CHAPTER III

Transportation Linkages
Introduction

Mobility2040 summarizes the efforts, the accomplishments to date and the identification of future transportation needs in the region in consultation with local communities and in cooperation with public and private entities. This chapter introduces the “linkages” from the transportation planning perspective. These linkages are overarching themes that influence or are relative to the decision-making process. Since there are real financial constraints to pursue all the transportation needs in the region, the linkages act as a compass by providing thorough and thoughtful weight to the planning process.

Land Use

Transportation planning should be conducted in concert with overall land use planning. The landmark agreement by the U.S. Department of Transportation (DOT), U.S. Environmental Protection Agency (EPA), and the U.S. Department of Housing & Urban Development (HUD) reinforces the concept that the transportation system is inextricably linked to the natural and built environment, and that planning for transportation must account for impact to/from economic development, housing, and the environment.

With considerable development pressure facing the region, Central Massachusetts’ land use pattern is constantly changing. Its former agricultural landscape has given way to new subdivisions, shopping centers, and industrial parks. The early pattern of development in the 1700’s and 1800’s also entailed the presence of manufacturing centers located on rivers and streams as a source of power for mills and factories. Around these mills sprouted self-contained villages to supply workers and the surrounding area by necessity contained farms and forests with residents engaged in production of food and crafts to meet local needs. These villages today lend each community its own distinctive character and are cherished by residents. But growth and development outside of these town centers has taken on a vastly different character. With permissive development regulations, growth has taken on characteristics of “sprawl,” resulting in large lot subdivisions, strip corridor commercial development, and new residences rising as continuous frontage development along once rural country roads. Farms and forests are disappearing, impacting wildlife and natural communities, while requiring ever-increasing costly solutions for maintaining environmental quality. Slowly, the region’s New England character is being replaced by a less distinctive suburban landscape.
TRANSPORTATION LINKAGES

According to the latest Massachusetts Audubon’s *Losing Ground* database, prepared in 2014, the region experienced the fourth highest number of acres of land converted from agriculture and forest for development of all 14 regions of the state from the period between 2005 and 2013 (2,866 acres). At the same time, the region ranked sixth among the state’s regions for the number of acres protected. In fact, the Region protected over 3.5 times as land as was developed over the 2005-2013 period (10,649 acres protected versus the 2,866 acres of new development).

Communities experiencing the highest growth in the region based on change in land cover (acres of new development) include Northborough, Shrewsbury, Grafton, and Uxbridge. Northborough, Shrewsbury and Grafton have also been in the top five in constructing new residential units, based on building permits issued in 2012 and 2013. The other two communities are Holden (#1 in each year with 132 and 188, respectively in 2012 and 2013) and Westborough.

<table>
<thead>
<tr>
<th>Community</th>
<th>Total Area (Acres)</th>
<th>Total Area of New Development (Acres)</th>
<th>New Development (Acres/Sq. Mi.)</th>
<th>State Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northborough</td>
<td>11,996</td>
<td>185</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>Shrewsbury</td>
<td>13,924</td>
<td>157</td>
<td>7</td>
<td>22</td>
</tr>
<tr>
<td>Grafton</td>
<td>14,918</td>
<td>185</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Worcester</td>
<td>24,602</td>
<td>185</td>
<td>5</td>
<td>77</td>
</tr>
<tr>
<td>Uxbridge</td>
<td>19,179</td>
<td>213</td>
<td>7</td>
<td>24</td>
</tr>
<tr>
<td>CMRPC Region</td>
<td>614,639</td>
<td>2,866</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

The influence of highways on development patterns is also clear, as much of the commercial and industrial development took place near major regional routes, including Routes 9, 12, 16, 20, 122, 122A, 140, and 146. In spite of this development, forested lands still make up 68.2% of the regional land use as of 2013. Low-density residential land uses make up the second highest use at 12.9% for the region. In Worcester, the highest percentage of land use is residential at 46% (two-thirds of residential land use are various forms of multi-family residential units), while commercial and industrial occupies 15%, according to Worcester Assessor’s Office data.

Most communities in the region are conflicted about how to grow. They often agree that they don’t want continuous sprawl, but worry that higher density development will ultimately increase the size of the community, with a corresponding burden on resources. They also worry that high density development will negatively impact their desire to preserve small town charm. While CMRPC sees
the general pattern and pace of greenfield\textsuperscript{1} development to continue as a trends extended, most communities in the region are beginning to focus commercial and other large scale development on specific sites identified in the prioritization plans developed for the region. CMRPC completed the Blackstone Valley, Central 13, and Rural 11 Prioritization Plans and participated in the 495/Compact Plan completed in 2011. These plans\textsuperscript{2} identified a number of Priority Development Areas (PDAs) and Priority Preservation Areas (PPAs) which are intended to be magnets and areas of concentration for development and redevelopment in each subregion, including where additional infrastructure investments would be targeted which were identified as Priority Infrastructure Investments or PIIs. For the purpose of this project, CMRPC staff considered it useful to divide the Central Massachusetts region into subregions corresponding to the prioritization plans completed between 2010 and 2014. The subregions include: (See Figure III-1)

1. Blackstone Valley (47 local, 29 regional, and 6 state PDAs)
2. Central 13 (69 local, 48 regional, and 10 state PDAs)
3. Rural 11 (69 local, 29 regional, and 0 state PDAs)
4. 495/Compact (55 local, 11 regional, and 8 state PDAs)

In all, there were 240 local PDAs of which a total of 117 were designated regional PDAs and 24 were state-designated. The principles underlying the prioritization projects included the following:

- Continued new growth will likely require major transportation and other infrastructure upgrades, beyond what is needed to keep existing systems in good repair.
- New commercial and residential growth must occur in a manner that is respectful of open space resources, transportation networks, and water resources in the region.
- Land use and transportation decisions must take into account the principles established by the Global Warming Solutions Act, the Clean Energy and Climate Plan, the transportation reorganization statute and GreenDOT Initiative.
- Workforce housing must continue to be produced and preserved within the region at a scale that allows the number of workers living in the region to keep pace with the number of new jobs created in the region.
- Sustainable new growth will involve the creation and maintenance of well planned-transportation networks and, where available, an effective public transit system that will coordinate with and build on existing transportation and encourage intermodal uses (mode shift).
- Coordinated planning and implementation efforts are necessary, particularly where jurisdictions and boundaries intersect.

\textsuperscript{1} An area of agricultural or forest land, or some other undeveloped site targeted for potential uses like residential, commercial or industrial development.
\textsuperscript{2} Find links to all Prioritization Plan and resources at: http://www.cmrpc.org/community-development-documents
Figure III-1: CMRPC Prioritization Plans

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Source: Data provided by the Central Massachusetts Regional Planning Commission (CMRPC), massDOT/Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.

Produced by the Central Massachusetts Regional Planning Commission (CMRPC)
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Planning, both locally and regionally, must continue to work to protect open space (facilitated by the PPA designated sites) and consider sustainable growth patterns of development when making land use decisions. Priority Development Areas, in many cases, are existing town centers that communities are seeking to revitalize. These preexisting developed areas are ideal to align with the stated principles of prioritization planning. Focusing on these areas will result in more compact development patterns than has been the norm over the past 60 years. While Priority Preservation Areas are not necessarily protected, their designation will provide local officials with specific targets for preservation and conservation efforts and thus may further steer development into PDAs and other areas of potential development and redevelopment. CMRPC plans to update and coordinate the different prioritization plans in a comprehensive regional plan scheduled to begin work in the future.

Overall, we anticipate that while PDAs may become a greater focus for development in Central Massachusetts communities, we still expect that communities experiencing the greatest growth pressures are still those most likely to see development both in PDAs and in other locations. The exception to this is the City of Worcester where buildout is nearly completed and a recent resurgence in interest in redevelopment has occurred. This is occurring at the same time as demand for urban living is occurring on a national basis, and is having an effect on downtown Worcester development.

The impact of these land use development trends will likely be continued pressure on major and minor arterials to get generally sprawling commuters to more concentrated employment locations. The region has seen high growth on its major arterials over the past decade and that trend is likely to continue into the foreseeable future, absent more communities in addition to Worcester embracing more dense residential development. While millennials nationwide are trending to more urban environments, the effect of this trend is much softer in this region than in the Boston region where there is tremendously more attractiveness in terms of the urban offerings. That said, Worcester is reaping some benefits of this trend and that will continue at a moderate pace into the future.

Access Management

Policy Background

The Federal Highway Administration defines access management as “the systematic control of the location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway. It involves roadway design applications, such as median treatments and auxiliary lanes, and the appropriate spacing of traffic signals.” In practical terms, it means managing the number of driveways that a vehicle may encounter without hampering reasonable access to a property and removing slower, turning vehicles from the arterial as
efficiently as possible. Access Management focuses on both short term and long term improvements.

A safe and efficient transportation system is an important element of a local commercial area. Individual business owners sometimes express concern regarding the potential impact of access management requirements on commercial activity. However, studies conducted of businesses within areas where access management has been implemented show that improved access has virtually no adverse impact on business activity.

Access Management Strategies can be useful components of transportation plans, often providing multiple benefits to communities that choose to include the strategies in their plan of development. These strategies can be used to improve the overall safety, capacity, and appearance of a corridor. The Massachusetts Department of Transportation (MassDOT) states that the object of Access Management is to ensure roadway safety and efficient operations while providing reasonable access to the adjacent land uses. Access Management can also improve the environment for pedestrians, bicycles, and motor vehicles in all settings and on all roadway types by reducing and consolidating driveway conflict points. Additionally, access management techniques can be used to foster economic development or redevelopment in an area.

By managing the number and spacing of driveways along a corridor, without restricting access to property unreasonably, access management can remove slower, turning vehicles from roadways with heavy traffic movement. Access management can provide for safe and efficient traffic flow, helping to negate some of the problems caused by driveways and turns associated with suburban-style strip development.

The intent of an access management plan is to evaluate the ability of transportation system users to safely access the existing or proposed land uses from the roadway and/or from adjacent parcels. Multimodal planning guidelines and recommended standards can be developed to help ensure that communities and other regulating authorities consider both internal and external vehicle, transit, bicycle, and pedestrian access in the planning, design, permitting and project approval stages.

**Performance Management**

Mobility2040 has a number of overarching goals that relate to Access Management. Reducing congestion and improving mobility, reducing Greenhouse Gas and promoting sustainable practices, and improving economic vitality and freight movement are three goals that Access Management can play a role in achieving.
**Accomplishments**

In FY 2008, Central Massachusetts Regional Planning Commission (CMRPC) and the CMMPO staff began to develop access management and land use planning strategies that would assist communities in managing land adjacent to roadways in order to provide for safe and efficient internal and external access for motorists, transit users, bicycle riders, and pedestrians. Staff examined three corridor development scenarios along “vital links,” as identified in the 2012 Long Range Transportation Plan, within the region:

- Near build-out conditions of primarily commercial/retail development (MA-9 Westborough)
- Medium-density development with residential and commercial land uses (MA-122A Holden)
- Under-utilized developable land identified as a future growth area (MA-140 Boylston)

For each of these scenarios, staff evaluated the ability to safely access the existing or proposed land uses from the roadway and/or from adjacent parcels. In addition, staff evaluated site design standards currently in place and their ability to provide for efficient vehicle, transit, bicycle, and pedestrian movement. This task has been developed as a multimodal planning effort. Copies of the resulting reports can be found on the CMRPC website.

**Planning Ahead**

Guidelines and recommended standards have been developed to help ensure that communities and other regulating authorities consider both internal and external vehicle, transit, bicycle, and pedestrian access in the planning, design, permitting, and project approval stages. In 2014, staff developed an Access Management Toolkit that can be used by local municipalities and development agents as a guide for smart development. In addition, staff will be cognizant of Access Management techniques when assisting municipalities in their Transportation Improvement Program (TIP) project development.

**Economic Development**

The Central Mass region today is an area in transition with regard to economic development, closely linked to the fortunes of Massachusetts but struggling to chart its own course. The boom period of the 1990s gave way to a series of recessions in the 2000s that have stubbornly refused to abate, at least in terms of new job creation. Between 2000 and 2010, employment in the region declined 3%, due to the recession, following a trend in Massachusetts as a whole.
 Population growth in the region was more robust than in most areas of the state, due in part to housing prices pushing more people westward and the high overall quality of life factors found in the region. Despite CMRPC projections for healthy future growth, particularly employment growth, the projected rates of growth may not be achieved if the growth of the remainder of the state stalls or declines. This has serious implications for both the state and the region. There are certainly some hopeful signs for improvement, but it will take a concerted and cooperative effort by the communities of Central Massachusetts to provide a brighter future for their residents. A summary of economic conditions and trends is provided below:

- In 2000 the Central Massachusetts Region was home to approximately 245,000 jobs, about 7% of the jobs in Massachusetts. This number has decreased to 224,000 in 2010, and in 2040 the region is expected to host 250,000 jobs, about 7.3% of the total jobs in Massachusetts. This trend seems to be on par with historical data.

- Due to the recent economic recession many economists predict that it will be several years, perhaps between 2017 and 2020, before employment numbers climb back to the 2005 levels.

- Four (4) industries represent nearly 50% of all employment in the region: Health Care, Education, Retail, and Manufacturing with a combined employment of over 125,000. However, the employment sectors with the highest annual wages are not in that group of sectors: Utilities and Management of Companies have annual wages in excess of $110,000. The regional average annual wage in 2010 was $48,332. While Education employment is often more local to the commuter’s home base, Retail, Manufacturing, and Health Care are generally congregated in areas farther away from housing, and require more travel. The WRTA system effectively serves these industries, but only from denser population clusters. Because this region is affected by past and present sprawl, it’s safe to assume that auto travel will continue to increase, even as transit ridership increases.

- Not surprisingly, the extreme effects of the recent economic recession were quite visible in the employment statistics in the CMRPC region in recent years. While Worcester County fared better than the nation, it did not always track better than the state. Between 2002 and 2008, Worcester County had a higher unemployment rate than both the state and the nation. In 2009 to 2011, the unemployment rate in the region was lower than the nation, but still higher than the state by more than one-half of one percent. As of July 2014, Worcester

County’s unemployment rate was 0.8% percentage points higher than the state (6.9% versus 6.1%).

- Although at no time during the recession did the region’s unemployment rate reach double-digits, it did in several communities however. In 2009 and 2010, ten (10) communities had an unemployment rate of over 10%, but by July 2014 no communities were over 10%. The community that was noted to be over 10% at the end of 2011, Southbridge at 10.1%, has dropped two full percentage points between December 2011 and July 2014, from 10.1% to 8.1%. Unfortunately, Southbridge had the highest unemployment rate of any of CMRPC’s communities in July 2014, slightly ahead of the City of Worcester (8.0%).

- By contrast, several communities in the region had considerably lower unemployment rates, with a couple at less than 5% as of July 2014. No community’s unemployment rate had increased in 2011, providing some signs at that time that the economy was moving in a more positive direction. However between 2012 and 2013, thirty-one (31) of the forty (40) CMRPC communities experienced an increase in unemployment, with three (3) communities experiencing a 1% increase. The other communities increase was all less than 1% percent. The good news is that by July 2014 only one community’s unemployment had increased over the 2013 rate.

- One of the greatest advantages that Central Massachusetts and the state has is the presence of a highly educated workforce. In 1990, 2000, and 2008 no state (except the District of Columbia) had a larger percentage of its over 25-year old population with Bachelor’s degrees or higher (38.1% in 2008, according to the US Census). In 2008 Massachusetts had 16.4% of its over 25-year old population with advanced degrees, again second only to the District of Columbia.

Historically the region was a center for agriculture, manufacturing, and education. In recent years both agricultural and manufacturing activity has declined significantly, although still important to the local economy. New, high-tech and biotech firms have come to the region, taking advantage of the well-educated workforce. In addition, healthcare systems are also significant employers. In the manufacturing sector, most new manufacturing jobs are in the advanced manufacturing realm.

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4 According to the President’s Council of Advisors on Science and Technology Report to the President on Ensuring American Leadership in Advanced Manufacturing: Advanced Manufacturing is ‘a family of activities that (a) depend on the use and coordination of information, automation, computation, software, sensing, and networking, and/or (b) make use of cutting edge materials and emerging capabilities enabled by the physical and biological sciences, for example nanotechnology, chemistry, and biology. This involves both new ways to manufacture existing products, and especially
Most people of working age would prefer a good-paying job that is satisfying and secure, but as the nature of the economy evolves, changes in the makeup of employment will occur. The better jobs in the future will require a technically skilled and knowledgeable workforce and part of this responsibility lies with the community. Results from a survey of 50 North Central Massachusetts manufacturers, released by the Massachusetts Manufacturing Extension Partnership in the summer of 2014, points to the lack of an adequate trained workforce, especially for advanced manufacturing. Thirty-four of the companies said workforce issues are a challenge, with 18 citing a lack of trained, skilled workers and 11 saying low ability levels and a lack of interest in manufacturing among high school graduates create problems. The Commonwealth of Massachusetts has been trying to promote advanced manufacturing through its Advanced Manufacturing Collaborative, realizing that manufacturing jobs tend have higher annual incomes than most people perceive. However, there are capacity limitations within the state’s technical schools that currently limit the amount of new students each fall.

While many of the workers in Central Massachusetts work in the town where they live or in a town nearby, an increasing number commute to jobs outside the region, placing an increasing burden on an aging transportation system.

**Environmental Consultation Overview**

Generally, a discussion consists of potential environmental mitigation activities and potential areas to carry out these activities. These efforts could also have the greatest potential to restore and maintain the environmental functions affected by LRTP as well as projects programmed on the region’s TIP. The discussion shall be developed via consultation with federal, state, and tribal land management, wildlife, and regulatory agencies.

“Consultation” means that one or more parties confer with other identified parties in accordance with an established process and, prior to taking action(s), considers the views of the other parties and periodically informs them about action(s) taken. “Environmental mitigation activities” means strategies, policies, programs, actions, and activities that, over time, will serve to avoid, minimize, or compensate for (by replacing or providing substitute resources) the impacts to or disruption of elements of the human and natural environment associated with the implementation of the LRTP Mobility2040.

The human and natural environment includes, for example, neighborhoods and communities, homes and businesses, cultural resources, parks and recreation areas, wetlands and water sources, the manufacture of new products emerging from new advanced technologies.” From http://manufacturing.gov/whatis_am.html
forested and other natural areas, agricultural areas, endangered and threatened species, and the ambient air. The environmental mitigation strategies and activities are intended to be regional in scope.

Further, the MPO shall consult, as appropriate, with state and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning the development of the LRTP. The consultation shall involve, as appropriate:

- Comparison of transportation plans with State conservation plans or maps, if available; or
- Comparison of transportation plans to inventories of natural or historic resources, if available.

**Annual CMMPO Environmental Consultation Meeting**

Annual Environmental Consultation Meeting was held 4/15/15 as an integral part of the concurrent CMMPO LRTP and TIP development efforts. The meetings are an opportunity to forge long-term relationships with various federal, state and local environmental stakeholders. These annual meetings have been held by the CMMPO since 2007. Staff conducts broad outreach to the environmental community and other interested stakeholders including:

- John H. Chaffee Blackstone River Valley National Heritage Corridor Commission (JHCBRVNHCC)
- Massachusetts Audubon Society
- Massachusetts Department of Conservation & Recreation (DCR)
- Massachusetts Department of Environmental Protection (DEP)
- Massachusetts Water Resources Authority (MWRA)
- Regional Environmental Council (REC)

Notably, past meeting participants have included the US Environmental Protection Agency (EPA), Conservation Law Foundation (CLF), Providence & Worcester Railroad (P&W RR), UMass-Amherst Stream continuity expert and commercial drainage pipe vendors.

The April 2015 Environmental Consultation Meeting was attended by staff from the Massachusetts Department of Environmental Protection (DEP), Town of Dudley Trails & Greenways Committee, the 495/MetroWest Partnership, a number of community engineers and planners as well as private consulting engineers. Agenda items for the 2015 meeting included the development of Mobility2040 and the CMMPO TIP, the use of GIS-based Environmental Profile Maps as well as regional efforts to measure the Greenhouse Gas (GHG) reduction
potential of all projects reflected in the LRTP and programmed on the CMMPO TIP. A PowerPoint presentation from the 2015 Environmental Consultation session is included in the LRTP’s Technical Appendix.

Environmental Profile Maps

The region contains a wide variety of natural features and resources. Transportation improvement projects often cross or are situated near environmentally sensitive areas. Transportation infrastructure poses a measurable impact on the natural environment, by affecting changes to:

- Forest fragmentation
- High levels of noise
- Impacts to water quality (contaminated runoff)
- Increased air pollution
- Land cover

As part of the regional planning process, MAP-21 guidelines encourage early consultation with host communities to address the environmental challenges associated with transportation improvement projects. Early assessment of existing conditions provides the opportunity for environmental agencies to discuss potential mitigation activities during the preliminary planning process, seeking avoidance or minimization of anticipated impacts.

The compilation of “Environmental Profile Maps” on the regional level is simply an early indication of benefits and challenges associated with a particular transportation improvement project. Other established formal environmental processes through federal NEPA and state MEPA must often be followed. The compilation of Environmental Profile Maps occurs at the very early stages of project conception. It should be noted that the CMMPO is not a permitting entity, it relies on MassDOT to enforce environmental compliance when planning and constructing improvement projects.

Regional efforts to compile Environmental Profile Maps for the areas in proximity to transportation improvement projects are based on MassGIS spatial data, which visually depicts key information. The screening conducted by the CMMPO as part of early Environmental Consultation efforts is based on the detailed expertise of other regulatory agencies, specifically Mass DEP, Mass DCR and National Heritage & Endangered Species Program (NHESP). Data in these Geographic information Systems (GIS) layers identify:

- Conservation lands
Cultural features
Highly sensitive avoidance areas
Recreation areas
Water supply protection areas
Wildlife habitat for endangered & protected species

Environmental Profile Maps provide detail of the environmental features within a ½ mile buffer zone of a proposed transportation project. This regional ecosystem approach allows for the identification of areas susceptible to possible impacts and assists in the consideration of context sensitive solutions for mitigation of impacts. This effort focuses on identifying various environmental systems, an example being a system of streams and connecting waterways, as opposed to simply looking at only where a single stream crosses under a roadway. A detailed list of the MassGIS layers, parent agencies and data sets used for the region’s early Environmental Consultation are included in the LRTP Technical Appendix.

The CMMPO has been refining this effort to identify Planning and Environment Linkages (PEL) in the region by participating in the FHWA’s PEL initiative to identify sensitive subareas in the region in consultation with federal, state, and local agencies. The CMMPO intends to continue working with applicable environmental agencies and other interested stakeholders, seeking to improve early environmental consultation procedures to helping to meet the planning region’s overall conservation efforts.

**Brownfields**

The presence or potential presence of a hazardous substance, pollutant, or contaminant can have possible impacts to human health and the environment. Most of the time, brownfields, or polluted properties could be cleaned up to support certain uses. This can be crucial to limit sprawl and spur redevelopment in derelict areas.

Under the previous governor’s administration, a multi-agency MA Brownfields Support Team (BST) was created to identify and provide technical assistance and funds for brownfields clean-ups. The South Worcester Industrial Park (SWIP) and the Fisherville Mill in the Town of Grafton were both included for assistance in the BST round of projects. The SWIP is located in an Environmental Justice area and the use of the properties included foundry, cast metal manufacturing, and auto salvage. Underground storage tanks were removed and Gardner Street was extended. The parcels will be suitable for light industrial and manufacturing use. The SWIP property is located along a heavy freight corridor which is the subject of an ongoing effort to review Management Systems data (i.e. safety, congestions, pavement, etc) to determine potential
improvements that can be made. In the case of Grafton, the Fisherville Mill property is located along the Blackstone River. The 35-acre property had oil contamination, mostly from a fuel oil-laden canal that runs through the property. Remediation was completed and oil-contaminated sediments were dredged from the canal. Also a containment structure was built on the property. Given the fact the canal is open, a greenhouse and floating platforms were added as a stormwater control measure. The 13-acre park is open to the public and allows public access to the Blackstone River.

In the region, there are more properties identified as brownfields and under MassDEP or EPA oversight. See Figure III-2.

**Figure III-2: MassDEP Brownfield Sites**

![Brownfield Sites](http://www.mass.gov/eea/docs/dep/cleanup/bfmap1014.pdf)

Source: http://www.mass.gov/eea/docs/dep/cleanup/bfmap1014.pdf

A more recent opportunity for brownfield redevelopment in the region is the WRTA Maintenance and Operations Facility site, formerly an NStar gas plant in Quinsigamond Avenue,
Worcester, MA. Before formal construction started, the 11-acre lot required the removal of 45,000 cubic yards of contaminated soil. An investment of $15 million dollars was necessary for the environmental cleanup and enhancements in the property. This property is also close to the SWIP development noted above. Both of these corridors are considered gateways into the City. The road system is functioning fairly well, but improvements have been and are being identified that will enhance the functioning. Recent and planned improvements include on-road bicycle accommodations along these corridors. These brownfield redevelopment sites are excellent examples of using the existing infrastructure to spur economic development.

Oil spills from transportation-related operations also represent a source of pollution. As a result, MassDEP has a Leaking Underground Storage Tank Release Prevention Program to provide technical assistance and guidance to storage tank owners and operators.

In the region there is only one active superfund site included in the EPA National Priorities List. The 23-acre site is located in Westborough, between Otis Street, Hocomonco Pond, and the Smith Valve Parkway. The site, used in the past for wood-treating and preservation operation, has restricted access and annual monitoring is conducted to ensure long-term protection of human health and the environment. Even though the pollutants are not transportation-related, it does deprive the public access.

### Sustainable Transportation, Smart Growth, and Livable Communities

#### Policy Background

**Sustainable Transportation**

Sustainable transportation provides exceptional mobility and access to meet development needs without compromising the quality of life of future generations. A sustainable transportation system is safe, healthy and affordable, provides transportation choices, make use of renewable resources while reducing emissions and minimizing short and long term environmental impacts. It is a multigenerational approach which meets the needs of the present without sacrificing the resources in the future, while maintaining or improving the environment. It also considers the long-term economic health and equity of a community. In transportation planning, it translates to addressing environmental management systems, to using funds effectively, to guaranteeing a long life-span of projects through high quality construction standards and to being sensitive to community and environmental needs.

5 [http://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=000751](http://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=000751)

TRANSPORTATION LINKAGES

The sustainability approach focuses on three interrelated and sometimes conflicting main areas: environment, economy and community. This triad is so important that the Federal Highway Administration (FHWA) promotes the Sustainable Highway Initiative to improve sustainability in the Nation’s roadway network. As part of this initiative, the FHWA had released a scoring tool known as INVEST, the acronym for “Infrastructure Voluntary Evaluation Sustainability Tool”, which is intended to assist the state’s and local agencies’ decision making process by introducing sustainability best practices as the new standard into highway and roadway projects.

The Commonwealth of Massachusetts has been a promoter of sustainability for several years. Moreover, MassDOT sustainability vision for the Commonwealth’s transportation system is laid out in GreenDOT. The vision encompasses all modes and all projects phases, from planning to design, construction and operations. GreenDOT’s three main goals are: (1) to reduce Greenhouse Gas (GHG) emissions; (2) to promote healthy transportation options, like walking, bicycling and public transportation; and (3) to support “Smart Growth” development.

Smart Growth, Livable Communities and Quality of Life

Most often sustainability and livability are used as synonyms. Even though they are essentially rooted in improving overall quality of life, they are in fact very distinct planning approaches. Present transportation planning efforts are intrinsically defined by both. Sustainability as aforementioned is a multigenerational approach based in the interrelationship of the environment, economy and community. Livability, on the other hand, is about partnerships focused in achieving broader community goals such as access to jobs, affordable housing, quality schools and safer streets. There’s no strict recipe for the type of partners, strategies or initiatives, which allows planning agencies to wade through a different array of strategies depending on local characteristics, invested stakeholders, fiscal realities and political climate, and other factors.

Livable transportation strategically connects all modes: bikeways, pedestrian facilities, transit services and roadways into an intermodal and interconnected system. These strategic connections are dependent on land use policies. Smart Growth is in essence a land use planning approach that promotes higher densities and mix of uses and activities as a way to reduce traffic congestion, preserve natural areas, avoid environmental degradation, promote economic development and refrain from predatory sprawl. Sustainability lies at the heart of Smart Growth theory and livability principles.

In 2009, the U.S. DOT recognizing the role of the transportation sector in achieving Smart Growth, announced an Interagency Partnership for Sustainable Communities. The partnership members are DOT, EPA, and HUD. The partnership established six interagency livability
principles: (1) provide more transportation choices; (2) promote equitable, affordable housing; (3) enhance economic competitiveness; (4) support existing communities; (5) coordinate policies and leverage investment; and (6) value communities and neighborhoods. In transportation planning, livability translates to addressing road safety and capacity issues, maximizing and expanding new technologies such as ITS, developing fast, frequent and dependable public transportation, integrating health and community design considerations as well as maximizing the use of Transportation Demand Management (TDM) measures.

At the state level, Smart Growth is one of GreenDOT key goals. Since GreenDOT implementation, MassDOT has worked with other state agencies on programs that support land development projects through the Massachusetts Environmental Policy Act (MEPA) permitting process. Another example is the Planning Ahead for Growth Program, in which MassDOT worked directly with the Executive Office of Housing and Economic Development (EOHED), and local agencies and officials to identify potential areas for growth and preservation. To further MassDOT’s GreenDOT Implementation Plan, the Commonwealth’s Healthy Transportation Compact and statewide Mode Shift Goal, the Healthy Transportation Policy Directive was issued in September of 2013 to ensure that all MassDOT projects are designed and implemented in a way that all network users have access to safe and comfortable healthy transportation options at all MassDOT related facilities and in all services provided.

Performance Management

Sustainability is at the forefront of Mobility2040. Even though the goals included in Mobility 2040 represent a concerted effort to achieve sustainability and livability goals, in this section the following performance measures are predominantly addressed:

- Each four year TIP will include at least one project that supports development of a regional PDA.
- Include criteria to the TIP scoring system to consider the effects of proposed projects on regional PDAs and PPAs.
- Discourage capacity building in low density areas (less than 4,000 persons per square mile or 1,000 jobs per square mile.
- All proposed projects must be included as part of a TIP Environmental Analysis and consultation processes.
Accomplishments

In an effort to avoid environmental impacts, the CMMPO references maps using MassGIS datalayers to identify environmental features within a mile of all TIP projects. The early identification of possible environmental impacts has become a standard procedure in the TIP development process and overall readiness for funding. Also, the CMMPO facilitates an Environmental Consultation Session on projects included in the TIP. The consultation sessions have proven to be an effective way to bring partners to the table to discuss best practices, new methodologies or tools to improve impact analyses and the identification of avoidance / minimization / mitigation alternatives.

Related to Smart Growth in the region, the CMRPC worked on several planning efforts for the CMMPO sub-regions in coordination with local officials, stakeholders and general public in the identification of Priority Development Areas (PDA) and Priority Preservation Areas (PPA), and priority infrastructure needs (including transportation infrastructure) within the region. Also, CMMPO staff provided comments on major development projects and infrastructure improvements consistent with GreenDOT’s policy directive. An extensive effort has been placed in increasing the healthy, active transportation modes for “last mile trips”. In that regard, the recently inaugurated WRTA Transit Hub and the opening of the Front Street segment from Front Street to Worcester Common has improved accessibility and transit connectivity to Downtown Worcester and the region, showing the synergy of several partners working in tandem for the livability overarching goal.

In relation to livability in the TIP, the CMMPO developed a draft TIP livability scoring criteria that proved useful in evaluating potential 2016-2019 TIP project candidates. Also, the CMMPO has been involved with several livability-related projects and initiatives, including Safe Routes to School Activities, Neighborhood SAFE and “Complete Streets”, among other initiatives.

Planning Ahead

The CMMPO is applying FHWA’s INVEST tool and identifying possible uses during the TIP development process. The CMMPO is charged with promoting sustainability in every transportation project that goes through the annual selection process. Special attention is placed on those projects where sensitive environmental areas had been previously identified. The CMMPO will continue annual Environmental Consultation Sessions as part of the TIP development process. In addition, the CMMPO will continue to work on the following projects and initiatives:
Safe Routes to School (SRTS) Activities

The Massachusetts Safe Routes to School program promotes healthy, active transportation modes for children and their parents in their travel to and from school. It educates students, parents and community members on the benefits of walking and bicycling for travel to and from school. Over the past two years, CMMPO staff has worked with Walk Bike Worcester on a pilot program for Safe Routes to School in the Worcester Public School System. This work is an integral part of the livability program for the CMMPO; it has a multimodal focus on the safety of schoolchildren in the City of Worcester.

Upcoming Safe Routes to School Taskforce efforts will include working with Woodland Academy/Claremont Academy in the City of Worcester. This unique school is housed in a single building, allowing for the integration of efforts across elementary and middle school levels. Special focus will be paid to incorporating student participation into the development of the project.

Neighborhood SAFE

Neighborhood SAFE is a new, proactive approach that the CMMPO is undertaking in order to provide communities with small area infrastructure assessments from a pedestrian and bicyclist safety perspective. The CMMPO has launched this effort to achieve the following objectives:

- Increase awareness of walkability in communities throughout the region
- Identify safety issues that pedestrians and bicyclists face
- Provide neighborhood safety analysis for all users of the transportation system
- Generate enthusiasm for healthy, active modes of travel

CMRPC is always looking for new communities to incorporate into Neighborhood SAFE. Upcoming work in this program will include a review of the Westborough Rotary area in the Town Center. Staff is optimistic that further studies will result from the development of the Regional Bicycle & Pedestrian Plan due in 2016.

Complete Streets

Through ongoing efforts with Walk Bike Worcester, the Safe Routes to School Taskforce, and Neighborhood SAFE, CMMPO staff has been working toward the incorporation of Complete Streets policies and techniques in all Transportation Planning products and initiatives.

Cross-collaboration with the Land Use staff of CMRPC is currently underway to achieve the Mobility2040 goal of 10% of the communities in the region adopting a Complete Streets policy within the next ten years.
Healthy, Active Transportation

Policy Background

Achieving major livability goals and healthier communities requires a transportation policy progressive enough to include health as a vital component. The focus on vehicle travel in transportation policy throughout the years has had a detrimental spillover effect on community health. Research shows that obesity, cardiovascular diseases, diabetes and other chronic health conditions can be associated with lack of physical activity. The Massachusetts Behavioral Risk Factor Surveillance Survey (BRFSS) 2008-2011 estimates that 61% of adults in the City of Worcester were overweight or obese, compared to 59% of Massachusetts adults, and lowest income residents in Worcester County had the highest prevalence of overweight (72%) and obesity (33%) in 2010.

Moreover, higher rates of asthma and other respiratory conditions can be found in locations with poor air quality that can be traced to Greenhouse Gas emissions. According to BRFSS, 11% of persons aged 18 and older in Worcester County have asthma. In Worcester County, Hispanics have the highest prevalence, followed by non-Hispanic Whites.

Injuries and fatalities as a result of crashes are also health effects related to transportation. Data from the Fatality Analysis Reporting System (FARS) show that fatalities as a result of a motor vehicle crash decrease 22% during the period from 2007 to 2011. Moreover, the fatality rate by a hundred million vehicle miles traveled (VMT) in 2011 was 0.62. Interestingly, in rural areas the rate was higher than urban areas, 1.10 versus 0.57. The percent of pedestrian fatalities in Massachusetts in 2011 was 17%, higher than the U.S. Bicyclists fatalities were 1%, whereas in the U.S. the proportion was 2% of all fatalities.

The Center for Disease Control and Prevention believes the topic is of major significance, and issued the report “Recommendations for Improving Health through Transportation Policy”. Key highlights in the report include the following: (1) reduce injuries associated with motor crashes; (2) improve air quality; (3) expand public transportation; (4) promote active transportation; (5) encourage healthy community design; (6) design to minimize adverse health effects and safety consequences, among others. Furthermore, the U.S. Department of Health and Human Services recommends using the Health Impact Assessments (HIA) as a planning tool to identify the impact of a new policy, program or major transportation project on community and individual health.

The Commonwealth of Massachusetts has been a national pioneer incorporating health into transportation policy. The Massachusetts Healthy Transportation Compact (HTC) was a key requirement of the landmark transportation reform legislation signed into state law in June 2009.
and is an inter-agency initiative designed to facilitate transportation decisions that balance the needs of all transportation users, expand mobility, improve public health, support a cleaner environment and create stronger communities. In December 2013, MassDOT released the Healthy Transportation Policy Directive to include design directives to promote healthy design guidelines and active transportation modes as included in GreenDOT.

Moreover, a HTC Advisory Council was formed to help coordinate the activities of the Compact. The HTC-AC identified five areas to focus moving forward: (1) help inform the Project Selection Advisory Council in health related topics; (2) prioritize asset planning as included in WeMove Massachusetts capital planning process; (3) develop guidance to consultants on how to incorporate health analysis in their projects; (4) enforce Complete Streets and Active Streets legislation and municipal training; and (5) assist new administration in capitalizing on progress achieved and continue with initiatives already in place.

Also, the HTC worked on two HIA’s on major transportation projects. The first one was the Grounding McGrath HIA, which became the example to follow on future transportation HIA’s, and in May 2014 an HIA for the Logan Airport was completed to investigate the association of airport noise and emissions with adverse health outcomes.

In January 2009, Massachusetts launched the Mass in Motion project which aims to promote wellness and to prevent overweight and obesity in Massachusetts with a particular focus on the importance of healthy eating and physical activity. Mass in Motion provides grant funding to cities and towns in the state to make wellness initiatives a priority. In the CMMPO region, the City of Worcester was that grantee. The project team included state and local departments of public health, public and private health care providers, health researchers, city, regional and state transportation staff (including CMRPC), economic development staff, and local non-profit organizations. The project is a multi-year partnership to address overweight, obesity and chronic disease through access to healthy food and physical activity opportunities at the local level.

**Performance Management**

Mobility2040 has set the goal to “*Increase Transportation Options and Promote Healthy Modes*.” As such, the following performance measures are of particular importance for the CMMPO:

- 10% of communities in the region have a local Complete Streets policy over 10 years.
- Expand bicycle infrastructure in the region by 50 miles by 2040.
- Increase bicycle parking at public facilities in the next five years.
TRANSPORTATION LINKAGES

- Improve pedestrian network within ½ mile of high activity transit stops.

**Accomplishments**

A result of the aforementioned partnership was the publication of the Greater Worcester Region Community Health Improvement Plan (CHIP). The CMMPO is actively working in the implementation of several strategies included in the CHIP, especially those in the area of Healthy Eating and Active Living. The strategies in which the CMMPO had been involved are the following: (1) increase the consideration of pedestrian and bicycle accommodation in routine decision-making through the adoption of Complete Streets transportation policy throughout the region. (2) establish four joint use agreements with schools in low-income neighborhoods to allow the use of both indoor and outdoor facilities by the public during non-school hours on a regular basis. (3) establish a district wide Safe Routes to School task force for ongoing identification and implementation of systems, policies and school-level changes to support increased walking and biking to school.

Also, the CMMPO participated in the development of Union Hill’s Health Impact Assessment (HIA) Report, an effort lead by the City of Worcester Division of Public Health and funded by the Massachusetts Department of Public Health to assess the health effects of a future neighborhood’s revitalization. The Union Hill neighborhood experiences higher crash rates, especially involving pedestrians, and higher rates of pedestrian injury than the city as a whole, for which the implementation of a Complete Streets program was recommended to guide street and sidewalk investments in the neighborhood.

More recently, the staff participated in a statewide Health Impact Assessment Workshop for regional planning staff facilitated by the Healthy Community Design Initiative, the Massachusetts Department of Public Health and the Metropolitan Area Planning Council. In addition, Regional Transportation Managers received a presentation about the Grounding McGrath Highway (Route 28 including McCarthy Overpass in Somerville) Health Impact Assessment as part of their monthly working meetings.

The CMMPO worked with Mass in Motion in the identification of transit stops close to “Corner Stores”, an initiative developed to assist store owners sourcing local produce. Also the Worcester Regional Transit Authority (WRTA) has been a supporter for more access to healthier foods and active living. This summer the Regional Environmental Council Mobile Market had a spot at the WRTA Hub, the City of Worcester DPH held a vaccination clinic at the WRTA Hub as part of the flu season awareness program, and the TV screens at the WRTA Hub lobby present
informational slides with parks, and places to hike and bike located at walking distance to WRTA stops.

**Planning Ahead**

Health is definitely an area that will shape transportation policy in the immediate future. MassDOT is already working on how to incorporate health in the transportation planning process, from corridor planning to funding and final permitting. Most likely consultants will have the biggest share in terms of developing reports and studies, but there is a growing consensus that transportation agencies should lead some efforts, like HIA’s for those projects with a large impact on the community. Not every TIP project will be a candidate for a HIA. As such, MassDOT is developing guidelines to assist regional and local officials in the evaluation of transportation projects.

The CMMPO will continue to work on the CHIP implementation and will provide support to initiatives related to transportation that improves the health of the region’s population, especially those that are centered in improving and expanding the pedestrian and bicycle infrastructure in the region. The work done so far has helped to strengthen the organization’s network with the City Division of Public Health, local non-profits, service providers and the community at large, expanding the CMMPO’s stakeholder base.

The CMMPO foresees more staff training in the future related to these matters since it is an evolving topic. As standard procedure, the CMMPO will continue analyzing regional and local data through our local partners. Particular attention will be placed in education and information sessions as a way to reduce fatalities and serious injuries.

**Climate Change**

**Policy Background**

Greenhouse Gases (GHG) are considered to be detrimental to overall air quality due to their long-term effects. There is broad scientific consensus that our climate is likely changing both regionally and globally and a growing concern that this may largely be due to the combustion of fossil fuels and other human activities that increase atmospheric concentrations of Greenhouse Gases, including the following: Carbon dioxide (CO2), Methane (CH4), Nitrous oxide (N2O), and other heat-trapping gases. These gases form a "blanket" of pollution that traps heat in the atmosphere that may cause climate instability characterized by severe weather events such as
TRANSPORTATION LINKAGES

storms, droughts, floods, heat waves and rising sea levels creating significant impacts on people, natural resources and economic conditions around the globe.

The transportation system is the second-largest contributor to Greenhouse Gas emissions in the United States, and the majority—approximately 72 percent—of the transportation sector’s emissions are generated by road transportation, including both passenger and freight travel. In 2011, the percentage of total Greenhouse Gas emissions in Massachusetts from the transportation sector was 39% of all emissions conducive to climate change. Additionally, research studies have identified the serious impacts climate change poses for transportation. Increases in very hot days will compromise pavement integrity, and deform rail lines; increased flooding will inundate roads, bridges, and rail lines. Heavier rainfall may require redesign and replacement of local drainage structures; and more frequent and more severe hurricanes and snow storms will disrupt service in affected areas and require devoting more resources to evacuations. Research shows that climate change impacts are already happening, as a matter of fact, the Northeast region of the United States had the highest increase in the nation of heavy rain events from 1958 to 2007 (See Figure III-3).

Recognizing the importance and impacts of global warming, the Commonwealth passed the Global Warming Solutions Act (2008), which set the goal of a 25% reduction in Greenhouse Gases below 1990 levels by 2020, and 80% by 2050. Since then, several efforts have been developed across agencies. MassDOT in representation of the transportation sector developed the GreenDOT Policy and Implementation Plan which is geared towards the attainment of this goal. GreenDOT includes mode-shift as one of the key aspects of Greenhouse Gas and set a goal of tripling the amount of travel by walking, bicycling, and public transportation between 2010 and 2030. It requires a threefold strategy: (1) to increase the investment in transit, biking and walking facilities, (2) to promote traveler education and encouragement to use healthy, active transportation modes, and (3) to enhance the roadways and transit systems performance.

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**Performance Management**

Reduction in Greenhouse Gases requires a multidimensional approach. It pertains to sustainable practices, congestion management strategies, mobility improvements, expansion of multi-modal, healthy, active modes of transportation. Mobility2040 focuses its climate change goals to three areas: (1) increasing mode share and reduction of VMT, (2) emphasizing traveler information thru technology, and (3) identifying vulnerabilities in major regional infrastructure that is susceptible to climate change.
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- Triple walk/bike/transit share in Worcester and double walk/bike/transit share in urbanized areas outside of Worcester by 2040.
- Identify vulnerable infrastructure susceptible to climate change now and add scoring criteria in the TIP for future years.
- One percent VMT reduction in each 5-year period.
- Institute one new Park & Ride lot in each 5-year period where adequate future year demand has been modeled for Transit & TDM along congested corridors.
- Install 5 Transit Signal Priority every 5 years.
- Expand I-290 ITS Real Time Traffic Management (RTTM). RTTM on I-395 and Route 146 also. Install 2 Variable Message Boards (VMB) every 5 years.

Accomplishments

While the magnitude of potential changes related to global warming are difficult to predict, transportation planners are called to assess potential harms related to these climate effects in order to better address infrastructure vulnerabilities and better plan for adaptation. In this regard, the CMMPO included the reduction of Greenhouse Gas generated by auto and transit as one of the core Mobility2040 goals. VMT reductions, TDM strategies and Park & Ride facilities are all included in Mobility2040 as Greenhouse Gas reduction measures. In addition, the CMMPO evaluates air quality impacts for all regionally significant transportation projects in conformity with federal and state’s regulations that are included in the TIP and the LRTP.

Also, the CMMPO has taken steps to identify criteria to evaluate the vulnerability of existing infrastructure and main corridors as part of the region’s Evacuation Plan. The criteria include flood-prone areas based on historical information, local hazards and location of primary services, along with Environmental Justice areas and other vulnerable populations that could be disproportionately impacted by an extreme weather event. Recent Corridor Profile planning studies have been successful in identifying critical infrastructure at stream crossings that could be affected by extreme flood events.

Related to transit, the CMMPO aims to maintain FTA age standards for transit vehicles. In addition to this, the WRTA has committed to acquiring hybrid vehicles as the common practice and to improve the performance of their all-electric vehicles. In recent years, the WRTA had added new routes to the system (including in and to surrounding towns) and the new Hub and all
fixed-route vehicles have bike racks, which provide more options for last mile trips. The WRTA has implemented several rider tools like system maps, schedules (print and digital), and real-time arrival and departure information from the Hub, or at the stops by using text or by QR codes. The website has been improved to include all the information readily available to their passengers. Another strategy used to improve transit operations is the use of Transit Signal Priority (TSP) systems. The WRTA analyzed several intersections with the intention to improve on-time performance by using TSP technologies.

To expand pedestrian and bicycle accommodations, the CMMPO has worked on several efforts, including the construction or development of new facilities like the new WRTA HUB and strengthening the network base with local organizations. In this regard, the CMMPO has been involved in walkability assessments and pedestrian and bicycle counts in coordination with local communities. Also, the CMMPO has partnered with MassRIDES to promote healthier commuting options. One example is the Safe Routes to School Program, which has been successfully offered to at least 5 schools in Worcester in the last 2 years. Further, the CMMPO joined MassRIDES in several activities, including the annual BayState Bike Week.

Information technology is a great ally to alleviate congestion, while in turn reducing harmful emissions, providing fuel savings and improving roadway efficiency. ITS technologies are planned for deployment in the Central Mass region on the length of I-290 interchange between I-495 and the MassPike (I-90). It is hoped this effort will result in travel time savings and improve the capacity along this corridor.

**Planning Ahead**

The CMMPO will continue evaluating the air quality impacts of all TIP projects. Federal and state regulations have specific methodologies to measure Greenhouse Gas in transportation projects. The CMMPO will continue its efforts in the development of key criteria to identify and address infrastructure vulnerabilities related to climate change as part of the TIP process.

At the same time, the CMMPO is committed to achieving at least one percent VMT reduction in each 5 year period, which will continue strengthening the links with state and local partners in traveler’s education efforts as a way to encourage mode change. The institution of at least one Park & Ride lot every 5 years is also a strategy that the CMMPO will pursue in its effort to reduce the region’s VMT.

In the same fashion, the CMMPO will pursue the development of more pedestrian and bicycle accommodations throughout the region with the objective to triple walk/bike/transit share in
Transportation Security

Policy Background

Transportation security refers to both personal and homeland security. It includes the vulnerability to intentional attack and natural disasters as well as the associated evacuation procedures. The goal is to increase the security of the transportation system for both motorized and non-motorized users. In order to achieve that goal, CMRPC staff in conjunction with Montachusett Regional Planning Commission (MRPC) under the guidance of the Central Region Homeland Security Advisory Council (CRHSAC) is working on an evacuation plan for all of Worcester County.

The overall goal of the Evacuation Plan is to provide Worcester County emergency management personnel with a comprehensive Regional Evacuation Plan. Phase 1 was primarily a data gathering procedure. Phase 2 is anticipated to include identification of evacuation scenarios, modeling of evacuation impacts against current conditions, and identification of
recommendations for prioritization and implementation of a County-Wide Evacuation Plan. Phase 3 is anticipated to be development of a County-wide Evacuation Plan based on Phase 2 data and recommendations, as well as involvement of stakeholders. Phase 3 would include establishment of communications protocol, and implementation of publicity of such outcomes, including perhaps coded signage and development of standard messaging systems.

Performance Management

As discussed in Chapter II of this report, MAP-21 requires performance based planning on federal emphasis area of Safety and Security. Mobility2040 recognizes the importance of the Transportation Security and measure progress to achieve the following goals and objectives:

Goal: Improve the Safety and Security of the region
Objective: Enhance Transportation Security Coordination regionwide
Performance Measure:

- Conduct one regional workshop/tabletop exercise every year to advance evacuation planning
- Continue involvement with Montachusett Regional Planning Commission (MRPC) and statewide evacuation planning efforts

Accomplishments

CMRPC and MRPC under the guidance of the CRHSAC have completed Phase 1 of the Worcester County Evacuation Plan. Phase 1 was primarily a data gathering exercise which consisted of two sub-phases (Phase 1a and Phase 1b). Phase 1a provided an initial data inventory and assessed readily accessible data and conditions. The data that was compiled of the Phase 1a is:

Key Demographics

- Populations
- Identify and describe daytime and nighttime populations
- Population densities
- Special populations
- Group quarters institutions
- Environmental Justice populations
- Major employment centers
- Hospitals
- Natural Features
- Flood Plains
- Critical Dams
- Any other features identified by the Council
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Transport Systems
- Overall Current Travel Patterns (to assess change needed in specific scenarios)
- Roadway Characteristics/Condition
- Transit (bus/rail/charter): Capacity
  Lines (rail has fixed routes)
  Private operators/charter
- Private Auto

Communication Systems
- Message boards
- Intelligent Transportation Systems
- Key travel corridors

- Congestion (Volume-to-capacity; Intersection Ratings)
- Bridge Characteristics/Condition
- Major water bodies (for example, Lake Quinsigamond presents impediment to E-W travel in area)

Phase 1b was a continuation of the work completed in Phase 1a, filling any data voids and working with municipalities to identify evacuation zones, evacuation routes, and traffic control points.

Between January 2013 and August 2013, CMRPC and MRPC met with emergency personnel from all 65 communities in Worcester County to gather information that would fill any data voids from Phase 1a related to the municipality; and to seek initial input on the identification of evacuation routes, traffic control points and evacuation zones.

Meetings with multiple towns within the CMMPO region, as clustered below, were then facilitated to review the draft maps and check for potential conflicts or incongruities that might require resolution across town borders. Holden, Paxton, Leicester, Auburn, Millbury, Worcester, West Boylston (Rutland and Hubbardston invited as well)
  - Northborough, Boylston, Berlin, Bolton, Westborough, Shrewsbury, Southborough
  - Barre, Hardwick, New Braintree, Oakham, Princeton, and Rutland
  - Grafton, Sutton, Northbridge, Upton, Milford, Hopedale, Mendon, Blackstone, Millville, Uxbridge, Douglas
  - Charlton, Sturbridge, Southbridge, Dudley, Webster and Oxford
  - East Brookfield, West Brookfield, North Brookfield, Brookfield, Spencer, and Warren.
In the MRPC region conflicts or discrepancies that requires resolution across town borders was handled on a case-by-case basis with emergency personnel from each respective community.

It is important to note that evacuation related data was also gathered from abutting Massachusetts RPAs (Regional Planning Agencies) and states where available. This data was incorporated into the planning process to ensure that any evacuation routes feeding into the region from abutting areas matched up with routes in Worcester County communities ensuring inter-agency consistency.

**Planning Ahead**

In the many meetings held, as staff sought to work with municipal officials to identify routes, inevitably, someone would ask “What type of event are we planning for?” Staff found it hard to be scenario neutral. We often indicated that though a likely scenario would be a major coastal event such as a hurricane, we wanted to identify corridors or conduits to move large populations of people. Even as we discussed evacuation planning, we often found that with the exception of local disasters, Worcester County was likely to be a “pass through” community (such as Boston area residents moving as far west as possible) or a “receiving or host” community (Boston area or coastal communities, heading to and stopping in Worcester County).

**Electronic Comprehensive Emergency Management Plan (eCEMP) Data Inconsistencies**

Though stakeholders were generally eager to provide local information and insight, staff found that level of accuracy between local data and data drawn from the state’s eCEMP Database varied widely. Some communities were meticulous about keeping the information up-to-date, while other communities found this to be a lower priority for available resources.

**Communication Across Municipal Borders**

Across the board municipal officials were concerned about how emergency personnel would communicate with each other across the town boundaries, across the region and across the state. There was a widespread concern about overall coordination and direction, specifically with regard to communication and guidance from MEMA, MassDOT and the Mass State Police.

**Massachusetts Turnpike**

For the nine (9) communities in Worcester County that the Massachusetts Turnpike (I-90) passes through, a consistent concern was raised about gaining access to Mass Turnpike “snow” gates to add additional entry points on the Turnpike.
Primary Care Shelters
Most Primary Care shelters are high schools or senior centers. On the other hand, eCEMP lists many more facilities; some that have no generator or will not be opened. It is important to clearly communicate about which shelters will open, when, and providing what services. This can be communicated with multiple tools - town website, message board, reverse 911, and Code Red (if available).

Communication with Residents
Communication with residents was generally a concern. 29 communities have contracted with Code Red, two (2) communities were considering contracting for Code Red services, and the 32 communities have either no emergency or a different emergency communication service.

Communication with Public Transportation Authorities
Communication with public transportation authorities will be extremely important. AMTRAK, WRTA, MBTA and MART will be needed to move concentrated populations, hospitals, etc. Scenario planning needs to address day-time and night-time populations, employment centers, residential developments, institutions hospitals, etc.

Communication Across State Borders
Communities bordering other state and counties were justifiably concerned about evacuation planning efforts in their neighboring communities and regions. 24 of the participating communities abut New Hampshire, Connecticut, Rhode Island, or an adjacent Massachusetts County.

Gas Stations
Since gasoline will be a highly valued resource by evacuees and emergency personnel alike, as part of this project the existing locations of public gas stations were mapped. Many more rural communities do not have gas stations located within their boundaries. For this and many other pieces of information gathered in this project there was tremendous concern about keeping information and tools current and up-to-date.

Additional Needs
In many meetings, officials identified additional needs such as Opticom⁹, bridge repairs, facility repairs, staffing needs, and evacuation route signs that would be needed to affect an orderly

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⁹ The Opticom System provides traffic signal priority override for a high level of safe traffic management for emergency vehicles travelling through an intersection.
evacuation. There is a need for MassDOT to prioritize bridge repair on the primary and secondary evacuation routes.

Local disasters most often identified were train derailment, truck rollover, pipeline explosion or deficient dams. In addition, power plants/transformer stations, waste water treatment or sewage treatment plants, and a few big chemical plants were also identified. The Quabbin and Wachusett reservoirs and aqueduct systems that supply water to Boston area residents and the various reservoirs that supply the City of Worcester were indicated as vulnerable infrastructure. 49 communities have the potential to be directly affected by a train derailment or other railroad accident in their community. Only 19 of the communities are not intersected by State Routes 2, 9, 146, US-20 or I-84, I-90, I-190, I-290, I-395, or I-495. Every other community sees significant cross state or interstate traffic that has a high potential for truck rollover or other accident that could complicate a regional evacuation.

In addition, the region’s communication towers (i.e. summit of Wachusett in Princeton, Ragged Hill in North Brookfield, or Asnebumskit in Paxton) were determined to be important vulnerable infrastructure.

Private emergency communication systems, such as Code Red,\(^{10}\) are important means of communication with residents in situations such as weather related events or evacuations.

**Next Steps**

In 2015 staff will continue Phase 2 Evacuation planning efforts. Phase 2 will aid jurisdictions in practical application and use of the “Tool Kit”. This will be accomplished through the development and delivery of training workshops and exercises to assure jurisdictions have the knowledge and capabilities to utilize this data during an actual event. Planners will interview municipal and regional stakeholders in advance of the workshops to identify communication concerns. Based on planner/facilitator understanding, workshop agendas will be designed that interactively develop and test a communications protocol between local and regional emergency personnel.

Phase 2 will continue to align the Central Region Homeland Security Advisory Council Evacuation Plan strategies and goals with state evacuation plans. During this phase efforts to

\(^{10}\) Code Red is designed to enable local government officials to record, send and track personalized messages to thousands of citizens in minutes. [http://www.ecnetwork.com/codered/](http://www.ecnetwork.com/codered/)
identify and resolve conflicting response actions between all stakeholders will be undertaken. Phase 2 will continue to utilize the Evacuation Advisory Council that helped coordinate and facilitate planning efforts in the first two phases of the evacuation planning project.

Title VI, Linguistic Isolation & Environmental Justice Population

Policy Background

Transportation planners have processes to determine how, when and where federal monies should be invested in regards to mobility, such as highway projects, roadway improvements, railway expansion, port development, freight movement, transit projects and bike and pedestrian accommodations. But also, transportation planners analyze accessibility to employment opportunities, health care, housing, education and entertainment. These tasks take into consideration public involvement and the needs of the community, with special attention to those that are most vulnerable, like the elderly, people with disabilities, low – income and minority population. As such, equal access and opportunity are embodied in transportation planning. The CMMPO, assisted by the 3C planning framework, recognizes that a multimodal transportation system levels the playing field, and minimizes mobility and accessibility disparities in our community.

Notwithstanding, there are regulations in place to guarantee that all transportation agencies operate its programs, services and activities in full compliance with federal nondiscrimination laws, including Title VI of the Civil Rights Act of 1964, the Civil Rights Restoration Act of 1987, Executive Order 13166, "Improving Access to Services for Persons with Limited English Proficiency", Executive Order 12898, “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations”, U.S. DOT policy and guidelines and state regulations including the Massachusetts Public Accommodation Law.

Title VI prohibits discrimination in federally assisted programs and requires that no person in the United States of America shall, on the grounds of race, color, or national origin, including limited English proficiency, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity receiving federal assistance. The Federal Highway Administration and the Federal Transit Administration regulations expand Title VI rule to prohibit discrimination on the basis of age, sex, and disability. Additionally, Massachusetts Public Accommodation Law prohibits making any distinction, discrimination, or restriction in admission to or treatment in a place of public accommodation based on race, color, religious creed, national origin, sex, sexual orientation, disability, or ancestry.
Environmental Justice primarily aims to identify and address disproportionately high and adverse human health and environmental effects of programs, policies and activities on minority and low-income population. Research has shown that households in poverty spend a higher proportion of their income in transportation expenses and suffer from limited vehicle availability.11

**Performance Management**

Transportation projects shall accommodate all users, regardless of their income, national origin, language barriers, disabilities, age, sex, ability to drive, or any other special needs. In that regard, Mobility2040 has a goal to achieve “Equitable Transportation for all Populations.” The measures established to achieve it are:

- Increase the number of ADA-compliant intersections by 10% over 10 years
- Improve outreach efforts by facilitating at least one open house/community sessions across the region every year.
- Increase multimodal access to job opportunities, health care, education, recreation, healthy food and affordable housing in two Environmental Justice or vulnerable population neighborhoods in 5 years.
- Inventory the bicycle and pedestrian network within a ½ mile of top boarding transit locations in the next two years.
- Expand transit/paratransit coverage in areas that lack adequate transit service with Environmental Justice population and other vulnerable populations. 2 routes every 5 years.

**Accomplishments**

The CMMPO has been repeatedly in compliance with federal and state regulations and is fully committed to address the needs of all in the Central Mass region. In 2013, the CMMPO received a “good standing” approval from a major Federal Certification Review of its programs, services and activities. Furthermore, the CMMPO had submitted Title VI reports (annual reports, triennial reports, among others) on time, and has assisted subrecipients in their compliance with Title VI regulations.

CMRPC website has been updated to reflect recent changes in the policy and to include complaint procedures and the “Discrimination Complaint Form”, making them readily accessible.

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to download either in word or in PDF formats. The CMMPO developed a Public Outreach Plan (POP) with input from a wide variety of transportation stakeholders, and an LEP Plan, both documents are also available to download on the agency website. CMMPO staff also assists the WRTA in providing Title VI information and procedures to its bus riders through flyers, “car cards”, public hearings/workshops, and area newspapers. Also, staff assists the WRTA in transit planning activities and Title VI provisions in the planning process.

Moreover, in order to facilitate the implementation of the 3C process and to expand citizens’ involvement in the CMMPO functions, an advisory committee was established for the CMMPO. The Advisory Committee provides a forum for broad public participation, technical and citizen input in the transportation planning process. It brings together public agencies, elected and appointed officials, transportation providers, environmental interests, technical experts, specialists, business persons and citizens concerned with transportation plans and programs.

The CMMPO has historically made a concerted effort to involve the region’s disabled, elderly, low-income and minority populations. A number of advocacy groups serving these populations are included on the TPAG Elderly and Disabled Technical Task Force. These advocacy groups distribute information and materials to their associates, including local community organizations. Recently, the CMMPO has been working to address the region’s needs through the Regional Coordinating Council.

The CMMPO has also updated his Environmental Justice definition based in the region’s characteristics. New criteria were added to the CMMPO Environmental Justice definition recognizing those who are the most vulnerable. The CMMPO vulnerable populations are: minority and low-income populations, zero-car households, elderly population, linguistically isolated households and Hispanic or Latino population. Maps were developed identifying areas with Environmental Justice population and vulnerable population (see Figure III-4). Also, the maps show the degree of vulnerability (number of meet criteria in each Census Block Group). The CMMPO completed a Benefits and Burdens Analysis for projects included in the TIP.
Figure III-4: Environmental Justice and Vulnerable Population

Legend

Roadways
- Interstate Routes
- US & State Routes
- WRTA Routes

Environmental Justice Population
- Minority (+20.3%)
- Low Income (-$50,259)
- Minority & Low Income

Vulnerable Population
- Lang_Isolated HH (+9.45%)
- ZeroVeh HH (+12.75%)
- Hispanic or Latino (+14.0%)
- HH with persons 75+ age (+18.8%)

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

Source: Data provided by the Central Massachusetts Regional Planning Commission (CMRPC), massDOT/Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, InformationTechnology Division.

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Planning Ahead

By recognizing the region’s characteristics and its diversity, the CMMPO has been effective in reaching out to vulnerable populations, reinforced its outreach process, provide better accommodations and translations of vital documents to non-English speakers. In the same fashion, the CMMPO has advised developers and consultants regarding the region’s characteristics improving the public participation process. The CMMPO will continue working to improve its outreach strategies. An integral part of this evolution has been the trainings in cultural diversity which has helped tailor outreach strategies to the region’s cultural variances.

Also, the CMMPO will continue its work on transit and paratransit planning, ensuring the compliance with federal and state’s policies and guidance. More emphasis will be placed on improving accessibility for those who are the most vulnerable in the region, improve service quality and guaranteeing a fair fare structure. CMMPO staff will work together with the WRTA to identify “transit deserts”\textsuperscript{12} in the region in those areas where vulnerable or Environmental Justice populations and high demand for transit service exists.

The CMMPO will continue its work on identifying the gaps in pedestrian and biking accommodations, especially in areas identified as Environmental Justice neighborhoods. Also, the CMMPO will continue working to increase ADA-compliant intersections throughout the region. Major effort will be placed on increasing accessibility using healthy, active modes of transportation to major employment areas, affordable housing, health care, healthy foods, education and recreational areas.

Access to Essential Services

Policy Background

The U.S. DOT in coordination with FHWA and FTA issued Planning Emphasis Areas (PEA) to guide state’s DOTs and MPOs’ transportation planning work. One of the main PEA for federal FY2015 is Access to Essential Services, specifically the identification of connectivity gaps in access to essential services. Under MAP-21, accessibility, or the ability to reach essential services, is fundamental in a sustainable, equitable and multi-modal transportation system.

Essential services or activities include: emergency services, health care, public services, education, employment opportunities, access to food and to social and recreational activities.

Performance Management

Mobility2040 includes goals and objectives directly related to improving accessibility to essential services in the region. Goal 1: Reduce congestion and improve mobility for all modes includes Objective 4 - Improved Transportation Accessibility for all modes, with the following measures:

- Increase the number of ADA-compliant roadways and intersections. 2 locations every 5 years.
- Improvement in the bicycle and pedestrian network within ½ mile of transit stations – for the top 10 high boarding and alighting locations. 2 locations every 5 years.
- Increase average frequency on core-routes to 10 minutes. 2 routes every 5 years.

Moreover, as previously discussed, access to essential services is related with transportation equity. As such, accessibility measures were included in Goal 6: Equitable Transportation for all populations.

Objective 1 - Provide access to essential services; minimize burdens and maximize benefits associated with low-income and minority areas.

- Increase multimodal access to job opportunities, health care, education, recreation, healthy food and affordable housing in two Environmental Justice or vulnerable population neighborhoods in 5 years.

In addition, in Goal 7: improve Economic Vitality and Freight Movement, there is a specific objective related to accessibility to major employment centers and related measures.
Objective 2 - Increase access to major employment centers.

- Improve the bicycle and pedestrian network near 2 major employment centers every 5 years.
- Increase frequency of bus routes traveling to/from 2 identified major employment centers every 5 years.

Accomplishments

The CMMPO has been working on the identification of transportation connectivity gaps for several years now as part of major livability undertakings. One example is the work the CMMPO is doing related to regional bikeways, trails and pedestrian networks. The CMMPO recognizes the suitability to complete the Bay State Greenway (BSG), as such, the staff started to identify state highways with wide shoulders as an option for on-road routes. Also, staff is involved in the Blackstone River Valley Bikeway initiative, a key segment in the BSG Nashua River – Buzzards Bay Corridor. In the same fashion, staff works in coordination with DCR on projects relevant to the Mass Central Rail Trail (104 miles connecting Boston to Northampton), the Midstate Trail (92 miles connecting New Hampshire to Rhode Island through Worcester County), and the East Coast Greenway (3,000 miles connecting Maine to Florida).

In addition, CMMPO staff has been responsive to local needs assisting local communities in the identification of walkability and bicycling gaps through the Neighborhood Safe program or through project-specific assessments. Another major endeavor has been the regional sidewalk inventory. Since 2012, staff is collecting data on sidewalk condition along federal-aid eligible roads in tandem with the regional pavement data collection schedule.

An effort related with the identification of transit gaps, primarily led by the WRTA, is the completion of the WRTA Service Standards. The service standards include performance measures to evaluate service efficiencies. One of the measures is route directness. This measure includes a maximum threshold of 300% of auto-travel time to essential services as a trigger for route’s stop data evaluation. Also, the service standards include criteria to evaluate potential new services. The criteria included access to employment centers, education, and presence of vulnerable populations along proposed route, among other criteria. This methodology proved effective for the implementation in 2013 of Route 29, which provided new transit service to the towns of Southbridge, Charlton, Oxford, Auburn and Worcester.

Public meetings are also a great way to identify transit gaps. The WRTA receives public comments all year long through the Customer Service Office, scheduled Advisory Board meetings and additional public meetings to discuss service changes. Recently, the WRTA had a series of “Listening Sessions” to hear from transit riders and public at large their opinions about
the service and how they would like to see the service improved. The comments from these sessions were then included in the process of the Comprehensive Service Analysis, which is still in the works. In addition, every year, the WRTA administers a survey to transit users and include several origin and destination questions, frequency and travel time among others.

WRTA member towns and major employers also had a voice in the identification of transit gaps. As an example, community vans are now providing fixed-route transportation in the towns of Northbridge, Grafton and Westborough as the result of an existing need to connect local services and jobs with the commuter rail and the WRTA fixed-route. The schedule is synchronized with the commuter rail in peak hours as the result of formal consultation and completed surveys by human resources personnel from major employment centers.

Furthermore, the Commonwealth’s Executive Order 530, related with quality and efficiency of paratransit and community transportation, recommended the creation of Regional Coordinating Councils (RCC). The RCC is a voluntary advisory body that represents regional stakeholders with an interest in improving community mobility and developing collaborative solutions to existing gaps and barriers. The Central Mass RCC is working in the identification of unmet needs in the region, with special attention to access to jobs and services in rural areas.

Related with auto-travel, MassDOT recently released the Massachusetts Travel Survey 2010-2011 (MTS). The survey collected information about travel patterns, preferences and behavior on a total of 15,033 households, of which 1,148 were completed in the CMMPO region. The results of the survey are currently being analyzed. The CMMPO will input this data into the Travel Demand Model together with the Census Transportation Planning Package (CTPP) to identify future needs and assist in the prioritization of transportation investments, with regard to access to essential services.

**Planning Ahead**

As a result of the renewed focus on accessibility, the CMMPO is gearing its efforts to perform an incremental accessibility gap analysis for all modes with special attention to Environmental Justice areas while continuing current efforts. Future tasks include the development of the Central Mass Walk and Bike Plan, the completion of WRTA’s Comprehensive Service Analysis and the travel study data input to the Travel Demand Model.

13 Some of the measures included in the survey were related to how far people travel, what mode they take, number of daily trips, trip purpose, among other questions. For more information visit projects’ website: http://www.massdot.state.ma.us/planning/Main/MapsDataandReports/Reports/TravelSurvey.aspx
As an initial step for the accessibility gap analysis, the CMMPO analyzed density patterns within the region, with special attention to employment and population density (see Figure III-5). Both, population and employment densities are higher in the Worcester area which gravitates towards the Eastern part of the region along major corridors like I-290, I-495 and Route 9. Also, throughout the region there seems to be a relationship between densely populated areas and employment concentration mostly located on or in proximity to major corridors (ie. Routes 9, 12 and 20). As a result, the western portion of the region is more dependent on these corridors as a lifeline for their communities.

Higher proportions of low income and minority population are mostly concentrated in locations with both high population and employment densities. Other vulnerable populations, like elderly or zero vehicle households are spread out throughout the region, making their accessibility to essential services even more difficult. Also, is noteworthy that in the northwestern section of the region, although not densely populated the employment locations are spread out and are mostly located along local roads, not necessarily federal-aid roads or major regional corridors.

Another relevant observation derived from the density analysis is that in the southeastern section of the region, densities gravitate towards the Route 146 corridor. Route 16 is one of the major corridors in this subregion providing the East-West connection between densely populated areas and employment centers.

As mentioned before, the CMMPO will continue its work assessing the accessibility gaps in the region with a special attention to main corridors.
Figure III-5  Access to Essential Services

Source: Data provided by the Central Massachusetts Regional Planning Commission (CMRPC), massDOT/Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, InformationTechnology Division.

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Legend
- CMRPC Outline
  - Employment Site
- WRTA Routes

Roadways
- Interstate Routes
- US & State Routes
- EJ Population
- Vulnerable Population

Population Density
- 48 - 1,000
- 1,001 - 5,000
- 5,001 - 10,000
- 10,001 - 38,077

Employment Density
- 0 - 200
- 201 - 500
- 501 - 1,000
- 2,001 - 3,500

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Connecticut
Rhode Island