Green Streets and Highways

Steven Miller

Supervisor of Environmental Management Systems and Sustainability
Highway Division
MassDOT

Four Divisions

• Highway
• Rail and Transit
• Aeronautics
• Registry of Motor Vehicles
Transportation Resources

- 35,000 miles of roadway
- 5,000 Bridges
- MBTA-Fifth highest in Transit Ridership
- 15 Regional Transit Authorities
- Ferry System serving 2.7 million riders and 600,000 cars and trucks
- 11 ocean freight ports, Cruise Terminals
- Logan International Airport
- The Big Dig
The Driving Forces

• Legislation
  ▪ Global Warming Solutions Act requires an examination of both Climate Change mitigation and Adaptation Strategies

• GreenDOT Policy Directive
  ▪ Established a Sustainability Committee representing the four Divisions and other stakeholders. GreenDOT ties together state policy to reduce greenhouse gas emissions, promote healthy transportation modes, and support smart growth
July 2008 Global Warming Solutions Act Signed
Global Warming Solution Act

- Established advisory committees for both climate change mitigation and adaptation strategies
- Advisory members included stakeholders representing business, scientific, insurance, local, state, federal interests
- Technical subcommittees established to support the advisory committees
Mitigation Success can affect Adaptation

GHG Levels

- 100% in 1990
- 75% in 2020 (10% - 25% Reduction from 1990)
- 20% in 2050 (80% Reduction from 1990)
Adaptation Technical Subcommittees

- Local Economy
- Natural Resources and Habitat
- Human Health and Welfare
- Key Infrastructure-Roadway Sector
- Coastal Zone and Oceans
Climate Change Parameters Considered

- Sea Level Rise
- Increased Temperature
- Changing Precipitation (more rain vs. snow)
- Extreme Weather Events (N’oreasters and Hurricanes)
Key Infrastructure-Roadway Sector
Adaptation Strategies

General Action Items

1. Review and Improve all Permitting Process
2. Review and Improve all Design Standards and Guidance
3. Review and Improve all Planning Process
4. Review and Improve all Funding Programs
Key Infrastructure-Roadway Sector
Adaptation Strategies

No Regret/Ongoing Strategies

1. Maintain diligence through the MA Bridge Inspection Program-Assign Scour Critical if needed

2. Maintain diligence through the National Bridge Inspection Program (NBIS Item 113) to assess scour vulnerability
Key Infrastructure-Roadway Sector
Adaptation Strategies

Short Term (2-5 years) Strategies

1. Develop LiDAR GIS Mapping of Coastal Counties to obtain accurate elevation data
2. Develop GIS Based Transportation Asset Inventory
3. Perform Sea Level Rise Vulnerability Assessment
4. Update the USGS Peak Flood Flow Frequency Regional Regression Equations
5. Develop Risk Based Probabilistic Methodology by adapting the FHWA HYRISK scour-critical methods and software
6. Recognize Climate Change Impacts as a Design Consideration
Key Infrastructure-Roadway Sector Adaptation Strategies

Mid Term (5-20 years) Strategies

1. Development and Implementation of New Design Standards
Key Infrastructure-Roadway Sector
Adaptation Strategies

Long Term (20+ years) Strategies

1. Progressive Adaptation as vulnerabilities in existing infrastructure emerge and climate impacts are realized
Boston Harbor Association Boston Sea Level Rise Forum November 9 and 10, 2010

Sea level Rise potentials and possible SLR adaptation consideration presented by Dr. Ellen Douglas, UMass Boston and Dr. Paul Kirshen, Battelle Institute

Maps were produced using recent LiDAR data for 2.5 and 5 foot SLR predictions and overlaid with a 5 ft storm surge at the “WHT-Wicked High Tide”

Due to the location of the boat section, the Ted Williams Tunnel, and the subway system would be flooded along with most of Logan Airport at the 5 foot SLR prediction. Evacuation routes, critical services would be affected.

The maps are considered screening tools and not for planning purposes.

visit tbha.org to view the maps and presentations
Additional Sea Level Rise Projects

The Cape Cod Pilot Project
Coordinated by US DOT and FHWA Volpe Center, Cambridge, MA

The project seeks to devise future transportation land use development scenarios that account for potential climate change effects and impacts and reduce the region’s greenhouse gas emissions.

An Expert Elicitation meeting was held last July in Woods Hole. The EE participants included MA Coastal Zone Management, USGS, Woods Hole, Water Energy and Ecology Information Services, Association to Preserve Cape Cod, Woods Hole Oceanographic Institute, Cape Cod Commission, Southern Climate Impacts Planning Program and Coastal Sustainability Studio at Louisiana State University, MassDOT, FHWA, Volpe Center

Participating EE members mapped areas of Cape Cod that would potentially be effected by sea level rise. The Cape could become a series of three islands.

Do we build bridges, improve the ferry system, move roads??
We recognize that Massachusetts cannot fully succeed without US DOT, FHWA, AASHTO, NAS/TRB and NCHRP programs to help develop new design and construction techniques.
We sit at the water’s edge
Green Streets and Highways
The Driving Forces

GreenDOT Policy Directive

“Consistent with Governor Patrick’s leadership on greenhouse gas emissions and sustainability issues, MassDOT is pleased to adopt our GreenDOT policy, a comprehensive environmental responsibility and sustainability initiative designed to make us a national leader in greening the state transportation system”

Secretary Jeffrey B. Mullan
Established a Sustainability Committee representing the four Divisions and other stakeholders. GreenDOT ties together state policy to reduce greenhouse gas emissions, promote healthy transportation modes, and support smart growth.

- [http://www.massdot.state.ma.us/main/Documents/HealthyTransportationCompact/P-10-002.pdf](http://www.massdot.state.ma.us/main/Documents/HealthyTransportationCompact/P-10-002.pdf)
Steven Miller
Supervisor of Environmental Management Systems and Sustainability
Highway Division
steven.j.miller@state.ma.us
617-973-8248