Cape Cod Canal Transportation Study
Bourne, Plymouth, Sandwich, Wareham.

Bourne Community Building
March 10, 2016.
Agenda

• Introductions.
• Update on Visitors Percentages.
• Next Steps.
• Questions.
Introductions

- Ethan Britland – MassDOT.
- Michael Clark – MassDOT.
- Bill Reed – Stantec.
- Ed Hollingshead – Stantec.
- Michael Paiewonsky – Stantec.
- Heather Ostertog – Stantec.
- Steve Cecil – Harriman.
- Sudhir Murthy – TrafInfo.
Regional Travel Demand Model

- Includes roadway network for entire Cape Cod and portions of mainland.
- Used to forecast traffic for future years 2020 and 2035 for the No-Build and Build Alternatives.
Model Development and Calibration Process

- Network and Traffic Analysis Zone (TAZ) Development.
- Trip Generation – based on socio-economic data (population & employment).
- Trip Distribution – development of an initial origin-destination trip table.
- Calibration – adjusting the trip table till assigned volumes matches actual counts.
Model Time Periods

Seasons:
- Fall Weekday.
- Fall Weekend.
- Summer Weekday.
- Summer Weekend.

Weekday/Weekend:
- AM – 6:00 AM to 9:00 AM.
- MD – 9:00 AM to 3:00 PM.
- PM – 3:00 PM to 6:00 PM.
- NT – 6:00 PM to 6:00 AM.
## Model Calibration Results – Fall

<table>
<thead>
<tr>
<th>Location</th>
<th>Count ADT</th>
<th>Model ADT</th>
<th>Percent Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sagamore Bridge</td>
<td>47,300</td>
<td>45,242</td>
<td>-4%</td>
</tr>
<tr>
<td>Bourne Bridge</td>
<td>47,650</td>
<td>46,529</td>
<td>-2%</td>
</tr>
<tr>
<td>Route 3 - North of Sagamore Bridge</td>
<td>28,150</td>
<td>28,015</td>
<td>0%</td>
</tr>
<tr>
<td>Route 25 - North of Belmont Circle</td>
<td>28,000</td>
<td>28,321</td>
<td>1%</td>
</tr>
<tr>
<td>Sandwich Road</td>
<td>10,850</td>
<td>11,436</td>
<td>5%</td>
</tr>
<tr>
<td>Scenic Highway</td>
<td>26,150</td>
<td>28,016</td>
<td>7%</td>
</tr>
<tr>
<td>Overall Network-wide</td>
<td>186,405</td>
<td>186,502</td>
<td>0%</td>
</tr>
</tbody>
</table>
Traffic on the Bridges

Commuter Trips:
- Work Trips on/off the Cape.
- School Trips on/off the Cape.

Non-Commuter Trips:
- Shopping, recreational, etc.
- Deliveries, lunch trips, etc.
- **AND visitor trips**
Estimating Current Visitor Trips on the Bridge Crossing – A CTPS Method

TOTAL DAILY BRIDGE VOLUME

Commuter Trips (from Mass. Travel Survey)

Non-Commuter Trips:
- First estimated non-visitor trips
- Remaining are visitor trips
Estimating Current Visitor Trips on the Bridge Crossing (CTPS Method)
Cape Cod Canal Crossing Study
Estimates of Visitors

Previous estimates:

- Based on CTPS methodology for weekday.
- Adopted weekday methodology for weekend.

Recently CTPS updated weekday estimates based upon the recent 2011-MTS\(^1\) data.

<table>
<thead>
<tr>
<th></th>
<th>Fall Weekday</th>
<th>Summer Weekday</th>
<th>Fall Weekend</th>
<th>Summer Weekend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall Weekday</td>
<td>12.2%</td>
<td>37.7%</td>
<td>44.0%</td>
<td>58.6%</td>
</tr>
</tbody>
</table>

\(^1\): MTS – Massachusetts Travel Survey (www.mass.gov/massdot/travelsurvey)
Review of AirSage Data

- Data collected by AirSage for MassDOT in August and October of 2015 was reviewed to confirm the estimates of visitor percentages.
- Data collected in terms of devices – devices that use the cellular network. Does not include Bluetooth or Wi-Fi capable devices.
- Data provided in terms of number of devices travelling between each origin-destination zone pairs.
- Data was reviewed for visitor percentages and the origin-destination of the visitor trips to/from the Cape.
Summary of AirSage Data

Total Daily Bridge Crossing in comparison to ADT.

<table>
<thead>
<tr>
<th></th>
<th>Fall Weekday</th>
<th>Summer Weekday</th>
<th>Fall Weekend</th>
<th>Summer Weekend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devices</td>
<td>186,313</td>
<td>278,826</td>
<td>284,004</td>
<td>454,070</td>
</tr>
<tr>
<td>ADT</td>
<td>94,950</td>
<td>131,980</td>
<td>104,200</td>
<td>153,950</td>
</tr>
</tbody>
</table>

Number of devices per vehicle significantly higher than average vehicle occupancy data collected by Cape Cod Commission in August 2012.

<table>
<thead>
<tr>
<th></th>
<th>Fall Weekday</th>
<th>Summer Weekday</th>
<th>Fall Weekend</th>
<th>Summer Weekend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devices/Veh</td>
<td>1.96</td>
<td>2.11</td>
<td>2.73</td>
<td>2.95</td>
</tr>
<tr>
<td>Veh Occup</td>
<td></td>
<td>1.44</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Review of AirSage Data

Comparing AirSage commute trips crossing the bridges with 2011 MTS data

<table>
<thead>
<tr>
<th></th>
<th>Fall Weekday</th>
<th>Summer Weekday</th>
<th>Fall Weekend</th>
<th>Summer Weekend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devices</td>
<td>27,064</td>
<td>19,322</td>
<td>8,132</td>
<td>7,367</td>
</tr>
<tr>
<td>2011 MTS</td>
<td>38,000</td>
<td>40,000</td>
<td>13,000</td>
<td>15,000</td>
</tr>
</tbody>
</table>
Approximate visitor percentages:

- Commute trips assumed to have one device per vehicle
- Non-commute non-visitors assume to have a vehicle occupancy in the range of 1.4 to 1.7
- Visitor trips and percentages determined based on ADT.
Conclusion and Recommendation on Visitor Percentages

The AirSage data had the following issues:

• No valid data source on number of devices per vehicle to convert “device trips” to “vehicle trips.”
• Significant discrepancy between AirSage commute trips and 2011 Massachusetts Travel Survey (MTS) data.

Recommend using recently updated CTPS’ visitor percentages in the model.
### AirSage O/D of Visitor Trips

**Origin/Destination of Long and Short Term Visitors**

<table>
<thead>
<tr>
<th>Zone Groups</th>
<th>Fall Weekday</th>
<th>Summer Weekday</th>
<th>Fall Weekend</th>
<th>Summer Weekend</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Long Term Visitor</td>
<td>Short Term Visitor</td>
<td>Long Term Visitor</td>
<td>Short Term Visitor</td>
</tr>
<tr>
<td>NH</td>
<td>2%</td>
<td>1%</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>NY/W. Mass</td>
<td>1%</td>
<td>1%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>CT</td>
<td>10%</td>
<td>1%</td>
<td>12%</td>
<td>2%</td>
</tr>
<tr>
<td>RI</td>
<td>15%</td>
<td>6%</td>
<td>17%</td>
<td>6%</td>
</tr>
<tr>
<td>Central Mass</td>
<td>6%</td>
<td>6%</td>
<td>7%</td>
<td>10%</td>
</tr>
<tr>
<td>NE Mass</td>
<td>8%</td>
<td>13%</td>
<td>7%</td>
<td>25%</td>
</tr>
<tr>
<td>South Shore</td>
<td>38%</td>
<td>65%</td>
<td>35%</td>
<td>46%</td>
</tr>
<tr>
<td>Boston</td>
<td>20%</td>
<td>6%</td>
<td>16%</td>
<td>8%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Projecting 2040 Traffic Volumes.
Two Components of the Travel Demand Model

- **Non-Visitors:**
  - Future trips generated by area residents through work commuting, school, and other daily activities (based on projected 2040 socio-economic data supplied by CTPS).

- **Visitors:**
  - Based on visitor growth trends range
    - 0.26% to 0.69%
Visitor Growth Trends: Sources and Methods

• No direct counts of visitors available, therefore indirect or proxy measures needed for analysis.

• Travel and tourism officials and professional analysts have traditionally used trends in employment in Accommodations & Food Services (NAICS 72: hotels and restaurants) as a proxy for trends in visitor activity.
Sources and Methods (continued)

• FXM compared trends in this sector with other economic indicators to construct a multiple regression model to estimate an average annual growth rate for visitors to Cape Cod.

• Economic and related data examined included peak season bridge crossings; total employment statewide as well as in Barnstable and other counties; room tax revenues; state and county population; state and county employment in hotels and restaurants.
Regression Model Parameters

- Measured traffic as combined top monthly volume of two bridges (not necessarily same month for each bridge) for historical changes in peak seasonal volumes (bridges).
- Used Accommodations and Food Services (A&FS) employment in Barnstable, Dukes, and Nantucket counties as proxy for visitors crossing the bridges (allhotel).
- Used Barnstable County share of total Massachusetts employment as proxy for non-visitor traffic (empshare).
## Regression Model Findings

<table>
<thead>
<tr>
<th>Analytic Assumption</th>
<th>Projected Average Annual Visitor Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth in A&amp;FS Employment at average annual rate 2001-2013</td>
<td>0.12%</td>
</tr>
<tr>
<td>Growth in A&amp;FS Employment at average annual rate 2006-2013</td>
<td>0.26%</td>
</tr>
<tr>
<td>Growth in A&amp;FS Employment at recent peak average annual rate</td>
<td>0.69%</td>
</tr>
<tr>
<td>A&amp;FS employment as share of total state employment in 2040 (1)</td>
<td>0.27%</td>
</tr>
<tr>
<td>A&amp;FS employment as share of total state employment in 2040 (2)</td>
<td>0.43%</td>
</tr>
<tr>
<td>Unweighted average of above forecasts</td>
<td>0.35%</td>
</tr>
</tbody>
</table>
• Project and analyze 2040 No-Build Traffic Volumes.

• Begin consideration of improvement alternatives.
Questions?

Comments and feedback can be emailed to Ethan Britland - ethan.britland@state.ma.us