Cape Cod 2003

Regional Transportation Plan

Preservation & Enhancement of Cape Cod's Transportation System

Endorsed
August 27, 2003

Prepared by CAPE COD COMMISSION
Transportation Staff
on behalf of the

CAPE COD METROPOLITAN PLANNING ORGANIZATION

Including:
Massachusetts Executive Office of Transportation & Construction
Massachusetts Highway Department
Cape Cod Regional Transit Authority
Cape Cod Commission

in cooperation with:
Massachusetts Department of Environmental Protection
United States Department of Transportation Federal Highway Administration
United States Department of Transportation Federal Transit Administration

Cape Cod Metropolitan Planning Organization

Endorsement of the
Cape Cod 2003 Regional Transportation Plan
and
Air Quality Conformity Determination

In accordance with title 23 USC 134 and 135 (1991) and title 23 CFR Part 450 Subpart C Section 322 (Metropolitan transportation planning process: Transportation Plan) of the Final Rules for Statewide and Metropolitan Planning, dated October 28, 1993, the Committee of Signatories representing the Metropolitan Planning Organization (MPO) for Cape Cod hereby endorses the 2003 Regional Transportation Plan (RTP).

Also

In accordance with the Clean Air Act as amended (title 42 USC 7401 *et. seq.* and PL 101-549) on November 15, 1990 and title 42 USC Section 7506, the MPO for Cape Cod has completed its review and hereby certifies that implementation of the Cape Cod MPO 2003 Regional Transportation Plan satisfies the conformity criteria specified in both 40 CFR Parts 51 and 93 (August 15, 1997) and 310 CMR 60.03 (December 30, 1994); furthermore this plan includes all regionally significant transportation projects contained in the Cape Cod MPO 2004-2008 Transportation Improvement Program (TIP) endorsed on August 27, 2003. The projects in the TIP are of the same design and concept that were analyzed in this Regional Transportation Plan. Therefore, no new air quality analysis is required for the TIP. Both the Cape Cod 2003 Regional Transportation plan and the Cape Cod MPO 2004-2008 Transportation Improvement Program are consistent with the air quality goals and in conformity with the Massachusetts State Implementation Plan.

Signatory Certification:

Susan Kadar, Chairman,
Cape Cod Commission — Date

Robert Parady, Chairman,
Cape Cod Regional Transit Authority — 8/27/03 Date

for Daniel A. Grabauskas, Secretary,
Executive Office of Transportation and Construction — 8/27/03 Date

for John Cogliano, Commissioner,
Massachusetts Highway Department — 8/27/03 Date

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1. Introduction

This 2003 Cape Cod Regional Transportation Plan (RTP) is a product of the Cape Cod Metropolitan Planning Organization (MPO) prepared by the transportation staff at the Cape Cod Commission acting on the MPO's behalf. The MPO for the Cape Cod Region (Barnstable County) is composed of four voting members and an advisory committee. These voting entities are; the Cape Cod Regional Transit Authority (Cape Cod RTA), the Cape Cod Commission (CCC), and the Massachusetts Executive Office of Transportation and Construction (EOTC), the Massachusetts Highway Department (MassHighway). The Cape Cod Joint Transportation Committee (CCJTC) serves in an advisory capacity.

The RTP is a fiscally constrained set of programs and projects for the 22 years between 2003 and 2025 developed by the MPO through a public process. The programs and projects recommended by the RTP include:

1.1. 2003 Regional Transportation Plan Programs

Programs vital to the maintenance and enhancement of the transportation system have been developed through public meetings and studies done to support the transportation needs of the Cape Cod region. Many individual projects are included in the Transportation Improvement Program (TIP) from these programs that are established to provide for future needs where the specific project location cannot be identified at this time. An example of this is the Exit 7 improvements currently on the TIP which. This project is part of the Intersection Improvements Program and has been identified as a safety and congestion problem through the public process.

Approximately 90% of the available funding is allocated to these programs over the next 22 years which is an estimated $550,000,000. The following programs are recommended by the RTP. More detailed descriptions and costs of these programs are available in Chapter 7 of this plan.

- Roadway Resurfacing and Rehabilitation
- Bridge Replacement/Reconstruction
- Transit Operating Assistance
- Intersection Improvements
- Bicycle and/or Pedestrian Facilities and Programs
- Access Management Program
- Transit Capital Needs
- Additional Transit Service
- TDM/TSM Program

- New Ferry Service - Water Taxi
- Regional Bicycle Network
- Land Conservation
- Transportation Management Associations (TMAs)
- Cape and Islands Rural Roads
- Route 6A/Scenic Byways
- Intelligent Transportation Systems (ITS)
- Park and Ride Expansion
- Bus Shelter

1.2. 2003 Regional Transportation Plan Projects

Specific projects necessary to relieve congestion and improve the performance of the transportation system, consistent with the regional goals for the Cape Cod region, were also identified by the RTP. The recommended projects represent approximately 10% of the available funding expected over the next 22 years which is an estimated $55,482,449 or an average annual amount of $2,412,280. The following projects are recommended by this plan. More detailed descriptions and costs of these projects are available in Chapter 7 of this plan.

- Sagamore Rotary Improvements
- Hyannis Intermodal, RR facilities
- Permanent Traffic Counting Stations
- Cape-Wide Advisory Radio
- Provincetown Local Intermodal Center
- Orleans Local Intermodal Center
- Rte. 132 Blvd.
- Upper Cape Local Intermodal Center
- Human Service Dispatch Center
- Variable Message Signs
- Rail Trail, Dennis to Barnstable
- Cape Cod Rail Trail, Resurface
- Cape Cod Rail Trail Extension
- Canal Area ITS
- Rte 28 Bike Accommodations
- Bus-Only Lanes for Rte.3 and Rte.6
- Rte. 6, Reconfigure Exit 1
- Transportation Management Center

1.3. Regional Transportation Plan Requirements

The Federal-Aid Highway Act of 1962 first established the continuing, comprehensive, and cooperative transportation planning process which is still used today. The Regional Transportation Plan (RTP) is the Cape Cod Region MPO's responsibility and is part of this process. This plan is intended to be used to implement MPO policies and investments to support a balanced multi-modal system. The MPO's plan will be used to help evaluate proposed projects and programs and to identify areas (substantive and geographic) requiring further and more detailed analysis.

The 2003 Plan is one part of a continuing process of adjusting the region's transportation program to more accurately reflect federal mandates and fiscal realities. This plan builds on the 1997 and 2000 Regional Transportation Plans as well as other planning efforts for the Cape Cod Region. The plan must address at least a 20 year planning horizon and be reviewed and updated at least every three years as the Cape Cod Region is located in an air quality non-attainment area. This plan covers the fiscal years between 2003 and 2025.

Based on Federal policy dated April 8, 1999, the Plan shall:

- Identify the projected transportation demand of persons and goods in the metropolitan planning area over the period of the plan;
- Identify adopted congestion management strategies including, as appropriate, traffic operations, ridesharing, pedestrian and bicycle management.
- Assess capital investment and other measures necessary to preserve the existing transportation system.
- Include design concept and scope descriptions of all existing and proposed transportation facilities in sufficient detail, regardless of the source of funding, in non-attainment and maintenance areas to permit conformity determinations under the U.S. EPA conformity regulations. In all areas, all proposed improvements shall be described in sufficient detail to develop cost estimates.
- Reflect a multi-modal evaluation of the transportation, socioeconomic, environmental, and financial impact of the overall plan, including all major transportation investments.
- For major transportation investments for which analyses are not complete, indicate that the design concept and scope (mode and alignment) have not been fully determined and will require further analysis.
- Reflect, to the extent that they exist, consideration of: the area's comprehensive long range land use plan and metropolitan development objectives; national, state, and local housing goals and strategies, community development and employment plans and strategies, and environmental resource plans; local, state, and national goals and objectives such as linking low income households with employment opportunities; and the area's overall social, economic, environmental, and energy conservation goals and objectives.
- Indicate, as appropriate, proposed transportation enhancement activities.
- Include a financial plan that demonstrates the consistency of proposed transportation investments with already available and projected sources of revenue. The financial

plan shall compare the estimated revenue from existing and proposed funding sources that can reasonably be expected to be available for transportation uses, and the estimated costs of constructing, maintaining and operating the total (existing plus planned) transportation system over the period of the plan. The estimated revenue by existing revenue source (local, state, federal and private) available for transportation projects shall be determined and any shortfalls identified.

Proposed new revenues and/or revenue sources to cover shortfalls shall be identified, including strategies for ensuring their availability for proposed investments. Existing and proposed revenues shall cover all forecasted capital, operating, and maintenance costs. All cost and revenue projections shall be based on the data reflecting the existing situation and historical trends. For air quality non-attainment and maintenance areas, the financial plan shall address the specific financial strategies required to ensure the implementation of projects and programs to reach air quality compliance.

In addition to past requirements, the Cape Cod region MPO became a Transportation Management Area (TMA) with the 2000 census because the region now includes a population greater than 200,000. This includes an additional requirement of a Congestion Management Plan (CMS). The Cape Cod MPO had developed a CMS in 1997 which is expected to be revised.

1.3.1. Public Participation

Adequate opportunity for public official (including elected officials) and citizen involvement must be provided in the development of the transportation plan to review and comment before it is approved by the MPO. Review procedures shall include opportunities for interested parties (including citizens, affected public agencies, representatives of transportation agency employees, and private providers of transportation) to be involved in the early stages of the plan development/update process.

The procedures shall include;

- Publication of the proposed plan or other methods to make it readily available for public review and comment
- and, in air quality non-attainment "Transportation Management Areas" (TMAs), an opportunity for at least one formal public meeting annually to review planning assumptions and the plan development process with interested parties and the general public.

The public participation elements associated with the development of the Plan for the Cape Cod region include the following:

- A series of public meetings were held between November 22, 2002 and January 30, 2003 to canvas for transportation priorities:
  - Initial meetings were held to receive input on projects and priorities. At these meetings and via the Cape Cod Commission web site, survey forms were distributed to determine plan priorities as well as to identify congestion and safety

locations. A limited number of responses were submitted and the survey was not based on a scientific sample but it does provide some guidance.
- A series of follow-up public meetings were held to receive feedback on the Plan's ideas crafted from the previous meetings and survey input.
- Discussion and guidance was received at public Cape Cod Joint Transportation Committee meetings.

· A 30-day public review and incorporation of comments on the final draft of the Regional Transportation Plan was started on June 20, 2003.

The top 10 priorities from the meetings and surveys were developed based on a rating scale from 1 to 10 (1.0 being most desirable). The final top 10 priorities included:

Average Rank	
2.2	Maintain roads and bridges
2.4	Improve public transportation (bus, air, rail, and water transportation)
2.9	Make safety improvements
3.7	Preserve/restore "Cape Cod Character" (do not 'improve' scenic roads)
3.8	Improve New Bedford/Martha's Vineyard ferry service
4.0	Increase roadway capacity (widening/new roads/new lanes/more signals)
4.0	Develop bicycle and pedestrian facilities
4.2	Purchase more open space to reduce future potential congestion
4.3	Address the needs of the aging driver (improve signage, delineation, and lighting)
4.3	Limit Development/Impose Land Use Controls to reduce future potential congestion

1.3.2. Air Quality Conformance

In non-attainment areas such as Eastern Massachusetts which includes the Cape Cod region, the FHWA and the FTA, as well as the MPO, must make a conformity determination on any new/revised plan in accordance with the Clean Air Act and the EPA conformity regulations for transportation related pollutants. The conformity analysis for this plan was done by MassHighway using their statewide model and projections for 2007, 2015, and 2025. The following table lists projects considered "significant" and are being modeled by MassHighway. Results of the air quality modeling are available in the appendix.

Table 1 - Air Quality Conformity Modeled Projects

Model Year	RTP Project #	Project Description
2007	1012	Route 132 Blvd
2007	1009	Sagamore Rotary Improvement
2015		No Additional Projects
2025	1008	Route 6 – Reconfigure Exit 1

1.4. Transportation Plan Goals

The following Mission Statement was developed for the 2003 Cape Cod MPO Regional Transportation Plan. *"The Regional Transportation Plan will propose a strategy that will establish and maintain a transportation system on Cape Cod for present and future year round and seasonal needs which is safe, convenient, accessible, cost-effective, and consistent with the Cape's historic, scenic and natural resources"*

To achieve this, solutions must be implemented that are consistent with the character of Cape Cod and the Regional Policy Plan. These solutions will typically be non-invasive; that is, by better management of "people-flow" and more efficient use of automobile capacity, the traditional approach of building new capacity as the way out of congestion can be avoided. In recognition of this, the following goals were developed for the Plan during the public process. The regional goals developed by the MPO were formed prior to and independently from the Statewide Road and Bridge Policy issued on January 27, 2003 by Governor Mitt Romney. The Statewide policy included two elements for which "It shall be the policy of the Commonwealth of Massachusetts, in all programs involving work on streets, roads and bridges to:

- ***Fix – it – First***: To give priority to the repair of existing streets, roads, and bridges; and
- ***Communities First:*** Wherever a street, road or bridge needs to be re-designed and reconstructed, to plan and undertake, in collaboration with the affected community, a "context-sensitive" project – one that fully protects and enhances the surrounding community and landscape while addressing mobility for all transportation modes."

The goals developed in the MPO public process are felt to be consistent with and complimentary to the statewide policies. The projects recommended by this plan were evaluated with respect to the following five goals:

1.4.1. Goal 1 - Maintain the System.

"Preserve and maintain the existing transportation system, emphasizing safety and harmony with the environment".

The following concepts are proposed to support this goal:

- Ensure that adequate funds are reserved for the maintenance and operation of the existing transportation system before new capital projects are considered
- Consider maintenance strategies rather than "improvement" approaches to scenic roadways
- Support maintenance strategies and programs that accommodate safe travel throughout the transportation network, regardless of mode. This includes considerations that encourage bicyclists, motorists, transit riders, and pedestrians to share the transportation network safely
- Improve maintenance of all sidewalks, bicycle paths, and paved road shoulders
- Repave and/or reconstruct and widen where possible original sections of Cape Cod Rail Trail in Dennis, Eastham, Harwich, and sections of Brewster
- Repave and/or reconstruct Cape Cod National Seashore bicycle paths

This goal is entirely consistent with the Statewide Road and Bridge Policy issued on January 27, 2003 by Governor Mitt Romney of "Fix – it – First".

1.4.2. Goal 2 - Develop alternatives to the automobile.

"Reduce dependence on private automobiles by developing and integrating alternate modes (e.g., rail, bus, ferry, air, bicycle, and pedestrian) into the transportation system and promote substitutes for transportation and systems to better manage transportation options."

The following concepts are proposed to support this goal:

- Promote an information-based consumer-oriented intelligent transportation system (ITS) that encourages travelers to use the most environmentally sensitive and efficient means of travel.
- Develop ITS solutions to congested areas such as the Canal area roadway system.
- New transportation projects must consider inclusion of ITS elements such as Variable Message Signs, Highway Advisory Radio, CCTV, and smart signals that can provide traffic data as well as react to changes in demand.
- Promote cooperation among the various transportation agencies which have responsibility for the Cape's transportation system
- Support all forms of transportation demand management strategies for school and work trips, including, but not limited to, Transportation Management Associations, flexible hours, carpooling, bus pass programs, preferential parking and telecommuting.

- Develop and market incentives that encourage employers to join Transportation Management Associations.
- Encourage coordination between youth transportation, school bus service needs, and public transportation.
- Encourage the coordination and communication between human service transportation providers.
- Encourage the use of fixed-route transit service rather than paratransit, where possible.
- Coordinate public transportation services between regions and between providers.
- Support efficient connections among all transportation modes and facilities to improve these connections.
- Provide bicycle racks and/or lockers at park and ride lots, transit centers, and village and town centers that support bicycle networks.
- Include consideration of bicycle and pedestrian amenities, paths, lanes, and safety needs in all transportation projects.

This goal is complimentary to the Statewide Road and Bridge Policy of "Communities First". This RTP goal emphasizes a number of alternatives that will lead to less demand for automobile infrastructure which has a potentially negative impact on Cape Cod communities.

1.4.3. Goal 3 - Integrate Land Use and Transportation Planning.

"Coordinate land use and transportation decisions to preserve and enhance Cape Cod's character by considering the interrelationship between changes in land use and corresponding changes in transportation demand."

The following concepts are proposed to support this goal:

- Plan transportation improvements which are consistent with the needs and desires of residents and businesses of the region and which are closely coordinated with local districts such as the Old Kings Highway, the towns, and the Cape Cod Commission.
- Support higher density and affordable housing opportunities in defined concentrated development areas through the provision of public transportation. These high density areas must also be balanced with open space.
- Support parking management principles that reduce transportation demand at employer sites and commercial areas. These policies must consider the needs of the neighborhoods and not shift the burden of parking to residential streets.
- Encourage transit-oriented development and provide alternatives to automobile travel by linking land use decisions with transit, bikeway, pedestrian, and park-and-ride investments.
- Anticipate future mobility needs, taking into account the projected senior, youth and other potential transit-dependent use facilities. These include proposed or existing retirement communities, schools, and medical facilities.

This goal is complimentary to the Statewide Road and Bridge Policy of "Communities First". This RTP goal emphasizes a more efficient planning process that will include "smart growth" and support for this managed growth with consolidated infrastructure and mobility options. This managed growth and transportation planning will help mitigate potentially negative impacts to many Cape Cod communities by reducing the need for automobile related infrastructure.

1.4.4. Goal 4 - Develop Transportation options that maintain the Cape's natural environment.

"Ensure the transportation system projects complement and enhance the natural environment of Cape Cod."

The following concepts are proposed to support this goal:

- Develop context-sensitive design measures that support the "Cape Cod Character".
- Emphasize sustainable transportation modes consistent with regional environmental policies.
- Ensure that transportation projects contribute to the protection of natural and scenic resources and open space.
- Encourage the development of designated recreational trails for pedestrians and bicycles.
- Avoid, minimize, or mitigate the impact of transportation improvements on parks, recreation areas, historic sites, environmentally sensitive areas, and other scenic and cultural resources.
- Include landscaping, pedestrian, and bicycle amenities in all transportation projects, where practical.
- Support established village and town centers with a broad range of transportation options.

This goal is entirely consistent with the Statewide Road and Bridge Policy issued on January 27, 2003 by Governor Mitt Romney referred to as "Communities First."

1.4.5. Goal 5 - Advance Environmental Justice.

"Promote the equitable sharing of the transportation system's benefits and burdens including consideration of income, gender, race, age, physical and mental ability, and transit dependency".

The following concepts are proposed to support this goal:

- Support self-sufficiency by providing specialized transportation services.
- Ensure that transportation projects do not subject any particular demographic groups, such as seniors, low-income individuals or children to inequitable environmental or financial impacts.
- Support programs that address the transportation needs of low income and transit dependent populations such as lifeline transit services.

- Identify and address structural and operational barriers to mobility.
- Ensure opportunities for all individuals, agencies, and communities to participate in transportation decision-making.
- Adopt measures of Environmental Justice for the region and incorporate them in the evaluation and programming of transportation projects.

This goal is independent and not contradictory to the Statewide Road and Bridge policy but it is consistent with the Federal policy supporting Title VI of the 1964 Civil Rights Act (42 U.S.C. 2000d-1) and related regulations. The federal policy was further emphasized by Presidential Executive Order 12898:Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations. The populations included in this executive order have been extended to include people with disabilities.

1.5. Conformity with other Planning Processes

The following sections describe the relationship between the Plan and other planning activities.

1.5.1. Conformity with the Federal Planning Process

The goals of TEA-21 are consistent with the goals for the Cape Cod region. The seven current TEA-21 Planning Objectives and the five Cape Cod transportation goals are compared in the following table:

Table 2 - Conformity with TEA-21

TEA-21 Planning Objectives	Goal 1: Main-tenance	Goal 2: Altern-atives	Goal 3: Land Use	Goal 4: Environ-ment	Goal 5: Env. Justice
Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.	♦				♦
Increase the safety and security of the transportation system for motorized and non-motorized users.		♦			♦
Increase the accessibility and mobility options available to people and for freight.		♦			
Protect and enhance the environment, promote energy conservation, and improve quality of life.			♦	♦	
Enhance the integration and connectivity of the transportation system, across and between mode, for people and freight.		♦			♦
Promote efficient system management and operation.				♦	
Emphasize the preservation of the existing transportation system	♦			♦	

1.5.1.1. Expected elements of the Transportation Equity Act Reauthorization

The Interstate Highway System was authorized by Congress in 1956 and since then the national highway program has evolved. The Intermodal Surface Transportation Act (ISTEA) of 1991was designed to integrate surface transportation programs and not focus primarily on the highway system. ISTEA was visionary legislation with central elements that included; strategic infrastructure investments, connections among modes of travel, flexibility, intergovernmental partnership, a strong commitment to safety, enhanced planning and strategic investment.

The Transportation Equity Act for the 21st Century was enacted in June 1998. TEA-21 authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 6-year period 1998-2003. Elements of this program are consistent with the goals of this plan and include:

- Rebuilding America
  - Record, guaranteed $198 billion in surface transportation investment while protecting a commitment to a balanced budget.
  - Balanced investment in highways, transit, intermodal projects, and technologies such as Intelligent Transportation Systems; strong state and local flexibility in the use of funds.

- Improving Safety
  - Incentive grants to increase seat belt use and to fight drunk driving by encouraging states to adopt 0.08 blood alcohol concentration standards.
  - National "One Call" notification program for pipeline safety.
  - Strong programs to continue making roads and rail-highway grade crossings safer.
  - Improved truck safety program to get bad drivers and vehicles off the road.

- Protecting the Environment
  - Expanded Congestion Mitigation and Air Quality Improvement and Transportation Enhancements programs to help communities improve the environment.
  - Advanced Vehicle Program to develop clean, fuel-efficient trucks.
  - Continued programs for National Scenic Byways, bicycle and pedestrian paths, recreational trails, and roadside wildflower plantings.
  - Increased tax-free transit benefits to encourage transit ridership.

- Creating Opportunity
  - Innovative jobs access program to help those moving from welfare to work.
  - Continued, effective Disadvantaged Business Enterprise program.
  - Strong labor protections for transportation workers.

1.5.1.2. Elements of TEA-21 Reauthorization

TEA-21 will expire on September 30, 2003 and the development of its successor statute is currently underway. This new federal program is expected to continue many of the tenets of ISTEA and TEA-21. The Department of Transportation (U.S. DOT) has developed a set of core principles and values that will frame the approach to the reauthorization of the surface transportation programs. These principles seek to enhance safety and security, increase mobility, reduce congestion, and grow the economy. The U.S. DOT's reauthorization effort will be motivated by the following core principles and values:

- Assure adequate and predictable funding for investment in the Nation's transportation system. This funding can contribute to the long-term health of the economy and, by enhancing the mobility of people and goods, promote greater productivity and efficiency
- Preserve State and local government funding flexibility to allow the broadest application of funds to transportation solutions
- Build on the intermodal approaches of ISTEA and TEA-21
- Expand and improve innovative financing programs in order to encourage greater private sector investment in the transportation system, and examine other means to augment existing trust funds and revenue streams
- Address the security of the Nation's surface transportation system
- Make substantial improvements in the safety of the Nation's surface transportation system. It is not acceptable that the Nation suffers 41,000 deaths and over 3 million injuries annually on the highway system
- Strengthen the efficiency and integration of the Nation's system of goods movement by improving international gateways and points of intermodal connection
- Simplify Federal transportation programs and continue efforts to streamline project approval and implementation
- Develop the data and analyses critical to sound transportation decision-making.
- Foster intelligent transportation systems as a means to improve safety, reduce congestion and protect the environment
- Improve on the performance of the entire transportation system through better planning, management, construction, operations, asset management, maintenance and construction

- Increase accessibility to transportation so that all Americans can enjoy its benefits

- Ensure an efficient infrastructure while retaining environmental protections that enhance our quality of life

1.5.2. Conformity with the State Planning Process

The policies of the Commonwealth are consistent with the goals for the Cape Cod region. The three current state transportation policies (as detailed in the appendix) and the five Cape Cod transportation goals are compared in the following table:

Table 3 - Conformity with Commonwealth Transportation Policies

Commonwealth Transportation Policies	Goal 1: Main-tenance	Goal 2: Altern-atives	Goal 3: Land Use	Goal 4: Environ-ment	Goal 5: Env. Justice
Fix it First	♦				♦
Communities First		♦	♦		♦
Sustainable Development		♦	♦	♦	♦

1.5.3. Conformity with Regional Planning

The Cape Cod MPO recognizes other regional planning efforts, such as the Cape Cod Commission's Regional Policy Plan recently updated in 2002. The Regional Transportation Plan provides a framework for transportation decisions and activities with state and federal involvement. The Regional Policy Plan provides a framework for local and regional (Barnstable County) land use activities. In order to improve coordination among all regional planning activities, MPO actions where feasible and appropriate will be consistent with the Regional Policy Plan (RPP). The RPP is required under the Cape Cod Commission Act, which states as a goal:

> "Conservation and preservation of natural undeveloped areas, wildlife, flora and habitats for endangered species; the preservation of coastal resources including aquaculture; the protection of ground water, surface water, and ocean water quality, as well as the other natural resources of Cape Cod; balanced economic growth; the provision of adequate capital facilities, including transportation, water supply, and solid, sanitary and hazardous waste disposal facilities; the coordination of the provision of adequate capital facilities with the achievement of other goals; the development of an adequate supply of fair affordable housing; and the preservation of historical, cultural, archaeological, architectural, and recreational values."

The RPP includes issues, goals, and policies for a number of topics within the Commission's areas of responsibility. To address these issues, goals and policies, minimum performance standards are defined. The issues identified for transportation on Cape Cod center around congestion and the growth of Cape traffic volumes. A 1995 Cape Cod resident survey identified traffic congestion as the top ranked problem facing Cape Cod. Based on this survey, the preferred approach to dealing with traffic congestion is by utilizing the following strategies:

- Limiting population growth
- Acquiring developable land
- More stringent land use regulation including restrictions on new buildings and residential dwellings

85% of the survey responses favored provision of alternative forms of transportation and a majority of respondents were opposed to the widening of roads and intersections. The RPP calls for a plan that will;

- Provide a source of funding for desirable transportation improvements
- Require that new development mitigate impacts in a manner consistent with Cape Cod's natural, scenic, and historic resources
- Promote land, air, and marine-based alternatives to automobile travel

The RPP also includes three goals for transportation:

- Goal 4.1.1: To maintain an acceptable level of safety on all roads on Cape Cod for all users
- Goal 4.1.2: To reduce and/or offset the expected increase in motor vehicle trips on public roadways and to reduce dependency on automobiles
- Goal 4.1.3: To maintain travel times and Level of Service on regional roads and intersections and to ensure that all road and intersection construction or modification is consistent with community character, historic, or scenic resources

The RPP includes a number of minimum performance standards and development review policies. These standards and policies are used in the review of Developments of Regional Impact (DRIs) or developments that are referred to the Cape Cod Commission by the Cape towns for review. The intent of the policies is to mitigate transportation impacts, promote alternative forms of transportation and travel reduction measures, as well as insure consistency between transportation and other policy areas.

The RPP focuses on minimizing impacts to the transportation system based on localized development while the goals and objectives of the transportation plan tend to be more regional in their focus. However, the transportation plan goals and objectives are consistent with the RPP guidance.

1.5.4. State-wide Build-Out Analysis

The Executive Office of Environmental Affairs (EOEA) has developed, statewide, build-out and current land use information in cooperation with planning agencies including the Cape Cod Commission. This information has been considered in the development of the region's transportation model. The towns on Cape Cod are unique in that some may reach build-out before the Plan horizon year of 2025.

1.5.5. Local Comprehensive Plans

Many towns in the Cape Cod region have developed local comprehensive plans and these have been used to develop the land use scenarios and build-out projections. Where the plans have been developed, the transportation projects and goals are considered with respect to the individual town's vision and are recognized in the process for developing the recommended projects for this Plan.

1.6. Progress Since the 2000 Plan

Strategies, projects, programs, and outreach efforts that have occurred since the 2000 Plan are discussed in the following sections:

1.6.1. TIP Projects constructed, implemented, or underway

- Completion of cloverleaf interchange – Route 6, Exit 9 at Route 134 (Dennis)
- Buck Island Road & Town Brook Road improvements including sidewalk, shoulders, etc. (Yarmouth)
- Hyannis Transportation Center (Barnstable)
- Cape Cod Rail Trail Bridges over Route 6 (Harwich & Orleans)
- Bridge, School St (Barnstable & Mashpee)
- Head of the Bay Road (Bourne)
- Shank Painter Property Acquisition (Provincetown)
- Bus between Rte. 128 Amtrak/MBTA railroad station & Woods Hole (Rte. 128 to Bourne & Falmouth)
- Bridge, Lower County Road over the Herring River (Harwich)
- Bridge, Route 6 over Depot Street (Harwich)
- Route 28 section, Falmouth town line to Rotary, Shoulders & Sidewalk (Mashpee)
- Route 130 Reconstruction & related (Sandwich)
- ITS communications equipment for the Transportation Center (Barnstable)
- Smart Card Demonstration (Cape-Wide)
- Bus Replacement purchases (Cape-Wide)
- Mobility Assistance Program capital replacements (Cape-Wide)
- Bike Spur, from Harwich town line by Chatham airport then to downtown Chatham (Chatham)
- Land Purchase for Bus Maintenance Facility (Dennis)
- Route 28 overlay and drainage improvements (Dennis & Harwich)
- Route 6, Traffic safety improvements (Eastham & Wellfleet)

- Bridge, Meadow Neck Rd over the Moonakis River (Falmouth)
- Main St, Rock Harbor Rd & Old Colony Rd (Orleans)
- Packets Landing I, Route 28@ Bass River property acquisition (Yarmouth)

1.6.2. Studies completed by the Cape Cod Commission

*or with substantial progress

- Cape Cod 5-Year Transit Plan (with others)
- Route 6 Outer Cape Traffic Flow and Safety Study*
- Park and Ride Study*
- Cape Cod Traffic Counting Reports (annually)
- Transportation Improvement Programs (TIPs) (annual update)
- Updates of Cape Cod Commission Transportation Information Center (www.gocapecod.org)
- Canal Area Transportation Study*
- Cape Cod National Seashore Intelligent Transportation System*
- Falmouth Steamship Authority Study*
- Participation in continuing development of Cape Cod Chamber of Commerce's online travel planner (www.smartguide.org)

1.6.3. Outreach efforts and coordination with decision makers

In addition to project specific meetings, a number of forums exist for informing and seeking input from decision makers and the public.

- RTP Public meetings, November 2002 and July2003
- Three Transit Summits
  - Outer Cape Human Service Transportation "mini-Summit"
- Cape Cod Transit Task Force & member organizations
- Cape Cod Chamber of Commerce
- Congressman Delahunt's Office
- Executive Office of Transportation & Construction (EOTC)
- National Park Service
- Cape Cod Commission
- Cape Cod Central Railroad
- Barnstable County Human Services Department
- Barnstable County Assembly of Delegates
- Lower Cape Coalition
- Southeastern Massachusetts Private Motor Carriers Association
- Cape Air
- Massachusetts Highway Department
- Woods Hole, Martha's Vineyard, and Nantucket Steamship Authority
- 15 Towns of Barnstable County

- Association for Preservation of Cape Cod
- Cape Cod Metropolitan Planning Organization
- Cape Cod Regional Transit Authority
- Cape Cod Joint Transportation Committee (advisory group)

2. Project Evolution

The process by which a transportation project is funded is based on the type of project, the magnitude of the project and the potential impacts. Regional strategies that are eligible for federal funds are developed in the public process associated with the Regional Transportation Plan and implemented in the Transportation Improvement Program (TIP) process.

The projects that are included in both the Plan and the TIP are the result of public process, maintenance needs, and projects developed by the Cape Cod Metropolitan Planning Organization (MPO) members. The MPO members must approve the Plan (every three years) and the TIP (annually).

Many projects begin in either the regional planning process, the local planning process, by a number of agencies but come primarily from the MPO members which currently include; MassHighway, Executive Office of Planning and Construction, Cape Cod Regional Transit Authority, and Cape Cod Commission. Projects are developed through the planning process from awareness of a transportation problem or need, to analysis of potential solutions, to conceptual design development. Projects are then recommended for inclusion in the TIP.

A major project generally requires several studies to advance to construction or implementation. Following problem identification and an alternatives analysis, the next stage for this type of project is the development of project feasibility which is often a study included in the region's Unified Planning Work Plan (UPWP) or an analysis done as part of the Plan process. The project, if found feasible and if it has demonstrated enough potential benefits with respect to the regional goals, becomes a regional priority. The project is then included in the regional transportation plan and advances through the appropriate environmental and design phases to eventually be included in the TIP for implementation.

Funds for projects are available through a large number of programs at the state and federal levels. These programs are designed to support the state and federal goals and are available to local programs to encourage consistency with their programs. The Federal transportation program has the most significant effect on funding. The current federal program is the Transportation Equity Act for the 21st Century (TEA-21), and it will be in effect until September 30, 2003.

TEA-21 provided increased funding over the previous federal program (ISTEA) for all states with the exception of Massachusetts. Massachusetts lost approximately $300 million per year or 41% of the funding provided by the previous federal program included in Title 23 – Federal Highway funds.

The figure on the following page and the following sections describe the process for developing transportation projects.

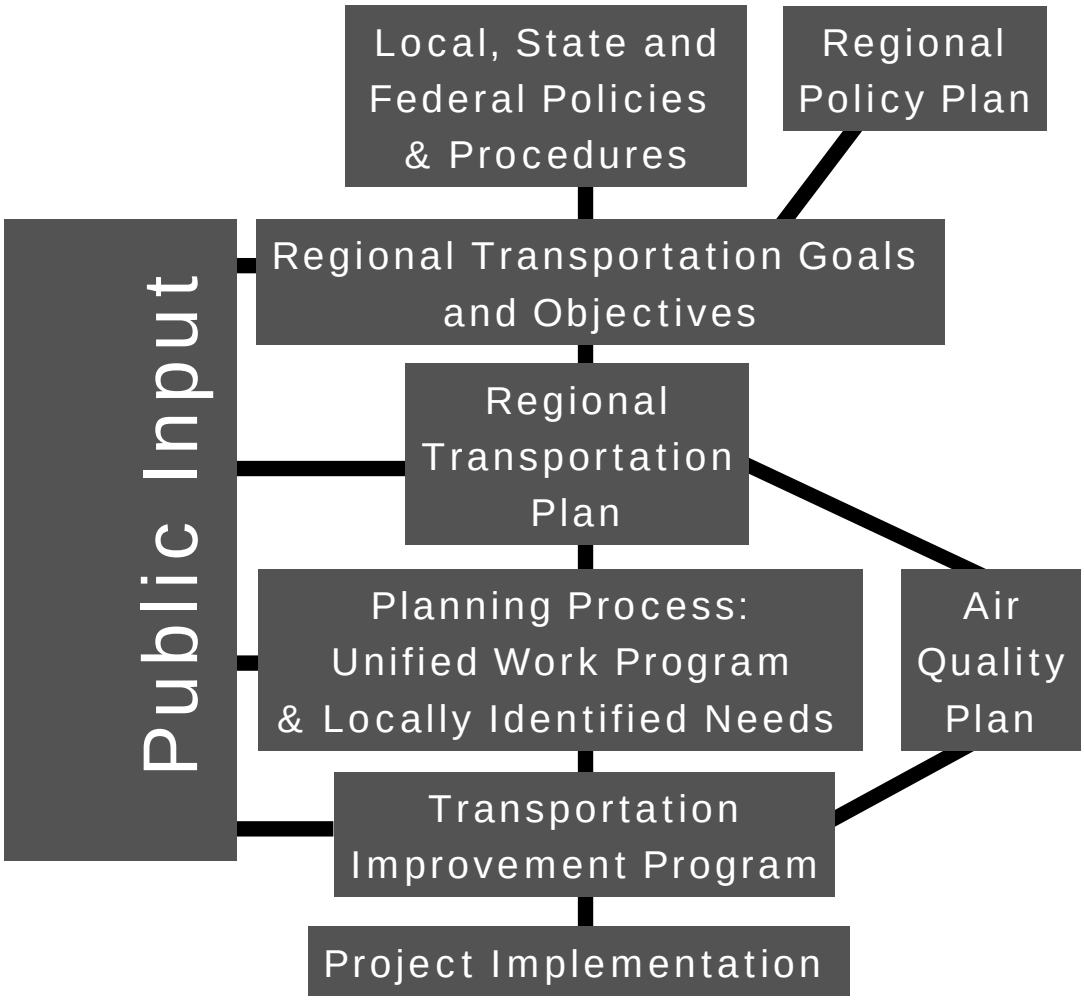


Figure 1 - Transportation Planning Procedure

2.1. Metropolitan Planning Organization (MPO)

Federal legislation requires the establishment of a Metropolitan Planning Organization (MPO) to carry out the required federal transportation planning process. MPO's are established for each urbanized area with a population of more than 50,000. The MPO for the Cape Cod Region (Barnstable County) is composed of four voting members and an advisory committee. These voting entities are; the Cape Cod Regional Transit Authority (Cape Cod RTA), the Cape Cod Commission (CCC), the Massachusetts Executive Office of Transportation and Construction (EOTC), the Massachusetts Highway Department (MassHighway). The Cape Cod Joint Transportation Committee (CCJTC) serves in an advisory capacity.

Massachusetts is in the process of changing the structure of many of the regional MPOs to include more local representation and has been considering this for the Cape Cod MPO. Cape Cod is fairly unique for Massachusetts in that it has a regional government in the form of Barnstable County. Local representation by the County and the major towns as well as some of the transportation providers like the Woods Hole, Martha's Vineyard and Nantucket Steamship Authority is under consideration. One other change has been discussed and that is to include the Cape Cod Transit Task Force as an advisory group similar to the Cape Cod Joint Transportation Committee.

2.1.1. New MPO Responsibilities

The 2000 Census has indicated that the urbanized area that the Cape Cod MPO is responsible for has grown to more than 200,000. This means that the MPO is now designated as a Transportation Management Area (TMA). Once a TMA is designated, a Congestion Management System is required. This must be developed within 18 months of designation as a TMA by the Secretary of the U.S. DOT which occurred in July 2002. The MPO must also go through the Federal certification process within 3 years of being designated as a TMA.

In addition to the Federal requirements, the state is requiring that memorandums of understandings (MOUs) be developed with the adjacent regions where the urbanized area boundaries extend beyond the MPO boundaries. These MOUs will define the planning responsibilities for these areas and set a cooperative framework for inter-regional planning.

2.1.1.1. Congestion Management Systems

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 required establishment of a Congestion Management System in each Transportation Management Area (TMA) with a population over 200,000. Congestion Management System (CMS) provides a systematic process that addresses measuring congestion, identifies recurring congestion and evaluates incident related congestion. The CMS Plan will also

recommend measures to alleviate congestion. The Cape Cod Region developed a CMS in 1997 and this will be updated. The update will be prepared in the Fall of 2003.

The intent of the CMS plan is to improve effectiveness of the existing and future transportation system performance and efficiency. It focuses on examining strategies for reducing single occupant vehicle (SOV) use, and promoting alternative modes. The CMS needs to address incident management with emphasis on planning for Intelligent Transportation Systems.

Identified benefits of a CMS Plan include a better understanding and measurement of congestion, selection and evaluation of congestion mitigation measures, implementation of Transportation System Management (TSM) actions to improve performance, and finally an improved system performance.

2.2. The Transportation Improvement Program

The **Transportation Improvement Program or "TIP"** is the capital plan, or short-range list, of federal aid eligible transportation projects to be implemented or constructed within available funding. The TIP is the annual implementation document that follows from the analysis and long-range planning in the Regional Transportation Plan. Compiled each year by the Cape Cod Metropolitan Planning Organization (MPO) staff for the Cape Cod region and endorsed by the MPO, this list of transportation projects includes at least three years of projects and must be financially constrained to funding estimates of federal and state source amounts, as required by federal law.

The first year, or annual element of the TIP, includes the specific projects to be implemented in the federal fiscal year beginning October 1st. For most highway projects, or other projects to be constructed with Federal Highway Administration (FHWA) funds, the project proponent submits the design to the Massachusetts Highway Department for review, a public hearing is held, and all other aspects of the project are completed. This includes elements such as any right-of-way acquisition and/or permits to be acquired. Projects in the first year of the TIP should have a completed, or nearly completed design that is approved by the Massachusetts Highway Department (MHD).

For a project with a completed design to receive Federal Highway Administration (FHWA) and/or Federal Transit Administration (FTA) funds the project must be listed in the first year of Transportation Improvement Program (TIP) that is endorsed by the Cape Cod Metropolitan Planning Organization (MPO), then combined with other regional TIPs into the State Transportation Improvement Program (STIP) and submitted for approval by federal agencies including FHWA, FTA and the Environmental Protection Agency (EPA).

With federal agency approval of the STIP, STIP/TIP projects may proceed toward advertising/implementation.

In order for a project to be implemented from the TIP first year:

- a highway, bicycle, or other FHWA/MHD funded project must be in the TIP/STIP, 100% design completed, all permits obtained, approved by MHD, advertised and a bid accepted.
- a transit project in the FTA category must be in the TIP/STIP and the Cape Cod Regional Transit Authority (Cape Cod RTA) must submit an application to FTA in order to have approval to proceed.
- a transit project in the FHWA category must be in the TIP/STIP, the CCC invokes the state to request a transfer of funds from FHWA to FTA, and the Cape Cod RTA must submit an application to FTA for approval before proceeding.

Previous Cape Cod TIP projects, or portions of projects, that received funding (1993-2002) include:

- **Hyannis Transportation Center, Barnstable**; Cape Cod Regional Transit Authority (Cape Cod RTA); **$6,000,000** FHWA and local funds;
- **Shank Painter Property Acquisition in Provincetown**; Town of Provincetown; **$247,000** FHWA and local funds;
- Relocation of **Nauset Lighthouse**, **Eastham**; National Park Service (NPS) /others; **$200,000** FHWA and local funds;
- Woods Hole, Nantucket and Martha's Vineyard **Steamship Authority (SSA) Terminal, Barnstable**; SSA, **$4,600,000** FHWA and local funds;
- Roadway maintenance/improvement projects; various projects and towns: **$28,000,000** FHWA, state, and local funds-- Route 6 Exit 9 – conversion to a full cloverleaf interchange **Dennis**; Buck Island Road **Yarmouth**; Route 151 **Mashpee** and **Falmouth**; Head of the Bay Road **Bourne**; sections of Route 28 in **Mashpee, Barnstable, Dennis, and Harwich**;
- Bridge maintenance/improvement projects; various projects and towns: **$14,300,000** FHWA, state, and local funds-- Perry St Bridge **Bourne**; Old County Road Bridge **Sandwich**; Route 6 various bridges in **Yarmouth Dennis Harwich**; Bridge Road bridge **Eastham**; 3 bridges (Menahaunt Rd, Quaker Rd, and Church St) in **Falmouth**; 2 bridges (Craigville Beach Rd and School St) in **Barnstable**;
- Cape Cod Regional Transit Authority (Cape Cod RTA) Cape-wide-- **local fixed route buses, b-bus, and Plymouth & Brockton Bus between Hyannis and Provincetown**, about **$4,000,000** [annually for operations]; FTA, state and local funds;
- Bicycle facility improvement projects; various projects and towns: **$6,700,000** FHWA, state, and local funds-- **Chatham** Bike Spur (from Harwich Cape Cod Rail Trail connection); Shining Sea Bikeway section **Falmouth**; Cape Cod Rail Trail (CCRT) [bicycle path] **Dennis to Wellfleet**; CCRT bike path spur in **Harwich**; Cape Cod Rail Trail Bicycle Bridges in **Harwich** and **Orleans**;

Other miscellaneous projects: Willow Street Yarmouth Railroad Grade Crossing Improvements $270,000; Bourne Monument Beach and Buzzards Bay Train Station area improvements $180,000; and the Park and Ride lots in Harwich and Barnstable $1,100,000.

3. Existing Conditions

In this chapter we set the stage for dealing with transportation issues. The following sections describe the geographical perspectives used in looking at the Cape as well as providing background on the people and place that have the needs and purpose for travel.

By looking at Cape Cod in smaller units - Sub-Regions - local issues and shorter distance travel needs were explored. Especially apparent was the lack of and need for comprehensive pedestrian and bicycling facilities.

3.1. 2000 Census Results

The most significant result of the 2000 Census was growth. Year round population in the Cape Cod region grew 19.1% between 1990 and 2000 to 222,230 people. Cape Cod is the 3rd fastest growing region in Massachusetts behind the Islands of Nantucket and Martha's Vineyard which also contribute to the traffic volumes on Cape Cod. 12 towns of the 20 oldest median aged population communities in the state are located in the region. Orleans and Chatham are the oldest communities in the Commonwealth with median ages of 55.5 and 53.9 respectively. The Capes youngest town is Bourne with a median age of 39.2 (144th of 351 communities). The increase in year-round population reflected in the population figures is also reflected in a decrease in vacant housing and vacation units which decreased 7.1% and 2.6% from the 1990 figures.

Based on the census data for Barnstable County, approximately 13,400 people commute from the County to jobs outside the region. This was an increase of approximately 40% over the number of commuters to off-Cape jobs in 1990. The major destination for workers living on Cape Cod and working elsewhere are:

Table 4 - Commuting Destinations

County	2000 Census - Commuters	% Change from 1990
Plymouth	4152	20.14
Suffolk	2767	34.52
Norfolk	1888	55.14
Middlesex	1768	60.00
Bristol	1264	26.91
Worcester	441	134.57
Providence (RI)	285	86.27
Nantucket	137	495.65
Essex	136	29.52
Dukes	131	79.45
Newport (RI)	122	134.62

In 2000, approximately 7,500 workers commuted to work on Cape Cod from outside Barnstable County. This was an increase of approximately 10.4% over the number of commuters to on-Cape jobs in 1990. The major sources of these commuters include:

Table 5 - Commuting Sources

County	2000 Census - Commuters	% Change from 1990
Plymouth	4371	16.34
Bristol	1390	-1.70
Norfolk	355	-9.21
Middlesex	325	-19.15
Suffolk	237	1.72
Providence (RI)	159	29.27
Essex	90	36.36
Worcester	82	-28.07
Hampden	55	22.22
Bristol (RI)	50	614.29
Dukes	43	53.57
Kent (RI)	38	18.75

The work force living and working on Cape Cod grew from 71,307 in 1990 to 84,704 in 2000. This represents a 9.0% increase

Median Household income reported in 2000 was determined to be $45,933 which is less than 266 of the 351 towns in Massachusetts. The median housing cost for the region was

$178,800 which is less than 159 other towns in Massachusetts. The lowest median housing cost was found in Yarmouth at $151,200 and the highest in Provincetown at $330,500. One interesting fact from the 2000 Census is that the Barnstable-Yarmouth "metropolitan" area has the third highest home owner occupancy rate of all metropolitan areas in the United States. 79.2% of the housing units in Barnstable-Yarmouth metropolitan area are owner-occupied compared to a statewide rate for Massachusetts of 61.7%.

3.2. Travel to and from the Cape

The fifteen towns of Cape Cod (Barnstable County) are arranged for the most part in a linear configuration and are predominately surrounded by water. Transportation access to and from the Cape may be made via any one of three general categories: land, air, or water. Travelers utilize one or more mode: pedestrian, bicycle, bus, rail, motor vehicle, airplane, or ferry.

For travel to or from Cape Cod, an estimated 200,000 people enter or leave the county and cross the Cape Cod Canal bridges on an average summer day. The majority make use of automobiles, evidenced by over 72,000 vehicles per day crossing over the bridges in January, and over 125,000 per day in July. A smaller but growing number of people make use of buses, ferries, and airplanes between the Cape and other destinations.

3.2.1. Land: Road, Rail, & Path

The gateway by land to Cape Cod is through the town of Bourne, a town divided by the Cape Cod Canal. For vehicular traffic, the northern part of Bourne is connected to the remainder of southeastern Massachusetts and regions beyond by several highways. This interregional system includes Route 3, Route 3A, Route 6, Route 28, and Route 25. These are the main roadways for linking to the interstate highway system including I-495, I-195 and I-95. The other ties by land include bikeways, (e.g. the Claire Saltonstall Bicycle Route from Boston to Provincetown), and a rail line (primarily being used for hauling solid waste to the SEMASS incinerator in Rochester, Mass.).

Three existing bridges--two highway bridges for vehicular traffic and one for rail - join the northern part of Bourne to the southern part of town and the other fourteen towns east of Bourne. The southern part of Bourne and the fourteen other Cape Cod towns are surrounded by water— clockwise, starting with the Cape Cod Canal: Cape Cod Bay, the Atlantic Ocean, Nantucket Sound, Vineyard, and Buzzard's Bay. Entrance to Cape Cod from other parts of the state by motor vehicle is limited to access through Bourne or on the ferries from the islands of Nantucket and Martha's Vineyard. Pedestrian and bicycle access through Bourne to the fourteen "down-cape" towns is available via sidewalks on the highway bridges. The Claire Saltonstall Boston-Cape Cod Bikeway makes use of the Sagamore Bridge however cyclists are required to walk their bikes across the bridge.

The primary bus operators for interregional travel are Plymouth & Brockton Street Railway Company (P&B) and Bonanza Bus Lines/Coach USA. P&B provided 34 weekday round trips from Hyannis to Boston in the Winter/Spring of 2003. During the same schedule period, Bonanza Bus ran six trips to Providence and ten trips to Boston.

Based on the most recent information, most of the freight movement in New England and on Cape Cod is accomplished by using trucks. According to the Final Report of the New England Transportation Initiative, eighty percent of freight was moved using trucks in 1991. When compared with 1982, freight movement in 1991 by trucks was up 37%, the share of freight movement by rail was down 50%, by water down 41% and freight moved by air stayed level at one percent of the total. A freight study is recommended to update this information.

The Cape Cod railroad bridge supports Cape Cod freight shipments which occur three to four times per day, year-round; this is primarily to transport trash to the SEMASS plant in Rochester, MA.

3.2.2. Air

Barnstable Municipal Airport in Hyannis and Provincetown Airport have scheduled commercial airline service. Many travelers drive from off-Cape to the airport in Hyannis in order to fly elsewhere, (e.g. 71% percent of Hyannis' air traffic is to/from Nantucket). The Barnstable-Yarmouth Regional Transportation Study in "Technical Memorandum Number 2," January 1993, reported "that the primary role of the Barnstable Municipal Airport is as a park-and-ride facility, serving passengers who are flying to/from Nantucket." Other origins/destinations include Martha's Vineyard, Logan International Airport in Boston, Newark, NJ and New York City. Only 15% of the airline passengers from Cape Cod use Barnstable Municipal Airport, 1% fly from Provincetown, 8% from Providence, and 76% from Boston.

The Barnstable Airport Commission, along with the Massachusetts Aeronautic Commission (MAC) are studying access issues and terminal needs for the airport and expect the use of this airport to grow 70% by 2015 (195,153 emplanements in 1999 to an expected 332,180 in 2015). The Environmental Notification Form (ENF) for the project was filed in April 2000 and the study is expected to be complete sometime in 2004.

3.2.3. Water

Other connections are made via the water. Currently, ferry boats transport people, motor vehicles, and goods between the Cape and Islands from Falmouth and Hyannis. A pilot freight service from New Bedford to the Islands was started in April 2000. In the lower-Cape area, a seasonally operated ferry service carries passengers between Harwich and the Island of Nantucket. Off-Cape passenger ferries also operate during the summer season between Provincetown and Boston, and Plymouth.

3.3. Moving around the Cape: Transportation Corridors

Although automobile travel is the predominate form of mobility on Cape Cod, transportation is more than just counts of cars on roads. The following sections describe transportation issues facing people adjacent to the major Cape transportation corridors. Within each of the following sections, the discussion is focused on the needs of travelers and the opportunities for other routes and/or modes of travel.

3.3.1. Route 6 Corridor

Route 6 is the major transportation corridor on the Cape, particularly for those traveling long distances. From where it enters Barnstable County in Buzzards Bay until its end in Provincetown, it provides a primarily limited access high-speed means of traveling along the spine of the Cape, both for private automobiles and for transit. The Route 6 corridor in the Outer Cape, where the roadway does not have limited access, also contains segments of "Bike Route One," a chain of bicycle routes traversing the entire Cape.

In addition to being the main thoroughfare for the Cape as a whole, it also is the "Main Street" of several Cape towns. Buzzards Bay, Eastham, and to a lesser degree, Truro and Wellfleet, all use Route 6 as a downtown thoroughfare. This dual purpose for the road has created some conflicts for this corridor.

3.3.1.1. Route 6 License Plate Survey

In April and August of 1999, the Cape Cod Commission conducted a license plate survey of vehicles traveling on Route 6. The survey recorded the license plates optically with high speed cameras at a location in Sandwich and one in Wellfleet. The information was analyzed through optical recognition software and the license plate numbers were compiled. Out of state plates were compiled by state, province, or country and Massachusetts plates were compiled by the city or town in which they were registered.

The most significant finding was that fewer vehicles registered in Cape Cod towns use Route 6 during the summer survey than the spring survey. This would indicate a Cape Cod year round resident driving behavior of making fewer trips in the summer, shifting some travel to late evenings, or finding alternate routes to Route 6. The map in the following figure shows the relative changes by town in the number of trips recorded in the April and August surveys.

The charts on the page following the figure show the percentages during April and August for vehicles registered in Cape Cod, other Massachusetts towns, and non-Massachusetts vehicles.

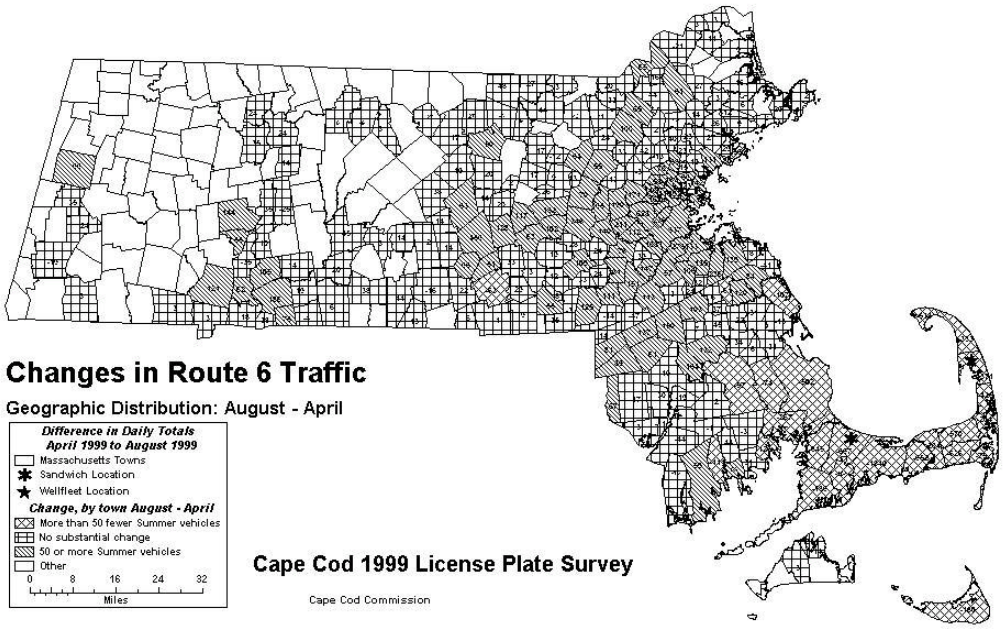


Figure 2 - Route 6 License Plate Survey - Massachusetts Towns

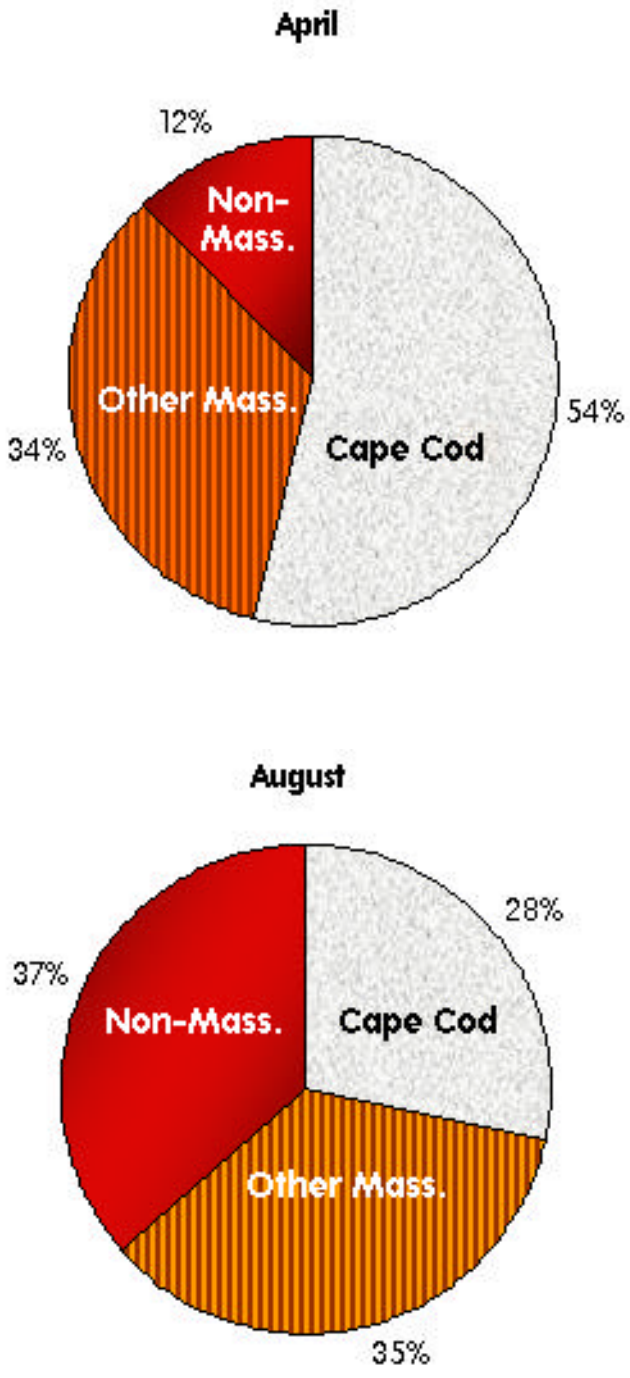


Figure 3 – 1999 Route 6 Traffic: Vehicle Registrations

3.3.1.2. Route 6 Existing Conditions

On Cape Cod, Route 6 has four main segments:

- From where it enters the county in Buzzards Bay to where it crosses the Cape Cod Canal at the Sagamore Rotary it is a two- to four-lane road with curb cuts on both sides.
- From the Sagamore Rotary to just after Exit 9 in Dennis, it is a four-lane limited access highway with a grass shoulder and rest areas.
- From Dennis to the Orleans/Eastham rotary the road narrows to two lanes but remains limited access, with a raised median and yellow reflective post delineators to reduce crossovers from one direction of traffic to the other. This section is actually built on what was designed to be one direction of a divided highway.
- Finally, from the Orleans Rotary until the road's end in Provincetown the road is once again a two- to four- lane road with curb cuts on both sides, although a grassed median does limit crossovers on sections of Route 6 in Truro and Provincetown.

The segments to the east of the Sagamore Bridge evolved in the following construction phases as shown in the following table:

Table 6 - Route 6 Completion Dates

Year Completed / Configuration	Segment Description
1950 2 lanes	Sagamore Bridge to Hyannis (exit 6)
1954 2 more lanes (4 total)	Sagamore Bridge to Hyannis (exit 6)
1955 2 lanes	Hyannis (exit 6) to Dennis (exit 9)
1956 2 lanes	Dennis (exit 9) to Harwich/Brewster (exit 11)
1958 2 lanes	Harwich/Brewster (exit 11) to Orleans (exit 12)
1959 2 lanes	Orleans (exit 12) to Orleans/Eastham Rotary
1967 2 more lanes (4 total)	Hyannis (exit 6) to Yarmouth (exit 7)
1971 2 more lanes (4 total)	Yarmouth (exit 7) to Dennis (exit 9)

Route 6 in the Outer Cape area was generally a consolidation of existing roadways and evolved over time since the 1930's. Short sections of the original Route 6 have been retained for local access for road straightening projects. In northern Truro and Provincetown, the original Route 6 became Route 6A.

Land Use

Adjacent land uses vary by location. In the limited access sections of the road there is some residential development and some industrial development along the corridor. In the sections with curb cuts there is more commercial development, including retail activity.

Congestion

Traffic flow along the corridor is reasonable in the winter but often operates poorly in the summer. During peak travel periods in the summer it is not unusual for westbound traffic to be stopped for several miles east of the Sagamore Rotary. Average Daily Traffic (ADT) volumes, mileage, and Vehicle Miles Traveled (VMT) are presented in the following table:

Table 7 - Traffic Volumes & Mileage: Route 6

Town	Summer ADT	Annual ADT	Miles	Avg. Daily Vehicle Miles Traveled (VMT)
Bourne	40,723	31,357	7.02	220,126
Sandwich	63,471	48,873	15.2	742,870
Barnstable	59,355	45,703	8.28	378,421
Yarmouth	49,884	38,411	4.56	175,154
Dennis	43,913	33,813	2.04	68,979
Harwich	35,808	27,572	5.63	155,230
Brewster	25,458	19,603	2.92	57,241
Orleans	22,773	17,535	3.6	63,126
Eastham	31,062	23,918	6.12	146,378
Wellfleet	23,053	17,751	8.56	151,949
Truro	19,525	15,034	9.93	149,288
Provincetown	17,257	13,288	3.8	50,494
Total			77.66	2,359,255

Source: Cape Cod Commission 1998-2000 Traffic Volumes

Transit

Transit service on this corridor primarily consists of Plymouth and Brockton (P&B) bus service from Boston to Hyannis, which stops at the Sagamore Park-and-Ride lot and the Barnstable Park and Ride lot at Exit 6 before completing its run to downtown Hyannis. P&B serves 25 cities and towns from Boston to Cape Cod and is partially subsidized by the Massachusetts Bay Transportation Authority (MBTA), MassPort and the Cape Cod Regional Transit Authority (Cape Cod RTA). P&B's Hyannis Elm Street terminal was the central hub for the Cape service. This function was relocated to the Hyannis Transportation Center in May 2003. Many of the buses are wheelchair lift-equipped.

The company operates three principal services for Cape Cod, a semi-express running between Orleans/Hyannis and Logan Airport, a similar service for downtown Boston, and local service between Provincetown and Hyannis.

P&B's express service offers 30 round trips each weekday and 20 round trips Saturdays, Sundays, and holidays with additional trips added during the summer months. The route runs along Routes 132 and 6 on Cape Cod and Route 3 and I-93 (the Southeast Expressway) into Boston. Sixteen of these trips operate daily under the heading "Logan Direct." Logan Direct provides hourly access from Hyannis to Logan Airport starting at 3:15 a.m.: originating at the Hyannis Transportation Center, with stops at the park-and-ride lots in Barnstable and Sagamore, the P&B terminal in Plymouth, the park-and-ride lot in Rockland, (a few runs stop at South Station in Boston) and finally Logan Airport.

On weekdays, there are trips geared to Boston commuters beginning in Hyannis starting at 4:45 a.m. and ending either at South Station or Park Square in Boston with returns in the afternoon and evening. Fares run between $16 and $27 each way depending on the length of the trip. Discounts are available through the purchase of a ten-ticket book.

Table 8 - Express Bus Service Ridership

	Annual Ridership	Daily Ridership
Provincetown/Hyannis (this service is within Cape Cod. Some riders may continue on to Boston)	27,095	74
Orleans/Boston Hyannis/Boston (these services share routes starting at Barnstable Park-and-Ride Lot)	368,881	1,011
Logan Direct	136,739	375

As shown in the table above, for the year beginning November 1999 and ending October 2000 (most current available data), ridership on the Provincetown-Hyannis route was 27,095, or an average of 74 passengers per day. For the Orleans/Hyannis to Boston route for the year beginning November 1999 and ending October 2000, annual ridership on the non-Logan Direct trips was 368,881 and on the Logan Direct trips, 136,739, an average of 1,385 passengers per day. Ridership during the summer months is about 20 percent higher. Compared to figures for the previous year, ridership increased 10 percent on the non-Logan direct trips and 23 percent on the Logan Direct trips.

Other current transit service includes the Bonanza Bus service from Providence via Bourne to Hyannis six round-trips a day, seven days a week. Plymouth and Brockton service – 29 roundtrips between Boston/Logan and Hyannis with 6 trips extending to and from Provincetown. The Hyannis to Provincetown bus service runs along Route 6 with a stop at the Harwich Routes 6/124 Park & Ride lot and downtown Orleans and continues

on to Provincetown. There is a new summer shuttle that runs along Route 6A from Provincetown into Truro that operates from June through the second week in October.

Bicycle alternatives

Travel by bicycle parallel to this corridor varies by location:

- Along the either side of the canal, bicycles can parallel Route 6 on the Army Corps of Engineers access roads.
- From Sagamore to Barnstable bicycles can travel the service road but are banned from Route 6 itself (ban extends from the Sagamore Bridge in Bourne to Orleans at the Eastham/Orleans Rotary).
- From Barnstable to Dennis there is no real option for bicycles other than local roads. However, in Dennis the Cape Cod Rail Trail begins, following roughly the Route 6 corridor all the way to Wellfleet.
- From Wellfleet to Provincetown most bicycles use Route 6, a portion of which is also designated part of the Claire Saltonstall Bicycle Route. However, this route is shared with high-speed automobile traffic. Efforts to extend the Rail Trail to Provincetown have been underway for some time.

Park-and Ride-Facilities

- Sagamore Park-and-Ride Lot – This lot is located near the Sagamore Rotary off Meetinghouse Lane with an exit directly onto Route 3 northbound. This lot has a capacity of 377 vehicles. Bus shelters appear to be in fair condition. Although the lot lacks rest facilities, two fast food restaurants are within walking distance. For the two observations taken in 2001, a peak parking demand was observed in May, with 385 parked vehicles (102.1 % of capacity). Including observations as far back as 1995, the average observed demand is 83% of capacity.

- Barnstable Park-and-Ride Lot – This lot is located on Route 132 adjacent to Interchange 6, north of the Mid-Cape Highway (Route 6). This lot has a ramp directly onto Route 6 westbound and the number of parking spaces was increased in August 2001. The lot capacity prior to August 2001 was 308 vehicles and since the expansion the lot can accommodate 365 vehicles. As part of the expansion, new shelters were installed and appear to be in good condition. Public restrooms and food service are available. The lot experiences heavy usage, often near or over-capacity. For the two observations taken in 2001, a peak parking demand was observed in November, with 354 parked vehicles (97% of capacity). Including observations as far back as 1995, the average observed demand is 97% of capacity.

- Harwich Park-and-Ride Lot – This lot is located on Route 124 adjacent to Interchange 10, south of the Mid-Cape Highway (Route 6). This lot has 77 spaces. Observations collected between 1996 and 2000 show an average of 18% occupancy with a peak of 37%.

3.3.2. Roadway Alternatives

Alternative routes to Route 6 include Route 6A from Bourne to Orleans and again in Truro; Route 39 in Harwich, Brewster and Orleans; Sandwich Road on the south side of the Canal; and Route 28 in Dennis and Harwich.

3.3.2.1. Problem Identification

The primary debate surrounding Route 6 has been over balancing safety, capacity, and the environment. Some want to increase its capacity through structural improvements to accommodate high levels of traffic safely. The levels of traffic between Dennis and Orleans are lower than those between Sandwich and Dennis, but still above what many consider the capacity of a two-lane highway with limited access and unpaved shoulders. Route 6 overall has a crash rate of 0.73 crashes per million vehicle miles traveled (for a town-by-town listing of crash rates please see chapter 5). The overall fatality rate for Route 6 is 0.46 fatal crashes per 100 million vehicle miles traveled. Crashes along the portion of Route 6 from Dennis to Orleans in the past led to the creation of the raised median and stanchions. However, many residents of the region remain opposed to making any capacity improvements to that section of the road, based on concerns that such improvements would encourage more development.

Similarly, on the outer Cape, many have sought some way to increase safety for pedestrians and cars along Route 6. In addition, the proliferation of curb cuts along that segment of the road has caused increased congestion and increased the potential for crashes. Also, in the segment along the Canal, traffic tends to travel faster than the roadway geometry design speed.

Another problem in this corridor is an insufficient supply of Park and Ride spaces at the Barnstable lot. Commission surveys at that lot have found it to usually be close to or over capacity. The Harwich Park and Ride, which opened in 1997, is seeing little regular usage, but also has limited bus service.

3.3.2.2. Planned Improvements/Alternatives

The project to eliminate the Sagamore Rotary located east of the Sagamore Bridge is planned to begin in 2004 with completion by 2006. This project will provide a direct connection between Rte. 3 and the Sagamore Bridge and, according to MHD, will help relive the congestion that occurs on either side of the bridge frequently during the summer.

Other improvements to consider for the Route 6 corridor include:

- Adding parking spaces at the Park and Ride in Barnstable and Sagamore
- Providing more amenities at the Park and Rides
- Access Management along the “Scenic Highway” segment along the Cape Cod Canal and Rte. 6 on the Outer Cape

- Transit service to the Cape Cod National Seashore from the regional transportation centers
- Increased transit service along Route 6 on the outer Cape
- Identification of the Cape Cod Rail Trail bicycle alternatives between Wellfleet and Provincetown
- Identification of the Cape Cod Rail Trail bicycle alternatives between Barnstable and Dennis
- Retain existing right-of-way where feasible to limit the future possibility of curb cuts and development on Route 6 in the Outer Cape.
- Additional strategies are also expected from the Canal Area Study currently underway.

3.3.3. Route 28 Corridor

State Route 28 begins at the Eastham Rotary, runs counter-clockwise for almost sixty-five miles through villages adjacent to the Atlantic Ocean/Nantucket Sound/Buzzards Bay from Orleans Center to Bourne before crossing the Cape Cod Canal and continuing north to the New Hampshire border.

3.3.3.1. Existing Conditions

Traffic flow along the corridor is generally heavy during the summer, with gridlock occurring in many locations. However, the level of traffic varies greatly along the corridor. Average Daily Traffic (ADT) volumes, mileage, and Vehicle Miles Traveled (VMT) are presented in the following table:

Table 9 - Traffic Volumes & Mileage: Route 28

Town	Summer ADT	Annual ADT	Miles	Avg. Daily Vehicle Miles Traveled (VMT)
Bourne	35,974	27,700	8.7	240,990
Falmouth	22,377	17,230	14.6	251,558
Mashpee	23,117	17,800	3.7	65,860
Barnstable	24,683	19,006	10.4	197,662
Yarmouth	28,109	21,644	5.2	112,549
Dennis	15,521	11,951	3.4	40,633
Harwich	12,530	9,648	6.4	61,747
Chatham	13,478	10,378	7.3	75,759
Orleans	16,778	12,919	4.9	63,303
Total			64.6	1,110,062

Source: Cape Cod Commission 1998-2000 Traffic Volumes

The cross section of Route 28 varies greatly throughout the Cape:

- Four lanes from the county line across the Bourne Bridge to the Bourne Rotary
- Four lanes, divided from the rotary to Saconesset Hills in Falmouth
- Predominately, two Lanes to the intersection of Old Stage Road in Barnstable
- Four Lanes from Old Stage Road to Phinneys Lane in Barnstable
- Predominately two lanes from Phinneys Lane to the Orleans/Eastham Rotary

Transit

Transit service varies along this corridor. The Cape Cod RTA provides the Sea Line Breeze, year-round fixed route service that runs from Falmouth to Hyannis and a year round service from Hyannis to Orleans on Route 28 called the H2O Breeze. Other year-round services in the corridor include the Villager Breeze (which primarily operates on Route 132) in Hyannis. Summer trolley services are provided along segments of Route 28 in Falmouth, Yarmouth, and Dennis.

Bicycle Facilities
Bicycle travel along the corridor is common despite the fact that it can be quite challenging. This is partially due to the great number of curb cuts along the corridor and partially due to the lack of alternatives on most sections of this corridor. Bicycle usage in the summer season is heavy due to the restaurants, motels, and other seasonal businesses along the corridor that attract seasonal workers who are often car-less. Bicycle facilities in the Route 28 corridor include the Shining Sea bicycle path between Falmouth center south to Woods Hole, a path to Route 28 along Route 130 in Mashpee from Great Neck Road, and a connection from Route 149 along Old Stage Road leading to a path along the south side of Route 28 to Bearses Way in Hyannis. It should be noted that all Cape Cod RTA fixed-route buses are equipped with bicycle racks.

Roadway alternatives
Route 28 is a regional roadway but it does not provide very direct inter regional travel options in most cases. Some alternative routes to 28 include Route 39, Great Western Road, Buck Island Road, Route 151, Upper and Lower County Roads, and, for longer trips, Route 6.

3.3.3.2. Problem Identification

Much of the Route 28 corridor is congested during summer peak hours. Traffic also slows when there is an incident or construction.

One major problem along the Route 28 corridor is how to provide for modes other than the automobile. Route 28 has a variety of conditions ranging from a limited access, divided highway to a two lane roadway. Route 28 overall has a crash rate of 3.02 crashes per million vehicle miles traveled (for a town-by-town listing of crash rates please see chapter 5). The overall fatality rate for Route 28 is 0.99 fatal crashes per 100 million vehicle miles traveled.

3.3.3.3. Alternatives

Improvements to consider in the Route 28 corridor include:

- Enhance year-round fixed route service from the Hyannis bus station to Orleans and add bus stops & shelters
- Reducing need for bicycles to travel along Route 28, by improving bikeways along Old Stage Road & Old Falmouth Road in Barnstable, Route 151 in Mashpee, and other alternatives and improve bicycle access from these parallel routes to Route 28.
- Further restricting commercial development along 28 to specified “village centers.” From Falmouth to Orleans:
  - Access Management
  - Encourage land use controls that limit traffic impacts
  - Increased public transit/shuttle service
  - Bicycle/pedestrian improvements
  - Road/intersection improvements

- Work with MassHighway to improve traffic signage in the region, especially on Route 28 from Chatham to Orleans (e.g., northbound traffic is designated for "Route 28 South").

3.3.4. Route 6A Corridor

Route 6A on Cape Cod is one of the oldest travel corridors in the country. Originally a path used by Native Americans, it was later adopted by colonists for travel from Plymouth out to Eastham. Later it served as state Route 6 until the construction of the current Route 6 in the 1950's. Today it is also known as the Old Kings Highway and is a state Scenic Road.

3.3.4.1. Existing Conditions

Route 6A is a narrow and windy two lane road with little or no shoulder. For this reason, passing zones are limited and biking can be difficult. Some segments have sidewalks (for example, in Barnstable Village, Brewster, and Orleans) but often it is difficult to travel along this corridor any way other than by automobile.

Adjacent land uses vary by location. Several village centers exist along the corridor, such as Barnstable Village, Yarmouthport, and Brewster. Several "new villages" have also sprung up as strip development in the last 20 years, such as the development in Orleans. In addition, Sandwich Center lies just off 6A to the south. Much of the corridor remains residential, or is undeveloped due to the proximity of wetlands with Sandwich and Orleans the notable exceptions.

Traffic flow along the corridor is generally heavy during the summer but rarely stopped. However, the level of traffic varies greatly along the corridor. Average Daily Traffic (ADT) volumes, mileage, and Vehicle Miles Traveled (VMT) are presented in the following table:

Table 10- Traffic Volumes & Mileage: Route 6A

Town	Summer ADT	Annual ADT	Miles	Avg. Daily Vehicle Miles Traveled (VMT)
Bourne	14,970	11,527	0.6	6,916
Sandwich	12,169	9,370	7.5	70,275
Barnstable	10,005	7,704	8.4	64,714
Yarmouth	14,238	10,963	3.7	40,563
Dennis	10,852	8,356	4.3	35,931
Brewster	13,896	10,700	7.8	83,460
Orleans	23,508	18,101	1.7	30,772
Total			34	332,630

Source: Cape Cod Commission 1998-2000 Traffic Volumes

Transit

Transit service is very limited on this corridor. The Village Breeze RTA service operates along Rte. 6A between Rte. 132 and the Barnstable County Complex. The Cape Cod Central Railroad goes along the corridor in Sandwich, but these services have almost no effect on traffic along the corridor. The Hyannis to Provincetown Plymouth and Brockton bus did serve the eastern portion of this corridor a few times a day, however, this service was discontinued in the Summer of 2000.

Roadway Alternatives

Bike travel along the corridor is common despite the fact that it is best suited for experienced bicyclists. This is due to the scenic nature of the corridor, relatively low vehicle speeds, and residential and commercial development. The existing alternatives to Route 6A include the Claire Saltonstall Bikeway from Bourne to Barnstable Village and Setucket Road from Yarmouth to Dennis and the Cape Cod Rail Trail for areas of Route 6A in Brewster and Orleans. In 1999, the Cape Cod Commission produced a map that shows alternative routes to bicycle travel on 6A for less experienced bicyclists. A related earlier effort was the creation of weatherproof maps for kiosks along the Cape Cod Rail Trail which show distances to typical destinations and facilities accessible from the trail.

3.3.4.2. Problem Identification

Much of the Route 6A corridor is congested during summer peak hours. In fact, a major problem along the Route 6A corridor is how to provide for modes other than the automobile. Several studies have been conducted on this subject, including a bicycle accommodation study and an alternate modes assessment conducted for the Commission in 1995. One recommendation from this study was the reduction of speed limits to 35 MPH. Recently an access management study was done that resulted in recommendations for improving access to Route 6A and other similar Cape Cod roadways.

Another issue is the scenic nature of Route 6A and the current process for funding roadway rehabilitation projects which require upgrading the width and alignment to modern standards. An ongoing initiative by the Cape Cod Commission (see Appendix) is to develop rural road design guidelines that will provide "footprint roadway" options to preserve the character of scenic roadways such as Route 6A. Route 6A overall has a crash rate of 2.86 crashes per million vehicle miles traveled (for a town-by-town listing of crash rates please see Chapter 5). The overall fatality rate for Route 6A is 0.55 fatal crashes per 100 million vehicle miles traveled.

3.3.4.3. Alternatives

Improvements to consider in the Route 6A corridor include:

- Providing a trolley-type transit service in the summer with stops located off the roadway in village centers including restoration of the recently abandoned service.
- Reducing need for bicycles to travel along Route 6A by encouraging use of Cape Cod Rail Trail, bikeways along Setucket Road, Old County Road, and use of the Service Road along Route 6.
- Work with communities to restrict commercial development along 6A to specified "village centers"
- Pedestrian enhancements such as "brick-style" crosswalks.
- Improvements appropriate to village scale similar to recent changes in Barnstable Village (replaced signals, sidewalk and crosswalk improvements, pedestrian amenities).
- Develop policies that respect the historic nature of the Route 6A corridor and allow context sensitive road and signal design, and roundabouts where feasible.

3.4. Travel within Sub-Regions

Each town, village, business district, and even each neighborhood will have a slightly different (and in a handful of cases a drastically different) set of options and conditions that affect, and are affected by, travel. For a document of this scope it would be impossible, and imprudent, to provide such detail. Some comparisons and evaluation can

be made at a larger scale. Therefore, transportation at the "local" scale is discussed for Sub-Regions identified in the following figure and described in the following sections.

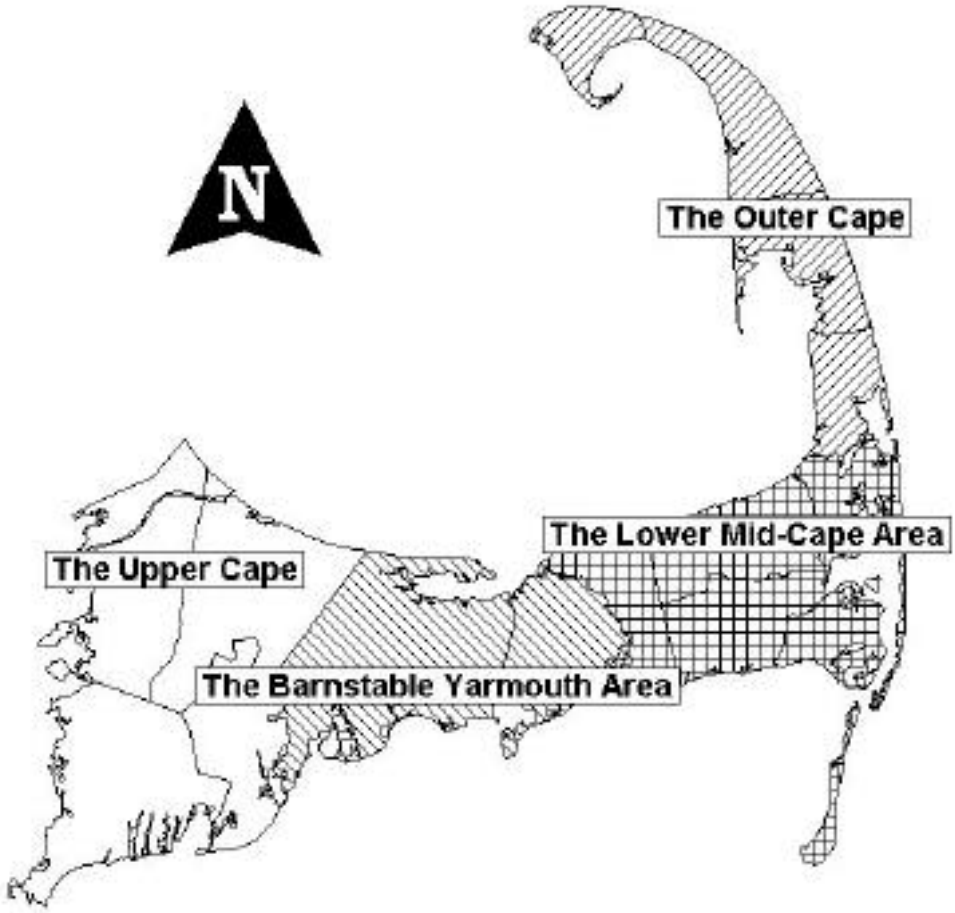


Figure 4 - Cape Cod Sub-Regions

3.4.1. The Outer Cape

The Outer Cape towns include Provincetown, Truro, Wellfleet, and Eastham. These comprise 16% of the land area of Cape Cod, and contain an estimated 13,720 year round residents (6.2 % of the Cape). They also contain 6% of the jobs in the county.

Many workers commute into or out of this region, but even more workers commute within this region. A full 81% of the 4,593 jobs within the four town area are held by residents of these towns.

3.4.1.1. Transportation Facilities

Transportation infrastructure includes over 430 miles of state and town maintained roadway, limited intercity and local bus services, commercial airline service and passenger ferry service. Various bicycle paths exist through the area, pedestrian facilities are primarily located in village centers.

Route 6 is the major north-south corridor that links the Outer Cape towns - both to each other and the other sub-regions of Cape Cod. Small-scale commercial air services are available at the Provincetown Airport. Passenger ferries between Provincetown and Plymouth or Boston operate 6 round trips during the summer.

Roadway Network

The main road in the region, Route 6, includes a four lane undivided cross-section through most of Eastham without shoulders. From North Eastham to Truro, Route 6 is restricted to two lanes with shoulders and occasional turning and through lanes at intersections. In North Truro to Provincetown, Route 6 is four lanes with a vegetated median in some sections. Scheduled Plymouth & Brockton Street Railway Co. bus service operates from Provincetown to Hyannis. Currently the service is 6 round trips per day, includes stops in Provincetown, North Truro, Truro, Wellfleet, South Wellfleet, North Eastham, and Eastham. A paratransit service called the “b-Bus” is available in these towns and is provided by the Cape Cod Regional Transit Authority (Cape Cod RTA) on an “on call” basis.

Bike Facilities

The Cape Cod Rail Trail connects the area from other parts of the Cape. The original route used Rock Harbor Road; the recently completed bicycle bridge in Orleans allows the trail to follow former railroad right-of-way all the way through Eastham to LeCount Hollow Road in Wellfleet. The State Bicycle Route 1 or Claire Saltonstall bikeway (which uses the trail) continues along side roads and bike path segments until North Truro and Provincetown where it follows Route 6A.

Air Service

This region contains Provincetown Airport. Typical air service from and to Boston runs between 5 and 8 trips in each direction per day in the Summer and 6 trips per day in the Winter.

Ferry Service

Passenger ferry service operates between Provincetown and Boston and Plymouth during the summer. For the 2003 summer season there are 6 round trips a day scheduled between Provincetown and Boston with an additional excursion trip on Fridays, Saturdays, and Sundays. One roundtrip is scheduled to and from Plymouth. These services operate in the tourist season. The Cape Cod Commission Strategic Plan for Expanded Water Transportation to Provincetown, Cape Cod had several recommendations for expanding the service to the "shoulder seasons" due to increasing

demand for service. The additional service will also benefit from the current reconstruction project at McMillan Wharf in Provincetown.

3.4.1.2. Transportation Issues and Problems

Some Outer Cape roadways are operating near design capacities, due to the rise in tourism and year-round populations in the region and an increased reliance on single-occupant vehicles. However, geographic, cost, character issues and policy restraints preclude for the most part building additional highway systems or adding capacity to the existing roadways. In any case, in other parts of the country where widening has been possible, the new vehicular capacity was used quickly and consequently mobility was not enhanced for the long term. In general, the public consensus indicates a strong desire to find alternatives to widening roadways.

Some alternatives have been identified. Creation of a convenient trolley shuttle system and facilities to encourage use of bicycles for commuting will help by providing alternatives to driving alone.

3.4.2. The Lower Mid-Cape Area

The towns of Dennis, Harwich, Brewster, Chatham and Orleans lie east of the heavily developed Barnstable/Yarmouth area and south of the outer Cape. These towns make up the "elbow" of Cape Cod, and the region studied in the July 1996 Monomoy Capacity Study.

The Town of Dennis is usually included along with the Towns of Barnstable and Yarmouth as the "mid-Cape" area. These three towns do share some similarities with respect to urbanization and proximity to each other. However it is felt that for environmental as well as geographic reasons it should been included in the Lower Mid-Cape study area. Dennis as well as the rest of the sub-region as defined for the Plan are separated by marshes or rivers which the transportation system must cross to access other Cape sub-regions.

This sub-region is approximately 19.2% of the land area of the Cape. In 2000, these towns contained 51,419 residents (23.1% of the Cape) and 16,500 jobs (21% of the county total). Of the 16,500 jobs in this sub-region, 75% were held by residents of the sub-region. A small but growing number of residents of this region work in the Boston region; 165 according to the 2000 census.

3.4.2.1. Transportation Facilities

This region has an extensive network of roads; 63 miles of state highways and over 400 miles of local roads. However, it has a limited transit system. It does, however, contain several bikeways and roads appropriate for biking. Mobility across this region is

important because it provides the only land connection to the Outer Cape. It also contains several regional destinations such as Nickerson State Park, the Cape Cod National Seashore sites, and the commercial center of Orleans.

Roadway Network
Routes 6, 6A, and 28 all traverse the region from the Yarmouth boundary to the Orleans rotary, where they all meet. In addition, Routes 134, 124 and 137 cross the sub-region from north to south, Route 39 also cuts across Harwich and Chatham, providing a shorter route than Route 28 across the southern part of the sub-region. In 1996 a Park and Ride lot with room for 77 cars opened at the Route 6/124 interchange in Harwich.

Transit service is provided both by town shuttles and by Plymouth and Brockton. Dennis, Orleans and Harwich all ran shuttles in 1996, although Harwich and Orleans have since discontinued their service. P&B operates 6 round-trips a day along Routes 6 from Hyannis to Provincetown during the summer. The Cape Cod RTA runs six trips a day along Route 28 from Orleans to Hyannis.

It is interesting to note that the directional signs on some state routes in this sub-region are confusing due to the geography of the sub-region. For example, Route 28 is signed as Route 28 South as it heads from Dennis to Orleans despite the fact that it travels first east, then north before ending in the Orleans Rotary.

Rail Service
Tracks coming from the west have been abandoned east of the Yarmouth transfer station. There is no longer any rail service in this sub-region. The tracks that formerly crossed the region have now been replaced by the Cape Cod Rail Trail.

Bike Facilities
The main bike facility in this sub-region is the Cape Cod Rail Trail, built on the old rail right-of way from Dennis to Wellfleet. This route provides a major east-west corridor for (mostly recreational) bike traffic across the elbow of Cape Cod. This bike path is uninterrupted and serves many villages, beaches, and Nickerson State Park where additional bike facilities exist. A connecting bike trail through Harwich has also been completed recently as were bicycle bridges across Route 6 in Harwich and Orleans for the Cape Cod Rail Trail.

Air Service
There is only one airport in this region, Chatham Airfield, and no scheduled commercial traffic uses this airfield.

Ferry Service
High speed passenger ferry service which accommodates bicycles operates from Harwich to Nantucket during the summer. This service operates from late May until Columbus Day and includes 3 round trips per day.

North/South Transportation Link: Rt 134

Route 134 in Dennis provides a link form Route 6A in the north and Route 28 in the south to Route 6. Local road connections at either end serve neighborhoods and beaches. This roadway is two lanes except for a four-lane section between Route 6 and Upper County Road. This section, near the Patriot Square shopping center also includes a center lane for turning. Traffic signals are located at Route 6A, Setucket Road, Bob Crowell Road, Patriot Square, T.F. Smith Road, Upper County Road, and at Route 28. Adjacent to Route 134 is the parking lot for the western end of the Cape Cod Rail Trail. The interchange at Route 6 and 134 was experiencing delays. A cloverleaf interchange was recently completed by MassHighway.

3.4.2.2. Transportation Issues and Problems

This area is generally less congested than other areas of the Cape, although certain road segments such as Main Street in Chatham west of downtown operate well over capacity during peak hours. However, as noted in the Monomoy Capacity Study, the roads of this region are predicted to become considerably more congested in the next ten years if current land use patterns and growth rates continue. If the current trend of converting seasonal housing to year-round use continues, congestion could become even worse and persist for longer portions of the year.

The Lower Mid-Cape region is also where Route 6 becomes a limited access highway with one lane in each direction. This is an unusual configuration, particularly because an entire section of the highway is built along only half of the right-of-way (which was acquired as part of the original plan to build a four lane highway all the way to the Orleans rotary from the Cape Cod Canal). Some would like to see the highway widened to a four lane configuration, or improved with a paved shoulder. Others feel that widening the highway would simply allow more development to occur on the lower Cape, and note that current traffic levels are adequately served by one lane in each direction.

3.4.3. The Barnstable/Yarmouth Area

The towns of Barnstable and Yarmouth make up the “urban core” of the Cape. They consist of 21% of the land area of Cape Cod, and contain 72,628 residents or 32.7% of the Cape’s population. They also contain 40% of the jobs in the county. Although a portion of workers commute into or out of this sub-region, 76% of employed persons living within the towns of Barnstable and Yarmouth work in these two towns. Along with the town of Dennis, Barnstable & Yarmouth are often referred to as the "Mid Cape." The effect of geography (transportation between Dennis & Yarmouth is restricted by water bodies such as Bass River) has made it more practical to address Dennis issues in the previous section which discusses the Lower Mid-Cape Area.

3.4.3.1. Transportation Facilities

The transportation infrastructure for this sub-region includes approximately 800 miles of roadways, intercity and local bus services, limited rail service, commercial airline service and ferry service. An intermodal transportation center to coordinate these different transportation services in Hyannis was opened in 2002 near the existing bus and railroad stations. Mobility to and within this "urban core" is beneficial for access to regional and local services, such as the transportation connections, the Cape Cod Hospital, Route 132 retail areas and downtown Hyannis. Other facilities in the Barnstable/Yarmouth area include the Cape Cod Community College located on Route 132 with the YMCA and the Cape Cod Conservatory nearby and the Barnstable County Complex on 6A.

The major west-east corridors (Route 6, Route 6A, and Route 28) link the towns of Barnstable and Yarmouth, both to each other and the other sub-regions of Cape Cod. Also, the railroad right of way comes from the west into the Town of Barnstable and forks with one section of tracks heading through Yarmouth into Dennis to Route 134 and the other turning south near Willow Street toward termination in Hyannis. This sub-region also has links by air and water in the Hyannis area of Barnstable. Commercial air services are available at the Barnstable Municipal Airport and ferries operate from Hyannis Harbor to the islands.

Roadway Network

The three roadway corridors are Route 6, Route 28 and Route 6A. Route 6 is a four-lane freeway divided by a vegetated median. Route 28 is a two-lane roadway with occasional turning lanes. Route 6A is an historic/scenic byway with two narrow lanes and roadside features such as stone walls and large trees. Scheduled Plymouth & Brockton Street Railway Co. bus service operates from Boston into Hyannis on Route 6 stopping at the Park and Ride commuter lot in Barnstable and continuing down Route 132 and Barnstable Road to the transportation center in downtown Hyannis. The Cape Cod RTA operates a regional year-round fixed route bus service called the SeaLine Breeze from Falmouth to the Hyannis Transportation. Along Route 28 in Orleans to Hyannis, the Cape Cod RTA operates the H2O Breeze bus line, a year-round bus service. The Cape Cod RTA also operates a paratransit service called the b-bus. The b-bus operates in all towns of the mid-Cape, 7 days a week, year round.

The limited-access, four-lane, median-divided, Mid-Cape Highway, or Route 6, has four access points through this section of Cape Cod. Major regional roadways emanate in both northerly and southerly directions from the Route 6 exits. Commercial areas have developed on three of these north/south connectors increasing travel demand and leading to sections of widened four lane roadway on Route 132 and 3 lanes on Union Street/Station Avenue. Improvements on Willow Street are also being discussed.

Bike Facilities
The State Bicycle Route 1 or Claire Saltonstall Bike Route follows the Service/Access Road in Barnstable from the Sandwich town line across Route 149 to Route 132, Route 132 to Phinneys Lane, Phinneys Lane/Hyannis Road to Route 6A, and east to Setucket Road in Yarmouth. This route continues along Setucket Road as a bike path into Dennis and Brewster. A north/south bicycle path branches from the Claire Saltonstall route at Route 149 and heads south along Old Stage Road leading to a path along the south side of Route 28 which runs east to Bearses Way in Hyannis. Many bicyclists are making trips in the sub-region though few roadways comfortably accommodate bicycle use.

Air Service
This region contains the major commercial airport on Cape Cod, Barnstable Municipal Airport. Air service is available several times each day on several different carriers between the Barnstable Municipal Airport and other destinations including the Islands and Boston.

Rail Service
The Cape Cod Central Railroad operates excursion train service between Hyannis and Sandwich. Service includes four round trips of various types of excursions on Tuesdays through Sundays during the tourist season. The service is under new management.

Ferry Service
The Steamship Authority operates passenger, automobile, and truck ferry service between Hyannis and Nantucket year-round. Private companies operate passenger service between Hyannis and Nantucket year-round, and passenger service between Hyannis and Martha's Vineyard during the summer.

North/South Transportation Links
There are four areas within the Barnstable-Yarmouth area that provide north/south transportation connections from the transportation "spine" of Route 6:

- In the western part of Barnstable, Route 149 (a two lane roadway) connects Route 6A and 28 as well as providing access to Route 6 at exit 5. A year round bus service connecting the villages of Cotuit, Marstons Mills, and West Barnstable via Route 149 was tried from November 1995 through June 1996 and had little ridership. The area is primarily low-density housing north of Route 6.

- Route 132 in Barnstable/Hyannis provides a link from Route 6A and Route 6 at Exit 6 to the Barnstable Municipal Airport and Route 28 at the Airport Rotary where Route 132 terminates. Route 132, the Cape's largest commercial and retail corridor, is two lanes from Route 6A to just before the signalized intersection of Route 132 with Phinneys Lane where it widens to an undivided four lanes. The four lane cross section continues through three more signalized intersections to the signalized intersection of the Capetown Plaza and the Cape Cod Mall entrances where a small median barrier exists. Route 132 narrows as it approaches and connects with Route

28 at the Airport Rotary. The Cape Cod Regional Transit Authority operates a local bus service called the Villager. The *Villager* service begins at the Barnstable County complex, travels along Route 6A to Route 132 and connects with each of the Malls and to the Barnstable Municipal Airport and terminates at the Hyannis Transportation Center. The bus operates eleven round-trips a day, Monday through Friday, seven round-trips a day on Saturdays.

- Willow Street in Yarmouth at Route 6, exit 7 connects with Route 6A to the north and Yarmouth Road at the Barnstable town line which leads to Route 28 and into Hyannis for an alternative to 132 for access to the downtown area. This access to Main Street, Hyannis passes the new Steamship Authority parking lot at the corner of Yarmouth Road and Main Street; this lot is just east of the railroad tracks and the Hyannis Transportation Center. In addition, this exit is the primary access route to the Cape Cod Hospital from Route 6. From Willow Street near the Route 6 exit ramps, Higgins Crowell Road provides a connection to Route 28 in West Yarmouth. Higgins Crowell Road also intersects with Buck Island Road, an alternative to Route 28 for east-west traffic in the area and may be realigned at the Willow Street end to improve traffic flow at Exit 7. Further south from Route 6 down Willow Street is Camp Street which also connects both to Buck Island Road and Route 28. Though travel demand is high in this area, few alternative provisions are present. The Town of Yarmouth has recently constructed improvements for Buck Island Road which include bicycle accommodation. Route 28 has bicycle traffic, especially in the summer season when seasonal workers commute via bicycle, yet the roadway has many access points and no markings for bicyclists.

- Union Street/Station Ave. at Exit 8 in Yarmouth is a main connector between Route 6A and Route 28 for destinations in Yarmouth and Dennis. This corridor includes an undivided roadway and offers few alternatives to the automobile.

3.4.3.2. Transportation Issues and Problems

Geography, environmental constraints, cost, character issues, and policy restraints generally make difficult building additional highway systems or adding capacity to the existing roadways. Many in the area have expressed a strong desire to find alternatives to widening roadways.

Development of a more balanced and coordinated system will improve the efficiency of the Barnstable/Yarmouth area infrastructure in a cost-effective and environmentally friendly manner thereby improving the quality of life. Town-level policy and land use decisions affect the operation of the transportation assets and must include consideration of the transportation implications. Growth centers must be chosen which provide for efficient transit connections to encourage this alternative. With redevelopment or new development along major routes, the responsible agencies should require a transit oriented connection to the major roadways and require parking to be located at the back or side of the development. To support development of these alternate modes in the Barnstable/Yarmouth area, some alternatives have been identified:

- The intermodal center in Hyannis has the potential to create a more efficient, connected system for transfers between modes which will aid in allowing for more trips without an automobile. In addition, increased trips by pedestrians and bicyclists will be encouraged with improvements for safety of these trip types.
- Accommodation of bicycles with the addition of lanes for this mode should be considered for major routes such as Routes 28 and 132.
- It is recommended that the construction of new travel lanes on Route 132 be accompanied by a median from Route 6 to Bearses Way, access management and controlled land use, as well as bicycle and pedestrian accommodation.
- A bicycle connection to the intermodal center site as a spur from the westerly extension of the Cape Cod Rail Trail into Yarmouth and Barnstable will provide additional alternative mode benefits for the region.

3.4.4. The Upper Cape

The Upper Cape towns of Bourne, Sandwich, Falmouth, and Mashpee include the mainland gateway to the Cape. They consist of 37% of the land area of Cape Cod, and contain 84,463 residents or 38% of the Cape's population. They also contain 33% of the jobs in the county. Although a portion of workers commute into or out of this sub-region, 63% of employed persons living within the four town area of Bourne, Sandwich, Falmouth and Mashpee work in these towns. The Upper Cape area includes regional and local services, such as the transportation connections, shopping centers and the Falmouth Hospital.

This area is identified as the upper Cape even though it is physically south of the lower or outer Cape. This is due to the fact that one must travel from the Cape "up" to Boston making the tip of the Cape the furthest or "lowest" and the Canal area the "upper" Cape.

3.4.4.1. Transportation Facilities

The transportation infrastructure in this sub-region includes approximately 1,200 miles of roadway, intercity and local bus services, limited rail service, and ferry service.

Roadway Network

The Cape Cod Canal bisects the Town of Bourne and is bridged in just three places, two for vehicular traffic and one for rail. The three major corridors connecting this sub-region to other parts of Cape Cod are Route 6A, Route 6 and Route 28. However, both Route 6A and Route 6 function more as intra-regional travel collectors from Falmouth and Mashpee as no direct connections are made to these towns by these corridors. Additional regional corridors serve as a network for the sub region. Route 151 from Route 28 in Falmouth near the Bourne town line crosses through North Falmouth and connects to Route 28 in Mashpee. Route 130 from Route 6A to Route 6 in Sandwich and on to Route 28 in Barnstable just east of Mashpee/Barnstable town line connects Mashpee with Sandwich and allows access to Route 6.

Bonanza Bus Lines/Coach USA provides intercity service from this sub-region to Boston and Providence, Rhode Island. The Sealine *Breeze*, a regional year round fixed route bus service, travels from Falmouth through Mashpee primarily on Route 28 to the Hyannis Transportation Center. The Park and Ride commuter lot in Sagamore is serviced by P&B for trips to and from Boston. The Cape Cod Regional Transit Authority (Cape Cod RTA) has operated the "WHOOSH," a summer shuttle, between downtown Falmouth and Woods Hole since 1993 with ridership increasing each year. In recent years, the Greater Attleboro Regional Transit Authority (GATRA) has operated the "OWL" (Onset-Wareham Link) with service to the Massachusetts Maritime Academy, Main Street in Buzzards Bay, and across the Bourne Bridge to Tedeschi's near the Bourne Rotary. Falmouth Hospital has contracted with the Cape Cod Regional Transit Authority to provide a free medical courtesy bus to transport riders to Falmouth Hospital for medical appointments. This Courtesy Bus is available to any individual living within the towns of Mashpee, Bourne, Sandwich, and Falmouth, and operates Monday through Friday. This service supplements the Cape Cod RTA's b-bus service, the paratransit service operating seven days a week for any resident in the upper Cape.

Ferry Service
This sub-region also has links by water between Falmouth and Martha's Vineyard. The Steamship Authority ferries operate between Woods Hole and the Vineyard carrying passengers, bicycles, automobiles, and trucks. The 2003 schedule includes 22 round trips per summer weekday. In addition, two private ferry operators provide passenger service between Falmouth Harbor and Martha's Vineyard during the summer season.

Bike Facilities
The Boston to Cape Cod Bikeway, also known as State Bicycle Route 1 and the Claire Saltonstall bikeway reaches the Cape Cod region on Route 3A in Bourne and follows Route 3A to Meetinghouse Road which connects to the Sagamore Rotary and Bridge. Once over the Sagamore Bridge, this bicycle route connects with Route 6A to the intersection of Route 6A and Route 130 in Sandwich. State Bicycle Route 1 proceeds south on Route 130 to the junction with the Service Road in Sandwich. The bike route continues on the Service Road in Sandwich and into the Town of Barnstable. Other bicycle trails include the bike paths along both sides of the Canal in Bourne and the Shining Sea Bike Path which connects downtown Falmouth to Woods Hole.

Rail Service
The third bridge across the Cape Cod Canal is the railroad bridge. Typical Cape Cod freight shipments by rail are made three to four times per day year round; this is primarily to transport trash to the SEMASS waste-to-energy plant in Rochester. The railroad bridge is currently undergoing maintenance. The Cape Cod Central Railroad operates excursion train service between Hyannis and Sandwich (typically four round trips during the tourist season).

3.4.4.2. Transportation Issues and Problems

- under-utilized third (rail) bridge over the Cape Cod Canal
- most of freight shipment is by trucks

- recent land development which is auto-oriented
- A need for more local transit service
- Canal-related crossing limitations
- Improved ferry service from off-Cape locations to the islands
- Maintenance of Bridges

3.4.4.3. Cape Cod Canal Area

An important transportation subset of the Upper Cape contains the roads and bridges along and over the Cape Cod Canal. The Canal Area includes the approaches to the Sagamore and Bourne Bridges and the roadway systems that serve the area. This area has been the subject of a number of studies that have looked at improvements and major new construction such as improvements to the Sagamore Rotary.

A number of promising projects have been developed by the principal study, the Canal Area Study which is currently in draft form and these include:

- Sandwich Road Parkway
- Relocation of Interchange 1
  - Interim closures of the westbound Exit 1 on-ramp to help improve traffic flow over the Sagamore Bridge in the off-Cape direction.
- Median Barrier for the Scenic Highway
- Scenic Highway/Route 25 Ramp
- Canal Area ITS

Two of these projects (Sandwich Road Parkway and the Scenic Highway/Route 25 Ramp) have been adopted by the Bourne Planning Board. These promising projects need to be pursued further as they appear to have significant potential benefits.

3.5. Cape Cod Land Use

As recognized in one of the Cape's regional transportation goals, land use creates transportation needs, and the creation of new transportation capacity usually induces new land uses. Land use patterns on the Cape have changed in the last 50 years from a village-centered pattern of relatively dense development in centers surrounded by little or no development, to a suburban style of subdivisions and strip malls. Such changes have transportation implications; and future land use patterns will both be affected by future transportation improvements and will create the need for new improvements.

3.5.1. Current Land Use

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 (excluding Camp Edwards and Otis Air Force Base) is used for housing, 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.

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. The housing density on the south shore and Buzzard's Bay coastline is greatest. Outer Cape development is more dense in the town centers of Provincetown and Eastham than the rest of the sub-region. Generally, lot sizes are largest on the Cape Cod Bay side of the Cape. 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. 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.

Seasonal Uses

In a tourist area such as Cape Cod, lodging units such as hotel and motel rooms also play an important role in regional transportation planning. Seasonal lodging is spread in clusters throughout the cape, including communities such as those in Provincetown, Chatham, Brewster, Harwich, Yarmouth, and Barnstable. There are also significant amounts of seasonal land uses along the south shore of the Cape.

Commercial and Industrial

Commercial and industrial land use varies by specific type, although generally they are more common uses on the Upper Cape than elsewhere:

- Office Uses: Office land uses are concentrated in Orleans, 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, Route 132 in Hyannis, Route 28 in Bourne, Route 6A in Orleans, and Route 134 in Dennis.
- Manufacturing Uses: Manufacturing largely occurs inland from Barnstable to Dennis, and in Falmouth and Bourne. On the whole there is not a large amount of manufacturing on Cape Cod.
- Mining: Mining is not widespread on Cape Cod, although there is some sand and gravel mining in Falmouth, Bourne and Barnstable.

Open Space

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 additional growth on land already developed within its borders.

In 1998, the Cape Cod Land Bank Act was passed and in the first year nearly 800 acres were approved for preservation across the region. Most of the parcels are for conservation or passive recreational use but some towns have purchased properties for other purposes such as future water supply well sites and trail links to the Cape Cod Pathways network.

Generally, open space uses are common inland and on the outer Cape, while not as common on the south shore of the Cape. The Cape Cod Bay and Buzzards Bay shores falls somewhere in between. Both transportation and local land use decisions have played a major role in the loss of open space. 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, "perceived" open space (undeveloped land as well as protected conservation land) 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.

4. Future Expectations

Transportation on Cape Cod has always been a challenging subject. In the past it was generally related to the summer tourist traffic. The summer traffic of the 1970's is now the traffic in all but the dead of winter. Transportation planning in the context of 2025 must consider year-round solutions as well as the ever increasing summer traffic.

The nature of the Cape's transportation system is becoming a critical issue from a variety of standpoints. An old issue is the balance of capacity and preservation of the character of Cape Cod. Constant pressure from the tourism industry to increase the capacity of the transportation system must be balanced with the ability to support the increases in traffic without "killing the goose that lays the golden eggs." This issue is also related to compliance with state and federal standards for roadway design that often requires modern design approaches such as wide shoulders when improving scenic roadways such as Route 6A.

Another newer perspective that must be considered is the increasing year round population. This trend is expected to continue and increase as the "baby boomers" born after World War II begin to seek retirement homes and turn to Cape Cod. This trend has several transportation implications other than more year round traffic. Barnstable County has one of the oldest populations in Massachusetts and over 40% of its population is expected to be over 50 by the year 2010 (compared to less than 20% nationwide). This trend will require more consideration of public and senior transportation as well as design practices that will ensure system safety while increasing operational efficiency.

In addition to the increases in elderly population there has been an increase in sprawl statewide that has included Cape Cod. Increasing numbers of Cape residents commute to job centers such as Boston and Providence, RI. This trend has increased the demand for commuter options such as Commuter Rail between the Cape and Boston. Development of options such as this must be considered with respect to compromising the character of Cape Cod for that of a bedroom sprawl community.

Alternative forms of transportation to/from and around Cape Cod are an important component of the transportation planning for the future. This component can be a powerful tool in achieving other objectives consistent with the Cape Cod Commission's Regional Policy Plan. The transportation options such as access by rail could be a good solution if the service is crafted to support tourism and other forms of trips without creating pressure to accelerate the development of housing. Summer passenger rail service to the Cape has been supported by the Cape Cod Regional Transit Authority and others to bring visitors and tourists to the Cape during peak summer seasons. This includes service from Washington DC and New York City to the Cape as well as additional service from Boston to the Cape. This type of service, when available, will provide another alternative to driving to the Cape in the peak summer months.

4.1. Cape Cod 2025

This transportation plan is for the years 2003 to 2025. Current projections used to estimate traffic demand are largely from the Massachusetts Institute for Social and Economic Research (MISER). Such projections provided for the Cape Cod region are based on trends that have occurred in the past, extended to the future.

The MISER projections include expected population and land use changes between now and 2025 without any regard for the recent initiatives such as the Cape Cod Land Bank and the efforts by the Cape Cod Commission to mitigate developments of regional impact (DRI) as defined by the Commission's Regional Policy Plan. Also, the MISER data does not take into account that some of the towns on Cape Cod are expected to reach "buildout" (a condition where all available land is being used for residential or commercial purposes) before 2025 and no additional growth can occur. Other issues not considered by MISER are some of the unique issues facing Cape Cod such as groundwater supply limitations and seasonal traffic demands.

The limitations of the MISER projections are understood by the MPO staff and adjustments have been made in many cases to provide more reasonable scenarios for the future. The MISER projections are anticipated to be accurate in the short term and will become less reliable as we go further into the future.

Efforts to create a more accurate projection for the Cape Cod region are underway by the Cape Cod Commission and the Executive Office of Environmental Affairs (EOEA). These projections, along with the 2000 census data will allow for a much more accurate vision of the future that will be incorporated into future transportation planning and plan updates.

4.1.1. Executive Office of Environmental Affairs - Build-out Analysis

In 2000 a "build out" analysis was done for the Cape Cod Region based on existing land use and zoning to estimate the potential for housing and population as well as the infrastructure and resource needs. The following table includes a summary of this analysis done for EOEA. The values included in the chart are additional impacts and needs from the 2000 base year. The miles of new roads are based on a historic percentage of the land development area required to support it. The build out is expected to occur in many Cape towns, especially on the Outer Cape, before 2025 but this will vary due to a number of conditions.

Table 11 - Buildout Development

Town:	Acres Sub-divided since 1990	Acres of Developable Land	Residential Lots	Dwelling Units	Acres C/I* Floor Area	Res Water Use GPD
Barnstable	473	8,657	6,874	6,874	223	904,120
Bourne	402	5,271	3,080	3,080	518	414,691
Brewster	159	2,868	2,762	2,762	44	271,180
Chatham	24	1,213	1,126	1,198	17	88,368
Dennis	492	1,680	1,193	1,193	112	86,182
Eastham	23	1,159	614	614	18	42,025
Falmouth	427	2,435	5,849	5,849	113	820,435
Harwich	310	3,950	2,780	2,780	85	256,705
Mashpee	403	2,799	2,602	4,323	150	364,753
Orleans	81	1,849	920	920	52	104,625
Provincetown	8	100	431	834	0.5	30,169
Sandwich	369	4,465	2,371	2,371	50	382,021
Truro	52	1,144	1,128	1,128	18	60,912
Wellfleet	95	1,285	1,364	1,364	52	72,347
Yarmouth	87	2,485	1,919	1,919	93	190,845
Total additional:	2,932	41,360	35,013	37,209	1,546	4,089,378

*Commercial/Industrial

Table 12 - Impacts of Buildout

Town:	C/I Water Use GPD	Muni. Solid Waste (tons)	Non-recycled Solid Waste (tons)	New Students	New Roads (miles)
Barnstable	729,882	6,184	1,784	1,942	110
Bourne	1,692,061	2,836	818	813	44
Brewster	144,996	1,854	535	593	25
Chatham	55,361	604	174	50	16
Dennis	366,982	589	170	141	7
Eastham	58,649	287	83	81	6
Falmouth	370,670	7,652	5,913	2,476	18
Harwich	277,355	1,756	506	525	47
Mashpee	492,588	2,495	837	1,148	30
Orleans	169,782	715	206	130	15
Provincetown	1,634	399	115	61	5
Sandwich	162,641	2,613	753	1,114	52
Truro	60,353	416	120	141	19
Wellfleet	171,237	495	169	113	21
Yarmouth	303,349	1,305	377	311	33
Total additional:	5,057,540	30,200	12,560	9,639	447

Notes:
1) Falmouth "acres sub-divided" are only from 1990 to 1994
2) Mashpee has more dwelling units (4323 total additional) than residential lots due to pre-approved condominiums.

4.2. Expected Changes 2003 to 2025

The projections for a number of factors within the region were developed by MHD in consultation with the Cape Cod Commission. These numbers were developed within the limits established by the EOEA Build Out analysis and trends established with the 2000 Census and past data.

Table 13 - Buildout Trends

	2000	2005	2010	2015	2020	2025
Population	222,230	230,000	237,000	252,000	266,000	280,000
Employment	98,203	100,000	102,500	107,200	111,100	114,300
Households	94,822	99,600	103,700	111,400	118,700	126,200
Group Quarters	5,677	5,880	6,050	6,440	6,800	7,150
Population in HH	216,553	224,120	230,950	245,560	259,200	272,850
Ave HH size	2.28	2.25	2.23	2.20	2.18	2.16

4.3. Regional Issues and the Regional Policy Plan

Transportation makes up an important part of Barnstable County's Regional Policy Plan (RPP). The Regional Policy Plan is an expression of the shared aspiration of Cape Codders for the future. It recognizes the Cape as a fragile and beautiful place. It is a Plan that seeks to protect habitat, in the awareness that Cape Cod is home to endangered species of global significance. It is a Plan with a goal to conserve a cultural landscape shaped slowly over 10,000 years of human habitation.

The Cape Cod MPO recognizes other regional planning efforts, such as the Regional Policy Plan (updated in 2002). The Regional Transportation Plan provides a framework for transportation decisions and activities with state and federal involvement. The Regional Policy Plan provides a framework for local and regional (Barnstable County) land use activities. In order to improve coordination among all regional planning activities, MPO actions where feasible and appropriate will be consistent with the Regional Policy Plan.

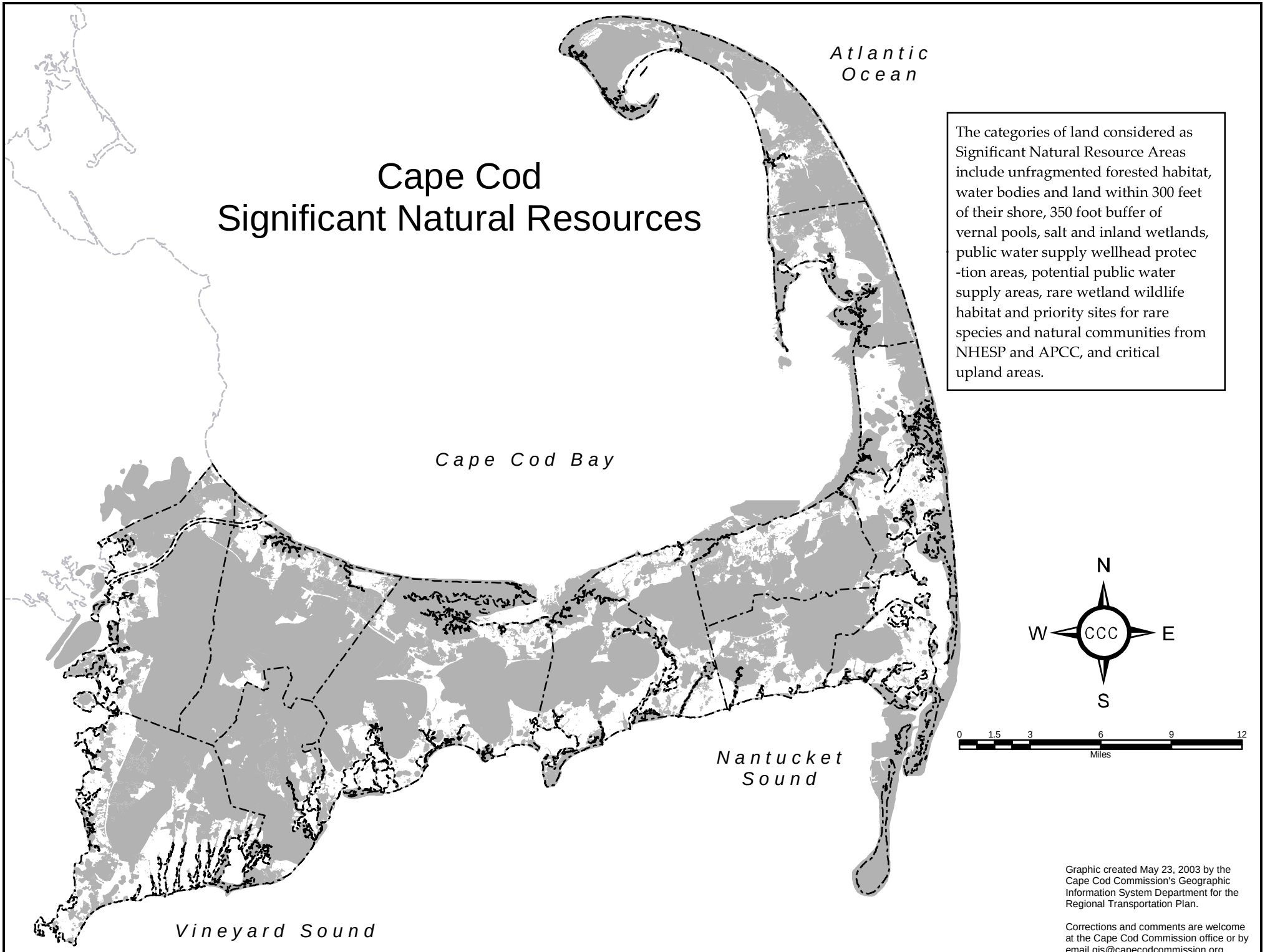
The Regional Policy Plan includes broad goals which set the direction for future and more detailed policies for the issues of land use/growth management, natural resources, economic development, community facilities and services (including transportation), affordable housing, and heritage preservation/community character. The RPP recognizes that dealing with our traffic problems by building new or bigger roads and intersections is not desirable. Not only have such strategies failed to keep up with travel demands caused by new development, they have done so at the expense of the environment and natural beauty of the Cape. Furthermore, increasing capacity for cars does little to improve transportation for young people, for the elderly that may prefer not to drive, for those people who cannot afford a car, or for others who do not drive. Two RPP issue areas are discussed in the following sections.

4.3.1. Environmental Concerns

The following figure "Cape Cod Significant Natural Resources" shows a composite of some of the natural resources on Cape Cod. The shaded area includes:

- Unfragmented Forested Habitat
- Water Bodies and Land within 300' of their Shore
- 350' Buffer of Vernal Pools
- Salt and Inland Wetlands
- Public Water Supply Wellhead Protection Areas
- Potential Public Water Supply Areas
- Rare Wetland Wildlife Habitat and Priority Sites for Rare Species and Natural • Communities from NHESP and from Association for Protection of Cape Cod
- Critical Upland Areas

Cape Cod
Significant Natural Resources



The categories of land considered as Significant Natural Resource Areas include unfragmented forested habitat, water bodies and land within 300 feet of their shore, 350 foot buffer of vernal pools, salt and inland wetlands, public water supply wellhead protec -tion areas, potential public water supply areas, rare wetland wildlife habitat and priority sites for rare species and natural communities from NHESP and APCC, and critical upland areas.

Graphic created May 23, 2003 by the Cape Cod Commission's Geographic Information System Department for the Regional Transportation Plan.

Corrections and comments are welcome at the Cape Cod Commission office or by email gis@capecodcommission.org.

4.3.2. Scenic and Historic Concerns

The shaded area of the following figure shows the following historic features:

- National Register Historic Districts
- Local Historic Districts
- Old Kings Highway Regional Historic District

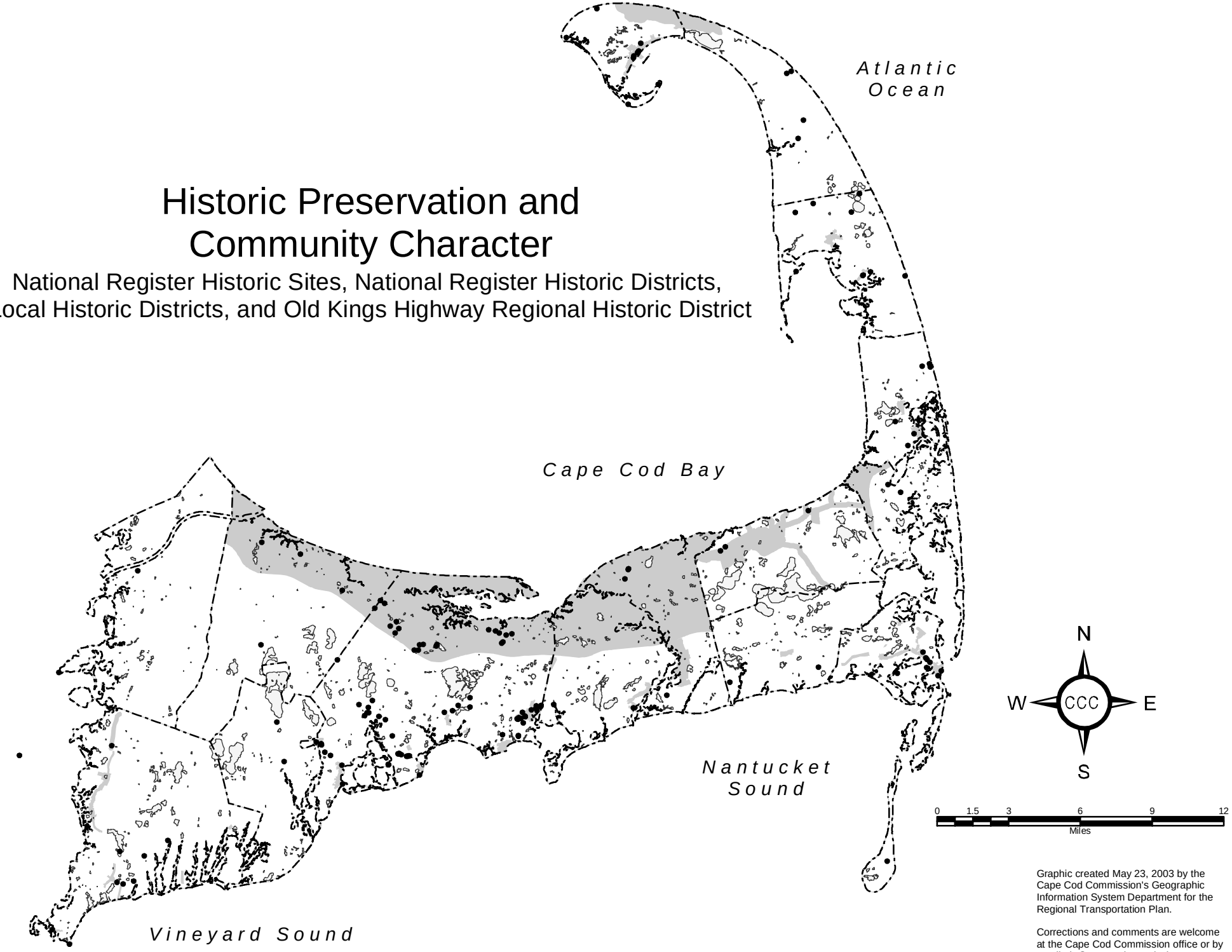
The cross-hatched area shows Scenic Landscapes designated by the Massachusetts Department of Environmental Management. Sites on the National Register are also indicated.

4.3.2.1. Rural Roads Initiative

Cape Cod Commission, together with the Martha's Vineyard Commission, the Nantucket Planning & Economic Development Commission, and the Cape Cod National Seashore, have received federal TEA-21 funding for the Cape & Islands Rural Roads Initiative. The Rural Roads Initiative is a study of design guidelines for public road construction and/or reconstruction projects, including recommendations for traffic controls, which meet standards for public safety while preserving the unique quality of rural roadways.

Historic Preservation and Community Character

National Register Historic Sites, National Register Historic Districts, Local Historic Districts, and Old Kings Highway Regional Historic District



Graphic created May 23, 2003 by the Cape Cod Commission's Geographic Information System Department for the Regional Transportation Plan.

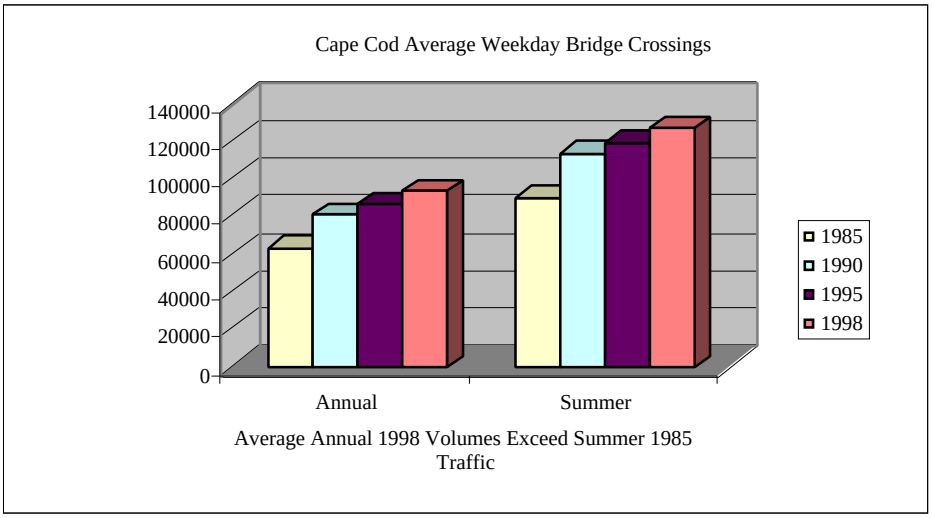
Corrections and comments are welcome at the Cape Cod Commission office or by email gis@capecodcommission.org.

4.4. Demand for Travel

Travel on Cape Cod has two main components, year-round and seasonal:

Year-Round Travel:
Like most regions, there is travel by year-round residents to and from work and for shopping, school, and social trips. As the Cape's year-round population continues to increase, this component of travel on the Cape will increase as well. This travel is easier to understand and analyze, since it represents travel for specific purposes and at fairly regular intervals.

Seasonal Travel:
A significant amount of travel is created by tourists and part-time residents. This travel is often to recreational areas such as beaches, although some of it is also spent on trips to and from shopping, social events, and work. Although most of this travel used to occur in the summer, in recent years it has also been increasing in the "shoulder seasons" of the spring and fall. As shown by the following figure, 1998 average daily traffic across the bridges exceeded the level experienced in July 1985.



4.4.1. Methodology and Assumptions

Understanding and predicting demand for travel on Cape Cod is not easy. Unlike many other regions, many of the trips are not to work or shopping, but instead travel for travel's sake. There are no easy methods to predict the number of "scenic drives" that people may be making. However, by integrating traditional travel demand forecasting with some adaptations for seasonal travel some observations about current demand and

predicted demand for the future can be made. It should be noted up front, however, that like most travel demand models, this model is not able to study the effects on land use that transportation improvements create. For this reason, the analysis in this section is limited to a study of future travel demand on the current road system.

Transit, bicycling and walking are feasible options to automobile travel in many instances on Cape Cod, particularly in the densely developed sections along the south shore of the Cape. However, most of the observations in this section are of demand for automotive travel, whether single occupant vehicles, carpools, or freight transport, since the roadway system is currently under far more stress than these other systems. This does not mean that they will not play a role in alleviating observed roadway congestion, however, as is discussed in the sections on proposed solutions to projected congestion.

4.4.2. Current Conditions

At present, traffic on Cape Cod is mildly congested most of the year but experiences times of extreme congestion in the summer. While summer traffic congestion has been a problem for some time on Cape Cod, year round congestion has become a problem in the last decade. Roads that experience year-round congestion during peak periods at present include:

- Route 132 from Route 6 to the Airport Rotary
- Route 28 from the Mashpee rotary to S. Yarmouth
- Willow Street/Yarmouth Road from Route 6 to Hyannis

In addition, roads that experience peak period summertime congestion include:

- Route 6 from Eastham to Wellfleet Center
- Route 6A in Brewster and Sandwich
- Route 28 in Falmouth
- Route 6A in Yarmouthport
- Route 151 in Hatchville and Mashpee
- Scenic Highway
- Bourne and Sagamore Rotaries
- Route 6 from Exit 9 to Exit 11
- Sandwich Road along the Cape Cod Canal
- Main Street and South Street in downtown Hyannis

However, it should also be noted that, even in the summertime, the vast majority of roads on Cape Cod are not congested. Of the 850 miles of regional roadway modeled, the most heavily used roads on Cape Cod, over 90 percent are not congested during the summertime afternoon rush hour (see Figure 2.11). Of the remaining thousand miles of public roads on the Cape, few if any experience systemic congestion.

In addition, people are generally able to get where they want fairly quickly at present, even in the summer. The average travel speed at rush hour at present is 26 miles per hour. This speed allows the average traveler to get to her or his destination in just over 15 minutes.

Ferry service to Martha's Vineyard and Nantucket attracts a large number of passengers and automobiles, particularly in the summer. In 2000 there were almost 2.9 million passengers on Steamship Authority ferries alone, of which an estimated 456,000 traveled in August (see Table below). Over 600,000 cars and trucks traveled in 2000 and an estimated 750,000 passengers used other ferry services.

Table 14 - Monthly Traffic Counts by Island 1998-2000

Woods Hole, Martha's Vineyard & Nantucket Steamship Authority

	MARTHA'S VINEYARD			NANTUCKET		
	PASS	AUTOS	TRUCKS	PASS	AUTOS	TRUCKS
YEAR 1998						
January	83,596	21,020	4,608	15,120	3,830	2,229
February	82,925	20,691	4,382	14,604	3,630	2,098
March	98,673	24,894	5,719	18,114	4,359	2,926
April	140,523	30,262	6,645	29,095	5,515	3,019
May	208,375	34,188	6,600	52,470	7,089	3,440
June	238,875	36,092	6,329	67,806	9,112	3,403
July	353,255	45,010	6,540	97,857	10,585	3,462
August	366,592	48,454	5,871	103,805	11,471	3,016
September	252,239	40,546	5,849	71,368	9,514	2,982
October	215,172	38,252	5,975	58,018	8,163	2,935
November	125,168	29,300	4,878	29,304	5,940	2,349
December	107,277	28,344	4,760	26,809	5,619	2,171
TOTAL	2,272,670	397,053	68,156	584,370	84,827	34,030
YEAR 1999						
January	84,182	22,075	4,604	14,640	4,071	2,064
February	82,876	21,916	4,394	14,764	3,887	2,057
March	98,893	25,523	5,823	16,177	4,381	2,796
April	148,186	32,127	6,838	32,846	5,954	3,318
May	216,760	35,279	7,080	52,101	7,430	3,674
June	250,921	38,634	7,157	65,021	9,570	3,804
July	342,049	45,067	6,396	98,721	11,096	3,520
August	367,079	46,943	6,358	105,386	11,720	3,254
September	243,515	39,330	5,981	65,055	9,235	3,035
October	222,387	39,708	6,029	50,306	8,320	3,198
November	133,182	30,716	5,561	26,002	5,570	2,689
December	115,136	29,071	5,440	25,862	5,591	2,412
TOTAL	2,305,166	406,389	71,661	566,881	86,825	35,821

YEAR 2000	Passengers	Autos	Trucks	Passengers	Autos	Trucks
January	90,231	22,638	4,900	15,285	3,954	2,098
February	91,509	23,990	4,984	14,625	3,920	2,365
March	111,342	28,578	6,209	18,114	4,810	3,065
April	148,648	32,718	6,489	26,917	5,550	3,123
May	211,802	35,481	7,601	46,578	7,115	3,913
June	260,109	39,936	7,387	69,865	8,928	3,932
July	344,643	46,073	6,386	98,693	10,911	3,586
August	350,756	46,188	6,817	105,754	11,061	3,372
September	245,334	38,604	5,847	72,513	8,801	3,039
October	216,968	37,313	6,071	56,743	7,350	2,985
November	128,759	29,772	5,158	28,488	5,544	2,539
December	109,080	28,225	4,693	24,985	4,950	2,101
TOTAL	2,309,181	409,516	72,542	578,560	82,894	36,118

Source: Steamship Authority

* One-way trips

Air service has attracted a small but significant percentage of travel to and from Cape Cod. In 1999, 428,967 passengers went through Barnstable Municipal Airport, and 16,818 went through Provincetown Airport in 1998.

4.4.3. Future Scenarios

If present growth trends continue unabated, demand for travel on Cape Cod is projected to increase significantly between now and 2025, particularly in the summer months. Between now and 2025, summer daily vehicle miles traveled are projected to increase from 6.3 million to 8.1 million. In that same time period, summer peak hour average speeds are projected to decrease from 26 miles per hour to 20 miles per hour. At the same time, summer peak hour average trip lengths are estimated to increase from 7.27 miles to 7.54 miles. In short, in the future, summer travel will take longer and be slower than at present; the average trip time will increase from 16 minutes to 22 minutes.

Table 15 - Vehicular Travel on Cape Cod

	Summer P.M. Peak Hour Average	
Year	VMT	Trips
1997	572,203	75,525
2003	603,150	78,356
2010	628439	81,077
2020	664,567	84,964
2025	682,631	86,908

In the same time period, winter travel will also increase, but not as sharply. From 1996 to 2020, winter daily vehicle miles are projected to increase from 3.9 million miles to 5.1 million miles. Winter peak hour average speeds will decrease from 31.7 miles per hour to 28.5 miles per hour.

The following figures show congestion on Cape Cod roads during average daily Summer afternoon peak hour conditions in the Base Year (1997) and the Future Year (forecast year 2025) if no travel demand management strategies, roadway improvements or additional land conservation measures are implemented. These forecasts project that the congested areas listed above will become more congested. In addition, the following roadways will begin to experience winter peak hour congestion:

- Route 130 from Route 6A to the Mashpee town line in Sandwich
- Route 6A in Brewster
- Route 6 from Exit 9 to Exit 10 in Dennis and Harwich

Also, the following roadways will begin to experience summer peak hour congestion:

- Route 6 in Wellfleet and Truro
- Route 6 from Exit 11 to the Orleans Rotary
- Route 6A in Sandwich
- Route 28 in Falmouth
- Bearses Way in Hyannis

In short, certain specific roadway segments are projected to reach capacity in the next 25 years.

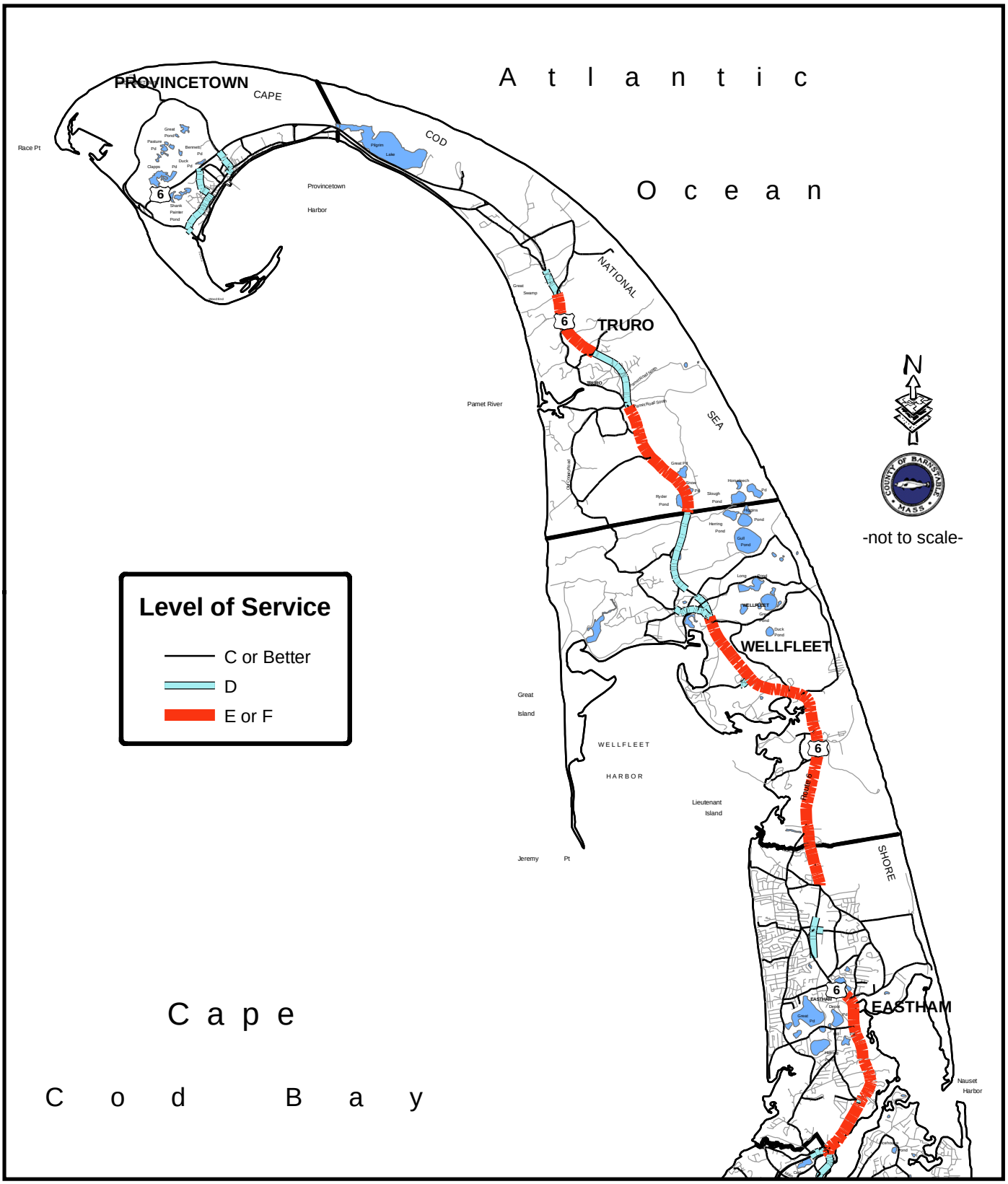
Of course, congestion problems exist that need to be addressed. However, there needs to be assurances that the proposed solutions are truly solutions and not simply temporary "band-aid" fixes. For example, when a road corridor is congested, often the solution proposed is to widen the roadway to the point where its design capacity is able to bear projected volumes. Sometimes this is the best solution. Often, however, increasing roadway capacity is only a temporary solution to the congestion problem. Many times increasing the capacity of a road will simply attract more travel that would not have otherwise occurred (or may have occurred at other times or using other modes or other roads).

In short, solutions to congestion are being carefully considered in order to efficiently allocate public money. Public resources are too scarce to spend on solutions that will not be used or will not serve as actual solutions to identified congestion. In addition, the environmental and community character impacts of any proposal must be considered.

Roadway Level of Service

Outer Cape

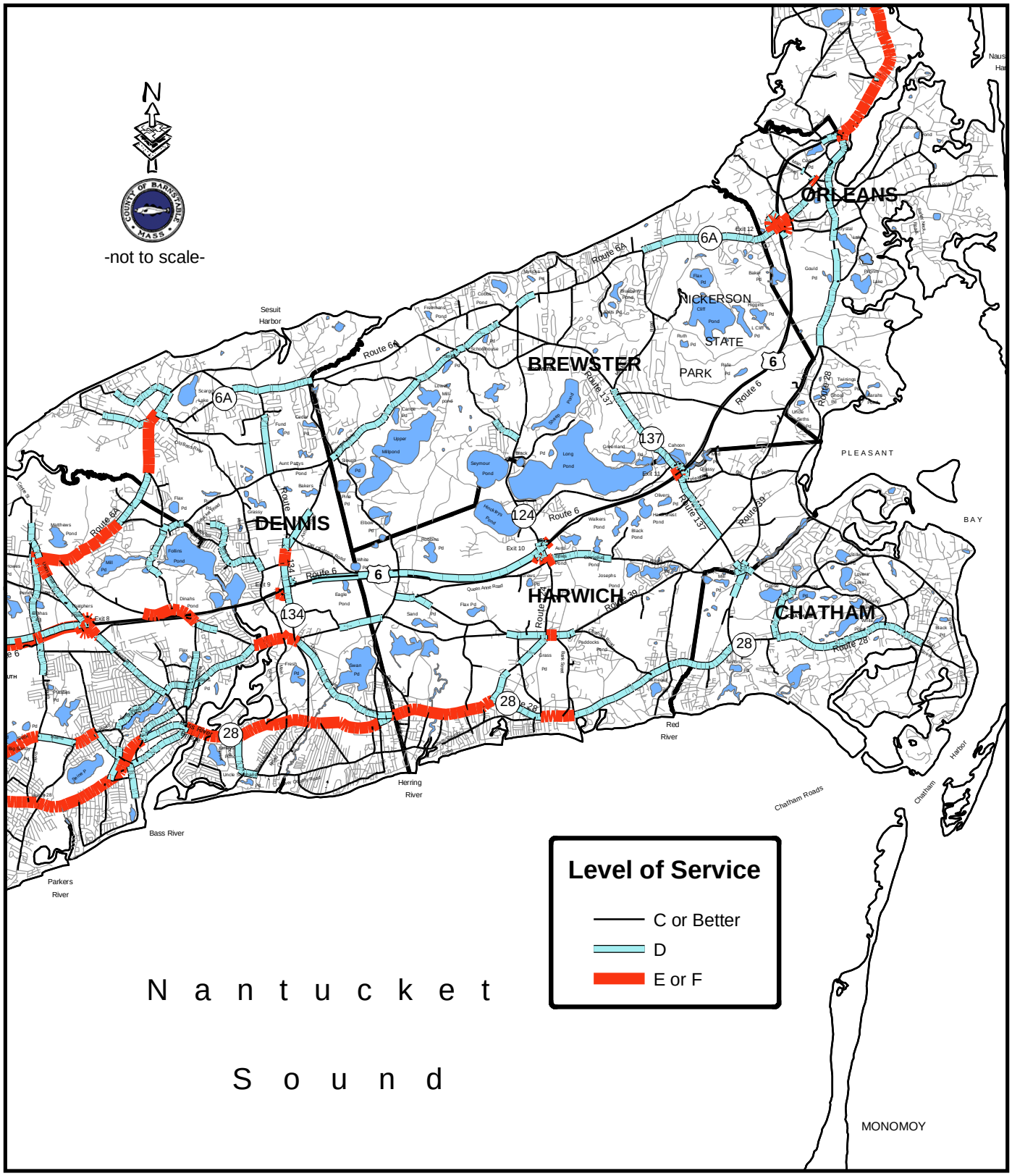
Base Year - Summer Weekday PM Peak Hour



Roadway Level of Service

Lower/Mid Cape

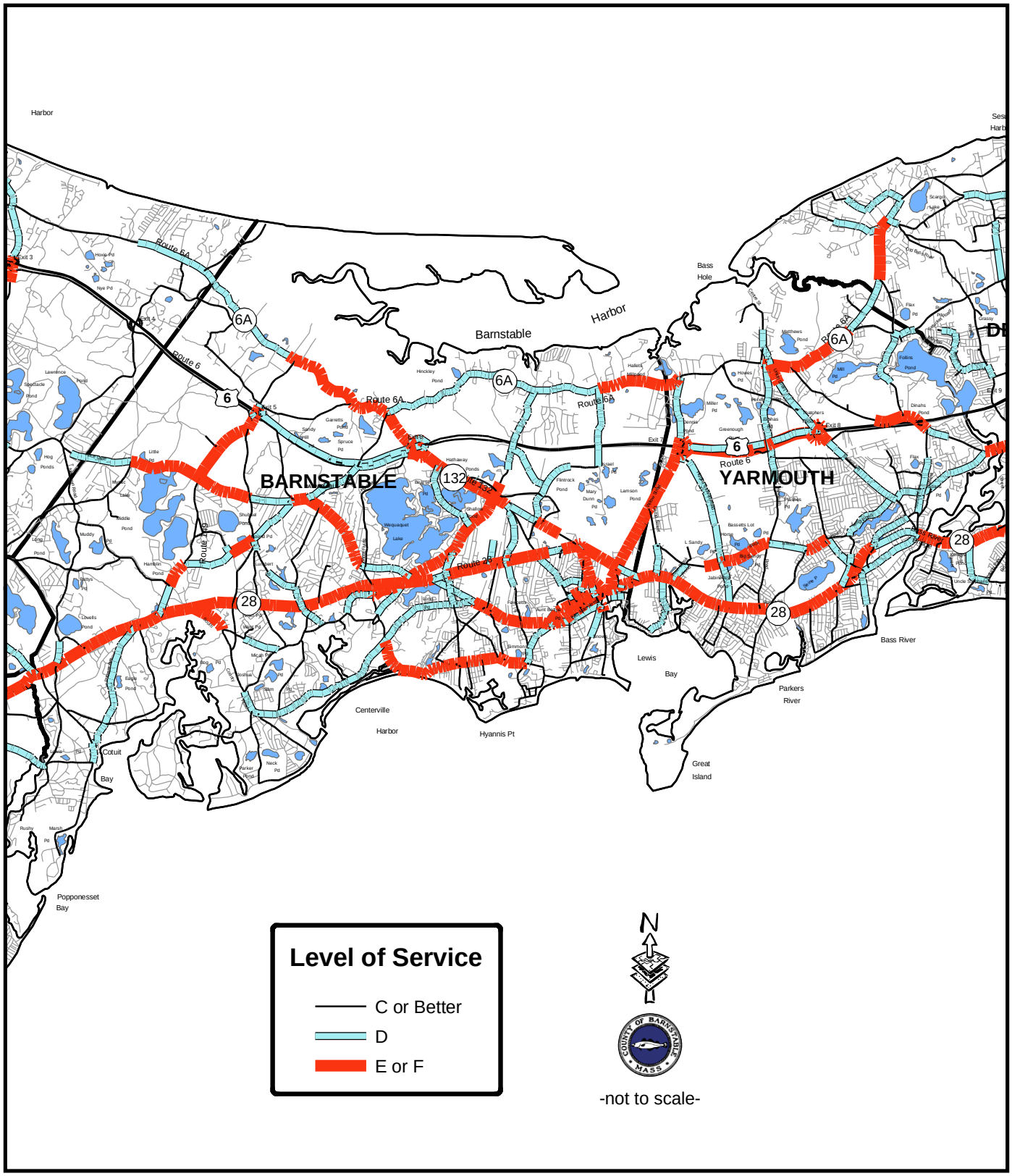
Base Year - Summer Weekday PM Peak Hour



Roadway Level of Service

Barnstable / Yarmouth Area

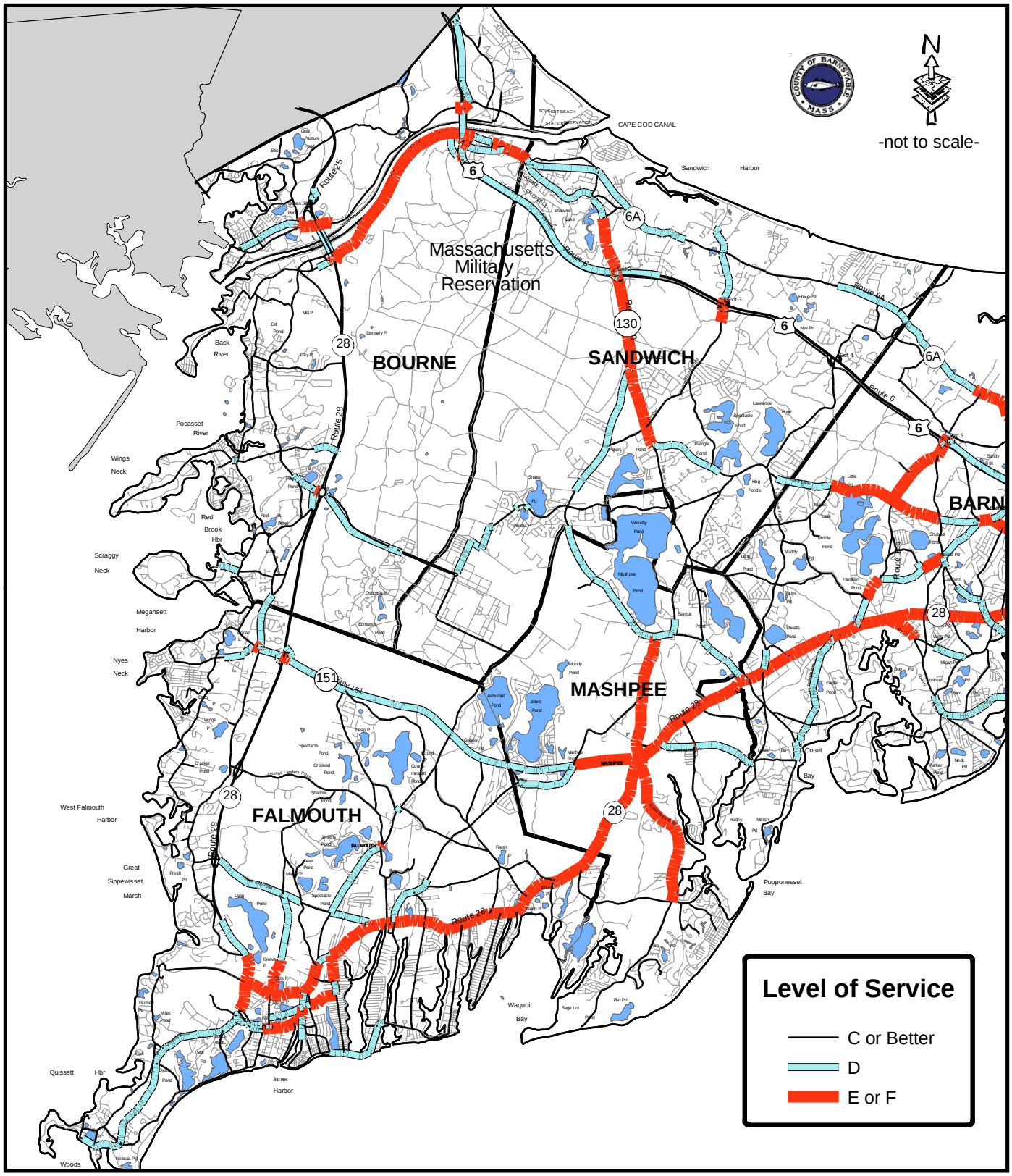
Base Year - Summer Weekday PM Peak Hour



Roadway Level of Service

Upper Cape Area

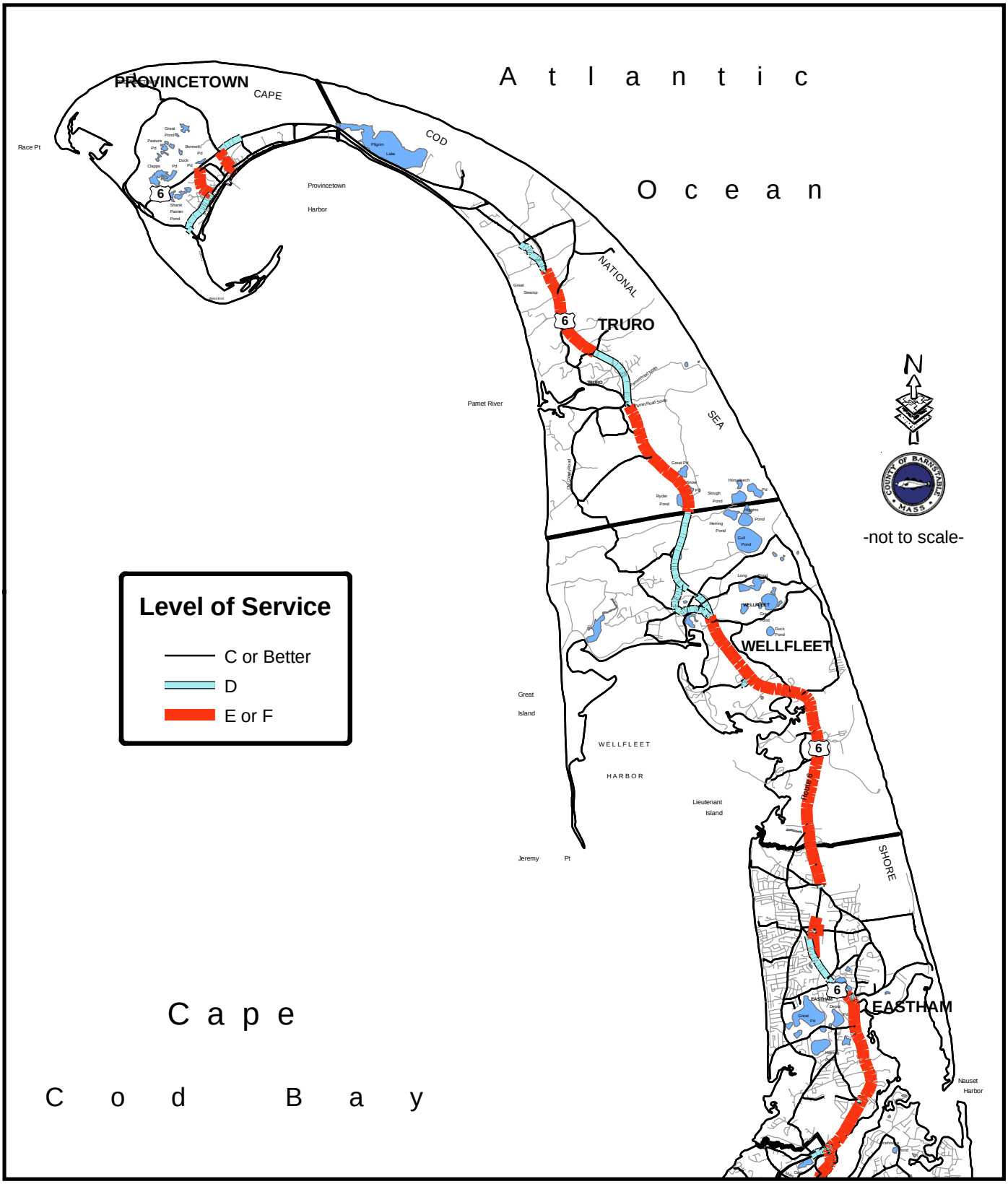
Base Year - Summer Weekday PM Peak Hour



Roadway Level of Service

Outer Cape

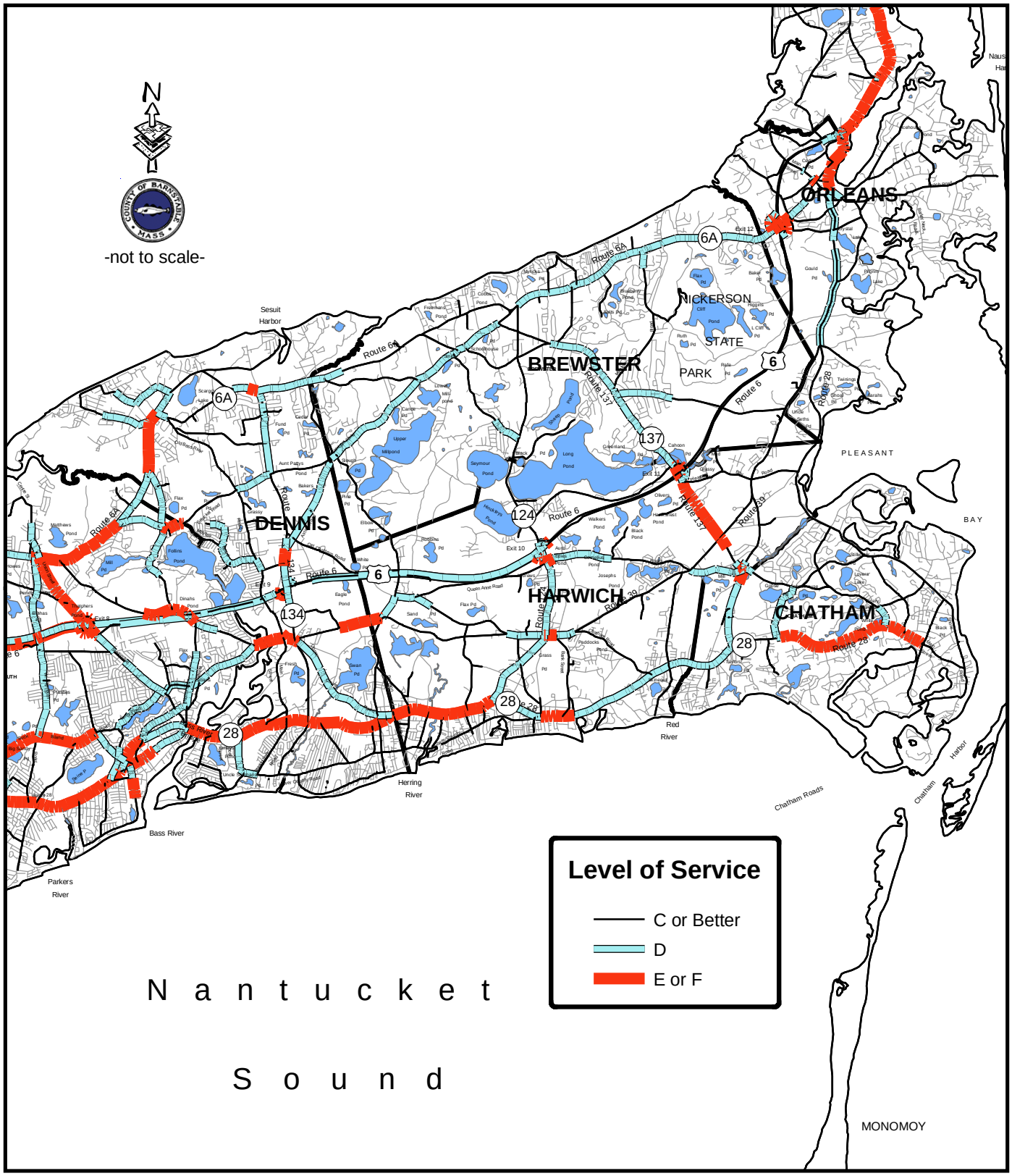
Future Year - Summer Weekday PM Peak Hour



Roadway Level of Service

Lower/Mid Cape

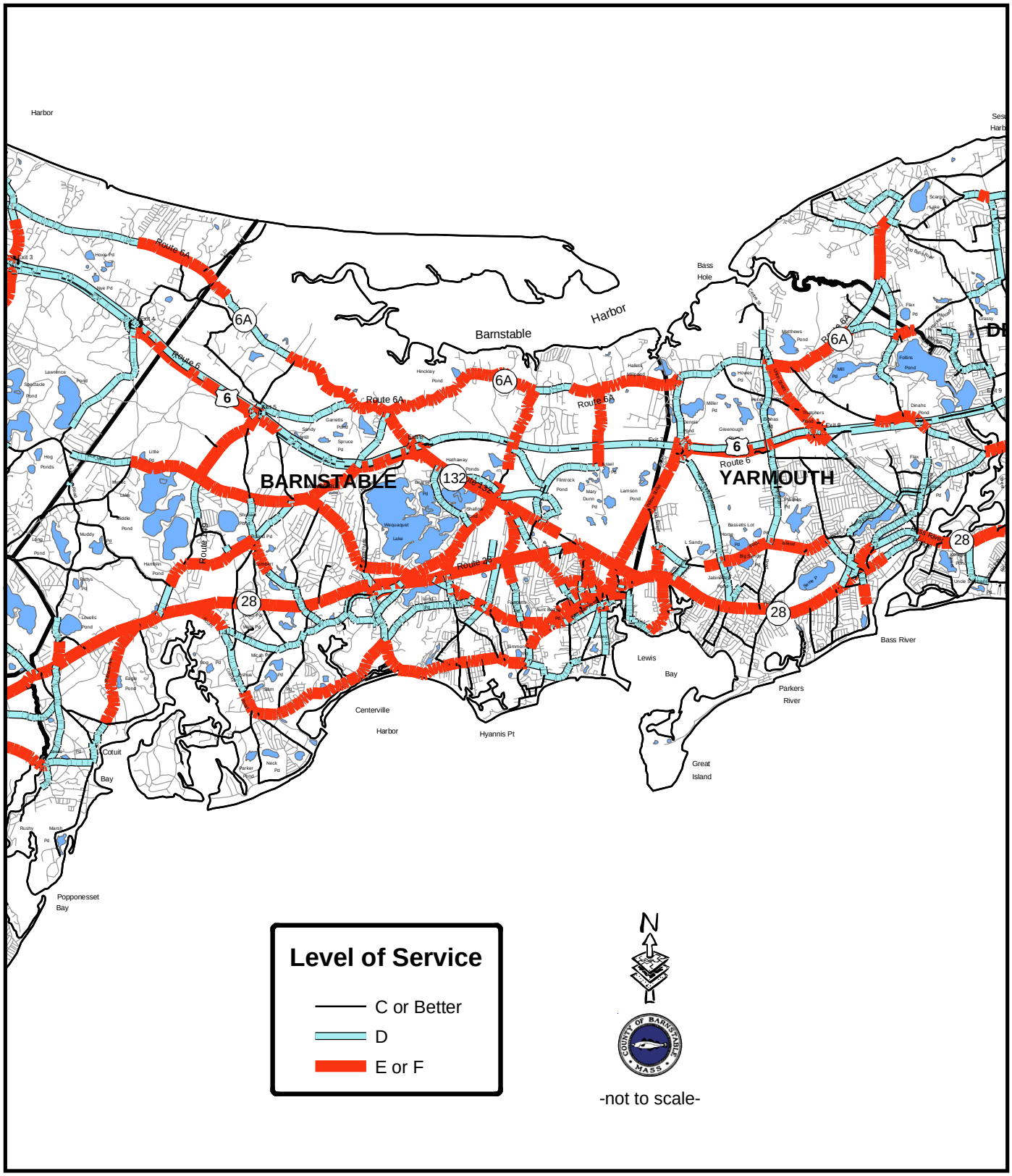
Future Year - Summer Weekday PM Peak Hour



Roadway Level of Service

Barnstable / Yarmouth Area

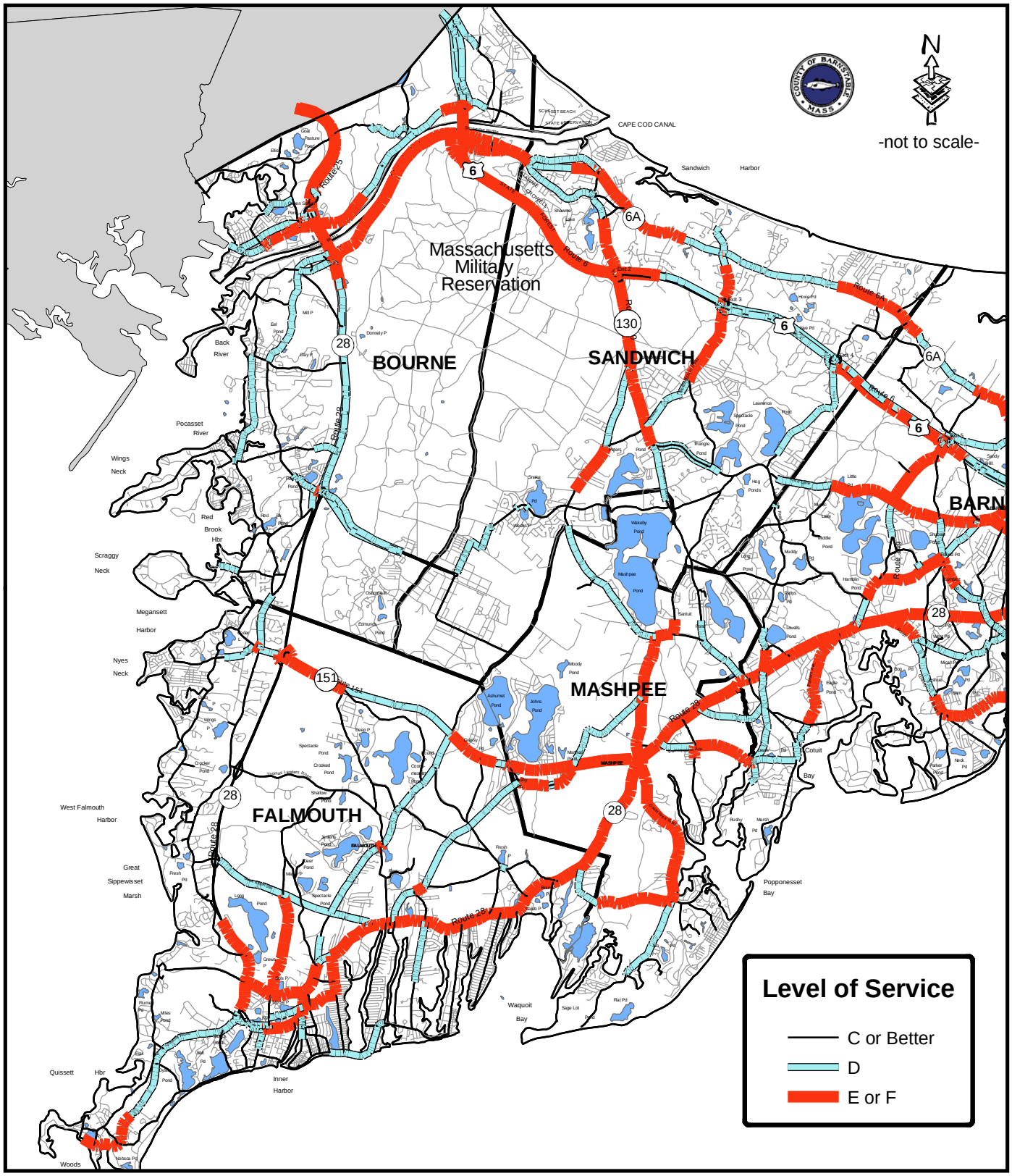
Future Year - Summer Weekday PM Peak Hour



Roadway Level of Service

Upper Cape Area

Future Year - Summer Weekday PM Peak Hour



5. Safety on Cape Cod Roads

This chapter includes descriptions of the seasonal and year-round issues affecting traffic safety including a description of the Cape demographics and some information about how they will change over time. During the public process for this plan a questionnaire was distributed. One of the questions asked was "*Please list the top three areas within your town that you feel have the worst local safety problems.*" From the responses to this survey, the following list was developed.

Table 16 – RTP Questionnaire Safety Problem Areas

Town	Safety Problem Areas	
Barnstable	Airport Rotary	Rte 132/Shoot Flying Hill Rd
Bourne	Canal Area	MacArthur Blvd - Lefts
Brewster	Rte 6A/Millstone	Rte 6A/Underpass
Dennis	Rte 28/School St	Rte 28 - Dennis/Harwich TL
Eastham	Rte 6/Brackett Rd	Rte 6/Governor Prence Rd
Falmouth	Rte 28 - Downtown	Teaticket Post Office
Harwich	Exits 10, 11- lefts	Rte 39/Rte 137
Mashpee	Mashpee Rotary/Rte 151	Rte 28 Mashpee Commons- Fal.
Orleans	Rte 28/Rte 6A	Rte 28/Rte 39
Sandwich	Rte 6/Exit 2	Cotuit Rd
Truro	Rte 6A	Rte 6
Yarmouth	Rte 6A/Union St	Rte 6/Exit 7

In November of 2002, MassHighway produced the "Top 1000 High Crash Locations Report: 1997-1999." The following table includes a summary of the top six Cape Cod locations:

Table 17 - Subset of Top 1000 Crash Locations

MHD "Rank"	Cape Cod Region "Rank"	Location	Total Crashes	Property Damage Crashes	Injury Crashes	Fatality Crashes	Weighted Average
49	1	Sagamore Rotary (Bourne)	243	187	56	0	467
135	2	Route 134/Route 6 (Dennis)	93	55	38	0	245
166	3	Airport Rotary (Barnstable)	84	53	31	0	208
180	4	North Bourne Rotary (Bourne)	98	74	24	0	194
228	5	Otis Air Force Rotary (Bourne)	73	55	18	0	145
260	6	Union Street/Route 6 (Yarmouth)	41	23	18	0	113

Notes:

- "Weighted Average" is a calculation assigning 1.0 to each Property Damage Crash, 5.0 to each Injury Crash, and 10.0 to each Fatality Crash.
- "Rank" mentioned in the above table refers to groups of intersections with identical Weight. Sagamore Rotary is in the 53rd position in the ranked list, Route 134/Route 6 is in position 168, and Airport Rotary is in position 227.

Of the top three Cape Cod Region accident locations, the Sagamore Rotary and the Airport Rotary are active MHD projects and the third, Rte. 134/Rte 6 has been recently been improved. The next 3 Cape Cod Region accident locations, based on MassHighway's Top 1000 High Crash Locations Report (1997-1999), are recommended for study based on safety concerns.

In addition to the three accident locations recommended for study above, The Cape Cod Joint Transportation Committee recommended three additional sites be studied. These sites include:

- Teaticket Hwy-Rte. 28 (Falmouth) at the Post Office
- Route 6/130 (Sandwich)
- Bourne Rotary

5.1. The Cape Cod Driver - Introduction

The demographics of Cape Cod depict a typical year round resident that is older than the rest of the population in the United States. This trend is continuing. In-migration of retirees and a stable aging population is not being offset by new younger residents or births. Older drivers require special considerations and with the trend toward an older population in America this has been recognized by the Federal Highway Administration through the publication of several recent documents and a special address to Congress by the National Highway Traffic and Safety Administration (NHTSA). The focus in both cases was on the behavior of older drivers with respect to the "typical" driver. The NHTSA Address also included issues related to younger drivers. Recommended guidelines for design standards that will help accommodate the needs of an older driver are also included in the literature.

The other dimension in defining the unique character of the Cape Cod driver is the seasonal driver. The Cape is flooded with drivers from other places who are not familiar with the Cape roads. Visitors to the Cape traveling by car across the Cape Cod Canal are welcomed to the Cape by a roadway feature that many drivers are unfamiliar with: a rotary. Drivers that are used to city streets or parkways are also subjected to the scenic rural roads that are a significant part of the Cape character and their physical nature may be somewhat unfamiliar to drivers from off-Cape.

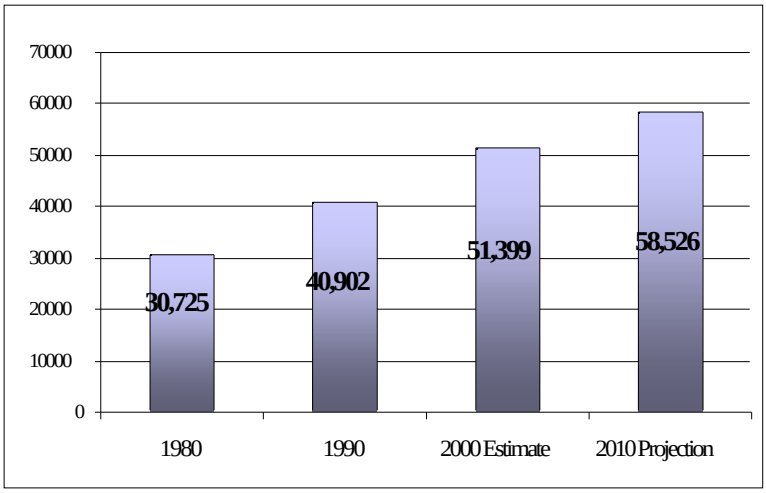
Among the drivers that flock to the Cape in the summer are a large number of young drivers with less experience in familiar surroundings, much less in the Cape driving

environment. This coupled with a holiday attitude requires more considerations for roadway design and planning. These considerations must also be balanced with the qualities that bring people to Cape Cod.

5.1.1. The Senior Driver

A relatively large and increasing percentage of Cape drivers are 65 and older (currently 24%). This steadily increasing proportion of drivers will experience declining vision, slowed decision making and reaction times, exaggerated difficulty in dividing attention between potential conflicts and traffic information, and reductions in strength, flexibility and overall fitness. These difficulties will, in many cases, overcome the increased experience the older driver has in operating an automobile. The large majority of drivers who suffer from age related driving problems are not aware that the problem exists and an educational process needs to be implemented.

Table 18 - Cape Population over 65



The overwhelming majority of Cape intersections are at grade. Based on FHWA crash statistics for drivers who are eighty years old or older, more than 50% of fatal crashes occur at intersections. This is compared with 24% or less for drivers up to 50. Many studies reinforce dramatic increases in intersection crashes as driver age increases.

Typical at-grade intersection difficulties identified, based on observation, for older drivers include:

1. Left Turns - from lack of sufficient caution and poor positioning on the road during the turn.
2. Stopping - Failure to stop, failure to make complete stops at stop signs, and stops that were jerky or abrupt.

Comparisons of subjective surveys of drivers aged 66-68 verses those aged 77 and older showed the older group had more difficulty following pavement markings, finding the beginning of left hand turn lanes, and driving across intersections. Another study of older drivers indicated that the most challenging aspect of intersection negotiation is making left turns during the green, left turn permitted signal phase. The protected "green arrow" left hand turn has been identified as an important improvement for older drivers.

Nighttime driving is associated with a higher crash risk for all drivers, however the effect of aging on vision is particularly compounded by the effect of darkness. The aging process causes gradual declines in a variety of ways; acuity, contrast sensitivity, glare recovery, and peripheral vision. These declining functions make night driving particularly difficult for older drivers. The ability to notice and recognize objects at night and in low-light conditions such as dawn, dusk, rain, fog, haze and snow is a chief concern. Studies show that between age 20 and age 70, aging reduces contrast sensitivity by a factor of 3.0 placing the typical older driver at a relative disadvantage in low light conditions.

Studies of night time recognition of signs were conducted with age groups between 19 and 49 and with groups aged 65 to 80 were done to develop age related differences. As expected, the older drivers required significantly larger letters to read unfamiliar signs. Current sign standards are based on an assumed vision of 20/25 (as opposed to "perfect" 20/20 vision), the older driver test group required a standard of 20/46.

5.1.2. Older Driver recommendations

Based on the issues associated with the older driving population on Cape Cod the following suggestions are recommended as considerations for Cape Cod roadway improvements. Many of these recommendations are from FHWA's *Older Driver Highway Design Handbook* (January 1998). This resource should be consulted for more details. The Older Driver Handbook includes other recommendations and guidelines that should be considered in Cape roadway design but their use should also be tempered with maintaining the character of Cape Cod's roadways.

Recommendations:

- Incorporate protected left turn phases into signalized intersections
- Maintain delineation through more frequent restriping and street cleaning
- Improve signage standards to include larger lettering
- Improve lighting level standards, in particular at intersections. Give consideration to placing utilities underground and installing breakaway safety poles for lighting.
- Consider "all red" phases for signalized intersections
- Establish driver education programs for older drivers
- Education on other options for mobility

Mobility programs to provide options to driving also need to be improved. This was a major topic at Cape Cod's February 2000 Transit Summit. The recommendations from the Summit included a "dual challenge" of reducing auto dependency and meeting the needs of the transit dependent and those in need of human services. By improving

mobility options, significant safety improvements may be realized. A short-term public transportation plan has been developed with an emphasis on human service needs.

5.1.3. Young Drivers

Safety and age-related crash statistics indicate that younger drivers' (under age 25) problems exceed those of any other age group. On a per mile driven basis, older drivers (over 65) have a greater fatality rate than any other age group. But, by any other measure, young drivers outnumber, out-travel, out-crash, and die more frequently. There are slight differences between younger and older drivers in the types of crashes they experience. For example, young drivers have more speeding and alcohol-related crashes. Younger drivers' crashes are frequently caused by inexperience, poor judgement, and risk taking, while older drivers' crashes are more often related to reduced physical and cognitive capabilities.

Most crashes for all groups occur at intersections however young drivers show a greater tendency than other age groups to be involved in non-intersection crashes. NHTSA statistics show that drivers between age 15 and 24 crash 43% of the time away from intersections while 41% between 25 and 64 and 31% between 65 and 74 of crashes are non-intersection crashes.

Younger drivers are more prone to risk taking behavior, and are subject to influences of youth culture and peer pressure. Many of these characteristics seem to be more evident in young visitors to Cape Cod.

5.1.4. Younger Driver Recommendations

Recommendations to accommodate younger driver safety issues are divided between residents and visitors:

- Increased education for young drivers locally is recommended.
- Recommendations to accommodate safety issues related to young visitors are also generally beyond the scope of this plan and must be enforcement oriented.
- Develop and implement an advertising campaign and roadside signs stating that traffic and drunk driving laws are strictly enforced on Cape Cod

5.1.5. Additional Recommendations

- Better signage for visitors directing them to popular destinations
- Signage explaining the rotary "rules of the road" and similar information to be included in visitor brochures and Cape related websites such as 'Go Cape Cod'

5.2. The Cape Cod Roadway

The significant roadways on Cape Cod are included in the Cape Cod Regional Transportation Model. The average posted speed on the Cape is less than 40 mph and, on average, the roadways carry 175% more traffic in July and August than they do in January and February.

Of the 2,568 centerline miles of roadways accounted for in the regional traffic model, 49 miles are considered Principal Arterials, 53 miles are considered Minor Arterials, and 52 miles of the roadway system are considered Major Collectors. The remaining 91% of Cape roadways are considered local or rural roads. Only 2.2% of the roads accounted for in the regional model have more than 1 lane in each direction.

The character of the rural roads include narrow lanes and a typical speed limit of 35 MPH. Most roads do not have shoulders and bicycles must often share the lanes with motorists. Many of the older roads evolved from Indian trails and stagecoach routes. Roadway geometry is therefore less accommodating than that which is designed to current state and federal standards. It is one of the fundamental goals of this Plan to preserve the scenic and rural character of the Cape's narrow, winding roads. Preservation of the rural character of Cape Cod's scenic roadways must be accompanied by a program of enforcement and education especially for the drivers that visit the Cape in the Summer.

The following tables list crash rates for Routes 6, 6A, and 28, respectively.

Table 19 - Crash Rates (based on years 1998-2000): Route 6

Town	All Crashes (Avg. Annual)	Fatal Crashes (Avg. Annual)	Crashes per million VMT	Fatal Crashes per 100 million VMT
Bourne	166	0.7	2.06	0.83
Sandwich	54	0.3	0.20	0.12
Barnstable	78	0.0	0.56	0.00
Yarmouth	53	0.0	0.82	0.00
Dennis	42	0.0	1.67	0.00
Harwich	22	0.3	0.39	0.59
Brewster	8	0.0	0.40	0.00
Orleans	14	0.3	0.61	1.45
Eastham	119	1.3	2.23	2.49
Wellfleet	42	0.7	0.76	1.20
Truro	25	0.3	0.46	0.61
Provincetown	10	0.0	0.52	0.00
Total	633	4	0.73	0.46

Registry of Motor Vehicles' Crash Records supplied by MassHighway
Vehicle Miles Traveled (VMT) calculated using Cape Cod Commission traffic data

Table 20 - Crash Rates (based on years 1998-2000): Route 28

Town	All Crashes (Avg. Annual)	Fatal Crashes (Avg. Annual)	Crashes per million VMT	Fatal Crashes per 100 million VMT
Bourne	143	0.3	1.62	0.38
Falmouth	188	1.0	2.04	1.09
Mashpee	100	0.0	4.16	0.00
Barnstable	222	1.3	3.07	1.85
Yarmouth	241	0.0	5.85	0.00
Dennis	71	0.7	4.81	4.49
Harwich	70	0.3	3.12	1.48
Chatham	149	0.0	5.37	0.00
Orleans	41	0.3	1.76	1.44
Total	1224	4	3.02	0.99

Registry of Motor Vehicles' Crash Records supplied by MassHighway
Vehicle Miles Traveled (VMT) calculated using Cape Cod Commission traffic data

Table 21 - Crash Rates (based on years 1998-2000): Route 6A

Town	All Crashes (Avg. Annual)	Fatal Crashes (Avg. Annual)	Crashes per million VMT	Fatal Crashes per 100 million VMT
Bourne	23	0.0	8.97	0.00
Sandwich	44	0.3	1.70	1.30
Barnstable	16	0.0	0.69	0.00
Yarmouth	57	0.0	3.85	0.00
Dennis	43	0.0	3.30	0.00
Brewster	93	0.0	3.06	0.00
Orleans	71	0.3	6.29	2.97
Total	347	0.67	2.86	0.55

Registry of Motor Vehicles' Crash Records supplied by MassHighway
Vehicle Miles Traveled (VMT) calculated using Cape Cod Commission traffic data

5.2.1. Safety-Related Technology

With the advent of improved technology come options in enforcement of traffic laws and speed control. Studies undertaken by the Insurance Institute for Highway Safety and the Federal Highway Administration have favorable reviews of applications such as red-light enforcement and photo radar. These techniques should be viewed in the context of education as well, since a goal is to improve safety by deterring unsafe driving. The greatest benefit of these techniques has been a "halo effect" whereby drivers are complying with traffic laws in un-monitored locations as well as those where the technology has been installed.

5.2.1.1. Red Light Enforcement

Drivers who run red lights are responsible for 260,000 crashes each year - nationwide. Of these, approximately 750 are fatal. Motorists are more likely to be injured in crashes involving red light running than in other types of crashes: occupant injuries occurred in 45 percent of red light running crashes compared with 30 percent for other crash types.

Enforcing red light laws by traditional means poses special difficulties for police, who in most cases must follow a violating vehicle through a red light to stop it (endangering motorists and pedestrians as well as officers). Red light running violations decreased by as much as 60% at intersections where cameras automatically enforce the law.

In areas where red light cameras have been installed as well as areas without cameras, most drivers supported the use of red light cameras - 80 percent in cities with cameras and 76 percent in cities without.

5.2.2. Recommendations

In the interest of preserving the character of Cape Cod and achieving safer roads, other methods of improving safety than traditional approaches must be explored. The following recommendations for improving safety will not substantially change the character of the roadways on Cape Cod.

- Traffic Calming measures such as 4-way stop signs and roundabouts.
- Improved striping maintenance and use of more reflective treatments.
- Increase enforcement and police presence on rural roads such as 6A.
- Investigate photo enforcement of red light running and speeding.

5.2.3. Recommendation – Aesthetics

<u>Roads</u>

- Use alternative guardrail treatments, such as steel Corten or steel backed timber - all on wood posts, where guardrail is necessary.
- Continue policy of not allowing business logo signs on state highways in Barnstable County
- Preserve all state owned/town owned land along roads and other transportation rights of way, for transportation uses and/or conservation.
- Prohibit pruning and clearing within state rights of way except for safety purposes (stopping sight distances).
- Encourage ornamental signal posts and mast arms.
- Develop design guidelines for Cape Cod to document preferred treatments in design concepts and details.
- Encourage use of simulated brick crosswalks and other contrasting materials to provide drivers with better visual identification. Crosswalks should be considered for all projects to accommodate walking as a viable mode of travel.
- Share the road and other bicycle education programs

6. The Transportation Plan and Strategies

This chapter presents strategies to pursue for the 22-year horizon of this plan update. The strategies were developed through a variety of processes and sources. Many of the strategies were from previous plans and several other sources contributed to the following list. These sources included the public process for the development of this plan, Transit Summits, and various studies done by the Cape Cod Commission in the past three years.

The most significant change in the strategies presented in this update is the focus on public transportation. This is in response to the efforts of the Cape Cod Regional Transit Authority (Cape Cod RTA) and the Cape's human service organizations to address the growing need for increased mobility options on Cape Cod. The other strategies that have been added are oriented toward preservation of the character of Cape Cod through design guidelines and access management.

The strategies are consistent with the five transportation goals adopted for this plan update and the projects included in the long range planning have been prioritized with respect to consistency with the goals as well as their support of individual strategies in addition to several other criteria.

6.1. Public Transportation – The 5 Year Plan

Public Transportation has been the subject of a large part of the MPO staff effort in the last three years. Key to this effort was the development of the Cape Cod Transit Task Force. The Task Force was appointed by the Massachusetts Secretary of Transportation and is composed of decision-makers from local, state, and federal agencies and the business community with an interest in improving public transportation. The Task Force was able to provide the support to develop a 5-Year Public Transportation Plan for Cape Cod.

6.1.1. Task Force Goals and Objectives:

1. Reduce auto dependency by providing mobility options.
2. Mitigate seasonal traffic by attracting people to the region without cars, and by providing seasonal public transportation options.
3. Meet the needs of the year-round population for public transportation, especially those who are "transit dependent" and in need of human services.
4. Develop coordination, communication, and cooperation among regional public transportation providers.
5. Incorporate smart growth and land use planning decisions into the development of public transportation.

6.1.2. Major Findings of the Transit Plan

In preparing its recommendations, the Task Force determined that:

- The Cape has a large number of transportation providers but little coordination among them
- Most Cape residents are unaware of the public transportation services available to them
- Visitors to the Cape have no practical expectation of a "car-free" vacation
- Traffic to and from Martha's Vineyard and Nantucket generally passes through Cape Cod.
- The Cape Cod National Seashore attracts as many as five million visitors each season

6.1.3. Conditions and Trends

The Task Force based its recommendations on the following:

- Cape Cod's year round population is growing faster than other regions in the eastern U.S.
- The Cape's over-65 population is nearly a quarter of its total population, a percentage that will continue to grow
- The cost of living on Cape Cod is considered by some sources to be one the highest in the country
- More than half (51 percent) of Cape households are considered "low income" according to a recent affordable housing study
- Traffic continues to increase dramatically. Summer traffic of a few years ago is now today's winter traffic

6.1.4. Principles of the Transit Plan:

This Plan takes a "back-to-basics" approach that advocates more efficient use of existing services and facilities. It is based on four principles:

1. Better connections among services;
2. Increased public awareness of what is available;
3. Greater efficiency and less duplication; and,
4. Filling of service gaps.

6.1.5. Key recommendations of the Transit Plan:

The following are high priority recommendations of the Transit Plan:

6.1.5.1. Public Transportation

- Increase the frequency of Cape Cod RTA bus service on the Hyannis-Orleans route during the fall and winter
- Offer year-round Sunday service of regional RTA bus routes
- Add RTA buses to corridors currently lacking service: Falmouth-Bourne, Bourne-Barnstable Village, Barnstable Village-Orleans and Orleans-Provincetown
- Coordinate bus service to whale watch departure points
- Add new buses and replace existing ones on regional routes
- Add bus stop signs
- Install bus shelters at key stops and transfer points
- Undertake planning for growth and management of the RTA bus fleet

6.1.5.2. Regional Bus Service

- Improve coach service from Boston and Providence to Woods Hole ferries bound for Martha's Vineyard (Relax & Ride)
- On Cape Cod, build a new bus-only lane on Rte. 6 from Exit 2 in Sandwich to the Sagamore Bridge
- Approaching Cape Cod, widen the road shoulder on Rte. 3 for bus-only lanes from Exit 2 in Cedarville to the Sagamore Bridge

6.1.5.3. Rail

- Seek formal proposals for passenger rail service to and from Cape Cod.

6.1.5.4. Air Travel

- Improve infrastructure to support airline service
- Add service to Provincetown from T.F. Green Airport in Greater Providence
- Expand off-Cape airline service to Martha's Vineyard and Nantucket for travelers who typically drive to Barnstable Municipal Airport for departing flights
- Expand service from Newark, JFK/New York and Cincinnati airports to New Bedford Municipal Airport with ferry connections to Martha's Vineyard

6.1.5.5. Water Travel

- Examine water taxi service between Cape Cod locations including harbors in Sandwich, Falmouth, Hyannis, Barnstable, and Provincetown
- Coordinate and publicize ferry and public transit schedules for travel between the Cape and the Islands, Boston and Provincetown

6.1.5.6. Travel and Traffic Management

- Use high tech, electronic networks and devices, such as Intelligent Transportation Systems (ITS), to make better and more efficient use of existing public transportation systems
- Install a system of changeable message signs for major roads
- Develop an integrated radio system to connect providers to ensure easy passenger connections

6.1.5.7. *New Facilities:*

- Integrate services at the new Hyannis Transportation Center and promote its use on and off Cape
- Plan smaller scale transportation centers in Orleans, Provincetown and on the Upper Cape
- Replace the RTA's operations center

6.1.5.8. Human Services Initiative:

- Develop and operate a central dispatching capability to coordinate all human service transportation on the Cape and Islands

6.1.5.9. Bicycles

- Develop bicycle lanes and a network of bicycle routes to link major destinations
  Install bike racks in town centers and at major attractions
  Install bicycle awareness signs along roads and at key intersections

6.1.5.10. Marketing

- Give priority to the marketing of public transportation services through comprehensive off-Cape and Cape-wide programs

6.1.6. Transit Plan Implementation

The Task Force believes that successful implementation of this plan will require a Public/Private Transportation Coordinating Council. The proposed Council would:

- Oversee the implementation of recommended improvements
- Develop and pursue sustainable funding sources for continuing improvements
- Develop agreements among transportation providers to foster service coordination, efficiency and accountability
- Coordinate provider schedules and cooperative services for special events
- Sustain the Cape Cod "Smart Guide" with a continuing and reliable source of funds
- Advocate for new services as needed
- Provide opportunities for continuing public review and comment

6.2. Roadway Strategies

Several studies related to Cape Cod's highways have been started or completed since the 1997 Regional Transportation Plan. These studies have become the basis of policy decisions with regard to Cape roads and many of the following policies have been developed to guide the roadway programs for the Cape Cod Region.

6.2.1. Rural Roads Initiative

Preserving the character of Cape Cod is a cornerstone of the Regional Transportation Plan strategy as well as for the Regional Policy Plan. Cape Cod Commission, together with the Martha's Vineyard Commission, the Nantucket Planning & Economic Development Commission, and the Cape Cod National Seashore, have received federal TEA-21 funding for the Cape & Islands Rural Roads Initiative. The Rural Roads Initiative is a study of design guidelines or development of context sensitive design principals for public road construction and/or reconstruction projects, including recommendations for traffic controls, which meet standards for public safety while preserving the unique quality of rural roadways

Guidelines for development of roadway design are included here to encourage the early implementation of some of the intended features of the Rural Roads Initiative. With regard to state highways, the end result of the process will be guidelines and demonstration projects that MassHighway will accept for Cape roads. Relevant signage guidelines will conform to the Manual of Uniform Traffic Control Devices (MUTCD).

The guidelines anticipated from the Rural Roads Initiative will *discourage* the following:

- Unnecessary Roadway widening
- Additional traffic signals for private entrances
- Traffic signal installations using cable bridges to support signal heads
- Multiple access driveways

It is anticipated that the design guidelines would take into account current traffic volumes, future traffic volumes based on land use projections, and the functional class of the roadway. These would be considered when weighing the factors of the road's scenic, historic, and cultural values as part of a public participation process. In many cases, it is expected that other (non-automobile) transportation solutions would be required in order to preserve roadway character.

6.2.2. Access Management

An access management study was undertaken for Route 6A as an effort to preserve some of the road's rural character and improve safety. The recommendations from the study are

consistent with preservation of the character of Cape Cod and are applicable and recommended for other similar roads on the Cape. It should be noted that access permits are controlled by various agencies depending on jurisdiction. Some of the strategies are listed for guidance purposes. Strategies from the Route 6A study include:

6.2.2.1. Access Management Strategies- Existing Conditions

- Modification of existing driveways to conform with access management guidelines established for Route 6A.
- Closure of any unnecessary or narrow driveways, narrowing of unduly wide driveways.
- Interconnection or sharing of driveways.
- Closure of existing curb cuts, especially in areas where there are frequent traffic conflicts such as on rotaries
- Maintain no access on the northbound side of MacArthur Boulevard
- Create a "no-access" line on Rt 6 in Provincetown and North Truro

6.2.2.2. Access Management Strategies - New Development

- Access to new development from existing secondary roads, not principal roadways.
- Shared Parking and cross easements
- Pedestrian links between adjacent parcels
- Maintenance of setbacks for proper access control and to provide a landscape buffer.
- Driveways constructed opposite any existing driveways rather than off set. Driveway location should include consideration of property lines on the opposite side of the road so that potential future driveways can be aligned.
- Improve coordination among local land use permitting and state curb cut permitting.

The Cape Cod Commission has had extensive experience reviewing access for Developments of Regional Impact. As a result, there have been many cases of reduction in number of driveways, location of driveways on the lesser traveled road, and turn restrictions such as “right-turn-in, right-turn-out.” For more information, the Commission has prepared a technical bulletin on access management.

In the development of this Regional Transportation Plan several strategies were presented and reviewed by the public and many were suggested at the public meetings. These strategies are consistent with the goals and objectives developed for this plan and the 1997 Regional Transportation Plan and have been incorporated into the process for determining the projects to pursue in the 25 year program presented by this plan.

6.2.3. Pavement Management System

The need for a Pavement Management System (PMS) update has been identified and is consistent with the goals to maintain the existing roadways. Benefits of this program should include:

- Allow Cape towns to predict the future condition of their pavement for different levels of funding and show the effects of under-funded road programs.
- On a regional level, as Cape towns complete their pavement needs analysis using the Cape Cod PMS, the MPO will be able to document the Region's needs and shortfalls and use the data to build a more effective TIP.

Roadway maintenance needs were developed for the 2000 Plan based on a survey conducted with the towns. The results of this survey included the minimum and a desirable annual roadway maintenance needs by town.

Table 22 - Roadway Maintenance Funding Needs

Town	**Minimum** annual needs estimate for roadway maintenance only	**Desirable** annual needs estimate for roadway maintenance only
Barnstable	$3,000,000	$4,750,000
Bourne	$900,000	$1,800,000
Brewster	$400,000	$600,000
Chatham	$400,000	$550,000
Dennis	$1,400,000	$1,900,000
Eastham	$300,000	$550,000
Falmouth	$1,200,000	$2,800,000
Harwich	$600,000	$1,800,000
Mashpee	$1,000,000	$1,300,000
Orleans	$500,000	$1,000,000
Provincetown	$100,000	$300,000
Sandwich	$850,000	$1,800,000
Truro	$150,000	$400,000
Wellfleet	$200,000	$450,000
Yarmouth	$1,000,000	$2,000,000
Cape-wide	**$12,000,000**	**$22,000,000**

6.3. General Strategies for Transportation on Cape Cod

The following items, originally developed for the 2000 Plan, include strategies which would help to achieve the Goals of the Plan.

- Maintain Cape Cod's existing transportation system.
- Preserve rights-of-way for transportation. Conservation or low-impact recreational uses should be considered to preserve the right-of-way for future transportation needs.
  - Preserve all right-of-way on Rte. 6 between Dennis and Eastham for future transportation uses and/or conservation/visual buffer.
  - Maintain no-access line on Rte. 28.MacArthur Boulevard northbound in Bourne.
  - Maintain all other existing no access lines.
- Encourage practices that reduce demand for automobile access to Cape Cod such as:

- Substituting Cape-to-Islands ferry service by increasing and promoting service from off-Cape to reduce unnecessary travel on Cape Cod.
- Control land use: Limit development and reduce "build-out"
- Discourage land uses that increase Cape Cod Canal Bridge and area car traffic
- Land conservation/land banking
- Travel Demand Management

· Give priority to solutions that will enhance mobility for travel within Barnstable County; encourage travelers coming to Barnstable County to use alternatives to the single occupant automobile.
· Make efficient and cost-effective road and intersection improvements. Some of the following strategies have major transportation implications and fall under the jurisdiction of a variety of agencies:
  - Design needed road and intersection improvements on Cape Cod in a manner that are efficient, cost-effective, and that respect the Cape's unique rural character
  - Work with MassHighway, and other project proponents, to address safety improvements that are appropriate to the scale and function of Cape Cod roads.
  - Work with MassHighway, and other project proponents, to locate necessary safety apparatus (guardrail, signs, markers, etc.) in such a way as to achieve the desired safety improvement, while not visually detracting from the region's scenic environment.
  - Consider modern roundabouts as an alternative to traffic signals where appropriate.
  - Implement "Footprint Road Program" - to allow reconstruction without any dimensional changes especially in scenic corridors such as 6A.
· Consider the impacts to existing and planned public transportation services and facilities from projects that increase roadway capacity.
· Improve access management on Rte. 6 in Outer Cape.
· Keep existing Rte. 6 rest area (parking areas) open and do not fence in useable areas

6.3.1. Canal Bridge Maintenance

The Bourne and Sagamore bridges provide the only crossings of the Cape Cod Canal for motorists, pedestrians and cyclists. Maintained by the U.S. Army Corps of Engineers, the geometric design of each bridge includes a roadway width of 40 feet (four 10 foot wide lanes) flanked by a 6-foot wide sidewalk on one side and a 2-foot wide safety curb on the other. The roadways are separated from the sidewalks and safety curbs by 16-inch high vertical granite curbing.

The bridges first opened to traffic in 1935 (currently approaching 100,000 vehicles per average day). Since that time, the bridges have been exposed to deicing salts, the effects of which include progressive deterioration of the concrete deck and some steel members of the bridges. These effects are compounded by the fact that the bridges are located near salt water. An additional maintenance activity is the periodic painting of the exposed steel portions of the bridges.

For certain maintenance activities, including repairs to the concrete deck, the worksite requires the closures of two lanes. For a bridge undergoing maintenance, the four lanes are reduced to two. Depending on the duration of the closure and the seasonal demand, significant delays and backups may occur. The Corps is committed to minimizing these conditions by avoiding daytime lane reductions during the summer months and limiting work to one bridge at a time. Please see the introduction for a discussion on the bridges regarding long-range planning issues.

6.3.1.1. Estimates for delay at the Sagamore and Bourne Bridges

This section is intended to help identify critical "windows of opportunity" for scheduling maintenance activities that require lane closures. Daytime during July 4th weekend would be a bad time for such activity; midnight in February would have little impact. This analysis should help identify other time periods that may also be acceptable.

Bridge volumes observed during recent work on the Sagamore and Bourne Bridges were compared to volumes observed in April and October 1999. Volumes observed on the Sagamore and Bourne Bridges during recent closures led to an identification of the one-lane capacity of the bridges. A review of the hourly MassHighway traffic counts during the lane closures indicates that a sustained flow of about 1,250 vehicles per hour can cross the bridge in each direction. It is logical that some vehicles in the theoretical backup would divert to the other bridge (for sake of this analysis, say 20%) and some trips observed in 1999 would not be made (again, for sake of this analysis, say 10%).

In calculating the backups and delays, the cumulative number of cars that could not be accommodated were divided by the bridge capacity to get the maximum theoretical delay for an average weekday. The results are shown in the following table:

Table 23 - Estimated Vehicular Delays during Bridge Lane Closures

		April	October
Sagamore Bridge	Northbound	1.7 hours	4.4 hours
	Southbound	2.4 hours	2.3 hours
Bourne Bridge	Northbound	0.3 hours	0.4 hours
	Southbound	0.3 hours	1.8 hours

Impacts to traffic will be most severe in the Fall during maintenance on the Sagamore Bridge. Encouraging the use of the alternate bridge would be an important element of any mitigation strategy. Impacts to the areas on bypass routes, (e.g., diversion from Route 6 westbound at Exit 2 through Sandwich), will be significant and some planning to minimize these impacts must also be done.

6.3.1.2. Strategies related to Bridge Maintenance :

Several strategies are suggested for addressing the impacts of maintenance-related lane closures. In all cases, adequate public notification is recommended. The Cape Cod Commission is committed to providing access to updates through the internet traveler information system (www.gocapecod.org). By providing timely warnings of impending closures, travelers would be more likely to adjust travel mode or timing.

• **Scheduling Maintenance Activities for Off-Peak Periods** minimizes disruptions to traffic during heavy travel periods. The Corps is already making efforts to achieve this - and should continue to do so. To the greatest extent possible, lane closures should avoid summer months and daytime periods during the spring and fall.

• **Traveler Information Systems** provide travelers with information in advance regarding the timing of lane closures and alternative ways to get to/from Cape Cod (bus, ferry, air, etc.). The Cape Cod Commission has included announcements of upcoming maintenance activities and links to transportation providers on the Cape Cod Commission Transportation Information Center on the internet (www.gocapecod.org). Included is a link to the Corps' website to provide travelers with the latest information on lane closures.

• **Improve Transportation Alternatives to Offset Automobile Crossings** by increasing express bus service, and improving marketing of bus and other alternatives. The marketing should inform travelers of the advantages of using alternatives and the disadvantages of driving during the lane closures. An additional strategy to enhance the attractiveness of buses and high-occupancy vehicles would be to allow travel on the shoulders (currently nonexistent on Route 6) of Routes 3, 6, 25, and 28 to bypass the queues (under police supervision). This concept would include construction of shoulders/breakdown lanes that could be used as a bus lane during peak times.

This would encourage a shift from single-occupant vehicles and would likely result in an overall reduction of vehicles traveling through the lane closures.

• **Traffic Management** reduces traffic conflicts. During periods of traffic congestion at the Canal crossings, motorists seek alternate routes - regardless of whether or not such routes actually save travel time. In addition, such routings have effect on the capacity of the bridges, and actually create bottlenecks in other locations such as the Exit One on-ramp at the approach of the Mid-Cape Highway at the Sagamore Bridge. Techniques to be considered should include police officer traffic control, signage, and turn restrictions.

6.3.2. Studies to Pursue:

- Continue the EIR process to replace the Sagamore Rotary, while at the same time pursue more modest alternatives for interim safety improvements for the Canal Area road system. The Sagamore Rotary replacement project is included as a recommended project in this plan on a conditional basis pending the resolution of concerns expressed in the current review process.

- A Cape Cod Rail Study to determine potential use of existing rail lines and rights of way. This study must determine appropriate service for the Cape (Seasonal, Passenger, or Commuter). The study will identify:
  - infrastructure needs including rail, signal and crossing protection, and additional maintenance needs for the service options,
  - potential station locations, parking needs, and development of impacts and potential mitigation expected for a number of scenarios that address the various service options,
  - the potential for improved rail freight service which should include the potential for a regional trash transfer facility and service for any other major freight customers, existing or likely. The freight component of this study must also address any infrastructure needs, associated maintenance costs, and potential mitigation required,
  - potential funding sources and possible public/private partnerships

- Develop a general freight study for Cape Cod. One element of transportation planning for the Cape Cod region that has been disregarded is freight transportation to and from the region. Little is known about the existing freight services and, as the year round population of the Cape and the Islands increases, what facilities and accommodations need to be planned for future freight needs.

- Development of transportation user fees for the Cape Cod region. The study will explore the feasibility of new revenue sources and the potential for accessing more of the fees collected on Cape Cod that end up in the state's general fund.

- Participate in the development of the Cape Cod Transit Task Force long range plan for improving public transportation on Cape Cod.

- Identify alternative funding sources for transportation on Cape Cod.

- Peak Period Congestion Management Study - Develop solutions to congestion problems including local cut through congestion such as at interchange 1 on Route 6. Strategies to be evaluated include ramp closures, ramp metering, variable message signs, traffic calming, and working with local rentals to stagger rental periods.

- Consider within the ongoing Route 6 Outer Cape study: Intersection improvements for problem locations; land acquisition to minimize future impacts; curb-cut

reductions, and a commercial bypass road in the vicinity of Brackett Road/Route 6 intersection.

- Develop long-term strategies for maintenance of the Bourne and Sagamore bridges and develop estimates of life-spans of the bridges based on maintenance strategies. This study will also include long term strategies for planning, engineering and determining rights of way needs for the replacement of the Bourne and Sagamore bridges.

- Develop a Title VI, Environmental Justice plan for the MPO.

6.3.3. Congestion Management System

The Cape Cod Region was declared a Transportation Management Area in July, 2002. The MPO has 18 months from that action to update the Congestion Management System (CMS) done for the region in 1997. The initial effort to revise the CMS was a questionnaire distributed during the public process for this plan. The questionnaire was also distributed to Town Planners and other officials. The questionnaire asked "*Please list the top three areas in Barnstable County that you feel have the worst regional congestion problems*" and the following priorities were identified

Regional Congestion Priorities

1. Bourne Bridge
2. Sagamore Bridge
3. Route 132
4. Route 28, Downtown Falmouth
5. Route 28, Hyannis
6. Route 6/6A Bourne and Sandwich - Summer
7. Route 6 - Eastham, East
8. Belmont Circle

The next question asked "*Please list the top three areas within your town that you feel have the worst local congestion problems*." With the following results (two priorities per town):

Table 24 - Local Congestion Priorities by Responding Towns

Town	Congested Areas	
Barnstable	Rte 28	132/Phinney's Lane
Bourne	Canal Area	Otis Rotary
Brewster	Rte 6A/Millstone	Rte 6A/Underpass
Dennis	Rte 28	Rte 28 - Dennis/Harwich TL
Eastham	Orleans Rotary	Rte 6
Falmouth	Rte 28/Jones Rd E&W	Palmer Ave
Harwich	Rte 39/Rte 37	Exit 10
Mashpee	Mashpee Rotary/Rte 151	Rte 151/Old Barn. Rd
Orleans	Skaket Corners	Rte 6A/Main St
Sandwich	Exit 2	Cotuit Rd
Truro	Center of Town	Rte 6A
Yarmouth	Rte 28	Rte 6A/Union St

Priority Projects

Based on the Congestion Management and Safety survey, 3 priority projects have been identified. These are projects/corridors currently not part of an ongoing or existing study that should be included in planning studies planned for the next three years. The priority projects will be refined as the Congestion Management System, due in January 2004, is refined. The proposed projects and studies should identify issues/solutions for safety and congestion as well as elements related to freight and seasonal demands.

- Route 132/Hadaway Road – Construct 132 Boulevard project and examine future needs and integration of 132 Blvd. project elements into roadway system.
- Route 28 corridor – explore solutions to this corridor including ITS, access management and alternatives.
- Route 6,exits 2 and 7 – Explore signal and structural solutions and examine improvements for Willow Street/Yarmouth Road.

6.4. Cape Cod Joint Transportation Committee Recommendations

In addition to the programs and projects recommended by the Metropolitan Planning Organization in this Plan, the following recommendations were endorsed by the Cape Cod Joint Transportation Committee (CCJTC) at its meeting on August 8, 2003:

Planning for Improved Crossing of the Cape Cod Canal

By the end of the Plan period (2025) the Cape Cod Canal highway bridges will have been in use for over ninety years. While carefully maintained bridges may last for many centuries, several issues factor in the decisions that will need to be made:

- Functional obsolescence: the ability of the bridges to safely and efficiently move vehicular traffic may be compromised by travel speeds, vehicle weights and widths, and quantity of flow.

- Improvements to existing structures: by relocating the existing sidewalk on each bridge, travel lanes could be widened to improve traffic flow and safety. This would require that the sidewalks (and utilities located under them) be cantilevered on the side of the bridges. A structural engineering study would be required to assess feasibility.

- Options for increased capacity: to accommodate increased vehicular demand, a new facility would be required (bridge or tunnel). Potentially, another means (car ferry) could also help meet this need. Additionally, High-Occupancy Vehicle (HOV) options should be considered such as "bus-only" lanes. Bicycle access should be maintained or improved.

- Consistency with other projects: the Sagamore Grade-Separation Study's *Refined Preferred Alternative* is predicated on a direct connection to the Sagamore Bridge. In the event of replacement of the Sagamore Bridge, one technique is to construct a new bridge adjacent to the existing bridge. This would require a major relocation of the *Alternative.*

6.5. Projects Considered in the Regional Transportation Plan

The public process was used to develop new projects for evaluation along with the projects from the 2000 Plan. The following "universe" of projects has been evaluated for the financially constrained Regional Transportation Plan update in terms of the goals for the region. Priorities that can be included within the long-range projections for operating and capital funding have defined the 2003 Plan recommended projects.

Two projects were included in the recommended projects due to their being funded:

· Sagamore Rotary Improvements are included in the list of recommended projects. This project has received statewide priority and is funded from the Statewide Road and Bridge program. The Sagamore Rotary Improvements are included as a recommended project in this plan on a conditional basis pending the resolution of concerns expressed in the project review process.
· Hyannis Intermodal Center, Phase II (rail facilities) this project was previously funded and has obligated funding.

Cape Cod Regional Transportation Plan

Summary of Considered Projects

Title/Description	Description	RTP Project#, Score & Projected Cost
Resurfacing PROGRAM	BUNDLED PROJECTS Roadway Resurfacing & Rehabilitation	900 - $230,256,893
Bridge PROGRAM	BUNDLED PROJECTS Bridge Replacement/Reconstruction	901 - $46,051,379
Transit Operating PROGRAM	BUNDLED PROJECTS Transit Operating Assistance	902 - $127,888,516
Intersection PROGRAM	BUNDLED PROJECTS Intersection Improvements	903 - $23,985,093
Bicycle/Pedestrian Projects PROGRAM	BUNDLED PROJECTS - bicycle and/or pedestrian facilities and programs	904 - $5,756,422
Access Management PROGRAM	Eligible for all state and local numbered routes. Curb cut consolidation, medians, other access improvements	905 - $1,918,807
Transit Capital PROGRAM	BUNDLED PROJECTS Transit Capital Needs	906 - $34,538,534
TDM/TSM PROGRAM	BUNDLED PROJECTS - Travel Demand Management/Transportation Systems Management projects	907 - $9,594,037
New Ferry Service - PROGRAM	BUNDLED PROJECTS - Passenger ferries connecting Cape Cod harbors	908 - $4,797,019
Regional Bike Network PROGRAM	BUNDLED PROJECTS - Regional links of bicycle trails and inter-town paths	909 - $4,164,684
Trans. Managment Association PROGRAM	Provide assistance to employers and institution for the development and coordination of alternative transportation options for employees and patrons.	950 - $191,881
Cape Cod & Islands Rural Roads PROGRAM	Develop roadway design standards compatible with the character of Cape Cod and the Islands. Includes demonstration construction projects.	951 - $2,703,774

Summary of Considered Projects

Title/Description	Description	RTP Project#, Score & Projected Cost
Route 6A/Scenic Byways PROGRAM	Signage, special maintenance for roadways designated as scenic.	952 - $383,761
Intelligent Transportation Systems PROGRAM	Coordinate, plan and implement ITS programs for highway and transit to and on Cape Cod.	953 - $5,756,422
Park & Ride Expansion PROGRAM	Expansion of parking facilities at Barnstable (Exit 6), Sagamore, Harwich (Exit 10) as necessary	954 - $436,093
Bus Shelter PROGRAM	Design and provide bus shelters and amenities designed to be compatible with the Cape Cod character at three levels; bus stop, transfer shelter, and "mini modal" center.	955 - $4,797,019
Land Conservation PROGRAM	Strategic purchase of land to reduce sprawl and inefficient allocation of transportation resources. Also used to acquire land for improvement of intersections.	956 - $9,594,037
Hyannis Intermodal Center - ph. 2+ APPROVED	Construction of maintenance facility in Dennis for CCRTA busses. Rail facility upgrade in Hyannis.	1002 - $3,000,000
Exit 6 1/2 - Hyannis Access	Barnstable - new interchange on Route 6 between exits 6 & 7 to improve access to downtown Hyannis	1003 n/a $15,000,000
Southside Connector	Bourne/Sandwich - Construction of a new divided highway between the Bourne Rotary and Route 6 near interchange 2	1004 n/a $100,000,000
Nickerson Park Access from Route 6	Brewster - Direct access via new interchange to Nickerson Park from Route 6	1005 n/a $15,000,000
Rt 28 MacArthur Boulevard Improvements*	Bourne - *Recommend MIS - - Construction of 2 new northbound lanes on Rt 28, reverse existing northbound, existing southbound becomes frontage road	1006 6 $10,000,000
Rt 6 Reconfigure Interchange One	Improve westbound on-ramp near Sagamore Bridge during peak times for off-cape traffic flow: Route 6, Exit 1: Reconfigure WB on-ramp	1008 21 $1,100,000

Cape Cod Regional Transportation Plan

Summary of Considered Projects

Title/Description	Description	RTP Project#, Score & Projected Cost
Sagamore Rotary Reconfiguration APPROVED	Replacement of Sagamore Rotary with grade-separated interchange allowing Rt 3 to Sagamore Bridge to pass over Route 6.	1009 - $35,000,000
Bourne Rotary Reconfiguration	Bourne - reconfigure Bourne rotary to allow traffic between Bourne Bridge to Route 28 (MacArthur Blvd)	1010 n/a $30,000,000
Rt 132 Boulevard	Barnstable - Construction of 2 new lanes from Rt 6 to Bearses Way (incl. landscaped median divider)	1012 42 $7,500,000
Cape Cod Rail Trail Resurface & Widen	Eastham to Dennis - Resurface and widen original rail trail from 8'-10'	1014 57 $3,000,000
Cape Cod Rail Trail Extensions	Extend Cape Cod Rail Trail to Provincetown in the north, Hyannis (or Bourne) in the west via new bike path	1015 50 $4,000,000
Rt 28 Bike Accomodation: Hyannis-Dennis	Construction, marking, and signage of Bicycle facility along Route 28 from Hyannis - Dennis	1016 40 $5,000,000
Additional CCRTA Service PROGRAM	Public transit shuttles connecting villages along Route 6A from Sandwich to Orleans, Provincetown-Orleans Shuttle, etc.	1021 - $37,224,864
Transportation Management Center	Operations center to monitor traffic operations, issue real-time reports to traveling public, control variable message signs and coordinated traffic signals	1022 19 $6,450,000
Variable Message Signs	Remote operated variable message signs installed along all major routes - Rt 6, Rt 28 in Bourne & Falmouth, Rt 25 Extension, Rt 3	1023 115 $1,220,000
Permanent Traffic Counting Stations	Install permanent traffic counting stations at strategic locations Cape-wide	1024 660 $197,000
Interchange Improvements Rt 6	Mid-Cape Hwy - Implement improvements to Route 6 Interchanges	1027 2 $38,200,000

Cape Cod Regional Transportation Plan

Summary of Considered Projects

Title/Description	Description	RTP Project#, Score & Projected Cost
Cape-wide Highway Advisory Radio	Provide travel information cape-wide via AM radio	1031 560 $250,000
Harwich/Chatham Rail Trail Extension	Extend Cape Cod Rail Trail through Chatham	1036 203 $985,000
Provincetown Local Intermodal Center	Develop an intermodal center in the vicinity of MacMillan Wharf to facilitate transfers and coordination between local bus, intercity coach, ferries, and other public transportation	1050 260 $1,000,000
Orleans Local Intermodal Center	Develop an intermodal center in the vicinity of the Eastham Rotary to facilitate transfers and coordination between local bus, intercity coach, and other public transportation	1051 260 $1,000,000
Upper Cape Local Intermodal Center	Develop an intermodal center(s)in the Upper Cape to facilitate transfers and coordination between local bus, intercity coach, ferries, and other public transportation	1052 173 $1,500,000
Human Services Dispatch Center	Develop a certral dispatch center for human services to coordinate and optimize resources.	1053 147 $1,500,000
Bourne Rotary Improvements	Develop capacity enhancements for the existing rotary to improve flows at entrances and exits by widening.	1055 n/a $500,000
Bus-Only Lanes for Rt 3 & Rt 6	Provide bus-only lanes between exit 2 and the bridge for both Rte. 3 and Rte. 6. This is expected to be achieved by widening and strengthening the shoulder section.	1057 38 $5,000,000
Sandwich Road Parkway	Develop Sandwich Road into a 4 lane parkway with a landscaped median.	1060 n/a $0
Scenic Highway/Rt 25 Connector Ramp	Develop a direct connection from Scenic Highway to Rte. 25 to divert traffic from the Bourne rotary.	1061 n/a $0
Cape Cod Rail: Dennis, Yarmouth, Barnstable	Extension of the existing Cape Cod Rail trail west to Hyannis Transportation Center (route to be determined)	1062 60 $3,000,000
Rt 6 Outer Cape Improvements	A series of improvements in the corridor between Orleans and Provincetown to be refined by the ongoing Rte 6 study expected to be complete in 2003	1063 n/a $0

Summary of Considered Projects

Title/Description	Description	RTP Project#, Score & Projected Cost
Route 28 Improvements	Improvements in Yarmouth, Dennis, Harwich, and Chatham to be refined by the ongoing Rte 28 study	1064 n/a $0
Higgins Crowell Rd - Realignment @ Willow St	Realignment of Higgins Crowell Road to improve the Rte 6/Exit 7 interchange operation.	1065 n/a $0
Canal Area Intelligent Transportation System	Real-time transportation information system to manage Canal area roadway system	1066 47 $3,000,000

7. The Financial Plan & Project Ranking

The ability to implement transportation solutions depends on many variables (design, environment, etc.) but in the final analysis these variables have no meaning if funds are not available. The following sections provide information on funding needs and estimated availability.

7.1. Basis for annualized needs

Cape Cod RTA Operating Assistance: capital and operating expenses for the Cape Cod Regional Transit Authority are presented in the following table. Roadway maintenance: figures for the 15 Cape Cod towns are presented in subsequent table and are based largely on interviews with town DPW personnel.

Table 25 - Annual Transit Funding Needs

ANNUAL NEEDS for the CAPE COD TRANSIT SYSTEM			
TYPE	CAPITAL	OPERATING	
vehicle purchases	$ 1,400,000		These vehicle purchases are for maintaining the existing fleet [local]
vehicles - new service	$ 440,000		One new regional service in five years - capital cost (purchase 2+ vehicles per year)
existing routes, operating assistance		$ 2,560,000	from Federal Transit Administration (FTA) 5311 funding & state funding from the Executive Office of Transportation & Construction (EOTC)
existing routes, operating assistance		$ 3,600,000	from Federal Transit Administration (FTA) 5307 funding & state funding from the Executive Office of Transportation & Construction (EOTC)
operating-new service		$ 1,500,000	Annual operating cost of one new regional service: 35 miles one way, 15 min weekday frequency & hourly weekends
Access to Jobs		$ 105,000	Annual operating cost
ITC construction Phase II	$ 600,000		This includes $3 million for construction of Phase II of the Intermodal Transportation Center, over five years
ITC maintenance, ITS improvements, other	$ 400,000	$ 400,000	This includes ongoing maintenance for ITC (estimated at $200,000 per year); ITS improvements for transit including Smart Cards; and may include other capital costs.
	$ 2,840,000	$ 8,165,000	
TOTAL ANNUAL NEEDS	**$11,005,000**		
		$ 9,065,000	**Annual needs less the one new service in five years**
For long range planning purposes the annual needs are based on: five years of actual needs for vehicle replacements; other capital projects, such as Phase II of the Intermodal Transportation Center; and existing annual operating assistance. The "one new service in five years" is included as an example only and is not a service that is designed.			

Table 26 - Annual Roadway Funding Needs

TOWN	MINIMUM annual needs estimate, roadway maintenance only	DESIRABLE Annual needs estimate, Roadway maintenance
BARNSTABLE	$ 3,000,000	$ 4,750,000
BOURNE	$ 900,000	$ 1,800,000
BREWSTER	$ 400,000	$ 600,000
CHATHAM	$ 400,000	$ 550,000
DENNIS	$ 1,400,000	$ 1,900,000
EASTHAM	$ 300,000	$ 550,000
FALMOUTH	$ 1,200,000	$ 2,800,000
HARWICH	$ 600,000	$ 1,800,000
MASHPEE	$ 1,000,000	$ 1,300,000
ORLEANS	$ 500,000	$ 1,000,000
PROVINCETOWN	$ 100,000	$ 300,000
SANDWICH	$ 850,000	$ 1,800,000
TRURO	$ 150,000	$ 400,000
WELLFLEET	$ 200,000	$ 450,000
YARMOUTH	$ 1,000,000	$ 2,000,000
	$ 12,000,000	**$ 22,000,000**

This fiscal analysis is based on the following assumptions:

Intersection Improvements
5 intersections per year @ $250,000 * 22 years = $27.5 million

Bridge Maintenance
The funding projections are based on past spending, the average age for bridges on Cape Cod is 62 years and the average AASHTO bridge rating is 68 (on a scale of 1-100). 50% of the bridges on Cape Cod have an AASHTO bridge rating of 50 or less. This generally means rehabilitation is required.

Access Management
Based on one project per year.

TDM/TSM Projects
Based on one project per year.

Transportation Management Program
Promotions and support for development of TMAs

Intelligent Transportation Program
One project element (e.g. variable message sign)

Bus Shelter Program
Development and maintenance of shelters and "mini-modal" centers

7.2. Available Funding (2003-2025)

The funding projected for Programs has been adjusted to accommodate the construction of projects and maintaining a fiscally constrained RTP. Additional funding sources will be sought. Total Program costs have been factored by 0.872. The following table is based on level funding from the previous Plan update.

Estimated Statewide Road and Bridge funding (Federal and non-federal)	$11,567,013,040
Cape Cod Regional Share (4.59%)	$530,925,899
Transit Funding (level-funding based on 2001 appropriation)	$74,556,550
Total Available Funding	$605,482,449

Programs needs (factored by 87.2%) are $550,000,000 and remaining project funding is $55,482,500 for the 22-year program or $2,414,280/year

7.3. Transportation Projects Evaluation

The following sections present analyses of the projects listed for consideration as one-page summaries of each project.

Information for each project is presented in two sections. The upper section includes a description of the project as well as estimates of the costs associated with it. Note that the costs are estimated in current dollars. The "RTP Projected Cost" equals the "Annual Cost" multiplied by the analysis period, 22 years, added to any "Up-front Costs." This places capital projects on equal footing with projects incurring operating costs.

The "Goal Compatibility Analysis" is used as a screening of the project. Should the project detract from an RTP Goal, a finding of "Incompatible" will be noted. If one or more "Incompatible" statements occur, the project is considered incompatible and no further analysis is warranted. In addition, a determination is made regarding the amount that a project contributes to advancing the goal. These scores are numerical values based on qualitative evaluations.

In the lower section, several criteria are used in the analysis of projects. Criteria include:

- Travel Miles: the benefits quantified for this criterion are based on the output of the regional transportation model when available. 1 Benefit = 10,000 modeled VMT reduced. If a project is expected to have automobile travel mileage reduction but does not lend itself to modeling, best estimates of the benefits will be used.
- Travel Hours: the benefits quantified for this criterion are based on the output of the regional transportation model when available. 1 Benefit = 1,000 modeled VHT reduced. If a project is expected to have regional travel time reduction but does not lend itself to modeling, best estimates of the benefits will be used.
- Safety: solutions for areas with the largest safety problems are likely to have the greatest benefit. Safety evaluations may be based on the "EPDO" method where the EPDO, or "Equivalent Property Damage Only" is calculated by assigning a value of 5 to each injury crash and 10 to each fatality crash. For intersections EPDO is adjusted by Million Entering Vehicles (MEV) and for road segments is adjusted by Million Vehicle Miles Traveled (MVMT). These figures are expected to be used in future improvements to the projects database.
- Air Quality: benefits are related to reductions in the precursors of ozone as determined from output of the regional transportation model air quality programs (when available). 1 Benefit = reduction of 100 kg of VOC or 100 kg of NOx.
- Goal Benefit: based on scores developed under the compatibility analysis, the scores are multiplied by weighting factors (currently 1) and added together to equal the goal benefit.

A transportation project may have benefits under several criteria. The magnitude of these benefits is comparable between projects. This means that a large project when compared to a smaller one (e.g., a multi-town transit service vs. a smaller service in a single village) would have greater quantified benefits (e.g., more reduced automobile mileage). All the criteria benefits are totaled together into a "Benefit Level."

The Benefit Level is then divided into the RTP Projected Cost (in millions of dollars) to come up with a "Score." This method allows the relative benefits of large and small projects to be compared on a benefit/cost basis. Please note that the Total Cost of Programs have been factored to funding levels.

New2003? ☐

1

RTP# 900 **Resurfacing PROGRAM**

Description BUNDLED PROJECTS
Roadway Resurfacing & Rehabilitation

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$12,000,000	**RTP Projected Cost**	
Upfront Cost			$230,256,893

Goal Scoring/Compatibility Analysis

goal scores			
5	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
0	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change		**Emissions Change VOC**	
VHT Change		**Emissions Change NOx**	

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	5.0
Air Quality	
GoalBenefit	5
Benefit Level	10.0

Project Status:
The design concept and scope for individual rehabilitation projects have not been fully determined and will require further analysis.

A specific project qualifying for this Program is:
[Barnstable: Reconstruction of Rt 28 from the Airport Rotary to the Yarmouth town line]

Source of Origin
MS

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

RTA = 5 Year Transit Plan
SBP = State Bike Plan
SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
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28 = Route 28 Study
CATS-Canal Area Transportation Study
BYTS = Barnstable/Yarmouth Transportation Study
SRot = Sagamore Rotary Study
ITS = Intelligent Transportation Systems Study
MCS = Monomoy Capacity Study
OCS = Outer Cape Capacity Study
6A = Route 6A Corridor Management Plan
Safe = Cape Cod Accident Record Information System
TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

1

RTP# 901 **Bridge PROGRAM**

Description BUNDLED PROJECTS
Bridge Replacement/Reconstruction

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$2,400,000	**RTP Projected Cost**	
Upfront Cost			$46,051,379

Goal Scoring/Compatibility Analysis

goal scores			
5	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
0	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	5.0
Air Quality	
GoalBenefit	5
Benefit Level	10.0

Project Status: The ongoing inspections by MassHighway will be reviewed locally to establish the priority of bridge projects and these needs will be addressed.

Source of Origin
MS

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

KEY:
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

1

RTP# 902 **Transit Operating PROGRAM**

Description BUNDLED PROJECTS
Transit Operating Assistance

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$6,665,000	**RTP Projected Cost**	
Upfront Cost			$127,888,516

Goal Scoring/Compatibility Analysis

goal scores		
7	1: Maintenance	Compatible
5	2: Alternatives	Compatible
0	3: Land Use	Compatible
0	4: Environment	Compatible
0	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	12
Benefit Level	14.0

Project Status: Funding has been provided by FTA section 5311, and 5307 for existing services and this is expected to continue. The CCRTA has submitted applications for funding of their proposed "smart card" program and implementation is expected in 2004.

Source of Origin
MS

KEY:

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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

1

RTP# 903 **Intersection PROGRAM**

Description BUNDLED PROJECTS
Intersection Improvements

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$1,250,000	**RTP Projected Cost**	
Upfront Cost			$23,985,093

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
0	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	7.0
Air Quality	
GoalBenefit	0
Benefit Level	7.0

Project Status:

Ongoing studies such as the Route 6 Outer Cape Improvement study are expected to generate a number of prioritized improvements. Additional needs will be identified through the TIP development process.

Specific projects qualifying for this Program include:
[Barnstable: Rt 28/Rt 149; Rt 28/S County Rd; Rt 28/Lumbert Mill Rd; Rt 6/Rt149 ramps @ Exit 5; Rt 6/Rt 132 ramps @ Exit 6]
[Yarmouth: Rt 6/Willow St ramps @ Exit 7]

Source of Origin
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Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

1

RTP# 904 **Bicycle/Pedestrian Projects PROGRAM**

Score -

State I.D.

Description BUNDLED PROJECTS - bicycle and/or pedestrian facilities and programs

Section 1 - Descriptive

Annual Cost	$300,000	**RTP Projected Cost**	
Upfront Cost			$5,756,422

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Compatible	
7	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
0	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change		**Emissions Change VOC**	
VHT Change		**Emissions Change NOx**	

Project Status: For bike network links (bicycle paths) see RTP#909

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	7
Benefit Level	9.0

Source of Origin
SBP, SPP

KEY:

RTA = 5 Year Transit Plan
SBP = State Bike Plan
SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus
Exempt

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	**Implemented**
☐	☐

1

RTP# 905 **Access Management PROGRAM**

Description Eligible for all state and local numbered routes. Curb cut consolidation, medians, other access improvements

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$100,000	**RTP Projected Cost**	
Upfront Cost			$1,918,807

Goal Scoring/Compatibility Analysis

goal scores			
7	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
0	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change		**Emissions Change VOC**	
VHT Change		**Emissions Change NOx**	

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	7.0
Air Quality	
GoalBenefit	7
Benefit Level	14.0

Project Status:
Access management strategies were developed in the Route 6A Access Management Study. Implementation of the principals developed in the study are being required for traffic mitigation due to some Developments of Regional Impact (DRIs). Application of the strategies are anticipated for existing conditions.

Source of Origin
MS

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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

1

RTP# 906 **Transit Capital PROGRAM**

Description BUNDLED PROJECTS
Transit Capital Needs

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$1,800,000	**RTP Projected Cost**	
Upfront Cost			$34,538,534

Goal Scoring/Compatibility Analysis

goal scores		
4	1: Maintenance	Compatible
5	2: Alternatives	Compatible
0	3: Land Use	Compatible
0	4: Environment	Compatible
0	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status: A transit plan for the region involving CCRTA was developed in 2002 which is recomended that a long term fleet and facilities capital plan be developed. Current needs are based on recent expenditures.

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	9
Benefit Level	11.0

Source of Origin

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

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Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved ☐ **Implemented** ☐

New2003? ☐

1

RTP# 907 **TDM/TSM PROGRAM**

Description BUNDLED PROJECTS - Travel Demand Management/Transportation Systems Management projects

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$500,000	**RTP Projected Cost**	
Upfront Cost			$9,594,037

Goal Scoring/Compatibility Analysis

goal scores			
6	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
7	4: Environment	Compatible	
7	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change		**Emissions Change VOC**	
VHT Change		**Emissions Change NOx**	

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	6.0
Air Quality	
GoalBenefit	20
Benefit Level	26.0

Project Status: Examples of related activities are underway - Cape Cod Bike Week every Spring, the first Cape Cod Alternative Transportation Week took place June 2000. Coordination with CARAVAN for Falmouth Technology Park ongoing.

Source of Origin
MS

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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

1

RTP# 908 **New Ferry Service - PROGRAM**

Description BUNDLED PROJECTS - Passenger ferries connecting Cape Cod harbors

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$250,000	**RTP Projected Cost**	
Upfront Cost			$4,797,019

Goal Scoring/Compatibility Analysis

goal scores			
5	1: Maintenance	Compatible	
8	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
0	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change		**Emissions Change VOC**	
VHT Change		**Emissions Change NOx**	

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	4.0
Air Quality	
GoalBenefit	13
Benefit Level	17.0

Project Status:

•Cost information preliminary estimate

Source of Origin

RPA, PUB, Mar

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
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PUB = Public Input

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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Recommended for Study

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

1

RTP# 909 **Regional Bike Network PROGRAM**

Score -

State I.D.

Description BUNDLED PROJECTS - Regional links of bicycle trails and inter-town paths

Section 1 - Descriptive

Annual Cost	$75,000	**RTP Projected Cost**	
Upfront Cost	$3,125,000		$4,164,684

Goal Scoring/Compatibility Analysis

goal scores		
8	1: Maintenance	Compatible
8	2: Alternatives	Compatible
0	3: Land Use	Compatible
0	4: Environment	Compatible
0	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	4.0
Air Quality	
GoalBenefit	16
Benefit Level	20.0

Project Status: Includes expansions and maintenance of regional bike path network. The “Shining Sea” Bike Path has been approved for design by the Town of Falmouth however the use of the right of way has not been decided.

Aslo see RTP #904 & #1015.

A project to be considered is maintenance and improvements for bicycle/pedestrian approaches to the Canal bridge crossings.

Source of Origin
SBP

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Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus
Exempt

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	**Implemented**
☐	☐

New2003? ☒

1

RTP# 950 **Trans. Managment Association PROGRAM**

Score -

State I.D.

Section 1 - Descriptive

Description Provide assistance to employers and institution for the development and coordination of alternative transportation options for employees and patrons.

Annual Cost	$10,000	**RTP Projected Cost**	
Upfront Cost			$191,881

Goal Scoring/Compatibility Analysis

goal scores			
5	1: Maintenance	Compatible	
9	2: Alternatives	Compatible	
7	3: Land Use	Compatible	
3	4: Environment	Compatible	
8	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	32
Benefit Level	34.0

Source of Origin
RTA

KEY:
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SPP = State Pedestrian Plan
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Park = Park & Ride study

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus

Type
B - Operating and Maintenance

AQ Analysis Yr

Approved	**Implemented**
☐	☐

New2003? ☒

1

RTP# 951 **Cape Cod & Islands Rural Roads PROGRAM**

Score -

State I.D.

Description Develop roadway design standards compatible with the character of Cape Cod and the Islands. Includes demonstration construction projects.

Section 1 - Descriptive

Annual Cost		RTP Projected Cost
Upfront Cost	$3,100,000	$2,703,774

Goal Scoring/Compatibility Analysis

goal scores			
8	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
2	3: Land Use	Compatible	
7	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	
Air Quality	
GoalBenefit	17
Benefit Level	17.0

Source of Origin
U.S.

KEY:

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MCS = Monomoy Capacity Study
OCS = Outer Cape Capacity Study
6A = Route 6A Corridor Management Plan
Safe = Cape Cod Accident Record Information System
TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☒

1

RTP# 952 **Route 6A/Scenic Byways PROGRAM**

Description Signage, special maintenance for roadways designated as scenic.

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$20,000	**RTP Projected Cost**	
Upfront Cost			$383,761

Goal Scoring/Compatibility Analysis

goal scores			
8	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
2	3: Land Use	Compatible	
7	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status: Considered Program Projects

Reconstruction of Rte. 6A as a footprint project

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	
Air Quality	
GoalBenefit	17
Benefit Level	17.0

Source of Origin
6A

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

RTA = 5 Year Transit Plan
SBP = State Bike Plan
SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
6 = Route 6 Study
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Conformity Information

AQStatus

Type
B - Operating and Maintenance

AQ Analysis Yr

Approved	**Implemented**
☐	☐

New2003? ☒

1

RTP# 953 **Intelligent Transportation Systems PROGRAM**

Description Coordinate, plan and implement ITS programs for highway and transit to and on Cape Cod.

Score -

State I.D.

Section 1 - Descriptive

Annual Cost	$300,000	**RTP Projected Cost**	
Upfront Cost			$5,756,422

Goal Scoring/Compatibility Analysis

goal scores			
2	1: Maintenance	Compatible	
7	2: Alternatives	Compatible	
5	3: Land Use	Compatible	
2	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	7.0
Air Quality	
GoalBenefit	16
Benefit Level	23.0

Source of Origin
LCP/RTA

KEY:

RPA = CCC Staff
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Conformity Information

AQStatus

Type
B - Operating and Maintenance

AQ Analysis Yr

Approved	**Implemented**
☐	☐

New2003? ☒

1

RTP# 954 **Park & Ride Expansion PROGRAM**

Description Expansion of parking facilities at Barnstable (Exit 6), Sagamore, Harwich (Exit 10) as necessary

Score -

State I.D.

Section 1 - Descriptive

Annual Cost		RTP Projected Cost
Upfront Cost	$500,000	$436,093

Goal Scoring/Compatibility Analysis

goal scores			
2	1: Maintenance	Compatible	
7	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
0	4: Environment	Compatible	
3	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	12
Benefit Level	14.0

Source of Origin
Park

KEY:

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Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☒

1

RTP# 955 **Bus Shelter PROGRAM**

Score -

State I.D.

Section 1 - Descriptive

Description Design and provide bus shelters and amenities designed to be compatible with the Cape Cod character at three levels; bus stop, transfer shelter, and "mini modal" center.

Annual Cost	$250,000	**RTP Projected Cost**	
Upfront Cost			$4,797,019

Goal Scoring/Compatibility Analysis

goal scores			
3	1: Maintenance	Compatible	
7	2: Alternatives	Compatible	
4	3: Land Use	Compatible	
6	4: Environment	Compatible	
7	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change		**Emissions Change VOC**	
VHT Change		**Emissions Change NOx**	

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	1.0
Air Quality	
GoalBenefit	27
Benefit Level	28.0

Source of Origin
RTA

KEY:

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Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved ☐ **Implemented** ☐

New2003? ☒

1

RTP# 956 **Land Conservation PROGRAM**

Score -

State I.D.

Description Strategic purchase of land to reduce sprawl and inefficient allocation of transportation resources. Also used to acquire land for improvement of intersections.

Section 1 - Descriptive

Annual Cost	$500,000	**RTP Projected Cost**	
Upfront Cost			$9,594,037

Goal Scoring/Compatibility Analysis

goal scores			
3	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
10	3: Land Use	Compatible	
2	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	-2,250	**Emissions Change VOC**	
VHT Change	-75	**Emissions Change NOx**	

Project Status: Analysis to be considered in Travel Demand Modeling

Replaces RTP #1030

Benefits Analysis

Travel Miles	0.2
Travel Hours	0.1
Safety	3.0
Air Quality	
GoalBenefit	15
Benefit Level	18.3

Source of Origin
MCS, OCS

KEY:

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Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

(2) **RTP# 1002** **Hyannis Intermodal Center - ph. 2+**

Score -

State I.D.

Description Construction of maintenance facility in Dennis for CCRTA busses. Rail facility upgrade in Hyannis.

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$3,000,000	$3,000,000

Goal Scoring/Compatibility Analysis

goal scores		
4	1: Maintenance	Compatible
4	2: Alternatives	Compatible
0	3: Land Use	Compatible
1	4: Environment	Compatible
3	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status: Hyannis complete except for Railroad elements

All benefits are estimates. Benefits are for remaining phases only (beyond phase 1).

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	12
Benefit Level	14.0

Source of Origin
BYTS

KEY:

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Conformity Information

AQStatus
Non-Exempt*

Type
A - Capital Improvements

AQ Analysis Yr
Y-2010

Approved	**Implemented**
☒	☐

New2003? ☐

2

RTP# 1003 **Exit 6 1/2 - Hyannis Access**

Score
n/a

State I.D.

Description Barnstable - new interchange on Route 6 between exits 6 & 7 to improve access to downtown Hyannis

Section 1 - Descriptive

Annual Cost		RTP Projected Cost
Upfront Cost	$15,000,000	$15,000,000

Goal Scoring/Compatibility Analysis

goal scores

0	1: Maintenance
5	2: Alternatives
-3	3: Land Use
0	4: Environment
0	5: Env. Justice

Compatibility
Insufficient information - compatibility not determined at this time

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
-39,925	-47,630
VHT Change	**Emissions Change NOx**
-2,883	-60,599

Project Status: Currently undergoing review at MassHighway Environmental section.

Benefits Analysis

Travel Miles	4.0
Travel Hours	2.9
Safety	4.0
Air Quality	1.1
GoalBenefit	2
Benefit Level	14.0

Source of Origin

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Conformity Information

AQStatus
Recommended for Study

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

2

RTP# 1004 **Southside Connector**

Description Bourne/Sandwich - Construction of a new divided highway between the Bourne Rotary and Route 6 near interchange 2

Score n/a

State I.D.

Section 1 - Descriptive

Annual Cost		RTP Projected Cost
Upfront Cost	$100,000,000	$100,000,000

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Incompatible	
0	2: Alternatives		
-5	3: Land Use	Incompatible	
0	4: Environment		
0	5: Env. Justice		

Compatibility
Compatibility not demonstrated

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
13,065	18,055
VHT Change	**Emissions Change NOx**
1,268	24,078

Project Status: Included in analysis for the Canal Area Transportation Study

Benefits Analysis

Travel Miles	-1.3
Travel Hours	-1.3
Safety	3.0
Air Quality	-0.4
GoalBenefit	-5
Benefit Level	-5.0

Source of Origin

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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved ☐ **Implemented** ☐

New2003? ☐

2

RTP# 1005 **Nickerson Park Access from Route 6**

Score n/a

State I.D.

Description Brewster - Direct access via new interchange to Nickerson Park from Route 6

Section 1 - Descriptive

	Annual Cost	RTP Projected Cost
Upfront Cost	$15,000,000	$15,000,000

Goal Scoring/Compatibility Analysis

goal scores		
0	1: Maintenance	
0	2: Alternatives	
0	3: Land Use	
0	4: Environment	
0	5: Env. Justice	

Compatibility

Insufficient information - compatibility not determined at this time

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Project Status: This project is not currently being studied.

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	4.0
Air Quality	
GoalBenefit	0
Benefit Level	4.0

Source of Origin

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

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CATS-Canal Area Transportation Study
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TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type

A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☐

2

RTP# 1006 **Rt 28 MacArthur Boulevard Improvements***

Score 6

State I.D.

Description Bourne - *Recommend MIS - - Construction of 2 new northbound lanes on Rt 28, reverse existing northbound, existing southbound becomes frontage road

Section 1 - Descriptive

Annual Cost		RTP Projected Cost
Upfront Cost	$10,000,000	$10,000,000

Goal Scoring/Compatibility Analysis

goal scores		
0	1: Maintenance	Compatible
2	2: Alternatives	Compatible
0	3: Land Use	Compatible
0	4: Environment	Compatible
0	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
4,933	-1,796
VHT Change	**Emissions Change NOx**
-155	11,353

Project Status: Included in alternatives analysis of Canal Area Transportation Study.

Benefits Analysis

Travel Miles	-0.5
Travel Hours	0.2
Safety	4.0
Air Quality	-0.1
GoalBenefit	2
Benefit Level	5.6

Source of Origin
28, CATS

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

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LCP = Local Comprehensive Plan/Local Initiative
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Recommended for Study

Type
A - Capital Improvements

AQ Analysis Yr
Y-2020

Approved	Implemented
☐	☐

New2003? ☐

2

RTP# 1008 **Rt 6 Reconfigure Interchange One**

Score 21

State I.D.

Description Improve westbound on-ramp near Sagamore Bridge during peak times for off-cape traffic flow: Route 6, Exit 1: Reconfigure WB on-ramp

Section 1 - Descriptive

Annual Cost	$50,000	**RTP Projected Cost**	
Upfront Cost			$1,100,000

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
0	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	3,580	**Emissions Change VOC**	3,359
VHT Change	194	**Emissions Change NOx**	5,022

Benefits Analysis

Travel Miles	-0.4
Travel Hours	-0.2
Safety	3.0
Air Quality	-0.1
GoalBenefit	0
Benefit Level	2.4

Project Status: Alternatives are being evaluated as part of the Canal Area study. Initial project proposed is the closing of the WB on ramp on congested Sunday afternoons.

Source of Origin
SRot, RPA

KEY:

RPA = CCC Staff
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Park = Park & Ride study

Conformity Information

AQStatus
Recommended for Study

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	Implemented
☐	☐

2

RTP# 1009 **Sagamore Rotary Reconfiguration**

Score -

State I.D.

Section 1 - Descriptive

Description Replacement of Sagamore Rotary with grade-separated interchange allowing Rt 3 to Sagamore Bridge to pass over Route 6.

Annual Cost		RTP Projected Cost
Upfront Cost	$35,000,000	$35,000,000

Goal Scoring/Compatibility Analysis

goal scores

1: Maintenance	Compatible
2: Alternatives	Compatible
3: Land Use	Compatible
4: Environment	Compatible
5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	
Air Quality	
GoalBenefit	0
Benefit Level	

Project Status: Earth Tech is designing and permitting this project and construction is expected to begin in 2004.

Goal Scores to be determined - subject to further review. Compatibility assumes funding in excess of Regional Funding Allocation and resolution of issues raised during the project review process. Fund source from statewide program.

Source of Origin

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Conformity Information

AQStatus
Recommended for Study

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	Implemented
☒	☐

New2003? ☐

2

RTP# 1010 **Bourne Rotary Reconfiguration**

Score n/a

State I.D.

Description Bourne - reconfigure Bourne rotary to allow traffic between Bourne Bridge to Route 28 (MacArthur Blvd)

Section 1 - Descriptive

	Annual Cost	RTP Projected Cost
Upfront Cost	$30,000,000	$30,000,000

Goal Scoring/Compatibility Analysis

goal scores

1: Maintenance	
2: Alternatives	
3: Land Use	
4: Environment	
5: Env. Justice	

Compatibility

Insufficient information - compatibility not determined at this time

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
1,098	2,280
VHT Change	**Emissions Change NOx**
146	2,998

Benefits Analysis

Travel Miles	-0.1
Travel Hours	-0.1
Safety	1.0
Air Quality	-0.1
GoalBenefit	0
Benefit Level	0.7

Project Status:

Options are currently being studied by the CCC. The study has identified some lower cost reconfiguration options for the existing rotary that will improve flow and may be an interim solution to higher cost alternatives such as a flyover.

This project is replaced by RTP #1062 and RTP # 1055

Source of Origin

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Park = Park & Ride study

Conformity Information

AQStatus
Recommended for Study

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

2

RTP# 1012 **Rt 132 Boulevard**

Score 42

State I.D.

Description Barnstable - Construction of 2 new lanes from Rt 6 to Bearses Way (incl. landscaped median divider)

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$7,500,000	$7,500,000

Goal Scoring/Compatibility Analysis

goal scores		
0	1: Maintenance	Compatible
6	2: Alternatives	Compatible
8	3: Land Use	Compatible
0	4: Environment	Compatible
0	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	-41,846
Emissions Change VOC	-50,933
VHT Change	-3,047
Emissions Change NOx	-63,603

Project Status: Under design by EarthTech for the Town of Barnstable

Benefits Analysis

Travel Miles	4.2
Travel Hours	3.0
Safety	9.0
Air Quality	1.1
GoalBenefit	14
Benefit Level	31.4

Source of Origin
MS, TDF

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OCS = Outer Cape Capacity Study
6A = Route 6A Corridor Management Plan
Safe = Cape Cod Accident Record Information System
TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Non-Exempt

Type
A - Capital Improvements

AQ Analysis Yr
Y-1999

Approved	Implemented
☐	☐

New2003? ☐

(2) **RTP# 1014** **Cape Cod Rail Trail Resurface & Widen**

Score 57

State I.D.

Description Eastham to Dennis - Resurface and widen original rail trail from 8'-10'

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$3,000,000	$3,000,000

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Compatible	
5	2: Alternatives	Compatible	
2	3: Land Use	Compatible	
8	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	15
Benefit Level	17.2

Project Status: This project has been a priority for the region for many years and sections of the path are being resurfaced with local funds due to the hazardous conditions that have developed.

Source of Origin
SBP

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

RTA = 5 Year Transit Plan
SBP = State Bike Plan
SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
6 = Route 6 Study
28 = Route 28 Study
CATS-Canal Area Transportation Study
BYTS = Barnstable/Yarmouth Transportation Study
SRot = Sagamore Rotary Study
ITS = Intelligent Transportation Systems Study
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6A = Route 6A Corridor Management Plan
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TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

(2) **RTP# 1015** **Cape Cod Rail Trail Extensions**

Score 50

State I.D.

Description Extend Cape Cod Rail Trail to Provincetown in the north, Hyannis (or Bourne) in the west via new bike path

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$4,000,000	$4,000,000

Goal Scoring/Compatibility Analysis

goal scores		
0	1: Maintenance	Compatible
5	2: Alternatives	Compatible
2	3: Land Use	Compatible
8	4: Environment	Compatible
2	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	3.0
Air Quality	
GoalBenefit	17
Benefit Level	20.0

Project Status:

Design required. Feasiblity study performed in 1994 by VHB regarding bike path sharing rail right-of-way from Dennis west to Sandwich/Bourne.

This project would potentially extend from terminus of RTP #1062

Extension of the Cape Cod Rail Trail from Rte. 134 to Barnstable

Source of Origin

SBP

KEY:

RTA = 5 Year Transit Plan
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SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
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28 = Route 28 Study
CATS-Canal Area Transportation Study
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LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus
Exempt

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	**Implemented**
☐	☐

New2003? ☐

(2) **RTP# 1016** **Rt 28 Bike Accomodation: Hyannis-Dennis**

Score 40

State I.D.

Description Construction, marking, and signage of Bicycle facility along Route 28 from Hyannis - Dennis

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$5,000,000	$5,000,000

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Compatible	
5	2: Alternatives	Compatible	
2	3: Land Use	Compatible	
6	4: Environment	Compatible	
2	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status: Inactive

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	5.0
Air Quality	
GoalBenefit	15
Benefit Level	20.0

Source of Origin
Safe

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

1

RTP# 1021 **Additional CCRTA Service PROGRAM**

Score -

State I.D.

Section 1 - Descriptive

Description Public transit shuttles connecting villages along Route 6A from Sandwich to Orleans, Provincetown-Orleans Shuttle, etc.

Annual Cost	$1,940,000	**RTP Projected Cost**	
Upfront Cost			$37,224,864

Goal Scoring/Compatibility Analysis

goal scores

7	1: Maintenance	Compatible
0	2: Alternatives	Compatible
0	3: Land Use	Compatible
0	4: Environment	Compatible
0	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	3.0
Air Quality	
GoalBenefit	7
Benefit Level	10.0

Project Status: A number of new routes have been suggested by the 5-Year Public Transportation Plan and a number of routes are being developed for the Outer Cape as part of a long-range planning effort.

Source of Origin
6A

KEY:
RTA = 5 Year Transit Plan
SBP = State Bike Plan
SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
6 = Route 6 Study
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BYTS = Barnstable/Yarmouth Transportation Study
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	**Implemented**
☐	☐

New2003? ☐

(2) **RTP# 1022** **Transportation Management Center**

Score 19

State I.D.

Description Operations center to monitor traffic operations, issue real-time reports to traveling public, control variable message signs and coordinated traffic signals

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$6,450,000	$6,450,000

Goal Scoring/Compatibility Analysis

goal scores			
3	1: Maintenance	Compatible	
2	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
2	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status: Ongoing discussions with CCRTA and other interested parties.

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	5.0
Air Quality	
GoalBenefit	7
Benefit Level	12.0

Source of Origin
ITS

KEY:

RPA = CCC Staff
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

2

RTP# 1023 **Variable Message Signs**

Score 115

State I.D.

Description Remote operated variable message signs installed along all major routes - Rt 6, Rt 28 in Bourne & Falmouth, Rt 25 Extension, Rt 3

Section 1 - Descriptive

Annual Cost	$10,000	**RTP Projected Cost**	
Upfront Cost	$1,000,000		$1,220,000

Goal Scoring/Compatibility Analysis

goal scores			
3	1: Maintenance	Compatible	
2	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
2	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	7.0
Air Quality	
GoalBenefit	7
Benefit Level	14.0

Project Status: Related activities underway by other agencies include Variable Message Signs at locations managed by the Steamship Authority and the U.S. Army Corps of Engineers

Source of Origin
ITS

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Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
Y-1999 (CMAQ)

Approved	Implemented
☐	☐

New2003? ☐

(2) **RTP# 1024** **Permanent Traffic Counting Stations**

Score 660

State I.D.

Description Install permanent traffic counting stations at strategic locations Cape-wide

Section 1 - Descriptive

Annual Cost	$1,000	**RTP Projected Cost**	
Upfront Cost	$175,000		$197,000

Goal Scoring/Compatibility Analysis

goal scores		
9	1: Maintenance	Compatible
3	2: Alternatives	Compatible
0	3: Land Use	Compatible
0	4: Environment	Compatible
0	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status: No design work has been done for this project.

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	1.0
Air Quality	
GoalBenefit	12
Benefit Level	13.0

Source of Origin
RPA, JTC

KEY:

RPA = CCC Staff
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Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved ☐ **Implemented** ☐

New2003? ☐

(2) **RTP# 1027** **Interchange Improvements Rt 6**

Description Mid-Cape Hwy - Implement improvements to Route 6 Interchanges

Score 2

State I.D.

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$38,200,000	$38,200,000

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Compatible	
0	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
0	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	8.0
Air Quality	
GoalBenefit	0
Benefit Level	8.0

Project Status:

Improvements to the portion of Route 6 between Dennis and Orleans have been contemplated for quite a while. Additional improvements are expected to be developed by the Route 6 Outer Cape study to be complete in late 2000. The RTP also recommends a study of the interchanges on Route 6 which will probably have additional safety recommendations.

Anticipated Projects:
Route 6 Dennis to Orleans $12,000,000
Outer Cape $5,000,000
Exit 5 Improvements $2,000,000

Source of Origin
MHD

RPA = CCC Staff
MHD = Mass Highway Dept
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KEY:
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Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
B - Operating and Maintenance

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

2

RTP# 1031 **Cape-wide Highway Advisory Radio**

Description Provide travel information cape-wide via AM radio

Score 560

State I.D.

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$250,000	$250,000

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Compatible	
7	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
5	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	12
Benefit Level	14.0

Project Status: Cape wide Advisory Radio is a component of the access planning underway by the Cape Cod National Seashore. This project is expected to be funded by the Seashore in FY2004.

Source of Origin

ITS

KEY:

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MHD = Mass Highway Dept
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PUB = Public Input

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LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☐

(2) **RTP# 1036** **Harwich/Chatham Rail Trail Extension**

Description Extend Cape Cod Rail Trail through Chatham

Score 203

State I.D.

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$985,000	$985,000

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Compatible	
5	2: Alternatives	Compatible	
2	3: Land Use	Compatible	
8	4: Environment	Compatible	
2	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status: Harwich section complete.

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	3.0
Air Quality	
GoalBenefit	17
Benefit Level	20.0

Source of Origin
SBP

KEY:

RPA = CCC Staff
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PUB = Public Input

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LCP = Local Comprehensive Plan/Local Initiative
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus
Exempt

Type
A - Capital Improvements

AQ Analysis Yr
N

Approved	Implemented
☐	☐

New2003? ☒

2

RTP# 1050 **Provincetown Local Intermodal Center**

Score 260

State I.D.

Section 1 - Descriptive

Description Develop an intermodal center in the vicinity of MacMillan Wharf to facilitate transfers and coordination between local bus, intercity coach, ferries, and other public transportation

Annual Cost		**RTP Projected Cost**
Upfront Cost	$1,000,000	$1,000,000

Goal Scoring/Compatibility Analysis

goal scores			
3	1: Maintenance	Compatible	
7	2: Alternatives	Compatible	
3	3: Land Use	Compatible	
6	4: Environment	Compatible	
5	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change

Emissions Change VOC

VHT Change

Emissions Change NOx

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	24
Benefit Level	26.0

Source of Origin

RTA

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

KEY:
RTA = 5 Year Transit Plan
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SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
6 = Route 6 Study
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LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved ☐ **Implemented** ☐

New2003? ☒

2

RTP# 1051 **Orleans Local Intermodal Center**

Score 260

State I.D.

Section 1 - Descriptive

Description Develop an intermodal center in the vicinity of the Eastham Rotary to facilitate transfers and coordination between local bus, intercity coach, and other public transportation

Annual Cost		**RTP Projected Cost**
Upfront Cost	$1,000,000	$1,000,000

Goal Scoring/Compatibility Analysis

goal scores

3	1: Maintenance	Compatible
7	2: Alternatives	Compatible
3	3: Land Use	Compatible
6	4: Environment	Compatible
5	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	24
Benefit Level	26.0

Source of Origin
RTA

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

RTA = 5 Year Transit Plan
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SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
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CATS-Canal Area Transportation Study
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LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	**Implemented**
☐	☐

New2003? ☒

2

RTP# 1052 **Upper Cape Local Intermodal Center**

Score 173

State I.D.

Description Develop an intermodal center(s)in the Upper Cape to facilitate transfers and coordination between local bus, intercity coach, ferries, and other public transportation

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$1,500,000	$1,500,000

Goal Scoring/Compatibility Analysis

goal scores			
3	1: Maintenance	Compatible	
7	2: Alternatives	Compatible	
3	3: Land Use	Compatible	
6	4: Environment	Compatible	
5	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	24
Benefit Level	26.0

Source of Origin
RTA

KEY:
RTA = 5 Year Transit Plan
SBP = State Bike Plan
SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
6 = Route 6 Study
28 = Route 28 Study
CATS-Canal Area Transportation Study
BYTS = Barnstable/Yarmouth Transportation Study
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ITS = Intelligent Transportation Systems Study
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OCS = Outer Cape Capacity Study
6A = Route 6A Corridor Management Plan
Safe = Cape Cod Accident Record Information System
TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	**Implemented**
☐	☐

New2003? ☒

2

RTP# 1053 **Human Services Dispatch Center**

Score 147

State I.D.

Description Develop a certral dispatch center for human services to coordinate and optimize resources.

Section 1 - Descriptive

		RTP Projected Cost
Annual Cost		
Upfront Cost	$1,500,000	$1,500,000

Goal Scoring/Compatibility Analysis

goal scores		
3	1: Maintenance	Compatible
6	2: Alternatives	Compatible
0	3: Land Use	Compatible
3	4: Environment	Compatible
8	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	20
Benefit Level	22.0

Source of Origin
RTA

KEY:

RPA = CCC Staff
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6A = Route 6A Corridor Management Plan
Safe = Cape Cod Accident Record Information System
TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved ☐ **Implemented** ☐

New2003? ☒

2

RTP# 1055 **Bourne Rotary Improvements**

Description Develop capacity enhancements for the existing rotary to improve flows at entrances and exits by widening.

Score n/a

State I.D.

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$500,000	$500,000

Goal Scoring/Compatibility Analysis

goal scores

	1: Maintenance	Incompatible
0	2: Alternatives	
0	3: Land Use	
0	4: Environment	
0	5: Env. Justice	

Compatibility
Compatibility not demonstrated

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status: Complementary to RTP #1061, Replaces RTP #1010.

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	7.0
Air Quality	
GoalBenefit	0
Benefit Level	7.0

Source of Origin
CATS

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

RTA = 5 Year Transit Plan
SBP = State Bike Plan
SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
6 = Route 6 Study
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CATS-Canal Area Transportation Study
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	**Implemented**
☐	☐

New2003? ☒

2

RTP# 1057 **Bus-Only Lanes for Rt 3 & Rt 6**

Score 38

State I.D.

Description Provide bus-only lanes between exit 2 and the bridge for both Rte. 3 and Rte. 6. This is expected to be achieved by widening and strengthening the shoulder section.

Section 1 - Descriptive

Annual Cost		RTP Projected Cost
Upfront Cost	$5,000,000	$5,000,000

Goal Scoring/Compatibility Analysis

goal scores		
0	1: Maintenance	Compatible
7	2: Alternatives	Compatible
0	3: Land Use	Compatible
5	4: Environment	Compatible
5	5: Env. Justice	Compatible

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	2.0
Air Quality	
GoalBenefit	17
Benefit Level	19.0

Source of Origin
RTA

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

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Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☒

2

RTP# 1060 **Sandwich Road Parkway**

Description Develop Sandwich Road into a 4 lane parkway with a landscaped median.

Score
n/a

State I.D.

Section 1 - Descriptive

Annual Cost	RTP Projected Cost
Upfront Cost	$0

Goal Scoring/Compatibility Analysis

goal scores

1: Maintenance	
2: Alternatives	
3: Land Use	
4: Environment	
5: Env. Justice	

Compatibility
Insufficient information - compatibility not determined at this time

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	8.0
Air Quality	
GoalBenefit	0
Benefit Level	8.0

Source of Origin
CATS

KEY:

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Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☒

2

RTP# 1061 **Scenic Highway/Rt 25 Connector Ramp**

Description Develop a direct connection from Scenic Highway to Rte. 25 to divert traffic from the Bourne rotary.

Score
n/a

State I.D.

Section 1 - Descriptive

Annual Cost	RTP Projected Cost
Upfront Cost	$0

Goal Scoring/Compatibility Analysis

goal scores

1: Maintenance	
2: Alternatives	
3: Land Use	
4: Environment	
5: Env. Justice	

Compatibility
Insufficient information - compatibility not determined at this time

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	7.0
Air Quality	
GoalBenefit	0
Benefit Level	7.0

Source of Origin
CATS

KEY:

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TDF = Travel Demand Forecast
LCP = Local Comprehensive Plan/Local Initiative
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☒

2

RTP# 1062 **Cape Cod Rail: Dennis, Yarmouth, Barnstable**

Score 60

State I.D.

Description Extension of the existing Cape Cod Rail trail west to Hyannis Transportation Center (route to be determined)

Section 1 - Descriptive

		RTP Projected Cost
Annual Cost		
Upfront Cost	$3,000,000	$3,000,000

Goal Scoring/Compatibility Analysis

goal scores			
0	1: Maintenance	Compatible	
5	2: Alternatives	Compatible	
2	3: Land Use	Compatible	
8	4: Environment	Compatible	
2	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	1.0
Air Quality	
GoalBenefit	17
Benefit Level	18.0

Source of Origin
LCP

KEY:

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PUB = Public Input

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LCP = Local Comprehensive Plan/Local Initiative
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U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☒

2

RTP# 1063 **Rt 6 Outer Cape Improvements**

Score n/a

State I.D.

Description A series of improvements in the corridor between Orleans and Provincetown to be refined by the ongoing Rte 6 study expected to be complete in 2003

Section 1 - Descriptive

Annual Cost	RTP Projected Cost
Upfront Cost	$0

Goal Scoring/Compatibility Analysis

goal scores

1: Maintenance	
2: Alternatives	
3: Land Use	
4: Environment	
5: Env. Justice	

Compatibility

Insufficient information - compatibility not determined at this time

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Project Status: This project is complementary to RTP #1037

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	9.0
Air Quality	
GoalBenefit	0
Benefit Level	9.0

Source of Origin

6

KEY:

RTA = 5 Year Transit Plan
SBP = State Bike Plan
SPP = State Pedestrian Plan
JTC = Cape Cod Joint Transportation Committee
6 = Route 6 Study
28 = Route 28 Study
CATS-Canal Area Transportation Study
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LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

RPA = CCC Staff
MHD = Mass Highway Dept
MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus

Type

A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☒

2

RTP# 1064 **Route 28 Improvements**

Description Improvements in Yarmouth, Dennis, Harwich, and Chatham to be refined by the ongoing Rte 28 study

Score
n/a

State I.D.

Section 1 - Descriptive

Annual Cost	RTP Projected Cost
Upfront Cost	$0

Goal Scoring/Compatibility Analysis

goal scores

1: Maintenance	
2: Alternatives	
3: Land Use	
4: Environment	
5: Env. Justice	

Compatibility
Insufficient information - compatibility not determined at this time

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Project Status: Rt 28 study expected to be complete in 2003

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	9.0
Air Quality	
GoalBenefit	0
Benefit Level	9.0

Source of Origin
28

KEY:

RPA = CCC Staff
MHD = Mass Highway Dept
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LCP = Local Comprehensive Plan/Local Initiative
Mar - Cape Cod Marine Transportation Studies
U.S. = U.S DOT/TEA-21
Park = Park & Ride study

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☒

(2) **RTP# 1065** **Higgins Crowell Rd - Realignment @ Willow St**

Score n/a

State I.D.

Description Realignment of Higgins Crowell Road to improve the Rte 6/Exit 7 interchange operation.

Section 1 - Descriptive

Annual Cost	RTP Projected Cost
Upfront Cost	$0

Goal Scoring/Compatibility Analysis

goal scores

	1: Maintenance
	2: Alternatives
6	3: Land Use
	4: Environment
	5: Env. Justice

Compatibility
Insufficient information - compatibility not determined at this time

Section 2 - Quantitative

Technical Analysis

VMT Change	Emissions Change VOC
VHT Change	Emissions Change NOx

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	5.0
Air Quality	
GoalBenefit	6
Benefit Level	11.0

Source of Origin
LCP

KEY:
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Park = Park & Ride study

RPA = CCC Staff
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MS = Management Systems
PUB = Public Input

Conformity Information

AQStatus

Type
A - Capital Improvements

AQ Analysis Yr

Approved	Implemented
☐	☐

New2003? ☒

2

RTP# 1066 **Canal Area Intelligent Transportation System**

Description Real-time transportation information system to manage Canal area roadway system

Score 47

State I.D.

Section 1 - Descriptive

Annual Cost		**RTP Projected Cost**
Upfront Cost	$3,000,000	$3,000,000

Goal Scoring/Compatibility Analysis

goal scores			
3	1: Maintenance	Compatible	
2	2: Alternatives	Compatible	
0	3: Land Use	Compatible	
2	4: Environment	Compatible	
0	5: Env. Justice	Compatible	

Compatibility
Compatible

Section 2 - Quantitative

Technical Analysis

VMT Change	**Emissions Change VOC**
VHT Change	**Emissions Change NOx**

Project Status:

Benefits Analysis

Travel Miles	
Travel Hours	
Safety	7.0
Air Quality	
GoalBenefit	7
Benefit Level	14.0

Source of Origin
CATS

KEY:

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Park = Park & Ride study

Conformity Information

AQStatus

Type
B - Operating and Maintenance

AQ Analysis Yr

Approved	**Implemented**
☐	☐

7.4. Recommended RTP Projects with Fiscal Constraint

Based on the criteria laid out in the previous section, the following pages present a ranking of projects that are compatible with Regional Transportation Plan Goals. Funded projects are listed first, followed by essential programs, then projects ranked by score. The cumulative cost is compared to the total expected Regional Transportation Plan funding amount which includes pre-approved funding for projects such like the Sagamore Rotary project.

It is important to note that this analysis is based on the best available information. As new funding forecasts and sources become available (or disappear), it is expected that needed projects will move up onto or down off of the list of recommended projects. For an explanation of abbreviations please see the listing at the end of the main report. The following three pages include a list of programs and projects in the priority order based on the evaluation process for consistency with the RTP goals and air quality factors. Programs and projects recommended by the RTP are designated by "Yes" under "Recommended."

Two projects were included in the recommended projects due to their being funded:

- Sagamore Rotary Improvements are included in the list of recommended projects. This project has received statewide priority and is funded from the Statewide Road and Bridge program. The Sagamore Rotary Improvements are included as a recommended project in this plan on a conditional basis pending the resolution of concerns expressed in the project review process.
- Hyannis Intermodal Center, Phase II (rail facilities) this project was previously funded and has obligated funding.

Cape Cod Regional Transportation Plan

Recommended RTP Projects with Fiscal Constraint

Years of Operation 22

RTP Funding - Millions $643

RTP#	Title	RTP Projected Cost	Score	Cumulative Cost (Millions)	Recommended	FUNDED?
1009	Sagamore Rotary Reconfiguration	$35,000,000	-	$35.0	Yes	☒
1002	Hyannis Intermodal Center - ph. 2+	$3,000,000	-	$38.0	Yes	☒
900	Resurfacing PROGRAM	$230,256,893	-	$268.3	Yes	☐
901	Bridge PROGRAM	$46,051,379	-	$314.3	Yes	☐
902	Transit Operating PROGRAM	$127,888,516	-	$442.2	Yes	☐
903	Intersection PROGRAM	$23,985,093	-	$466.2	Yes	☐
905	Access Management PROGRAM	$1,918,807	-	$468.1	Yes	☐
904	Bicycle/Pedestrian Projects PROGRAM	$5,756,422	-	$473.9	Yes	☐
1021	Additional CCRTA Service PROGRAM	$37,224,864	-	$511.1	Yes	☐
908	New Ferry Service - PROGRAM	$4,797,019	-	$515.9	Yes	☐
956	Land Conservation PROGRAM	$9,594,037	-	$525.5	Yes	☐
907	TDM/TSM PROGRAM	$9,594,037	-	$535.1	Yes	☐
909	Regional Bike Network PROGRAM	$4,164,684	-	$539.2	Yes	☐
906	Transit Capital PROGRAM	$34,538,534	-	$573.8	Yes	☐
950	Trans. Managment Association PROGRAM	$191,881	-	$574.0	Yes	☐
951	Cape Cod & Islands Rural Roads PROGRAM	$2,703,774	-	$576.7	Yes	☐
952	Route 6A/Scenic Byways PROGRAM	$383,761	-	$577.0	Yes	☐
953	Intelligent Transportation Systems PROGRAM	$5,756,422	-	$582.8	Yes	☐
954	Park & Ride Expansion PROGRAM	$436,093	-	$583.2	Yes	☐
955	Bus Shelter PROGRAM	$4,797,019	-	$588.0	Yes	☐

Cape Cod Regional Transportation Plan

Recommended RTP Projects with Fiscal Constraint

Years of Operation 22

RTP Funding - Millions $643

RTP#	Title	RTP Projected Cost	Score	Cumulative Cost (Millions)	Recommended	FUNDED?
1024	Permanent Traffic Counting Stations	$197,000	660	$588.2	Yes	☐
1031	Cape-wide Highway Advisory Radio	$250,000	560	$588.5	Yes	☐
1050	Provincetown Local Intermodal Center	$1,000,000	260	$589.5	Yes	☐
1051	Orleans Local Intermodal Center	$1,000,000	260	$590.5	Yes	☐
1036	Harwich/Chatham Rail Trail Extension	$985,000	203	$591.5	Yes	☐
1052	Upper Cape Local Intermodal Center	$1,500,000	173	$593.0	Yes	☐
1053	Human Services Dispatch Center	$1,500,000	147	$594.5	Yes	☐
1023	Variable Message Signs	$1,220,000	115	$595.7	Yes	☐
1062	Cape Cod Rail: Dennis, Yarmouth, Barnstable	$3,000,000	60	$598.7	Yes	☐
1014	Cape Cod Rail Trail Resurface & Widen	$3,000,000	57	$601.7	Yes	☐
1015	Cape Cod Rail Trail Extensions	$4,000,000	50	$605.7	Yes	☐
1066	Canal Area Intelligent Transportation System	$3,000,000	47	$608.7	Yes	☐
1012	Rt 132 Boulevard	$7,500,000	42	$616.2	Yes	☐
1016	Rt 28 Bike Accomodation: Hyannis-Dennis	$5,000,000	40	$621.2	Yes	☐
1057	Bus-Only Lanes for Rt 3 & Rt 6	$5,000,000	38	$626.2	Yes	☐
1008	Rt 6 Reconfigure Interchange One	$1,100,000	21	$627.3	Yes	☐
1022	Transportation Management Center	$6,450,000	19	$633.7	Yes	☐
1006	Rt 28 MacArthur Boulevard Improvements*	$10,000,000	6	$643.7	No	☐
1027	Interchange Improvements Rt 6	$38,200,000	2	$681.9	No	☐