



CAPE COD
COMMISSION

2016 REGIONAL TRANSPORTATION PLAN
Technical Appendix E: Freight

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Technical Appendix E: Freight

Freight transportation is the movement of goods in large quantity. The movements are generally split up in to four major categories, truck, rail, and water and air freight, each with their own types of contracts. On Cape Cod, freight travel mostly reaches its end point for goods to be bought by consumers or movements are internal to the region. Few goods are exported. Cape Cod exports including solid waste, parcel post and seafood products which are explored in the study.

Local economies typically depend on freight transportation to export and import goods. The freight industry on Cape Cod is different because of the seasonal tourist industry, abundance of waterways, and historic culture. The tourist industry creates more demand on goods in the summer months; the waterways create opportunities for sea freight, but also require crossings for truck freight. The historic character and geographic placement of Cape Cod limits the ability to create large-scale freight infrastructure.

In 2014 the Cape Cod Commission performed a regional freight study. The purpose of the study was to provide recommendations to improve freight flexibility, speed-efficiency, fuel-efficiency, and safety by transport method. The study overviewed freight infrastructure, featured data from a survey presented to local freight businesses, and finally provided recommendations for the improvement of freight operations and infrastructure on Cape Cod.

TRUCK FREIGHT

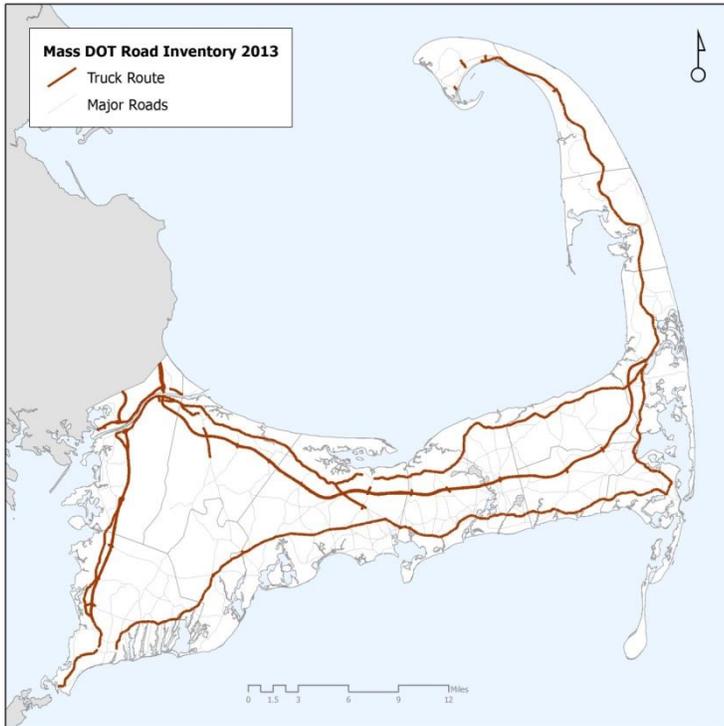
Vehicle transportation is the primary method of freight distribution in the region. It is important to note that all vehicle traffic on Cape Cod experiences two different seasons, extreme congestion in the summer or peak season, and normal congestion in the remaining seasons or off season.

Maintaining properly designed intersection controls is important for the freight industry to ensure safety, and minimize delays. At signalized intersections this may mean optimizing signal timing and phases and providing turning lanes. At roundabouts this may mean the provision of truck aprons adjacent to the center island and on exit/entrance shoulders.

The maximum legal speed limit on most Cape Cod highways is 55 mph. Exceptions include Route 3 (60 mph) and Route 25 (65 mph) in Bourne. The speed limits on the road affect the movement of freight traffic by governing travel time. In order to encourage truck freight to remain on the limited-access portions of freeways such as the Mid Cape Highway, an evaluation of safety and free-flow travel speeds should be performed – possibly leading to an increase in some speed limits (perhaps limited to daytime hours).

Freight traffic is affected by congestion on Cape Cod. At certain times of the year freight carriers are not able to make trips due to travel times. Congestion is found on almost all Cape Cod roads in the summer. Year round, heaviest travel occurs on the Cape Cod Canal roads and bridges and the Mid-Cape Highway. High volumes of traffic are also found on the roads leading to and within the Hyannis area (an area that receives/sends goods to/from many businesses, institutions such as Cape Cod Hospital and multimodal facilities such as the ferry ports).

Freight traffic has the most significant effect on pavement conditions because of the stress that truck weight causes on the pavement. Freight is also affected by pavement conditions because potholes and other pavement issues can create safety hazards for truck drivers and cargo. Pavement condition data are collected with the intent to keep the roadway system in the best possible condition with the most efficient use of available funds.



MASSDOT DESIGNATED TRUCK ROUTES

There are over 200 miles of designated truck routes under state authority (shown in the following figure). These routes are only located on state highways (e.g., Routes 6, 28, 6A and 28A). There are several obvious gaps in connectivity, due to changes in jurisdiction (e.g., Route 6A in Barnstable Village, Route 28 in downtown Falmouth). Other gaps in connectivity occur between the truck route network and intermodal facilities such as the ferry ports in Hyannis and Provincetown.

FIGURE 1: MASSDOT TRUCK ROUTES

Source: Massachusetts Roadway Inventory File 2013

CANAL BRIDGES

The largest bottlenecks on Cape Cod occur at the canal bridges during the summer season. The Bourne Bridge and Sagamore Bridge permit vehicular travel over the Cape Cod Canal. Summer time delays at the canal bridges can sometimes be measured in hours. Because of the unreliable travel time associated with crossing the canal bridges many freight companies will not locate or deliver on Cape Cod.

The Bourne Bridge and Sagamore Bridge are both under the jurisdiction of the Army Corp of Engineers (ACOE). One or the other of the two highway bridges may have restrictions on lanes and heavy vehicles during several weeks of the year to accommodate painting and structural maintenance activities. While avoiding the heavy summer traffic season, these lane closures have been observed to result in traffic backups of several hours.

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. Historic records indicate a general upward trend in the annual bridge crossings and this traffic is currently approaching 100,000 vehicles per average day. Over the decades, 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. The ACOE is committed to minimizing these conditions by avoiding daytime lane reductions during the summer months and limiting work to one bridge at a time.

The Army Corps of Engineers established a website and email notification system for major maintenance efforts on the bridges. By providing timely warnings of impending closures, travelers may adjust travel mode, choice of bridge crossing and approach routes, or timing. The bridges do need to be maintained in order to continue to provide safe passage to and from the region. Foul weather may interfere sometimes in the maintenance efforts, and as a result the schedule prolonged. Some further strategies to minimize impacts are listed below.

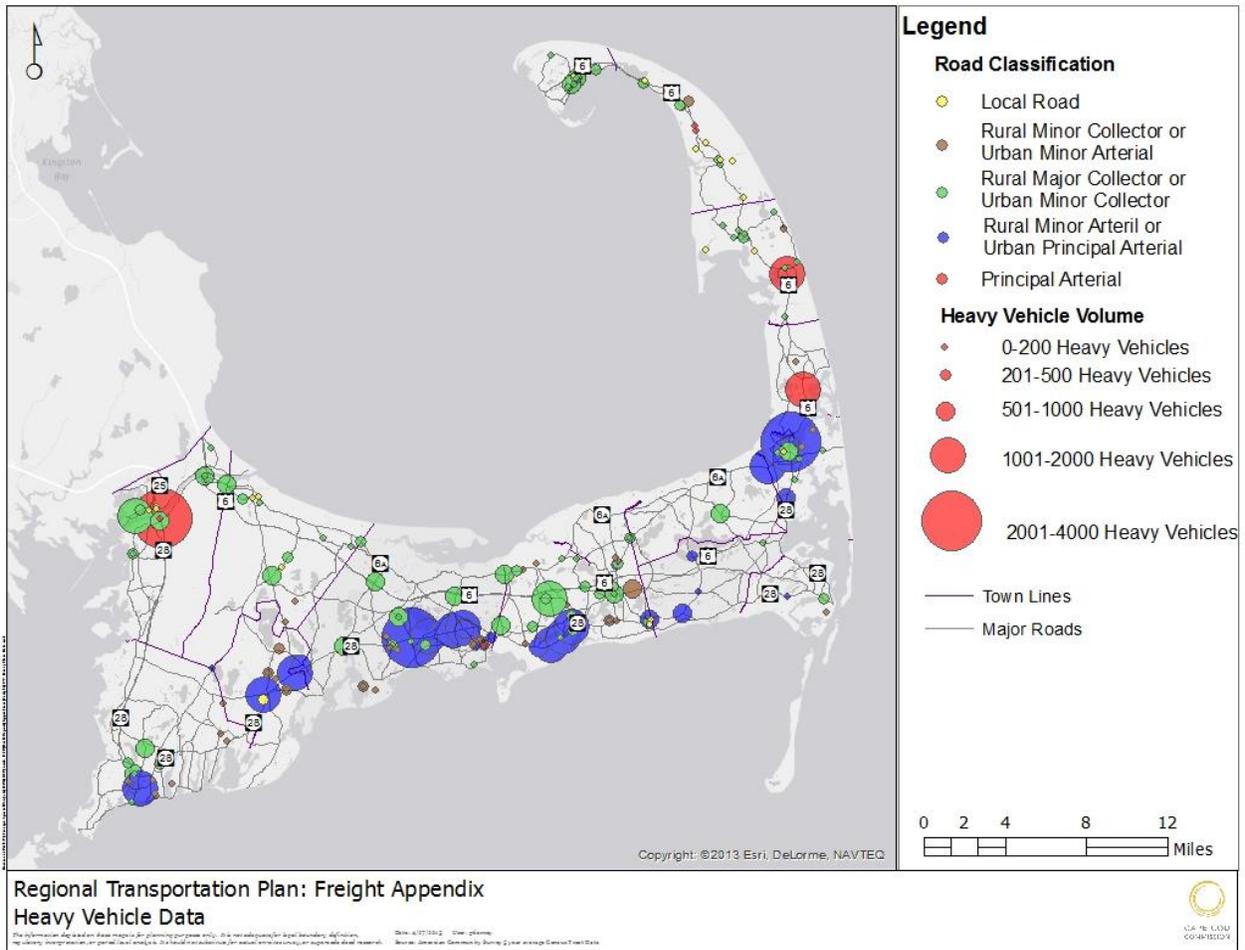
- Scheduling Maintenance Activities for Off-Peak Periods minimizes disruptions to traffic during heavy travel periods. The Army Corps is already making efforts to achieve this - and should continue to do so. To the greatest extent possible, lane closures should avoid summer months and daytime periods during the spring and fall.
- Intelligent Transportation Systems (ITS) is collection and dissemination of real-time information through means such as cameras and/or cell phone data collection. The information is available on the state traffic information website and 511 telephone system. This allows for travelers to check online or via cell phones on current traffic conditions at the bridges. Radio stations also look up and provide updates on bridge traffic. The Cape Cod Commission website provides links to transportation providers (www.capecodcommission.org) including a link to the ACOE 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 may actually create bottlenecks in other locations such as the Exit One on-ramp at the approach of the Mid-Cape Highway westbound at the Sagamore Bridge. Techniques to be considered should include police officer traffic control, signage, and turn restrictions.

VEHICLE CLASSIFICATION DATA

The Cape Cod Commission data collection program deploys a number of automated traffic recorders that detect the classification of vehicles traveling at that location, including several types of heavy vehicles. Data collection is limited to non-access controlled roads due to the safety concerns of setting up equipment on limited-access highways such as the Mid-Cape Highway. Nodes on the map above show the relative truck traffic volumes for each location that data were collected. The sizes of the circles represent the relative volume of truck traffic (larger circles are more heavily traveled). The colors of the circles represent the functional classification of the roadway as follows:

- Red: Urban or Rural Principal Arterials (higher level)
- Blue: Urban Principal Arterial or Rural Minor Arterial (lower level)
- Green: Urban Minor Arterial or Rural Major Collector
- Brown: Urban Collector or Rural Minor Collector
- Yellow: Local

Most of the high volume truck traffic was measured on more important (collectors and arterials) functionally classified roads, showing that trucks are generally not driving on local roads. Data availability is limited – Cape Cod Commission technicians generally install automated traffic recorders at 200 locations during the summer – a subset of which are deployed as classification counts.



Source: Cape Cod Commission Traffic Counting Program

FIGURE 2: OBSERVED HEAVY VEHICLE TRAFFIC VOLUMES BY FUNCTIONS CLASS

RAIL FREIGHT

Freight service is the major user of Cape Cod's rail network in addition to scenic excursions and weekend passenger service. The Commonwealth of Massachusetts, through MassDOT, still owns most railroad tracks on Cape Cod today. Massachusetts Coastal Railroad (a company of Cape Rail, Inc.) operates under contract to provide freight service.

Currently, the primary use of Cape Cod's rails is for transporting solid waste by Mass Coastal Railroad. Mass Coastal is a short line freight railroad serving Cape Cod and southeastern Massachusetts between Middleboro, Otis Air Force Base, Hyannis, and South Yarmouth. The majority of Cape Cod's solid waste is transported to the SEMASS trash-to-energy plant in Rochester, MA via Mass Coastal's Energy Train. Other freight Mass Coastal carries includes food, construction materials, chemicals, heavy equipment amongst many other things.

RAIL CONNECTIVITY

Rail service has a long and rich history on Cape Cod. The region's early growth was in part brought about by the railroad. Many miles of usable track still exist on Cape Cod, intersecting the roads and waterways. MassDOT owns the majority of rail tracks on Cape Cod, but some tracks are owned by federal agencies. Currently though, only the Mass Coastal freight service, the Cape Cod Central Railroad scenic train service, and the Cape Flyer summer weekend passenger service operate on Cape Cod. Proposals currently



FIGURE 3: CAPE COD RAIL INFRASTRUCTURE

exist to connect Buzzards Bay to Middleboro, which would give Cape passengers improved access to Boston. If freight rail service were to be expanded, upgrades would be necessary to the tracks, stations, and signals. Moreover, issues of accessibility, mobility and connectivity would need to be addressed. Funding for these improvements would need to be identified and secured. As many tracks are converted in bicycle paths, the future of rail on Cape Cod is still uncertain. A major advantage of rail freight is the movement of goods across the Cape Cod Canal without adding vehicle crossings to the congested highway bridges.

Cape Cod Commission staff met with a representative of Cape Cod's major rail operation: Mass Coastal Railroad. Mass Coastal operates the "Energy Train" transporting solid waste from the Yarmouth Transfer Station (and from the soon-to-close Otis transfer station at Joint Base Cape Cod) to the Southeastern Massachusetts Resource Recovery Facility – "SEMASS"), and an

excursion/tourist train identified as “Cape Cod Central Railroad.” Freight issues and concerns affecting rail service highlighted at this meeting included:

- Energy Train service is affected by Cape Cod Canal rail bridge delays, and hours of operation at SEMASS and the Yarmouth transfer station
- Commercial marine shipping may have priority (especially eastbound in the canal – can restrict access to the rail bridge for over 1 ½ hours).
- The Otis transfer station will close in December 2014 resulting in:
- More Energy Train cars available for Yarmouth transfer station – resulting in fewer daily trips to SEMASS
- Opportunity to modify the Otis facility for trans-loading operations (e.g., propane, construction materials, etc.)
- Potential future rail shipments could include deliveries of construction materials to Hyannis.
- National (and global) freight trends are for containerization (freight is consolidated in large containers that can be stacked on ships or trains and then transported over the road by tractor trailers).
- Rail services between North Falmouth and Hyannis are restricted due to the absence of a “Y” rail connector in the vicinity of the rail bridge (currently, the rail bridge must be lowered and a train would have to partially cross the canal and then reverse)

WATER FREIGHT

Waterborne freight to and from Cape Cod uses a variety of vessel types and seaports. The primary form of public water transportation on Cape Cod is ferry service, carrying passengers between the mainland and the islands of Martha's Vineyard and Nantucket. A significant amount of freight is carried by water transportation as well. As a result, the region's seaports and channels are vital in addressing the economic and transportation needs of Cape Cod.

CAPE COD SEAPORTS

Cape Cod has 586 miles of tidal coastline, with many inlets and bays that provide marine access to the land. Seaports have been constructed along several of these bays and inlets to facilitate the transfer of people and goods from water to land transportation. Significant Cape Cod seaports are recognized in reports by the Army Corps of Engineers, the agency that maintains many of them. These and other seaports are discussed in the Existing Conditions appendix.

FERRY FREIGHT

The Steamship Authority records movements of trucks between Cape Cod and the Islands. Generally, these trucks are transporting goods from the mainland to the Islands. In 2013, truck movements exceeded 153,000 vehicles. The total number of trucks carried includes pick-up trucks, vans, and other commercial vehicles under 20' in overall length. In 2004, the Steamship Authority started classifying certain vehicles under 20' as trucks rather than automobiles. Some pick-up trucks and vans that were previously classified as automobiles are now being classified more consistently as trucks based on the make and model of the vehicle. SUVs, however, are still classified and counted as automobiles. This resulted in more trucks and fewer automobiles being carried starting in 2004. Also, the number of trucks in this category of under 20' represented 53% of the total trucks carried on the Woods Hole – Martha's Vineyard route and 36% of the total trucks carried on the Hyannis – Nantucket route during 2005. The numbers of trucks, automobiles, or passengers are reported as one-way segments or movements. A truck carried round trip is reported as two trucks carried. Roughly two-thirds of these shipments are made between Woods Hole and Martha's Vineyard. The remainder is made between Hyannis and Nantucket.

TABLE 1. TRUCKS CARRIED BY STEAMSHIP AUTHORITY FERRIES

Source: Steamship Authority

YEAR	TO AND FROM MARTHA'S VINEYARD	TO AND FROM NANTUCKET
2013	118,922	34,329
2012	112,958	39,657
2011	114,782	44,025
2010	116,461	49,547
2009	115,600	48,187
2008	98,393	44,537
2007	98,257	41,011
2006	103,939	40,175
2005	97,595	39,598
2004	87,166	40,799
2003	70,546	43,226

CHANNELS

Cape Cod Canal

The Cape Cod Canal is a significant aspect of freight infrastructure in the region. This channel allows safe passage from ports north and south of Cape Cod, relieving the hazard of navigation around the peninsula. Details on the Cape Cod Canal can be found in the Existing Conditions Sections.

The Cape Cod Canal is owned and operated by the Army Corps of Engineers. Over six thousand ships, tug and barge combinations and other large commercial vessels pass through the canal annually. In 2009 they carried over 8 million tons of cargo to ports along the east coast including 1.9 billion gallons of petroleum products and 380 million gallons of bio fuels.

Woods Hole Channel

The Woods Hole Channel connects Buzzards Bay with Great Harbor in Woods Hole. Freight vessels traveling to Boston and points north can also use the channel on their way to the Cape Cod Canal. The channel is used by seasonal passenger ferries from New Bedford to Martha's Vineyard. As a result, the channel is heavily traveled.

Nantucket Channel

The Nantucket Channel provides passage through the Nantucket Sound and between Cape Cod and the Islands. Ferries, ships navigating around the Cape, and other vessels use this channel.

FREIGHT SURVEY

The Cape Cod Commission sought input from users and providers of freight services on Cape Cod through an online questionnaire. The questionnaire included multiple-response and open-ended questions. The availability of the questionnaire was announced on the Cape Cod Commission and Cape Cod Chamber of Commerce websites and via a direct email announcement sent by the Cape Cod Chamber to its membership. Only seven responses were received as of the fall of 2014 and are summarized below

Question 1: Which Cape Cod town(s) is your company based in?

Three respondents indicated Barnstable, two each for Bourne and Mashpee, and one each for Yarmouth and Provincetown.

Question 2: What type of business do you operate?

There was one response in each of the following categories:

- Freight Shipper
- Entertainment/Recreation
- Manufacturing
- Professional Services
- Restaurant
- Other Retail

Comments included the statement “Cape Cargo we pickup and deliver freight on the Cape.”

Question 3: How does your company use freight?

Five responses indicated that their company imports/receives goods. There was one response each for “transport goods (I operate a shipping company)” and “other.”

There was one comment: “ship and receive goods”

Question 4: How frequently do you use freight?

Responses were organized into three categories as follows:

Importing

- One response for greater than three times per day
- One response for one-two times per day
- Two responses for three-five times per week
- One response for one-two times per week
- One response for less than once per week

Exporting

- One response for less than once per week

Transporting

- One response for greater than three times per day
- One response for one-two times per day

Question 5: Where does your freight come from or where does it go?

Responses were organized into three categories as follows:

Importing

- Five responses for “Off Cape” (mainland side of Cape Cod Canal)
- Two responses for “On Cape” (south/east of Cape Cod Canal)

Exporting

- No responses

Transporting

- One response for “Off Cape” (mainland side of Cape Cod Canal)
- Two responses for “On Cape” (south/east of Cape Cod Canal)
- One response for Islands (Nantucket or Martha’s Vineyard)
- One response for International
- One response for Other

Question 6: What are some of the major commodities that your company imports/exports/transport (or relies upon)?

This was an open-ended question that received seven responses as follows:

- Lighting products
- Parts for repair of our video games. Prizes for our customers. Paper products plates, cups, napkins, paper towels, etc....
- Hardware, paint & sundries, power tools, hand tools, locks, plumbing supplies, electrical supplies, fasteners, housewares, lawn and garden supplies, fertilizers, automotive supplies, propane, cleaning supplies.
- Green Coffee - Import Ship off Cape Roasted Coffee USPS and UPS Daily, also self deliver in our own truck to on Cape customers
- Cabinets flooring retail goods
- We transport all types of freight except perishables and food. General freight, household goods, furniture, items for internet purchases, freight to from the Islands
- Food, kitchen equipment, restaurant supplies

Question 7: What types of shipping does your company use on Cape Cod?

All seven responses indicated that they use road (trucking) for their shipping needs. One response also indicated the use of waterborne freight.

Question 8: Please identify your primary shipping company (if applicable):

There was one response each for the following shipping companies

- Cape Cod Express
- FedEx
- UPS

There were two responses that indicated “Other.”

Question 9: What issues regarding freight do you have (e.g., roadway safety, speed/fuel efficiency, flexibility, reliability)? How may these issues be addressed?

Responses included the following statements:

- Prices are so much higher for just 20 units
- Many carriers do not want to deliver to Cape Cod so they deliver to Cape Cod Express in Wareham who then delivers the freight locally. This adds time and the potential for damage.

Question 10: What types of policy changes or investments would you support or not support?

Responses were organized into a set of categories as follows:

Increase vehicular capacity across the Cape Cod Canal

- Two responses were “Strongly Support”
- Two responses were “Neutral”

Rail investments

- Three responses were “Support”
- One response was “Neutral”
- One response was “Oppose”

Ferry ports (expansion or construction of new ports)

- Two responses were “Strongly Support”
- Three responses were “Support”
- One response was “Neutral”

Air freight (expansion of facilities)

- Five responses were “Support”
- One response was “Neutral”

Improved intermodal facilities (e.g., ferry to rail, air freight to truck, etc.)

- Five responses were “Support”
- One response was “Neutral”

Identification of appropriate trucking routes/trucking restrictions

- Two responses were “Strongly Support”
- Two responses were “Support”
- Two responses were “Neutral”

There was one comment: “convert South St Hyannis to 2 way traffic to allow for safer egress from WHMVNSSA terminal.”

Question 11: Do you have any other comments, questions, or concerns?

This question had one response: “It is troublesome to hear that any wide load requires two state police escorts on the bridges. Trucking companies pay a four hour minimum to the state police for this service when the drive over the bridge takes 15 minutes!”

RECOMMENDATIONS

This 2015 Cape Cod Freight Study was the first attempt by the Cape Cod Metropolitan Planning Organization to bring a comprehensive assessment of issues facing freight haulers to, from and within Barnstable County. In order continue to make progress in improving freight safety and reliability, the following strategies were offered in the report:

Identify “Critical” Freight Commodities

Work with planners to identify commodities critical in all stages of emergency preparedness and response. These stages include advanced planning and resiliency preparations, emergency management during events, and follow-up/rehabilitation.

Encourage Specific Types of Freight Transportation

Freight modes that minimize travel over Cape Cod’s narrow and congested roadways are to be encouraged. Such modes include rail and waterborne. Trucking deliveries during off-peak times are also encouraged.

Make Infrastructure Improvements for Freight Industry

Maintain and rehabilitate bridges and roads – focusing on higher functional class facilities. During roadway and intersection rehabilitation on truck routes, include properly-engineered pavement, turning radii, and avoid height obstructions.

Update Truck Routes

Work with town and state officials to refine preferred truck routes. Currently, truck routes are based on a limited number of state roads and may be discontinuous based on jurisdiction. Refined truck routes would be included in the MassDOT’s Roadway Inventory.

Bridge Maintenance Scheduling

To reduce impact to freight traffic, restructure Bourne and Sagamore bridge repair contracts (night work or 24-hour shift).

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