognition.
- Bicycling reduces road congestion and pollution; cars are most polluting in the first six miles traveled.
- Cape Cod is a zone of non-attainment under the Clean Air Act; commuting programs are recognized as critical to meeting Clean Air standards
- Increased bicycle use improves environmental quality and can make Cape Cod a more desirable place to live.
- Bicycling places little demand on the infrastructure.
- Bicycling is pleasurable and healthy.

MAC advocates highway standards which protect public safety and guard against unnecessary loss of natural, historic and environmental resources. Transportation plans, new road construction, road resurfacing and improvement projects should include considerations that increase safe bicycle access and use. Roads should be upgraded to meet AASHTO standards outlined in the Guide for the Development of Bicycle Facilities and the Federal Highway Administration Manual on Selecting Roadway Design Treatments to Accommodate Bicycles.

Sincerely,

Vicki Putz

MAD ABOUT CYCLING

A non-profit member organization committed to creating a bicycle -ndly atmosphere on Cape Cod that encourages residents and tourists to ride bicycles - transportation and -ecreation.

PO Box 491
Falmouth MA 02541

Cape Cod Regional Transportation Plan: Telephone Comments

Date	Commenter/Agency	Comment
11/5/96	Ron Munkacsi	Supports left turn pockets (or right shoulders); signs: "Not everyone is on vacation - observe speed limits," "If more than 5 vehicles are behind you, you must pull over"
10/29/96	Lauren McKean Cape Cod National Seashore	CCNS supports RTP efforts - experiencing local concern over replacement of parking lost to erosion; use of shuttles for beach access
10/22/96	Ginny Stack	Supports ferries originating in Hingham/Boston to Provincetown with cars or passenger only w/renatl cars @ Provincetown. Favors Rt 6A bus service w/bike racks
3/13/97	Betsey Brown Truro	Supports access management. Concerned over lack of authority for town to control new curb cuts on Route 6

Printed:

Regional Transportation Plan Projects Supporting Analysis

- Memos
- Air Quality Summaries

RTP # 1024

July 10, 1996

Mr. Phil Hughes
Massachusetts Highway Department
10 Park Plaza
Room 4210
Boston MA 02116

Subject: New permanent traffic counting stations for Cape Cod

Dear Mr. Hughes:

In order to effectively implement our transportation planning responsibilities to the Cape Cod Metropolitan Planning Organization, we respectfully request that the Massachusetts Highway Department (MHD) assist in the creation of new permanent traffic counting stations.

As you are aware, the Cape Cod Commission operates an extensive traffic data collection program. For reasons relating to safety, staffing, equipment, and weather, our counting program operates in the summer and to a limited degree in the spring and fall. Additionally, counts are usually taken for only 48 hours at a time on weekdays at any given location. MHD currently maintains four permanent stations on Cape Cod, all of them west of Hyannis:

Bourne Bridge (Bourne)
Sagamore Bridge at the Cape Cod Canal (Bourne)
Route 6 at the Sandwich/Barnstable town line
Route 28 east of Main Street in Cotuit (Barnstable)

A network of permanent stations would provide traffic data generated 24 hours a day, 365 days a year in all weather conditions. This will enhance efficiency and productivity in our data collection efforts, leading to more accurate factors for seasonal variation and annual growth. Many of the proposed locations experience high speed and heavy traffic. This makes permanent stations the safest way of collecting data. We are especially interested in technologies which permit real-time, remote access (via computer modem) to the proposed count sites.

Traffic volumes on Cape Cod are seasonal in nature and vary significantly by day of the week. This phenomenon is especially pronounced in communities further away from the Cape Cod Canal area. The continuing development of Cape Cod's Long Range Transportation Plan and travel demand forecast depend on high-quality comprehensive data. In order of priority, installation of permanent traffic counting equipment at the following locations would help address these needs:

1. U.S. Route 6 north of the Eastham/Orleans Rotary (Eastham)
2. State Route 28 at the Yarmouth/Dennis town line - Bass River bridge
3. U.S. Route 6 at the Yarmouth/Dennis town line - Bass River bridges
4. State Route 6A west of Setucket Road (Yarmouth)
5. U.S. Route 6 south of LeCount Hollow Rd (Wellfleet)
6. State Route 28 at the Falmouth/Mashpee town line
7. State Route 6A east of Tupper Road (Sandwich)
8. U.S. Route 6 at the Harwich/Brewster town line
9. State Route 28 at the Barnstable/Yarmouth town line
10. State Route 6A at the Brewster/Orleans town line
11. U.S. Route 6 the Truro/Provincetown town line
12. State Route 28 at the Harwich/Chatham town line - west end
13. Route 130 at the Sandwich/Mashpee town line
14. State Route 28 north of Route 39 (Orleans)
15. Route 151 at the Falmouth/Mashpee town line
16. State Route 28 at the Bourne/Falmouth town line
17. Race Lane east of Route 149 (Barnstable)

Your assistance in this matter would be greatly appreciated, especially in the areas of developing costs, identifying funding sources, and implementation of available technology. Please contact our Senior Transportation Engineer Lev Malakhoff for more information.

Sincerely,

Armando J. Carbonell
Executive Director
AJC:LAM:lm

Off-Network Projects

Cape Cod Regional Transportation Plan Projects Analysis
Air Quality Analysis Summary

RTP#	Analysis Year
1023	1996

Mobile 5 Lookups

No Build Analysis

		Speed&Year	VOC Factor	NOx Factor
		1996		
NoBuild VMT		1996		
NoBuild Speed		Analysis Factors		

Build Analysis

		451996	0.855	1.729
		461996	0.840	1.738
Build VMT	-325			
Build Speed	45	Analysis Factors	0.855	1.729

Comments

	VOC	NOx	VMT
NoBuild			
Build	-278	-562	
Reduction	278	562	325

Printed 2/6/97

Off-Network Projects

Cape Cod Regional Transportation Plan Projects Analysis
Air Quality Analysis Summary

RTP#	Analysis Year
902	1996

Mobile 5 Lookups

No Build Analysis		Speed&Year	VOC Factor	NOx Factor
		1996		
NoBuild VMT		1996		
NoBuild Speed		Analysis Factors		

Build Analysis				
		251996	1.307	1.645
		261996	1.273	1.647
Build VMT	-15,000			
Build Speed	25	Analysis Factors	1.307	1.645

Comments

	VOC	NOx	
NoBuild			
Build	-19,605	-24,675	VMT
Reduction	19,605	24,675	15,000

Printed 2/6/97

Congestion Management System

Summaries
- Roadways
- Transit
- Park & Rides

Cape Cod Congestion Management System: Roadways

Maximum & Average Estimated Volume/Capacity - based on all observed data

Corr#	Route 28	Northbound		
1	Bour/Falm TL - Otis Rotary	Max	.99	
	Bourne	Avg	0.77	

Corr#	Route 28	Northbound		
1	Otis Rotary - Bourne Rotary	Max	1	
	Bourne	Avg	0.90	

Corr#	Route 28	Southbound		
2	Bourne Rotary - Clay Pond	Max	.95	
	Bourne	Avg	0.52	

Corr#	Route 28	Southbound		
2	Clay Pond - Barlows Landing	Max	1.12	
	Bourne	Avg	0.86	

Corr#	Route 28	Southbound		
2	Barlows Landing - Otis Rotary	Max	1.09	
	Bourne	Avg	0.97	

Corr#	Route 28	Southbound		
2	Otis Rotary - Bour/Falm TL	Max	1	
	Bourne	Avg	0.81	

Corr#	Route 28	Westbound/Northbound		
3	Mashpee TL - Metoxit	Max	1.26	
	Falmouth	Avg	1.05	

Corr#	Route 28	Westbound/Northbound		
3	Metoxit - Fresh Pond	Max	1.15	
	Falmouth	Avg	0.81	

Corr#	Route 28	Westbound/Northbound		
3	Fresh Pond - Central	Max	.89	
	Falmouth	Avg	0.34	

Corr#	Route 28	Westbound/Northbound		
3	Central - Davisville	Max	1.22	
	Falmouth	Avg	1.13	

Corr#	Route 28	Westbound/Northbound		
3	Davisville - Brick Kiln (E)	Max	1.07	
	Falmouth	Avg	0.71	

Corr#	Route 28	Westbound/Northbound		
3	(E) Brick Kiln - Trotting Park	Max	1.34	
	Falmouth	Avg	1.04	

Corr#	Route 28	Westbound/Northbound		
3	Trotting Park - Jones (E)	Max	1.43	
	Falmouth	Avg	1.31	

Corr#	Route 28	Westbound/Northbound		
3	Jones (E) - Falmouth Heights	Max	1.29	
	Falmouth	Avg	1.12	

Corr#	Route 28	Westbound/Northbound		
3	Falmouth Heights - Shore	Max	1.2	
	Falmouth	Avg	1.06	

Corr#	Route 28	Westbound/Northbound		
3	Shore - Town Hall	Max	1.29	
	Falmouth	Avg	1.03	

Corr#	Route 28	Westbound/Northbound		
3	Town Hall - Palmer	Max	1.33	
	Falmouth	Avg	1.24	

Corr#	Route 28	Westbound/Northbound		
3	Palmer - Jones (W)	Max	1.36	
	Falmouth	Avg	1.20	

Corr#	Route 28	Westbound/Northbound		
3	Jones (W) - Brick Kiln (W)	Max	1.06	
	Falmouth	Avg	0.97	

Corr#	Route 28	Westbound/Northbound		
3	(W) Brick Kiln - Thomas Landers	Max	.86	
	Falmouth	Avg	0.38	

Corr#	Route 28	Westbound/Northbound		
3	Thomas Landers - Route 151	Max	.88	
	Falmouth	Avg	0.48	

Corr#	Route 28	Eastbound/Southbound		
4	Bourne TL - Route 151	Max	.83	
	Falmouth	Avg	0.36	

Corr#	Route 28	Eastbound/Southbound		
4	Route 151 - Thomas Landers	Max	.91	
	Falmouth	Avg	0.45	

Corr#	Route 28	Eastbound/Southbound		
4	Thomas Landers - Brick Kiln (W)	Max	.98	
	Falmouth	Avg	0.43	

Corr#	Route 28	Eastbound/Southbound		
4	(W) Brick Kiln - Jones (W)	Max	1.18	
	Falmouth	Avg	0.92	

Corr#	Route 28	Eastbound/Southbound		
4	Jones (W) - Palmer	Max	1.19	
	Falmouth	Avg	0.92	

Corr#	Route 28	Eastbound/Southbound		
4	Palmer - Town Hall	Max	1.49	
	Falmouth	Avg	1.26	

Corr#	Route 28	Eastbound/Southbound		
4	Town Hall - Shore	Max	1.33	
	Falmouth	Avg	1.17	

Corr#	Route 28	Eastbound/Southbound		
4	Shore - Falmouth Heights	Max	1.13	
	Falmouth	Avg	0.97	

Corr#	Route 28	Eastbound/Southbound		
4	Falmouth Heights - Jones (E)	Max	1.48	
	Falmouth	Avg	1.28	

Cape Cod Congestion Management System: Roadways

Maximum & Average Estimated Volume/Capacity - based on all observed data

Corr#	Route 28	Eastbound/Southbound		
4	Jones (E) - Trotting Park	Max	1.2	
	Falmouth	Avg	0.99	
4	Trotting Park - Brick Kiln (E)	Max	1.15	
	Falmouth	Avg	1.07	
4	(E) Brick Kiln - Davisville	Max	1.42	
	Falmouth	Avg	1.15	
4	Davisville - Central	Max	1.25	
	Falmouth	Avg	0.95	
4	Central - Fresh Pond	Max	1.32	
	Falmouth	Avg	0.49	
4	Fresh Pond - Metoxit	Max	.99	
	Falmouth	Avg	0.76	
5	Falmouth TL - Mashpee Rotary	Max	.9	
	Mashpee	Avg	0.31	
5	Mashpee Rotary - Quinaquisset	Max	1.19	
	Mashpee	Avg	1.10	
5	Quinaquisset - Barnstable TL	Max	1.42	
	Mashpee	Avg	1.06	
6	Barnstable TL - Quinaquisset	Max	1.12	
	Mashpee	Avg	1.03	
6	Quinaquisset - Mashpee Rotary	Max	1.08	
	Mashpee	Avg	0.85	
6	Mashpee Rotary - Falmouth TL	Max	1.07	
	Mashpee	Avg	0.92	
7	Mashpee TL - Route 130	Max	1.41	
	Barnstable	Avg	1.14	
7	Route 130 - Newtown	Max	1.21	
	Barnstable	Avg	0.99	
7	Newtown - Putnam	Max	1.11	
	Barnstable	Avg	1.03	

Corr#	Route 28	Eastbound		
7	Putnam - Route 149	Max	1.54	
	Barnstable	Avg	1.17	
7	Route 149 - South County Rd	Max	1.13	
	Barnstable	Avg	1.01	
7	S. County Rd - Osterville/West Barnstable	Max	1.19	
	Barnstable	Avg	1.11	
7	Osterville/West Barnstable - Lumbert Mill	Max	1.06	
	Barnstable	Avg	0.97	
7	Lumbert Mill - Old Stage	Max	1.41	
	Barnstable	Avg	1.08	
7	Old Stage - West Main St	Max	1.18	
	Barnstable	Avg	1.10	
7	West main St - Old Strawberry Hill	Max	1.24	
	Barnstable	Avg	0.57	
7	Old Strawberry Hill - Pitchers Way	Max	1.31	
	Barnstable	Avg	1.19	
7	Pitchers Way - Bearses Way	Max	1.52	
	Barnstable	Avg	1.23	
7	Bearses Way - Airport Rotary	Max	1.11	
	Barnstable	Avg	0.85	
7	Airport Rotary - Yarmouth Rd	Max	1.34	
	Barnstable	Avg	1.18	
7	Yarmouth Rd - Yarmouth TL	Max	1.17	
	Barnstable	Avg	1.07	
8	Yarmouth TL - Yarmouth Rd	Max	1.44	
	Barnstable	Avg	1.26	
8	Yarmouth Rd - Airport Rotary	Max	1.21	
	Barnstable	Avg	1.06	
8	Airport Rotary - Bearses Way	Max	1.35	
	Barnstable	Avg	1.18	

Cape Cod Congestion Management System: Roadways

Maximum & Average Estimated Volume/Capacity - based on all observed data

Corr#	Route 28	Westbound		
8	Bearses Way - Pitchers Way	Max	1.19	
	Barnstable	Avg	1.04	

Corr#	Route 28	Eastbound		
9	Sea St/Higgens Crowell - South Sea	Max	1.41	
	Yarmouth	Avg	1.27	

Corr#	Route 28	Westbound		
8	Pitchers Way - Old Strawberry Hill	Max	1.29	
	Barnstable	Avg	1.18	

Corr#	Route 28	Eastbound		
9	South Sea - Long Pond	Max	1.23	
	Yarmouth	Avg	1.07	

Corr#	Route 28	Westbound		
8	Old Strawberry Hill - West Main St	Max	1.3	
	Barnstable	Avg	0.61	

Corr#	Route 28	Eastbound		
9	Long Pond - Forest	Max	1.27	
	Yarmouth	Avg	1.14	

Corr#	Route 28	Westbound		
8	West Main St - Old Stage Rd	Max	1.38	
	Barnstable	Avg	1.20	

Corr#	Route 28	Eastbound		
9	Forest - N. Main St	Max	1.22	
	Yarmouth	Avg	1.12	

Corr#	Route 28	Westbound		
8	Old Stage Rd - Lumbert Mill	Max	1.19	
	Barnstable	Avg	1.02	

Corr#	Route 28	Eastbound		
9	N. Main St - Dennis TL	Max	1.29	
	Yarmouth	Avg	1.09	

Corr#	Route 28	Westbound		
8	Lumbert Mill - Osterville/West Barnstable	Max	1.24	
	Barnstable	Avg	1.03	

Corr#	Route 28	Westbound		
10	Dennis TL - N. Main St	Max	1.63	
	Yarmouth	Avg	1.38	

Corr#	Route 28	Westbound		
8	Osterville/West Barnstable - S. County	Max	1.07	
	Barnstable	Avg	0.92	

Corr#	Route 28	Westbound		
10	N. Main St - Forest	Max	1.37	
	Yarmouth	Avg	1.09	

Corr#	Route 28	Westbound		
8	South County - Rt 149	Max	1.24	
	Barnstable	Avg	0.87	

Corr#	Route 28	Westbound		
10	Forest - Long Pond	Max	1.23	
	Yarmouth	Avg	1.08	

Corr#	Route 28	Westbound		
8	Rt 149 - Putnam	Max	1.42	
	Barnstable	Avg	1.27	

Corr#	Route 28	Westbound		
10	Long Pond - South Sea	Max	1.59	
	Yarmouth	Avg	1.20	

Corr#	Route 28	Westbound		
8	Putnam - Newtown	Max	1.32	
	Barnstable	Avg	0.39	

Corr#	Route 28	Westbound		
10	South Sea - Sea St/Higgins Crowell	Max	1.51	
	Yarmouth	Avg	1.17	

Corr#	Route 28	Westbound		
8	Newtown - Route 130	Max	1.28	
	Barnstable	Avg	1.03	

Corr#	Route 28	Westbound		
10	Sea St/Higgins Crowell - Camp	Max	1.51	
	Yarmouth	Avg	1.10	

Corr#	Route 28	Westbound		
8	Route 130 - Mashpee TL	Max	1.64	
	Barnstable	Avg	1.12	

Corr#	Route 28	Westbound		
10	Camp - East Main St	Max	1.52	
	Yarmouth	Avg	1.18	

Corr#	Route 28	Eastbound		
9	Barnstable Tl - East Main	Max	1.42	
	Yarmouth	Avg	0.86	

Corr#	Route 28	Westbound		
10	East Main St - Barnstable TL	Max	1.37	
	Yarmouth	Avg	0.30	

Corr#	Route 28	Eastbound		
9	East Main - Camp	Max	1.43	
	Yarmouth	Avg	1.20	

Corr#	Route 28	Eastbound		
11	Yarmouth TL - School St	Max	1.18	
	Dennis	Avg	0.98	

Corr#	Route 28	Eastbound		
9	Camp - Sea St/Higgens Crowell	Max	1.21	
	Yarmouth	Avg	1.12	

Corr#	Route 28	Eastbound		
11	School St - Old Main St	Max	1.28	
	Dennis	Avg	1.07	

Cape Cod Congestion Management System: Roadways

Maximum & Average Estimated Volume/Capacity - based on all observed data

Corr#	Route 28	Eastbound		
11	Old Main St - Main St/Trotting Park Rd	Max	1.36	
	Dennis	Avg	0.98	
11	Main St/Trotting Park Rd - Route 134	Max	1.57	
	Dennis	Avg	1.28	
11	Route 134 - Shad Hole	Max	1.18	
	Dennis	Avg	1.07	
11	Shad Hole - Sea St	Max	.97	
	Dennis	Avg	0.55	
11	Sea St - Upper County	Max	1.4	
	Dennis	Avg	0.98	
11	Upper County - Harwich TL	Max	1.68	
	Dennis	Avg	1.47	
12	Harwich TL - Upper County	Max	1.74	
	Dennis	Avg	1.43	
12	Upper County - Sea St	Max	1.04	
	Dennis	Avg	0.47	
12	Sea St - Shad Hole	Max	1.11	
	Dennis	Avg	0.91	
12	Shad Hole - Route 134	Max	1.43	
	Dennis	Avg	1.19	
12	Route 134 - Main St/Trotting Park	Max	1.21	
	Dennis	Avg	1.04	
12	Main St/Trotting Park - Old Main St	Max	1.51	
	Dennis	Avg	0.88	
12	Old Main St - School St	Max	1.53	
	Dennis	Avg	0.96	
12	School St - Yarmouth TL	Max	1.56	
	Dennis	Avg	0.86	
13	Dennis TL - Route 39	Max	1.06	
	Harwich	Avg	0.90	
13	Route 39 - Lower County Rd	Max	1.08	
	Harwich	Avg	0.72	
13	Lower County Rd - Bank	Max	1.31	
	Harwich	Avg	1.06	
13	Bank - Depot/Uncle Venies	Max	1.08	
	Harwich	Avg	1.01	
13	Depot/Uncle Venies - Chatham TL	Max	1.13	
	Harwich	Avg	0.80	
14	Chatham TL - Depot/Uncle Venies	Max	1.19	
	Harwich	Avg	0.93	
14	Depot/Uncle Venies - Bank	Max	1.21	
	Harwich	Avg	0.64	
14	Bank - Lower County Rd	Max	1.22	
	Harwich	Avg	0.98	
14	Lower County Rd - Route 39	Max	1.08	
	Harwich	Avg	0.83	
14	Route 39 - Dennis TL	Max	1.29	
	Harwich	Avg	1.04	
15	Harwich TL - Route 137	Max	1.16	
	Chatham	Avg	0.88	
15	Route 137 - Barn Hill	Max	1.03	
	Chatham	Avg	0.74	
15	Barn Hill - Crowell/Queen Anne	Max	1.24	
	Chatham	Avg	0.62	
15	Crowell/Queen Anne - Main	Max	1.47	
	Chatham	Avg	0.89	
15	Main - Shore	Max	1.15	
	Chatham	Avg	0.67	
15	Shore - Crowell	Max	1.08	
	Chatham	Avg	0.94	

Cape Cod Congestion Management System: Roadways

Maximum & Average Estimated Volume/Capacity - based on all observed data

Corr#	Route 28	Eastbound/Northbound		
15	Crowell - Training Field	Max	1.01	
	Chatham	Avg	0.58	

Corr#	Route 28	Eastbound/Northbound		
15	Training Field - Harwich TL	Max	1.31	
	Chatham	Avg	0.52	

Corr#	Route 28	Southbound/Westbound		
16	Harwich TL - Training Field	Max	1.06	
	Chatham	Avg	0.40	

Corr#	Route 28	Southbound/Westbound		
16	Training Field - Crowell	Max	1.1	
	Chatham	Avg	0.37	

Corr#	Route 28	Southbound/Westbound		
16	Crowell - Shore	Max	.78	
	Chatham	Avg	0.28	

Corr#	Route 28	Southbound/Westbound		
16	Shore - Main	Max	1.1	
	Chatham	Avg	0.52	

Corr#	Route 28	Southbound/Westbound		
16	Main - Crowell/Queen Anne	Max	1.44	
	Chatham	Avg	1.11	

Corr#	Route 28	Southbound/Westbound		
16	Crowell/Queen Anne - Barn Hill	Max	1.14	
	Chatham	Avg	1.06	

Corr#	Route 28	Southbound/Westbound		
16	Barn Hill - Route 137	Max	1.06	
	Chatham	Avg	0.92	

Corr#	Route 28	Southbound/Westbound		
16	Route 137 - Harwich TL	Max	1.41	
	Chatham	Avg	0.99	

Corr#	Route 28	Northbound		
17	Chatham TL - Pleasant Bay	Max	.96	
	Harwich	Avg	0.55	

Corr#	Route 28	Northbound		
17	Pleasant Bay - Orleans TL	Max	1.27	
	Harwich	Avg	0.87	

Corr#	Route 28	Southbound		
18	Orleans TL - Pleasant Bay	Max	1.15	
	Harwich	Avg	0.74	

Corr#	Route 28	Southbound		
18	Pleasant Bay - Chatham TL	Max	1.14	
	Harwich	Avg	0.45	

Corr#	Route 28	Northbound		
19	Harwich TL - Route 39	Max	1	
	Orleans	Avg	0.77	

Corr#	Route 28	Northbound		
19	Route 39 - Eldredge Park Way	Max	1.14	
	Orleans	Avg	0.95	

Corr#	Route 28	Northbound		
19	Eldredge Park Way - Main	Max	1.35	
	Orleans	Avg	1.21	

Corr#	Route 28	Northbound		
19	Main - Route 6A	Max	1.26	
	Orleans	Avg	1.05	

Corr#	Route 28	Southbound		
20	Route 6A - Main	Max	1.3	
	Orleans	Avg	1.15	

Corr#	Route 28	Southbound		
20	Main - Eldredge Park Way	Max	1.37	
	Orleans	Avg	1.19	

Corr#	Route 28	Southbound		
20	Eldredge Park Way - Route 39	Max	1.03	
	Orleans	Avg	0.84	

Corr#	Route 28	Southbound		
20	Route 39 - Harwich TL	Max	.95	
	Orleans	Avg	0.54	

Corr#	Route 28/6A	Northbound		
21	Route 6A - Old County Rd	Max	1.33	
	Orleans	Avg	1.17	

Corr#	Route 28/6A	Northbound		
21	Old County Rd - Eastham TL	Max	1.23	
	Orleans	Avg	0.51	

Corr#	Route 28/6A	Northbound		
21	Eastham TL - Orleans Rotary	Max	1.32	
	Orleans	Avg	1.13	

Corr#	Route 28/6A	Southbound		
22	Orleans Rotary - Orleans TL	Max	1.56	
	Orleans	Avg	1.13	

Corr#	Route 28/6A	Southbound		
22	Orleans TL - Old County Rd	Max	1.39	
	Orleans	Avg	1.12	

Corr#	Route 28/6A	Southbound		
22	Old County Rd - Route 6A	Max	1.42	
	Orleans	Avg	1.22	

Corr#	Route 132	Southbound		
23	Route 6 - Old Route 132	Max	1.34	
	Barnstable	Avg	1.00	

Corr#	Route 132	Southbound		
23	Route 132 - Phinney's	Max	1.34	
	Barnstable	Avg	1.11	

Cape Cod Congestion Management System: Roadways

Maximum & Average Estimated Volume/Capacity - based on all observed data

Corr#				
23	**Route 132**	Southbound	Max	1.37
	Phinney's - Bearse's		Avg	1.08
	Barnstable			
23	**Route 132**	Southbound	Max	1.27
	Bearse's - Airport Rd		Avg	1.10
	Barnstable			
23	**Route 132**	Southbound	Max	1.31
	Airport Rd - Airport Rotary		Avg	1.15
	Barnstable			
24	**Route132**	Northbound	Max	1.33
	Airport Rotary - Airport Rd		Avg	1.13
	Barnstable			
24	**Route132**	Northbound	Max	1.34
	Airport Rd - Bearse's		Avg	1.20
	Barnstable			
24	**Route132**	Northbound	Max	1.53
	Bearse's - Phinney's		Avg	1.18
	Barnstable			
24	**Route132**	Northbound	Max	1.39
	Phinney's - Old Route 132		Avg	1.09
	Barnstable			
24	**Route132**	Northbound	Max	1.29
	Old Route 132 - Route 6		Avg	0.87
	Barnstable			
25	**Rt 6 - Scenic Highway**	Eastbound	Max	.25
	Belmont Circle - Bournedale Rd		Avg	0.25
	Bourne			
25	**Rt 6 - Scenic Highway**	Eastbound	Max	1.49
	Bournedale Rd - Sagamore Rotary		Avg	1.00
	Bourne			
26	**Rt 6 - Scenic Highway**	Westbound	Max	1.21
	Sagamore Rotary - Bournedale Rd		Avg	0.98
	Bourne			
26	**Rt 6 - Scenic Highway**	Westbound	Max	.92
	Bournedale Rd - Belmont Circle		Avg	0.36
	Bourne			
27	**Route 6A**	Eastbound	Max	.98
	Route 137 - Route 124		Avg	0.53
	Brewster/Orleans			
27	**Route 6A**	Eastbound	Max	1.17
	Route 124 - Underpass		Avg	0.99
	Brewster/Orleans			
27	**Route 6A**	Eastbound	Max	1.16
	Underpass - Millstone		Avg	1.04
	Brewster/Orleans			

Corr#				
27	**Route 6A**	Eastbound	Max	.25
	Millstone - Deer Park Rd		Avg	0.25
	Brewster/Orleans			
27	**Route 6A**	Eastbound	Max	1.13
	Deer Park Rd - Orleans TL		Avg	1.03
	Brewster/Orleans			
27	**Route 6A**	Eastbound	Max	1.31
	Orleans TL - West Rd		Avg	1.19
	Brewster/Orleans			
27	**Route 6A**	Eastbound	Max	1.37
	West Rd - Route 28		Avg	1.15
	Brewster/Orleans			
28	**Route 6A**	Westbound	Max	1.4
	Route 28 - West Rd		Avg	1.17
	Brewster/Orleans			
28	**Route 6A**	Westbound	Max	1.1
	West Rd - Brewster TL		Avg	0.86
	Brewster/Orleans			
28	**Route 6A**	Westbound	Max	1.16
	Brewster TL - Deer Park Rd		Avg	1.01
	Brewster/Orleans			
28	**Route 6A**	Westbound	Max	1.05
	Deer Park Rd - Millstone		Avg	0.48
	Brewster/Orleans			
28	**Route 6A**	Westbound	Max	1.19
	Millstone - Underpass		Avg	1.01
	Brewster/Orleans			
28	**Route 6A**	Westbound	Max	1.08
	Underpass - Route 124		Avg	0.47
	Brewster/Orleans			
28	**Route 6A**	Westbound	Max	1.09
	Route 124 - Route 137		Avg	0.35
	Brewster/Orleans			
29	**Route 6A**	Eastbound	Max	1.11
	Sandwich Rd - Sandwich TL		Avg	0.50
	Sandwich/Bourne			
29	**Route 6A**	Eastbound	Max	.91
	Sandwich TL - Tupper Rd (E)		Avg	0.53
	Sandwich/Bourne			
29	**Route 6A**	Eastbound	Max	1.29
	Tupper Rd (E) - Jarves Rd		Avg	0.79
	Sandwich/Bourne			
29	**Route 6A**	Eastbound	Max	1.03
	Jarves Rd - Main St		Avg	0.86
	Sandwich/Bourne			

Cape Cod Congestion Management System: Roadways

Maximum & Average Estimated Volume/Capacity - based on all observed data

Corr#	Route 6A	Westbound		
30	Main St - Jarves Rd	Max	1.1	
	Sandwich/Bourne	Avg	0.69	

Corr#	Route 6A	Westbound		
30	Jarves Rd - Tupper Rd (E)	Max	1.2	
	Sandwich/Bourne	Avg	0.87	

Corr#	Route 6A	Westbound		
30	Tupper Rd (E) - Bourne TL	Max	.99	
	Sandwich/Bourne	Avg	0.77	

Corr#	Route 6A	Westbound		
30	Bourne TL - Sandwich Rd	Max	.25	
	Sandwich/Bourne	Avg	0.25	

Corr#	Route 6	Northbound		
31	Orleans rotary - Samoset Rd	Max	1.08	
	Eastham/ Wellfleet/Truro	Avg	0.63	

Corr#	Route 6	Northbound		
31	Samoset Rd - Nauset Rd (S)	Max	1.31	
	Eastham/ Wellfleet/Truro	Avg	1.03	

Corr#	Route 6	Northbound		
31	Nauset Rd (S) - Brackett Rd	Max	1.21	
	Eastham/ Wellfleet/Truro	Avg	1.00	

Corr#	Route 6	Northbound		
31	Brackett Rd - Nauset Rd (N)	Max	1.29	
	Eastham/ Wellfleet/Truro	Avg	0.91	

Corr#	Route 6	Northbound		
31	Nauset Rd (N) - Wellfleet TL (drive in)	Max	1.6	
	Eastham/ Wellfleet/Truro	Avg	0.90	

Corr#	Route 6	Northbound		
31	Wellfleet TL (drive in) - Marconi State Park	Max	1.34	
	Eastham/ Wellfleet/Truro	Avg	1.09	

Corr#	Route 6	Northbound		
31	Marconi State Park - Lecount Hollow Rd	Max	1.1	
	Eastham/ Wellfleet/Truro	Avg	0.90	

Corr#	Route 6	Northbound		
31	Lecount Hollow Rd - Main St	Max	1.23	
	Eastham/ Wellfleet/Truro	Avg	0.92	

Corr#	Route 6	Northbound		
31	Main St - Wellfleet/Truro TL	Max	1.23	
	Eastham/ Wellfleet/Truro	Avg	0.80	

Corr#	Route 6	Northbound		
31	Wellfleet/Truro TL - South Pamet Rd	Max	1.14	
	Eastham/ Wellfleet/Truro	Avg	0.76	

Corr#	Route 6	Northbound		
31	South Pamet Rd - Route 6A	Max	.96	
	Eastham/ Wellfleet/Truro	Avg	0.79	

Corr#	Route 6	Southbound		
32	Route 6A - South Pamet Rd	Max	1	
	Eastham/Wellfleet/Truro	Avg	0.85	

Corr#	Route 6	Southbound		
32	South Pamet Rd - Wellfleet/Truro TL	Max	1.08	
	Eastham/Wellfleet/Truro	Avg	0.68	

Corr#	Route 6	Southbound		
32	Wellfleet/Truro TL - Main St	Max	1.08	
	Eastham/Wellfleet/Truro	Avg	0.93	

Corr#	Route 6	Southbound		
32	Main St - Lecount Hollow Rd	Max	1.03	
	Eastham/Wellfleet/Truro	Avg	0.73	

Corr#	Route 6	Southbound		
32	Lecount Hollow Rd - Marconi State Park	Max	1.09	
	Eastham/Wellfleet/Truro	Avg	0.78	

Corr#	Route 6	Southbound		
32	Marconi State Park - Eastham TL (drive in)	Max	1.16	
	Eastham/Wellfleet/Truro	Avg	1.03	

Corr#	Route 6	Southbound		
32	Eastham TL (drive in) - Nauset Rd (N)	Max	1.06	
	Eastham/Wellfleet/Truro	Avg	0.92	

Corr#	Route 6	Southbound		
32	Nauset Rd (N) - Brackett Rd	Max	1.24	
	Eastham/Wellfleet/Truro	Avg	0.90	

Corr#	Route 6	Southbound		
32	Brackett Rd - Nauset Rd (S)	Max	1.15	
	Eastham/Wellfleet/Truro	Avg	0.89	

Corr#	Route 6	Southbound		
32	Nauset Rd (S) - Samoset Rd	Max	1.22	
	Eastham/Wellfleet/Truro	Avg	0.84	

Corr#	Route 6	Southbound		
32	Samoset Rd - Orleans rotary	Max	1.03	
	Eastham/Wellfleet/Truro	Avg	0.41	

CAPE COD CONGESTION MANAGEMENT SYSTEM: TRANSIT

Travel Time & Passenger Destinations by Origin

Coach of Dennis — Direction: Circular — Schedule: 6/22/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
114100	Haigis Beach	Patriots Square	20	114101	Haigis Beach	Patriots Square	20
114102	Hall Lot	Patriots Square	17	114103	Windmill Village	Patriots Square	9
114104	Windmill Village	Patriots Square	9	114105	Windmill Village	Patriots Square	9

Coach of Dennis — Direction: Circular — Schedule: 6/22/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
115107	Benny's	Yarmouth Lot	31	115104	Old Main	Yarmouth Lot	5
115105	Old Main	Yarmouth Lot	5	115106	Old Main	Yarmouth Lot	5
115100	Patriots Square	Yarmouth Lot	14	115101	Patriots Square	Yarmouth Lot	14
115102	Patriots Square	Hall St.	42	115103	Patriots Square	Swan River	30

Hyannis Area Trolley — Direction: Circular — Schedule: 6/24/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
119126	Kalmus Beach	Veterans Beach	1	119127	Kalmus Beach	Veterans Beach	1
119128	Kalmus Beach	Main St	24	119129	Kalmus Beach	Main St	24
119130	Kalmus Beach	P & B Terminal	15	119131	Kalmus Beach	P & B Terminal	15
119132	Kalmus Beach	P & B Terminal	15	119133	Kalmus Beach	P & B Terminal	15
119134	Kalmus Beach	P & B Terminal	15	119135	Kalmus Beach	P & B Terminal	15
119136	Kalmus Beach	P & B Terminal	15	119137	Kalmus Beach	P & B Terminal	15
119138	Kalmus Beach	P & B Terminal	15	119121	Main St	Ocean St Docks	8
119122	Main St	Ocean St Docks	8	119123	Main St	Ocean St Docks	8
119100	P&B Terminal	South St @ Sea St.	7	119101	P&B Terminal	P & B Terminal	31
119104	P&B Terminal	P & B Terminal	31	119105	P&B Terminal	P & B Terminal	31
119106	P&B Terminal	P & B Terminal	31	119102	P&B Terminal	Main St @ Pine Ave	101
119103	P&B Terminal	Main St @ Pine Ave	101	119107	P&B Terminal	P & B Terminal	31
119108	P&B Terminal	P & B Terminal	31	119109	P&B Terminal	P & B Terminal	31
119110	P&B Terminal	P & B Terminal	31	119111	P&B Terminal	P & B Terminal	31
119112	P&B Terminal	P & B Terminal	31	119113	P&B Terminal	P & B Terminal	31
119114	P&B Terminal	P & B Terminal	31	119115	P&B Terminal	P & B Terminal	31
119116	P&B Terminal	P & B Terminal	31	119117	P&B Terminal	P & B Terminal	31
119118	P&B Terminal	P & B Terminal	31	119119	P&B Terminal	P & B Terminal	31
119120	P&B Terminal	P & B Terminal	31	119124	Veterans Beach	JFK Museum	25
119125	Veterans Beach	JFK Museum	25	119139	Veterans Beach	P & B Terminal	13
119140	Veterans Beach	P & B Terminal	13				

Hyannis Area Trolley — Direction: Circular — Schedule: 6/24/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
120118	Kalmus Beach	P & B Terminal	13	120119	Kalmus Beach	P & B Terminal	13
120120	Kalmus Beach	P & B Terminal	13	120121	Kalmus Beach	P & B Terminal	13
120122	Kalmus Beach	Ocean St. Docks	5	120123	Kalmus Beach	Ocean St. Docks	5
120113	Main St @ Maggies Ice	Main St @ Maggies Ice	28	120107	P & B Terminal	Main St.	11
120108	P & B Terminal	Main St.	11	120109	P & B Terminal	Old County & Sea St.	25
120110	P & B Terminal	Nantucket St.	14	120111	P & B Terminal	P & B Terminal	31
120112	P & B Terminal	JFK Memorial (not	16	120100	P&B Terminal	Veterans Beach	17
120117	South St. @ Ocean	P & B Terminal	20	120124	Veterans Beach	P & B Terminal	11
120125	Veterans Beach	P & B Terminal	11	120126	Veterans Beach	P & B Terminal	11

Travel Time & Passenger Destinations by Origin

Hyannis Area Trolley — Direction: Circular — Schedule: 6/24/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
121107	Hyannis Marina	JFK Museum	14	121108	Hyannis Marina	JFK Museum	14
121106	P & B Terminal	Ocean St. Docks	10				

Hyannis Area Trolley — Direction: Circular — Schedule: 6/24/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
122119	Kalmus Beach	Main St. & School St.	9	122120	Kalmus Beach	Main St. & School St.	9
122110	Main St. (Maggies Ice	P & B Terminal	19	122111	Main St. (Maggies Ice	P & B Terminal	19
122112	Main St. (Maggies Ice	P & B Terminal	19	122113	Main St. (Maggies Ice	P & B Terminal	19
122103	P & B Terminal	Sea St. and Main	12	122104	P & B Terminal	Sea St. and Main	12
122105	P & B Terminal	Sea St. and Main	12	122108	P & B Terminal	P & B Terminal	28
122109	P & B Terminal	Main St. Restaurant	3	122114	Sea St. and Main	Main St. @ Pine	28
122115	Sea St. and Main	Main St. @ Pine	28	122116	Sea St. and Main	Main St. @ Pine	28
122117	Sea St. and Main	P & B Terminal	17	122118	Veterans Beach	Main St. (Gringo's)	26

Hyannis Area Trolley — Direction: Circular — Schedule: 6/24/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
123106	Hyannis Marina	P & B Terminal	4	123107	Hyannis Marina	P & B Terminal	4
123104	P & B Terminal	Old Harbor Rd	12	123105	Physic Point B & B	P & B Terminal	21

Hyannis Area Trolley — Direction: Circular — Schedule: 6/24/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
126100	P & B Terminal	Southwind Plaza	13	126101	P & B Terminal	P & B Terminal	29
126102	P & B Terminal	Staples (Airport Rotary)	4	126103	P & B Terminal	Cape Cod Mall	21
126104	P & B Terminal	Festival Mall	16				

Hyannis Area Trolley — Direction: Circular — Schedule: 6/24/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
127103	Cape Cod Mall	P & B Terminal	9	127104	Cape Cod Mall	Festival Mall	27
127104	Cape Cod Mall	Festival Mall	27	127105	Cape Cod Mall	Festival Mall	27
127106	Cape Cod Mall	Festival Mall	27	127100	P & B Terminal	Festival Mall	20
127101	P & B Terminal	Southwind Plaza	12	127102	Southwind Plaza (Stop &	CCM	10

Hyannis Area Trolley — Direction: Circular — Schedule: 6/24/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
128108	Festival Mall	P & B Terminal	11	128100	P & B Terminal	Festival	19
128101	P & B Terminal	Festival	19	128102	P & B Terminal	Festival	19
128103	P & B Terminal	Festival	19	128104	P&B Terminal	Cape Cod Mall	23
128105	P&B Terminal	Cape Cod Mall	23	128106	P&B Terminal	Cape Cod Mall	23
128107	P&B Terminal	Cape Cod Mall	26				

Hyannis Area Trolley — Direction: Circular — Schedule: 6/24/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
129110	Cape Cod Mall	P & B Terminal	9	129109	Cape Crossroads Apts	P & B Terminal	12
129108	Festival	P & B Terminal	15	129100	P & B Terminal	Festival Mall	16
129101	P & B Terminal	Festival Mall	16	129102	P & B Terminal	Southwind Plaza	11
129103	P & B Terminal	Cape Cod Mall	22	129104	P & B Terminal	Cape Cod Mall	22
129105	P & B Terminal	Cape Cod Mall	22	129105	P & B Terminal	Cape Cod Mall	22
129106	P & B Terminal	Cape Cod Mall	22	129107	P & B Terminal	Festival Mall	16

Travel Time & Passenger Destinations by Origin

Orleans Trolley — Direction: Circular — Schedule: 7/1/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
125104	CVS	SKAKET CORNERS	13	125102	SKAKET CORNERS	TONSET WOODS	30
125105	STOP & SHOP	TONSET WOODS	77	125103	TONSET WOODS	RT. 6A & MAIN ST.	8
125101	X-MAS TREE SHOP	CVS	1				

Orleans Trolley — Direction: Circular — Schedule: 7/1/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
124104	?	PILGRIM LAKE	14	124105	?	PILGRIM LAKE	14
124106	?	PILGRIM LAKE	14	124107	?	6A & ELDEREGE PARK	146
124108	?	ROCK HARBOR	42	124109	GENERAL STORE	RT. 6A & MAIN ST.	19
124101	STOP & SHOP	PILGRIM LAKE	14	124102	STOP & SHOP	PILGRIM LAKE	14
124103	STOP & SHOP	PILGRIM LAKE	14				

Sea Line — Direction: inbound — Schedule: 9/6/94

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
101118	CC Hospital	CC Mall	13	101104	Falmouth Bus	Mash Commons	33
101105	Falmouth Bus	Osterville Center	52	101106	Falmouth Bus	CC Hospital	74
101107	Falmouth Center	Falmouth Mall	4	101108	Falmouth Center	East Falmouth	12
101109	Falmouth Mall	Barnstable Village	93	101110	Falmouth Mall	Hyannis Bus	65
101120	Hyannis Bus	Barnstable Village	28	101121	Hyannis Bus	Barnstable Village	28
101119	Hyannis Docks	CC Mall	10	101112	Mash Commons	CC Mall	59
101111	Waquoit (Metoxit Rd)	CC Mall	59	101113	WE Rotary	Hyannis Bus	14
101114	WE Rotary	CC Mall	16	101115	WE Rotary	CC Mall	19
101116	WE Rotary	CC Mall	19	101117	WE Rotary	CC Mall	15
101100	Woods Hole	Marstons Mills	59	101101	Woods Hole	Hyannis Purity	89
101102	Woods Hole	CC Mall	98	101103	Woods Hole	CC Mall	98

Sea Line — Direction: inbound — Schedule: 6/24/95

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
104117	CC Hospital	CC Mall	12	104105	East Falmouth	CC Mall	55
104106	East Falmouth	Centerville Shops	35	104100	Falmouth Mall	CC Hospital	64
104101	Falmouth Mall	East Falmouth	16	104102	Falmouth Mall	Barnstable Village	89
104103	Falmouth Mall	Barnstable Village	80	104104	Falmouth Mall	CCCC	68
104118	Hyannis Bus	CCCC	13	104119	Hyannis Bus	Barnstable Village	22
104120	Hyannis Bus	Barnstable Village	22	104121	Hyannis Bus	Barnstable Village	22
104115	Hyannis Docks	CC Mall	12	104116	Hyannis Docks	Hyannis Bus	6
104112	Hyannis Purity	WE Rotary	3	104113	Hyannis Purity	WE Rotary	3
104114	Hyannis Purity	WE Rotary	3	104109	Mash Commons	CC Mall	46
104110	Osterville Center	WE Rotary	14	104111	Osterville Center	CCCC	35
104107	Waquoit (Metoxit Rd)	WE Rotary	37	104108	Waquoit (Metoxit Rd)	Marstons Mills	18

Sea Line — Direction: inbound — Schedule: 6/24/95

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
108116	Centerville Center	CC Mall	31	108117	Centerville Center	CC Mall	31
108114	Cotuit Landing	CC Hospital	31	108109	East Falmouth	Waquoit (Metoxit Rd)	8
108110	East Falmouth	Waquoit (Metoxit Rd)	8	108111	East Falmouth	CC Mall	74
108100	Falmouth Mall	Marstons Mills	46	108101	Falmouth Mall	CC Mall	87
108102	Falmouth Mall	Hyannis Docks	70	108103	Falmouth Mall	Mash Commons	25
108104	Falmouth Mall	CC Mall	83	108105	Falmouth Mall	Waquoit (Metoxit Rd)	9
108106	Falmouth Mall	Waquoit (Metoxit Rd)	9	108107	Falmouth Mall	Waquoit (Metoxit Rd)	8

Travel Time & Passenger Destinations by Origin

108108	Falmouth Mall	Waquoit (Metoxit Rd)	8	108119	Hyannis Docks	CC Mall	19
108113	Mash Commons	CC Mall	56	108115	Osterville Center	CC Mall	38
108112	Waquoit (Metoxit Rd)	Barnstable Village	95	108118	WE Rotary	CC Mall	19

Sea Line Direction: inbound Schedule: 6/24/95

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
103115	CC Mall	Barnstable Village	13	103109	East Falmouth	Centerville Shops	43
103110	East Falmouth	Waquoit (Metoxit Rd)	8	103100	Falmouth Mall	Marstons Mills	37
103101	Falmouth Mall	Mash Commons	27	103102	Falmouth Mall	Waquoit (Metoxit Rd)	18
103103	Falmouth Mall	Waquoit (Metoxit Rd)	18	103104	Falmouth Mall	Waquoit (Metoxit Rd)	18
103105	Falmouth Mall	Waquoit (Metoxit Rd)	18	103106	Falmouth Mall	Waquoit (Metoxit Rd)	18
103107	Falmouth Mall	Waquoit (Metoxit Rd)	14	103108	Falmouth Mall	CCCC	80
103114	Hyannis Purity	CC Hospital	8	103113	Marstons Mills	Hyannis Bus	30
103111	Mash Commons	Hyannis Bus	39	103112	Mashpee T.H.	WE Rotary	25

Sea Line Direction: inbound Schedule: 6/24/95

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
107103	CC Hospital	CC Mall	10	107100	Falmouth Mall	CC Mall	55
107101	Falmouth Mall	CC Mall	53	107102	Mash Commons	Hyannis Docks	26

Sea Line Direction: inbound Schedule: 5/25/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
118112		P & B Terminal	23	118111	Centerville Center	Centerville Shopping	1
118105	Mahoney's	Cotuit Landing	17	118104	Maravista Ave	Waquoit (Metoxit Rd)	9
118106	Osterville Center	P & B Terminal	31	118107	Osterville Center	P & B Terminal	31
118108	Osterville Center	P & B Terminal	31	118109	Osterville Center	Old Colony Rd	20
118110	Osterville Center	Old Colony Rd	20	118101	Teaticket (M all)	East Falmouth	9
118102	Teaticket (M all)	East Falmouth	9	118103	Teaticket (M all)	P & B Terminal	68
118115	WE Rotary	Pleasant St	14	118113	West Side Apts.	P & B Terminal	20
118114	West Side Apts.	P & B Terminal	20				

Sea Line Direction: outbound Schedule: 9/6/94

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
100104	CC Hospital	East Falmouth	56	100108	Cotuit Landing	Falmouth Center	41
100113	East Falmouth	Falmouth Bus	20	100114	East Falmouth	Falmouth Mall	5
100100	Hyannis Bus	Falmouth Bus	81	100101	Hyannis Bus	Woods Hole	90
100102	Hyannis Docks	WE Rotary	7	100103	Hyannis Docks	Stop & Shop	67
100105	Hyannis Purity	Cotuit Landing	28	100107	Marstons Mills	Cotuit Landing	6
100109	Mash Commons	Falmouth Mall	20	100110	Waquoit (Metoxit Rd)	Falmouth Mall	14
100111	Waquoit (Metoxit Rd)	Falmouth Mall	14	100112	Waquoit (Metoxit Rd)	Falmouth Mall	17
100106	WE Rotary	Hyannis Purity	5				

Sea Line Direction: outbound Schedule: 6/24/95

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
105100	Barnstable Village	Hyannis Bus	23	105101	CC Mall	East Falmouth	68
105109	East Falmouth	Falmouth Mall	13	105102	Hyannis Bus	Falmouth Mall	72
105103	Hyannis Purity	Falmouth Mall	51	105107	Mash Commons	East Falmouth	9
105104	Stop & Shop	Falmouth Mall	21	105105	Stop & Shop	Falmouth Mall	21
105106	Stop & Shop	Falmouth Mall	21	105108	Waquoit (Metoxit Rd)	Falmouth Mall	15

Sea Line Direction: outbound Schedule: 6/24/95

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
109105	CC Hospital	East Falmouth	46	109101	CC Mall	Hyannis Purity	30

109102	CC Mall	Hyannis Docks	14	109103	CC Mall	Hyannis Bus	8
109104	CC Mall	Osterville Center	41	109100	CCCC	Centerville Shops	43
109108	East Falmouth	Falmouth Mall	6	109107	Hyannis Purity	Falmouth Mall	46
109106	WE Rotary	Hyannis Purity	9				

Sea Line Direction: outbound Schedule: 6/24/95

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
102100	Barnstable Village	Hyannis Bus	25	102109	CC Hospital	Hyannis Purity	13
102103	CC Mall	Hyannis Purity	29	102104	CC Mall	Osterville Center	42
102105	CC Mall	Osterville Center	42	102101	CCCC	CC Mall	13
102102	CCCC	Hyannis Purity	38	102113	East Falmouth	Falmouth Mall	8
102106	Hyannis Bus	East Falmouth	61	102107	Hyannis Bus	Falmouth Mall	72
102108	Hyannis Bus	Falmouth Mall	72	102110	WE Rotary	Marstons Mills	23
102111	WE Rotary	Marstons Mills	21	102112	WE Rotary	Osterville Center	12

Sea Line Direction: outbound Schedule: 6/24/95

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
106101	CC Mall	WE Rotary	29	106102	CC Mall	Falmouth Mall	85
106103	CC Mall	Hyannis Purity	32	106104	CC Mall	Falmouth Mall	85
106105	CC Mall	Falmouth Mall	85	106106	CC Mall	East Falmouth	76
106100	CCCC	Osterville Center	59	106111	Cotuit Landing	East Falmouth	16
106112	Cotuit Landing	East Falmouth	16	106113	Cotuit Landing	East Falmouth	16
106116	East Falmouth	Falmouth Mall	8	106117	East Falmouth	Falmouth Mall	8
106118	East Falmouth	Falmouth Mall	8	106119	East Falmouth	Falmouth Mall	8
106107	Hyannis Bus	Falmouth Mall	78	106108	Hyannis Bus	Hyannis Purity	27
106109	Hyannis Bus	Falmouth Mall	77	106110	Hyannis Purity	Osterville Center	15
106114	Mash Commons	East Falmouth	13	106115	Mash Commons	Falmouth Mall	17

Sea Line Direction: outbound Schedule: 5/25/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
117106	Hyannis Docks	Federated	9	117107	Hyannis Docks	Post Office-Hyannis	10
117109	Mash Commons	Stop & Shop	18	117101	P&B Terminal	Mash Commons	51
117102	P&B Terminal	Teaticket (Mall)	74	117103	P&B Terminal	Stop & Shop	69
117104	P&B Terminal	Stop & Shop	69	117105	P&B Terminal	Teaticket (Mall)	74
117108	Post Office-Hyannis	Stop & Shop	53	117111	Seacoast Shores	Oxbow (Brick Kiln)	6
117110	Waquoit (Metoxit Rd)	East Falmouth	11				

The Villager Direction: inbound Schedule: 6/22/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
110102	Barnstable Rd	CCCC	15	110100	P&B Terminal	Friendly's	12
110101	P&B Terminal	CCCC	19	110103	P&B Terminal	IHOP	10
110104	P&B Terminal	Uno's	4	110105	P&B Terminal	Bearse's Way	13

The Villager Direction: outbound Schedule: 6/22/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
111100	Barnstable Village	CC Mall	19	111102	CC Mall	P & B Terminal	8
111103	CC Mall	P & B Terminal	8	111104	CC Mall	P & B Terminal	8
111105	CC Mall	P & B Terminal	8	111106	CC Mall	P & B Terminal	8
111107	CC Mall	P & B Terminal	8	111108	CC Mall	P & B Terminal	6
111109	CC Mall	P & B Terminal	6	111110	CC Mall	P & B Terminal	6
111101	CCCC	P & B Terminal	19				

Travel Time & Passenger Destinations by Origin

Yarmouth Easy Shuttle — Direction: C W — Schedule: 6/22/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
113100	P&B Terminal	Yarmouth Municipal Lot	17				

Yarmouth Easy Shuttle — Direction: C W — Schedule: 6/22/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
116103	College St.	P & B Terminal	19	116112	Higgins Crowell	P & B Terminal	17
116113	Higgins Crowell	P & B Terminal	17	116114	Higgins Crowell	P & B Terminal	17
116115	Higgins Crowell	P & B Terminal	17	116104	X-mas Tree Shop	P & B Terminal	17
116105	X-mas Tree Shop	P & B Terminal	17	116106	X-mas Tree Shop	P & B Terminal	17
116107	X-mas Tree Shop	P & B Terminal	17	116108	X-mas Tree Shop	P & B Terminal	17
116109	X-mas Tree Shop	P & B Terminal	17	116110	X-mas Tree Shop	P & B Terminal	17
116111	X-mas Tree Shop	P & B Terminal	17	116101	Yarmouth Lot	P & B Terminal	35
116102	Yarmouth Lot	Sportsworld	12				

Yarmouth Easy Shuttle — Direction: C W — Schedule: 6/22/96

Pax I.D.	Origin	Destination	Minutes	Pax I.D.	Origin	Destination	Minutes
112100	P&B Terminal	Wendward Way	9	112101	P&B Terminal	Wendward Way	9
112102	P&B Terminal	Yarmouth Municipal Lot	22	112103	P&B Terminal	Yarmouth Municipal Lot	22
112104	P&B Terminal	Pond St	20	112109	P&B Terminal	Yarmouth Municipal Lot	20
112110	P&B Terminal	Yarmouth Municipal Lot	20	112111	P&B Terminal	Yarmouth Municipal Lot	20
112112	P&B Terminal	Yarmouth Municipal Lot	20	112105	P&B Terminal	Pond St	20
112106	P&B Terminal	Pond St	20	112107	P&B Terminal	Pond St	20
112113	Snug Harbor Motel	Appleby Rd.	6				

Cape Cod Congestion Management System: Park and Ride Lots

Barnstable

Max %Full 116% Avg % Full 95%

		Vehicles		Spaces		% Full			Vehicles		Spaces		% Full
8/30/96-Fri	12:00	170	/	221	=	76.9%	8/28/96-Wed	9:25	198	/	221	=	89.6%
8/27/96-Tue	14:10	222	/	221	=	100.5%	8/13/96-Tue	10:15	224	/	221	=	101.4%
8/9/96-Fri	9:20	161	/	221	=	72.9%	8/8/96-Thu	10:20	256	/	221	=	115.8%
7/30/96-Tue	14:15	244	/	210	=	116.2%	7/26/96-Fri	8:35	170	/	221	=	76.9%
7/25/96-Thu	12:05	242	/	221	=	109.5%	7/24/96-Wed	12:15	229	/	221	=	103.6%
7/22/96-Mon	14:45	224	/	221	=	101.4%	7/19/96-Fri	9:30	195	/	221	=	88.2%
7/15/96-Mon	9:42	215	/	221	=	97.3%	7/11/96-Thu	14:30	240	/	221	=	108.6%
7/10/96-Wed	9:40	231	/	221	=	104.5%	7/9/96-Tue	10:40	230	/	221	=	104.1%
7/1/96-Mon	10:45	192	/	221	=	86.9%	6/24/96-Mon	10:00	200	/	212	=	94.3%
6/18/96-Tue	13:45	228	/	212	=	107.5%	6/17/96-Mon	9:30	182	/	215	=	84.7%
6/13/96-Thu	13:50	238	/	215	=	110.7%	6/10/96-Mon	10:20	218	/	215	=	101.4%
6/5/96-Wed	13:15	224	/	215	=	104.2%	7/20/95-Thu	8:00	200	/	225	=	88.9%
7/19/95-Wed	7:45	196	/	225	=	87.1%	7/18/95-Tue	9:00	213	/	225	=	94.7%
7/13/95-Thu	7:50	199	/	225	=	88.4%	7/12/95-Wed	7:55	208	/	225	=	92.4%
7/11/95-Tue	7:50	199	/	225	=	88.4%	7/6/95-Thu	8:00	198	/	225	=	88.0%
7/5/95-Wed	7:00	190	/	225	=	84.4%	6/28/95-Wed	8:30	209	/	225	=	92.9%
6/27/95-Tue	8:30	201	/	225	=	89.3%	6/22/95-Thu	7:50	190	/	225	=	84.4%
6/21/95-Wed	7:50	190	/	225	=	84.4%	6/20/95-Tue	8:30	207	/	225	=	92.0%
6/15/95-Thu	10:00	198	/	225	=	88.0%	6/14/95-Wed	8:20	208	/	225	=	92.4%
6/13/95-Tue	8:25	223	/	225	=	99.1%	6/13/95-Tue	15:00	228	/	225	=	101.3%

Harwich

Max %Full 16% Avg % Full 6%

10/10/96-Thu	11:15	12	/	75	=	16.0%	8/19/96-Mon	10:30	0	/	75	=	0.0%
8/14/96-Wed	14:15	8	/	75	=	10.7%	7/25/96-Thu	11:45	5	/	75	=	6.7%
7/17/96-Wed	11:15	4	/	75	=	5.3%	7/8/96-Mon	10:30	3	/	75	=	4.0%
6/25/96-Tue	9:40	1	/	75	=	1.3%	6/13/96-Thu	13:00	0	/	75	=	0.0%

Sagamore

Max %Full 94% Avg % Full 83%

8/27/96-Tue	14:35	342	/	377	=	90.7%	8/15/96-Thu	12:15	340	/	377	=	90.2%
8/9/96-Fri	8:50	273	/	377	=	72.4%	8/8/96-Thu	12:20	336	/	377	=	89.1%
7/30/96-Tue	11:45	352	/	377	=	93.4%	7/24/96-Wed	9:45	326	/	377	=	86.5%
7/19/96-Fri	9:00	246	/	377	=	65.3%	7/15/96-Mon	11:45	337	/	377	=	89.4%
7/10/96-Wed	13:00	335	/	377	=	88.9%	7/1/96-Mon	16:53	272	/	377	=	72.1%
6/28/96-Fri	8:40	268	/	377	=	71.1%	6/24/96-Mon	12:00	344	/	377	=	91.2%
6/21/96-Fri	9:10	268	/	377	=	71.1%	6/20/96-Thu	13:00	325	/	377	=	86.2%
6/17/96-Mon	10:05	290	/	377	=	76.9%	6/13/96-Thu	9:45	355	/	377	=	94.2%

Cape Cod Congestion Management System: Park and Ride Lots

		Vehicles		Spaces		% Full			Vehicles		Spaces		% Full
6/12/96-Wed	15:15	335	/	377	=	88.9%	6/8/95-Thu	7:40	305	/	377	=	80.9
6/6/95-Tue	8:10	328	/	377	=	87.0%	6/1/95-Thu	8:00	310	/	377	=	82.2
5/31/95-Wed	8:00	315	/	377	=	83.6%	5/30/95-Tue	8:00	294	/	377	=	78.0
5/25/95-Thu	8:05	302	/	377	=	80.1%	5/24/95-Wed	8:00	313	/	377	=	83.0%

Pavement Management System

BARNSTABLE COUNTY PAVEMENT MANAGEMENT SYSTEM

Barnstable County is in the process of implementing a pavement management system that will provide an objective tool for our region to:

- plan the budget for roadway maintenance, repair, and reconstruction,
- select projects knowing where pavements are that need repair, when repairs are required, and what repair strategy is appropriate, and
- evaluate the benefits of alternative projects.

The Federal Highway Administration defines pavement management systems as "A set of tools or methods that assist decision makers in funding cost-effective strategies for providing, evaluating and maintaining pavement in a serviceable condition."

The overall goal of the Barnstable County Pavement Management System is to obtain the greatest return on monetary investments of roadway pavement.

Recently, the region has completed the first phase of data collection for 555 miles of STP roads and 11 miles of NHS roads. The first phase consisted of hiring a consultant to inventory roadways and conduct a pavement conditions survey of 359 miles of roadway. The results of the asphalt condition survey ratings for those roadways inventoried follows:

Insert VHB final Report Here

File Name: Doc 1: PMS Summary for LRP 1996 Update

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Insert VHB final Report Here

File Name: Doc 1: PMS Summary for LRP 1996 Update

Barnstable County Asphalt Condition Surveys

STREET	SECTION	SURVDATE	POT-S	POT-E	ALL-S	ALL-E	DIST-S	DIST-E	RUT-S	RUT-E	BLK-S	BLK-E	T&L-S	T&L-E	POL-S	POL-E	RAV-S	RAV-E	COR-S	COR-E	COMMENTS	B/V	PCI	CURB	STID
126 CHATHAM RD	0	2/29/96	L	I	M	I	M	1	L	I			H	2			L	E			SECTION HAS CAPE COD BERM, NOT INC	89	76	0 0	169
126 DEPOT ST	0	2/29/96	L	I	M	2	L	I					M	2	H	L					SECTION HAS CAPE COD BERM, NOT INC	426	76	0 0	144
126 DEPOT ST	5702	2/29/96	L	I	M	2	L	I					M	2	H	L					SECTION HAS CAPE COD BERM, NOT INC	177	76	0 0	144
126 GREAT WESTERN RD	0	2/29/96	M	I	H	2	L	I	L	I			M	2			L	E			SECTION HAS CAPE COD BERM, NOT INC	425	64	0 0	154
126 GREAT WESTERN RD	3538	2/29/96	M	I	H	2	L	I	L	I			M	2			L	E			SECTION HAS CAPE COD BERM, NOT INC	288	64	0 0	154
126 GREAT WESTERN RD	9293	2/29/96	M	I	H	2	L	I	L	2	M	I	M	I			H	L			SECTION HAS CAPE COD BERM, NOT INC	277	62	0 0	154
126 LONG POND RD	0	2/29/96			L	4	L	I			M	I	M	4							CP CD BRM, NOT INC IN WIDTH; 5" GRANI	67	61	0 0	119
126 LONG POND RD	950	2/29/96	L	2	M	4	L	I			M	I	H	3			H	L			SECTION HAS CAPE COD BERM, NOT INC	54	55	0 0	119
126 LOWER COUNTY RD	0	2/26/96	L	I	H	I	L	I			H	I	H	3			H	L			BRIDGE DECK SURFACE IN POOR CONDI	245	67	5 5	113
126 MAIN ST	0	3/1/96	L	I	M	I	M	I	M	3	M	I	M	4	L	E					MOSTLY CP CD BRM,SM AMT 5" GRANITE	225	59	0 0	1
126 MAIN ST	2904	3/1/96	L	I	M	I	M	I	M	3	M	I	M	4	L	E					MOSTLY CP CD BRM,SM AMT 5" GRANITE	245	59	0 0	1
126 MAIN ST	4171	3/1/96	L	I	M	I	M	I	M	3	M	I	M	4	L	E					MOSTLY CP CD BRM,SM AMT 5" GRANITE	299	59	0 0	1
126 MAIN ST	7709	3/1/96	L	I	M	I	M	I	M	3	M	I	M	4	L	E					MOSTL CP CD BRM,SM AMT 5" GRANITE C	202	59	0 0	1
126 MAIN ST	8659	3/1/96	L	I	M	I	M	I	M	3	M	2	M	2	H	L					MOSTLY CP CD BRM,SM AMT 5" GRANITE	213	56	0 0	1
126 MAIN ST	11986	3/1/96	L	I	M	I	M	I	M	3	M	2	M	2	H	L					MOSTLY CP CD BERM; SMALL INTERVALS	105	56	0 0	1
126 MAIN ST	16262	3/1/96	L	I	M	I	M	I	M	3	M	2	M	2	H	L					MSTLY CP CD BRM,SM AMT 5" GRANITE C	160	56	0 0	1
126 MAIN ST	2	2/29/96	M	I	M	I	L	I	L	I			M	2			H	L				167	83	0 0	470
126 ORLEANS HARWICH	0	3/1/96	M	I	M	3	L	2	L	I	H	I	H	4	L	L					CP CD BRM,NOT INC IN WIDTH; MM5@697	252	61	0 0	139
126 ORLEANS HARWICH	9187	3/1/96			L	I	L	I	L	2			L	3	L	L					CP CD BRM,NOT IN WIDTH,MM3@ 17530'.D	412	80	0 0	139
126 ORLEANS HARWICH	19642	3/1/96			L	I	L	I	L	3			L	2	L	L					SECTION HAS CAPE COD BERM, NOT INC	367	82	0 0	139
126 PLEASANT LAKE AV	0	3/1/96	M	I	H	2	L	I			M	3	M	1	L	L	L	E			CP CD BRM,NOT IN WIDTH; MM3@6980'	286	66	0 0	115
126 PLEASANT LAKE AV	7762	3/1/96	L	I	L	3	L	I					M	4			H	L			SMALL INTERVALS OF 5" GRANITE CURBI	107	67	0 0	115
126 PLEASANT LAKE AV	8395	3/1/96	L	I	M	I	L	I	L	2	M	I	L	3	L	L	H	L			SECTION HAS CAPE COD BERM; NOT INC	618	76	0 0	115
126 PLEASANT LAKE AV	9557	3/1/96	L	I	M	I	L	I	L	2	M	I	L	3	L	L	H	L			SECTION HAS CAPE COD BERM; NOT INC	510	76	0 0	115
126 PLEASANT LAKE AV	13686	3/1/96	L	I	M	I	L	I	L	2	M	I	L	3	L	L	H	L			SECTION HAS CAPE COD BERM, NOT INC	416	76	0 0	115
126 QUEEN ANNE RD	0	2/29/96	L	I	H	4	L	2	M	I			H	1	H	L	L	E			CP CD BRM,NOT INC IN WIDTH,SEVERAL	108	40	0 0	161
126 QUEEN ANNE RD	11458	2/29/96	L	I	H	4	L	2	M	I			H	I	H	L	L	E			CP CD BRM,NOT INC IN WIDTH,SEVERAL	120	40	0 0	161
126 RT 28	0	2/29/96			M	I			M	2	M	I	M	2	L	E					SECTION HAS CAPE COD BERM; NOT INC	403	70	0 0	124
126 SISSON RD	0	3/1/96	L	I	M	I	L	I	L	2	M	I	L	3	L	L	H	L			SECTION HAS CAPE COD BERM, NOT INC	412	76	0 0	114
126 UNCLE VENIES RD	0	2/29/96	L	I	M	3	L	I					H	2			L	E			CP CD BRM,NOT INC IN WIDTH;WAS CRK	60	65	0 0	3
172 FALMOUTH RD	0	2/16/96																			NO DISTRESSES	0	100	0 0	13
172 FALMOUTH RD	1	2/16/96																			CP CD BRM;NOT INC IN WIDTH; ROTARY E	0	100	6 0	95
172 FALMOUTH RD	845	2/16/96																			NO DISTRESSES; CP CD BRM; DOES NOT	0	100	0 0	95
172 FORESTDALE RD	0	6/15/94			M	I			L	2	M	2	M	2								1165	85	0 0	4
172 GREAT NECK RD	0	6/15/94	L	I	M	I	L	I	L	I	M	2	M	2	L	L	L	L				429	78	0 0	23
172 GREAT NECK RD	1	6/15/94	L	I	M	I	L	I			M	I	M	3	L	L						248	74	0 0	11
172 GREAT NECK RD	10560	6/15/94			M	I	M	I					M	1	L	L						593	87	0 0	23
172 GREAT NECK RD	12250	6/15/94	L	I	M	I	M	I					M	2	L	L						227	84	0 0	23
172 GREAT OAK RD	0	6/15/94	M	I	M	2	M	2			M	2	M	2					L	L		152	70	0 0	24
172 GREAT OAK RD	10296	6/15/94	M	I	M	I	M	2			M	2	M	2								71	73	0 0	24
172 NATHAN ELLIS HIG	0	12/16/93	M	I	M	I	M	I	M	2			L	2								846	67	5 0	12
172 NATHAN ELLIS HIG	5966	12/16/93			H	2			M	2	M	2	L	2			H	L				876	61	5 0	12
172 QUINAQUESSET AVE	0	6/15/94	M	I	L	I	M	I	L	2	M	2	M	2	L	L						89	81	0 0	19
172 RED BROOK RD	0	6/15/94																			NO DISTRESSES	0	100	0 0	28
172 SANDWICH COTUIT	0	6/15/94			M	2			L	2	M	2	L	2							DATA COVERS ROADWAY FROM SANDWI	161	76	0 0	3
172 SANDWICH COTUIT	6864	6/15/94																			NO DISTRESSES	0	100	0 0	3
172 SANDWICH COTUIT	1	6/15/94	M	I	L	I	M	I					M	1								426	86	0 0	37
20 BARNSTABLE RD	0	8/17/95					M	I			L	3	M	2								217	82	6 0	14
20 BARNSTABLE RD	317	8/17/95					M	3			L	4										330	83	6 0	14
20 BARNSTABLE RD	1320	8/17/95									L	I	M	3								515	80	0 0	14
20 BARNSTABLE RD	2534	8/17/95									L	I	M	3								277	80	0 0	14
20 BARNSTABLE RD	3168	8/17/95									L	I	M	3								626	80	0 0	14
20 BEARSES WY	0	8/17/95			M	I	M	I			M	3	L	I								219	75	4 0	97
20 BEARSES WY	1162	8/17/95			M	I	M	I			M	3	L	I								219	75	4 0	97
20 BEARSES WY	2218	8/17/95									M	3	L	I								300	80	4 0	97
20 BEARSES WY	2957	8/17/95									M	3	L	I								300	80	4 0	97
20 BEARSES WY	3274	8/17/95									M	3	L	I								300	80	4 0	97
20 BEARSES WY	4013	8/17/95	M	I	M	2	M	I	M	2	M	3	L	I								759	64	0 0	97
20 CENTER ST	0	11/12/95											M	I	L	L			L	L		0	95	3 0	15
20 COTUIT RD	0	2/28/96			L	I							M	2							CAPE COD BERM; NOT INC IN WIDTH; RD	886	89	0 0	636
20 CRAIGVILLE BEACH	0	8/17/95	M	I	M	4	M	I			M	3	L	I							RECONSTRUCTED 1991	134	53	5 0	119
20 CRAIGVILLE BEACH	528	8/17/95	M	I	M	4	M	I			M	3	L	I							RECONSTRUCTED 1991	62	53	5 0	119
20 CRAIGVILLE BEACH	2851	8/17/95	M	I	M	2	M	I			M	3	H	2							RECONSTRUCTED 1991	139	69	0 0	119
20 CRAIGVILLE BEACH	3696	8/17/95	M	I	M	2	M	I			M	3	H	2							RECONSTRUCTED 1991	302	69	0 0	119
20 CRAIGVILLE BEACH	5122	8/17/95			M	I	M	I			M	I	M	2								446	85	6 0	119
20 CRAIGVILLE BEACH	7286	8/17/95			M	I	M	I			M	I	M	2								446	85	6 0	119
20 FALMOUTH RD	0	2/27/96					L	I	L	2			M	2							SECTION HAS CAPE COD BERM; NOT INC	2513	88	0 0	1
20 FALMOUTH RD	2798	2/27/96					L	I	L	2			M	2							SECTION HAS CAPE COD BERM; NOT INC	2686	88	0 0	1
20 FALMOUTH RD	11616	2/27/96							L	I			M	2							SECTION HAS CAPE COD BERM WHICH IS	2385	90	0 0	1
20 FALMOUTH RD	12197	2/27/96							L	I			M	2							SECTION HAS CAPE COD BERM WHICH IS	2669	90	0 0	1

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Barnstable County Asphalt Condition Surveys

STREET	SECTION	SURVDATE	POT-S	POT-E	ALL-S	ALL-E	DIST-S	DIST-E	RUT-S	RUT-E	BLK-S	BLK-E	T&L-S	T&L-E	POL-S	POL-E	RAV-S	RAV-E	COR-S	COR-E	COMMENTS	B/V	PCI	CURB	STID
20 FALMOUTH RD	14784	2/27/96			M	1			L	1	M	1	M	3								1023	77	0	0	1
20 FALMOUTH RD	27814	2/27/96			L	1	M	1			M	2	M	2						L	SECTION HAS CAPE COD BERM, NOT INC	1014	80	0	0	1
20 FALMOUTH RD	32578	2/27/96	H	1			M	1			M	1	M	2								1019	83	3	0	1
20 FALMOUTH RD	36386	2/27/96			L	1	M	1	M	2	L	1	L	1							SECTION HAS CAPE COD BERM BUT NOT	366	71	0	0	1
20 FALMOUTH RD	47678	2/27/96					L	2	L	2			L	1							CRACK SEALED	2043	87	4	0	1
20 FALMOUTH RD	48470	2/27/96			L	1			L	2	L	1	L	1							CRACK SEALED	1702	89	4	0	1
20 FALMOUTH RD	48787	2/27/96									L	1	L	1							CRACK SEALED	0	99	4	0	1
20 GOSNOLD ST	0	8/17/95					M	1	L	1	M	2	M	2								142	81	4	0	141
20 GREENWOOD AV	1	8/17/95	H	1	H	4	M	1					M	3			L	L			NEW PAVEMENT STA 0+00 TO STA 1+00	191	42	0	0	211
20 GREENWOOD AVE	0	8/17/95	M	1	L	3	M	1			L	2	L	1							CRACK SEALED	422	74	4	0	211
20 HIGH SCHOOL RD	0	8/17/95					M	1			L	4	L	1							CRACK SEALING	194	67	3	0	68
20 HIGH SCHOOL RD	1690	8/17/95					L	1														0	95	6	0	68
20 HYANNIS BARNSTAB	0	8/17/95	M	2	M	1	M	1			L	2	L	1								514	74	6	0	423
20 HYANNIS BARNSTAB	1584	8/17/95	M	2	M	1	M	1			L	2	L	1								514	74	6	0	423
20 IYANOUGH RD	1	2/26/96	M	1	L	1	M	1	M	2	M	2	M	2							CRACK SEALED; ADDITIONAL CRACKING	670	66	4	0	1511
20 IYANOUGH RD	0	2/28/96																			NO DISTRESSES; ROAD WIDENS TO 44' @	0	100	6	0	167
20 IYANOUGH RD	5500	2/28/96																			CAPE COD BERM; NOT INCLUDED IN WID	0	100	6	0	167
20 IYANOUGH RD	7100	2/28/96																			CAPE COD BERM; NOT INCLUDED IN WID	0	100	6	0	167
20 IYANOUGH RD	9700	2/26/96	H	1									M	1							CAPE COD BERM; NOT INCLUDED IN WID	2191	85	6	0	167
20 IYANOUGH RD	13600	2/29/96									M	1									CAPE COD BERM; NOT INCLUDED IN WID	0	95	6	0	167
20 IYANOUGH RD	18900	2/29/96					M	1	M	2	L	2	L	2							CP CD BRM;TOTAL LENGTH OF DISTRESS	800	71	0	0	167
20 LEWIS BAY RD	0	11/29/95	L	1			M	1	M	2	L	2	M	2								169	69	4	0	27
20 LEWIS BAY RD	634	11/29/95	L	1			M	1	M	2	L	2	M	2								169	69	4	0	27
20 LEWIS BAY RD	1056	11/29/95	L	1			M	1	M	2	L	2	M	2								169	69	4	0	27
20 LUMBERTS MILL RD	0	8/17/95					M	1					M	1							SECTION HAS CAPE COD BERM, NOT INC	315	90	0	0	395
20 LUMBERTS MILL RD	4224	8/17/95					M	1					M	1							SECTION HAS CAPE COD BERM, NOT INC	315	90	0	0	395
20 LUMBERTS MILL RD	7128	8/17/95																			NO DISTRESSES	0	100	0	0	395
20 MAIN ST CENT	0	8/17/95							M	1												552	85	0	0	241
20 MAIN ST CENT	1690	8/17/95			H	3	M	1			M	3	M	2								81	55	0	0	241
20 MAIN ST CENT	3379	8/17/95	M	1	H	2			M	2	M	3	H	2								221	62	0	0	241
20 MAIN ST HYAN	0	8/17/95			L	1	L	1			M	2	M	2								603	82	4	5	65
20 MAIN ST HYAN	1901	8/17/95					L	1			L	3	L	1								567	84	4	0	65
20 MAIN ST HYAN	2693	8/17/95					M	1	L	1			M	3	H	E						487	74	6	0	65
20 MAIN ST HYAN	7128	8/17/95	L	1	M	1	M	2			H	1	M	3								235	70	4	0	65
20 MAIN ST OSTE	0	8/17/95			M	1	M	1			M	1	M	1							SECTION HAS CAPE COD BERM; NOT INC	515	87	0	0	333
20 MAIN ST OSTE	6600	8/17/95	M	1	M	1	M	2			M	2	H	2								120	72	6	0	333
20 MAIN ST OSTE	8923	8/17/95			M	1	M	1			M	2	H	3								86	69	5	0	333
20 MAIN ST OSTE	10613	8/17/95											M	1								0	95	0	0	333
20 MAIN ST OSTE	11141	8/17/95											M	1								0	95	0	0	333
20 MAIN ST YARM	0	2/26/96	M	1	L	2	L	1	L	2	L	2	L	1							CAPE COD BERM; NOT INCL IN WIDTH ME	335	83	0	0	443
20 MAIN ST YARM	19378	2/26/96	H	1	L	1	M	1	L	1	L	1	L	1							ADDITIONAL MM13@25539';CAPCOD BRM	303	81	0	0	443
20 MAIN ST YARM	29304	2/26/96			L	1	M	1			L	1	L	1							STREET HAS CAPE COD BERM, NOT INCL	0	92	0	0	443
20 MAIN ST YARM	30254	2/26/96	M	2	H	1	M	1	H	2			L	1							CRACK SEALED	65	65	0	0	443
20 MAIN ST YARM	31046	2/26/96	M	2	H	1	M	1	H	2			L	1							CRACK SEALED	65	65	0	0	443
20 MAIN ST YARM	31838	2/26/96	H	1	H	1	H	3			M	2	H	3							CRACK SEALED, MOST HAS WORN OFF	160	49	4	0	443
20 MAIN ST YARM	33053	2/26/96	H	1	H	1	H	3			M	2	H	3							CRACK SEALED, MOST HAS WORN OFF	162	49	4	0	443
20 MAIN ST YARM	33475	2/26/96	H	1	H	1	H	3			M	2	H	3							CRACK SEALED, MOST HAS WORN OFF	115	49	4	0	443
20 MAIN ST YARM	34848	2/26/96	M	1	L	1	M	1	L	1	L	2	L	1							SECTION HAS CAPE COD BERM,NOT INCL	433	83	0	0	443
20 MAIN ST YARM	39389	2/26/96	M	1	L	1	M	1	L	1	L	2	L	1							SECTION HAS CAPE COD BERM,NOT INCL	532	83	0	0	443
20 MARSTON AV	0	8/17/95					L	1					L	1								0	95	3	0	137
20 MEETING HOUSE WA	0	4/12/96			M	1					M	1	M	3							CAPE COD BERM; NOT INCLUDED IN WID	89	77	0	0	556
20 MEETING HOUSE WA	528	4/12/96	L	1	M	2	L	1			H	3					L	L			GRANITE CURBING	90	67	6	0	556
20 MEETING HOUSE WA	1056	4/12/96	M	1	H	3	L	1			H	4	H	1			H	L			CAPE COD BERM, NOT INCLUDED IN WID	146	50	0	0	556
20 NORTH ST	0	2/29/96			M	1	L	1	L	2	M	1	M	4							SECTION HAS CAPE COD BERM - NOT IN	382	68	0	0	38
20 NORTH ST	1109	2/29/96			M	1	M	1	L	2	M	2	M	2								269	83	3	0	38
20 NORTH ST	2746	2/29/96					M	1	L	2	M	2	M	3								324	74	3	0	38
20 OAK ST CENTE	0	8/15/95																			NO DISTRESSES	0	100	0	0	496
20 OAK ST CENTE	5597	8/15/95																			NO DISTRESSES	0	100	0	0	496
20 OAK ST CENTE	5174	8/15/95					M	4			M	2					L	L	L	L		144	63	0	0	496
20 OCEAN AV	0	8/25/93	M	1			M	1	L	1												503	87	6	0	140
20 OCEAN AV	698	8/25/93	M	1			M	1	L	1												503	87	6	0	140
20 OCEAN AV	2059	8/17/95	H	1			M	1	M	2	L	3	L	1							SOME CRACK SEALING	192	72	3	0	140
20 OCEAN ST HYA	0	8/17/95	M	2	M	2	M	2			M	3	L	1								308	65	6	0	75
20 OCEAN ST HYA	792	8/17/95					M	1					M	2								609	88	3	0	75
20 OCEAN ST HYA	1584	8/17/95			M	1	M	1			M	1	M	1							ACTUAL PAVT WIDTH 50'-22' WIDE;PERPE	877	87	3	0	75
20 OCEAN ST HYA	2270	8/17/95					M	2														260	80	3	0	75
20 OCEAN ST HYA	4118	8/17/95					M	2														260	80	3	0	75
20 OLD COLONY RD	0	8/17/95									L	1	L	3								309	85	5	0	164
20 OLD COLONY RD	4382	8/17/95									L	1	L	3								438	85	5	0	164
20 OLD COLONY RD	4858	8/17/95	M	2	M	2					M	4	M	1								133	55	5	5	164

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Barnstable County Asphalt Condition Surveys

STREET	SECTION	SURVDATE	POT-S	POT-E	ALL-S	ALL-E	DIST-S	DIST-E	RUT-S	RUT-E	BLK-S	BLK-E	T&L-S	T&L-E	POL-S	POL-E	RAV-S	RAV-E	COR-S	COR-E	COMMENTS	B/V	PCI	CURB	STID
20 OLD FALMOUTH ROA	0	8/17/95			M	1	M	1			M	2	M	2								125	79	0 0	560
20 OLD STAGE RD	0	8/17/95			M	1	M	1					M	2								178	85	0 0	242
20 OLD STAGE RD	6072	8/17/95	M	2	M	3	M	2			M	2	L	1								24	58	0 0	242
20 OLD STAGE RD	7075	8/17/95			M	2	M	1	M	2	M	2	L	1								689	70	8 0	242
20 OLD STAGE RD	16421	8/17/95	M	1	M	3	M	1	M	3	M	3	L	1								82	54	0 0	242
20 OSTERVILLE WEST	0	8/15/95					M	1	L	1			M	1								0	96	0 0	394
20 OSTERVILLE WEST	4118	8/15/95	L	1	M	1	L	1	M	2			L	1								405	70	0 0	394
20 OSTERVILLE WEST	9662	8/15/95	M	2	M	2	M	1	M	2	M	2	M	2								68	64	0 0	394
20 PHINNEYS LN	0	8/17/95					L	1	H	1												268	79	5 0	419
20 PHINNEYS LN	422	8/17/95					L	1					H	1								0	94	5 0	419
20 PHINNEYS LN	6442	8/17/95																			NO DISTRESSES	0	100	0 0	419
20 PHINNEYS LN	9029	8/17/95																			NO DISTRESSES	0	100	0 0	419
20 PHINNEYS LN	10613	8/17/95																			NO DISTRESSES	0	100	0 0	419
20 PHINNEYS LN	11088	8/17/95	L	1	L	1	L	1	H	1			L	1								1162	87	0 0	419
20 PHINNEYS LN	15312	8/17/95			L	1	M	1					L	1								0	92	6 0	419
20 PHINNEYS LN	15734	8/17/95			L	1	M	1					L	1								0	92	6 0	419
20 PHINNEYS LN	1	8/17/95	L	1	L	1	L	1														0	93	6 0	841
20 PINE ST CENT	0	8/17/95			M	1	M	1			M	2	M	2								384	79	0 0	230
20 PINE ST CENT	3221	8/17/95					M	1			M	1	M	1								1091	89	0 0	230
20 PITCHERS WY	0	8/17/95											M	1								0	95	0 0	100
20 PITCHERS WY	2693	8/17/95			M	1	M	1			M	2	L	1								190	80	0 0	100
20 PITCHERS WY	9026	8/17/95					M	1					M	1							SECTION HAS CAPE COD BERM; NOT INC	584	90	0 0	100
20 PROSPECT ST	0	8/17/95									M	3	L	1								209	80	0 0	550
20 PROSPECT ST	686	8/17/95									M	3	L	1								199	80	0 0	550
20 PROSPECT ST	1267	8/17/95	M	1			M	2			M	3	L	1								393	72	4 0	550
20 PROSPECT ST	2165	8/17/95	M	1			M	2			M	3	L	1								360	72	4 0	550
20 PROSPECT ST	7814	8/17/95					M	1					M	1								896	90	0 0	550
20 PROSPECT ST	11299	8/17/95																			NO DISTRESSES; CAPE COD BERM NOT I	0	100	0 0	550
20 PROSPECT ST	15787	8/17/95																			CAPE COD BERM; NOT INCLUDED IN WID	0	100	0 0	550
20 PROSPECT ST	19589	8/17/95																			CAPE COD BERM; NOT INCLUDED IN WID	0	100	0 0	550
20 PUTNAM AV	0	8/17/95	L	1	M	1	L	1	M	2			L	1			L	L				51	70	0 0	609
20 PUTNAM AV	475	8/17/95	L	1	M	1	L	1	M	2			L	1			L	L				60	70	0 0	609
20 RACE LN	0	3/15/96	M	1	M	2	M	1	M	2	M	2	L	1								251	67	0 0	498
20 SCHOOL ST COTUIT	0	8/17/95			M	1	M	1			M	2	L	2							ALL CRACKS ARE SEALED	137	80	6 0	587
20 SCHOOL ST COTUIT	1320	8/17/95	M	1	M	2	M	1	H	2	M	3	L	1								17	61	0 0	587
20 SCHOOL ST COTUIT	2218	8/17/95	M	1	M	2	M	1	H	2	M	3	L	1								7	61	0 0	587
20 SCHOOL ST COTUIT	2957	8/17/95	M	1	M	2	M	1	H	2	M	3	L	1								53	61	0 0	587
20 SCHOOL ST COTUIT	3379	8/17/95	M	1	M	2	M	1	H	2	M	3	L	1								53	61	0 0	587
20 SCHOOL ST COTUIT	3960	8/17/95	M	1	M	2	M	1	H	2	M	3	L	1								53	61	0 0	587
20 SCUDDER AV	3643	8/17/95											M	1							SECTION HAS CAPE COD BERM; NOT INC	0	95	3 0	101
20 SCUDDER AV	4646	8/17/95											M	1							SECTION HAS CAPE COD BERM; NOT INC	0	95	3 0	101
20 SCUDDER AV	6547	8/17/95											M	1							SECTION HAS CAPE COD BERM; NOT INC	0	95	3 0	101
20 SHOOT FLYING HIL	0	8/17/95			M	1	M	1	M	2	M	3										289	69	0 0	345
20 SHOOT FLYING HIL	7392	8/17/95			M	1					M	2	M	2								277	82	0 0	345
20 SHOOT FLYING HIL	8448	8/17/95			M	1					M	2	M	2								277	82	0 0	345
20 SMITH ST	0	8/17/95											M	1								0	95	2 0	133
20 SMITH ST	581	8/17/95											M	1								0	95	2 0	133
20 SOUTH COUNTY ROA	0	8/17/95			M	1	L	1					M	2								255	86	6 0	548
20 SOUTH MAIN STREE	0	8/17/95			M	1	M	1			M	2	H	2								173	79	5 0	334
20 SOUTH MAIN STREE	1848	8/17/95			M	1	M	1			M	2	H	2								173	79	5 0	334
20 SOUTH MAIN STREE	3654	8/17/95	M	1	M	2	M	2			M	2	H	3								215	61	6 0	334
20 SOUTH MAIN STREE	5280	8/17/95	M	1	M	2	M	2			M	2	H	3								215	61	6 0	334
20 SOUTH MAIN STREE	6970	8/17/95	M	1	M	2	M	2			M	2	H	3								465	61	6 0	334
20 SOUTH MAIN STREE	7709	8/17/95					M	1					M	2								509	88	4 0	334
20 SOUTH ST HYA	0	8/17/95					L	2			M	2	M	2								1509	88	6 0	74
20 SOUTH ST HYA	3696	8/17/95			M	1	M	1					M	2								1079	85	6 0	74
20 SOUTH ST HYA	4330	8/17/95					M	1									L	L				1247	90	3 0	74
20 STRAWBERRY HILL	0	8/17/95																			NO DISTRESSES	0	100	4 0	238
20 STRAWBERRY HILL	1373	8/17/95																			NO DISTRESSES	0	100	0 0	238
20 WEQUAQUET LN	0	8/17/95																			NO DISTRESSES	0	100	0 0	240
20 WEST MAIN ST	0	8/17/95					M	1					M	1								912	90	6 0	39
20 WEST MAIN ST	1637	8/17/95					M	1					M	1								2806	90	6 0	213
20 WEST MAIN ST	5174	8/17/95					M	1					M	1								741	90	6 0	213
20 WEST MAIN ST	6706	8/17/95					M	1					M	1								2806	90	6 0	213
20 WEST MAIN ST	8026	8/17/95					M	1					M	1								1425	90	6 0	213
20 YARMOUTH RD	0	8/17/95			H	1			M	1	L	1	M	2								351	82	5 0	2
20 YARMOUTH RD	1584	8/17/95	L	1	M	3	M	2					M	2								213	63	4 0	2
20 YARMOUTH RD	1848	8/17/95	M	1			L	1	L	2	L	3	M	1	L	L						1151	78	6 0	2
20 YARMOUTH RD	7022	8/17/95	M	1			L	1	L	2	L	3	M	1	L	L						912	78	6 0	2
224 CHATHAM RD	0	1/30/96			L	1	L	1	L	2			M	1	L	L	L	L			MM3@13138,MM1@2619;MM0&2 MISSING	1891	87	5.5	6

pot=potholes;all=alligator;dist=distortion;rut=rutting;blk=block cracking;t=transverse longitudinal cracking;

pol=polishing;rav=raveling;cor=corrugation S=SEVERITY E=EXTENT

Barnstable County Asphalt Condition Surveys

STREET	SECTION	SURVDATE	POT-S	POT-E	ALL-S	ALL-E	DIST-S	DIST-E	RUT-S	RUT-E	BLK-S	BLK-E	T&L-S	T&L-E	POL-S	POL-E	RAV-S	RAV-E	COR-S	COR-E	COMMENTS	B/V	PCI	CURB	STID
224 CHATHAM RD	22229	1/30/96			L	1	L	1	L	2			L	1	L	L	H	L			CP CD BRM,NOT IN WIDTH,MM 5 MISSING	629	87	0	6
224 CHATHAM RD	22704	1/30/96			L	1	L	1	L	2			L	1	L	L	H	L			CP CD BRM, NOT INC IN WIDTH,DISTORTI	1013	87	0	6
224 CRANBERRY HIGHWY	0	1/30/96					L	1	M	2			L	1	L	L					GRANITE CRBING; HIGH SEVERITY RUTTI	458	74	6	3
224 CRANBERRY HIGHWY	2059	1/30/96			L	1	L	1	M	2			L	1	L	L					CP CD BRM,NOT INC IN WIDTH;GRANITE C	632	72	5	3
224 CRANBERRY HIGHWY	3168	1/30/96			L	1	L	1	M	2			L	1	L	L					CP CD BRM,NOT INC IN WIDTH; GRANITE	632	72	5	3
224 CRANBERRY HIGHWY	3960	1/30/96			L	1	L	1	M	2			L	1	L	L					CP CD BRM; NOT INC IN WIDTH; GRANITE	638	72	5	3
224 CRANBERRY HIGHWY	4118	1/30/96			L	1	L	1	M	2			L	1	L	L					CP CD BRM; NOT INC IN WIDTH; GRANITE	971	72	5	3
224 CRANBERRY HIGHWY	5386	1/30/96			L	1	L	1	M	2			L	1	L	L					CP CD BRM; NOT INC IN WIDTH; GRANITE	983	72	5	3
224 CRANBERRY HIGHWY	7814	1/30/96			L	1	L	1	M	2	M	2	M	2	L	L	L	E			CP CD BRM,NOT INC IN WIDTH;GRNIT CR	1024	69	5	3
224 CRANBERRY HIGHWY	10032	1/30/96			L	3			L	2	M	1	M	2			L	E			SECTION HAS CAPE COD BERMING, NOT	744	75	0	3
224 HARWICH RD	0	1/30/96	M	1	M	2	L	1			L	3	L	1	L	E					CP CD BRM,NOT INC IN WIDTH,BLK & TL N	255	75	0	79
242 BRADFORD ST	0	1/29/96	L	1	M	1	L	1			H	2	H	2	L	E					CP CD BRM;NOT INC IN WIDTH; MM 61 IS I	193	73	0	3
242 BRADFORD ST	3079	1/29/96	L	1	M	3					M	2	M	2								344	66	5	3
242 BRADFORD ST	5861	1/29/96			L	1	L	1	L	2			M	2			L	L			GRANITE CURBING, MM 60 IS MISSING	2136	66	5	3
242 BRADFORD ST	6389	1/26/96			M	1	M	1					M	2			L	L			CP CD BRM;DISTOR ⊕ CTCH BSNS&UTIL	2126	85	0	3
242 BRADFORD ST	6917	1/26/96	L	1	M	2							M	2			H	L				1059	77	0	3
242 BRADFORD ST	12144	1/26/96			M	2	L	1	L	2	M	2	M	2	L	L	L	E				407	73	0	3
242 COMMERCIAL STREE	0	1/26/96	L	1			L	1	L	2			M	1	L	L					SECTION HAS CAPE COD BERM; NOT INC	899	87	0	23
242 COMMERCIAL STREE	4277	1/26/96	L	1			L	1	L	2			M	1	L	L					GRANITE CURBING FROM STA 4445 TO 50	1438	87	0	23
242 PROVINCE LAND RD	0	1/29/96	H	1	H	1			H	2			M	1							CPE CD BRM,NOT INC IN WIDTH;DISTRES	26	57	0	1
261 CHASE RD	3485	11/15/94	M	1	L	4	M	3	M	2	L	3	L	1					H	L		72	46	0	6
261 COTUIT RD NORT	0	9/15/93					L	1					M	1								0	95	0	17
261 COTUIT RD NORT	7445	9/15/93					L	1					L	1								0	95	0	17
261 COTUIT RD SOUT	0	9/15/93																			NO DISTRESSES	0	100	0	104
261 CRANBERRY HIGHWY	0	1/25/96			L	1	L	1	L	2	M	1	L	1	H	L					CRACK SEALED	1257	86	0	1
261 CRANBERRY HIGHWY	686	1/25/96			L	1	L	1	L	2	M	1	L	1	H	L					CRACK SEALED	1521	86	0	1
261 CRANBERRY HIGHWY	7181	1/25/96			L	1	L	1	L	1	M	1	L	1	H	L					CRACK SEALED	0	92	0	1
261 CRANBERRY HIGHWY	8501	1/25/96			L	1	M	1			L	2	L	1							CRACK SEALED	1064	86	5	1
261 CRANBERRY HIGHWY	10138	1/25/96					M	1	M	2	L	1	L	1							CRACK SEALED	712	72	0	1
261 CRANBERRY HIGHWY	11616	1/25/96			L	2	M	1	M	2	L	2	L	1			H	L			CRACK SEALED	336	80	0	1
261 CRANBERRY HIGHWY	21542	1/25/96			L	2	M	1	M	2	L	2	L	1			H	L			CRACK SEALED, MM6 ⊕ 28341'	336	80	0	1
261 CRANBERRY HIGHWY	30413	1/25/96			L	2	M	1	M	2	L	2	L	1			H	L			CRACK SEALED;	336	80	0	1
261 CRANBERRY HIGHWY	31733	1/25/96			L	2	M	1	M	2	L	2	L	1			H	L			CRACK SEALED; MM 8 ⊕ 38916'	289	80	0	1
261 FARMERSVILLE RD	0	9/15/93					L	1					L	1	L	L						0	95	0	11
261 FARMERSVILLE RD	581	9/15/93											L	1	L	L						0	99	0	11
261 FORESTDALE RD	0	7/28/95			L	2	L	1	L	1			M	2								1157	88	0	218
261 FORESTDALE RD	3854	7/28/95	L	1							L	2										1498	89	0	218
261 FORESTDALE RD	9979	7/28/95									L	1										0	99	0	218
261 FORESTDALE RD	12355	7/28/95							L	2			L	1	L	L					ROAD WIDENS AT QUAKER MEETING HOU	1020	90	5	218
261 FORESTDALE RD	2798	7/28/95											L	1							WIDTH INCREASES AT RAMP'S ENTRANC	0	99	0	218
261 FORESTDALE RD	2957	7/28/95											L	1							WIDTH INCREASES AT RAMP'S ENTRANC	0	99	0	218
261 FORESTDALE RD	20064	7/28/95							M	1			L	1	L	L	L	L				968	85	0	218
261 GREAT HILL RD	0	1/15/94	M	1	M	2	M	2	M	2			H	2							DISTRESS SURVEY COVERS CHASE RD T	50	65	0	6
261 MAIN ST	0	4/12/96			M	1	L	1					M	2							CAPE CD BERM; NOT INCLUDED IN WIDTH	612	86	0	22
261 NEWTOWN RD	0	4/12/96			H	3	L	1			H	2	H	2			H	L			CPE CD BRM,INSUFFICIENT CRK SEALNT	49	55	0	10
261 QUAKER MEETING H	4488	9/15/93					L	1					L	2								0	94	0	93
261 QUAKER MEETING H	5122	9/15/93					L	1					L	2								0	94	0	93
261 QUAKER MEETING H	5861	9/15/93					L	1					M	2								1257	89	0	93
261 QUAKER MEETING H	11194	7/15/95											L	1								0	99	0	93
261 QUAKER MEETING H	16579	9/15/93			L	1	L	1	L	1			L	1			L	L				0	93	0	93
261 RACE LN	0	1/15/94											L	1	L	L						0	99	0	9
261 WATER ST	0	10/15/94																			NO DISTRESSES	0	100	6	21
261 WATER ST	1214	10/15/94																			NO DISTRESSES	0	100	6	21
261 WATER ST	2165	10/15/94																			NO DISTRESSES	0	100	6	21
300 SHORE RD	0	1/25/96	L	1	M	2	L	1	L	2	M	4	H	2	L	L	L	E			CP CD BRM,STA 0-140, A 140' BIT CONC P	83	53	0	2
300 SHORE RD	1056	1/25/96	L	1	M	2	L	1	L	2	M	4	H	2	L	L	L	E			SECTION HAS CAPE COD BERM; NOT INC	82	53	0	2
300 SHORE RD	3538	1/25/96	L	1	M	2	L	1	L	2	M	4	H	2	L	L	L	E			CP CD BRM; MM53 & 55 MISSING; MM 56 ⊕	84	53	0	2
351 BUCK ISLAND RD	0	3/1/96			M	3					M	2	M	2							CP CD BRM;NOT INC IN WIDTH;CRACK SE	147	68	0	471
351 BUCK ISLAND RD	5914	3/1/96			M	1	M	1			L	2	M	2							CP CD BRM;CRK SEALED,NEW CRACKS,I	602	84	0	471
351 BUCK ISLAND RD	10243	3/1/96			M	1	M	1			L	2	M	2							CP CD BRM;CRACK SEALED,NEW CRACK	366	84	0	471
351 CAMP ST	0	3/1/96							L	2												445	90	0	566
351 CRANBERRY HIGHWY	0	2/1/96			L	1							L	1							SECTION HAS CAPE COD BERM, NOT INC	0	95	0	34
351 CRANBERRY HIGHWY	8659	2/1/96	H	1	L	1	L	1	L	2	M	1	M	4							CP CD BRM,NOT INC IN WIDTH,MOST CRA	860	66	0	34
351 CRANBERRY HIGHWY	10243	2/1/96	H	1	L	1	L	1	L	2	M	1	M	4							CP COD BRM,NOT INC IN WIDTH;MOST CR	494	66	0	34
351 CRANBERRY HIGHWY	14362	2/1/96	H	1	L	1	L	1	L	2	M	1	M	4							CP CD BRM,NOT INC IN WIDTH;MOST CRA	443	66	0	34
351 CRANBERRY HIGHWY	15470	2/1/96	H	1	L	1	L	1	L	2	M	1	M	4							CP CD BRM;NOT INC IN WIDTH;MOST CRA	802	66	0	34
351 CRANBERRY HIGHWY	16216	2/1/96	H	1	L	1	L	1	L	2	M	1	M	4							CP CD BRM;NOT INC IN WIDTH;MOST CRA	648	66	0	34
351 EAST MAIN ST	0	3/3/96	H	1			M	1			M	1	L	1								777	82	6	432
351 FOREST RD	0	3/1/96			L	1					L	1	L	1							CRACK SEALED	0	95	4	276
351 FOREST RD	792	3/1/96																			NO DISTRESSES	0	100	0	276

pot-potholes;all-alligator;dist-distortion;rut-rutting;blk-block cracking;t-transverse longitudinal cracking;

pol-polishing;rav-raveling;cor-corrugation S-SEVERITY E-EXTENT

Barnstable County Asphalt Condition Surveys

STREET	SECTION	SURVDATE	POT-S	POT-E	ALL-S	ALL-E	DIST-S	DIST-E	RUT-S	RUT-E	BLK-S	BLK-E	T&L-S	T&L-E	POL-S	POL-E	RAV-S	RAV-E	COR-S	COR-E	COMMENTS	B/V	PCI	CURB	STID
351 FOREST RD	1426	3/1/96																			NO DISTRESSES	0	100	0	276
351 GREAT WESTERN RO	0	7/15/94																			NO DISTRESSES; OVERLAYED IN 1993	0	100	0	136
351 HIGGINS CROWELL	0	3/1/96			L	3					L	3	L	1							CRACK SEALED	328	78	0	19
351 HIGGINS CROWELL	3802	3/1/96			L	3					L	3	L	1							CRACK SEALED	261	78	0	19
351 HIGGINS CROWELL	7022	3/1/96			M	2					L	2	M	2							CP CD BRM,NOT INC IN WIDTH,CRACK SE	248	78	0	19
351 HIGHBANK RD	0	2/13/96	M	I	L	I	L	I			L	I	L	4							CP CD BRM,NOT INC IN WIDTH,MOST CRA	210	75	0	57
351 HIGHBANK RD	2693	2/13/96	M	I	L	I	L	I			L	I	L	4							CP CD BRM, NOT INC IN WIDTH, MOST CR	352	75	0	57
351 LONG POND DR	0	3/3/96	M	I	L	I	M	2					L	1							CRACK SEALED	203	78	6	278
351 LONG POND DR	4382	3/3/96	M	I	L	I	M	2					L	1							CRACK SEALED	334	76	6	278
351 LONG POND DR	6864	3/3/96	M	I	L	I	M	2					L	1							CRACK SEALED	334	76	6	278
351 LONG POND DR	8818	3/3/96											L	1								0	99	5	278
351 MAIN ST	0	3/3/96					M	I	L	I	M	I	M	1								0	96	3	58
351 MAIN ST	792	3/3/96					M	I	L	I	M	I	M	1								0	96	3	58
351 MAIN ST	6178	3/3/96					M	I	L	I	M	I	M	1								0	96	3	58
351 NORTH DENNIS RD	1584	4/12/96	H	I	M	I	L	I	L	I			L	1			H	L			CP CD BRM, NOT INC IN WIDTH MEASURE	193	80	0	45
351 NORTH MAIN STREE	0	7/15/94																			NO DISTRESSES; OVERLAY AND NEW SID	0	100	6	59
351 NORTH MAIN STREE	158	7/15/94																			NO DISTRESSES; OVERLAY AND NEW SID	0	100	6	59
351 NORTH MAIN STREE	528	7/15/94																			NO DISTRESSES; OVERLAY AND NEW SID	0	100	6	59
351 NORTH MAIN STREE	1373	7/15/94																			NO DISTRESSES; OVERLAY AND NEW SID	0	100	6	59
351 NORTH MAIN STREE	3379	7/15/94																			NO DISTRESSES; OVERLAY AND NEW SID	0	100	6	59
351 NORTH MAIN STREE	3907	7/15/94																			NO DISTRESSES; OVERLAY AND NEW SID	0	100	6	59
351 NORTH MAIN STREE	4858	7/15/94																			NO DISTRESSES; OVERLAY AND NEW SID	0	100	6	59
351 NORTH MAIN STREE	6230	7/15/94																			NO DISTRESSES,OVERLAY AND NEW SID	0	100	6	59
351 NORTH MAIN STREE	8659	7/15/94																			NO DISTRESSES; OVERLAY AND NEW SID	0	100	6	59
351 OLD TOWN HOUSE R	0	3/3/96	H	I	L	I							L	1							CAPE COD BERM;NOT INCLUDED IN WIDT	176	84	0	21
351 OLD TOWN HOUSE R	1637	3/3/96	M	I	L	I	L	I	L	2			L	1							CP CD BRM; NOT INCLUDED IN WIDTH; CR	1465	85	0	21
351 REGIONAL AV	0	2/14/96			L	I							M	3							CP CD BRM;NOT INCLUDED IN WIDTH; HE	208	79	6	173
351 RT TWENTY EIG	0	3/3/96			M	I					M	I	M	4								903	72	6	23
351 RT TWENTY EIG	2857	3/3/96			M	I					M	I	M	3								902	77	6	23
351 RT TWENTY EIG	8554	3/3/96			M	I					M	I	M	3								942	77	6	23
351 RT TWENTY EIG	10560	3/3/96			M	I					M	I	M	3								729	77	6	23
351 RT TWENTY EIG	11141	3/3/96			M	I					M	I	M	3								737	77	6	23
351 RT TWENTY EIG	18269	3/3/96	L	I	M	I	L	I	L	3	M	I										572	80	6	23
351 RT TWENTY EIG	22862	3/3/96											L	2								0	95	6	23
351 SETUCKET RD	0	4/12/96					M	I	M	I			L	1							CAPE CD BRM; EXC CRACK SEALANT; AP	154	82	0	1116
351 SHERIDAN RD	0	4/12/96					L	1					L	2								0	94	0	60
351 STATION AV	0	3/3/96			L	2	M	I	M	2	L	2	L	1							CRACK SEALED	400	80	0	24
351 STATION AV	3485	3/3/96			L	I	M	I			L	I	L	1							CRACK SEALED	0	92	4	24
351 STATION AV	2006	3/3/96			L	I	M	I			L	I	L	1							CRACK SEALED	0	92	4	24
351 STATION AV	6547	3/3/96			L	I	M	I			L	I	L	1							CRACK SEALED	0	92	4	24
351 STATION AV	8554	3/3/96					M	I			L	I	L	1							CRACK SEALED	1357	90	6	24
351 STATION AV	9504	3/3/96					M	I			M	3	M	1								615	77	5	24
351 TOWN BROOK RD	0	3/1/96	H	I	M	2	L	I	M	I	L	I	L	1							CRACK SEALED; ADDITIONAL CRACKING	400	71	0	562
351 UNION ST	1214	2/14/96	M	I	M	I	L	I			M	I	M	4			L	L			SECTION HAS CAPE COD BERM; NOT INC	219	68	6	22
351 UNION ST	2323	2/14/96	M	I	M	I	L	I			M	I	M	4			L	L			SECTION HAS CAPE COD BERM; NOT INC	219	68	6	22
351 UNION ST	2429	2/14/96			M	I	L	I					M	2	L	L					CP CD BRM,NOT INC IN WIDTH; SOME CR	798	86	0	22
351 WEST YARMOUTH RO	0	2/1/96			M	I	L	2					M	3							LONGITUDINAL UTIL RELATED DIST IN NB	109	75	0	20
351 WEST YARMOUTH RO	2218	2/1/96			L	I	L	I					L	1							SECTION HAS CAPE COD BERM; NOT INC	0	94	0	20
351 WEST YARMOUTH RO	13094	2/1/96			M	2					M	I	M	4								163	70	6	20
351 WEST YARMOUTH RO	14203	2/1/96	L	I	M	I	L	I	L	2			L	2								0	85	0	20
351 WEST YARMOUTH RO	14467	2/1/96	L	I	M	I	L	I	L	2			L	2								0	85	0	20
351 WEST YARMOUTH RO	15365	2/1/96	L	I	M	I	L	I	L	2			L	2								0	85	0	20
351 WEST YARMOUTH RO	15576	2/1/96	L	I	M	I	L	I	L	2			L	2								0	85	0	20
351 WEST YARMOUTH RO	15734	2/1/96	L	I	M	I	L	I	L	2			L	2								0	85	0	20
351 WHITES PATH	0	2/14/96											L	1							SECTION HAS CAPE COD BERM; NOT INC	0	99	5	29
351 WHITES PATH	6706	2/14/96			M	I							M	3								419	78	0	29
351 WILLOW ST	0	7/15/94																			CIR AND OVERLAY IN 1994; NO DISTRESS	0	100	6	4
351 WILLOW ST	1742	7/15/94																			NO DISTRESSES; OVERLAY 1993	0	100	0	4
351 WILLOW ST	4858	7/15/94																			CIR AND OVERLAY 1994; NO DISTRESSES	0	100	6	4
351 WILLOW ST	5122	7/15/94																			CIR AND OVERLAY 1994; NO DISTRESSES	0	100	6	4
351 WILLOW ST	5491	4/15/94	M	I	M	I					H	2	H	2	L	E						139	73	5	4
351 WILLOW ST	6019	4/15/94	M	I	M	I					H	2	H	2	L	E						487	73	5	4
351 WILLOW ST	6917	4/15/94			M	I					M	I	M	3							SHIM COAT ON BOTH LANES	1055	77	0	4
351 WILLOW ST SO	0	4/15/94			M	I					M	I	M	3							SHIM COAT ON BOTH LANES	193	77	0	599
351 WINSLOW GRAY RD	0	3/3/96	H	I	H	2	M	2			M	I	M	2			H	E			CRACK SEALED; CRACKS RE-OPENED	63	59	5	392
351 WINSLOW GRAY RD	1320	3/3/96	H	I	H	2	M	2			M	2	M	2			H	L			CRACK SEALED; SOME CRACKS HAVE RE	181	58	0	392
351 WOOD RD	0	3/1/96	M	I	L	2	L	I			L	2	L	1								0	85	0	166
351 WOOD RD	1056	3/1/96											M	2							CRACK SEALED; ADDITIONAL CRACKING	969	90	6	166
351 WOOD RD	3274	3/1/96											M	2							CRACK SEALED; ADDITIONAL CRACKING	337	90	6	166
351 WOOD RD	4648	3/1/96											M	2							CRACK SEALED; ADDITIONAL CRACKING	989	90	6	166

Barnstable County Asphalt Condition Surveys

STREET	SECTION	SURVDATE	POT-S	POT-E	ALL-S	ALL-E	DIST-S	DIST-E	RUT-S	RUT-E	BLK-S	BLK-E	T&L-S	T&L-E	POL-S	POL-E	RAV-S	RAV-E	COR-S	COR-E	COMMENTS	B/V	PCI	CURB	STID
351 WOOD RD	5069	3/1/96											M	2							CRACK SEALED, ADDITIONAL CRACKING	517	90	6 0	166
36 BUZZARDS BAY BYP	0	1/25/96			M	1	M	1	L	2	M	1	M	4							CP CD BRM, 2 LANES WESTBOUND, 1 LAN	673	67	0 0	354
36 BUZZARDS BAY BYP	1954	1/25/96							L	2			M	4							CP CD BRM, 2 LANES WESTBOUND, 1 LAN	292	73	0 0	354
36 CRANBERRY HIGHWY	0	1/25/96			M	1	M	1					M	2	H	L					CP CD BRM,SURVEY=PAST SANDWICH RO	1053	85	0 0	65
36 CRANBERRY HIGHWY	317	1/25/96			M	1	M	1					M	2	H	L					CP CD BRM,SURVEY=PAST SANDWICH RO	1053	85	0 0	65
36 CRANBERRY HIGHWY	581	1/25/96			M	1	M	1					M	2	H	L					CP CD BRM,SURVEY=PAST SANDWICH RO	647	85	0 0	65
36 MAIN ST	0	1/25/96	M	1	L	1	M	1			M	1	M	2							SURVEY=PAST WEST END ROTARY-WAR	541	83	5 0	193
36 MAIN ST	1690	1/25/96	M	1	L	1	M	1			M	1	M	2							SURVEY=PAST WEST END ROTARY-WAR	367	83	5 0	193
36 MAIN ST	4171	1/25/96	M	1	L	1	M	1			M	1	M	2							SURVEY=PAST WEST END ROTARY-WAR	606	83	5 0	193
36 SANDWICH RD	0	1/21/96			L	1					M	1	M	1								0	94	0 0	1
36 SANDWICH RD	1531	1/21/96			L	1					M	1	M	1								0	94	0 0	1
36 SANDWICH RD	4171	1/21/96			L	1					M	1	M	1								0	94	0 0	1
36 SANDWICH RD	4910	1/21/96			L	1					M	1	M	1								0	94	0 0	1
36 SANDWICH RD	5966	1/21/96			L	1					M	1	M	1								0	94	0 0	1
36 SANDWICH RD	6653	1/21/96			L	1					M	1	M	1								0	94	0 0	1
36 SANDWICH RD	7181	1/21/96			M	1					M	1	M	1								1447	89	0 0	1
36 SANDWICH RD	7392	1/21/96			L	1					M	1	M	1								0	94	0 0	1
41 AIRLINE RD	0	2/28/96	H	2	H	4	H	4													1ST 460' OF SECTION HAS RIDEABILITY IN	45	31	0 0	21
41 AIRLINE RD	1584	2/28/96	H	2	H	4	H	4													1ST 460' OF SECTION HAS RIDEABILITY IN	45	31	0 0	21
41 HARWICH RD	0	2/1/96	L	1	M	1	L	1	M	3	L	1	L	2	L	L	H	L			CAPE COD BRM NOT INC IN WIDTH;VARIO	88	59	0 0	8
41 HARWICH RD	634	2/1/96	M	1	M	1	L	1	M	2	L	1	L	2	L	L	H	L			CAPE COD BERM; NOT INC IN WIDTH;VAR	452	68	0 0	8
41 HARWICH RD	11141	2/1/96	L	1	L	1	L	1	L	1			L	1			H	L			CAP CD BRM,NOT INC IN WIDTH;VARIOUS	0	92	0 0	8
41 LONG POND RD	0	2/1/96			M	2	L	1	L	2	L	2	L	2			H	L			CAP CD BRM,NOT INC IN WIDTH;VARIOUS	349	74	0 0	2
41 LONG POND RD	3010	2/1/96			M	1	L	1	L	2	L	1	L	2	L	L	H	L			CAPE COD BERM,NOT INC IN WIDTH,MM5	1147	85	0 0	2
41 LONG POND RD	17371	2/1/96			M	1	L	1	L	2	L	1	L	2	L	L					CAP COD BRM NOT IN WIDTH,MM6 MISSIN	456	86	0 0	2
41 MAIN ST	0	1/31/96			M	1	L	1	M	2	M	2	M	2	L	L	L	L			CAP CD BRM,5" GRANITE CRBG STA3532	893	68	0 0	77
41 MAIN ST	8659	1/31/96			M	1	L	1	M	2	M	2	M	2	L	L	L	L			CAP CD BRM,5" GRANITE CRBG STA22609	812	68	0 0	77
41 MAIN ST	13358	1/31/96			M	1	L	1	M	2	M	2	M	2	L	L	L	L			CAP CD BRM,5" GRANITE CRBG STA22609	673	68	0 0	77
41 MAIN ST	16685	1/31/96			M	1	L	1	M	2	M	2	M	2	L	L	L	L			CAP CD BRM,5" GRANITE CRBG STA22609	513	68	0 0	77
41 MAIN ST	22176	1/31/96			M	1	L	1	M	2	M	2	M	2	L	L	L	L			CAP CD BRM,5" GRANITE CRBG STA22609	671	68	0 0	77
41 MAIN ST	27931	1/31/96			M	1	L	1	M	2	M	2	M	2	L	L	L	L			CAP CD BRM,5" GRANITE CRBG STA22609	482	68	0 0	77
41 MAIN ST	31997	1/31/96			M	1	L	1	M	2	M	2	M	2	L	L	L	L			CAP CD BRM,5" GRANITE CRBG STA22609	288	68	0 0	77
41 MAIN ST	37488	1/31/96			M	1	L	1	M	2	M	2	M	2	L	L	L	L			CAP CD BRM,5" GRANITE CRBG STA22609	208	68	0 0	77
41 MAIN ST	38491	1/31/96			M	1	L	1	M	2	M	2	M	2	L	L	L	L			CAP CD BRM,5" GRANITE CRBG STA22609	288	68	0 0	77
41 RT TWENTY EIG	0	1/30/96			L	1	L	1	L	2			M	2	L	L					SECTION HAS CAPE COD BERM, NOT INC	932	86	0 0	78
41 SOUTH ORLEANS RO	0	1/30/96	L	1	M	3	L	1	L	2	L	1	L	1			L	L			CAP CD BRM,NOT INC IN WIDTH;VARIOUS	234	65	0 0	63
55 MAIN ST	0	1/26/96			M	1			L	2			M	2	L	L						2180	86	0 0	156
55 MAIN ST	1267	1/26/96			M	1			L	2			M	2	L	L						2357	86	0 0	156
55 MAIN ST	4171	1/26/96			M	1			L	2			M	2	L	L						2276	86	0 0	156
55 MAIN ST	9029	1/29/96			L	1	L	1	L	2			M	4								516	70	4 0	156
55 MAIN ST	10190	1/26/95			M	1	L	1	L	3			M	2	L	E					SOME MEDIUM SEVERITY RUTTING IS PR	560	79	5 5	156
55 MAIN ST	20698	1/26/95			M	1	L	1	L	3			M	2	L	E					SOME MEDIUM SEVERITY RUTTING IS PR	560	79	5 5	156
55 MEETING HOUSE RO	0	1/26/96	L	1	M	1	L	1			M	2	M	2	L	L					SECTION HAS CAPE COD BERM, NOT INC	326	79	0 0	92
55 OLD HARBOR RD	0	1/26/96			M	1	M	1	L	2	M	1	M	3	L	L						245	72	4 0	88
55 OLD HARBOR RD	950	1/26/96			M	1	M	1	L	2	M	1	M	3	L	L						245	72	4 0	88
55 OLD HARBOR RD	1162	1/26/96			M	1	M	1	L	2	M	1	M	3	L	L						245	72	4 0	88
55 OLD HARBOR RD	2429	1/26/96			M	1	M	1	L	2	M	1	M	3	L	L						245	72	4 0	88
55 OLD QUEEN ANNE R	0	1/25/96					L	1					M	2			L	L			SECTION HAS CAPE COD BERM, NOT INC	534	89	0 0	77
55 OLD QUEEN ANNE R	1742	1/25/96															L	L			CPE CD BRM,NOT IN WIDTH;LOCALIZED S	0	98	0 0	77
55 OLD QUEEN ANNE R	3538	1/25/96	L	1	M	1					M	1	M	2							SECTION HAS CAPE COD BERM, NOT INC	800	86	0 0	77
55 OLD QUEEN ANNE R	6230	1/25/96	L	1	M	1					M	1	M	2							SECTION HAS CAPE COD BERM, NOT INC	582	86	0 0	77
55 OLD QUEEN ANNE R	8606	1/25/96			L	2					L	1	L	1							CPE CD BRM; NOT INC IN WIDTH; CRACKS	646	90	0 0	77
55 OLD QUEEN ANNE R	13866	1/25/96											M	2	L	L					CPE COD BERM; NOT INC IN WIDTH; GRA	168	90	5 5	77
55 ORLEANS RD	0	1/29/96	M	1	M	1			L	3			M	3	L	L					SECTION HAS CAPE COD BERM, NOT INC	600	78	0 0	34
55 ORLEANS RD	1109	1/29/96	M	1	M	1			L	3			M	3	L	L					SECTION HAS CAPE COD BERM, NOT INC	600	78	0 0	34
55 ORLEANS RD	2270	1/29/96	M	1	M	1			L	3			M	3	L	L					SECTION HAS CAPE COD BERM, NOT INC	434	78	0 0	34
55 ORLEANS RD	12566	1/29/96	M	1	M	1			L	3			M	3	L	L					SECTION HAS CAPE COD BERM, NOT INC	415	78	0 0	34
75 ACCESS RD	0	2/27/96			L	1							L	2			L	E			CPE CD BRM; NOT INC IN WIDTH,200' PAV	0	93	0 0	129
75 AIRLINE RD	0	2/28/96	M	1	H	2	M	1	M	1			L	1			H	L			SECTION HAS CAPE COD BERM, NOT INC	287	61	0 0	54
75 AIRLINE RD	3643	2/28/96	M	1	H	2	M	1	M	1			L	1			H	L			SECTION HAS CAPE COD BERM, NOT INC	293	61	0 0	54
75 AIRLINE RD	1	2/28/96	L	1	L	1	L	1	L	2			L	1	L	L					CP CD BRM,APPROX 95% OF CRACKS WE	668	86	0 0	342
75 CRANBERRY HIGHWY	0	2/27/96							M	2			M	2							CP CD BRM,NOT IN WIDTH,5" GRNITE CRB	343	74	0 0	1
75 CRANBERRY HIGHWY	4594	2/27/96	L	1	M	1			M	2	M	1	M	2	L	L					CP CD BRM,NOT IN WIDTH,ADDITIONAL M	440	70	0 0	1
75 CRANBERRY HIGHWY	14203	2/27/96	L	1	M	1			M	2	M	1	M	2	L	L					CP CD BRM,NOT IN WIDTH,ADDITIONL MM	474	70	0 0	1
75 DEPOT ST	1848	2/26/96	M	1	H	1	L	1					M	4			H	L				199	67	0 0	75
75 DEPOT ST	3698	2/26/96	L	1	M	1							M	2			L	E			GRANITE CURBING	1035	86	5 5	75
75 DEPOT ST	9082	2/26/96			H	1	L	1					L	1	L	L	L	L			CP CD BRM; 95% OF CRACKS ARE WELL	357	83	0 0	75
75 EAST-WEST DENNIS	0	2/27/96			M	1	L	1					L	2	L	L					CP CD BRM;NOT IN WIDTH;ROAD WIDENS	1654	91	0 0	12
75 EAST-WEST DENNIS	3749	2/27/96					L	1					L	2							SECTION HAS CAPE COD BERM, NOT INC	0	94	0 0	12
75 EAST-WEST DENNIS	4435	2/27/96			L	1	L	1	H	2			L	2	L	L					CP CD BERM; NOT INC IN WIDTH; H-RUTT	1155	62	0 0	12

pot=potholes;all=alligator;dist=distortion;rut=rutting;blk=block cracking,t=transverse longitudinal cracking;

pol=polishing,rav=raveling,cor=corrugation S=SEVERITY E=EXTENT

Barnstable County Asphalt Condition Surveys

STREET	SECTION	SURVDATE	POT-S	POT-E	ALL-S	ALL-E	DIST-S	DIST-E	RUT-S	RUT-E	BLK-S	BLK-E	T&L-S	T&L-E	POL-S	POL-E	RAV-S	RAV-E	COR-S	COR-E	COMMENTS	B/V	PCI	CURB	STID
75 EAST-WEST DENNIS	9082	2/27/96			L	1			H	2			M	2	L	L					H-RUTTING PRIMARILY @ APPROACHES (	1488	63	0 0	12
75 EAST-WEST DENNIS	10507	2/27/96					L	1					L	1							5" GRANITE CURBING	0	95	0 0	12
75 EAST-WEST DENNIS	11405	2/27/96	M	1	M	1	L	1			M	2	M	1							SECTION HAS CAPE COD BERM; NOT INC	365	78	0 0	12
75 EAST-WEST DENNIS	12197	2/27/96	M	1	M	1	L	1			M	3	M	1							SECTION HAS CAPE COD BERM; NOT INC	390	73	0 0	12
75 EAST-WEST DENNIS	12355	2/27/96	L	1							L	1	L	1			H	L			CPE CD BRM,NOT IN WIDTH,RD WIDENS T	0	94	0 0	12
75 EAST-WEST DENNIS	13411	2/27/96	M	1	H	1	L	1			M	2	M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,MM5 MISSING,	565	76	0 0	12
75 EAST-WEST DENNIS	14626	2/27/96	M	1	H	1	L	1			M	2	M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,MM 5 MISSING	375	76	0 0	12
75 EAST-WEST DENNIS	15946	2/27/96	M	1	H	1	L	1			M	2	M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,MM5 MISSING;	369	76	0 0	12
75 EAST-WEST DENNIS	16843	2/27/96	M	1	H	1	L	1			M	2	M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH;MM5 IS MISSIN	481	76	0 0	12
75 EAST-WEST DENNIS	21226	2/27/96	M	1	H	1	L	1			M	2	M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,MM 5 MISSING	346	76	0 0	12
75 GREAT WESTERN RD	0	2/29/96					L	1	L	2			L	1	L	L					CPE COD BERM,NOT INC IN WIDTH,APPR	465	89	0 0	154
75 GREAT WESTERN RD	581	2/29/96					L	1	L	2			L	1	L	L					CPE COD BRM,NOT INC IN WIDTH; APPRO	465	89	0 0	154
75 GREAT WESTERN RD	2165	2/29/96					L	1	L	2			L	1	L	L					CPE CD BEAM; NOT INC IN WIDTH; APPRO	465	89	0 0	154
75 HIGHBANK RD	0	2/28/96	M	1	M	1	L	1	L	2			M	2			H	L			BEGINNING IS 32' WIDE;GRADUAL NARRO	262	82	5 0	71
75 LOWER COUNTY RD	0	2/26/96	L	1	M	1	L	1					M	1			H	L			DISTORTION DUE TO UTILITY PATCH; MO	1256	90	0 0	80
75 LOWER COUNTY RD	3274	2/26/96	M	1	H	2	L	1			M	2	M	2			H	L				500	63	0 0	80
75 LOWER COUNTY RD	4699	2/26/96	M	1	H	2	L	1			M	2	M	2			H	L				396	63	0 0	80
75 LOWER COUNTY RD	6600	2/26/96	M	1	H	2	L	1			M	2	M	2			H	L				524	63	0 0	80
75 LOWER COUNTY RD	12302	2/26/96	M	1	M	1							M	4			L	E			SECTION HAS CAPE COD BERM; NOT INC	377	69	0 0	80
75 LOWER COUNTY RD	13306	2/26/96	M	1	M	1							M	4			L	E			SECTION HAS CAPE COD BERM; NOT INC	377	69	0 0	80
75 MAIN ST	0	2/27/96	L	1	M	1	L	1	L	2	L	2	L	1	L	L	H	L			CP CD BRM,GRNITE CRB,DIST/RAV DUE T	174	83	0 0	914
75 MAIN ST	5386	2/27/96	L	1	M	1	L	1	L	2	L	2	L	1	L	L	H	L			CP CD BRM,GRNITE CRB,DIST/RAV DUE T	327	83	0 0	914
75 MAIN ST	7867	2/27/96	L	1	M	1	L	1	L	2	L	2	L	1	L	L	H	L			CP CD BRM,GRNITE CRB,DIS/RAV DUE TO	309	83	0 0	914
75 MAIN ST	8184	2/27/96			L	1	L	1					L	1			H	L			CP CD BRM,DISTRESS SURVEY COVERS	0	93	0 0	914
75 MAIN ST ROUT	0	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNIT CRB,MM19 MISSNG,HIG	371	53	5 0	78
75 MAIN ST ROUT	528	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	371	53	5 0	78
75 MAIN ST ROUT	2957	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	371	53	5 0	78
75 MAIN ST ROUT	3749	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	303	53	5 0	78
75 MAIN ST ROUT	6019	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	176	53	5 0	78
75 MAIN ST ROUT	9557	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	265	53	5 0	78
75 MAIN ST ROUT	10138	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	296	53	5 0	78
75 MAIN ST ROUT	10349	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	245	53	5 0	78
75 MAIN ST ROUT	14995	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	296	53	5 0	78
75 MAIN ST ROUT	15682	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	296	53	5 0	78
75 MAIN ST ROUT	16262	2/1/96	H	1	M	1	M	1	M	3	M	2	H	2	L	L	L	L			CP CD BRM,GRNITE CRB,MM19 MISSNG,H	242	53	5 0	78
75 MAYFAIR RD	0	2/28/96	L	1	M	1	L	1					M	2	L	L					CP CD BRM; NOT INC IN WIDTH;APPROX	571	85	0 0	138
75 MAYFAIR RD	1373	2/28/96			M	1	L	1			M	1	M	2							CP CD BRM; NOT INC IN WIDTH; APPROX	600	86	0 0	138
75 OLD BASS RIVER R	0	2/27/96	L	1	L	1	L	1					L	2							CPE CD BRM; APPROX 70% OF CRACKS A	852	91	0 0	68
75 OLD BASS RIVER R	792	2/27/96	L	1	L	1	L	1					L	2							CPE CD BRM; APPROXIMATELY 70% CRA	491	91	0 0	68
75 OLD BASS RIVER R	1478	2/27/96	L	1	L	2	L	1			M	2	L	2			H	L			CPE CD BERM; NOT INC IN WIDTH; 5" BITU	505	85	0 0	68
75 OLD BASS RIVER R	1742	2/27/96	L	1	L	2	L	1			M	2	L	2			H	L			CPE CD BERM; NOT INC IN WIDTH; 5" BITU	505	85	0 0	68
75 OLD BASS RIVER R	2693	2/27/96	L	1	L	2	L	1			M	2	L	2			H	L			CP CD BRM; NOT INC IN WIDTH; 5" BITUM	505	85	0 0	68
75 OLD BASS RIVER R	3854	2/27/96	L	1	L	2	L	1			M	2	L	2			H	L			CPE CD BRM; NOT INC IN WIDTH; 5" BITUM	505	85	0 0	68
75 OLD BASS RIVER R	4699	2/27/96	L	1	L	2	L	1			M	2	L	2			H	L			CPE CD BRM, NOT INC IN WIDTH; 5" BITUM	606	85	0 0	68
75 OLD BASS RIVER R	8131	2/27/96	M	1	L	1	L	1			M	2	H	2			H	L			CAPE COD BERM; NOT INCLUDED IN WID	259	78	0 0	68
75 OLD BASS RIVER R	18691	2/27/96	M	1	L	1	L	1			M	2	H	2			H	L			CAPE COD BERM; NOT INCLUDED IN WID	65	78	0 0	68
75 OLD BASS RIVER R	19800	2/27/96			L	1	L	1					M	1	L	L					CPE CD BRM;GRNITE CRB;1ST 72 HAS DIV	0	93	5 5	68
75 SCHOOL ST	0	2/26/96	L	1	M	1	L	1					M	2			L	E			CPE COD BRM; NOT INC IN WIDTH,90% T	241	84	0 0	192
75 SCHOOL ST	581	2/26/96	L	1	M	1	L	1					M	2			L	E			CPE CD BRM,NOT INC IN WIDTH,90% T&L	297	84	0 0	192
75 SETUCKET RD	0	2/28/96	L	1									L	1							SECTION HAS CAPE COD BERM; NOT INC	0	95	0 0	56
75 SETUCKET RD	5122	2/28/96	L	1	H	1	L	2					M	1							SECTION IS COMPOSED OF 2 LARGE ROA	340	85	0 0	56
75 SETUCKET RD	8342	2/28/96					L	1	L	2	M	1	M	1	L	L					CPE CD BRM,NOT IN WIDTH,BLK CRK/DIS	342	88	0 0	56
75 SETUCKET RD	10454	2/28/96					L	1	L	2	M	1	M	1	L	L					CPE CD BRM,NOT IN WIDTH,BLK CRK/DIS	342	88	0 0	56
75 SOUTH YARMOUTH R	0	2/27/96					L	1					M	1			H	L			CPE CD BRM; NOT INC IN WIDTH; APPRO	0	94	0 0	139
75 UPPER COUNTY RD	0	2/28/96	M	1	H	1	L	1					M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,APPROX 40%	0	82	0 0	72
75 UPPER COUNTY RD	581	2/28/96	M	1	H	1	L	1					M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,APPROX 40%	0	82	0 0	72
75 UPPER COUNTY RD	1267	2/28/96	M	1	H	1	L	1					M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,APPROX 40%	0	82	0 0	72
75 UPPER COUNTY RD	7814	2/28/96	M	1	H	1	L	1					M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,APPROX 40%	0	82	0 0	72
75 UPPER COUNTY RD	10982	2/28/96	M	1	H	1	L	1					M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,APPROX 40%	0	82	0 0	72
75 UPPER COUNTY RD	11669	2/28/96	M	1	H	1	L	1					M	2	L	L	H	L			CP CD BRM,NOT IN WIDTH,APPROX 40%	0	82	0 0	72
96 ACAPESKET RD	0	1/30/96	H	1	L	2							L	1							CRACK SEALED	76	86	0 0	37
96 ACAPESKET RD	1162	1/30/96	M	1	L	1	M	1	L	2	L	1	L	1							CRACK SEALED-LAST 150' OF SECTION C	143	84	0 0	37
96 ACAPESKET RD	3168	1/30/96	H	1	L	1	M	1	M	2	L	1	L	1							CRACK SEALED	158	67	0 0	37
96 BRICK KILN RD	0	2/1/96	H	1	H	3	L	1					H	2								169	54	0 0	127
96 BRICK KILN RD	845	2/1/96	H	1	H	3	L	1					H	2								133	54	0 0	127
96 BRICK KILN RD	3696	1/31/95	M	1	H	3			M	1	M	1									DISTRESS SURVEY COVERS UP TO SAND	143	53	0 0	127
96 CARRIAGE SHOP RD	0	2/13/96	H	1	H	4	M	1	M	2			H	2								70	36	0 0	89
96 CARRIAGE SHOP RD	5174	2/13/96	H	1	H	4	M	1	M	2			H	2								49	36	0 0	89
96 CARRIAGE SHOP RD	5650	2/12/96	H	1	H	3	M	1	M	2			H	1			H	E				87	46	0 0	89
96 CARRIAGE SHOP RD	11035	2/12/96	H	1	H	3	M	1	M	2			H	1			H	E				97	46	0 0	89

Barnstable County Asphalt Condition Surveys

STREET	SECTION	SURVDATE	POT-S	POT-E	ALL-S	ALL-E	DIST-S	DIST-E	RUT-S	RUT-E	BLK-S	BLK-E	T&L-S	T&L-E	POL-S	POL-E	RAV-S	RAV-E	COR-S	COR-E	COMMENTS	B/V	PCI	CURB	STID
96 CARRIAGE SHOP RD	11669	2/12/96	H	L	H	3	M	L	M	2			H	L			H	E				42	46	0.0	89
96 CARRIAGE SHOP RD	15365	2/12/96	H	L	H	3	M	L	M	2			H	2								42	46	0.0	89
96 CARRIAGE SHOP RD	16262	2/12/96	H	L	H	3	M	L	M	2			H	2								39	46	0.0	89
96 CENTRAL AV	0	2/10/96					L	L			M	L	M	L							CAPE COD BERM; NOT INC IN WIDTH MEA	0	94	5.0	27
96 CENTRAL AV	317	2/10/96					L	L			M	L	M	L							CAPE COD BERM; NOT INCLUDED IN WID	0	94	5.0	27
96 CENTRAL AV	1109	2/10/96					L	L					M	L							CAPE COD BERM; NOT INCLUDED IN WID	0	95	5.0	27
96 CURRIER RD	0	1/31/96	H	L	M	3			M	2			M	2							DISTRESS SURVEY COVERS ROADWAY F	50	59	0.0	150
96 DAVIS STRAITS	0	2/15/96					M	L					M	L								1734	90	0.0	4
96 DAVIS STRAITS	634	2/15/96					M	L					M	L								1541	90	0.0	4
96 DAVISVILLE RD	0	1/29/96	H	2	H	4	M	L	L	2			M	L							CRACK SEALED; ADDITIONAL CRACKING	88	37	0.0	32
96 DAVISVILLE RD	1848	1/29/96			M	2							M	2								152	78	0.0	32
96 DAVISVILLE RD	8184	1/29/96	M	L	H	2	M	L					M	2							DISTRESS SURVEY DATA COVERS ROAD	165	64	0.0	32
96 EAST FALMOUTH HI	0	2/15/96	M	L	M	L	M	L	M	2	M	L	M	2								809	66	0.0	6
96 EAST FALMOUTH HI	475	2/15/96	M	L	M	L	M	L	M	2	M	L	M	2								1368	66	0.0	6
96 EAST FALMOUTH HI	898	2/15/96	M	L	M	L	M	L	M	2	M	L	M	2								809	66	0.0	6
96 EAST FALMOUTH HI	2059	2/15/96	M	L	M	L	M	L	M	2	M	L	M	2								768	66	0.0	6
96 EAST FALMOUTH HI	4118	2/15/96	M	L	M	L	M	L	M	2	M	L	M	2								768	66	0.0	6
96 EAST FALMOUTH HI	6659	2/15/96	M	L	M	L	M	L	M	2	M	L	M	2								984	66	0.0	6
96 FALMOUTH HEIGHTS	0	2/12/96	M	L			M	L			M	L	M	2								1045	85	0.0	208
96 FRESH POND RD	0	2/12/96	H	L	H	2	M	L			M	2	H	2								193	61	0.0	111
96 FRESH POND RD	3010	2/12/96	H	L	H	2	M	L			M	2	H	2								193	61	0.0	111
96 GIFFORD ST	0	1/26/96											M	L							CAPE COD BERM;NOT INC IN WIDTH MEA	0	95	4.0	140
96 GIFFORD ST	422	1/26/96											M	L							CAPE COD BERM; NOT INC IN WIDTH MEA	0	95	4.0	140
96 GIFFORD ST	2482	1/26/96											M	L							CAPE COD BERM;NOT INC IN WIDTH MEA	0	95	4.0	140
96 GIFFORD ST	3010	1/26/96	M	L	M	L	H	L	M	2	M	L	M	2							CPE COD BRM; DISTRESS SURVEY COVE	76	65	0.0	140
96 GRAND AV	0	2/12/96	H	L	H	L	M	2			H	L	H	3								387	62	5.0	162
96 GRAND AV	3749	2/12/96	M	L	H	2	M	L			M	L	H	3							DISTRESS SURVEY COVERS UP TO FALM	403	62	6.0	162
96 GRAND AV	4752	2/12/96	M	L	H	2	M	L			M	L	H	3							DISTRESS SURVEY COVERS UP TO FALM	192	62	6.0	162
96 GRAND AV	6442	2/12/96	M	L	H	2	M	L			M	L	H	3							DISTRESS SURVEY COVERS UP TO FALM	403	62	6.0	162
96 GRAND AV	6864	2/12/96	M	L	H	2	M	L			M	L	H	3							DISTRESS SURVEY COVERS UP TO FALM	403	62	6.0	162
96 GRAND AV	9187	2/12/96	M	L	H	2	M	L			M	L	H	3							DISTRESS SURVEY COVERS UP TO FALM	403	62	6.0	162
96 HAYWY RD	6019	2/13/96			L	L	L	L					M	L							DISTRESS SURVEY COVERS FROM CURR	0	93	0.0	91
96 JOHN PARKER RD	0	1/31/96			L	L	L	L					M	L								0	93	0.0	88
96 JOHN PARKER RD	2429	1/31/96			L	L	L	L					M	L								0	93	0.0	88
96 JOHN PARKER RD	4118	1/31/96			L	L	L	L					M	L								0	93	0.0	88
96 JONES RD	0	1/26/96																			CP CD BRM N SIDE;RECENTLY PAVED,GR	0	100	6.0	131
96 JONES RD	1320	1/26/96																			CP CD BRM N SIDE;RECENTLY PAVED SE	0	100	6.0	131
96 JONES RD	2746	1/26/96																			CP CD BRM N SIDE;RECENTLY PAVED,GR	0	100	6.0	131
96 JONES RD	5438	1/26/96																			CP CD BRM N SIDE;RECENTLY PAVED,GR	0	100	6.0	131
96 LEWIS ST	0	1/30/96																			DISTRESS SURVEY COVERS FROM THAT	0	100	0.0	54
96 LOCUST ST	0	1/26/96			M	L	M	L	M	3	H	2	H	3								180	56	4.0	295
96 MAIN ST	0	2/15/96			M	L	L	L	L	2	M	L	M	2								2017	85	4.0	3
96 MAIN ST	3274	2/16/95					L	L	L	L			M	3								742	79	4.0	3
96 MAIN ST	5702	2/15/96					L	L	L	L			M	3								742	79	4.0	3
96 MAIN ST	6178	2/15/96			M	L	M	L	L	L	M	L	M	2								391	84	0.0	3
96 MARAVISTA AV	1	1/30/96			M	L	M	L	L	2			H	2			H	L	H	L	SECTION HAS CAPE COD BERM;NOT INC	146	82	0.0	59
96 MARAVISTA AV	264	1/30/96	M	L	M	2	M	L			M	L	M	3			H	L				5793	69	0.0	56
96 MARAVISTA AV	0	1/30/96	M	L	M	2	M	L			M	L	M	3			H	L				197	69	0.0	56
96 MARAVISTA AV	1954	1/30/96	M	L	M	2	M	L					M	2			H	E				194	73	3.0	59
96 MARAVISTA AV	3168	1/30/96	M	L	M	L	M	L					H	2								227	78	0.0	59
96 MENAUHANT RD	0	2/12/96					L	L					M	2								440	89	0.0	30
96 MENAUHANT RD	1056	2/12/96	M	L			L	L			M	L	M	L								776	86	6.0	30
96 MENAUHANT RD	1531	2/12/96	M	L			L	L			M	L	M	L								370	86	6.0	30
96 MENAUHANT RD	2651	2/12/96	M	L			L	L					M	L							ROAD WIDENS FOR BRIDGE DECK TO 34'	982	87	6.0	30
96 MENAUHANT RD	3643	2/12/96	M	L			L	L					M	L							ROAD WIDENS FOR BRIDGE DECK TO 34'	982	87	6.0	30
96 MENAUHANT RD	4330	2/12/96	H	L	H	3	L	L					M	2								178	54	0.0	30
96 MENAUHANT RD	6178	2/12/96	H	L	H	3	L	L					M	2								178	54	0.0	30
96 MENAUHANT RD	6547	2/12/96	H	L	H	3	L	L					M	2								178	54	0.0	30
96 MENAUHANT RD	7181	2/12/96	H	L	H	3	M	L					M	2							IST 690' SEPARATE PAVT FOR BRIDGE O	181	55	4.0	30
96 MENAUHANT RD	8712	2/12/96	L	L	M	L	M	L	L	2			M	L								429	80	0.0	30
96 MENAUHANT RD	9926	2/12/96	H	L	H	4	L	L			M	L	H	L								74	44	0.0	30
96 NATHAN ELLIS HIG	0	2/1/96											M	L								0	95	0.0	151
96 NATHAN ELLIS HIG	1003	2/1/96			M	L	M	L			M	L	M	3							ROAD WIDENS TO 48' FOR RT 28 UNDERP	106	75	5.0	151
96 NATHAN ELLIS HIG	2323	2/1/96			M	L	M	L			M	L	M	3							ROAD WIDENS TO 48' FOR RT 28 UNDERP	564	75	5.0	151
96 NATHAN ELLIS HIG	3432	2/1/96	M	L	H	2			L	2			M	2					H	L	CP CD BRM,NOT INC IN WIDTH;RD WIDEN	687	63	0.0	151
96 NATHAN ELLIS HIG	19589	2/1/96			M	2			M	2	M	L	M	2							ROAD WIDENS AT INTERSECTION WITH S	924	72	0.0	151
96 NATHAN ELLIS HIG	25450	2/1/96			M	2			M	2	M	L	M	2							ROAD WIDENS @ INTERSECTION WITH S	950	72	0.0	151
96 NOBSKA RD	0	1/26/96	H	L	H	2			M	L	M	L	H	2								105	81	0.0	332
96 NORTH FALMOUTH H	0	2/10/96							L	3											CPE CD BRM,GRNITE CRB;NEW PAVT; PO	934	85	6.0	364
96 NORTH FALMOUTH H	4171	2/10/96																			NEW PAVEMENT; NO DISTRESSES	0	100	6.0	364

pot-potholes all-alligator;dist=distortion;rut=rutting;blk=block cracking;t=transverse longitudinal cracking;

pol=polishing;rav=raveling;cor=corrugation S=SEVERITY E=EXTENT

Barnstable County Asphalt Condition Surveys

STREET	SECTION	SURVDATE	POT-S	POT-E	ALL-S	ALL-E	DIST-S	DIST-E	RUT-S	RUT-E	BLK-S	BLK-E	T&L-S	T&L-E	POL-S	POL-E	RAV-S	RAV-E	COR-S	COR-E	COMMENTS	B/Y	PCI	CURB	STID
96 NORTH FALMOUTH H	6442	2/10/96																			NEW PAVEMENT; NO DISTRESSES	0	100	6 0	364
96 NORTH FALMOUTH H	8606	2/10/96							L	2										L	CP CD BRM; POOR ROADWAY CROSS SE	684	90	0 0	364
96 NORTH FALMOUTH H	9134	2/10/96																			ROTARY SOUTHBOUND SIDE; NO DISTRE	0	100	6 0	364
96 NORTH FALMOUTH H	9451	2/10/96																			ROTARY SOUTHBOUND SIDE; NO DISTRE	0	100	6 0	364
96 NORTH FALMOUTH H	9821	2/10/96					M	1	L	1											SECTION HAS CAPE COD BERM, NOT INC	0	97	0 0	364
96 OLD BARNSTABLE R	5386	2/12/96	H	1	M	2	M	1	L	1			M	2								187	73	0 0	96
96 OLD BARNSTABLE R	7603	2/12/96	M	1			M	1					M	1								348	87	0 0	96
96 OLD BARNSTABLE R	15734	2/12/96			H	1	L	1					M	2								483	85	0 0	96
96 OLD MEETING HOUS	0	2/13/96											M	2								620	90	0 0	1120
96 OLD MEETING HOUS	645	2/13/96	M	2	H	3	L	1					M	2								308	53	0 0	1120
96 OLD MEETING HOUS	1426	2/13/96	M	2	H	3	L	1					M	2								109	53	0 0	1120
96 OX BOW RD	0	2/13/96	H	1	H	1	L	2			H	3	H	2							LARGE UTILITY TRENCH 600 LONG 15' WI	375	64	0 0	543
96 OYSTER POND RD	3696	1/26/96																			SECTION HAS CAPE COD BERM; NOT INC	0	100	0 0	334
96 PALMER AV	0	2/14/96	M	1	L	1	M	1			L	3	L	1							CRACK SEALED; CRACKS HAVE RE-OPEN	699	79	0 0	2
96 PALMER AV	4171	2/14/96	M	1	L	1	M	1			L	3	L	1							CRACK SEALED; CRACKS HAVE RE-OPEN	901	79	0 0	2
96 PALMER AV	4752	2/14/96	M	1	L	1	M	1			L	3	L	1							CRACK SEALED; CRACKS HAVE RE-OPEN	901	79	0 0	2
96 PALMER AV	6706	2/14/96	M	1	L	1	M	1			L	3	L	1							CRACK SEALED; CRACKS HAVE RE-OPEN	105	79	0 0	2
96 PALMER AV	9557	2/15/96	M	1	L	1	M	1	M	1	L	2	L	1							CRACK SEALED; SOME CRACKS HAVE RE	265	80	6 0	2
96 PALMER AV	13147	2/15/96	M	1	L	1	M	1	M	1	L	2	L	1							CRACK SEALED; SOME CRACKS HAVE RE	265	80	6 0	2
96 RANDOLPH ST	0	1/30/96	H	1	H	2	M	1					H	2							DISTRESS SURVEY COVERS FROM MARA	303	62	4 0	64
96 RANSOM RD	0	1/29/96	H	1	H	3					M	1					H	E				13	55	0 0	351
96 RED BROOK RD	0	2/10/96			M	1							M	2								442	88	0 0	9
96 SANDWICH RD	0	2/10/96					M	1					M	1							CPE CD BRM NOT INC IN WIDTH MEASUR	808	90	4 0	50
96 SANDWICH RD	4963	2/10/96			M	1	M	1					M	1								2117	87	0 0	50
96 SANDWICH RD	12302	2/10/96			M	1	M	1					M	1								650	87	0 0	50
96 SANDWICH RD	18586	2/10/96					M	1					M	1								719	90	0 0	50
96 SANDWICH RD	21912	2/10/96					M	1					M	1								805	90	0 0	50
96 SANDWICH RD	25027	2/10/96											M	1								0	95	0 0	50
96 SEACOAST SHORES	0	2/10/96											M	1								0	95	4 0	20
96 SEACOAST SHORES	8342	2/10/96											M	1								0	95	4 0	20
96 SHORE ST	0	1/26/96			L	2	L	1					M	2	L	L						529	88	6 0	223
96 SHORE ST	422	1/26/96			L	2	L	1					M	2	L	L						529	88	6 0	223
96 SHORE ST	581	1/26/96			L	2	L	1					M	2	L	L						529	88	6 0	223
96 SHORE ST	1584	1/26/96			L	2	L	1					M	2	L	L					NO DISTRESSES FROM 25' N OF CLINTON	529	88	6 0	223
96 SIPPEWISSETT RD	0	1/26/96	M	1	H	1	M	1	M	2	H	2	H	2			H	L	H	L		75	61	0 0	358
96 SIPPEWISSETT RD	13517	1/29/96	M	1	H	2			L	1			M	2			H	E				74	65	0 0	358
96 SPRING BARS RD	0	1/30/96	H	1	H	2	M	1			M	1	H	2							DISTRESS SURVEY=WORCESTER PRK AV	300	62	4 0	170
96 SURF DR	0	1/26/96																			NO DISTRESSES	0	100	0 0	224
96 SURF DR	2112	1/26/96											L	1								0	99	0 0	224
96 SURF DR	6072	1/26/96											L	1								0	99	0 0	224
96 TEATICKET HIGHWY	0	2/15/96					M	1					M	1								1537	90	5 0	5
96 TEATICKET HIGHWY	1584	2/15/96					M	1					M	1								1876	90	5 0	5
96 TEATICKET HIGHWY	4963	2/15/96	H	1	M	1	M	1	M	1	M	1	M	2								1126	77	0 0	5
96 THATCHERS LN	0	1/30/95																			NO DISTRESSES	0	100	0 0	53
96 WAQUOIT HIGHWY	0	2/15/96	M	1	M	1	M	1	M	2	M	1	M	2								762	66	0 0	7
96 WAQUOIT HIGHWY	2165	2/15/96	M	1	M	1	M	1	M	2	M	1	M	2								762	66	0 0	7
96 WAQUOIT HIGHWY	3802	2/15/96	M	1	M	1	M	1	M	2	M	1	M	2								762	66	0 0	7
96 WAQUOIT HIGHWY	5280	2/15/96	M	1	M	1	M	1	M	2	M	1	M	2								762	66	0 0	7
96 WAQUOIT HIGHWY	6917	2/15/96	M	1	M	1	M	1	M	2	M	1	M	2								715	66	0 0	7
96 WATER ST	0	1/29/96	H	1	M	1	M	2			M	3	M	2								374	68	6 0	304
96 WATER ST	370	1/29/96	M	1			L	1					M	2							STA 6+50 TO 6+90 - ROAD NARROWS FOR	573	86	2 0	304
96 WATER ST	1531	1/29/96					L	2			M	1	M	2								138	69	4 0	304
96 WEST FALMOUTH HI	0	2/10/96					M	1	L	1											CAPE COD BERM; NOT INCLUDED IN WID	0	97	0 0	363
96 WEST FALMOUTH HI	2640	2/10/96					M	1	L	1											CAPE COD BERM; NOT INCLUDED IN WID	0	97	0 0	363
96 WEST FALMOUTH HI	6283	2/10/96					M	1	L	1											CAPE COD BERM; NOT INCLUDED IN WID	0	97	0 0	363
96 WEST FALMOUTH HI	8131	2/10/96					M	1	L	1											CAPE COD BERM; NOT INCLUDED IN WID	0	97	0 0	363
96 WEST FALMOUTH HI	10613	2/10/96					M	1	L	1											CAPE COD BERM; NOT INCLUDED IN WID	0	97	0 0	363
96 WOODS HOLE RD	0	1/29/96			L	1	M	1	L	2			M	2							CAPE COD BRM; NOT INCLUDED IN WIDTH	2211	85	5 0	296
96 WOODS HOLE RD	7181	1/29/96			L	1	M	1	L	2			M	2							CAPE CD BRM; NOT INCLUDED IN WIDTH	1122	85	5 0	296
96 WOODS HOLE RD	15629	1/29/96					M	1			M	2	M	2								365	82	6 0	296
96 WOODS HOLE RD	18474	1/29/96					M	1			M	2	M	2								227	82	6 0	296
96 WORCESTER AV	4541	1/30/96			M	1	M	1	H	1			M	2							ROAD WIDENS AT INTERSECTION WITH R	300	80	2 0	171

pot=potholes;all=alligator;dist=distortion;rut=rutting;blk=block cracking;t=transverse longitudinal cracking;

pol=polishing;rav=raveling;cor=corrugation S=SEVERITY E=EXTENT

Intermodal Management System

- Draft Inventory

2/26/96

Intermodal Management System

Draft Freight Terminal Inventory

Name	Location	Owner/Operator	Criteria for Inclusion	Remarks
PRIMARY AIRPORTS				Operations
*b able Municipal Airport (Hyannis)	Barnstable	Municipal	>65,000 Aircraft Ops & Air Freight	108,084
Logan Airport	Boston	Massport	>65,000 Aircraft Ops & Air Freight	470,318
Hanscom Field	Bedford	Military	>65,000 Aircraft Ops & Air Freight	187,550
Martha's Vineyard Airport	Martha's Vineyard	Municipal	>65,000 Aircraft Ops & Air Freight	52,882
Nantucket Memorial Airport	Nantucket	Municipal	>65,000 Aircraft Ops & Air Freight	115,371
New Bedford Airport	New Bedford	Municipal	>65,000 Aircraft Ops & Air Freight	78,194
Worcester Municipal Airport	Worcester	Municipal	>65,000 Aircraft Ops & Air Freight	57,278
Secondary Airports				
Westover Metropolitan Airport/AFB	Chicopee/Ludlow	Civilian/Military	PVPC 93 RTP&MAC94=No Air Freight	57,036
*Otis AFB	Falmouth	Military	Aircraft Ops Unknown	
*Provincetown Airport	Provincetown	Municipal	Aircraft Ops Unknown	
Barnes Municipal Airport	Westfield	Municipal	PVPC 93 RTP&MAC94=No Air Freight	59,266
Naval Air Station	Weymouth	Military	Aircraft Ops Unknown	
Potential Additional Airports				
Moore's Field (Ft. Devens)	Ayer	Military	Ft. Devens Civilian Reuse Plan	
FERRY TERMINALS				
*Hyannis Ferry Terminal	Barnstable	MV&N Steamship Authority	All Known Year-Round Interregional	
*Woods Hole Ferry Terminal	Falmouth	MV&N Steamship Authority	All Known Year-Round Interregional	
Nantucket Ferry Terminal	Nantucket	MV&N Steamship Authority	All Known Year-Round Interregional	
Martha's Vineyard Ferry Terminal	Vineyard Haven	MV&N Steamship Authority	All Known Year-Round Interregional	
Martha's Vineyard Ferry Terminal	Oak Bluffs	MV&N Steamship Authority	All Known Year-Round Interregional	
PRIMARY PIPELINE TERMINALS				
Springfield Jet Lines Inc. Terminal	Springfield	Jet Lines, Inc. (Petroleum)	All Known Interregional	
Ludlow Jet Lines Inc. Terminal	Ludlow	Jet Lines, Inc. (Petroleum)	All Known Interregional	
Leominster Mobil Pipeline Terminal	Leominster	Mobil Pipeline Co.(Petroleum)	All Known Interregional	
Holyoke Mobil Pipeline Terminal	Holyoke	Mobil Pipeline Co.(Petroleum)	All Known Interregional	
Springfield Mobil Pipeline Terminal	Springfield	Mobil Pipeline Co.(Petroleum)	All Known Interregional	
Excluded Pipeline Terminals				
Tennessee Gas Co. (Tenneco)	Agawam	Tenneco Gas Co. (Natural Gas)	Feeder to Municipal System	
Tennessee Gas Co. (Tenneco)	E. Longmeadow	Tenneco Gas Co. (Natural Gas)	Feeder to Municipal System	
Tennessee Gas Co. (Tenneco)	Westfield	Tenneco Gas Co. (Natural Gas)	Feeder to Municipal System	
Tennessee Gas Co. (Tenneco)	Holyoke	Tenneco Gas Co. (Natural Gas)	Feeder to Municipal System	
Tennessee Gas Co. (Tenneco)	Northampton	Tenneco Gas Co. (Natural Gas)	Feeder to Municipal System	
PRIMARY PORT TERMINALS (Add specific terminals as data becomes available)				Tons, Barrels or Containers
Port of Boston			>450,000 Tons/Year	19,207,776
Conley Terminal	South Boston	Massport	>10,000 Containers/Year	35,000
Moran Terminal	Boston	Massport	>10,000 Containers/Year	50,000
East Boston Terminal	East Boston	Mobil Oil Corp	>1M Bbls of Storage	
Revere Terminal Ship Pier	Revere	Coastal Oil N.E.	>1M Bbls of Storage	
Chelsea Terminal Tanker Wharf	Chelsea	Gulf Oil Co.	>1M Bbls of Storage	
Everett Terminal Wharf	Everett	Exxon Co. USA	>1M Bbls of Storage	
South Boston Barge Dock	South Boston	Coastal Oil N.E.	>1M Bbls of Storage	
Braintree Terminal Wharf	Braintree	Citgo Petroleum	>1M Bbls of Storage	
Port of Fall River	Fall River		>450,000 Tons/Year	3,530,233
Brayton Point Station Dock	Fall River/Somerset	New England Power Co.	>1M Bbls of Storage	
Fall River Line Pier	Fall River	Fall River Line Pier, Inc.	Research Underway	
State Pier Terminal	Fall River	MDEM	Research Underway	
Port of New Bedford & Fairhaven	New Bedford		>450,000 Tons/Year	483,739
State Pier Terminal	New Bedford	MDEM	Research Underway	
Port of Salem	Salem	MDEM	>450,000 Tons/Year	1,438,636
Secondary Port Terminals				
Port of Vineyard Haven	Martha's Vineyard		<450,000 Tons/Year	265,130
Port of Nantucket	Nantucket		<450,000 Tons/Year	168,039
Port of Hyannis	Barnstable		<450,000 Tons/Year	111,403

Port of Gloucester	Gloucester	<450,000 Tons/Year	103,575
Plymouth Harbor	Plymouth	<450,000 Tons/Year	37,982
Chatham Harbor	Chatham	<450,000 Tons/Year	4,456
Falmouth Harbor	Falmouth	<450,000 Tons/Year	1,355
Cuttyhunk Harbor	Gosnold?	<450,000 Tons/Year	1,185
Sci' 'e Harbor	Scituate	<450,000 Tons/Year	159

PRIMARY RAIL TERMINALS

				Intermodal Cars or Containers
	Ayer	Guilford/Allied Systems	Known Primary Yards	>12,500 IM Cars
Beacon Park Yard	Boston	Conrail	Known Primary Yards	100,000
New England Intermodal Terminal	Palmer	Massachusetts Central RR	Known Primary Yards	
Springfield Terminal	West Springfield	Conrail	Known Primary Yards	>12,500 IM Cars
Franklin Street Yard	Worcester	Conrail	Known Primary Yards	>12,500 IM Cars
Southbridge(35%)&Wiser Av(65%)Yar	Worcester	Providence & Worcester RR	Known Primary Yards	44,500 Containe

Secondary Rail Terminals

				Pri. Commodity
Ft. Devens/Ayer Intermodal Terminals	Ayer	Guilford	Secondary Freight Yard	<12,500 IM Cars
Braintree Rail Terminal	Braintree	Conrail	Secondary Freight Yard	Steel
East Brookfield Intermodal Facility	East Brookfield	Conrail	Secondary Freight Yard	
Framingham Freight Terminal	Framingham	Conrail	Secondary Freight Yard	Automobiles
New England Automotive Gateway	East Brookfield	Conrail	Secondary Freight Yard	Automobiles
Westborough Freight Terminal	Westborough	Conrail	Secondary Freight Yard	Automobiles

Intermodal Management System

Draft Freight Terminal Inventory

Name	Location	Firm Name	Criteria for Inclusion	Remarks
CK "TERMINALS" (Major Firms Headquartered in Massachusetts)				Power Units
Clean Harbors of Kingston	Braintree	Clean Harbors of Kingston	>50 Power Units	196
Noonan (JP) Transportation	West Bridgewater	Noonan (JP) Transportation	>50 Power Units	187
West Lynn Creamery	Lynn	West Lynn Creamery	>50 Power Units	181
Plymouth Rock Transp. Co.	Stoneham?	Plymouth Rock Transp. Co.	>50 Power Units	112
Lily Transport Lines	Needham	Lily Transport Lines	>50 Power Units	107
Hallamore Motor Transportation	Holbrook	Hallamore Motor Transportation	>50 Power Units	94
Transgas, Inc.	Lowell	Transgas, Inc.	>50 Power Units	83
Sullivan (R.M.) Transportation	Springfield	Sullivan (R.M.) Transportation	>50 Power Units	71
Van-Pak Inc.	Springfield	Van-Pak Inc.	>50 Power Units	70
American Truck & Trailer Co.	Seekonk	American Truck & Trailer Co.	>50 Power Units	68
Fusaro Transportation	Fall River	Fusaro Transportation	>50 Power Units	65
Clark & Reid, Co.	Burlington	Clark & Reid, Co.	>50 Power Units	63
Sons Transportation Co. Inc.	Worcester	Sons Transportation Co. Inc.	>50 Power Units	60
Roy Brothers Inc.	Billerica	Roy Brothers Inc.	>50 Power Units	55
Eastern Connection	Boston	Eastern Connection	>50 Power Units	52
Subtotal Terminals in this Category:	15			

RUCK TERMINALS (Major Nationals/Regionals w/Terminals in Massachusetts)				Terminals
ABF Freight Systems	4	Massachusetts Terminals	>2 Mass. Terminals	4
Carolina Freight	3	Massachusetts Terminals	>2 Mass. Terminals	3
Central Transportation	4	Massachusetts Terminals	>2 Mass. Terminals	4
Consolidated Freightways	11	Massachusetts Terminals	>2 Mass. Terminals	11
Overnight Transportation	6	Massachusetts Terminals	>2 Mass. Terminals	6
Preston Trucking	3	Massachusetts Terminals	>2 Mass. Terminals	3
Roadway Express	7	Massachusetts Terminals	>2 Mass. Terminals	7
TNT Red Star	3	Massachusetts Terminals	>2 Mass. Terminals	3
Yellow Freight	11	Massachusetts Terminals	>2 Mass. Terminals	11
Subtotal Terminals in this Category:	52			

TRUCK "TERMINALS" (Private Fleets: Companies that Carry Their Own Goods in Their Own Trucks)			# of Power Units
To be determined based on ongoing research			

TRUCK TERMINALS (Drayage Carriers: Carriers Transfer Goods From One Mode to Another)			# of Power Units
Delmar Transportation	Boston/Allston		
Kellaway Transportation	Braintree/Randolph		
Boston Freight Terminals	Boston		
Others to be determined based on ongoing research			

TRUCK TERMINALS (Package Fleets w/Distribution Centers in Massachusetts)			Terminals
UPS	Shrewsbury	All Distribution Centers	
FEDEX	Framingham	All Distribution Centers	
Others to be determined based on ongoing research			

TRUCK TERMINALS (Tandem Truck Terminals in Massachusetts)			Terminals
Mass Pike Exit 6--Chicopee		All Tandem Terminals	
Mass Pike Exit 11--Millbury		All Tandem Terminals	
Mass Pike Exit 14--Weston		All Tandem Terminals	
Mass Pike Exit 18--Allston/Brighton		All Tandem Terminals	

TRUCK TERMINALS (High Volume Mail Facilities in Massachusetts)			Terminals
South Station General Mail Facility	Dorchester Ave.		
Springfield Bulk Mail Facility	Fiberloid Avenue		
Shrewsbury Mail Facility	196 W. Main Street		
Others to be determined based on ongoing research			

Terminals (Truck Load Carriers)			
Consolidated			

Others to be determined based on ongoing research			
Note: Major Truck Load Carriers don't generally have facilities in Massachusetts. We may choose to leave this category out of the facilities inventory, while Russ includes them on his inventory of truck companies that operate in the state...			

Intermodal Management System

Draft Passenger Terminal Inventory

Name	Location	Owner/Operator	Criteria for Inclusion	Remarks
PRIMARY AIRPORTS				Enplanements
Barnstable Municipal Airport (Hyannis)	Barnstable	Municipal	> 30,000 Enplanements per Year	153,585
Logan Airport	Boston	Massport	> 30,000 Enplanements per Year	11,388,186
Martha's Vineyard Airport	Martha's Vineyard	Municipal	> 30,000 Enplanements per Year	50,565
Nantucket Memorial Airport	Nantucket	Municipal	> 30,000 Enplanements per Year	200,474
Worcester Municipal Airport	Worcester	Municipal	> 30,000 Enplanements per Year	71,910
Secondary Airports				
New Bedford Airport	New Bedford	Municipal	< 30,000 Enplanements per Year	18,082
Moore's Field (Ft. Devens)	Ayer	Military	Enplanements Unknown	N.A.
Hanscom Field	Bedford	Military	Enplanements Unknown	N.A.
Westover Metropolitan Airport/AFB	Chicopee	Military	< 30,000 Enplanements per Year	2,100
Otis AFB	Falmouth	Military	Enplanements Unknown	N.A.
Provincetown Airport	Provincetown	Municipal	< 30,000 Enplanements per Year	11,400
Barnes Municipal Airport	Westfield	Municipal	< 30,000 Enplanements per Year	720
South Naval Air Station	Weymouth	Military	Enplanements Unknown	N.A.
PRIMARY INTERCITY BUS TERMINALS				
Back Bay Bus Station	Boston	MBTA	Professional Judgement	N.A.
Boston Peter Pan Bus Station	Boston	Peter Pan Bus Lines	Professional Judgement	N.A.
Fitchburg Bus Station	Fitchburg	MART	Professional Judgement	31,200
Hyannis Bus Station	Barnstable	Municipal	Professional Judgement	N.A.
New Bedford Bus Station	New Bedford	SRTA	Professional Judgement	N.A.
South Station Transportation Center	Boston	MBTA	Professional Judgement	N.A.
Springfield Bus Terminal	Springfield	Peter Pan Bus Lines	Professional Judgement	N.A.
Worcester Greyhound Bus Station	Worcester	Greyhound Bus Lines	Professional Judgement	N.A.
Worcester Peter Pan Bus Station	Worcester	Peter Pan Bus Lines	Professional Judgement	N.A.
Secondary Intercity Bus Terminals				
Pittsfield Bus Station	Pittsfield		Professional Judgement	N.A.
Northampton Bus Station	Northampton		Professional Judgement	N.A.
Amherst Bus Station	Amherst		Professional Judgement	N.A.
Gallagher Transportation Center	Lowell		Professional Judgement	N.A.
Buckley Transportation Center	Lawrence		Professional Judgement	N.A.
Washington Square Transit Station	Haverhill		Professional Judgement	N.A.
Attleboro Train Station	Attleboro		Professional Judgement	N.A.
Taunton Bus Station	Taunton		Professional Judgement	N.A.
Brockton Bus Station	Brockton	Dedicated Transp Facility?	Professional Judgement	N.A.
Fall River (SRTA) Bus Terminal	Fall River	SRTA	Professional Judgement	N.A.
Woods Hole Bus Station	Woods Hole	Dedicated Transp Facility?	Professional Judgement	N.A.
Falmouth Bus Station	Falmouth	Dedicated Transp Facility?	Professional Judgement	N.A.
Plymouth Bus Station	Plymouth	Dedicated Transp Facility?	Professional Judgement	N.A.
Provincetown Bus Station	Provincetown	Dedicated Transp Facility?	Professional Judgement	N.A.
PRIMARY PORT/FERRY TERMINALS				Passengers
Nantucket Steamship Wharf	Nantucket	MV&N Steamship Authority	All Known Year-Round Interregional	483,943
Hyannis Ferry Terminal	Barnstable	MV&N Steamship Authority	All Known Year-Round Interregional	
Vineyard Haven Ferry Terminal	Martha's Vineyard	MV&N Steamship Authority	All Known Year-Round Interregional	1,772,342
Oak Bluffs Ferry Terminal	Martha's Vineyard	MV&N Steamship Authority	All Known Year-Round Interregional	
Woods Hole Ferry Terminal	Falmouth	MV&N Steamship Authority	All Known Year-Round Interregional	
Cuttyhunk Is Ferry Terminal	Gosnold		All Known Year-Round Interregional	N.A.
New Bedford Ferry Terminal	New Bedford - Cutt	MV&N Steamship Authority	All Known Year-Round Interregional	
Black Falcon Passenger Terminal	Boston	Massport	All Known Year-Round Interregional	21,000
Secondary Port/Ferry Terminals				Passengers
Falmouth Ferry Terminal	Falmouth - MV	Hy-Line Cruises	Seasonal (Not an IMS Priority)	300,000
New Bedford Ferry Terminal	New Bedford - MV	Cape & Islands Express Line	Seasonal (Not an IMS Priority)	90,900
Hyannis Dock (Straight Wharf)	Nantucket - Hyanni	Hy-Line Cruises	Seasonal (Not an IMS Priority)	
Martha's Vineyard Hy-Line Dock	MV - Hyannis	Hy-Line Cruises	Seasonal (Not an IMS Priority)	100,000

Provincetown Ferry Terminal	Provincetown - Bos	Bay State Cruise Co.	Seasonal (Not an IMS Priority)	One Vessel

Excluded Port/Ferry Terminals

Hingham Ferry Terminal	Hingham - Boston	MBTA	Intraregional (To Be Included in CMS)	
Hull Ferry Terminal	Hull - Boston	MBTA	Intraregional (To Be Included in CMS)	
Ro[illegible]s Wharf	Hingham - Boston	MBTA	Intraregional (To Be Included in CMS)	
Lo[illegible]Wharf	L.W. - Charlestown	MBTA	Intraregional (To Be Included in CMS)	
Logan Airport Water Shuttle	Rowes Wharf - Log	Massport	Intraregional (To Be Included in CMS)	

PRIMARY INTERCITY RAIL STATIONS

				Passengers
South Station	Boston	MBTA	> 10,000 Interregional Passengers/Year	818,591
Route 128 (Amtrak) Station	Westwood	Amtrak?	> 10,000 Interregional Passengers/Year	140,735
Back Bay Station	Boston	Amtrak?	> 10,000 Interregional Passengers/Year	105,587
Springfield Train Station	Springfield	Amtrak?	> 10,000 Interregional Passengers/Year	186,121
Worcester Train Station	Worcester	Amtrak?	> 10,000 Interregional Passengers/Year	40,532

Secondary Intercity Rail Stations

				Passengers
Pittsfield Train Station	Pittsfield	Amtrak?	< 10,000 Passengers per Year	3,698
Amherst Train Station	Amherst	Amtrak?	< 10,000 Passengers per Year	3,346
Hyannis Train Station	Hyannis	Amtrak?	< 10,000 Passengers per Year	2,358
Northampton Train Station	Northampton	Amtrak?	< 10,000 Passengers per Year	899
Buzzard's Bay Train Station	Buzzard's Bay	Amtrak?	< 10,000 Passengers per Year	314
Wareham Train Station	Wareham	Amtrak?	< 10,000 Passengers per Year	147
Sandwich Train Station	Sandwich	Amtrak?	< 10,000 Passengers per Year	126
W. Barnstable Train Station	W. Barnstable	Amtrak?	< 10,000 Passengers per Year	47
Taunton Train Station	Taunton	Amtrak?	< 10,000 Passengers per Year	26

Potential Additional Intercity Rail Stations

North Station	Boston	MBTA	Pending North-South Rail Link	N.A.

Cape Cod
Traffic Counting Report 1996

- Extract

EXECUTIVE SUMMARY

The Cape Cod Commission (formerly the Cape Cod Planning and Economic Development Commission) has completed its thirteenth year of an ongoing traffic counting program. Over 789 different locations on Cape Cod have been counted since the program began. Each year new locations are counted and many old locations are updated. This has resulted in a useful database of traffic volume information for transportation planning.

In 1996, 229 counts were performed at 209 different locations. Of these counts, 65 were comparable with 1995 counts because they were performed at the same location. Almost all of these were performed during the same month in each of these two years. These and the other counts are comparable through the use of monthly adjustment factors. Of the 65 comparable locations, 28 showed decreases while 37 showed increases in adjusted daily traffic. Overall, these counts indicate that traffic volumes in 1996 increased over 4% from 1995. All 1996 counts are listed in Appendix A. Over the ten year period 1986-1996, the average change in traffic cape wide has been 0.10% per year, or a total of 1.00%.

The traffic counting data are used by local, state, and federal officials, engineers, transportation planners, and many other individuals and organizations. This information is used to perform traffic impact studies for new developments, analyze existing traffic demands on Cape Cod's roads and identify ways to improve traffic flow and safety. The Commission expects to continue to expand and update this important database for transportation planning.

INTRODUCTION

This report summarizes traffic counts conducted by the Cape Cod Commission between 1984 and 1996. Traffic count locations were selected based on recommendations from the Massachusetts Highway Department (MHD), town officials, members of the Cape Cod Joint Transportation Committee (CCJTC), and the Commission's transportation staff. Since 1989, traffic counts have been conducted with computer-compatible GK5000 counters. These counters have dual input capability which enables the collection of directional traffic volumes, vehicle speeds, or vehicle classification for a particular study. Field data from the counters

were transferred directly to main the computer database. Earlier counts were conducted with "paper-punch" traffic counting equipment. Late in the summer of 1993 four new Timemark Delta II counters were purchased. These counters are also computer compatible and have the same capabilities as the GK5000 counters, plus additional features such as the ability to simultaneously conduct a speed, classification, and volume study for a particular study location. A total of 10 traffic counters are now used to collect traffic data.

Since the traffic counting program began in 1984, the Commission has obtained 2119 counts at 789 different locations. In 1996, 229 counts were performed at 209 different locations. Directional counts were conducted at most of the locations where possible. Directional traffic volume information is important when performing traffic studies because direction of travel can vary significantly by time of day.

A summary table of the traffic counting program's activities is as follows:

Year	New Locations	Total Counts	Year	New Locations	Total Counts
1984	68	68	1991	46	109
1985	56	78	1992	3	98
1986	83	142	1993	15	105
1987	174	280	1994	58	224
1988	94	175	1995	45	220
1989	63	207	1996	39	229
1990	43	166	Totals	787	2101

SEASONAL ADJUSTMENT FACTORS

The MHD collects year-round traffic volumes from the following permanent traffic counting stations:

- Route 6 near the Barnstable/Sandwich town line
- Route 6 at the Sagamore Bridge
- Route 28 at the Bourne Bridge
- Route 28 in Barnstable, east of Route 130
- Route 3 near the Bourne/Plymouth town line.

Based on the data collected the following Monthly adjustment factors are derived:

	Adj. Factor		Adj. Factor
January	1.35	July	0.73
February	1.31	August	0.74
March	1.25	September	0.89
April	1.06	October	0.97
May	0.93	November	1.09
June	0.86	December	1.15

These factors provide an indication of relative traffic volumes throughout the year. For example, weekday traffic in January is approximately half the weekday traffic in July. Still, there are obvious problems with the data. The permanent stations are on state highways; seasonal traffic fluctuations may be very different on residential streets. Also, none of the permanent stations are located east of Barnstable. This is significant because seasonal traffic fluctuations are generally greater in areas with higher seasonal population changes, such as the Outer Cape.

CAPEWIDE RESULTS

Traffic counts which were obtained at the same locations in 1995 and 1996 are shown in table 1. The list includes the beginning dates the counts were taken and the annual average daily traffic for both years. These are presented to make comparisons between the traffic volumes of the two years.

Each of the 65 locations in table 1 has a growth rate for the 1995-1996 period associated with it. These growth rates are presented graphically in figure 1. The locations are identified along the horizontal axis with numbers corresponding to table 1. The vertical axis shows the percent change from 1995. The locations are arranged by percent change from 1995; locations which experienced the greatest decrease are shown to the left of the graph, those with the greatest increase are shown to the right.

A remarkable 156% traffic increase was recorded in Wellfleet on East Commercial St. South of Main St. This is a relatively low volume road carrying 4025 vehicles per day. Because of the magnitude of the increase, the Commission has scheduled this location to be counted again in 1997. 1996 count information has been confirmed by two counts at this location.

Also showing remarkable growth of 106% is Rt 151 East of Old Barnstable Road in

Mashpee. This is a large volume road carrying 24,737 vehicles per day. Caution is recommended in reading information for this road as the comparison counts were performed in different months (early July vs. late September), then adjusted to annual averages. This location will be counted again in 1997.

In some cases, remarkable growth changes may be the result of special events (fairs, sporting, entertainment, etc.) occurring in the area of these roadways.

Table 2 shows a summary of growth rates over a 10 year period as well as 1995-1996 for four regions of Cape Cod as well as important roads. For each type of data, the number of comparisons made is listed with the annual average growth rate. Based on all 1035 comparisons available over a 10 year period in the database, Capewide traffic grew an average 0.10% per year -- resulting in a 1% change. Traffic by subregion may vary significantly from a high of 5.1% in the lower Cape towns of Harwich, Chatham, Brewster, and Orleans to a reduction of 3.10% in the mid-Cape towns of Barnstable, Yarmouth and Dennis. After weighing the changes by multiplying the growth rates by the traffic volumes, annual average daily traffic volumes were found to increase by 4.34% from 1995 to 1996 (table 2,).

Table 1 - Traffic Count Comparisons: 1995-1996

Location	TOWN	ROUTE		ROAD	1995 BEGIN DATE	1995 AADT	1996 BEGIN DATE	1996 AADT	% Annual Growth
1	Bourne	Head of the Bay Rd	N of	Belmont Circle	5/22/95	3645	5/22/96	4313	18.3%
2	Bourne	Rt 28	S of	Bourne Rotary	5/30/95	32588	5/21/96	34559	6.0%
3	Bourne	Rt 6 Scenic	W of	Sagamore Rotary	5/30/95	22160	5/22/96	24372	10.0%
4	Bourne	Rt 6&28	E of	Academy Dr	5/22/95	11493	5/22/96	12733	10.8%
5	Bourne	Rt 6A	@	Bour/Sand TL	5/17/95	10908	5/20/96	12940	18.6%
6	Bourne	Rt 6	@	Bour/Ware TL	5/23/95	16018	5/20/96	19038	18.9%
7	Sandwich	Old County Ln	E of	Jones Ln	5/29/95	367	5/29/96	439	19.6%
8	Sandwich	Race Ln	@	Sand/Barn TL	6/6/95	4316	6/4/96	4608	6.8%
9	Sandwich	Rt 130	S of	Beale Way	6/28/95	10845	6/18/96	13414	23.7%
10	Sandwich	Town Neck Rd	N of	Tupper Rd	7/5/95	4750	7/1/96	3961	-16.6%
11	Falmouth	Sandwich Rd	@	Falm/Mash TL	5/24/95	2754	5/28/96	2824	2.5%
12	Falmouth	Thomas Landers Rd	E of	Rt 28	5/22/95	2715	5/28/96	2903	6.9%
13	Falmouth	Gifford St	S of	Brick Kiln Rd	7/11/95	8331	7/10/96	8685	4.2%
14	Falmouth	Palmer Av	W of	Rt 28	5/24/95	1815	5/28/96	2118	16.7%
15	Falmouth	Spring Bars Rd	E of	Worcester Court Av	5/24/95	6605	5/28/96	4464	-32.4%
16	Falmouth	Red Brook Rd	@	Falm/Mash TL	8/22/95	2368	7/8/96	2434	2.8%
17	Falmouth	Rt 28	@	Falm/Mash TL	5/30/95	12294	5/29/96	12466	1.4%
18	Falmouth	Woods Hole Rd	S of	Oyster Pond	5/24/95	9259	5/28/96	7755	-16.2%
19	Falmouth	Quisset Rd	S of	Mandarin Way	7/11/95	1889	7/10/96	2157	14.2%
20	Mashpee	Rt 130	W of	Great Neck Rd North	7/10/95	6629	7/10/96	7569	14.2%
21	Mashpee	Rt 151	E of	Old Barnstable Rd	7/10/95	11976	9/24/96	24737	106.6%
22	Mashpee	Rt 28	@	Mash/Barn TL	8/15/95	18603	7/8/96	16810	-9.6%
23	Mashpee	Donna's Lane	E of	Rt 28	7/13/95	1816	7/10/96	1697	-6.6%
24	Barnstable	Rt 6A	E of	Hyannis Rd	6/13/95	5928	5/14/96	6636	11.9%
25	Barnstable	Rt 28	@	Barn/Yarm TL	6/20/95	16881	6/11/96	16572	-1.8%
26	Barnstable	Pine St	E of	South Main St	6/5/95	6107	6/5/96	6165	0.9%
27	Barnstable	Five Comers Rd (Pond St)	S of	Rt 28	6/12/95	1565	6/12/96	1668	6.6%
28	Barnstable	Pine St	Btwn	Main St and South St	6/27/95	423	6/26/96	287	-32.2%
29	Barnstable	Main St Hyannis	@	Barn/Yarm TL	6/5/95	13542	6/5/96	12207	-9.9%
30	Barnstable	Rest Area Ingress	S of	Rt 6	6/30/95	1225	7/2/96	833	-32.0%
31	Barnstable	Oak St	@	Rt 6 Overpass	6/7/95	2363	6/10/96	2453	3.8%
32	Barnstable	Rest Area Egress	S of	Rt 6	6/30/95	1232	7/2/96	931	-24.4%
33	Yarmouth	Willow St	S of	Rt 6A	8/7/95	4934	8/6/96	5736	16.3%
34	Yarmouth	Railroad Ave	S of	Rt 6A	8/21/95	2129	8/6/96	2352	10.5%
35	Yarmouth	Springer Ln	S of	Rt 28	8/9/95	807	8/6/96	760	-5.8%
36	Dennis	Main St	N of	Hibbards Rd	7/17/95	5860	7/17/96	6287	7.3%
37	Dennis	Rt 134	S of	Upper County Rd	6/21/95	10998	6/26/96	11099	0.9%
38	Dennis	Rt 28	@	Denn/Harw TL	7/18/95	12165	7/16/96	11452	-5.9%
39	Dennis	Rt 6A	@	Denn/Brew TL	6/21/95	5556	7/15/96	6152	10.7%
40	Dennis	Old Chatham Rd	@	Dennis/Harwich TL	6/26/95	1367	6/26/96	1389	1.6%
41	Harwich	Rt 124	N of	Rt 39	7/17/95	6926	7/17/96	7418	7.1%
42	Harwich	Lower County Rd	W of	Rt 28	7/19/95	3754	8/19/96	4546	21.1%
43	Harwich	Rt 124	@	Harw/Brew TL	7/18/95	4863	7/17/96	4765	-2.0%
44	Harwich	Rt 28	@	Harw/Chat TL (N end)	7/19/95	6456	7/17/96	6544	1.4%
45	Harwich	Rt 28	E of	Sisson Rd (Rt 39)	7/17/95	9962	7/17/96	9636	-3.3%
46	Chatham	Barn Hill Rd	N of	Hardings Beach Rd.	8/2/95	3230	8/5/96	3400	5.3%
47	Chatham	Sam Ryder Rd	N of	Middle Rd	8/21/95	1605	8/7/96	1785	11.2%
48	Brewster	Millstone Rd	S of	Rt 6A	6/21/95	4010	6/19/96	3592	-10.4%
49	Brewster	Freemans Way	W of	Rt 6	7/26/95	1660	7/23/96	1816	9.4%
50	Brewster	Rt 6A	@	Brew/Orle TL	6/27/95	15176	6/19/96	13842	-8.8%
51	Brewster	Stoney Brook Rd	W of	Rt 6A	7/5/95	4859	7/23/96	4380	-9.9%
52	Orleans	Rt 28	S of	Main St	7/24/95	10086	7/22/96	9144	-9.3%
53	Orleans	Rt 28	N of	Rt 39	7/25/95	11014	7/22/96	10562	-4.1%
54	Eastham	Rt 6	@	East/Well TL	8/1/95	19609	7/29/96	18168	-7.3%
55	Eastham	Samoset Rd	W of	Rt 6	7/25/95	3470	7/22/96	3357	-3.3%
56	Eastham	West Rd	@	East/Well TL	7/31/95	1308	7/22/96	1304	-0.3%
57	Wellfleet	East Commercial St	S of	Main St	8/23/95	1572	8/26/96	4025	156.0%
58	Wellfleet	Lieutenant Island Rd	W of	Rt 6	7/31/95	919	7/31/96	900	-2.1%
59	Wellfleet	Rt 6	@	Well/Trur TL	8/15/95	15086	7/31/96	14094	-6.6%
60	Truro	Rt 6A	N of	Rt 6	8/15/95	3115	8/13/96	3066	-1.6%
61	Truro	Rt 6A	@	Trur/Prov TL	8/14/95	3764	8/12/96	3980	5.7%
62	Truro	Rt 6	N of	Rt 6A	8/15/95	12724	8/14/96	12104	-4.9%
63	Provincetown	Province Land Rd	S of	Race Point Rd	8/14/95	1211	8/14/96	1078	-11.0%
64	Provincetown	Bradford St	Btwn	Winslow&Prince	8/14/95	8761	8/14/96	8764	0.0%
65	Provincetown	Conwell St	S of	Rt 6	8/14/95	5679	8/13/96	5665	-0.2%

Figure 1 - Percent AADT Growth for 65 Comparison Locations: '95-'96

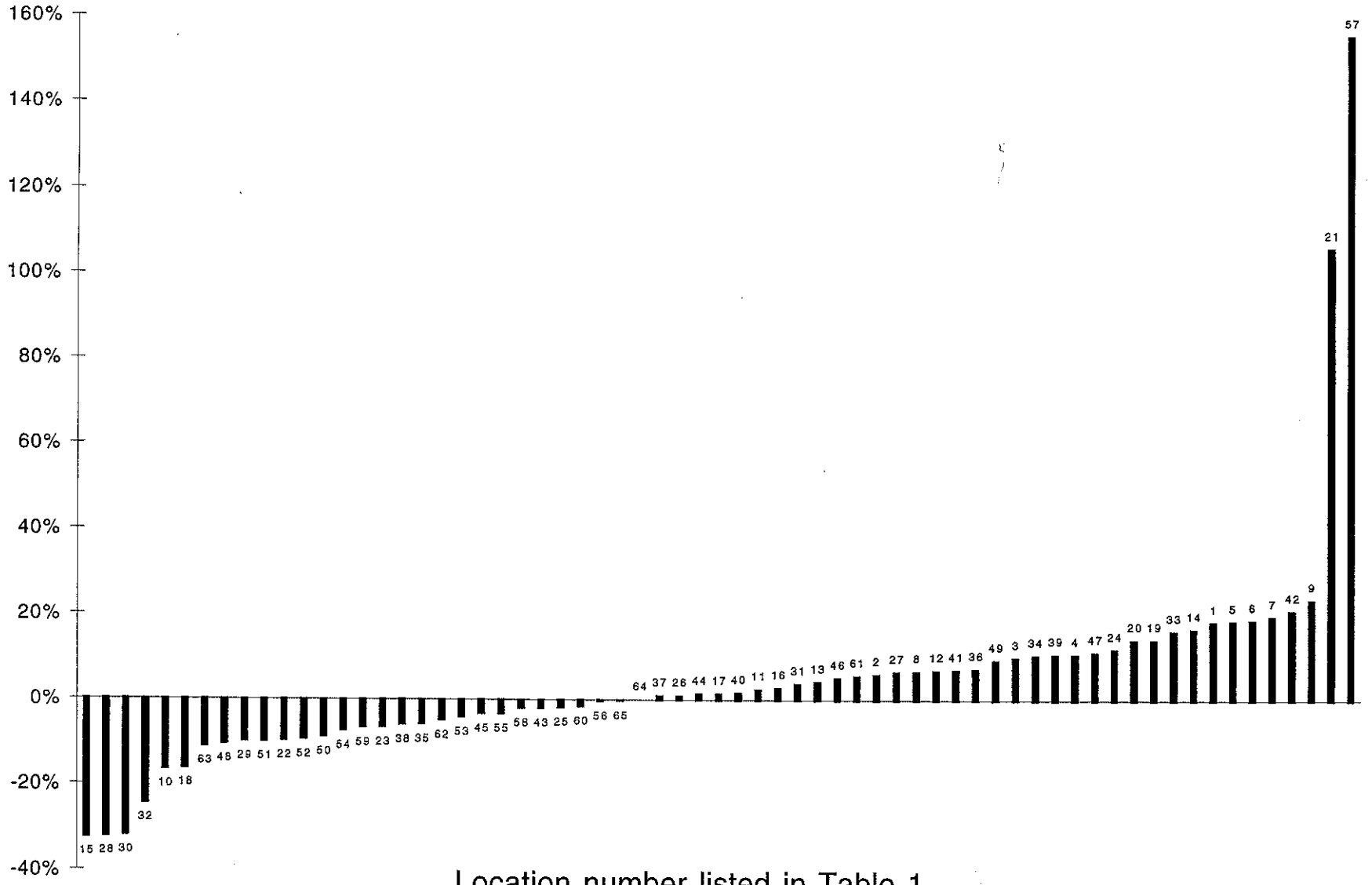


Table 2
Cape Cod Annual Traffic Growth

		Towns	1995-1996 # of Comparisons	1995-1996 Annual Average Growth	1986-1996 # of Comparisons	1986-1996 Annual Average Growth	1986-1996 10 Year Change
Regions	Upper	Bourne, Sandwich, Falmouth, Mashpee	23	11.19%	284	0.31%	3.10%
	Mid	Barnstable, Yarmouth, Dennis	17	-0.11%	289	-0.32%	-3.10%
	Lower	Harwich, Chatham, Brewster, Orleans	13	-2.60%	271	0.50%	5.10%
	Outer	Eastham, Wellfleet, Truro, Provincetown	12	-0.92%	191	0.15%	1.50%
	All	All Cape Towns	65	4.34%	1035	0.10%	1.00%
Roads	Rt 28	Bourne, Falmouth, Mashpee, Barnstable, Yarmouth, Dennis, Harwich, Chatham, Orleans	10	-0.75%	171	-0.61%	-5.90%
	Rt 6A	Bourne, Sandwich, Barnstable, Yarmouth, Dennis, Brewster, Orleans	6	4.88%	107	-0.59%	-5.80%
	Rt 6	Bourne, Orleans, Eastham, Wellfleet, Truro, Provincetown	6	3.52%	95	-0.57%	-5.60%
	All others	All Cape Towns	44	8.89%	673	0.56%	5.70%

Note:

Table shows average annual growth for most recent year ('95-'96), and for previous 10 years ('86-'96). Also shown is the change in traffic over 10 years, and the number of comparisons used to determine growth.

Travel Demand Forecasting

The Travel Demand Forecasting program at the Cape Cod Commission is based on the regional model. This model takes inputs of land use data and, in turn, predicts demand for transportation on a regional level. We have recently completed a relatively sophisticated model that includes most regional roadways above "local" function classification. We are also currently working on adding a mode choice element so that it will be able to predict transit demand along travel corridors.

Our travel demand forecasting also uses other tools to help us make sound planning decisions. For example, in the Monomoy and Outer Cape Capacity studies, we used the regional model as a starting point to make some predictions about the need for roadway and intersection improvements on roads not included in the model, using land use and population projections for the regions.

Our new regional model allows a fair amount of accuracy for our decision making for projects such as the Capacity Studies. However, we recognize that travel demand models have some weaknesses. For example, they are unable to fully model the interactions between land use and transportation; rather, they take land use as an input and output travel forecasts. Due to these weaknesses, we often need to rely on the planning expertise of our staff, in conjunction with the model, for more accurate predictions of future travel demand and land use changes.

The Current Model

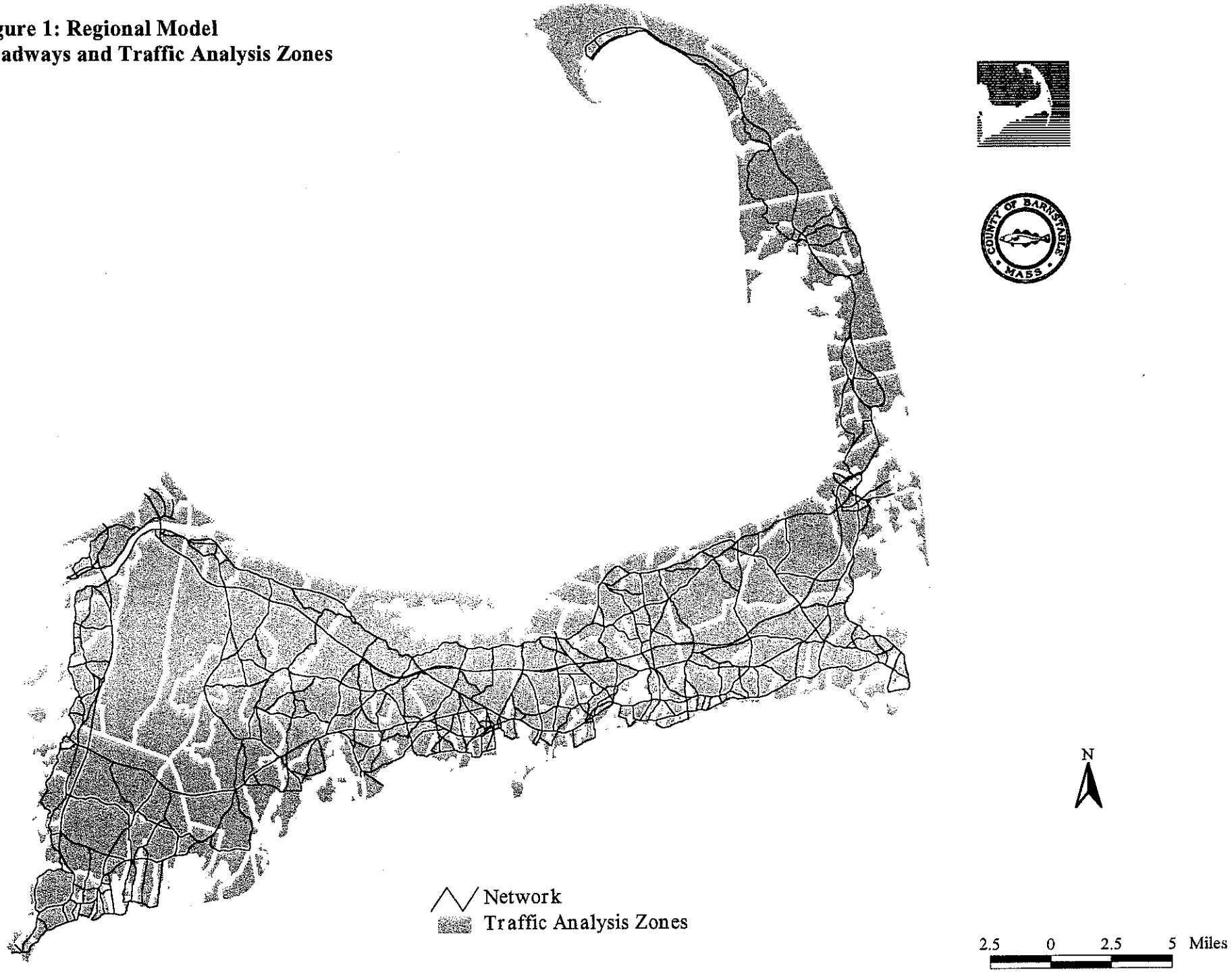
Our new model includes most primary and secondary roads in the region. This model uses Traffic Analysis Zones based on Census Block Groups, except in certain parts of the Outer Cape where coastal sections have been split off into their own TAZ. There are a total of 238 zones in the new model. In addition, there are 5 "external" zones to simulate traffic to and from the Islands and to and from Plymouth County. The new model uses the modeling program TRIPS running on a Pentium Windows platform. This program was chosen due to its flexibility and ability to model transit, roads and roadway intersections in a sophisticated manner.

Housing and employment data for this model is based on information from the 1990 Census of Population and Housing and state assessors parcel and 1990 McConnell land use data. This data is divided into six land use types for traffic generation: year-round housing units, seasonal housing units, retail employment, non-retail employment, parking spaces at beaches, and hotel rooms/campground sites.

Information on roadways was based on U.S.G.S. line files and the Roadway Inventory File supplied by the Massachusetts Executive Office of Transportation and Construction based on the functional classifications adopted by the MPO. Most of the roadways in the region that are classified as above "local" are included in the model.

We also have maps showing the roadway network used in the model, traffic analysis zones and locations of where the traffic they generate "enters" the system stored in ArcView.

Figure 1: Regional Model
Roadways and Traffic Analysis Zones



These are linked to the model via geocoding numbers based on beginning and end nodes for each link.

Strengths of Modeling as a Travel Demand Forecasting Tool

Travel Demand Modeling is such an integral part of TDF that many mistakenly assume the two terms are interchangeable. Modeling does have many strengths as a TDF tool:

- It allows planning to go beyond intuition and make some quantitative statements about the effects of various scenarios on travel demand.
- It can uncover some surprising effects of development patterns that might not immediately be expected; for example, that development on a major, congested artery will increase traffic on a parallel route far more than it will on that major artery.
- It adds legitimacy to any transportation planning effort by providing a more impartial view

Weaknesses of Modeling for Travel Demand Forecasting

However, modeling does have its weaknesses, particularly for a region such as Cape Cod. These weaknesses make it important for transportation planners to look beyond the model results and check them to see if they are reasonable.

Weaknesses of modeling are sometimes due to the state of the art being somewhat primitive. Such weaknesses can be lessened or even turned into strengths as modeling techniques are improved through the Travel Model Improvement Program (TMIP) and other efforts. At present, they include:

- The need to input future growth scenarios as a "given" rather than recognizing the interactions between land use, transportation and air quality. Efforts such as LUTRAQ (Land Use, Transportation and Air Quality) in Oregon can help to close this loop.
- Mode choice is similarly troublesome.
- The development of modeling based on an outdated central city-suburban model in which travel occurs based on fairly predictable flows between home and work in the morning and work and home in the evening. Travel behavior on the Cape is based on a different set of imperatives; tourists meander around the transportation system based on whim while those who work on Cape Cod are less likely to follow predictable 9 am. to 5 pm. style work commutes.
- The basic lack of a theoretical basis for the "gravity model" on which modeling is based. The gravity model is less accurate than it once was due to the general increasing of commute times and the tendency of Americans to choose a workplace not on proximity but on the quality of the job, particularly in a region such as Cape Cod. A better underlying theory may improve the predictive ability of modeling.

Other weaknesses are inherent in modeling and are unlikely to be reduced through improvements in the state of the art:

- A lack of accurate data on jobs and other demographic factors, particularly outside of major urban areas. For example, on Cape Cod, it is difficult to obtain good data on employment on anything more specific that a town-level. In addition, seasonal jobs are often "invisible" to the Census and other major sources of data. Better data may improve modeling efforts, but are often either expensive or impossible to obtain due to confidentiality problems.
- The basic fact that, while many of modeling's faults may theoretically be solved through the use of more detailed data, more staff time or more computing power, such resources are unavailable to the Cape Cod Commission transportation staff and are unlikely to be available in the future.

Other Tools

For these reasons, the Cape Cod Commission relies on other travel demand forecasting tools in addition to modeling. These include:

1. Corridor studies and alternative route analysis.
2. Studies of the "build out" potential of regions based on current and potential zoning.
3. Interpolation of impacts on minor roadways from model output of major roadways.
4. Traffic counts and the change in traffic counts over time.
5. Expertise of planning staff in understanding the interrelationship of transportation and land use.

Applications for Travel Demand Forecasting

Travel Demand Forecasting, in whatever form, is an important part of transportation planning. At the Commission, we have only started to tap into its many uses. With the creation of a more detailed model and the development of other TDF tools our use of it will increase in the future.

Among present and future uses for TDF are:

- Predictions of how future projected growth will impact the current transportation system.
- Predictions of how future transportation improvements might help alleviate those future impacts.
- Transit planning and management
- Capacity studies such as the ones completed for the Outer Cape and Monomoy regions and planned for the Mid and Upper Cape.
- Planning for the minimization of the impact of future growth on the transportation system of the Cape.

Land Use

Land use and transportation needs are interactive. Different land use mixes require different transportation needs. For example, a high-density residential development located near a major employment center with a variety of jobs is more likely to attract transit use than a suburban subdivision far from any jobs. For this reason, understanding current land use and demographics is not just an important part of transportation planning; it is where this planning must begin and end. All aspects of transportation planning, from transit planning to travel demand forecasting, are dependent on good land use data.

Unfortunately, the data that is available for regions outside major metropolitan areas is not as detailed as we would like. Plenty of data is out there, but getting it to fit into our transportation planning needs can be difficult. Often good numbers are available, but for larger areas than is likely to be useful. Often data is provided for small areas, even individual parcels, but is not detailed enough in terms of the specific use for the land.

This section provides an overview of what data is out there and what it means for the transportation system of Cape Cod. By assessing what the existing information is telling us, we can begin to see how land use information fits into our long range plan for Cape Cod, and what data would be worth collecting in the future.

Sources of Information

There are currently three primary sources of land use data for Cape Cod:

1. *MacConnell Land Use Data* is based on remote sensing data collected in those year 1971 and 1990 for MassGIS. It provides time-series data for about 25 general use categories with which we can study trends in land use on the Cape. It is available on the parcel level.
2. *Tax Assessor's Data* collected from each of the 15 towns on Cape Cod has been digitized by the Cape Cod Commission GIS Department. This data is more specific than the MacConnell data; about 100 tax code classifications exist. It is also available on the parcel level. This data was digitized at different times for each town, beginning in 1988 and finishing in 1996. It is a "snapshot" of each town at a slightly different time, and is not available for earlier years in geographic form.
3. *U.S. Census Data* is provided for 1990 (and, to a lesser extent, earlier years ending in "0") on various detail levels. The most geographically detailed data is available for "blocks" of a few hundred people, but is limited in terms of is demographic detail. Data available for "block groups" of 1,000 to 3,000 people provides more detailed information on housing types, income levels, and other information that can be tied into land use. In addition, the *Census Transportation Planning Package* provides detailed information about employment, journey-to-work, and other demographic parameters, but its geographic detail for Cape Cod is limited to "places" (such as village centers) or entire towns.

All of these sources have their strengths and weaknesses. Generally, the data from town tax assessors is most useful for transportation planning purposes since it is the most

detailed. However, for travel demand forecasting, where demographics are as important as land uses, U.S. Census data is often the most valuable source of data. MacConnell data is the best time-series land use data we have available, but its level of detail in terms of land use types is limited.

All three of these data sources are readily adapted to use in the GIS-T database we maintain for transportation planning purposes. However, for this section our observations are based on the tax assessors data unless otherwise noted.

Recent Conditions

Land use on Cape Cod is dominated by housing and open space. According to tax assessor's data collected from 1988 to 1996, 38% of land on Cape Cod that is not located in Camp Edwards or Otis Air Force Base is used for housing of some sort, while 26% is open space or recreational land. An additional 30% is publicly-owned land, of which much is open space. Less than 3 percent is used for employment. Figure 1 provides an overview of this data.

Each land use is important from a transportation perspective. Housing units provide the basic production of trips, while employment, retail and recreational locations provide many of the attractions. Lodging units, seasonal units, and beaches provide for much of the "wild card" in transportation planning for Cape Cod; they produce and attract many trips but not ones that are easily measured in traditional travel demand modeling. Since each land use has different implications for the region, we will look at each one separately.

Housing

Housing is not only the most common land use on Cape Cod; it is also the one that is growing the most quickly. As population grows, so does the need for places to live. In a region such as Cape Cod, that tends heavily toward single-family detached housing, this population growth translates into an increase in the use of land for housing.

Figure 2 provides a map of land devoted to housing on Cape Cod. Much of the land devoted to housing is on the south shore and Buzzard's Bay coastline. The town of Barnstable has a large amount of land devoted to housing, as do Chatham, Orleans, Eastham and Wellfleet.

Figure 3 shows the number of housing units per square mile on Cape Cod.[1] Not surprisingly, the housing density on the south shore and Buzzard's Bay coastline is greatest. Outer Cape development is more dense in Provincetown and Eastham than the rest of the region. Figure 4 shows the average lot size for housing, an interesting comparison to the last figure. This map is interesting because it shows not the density of housing compared to total land but the density of housing on *land used for housing*. This helps remove potential biases due to large tracts of land that is either undevelopable or

[1] Both Figure 3 and Figure 4 are based both on tax assessors' data and U.S. Census data from 1990

used for other purposes. Generally, lot sizes are largest on the Cape Cod Bay side of the Cape.

Multifamily housing is different from a transportation planning perspective than single family housing. Multifamily units tend to have higher densities, lower average incomes, and lower auto ownership levels. They are therefore generally assumed to be more receptive to transit and produce less vehicle miles traveled than single family housing units. Survey research tends to support these assumptions. Figure 5 shows land devoted to multifamily housing on Cape Cod, with multifamily housing defined as anything other than a single detached housing unit. Multifamily housing units are concentrated in certain areas, such as Hyannis, Wellfleet Center and Dennisport. Other areas, such as Sandwich and Barnstable Village, are almost devoid of multifamily housing units.

The density of housing development is an important factor for transportation planning as well. On Cape Cod, the density of housing may remain constant but the density of *occupied* housing depends on the time of year. In the winter much of the lower Cape and even the rest of the region is relatively sparsely populated, with the exception of the south shore from Hyannis to Dennis and parts of Falmouth. In the summer the Cape is a much more crowded place, with occupied housing levels at a point where transit may even be a feasible transportation option.

Seasonal residents are important because they have different travel patterns than year-round residents. In addition, their sheer number puts more stress on the transportation infrastructure. Figure 6 shows the number of housing units occupied in April, when the Census is taken. This map suggests that Falmouth, Yarmouth, Dennis, Chatham and parts of Barnstable are the "year-round core" of the Cape, where the population is still significant in the off-season. Meanwhile, Truro, Wellfleet, Eastham, and Brewster are far less densely populated, revealing the seasonal nature of their housing stock at present.

Lodging

In a seasonal region such as Cape Cod, lodging units also play an important role in regional transportation planning. In many ways they are housing units, since many tourists use them as their base while on the Cape. However, in many ways they also act as employment locations, since they provide employment, especially in the summer. In other regions it would be easy to ignore lodging from a transportation planning perspective, but on the Cape the large number of lodging units make it difficult to ignore them.

Figure 7 shows the land used by lodging units on Cape Cod. Lodging is somewhat clustered in certain block groups, such as those in Provincetown, in Chatham, and in Brewster. There is also significant amounts of lodging land uses along the south shore of the Cape. Although other block groups contain some lodging units, it is interesting to note how much of the Cape is entirely lacking short-term lodging; or, at least, short-term lodging that is taxed as short-term lodging.

Employment-Related Land Uses

Even though the journey to work is a less significant generator of trips here than elsewhere, employment-related land uses are still an important factor in transportation planning on the Cape. For the purposes of this plan we have broken employment-related land use into four categories: office, retail, manufacturing and mining. Figures 8 through 11 show land uses related to these four categories. Public employment centers are not included in these figures, but are easy to determine since they are concentrated at the 15 town halls, the county complex, and the state and federal offices throughout the Cape.

- *Office Uses*: Office land uses are concentrated in Provincetown, Eastham, Chatham, Falmouth, Bourne and the Route 28 corridor from Hyannis to Dennis. To a lesser extent there is also office use along Route 132 and Route 6A in Sandwich.
- *Retail Uses*: Retail uses are more dispersed, although there is still a concentration along Route 28 from Hyannis to Dennis and Routes 132 in Hyannis, Route 28 in Bourne and Route 134 in Dennis.
- *Manufacturing Uses*: Manufacturing largely occurs inland from Barnstable to Dennis, in Provincetown, and in Falmouth and Bourne. On the whole there is not a large amount of manufacturing on Cape Cod.
- *Mining*: Mining is also not widespread on Cape Cod, although there is some mining in Falmouth and other locations. Much of the mining on the Cape occurs inland.

Agricultural Uses

Although not as significant a use on Cape Cod as in some other parts of the country, agriculture is somewhat of a "land hog," using up a lot of land even if only a small number of farms exist. Figure 12 shows the land use of agriculture on the Cape. Much of the farming uses on the Cape is in the Upper Cape, although the mid and Monomoy regions have some agriculture as well.

Much of the agricultural uses on Cape Cod are cranberry bogs and small crop farms. It is likely that much of the crop land is not currently being used, based on informal observations.

Open Space

Preservation of open space is an important priority for the Cape Cod community. In the 1995 Cape Cod residents' survey conducted for the Commission, a majority (53%) of Cape residents supported increasing taxes for the purchase of open space to reduce their town's development. Over 80% supported increased taxes for the purchase of open space for water supply protections. In addition, the preservation of open space has the potential to reduce projected increases in traffic in the region.

At present, a significant percentage of the land on Cape Cod is devoted to preservation as open space, recreational land, or public land. In addition, the Cape Cod National Seashore

on the lower Cape not only preserves a great deal of land in that area, but also restricts the development of land already developed within its borders (see Figure 15).[2]

In the case of open space, the data that exists is generally difficult to decipher. Open space can be classified in many different ways. Some open space is publicly held, some is private, some may even be considered development for some purposes but for all intents and purposes act as open space, such as right of ways for utility lines. In addition, often recreational land such as golf courses is seen as open space and often it is not.

On the whole, we can get a picture of open space by looking at a number of land use classifications and using some professional judgment. Figures 13 and 14 show public land or dedicated open space uses, recreational uses such as golf courses, and the land on the lower Cape included in the National Seashore. Much of the land in the National Seashore is also included as public land in Figure 13, although Figure 15 allows us to identify that land to some extent. Some of the land listed as public in Figure 13 is not truly open space, but town, county or state land used for public offices or other public development uses. This amount is probably fairly small, with the exception of the Otis Air Force Base/Camp Edwards complex on the upper Cape, which dominates two block groups.

Generally, open space uses are common inland and on the lower Cape, while not as common on the south shore of the Cape. The Cape Cod Bay and Buzzards Bay shores fall somewhere in between. The one area that appears to suffer from a lack of open space uses is the south shore of the Cape from Hyannis to Harwich, where development pressures have been strong. On the rest of the Cape open space is generally not hard to find, at present. Whether this condition will continue depends on the development and transportation policies adopted by the region and its towns in the future.

Trends in development

Development pressures have been great in this region for the past 25 years and are likely to continue to be great in the future. Between 1971 and 1990 the amount of land used for residences increased by over 50%. Similarly, commercial uses increased significantly from 197 1 to 1990.

According to land use projections conducted for the 1997 Long Range Transportation Plan for Cape Cod, residential uses will continue to be developed at a significant pace. Commercial development will also continue in the future, at an even more rapid pace than residential development. However, since amount of land involved is not as significant, the impact on the land use of Cape as a whole will not be as great. These findings are summarized in Figures 16 through 18.

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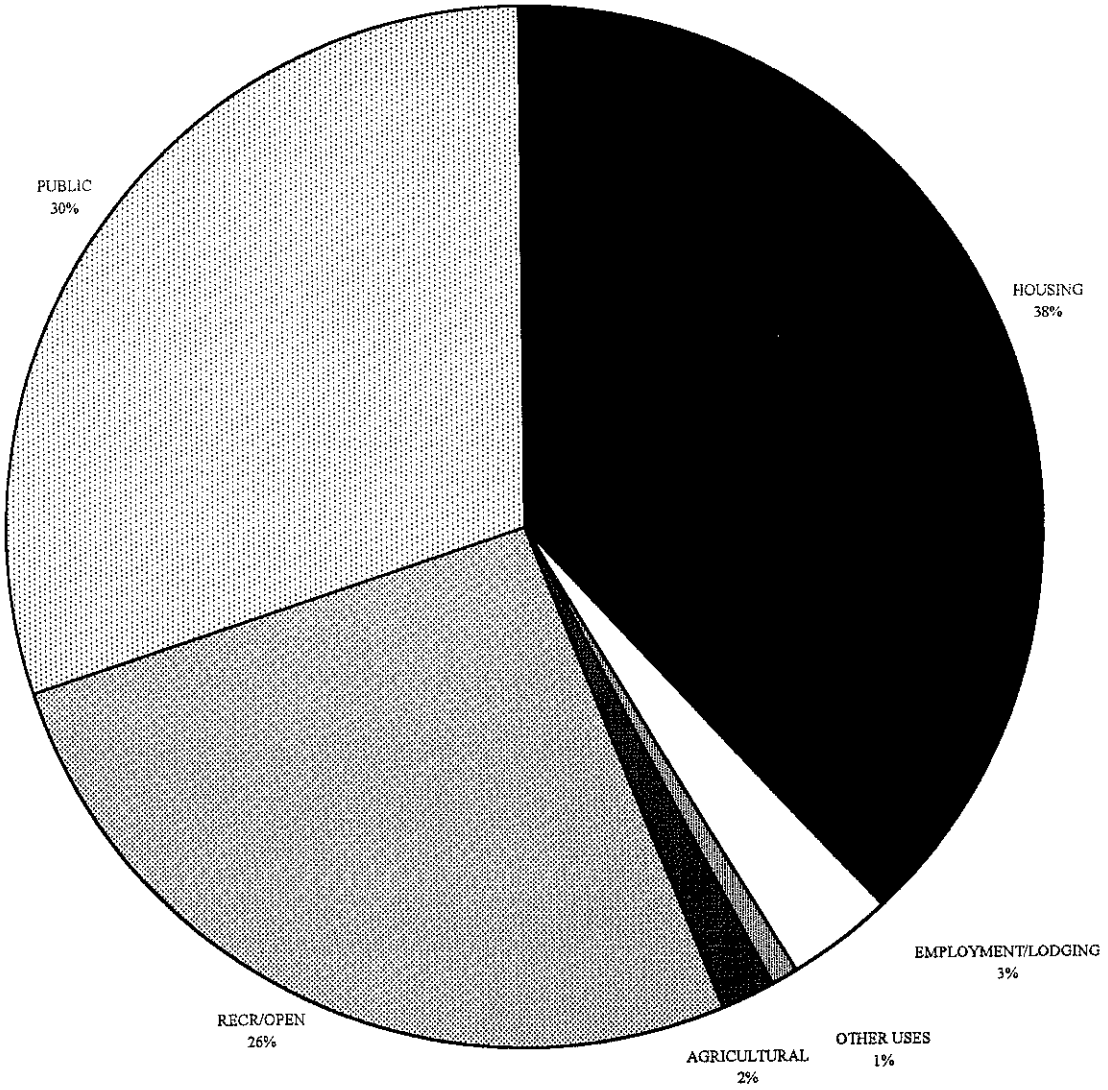
[2] Data on National Seashore land is from the Cape Cod Commission Geographic Information Systems staff

Implications for transportation

This snapshot of land uses in the region has some basic implications for our transportation planning, and the update to the Long Range Plan specifically:

- Journey-to-work trips will occur from a variety of locations to a smaller group of commercial, retail and industrial locations. We can therefore expect bottlenecks at peak hours near the locations of workplaces.
- Transit ridership may have a higher potential in the summer months due to the higher number of occupied housing units at that time. However, it is not clear how receptive summer tourists are to transit use, so this difference in potential may not be as high as the numbers by themselves might suggest.
- The Route 28 corridor from Hyannis to Dennis appears to have good potential for year-round transit ridership, due to the concentration and proximity of different uses.
- The development of an accurate travel demand model will be impaired by the vast seasonal differences in the use of residential land, leading to the need for some innovations in travel demand modeling to respond to seasonal variations.

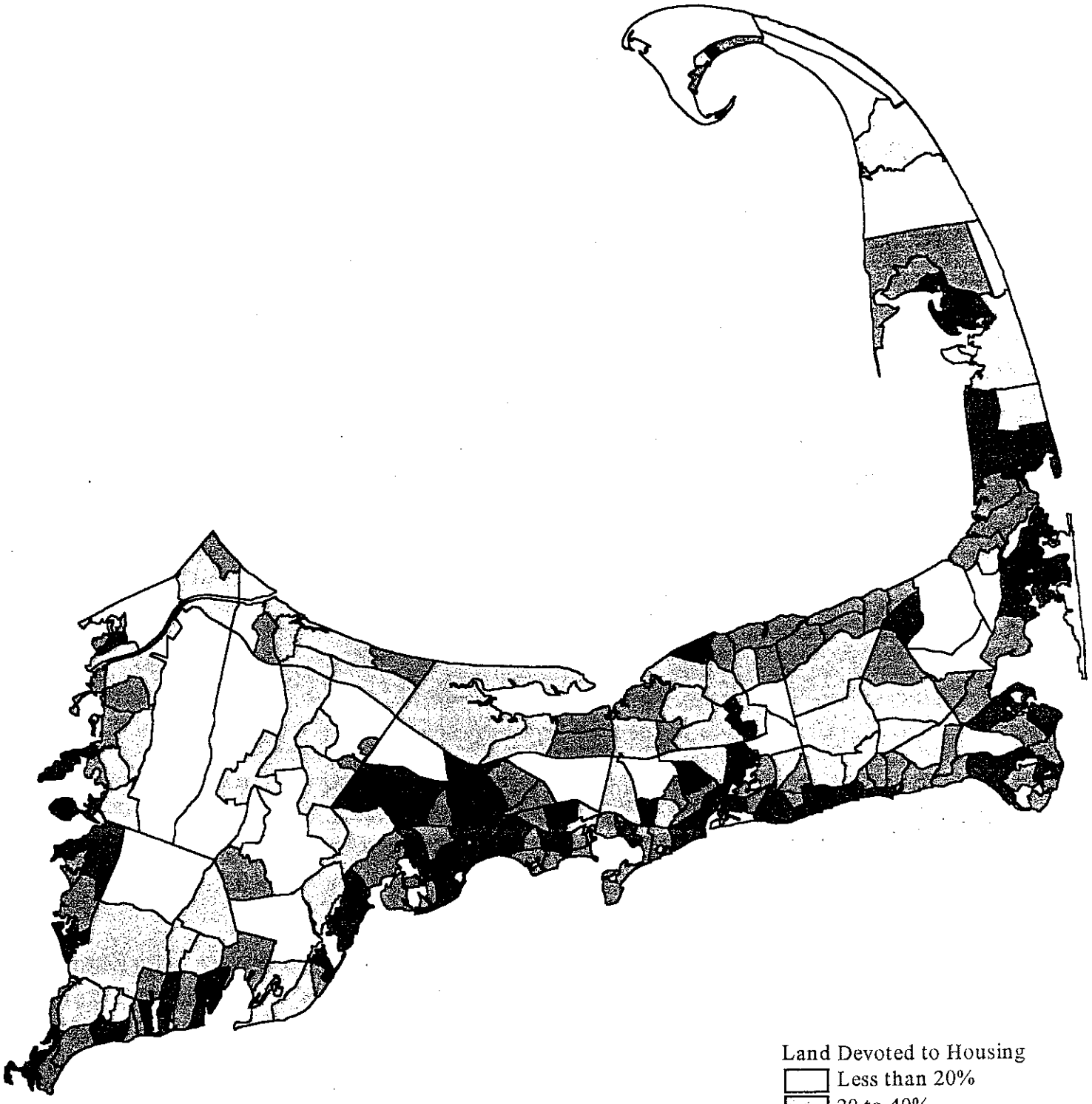
Figure 1:Land Use on Cape Cod (except military complex)



Source: Tax Assessors' data from Cape towns, 1988-1996

Land Uses on Cape Cod (1990): Housing

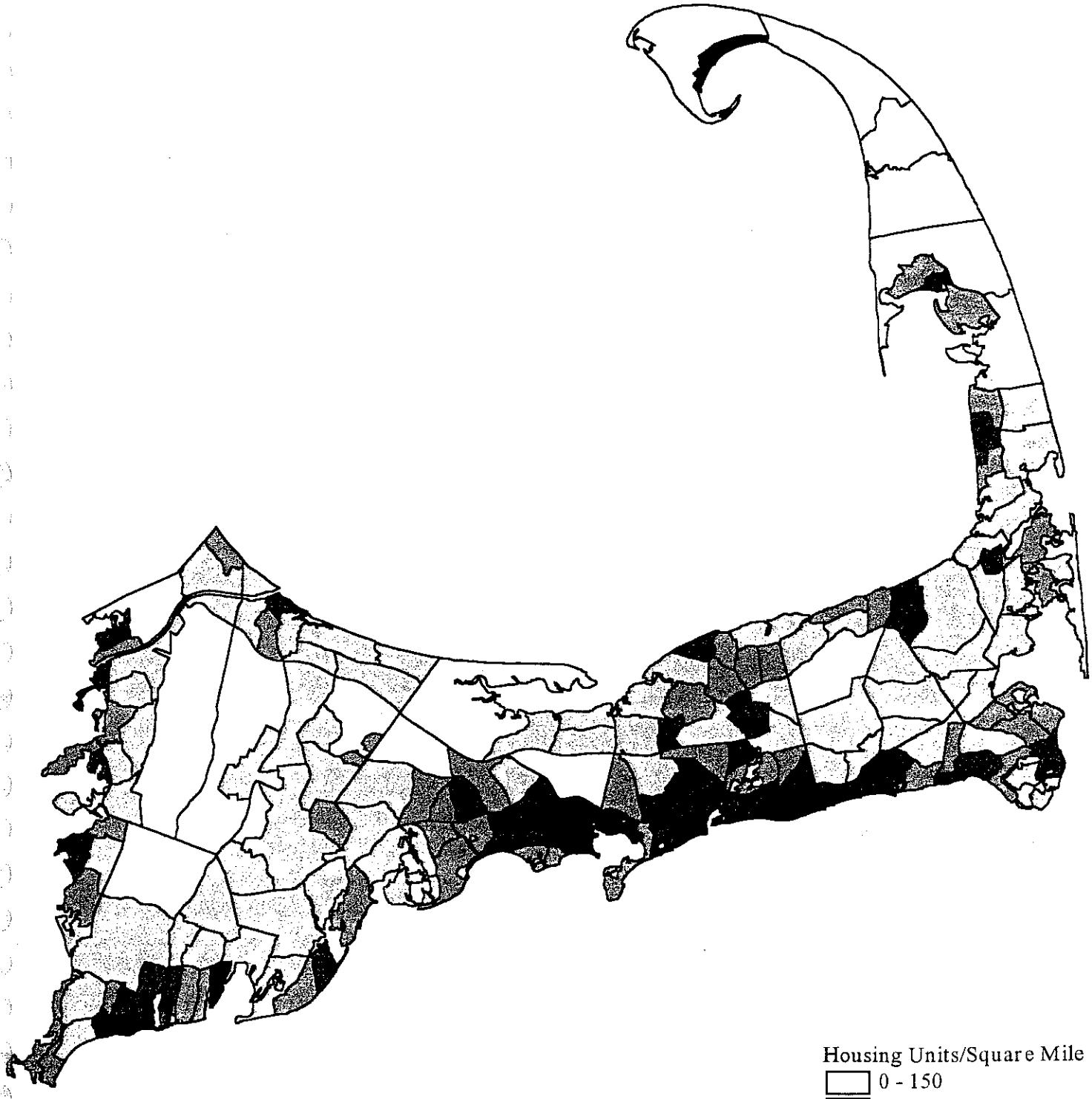
Cape Cod Commission
Regional Transportation Model



13

Land Uses on Cape Cod (1990): Housing Units/Square Mile

Cape Cod Commission
Regional Transportation Model



Land Uses on Cape Cod (1990): Average Housing Lot Size

Cape Cod Commission
Regional Transportation Model

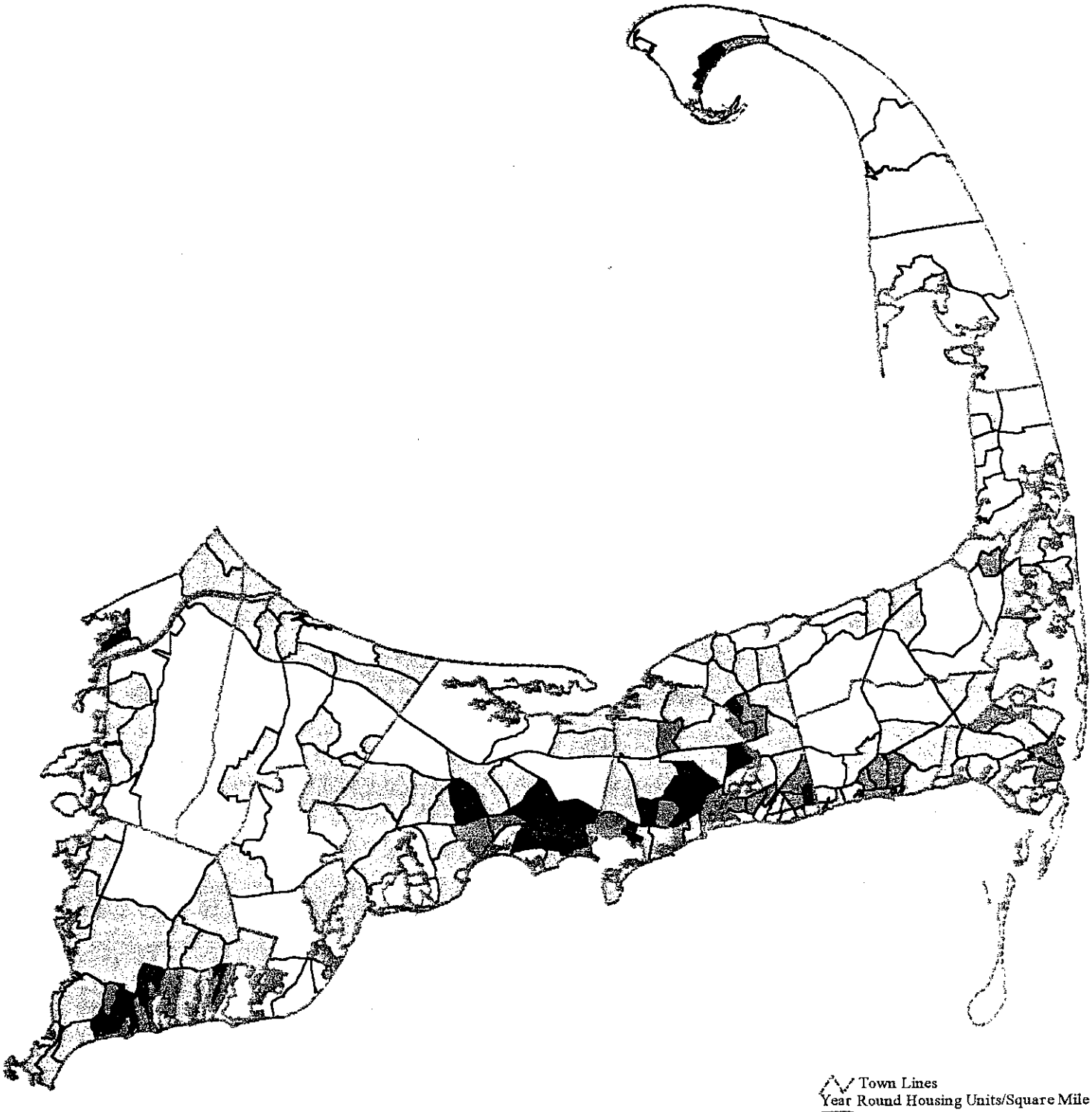
15

Land Uses on Cape Cod (1990): Multifamily Housing

Cape Cod Commission
Regional Transportation Model

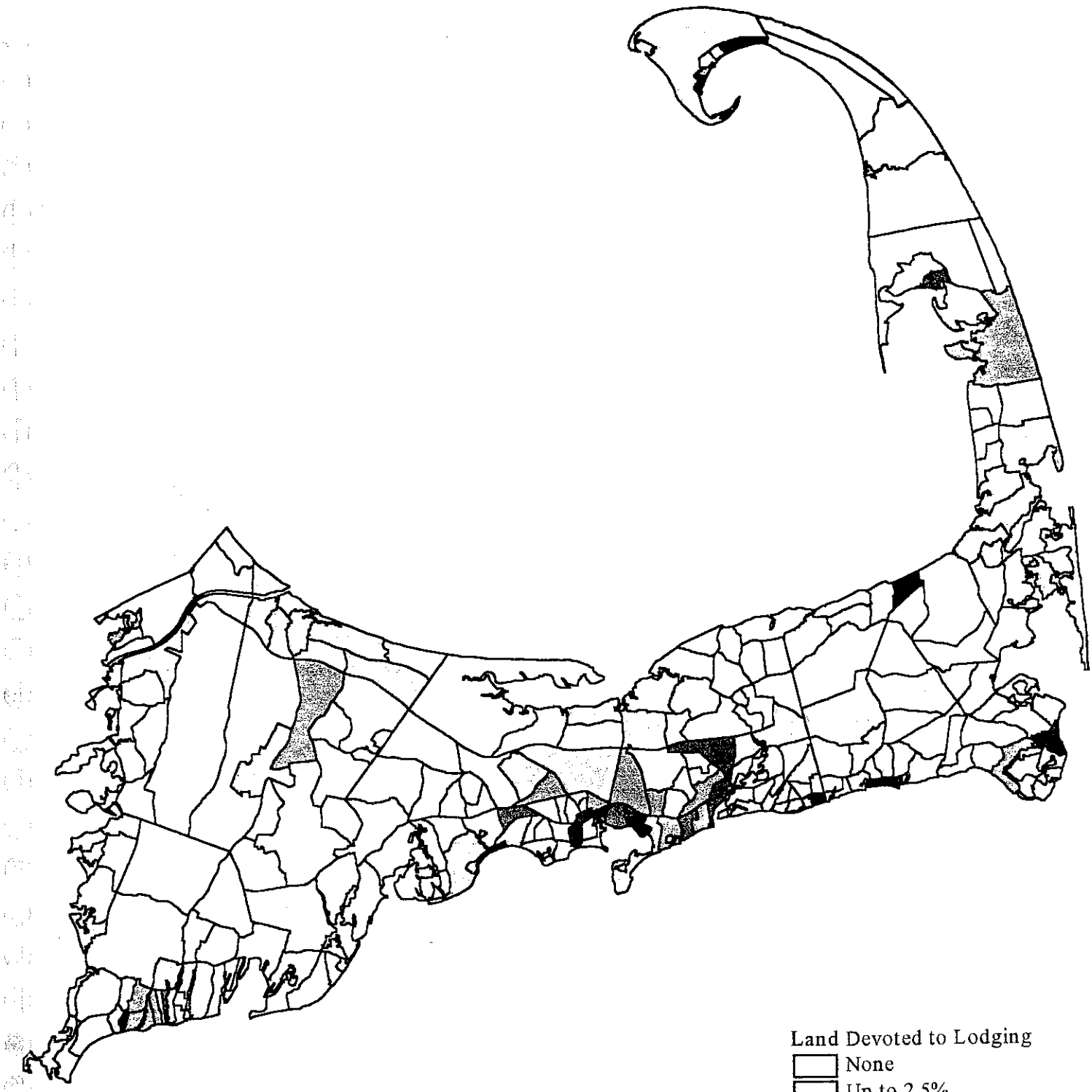
Land Uses on Cape Cod (1990): Year Round Housing Units/Square Mile

Cape Cod Commission
Regional Transportation Model



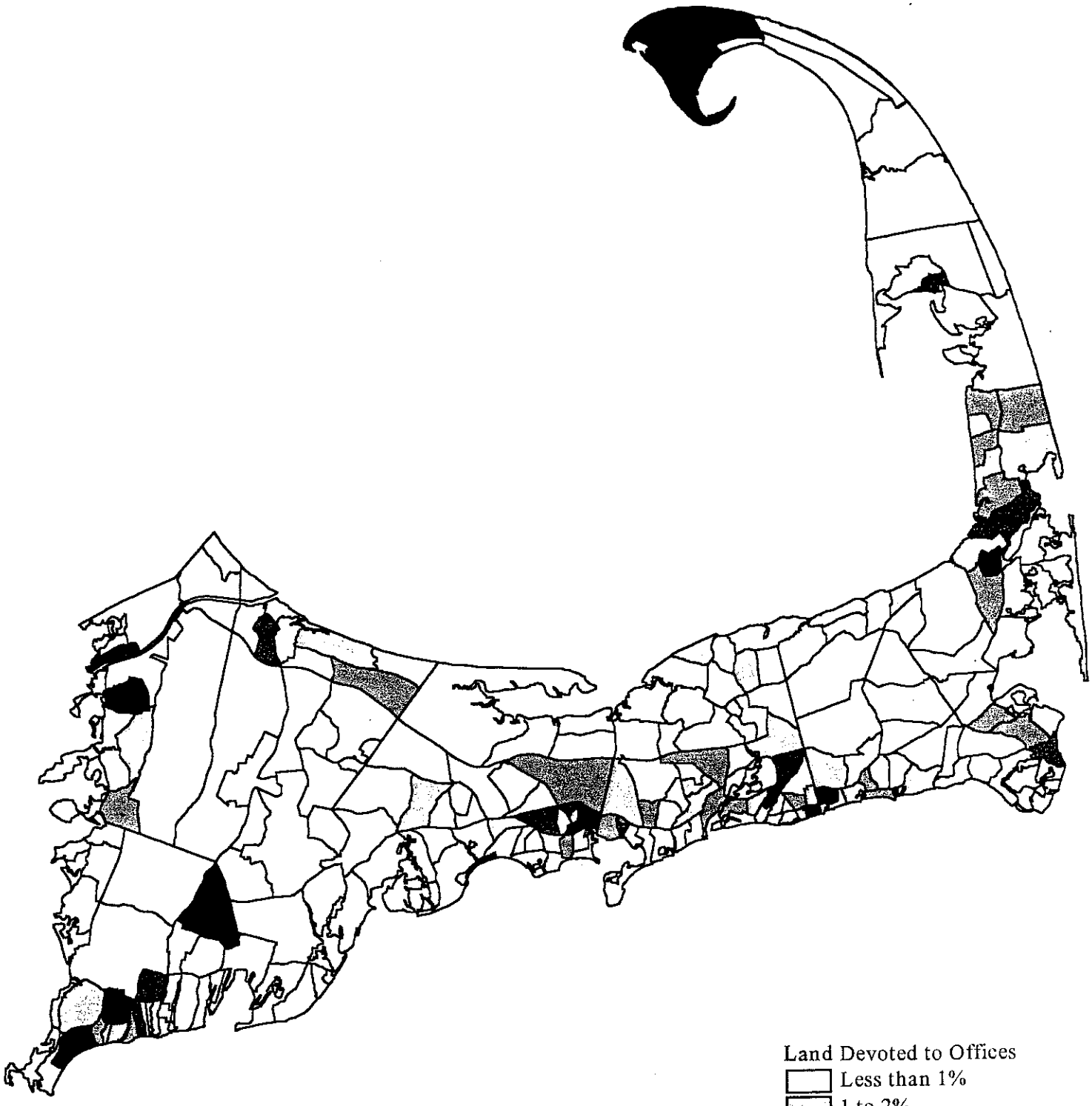
Land Uses on Cape Cod (1990): Lodging (Hotels/Motels/Resorts)

Cape Cod Commission
Regional Transportation Model



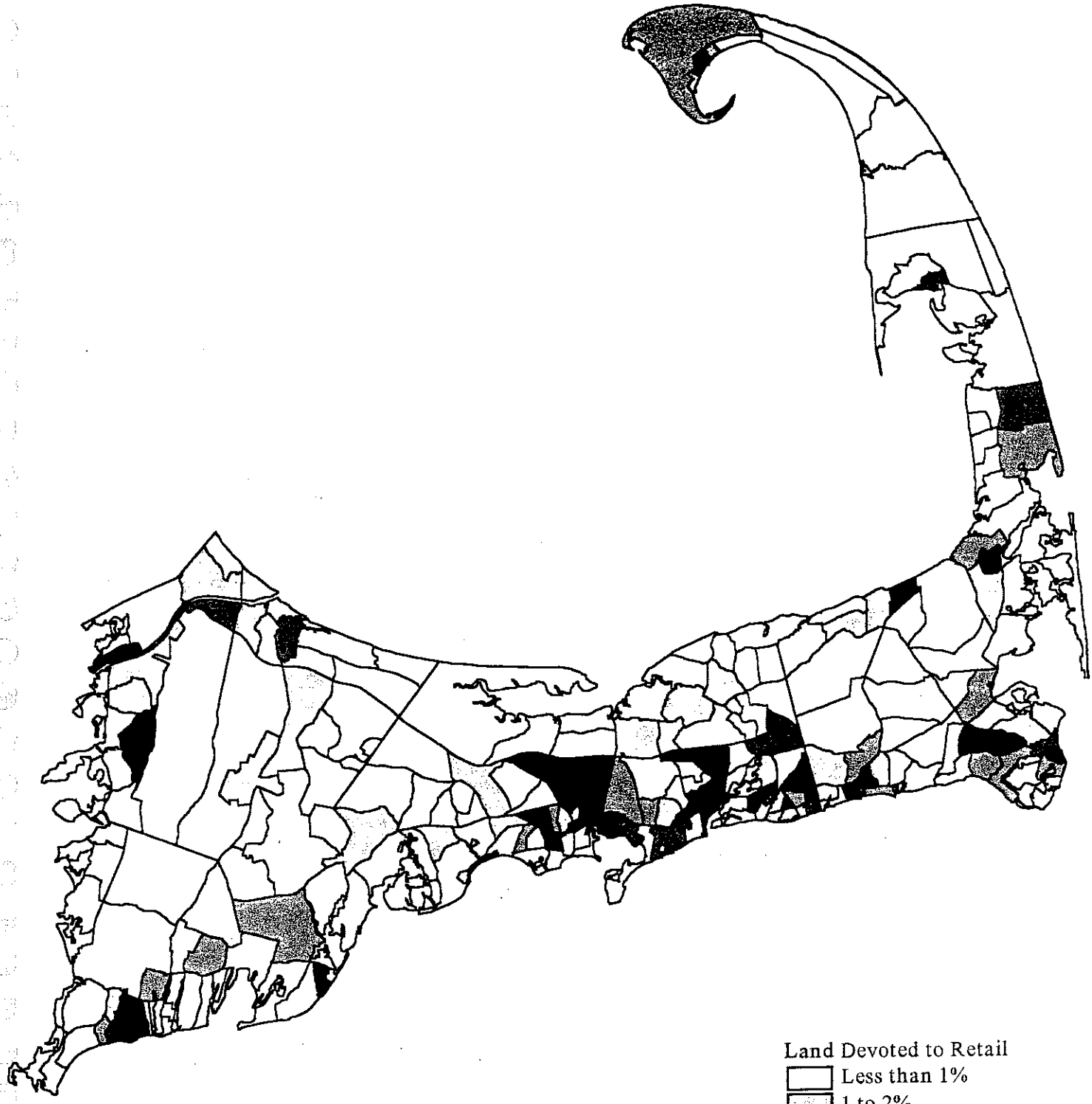
Land Uses on Cape Cod (1990): Office Uses

Cape Cod Commission
Regional Transportation Model



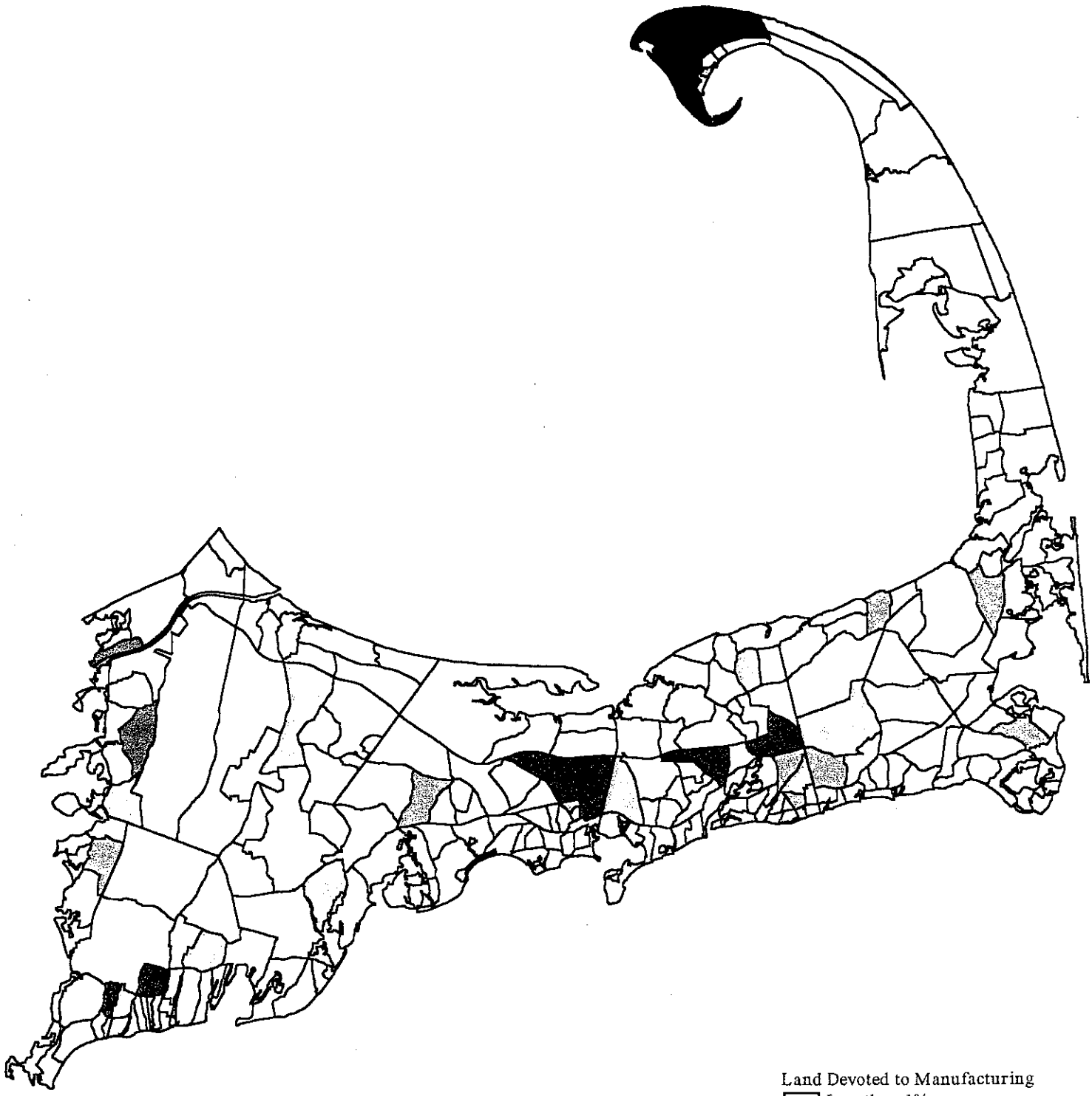
Land Uses on Cape Cod (1990): Retail Uses

Cape Cod Commission
Regional Transportation Model



Land Uses on Cape Cod (1990): Manufacturing Uses

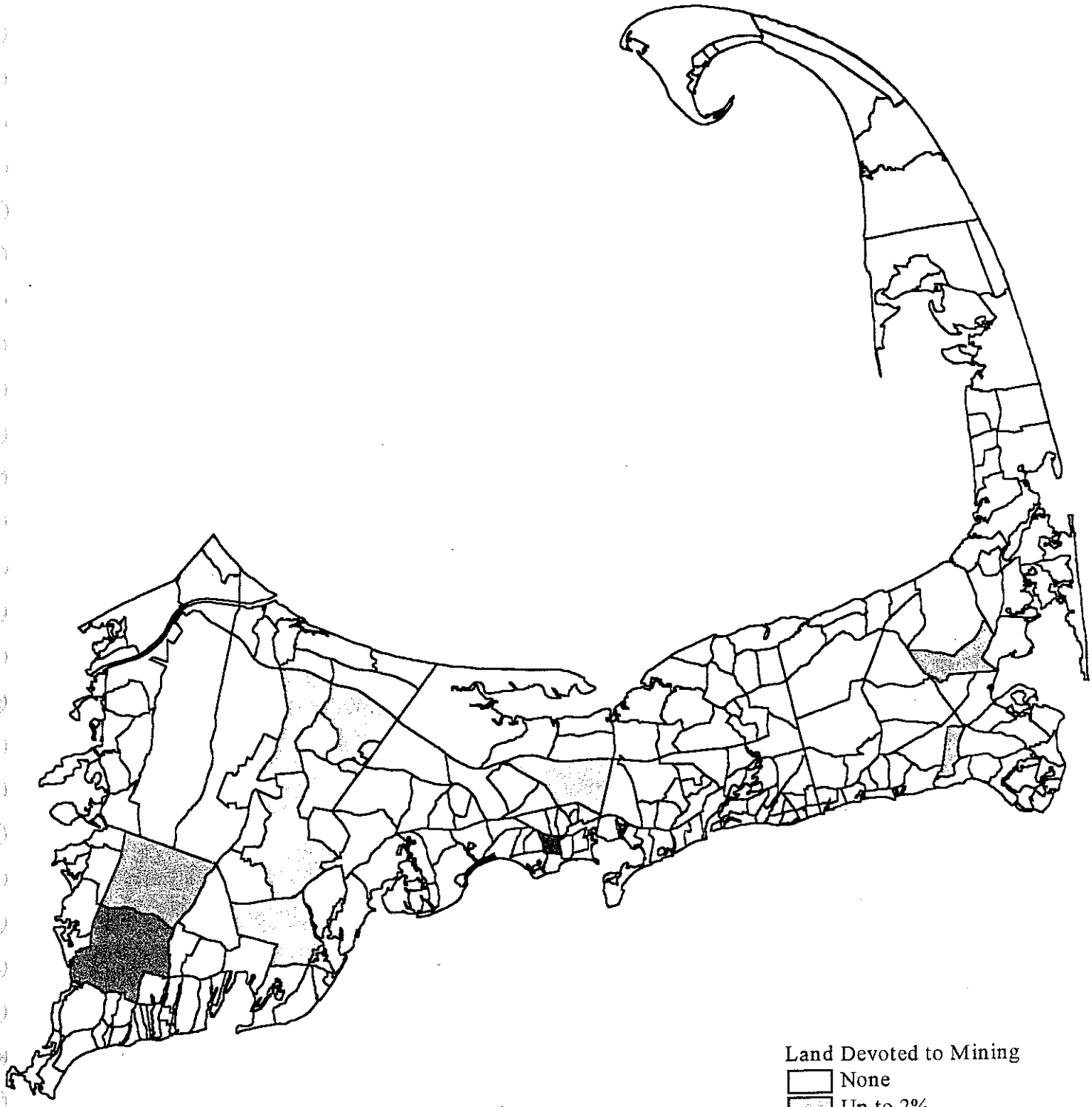
Cape Cod Commission
Regional Transportation Model



11

Land Uses on Cape Cod (1990): Mining Uses

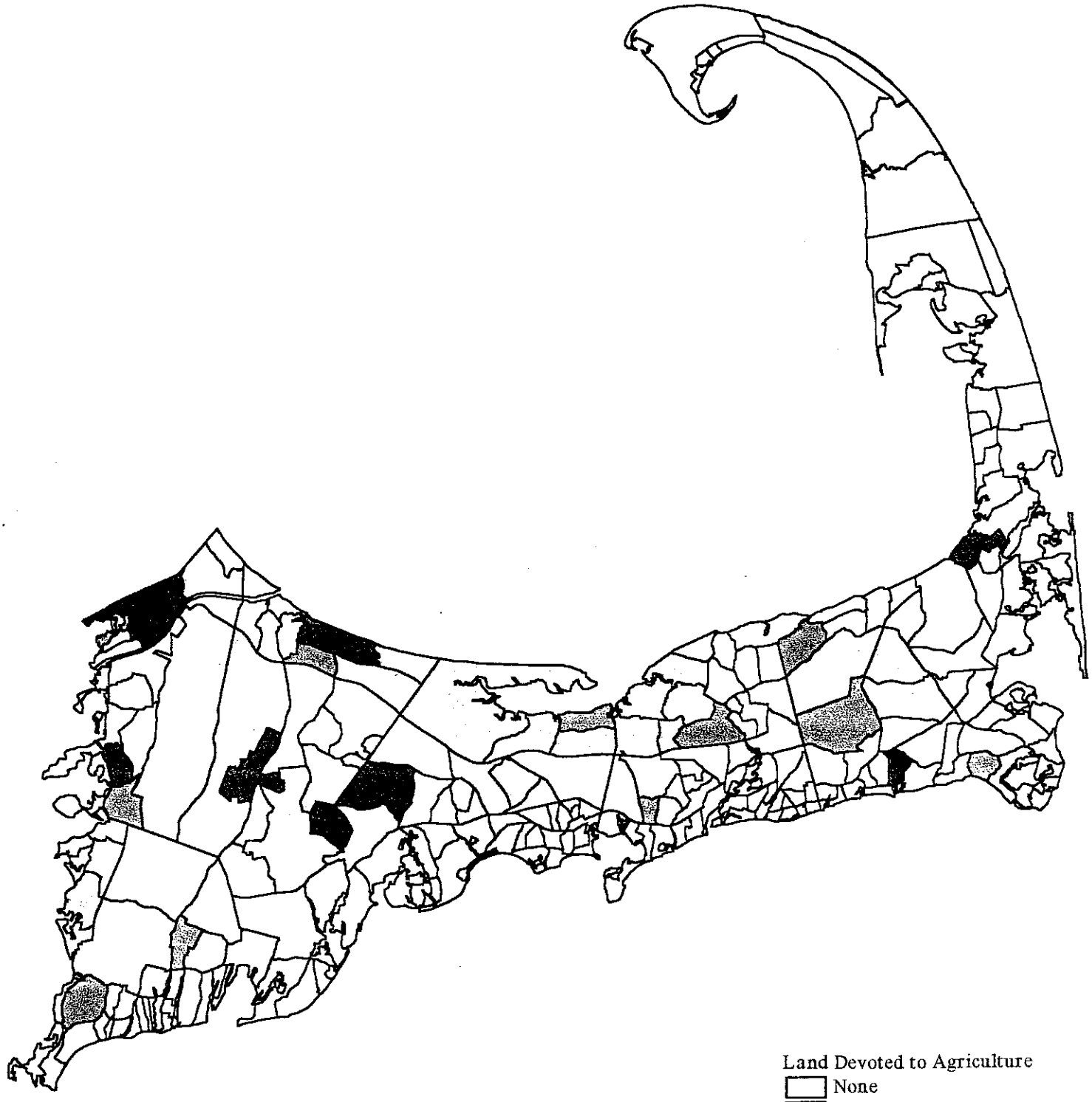
Cape Cod Commission
Regional Transportation Model



12

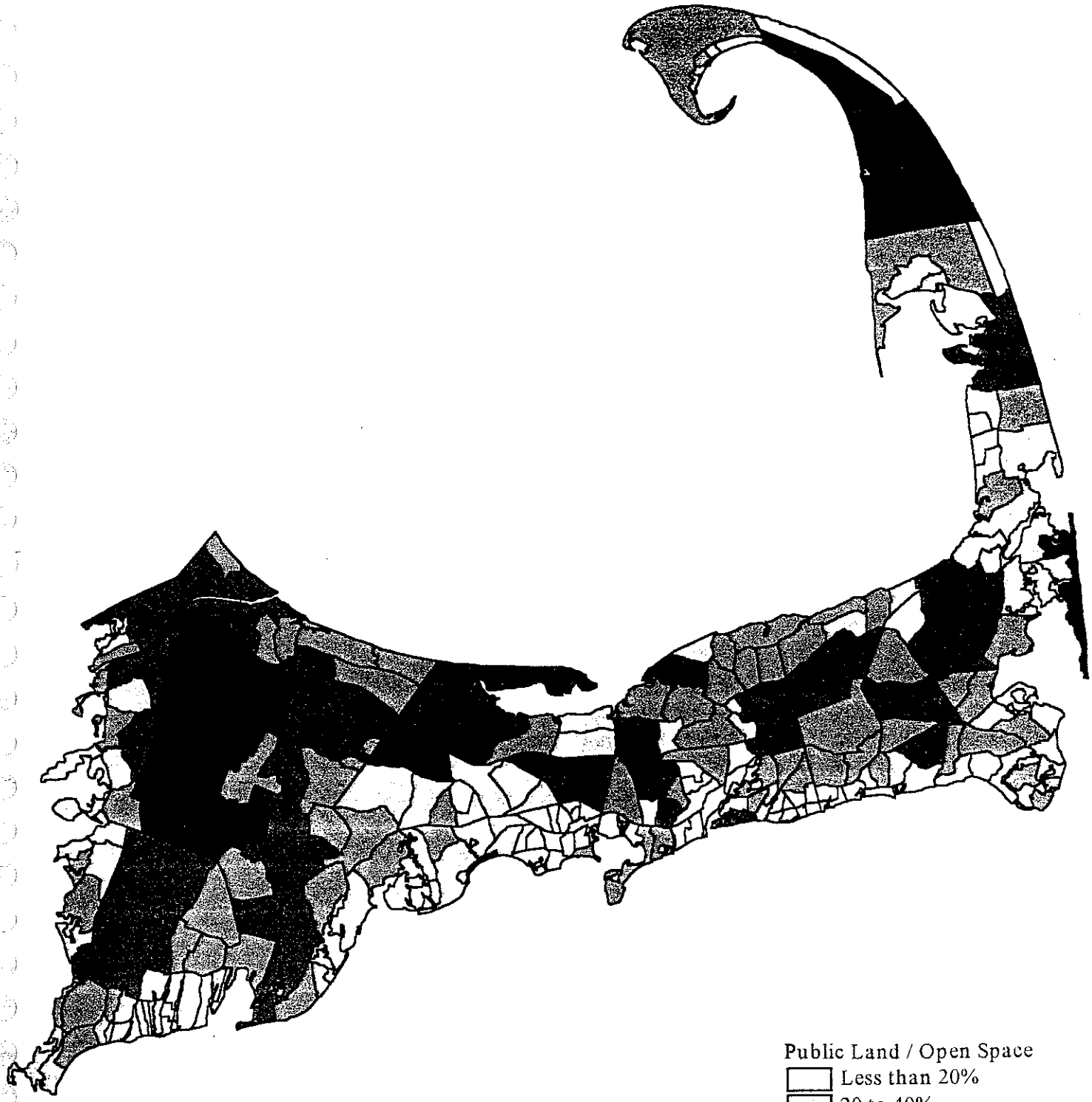
Land Uses on Cape Cod (1990): Agricultural Uses

Cape Cod Commission
Regional Transportation Model



Land Uses on Cape Cod (1990): Public Land or Open Space

Cape Cod Commission
Regional Transportation Model



Land Uses on Cape Cod (1990):
Recreational Uses (Golf Courses, Marinas, Camps, etc.)

Cape Cod Commission
Regional Transportation Model

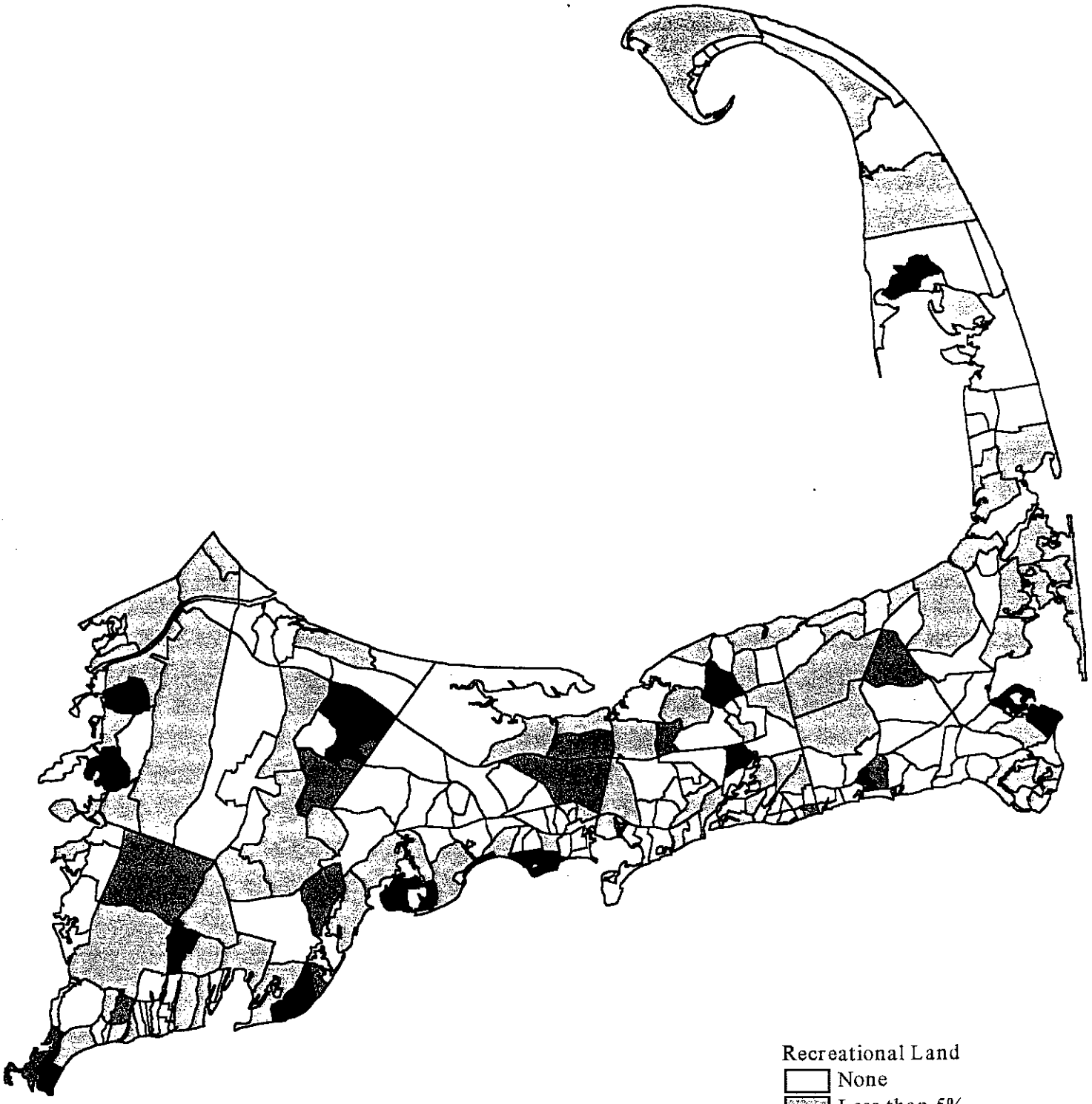


Figure 15: Acres in the National Seashore by Town

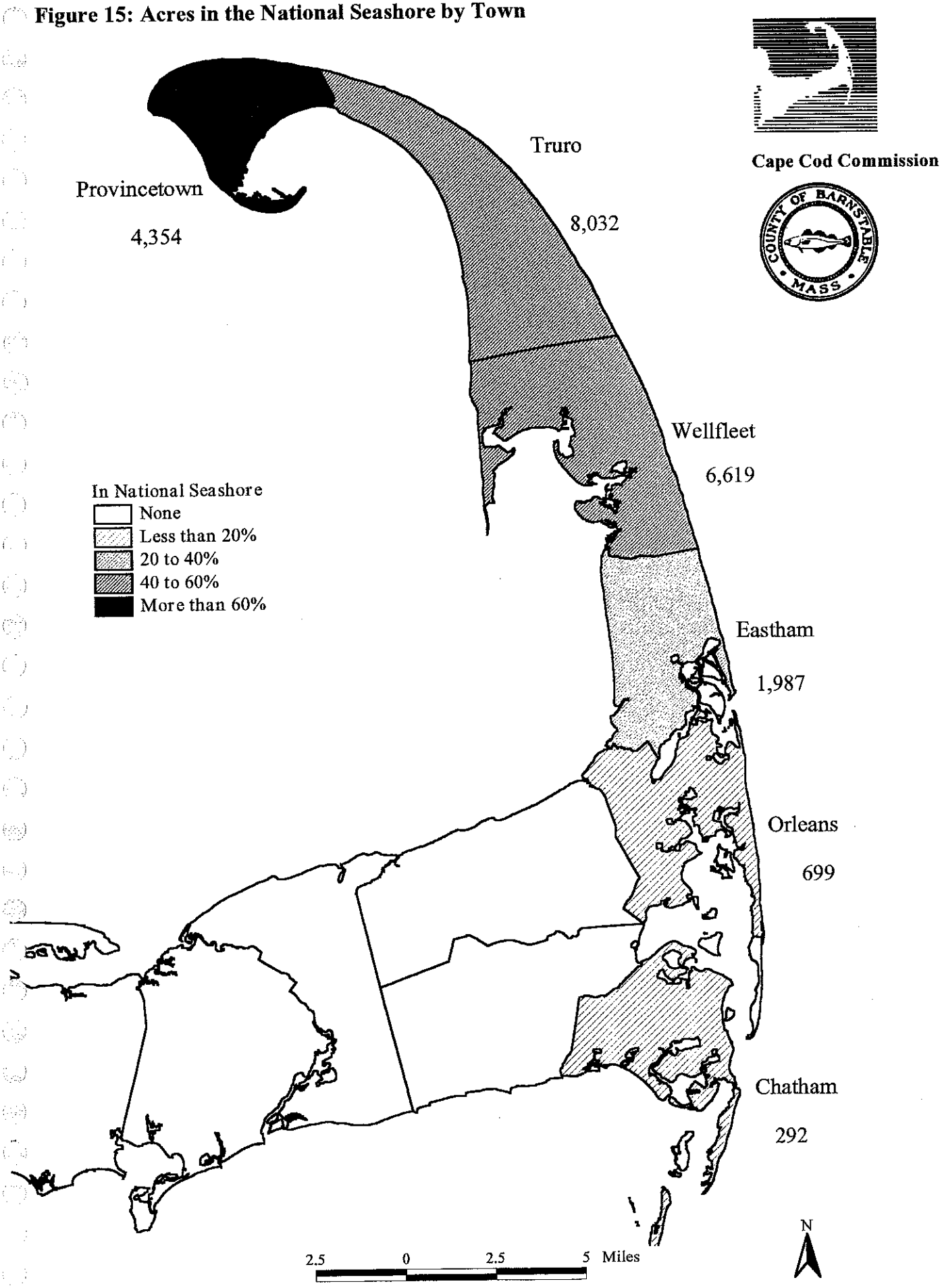


Figure 16 1971 Land Use on Cape Cod

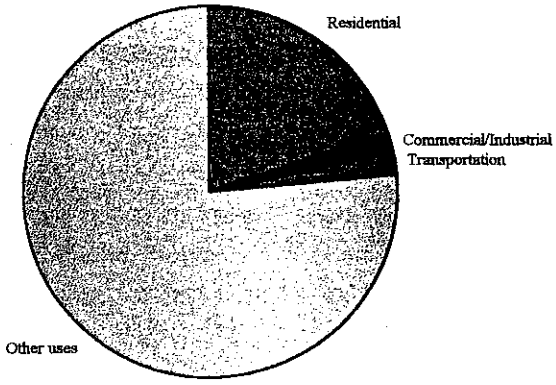


Figure 17 1990 Land Use on Cape Cod

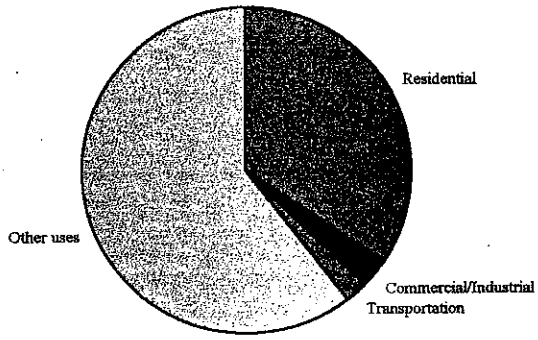
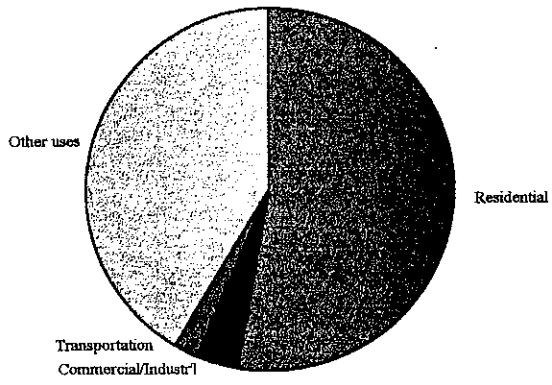


Figure 18 2020 Projected Land Use on Cape Cod



Source: 1971 and 1990 MacConnell Land Use Data, Cape Cod Commission staff land use projections

Outer Cape Capacity Study Summary

Background

The Outer Cape Capacity Study grew out of a need to coordinate the Local Comprehensive Plans of Provincetown, Truro, Wellfleet and Eastham. The study was designed to evaluate the impacts of growth on a regional basis. Other parts of the study examined issues of land use, water resources, fiscal capacity, and natural resources.

The Outer Cape region is small enough that any part of it should be accessible within a 45 minute drive of any other part of it. However, congestion is already beginning to slow traffic in some parts of the region, and is likely to slow it more in the future. Most notably, traffic in the summer is often extremely bad (Figure 1). Summer tourists and residents are placing an increasing strain on the roads, far beyond that experienced in the rest of the season. To give you a sense of the magnitude of this difference, note that over half the housing units in the region were used as seasonal homes in 1990. This seasonality also has a significant impact on the way traffic behaves in the region. For example, tourists or seasonal residents are more likely to go for a drive with no particular destination in mind. In addition, they are less likely to commute to work every day and more likely to travel to natural attractions. All these behavioral factors affect the transportation system.

Present conditions were compared against a future scenario and against a build out scenario, in which land in the Outer Cape region has been entirely developed to the extent permitted by current town zoning. This case provided a worst case benchmark, a level at which (assuming no change in zoning) no further new development would be permitted.

In addition to a build out scenario, we looked at the region using a 2020 scenario. These scenarios used growth from the past 10 years to project growth in the future for each land use type in the model (single family homes, multifamily units, retail jobs and service jobs) and for each TAZ in the model. In addition, each scenario's projected levels of development were checked against the levels under build out; if more growth was projected than allowed under build out, we had to cap growth at build out levels for that scenario.

We also developed winter scenarios for the present, 2020 under build out. In these scenarios, seasonal housing is assumed to be vacant and employment levels are lower than they are during the summer, based on the amount of seasonal employment in the region. We also ran a scenario in which build out has been reached but winter housing occupancy has increased. These scenarios were run to determine how significant seasonal traffic variations are in the Outer Cape region.

Findings

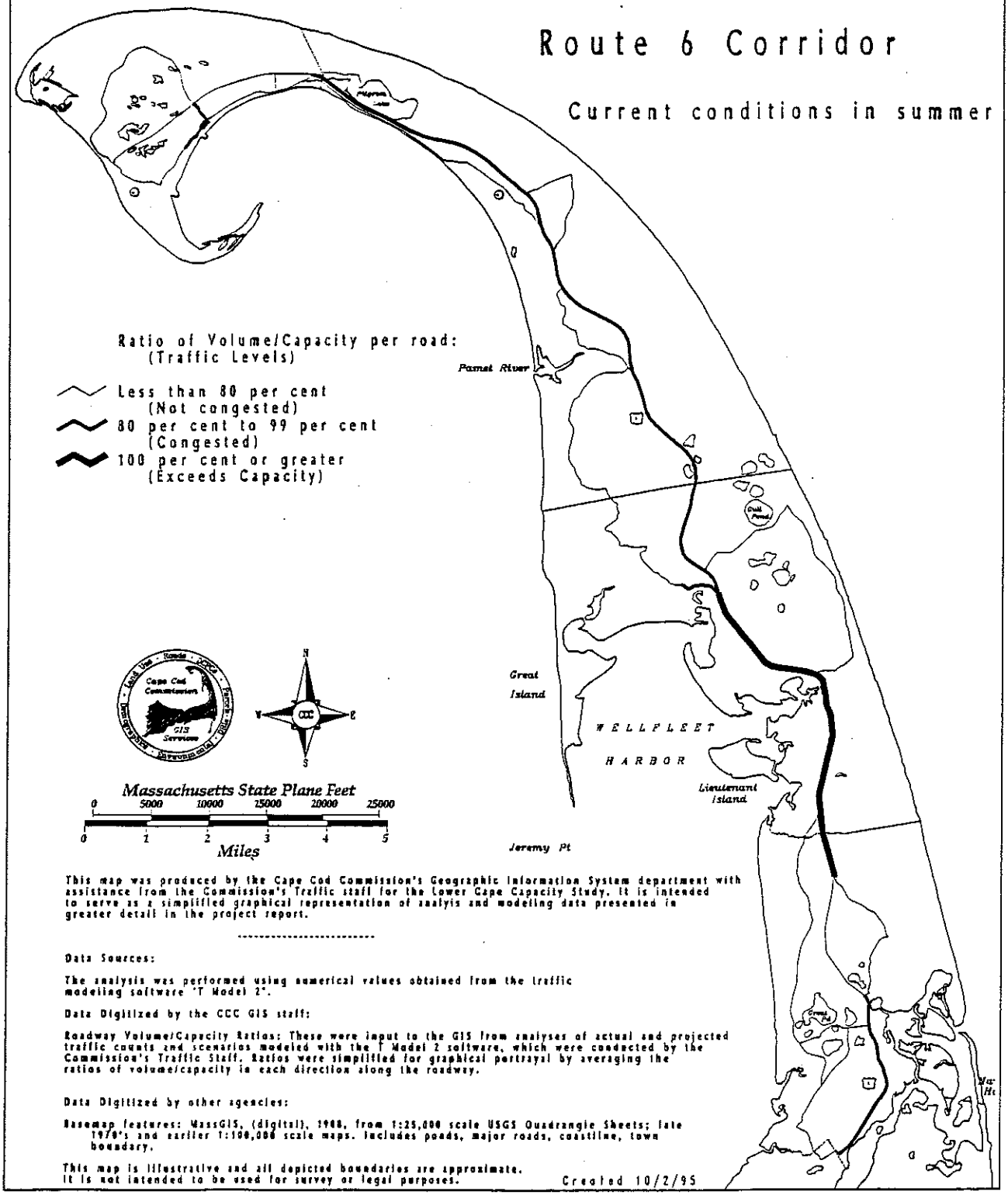
The findings of the Outer Cape study are disturbing. Not only do traffic rates increase as population increases; they increase more quickly than the population. A projected increase of 46% in housing units results in a 66% increase in travel mileage and a 196% increase in traveling time. Under projected growth conditions for 2020, summer traffic on Route 6 from the Orleans Rotary to the Provincetown line will exceed capacity, analogous to the traffic today on the Eastham/Wellfleet line.

Figure 1

Road Volume/Capacity Ratio

Route 6 Corridor

Current conditions in summer



This map was produced by the Cape Cod Commission's Geographic Information System department with assistance from the Commission's Traffic staff for the Lower Cape Capacity Study. It is intended to serve as a simplified graphical representation of analysis and modeling data presented in greater detail in the project report.

Data Sources:

The analysis was performed using numerical values obtained from the traffic modeling software 'T Model 2'.

Data Digitized by the CCC GIS staff:

Roadway Volume/Capacity Ratios: These were input to the GIS from analyses of actual and projected traffic counts and scenarios modeled with the T Model 2 software, which were conducted by the Commission's Traffic Staff. Ratios were simplified for graphical portrayal by averaging the ratios of volume/capacity in each direction along the roadway.

Data Digitized by other agencies:

Basemap features: MassGIS, (digital), 1988, from 1:25,000 scale USGS Quadrangle Sheets; late 1970's and earlier 1:100,000 scale maps. Includes roads, major roads, coastline, town boundary.

This map is illustrative and all depicted boundaries are approximate. It is not intended to be used for survey or legal purposes.

Created 10/2/95

On many links, capacity is also strained under the future winter scenario. In 2020, winter traffic conditions will approach current summer conditions along Route 6 in the Outer Cape region. In the build out winter scenario, Route 6 is operating over capacity in some areas, and is very analogous to today's summer conditions. The winter scenario gets even more congested if the assumption is made that the current increase in year-round occupancy of housing units continues. Under that scenario Route Six approaches or exceeds capacity from the Orleans rotary to the Truro town line. In short, there is a significant increase in roadway congestion in the region in the future, with winter conditions in the future approaching summer conditions today.

Without major transportation improvements, and with current growth rates projected into the future, the Outer Cape region can be expected to urbanize in terms of traffic patterns. Backups will be frequent, left turns difficult, and travel times will discourage travel, especially in the peak periods of rush hour. Many drivers will cope with increased congestion by using alternative routes. It is clear that alternative routes will become more popular as the region grows. This popularity will increase pressures on these roads, which may need to be addressed by local governments through signalization, widening, or other approaches.

Recommendations

If the region does nothing to respond to future growth, winter conditions will resemble summer, and the summer will be unlike anything seen before. Strategies for doing something can be divided into two broad categories, supply side and demand side. Supply-side solutions are all variations on expanding the capacity of the transportation system, including providing transportation alternatives, intelligent transportation systems and adding new road capacity. Demand-side solutions involve limiting the population growth of the region, or at least limiting their travel needs.

Supply-side solutions involve increasing transportation options through increased transit, increased road capacity, or through the use of innovative tools that allow us to use the current structure more efficiently. This path is expensive to the point of being prohibitive. Table 2 lists the estimated costs to each Outer Cape town of accommodating the growth in demand for transportation.

Table 2: Totals By Town of Needed Transportation Improvements by 2020

Town	Cost	Cost with Transit Alternative
Eastham	$3.61 m.	$3.53 m.
Wellfleet	$4.37 m.	$4.27 m.
Truro	$2.89 m.	$2.82 m.
Provincetown	$1.39 m.	$1.37 m.

	Approximate Annual Costs (not including interest)	
Town	Cost	Cost with Transit Alternative
Eastham	$150,416	$147,083
Wellfleet	$182,083	$177,917
Truro	$120,416	$117,750

Provincetown	$57,916	$57,083

These costs are high even without contemplating the change in the character of the region such improvements would likely create. The environment may be incapable of supporting new construction at many locations along the region's roadways. On a second level, if the environment is defined to include attractive elements of infrastructure (such as scenic country roads), protection of community character against unattractive changes (such as multi-lane freeways), or even protection of communities (widening would displace many homes in the Outer Cape region), then the decision on what to do becomes narrower.

An analysis of the environmentally sensitive areas along the Route Six corridor found that there were pockets of "environmentally sensitive" areas along the road that would make roadway improvements harmful to natural resources along the corridor. These pockets became the norm and not the exception about halfway through Truro going north to Provincetown. Route Six at the very end of the outer Cape passes through sand dunes and other extremely sensitive areas that would make roadway improvements extremely detrimental. This analysis makes demand-side solutions more appealing than most supply-side solutions.

Demand-side solutions involve reducing the demand for transportation, or at least slowing the rate of its growth. Most likely, this method involves slowing the rate of population growth in the region, or at least the rate of growth of trip production caused by increasing populations. Strategies such as promoting traditional neighborhood developments in village centers or elsewhere off Route Six may hold some promise.

So now we have a sense of where the region needs to head in the future in order to avoid exceeding its transportation capacity. If this is a desirable goal for the region, what actions might the Outer Cape towns take to reduce growth? There are three main approaches; the use of zoning or performance based zoning standards, Travel Demand Management (TDM); and public acquisition of developable land to be held in trust.

- Changing zoning ordinances to reduce the level of development permitted in the region would be inexpensive for the region's governments but might have fiscal impacts for landowners in the region. It does hold some promise if the ordinances were designed to encourage cluster development in "growth centers" while restricting other areas, but, again, the equity of such strategies is low.

- Travel Demand Management might provide some relief from congestion in the Outer Cape region. Examples of TDM strategies include increasing transit service or offering incentives to those who carpool or use transit.

Acquiring land to reduce development is a more viable solution. It also has the effect of combining with goals outlined in other sections of the Outer Cape Capacity study such as water resources and natural resources.

Monomoy Capacity Study Summary

Background

The Monomoy Capacity Study grew out of a need to coordinate the Local Comprehensive Plans of Orleans, Brewster, Chatham, Harwich and Dennis. The study was designed to evaluate the impacts of growth on a regional basis. Other parts of the study examined issues of land use, water resources, fiscal capacity, and natural resources.

The Monomoy region is small enough that any part of it should be accessible within a half-hour drive of any other part of it. However, congestion is already beginning to slow traffic in some parts of the region, and is likely to slow it more in the future. Most notably, traffic in the summer is often extremely bad (Figure 1). Summer tourists and residents are placing an increasing strain on the roads, far beyond that experienced in the rest of the season. To give you a sense of the magnitude of this difference, note that almost half the 40,000 housing units in the region were used as seasonal homes in 1990. This seasonality also has a significant impact on the way traffic behaves in the region. For example, tourists or seasonal residents are more likely to go for a drive with no particular destination in mind. In addition, they are less likely to commute to work every day and more likely to travel to natural attractions. All these behavioral factors affect the transportation system.

Present conditions were compared against several future scenarios and against a build out scenario, in which land in the Monomoy region has been entirely developed to the extent permitted by current town zoning. This case provided a worst case benchmark, a level at which (assuming no change in zoning) no further new development would be permitted.

Figure 1: Current Summer Volume/Capacity on Network Roadways

Cape Cod Commission
Regional Transportation Model

Road Network Volume/Capacity
- Less than 80%
- 80% to 100%
- More than 100%
- Shoreline

N

1 0 1 2 3 Miles

Data Sources: MassGIS 1:100000 scale Arc/Info coverages of USGS Digital Line Graph Files, output from regional model in TModel 2 software.

In addition to a build out scenario, we looked at the region using three snapshots of the future, at the years 2005, 2010 and 2015. These scenarios used growth from the past 10 years to project growth in the future for each land use type in the model (single family homes, multifamily units, retail jobs and service jobs) and for each TAZ in the model. In addition, each scenario's projected levels of development were checked against the levels under build out; if more growth was projected than allowed under build out, we had to cap growth at build out levels for that scenario. In some areas this occurred even in the 2005 scenario; in others it never occurred. Generally, however, by 2015, many TAZ s had approached build out, especially in housing units.

We also developed winter scenarios for the present, 2015 and under build out. In these scenarios, seasonal housing is assumed to be vacant and employment levels are lower than they are during the summer, based on the amount of seasonal employment in the region. These scenarios were run to determine how significant seasonal traffic variations are in the Monomoy region.

Findings

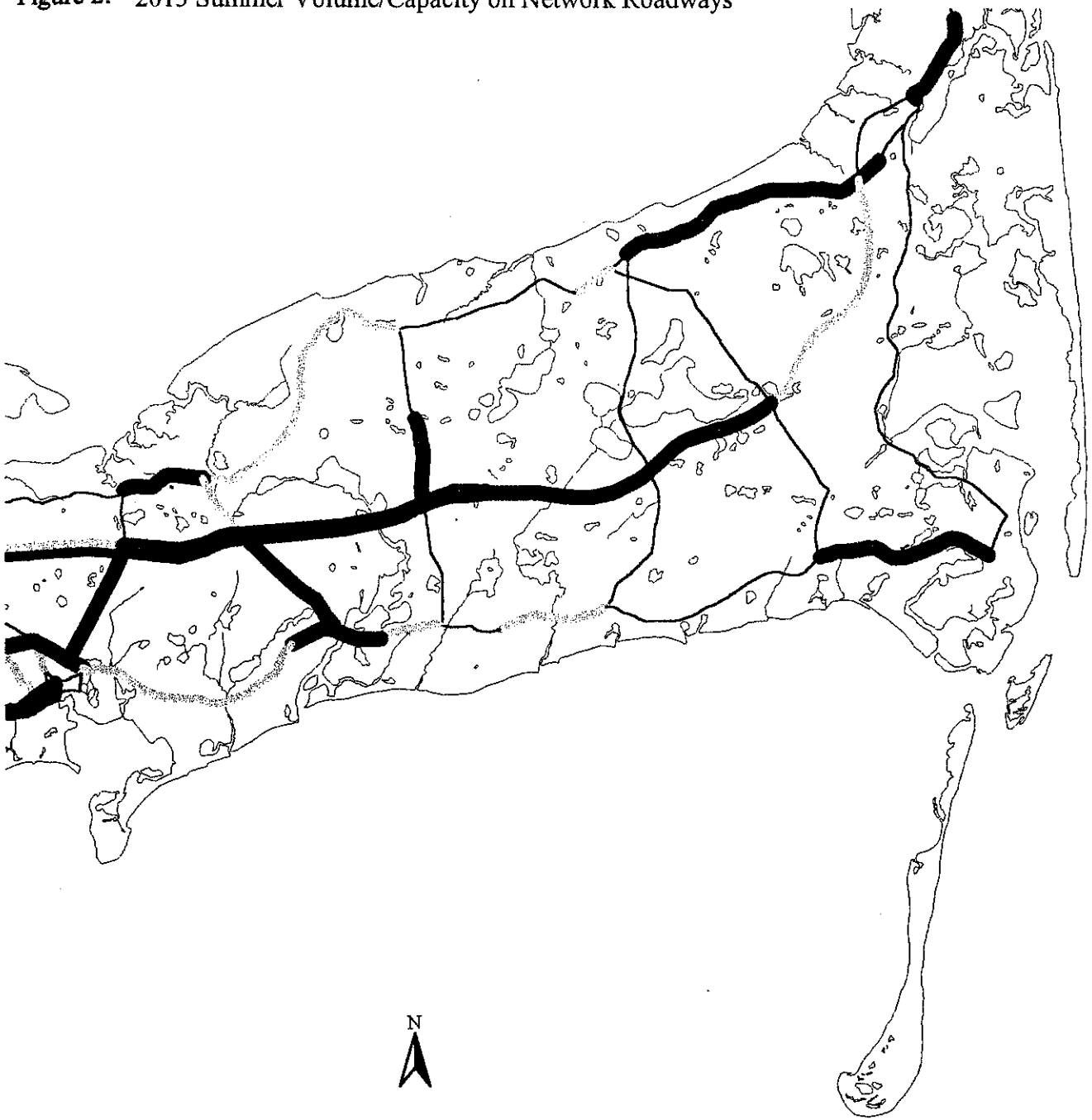
The findings of the Monomoy study are disturbing. By 2005 almost one-third of major regional roadways will be congested or over capacity during summer rush hours. By 2015 over 20% of major regional roadways will be over current capacity. Specifically, Route 6, 28 and 6A will experience sharp rises in the mileage of automobile travel, particularly in Dennis, Harwich and Brewster (see Figure 2). Increases in traffic on these roads is likely to spill over onto other local roads that can be used as alternative routes.

The analysis shows the spatial effects (i.e., developing a wide-spread residential pattern) and the increasingly higher travel time cost as traffic demand approaches and exceeds capacity. Most notably, as growth continues, congestion along Routes 6, 28 in Dennis and Chatham, Route 6A in Dennis and Brewster, and Route 134 north of Route 6 rapidly reaches and exceeds capacity. Other roads in the model, while not breaking down entirely until summer build out conditions are reached, experience some serious congestion by 2015.

It is interesting to note that certain north/south roadways do not reach their carrying capacities, even under build out. For example, Route 28 from Chatham to Orleans and Route 137 from Brewster to Chatham generally are not strained even while many other roadways in the region are predicted to be operating over capacity. Old Harbor Road (Route 28) in Chatham, for example, currently has a peak hour volume of about 30% of capacity. According to our model, in 2015 that stretch of road will have a volume of about 40% of capacity, while under build out it will have a volume of about 75% of current capacity. Compare these numbers to the section of Main Street (Route 28) just west of downtown Chatham, where current volumes are 90% of capacity at peak hour, and grow to 110% of capacity in 2015 and 170% of capacity under build out.

On many links, capacity is also strained under future winter scenarios. In 2015, winter traffic conditions will be worse than current summer conditions along Route 6 in the Monomoy region, even operating over capacity in some areas. (see Figure 3) The winter scenario gets even more congested if the assumption is made that the current increase in year-round occupancy of housing units continues.

Figure 2: 2015 Summer Volume/Capacity on Network Roadways



Cape Cod Commission
Regional Transportation Model

COUNTY OF BARNSTABLE MASS

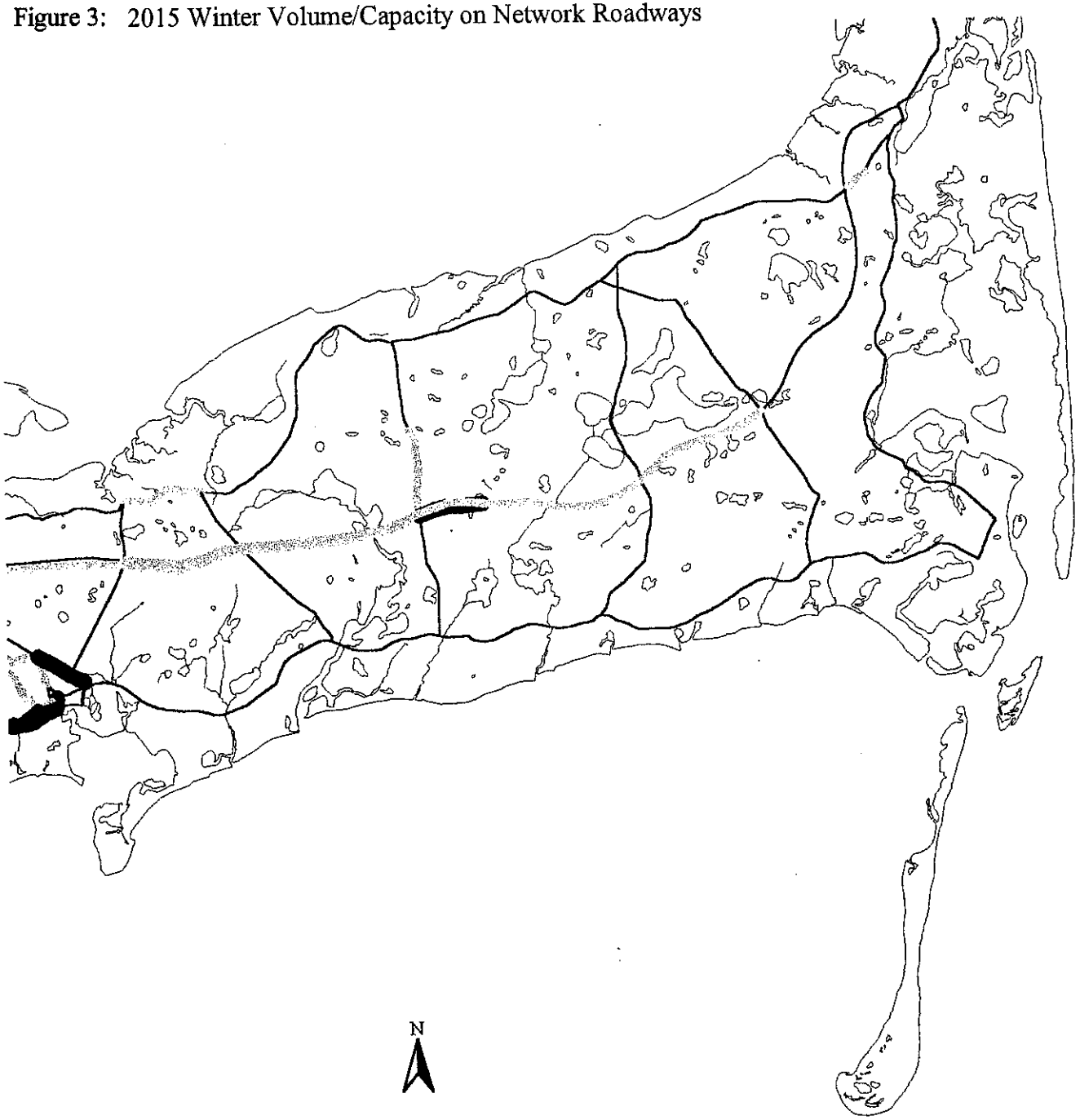
Road Network Volume/Capacity
- Less than 80%
- 80% to 100%
- More than 100%
- Shoreline

N

1 0 1 2 3 Miles

Data Sources: MassGIS 1:100000 scale Arc/Info coverages of USGS Digital Line Graph Files, output from regional model in TModel 2 software.

Figure 3: 2015 Winter Volume/Capacity on Network Roadways



Cape Cod Commission
Regional Transportation Model

Road Network Volume/Capacity
Less than 80%
80% to 100%
More than 100%
Shoreline

N

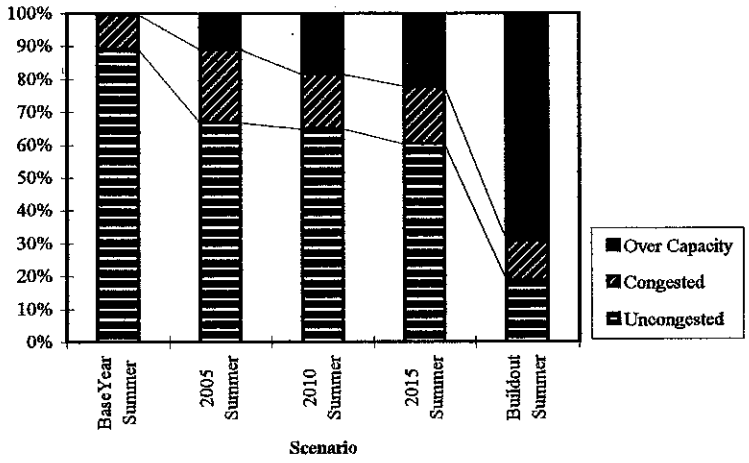
1 0 1 2 3 Miles

Data Sources: MassGIS 1:100000 scale Arc/Info coverages of USGS Digital Line Graph Files, output from regional model in TModel 2 software.

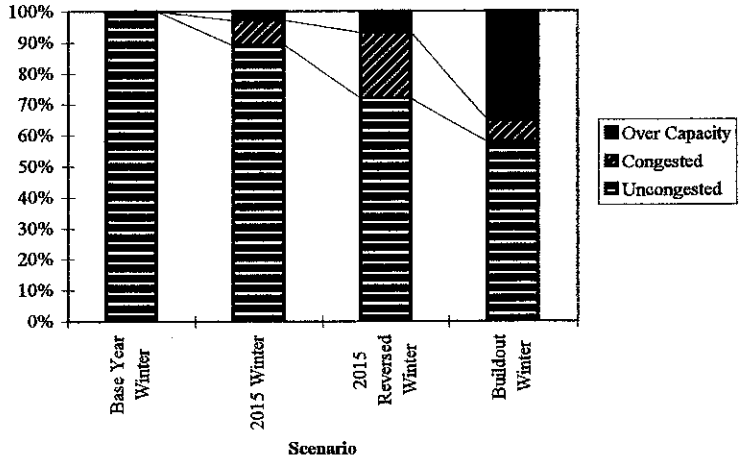
Table 1: State of Network Roadways under Each Scenario

Scenario	*Uncongested*	*Congested*	*Over Capacity*	*Total*
BaseYear Summer	88.85%	10.68%	0.47%	100.00%
2005 Summer	66.74%	22.13%	11.13%	100.00%
2010 Summer	64.88%	16.58%	18.54%	100.00%
2015 Summer	60.28%	17.50%	22.22%	100.00%
Buildout Summer	18.75%	11.90%	69.35%	100.00%
Base Year Winter	99.96%	0.00%	0.04%	100.00%
2015 Winter	89.12%	7.96%	2.92%	100.00%
2015 Reversed Winter	71.96%	21.25%	6.79%	100.00%
Buildout Winter	57.73%	7.17%	35.10%	100.00%

State of Network Roadways in Summer



State of Network Roadways in Winter



In short, there is a significant increase in roadway congestion in the region in the future. While less than 11 percent of regional roadways in the model were congested in the base year summer, by 2005 over 11 percent of regional roadways will be over capacity, with an additional 22 percent congested. In the 2015 summer scenario, almost a quarter of regional roadways are over capacity. Meanwhile, while in the base year winter scenario almost no roads in the model are congested, in the 2015 winter scenario almost as many roads are congested as in the base year summer scenario.

When traffic conditions during some future winter reflect existing summer, what will the future summer be like? Without major transportation improvements, and with current growth rates projected into the future, the Monomoy region can be expected to urbanize in terms of traffic patterns. Backups will be frequent, left turns difficult, and travel times will discourage travel, especially in the peak periods of rush hour. Many major roadways will start to resemble Route 6 on a Sunday afternoon in July. Another way many drivers will cope with increased congestion will be by using alternative routes. It is clear that alternative routes will become more popular as the region grows. This popularity will increase pressures on these roads, which may need to be addressed by local governments through signalization, widening, or other approaches.

Recommendations

If the region does nothing to respond to future growth, winter conditions will resemble summer, and the summer will be unlike anything seen before. Strategies for doing something can be divided into two broad categories, supply side and demand side. Supply-side solutions are all variations on expanding the capacity of the transportation system, including providing transportation alternatives, intelligent transportation systems and adding new road capacity. Demand-side solutions involve limiting the population growth of the region, or at least limiting their travel needs.

Supply-side solutions involve increasing transportation options through increased transit, increased road capacity, or through the use of innovative tools that allow us to use the current structure more efficiently. This path is expensive to the point of being prohibitive. Table 2 lists the estimated costs to each Monomoy town of accomodating the growth in demand for transportation.

Table 2: Totals By Town of Needed Transportation Improvements

Town	Year	Cost	Cost with Transit Alternative
Orleans	2005	$2,775,000	$2,739,750
Brewster	2005	$2,590,000	$2,577,250
Chatham	2005	$3,350,000	$3,099,500
Harwich	2005	$7,307,500	$7,183,875
Dennis	2005	$7,212,500	$7,190,625
Orleans	2010	$2,557,500	$2,524,875
Brewster	2010	$1,872,500	$1,875,765
Chatham	2010	$2,370,000	$2,357,750

Harwich	2010	$5,570,000	$5,490,750
Dennis	2010	$4,830,000	$4,874,250
Orleans	2015	$1,492,500	$1,488,375
Brewster	2015	$2,585,000	$2,565,750
Chatham	2015	$1,700,000	$1,694,500
Harwich	2015	$3,157,500	$3,130,125
Dennis	2015	$2,745,000	$2,832,000

These costs are high even without contemplating the change in the character of the region such improvements would likely create. The environment may be incapable of supporting new construction at many locations along the region's roadways. On a second level, if the environment is defined to include attractive elements of infrastructure (such as scenic country roads), protection of community character against unattractive changes (such as multi-lane freeways), or even protection of communities (widening would displace many homes in the Monomoy region), then the decision on what to do becomes narrower.

Demand-side solutions involve reducing the demand for transportation, or at least slowing the rate of its growth. Most likely, this method involves slowing the rate of population growth in the region. But how much of the assumed growth from the study would have to disappear in order to reduce traffic to tolerable levels without adding supply?

In order to answer this question, we ran the 2015 scenario again with reduced residential growth levels in the Monomoy region. The implication of these findings is that the Monomoy region, acting alone, would need to restrict residential growth to less than half its current levels in order to avoid exceeding its transportation capacity. If Monomoy towns restricted commercial and industrial development as well, that would likely also improve future roadway conditions, although the economic impacts of such an action might be harmful. If the rest of Cape Cod could also limit its rate of residential growth to less than half of current levels, that would help keep the Monomoy region within its transportation capacity as well.

So now we have a sense of where the region needs to head in the future in order to avoid exceeding its transportation capacity. If this is a desirable goal for the region, what actions might the Monomoy towns take to reduce growth? There are three main approaches; the use of zoning or performance based zoning standards, Travel Demand Management (TDM); and public acquisition of developable land to be held in trust.

- Changing zoning ordinances to reduce the level of development permitted in the region would be inexpensive for the region's governments but might have fiscal impacts for landowners in the region

- Travel Demand Management might provide some relief from congestion in the Monomoy region.Examples of TDM strategies include increasing transit service or offering incentives to those who carpool or use transit.

- Acquiring land to reduce development is a more viable solution. It also has the effect of combining with goals outlined in other sections of the Monomoy Capacity study such as water resources and natural resources.

Barnstable-Yarmouth Transportation Study: Travel Demand Management

- Executive Summary

technical report

short range tdm/tsm plan

cape cod commission
tdm/tsm study

executive summary

june, 1995

submitted to

cape cod commission
barnstable-yarmouth transportation study committee

prepared by

mcdonough & scully, inc.
transportation engineers and planners
two natick executive park
natick, massachusetts 01760
508-647-0300

introduction

Since the inception of the Cape Cod Commission, Travel Demand Management (TDM) and Transportation System Management (TSM) have been emphasized elements in dealing with congestion, safety and mobility, as clearly evident in the Regional Policy Plan. In short, TDM or TSM involve actions designed to reduce daily or peak period demand and/or improve the efficiency of the available roadway and transit systems. Their focus tends to be less capital intensive or construction related. While new options continue to be identified, many of the TDM/TSM actions have been under consideration since the 1977 Clean Air Act Amendment and energy crises in the 1970's. With the ISTEA legislation passed in 1991 and the 1990 Clean Air Act, these alternatives have taken on a much greater level of importance. Between the national legislation, the Commonwealth's air quality requirements, the Cape's Regional Policy Plan, and realization that "one can not build our way out of every traffic problem", TDM and TSM must be part of transportation improvement plans. National research indicates that at this time, TDM and TSM together represent about 10% to 20% of the solution, which also shows that these strategies can represent only part of the solution as well.

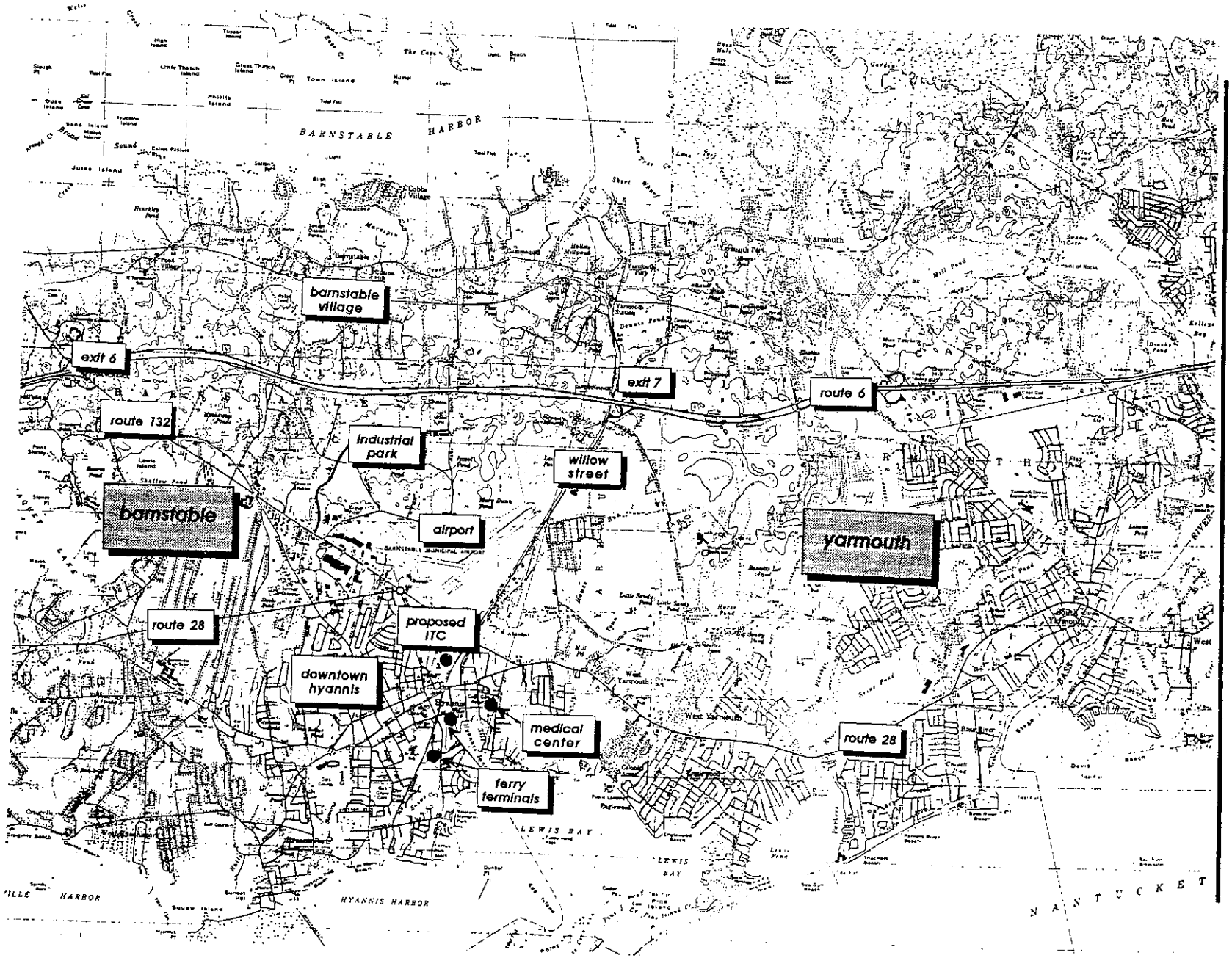
TDM/TSM experience in different locations vary on results. Data suggests that vehicle trip reductions or VMT reduction can potentially range from 2% to 10% on an overall areawide basis while trips generated by specific activity centers or buildings can be as high as 40%. Most of the reported experience, however, is from typical suburban areas where the TDM/TSM has been geared towards the peak period work trip. On the Cape, not only is the work commute a target for reduction area, but the non-work trips become an increasingly important target for reducing congestion particularly during the peak season. The "short" trip, tourist travel and "pass through" trip to the terminals also become candidates for TDM/TSM targets. Based on travel studies conducted in the region and current State-of-the-Art research, there are clearly opportunities to successfully implement TDM/TSM actions to better manage the movement of people and goods during the peak periods of the year.

This study examines the potential for TDM/TSM with a focus on the Hyannis-Yarmouth area shown in Figure 1. It is strongly related to the Barnstable-Yarmouth Regional Transportation Study (BYTS), representing an element of that region's transportation plan.

This study and its recommendations need to consider the following:

- the planning factors required by ISTEA and the fact that a comprehensive, well balanced plan must include TDM and TSM components;

- the Regional Policy Plan (RPP) which recognizes the sensitive physical nature of Cape Cod and consequently, emphasizes non-structural alternatives to the extent possible to mitigate traffic congestion and safety problems, particularly away from designated activity centers; and



cape cod commission
tdm/tsm study

hyannis-west yarmouth region

project area

Figure 1

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Natick, Massachusetts

- the relationship of the TDM/TSM study in the context of the overall BYTS study where TDM/TSM will be an integral part of the short and long range transportation plan.

Figure 2 illustrates the overall relationship of the BYTS tasks study underway or scheduled in the mid-Cape region and illustrates how this TDM/TSM study also fits into the BYTS program.

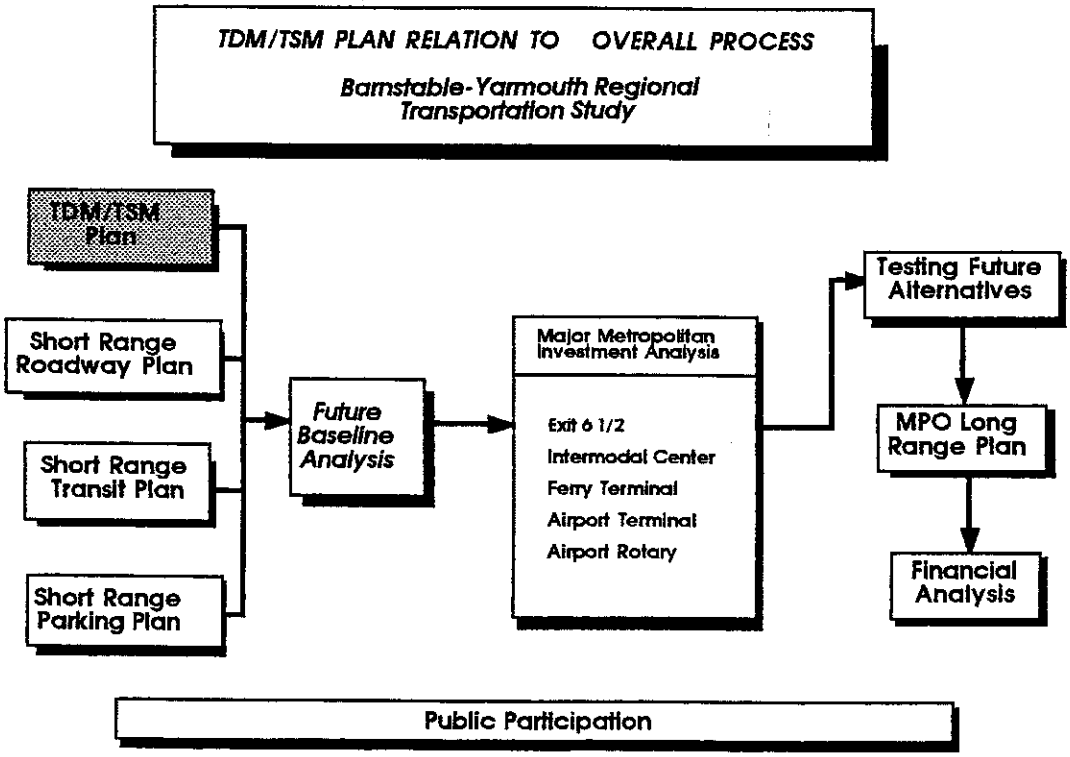


figure 2
study process flow chart

study process

The study process included reviewing current travel conditions in the region. This involved not only roadway operating conditions, also understanding travel patterns of residents, employees and visitors in the area and usage of alternative modes. Findings from other studies including those listed below and at the end of this report were incorporated as appropriate:

- CMAQ Signal Demonstration Grant
- CCC Short Range Parking Plan
- CCRTA Intermodal Transportation Center Study
- Yarmouth Engineering Study
- Barnstable-Yarmouth Transportation Study

Travel surveys of employees were conducted at a selected number of employers as well as patrons at the ferry, bus and rail terminals and downtown parking facilities. The study also included research at the national level related to identifying the effectiveness of TSM and TDM strategies and evaluation methodologies. Based on these findings, potential strategies and actions were identified and considered in terms of criteria based on the MPO's and BYTS goals.

executive summary & recommendations

The Short Range TDM/TSM Study was completed for the Cape Cod Commission through a grant from the Massachusetts Highway Department as part of their effort to assist Barnstable and Yarmouth in improving overall travel conditions on the area's transportation system, particularly during the summer period when demands reach their peak. The effort is strongly related to the Barnstable-Yarmouth Regional Transportation Study (BYTS), representing an element of the short range plan. Findings from the BYTS work, the CMAQ Signal Demonstration Grant Project, the Short Range Parking Plan and the Yarmouth Engineering Study were reviewed and incorporated as appropriate. Importantly findings from this TDM/TSM effort may also be relevant to other parts of the Cape as well.

The Barnstable-Yarmouth Regional Transportation Study[1] and the Yarmouth Engineering Study[2] included an assessment of the major roadways and the intersections in the study area. The highlights of these analyses which became one basis for evaluation during this TDM/TSM study are summarized as follows:

- of more than 90 intersections studied, 41 (18 signalized and 23 unsignalized) were identified with congestion or safety related problems,
- the two key existing interchanges with Route 6 (Exits 6 and 7) that serve the area currently experience significant problems that include conflicts with nearby intersecting streets and long delays to ramp exiting traffic resulting in queues that at times reach Route 6,
- current signal progression is lacking through the area on major arterials and in the downtown area,
- existing two lane sections of Route 132, Route 28 and Willow Street carry volumes well in excess of desirable two lane service volume levels,
- excessive curb openings or poorly defined openings exist on many roadways but particularly on Route 28 from approximately Bearses Way in Barnstable to the east through the Town of Yarmouth,
- the inadequate roadway capacity coupled with poorly operating, outdated signals, uncontrolled movements on and off the key corridors result in relatively long travel times and less than desirable access from Route 6 to the major terminals, the downtown and along the Route 28 corridor throughout the region,
- a high parking demand exists within the downtown Hyannis core and summer recreational areas that exceeds the available public or the major transportation terminal related supply, (although SSA has recently taken steps to meet its short range needs with the purchase of the Hinckley site)

1 "Improve Public Transit", Transportation Control Measure Information Documents, U. S. Environmental Protection Agency, 1992, p. 7 and "Trip Reduction Ordinances', Transportation Control Measure I

2 "Improve Public Transit", Transportation Control Measure Information Documents, U. S. Environmental

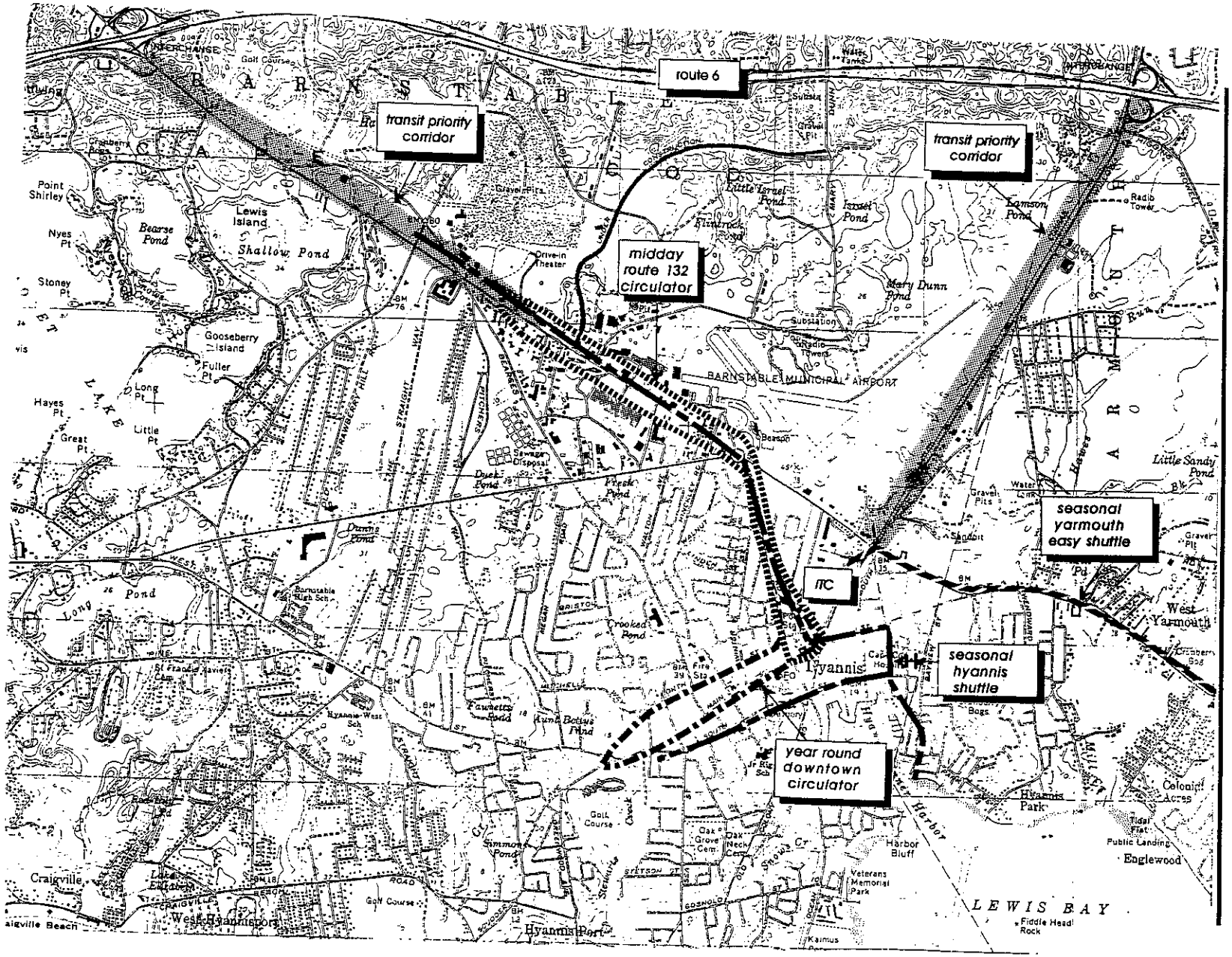
- excessive traffic circulation takes place as a result of less than desirable signing as well as the inadequate parking at the terminals, in downtown and at certain beaches,
- adequate facilities simply do not exist to safely accommodate and encourage bicycle travel and pedestrian movement for the various types of trips including along the major arterials,
- the provision of travel information to the public to make decisions before and during the trip is inadequate,
- surveys of current travel patterns indicate a very high proportion of single occupant vehicles used by on-Cape commuters in the two towns,
- the predominant mode among arriving visitors to the region is also the private vehicle,
- a limited amount of fixed route transit service exists in the study area, particularly during the non-summer period, and
- phase 1 of the BYTS effort also identified the low level of coordination among mass transportation routes and/or schedules which will tend to work contrary to the goal of attracting riders and reducing single occupant vehicles.

Based on the assessment of the existing roadway conditions in the study area, improvements to the system are warranted. Recognizing financial, environmental, historical and scenic constraints that exist within the area, a part of any long range plan must consider low cost actions to obtain the desired levels of service and improved mobility. Consequently, TDM and TSM will become more important in the movement of people between homes, workplace, recreational and shopping locations. *Clearly, the current travel characteristics of on- and off-Cape travelers creates opportunities to reduce the reliance on the single occupant vehicle, but the challenge is as great and will require consistent, substantial effort on all parties.*

recommended short range TDM/TSM plan

The TDM and TSM recommendations are summarized in Tables 1 and 2, respectively. The TDM actions are categorized by public transit, ridesharing, bicycling, pedestrian facilities, parking management, peak demand management and land use options. In addition, a separate category for employer sponsored actions is listed. Figures 3 and 4 illustrate the public transit routes to be provided by the plan and the bicycle route plan.

The TSM actions are categorized by intersection/roadway upgrade and intelligent transportation system (ITS) actions. Figure 5 summarizes the traffic signal system recommendations along with the related ITS activities. Figure 6 shows the framework for the traffic management center in the long range. The actions listed in Tables 1 and 2 describe the action, the likely responsible agency, and order of magnitude costs where applicable.



cape cod commission tdm/tsm study

barnstable-west yarmouth region

summary of short range tdm - transit recommendations

tdm - transit strategies

- improve coordination
- advance intermodal transportation center
- develop priority system from Route 6
- provide shelters/turnouts on major routes
- continue summer shuttles
- increase marketing/include off-cape
- use new technology to provide information
- expand service area/frequencies
- develop neighborhood travel centers
- require transit friendly site design
- encourage employers to subsidize pass

Figure 3

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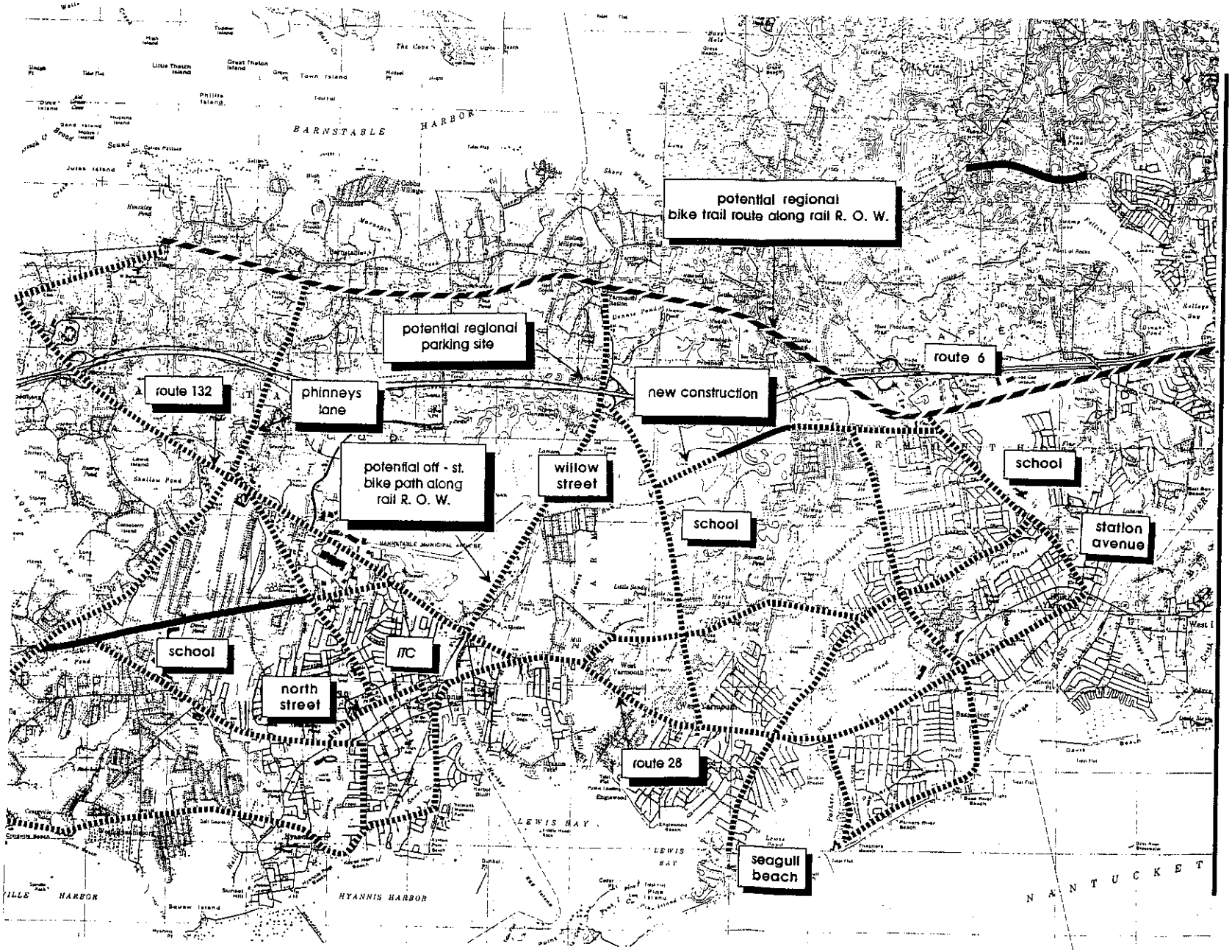

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barnstable-yarmouth region

proposed bicycle routes

LEGEND

existing bikepath
proposed bicycle route

Figure 4

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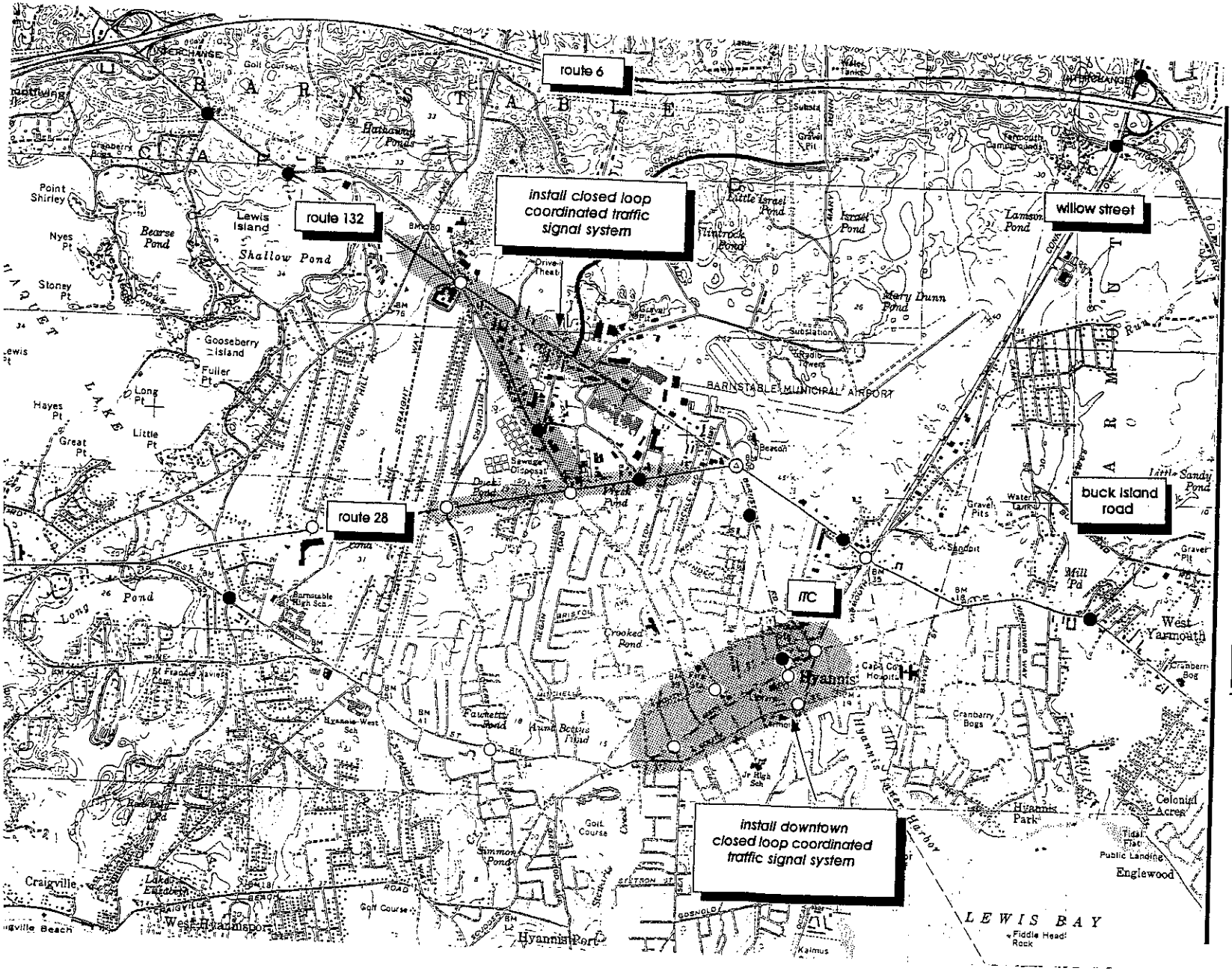

cape cod commission tdm/tsm study

barnstable-west yarmouth region

tsm-traffic signal recommendations

tsm - intelligent transportation systems (its)

- develop regional traffic management center (TMC)
- create computerized, coordinated signal systems on Route 132, Route 28 and downtown Hyannis
- monitor traffic flow conditions
- monitor public parking system
- install regional and local changeable message sign system interconnected with TMC
- install its travel information kiosks at key locations
- develop travel advisory program

legend

- ● new signal location
- ○ upgrade existing signal

Figure 5

McDonough & Scully, Inc.
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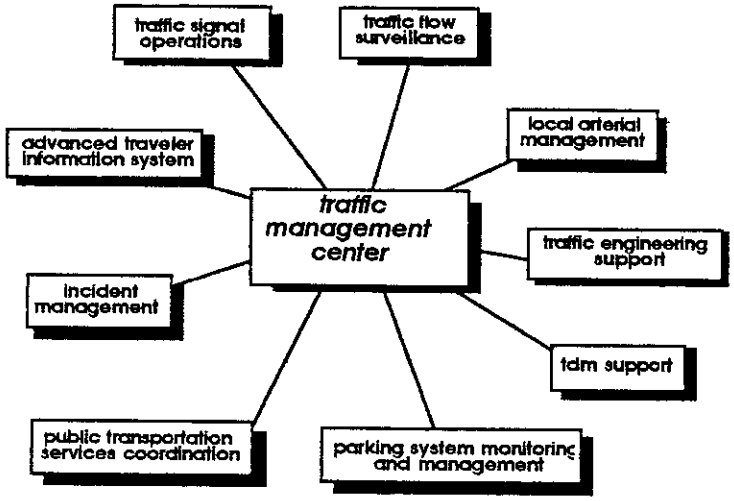

fig 6
traffic management center/ATMS framework

Among all the strategies identified for the region, the most significant actions that could have more substantial positive impacts in a relatively short time frame on improving system efficiency and/or reducing the dependence on single occupant vehicles in the core area include:

- upgrading all existing traffic signal installation, install computer based (i.e. closed loop), coordination systems where applicable and secure adequate funding for the monitoring and maintenance of the investment in equipment ,
- pursuing a fringe parking program together with a core area peak season pricing fee structure
- strongly encourage transit and alternative modes through expanding service areas, increasing frequencies of service, construction of the Intermodal Transportation Center,providing priority systems is transmit (i.e. signal pre-emption, intermodal link) and the provision of year round midday transit circulator shuttles within downtown and between the downtown and the Route 132 business area,
- marketing off-Cape and on-Cape the ability to reach the Hyannis area and travel to ultimate destination without absolutely one's own needing private vehicle, greater
- advancing the regional traffic management center (TMC) which will focus in the short range on monitoring traffic flow conditions on the arterials, coordinate the advance or in-route traveler information and guidance systems, and ensure that traffic signals are operating at optimum levels.
- instituting an advanced traveler information system (ATIS) including highway advisory radio service, news media coverage, direct communication links with the

transit operators and the TMC, signage (both fixed and variable message) and travel information centers along the key routes with computerized information kiosks,

Importantly, for enhancing coordination in the region, it is recommended that a Mid-Cape regional traffic committee be permanently established which would review and study key transportation issues affecting the barnstable-yarmouth region and be in a position to make recommendations to the MPO through the current Joint Transportation Committee (JTC) process. The existing BYTS committee could be further enhanced with the addition of the Town of Dennis (which is under consideration) and having the police and fire chiefs from each community represented on the committee.

In general, the Towns will tend to be the initiator of most of the roadway, bicycle route and sidewalk construction strategies. MPO and/or State support will be required for federally funded actions. THe towns must ensure that maintaining services and facilities do not exceed each town's financial plan. However, there are a substantial amount of actions that can be initiated by the regional agency including marketing efforts, developing brochures and creating the 'sideboard' in addition to seeking adequate funding for the more capital intensive projects. The CCRTA will generally be responsible, with assistance from the towns and the MPO staff, for implementing transit related actions. Certain travel demand related actions can and should be encouraged through employer sponsored programs including encouraging ridesharing, staggering work schedules to manage peak demands more efficiently, and instituting programs that further provide the opportunity for employees to reduce their reliance on the private vehicle. The Cape Cod Commission or Towns may provide direct or indirect assistance in implementing most of these actions, through funding, regulations, permitting conditions, and potentially, acquiring property, and possibly through technical staff assistance.

costs

Costs for implementing the TDM/TSM vary considerably depending on the specific action. For example, restriping an intersection with new signing could cost less than $10,000. The Traffic Management Center and its specific elements could cost several million dollars, again depending on the desired level of management. Certain actions may require primarily staff time and have relatively low "outside" costs. Advertising, brochures and other coordinating type strategies can cost as little or as much as desired. However, to be effective, responsibly adequate expenditures and time well in excess of minimal amounts will be necessary. Where appropriate or possible, estimated costs are tested in Tables 1 and 2.

funding

Funding sources for these actions are being explored in detail as part of the BYTS regional study. In general, however, ISTEA funding is available for actions such as fringe parking, shuttle bus and midday circulator service, signing, ITS monitoring and information kiosks. Specific funding programs within ISTEA include CMAQ, STP, NHS and enhancement funds. As the funding program becomes more defined and project priorities are developed, specific actions can be identified. In this way, the projects can then be incorporated into the County's Long Range Transportation Plan.

table 1
recommended short range
travel demand management (tdm) plan

strategy / action	responsible agency	estimated costs	report page(s) for detailed discussion
Improve Transit			
• advance intermodal transportation center	RTA	$8 million	52-53
• improve coordination			
- modify transit start/end times to coordinate with working schedules	HyLine	-	53
- coordinate rail schedules with transit schedules	RTA, P & B, Scenic Rail,	-	
- coordinate ferry schedules with transit schedules	Steamship Authority	-	
- develop neighborhood traffic centers where bicyclists, pedestrians and transit riders can switch modes easily		varies	
• provide express transit service to/from Route 6	CCC, RTA, towns	$30/hour	53
- provide express service to/from Route 6 along Route 132 to connect remote parking facilities with downtown business center, terminal and ITC			
- provide express service to/from Route 6 along Willow Street to connect remote parking facilities with downtown business center, terminals, beaches and ITC			
- determine feasibility of exclusive intermodal link from Route 6 to terminal			
- In short range, queue bypass link from Willow Street to ITC should be considered		-	
• expand service area/frequencies	RTA,CCC, private sector	$30/hour	53-54
- provide midday shuttle along Route 132/Independence Park			
- provide year round downtown circulator			
- continue summer shuttles			
• amenities	towns, RTA	-	
- provide shelters/turnouts on Route 132 and Route 28		-	
- build and repair benches at bus stops and shelters			
- change vehicle type for local service -standard type buses provide stronger		$150,000/veh	54

table 1 (continued)
recommended short range
travel demand management (tdm) plan

strategy / action	responsible agency	estimated costs	report page(s) for detailed discussion
service image and have more capacity. The existing buses can be used as circulators in the short range unless trolley type vehicles are used			
Advance Traveler Information System (ATIS)			
• develop a brochure that clearly presents information on public transit including stops, schedules, fees, routes, parking areas in the vicinity of bus stops and available bicycle lockers/racks at bus stops.	MPO RTA Chambers of Commerce CCC	$10,000 minimal	54
• distribute brochures/advertise at motels and conference facilities	CCC Chambers of Commerce		
• transportation information regarding local and regional transit service should be incorporated into any tourist related publication prepared by the Chambers of Commerce or the State Tourist Bureau - all key conference centers in the region should be contacted by the MPO and coordination of information regarding the transportation system incorporated into any of the conference center publications.	MPO Chambers of Commerce		
• develop ITS information centers along the major routes (Route 6,Route 132, Route 28 and Willow Street) prior to major decision points for the traveler and include information on the parking system, access routes key destination points and alternative transportation systems available - the Center would include a large board map, a small electronic kiosk programmed with traveler information, a computer program to illustrate "best route" and direct communication lines to the regional traffic management center and other modes of transportation	MPO	$150,000 initial	
• use local news media on regular basis to report road construction related development		minimal	
• consider use of highway advisory radio (HAR) system along regional highway			

table 1 (continued)
recommended short range
travel demand management (tdm) plan

strategy / action	responsible agency	estimated costs	report page(s) for detailed discussion
Areawide Ridesharing			
• provide areawide ridesharing match program through regional agency and/or transportation management association (TMA)	CCC, private sector	–	56-57
• on-site coordinator at the employment site to work one-on-one with commuters to provide assistance in forming and maintaining ridesharing programs	private sector (potentially TMA)	$30,000 annual	
• improve employer and regional rideshare marketing	CCC		
• provide preferential parking spaces and or prices to carpool/vanpool vehicles	private sector	minimal	
Enhance Bicycling			60-66
• construct/designate bicycle route system for recreational as well as commuter travel in the study area as shown in Figure 3	CCC, towns	varies by route	
• install bicycle racks and lockers at transportation terminals, transit stops, beaches, town halls, public parking lots and at other major activity centers	CCC, towns	$200-$500/rack $400/locker	
• set minimum bicycle parking space requirements at new development sites in the future	CCC, towns	n/a	
• improve bicycle/pedestrian signing	CCC, towns	minimal	
• educate bicycle and automobile drivers as to the specific rules of the road of each mode, safety instruction, work to improve public attitudes toward bicycling through newsletters	CCC, safety agencies private sector	n/a	

table 1 (continued)
recommended short range
travel demand management (tdm) plan

strategy / action	responsible agency	estimated costs	report page(s) for detailed discussion
• establish bike-to work day or bike-to-work week event in the summer to increase publicity and media attention	CCC	n/a	
Pedestrian Movement			65-
• In Downtown Hyannis, highlight midblock crossings and protected crossings at Main Street and Center Street near the existing rail and P & B terminals	Barnstable	$20,000 (not including signal work)	
• strengthen the links between Main Street and waterfront and ferry terminals	Barnstable	n/a	
• strengthen the Pleasant Street pedestrian connection between terminal and water front through sidewalks and lighting	Barnstable	$50,000	
• close several sidewalk gaps on Route 132	Barnstable		
• In Yarmouth, more attention should be given to building new sidewalks and highlighting midblock crossings on Route 28	Yarmouth	varies	
Enhance Parking Management			58-60
• Institute/pursue the fringe or remote parking policy as detailed in *Short Range Parking Plan* including potential leasing of existing spaces at the CC Community College (200-500 spaces) or Cape Cod Mall for summer period demand and advancing preferred permanent long term large supply solutions at Route 6 Exit 6 and Exit 7 locations	Barnstable CCC, RTA		
• Improve organization and coordination of public parking system in region and include participation of all major transportation agencies/operators	Barnstable		

table 1 (continued)
recommended short range
travel demand management (tdm) plan

strategy / action	responsible agency	estimated costs	report page(s) for detailed discussion
• institute direct shuttle between remote parking lots and terminals and downtown	Barnstable, RTA	$20,000/year	
• with implementing of remote parking system, develop a peak season fee structure program for on and off-street parking areas that would encourage remote parking (near Route 6) and cover costs of "free" shuttle connection from remote lots and or downtown circulator	Barnstable	minimal	
Peak Demand Management			
• encourage employers to implement various working schedule options as detailed in *Employer Sponsored Programs*	CCC & private sector	n/a	
• carefully schedule events, avoid two major events at the same time on the same day	RTA, towns	n/a	
• provide information to residents and visitors regarding event schedules, parking areas and access routes through newsletters, TV, radio and brochures			
• provide public transit service between major terminals and event locations on several major event days such as July 4th, /(seaport festival), etc.	Chambers of Commerce towns	varies	
Land Use Regulatory Options			77-78
• zoning	towns	n/a	
- encourage mixed land use development including housing, office, retail, light industrial, and recreational uses.			

table 1 (continued)
recommended short range
travel demand management (tdm) plan

strategy / action	responsible agency	estimated costs	report page(s) for detailed discussion
- encourage adequate development density and patterns to support transit, facilitate ridesharing and encourage walking	towns	n/a	
- reduce the amount of parking required through developing programs to encourage ridesharing, transit usage, bicycling and walking	towns	n/a	
• trip reduction - encourage employers to implement various trip reduction programs as detailed in *Employer Sponsored Programs*	towns, private sector	n/a	
Employer Sponsored Program			68-77
• assist region in marketing alternative modes to travel	private sector	n/a	
• provide preferential parking spaces to carpool/vanpool vehicles	private sector	minimal	
• encourage employers to subsidize transit passes, local governments can reimburse a portion of the costs			
• provide guaranteed ride home for employees or reimburse taxi fare for the emergency ride home	private sector	minimal	
• implement flexible work hours, staggered work hours, compressed work weeks and telecommuting options.	private sector	n/a	
• provide bicycle lockers/racks for bicycle commuters participate in "bike to work" day	private sector	$200-$500/rack $400/locker	
• encourage business leaders to establish a regional TMA which would be a "vehicle" to enhance private - public communication and coordination in meeting region's transportation needs	private sector	n/a	

table 2
recommended short range
travel system management (tsm) plan

strategy / action	responsible agency	estimated costs	report page(s) for detailed discussion
Intersection/roadway upgrade	State, towns 4.0 million	3.4 million~	79-98
• install new signals at 14 deficient unsignalized intersections			
• upgrade 11 existing signalized intersections (i.e. new controller, convert to actuated control), upgrade signal timing changes at 16 locations			
• install closed loop coordinated traffic signal systems on Route 132, Route 28, Bearses Way and downtown Hyannis (see Figure 5)			
• minor geometric changes (i.e. add turn lanes, alter existing markings, improve radii) or turn restrictions			
Intelligent Transportation System (ITS)			99-109
• develop regional traffic management center (TMC) to coordinate a wide range of functions and activities including monitoring traffic flows and public parking conditions and advance travel information system (ATIS)	byts committee, MHD CCC	$750,000 (initial)	
• develop a completely new signing system in the region to provide traveler information on routes, parking locations, parking conditions, roadway conditions, regulations, alternative transportation systems available, etc., it should be developed in coordination with the areawide ITS based monitoring & sign program	CCC MHD, towns	$100,000 (initial)	
• develop ITS information centers along major routes see detail in *ATIS* of Table 1			
• maintain region traffic committee (byts structure) to continue effective coordination and communication			

table 2 (continued)
recommended short range
travel system management (tsm) plan

strategy / action	responsible agency	estimated costs	report page(s) for detailed discussion
• develop travel advisory program	CCC, towns private sector	n/a	
• create closed loop coordinated signal systems on route 132, bearses way, route 28 and downtown Hyannis	MHD, CCC towns		
• Install ITS travel information kiosks at key locations - Route 132 near Route 6 Exit 6 - Route 6 - Willow Street near Route 6 Exit 7 - Cape Cod Mall	CCC towns		

Barnstable-Yarmouth Transportation Study: Short Range Parking Study

- Executive Summary

technical report

short range parking plan

cape cod commission
parking study

executive summary

February, 1995

submitted to

cape cod commission
barnstable-yarmouth transportation study committee

Prepared By

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introduction

The purpose of this study was to identify and evaluate optional strategies to better satisfy current parking requirements or immediate growth in relation to key transportation terminals, beaches as well as downtown Hyannis. It is intended to be one tool to manage congestion and improve vehicle and pedestrian safety and accessibility in Cape Cod's urban core. The plan focuses on the peak summer period. The ongoing Barnstable-Yarmouth Transportation Study[1] being conducted by MSI includes developing a Travel Demand Management (TDM) and Transportation System Management (TSM) plan that represents an element into the overall transportation plan for the urban core. This short range parking study is related to that effort as parking strongly influences the TDM/TSM effectiveness and will be an integral part of the regional transportation plan.

study area

The study area essentially includes the town of Yarmouth and the Hyannis section of Barnstable. The primary study area within Barnstable covers an area bounded to the west by Centerville, north by Route 6A and east by Barnstable/Yarmouth Town Line. The core study area within Yarmouth covers an area bounded to the north by Route 6A, east by North Main Street, and west by Yarmouth/Barnstable Town Line. Figure 1 shows the study area.

study process

The study was divided into three phases including: Phase I - Study Mobilization; Phase II - Summary of Needs; and, Phase III - Recommendations. During Phase I, available information and data were compiled regarding:

- existing public parking supply in study area
- current/projected peak parking demands
- current growth issues
- current intermodal plans

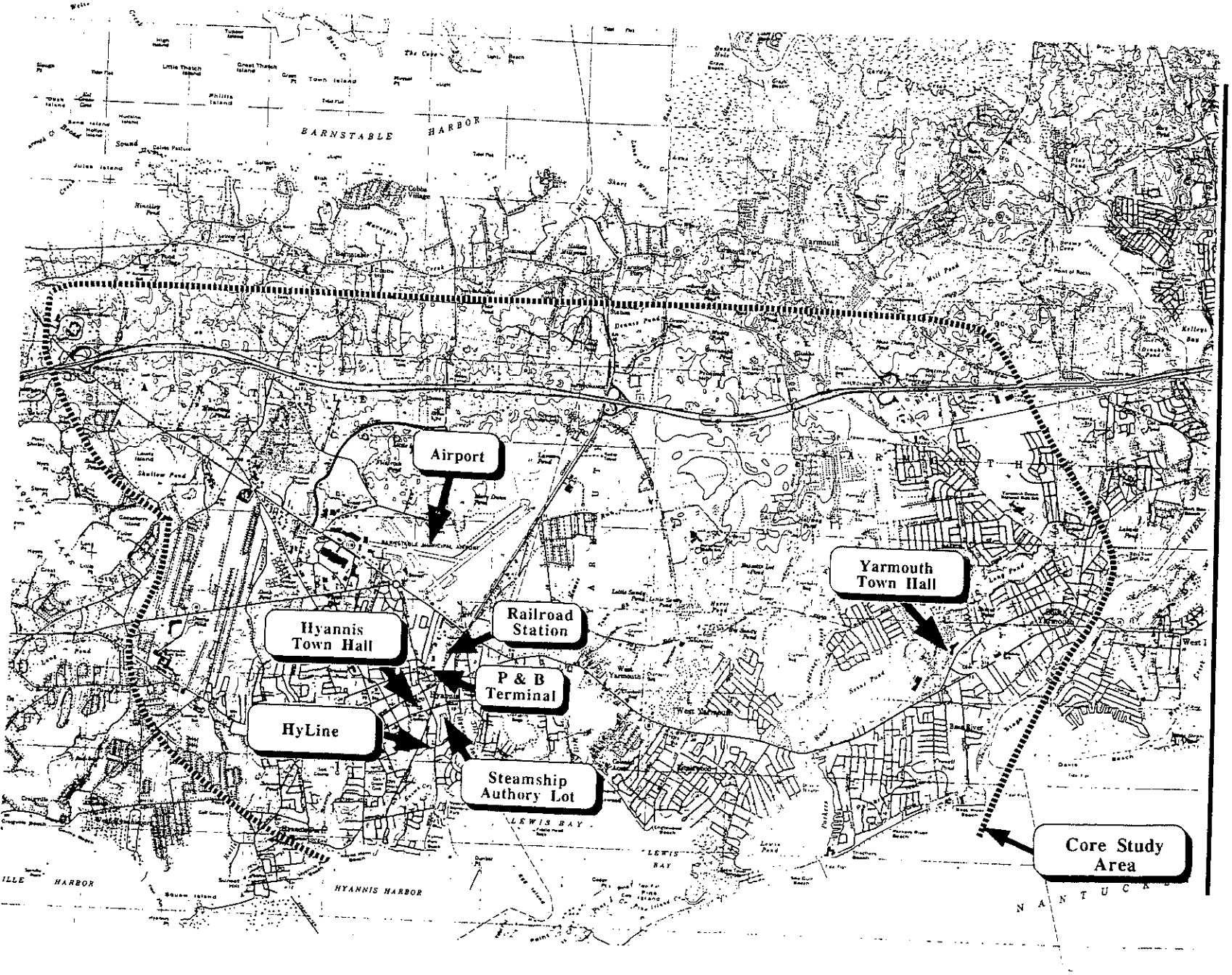
The detailed results of the stusy are included in the Technical Report.

The information obtained in Phase I became the basis for analysis in Phase II. During this phase, critical parking needs of the study facilities were identified. In addition, short vs. long term parking characteristics of the study facilities, walking distances between these parking facilities and activity centers, and fee policies were investigated.

1 Barnstable-Yarmouth Transportation Study being conducted by McDonough & Scully, Inc.

cape cod
short range parking study

barnstable-yarmouth region



study area

Figure 1

McDonough & Scully, Inc.
Natick, Massachusetts

Phase III - Development of Recommended Short Range Parking Plan. During this phase, various parking strategies were identified and evaluated against a set of criteria for selecting new parking sites. Parking management strategies as well as potential new parking supply sites were evaluated. Costs of various types of measures were estimated and the final short range parking plans were recommended.

executive summary & recommendations

This Short Range Parking Study was completed for the Cape Cod Commission as part of their effort to assist the towns of Barnstable and Yarmouth in improving overall travel conditions on the area's transportation system, particularly during the summer period when demands reach their peak. The effort is also an action consistent with the MPO long range plan. From observations and analysis conducted in the Barnstable-Yarmouth Regional Transportation Study (byts) study area, there are apparent parking demand constraints during the summer peak periods as well as other time periods in the downtown, the beaches, and the major transportation terminals. A relatively high proportion of the demand is by long term parkers (i.e. those parking more than 4 hours) while the downtown Hyannis shortfall is in relation to convenient short term parking supply. Most of the parking demands found at the transportation terminals are at least a day with many parking for several days to a week.

existing parking space need

With respect to the terminals and beaches, an increase in parking supply is warranted although improved management of parking may also provide benefits. Presently, patrons of these facilities drive to the primary parking location, find it is at capacity and circulate on the street network adding to the congestion and conflicts. Some find spaces in nearby privately owned commercial lots while others are rerouted to other locations. In total, it was estimated that a *current* short range parking supply need is approximately 940 spaces that includes approximately 100 short term parking spaces in the downtown core area and providing a reserve of 100 spaces related to Yarmouth beach parking. following public review, these needs were generally verified except for the Hyannis downtown core area where some feel the needs are much greater than the 100 estimated short term spaces. Certainly, in the future as vacant space becomes occupied or new development occurs, both the short and long term parking demands will be higher.

alternative analysis

During the course of this study, parking supply and management options were identified and evaluated. Those actions that offer high potential for both effectiveness in addressing the needs and are realistic short range options were selected following review by the public and the byts steering committee for inclusion in the short range parking plan. More than twenty-five supply options were initially identified and 20 options were studied in some detail. The evaluation, which also included reviewing the parking needs and alternatives with the byts steering committee and the general public, supports the desire to work towards a *fringe parking policy*. However, the evaluation and comments received from the Committee as well as the public strongly raise the awareness of the relative difficulty that a fringe parking program will inherit. To be successful, it will:

- require a high level of commitment and involvement from the managing entity,

- need to be cost-effective to both the operator and consumer, and
- require convenient shuttle service.

The evaluation also resulted in several sites having high potential in providing some of the necessary parking supply in a relatively quick timeframe, possibly on an interim basis. In addition, several sites appear to offer opportunities for providing larger, more permanent supply facilities in the longer timeframe.

In addition to supply, the study addressed management issues including organizational structure, pricing, regulations, enforcement, marketing, and access. Strategies were identified for consideration in the short range plan.

recommended short range parking plan

The recommendations are summarized in Figure 2 and Table 1. The actions are categorized by supply, management and access. The recommendations include actions to be considered for direct implementation during the short range timeframe (i.e. immediately or within the 3 to 5 year range) as well as actions that appear desirable and feasible but require more detailed studies. The actions listed in Table 1 provide information about the action, identify the likely responsible agency, and order of magnitude costs where available or applicable.

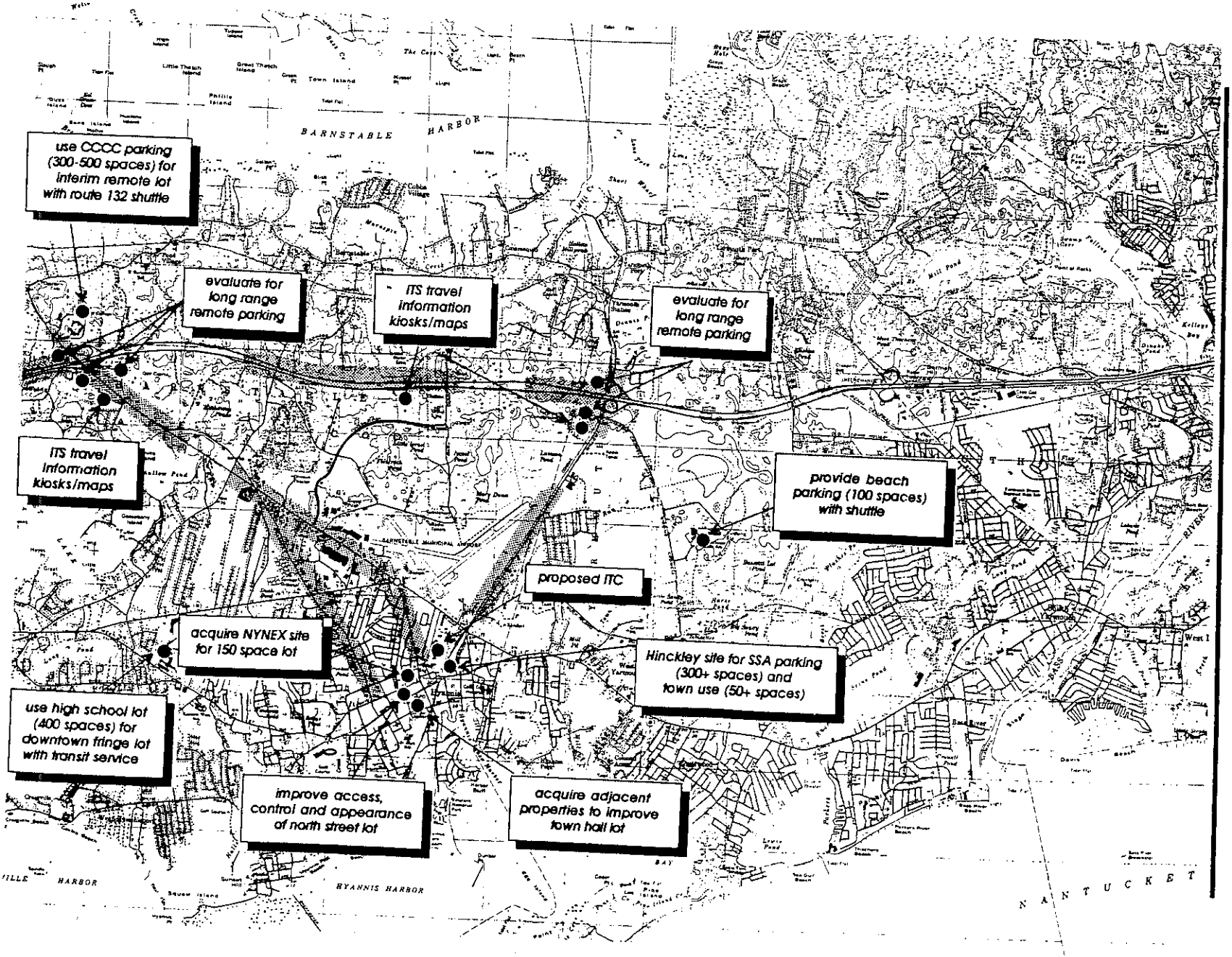
In general, the Town of Barnstable will tend to be the initiator of most of the construction or acquisition strategies unless or until a different management organization is formed to oversee the implementation. Regulatory and permitting actions will need to be considered by both Towns. The Cape Cod Commission or MPO may provide direct or indirect assistance in implementing actions, possibly through funding, regulations, permitting conditions, and potentially, acquiring property.

costs

The total costs estimated for the short range program and summarized in Table 1 is estimated at $700,000. This cost estimate does not include property acquisition, engineering design or permitting services, or most of the management strategies which would typically involve staff time. It also does not include the costs for the Steamship use of or acquisition of the Hinckley site for parking. Estimates for leasing parking in the summer at the Cape Cod Community College are simply based on assumptions of a $1 per day per space. Shuttle costs are based on $28 per hour and 12 hours per day.

funding

Funding sources for these actions are being explored in detail as part of the byts regional study. In general, however, ISTEA funds are available for actions such as fringe parking, shuttle bus service, signing, ITS monitoring and information kiosks. Most parking management actions and acquisition of downtown sites for parking may not be supported through the ISTEA funds. Parking revenues through fees and fines could provide a base to cover costs of operations and maintenance.



cape cod
short range parking study

barnstable-yarmouth region

summary of short range parking recommendations

LEGEND

arterial signage improvement

Figure 2

McDonough & Scully, Inc.
Natick, Massachusetts

table 1
recommended short range parking plan

parking supply (see page 37 to page 48)

action	responsible agency	estimated costs
• institute/pursue the fringe or remote parking policy and develop a formal agreement among the towns, authorities and airport to:	Town of Barnstable Town of Yarmouth CC Commission	minimal
- limit new on-site parking		
- participate in a task force to examine the form, legal, and financial issues for single parking management entity		
- help fund design, construction of remote & operate shuttle connection service and traffic management center operations related to parking monitoring and access		
• as an interim measure, arrange to lease spaces at CC Community College (200-500 spaces) and possibly Cape Cod Mall (200 spaces) for summer period demand, this will require shuttle service	Barnstable CC Commission	$40,000/year (shuttle/lease)
• arrange in the short range to use the Mattacheese School for emergency overflow remote parking related to the Yarmouth beaches (in particular Seagull Beach) - requires shuttle	Yarmouth	$20,000/year (shuttle)
• agree to use supply (300 - 400 spaces) at Hinckleys site to:	Steamship Authority	
- satisfying current SSA parking needs - reserve some amount (minimum of 25-50 spaces) of supply for public or town use - use partial or future conversion to short term downtown supply - use as transitional use from current inactive condition to future		

table 1 (continued)
recommended short range parking plan

action	responsible agency	estimated costs
joint development program		
- if sufficient remote parking becomes permanently available to serve the region, consider further joint development to enhance the downtown and/or consider using a higher proportion of supply for short term parking		
• the Town of Barnstable should pursue the acquisition of the NYNEX property for downtown public parking to enhance downtown parking opportunities if it can affordably acquired - institute minor improvements related to signing, appearance, control	Barnstable	$10,000 $1.1 million assessed value
• the Town of Barnstable should pursue the acquisition of two available sites adjacent to the Town Hall parking Lot off Pearl Street to enhance vehicular and pedestrian access to public parking areas and enhance the development of parking supply in future	Barnstable	$150,000 $320,000 assessed value
• bring the North Street Lot under greater management control together with the other public parking facilities - improve lot control, appearance and access	Barnstable	$200,000
• advance preferred long term large supply solutions at Route 6 Exit 6 and Exit 7 locations by examining in more detail sites: Route 132 corridor (sites 2 and 18), Willow Street corridor (sites 13 and 14)	byts committee	n/a
management		
• organization (see page 59 to page 62)		
- Town of Barnstable needs to formalize/coordinate the public parking	Barnstable	minimal

table 1 (continued)
recommended short range parking plan

action	responsible agency	estimated costs
system addressing parking policies if it is to expand and be service to influence travel conditions		
- there is a need to further explore the feasibility of an independent organization to be responsible for public parking in region and include participation of all major transportation agencies/operators	Barnstable	$20,000
• pricing (see page 54 to page 57, page 65)		
- do not institute fee structure for the public parking system in the immediate timeframe, however,		
- in the short range (i.e. 2-3 years), develop a peak season fee structure program for on and off-street parking areas that would cover costs once a remote system in place - the program should: • encourage remote parking (near Route 6) • encourage downtown employees to use CBD fringe spaces • minimally impacts downtown shoppers and residents (possibly through shopper discounts and resident stickers) • covers costs of "free" shuttle connection from remote lots and/or downtown circulator • creater a parking fund to assist in developing new parking and improvements to the system in the future	Barnstable	minimal
• time limits/enforcement (see page 57 and page 65)		
- in the immediate timeframe, designate a greater portion of Town Hall spaces to be short term spaces (for summer period)	Barnstable	<$1,000
- once NYNEX property is acquired for parking (approx. 150 spaces),	Barnstable	minimal

table 1 (continued)
recommended short range parking plan

action	responsible agency	estimated costs
designate a majority of spaces in the lot for long term parking with most of the spaces in the North Street Lot and Town Hall Lot redesignated as short term parking		
- with a great number of space available for public parking and designated as short term parking in the downtown, there will be a need for higher level of consistent enforcement of regulations using the parking control aids presently used by the Town	Barnstable	$10,000
- the enforcement program will require increased ticket collection efforts	Barnstable	$5,000
- to ensure the most convenient short term off-street parking areas are available for the downtown visitor and shopper - parking should be prohibited until after 9:30 AM	Barnstable	n/a
• regulatory (see page 50 to page 54)		
- set maximum allowed parking requirements for downtown and village centers without relieving the proponent from responsibility of total parking requirements	Barnstable, Yarmouth CC Commission	n/a
- develop regulations that allow downtown or activity center development to occur and allow flexibility in providing normally required parking supply - for example, the applicant can provide new parking at remote facility, participate in remote lot-downtown shuttle service, pay in-lieu of providing parking and allow bonuses for the development that further supports public transit and demand management activity	Barnstable Yarmouth CC Commission	n/a

table 1 (continued)
recommended short range parking plan

action	responsible agency	estimated costs
- institute parking facility design guidelines that enhance aesthetics and pedestrian movement within and through the parking facility - (see Designing the Future to Honor the Past, Design Guidelines for Cape Cod prepared by CCC)	Barnstable, Yarmouth Cape Cod Commission	n/a
- require downtown or village center as well as any major development's parking facilities for long term parkers to reserve a center number of spaces for carpools and vanpools	Barnstable Yarmouth CC Commission	n/a
- develop regulations that allow reductions in the minimum parking requirements where it can be demonstrated that two or more uses can make use of the same parking facility due to differences in peak activity periods (i.e. shared parking provisions)	Barnstable Yarmouth	n/a
• marketing (see pages 58, 59 and 66)		
- develop a brochure that clearly presents information on the public parking system including the locations of parking, the best access route, and information on time limits, fees, and enforcement regulations - it should be kept up to date and distributed on and off - Cape.	CC Commission with Barnstable, Yarmouth & chambers of commerce	$20,000 (initial)
- the brochure should also provide information on the availability of alternative modes of transportation as well as other amenities and services provided as the parking areas		n/a
- develop ITS information centers along the major routes (Route 132, Route 28 and Willow Street) prior to major decision points for the traveler and include information on the parking system, access routes, key destination points and alternative transportation systems available - the system can be expanded to other roadways and areas of the Cape -	CC Commission	$150,000

table 1 (continued)
recommended short range parking plan

action	responsible agency	estimated costs
the Center would include a large board map, a small electronic kiosk programmed with traveler information, a computer program to illustrate "best route" and direct communication lines to the regional traffic management center and other modes of transportation		
- transportation information regarding the parking and alternative modes of transportation should be incorporated into any tourist related publication prepared by the chambers of commerce or the State Tourist Bureau - all key conference centers in the region should also be contacted by the MPO and coordination of information regarding the transportation system incorporated into any of the conference center publications be provided	CC Commission with chambers of commerce	n/a
Access (see page 67 to page 71)		
- a completely new signing system must be established in the region providing travelers information on routes, parking locations, parking condition, roadway conditions, regulations, alternative transportation system available, etc. it should be developed in coordination with the areawide ITS based monitoring & sign program	CC Commission with MHD, Barnstable Yarmouth	$100,000
- improve the visibility of the Downtown Hyannis parking lots at the corner of North and Basset Streets and the Candlelight Lot	Barnstable	$15,000
- pedestrian connections between the parking facilities and the sidewalk system and key destinations must be improved particularly with respect to the public parking lots at North and Basset and the North Street lot - this requires better walkways that are well lighted, secure and easy to locate.	Barnstable	$50,000

table 1 (continued)
recommended short range parking plan

action	responsible agency	estimated costs
- parking facility signs should be distinct, clearly seen by the motorist and consistent within the system	Barnstable, Yarmouth	$10,000
- using ITS technology, develop public parking system monitoring coordinated with a signage system that will direct parkers to appropriate locations and reducing the amount of unnecessary circulation in the congested areas - include Intermodal Center Lot, SSA Lots, and Airport Lots. -possible develop test on small scale	Barnstable or lead parking agency with MHD (coordinate with regional TMC)	$100,000 - $200,000

Transit

OPERATIONS	YEAR:	1996	SUMMER					
	SERVICE:	Mashpee Trolley, HAT, YES, COD, Harwich Cranberry, Orleans						
	TOWN/ROUTE:	See individual shuttle data sheets						
MONTH:	Mashpee Trolley	Hyannis Area Trolley (HAT)	Yarmouth Easy Shuttle (YES)	Coach of Dennis (COD)	Harwich Cranberry Shuttle	Orleans Trolley	**TOTALS/ AVERAGES**	
DAYS	73	96	73	73	86	106	**85**	DAYS
TOTAL TRIPS	1,314	4,958	1,022	1,022	946	742	**10,004**	TOTAL TRIPS
DAILY HOURS of SERVICE	13	14	14	14	11	11	**12.8**	DAILY HOURS of SERVICE
TOTAL VEHICLE HOURS	1,898	2,566	1,022	1,022	946	1,040	**8,494**	TOTAL VEHICLE HOURS
ROUTE MILES (one-way)	23	6	13	11	15	20	**14.6**	ROUTE MILES (one-way)
TOTAL VEHICLE MILES	30,222	27,269	13,695	10,731	14,190	12,488	**108,595**	TOTAL VEHICLE MILES
TOTAL PASSENGERS	4,298	27,005	19,890	7,452	3,380	2,162	**64,187**	TOTAL PASSENGERS
Pass Boardings/veh hour	2.26	10.52	19.46	7.29	3.57	2.08	**7.56**	Ave Pass Boardings/veh hour
Pass Boardings/veh mile	0.14	0.99	1.45	0.69	0.24	0.17	**0.59**	Ave Pass Boardings/veh mile
Vehicle miles/Pass trip	7.03	1.01	0.69	1.44	4.20	5.78	**1.69**	Ave Vehicle Miles/Pass TRIP
Pass Boardings/trip	3.27	5.45	19.46	7.29	3.57	2.91	**6**	Ave Pass Boardings/TRIP
TOTAL REVENUE	$ 1,755	$ 7,787	$ 6,260	$ 2,713	$ 1,015	$ 858	**$ 20,388**	TOTAL REVENUE
TOTAL COST	$ 64,482	$ 99,399	$ 50,654	$ 46,734	$ 43,846	$ 48,111	**$ 353,226**	TOTAL COST
NET	$ (62,727)	$ (91,612)	$ (44,394)	$ (44,021)	$ (42,831)	$ (47,253)	**$ (332,838)**	NET COST (for the season)
NET COST/PASSENGER	14.59	3.39	2.23	5.91	12.67	21.86	**10.11**	AVE NET COST/PASSENGER
GALLONS OF FUEL	4,213	5,476	2,702	1,429	2,127	2,495	**18,442**	GALLONS OF FUEL
MILES PER GALLON	7	5	5	8	7	5	**6**	MILES PER GALLON
AVERAGE FARE	0.41	0.29	0.31	0.36	0.30	0.40	**0.32**	AVERAGE FARE

OPERATIONS	YEAR:	1996	SUMMER					
P&B contracted	SERVICE:	YARMOUTH EASY SHUTTLE		YES				
	TOWN/ROUTE:	YARMOUTH	Route 28/Old Main/South/So. Shore Dr/Seaview Av/Route 28/E. Main-->P&B					
MONTH:	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	**TOTALS/ AVERAGES**	
DAYS	0	9	31	31	2	0	**73**	DAYS
RUNS PER DAY		14	14	14	14		**14**	RUNS PER DAY
TOTAL TRIPS	0	126	434	434	28	0	**1022**	TOTAL TRIPS
DAILY HOURS of SERVICE		14.0	14.0	14.0	14.0		**14**	DAILY HOURS of SERVICE
NUMBER OF VEHICLES		1.0	1.0	1.0	1.0		**1**	NUMBER OF VEHICLES
TOTAL VEHICLE HOURS	0	126	434	434	28	0	**1022**	TOTAL VEHICLE HOURS
ROUTE MILES (one-way)		13.4	13.4	13.4	13.4		**13.4**	ROUTE MILES (one-way)
TOTAL VEHICLE MILES	0	1,688	5,816	5,816	375	0	**13695**	TOTAL VEHICLE MILES
TOTAL PASSENGERS		1,690	8,715	9,304	181		**19890**	TOTAL PASSENGERS
Pass Boardings/veh hour	0.00	13.41	20.08	21.44	6.46	0.00	19.46	Ave Pass Boardings/veh hour
Pass Boardings/veh mile	0.00	1.00	1.50	1.60	0.48	0.00	1.45	Ave Pass Boardings/veh mile
Vehicle miles/Pass trip	0.00	1.00	0.67	0.63	2.07	0.00	0.69	Ave Vehicle Miles/Pass TRIP
Pass Boardings/trip	0	13	20	21	6	0	19.46	Ave Pass Boardings/TRIP
							272	Passengers per day
TOTAL REVENUE		$ 199	$ 3,230	$ 2,831	$ -	$ -	$ 6,260	TOTAL REVENUE
TOTAL COST		$ 13,742	$ 17,913	$ 17,004	$ 1,995		$ 50,654	TOTAL COST
NET	$ -	$ (13,543)	$ (14,683)	$ (14,173)	$ (1,995)	$ -	$ (44,394)	NET COST (for the season)
NET COST/PASSENGER	0.00	8.01	1.68	1.52	11.02	0.00	2.23	AVE NET COST/PASSENGER
GALLONS OF FUEL		338	1,163	1,163	38	0	2,702	GALLONS OF FUEL
MILES PER GALLON	0	5	5	5	10	0	5	MILES PER GALLON
AVERAGE FARE	0.00	0.12	0.37	0.30	0.00	0.00	0.31	AVERAGE FARE

OPERATIONS	YEAR:	1996	SUMMER					
P&B contracted	SERVICE:	HYANNIS AREA TROLLEY		HAT	2 vehicles			
	TOWN/ROUTE:	BARNSTABLE	Rt A: P&B, Main St, Sea St, South St, Ocean St, Lewis Bay Rd, Center St					
	TOWN/ROUTE:	BARNSTABLE	Rt B: P&B, Center St, Barnstable Rd, Rt 132, Rt 28, Ridgewood Ave					

MONTH:	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTALS/ AVERAGES	
DAYS	4	15	31	31	10	5	**96**	DAYS
RUNS PER DAY	**40**	**50**	**54**	**54**	**47**	**46**	**54**	RUNS PER DAY
TOTAL TRIPS	160	750	1,674	1,674	470	230	**4958**	TOTAL TRIPS
DAILY HOURS of SERVICE	**10.0**	**13.0**	**14.0**	**14.0**	**12.0**	**12.0**	**14**	DAILY HOURS of SERVICE
NUMBER OF VEHICLES	2.0	2.0	2.0	2.0	2.0	2.0	**2**	NUMBER OF VEHICLES
TOTAL VEHICLE HOURS	80	390	868	868	240	120	**2566**	TOTAL VEHICLE HOURS
ROUTE MILES (one-way)	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	**5.5**	ROUTE MILES (one-way)
TOTAL VEHICLE MILES	880	4,125	9,207	9,207	2,585	1,265	**27269**	TOTAL VEHICLE MILES
TOTAL PASSENGERS	**611**	**2,984**	**10,585**	**10,627**	**1,516**	**682**	**27005**	TOTAL PASSENGERS
Pass Boardings/veh hour	7.64	7.65	12.19	12.24	6.32	5.68	10.52	Ave Pass Boardings/veh hour
Pass Boardings/veh mile	0.69	0.72	1.15	1.15	0.59	0.54	0.99	Ave Pass Boardings/veh mile
Vehicle miles/Pass trip	1.44	1.38	0.87	0.87	1.71	1.85	1.01	Ave Vehicle Miles/Pass TRIP
Pass Boardings/trip	4	4	6	6	3	3	5	Ave Pass Boardings/TRIP
							281	Passengers per day
TOTAL REVENUE	**$ 146**	**$ 548**	**$ 3,147**	**$ 3,078**	**$ 597**	**$ 271**	**$ 7,787**	TOTAL REVENUE
TOTAL COST	**$ 2,614**	**$ 22,347**	**$ 31,585**	**$ 30,589**	**$ 8,484**	**$ 3,780**	**$ 99,399**	TOTAL COST
NET	$ (2,468)	$ (21,799)	$ (28,438)	$ (27,511)	$ (7,887)	$ (3,509)	$ (91,612)	NET COST (for the season)
NET COST/PASSENGER	4.04	7.31	2.69	2.59	5.20	5.15	3.39	AVE NET COST/PASSENGER
GALLONS OF FUEL	**149**	**806**	**1,809**	**1,809**	**456**	**447**	**5476**	GALLONS OF FUEL
MILES PER GALLON	6	5	5	5	6	3	5	MILES PER GALLON
AVERAGE FARE	0.24	0.18	0.30	0.29	0.39	0.40	0.29	AVERAGE FARE

OPERATIONS	YEAR:	1996	SUMMER					
CATS contracted	SERVICE:	COACH OF DENNIS		COD				
	TOWN/ROUTE:	DENNIS	Rt 134, Rt 28, School St, Lower County Rd, Old Wharf Rd, Inman Rd, Division St					
MONTH:	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	**TOTALS/ AVERAGES**	
DAYS	0	9	31	31	2	0	**73**	DAYS
RUNS PER DAY		**14**	**14**	**14**	**14**		**14**	RUNS PER DAY
TOTAL TRIPS	0	126	434	434	28	0	**1022**	TOTAL TRIPS
DAILY HOURS of SERVICE		**14.0**	**14.0**	**14.0**	**14.0**		**14**	DAILY HOURS of SERVICE
NUMBER OF VEHICLES		1.0	1.0	1.0	1.0		**1**	NUMBER OF VEHICLES
TOTAL VEHICLE HOURS	0	126	434	434	28	0	**1022**	TOTAL VEHICLE HOURS
ROUTE MILES (one-way)		**10.5**	**10.5**	**10.5**	**10.5**		**10.5**	ROUTE MILES (one-way)
TOTAL VEHICLE MILES	0	1,323	4,557	4,557	294	0	**10731**	TOTAL VEHICLE MILES
TOTAL PASSENGERS		**606**	**3,096**	**3,661**	**89**		**7452**	TOTAL PASSENGERS
Pass Boardings/veh hour	0.00	4.81	7.13	8.44	3.18	0.00	7.29	Ave Pass Boardings/veh hour
Pass Boardings/veh mile	0.00	0.46	0.68	0.80	0.30	0.00	0.69	Ave Pass Boardings/veh mile
Vehicle miles/Pass trip	0.00	2.18	1.47	1.24	3.30	0.00	1.44	Ave Vehicle Miles/Pass TRIP
Pass Boardings/trip	0	5	7	8	3	0	7	Ave Pass Boardings/TRIP
							102	Passengers per day
TOTAL REVENUE		**$ 295**	**$ 1,074**	**$ 1,344**	**$ -**		**$ 2,713**	TOTAL REVENUE
TOTAL COST		**$ 14,416**	**$ 15,293**	**$ 14,673**	**$ 2,352**		**$ 46,734**	TOTAL COST
NET	$ -	$ (14,121)	$ (14,219)	$ (13,329)	$ (2,352)	$ -	$ (44,021)	NET COST (for the season)
NET COST/PASSENGER	0.00	23.30	4.59	3.64	26.43	0.00	5.91	AVE NET COST/PASSENGER
GALLONS OF FUEL		**163**	**672**	**554**	**40**		**1429**	GALLONS OF FUEL
MILES PER GALLON	0	8	7	8	7	0	8	MILES PER GALLON
AVERAGE FARE	0.00	0.49	0.35	0.37	0.00	0.00	0.36	AVERAGE FARE

OPERATIONS	YEAR:	1996	SUMMER					
CATS contracted	SERVICE:	HARWICH CRANBERRY SHUTTLE						
	TOWN/ROUTE:	HARWICH	Rt 28, Deep Hole Rd, Uncle Venies Rd, Bank St, Lower County Rd, Division St					
MONTH:	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	**TOTALS/ AVERAGES**	
DAYS	0	2	31	31	22	0	**86**	DAYS
RUNS PER DAY		**11**	**11**	**11**	**11**		**11**	RUNS PER DAY
TOTAL TRIPS	0	22	341	341	242	0	**946**	TOTAL TRIPS
DAILY HOURS of SERVICE		**11.0**	**11.0**	**11.0**	**11.0**		**11**	DAILY HOURS of SERVICE
NUMBER OF VEHICLES		1.0	1.0	1.0	1.0		**1**	NUMBER OF VEHICLES
TOTAL VEHICLE HOURS	0	22	341	341	242	0	**946**	TOTAL VEHICLE HOURS
ROUTE MILES (one-way)		**15**	**15**	**15**	**15**		**15**	ROUTE MILES (one-way)
TOTAL VEHICLE MILES	0	330	5,115	5,115	3,630	0	**14190**	TOTAL VEHICLE MILES
TOTAL PASSENGERS		**57**	**1,559**	**1,381**	**383**		**3380**	TOTAL PASSENGERS
Pass Boardings/veh hour	0.00	2.59	4.57	4.05	1.58	0.00	3.57	Ave Pass Boardings/veh hour
Pass Boardings/veh mile	0.00	0.17	0.30	0.27	0.11	0.00	0.24	Ave Pass Boardings/veh mile
Vehicle miles/Pass trip	0.00	5.79	3.28	3.70	9.48	0.00	4.20	Ave Vehicle Miles/Pass TRIP
Pass Boardings/trip	0	3	5	4	2	0	4	Ave Pass Boardings/TRIP
							39	Passengers per day
TOTAL REVENUE		**$ 63**	**$ 388**	**$ 415**	**$ 149**		**$ 1,015**	TOTAL REVENUE
TOTAL COST		**$ 10,933**	**$ 13,082**	**$ 12,292**	**$ 7,539**		**$ 43,846**	TOTAL COST
NET	$ -	$ (10,870)	$ (12,694)	$ (11,877)	$ (7,390)	$ -	$ (42,831)	NET COST (for the season)
NET COST/PASSENGER	0.00	190.70	8.14	8.60	19.30	0.00	12.67	AVE NET COST/PASSENGER
GALLONS OF FUEL		**71**	**767**	**825**	**464**		**2127**	GALLONS OF FUEL
MILES PER GALLON	0	5	7	6	8	0	7	MILES PER GALLON
AVERAGE FARE	0.00	1.11	0.25	0.30	0.39	0.00	0.30	AVERAGE FARE

OPERATIONS	YEAR:	1996	SUMMER					
CATS contracted	SERVICE:	MASHPEE TROLLEY						
TOWN/ROUTE:		MASHPEE	GREEN ROUTE	Mashpee Commons, Steeple St, Job's Fishing Rd, Rt 151, Great Neck Rd North, Rt 130, Cotuit Rd, Santuit Pond				
TOWN/ROUTE:		MASHPEE	BLUE ROUTE	Mashpee Commons, Steeple St, Job's Fishing Rd, Rt 151, Great Neck Rd South-->(New Seabury/Maushop Village/South Cape Beach), Mash. Com., Grt Neck Rd North, Old Barnstable Rd, Rt 151, Hooppole Rd -->(Otis, John's Pond)				

MONTH:	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	TOTALS/ AVERAGES	
DAYS	0	9	31	31	2	0	**73**	DAYS
RUNS PER DAY		**18**	**18**	**18**	**18**		**18**	RUNS PER DAY
TOTAL TRIPS	0	162	558	558	36	0	**1314**	TOTAL TRIPS
DAILY HOURS of SERVICE		**13.0**	**13.0**	**13.0**	**13.0**		**13**	DAILY HOURS of SERVICE
NUMBER OF VEHICLES		**2.0**	**2.0**	**2.0**	**2.0**		**2**	NUMBER OF VEHICLES
TOTAL VEHICLE HOURS	0	234	806	806	52	0	**1898**	TOTAL VEHICLE HOURS
ROUTE MILES (one-way)		**23**	**23**	**23**	**23**		**23**	ROUTE MILES (one-way)
TOTAL VEHICLE MILES	0	3,726	12,834	12,834	828	0	**30222**	TOTAL VEHICLE MILES
TOTAL PASSENGERS		**389**	**1,900**	**1,989**	**20**		**4298**	TOTAL PASSENGERS
Pass Boardings/veh hour	0.00	1.66	2.36	2.47	0.38	0.00	2.26	Ave Pass Boardings/veh hour
Pass Boardings/veh mile	0.00	0.10	0.15	0.15	0.02	0.00	0.14	Ave Pass Boardings/veh mile
Vehicle miles/Pass trip	0.00	9.58	6.75	6.45	41.40	0.00	7.03	Ave Vehicle Miles/Pass TRIP
Pass Boardings/trip	0	2	3	4	1	0	3	Ave Pass Boardings/TRIP
							59	Passengers per day
TOTAL REVENUE		**$ 173**	**$ 732**	**$ 850**	**$ -**		**$ 1,755**	TOTAL REVENUE
TOTAL COST		**$ 16,317**	**$ 23,599**	**$ 21,815**	**$ 2,751**		**$ 64,482**	TOTAL COST
NET	$ -	$ (16,144)	$ (22,867)	$ (20,965)	$ (2,751)	$ -	$ (62,727)	NET COST (for the season)
NET COST/PASSENGER	0.00	41.50	12.04	10.54	137.55	0.00	14.59	AVE NET COST/PASSENGER
GALLONS OF FUEL		**530**	**1,816**	**1,739**	**128**		**4213**	GALLONS OF FUEL
MILES PER GALLON	0	7	7	7	6	0	7	MILES PER GALLON
AVERAGE FARE	0.00	0.44	0.39	0.43	0.00	0.00	0.41	AVERAGE FARE

OPERATIONS	YEAR:	1996	SUMMER	(1996 is the first summer operation for this service)				
CATS contracted	SERVICE:	ORLEANS TROLLEY						
	TOWN/ROUTE:	ORLEANS	Rt 6A, Rock Harbor Rd, Main St, Rt 28					
MONTH:	JUNE	JULY	AUGUST	SEPTEMBER	SEPTEMBER	OCTOBER	**TOTALS/ AVERAGES**	
DAYS	0	31	31	2	28	14	**106**	DAYS
RUNS PER DAY		**7**	**7**	**7**	**7**	**7**	**7**	RUNS PER DAY
TOTAL TRIPS	0	217	217	14	196	98	**742**	TOTAL TRIPS
DAILY HOURS of SERVICE		**11.0**	**11.0**	**11.0**	**8.0**	**8.0**	**11**	DAILY HOURS of SERVICE
NUMBER OF VEHICLES		**1.0**	1.0	**1.0**	**1.0**	**1.0**	**1**	NUMBER OF VEHICLES
TOTAL VEHICLE HOURS	0	341	341	22	224	112	**1040**	TOTAL VEHICLE HOURS
ROUTE MILES (one-way)		**20**	**20**	**20**	**12**	**12**	**20**	ROUTE MILES (one-way)
TOTAL VEHICLE MILES	0	4,340	4,340	280	2,352	1,176	**12488**	TOTAL VEHICLE MILES
TOTAL PASSENGERS		**757**	**801**	**14**	**413**	**177**	**2162**	TOTAL PASSENGERS
Pass Boardings/veh hour	0.00	2.22	2.35	0.64	1.84	1.58	2.08	Ave Pass Boardings/veh hour
Pass Boardings/veh mile	0.00	0.17	0.18	0.05	0.18	0.15	0.17	Ave Pass Boardings/veh mile
Vehicle miles/Pass trip	0.00	5.73	5.42	20.00	5.69	6.64	5.78	Ave Vehicle Miles/Pass TRIP
Pass Boardings/trip	0	3	4	1	2	2	3	Ave Pass Boardings/TRIP
							20	Passengers per day
TOTAL REVENUE		**$ 304**	**$ 245**	**$ 5**	**$ 229**	**$ 75**	**$ 858**	TOTAL REVENUE
TOTAL COST		**$ 14,127**	**$ 12,292**	**$ 503**	**$ 7,036**	**$ 14,153**	**$ 48,111**	TOTAL COST
NET	$ -	$ (13,823)	$ (12,047)	$ (498)	$ (6,807)	$ (14,078)	$ (47,253)	NET COST (for the season)
NET COST/PASSENGER	0.00	18.26	15.04	35.57	16.48	79.54	21.86	AVE NET COST/PASSENGER
GALLONS OF FUEL		**807**	**780**	**51**	**622**	**235**	**2495**	GALLONS OF FUEL
MILES PER GALLON	0	5	6	5	4	5	5	MILES PER GALLON
AVERAGE FARE	0.00	0.40	0.31	0.36	0.55	0.42	0.40	AVERAGE FARE

PASSENGER DATA

BUS	1991	1992	1993	#days 1994	1994	ppd 1994	#days 1995	1995	ppd 1995	#days 1996	1996	ppd 1996
SeaLine	23,000	23,000	29,465	365	32,111	88	365	37,225	102	182	15,659	86
Peter Pan	7,000	8,000										
Plym. & Brock.	526,000	524,000	516,760		540,761							
BONANZA:												
Boston-Hyan	108,000	107,000	109,539		119,408							
Bos/Log-WH	part 236,339	199,134	204,674		216,904							
Bos - Buz Bay	part 236,339	31,893	30,197		29,513							
TOTAL Bonanz	344,339	338,027	344,410		365,825							
SEASONAL:												
Falmouth-WHOOSH				73	22,050	302	110	30,132	274			0
Barns-Hyannis Area Trolley				92	48,411	526	138	24,112	175	97	27,005	278
Yarmouth-YES				73	30,067	412	74	18,350	248	73	19,890	272
					100,528			**72,594**				
Dennis- Coach of Dennis				0		0	74	7,056	95	73	7,452	102
Harwich-"Beach Shuttle"		"Cranberry Shuttle" in 1996		0		0	74	3,874	52	86	3,380	39
Mashpee-Mashpee Trolley				0		0	74	4,167	56	73	4,298	59
								15,097			**15,130**	
								87,691				
Orleans trolley (new in 1996)						0			0	64	2,162	34
YEAR ROUND:												
Barns-VILLAGER Route 132		new 11/13/95		0		0	49	2,216	45	183	8,406	46
Barns-VILLAGER Route 149		new 11/13/95		0		0	49	118	2	183	673	4
Barns-VILLAGER total		new 11/13/95		0		0	49	2,334	48	183	9,079	50
Mashpee CIRCULATOR		new 12/4/95		0		0	28	205	7	183	2,202	12
BOAT												
Hyline Hy-Nan	426,000	310,000										
Hyline Hy-MV	in above	112,000										
SSA Hy to Nan	489,000	483,943	240,518		268,892							
SSA WH to MV	1,708,000	1,772,342	946,960		1,012,406							
SSA Nan WH &	*WH to Nan*		195		2,076							
SSA Nan to Hy			248,097		274,943							
SSA MV to WH			938,785		1,004,051							
sum SSA HY			**488,615**		**543,835**							
sum SSA WH			**1,885,940**		**2,018,533**							
TOTAL SSA			2,374,555		2,562,368							
Island Queen	Fal Har to MV	300,000										
RAIL												
Cape Cod Scen	82,000	107,000										
Amtrak	2,000	4,000										
AIR												
Barn. Airport	215,000	237,000										
Prvtwn Airport	13,000	16,000										
	-this pattern means data was not available as of printing date											

		WORKPLACE																			
		BOUR	SAND	FALM	MASH	BARN	YARM	DENN	HARW	CHAT	BREW	ORLE	EAST	WELL	TRUR	PROV	Subtotals, Cape	Islands	Boston	other off-Cape	TOTAL
	BOUR	2843	334	1011	69	397	131	29	21	13	6	23		8			4,685	17	327	2022	7251
	SAND	481	2283	521	153	1701	225	86	31	38	18	24	6			10	5,577	5	355	1523	7460
	FALM	646	167	8926	487	864	75	16	12	11	24	18				4	11,250	22	378	1143	12793
	MASH	147	119	626	858	919	170	62	19	67		8					2,995		132	539	3666
R	BARN	307	419	547	380	12568	1380	345	147	76	83	136	13			28	16,429	27	514	1404	18374
E	YARM	53	96	110	51	2885	3494	853	165	71	61	113				9	7,961		100	545	8606
S	DENN	32	52	19	22	1028	995	2039	348	176	178	127	31		9	5	5,061		49	360	5470
I	HARW	39	8	48	5	530	232	298	1485	362	150	454	73	16		12	3,712		39	185	3936
D	CHAT			4	17	118	54	82	189	1660	33	185	45	7	7		2,401		18	118	2537
E	BREW	32	26	22		400	243	288	154	228	1236	827	100	11	14	17	3,598	4	26	162	3790
N	ORLE	5	6	15		195	34	78	94	149	209	1332	165	31		15	2,328		33	133	2494
C	EAST	8	7	8	14	144	73	79	84	53	72	528	631	111	42	29	1,883		19	70	1972
E	WELL					45	7	39	5		29	125	85	622	13	89	1,059	8		8	1075
	TRUR				2	13	11		8		5	35	13	66	259	241	653		13	34	700
	PROV					12				15			31	33	21	1429	1,541	13	8	93	1655
	Islands			23								18					41	9062	29	75	9207
	EXT	1679	735	1257	141	1520	494	116	127	63	69	115	48	54	27	113	6,558	225			6783
																	77,932				97769
	TOTAL	6272	4252	13137	2199	23339	7618	4410	2889	2982	2173	4068	1241	959	392	2001		9383	2040	8414	97769
# working in town and living on Cape		4,593	3,517	11,857	2,058	21,819	7,124	4,294	2,762	2,919	2,104	3,935	1,193	905	365	1,888	71,333	96	2,011	8,339	81,779
																	71,333	Live & work on Cape			
																	41	live on Islands, work on Cape			
																	6,558	live externally (not including Islands), work on Cape			
																	77,932	total working on Cape			
	data from US Census of Population, 1990																				

Potential Transit Service Cost estimated for 1, 5, and 10 years

Description of potential transit service	number of buses operating	hours per day	days per week	weeks per year	hourly cost	total estimated cost for one year or season	inflation 3%/yr	total estimated cost for 5 years or seasons	**total estimated cost for 10 YEARS or SEASONS**
Year round, 9 hours [8am-5pm], 1 bus	1	9	7	52	$35	$114,660	3%	$608,746	**$1,314,448**
Year round, 9 hours [8am-5pm], 2 buses	2	9	7	52	$35	$229,320	3%	$1,217,491	**$2,628,897**
Year round, 14 hours [8am-10pm], 1 bus	1	14	7	52	$35	$178,360	3%	$946,937	**$2,044,698**
Year round, 14 hours [8am-10pm], 2 buses	2	14	7	52	$35	$356,720	3%	$1,893,875	**$4,089,395**
Year round, 19 hours [5am-midnight], 1 bus	1	19	7	52	$35	$242,060	3%	$1,285,129	**$2,774,947**
Year round, 19 hours [5am-midnight], 2 buses	2	19	7	52	$35	$484,120	3%	$2,570,259	**$5,549,893**
Year round, 19 hours [5am-midnight], 3 buses	3	19	7	52	$35	$726,180	3%	$3,855,388	**$8,324,840**
Year round, 19 hours [5am-midnight], 15 buses	15	19	6	52	$35	$3,112,200	3%	$16,523,092	**$35,677,885**
Year round, 19 hours [5am-midnight], 30 buses	30	19	6	52	$35	$6,224,400	3%	$33,046,185	**$71,355,770**
Year round, 19 hours [5am-midnight], 45 buses	45	19	6	52	$35	$9,336,600	3%	$49,569,277	**$107,033,656**
Seasonal, 14 hours [8am-10pm], 1 bus	1	14	7	11	$35	$37,730	3%	$200,314	**$432,532**
Seasonal, 14 hours [8am-10pm], 2 buses	2	14	7	11	$35	$75,460	3%	$400,627	**$865,064**
Seasonal, 19 hours [5am-midnight], 1 bus	1	19	7	11	$35	$51,205	3%	$271,854	**$587,008**
Seasonal, 19 hours [5am-midnight], 2 buses	2	19	7	11	$35	$102,410	3%	$543,709	**$1,174,016**
Seasonal, 19 hours [5am-midnight], 3 buses	3	19	7	11	$35	$153,615	3%	$815,563	**$1,761,024**
Seasonal, 18 hours [6am-midnight], 3 buses	3	18	7	11	$35	$145,530	3%	$772,639	**$1,668,338**
5/19-9/14 season, 14 hours [8am-10pm], 1 bus	1	14	7	17	$35	$58,310	3%	$309,576	**$668,459**
5/19-9/14 season, 14 hours [8am-10pm], 2 buses	2	14	7	17	$35	$116,620	3%	$619,151	**$1,336,918**
5/19-9/14 season, 19 hours [5am-midnight], 1 bus	1	19	7	17	$35	$79,135	3%	$420,138	**$907,194**
5/19-9/14 season, 19 hours [5am-midnight], 2 buses	2	19	7	17	$35	$158,270	3%	$840,277	**$1,814,388**
5/19-9/14 season, 19 hours [5am-midnight], 3 buses	3	19	7	17	$35	$237,405	3%	$1,260,415	**$2,721,582**
5/19-9/14 season, 18 hours [6am-midnight], 3 buses	3	18	7	17	$35	$224,910	3%	$1,194,078	**$2,578,341**
5/19-9/14 season, 14 hours [8am-10pm], 2 buses	2	14	6	17	$35	$99,960	3%	$530,701	**$1,145,929**
5/19-9/14 season, 15 hours [7am-10pm], 2 buses	2	15	7	17	$35	$124,950	3%	$663,377	**$1,432,412**
Year round, 15 hours [7am-10pm], 2 buses	2	15	7	52	$35	$382,200	3%	$2,029,152	**$4,381,495**
Year round, 19 hours [5am-midnight], 2 buses	2	19	6	52	$35	$414,960	3%	$2,203,079	**$4,757,051**

Commuters

Working in Barnstable, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST
Barnstable	12,568			
Yarmouth	2,885	E	2,885	0
Sandwich	1,701	W	0	1,701
Off-Cape, External	1,520	W	0	1,520
Dennis	1,028	E	1,028	0
Mashpee	919	W	0	919
Falmouth	864	W	0	864
Harwich	530	E	530	0
Brewster	400	E	400	0
Bourne	397	W	0	397
Orleans	195	E	195	0
Eastham	144	E	144	0
Chatham	118	E	118	0
Total from these towns	23,269		5,300	5,401
% of total employed	99.70%			
Total # working in town	23,339			
	based on 1990 U. S. Census			
Wellfleet	45	E	45	0
Truro	13	E	13	0
Provincetown	12	E	12	0
Islands	0		0	0
Total from these towns	70		70	0
% of total employed	0.30%			
	100.00%			
Total # working in town	23,339		5,370	5,401
1990 town population	40,949			
% living & working in town	30.7%			

Working in Bourne, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Bourne	2,843				
Off-Cape, External	1,679	W	0	1,679	
Falmouth	646	E	646	0	
Sandwich	481	E	481	0	
Barnstable	307	E	307	0	
Mashpee	147	E	147	0	
Total from these towns	6,103		1,581	1,679	
% of total employed	97.31%				
Total # working in town	6,272				
	based on 1990 U. S. Census				
Yarmouth	53	E	53	0	
Dennis	32	E	32	0	
Harwich	39	E	39	0	
Chatham	0	E	0	0	
Brewster	32	E	32	0	
Orleans	5	E	5	0	
Eastham	8	E	8	0	
Wellfleet	0	E	0	0	
Truro	0	E	0	0	
Provincetown	0	E	0	0	
Islands	0	E	0	0	
Total from these towns	169		169	0	
% of total employed	2.69%				
	100.00%				
Total # working in town	6,272		1,750	1,679	
1990 town population	16,064				
% living & working in town	17.7%				

Working in Brewster, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Brewster	1,236				
Orleans	209	E	209	0	
Dennis	178	W	0	178	
Harwich	150	E	150	0	
Total from these towns	1,773		359	178	
% of total employed	81.59%				
Total # working in town	2,173				
	based on 1990 U. S. Census				
Bourne	6	W	0	6	
Sandwich	18	W	0	18	
Falmouth	24	W	0	24	
Mashpee	0	W	0	0	
Barnstable	83	W	0	83	
Yarmouth	61	W	0	61	
Chatham	33	E	33	0	
Eastham	72	E	72	0	
Wellfleet	29	E	29	0	
Truro	5	E	5	0	
Provincetown	0	E	0	0	
Islands	0	W	0	0	
Off-Cape, External	69	W	0	69	
Total from these towns	400		139	261	
% of total employed	18.41%				
	100.00%				
Total # working in town	2,173		498	439	
1990 town population	8,440				
% living & working in town	14.6%				

Working in Chatham, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Chatham	1,660				
Harwich	362	W	0	362	
Brewster	228	W	0	228	
Dennis	176	W	0	176	
Orleans	149	E	149	0	
Total from these towns	2,575		149	766	
% of total employed	86.35%				
Total # working in town	2,982	based on 1990 U. S. Census			
Bourne	13	W	0	13	
Sandwich	38	W	0	38	
Falmouth	11	W	0	11	
Mashpee	67	W	0	67	
Barnstable	76	W	0	76	
Yarmouth	71	W	0	71	
Eastham	53	E	53	0	
Wellfleet	0	E	0	0	
Truro	0	E	0	0	
Provincetown	15	E	15	0	
Islands	0	W	0	0	
Off-Cape, External	63	W	0	63	
Total from these towns	407		68	339	
% of total employed	13.65%				
	100.00%				
Total # working in town	2,982		217	1,105	
1990 town population	6,579				
% living & working in town	25.2%				

Working in Dennis, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Dennis	2,039				
Yarmouth	853	W	0	853	
Barnstable	345	W	0	345	
Harwich	298	E	298	0	
Brewster	288	E	288	0	
Off-Cape External	116	W	0	116	
Total from these towns	3,939		586	1,314	
% of total employed	89.32%				
Total # working in town	4,410				
	based on 1990 U. S. Census				
Bourne	29	W	0	29	
Sandwich	86	W	0	86	
Falmouth	16	W	0	16	
Mashpee	62	W	0	62	
Chatham	82	E	82	0	
Orleans	78	E	78	0	
Eastham	79	E	79	0	
Wellfleet	39	E	39	0	
Truro	0	E	0	0	
Provincetown	0	E	0	0	
Islands	0	W	0	0	
Total from these towns	471		278	193	
% of total employed	10.68%				
	100.00%				
Total # working in town	4,410		864	1,507	
1990 town population	13,864				
% living & working in town	14.7%				

Working in Eastham, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Eastham	631				
Orleans	165	W	0	165	
Brewster	100	W	0	100	
Total from these towns	896		0	265	
% of total employed	72.20%				
Total # working in town	1,241				
	based on 1990 U. S. Census				
Bourne	0	W	0	0	
Sandwich	6	W	0	6	
Falmouth	0	W	0	0	
Mashpee	0	W	0	0	
Barnstable	13	W	0	13	
Yarmouth	0	W	0	0	
Dennis	31	W	0	31	
Harwich	73	W	0	73	
Chatham	45	W	0	45	
Wellfleet	85	E	85	0	
Truro	13	E	13	0	
Provincetown	31	E	31	0	
Islands	0	W	0	0	
Off-Cape External	48	W	0	48	
Total from these towns	345		129	216	
% of total employed	27.80%				
	100.00%				
Total # working in town	1,241		129	481	
1990 town population	4,462				
% living & working in town	14.1%				

Working in Falmouth, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Falmouth	8,926				
Off-Cape, External	1,257	W	0	1,257	
Bourne	1,011	W	0	1,011	
Mashpee	626	E	626	0	
Barnstable	547	E	547	0	
Sandwich	521	W	0	521	
Yarmouth	110	E	110	0	
Total from these towns	12,998		1,283	2,789	
% of total employed	98.94%				
Total # working in town	13,137				
	based on 1990 U. S. Census				
Dennis	19	E	19	0	
Harwich	48	E	48	0	
Chatham	4	E	4	0	
Brewster	22	E	22	0	
Orleans	15	E	15	0	
Eastham	8	E	8	0	
Wellfleet	0	E	0	0	
Truro	0	E	0	0	
Provincetown	0	E	0	0	
Islands	23	W	0	23	
Total from these towns	139		116	23	
% of total employed	1.06%				
	100.00%				
Total # working in town	13,137		1,399	2,812	
1990 town population	27,960				
% living & working in town	31.9%				

Working in Harwich, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Harwich	1,485				
Dennis	348	W	0	348	
Chatham	189	E	189	0	
Yarmouth	165	W	0	165	
Brewster	154	W	0	154	
Barnstable	147	W	0	147	
Off-Cape, External	127	W	0	127	
Total from these towns	2,615		189	941	
% of total employed	90.52%				
Total # working in town	2,889				
	based on 1990 U. S. Census				
Bourne	21	W	0	21	
Sandwich	31	W	0	31	
Falmouth	12	W	0	12	
Mashpee	19	W	0	19	
Orleans	94	E	94	0	
Eastham	84	E	84	0	
Wellfleet	5	E	5	0	
Truro	8	E	8	0	
Provincetown	0	E	0	0	
Islands	0	W	0	0	
Total from these towns	274		191	83	
% of total employed	9.48%				
	100.00%				
Total # working in town	2,889		380	1,024	
1990 town population	10,275				
% living & working in town	14.5%				

Working in Mashpee, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Mashpee	858				
Falmouth	487	W	0	487	
Barnstable	380	E	380	0	
Sandwich	153	W	0	153	
Off-Cape External	141	W	0	141	
Total from these towns	2,019		380	781	
% of total employed	91.81%				
Total # working in town	2,199				
	based on 1990 U. S. Census				
Bourne	69	W	0	69	
Yarmouth	51	E	51	0	
Dennis	22	E	22	0	
Harwich	5	E	5	0	
Chatham	17	E	17	0	
Brewster	0	E	0	0	
Orleans	0	E	0	0	
Eastham	14	E	14	0	
Wellfleet	0	E	0	0	
Truro	2	E	2	0	
Provincetown	0	E	0	0	
Islands	0	W	0	0	
Total from these towns	180		111	69	
% of total employed	8.19%				
	100.00%				
Total # working in town	2,199		491	850	
1990 town population	7,884				
% living & working in town	10.9%				

Working in Orleans, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Orleans	1,332				
Brewster	827	W	0	827	
Eastham	528	E	528	0	
Harwich	454	W	0	454	
Chatham	185	W	0	185	
Barnstable	136	W	0	136	
Dennis	127	W	0	127	
Wellfleet	125	E	125	0	
Off-Cape External	115	W	0	115	
Yarmouth	113	W	0	113	
Total from these towns	3,942		653	1,957	
% of total employed	96.90%				
Total # working in town	4,068				
	based on 1990 U. S. Census				
Bourne	23	W	0	23	
Sandwich	24	W	0	24	
Falmouth	18	W	0	18	
Mashpee	8	W	0	8	
Truro	35	E	35	0	
Provincetown	0	E	0	0	
Islands	18	W	0	18	
Total from these towns	126		35	91	
% of total employed	3.10%				
	100.00%				
Total # working in town	4,068		688	2,048	
1990 town population	5,838				
% living & working in town	22.8%				

Working in Provincetown, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Provincetown	1,429				
Truro	241	W	0	241	
Off-Cape External	113	W	0	113	
Total from these towns	1,783		0	354	
% of total employed	89.11%				
Total # working in town	2,001				
	based on 1990 U. S. Census				
Bourne	0	W	0	0	
Sandwich	10	W	0	10	
Falmouth	4	W	0	4	
Mashpee	0	W	0	0	
Barnstable	28	W	0	28	
Yarmouth	9	W	0	9	
Dennis	5	W	0	5	
Harwich	12	W	0	12	
Chatham	0	W	0	0	
Brewster	17	W	0	17	
Orleans	15	W	0	15	
Eastham	29	W	0	29	
Wellfleet	89	W	0	89	
Islands	0	W	0	0	
Total from these towns	218		0	218	
% of total employed	10.89%				
	100.00%				
Total # working in town	2,001		0	572	
1990 town population	3,561				
% living & working in town	40.1%				

Working in Sandwich, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Sandwich	2,283				
Off-Cape, External	735	W	0	735	
Barnstable	419	E	419	0	
Bourne	334	W	0	334	
Falmouth	167	E	167	0	
Mashpee	119	E	119	0	
Total from these towns	4,057		705	1,069	
% of total employed	95.41%				
Total # working in town	4,252				
	based on 1990 U. S. Census				
Yarmouth	96	E	96	0	
Dennis	52	E	52	0	
Harwich	8	E	8	0	
Chatham	0	E	0	0	
Brewster	26	E	26	0	
Orleans	6	E	6	0	
Eastham	7	E	7	0	
Wellfleet	0	E	0	0	
Truro	0	E	0	0	
Provincetown	0	E	0	0	
Islands	0	E	0	0	
Total from these towns	195		195	0	
% of total employed	4.59%				
	100.00%				
Total # working in town	4,252		900	1,069	
1990 town population	15,489				
% living & working in town	14.7%				

Working in Truro, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Truro	259				
Total from these towns	259				
% of total employed	66.07%				
Total # working in town	392				
	based on 1990 U. S. Census				
Bourne	0	W	0	0	
Sandwich	0	W	0	0	
Falmouth	0	W	0	0	
Mashpee	0	W	0	0	
Barnstable	0	W	0	0	
Yarmouth	0	W	0	0	
Dennis	9	W	0	9	
Harwich	0	W	0	0	
Chatham	7	W	0	7	
Brewster	14	W	0	14	
Orleans	0	W	0	0	
Eastham	42	W	0	42	
Wellfleet	13	W	0	13	
Provincetown	21	E	21	0	
Islands	0	W	0	0	
Off-Cape External	27	W	0	27	
Total from these towns	133		21	112	
% of total employed	33.93%				
	100.00%				
Total # working in town	392		21	112	
1990 town population	1,573				
% living & working in town	16.5%				

Working in Wellfleet, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Wellfleet	622				
Eastham	111	W	0	111	
Total from these towns	733		0	111	
% of total employed	76.43%				
Total # working in town	959				
	based on 1990 U. S. Census				
Bourne	8	W	0	8	
Sandwich	0	W	0	0	
Falmouth	0	W	0	0	
Mashpee	0	W	0	0	
Barnstable	0	W	0	0	
Yarmouth	0	W	0	0	
Dennis	0	W	0	0	
Harwich	16	W	0	16	
Chatham	7	W	0	7	
Brewster	11	W	0	11	
Orleans	31	W	0	31	
Truro	66	E	66	0	
Provincetown	33	E	33	0	
Islands	0	W	0	0	
Off-Cape External	54	W	0	54	
Total from these towns	226		99	127	
% of total employed	23.57%				
	100.00%				
Total # working in town	959		99	238	
1990 town population	2,493				
% living & working in town	24.9%				

Working in Yarmouth, living in:	# of persons	east west	Commuters FROM EAST	Commuters FROM WEST	
Yarmouth	3,494				
Barnstable	1,380	W	0	1,380	
Dennis	995	E	995	0	
Off-Cape, External	494	E	494	0	
Brewster	243	E	243	0	
Harwich	232	E	232	0	
Sandwich	225	W	0	225	
Mashpee	170	W	0	170	
Bourne	131	W	0	131	
Total from these towns	7,364		1,964	1,906	
% of total employed	96.67%				
Total # working in town	7,618				
	based on 1990 U. S. Census				
Falmouth	75	W	0	75	
Chatham	54	E	54	0	
Orleans	34	E	34	0	
Eastham	73	E	73	0	
Wellfleet	7	E	7	0	
Truro	11	E	11	0	
Provincetown	0	E	0	0	
Islands	0	W	0	0	
Total from these towns	254		179	75	
% of total employed	3.33%				
	100.00%				
Total # working in town	7,618		2,143	1,981	
1990 town population	21,174				
% living & working in town	16.5%				

Working Islands, Boston, other off-Cape, living in:	# of persons			Islands	Boston	Other off-Cape
Bourne	2,366			17	327	2022
Sandwich	1,883			5	355	1523
Falmouth	1,543			22	378	1143
Mashpee	671			0	132	539
Barnstable	1,945			27	514	1404
Yarmouth	645			0	100	545
Dennis	409			0	49	360
Harwich	224			0	39	185
Chatham	136			0	18	118
Brewster	192			4	26	162
Orleans	166			0	33	133
Eastham	89			0	19	70
Wellfleet	16			8	0	8
Truro	47			0	13	34
Provincetown	114			13	8	93
Islands	9,166			9062	29	75
Total from Cape towns	10,446					
Total Cape & Islands	19,612					
% of total employed	98.87%					
Total # working ...	19,837	based on 1990 U. S. Census		9383	2040	8414
Off-Cape External	225			225		
Total from off Cape	225					
% of total employed	1.13%					
	100.00%					

Access Management

WHAT IS ACCESS MANAGEMENT?

Access Management is a way to organize traffic movements to better use existing roadway capacity which results in continued economic viability of adjacent land development. Corridors where access management is employed can sustain a higher level of development. Access management is also a way to lengthen the useful life of roadways without adding traffic lanes. This is accomplished through controlling access location and spacing, prohibiting turn movements, provision of turn lanes, location of median barriers, and access geometry.

Every driveway creates the potential for accidents at "conflict points", where the paths of traffic traveling the roadway intersect with the paths of traffic turning into and out of driveways. Reducing the number of driveways and increasing the spacing between driveways and intersections separates these conflict areas. See Figures 1 through 3.

The appropriate driveway spacing simplifies the driving task by locating driveways along the roadway such that drivers can monitor one driveway at a time, rather than several simultaneously. Longer driveway spacing reduces the amount of information a driver must acquire, process, and react to all together, thus, simplifying the driving task. Shorter driveway spacing requires the driver to watch for traffic entering and exiting several driveway locations at once while maintaining control of his own vehicle. Figure 4 shows examples of poor and better access management.

WHY DO ACCESS MANAGEMENT?

The economic viability of adjacent land development along a roadway experiencing traffic congestion and high accident rates will be impacted by further deterioration in traffic conditions. Without restrictions on access, traffic congestion will increase, lower travel speeds will result, longer travel delays and higher accident rates will occur throughout the corridor.

With access management, a greater amount of development can be served by a roadway because a greater amount of traffic can be served with longer driveway spacing, better access location, coordinated traffic control and better driveway design. It is a valuable tool for preventing the loss of roadway capacity that often accompanies high traffic generating development. The loss of roadway capacity most often occurs along roadway corridors with numerous adjacent commercial development such as Route 28 in Yarmouth, Route 6 in Eastham, and Route 6A in

Orleans.

Access management applied to arterial roads can maintain the roads function within the overall transportation system to serve through traffic, resulting in higher accessibility in the region. Access management measures that separate turning vehicles from through vehicles create more efficient flow of traffic and minimize accidents.

Barnstable County's Regional Policy Plan recommends that each town identify areas in need of access management techniques to minimize accidents and relieve traffic congestion. A critical time to consider access changes occurs when new development is proposed and when adjacent roadway and intersection improvements are proposed.

This technical bulletin is intended to promote awareness of the impact of continued uncontrolled access and consideration of access management as a way for local authorities to deal with congestion.

ACCESS MANAGEMENT TECHNIQUES

The most effective use of the following techniques is when new developments are being proposed, when redevelopment or change of use occurs, and when roadway and traffic control improvements are planned. Traffic impact studies provide an opportunity to address access management. Economic incentives may also be a feasible way to encourage access management for existing businesses.

RELATING ROADWAY FUNCTION WITH LAND ACCESS AND MOBILITY

The relationship between mobility and land access for various classifications of roadways is shown in Figure 5. Higher mobility is characterized by higher speeds and uniform traffic flows while land access requires low speeds and results in inconsistent flows. Roads serving high mobility traffic have fewer driveways than roads serving land access.

LOCATION OF INTERSECTING ROADWAYS

Providing desirable location and spacing of intersecting roadways can be achieved by establishing maximum intervals of local, collector and arterial roadways per mile. These measures can smooth traffic flow along the roadway.

LOCATION OF ACCESS DRIVEWAYS

The location of driveways directly affects the level of traffic congestion on the mainline roadway. The spacing of adjacent and opposing driveways, and the spacing of driveways and intersections influences accident potential. Driveway design techniques that limit the types of conflicts, reduce the frequency of conflicts and/or reduce the area of conflict at driveways include:

- limiting the number of driveways by developing appropriate driveway or intersection spacing requirements for various types of roadways.

- relocating, closing, and prohibiting turn-movements with changes in traffic control or roadway cross-section.

- providing access via existing secondary roads

- sharing access with existing driveways instead of creating a new driveway

- creating an internal roadway system that connects adjacent properties to eliminate short trips between adjacent properties and decrease traffic on arterial roadways with adjacent commercial development. This technique can also reduce the need for access along the mainline roadway.

DRIVEWAY DESIGN OF HIGHER MOBILITY ROADS

Driveway design techniques that limit the deceleration requirements of drivers on desired high mobility roads are described below. These techniques are site specific and should be implemented where appropriate and consistent with the needs of the surrounding roadway system.

- control parking along the roadway near the operational area of intersections and driveways to provide appropriate driveway turning speeds.

- provide an ongoing "line of sight obstruction maintenance plan" to maintain safe intersection sight distances.

- install visual cues like landscaped medians or sidewalks at driveway entrances to assist drivers who want to turn into a driveway.

- install right-turn acceleration and deceleration lanes to reduce the need for speed changes in the through travel lanes.

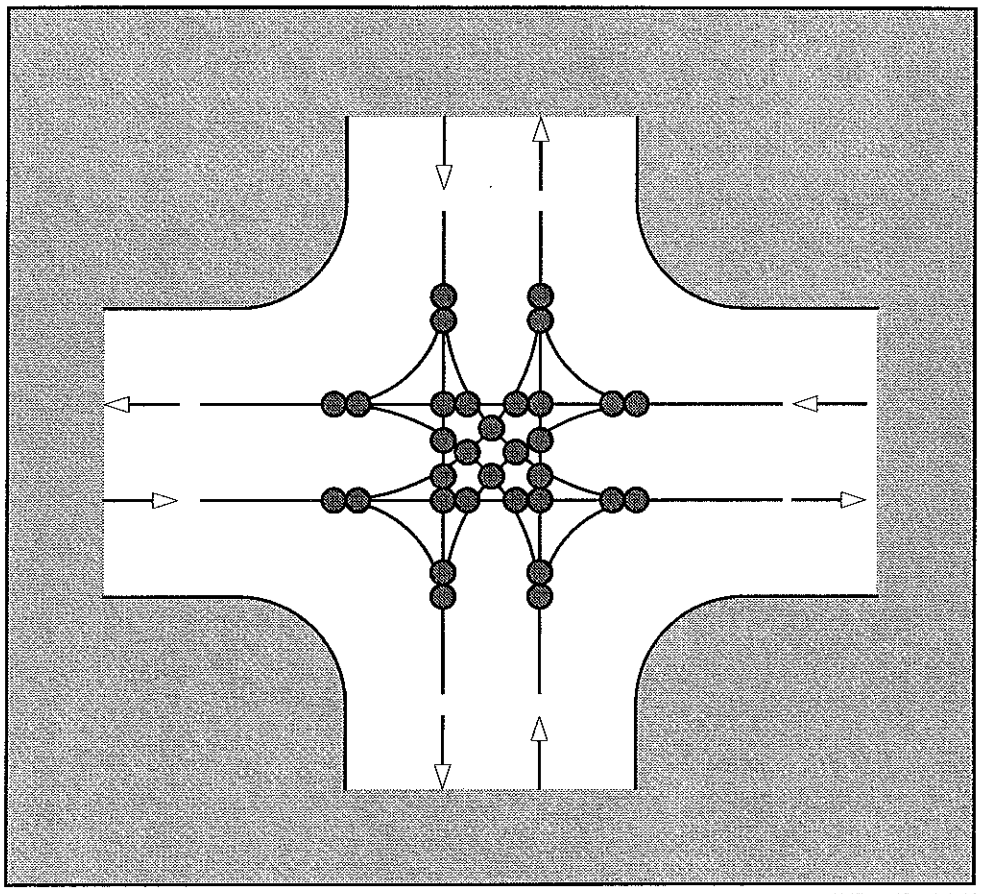
- provide an effective approach width of the driveway to minimize the difference

between the entrance speed of drivers and the speed of through travelers on the roadway

- regulate the maximum width of driveways to minimize conflict areas

LOCATION OF MEDIAN BARRIERS ON HIGHER MOBILITY ROADS

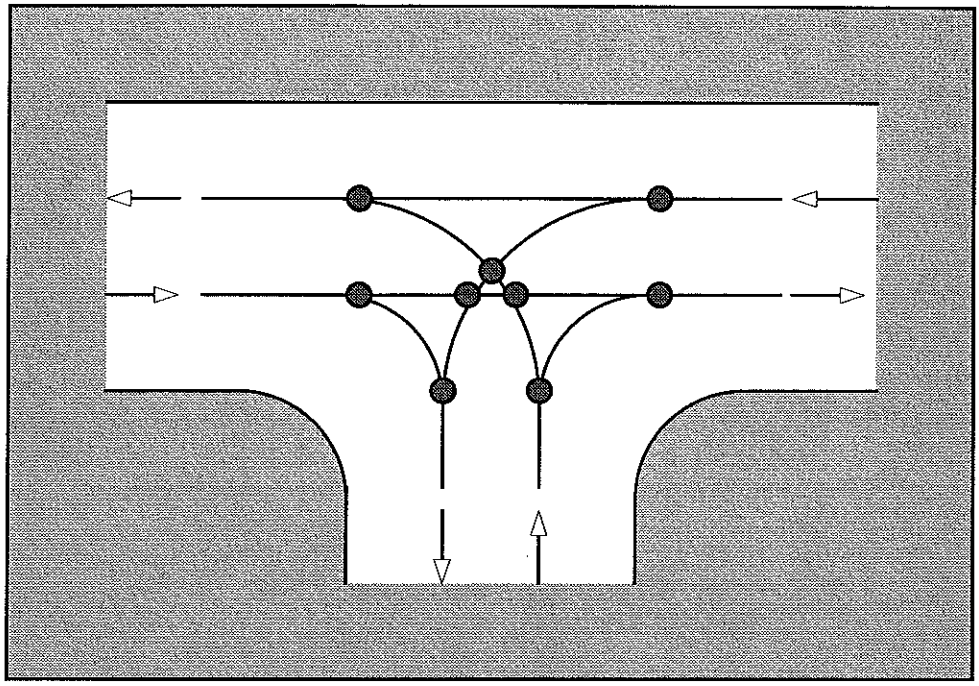
Limiting or prohibiting certain turning maneuvers can be achieved through installation of median barriers that prohibit direct left-turn access onto the mainline and channelized median openings that prevent left-turn ingress/egress movements. Median barriers can be painted, raised curb, depressed, landscaped, or guardrail safety types. The application of the types of median barriers can be established for various roadway classifications. Minimum spacing and maximum number of median breaks per mile can be established to provide access to abutting properties and to maintain two-way progression. Minimum and desired median widths can also be established to ensure accommodation of left-turn lanes.



4 - WAY INTERSECTION
32 POINTS OF CONFLICT

Figure 1

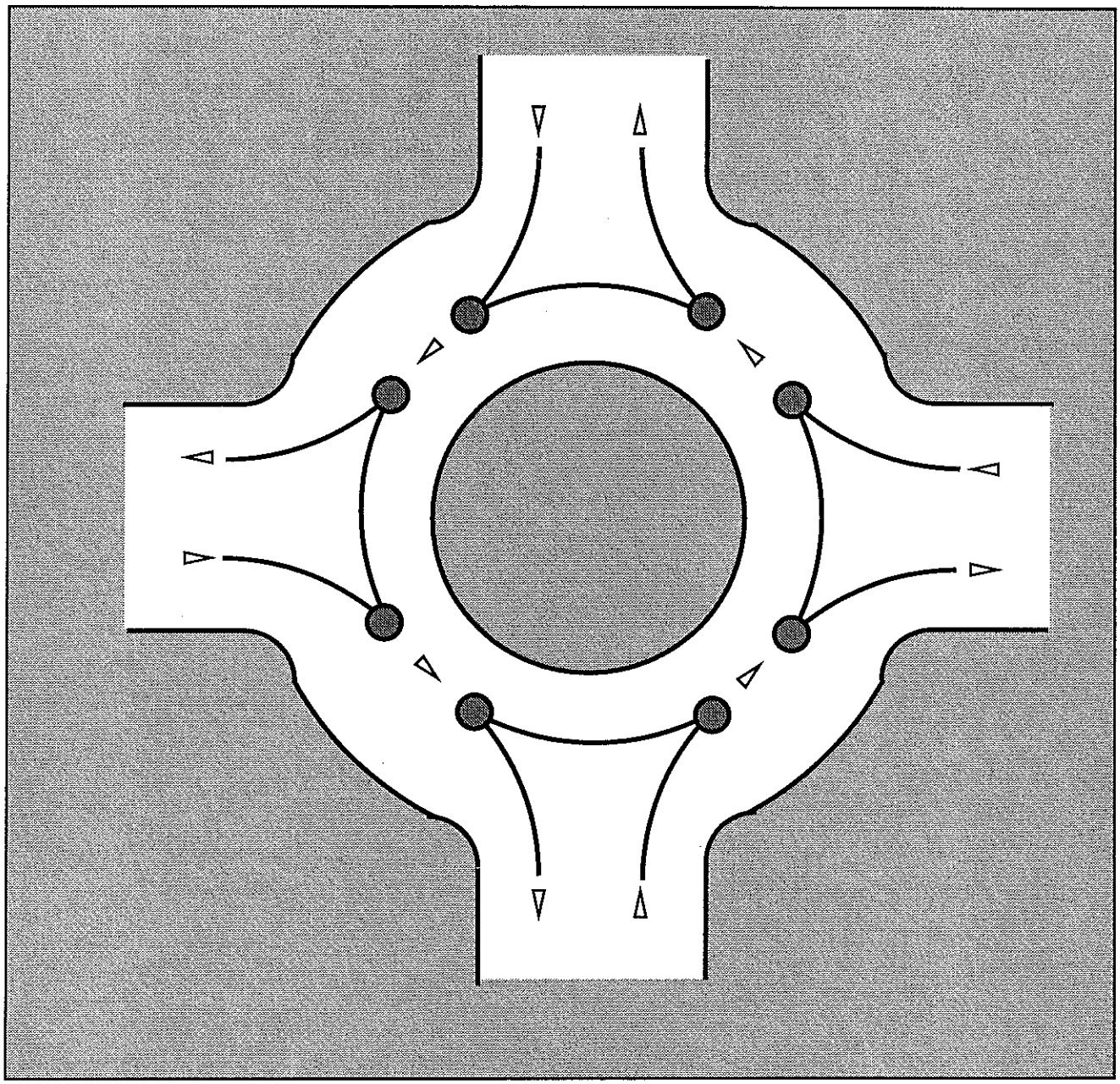
Access Management



T-INTERSECTION
9 POINTS OF CONFLICT

Figure 2

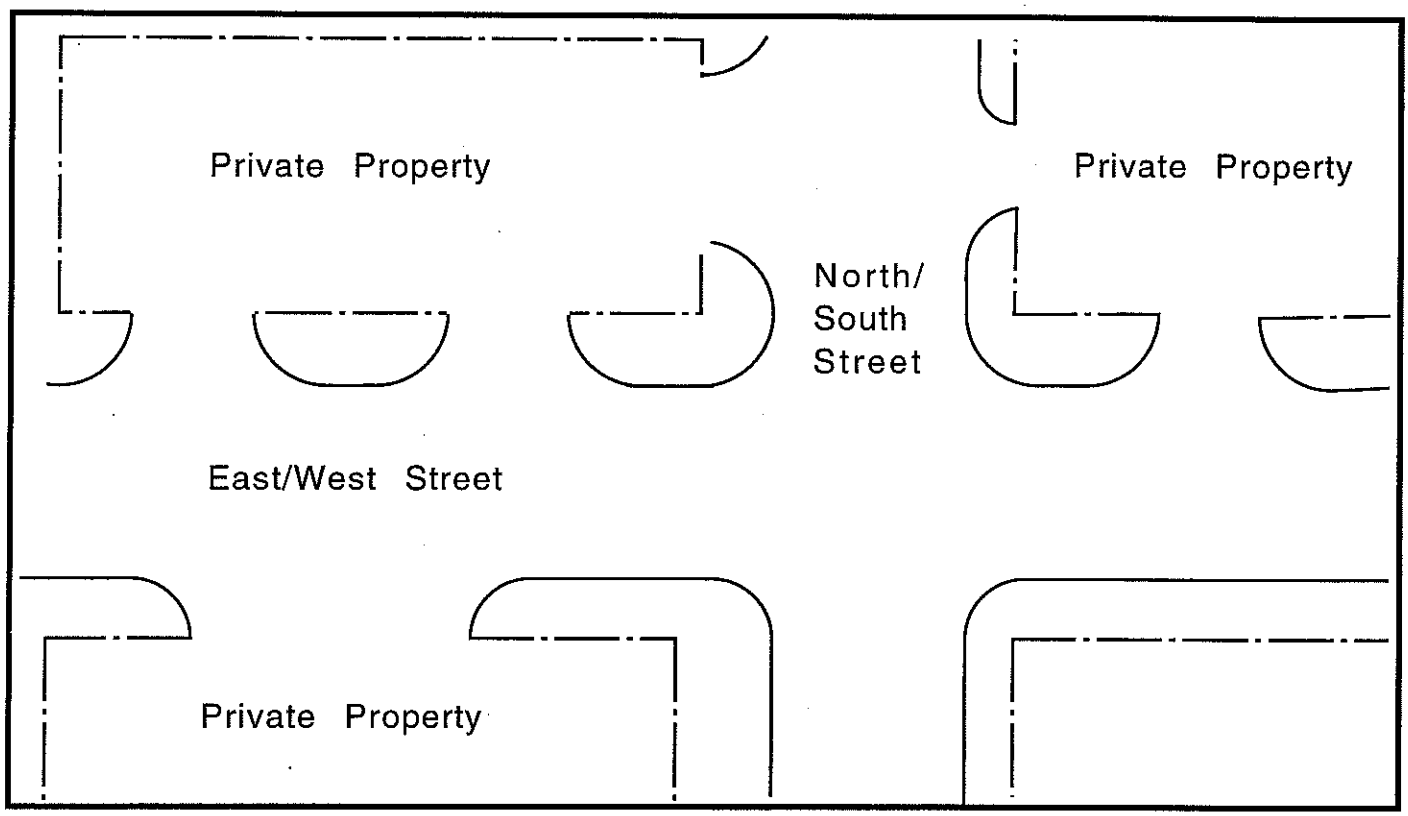
Access Management



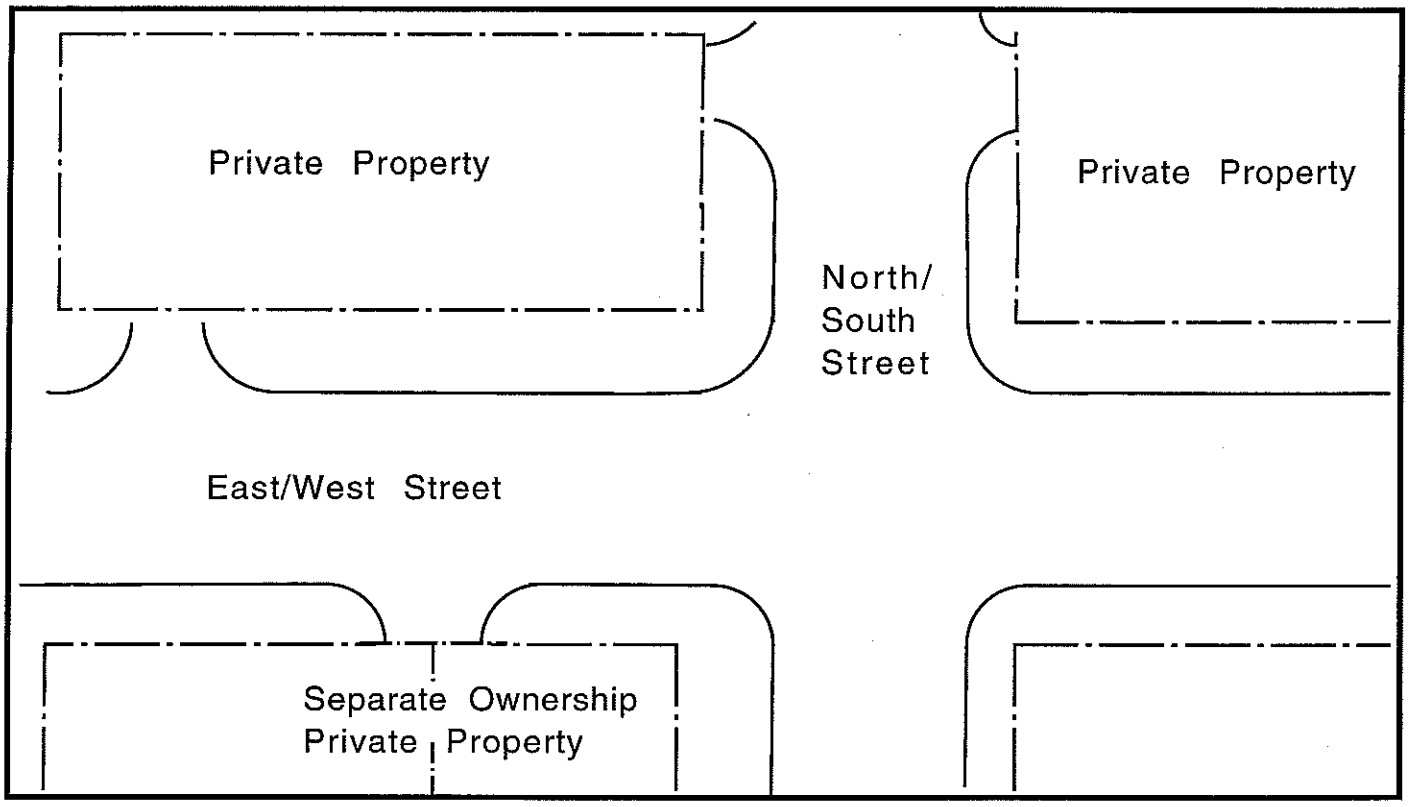
ROUNDABOUT
8 POINTS OF CONFLICT

Figure 3

Access Management



EXAMPLE OF POOR ACCESS MANAGEMENT



EXAMPLE OF BETTER ACCESS MANAGEMENT

Figure 4

Access Management

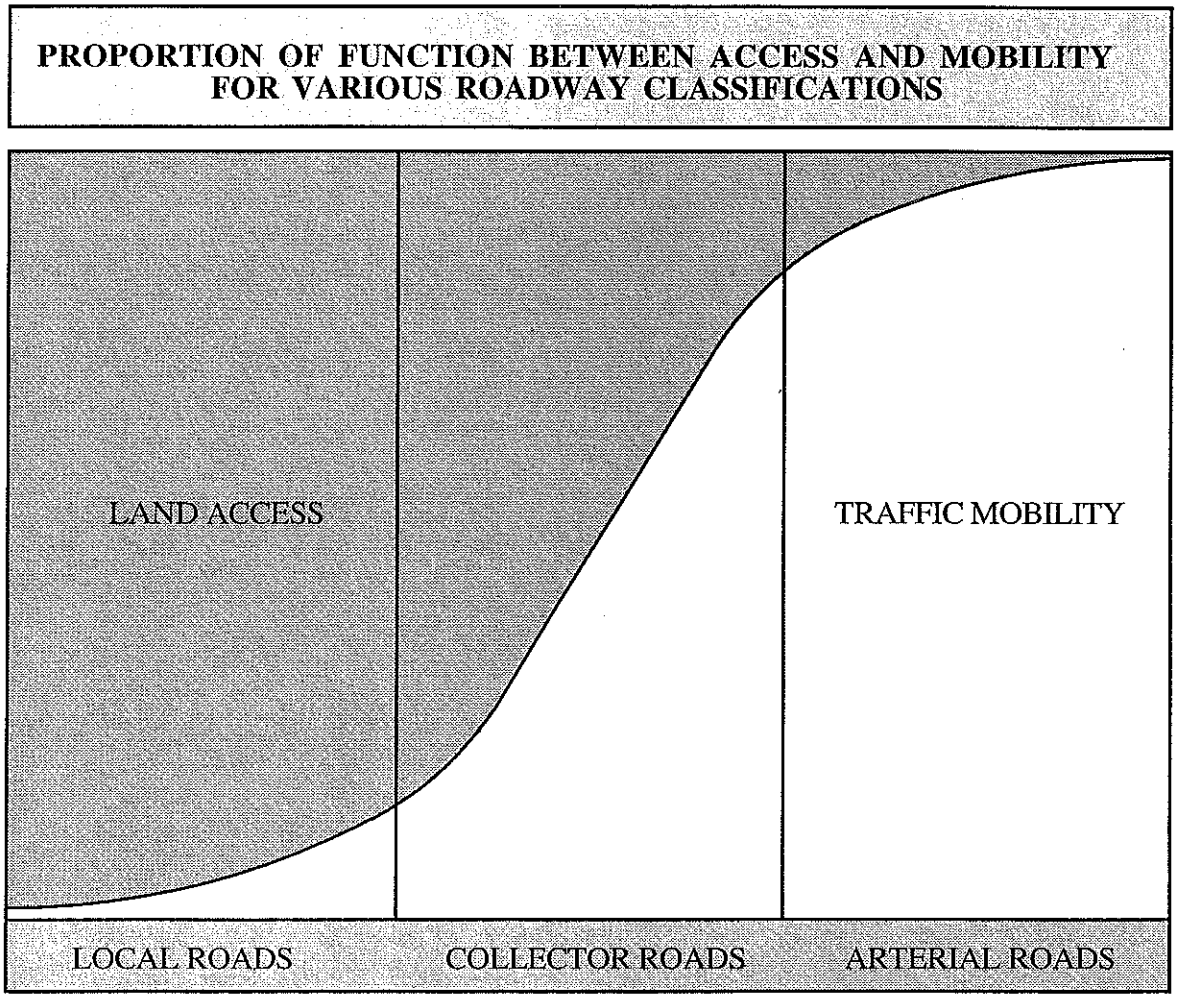


Figure 5

Access Managment

Intelligent Transportation Systems

Executive Summary

INTRODUCTION

Effective strategic deployment is a major concern shared by all involved in Intelligent Transportation Systems (ITS), especially those responsible for the operation and maintenance of the transportation system. Initially, the Federal Highway Administration (FHWA) developed an operational test program focused on deploying and evaluating ITS technologies in actual settings. After the initial thrust of tests were underway, the operational test program shifted its focus to deployment of only those operational tests which evaluate a solution to demonstrated needs in the transportation marketplace. To determine which ITS operational test were needed, a national request for proposals was issued by the FHWA to conduct feasibility studies for ITS operational tests. Farradyne Systems, Inc. (FSI) in cooperation with the Massachusetts Highway Department (MHD) and the Cape Cod Commission (CCC) submitted a proposal and was awarded one of the three feasibility studies conducted nationwide. The FSI study team performed a year-long study of The Application of ITS to Recreational Traveler on Cape Cod to determine the feasibility of an ITS operational test on Cape Cod.

The Application of ITS to Recreational Travel on Cape Cod study has two noteworthy points. The first point is that the FSI study team proposed using the FHWA ITS Planning Process (used for Early Deployment Planning (EDP)). The EDP process focuses on finding potential ITS solutions to transportation problems from a user's perspective. The second point was that it addressed recreational travelers (the users in this study) needs. Every state in the United States generates tourist revenue. Focusing on recreational travelers addresses the ever-present question of how to generate transportation funding opportunities. Also, recreational travelers point of origin may be either rural, suburban, or urban; therefore, this study has the potential to produce results which may be applied to numerous recreational destinations in the United States.

PROCESS

The process the FSI study team used combined ITS experience and expertise with operational test requirements and a modified version of the FHWA EDP process. The EDP process is a very effective means of developing ITS plans. The EDP process contains effective involvement of stakeholders throughout the study process combined with data collection, problem analysis, target market, performance measures, architectural structure development, strategic plan, and evaluation measures. Additional factors added to the EDP process include collection of requirements for operational tests and addressing those requirements which are not included in the EDP process; such as public/private partnerships. Also, experience from other successful FSI EDPs resulted in enhancements to the planning process, such as an evolutionary vision statement.

To ensure local accuracy and study success, frequent interactions between a representative group of affected stakeholders (called a Steering Committee) on Cape

Cod and the FSI study team were held throughout the process. The Steering Committee members assisted in providing data, information, and feedback to the FSI study team. Each member was also a "champion" within their organization to facilitate Cape Cod ITS deployment efforts. Members of the Steering Committee represented: MHD district or field offices, Barnstable Department of Public Works (DPW), Barnstable Planning Department, Plymouth & Brockton Street Railway, the Massachusetts House Committee on Transportation, FHWA, CCC, MHD Central Office, Massachusetts State Police, Bourne DPW, and Cape Cod Economic Development Commission (CCEDC).

One addition to the EDP process was to promote and encourage public/private partnerships. Both operational test requirements and FSI experience promote the importance of facilitating these partnerships. Public/private partnerships are win-win arrangements for both public agencies and private sector participants. The public sector gains by securing funding or trade-offs of ITS technologies or core infrastructure elements toward deployment. The private sector participant has the opportunity to provide a technology or service in the marketplace and to generate revenue or market recognition which may be transferable to other locations interested in deploying the product or service. Contacts were made with private transit providers, the banking industry, traffic information services, and other ITS technology providers.

FSI also incorporated a vision statement into the EDP process. The vision statement is an evolving "straw man" created after the User Services were selected for Cape Cod. The vision was an idea of what could be done to address transportation problems on Cape Cod. As the study progressed, the vision was updated to reflect that progress. The vision provided a goal or deployment idea, of sorts, to which the FSI study team could aim its efforts. The vision results assisted in the system architecture and proposed operational test project development.

PROBLEM

All recreational areas are challenged by the precarious balance of providing sufficient services with managing the services and the supply of tourists. The question of balance is referred to as: how to provide sustainable transportation. The service provision is necessary to continue to draw the tourists to that particular location. The services must ensure enjoyment of recreational trips, and hopefully to generate more visitors to that area -- resulting in increased tourism revenue and economic activity. Management of the services and the supply of tourists are important so the enjoyment of the recreational travel is not diminished -- resulting in reduced tourism revenue.

Cape Cod is a beautiful area that many people call home and many more people visit year after year to enjoy its wonderful sites. Over the years though, the population has grown dramatically. This is especially evident in the summer months when the population triples, and thus the number of vehicles increases from approximately 155,000 to more than 280,000. Over 95% of the people visiting Cape Cod use a car or light truck as their means of transportation. The business generated by these visitors is the livelihood of many Cape Cod year-round residents.

Cape Cod and other similar recreational areas are dependent on tourism and transportation as their economic base. The problems existing on Cape Cod are

common to many other recreational areas such as Virginia Beach, Virginia; Bar Harbor, Maine; or Yosemite National Park, California. If transportation problems become severe enough, recreational travelers will go elsewhere thereby eliminating the economic base. In areas that are economically dependent on tourism revenue, it is imperative to address these problems and determine possible solutions which do not destroy the reasons tourists visit those areas.

Transportation challenges addressed by this study include only those problems that apply to recreational travelers to Cape Cod and those that have a potential ITS application as a solution. Cape Cod's transportation challenges (in order of importance of finding a solution) are:

- Corridor congestion on major routes in Cape Cod
- Lack of information for the traveler
- High accident locations in Cape Cod towns
- Visitor center inadequacies
- Excess demand on parking facilities
- Transit information and coverage
- Public transportation deficiencies
- Inadequate signing
- Water transportation service
- Bus terminal traffic
- Rail system

PROPOSED OPERATION TEST

To establish the proposed operational test, User Services were selected. This was accomplished by matching Cape Cod list of transportation problems to the list FHWA User Services. Cape Cod's transportation problems indicate a need to provide improved information and traffic and transit management functions. This evaluation resulted in the following list of appropriate User Services for Cape Cod:

- En-Route Driver Information
- Traveler Services Information
- Demand and Management Operations
- Electronic Payment Services
- Route Guidance
- Pre-Trip Travel Information
- Personalized Public Transit

From the selected User Services a vision was developed. The vision evolved into the proposed operational test, which is a portfolio package of User Service or an Integrated Travel and Tourism System (ITTS) for Cape Cod. The ITTS consists of four individual projects or modules. Each module addresses Cape Cod's transportation challenges on its own. When two or more of the modules are deployed, the resulting Intelligent Transportation System demonstrates a synergistic effect (the benefits resulting from the combination of the modules is greater than the individual modules.) Another advantage is that the portfolio approach is modular or stageable, in that it allows transportation providers to deploy modules based on funding and time allocations.

Deployment of any one or more of the modules requires the assistance from local stakeholders to guide the implementation. Transportation planning, including ITS

planning, is dependent on effective institutional arrangements. An institutional organization proposed to guide the deployment of all the ITTS modules and bring together the tourism and transportation industries is called a Tourism Network. The Tourism Network is an extension of the Steering Committee combined with the organizational structure already established in the Cape Cod area to deploy the Visitor Information Network System (VINS).

The **Integrated Travel and Tourism System (ITTS)** modules are:

Travel Information Center

The Traveler Information Center includes the Cape Cod Congestion Index (C^3 Index) and a Recreational Traveler Demand Management (RTDM) plan. The basic function of this module is data fusion and information management (dissemination is provided through "normal" transportation management devices, i.e. VMS, HAR). The C^3 Index will provide an indication of congestion levels on Cape Cod to the tourists. RTDM will be used to stagger the arrival and departure times of travelers so as to spread out the peak travel time. This module will ultimately be connected with the Smart Card activities to monitor and reward travel behavior. Estimated first year costs are $585,000. Cost figures were based on market cost packages as found in the ITS National Architecture.

Tourist Information Center

The Tourist Information Center will build upon the existing Cape Cod VINS and add a Recreational Tourist Information System (RTIS). The basic function of this module is information dissemination. It is envisioned to assist tourists by providing information on traffic conditions (C^3 Index) and visitor activities. Information may be obtained through sources such as kiosks, Personal Digital Assistants (PDAs), information centers, 1-800-CAPE-COD, and the internet. First year costs are estimated to be $1,010,000.

Transit Management Center

The Transit Management Center will initially operate as an Enhanced Demand Actuated Transit (EDAT) system. This system builds upon the current paratransit services, the proposed enhanced transit telephone service, and the proposed Intermodal Center on Cape Cod. The Transit Management Center will be used to allow potential riders to individually request transit service to their location and will ultimately aim to optimize transit operations through automatic vehicle location. Also, smart cards will be integrated into the transit system as a means of electronic payment of fares. Estimated first year costs are $560,000.

Smart Card Settlement Center

The Smart Card Settlement Center is proposed to be a financial clearinghouse for low value transactions among Cape Cod tourism providers. Rewards or discounts will be offered to those who use the cards and those who demonstrate "desired" travel behavior (e.g. travel outside the peak period). Data obtained from card users may be used by the tourism providers to assist in focusing their services and marketing efforts to enhance the performance of other modules. First year costs are estimated to be $530,000.

Figure ES-1 illustrates the integrated system concept. This figure represents integration of the four modules as well as form the basis for successful deployment prioritization.

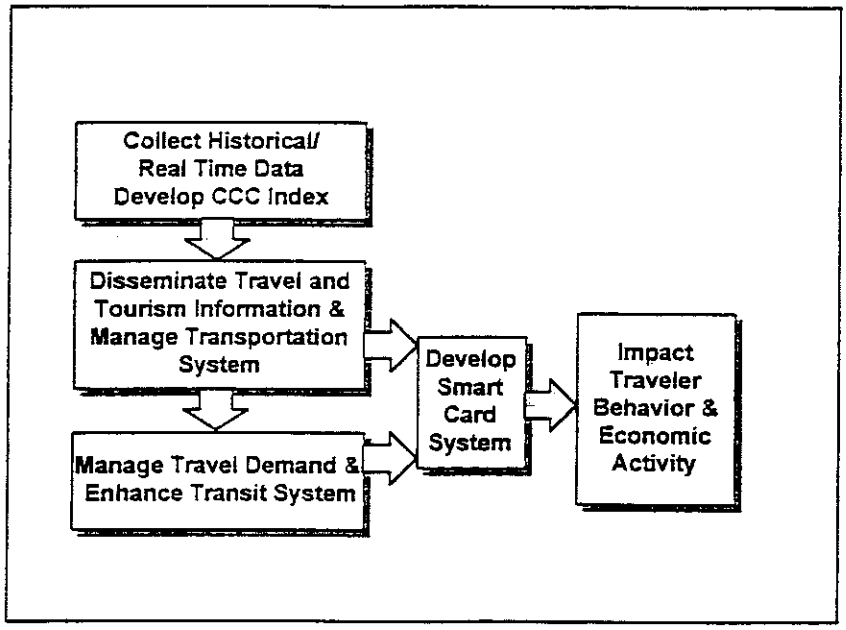


Figure ES-1 - Integrated System Concept

To provide for maximum deployment flexibility and to be responsive to local needs, and existing organizational structures, a distributed (versus centralized) system architecture was developed. Figure ES-2 represents the proposed operational test architecture and the resultant synergy for Cape Cod when all four modules are deployed. The major advantage of this architecture is the integration of the four modules. This type of architecture clearly defines responsibilities for public agencies and private sector participants. Another benefit of this architecture is that it allows for ease of transition or deployment as it maintains much of the existing organizational responsibilities and boundaries.

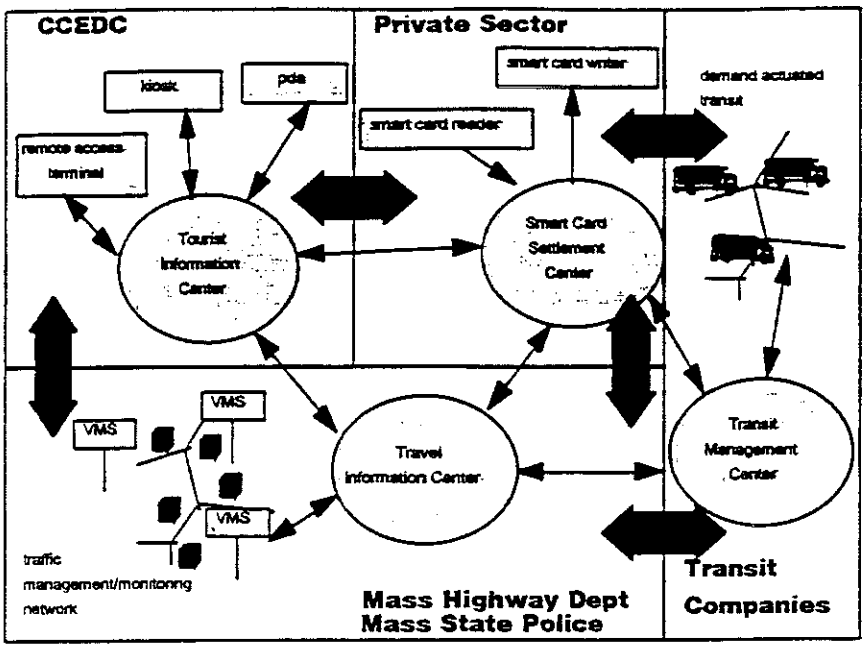


Figure ES-2 - Cape Cod System Architecture

BENEFITS

Why should Cape Cod deploy ITS technologies? Answer: to assist in management of the current and planned transportation infrastructure and to provide for sustainable transportation. The benefits to deployment of this operational test are the same as the benefits of ITS:

- Improve Safety
- Reduce Congestion
- Increase Economic Productivity
- Increase and Give Higher Quality Mobility
- Reduce Environmental Impacts
- Improve Energy Efficiency
- Improve Economic Productivity
- Encourage Application of New Technologies (to support or initiate local technology providers)

The Application of ITS to Recreational Travel on Cape Cod report indicates suggested "next steps" to be taken toward successful deployment of the four operational test modules. Once the "next steps" are taken, Cape Cod can expect to realize benefits from ITS for both recreational travelers and year-round residents of the Cape.

TRANSPORTATION HOTLINK FOR WORLD WIDE WEB

Travel and Tourism Magazine: "Getaway Guide"	1-800-447-6277
Air Service:	
Barnstable Airport	508-775-2020
Chatham Municipal Airport	508-945-9000
Logan Airport Public Information Mon-Fri 9-5	617-561-1800
Massport's Ground Transportation Information Service	1-800-23-LOGAN
Martha's Vineyard Airport	508-693 7022
Nantucket Memorial Airport	508-325-5300
Provincetown Municipal Airport	508-487-0241
New Bedford Regional Airport	508-991-6160
Bus Service:	
Cape Cod Regional Transit Authority Summer Trolley Service in Towns	1-800-352-7155
B-Bus Service Door-to-door service throughout the entire Cape	1-800-352-7155
Bonanza Bus Lines Providence, Rhode Island; Hartford Connecticut; New York, New York Woods Hole & Falmouth to Boston & Logan Airport	1-800-556-3815
Plymouth and Brockton Street Railway Internet Address: http: // www.p-b.com Plymouth, Brockton, Plymouth, Hyannis, Provincetown	508-746-0378
Peter Pan Trailways Hyannis and Boston	1-800-343-9999
Sea Line Scheduled Bus Service Provided to Barnstable Village, Hyannis, Mashpee, Falmouth, Woods Hole	1-800-352-7155

Commuter Information, Park and Ride Facilities:

Caravan for Commuters	1-800-248-5009

Ferry Service:

Hy-Line Hyannis, Nantucket, Martha's Vineyard	508-778-2600
Island Queen Falmouth and Martha's Vineyard	508-548-4800
Steamship Authority: passenger and automobiles Woods Hole and Martha's Vineyard; Hyannis and Nantucket	508-477-8600
Freedom Cruise Line Cape and Islands	508-432-8999
Bay State Cruise Company Boston and Provincetown	617-723-7800

Rail Service:

Amtrak's "Cape Codder" Service Hyannis, Boston, New York, Washington D.C.	1-800-872-7245
MBTA Commuter Rail and Subway in Boston	1-800-392-6100

Real-Time Information on Traffic and Road Conditions:

Smart-Traveler system	617-374-1234

Boston Central Artery Tunnel Project Information: 617-228-4636

Bicycling:

Bicycle Coalition of Massachusetts:	617-491-7433

Walking:

Cape Cod Pathways	508-362-3828

Resource Library

Cape Cod Commission • Transportation Resource Library

	Subject/Category	Title	Author/Publisher	Date
421	Air Quality	Air Quality Considerations in Residential Planning Volume 3 Scientific Support and Documentation	Richard H. Thuillier SRI International for US Dept. of Housing. & Urban Dev.	5/1/78
167	Air Quality	Environmental Research Needs in Transportation	Transportation Research Board Transportation Research Board	3/1/92
405	Air Quality	Important Policy Update on Rideshare Plans	South Coast Air Quality Mgmt. District South Coast Air Quality Mgmt. District	10/20/95
401	Air Quality	Massachusetts Hybrid Program Description	MA EOEA/DEP/Div. Enh. Veh. Insp. & Maint. MA EOEA/DEP/Div. Enh. Veh. Insp. & Maint.	3/27/96
420	Air Quality	Transportation Air Quality	U.S. Dept. of Transportation/Fed. Hwy. Adm. U.S. Dept. of Transportation/Fed. Hwy. Adm.	
149	Air Travel	Census U.S. Civil Aircraft	Office of Aviation Policy, Plans & Management Analysis FAA	1/1/92
148	Air Travel	Rotorcraft Low Altitude IFR Benefit/Cost Analysis: Conclusions and Recommendations	Anoll, Newman, and McConkey Federal Aviation Administration	10/1/93
181	Air Travel	Second Major Airport Siting Study	Mass. Aeronautics Commission Mass. Aeronautics Commission	8/1/92
100	Bicycles/Pedestrians	A Colorado Guide to Everyday Bicycle Transportation		
168	Bicycles/Pedestrians	A Manual for Planning Pedestrian Facilities	Prokopy, Scott, Kagan FHWA	6/1/74

Subject/Category	Title	Author/Publisher	Date
Bicycles/Pedestrians 91	A Study of Health Effects of Bicycling in an Urban Atmosphere	Waldman, Weiss, Articola US DOT Office of Environmental Affairs	10/14/77
Bicycles/Pedestrians 430	Bicycle and Pedestrian Planning Under ISTEA	US Dept. of Trans./FHA National Highway Institute	6/1/94
Bicycles/Pedestrians 106	Bicycling and Air Quality Information Document	ABT Associates Inc. EPA	9/1/79
Bicycles/Pedestrians 99	Bicycling in Colorado	Colorado Bicycle Program	5/1/92
Bicycles/Pedestrians 96	Bikeways: Demand Determination	Wren,Petyle, Lemanski Mass DPW	4/1/75
Bicycles/Pedestrians 95	Bikeways: End of Year Report	Wren, Petyle, Lemanski Mass DPW	4/1/75
Bicycles/Pedestrians 97	Bikeways in Massachusetts	Wren, Petyle, Lemanski MASS DPW	4/1/75
Bicycles/Pedestrians 102	Bikeways - State of the Art 1974	Dan Smith ,Jr. FHWA	7/1/74
Bicycles/Pedestrians 108	Cyclateral Thinking: An Atlas of Ideas for Bicycle Planning	Douglas B Smith, Ed. Shea Brothers, Cambridge MA	1/1/76
Bicycles/Pedestrians 182	From Rails to Trails	Citizen's Advisory on Env. Quality(H.L. Diamond) US Government Printing Office	2/1/75
Bicycles/Pedestrians 112	Guide for Development of New Bicycle Facilities 1981	AASHTO AASHTO	1/1/81
Bicycles/Pedestrians 94	Guide for the Development of Bicycle Facilities	AASHTO FHWA	8/1/91

Subject/Category	Title	Author/Publisher	Date
Bicycles/Pedestrians 107	MBTA Lexington Branch Rail Road Right-of -Way Study	Vollmer Associates Vollmer Associates	
Bicycles/Pedestrians 110	Old Town House Road Bike Path Application, Yarmouth MA	VHB VHB	7/16/87
Bicycles/Pedestrians 101	Planning for the Bicycle as a Form of Transportation	Hamill, Wise US DOT Office of the Secretary	1/1/74
Bicycles/Pedestrians 105	Proposal for Preliminary Design/Engineering Study for for the Yarmouth Bike Path	Lee Pare Assoc. Inc. Lee Pare Assoc. Inc.	7/16/87
Bicycles/Pedestrians 103	Regional Bikeway Plan	Charles M Repeta, Jr. SRPEDD	7/15/76
Bicycles/Pedestrians 109	Regional Bikeway Plan	SRPEDD SRPEDD	4/29/76
Bicycles/Pedestrians 104	Review of the Transportation Planning Process in the Minneapolis - St. Paul Metropolitan Area	US DOT Research and Special Programs Administration FHWA	11/1/93
Bicycles/Pedestrians 92	Safety Effectiveness of Highway Design Features Volume VI: Pedestrians and Bicyclists	Charles V. Zegeer, P.E., James C. Stutts, William W. Hunter U.S. Dept. of Transp./ Fed. Highway Admin.	11/1/92
Bicycles/Pedestrians 98	The Business of Bicycling		
Bicycles/Pedestrians 188	The National Bicycling and Walking Study: Transportation Choices for a Changing America	FHWA FHWA	1/1/94
Bicycles/Pedestrians 111	Yarmouth Bike Path, Yarmouth, MA	Mass DPW Mass DPW	1/11/88

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429	CCC Publications	10 Year Needs Assessment - Summary List, October, 1989	CCPEDC CCPEDC	10/1/89
3	CCC Publications	Alternatives Recommended For Analysis In The Environmental Impact Statement Of US Route 6 On Cape Cod Between Dennis And Orleans	Cape Cod Planning And Economic Development Commission	✓ 10/1/86
428	CCC Publications	Cape Cod High Hazard Locations -- Observations	CCPEDC CCPEDC	8/1/81
1	CCC Publications	Final Regional Transportation Plan For Cape Cod	Cape Cod Committee of Signatories FHA	3/1/82
2	CCC Publications	Regional Transportation Plan For Cape Cod	CCC FHA	1/1/79
6	CCC Publications	Route 28 & 132 Traffic Circulation Study Barnstable Area	CCC FHWA	✓ 8/31/92
7	CCC Publications	Route 28 - Bourne General MacArthur Boulevard Traffic Circulation Study	CCC FHWA	✓ 4/1/89
5	CCC Publications	Route 28 Traffic Circulation Study Mashpee Rotary Area	CCC FHWA	✓ 12/1/89
4	CCC Publications	Route 28 Traffic Circulation Study Yarmouth - Orleans	CCC FHWA	✓ 3/15/92
114	Census/Statistics	1990 Census Transportation Planning Planning Package Participant Workbook	U.S.D.O.T.	11/25/92
138	Census/Statistics	1990 U.S. Census Geographic Codes Population and Housing Counts - Barnstable County	Nora Groves MISER	6/8/92
123	Census/Statistics	1990 U.S. Census Population and Housing Data Workshop	Cape Cod Commission	12/6/91

	Subject/Category	Title	Author/Publisher	Date
134	Census/Statistics	1995 Status of the Nation's Surface Transportation System: Condition & Performance	U.S. Dept. of Transportation--Federal Hwy. Adm. U.S. Dept. of Trans.-Fed. Transit Adm.	6/3/96
116	Census/Statistics	Census Mapbook for Transportation Planning	GIS/Trans., Ltd. Federal Highway Adm. HPM-40	12/1/94
115	Census/Statistics	Characteristics of Urban Transportation Demand: An Update	U.S. D.O.T.	7/1/88
118	Census/Statistics	Highway Statistics 1982	Federal Highway Administration D.O.T	1/1/82
423	Census/Statistics	Highway Statistics 1995	Mary K. Teets, Editor US Dept of Transp./FHA	11/1/96
121	Census/Statistics	Household Travel: Report 9,1977 NPTS	Dieter Klinger, J. Richard Kuzmyak and Susan Liss U.S.D.O.T.	7/1/82
129	Census/Statistics	Household Vehicle Utilization: Report 5, 1977 NPTS	J. Richard Kuzmyak U.S.D.O.T.	4/1/81
128	Census/Statistics	National Personal Transportation Survey : Summary of Travel Trends	Federal Highway Administration	3/1/92
117	Census/Statistics	National Transportation Statistics, Annual Report, September 1993	Volpe National Transportation Systems Center US DOT	9/1/93
132	Census/Statistics	Person Trip Characteristics Report 11,1977 NPTS	Ruth H. Asin U.S.D.O.T.	12/1/83
120	Census/Statistics	Proceedings of the National Conference on Decennial Census Data for Transportation Planning	Transportation Research Board National Research Council	12/9/84

	Subject/Category	Title	Author/Publisher	Date
422	Census/Statistics	Selected Highway Statistics 1995	U.S. Dept. of Transp./FHA U.S. Dept. of Transp./FHA	11/1/96
131	Census/Statistics	Survey Data Tabulations NPTS 1983-1984	COMSIS Corporation U.S.D.O.T.	11/1/85
125	Census/Statistics	The Demographics of Commuting in Greater Boston	CTPS FHA	10/26/89
127	Census/Statistics	The Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance	Congress Committee on Public Works and Transportation U.S. Congress	1/15/93
126	Census/Statistics	The Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance	FHWA	1/1/93
122	Census/Statistics	Tiger In Action: Making Use Of The Census Bureau's Tiger Files	Howard J. Simkowitz Caliper Corporation	3/14/90
119	Census/Statistics	Transportation Planners Guide to Using the 1980 Census	Arthur B. Sosslau, COMSIS Corporation U.S.D.O.T.	1/1/83
130	Census/Statistics	Urban/Rural Split of Travel Report 8, 1977 NPTS	Ruth H. Asin U.S.D.O.T.	6/1/82
124	Census/Statistics	Use of Census Data in Transportation Planning	Robert Dunphy, Alfred T.Fontana, Charles A. Goodman, Institute of Transportation Engineers	1/1/87
133	Census/Statistics	Vehicle Occupancy: Report 6, 1977 NPTS	J. Richard Kuzmyak U.S.D.O.T.	4/1/81
425	Environment	Planning and Environmental Training Catalog	US Dept. of Transp./FTA/FHA FTA Office of Planning/FHA Office of Environment and Planning	4/20/95

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160	Ferry	An Analysis of A New Bedford Terminal	Holmes & McGrath Woods Hole, Martha's Vineyard & Nantucket Steamship Authority	10/12/90
162	Ferry	An Evaluation and Ranking of Alternative Parking Facilities	Holmes & McGrath Woods Hole, Martha's Vineyard, & Nantucket Steamship Authority	8/21/90
161	Ferry	Existing Traffic Analysis Falmouth, MA	McDonough & Scully, Inc. Woods Hole, Martha's Vineyard & Nantucket Steamship Authority: Town of Falmouth	8/21/90
159	Ferry	Functional Design of Ferry Systems	Habib, Bloch, and Roess US Department of Transportation	7/1/80
170	Ferry	Marine Transportation Symposium	CCC	4/27/91
158	Ferry	Some Critical Aspects of Ferry Planning	Roess, Grealy, Berkowitz US DOT Maritime Admin.	2/1/92
179	Ferry	The Steamship Authority: 1989 Annual Report		1/1/89
178	Financial	Exploring Key Issues In Public-Private Partnerships for Highway Development	Walcoff & Associates FHWA	6/1/92
414	Financial	Federal, State and Local Transportation Financial Statistics Fiscal Years 1982-1992 - January 1995	Jean T. Wooster U.S. Dept. of Transportation Bureau of Transportation Statistics	6/1/95
172	Financial	Impact Fee Primer: A Manual for Local Officials Volume I	MAPC MDPW	8/1/89
173	Financial	Impact Fee Primer: Case Study Analysis Volume II	MAPC MDPW	8/1/89

	Subject/Category	Title		Author/Publisher	Date
174	Financial	Impact Fee Primer: MAPC Impact Fee Computer Program User's Guide III	Volume	MAPC MDPW	8/1/89
151	Financial	Private Funding for Roads		Laurence J. Meisner & Laura Firtel American Planning Association	10/1/90
171	Financial	Real Estate Acquisition Guide for Local Public Agencies		FHWA	
175	Financial	Road Investment To Foster Local Economic Development		The Public Policy Center US Department of Transportation	5/1/90
415	General Planning	A Guide to Metropolitan Transportation Planning Under ISTEA How the Pieces Fit Together		US Dept. of Transp./FHA/FTA US Dept. of Transp./FHA/FTA	
166	General Planning	Corridor Preservation Case Studies and Analysis Factors in Decision-Making		U.S. Dept. of Trans.-Fed. Hwy. Adm. U.S. Dept. of Trans.-Fed. Hwy. Adm.	
165	General Planning	Corridor Preservation Study of Legal and Institutional Barriers		U.S. Dept. of Trans.-Fed. Hwy. Adm. U.S. Dept. of Trans.-Fed. Hwy. Adm.	
406	General Planning	Leaving A Place Better Than We Found It Success Stories from the Visual Database of Transportation Enhancements		US Dept. of Trans./FHA US Dept. of Trans./FHA	11/29/96
163	General Planning	National Transportation Planning Study		US Department of Transportation	3/1/90
164	General Planning	Public Involvement Techniques for Transportation Decision-making		Howard/Stein-Hudson Assoc., Inc. and Federal Hwy. Adm./Federal Transit Adm.	9/1/96
416	General Planning	Statewide Transportation Planning Under ISTEA, A New Framework for Decision Making		Sarah J. Siwek & Assocs. Transportation & Environmental US Dept. of Trans./FHA/FTA	

	Subject/Category	Title	Author/Publisher	Date
65	GIS	A GIS Based Transportation Program Management System For A County Transportation Agency	Meyer and Sarasua TRB	1/12/92
51	GIS	The Development of a Geographic Information System in Pennsylvania	Pennsylvania Department of Transportation	8/1/90
157	Growth Management	Linking Transportation and Land Use Planning: The Key to Suburban Growth Management	Lincoln Institute of Land Policy	10/12/89
50	Highway Design	Community Involvement In Highway Planning and Design: A Manual of Techniques	FHA	1/1/77
44	Highway Design	Corridor Transportation Management for Highway Reconstruction: Southeast Expressway, Massachusetts 1984-1985	Steffans, Weinstock, and Sullivan US Department of Transportation	5/1/86
46	Highway Design	Effectiveness of Median Storage and Acceleration Lanes for Left-Turning Vehicles	ITE	1/1/86
45	Highway Design	Geometrics and Safety Considerations	Cleveland, Craus, Das, Gandhi, Kostyniuk, Lamm, Livneh, TRB	1/1/84
42	Highway Design	Noise Barrier Design Guidelines	Farnham and Beimborn US Department of Transportation	7/1/90
49	Highway Design	Operational Design Guidelines for High Occupancy Vehicle Lanes on Arterial Roadways	Ministry of Transportation of Ontario, Canada US DOT	11/1/94
43	Highway Design	Passing and No-Passing Zones: Signs, Markings, and Warrants	Weaver and Woods FHA	9/1/78
47	Highway Design	Planning/Design Features and Case Studies in Freeway Reconstruction	Leisch ITE	3/16/81

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48	Highway Design	Single Point Urban Interchange Design and Operations Analysis	Messer, Bonneson, Anderson, and McFarland TRB	12/1/91
135	Miscellaneous	1993 ADA Complementary Paratransit Plan Update	Cape Cod Regional Transit Authority	12/1/92
169	Miscellaneous	Engineering Study Report Environmental Impact Statement/ Environmental Impact Report: Route 6 Between Dennis and Orleans	Louis Berger & Associates, Inc.	6/9/89
407	Miscellaneous	Envisioning Information	Edward R. Tufte Graphics Press	7/1/94
187	Miscellaneous	Managing Truck Traffic on Local Streets	Pioneer Valley Planning Commission	1/1/85
137	Miscellaneous	Overview of Travel Demand Management Measures	COMSIS/Georgia Tech U.S. Department of Transportation	1/1/94
411	Miscellaneous	Public Involvement in Transportation Decision Making Course Manual	NTI/FTA/FHWA/ICF Kaiser NTI/FTA/FHWA/ICF Kaiser	11/21/96
177	Miscellaneous	Public-Private Partnerships in Transportation: A Casebook for Local Elected Officials	COMSIS Corp. US Department of Transportation	2/1/86
176	Miscellaneous	The Flexibility Document	FHWA	7/1/86
408	Miscellaneous	The Visual Display of Quantitative Information	Edward R. Tufte Graphics Press	3/1/95
136	Miscellaneous	The Year's Work 1990	Insurance Institute for Highway Safety and Highway Loss Data Institute	1/1/90

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Other Agencies' Reports 431	Final Supplemental Environmental Impact Statement on Operation and Maintenance of the Cape Cod Canal Supplement No. 1 Major Rehabilitation of the Bourne and Sagamore Highway Bridges	NE Div., US Army Corps of Engineers NE Div., US Army Corps of Engineers	5/1/79
Other Agencies' Reports 404	Intermodal Transportation Issues And Opportunities In the Greater New Bedford Area	FHA & MHD FHA & MHD	11/1/96
Pavement Management 427	Transportation Research Record Subsurface Drainage, Soil-Fluid Interface Phenomena, and Management of Unpaved Surfaces	Transportation Research Board National Research Council National Academy Press	7/1/94
Railroads 143	Amtrak's America	Amtrak Amtrak	1/1/93
Railroads 139	Bourne Commuter Rail Feasibility Study	Thomas J. Humphrey Mass. Bay Transportation Authority	7/1/96
Railroads 141	Commuter Rail State-of-the-Art: A Study of Current Systems	Shen and Wu US Department of Transportation	12/1/92
Railroads 147	Intercity Freight and Passenger Rail: State and Local Project Reference Guide	Federal Railroad Administration Federal Railroad Administration	9/1/96
Railroads 145	Old Colony Railroad Rehabilitation Project from Boston to Lakeville, Plymouth and Scituate, MA	Urban Mass Transit Admin. & MBTA US DOT	5/1/90
Railroads 146	Old Colony Railroad Rehabilitation Project from Boston to Lakeville, Plymouth and Scituate, MA	MBTA US DOT	5/1/90
Railroads 144	Old Colony Railroad Rehabilitation Project from Boston to Lakeville, Plymouth and Scituate, MA Summary of the Public Involvement Program	Sverdrup Corporation MBTA	3/1/90
Railroads 142	Preservation of Railroad Rights-of-Way Into Central City Areas for Future Transportation Use	US DOT US Senate Committee on Appropriations	5/1/72

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140	Railroads	State Rail Plan w/map	Executive Office of Transportation & Construction Commenwealth. of Mass	1/1/89
33	Reference	Manual on Uniform Traffic Control Devices	FHWA	1/1/88
418	Reference	National Transportation Statistics 1996	Marilyn Gross Richard N. Feldman US Dept. of Transportation Bureau of Transportation Statistics	11/1/95
412	Reference	Transportation Acronym Guide 1996	Marilyn Gross Richard N. Feldman U.S. Dept. of Transportation Bureau of Transportation Statistics	6/1/96
413	Reference	Transportation Expressions 1996	Richard Feldman Marilyn Gross U.S. Dept. of Transportation Bureau of Transportation Statistics	6/1/96
417	Reference	Transportation Statistics Annual Report 1996	Bureau of Transportation Statistics Bureau of Transportation Statistics US Dept. of Transportation	1/1/96
400	Ride Sharing	Caravan for Commuters, Inc.	MHD/U.S. Dept. of Transp./FHA MHD/U.S. Dept. of Transp./FHA	
402	Ride Sharing	NCHRP Synthesis 213 Effective Use of Park-and-Ride Facilities A Synthesis of Highway Practice	Katherine F. Turnbull, Ph.D. National Academy Press	11/27/96
410	Ride Sharing	Resource Guide & Marketing Guide for Transportation Coordinators Commuter Transportation Services 1995	Caravan for Commuters, Inc. MA Hwy. Dept./US Dept. of Caravan for Commuters, Inc. MA Hwy. Dept./US Dept. of Trans./FHA	

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403	Ride Sharing	Ridesharing Regulation Package	MA Dept. of Env. Protection MA Dept. of Env. Protection	11/1/95
183	Ride Sharing & TDM	An Assessment of Travel Demand Management Approaches at Suburban Activity Centers	Bhatt and Higgins US Department of Transportation	7/1/89
424	Ride Sharing & TDM	Guaranteed Ride Home: Taking the Worry Out of Ridesharing	U.S. Dept. of Transportation Commuter Transportation Services, Inc.	11/1/90
10	Ride Sharing & TDM	Introduction to Ridesharing: A Manual for New Ridesharing Coordinators	FHWA US Department of Transportation	10/1/87
12	Ride Sharing & TDM	Ridesharing Remedies for Hospitals and Medical Centers	US Department of Transportation	6/1/82
11	Ride Sharing & TDM	Rural Ridesharing	Dingle Associates, Inc. FHWA	4/1/82
9	Ride Sharing & TDM	Shared-Ride Taxi Services as Community Public Transit	Institute of Transportation Studies Urban Mass Transportation Administration	1/1/80
409	Ride Sharing & TDM	Target Clean Air	Conneticut. Dept. of Transportation Conneticut. Dept. of Transportation	8/23/93
426	Ride Sharing & TDM	Transportation Demand Management Planning at Multi-Tenant Buildings Prototype III: An Example of TDM Planning During Project Design	US Dept. of Transportation Commuter Transp. Services, Inc.	9/1/88
76	Safety	A Road Map to Child Passenger Safety	USDOT	4/1/85
84	Safety	Accident Research Manual	Council, F.M., Reinfurt, D.W., Campbell, B.J. Roediger, F.L. FHWA	2/1/80

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82	Safety	Cost And Safety Of Highway Design Elements	Roy Jorgensen Associates, Inc. Transportation Research Board	1/1/78
83	Safety	Development of Multi-Variate Exposure and Fatal Accident Involvement Rates for 1977	Mengert, Bair, DiGregorio, Hoxie, Mumford USDOT	10/1/85
90	Safety	Evolution Of Severity Of Collisions With Roadside Features: Data Needs	John G. Viner, FHA, Workshop Chairman Transportation Research Board	3/1/83
70	Safety	Freeway Incident Management Handbook	Robert A. Reiss and Walter M. Dunn, Jr FHWA	7/1/91
79	Safety	Guidelines for Integrating Helicopter Assets into Emergency Planning	Henninger, Thompson, and Adams Federal Aviation Administration	7/1/91
74	Safety	Hazardous Location Analysis Workshop	UMass	1/1/91
89	Safety	Hazardous road locations: Identification And Counter Measures	OECD Road Research Group OECD	1/1/76
71	Safety	Implementation Analysis For Daytime Headlamp Use	Teague, Rohter, Gau, Wakeley, and Vierqutz US Department of Transportation	11/1/90
85	Safety	Integrated Road Safety Programs	OECD Scientific Expert Group OECD	1/1/84
87	Safety	Local Highway Safety Studies (LHSS)	Brian L. Bowman, Ph.D. FHWA	7/1/86

Subject/Category	Title	Author/Publisher	Date
Safety	Manual on Identification, Analysis and Correction of High Accident Locations		11/1/75
78		USDOT	
Safety	Methods For Evaluating Highway Safety Improvements	John C. Laughland, Lonnie E. Haefner, Jerome W. Hall, and	1/1/75
72		Transportation Research Board	
Safety	Safety and System Applications		1/1/91
77		USDOT	
Safety	Safety Management Information Statistics (SAMIS): 1990 Annual Report	Rudich	4/1/92
73		Federal Transit Administration	
Safety	The Correction Of Hazards On Urban Streets	ITE Technical Council Committee 5-7	1/1/86
88		ITE	
Safety	The Problem of Reduced Accident Reporting	ITE	7/1/83
75		ITE	
Safety	The Year's Work 1992		1/1/92
81		Insurance Institute for Highway Safety	
Safety	The Year's Work/Insurance Institute for Highway Safety		1/1/91
86		Insurance Institute for Highway Safety	
Safety	Twenty Years of Accomplishments		1/1/89
80		Insurance Institute for Highway Safety	
Site Impact Analysis & Access Management	Access Management and Traffic Analysis of Highways		
152		FHWA	
Site Impact Analysis & Access Management	Access Management For Local Roads	MAPC	10/3/89
153			

Subject/Category	Title	Author/Publisher	Date
Site Impact Analysis & Access Management 180	Access Management for Streets and Highways	Flora and Keitt FHA	6/1/82
Site Impact Analysis & Access Management 154	Corridor Parking Facilities For Carpoolers: Volume I Survey of Existing Facilities	Flora, Stimpson, and Wroble FHA	2/1/81
Site Impact Analysis & Access Management 155	Guidelines for Planning and Designing Access Systems for Shopping Centers	Technical Council Committee 5-DD Institute of Traffic Engineers	1/1/75
Site Impact Analysis & Access Management 156	Traffic Access and Impact Studies for Site Development	Transportation Planners Council ITE	1/1/1988
Traffic Control & Signage 34	Color and Shape Coding for Freeway Route Guidance	FHWA	3/1/78
Traffic Control & Signage 37	Comparison of Signs and Markings for Passing/No-Passing Zones	FHWA	8/1/81
Traffic Control & Signage 40	Traffic Control Devices Handbook	FHWA	1/1/83
Traffic Control & Signage 36	Traffic Control In Over Saturated Street Networks	Louis J. Pignataro, William R. McShane, Kenneth W. Crowley, Transportation Research Board	1/1/78
Traffic Control & Signage 35	traffic control in saturated conditions	OECD Road Research Group OECD Road Research	1/1/81
Traffic Control & Signage 38	Traffic Signs in Complex Visual Environments	FHWA	11/1/82
Traffic Control & Signage 41	Work Area Traffic Control Handbook	ITE	1/1/79

	Subject/Category	Title	Author/Publisher	Date
39	Traffic Control & Signage	Work Zone Traffic Control	FHWA	4/1/80
16	Transit	A Guide to Land Use and Public Transportation	The Snohomish County Transportation Authority US Department of Transportation	12/1/89
18	Transit	A Guide to Strategic Planning For Transit Properties	Farkas and Ayele US Department of Transportation	12/1/88
29	Transit	A Handbook for Coordinating Transportation Services	ODOT US Department of Transportation	10/1/91
15	Transit	Building Better Communities: Coordinating Land Use and Transit Planning	American Public Transit Association	9/1/89
21	Transit	Characteristics of Urban Transportation Systems	Cohen and Reno US Department of Transportation	9/1/92
31	Transit	Current Use of Geographic Information Systems in Transit Planning	Schweiger US Department of Transportation	8/1/91
8	Transit	Evaluation of Intermodal Passenger Transfer Facilities	Center for Urban Transportation Studies Federal Highway Administration	9/1/94
28	Transit	Guidebook for Planning Small Urban and Rural Transportation Programs Volume 2	COMSIS Corporation US Department of Transportation	6/1/90
27	Transit	Guidebook for Planning Small Urban and Rural Transportation Programs Volume 1	COMSIS Corporation US Department of Transportation	6/1/90
20	Transit	Measurement of Transit Benefits	Beimborn, Horowitz, Schuetz, and Zejun US Department of Transportation	6/1/93

	Subject/Category	Title	Author/Publisher	Date
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25	Transit	Planning Guidelines for Suburban Transit Services	Washington and Stokes US Department of Transportation	8/1/88
32	Transit	Private Sector Contracting Workshop Manual for Rural and Small Urban Public Transportation Providers	Carter-Goble Associates US Department of Transportation	11/1/88
23	Transit	Recreational Transit Service to the California Santa Monica Mountains	Webb Crain and Associates	1/1/80
17	Transit	Ruralization of Risk Management A Handbook for Small Transit Operators	Walther U.S.D.O.T.	12/1/92
13	Transit	Suggested Procedures for Evaluating the Effectiveness of Freeway HOV Facilities	Turnbull, Henk, and Christiansen US Department of Transportation	2/1/91
19	Transit	The Economic Impacts of SEPTA on the Regional and State Economy	The Urban Institute and Cambridge Systematics, Inc. US Department of Transportation	6/1/91
30	Transit	The Ninth National Conference on Rural Public Transportation	Public Transportation Division US Department of Transportation	9/1/90
26	Transit	Trolleys in the Land of Pilgrims	O.R. Cummings Harold E. Cox	8/1/92
24	Transit	Urban Mass Transportation Act of 1964	US Department of Transportation	5/1/83
64	Transportation Modeling	A New Strategic Urban Transportation Planning Process	Edward A Mierzejewski, PE Center for Urban Transportation Research University of South Florida	6/1/95

Subject/Category	Title	Author/Publisher	Date
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Transportation Modeling 58	Quick Response Training Course	US Department of Transportation	11/16/82
Transportation Modeling 61	Quick-Response Urban Travel Estimation Techniques and Transferable Parameters User's Guide	TRB FHA	1/1/78
Transportation Modeling 56	Simplified Aids for Transportation Analysis: A Short Range TSM Subarea Planning Case Study	Golenberg and Howard US Department of Transportation	5/1/83

Subject/Category	Title	Author/Publisher	Date
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Transportation Modeling 54	Transportation Planning for Small Urban Areas	TRB FHA	1/1/76
Transportation Modeling 53	UTPS Highway Network Development Guide	Levinsohn and Roskin US Department of Transportation	1/1/83