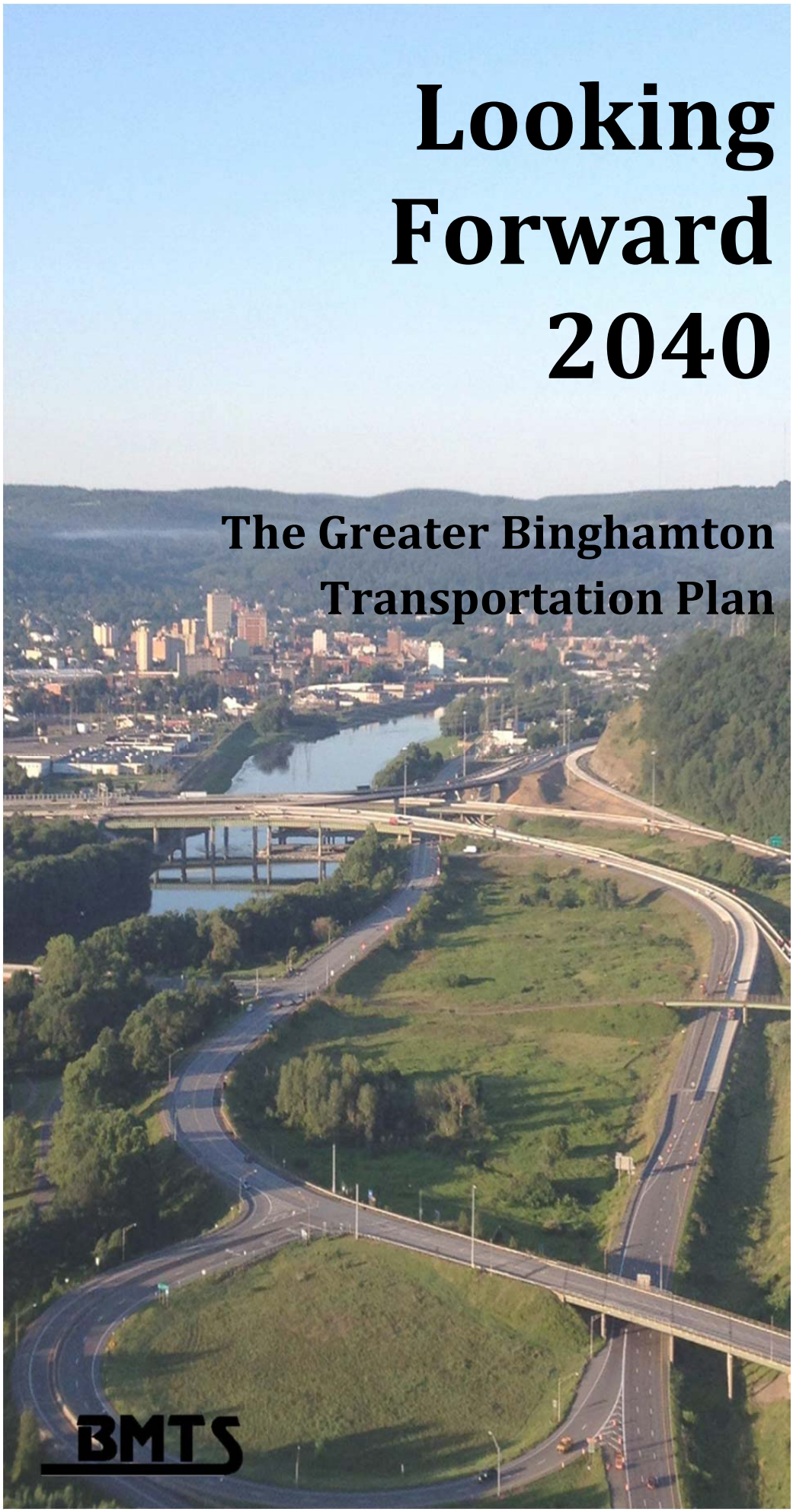
Looking Forward 2040

The Greater Binghamton Transportation Plan



BMTS

BMTS BINGHAMTON METROPOLITAN TRANSPORTATION STUDY

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BINGHAMTON METROPOLITAN TRANSPORTATION STUDY
POLICY COMMITTEE

RESOLUTION 2015 - 09

Resolution approving the long range transportation plan, *Looking Forward 2040*

WHEREAS the Binghamton Metropolitan Transportation Study Policy Committee has been designated by the Governor of the State of New York as the Metropolitan Planning Organization responsible, together with the State, for the comprehensive, continuing, and cooperative transportation planning process for the Binghamton Urban Area, and

WHEREAS Federal regulations (23 CFR §450.322) require that the urban transportation planning process shall include development of a long range regional transportation plan that shall have a twenty year horizon and in air quality attainment areas be updated no less frequently than every five years

WHEREAS the BMTS Policy Committee has been designated as the organization of local elected officials responsible for meeting the planning requirements of the Clean Air Act Amendments of 1990, and

WHEREAS there has been developed a Draft Long Range Plan ~ *Looking Forward 2040* that has met Federal requirements for content, public outreach, and cooperative development, and

WHEREAS the BMTS Policy Committee has adopted the required financial plan and the Draft Plan is fiscally constrained to that plan, and

WHEREAS the BMTS Policy Committee has created a Planning Committee of technical representatives to advise it on matters concerning the implementation of the urban transportation planning process, and

WHEREAS the BMTS Planning Committee has reviewed and approved the Draft Long Range Plan ~ *Looking Forward 2040*

NOW BE IT RESOLVED that the BMTS Policy Committee approves *Looking Forward 2040* as the long range transportation plan for the Greater Binghamton Region.

CERTIFICATION OF RESOLUTION 2015 - 09

I, the undersigned, duly elected Chair of the Binghamton Metropolitan Transportation Study Policy Committee, do hereby certify that the foregoing is a true and correct copy of BMTS Policy Committee Resolution 2015-08, adopted by consensus this 30th day of September, 2015.

Michael Marinaccio — 9-30-15

Michael Marinaccio, Chair — Date

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BMTS

Adopted by the Binghamton Metropolitan Transportation Study Policy Committee:

September 30, 2015

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INTRODUCTION

The Binghamton Metropolitan Transportation Study (BMTS) has been designated by the Governor of New York State as the metropolitan planning organization (MPO) responsible for carrying out federal transportation planning requirements for the Binghamton region. One of the primary responsibilities given to MPOs by Congress is the development of a long range transportation plan (LRTP).

The LRTP, in compliance with current federal transportation legislation, must address the eight planning factors established in the previous federal transportation bill, SAFETEA-LU, which remain unchanged in the current bill, ***Moving Ahead for Progress in the 21st Century (MAP – 21).***

MAP – 21 also established national performance goals in the areas of safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability, and reduced project delivery delays. As the State of New York works to establish performance measures designed to meet the national performance goals, BMTS will work closely with the New York State Department of Transportation and will incorporate these measures in the next update of its long range plan.

MAP-21 Planning Factors:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency;
- Increase the safety of the transportation system for motorized and non-motorized users;
- Increase the security of the transportation system for motorized and non-motorized users;
- Increase accessibility and mobility of people and freight;
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- Promote efficient system management and operation; and
- Emphasize the preservation of the existing transportation system.

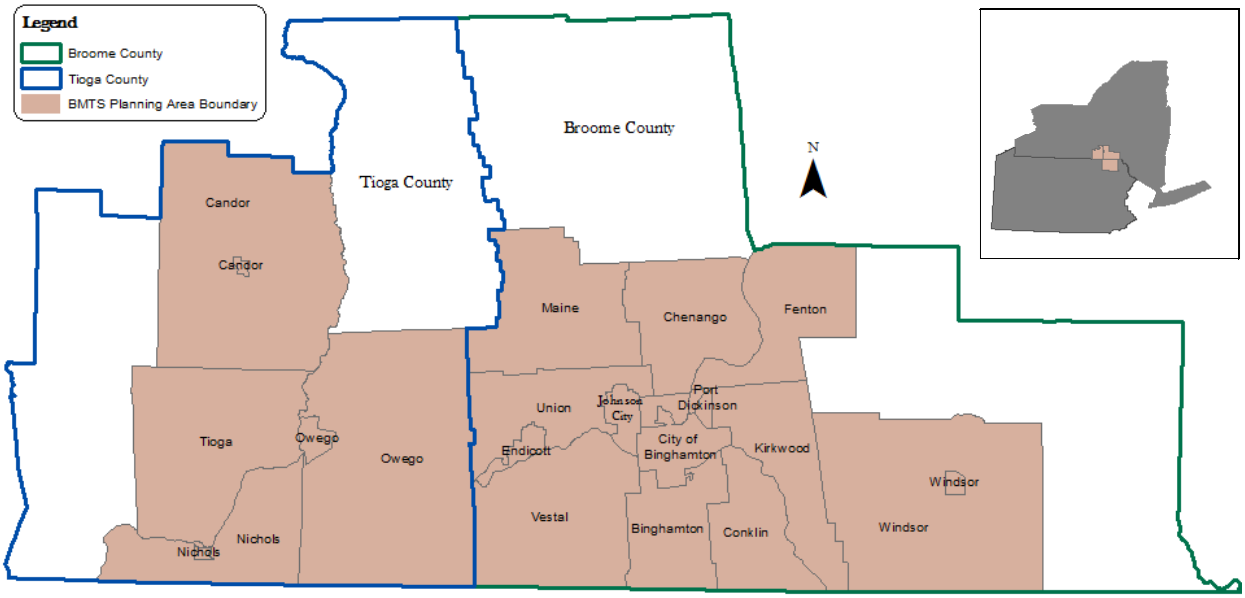
BINGHAMTON MPO

COMPOSITION OF THE MPO

The Binghamton Regional MPO is responsible for transportation planning in the metropolitan area. Currently the MPO has 14 voting members on its Policy Committee, which include representatives from state transportation agencies, regional entities involved in transportation, and municipalities. The Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) participate in the MPO in a nonvoting capacity. The municipalities and agencies that participate in a voting capacity are:

New York State Department of Transportation, New York's Empire State Development, Southern Tier East Regional Planning & Development Board, Broome County, Tioga County, City of Binghamton, Town of Chenango, Town of Dickinson, Town of Owego, Town of Union, Town of Vestal, Village of Endicott, Village of Johnson City, Village of Owego

BMTS is responsible for transportation planning for 21 cities, towns, and villages in the urbanized area. The planning area covers approximately 678 square miles and includes a population of 215,444.



Map 1 – BMTS Planning Area

As you can see from the map inset above, a portion of BMTS' Planning Area extends into Pennsylvania. The municipalities within Pennsylvania are the Boroughs of Great Bend, Hallstead, and New Milford and a portion of the Township of New Milford in the County of Susquehanna. BMTS coordinates with the Northern Tier Regional Planning and Development Commission who does transportation planning for the section of our MPO that is located within Pennsylvania.

BASELINE DATA

What follows is an examination of regional and national demographic and transportation trends and their relationship to current and future transportation conditions within the BMTS Study Area.

The 2010 U. S Census lists a population figure of 215,444 for the 2010 Binghamton Metropolitan Planning Area (MPA), the federally designated BMTS planning area. This total is a very small decrease of 13 people from the 2000 Census population total of 215,457 for the Binghamton MPA, indicating that the population

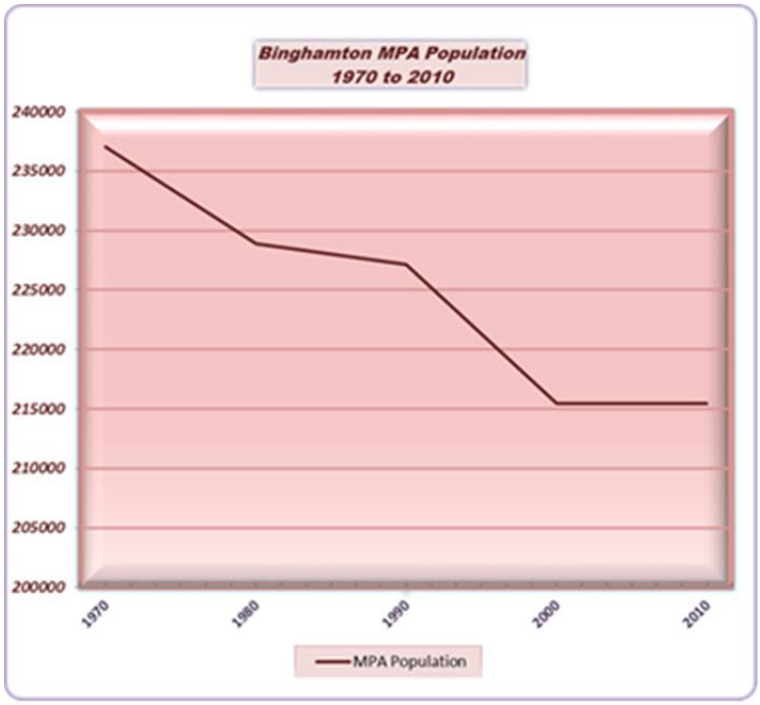


Figure 1 – BMTS Planning Area Population

in the BMTS planning area has remained essentially flat over the past decade. By comparison, from 1970 to 2000 the population in the BMTS Planning Area dropped by 21,595 people, a 9% decrease over that time period. (See Figure 1)

As the overall population in the Planning Area declined in the 1970 to 2000 time period, most of this decrease occurred in the urban core (defined as the City of Binghamton, and the Villages of Johnson City, Endicott, and Owego). From 1970 to 2000 the population in the urban core declined from 103, 856 to 79,864, a drop of 23%. During that same period the population outside of the urban core of the Planning Area increased slightly (from 133,196 to 133,593).

However, this trend also diminished in the period between the 2000 and the 2010 US Census, as there was virtually no change in either the urban core or suburban/rural components of the BMTS Planning Area population. (See Figure 2)

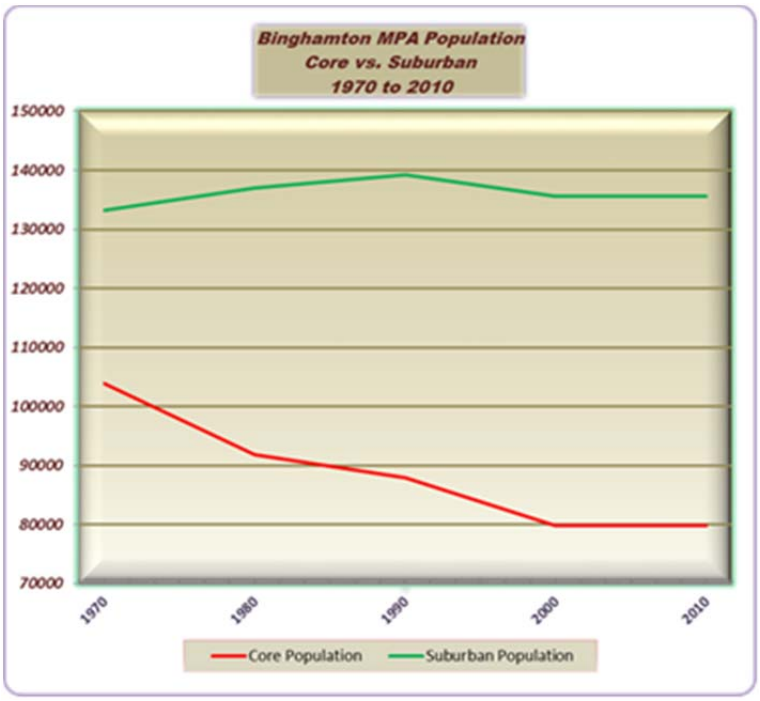


Figure 2 – BMTS Planning Area Population: Core vs. Suburban

In effect, long-standing trends in population loss and increasing suburban development in the Binghamton-area seem largely to have abated over the last decade.

In addition, the local and national trend toward smaller household sizes and the corollary trend of more households overall (77,723 households in 1970, 93,744 households in 1990 and 96,321 households in 2010), has also stabilized in the Binghamton area, with an average household size of 2.24 persons per household in the BMTS Planning Area in the 2010 US census compared to 2.28 persons per household in the 2000 US Census (mirroring the national trend). By contrast, prior to the 2010 Census, the average household size in the Planning Area had dropped regularly

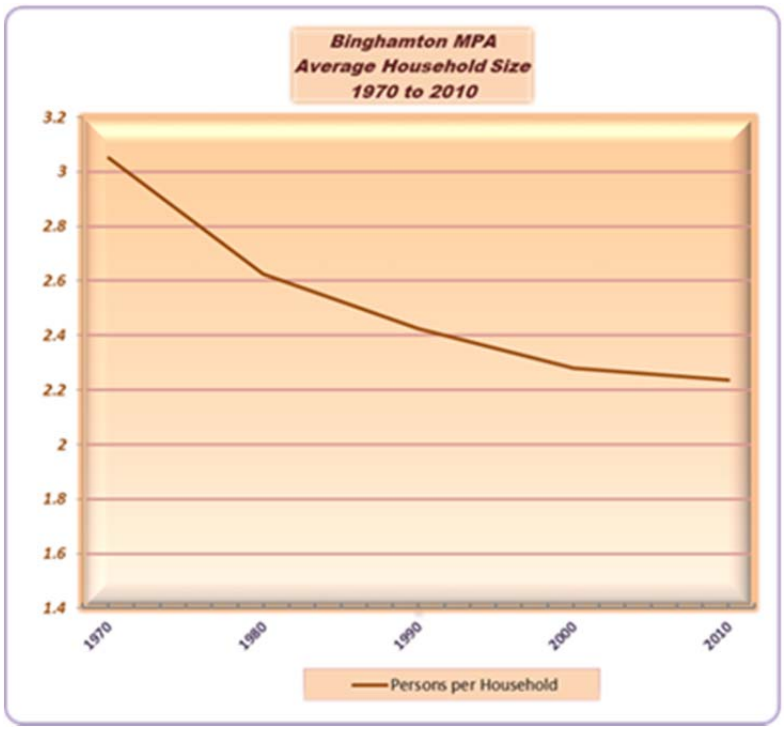


Figure 3 – BMTS Planning Area Average Household Size

(though at a decreasing rate) from a figure of 3.05 persons per household in 1970 to the 2.28 figure for 2000. (See Figure 3)

One trend that has not particularly slowed is the continued aging of the population in Broome and Tioga Counties. According to the 2010 U.S. Census, the percentage of the population over age 65 stood at 16.2%, up from 15.7% in the 2000 Census. Moreover, the median age in Broome County stood at 40.2 and Tioga County at 42.5, up from the 2000 US Census figures of 38.2 and 38.0 respectively.

An aging population is not a condition unique to the Binghamton area. The population of the United States as a whole is increasing in age (13.0% over 65 in 2010 vs. 12.4%; in 2000; 37.2 median age in 2010 vs. 35.2 in 2000). Thus, the Binghamton area is not particularly an outlier in this regard.

The number of workers in the Binghamton area has also continued to decrease going from 113, 880 workers in 2000 to 111,143 workers in 2010, continuing a trend that began in 1990.

	BROOME COUNTY			TIOGA COUNTY			TOTAL		
	Workers	Per capita	Per household	Workers	Per capita	Per household	Workers	Per capita	Per household
1990	97,028	0.46	1.19	24246	0.46	1.29	121,274	0.46	1.21
2000	89,550	0.45	1.11	24330	0.47	1.23	113,880	0.45	1.13
2010	87,254	0.43	0.96	23,889	0.47	1.08	111,143	0.44	0.99

Table 1 – Number of Workers: Broome and Tioga County

The importance of these various demographic trends for the Binghamton area's transportation conditions is that all of these factors tend to suppress travel demand, reducing the frequency of trip making, and the average length of those trips. Combined, all of the demographic conditions discussed above lessen the growth of the demand for transportation on a regional level, or perhaps even reducing that demand. This conclusion is justified as follows:

- An area experiencing little or no population growth means less growth in demand for transportation.
- A population that is not expanding outwards ("sprawling") means shorter travel distances.

- An aging population makes fewer trips (persons aged 55 to 64 drive 11% less than average; persons over age 65 drive 43% less than average).
- A population with less workers makes less trips, since commuting to work, the single largest trip purpose, is eliminated.
- A population with more households tends to make more trips than the same population with fewer households. The long term trend of smaller household size seems to have leveled off, removing another factor that had previously led to increased travel demand.

One measure that reflects this flattening of travel demand in the Binghamton area is Vehicle Miles Traveled (VMT), the basic measure used to quantify the amount of automobile travel occurring on an area-wide scale.

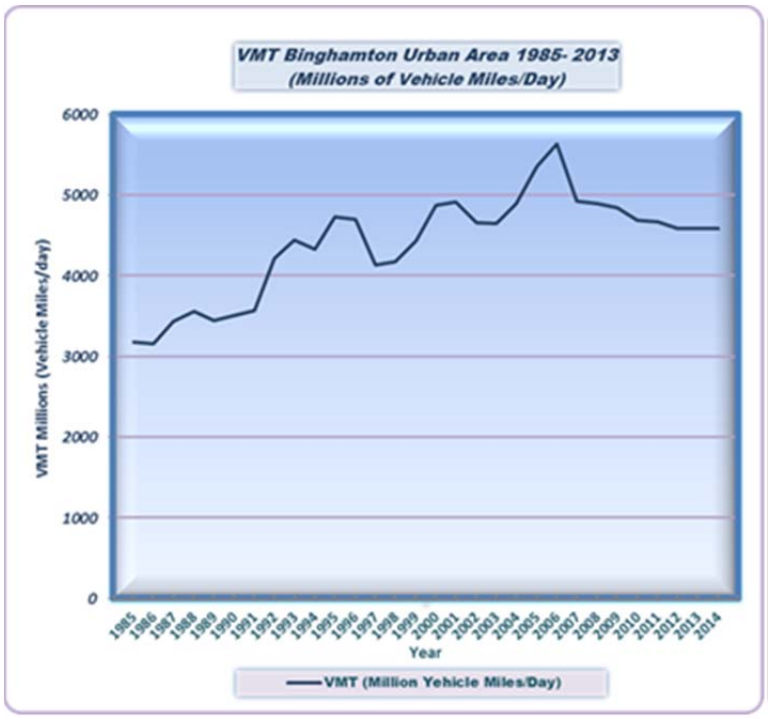


Figure 4 – Vehicle Miles Traveled (VMT)

As shown in Figure 4, automobile travel increased sharply from 1985, the earliest year we have this data for the Binghamton area. Judging from national statistics, it is safe to say that this increase in VMT began long before 1985. The rise in VMT remained fairly steady until 2006, when a period of decline began that lasted until 2010. In recent years, a relatively unchanging rate of VMT can be observed.

While there are several factors unrelated to demographics that have influenced the decline in automotive travel (volatile fuel prices, national and local economic conditions, and the probability that saturation level in car ownership and driving frequency) has been reached, it is likely that demographic conditions in the Binghamton area are a major contributing factor.

BMTS receives demographic forecasts from the New York State Department of Transportation that are created by IHS Global Insight. IHS Global Insight is an econometric firm that uses their proprietary birth/death/migration demographic model to develop population projections at the county level. Their projections are used in this report, and are also used in the development of the BMTS travel demand model, that is referenced in this report.

The population forecast projects a levelling off of population in Broome and Tioga Counties, with very small increases into the middle of the next decade, followed by very small decreases to the end of the forecast period in 2040. For all intents, this is a forecast of flat population growth over the next 25 years; in effect, a projected continuation of the observed trend in the Binghamton area for the last ten years. (See Figure 5)

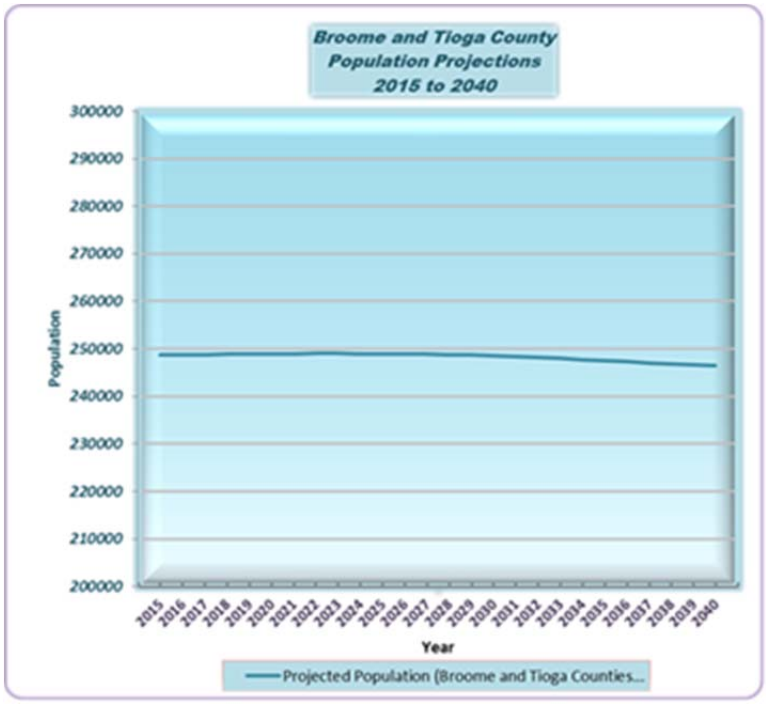


Figure 5 – Broome and Tioga County Population Projections

IHS Global Insight also provides NYSDOT and BMTS with a forecasted age breakdown of the population out to 2040. The projected increase in the number of senior citizens (defined for our purposes as those over age 65) presents unique transportation issues for the future, both nationally and in the Binghamton area. In the BMTS planning area, the population of that age group is increasing at the fastest rate, and it is the age group with the largest percentage of individuals who have special transportation needs.

As illustrated in Figure 6, the number of senior citizens in Broome and Tioga County is expected to increase substantially, currently making up approximately 20% of the population in 2015, and rising to over 29% of the population in 2040. By comparison, the U.S. Census Bureau projects that individuals over age 65 will make up approximately 21% of the U.S. population in 2040, up from a little over 15% in 2015. So while this increase is in line with a projected national trend, it is also expected to be a more pronounced increase in the Binghamton area.

The projected increase in the number of senior citizens across the United States is expected to have important implications for transportation policy at a national level. It follows then, that the relatively greater increase expected in the Binghamton area will have an even more profound impact here, influencing plans for the provision of public transportation services, highway design and signage, pedestrian facility design. Almost all aspects of the overall Binghamton area transportation system will be affected.

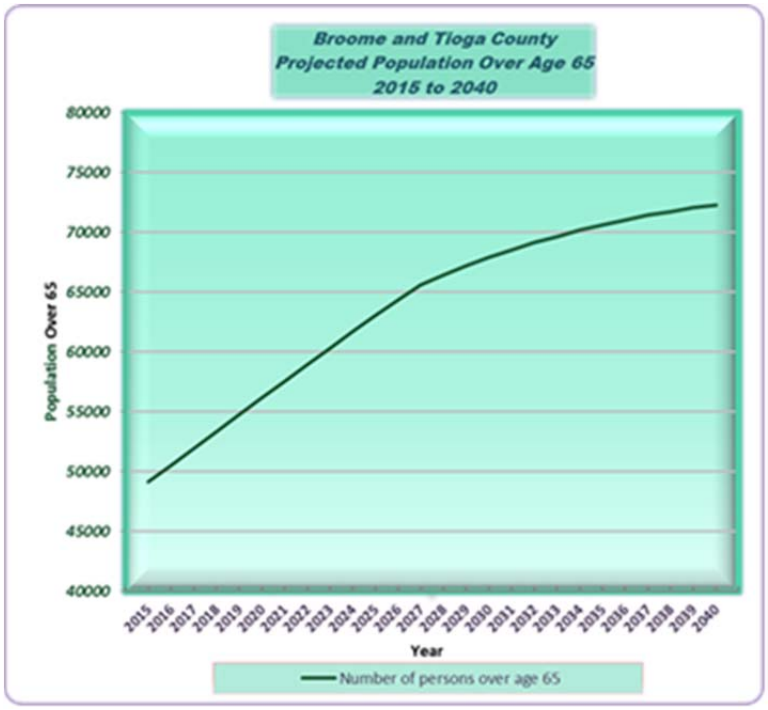


Figure 6 – Broome and Tioga County Population Projections: Over Age 65

Other forecasts from the IHS Global Insight include projections of the total number of households and the number of workers in the Binghamton area. Much like the population projections, there is expected to be little change in the number of households out to 2040, and a relatively small projected increase in the number of workers in the Binghamton area, going from 45.4% of the population of Broome and Tioga Counties in 2015, to 47.1% in 2040.

BMTS uses its own travel demand model, rather than the IHS Global Insight VMT projection model to produce VMT forecasts. The IHS Global Insight model is one based on historical growth rates with inputs that range from the demographic trends we have discussed in this section of the plan, to other forecasted factors, such as the projected price of motor fuels over the next 25 years or the amount of expected investment in communications equipment by individual and businesses (with the idea that an increase in investment in communications makes travel less necessary, and as such, correlates with a decrease in travel).

The BMTS travel demand model uses a variety of data to forecast future trip generation rates and project land use inputs, which are then used to estimate the levels of traffic and travel demand projected for the next 25 years. This included the data from IHS Global Insight, input from local area planning departments, and land use projections developed for BMTS' previous long range plan, TRANSPORTATION TOMORROW 2030: Placemaking for Prosperity.

The BMTS travel model projects an increase of approximately 22% by the year 2040. This is substantially less than the IHS/Global Insights projection of a 37% increase over the same time period.

Based on recent trends in VMT growth at the national and local levels it is certainly arguable that even a projected 22% increase in VMT over the 25 year horizon of the BMTS long-range plan may be too high. However, the recent tendency in reduction/flattening in VMT is still a relatively short-term trend, and it is difficult to discern whether it represents a profound change in travel behavior, or whether it is more of a short term reaction to the volatility of gasoline prices, changing economic conditions, etc.

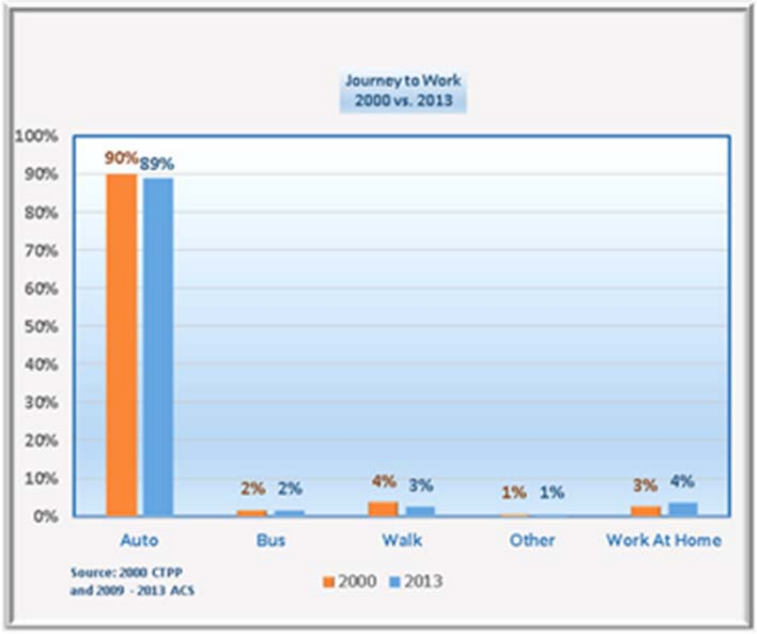


Figure 7 – Journey to Work: Mode Choice

The BMTS travel model figures represent a compromise between projecting VMT based on long-term growth rates and a relatively short term trend. As such, it is a relatively conservative estimate of growth in VMT for the Binghamton area, with a good amount of that growth projected to occur on the Interstate system, as a product of intercity travel and freight movements.

Whatever the reason for the recent drop in VMT, it does not appear that individuals switching to other modes of travel is a cause at either the local or national level. The US Census Journey-To-Work data is the best source of

information that we have to compare transportation choices over time. Comparing the 2013 American Community Survey's (ACS) results for the Binghamton area to those of the 2000 US Census, there is no evidence of a fundamental change in the mode of transportation that the population of the Binghamton area uses to commute to work. (See Figure 7)

It is notable that the data indicates that there is virtually no change in the transportation mode choice of commuters in the Binghamton area. It should also be noted that the work trip tends to be the trip most likely to use modes of transportation other than personal vehicles (transit, for example), so it is unlikely that other trip purposes would show a different trend in terms of transportation choices.

Another related issue pertains to travel behavior of younger individuals, with the perception that they have eschewed driving for other transportation choices, and that this represents a trend that will affect the overall level of driving in the future, pushing VMT downward.

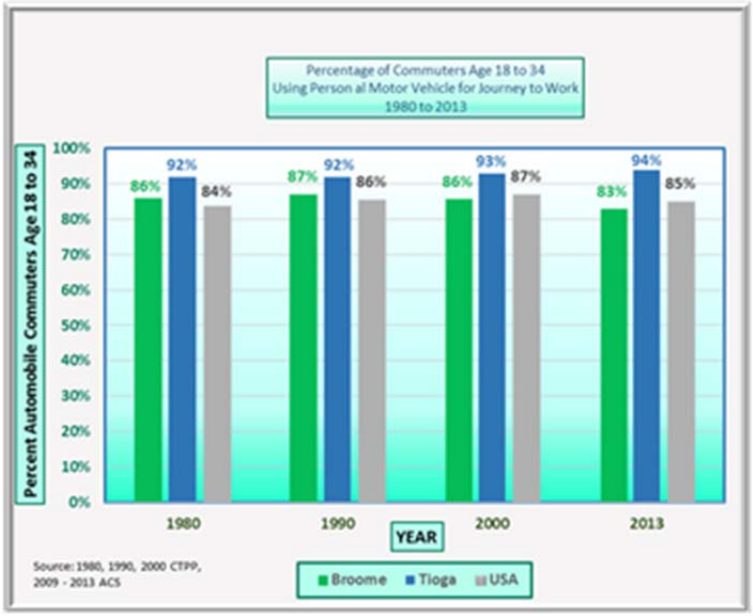


Figure 8 – Journey to Work: Personal Automobile

Again, comparing U.S. Census Journey-To-Work data, this time for the same age group over a 33 year period, at both the national and local levels, it appears there is a small decrease in the percent of people using a personal automobile, but little change in the work trip travel behavior of younger individuals in the 2013 ACS data when compared to that of their age group peers in earlier US Census data. (See Figure 8) It should be noted that a lower percentage of the 18-34 age group is in the workforce than in the past, and this fact may contribute to the perception that this age group drives less.

Another set of factors that affect transportation in the Binghamton area are the trends in urbanization in Broome and Tioga Counties. The US Census defines designated Urbanized Areas based on the population density within census tracts. Comparing the geographic extent of the census-defined Binghamton Urbanized Area (UA) from the 2010 US Census to that of the 2000 Census finds that the area of the 2010 Binghamton UA decreased in geographic area by a total of two square miles (of the fourteen New York State UAs the only other UA that decreased in geographic area from 2000 to 2010 was the Ithaca UA).

Together with the core vs. suburban population trend referenced earlier, it would seem that the trend of outmigration from the urban core has substantially slowed, at least temporarily, and that the urban/suburban mix of population has stabilized, reducing any sprawl tendencies in the Binghamton area.

Furthermore, it can be argued that over the past 65 years, the Greater Binghamton area has stayed relatively geographically compact, in contrast to other urban areas in New York State, and the United States as a whole.

When compared to urban areas in Upstate New York over the last 60 years, it can be seen that the population in Binghamton's UA has remained almost static since the end of World War II, with a very low rate of urban growth even when compared with other UAs in Upstate NY that have tended to be relatively slow growing themselves during this time period, when compared to urban areas in other parts of the United States.

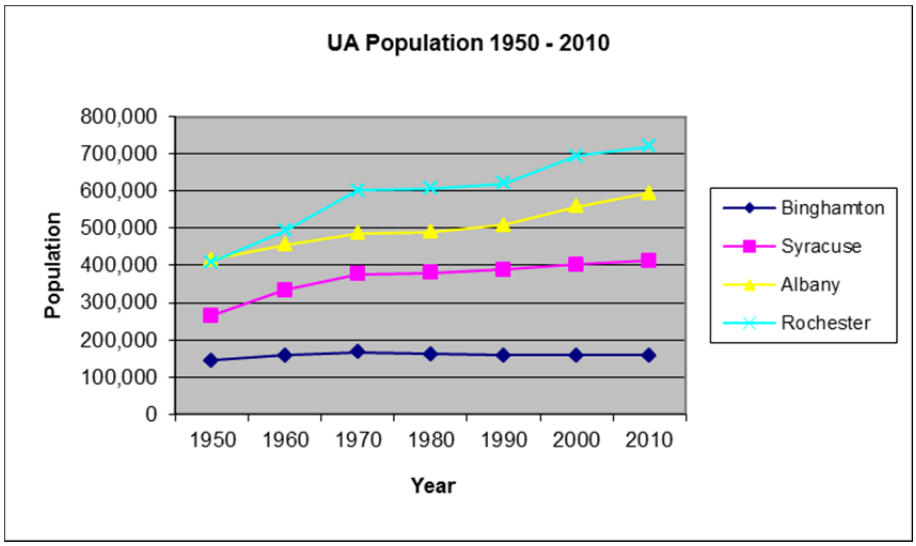


Figure 9 – Urban Area Population

During a long portion of the 60 year time period referenced in the above chart, there was a good deal of outmigration from the urban core to suburban areas, resulting in a certain amount of urban sprawl in the Greater Binghamton area. However, the area's relatively static population growth during the post-war era reduced "sprawl" tendencies somewhat, compared to other urbanized areas in the United States during that same time period. The recent ten-year trend of sharply reduced outmigration from the core cities and villages has resulted in a further slowing of urban sprawl.

From a transportation standpoint, this has its advantages as it minimizes the need for construction of new facilities, allowing more easily for a policy of concentrating funding on the maintenance of existing facilities, and also reduces the negative externalities of automobile travel.

VISION, GOALS AND OBJECTIVES

This plan update, *Looking Forward: 2040*, includes elements from TRANSPORTATION TOMORROW: 2030 and TRANSPORTATION TOMORROW: 2035, the two previously adopted plans. Since this area has not seen a large increase or decrease in population, nor has there been a substantial change in land use patterns, many of the components of the previous plans are still relevant as we look at this area's transportation needs in 2040. The same goals will be used for this plan.

LOOKING FORWARD: 2040 GOALS AND OBJECTIVES

Sustainability

Goal 1: Enhance the livability of the region with appropriate transportation investment

- 1.1 Invest in strategies to reduce per capita vehicle miles traveled (VMT)
  - a) Improve the availability and level of service of public transit
  - b) Construct sidewalks to ensure connectivity in the urban communities and contiguous residential areas
  - c) Complete the Two Rivers Greenway
  - d) Overcome barriers to bicycle use as identified in the Bicycle Plan (BMTS 2015)
  - e) Promote travel demand management strategies, including ridesharing, car sharing, telecommuting
- 1.2 Invest in strategies to reduce truck ton-miles of travel (TMT)
  - a) Improve rail freight service access for local shippers by supporting limited appropriate public investment in freight railroad improvements including restoration of quality service between Binghamton and Syracuse
  - b) Develop a truck-rail intermodal terminal in Greater Binghamton by supporting appropriate participation in public-private partnership
- 1.3 Invest in strategies to reduce vehicle emissions
  - a) Purchase all public transit buses with the best available technology to limit GHG emissions
  - b) Improve traffic signal timing to reduce unnecessary delay by converting signalized arterial streets to adaptive signal timing technology within 10 years and retime isolated signals no less than every 2 years
  - c) Actively investigate the opportunity to replace signalized intersections with roundabouts and construct those determined feasible
  - d) Promote compact, mixed-use development and infill/redevelopment of the urban core communities

Accessibility

Goal 2: Ensure that the regional transportation system provides convenient mode-neutral access to destinations including employment, education, and services

- 2.1 Improve the availability and level of service of public transit
  - a) Reduce fixed route bus headways
  - b) Increase ADA paratransit bus fleet to accommodate all requests for service
  - c) Periodically evaluate and adjust route structure to reflect changing demand
- 2.2 Improve pedestrian accessibility
  - a) Construct sidewalks where gaps are identified
  - b) Continue to bring existing sidewalks and curb ramps into ADA compliance
  - c) Install pedestrian signal technology at existing and new installations
- 2.3 Overcome barriers to bicycle use as identified in the Bicycle Plan (BMTS 2015)
- 2.4 Maintain access for motor vehicles and truck freight delivery

Mobility

Goal 3: Create a regional transportation system that provides travel choices so personal travel and goods movement can maximize efficiency

- 3.1 Invest in strategies to provide travel choices and alternatives to single-occupant vehicle personal travel
  - a) Improve the availability and level of service of public transit
  - b) Continue to support and promote regional rideshare service
  - c) Promote the creation of a car share service
  - d) Complete the Greater Binghamton Greenway
  - e) Overcome barriers to bicycle use as identified in the Bicycle Plan (BMTS 2015)
- 3.2 Invest in strategies that improve the efficiency of vehicle travel
  - a) Complete the deployment of the ITS Regional Architecture (Update expected in 2016)
  - b) Participate in statewide efforts that support ITS Advanced Commercial Vehicle Operations
  - c) Address congested areas with appropriate measures

Safety

Goal 4: Create a regional transportation system of Complete Streets that provides safe and secure travel for all users and all modes

- 4.1 Improve roadway safety by reducing the number and severity of crashes
  - a) Continuously analyze traffic crash data to identify high crash locations
  - b) Study and propose countermeasures for high crash locations
  - c) Proactively identify and deploy techniques to improve safety for special populations of drivers, including older drivers and new drivers
- 4.2 Improve safety and security for transit users
  - a) Install shelters at key locations
  - b) Provide support as necessary, including cameras, for on-board safety and security
- 4.3 Improve pedestrian safety
  - a) Construct sidewalks where gaps are identified in the Pedestrian Plan (BMTS 2013)
  - b) Continue to bring existing sidewalks and curb ramps into ADA compliance
  - c) Install pedestrian signal technology at existing and new installations
- 4.4 Improve safety for cyclists
  - a) Address safety needs as identified in the Bicycle Plan (BMTS 2015)

System Preservation

Goal 5: Maintain the regional transportation system in a state of good repair

- 5.1 Invest to maintain pavement sufficiency on both the State system and local arterial roadways
- 5.2 Invest to continuously reduce the number of structurally deficient bridges using the most cost-effective asset management tools
- 5.3 Manage the Broome County transit fleet based on Federal Transit Administration bus replacement guidelines
- 5.4 Adopt a regional Complete Streets policy for all infrastructure projects

ASSESSING THE REGIONS TRANSPORTATION NEEDS

As noted previously, Federal law requires BMTS to update the regional transportation plan at least every five years. This provides not only the opportunity to look forward with new forecasts and ideas, but also to look back at what has and has not been accomplished from previous Plans. TRANSPORTATION TOMORROW 2030: Placemaking for Prosperity was adopted in September 2005 and TRANSPORTATION TOMORROW 2035: Creating a Sustainable Future was adopted in 2010. Each included a full menu of projects and actions, with the explicit understanding that everything in a twenty-five year plan does not get implemented in the first five years. In both cases, however, there were high priority actions that were identified for early implementation. There is recognition that this did not reflect a shift away from Plan priorities as much as a response to being fiscally constrained by flat funding and construction cost inflation, limiting the amount of work that could be accomplished. The list below highlights past commitments that are still priorities.

1. **Main Street (NY 17C) Reconstruction.** The 2030 and 2035 Plans include as a high priority the need to address Main Street across the Triple Cities, recognizing its importance to revitalizing the urban core communities. The earlier plan identified specific projects in Johnson City and Endwell/Endicott that came from a corridor study conducted by NYSDOT. *Placemaking for Prosperity* had as a high priority the need to reconstruct Main Street using principles of placemaking and context sensitive solutions to support community revitalization and economic growth and stability. These actions also rank high on meeting sustainability objectives and complete street initiatives. This is intended to be a series of projects through the City of Binghamton and Villages of Johnson City and Endicott.
   Priority: High Cost estimate: $45.00 million

2. **Complete the Binghamton Metropolitan Greenway Plan.** BMTS completed its greenway plan in 1999, and a subsequent Implementation Plan in 2000 which identified short term priorities and longer term projects. While some progress has been made with projects completed in Binghamton and Vestal, much more remains to be done to complete the entire regional greenway system. Of particular importance is the Rt. 434 Greenway which would connect downtown Binghamton with Binghamton University's campus. Having a complete system will enhance the livability of the region, and contribute to sustainability by making bicycling and walking more attractive alternatives to motorized transportation. See Appendix B for a more complete breakdown of costs.

   Priority: Medium Cost estimate: $30.20 million

3. **Complete BMTS Pedestrian and Bicycle Plans.** The BMTS Pedestrian and Bicycle Plan was adopted in 1996. While work has progressed on implementing some elements of the plan, many actions that were identified as short term/high priority have not been accomplished, including for example the construction of sidewalks along all BC Transit bus routes and in the vicinity of all schools. The BMTS Policy Committee adopted the updated Pedestrian Plan in 2013 and the Bicycle Plan in 2015. The improvements listed in these documents will need to be completed.

   Priority: Medium Cost Estimate: To be determined as specific projects are identified

4. **Address Safety Needs of the Aging Population.** This strategic action was intended to address the special needs of senior citizens both as drivers and pedestrians. Actions may include larger, brighter signs; simplified intersections; and accessible pedestrian signals with adequate crossing time for those with slower walking speeds. Some improvements have been included in the context of programmed projects. However, there still exist many areas that need to be improved. This project will provide funding for these and other identified actions.
   Priority: Medium Cost estimate: $17.00 million

5. **Consolidate and Enhance Transit Service.** Broome County is currently undertaking a study to evaluate BC Transit routes for efficiency and service improvements. User surveys frequently cite the need for enhanced transit service in terms of frequency, geography and night and weekend service. The result of the current study may lead to changes in routes and schedules and is scheduled to be completed in 2015.
   Priority: Medium Cost Estimate: To be determined as specific projects are identified
6. **Deploy ITS to Improve Travel Information and Travel Time Reliability.** Intelligent Transportation System technology can do a great deal to improve mobility in an urban region. BMTS adopted the Binghamton ITS Regional Architecture in 2003, and the ITS Strategic Implementation Plan in 2004. Many of the priority actions in the plan were constructed in the I-86 designation: I-81/NY 17 Prospect Mountain project. With the NYSDOT Operations Center fully functional, the Architecture is being revisited to determine if there are other deployments that will be useful in accomplishing the objectives of improving traffic movement on the region's principle arterial highways and main signalized arterial surface streets. This project will fund projects identified in the ITS Regional Architecture.
   Priority: Low Cost estimate: $17.00 million

7. **Support Core Urban Area Economic Development Proposals.** This was proposed as a strategic action to support economic development proposals by providing necessary transportation improvements. Only as proposals are confirmed can specific projects be considered. Since the Plan was adopted, three Brownfield Opportunity Area studies have been conducted, but no development proposals have come forward
   Priority: High Cost estimate: To be determined as specific project proposals are brought forward.
8. **Maintain all Modal Facilities in State of Good Repair:** A high priority of all BMTS long range plans has been to provide adequate funding to maintain the regional transportation system in a state of good repair. This encompasses bridge conditions in terms of both structurally deficient and functionally obsolete bridges; pavement condition on both higher level and local arterial and collector streets; age of buses in the transit fleets; and other structural elements including culverts, traffic signals and signs, and guiderail investment. Rather than identify specific projects in the Plan, this is a strategic action that identifies both specific objectives and the proportion of available funding that will be dedicated to state of good repair activities.
   Priority: High Cost Estimate: To be determined as specific projects are identified
9. **Focus Pavement Improvement on Urban Arterial Streets.** *Placemaking for Prosperity* identified a subset of state of good repair that would support the primary goal of revitalizing and redeveloping the urban core communities, which is to focus pavement investment on key urban arterial streets. Economic development agencies agreed that presenting a picture of deteriorated infrastructure can negatively impact business location decisions. This action also operates in terms of an overall objective that leads to the identification of specific projects over time.
   Priority: High Cost estimate: See below

The level of investment in system preservation/state of good repair was set at 75% of the capital resources in the 2035 long range plan, financial plan. This goal will be carried over into the 2040 Long Range Plan. That yields an investment of $285 million in Federal aid and an additional $112 million in NYS Dedicated Fund expenditures of the life of the plan.

10. **New Susquehanna River Crossing, Town of Vestal to NY Route 17 and Town of Union.** The Vestal Corridor Study demonstrated that a proposed bridge connecting Vestal Road and/or Vestal Parkway to NY Route 17 would provide improvements to traffic on Vestal Road, and resolve some of the issues related to truck traffic in residential neighborhoods. The study included an initial engineering evaluation of the feasibility of constructing a new bridge on a number of proposed alignments. It found that connecting to Route 17 was feasible from both termini in Vestal (African Road and Sycamore Road). Connecting to Hooper Road in the Town of Union was only feasible with the African Road terminus.
    Priority: Low Cost estimate: $25-$40 Million (*2004 cost estimate)

11. **Improve Freight Mobility on Multi-modal Trade Corridors.** The Binghamton Regional Freight Study, completed in 2008, was identified in *Placemaking for Prosperity* as the mechanism to identify specific freight improvement projects for both highway and rail. Because the principal arterial system in the region has adequate capacity, the study identify few highway projects, including a long term need for capacity expansion on I-81 south of Binghamton, and some spot improvements to improve local access. Recommended rail improvements, which are not funded by BMTS, include rationalization of rail yards and movements in Binghamton, where Canadian Pacific and Norfolk Southern overlap; and improvement of the New York, Susquehanna & Western railroad between Binghamton and Syracuse, and its Utica branch. This project will provide funding for the identified highway improvements as they become necessary.
    Priority: Low Cost estimate: To be determined as projects are identified.

FINANCING THE VISION

Federal law has, since the passage of the Intermodal Surface Transportation Efficiency Act in 1991, required that MPO regional transportation plans be fiscally constrained.

> "(f) The metropolitan transportation plan shall, at a minimum, include...
> (10) A financial plan that demonstrates how the adopted transportation plan can be implemented.
> (i) For purposes of transportation system operations and maintenance, the financial plan shall contain system-level estimates of costs and revenue sources that are reasonably expected to be available to adequately operate and maintain Federal-aid highways (as defined by 23 U.S.C. 101(a)(5)) and public transportation (as defined by title 49 U.S.C. Chapter 53).
> (ii) For the purpose of developing the metropolitan transportation plan, the MPO, public transportation operator(s), and State shall cooperatively develop estimates of funds that will be available to support metropolitan transportation plan implementation, as required under §450.314(a). All necessary financial resources from public and private sources that are reasonably expected to be made available to carry out the transportation plan shall be identified.
> (iii) The financial plan shall include recommendations on any additional financing strategies to fund projects and programs included in the metropolitan transportation plan. In the case of new funding sources, strategies for ensuring their availability shall be identified.
> (iv) In developing the financial plan, the MPO shall take into account all projects and strategies proposed for funding under title 23 U.S.C., title 49 U.S.C. Chapter 53 or with other Federal funds; State assistance; local sources; and private participation. Starting December 11, 2007, revenue and cost estimates that support the metropolitan transportation plan must use an inflation rate(s) to reflect "year of expenditure dollars," based on reasonable financial principles and information, developed cooperatively by the MPO, State(s), and public transportation operator(s).
> (v) For the outer years of the metropolitan transportation plan (*i.e.* , beyond the first 10 years), the financial plan may reflect aggregate cost ranges/cost bands, as long as the future funding source(s) is reasonably expected to be available to support the projected cost ranges/cost bands...
> (vii) For illustrative purposes, the financial plan may (but is not required to) include additional projects that would be included in the adopted transportation plan if additional resources beyond those identified in the financial plan were to become available."

23 CFR 450.322 (f)(10)

The current Federal authorization, *Moving Ahead for Progress in the 21st Century (MAP-21),* continues to reinforce the fiscal constraint element of these plans. A key element of this requirement is that the MPO, public transit operator, and state must work cooperatively to develop an estimate of funds from all sources that are reasonably expected to be available to implement the projects and actions in the Plan. With the current funding uncertainties, MPOs are prioritizing projects and strategies with the expectation that funding levels will remain at current levels with minimal if any increases over the twenty year Plan horizon. BMTS worked with the New York State Department of Transportation and Broome County to develop the financial plan; Broome County is the designated recipient of the FTA funds for the region.

TRENDS IN FEDERAL FUNDS

Projecting future revenues is a difficult task because the revenues are derived primarily from federal, state and local taxes as well as from programs with revenues coming from user fees. This fact is made even more challenging with the current Federal authorization, MAP-21, which expired on September 30, 2014, and then extended several times, with the latest extension scheduled to end on October 29, 2015. With MAP-

21 the federal government made specific funding source changes which have affected revenue forecasts for BMTS. First, the majority of funding previously appropriated for a separate Highway Bridge Rehabilitation and Replacement (HBRR) Program is now redirected to a new program - the National Highway Performance Program (NHPP) – which focuses a larger share of the MAP-21 overall highway program resources on the interstate system as well as the National Highway System (NHS). NHPP eligibility is restricted to highway and bridge investments on the NHS. This change increased the demand on Surface Transportation Program (STP) funding which can be used to fund many different types of projects on federal-aid facilities. Additionally, 15% of the funds in the former HBRR Program were diverted to the STP Off-System bridge set-aside which must be spent on bridges off the federal-aid system.

As with the past Federal Transportation Authorizations, the transportation funding for MAP-21 is derived from the Highway Trust Fund which relies on federal gas tax for its money. The current 18.4-cents-per-gallon gas tax has been held stagnant since 1993, and not surprisingly, the revenue derived from this tax has not kept up with current transportation spending. This funding shortfall has been documented by many professional organizations, including a 2014 report by the American Association of State Highway and Transportation Officials and the American Public Transportation Association which estimated a nationwide shortfall of $63 billion annually.

There is broad agreement that travel demand, including amount of travel and mode choice, is sensitive to the personal or household cost of transportation. Two issues that fall into the wild card area are price of fuel and application of roadway pricing.

The U.S. Energy Information Agency provides both short and long term forecasts of the availability and cost of energy. In its *Annual Energy Outlook 2015* forecasts are provided through 2040. The base forecast is the "Reference Case" which is defined as reflecting no changes in law or regulation, i.e. no government policy intervention to shape the energy market.

> Energy consumption in the transportation sector declines in the Reference case from 27.0 quadrillion Btu in 2013 to 26.4 quadrillion Btu in 2040. Energy consumption falls most rapidly through 2030, primarily as a result of improvement in light-duty economy with the implementation of corporate fuel economy (CAFÉ) standards and Greenhouse gas emission (GHG) standards. This projection is a significant departure from the historical trend. Transportation consumption grew by an average of 1.3%/year from 1973 to 2007 –when it peaked at 28.7 quarillion Btu- as a result of increases in demand for personal travel and movement of goods that outstripped gains in fuel efficiency.
> *Annual Energy Outlook 2015, USEIA. Executive Summary*

In itself, growth in cost is unlikely to affect personal travel behavior. This suggests that changes in government policy would be required if there is the desire to address sustainability through a substantial reduction in GHG emissions from the transport sector. Since pricing is a direct way to impact behavior, government could price either fuel or travel. The former could be through a carbon tax or some surrogate, which would raise the cost of fossil fuel. This would initially encourage less car travel, and push conversion to alternative-fuel vehicles.

Pricing travel is a different concept. The simplest form is to charge tolls, a longstanding practice on some limited access highways. Created to pay debt service on the facility, flat tolls do little to influence travel behavior, unless there is a free alternative nearby. With electronic toll technology like E-Z Pass™, tolls can be varied by time of day or other factors. This can be used, for example, as a means of reducing peak period congestion; by pricing those times of day higher, people whose travel time is flexible can choose to stay out of the peak. A broad pricing strategy that has been proposed to Congress is a tax on vehicle-miles

of travel (VMT). The concept is to replace the current motor fuel tax that is the primary revenue source for the US Highway Trust Fund as well as most state transportation funds. Originally conceived of as a user fee, with the amount of fuel purchased a reasonable surrogate for the amount of road usage, this has become less so as alternative fuel vehicles enter the market, and may not pay any fuel tax at all. In order to restore the user fee connection, a VMT tax would be imposed not on the fuel but for every mile driven. By relying on computer technology, which can be coupled with GPS location funding, and time of day, a VMT tax can be a very powerful policy tool. The cost per mile can be changed by type of roadway, time of day, or a host of other factors. It can be raised to influence mode choice decisions, when transit or non-motorized modes are available. Rural residents, particularly those involved in agriculture, could be given a discounted charge because they would necessarily drive longer distances, but they serve an important societal purpose.

People are presently resistant to tax increases, and generally do not see user fees as different from any other tax. Use of electronic toll technology also elicits concerns from those who believe it may constitute an invasion of privacy, a means for government to monitor the movement of private citizens. How transportation will be adequately funded on the national level is clearly an important missing link as the long range plan is completed.

FUNDING RESOURCE ESTIMATES

While projections of funding availability into the future are not definite, certain assumptions can be made to identify reasonable resource estimates for long-term planning. With BMTS, the Financial Plan typically begins with a baseline of current Federal aid and State transportation funding. Other assumptions regarding the revenue forecast include the following:

- Revenue forecasts are generated for five-year blocks. This strategy was used in previous Plans.
- The baseline for calculating revenue forecasts for all FHWA and state fund sources is the NYSDOT Planning Targets as outlined in the currently approved 2014-2018 BMTS Transportation Improvement Program.
- The baseline for calculating revenue forecasts for FTA programs is the FY 2014 FTA apportionments published in the Federal Register.
- Funding for FHWA and FTA programs is held flat for the first ten years and then increased by 2% for each subsequent block. The 2% increase is a conservative approach, but reflects the uncertainty with the Federal funding.
- State Funds will remain flat for the first 10 years (based on FFY 2015 planning target from current TIP). For each subsequent 5 year block, there will be a 2% increase.

The table below depicts the resources that are reasonably expected to be made available over the life of the Long Range Plan. Certain assumptions are made based on past trends. Looking back at the revenue projections from the last two BMTS long range plans, highlights that little has changed in the resources available for transportation. TRANSPORTATION TOMORROW 2030: Placemaking for Prosperity forecasted that approximately $613,000 million would be available for funding. Transportation Tomorrow 2035: Creating a Sustainable Future used a forecast of $846.00 million. The forecast below for Looking Forward 2040 is back at the same levels that were predicted in 2005 for 25 years in the future.

2015-2039 BMTS REVENUE FORECASTS (millions)

PROGRAM	FFYs 2015-2019	FFYs 2020-2024	FFYs 2025-2029	FFYs 2030-2034	FFYs 2035-2039	TOTAL rounded
NHPP	$76	$76	$78	$79.6	$81.2	$391
STP OFF SYSTEM	$4.5	$4.5	$4.6	$4.7	$4.8	$23
STP FLEX	$37	$37	$38	$38.8	$39.6	$190
HSIP	$2.5	$2.5	$2.6	$2.7	$2.8	$13
TOTAL FEDERAL (FHWA)	$120	$120	$123.2	$125.8	$128	$617
STATE FUNDS	$29	$29	$30	$30.6	$31.2	$150
FTA 5307	$16.8	$16.8	$17	$17.3	$17.6	$86
FTA 5310	$1	$1	$1	$1	$1	$5
FTA 5339	$1.7	$1.7	$2	$2	$2	$9
TOTAL FEDERAL FTA	$19.5	$19.5	$20	$20.3	$20.6	$100

Table 2 – BMTS Revenue Forecasts 2015-2039

* Region 9 Planning Targets from 2015-18, with 2019 held flat from 2018

* Assumption that the share of FHWA funds spent in the MPO area is 20% plus capital projects identified through the Statewide Capital Planning process.

INFRASTRUCTURE

PAVEMENT

NYSDOT measures the pavement sufficiency of all State Highways each year, using a visual surface scoring methodology. BMTS staff does the same for the remainder of the Federal Aid system: minor arterials and collector streets under local jurisdiction. The result not only provides an annual assessment, but also time series data of overall pavement condition. In the hierarchy of roadway functional classification, there is no question that the principal arterial highways under NYSDOT jurisdiction are the most important to through traffic, including trucks. These roads, including Interstates 81 and 88, and NY Route 17/I-86, are also used substantially by local travelers. Minor arterial streets like Main Street and NY Route 434 provide a primary means of travel for local residents across the region. Collector streets are included in the pavement database because they are eligible for use of federal aid. They serve an important role of providing access between neighborhoods and arterial streets. While the lower traffic volume on collector streets typically make them a low priority for Federal investment, the perspective of a sustainable region places as much focus on these streets because of their immediate visibility to residents and businesses.

NYSDOT (ON-SYSTEM) PAVEMENT SUFFICIENCY SCORING – BINGHAMTON URBAN AREA

The percentage of Binghamton Urban Area NYSDOT road mileage rated poor has remained relatively constant since 2009 at around 10%. The percentage of miles rated fair increased greatly, from 25% in 2009 to 39% in 2013. However, pavement rated as fair can often be treated with cost-effective measures that result in significant improvement, while poor pavements typically need more costly reconstruction. Pavement considered to be in excellent condition increased from 10% to 18%.

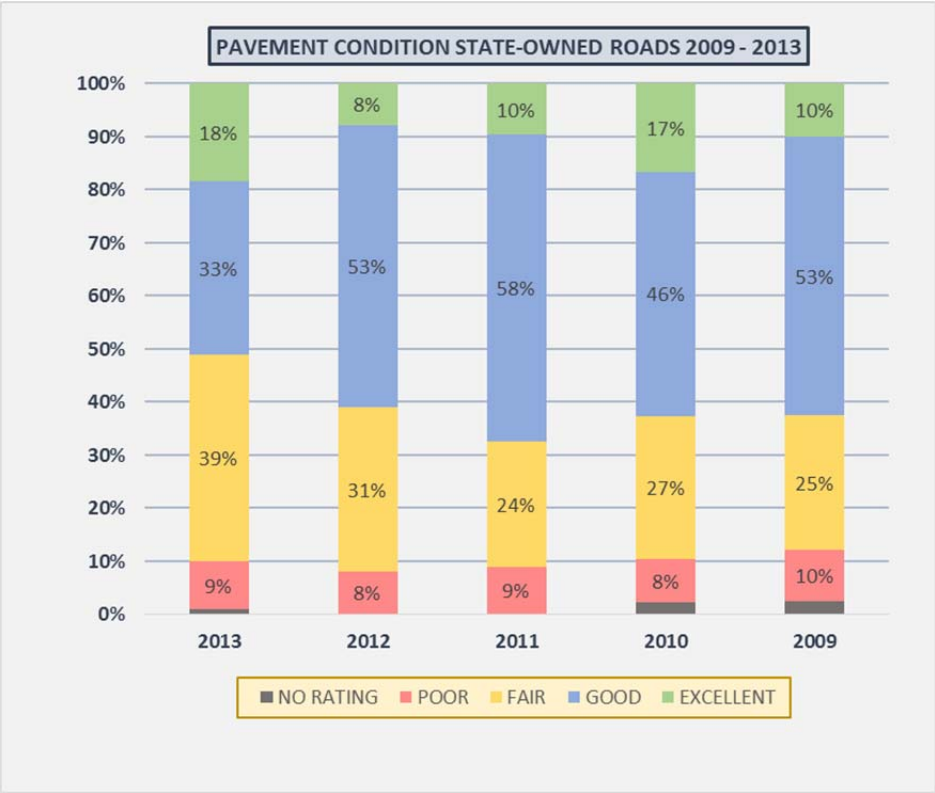


Figure 10 – NYSDOT Pavement Sufficiency Rating

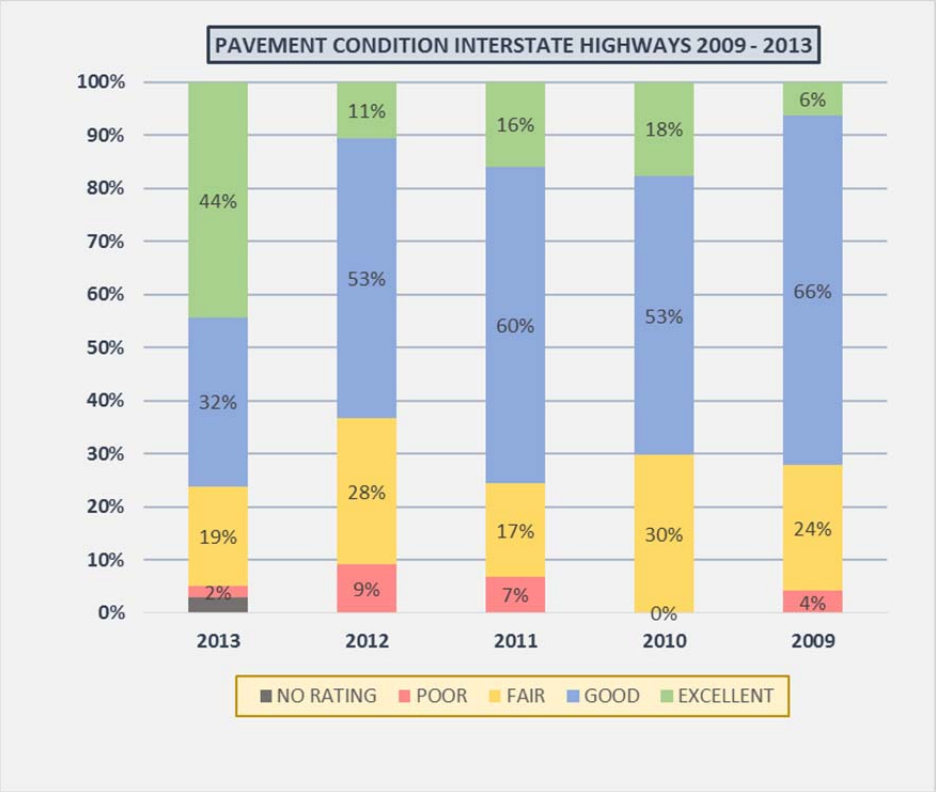


Figure 11 – NYSDOT Pavement Sufficiency Rating – Interstate Highways

NYSDOT Interstate and Route 17 road mileage in the Binghamton Urban Area is broken out because of the importance to interstate and interregional travel, including much freight movement. Conditions since 2009 have improved; in 2009 only 6% of interstate pavement was rated excellent, by 2013 44% was rated excellent, and the percentage rated fair or poor had dropped from 28% to 21%.

BMTS LOCAL (OFF-SYSTEM) PAVEMENT SUFFICIENCY SCORING

As noted previously, BMTS staff rates all locally owned pavements that are part of the Federal aid system by being functionally classified as either minor arterial or collector streets.

MINOR ARTERIALS:

The previous BMTS long range plan notes that in 1999, 25.4% of minor arterial street miles were rated poor and an additional 35.9% fair.

Since then the percentage of minor arterial miles rated **poor** steadily decreased to 2.3% in 2005. Following years showed a rise to 6.5% in 2007, a quick decrease to a low of 1.4% in 2009, then a rise again to a high of 5.1% in 2013, with the 2014 level at 4.5%. It is typical for the percentage of minor arterial miles rated poor to fluctuate as roadways are repaired, then experience wear and tear, leading to the next repair

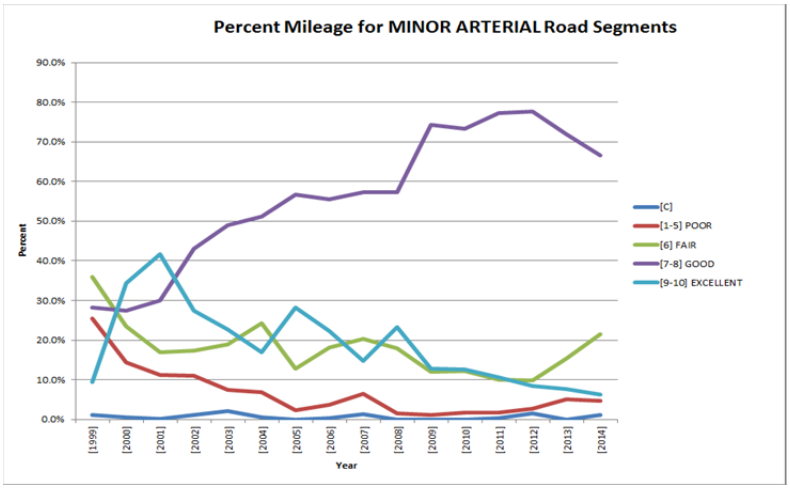


Figure 12 – Minor Arterial Pavement Sufficiency Ratings

cycle. It is positive to note that the percentage of miles rated poor have decreased significantly since 1999, and has been no higher than 6.5% despite the cyclical fluctuations.

Since 2005, minor arterial miles rated **fair** peaked in 2007, decreasing through 2012 to a low of 9.8%, and then rising the past two years to 21.4% in 2014. The fluctuations in percentages of minor arterial miles rated fair are similar to the wear & tear/repair cycles notes for the miles rated poor. Miles rated fair have also decreased significantly since 1999, and has been no higher than 21.4%.

Figure 12 and Table 3 provide details and trends regarding the percentage of minor arterial miles in each pavement condition scoring classification.

	[C]	[1-5] POOR	[6] FAIR	[7-8] GOOD	[9-10] EXCELLENT
1999	1.1%	25.4%	35.9%	28.1%	9.4%
2005	0.0%	2.3%	12.7%	56.7%	28.3%
2006	0.4%	3.7%	18.1%	55.6%	22.3%
2007	1.3%	6.5%	20.2%	57.2%	14.7%
2008	0.0%	1.4%	18.0%	57.3%	23.2%
2009	0.0%	1.1%	12.0%	74.2%	12.7%
2010	0.0%	1.7%	12.3%	73.4%	12.6%
2011	0.3%	1.7%	10.0%	77.3%	10.7%
2012	1.4%	2.7%	9.8%	77.7%	8.5%
2013	0.0%	5.1%	15.3%	71.9%	7.6%
2014	1.1%	4.6%	21.4%	66.6%	6.2%

Table 3 – Percent Mileage for Minor Arterial Segments
[C] = Under Construction

COLLECTORS:

Since 1999, the percent mileage of collector streets rated **poor** have also decreased, although less steadily, from 26.8% to 16.3% in 2005 to 7.9% in 2012. The 2013-2014 years show an increasing percentage of mileage rated poor. The percentage of collector miles rated **fair** increased from 2005 to a more typical historical level of 25.6% before a steady decline to 19.1% in 2014. Perhaps most notable is that pavements rated **good** increased by nearly 12% percentage points since 2005, while those rated **excellent** decreased by 7.6% points.

The BMTS pavement survey data indicates positive results from investments made over the past several years toward preserving the roadway infrastructure, as well as from the criteria used to select projects to be included in the Transportation Improvement Program. The action statement for system preservation established from the previous BMTS long range plan completed during 2000 for the year 2025 was to improve arterial pavement sufficiency to no more than 10% poor in ten years and maintain that level. It also called to improve collector street pavement sufficiency to no more than 25% poor in ten years and maintain that level. Thus far, the action item has been fulfilled.

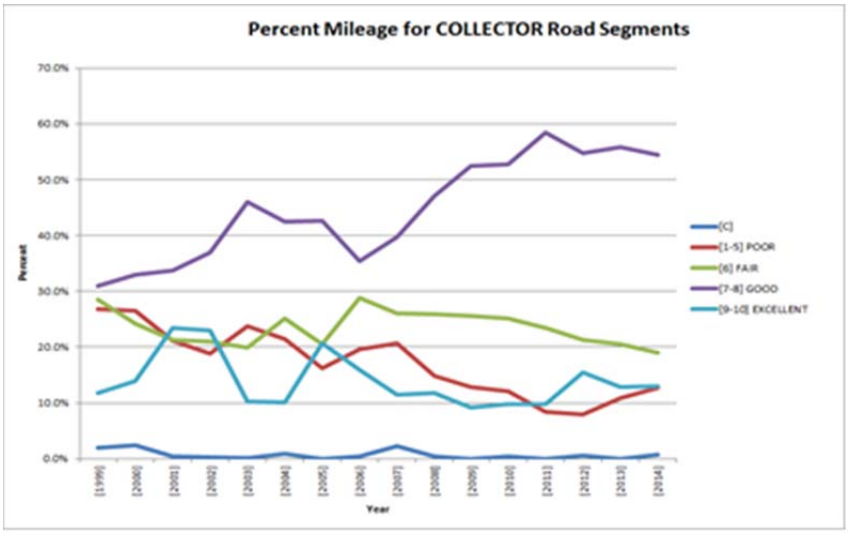


Figure 13 – Collector Pavement Sufficiency Ratings

		[C]	[1-5] POOR	[6] FAIR	[7-8] GOOD	[9-10] EXCELLENT
1999		2.0%	26.8%	28.6%	31.0%	11.7%
2005		0.0%	16.3%	20.5%	42.6%	20.6%
2006		0.4%	19.5%	28.8%	35.4%	15.9%
2007		2.2%	20.6%	26.1%	39.7%	11.4%
2008		0.4%	14.9%	25.9%	47.1%	11.7%
2009		0.0%	12.8%	25.6%	52.4%	9.1%
2010		0.3%	12.1%	25.1%	52.7%	9.8%
2011		0.0%	8.4%	23.4%	58.5%	9.7%
2012		0.6%	7.9%	21.3%	54.8%	15.4%
2013		0.0%	10.9%	20.5%	55.8%	12.8%
2014		0.8%	12.7%	19.1%	54.5%	13.0%

Table 4 – Percent Mileage for Collector Segments
[C] = Under Construction

PAVEMENT SUMMARY

BMTS has been investing substantially in roadway reconstruction and pavement projects over the past decade, primarily on the State highway system. A number of local minor arterials and collectors have been rehabilitated as well. However, due to funding constraints, some projects were reduced in scope, opting for simplified treatments over reconstruction, so other projects could be accomplished. One of the issues that local governments confront in developing their own capital street reconstruction programs is that rebuilding major streets carries a substantial cost, often several million dollars. Such projects are often beyond the financial capabilities of local government. New York State has no program to invest State funds in local projects other than the Consolidated Highway Improvement Program (CHIPS), which is oriented more toward maintenance than capital expenditure. As a result, local governments compete for scarce Federal STP money for these major local projects. On the other hand, it is often less costly to mill and resurface streets, which has become the treatment of choice. It is important in managing transportation assets that life cycle costs of alternative strategies be considered. For example, the lower construction cost of a pavement overlay or mill/resurface treatment must be balanced against the longer service life of full pavement reconstruction.

The combination of fiscal constraints and rapid expansion of the number of miles of pavements requiring resurfacing have resulted in paving cycles increasing to unacceptable levels in many areas of the State. While a 12 year cycle of pavement renewal is NYSDOT's "state of good repair" standard, the Department has been unable to achieve that. A preventive maintenance strategy, including crack sealing and other low cost strategies, will slow the deterioration process.

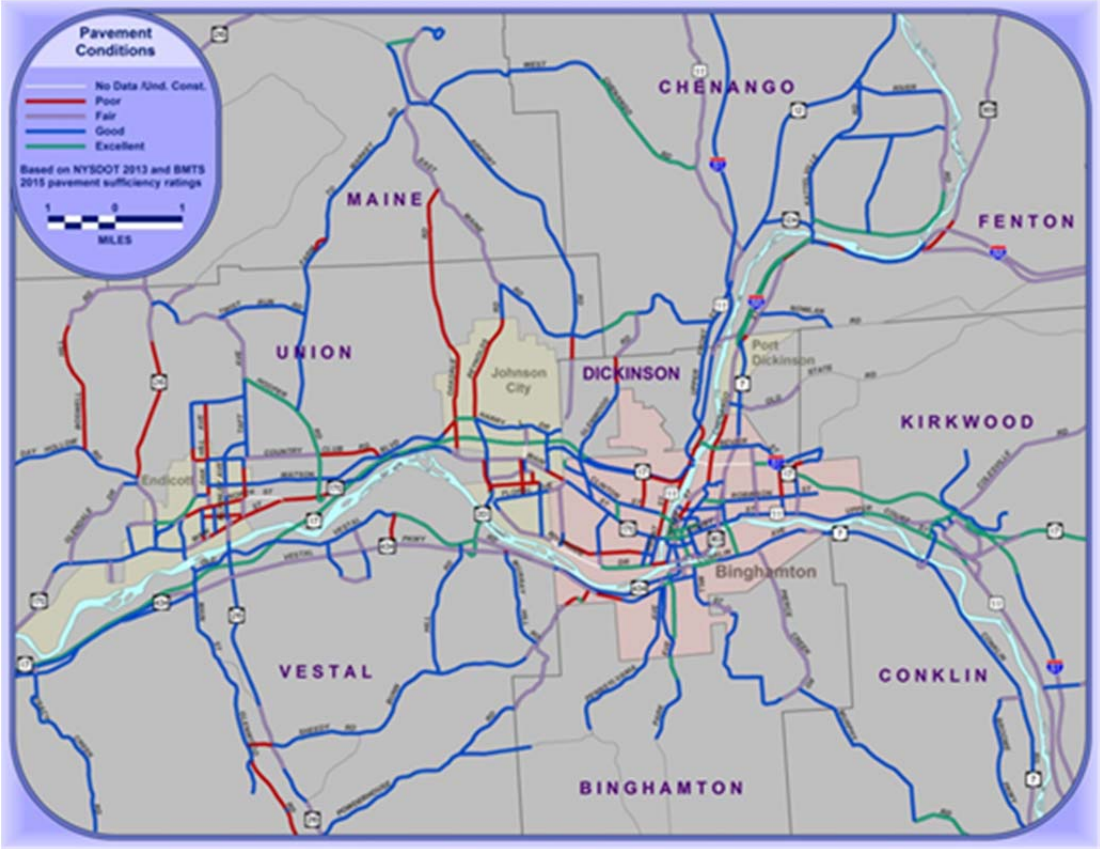
Regarding fiscal constraints, it is also important to note the need to enable safe access to public roads for all users of all ages and abilities. This is the purpose behind the New York State Complete Streets legislation, which took effect on February 11, 2012. NYSDOT is reexamining and enhancing its policies, programs and standards to ensure they comply with the law. In February 2014, NYSDOT published the New York State Complete Streets Report highlighting its Complete Streets initiatives. NYSDOT has developed a Complete Streets Checklist to be used at the Initial Project Proposal (IPP), and Scoping/Design stages of projects to help ensure design elements for each travel mode are included in the earliest stages of project plans. This enables the most efficient use of transportation funds by avoiding more expensive practices of accounting for the needs of each roadway user in the later stages of a project, or the need to retrofit a roadway after a project is completed. BMTS is currently developing a Complete Streets Policy and will encourage municipalities to adopt and implement their own as well. Maps 2 and 3 show the current condition of specific roads, based on pavement ratings from NYSDOT and BMTS, for Broome and Tioga County. (See Appendix C for maps showing AADT and Functional Class designations for roads within the BMTS Planning Area)

New York's Statewide Transportation Master Plan for 2030 identifies asset management as a key strategy in meeting its goals for mobility and reliability

"Strategy: Managing to Achieve a State of Good Repair

During the life of this Plan, New York State will continue to give the highest priority for funding to asset preservation in support of system-wide improved mobility and reliability. Irrespective of ownership, the State's transportation operators will be encouraged to restore deficient parts of the transportation system to a good condition and to continually maintain their assets to a state of good repair."

Strategies for a New Age: New York State's Transportation Master Plan, p. 36



Map 2 – Pavement Conditions – Broome County

Map 3 – Pavement Conditions – Tioga County

BRIDGES

Deficient bridges can have a much greater impact on travel than poor pavements. Closed bridges inconvenience all users, while those with weight limit postings mean that truck, bus, and emergency vehicle traffic must be diverted. Bridges with substandard vertical clearance also create an obstacle to truck movement. NYSDOT has the legal responsibility to inspect all bridges, regardless of ownership. Bridge sufficiency rating is complicated, taking many factors other than physical condition into account, including geometry and traffic volume. Deficient bridges are classified into two categories: structurally deficient and functionally obsolete. The latter do not have deterioration issues, but in some way do not meet current design standards, for example by having lanes that are too narrow.

BMTS has traditionally left the recommended selection of bridge projects to the NYSDOT Region 9 Structures unit, as well as using information provided by local members. Federal bridge funds can be used on both State and local bridges. Many of the major river crossings and overpasses in the Binghamton area have been rehabilitated in the past decade. For example, since the completion of the last Plan update, the Hooper Road Overpass over NY 17C has been rehabilitated, and the NY 201 Overpass over NY 434 and Vestal Road has been replaced. The Exchange Street Bridge in Binghamton is under construction.

BMTS also supports the use of Federal capital funds for demonstrated preventive maintenance techniques that extend the life of bridges. This includes bridge painting and bridge washing. NYSDOT invests substantially in these techniques. While local governments have not generally funded preventive maintenance, the Town of Vestal recently used federal funds to paint the Main Street Bridge over Big Choconut Creek. The BMTS 2014-2018 TIP includes a block of funds for local bridge maintenance.

NYSDOT also invests in repairing bridges that have a sufficiency rating greater than 5, which means they are not deficient. These are projects that are determined to be cost effective based on extending the life of the bridge before it becomes deficient and requires more expensive rehabilitation or replacement.

A real challenge in terms of maintaining bridges in a state of good repair is a life cycle issue, and is both a regional and national problem. Much of the Interstate Highway system was constructed forty to fifty years ago. Since bridges are typically designed to have a fifty year life, it means that a large number of bridges that service high volumes of car and truck traffic are reaching the end of their useful life. In the BMTS region, this is true of most of the bridges along Interstate 81, although several have been recently rehabilitated, including those on NY 17 in Tioga County (as part of the I-81/NY 17 Conversion Project), and on I-81 in the Town of Kirkwood (as part of the I-81 Bridge Joint Rehabilitation Project). The I-81/NY 17 (future I-86) Bridges over the Chenango River, are in the process of being replaced as part of the I-86/Prospect Mountain Project Phase I, nearing completion as of this writing.

Figure 14 shows that in terms of overall bridge deficiency, there is not a lot of variation based on ownership. Overall, about 75% of bridges are non-deficient, regardless of ownership. Of the deficient bridges, approximately 70% are functionally obsolete, rather than structurally deficient.

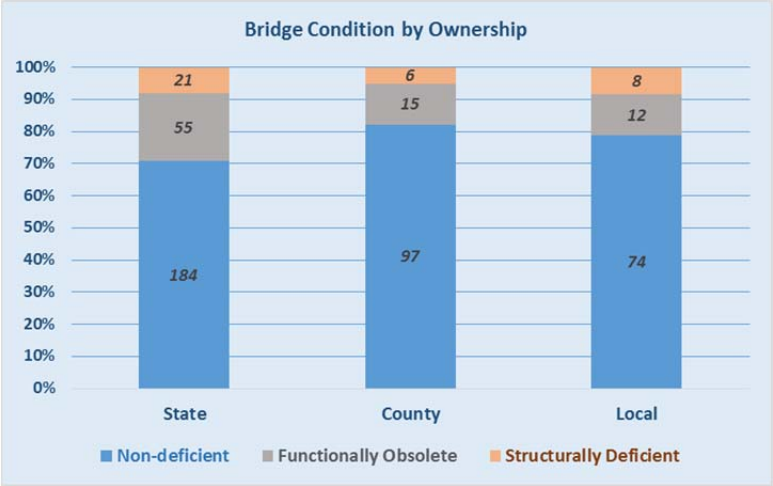


Figure 14 – Bridge Condition by Ownership

BRIDGES SUMMARY

As with pavements, NYSDOT has adopted a strategy of looking at needs, life cycles, and strategic treatments to maximize the investment of resources on bridges. Rather than addressing the very worst bridges first, there is an evaluation of the entire list of bridge needs. Sometimes it is very cost effective to repair a bridge that shows some deterioration but is not yet deficient. Known as its "5-7 bridge repair" program, the purpose is to extend the life of a bridge with required repairs rather than let it continue to deteriorate and require a more costly total rehabilitation or even replacement. This may result in the need to load-post or even close some very deficient bridges. Part of the evaluation is looking at the impact to the travelling public in terms of both traffic volume and detour length.

In sum, in recognition of the importance of infrastructure preservation in the regional transportation system, this Plan includes the following commitments:

1. Preserving the transportation infrastructure is the highest priority of BMTS in this Plan. There is a commitment over the life of the Plan to spend 75% of available resources on a range of system preservation projects including replacement, rehabilitation, and preventive maintenance.

2. Protect core urban area arterial streets. In order to support the development of a sustainable region, attention will necessarily be directed to the infrastructure in the urban core communities. Rehabilitation or reconstruction of key urban arterial streets will be given a higher priority, for example, than that of a highway in an outlying location. Pavement life cycle forecasts in areas where economic development actions result in more heavy truck volume may become a special focus.

3. Maintaining the Broome and Tioga County transit fleets in a state of good repair and meeting life cycle replacement targets. This is equally important to meeting the system preservation goal.

4. To fund preventive maintenance of pavements, bridges, and buses when such techniques are demonstrated to reduce life-cycle costs.

5. Maintain arterial pavement sufficiency at no more than 10% poor.

6. Maintain collector street pavement sufficiency at no more than 25% poor as funding permits, once arterial goals are met.

7. Reduce the number of deficient bridges by 10%, and then maintain that level.

TRANSPORTATION SAFETY AND SECURITY

As we look to the future of the Binghamton regional transportation system, there is one constant both for the present and for the next 25 years. "How can we guarantee the safety and security of the traveling public?" The goal of BMTS is to improve and enhance the safety and security of all users. The bicyclist, pedestrian, transit rider, motor vehicle operator, and truck driver all rely on the transportation professionals to maintain and improve the transportation systems. The BMTS Policy Committee has assigned a high priority to safe and secure travel.

One way to examine safety is to understand the costs of crashes. Transportation plans typically consider the cost to the highway user in terms of dollars spent on delays and congestion, but do not evaluate the cost of crashes to both the user and the public. In order to understand the relative magnitude of these issues, we analyzed data from a three year period from January 2012 through December 2014. The use of such a time period is standard practice, in that it corrects for random variations in crash occurrence.

During the analysis period, there were 14,564 crashes within the municipalities that make up the Binghamton Metropolitan Planning Area (MPA). Thirty one of these crashes involved fatalities, resulting in 38 deaths. Another 3,073 crashes involved personal injuries, resulting in 3,958 persons injured. The remainder were classified as property damage only (PDO). The New York State Department of Transportation has developed a range of average costs for the period 2011-2013 associated with the three categories of accidents. These costs are inclusive of immediate crash costs including medical care and property damage to vehicles, as well as long term costs including lost worker productivity and long term medical care, and legal costs.

The NYSDOT costs are:

- Fatality: $3.22 - $4.85 million per person killed
- Personal Injury: $77,200 - $105,200 per person injured
- PDO/NR: $3,800 – $5,200 per damaged vehicle

When applied to the crashes that occurred during the analysis period, the public cost of these crashes can be estimated to be between $402 - $601 million over the three year period, or an average of approximately $167 million per year. This is a significant cost, particularly compared to the cost of travel delay, which is not substantial in the Binghamton metropolitan area. Safety mitigation projects are often less expensive than capacity projects and can provide a large amount of benefits. The public cost of crashes is also significant when compared to the amount of state and federal funds that are spent annually on transportation improvements in the BMTS Planning area, which is on the order of $25 million, or one-tenth the amount of crash costs.

Five major safety actions need to be addressed in the region both on a project by project basis and also by incorporating safety as a key component in the project development process: (1)Improve Roadway Safety, (2) Complete Streets, (3) Improve Pedestrian Safety, (4) Improve Bicycle Safety, and (5) Address the Needs of an Aging Population

IMPROVE ROADWAY SAFETY

A high priority is placed on reducing the number and severity of crashes that occur on highways throughout the urban area. NYSDOT addresses this on the State highway system through their established practices of identifying and evaluating High Accident Locations (HAL) and Priority Investigation Locations (PIL). The methodology relies on statistical analysis of crash record data for similar types of roadway facilities throughout the state. Data quality is based on the accuracy of police crash records and subsequent coding. The State Highway reference marker system yields a reasonably accurate basis for recording crash locations. While crash record data on locally owned roads and streets is not always as accurate as the information for State owned roads, it is becoming more so, thanks to access to the state's Accident Location Information System (ALIS). BMTS uses data from the ALIS application to identify high accident locations on non-State owned roads, as a "red-flag" type procedure to determine locations that merit further investigation.

As locations are identified, safety studies determine whether there are crash types that are susceptible to correction through specific countermeasures, which often but not always involve capital construction. The methodology also provides for the calculation of safety benefits and benefit/cost ratio.

BMTS is also committed to take a proactive approach to identify areas of concern before they become a high accident location. The New York State MPOs have developed a Road Safety Assessment process, modeled after federally supported road safety audits. The practice involves use of a multidisciplinary team to evaluate street segments. The team is made up of municipal engineers and public works officials, transit operators, police and public safety officials, and local elected officials, all working together to create safety plans for these streets. The diverse knowledge and experience provided by individuals outside the field of traffic engineering often brings a different perspective that can better elucidate problems and solutions.

There are numerous techniques and strategies that can improve the safety of urban arterial streets. These may include access management plans to reduce the number of driveways, since each creates conflict points; improving signal operations to reduce delay and driver frustration; improved sign and pavement marking plans to reduce driver confusion; or the replacement of signalized intersections with roundabouts, which have proven safety benefits. Also, as noted in the Plan Element that discusses regional transportation system management and operations and the use of Intelligent Transportation Systems techniques, the availability of new technology under the umbrella of "IntelliDrive" will allow for numerous safety improvements that cannot currently even be identified.

COMPLETE STREETS

It is important to recognize that all trips, except for a solely walking trip, are multimodal. For example, there is some walking involved when public transit is used, and even when one drives a car to a destination. There is also the capability in the Urban Area to ride a bike to a public transit stop, and use the bike rack on the bus for a portion of the trip. In light of this, designing transportation facilities to best meet the needs of all users (including all travel modes) of all ages and abilities is essential in developing a safe and secure transportation system. Such a street design is referred to as a Complete Street.

During July 2011, the City of Binghamton adopted a Complete Streets Policy, and New York State passed the Complete Street Act legislation that took effect on February 11, 2012. The goal of these initiatives is to provide a seamless and safe transportation system for all users, and to weigh the needs of each mode of transportation equally when developing transportation projects.

As a part of the 2015-2016 Unified Planning Work Program BMTS is developing a Complete Streets Policy. The Policy will comply with and incorporate elements of the New York State legislation in the project development process, and will work toward providing a consistent traveling experience for each user by providing engineering instructions consisting of uniform design guidelines for municipalities to adopt and use when they undertake a reconstruction, paving or pavement striping project. Additionally, the BMTS Complete Streets Policy will include educational, encouragement, enforcement, evaluation elements that are also necessary to more fully benefit from the engineering improvements made to the transportation system. The policy will also encourage municipalities to develop their own complete streets policies, and BMTS will assist in their implementation.

A transportation system that is safe for all modes of travel maximizes accessibility for the entire population, and enables the most efficient use of transportation funds by avoiding more expensive practices of accounting for the needs of each roadway user in the later stages of a project, or the need to retrofit a roadway after a project is completed.

Multi-use trail development for bicyclists and pedestrians is also a vital element of a complete streets system, which compliments the roadway system, further enhancing accessibility of destinations. Thus, completion of the Two Rivers Greenway regional trail system is an important action identified for the Long Range Plan. For example, funding is being pursued to construct the Route 434 Greenway Project, which will connect downtown Binghamton to the Binghamton University Campus in Vestal. The trail will provide access for students, residents, and visitors to residences, hotels, college facilities, parks, and retail establishments in Binghamton and Vestal, as well as to MacArthur Park/Elementary School and the Binghamton south side.

A complete streets policy is important to institutionalize a process for BMTS and its member municipalities to make it the standard practice to design for all modes in each transportation project.

IMPROVE PEDESTRIAN SAFETY

It is important to ensure that all of our communities and neighborhoods are safe and walkable. Walkability contributes to a positive image of the quality of life in a community. During June 2013, the BMTS Pedestrian Plan was adopted. It was a significant update of the 1996 Pedestrian and Bicycle Plan, documenting the many changes that occurred in Federal, State, and local policies and legislation; new developments in pedestrian facility design standards and technology; as well as the accomplishments made locally in implementing the 1996 Plan. However, most of the recommendations from the original Pedestrian and Bicycle Plan remained the same, and recommendations and action items from Transportation Tomorrow 2035 were incorporated. Refer to the BMTS Pedestrian Plan for a list of recommendations and action items.

To meet the needs of pedestrians in terms of both safety and convenience, a sidewalk network must be continuous. If people are expected to walk in the street, or alongside a road, even for a small part of their trip, they are less likely to make that trip on foot. This is especially true for individuals with mobility or

vision impairments, for whom a gap in the sidewalk network can become an absolute barrier to travel. The same is true of inaccessible or poorly designed intersections, which are equally part of the pedestrian travel network. While most attention is focused on signalized intersections, safety must be addressed at intersections without signals by making sure there is adequate sight distance for both pedestrians and drivers. All sidewalks and intersections must be brought into compliance with the design requirements of the Americans with Disabilities Act.

Source: www.pedbikeimages.org/DanBurden

BMTS is committed to using appropriate technology to improve pedestrian safety, particularly at signalized intersections. This includes the use of pedestrian countdown signals to inform people of how much time they have to complete a safe crossing; and accessible (audible) pedestrian signals to communicate with visually impaired pedestrians. For unsignalized intersections and mid-block crosswalks, there is new technology called the High Intensity Activated Crosswalk, or HAWK signal. This signal stays dark for traffic, resulting in unimpeded flow, until activated by a pedestrian. The signal then stops traffic, permitting the person to cross in a protected manner. Another new technology advancement is the Rectangular Rapid Flash Beacon, or RRFB. RRFBs are attached to pedestrian crossing warning signs and are activated by pressing a button. Solar powered RRFBs enable low cost and easy installation. Local installations of the RRFB are in Conklin at the NYS Rt. 7 crossing from Powers Road to Schnurbusch Park, and in Johnson City at the Riverside Drive crossing located between Columbus Place and Adams Avenue.

Greater Binghamton should become known as a safe and convenient place to walk, for children and senior citizens, and for those with either mobility or visual impairments. The design of urban core arterial streets will include a focus on walkability. In some locations, decisions may be made that favor pedestrians over vehicular traffic. Great progress has been made during the last twenty years including pedestrian and bicycle accommodations in all projects that are constructed with federal funds. BMTS will continue working with the local governments to ensure that these same accommodations are made on local projects when streets are reconstructed. Implementation of the Two Rivers Greenway trail system will compliment improvements to the roadway network. The BMTS Complete Streets Policy will work to institutionalize the practice of including pedestrian facilities in transportation projects.

IMPROVE BICYCLE SAFETY

Safe bicycling is also an important part of a sustainable transportation system, and contributes to the quality of life in a community. During March 2015, the BMTS Bicycle Plan was adopted. Like the 2013 Pedestrian Plan, it was a significant update of the 1996 Pedestrian and Bicycle Plan, documenting the many changes that occurred in Federal, State, and local policies and legislation; new developments in bicycle facility design standards and technology; as well as the accomplishments made locally in implementing the 1996 Plan. Likewise, most of the recommendations from the original Pedestrian and Bicycle Plan remained the same, and recommendations and action items from the Transportation Tomorrow 2035 were incorporated. Refer to the BMTS Bicycle Plan for a list of recommendations and action items.

Improving Bicycle safety requires incorporating bicycle facilities into the transportation system that are safe, convenient, and link to essential destinations including: residential, commercial, and business districts; educational institutions, major employment sites, recreation areas, and river corridors. The level of expertise varies among cyclists, necessitating multiple types of treatments to roadways as well as development of multi-use trails to provide cyclists a choice of facilities that they feel safe and secure using.

Greater Binghamton should become known as a safe and enjoyable place to bike for those of all cycling abilities. As with pedestrians, much progress has been made during the last twenty years with the inclusion of bicycle accommodations in all projects that are constructed with federal funds. BMTS will continue working with the local governments to ensure that these same accommodations are made on local projects. Implementation of the Two Rivers Greenway trail system will compliment improvements to the roadway network. The BMTS Complete Streets Policy will work to institutionalize the practice of including bicycle facilities in transportation projects.

ADDRESS THE NEEDS OF AN AGING POPULATION

As noted earlier in the baseline section of this plan, Greater Binghamton is aging, with 16.5% of the population being over age of 65, versus 12.6% nationally. In addition, the age cohort over 75 is identified as the most rapidly growing segment, currently at 8.8% of the total population. This trend will continue, and must be addressed in the Plan. Elderly people have special needs as drivers, as pedestrians, and as transit users. Providing a good quality of life in urban core neighborhoods means providing for these needs.

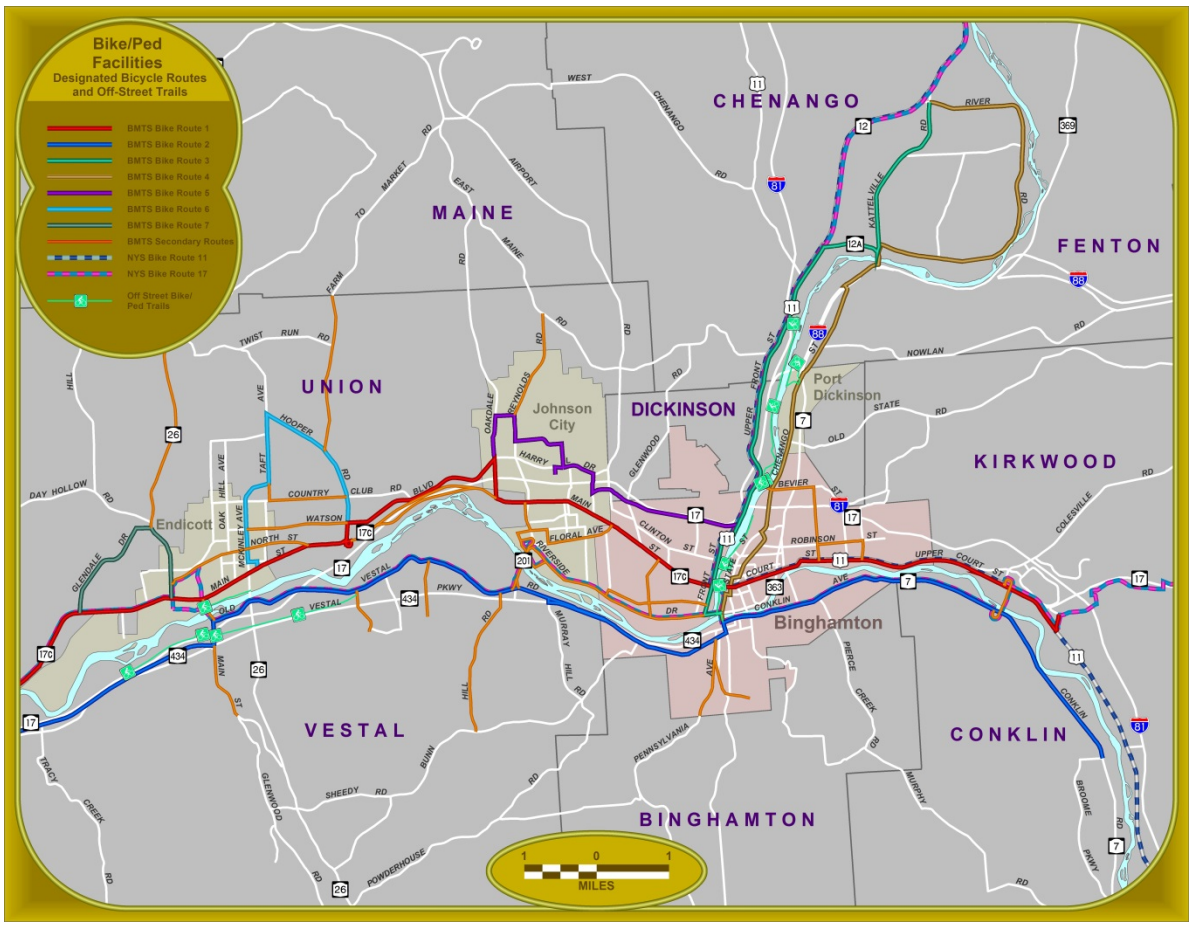
First, it is important to consider the impacts that aging has on drivers. The reality is that people continue to drive as they grow older. Nearly the entire population of those who will be senior citizens during the time period of the Plan are licensed drivers; most associate being able to drive with an acceptable quality of life. But as people age, reflexes slow, sight and hearing diminish, and physical movement is limited. All of these things can result in greater potential for crashes. Older drivers are least able to survive crashes. Older people tend to compensate by driving less, driving only during less busy midday hours, and avoiding nighttime driving. But they still have a disproportionate crash rate. National statistics from 2012, compiled by the National Highway Traffic Safety Administration are telling. People of age 65 and older accounted for 14% of the population, 16.6% of traffic fatalities, and 19.7% of pedestrian fatalities. When looking just at the senior population, drivers 80 years of age and over accounted for 27.1% of those who were involved in fatal crashes; 33.4% of the 935 pedestrian fatalities were people aged 80 years and older.

Significant research has been completed on the impacts of aging on drivers and possible mitigations that can be completed to offset these inevitable consequences. Older drivers need less confusing intersections and interchanges, and need to be able to easily see the signs they need to find their way. Increased visibility and retroreflectivity of signs, lighted and larger wayfinding signs, enlarged edge makings, increased use of rumble strips and maintenance of pavement markings can all improve safety. Something as simple as larger lettering on a street sign improves the safety and mobility of an elder driver. BMTS will make it a priority to consider the needs of this segment of the elderly population, not only when planning reconstruction and construction projects, but also by investing in regional programs of sign replacements.

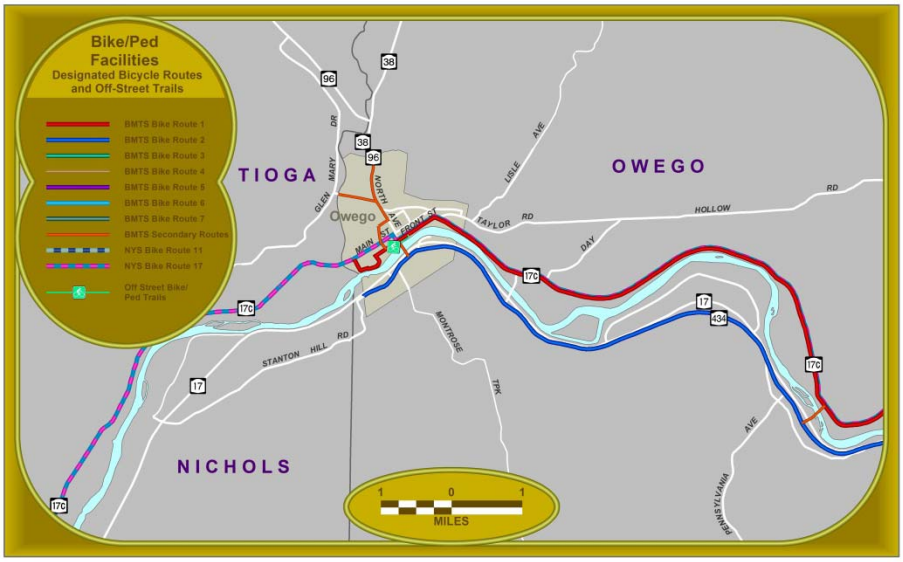
Older people also begin to rely on alternate means of transportation to replace or supplement their personal automobile. Transit and paratransit needs are addressed in the following section. As noted in the section on pedestrian safety, walking must be encouraged and facilitated for all age groups. Even when using public transportation, every trip begins as a pedestrian trip. Sidewalk construction is key, but it is also important that sidewalks be well maintained to prevent accidents. It also is important to have well marked crosswalks and accessible pedestrian signals at all heavily traveled intersections. Streets need to be well lit to make people feel safe when walking at night. Older people often see signalized intersections as a barrier to walking, because they feel the signal does not stay green long enough for them to safely cross. Signal timing plans throughout the urban core will be reviewed to ensure that walk times accommodate the slower walking pace of the elderly.

In sum, in recognition of the importance of safety in the regional transportation system, this Plan includes the following actions:

1. Improve roadway safety through routine use of traffic engineering methods to identify high crash locations and implement appropriate countermeasures.
2. Continue to use the Road Safety Assessment process to identify safety deficiencies on urban arterial and collector streets.
3. Create and adopt a BMTS Complete Streets Policy.
4. Improve pedestrian safety by committing to construction of continuous sidewalk systems in key locations, including urban core neighborhoods, and in the vicinity of school and bus routes. Favor walkability on urban core arterial streets.
5. Improve bicycle safety by incorporating bicycle facilities into the transportation system that are safe, convenient, and link to essential destinations.
6. Complete the Two Rivers Greenway multi-use trail system. Particularly important projects include:
   - **Route 434 Greenway Trail**, connecting downtown Binghamton to the Binghamton University Campus in Vestal
   - Replacing the **Pedestrian/Bicycle Bridge over I-81**, connecting Sunrise Terrace to Front Street/Bevier Street.
7. Invest in projects and programs that respond to the special needs of elderly drivers, including appropriate signing, wayfinding, and intersection design.
8. Invest in projects and programs that respond to the special needs of elderly pedestrians, including sidewalk construction, maintenance, and lighting; and accessible intersection design.



Map 4 – Bicycle and Pedestrian Facilities – Broome County



Map 5 – Bicycle and Pedestrian Facilities – Tioga County

PUBLIC TRANSIT

Public transit is a vital piece of Greater Binghamton's transportation system. It provides personal mobility to those who do not have access to a car due to affordability, physical limitations, or choice. Providing public transit options helps BMTS achieve our goals of sustainability, accessibility and mobility. This mode consumes less fuel and creates fewer emissions per person and also allows those who don't drive or can't drive the ability to get to work, medical appointments, and many other things. It is important not only to maintain public transit services, but to recognize existing and future demand for enhanced services and the financial commitment necessary to make that happen.

As noted in the demographic baseline and population forecast information, the population of Greater Binghamton is aging, with 16.2% of the population over 65 years old. In addition, the oldest population groups keep growing as people live longer. Between 1990 and 2000, the proportion of people older than 75 grew from 6.4% to 8.3% and in 2010 rose to 8.8%. The current trend is that nearly all senior citizens except the very old are licensed drivers, and the large majority continues to own a car and drive late into life. Nonetheless, the demand for public transportation among this demographic will grow over time. This will be affected by economics, if the relative cost of automobile ownership grows with respect to fixed incomes. In order to be responsive, public transit services must be responsive to the needs of this group.

The Broome County Office for the Aging also provides the following information in their Plan for Services, 2012-2016:

- The total population of Broome County grew by 0.13% from 2000 to 2010. However, the senior population increased by 7.1% in the same time period.
- From 2000 to 2010 the county experienced an increase of 2,930 seniors between the ages of 60 and 64 as baby boomers started becoming seniors. This is just the beginning of the wave; baby boomers will be joining the ranks of seniors for another fifteen years.
- While the population of seniors between ages 65 and 84 decreased by 4%, the county experienced a 23% growth in the age 85+ population.

Young people who are not yet licensed to drive, or if licensed are less likely to have a car available for their travel needs also rely substantially on public transportation. The Binghamton City School District relies on BC Transit for transporting high school students rather than using school buses. Students at Binghamton University, SUNY Broome, and Davis College, especially those that live off-campus, also create substantial demand for transit service.

According to many reports, Millennials are another group that is walking and taking public transportation more and choosing to drive less. Declining travel is due to changing attitudes and perspectives about driving as well as lifestyle changes such as increased schooling, decreased employment, and delay in marriage and childbearing.

A report released in October of 2014 by the U.S. PIRG Education Fund found the following trends:

- Census data show that the share of 16 to 24 year-olds traveling to work by car declined by 1.5 percentage points between 2006 and 2013, while the share of young people getting to work by public transportation, on foot or by bicycle, or else working from home, had increased.

- Young people aged 20 to 30 are less likely to move from central cities to suburbs than a decade ago.
- Driver's licensing among young people has continued to decline. The percentage of high school seniors with driver's licenses declined from 85 percent to 73 percent between 1996 and 2010, according to the AAA Foundation for Highway Safety, with federal data suggesting that the decline has continued since 2010.
- Young people are not the only Americans who are driving less. The number of miles driven by the average American has declined nearly continuously since 2004. Americans now drive no more in total than we did in 2005 and no more on average than we did at the beginning of President Bill Clinton's second term in office.

Regarding environmental justice, three core principles of environmental justice must be considered to ensure that it has been properly integrated into the transportation planning process.

1. To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects on low income and minority populations.
2. To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.
3. To prevent denial of, reduction in, or significant delay in the receipt of benefits by low income and minority populations. *– BMTS Environmental Justice Analysis, TIP 2014-2018 (2014)*

Additional, rather than minimal, investment in public transit will continue to meet BMTS' environmental justice goals. This needs to be considered in determining criteria for the future selection of transportation projects.

Public transit is an important factor for economic development as well. It connects people to jobs, supports business development, and can save households money.

There are other variables that affect the attractiveness and success of transit service in metropolitan areas. One is the fact that traffic congestion can discourage people from using their own car if there are more convenient transit alternatives. Greater Binghamton's relative lack of traffic congestion will work against the growth in discretionary ridership. The convenience of driving a personal vehicle is preferable to using transit. Most current transit riders do not have other transportation options and must use transit.

Higher gasoline prices may be an incentive for more residents to choose public transportation over a personal automobile. It may also lead to more use of the Park-and-Ride lots, and create a need for new lots to serve the suburban area. Park-and-Ride lots can also serve as a base for rideshare and carpool programs that can be initiated through the private sector by employers using incentives, such as a Transit Benefits Program that permits employees to set aside up to $130 per month of their pre-tax income to pay for transit and vanpool commuting costs.

Broome County, through its Department of Public Transportation, is the primary operator of public transit service in Greater Binghamton.

URBAN FIXED ROUTE

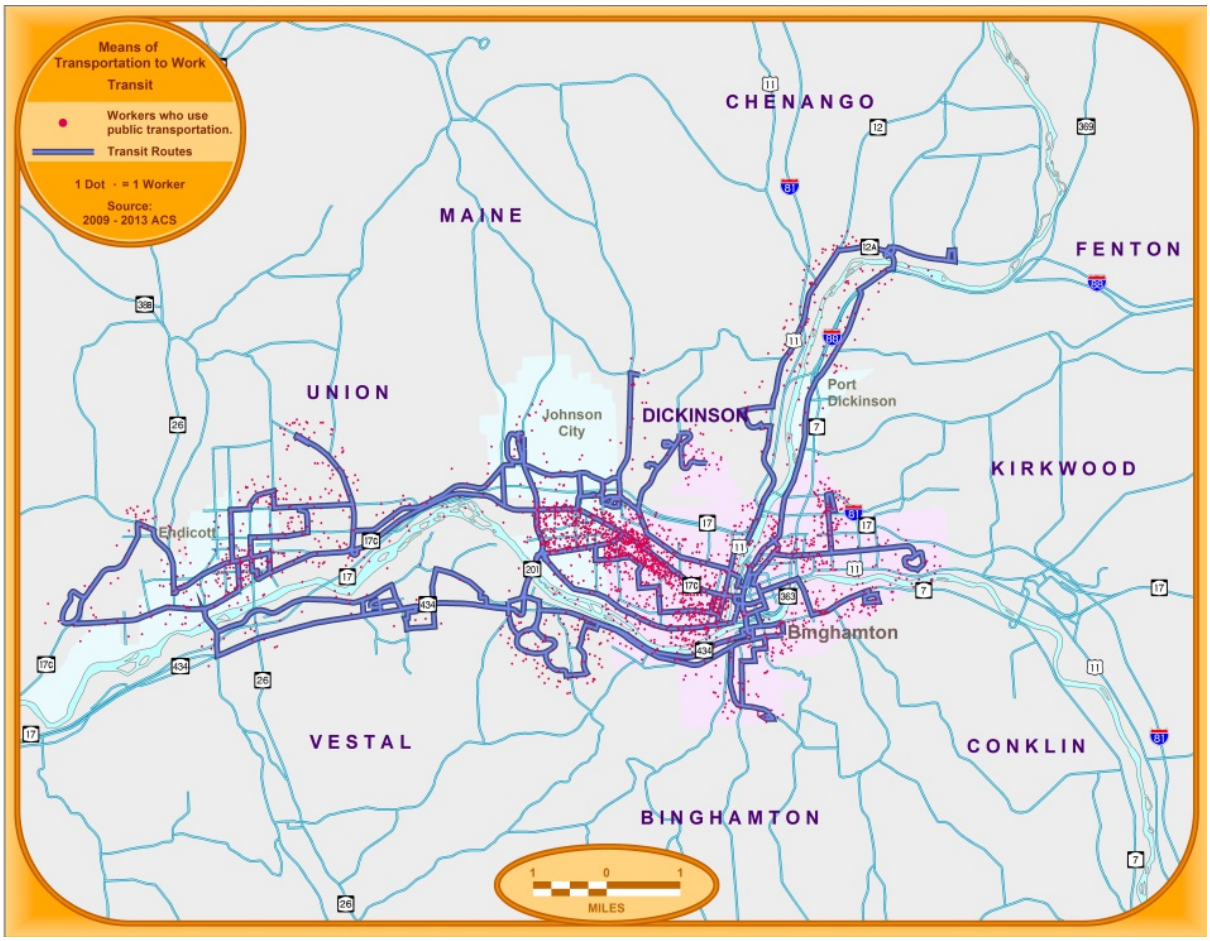
BC Transit is the urban fixed-route bus service operated by Broome County. It provides about 2.8 million trips per year. There are bus routes on most arterial streets in the Urban Area with route modifications to more suburban locations, including employment sites. The system uses a 'pulse' model, in which all routes converge at a central transfer point at the same time. This facilitates transfers from one route to another, but requires many riders two segments to complete their trip. The transfer point, known as BC Junction, is located at the Greater Binghamton Transportation Center in downtown Binghamton. This location also houses terminals for Coach USA, Greyhound, Trailways, and Megabus. There is an indoor waiting area for both local and intercity bus patrons, a security presence and various amenities at the transportation center.

Several transit service enhancement recommendations were made in BMTS' *Transportation Tomorrow: 2030 ~ Placemaking for Prosperity and Transportation Tomorrow 2035: Creating a Sustainable Future*. In MAP-21, changes were made to the way that funding for transit is programmed. A notable change is the elimination of funding for the Job Access-Reverse Commute (JARC) program. BC Transit was able to add late evening hours and also extend the hours of Saturday service and add Sunday service because if this funding source. With these funding changes they have had to cut back on their evening and weekend hours. Late night service is important because it increases employment opportunities in terms of access to 2nd and 3rd shift jobs, and late evening retail. Map 6 shows the location of persons who use transit as their means of transportation to work.

In 2014, because of the restructuring of funding at the state level, most of the non-emergency Medicaid trips that were assigned to Tioga County's public transportation system were eliminated. Because these trips were the primary source of revenue for the system, Ride Tioga ceased operations. There is now only one public transportation provider in BMTS' planning area; BC Transit which only serves Broome County.

In 2010 the *BC Transit – Off Campus College Transport Consolidation Study* was completed. Since that time, there has been a large increase in the communication and coordination between BC Transit and OCCT (Binghamton University's bus system). This is seen as an important step in providing improved, coordinated service and reducing costs.

BC Transit is in the process of installing full camera surveillance on all of its busses. Enhancing the safety and security of the busses will help to make the current riders feel safer and may also attract additional riders who's previous perception was that the buses weren't safe. BC Transit has hired a consultant and is in the process of conducting a route study for the fixed-route system. Once the study is completed, BC Transit will be provided with recommendations for the locations of the routes, as well as the timing of the routes.



Map 6 – Means of Transportation to work - Transit

BC Transit's bus fleet management is important to ensure efficient and quality transit service. Buses must be well maintained, dependable, and attractive. To accomplish this, it important to maintain a staggered bus replacement schedule. Bus replacements are also an opportunity to meet BMTS' sustainability, accessibility, and mobility goals by committing to lower emissions transit vehicles, as well as lower operating costs resulting from greater fuel efficiency, by investing in 3rd generation hybrid propulsion, clean diesel, and CNG vehicles.

URBAN PARATRANSIT SERVICE

BC Lift is a curb-to-curb paratransit service serving the Binghamton urban area residents that are unable to use the BC Transit fixed route service due to physical or mental impairments. It meets the requirements of the American with Disabilities Act, although it was initiated prior to the law being passed. The ADA requires equal access for individuals with disabilities to public facilities and services. This means that individuals who live in the BC Transit service area and, as a result of a disability, cannot use fixed-route bus service, must be provided paratransit service.

BC Lift ridership has increased from 73, 086 riders in 2010 to 77, 493 riders on 2014. This service is currently beyond capacity and BC Transit is having to use its BC Country (BC Transit's rural paratransit service) to handle overflow.

As noted in the introduction of this element, with Greater Binghamton's elderly population forecasted to grow significantly, the demand for urban paratransit service will continue to increase. This may create opportunities for increased matching of trip ends and greater scheduling efficiency. Service delivery models need to be periodically reexamined to determine if there is a more efficient and cost-effective means of meeting the transportation needs of elderly and disabled people. This work may range from the use of ITS technology for improved operations to entirely new services. Paratransit fleet management should also reevaluate the appropriate vehicle mix needed to best deliver the service.

RURAL PARATRANSIT SERVICE

BC Country is an on-demand paratransit service for Broome County residents living outside the urbanized area. It has been operating for more than thirty years. Ridership has risen from 23,956 riders in 2000 to a high of 30,288 riders in 2002, while the 2004 ridership was 28,245.

Much of the service area lies within the BMTS Metropolitan Planning Area. The primary deficiency of this operation stems from its original design. It was designed to take over the transport of seniors to the Office for Aging's rural senior centers, and also to provide transport into the urban core. The hours of operation and zone structure mean that it cannot be used by rural residents to travel to work or school, or meet many other regular needs. This creates a large barrier for the rural poor that must be corrected. Demand for BC Country service is also likely to increase due to the aging population outside the urban area.

BMTS' *Broome County Rural Paratransit Analysis (2002)* provides three alternatives to improve BC Country services. Recommendations from these alternatives range from minor changes to existing services, such as starting BC Country Service at 6:00 AM, to addressing unmet needs by adding buses and drivers and creating demand-response zones in areas of highest demand, to creating fixed route express bus service to more remote areas in the County and relying on demand response feeder service to provide connections.

This Plan also recognizes the fact that a separate rural paratransit service is in a sense an artifact, resulting from federal transit legislation that created separate funding programs within and beyond the urbanized area boundary. For part rural counties like Broome, the boundary makes little sense to residents, and creates barriers to meeting everyone's transportation needs efficiently. In the long term, it is appropriate to rethink this issue and understand how best to provide transportation services to all of Broome County's residents.

The Plan recommends the following actions with respect to Broome County's public transit services:

- Enhance BC Transit fixed route bus service. To help achieve the revitalization of the urban core, transit service must be provided that evolves to match the needs of residents. Safety and convenience are paramount; improvements must be made to service frequency and delivery. Geographic and temporal coverage may change over time.
- BC Lift is critical for those for individuals unable to use BC Transit, but who rely on public transportation to be able to live independently. Increase BC Lift's ridership capacity in order to meet growing demand. While increased use creates some improvements in efficiency by being able to match

more trips and put more riders on each bus, this has its limits. Add more buses and drivers over time to meet rider demand.

- A robust rural transportation service allows people to conveniently travel to the metropolitan area for jobs and services. BC Country service must be redeveloped over the life of the Plan to provide for safe and convenient travel by public transit throughout Broome County. Further evaluation is necessary to determine the value of retaining a separate rural paratransit service, or to providing service with a combination of paratransit feeder service to rural villages and express bus service from those locations to the metropolitan area.

SUMMATION: PUBLIC TRANSIT IN THE LONG TERM

Given that public transit funds are limited at federal, state, and local levels, it is important to be accountable by investigating and considering different options to look at how available public funds can have the greatest impact.

Cooperation and coordination of the existing transit systems is necessary. Since Tioga County no longer has a public transit system, any cost effective coordination to provide service to key locations within the County would be a great benefit to the residents of Tioga County. The private sector will also need to consider the role it has in providing needed transportation services to the public. Private sector employers should be informed of the transportation needs of their employees and the options available to meet them. Businesses can individually or cooperatively fund transportation services for their employees and the community, such as a free shuttle bus that circulates around the shopping streets and neighboring residential blocks, or vanpool or shuttle service to Park-and-Ride lots. They can also use incentive programs to encourage employees to use public transit and shuttle services. Additionally, municipalities can encourage economic development though reductions in land use requirements for parking spaces, for companies that encourage employee use of non-individual automobile commuting alternatives. Public-private partnerships to provide transportation services should also be encouraged.

REGIONAL TRANSPORTATION SYSTEMS MANAGEMENT & OPERATIONS – INTELLIGENT TRANSPORTATION SYSTEMS DEPLOYMENT

Active management of transportation systems is becoming more commonplace, as the public demands greater reliability and safety, and as technology has enabled strategies that were not previously possible. Operation of freeways and arterials recognizes that a substantial proportion of delay results from non-recurring causes; this is particularly true in Binghamton, where there is little congestion even in peak travel periods. These causes include incidents, work zones, weather conditions, and special events. Reliability is enhanced by detecting and clearing incidents quickly; by limiting the number, duration, and exposure of work zones; responding to treatable weather conditions; and planning for the traffic impact of special events. This is not only about individual motorists travel. Freight movement by trucks is similarly impacted as is the operation of the fixed-route transit service. Reliability of transit on-time performance and freight delivery schedules can depend on managing arterial travel.

Source: www.dot.ny.gov

An important facet of a robust transportation operations strategy is the provision of information to travelers that is accurate, reliable, useful, and real time. There is ample evidence that people will adjust their route, mode choice, or travel time to avoid congestion and delay.

Enabling active management and operation is intelligent transportation systems (ITS). ITS encompasses a set of technology-based tools that help actively manage our transportation system from minute to minute, in response to changing conditions. Instead of traffic signals operating on a pre-set timing plan, a central computer may control an arterial or an entire regional signal system that responds to demand. When a bus is running behind schedule on Main Street, a green signal can be held long enough for the bus to get through. When a crash occurs on Interstate 88, travelers can be quickly diverted to a pre-planned detour rather than become part of an inevitable traffic jam with the chance for additional crashes in the queue. A commuter may look at an Internet site like www.511ny.com before leaving for work and choose an alternate route or mode based on the current information. Trucks can be weighed without stopping and have their credentials checked electronically, increasing the productivity of both drivers and inspectors. Snowplows can be dispatched based on automated weather and pavement information to address changing weather conditions before problems occur.

ITS elements include:

- Detection technology, to provide real time information on how the system is operating. This may include sensors in the pavement that measure vehicle speed, sensors at traffic signals that measure vehicle presence, sensors in vehicles like buses or snowplows that report location, closed-circuit television cameras to provide visual detection/verification of highway incidents, or sensors that provide information on weather conditions. In recent projects, electronic toll tags (like EZ Pass) or GPS-equipped cellular telephones have been used as traffic probes to measures travel time and speed.

- Control technology, to allow for real time response to traffic conditions. This may include control of traffic signals, either individually or in systems, to respond to changing traffic volumes, preemption by emergency vehicles, priority for transit vehicles; control of variable message signs or emergency highway advisory radio to communicate to travelers; even control of automated deicing systems on critical bridges.

- Communications technology, to allow everything to work together. This may include communications from detection devices to traffic management centers, which then communicate to control systems; communications to emergency dispatch centers when incidents are detected; communications to highway maintenance centers in response to weather conditions; and direct communications to travelers via everything from internet sites, to radio traffic report services, to in-vehicle devices, 511 traveler information telephone service, to travel and weather advisories on individual cell phones.

In response to Federal regulation, BMTS developed and approved the ITS Architecture for the Binghamton Metropolitan Region in March 2004; and the companion ITS Strategic Plan and Implementation Strategy in April, 2005. The architecture follows a logical process to define transportation needs and the ITS functions that can address them, and how those ITS elements link together to build a working system. Following this process, avoids wasting money by deploying individual ITS projects without understanding how they fit into an overall system. The implementation plan takes the next step by laying out the appropriate sequence of projects, to avoid spending money prematurely, for example on ITS devices that have nothing to communicate to. The Strategic Plan also references the Federal requirement that ITS projects be based on a systems engineering process that is very different from the standard project development process. This process requires that project elements be evaluated to ensure that adopted standards are being used, and interoperability of devices and systems is guaranteed.

Based on the ITS Strategic Plan and Implementation Strategy, the highest priority is the instrumentation and control of the Interstate highways in the metropolitan area. This includes the development of a regional traffic management and operations center. NYSDOT Region 9 now has an operations center(TOC). The TOC controls variable message signs, highway advisory radio, and coordinates disaster response activities. As more ITS elements are deployed, the center will be required to become more robust in its traffic management functions. It is also important that the center not be limited to NYSDOT regional geography on a functional level. Coordination of travel management on future I-86 and on I-81 and I-88 cannot be constrained by county or state lines. The center will have to communicate and function into adjacent counties and NYSDOT Regions, as well as coordinate with PennDOT management functions on the I-81 corridor. All of this functionality is detailed in the ITS Regional Architecture, which must be followed.

The current multi-year project known as I-86 Designation – I-81/NY 17 Overlap Prospect Mountain, includes all of the ITS deployments that are the highest priority of the Strategic Implementation Plan. Similarly, 511NY is now in place, providing an Internet and telephone based travel information system on a statewide basis. Travelers can check on road conditions, work zones, weather, congestion, and other factors that may influence their travel decision. They can also acquire information about transit systems, and be linked to sites for ridesharing, car sharing, and bicycle maps.

The second priority is deployment of advanced traffic signal control on arterial streets. This will ease congestion, and signals can adjust in real time to vehicular demand. Further out in the Plan implementation will be considered ITS elements related to what has become known as "vehicle-infrastructure integration" or IntelliDrive. Research and development is underway on devices that allow for direct communication between vehicles (and drivers) and infrastructure elements, with the primary benefit being safety. This can include devices that sense a vehicle's position in the lane and use either warning or control technology to prevent running off the road; or others that communicate with a traffic signal to warn against or actively prevent the driver from running a red light. There is an ever expanding range of applications being developed by researchers.

BMTS will investigate and plan for emerging technologies including autonomous vehicles and Automated Transit Networks (ATN) that facilitate transportation and transportation choices."

Recommended actions in the 2005 Plan are:

- Traffic signal improvement. Using ITS Advanced Traffic Signal System technology to optimize traffic signal timing and operations. Over the life of the Plan, this is expected to evolve from time based coordination and closed-loop systems to fully traffic adaptive systems that can optimize signal operations in real-time.

- Additional ITS deployment. In the context of reviewing and updating the ITS Regional Architecture, new functions like IntelliDrive applications may be determined that have a positive benefit in the Binghamton region. Others may be deployed on a statewide basis, like commercial vehicle operations applications. BMTS should be prepared to implement appropriate management and operations strategies.

BMTS is currently in the process of updating the ITS Regional Architecture as part of the BMTS 2015-2016 Unified Planning Work Program.

FREIGHT TRANSPORTATION

The movement of freight requires different services and different performance measures than the movement of people, although it often relies on the same infrastructure. Freight movement is complex, and both problems and solutions often lie well beyond the scope of an individual metropolitan area and its transportation plans and programs. Freight movement involves many modes: highway, rail, air, water, and pipeline. While the popular view is that more freight should move by rail, the reality is that the vast majority moves by truck. This is the result of highway's 'many-to-many' geography versus rail's 'few-to-few" service model. According to data from the Federal Highway Administration, about 80% of freight tonnage in New York State moves by truck; when the water mode is removed to better reflect the situation in Upstate New York, truck share is 81%. Air cargo service is not a meaningful option in Binghamton.

New York is a state that freight moves through as well as a place of origins and destinations. Goods flow to and from our ports, especially the Port of New York and New Jersey; and through our international gateways on the Canadian border. Because of the importance of freight movement to the state's economy, New York State DOT had adopted 'trade corridor' model of evaluating freight flow. Greater Binghamton is in a key location, at the junction of three Interstate highways (I-81, NY 17/future I-86, and I-88). It also served by four freight railroads: two Class 1 national railroads (Norfolk Southern and Canadian Pacific/CP Rail), one regional (New York, Susquehanna & Western), and one short line (Owego & Harford). While much of the freight movement is through movement, local businesses have access to these networks. That can provide a positive incentive for the regional economy. Different business types require different freight services. A manufacturer requires raw materials to be shipped in and finished products to be shipped out (acknowledging that either the input or output may be subassemblies of a final product). This may involve international as well as domestic shipping. A warehouse/distribution business receives items in large quantity and processes them for movement to individual stores. Retail establishments depend on deliveries that may range from truckloads to individual parcels. Package delivery services, especially those that provide overnight delivery, have pervasive logistics networks.

Regardless of the business type, management of the supply chain has become a focus for increasing efficiency and profit. In an automated supply chain, a consumer good that is purchased at a cash register that is actually a data terminal may order its replacement all the way back up the supply chain, through the warehouse distribution network and the manufacturing network.

This kind of management requires reliability in travel time for freight movement. Storing inventory at any point is costly; keeping inventory in motion is less so. Manufacturers may often keep less than a one day supply of parts or material on hand. Predictable arrival becomes paramount. The absolute travel time through an urban area or across the country is less an issue. For certain businesses, especially those that ship bulk commodities, presence of both truck and rail modes helps establish competitive shipping rates.

TRUCK TRANSPORTATION

Given the focus on reliability of performance, freight planning includes the use of regional transportation system management and operations strategies. By addressing the unexpected delays that result from incidents, work zones, and weather; reliability of the principle arterial system is improved. Using the same traveler information system that provides real time status of the transportation network to travelers can help truck drivers make the best choices. The deployment of 511NY, a statewide traveler information telephone and web service, has improved the availability of useful information. A caveat for incident management plans with respect to the establishment of pre-planned or immediate incident response detours is to make sure there are no barriers to large tractor trailers. There are also special items in the ITS toolbox to aid

truck movement, under the umbrella of 'commercial vehicle operations'. These include techniques like weigh-in-motion and electronic credentialing that minimize or eliminate delays for trucks crossing state borders. It is anticipated that all of these strategies will be deployed at a statewide level, and will necessarily involve partnership with Pennsylvania DOT. They will not directly involve BMTS other than as a stakeholder to be consulted in implementation plans.

There are also specific regional issues in the movement of freight. The *Binghamton Regional Freight* Study, completed in 2008, provides a thorough analysis of these issues. The study found that there are few highway capacity issues affecting truck movement in or through the region. There are some spot improvements of value, particularly in relation to development off specific industrial/commercial sites. This is often referred to as 'the last mile', providing good access between the Interstate system and the origin/destination point. This can mean developing alternate routes to avoid having trucks travel through residential neighborhoods. It also means addressing the infrastructure to eliminate load-posted bridges or overpasses with sub-standard vertical clearance on truck routes. It is important to have the resources to address such projects as they are identified, particularly if they hold a key to economic development.

Another local issue is competition for curbside parking in downtowns and other commercial districts. As businesses prosper, they receive more deliveries. In downtown Binghamton, Johnson City, and Endicott, few businesses have off-street loading docks or delivery areas. The establishment of curbside loading zones can provide something of a guarantee for parking for delivery trucks, but reduces the amount of parking for cars. This may reduce the actual or perceived convenience for customers. Sustainable communities must address goods movement as part of Complete Streets design. This is an issue that will have to be addressed by local governments in partnership with BMTS and in some locations NYSDOT. The issue of on-street parking and loading zones will be of particular note in the scope and design of the recommended rebuilding of Main Street.

RAIL TRANSPORTATION

As noted in the *Binghamton Regional Freight Study,* despite Binghamton's access to three freight railroads, the region has only a handful of companies that utilized rail shipping. Nearly all of those did so because of bulk commodities: coal, agricultural feed products, plastic resins, crushed stone, and the like. It was also determined that the likelihood of either Norfolk Southern or CP Rail establishing a truck-rail intermodal terminal was small, because of inadequate current and forecasted demand. While these conditions are not likely to in the near future, it is important that the rail infrastructure be maintained and improved to support local rail shippers and attract new companies.

Source: www.thecrhs.org, Mike Stellpflug, 2010

At this time, there are two areas of critical need. One is the Portageville Bridge on the Norfolk Southern RR's Southern Tier line, connecting Binghamton to Buffalo. This viaduct over the Genesee River at Letchworth Gorge has six towers that were built in 1875 and a superstructure that dates to 1903. New York State currently has a project programmed for the bridge at a cost of $70 million. The purpose of the project is to address the existing deficiencies at the Portageville Bridge on the Southern Tier rail freight route across the Genesee River by providing a modern rail crossing of the Genesee River at its current location that is capable of carrying current industry standard freight rail loads, to the greatest degree possible meeting Federal Railroad Administration (FRA) Class 4 speeds, while reducing ongoing maintenance efforts and costs. The Project is needed in order for Norfolk Southern, the Project Sponsor, to continue safe, reliable, and efficient rail operations on the Southern Tier route. These operations are critical to the economic viability and growth of the Southern Tier and other affected areas of New York.

The second concern is the NYS&W's track infrastructure. Its Syracuse branch connects with the CSX railroad in Syracuse, and with trackage rights on the NS Southern Tier line to Port Jervis and its own track to terminals in the Port of NY & NJ – New Jersey. This allows service to local customers, and also through movement of freight. At this time, portions of the Syracuse branch track are in poor repair, requiring slow speeds. That in turn makes service less competitive, and takes away a connection for local businesses to CSX.

The NYS&W's Utica branch experienced a number of track washouts during the 2006 flood. As a result of a successful petition to the US Surface Transportation Board, the segment has been taken out of service between Chenango

The New York State Rail Plan, completed in 2009, identifies the importance of sound freight rail infrastructure to the state's economy. This is the Plan's vision:

> "The rail system of the future would be "green" and support sustainable economic growth throughout New York and strengthen its premier position in the rapidly changing global economy. The vision for the freight rail system is an energy efficient transporter of long distance cargo with intermodal connections that function seamlessly for local deliveries and reduce the cost of freight movement. Short line railroads provide efficient service to the state's industries and shippers by providing connections to national and international markets and by supporting an expanding state economy."
>
> *New York State Rail Plan*, p.vi

The *Rail Plan* commits to a freight rail system...

> "That serves business upstate as well as downstate via integrated rail network that is restored to good condition and maintained in a state of good repair."
>
> *New York State Rail Plan*, p.vii

Forks and Sherburne. Restoration of this service is seen as less important to Binghamton than the Syracuse branch.

Recommended freight related actions in the Plan:

1. Identify and prioritize for project development connections from the National Highway System principle arterial highways to significant local freight destinations that require infrastructure upgrades to facilitate truck movement; including those that support specific development proposals.
2. Collaborate with local governments to resolve issue of curbside delivery and truck parking in key areas including the core community downtowns and Main Street. Do so creatively in the context of Complete Streets design.
3. Cooperate with New York State and Pennsylvania in the implementation of ITS commercial vehicle operation initiatives.
4. Support public-private partnerships for the development of rail projects only when the public benefit can support the public investment. Initial focus is on the Norfolk Southern Portageville Bridge replacement project, and on the NYS&W Syracuse Branch.

NATURAL GAS EXTRACTION

The Marcellus Shale is a geologic formation that holds a large quantity of natural gas. Until recent years, gas could not be economically extracted from shale formations, so there was no development pressure. But the ability to combine horizontal drilling with hydraulic fracturing has changed that. As shown on the adjacent map, this formation underlies nearly all of Broome and Tioga Counties. Energy companies have become very active in leasing mineral rights from landowners in the Southern Tier. There remain a number of unresolved issues with respect to natural gas extraction, many of which will have transportation system impacts.

1. Drilling permits. Legal oversight of drilling lies entirely with states, unless Congress changes the law that removed oversight responsibility from the U.S. Environmental Protection Agency. NYSDEC issued its SEQR Finding Statement for high-volume hydraulic fracturing (HVHF) on June 29, 2015. This officially prohibits HVHF in New York State. It is unknown when and if HVHF will be permitted in New York State and what conditions will be imposed upon drilling activities at that time.

2. Drilling activity. At such time as NYSDEC begins issuing drilling permits, there may be a great deal of drilling activity, but the magnitude is not yet known. Activities involve construction of drill pads, construction of collector pipelines to move the gas from wells to major pipelines, and drilling. Each of these activities involves heavy truck traffic, including the movement of construction machinery and material, and the movement of the large volumes of water required for the hydrofracturing process and possible transport of wastewater to processing plants. Of specific concern is that drilling will occur primarily in rural areas, and that the county and town roads serving these areas are not constructed for large numbers of heavy trucks. Local governments have been researching and writing road use ordinances to ensure that responsible parties pay for mitigation of the impacts.

3. Creation of wealth. There is the potential for natural gas extraction to create significant wealth across the region, but that also comes with many unknowns. Landowners enter into lease arrangements with energy companies. This has two components: a lease payment, typically calculated on a per-acre basis; and royalties, based on volume and market price of gas produced from the property. The upfront lease payment may be large, with current rates of thousands of dollars per acre. The question is how much of that money stays in the region. Will land owners leave their property once drilling operations begin? What

is the impact on land value, since mineral rights can be separated from the land? The wealth of the region will increase if property owners choose to remain. There are both positive and negative impacts associated with gas extraction. During the construction and drilling phases, there will be increases in employment; these are relatively short-term. There will also be the mostly localized negative impacts associated with any major construction project. During the production phase, there is lower level of permanent employment. Negatives include noise generated by well operations and compressor stations, and the potential for groundwater contamination.
While increased wealth may have region wide effects, other impacts are more localized. Positive benefits will accrue to property owners who have signed leases, while negative impacts may be experienced by those in the area that receive no monetary compensation.

In sum, natural gas extraction from the Marcellus Shale could have significant impacts on the region's transportation system and its economy. There is awareness of the impacts and plans in place by many local municipalities to deal with the possibility of natural gas exploration. BMTS will facilitate discussion on this topic if legislation is changed at the State level.

INTERCITY PASSENGER RAIL

While a metropolitan transportation plan typically addresses only surface transportation facilities and services within the metropolitan area, in the course of developing the 2035 Long Range Plan the public expressed the sentiment that intercity passenger travel is important to accomplishing the goal of creating a sustainable region. Therefore, this element is included in the update as a component of *Transportation Tomorrow: 2040 Looking Forward.*

The caveat for this element is that unlike the recommended actions of the Plan, BMTS cannot play a direct role in project selection, development, funding or implementation for intercity modes.

Just as an attractive and vital region offers accessibility to many destinations by many modes within the region, the same measure applies to travel beyond the region. Being able to travel to and from Greater Binghamton safely and conveniently by bus, rail, and air as well as automobile contributes to positive decisions about personal and business location.

BUS SERVICE

Greater Binghamton is served by two intercity bus companies, Coach USA/Shortline Bus and Greyhound Bus Lines. They both operate from the Greater Binghamton Transportation Center in downtown Binghamton. Coach USA provides a great deal of service, with up to ten daily trips to New York City; and also west to Elmira/Corning/Olean; and along I-88 to Oneonta and Albany. They also have a special college campus service, with buses leaving from Binghamton University to destinations in the New York metro area. Greyhound serves such destinations as Ithaca, Syracuse, and Philadelphia.

While intercity bus service is often seen as comparable to local bus service in terms of appealing only to captive riders, surveys taken as part of the passenger rail feasibility study referenced below showed that people use Coach USA for business travel to New York City. The buses are comfortable and the travel time of three hours and forty minutes to mid-Town Manhattan is comparable to that of driving. Business people expressed as a positive attribute the opportunity to work while travelling.

There is a clear link between intercity bus service and sustainability goals in terms of reducing per capita GHG emissions and energy consumption. The Greater Binghamton Transportation Center promotes use of intercity buses by providing an attractive, safe, and convenient location.

PASSENGER RAIL SERVICE

While Binghamton has a rich history of railroad travel, and is still served by three freight railroads, passenger service was terminated almost 50 years ago. The *Phoebe Snow,* which ran from Hoboken through Binghamton to Buffalo, ended service in November 1966. This was the consequence of a variety of factors including railroad cost structures and inability to compete well with the convenience of automobile travel. In fact, intercity passenger rail service has greatly diminished across the nation, with Amtrak requiring continual Federal subsidies to continue operation.

Nonetheless, because of interest in restoring passenger rail service, primarily between Binghamton and New York City, the New York State DOT retained a consultant to perform a feasibility study. The "Binghamton Based Intercity Rail Passenger Service Feasibility Study" was completed in 2002. Based on market and cost analyses, examination of rail infrastructure and operating protocols, the study determined that scheduled service between Binghamton and New York City may prove feasible. The only feasible

route was determined to be via Scranton, and depends on the restoration of service between there and New York City. The alternative of using the Southern Tier Line to Port Jervis was determined not feasible because of the rail infrastructure and travel time. This line is now single track with periodic passing sidings, and is in use for regular freight service. Track conditions and schedule constraints, as well the necessity to transfer either in Port Jervis or Hoboken NJ would result in a travel time approaching five hours. This is far greater than travel by car or bus, making train service non-competitive.

The creation of scheduled service between Scranton and New York City is the subject of a Federal Transit Administration "New Starts" grant process. The primary capital project need is the restoration of a thirty-three mile segment of track known as the Lackawanna Cutoff.

LACKAWANNA CUTOFF [*From NJ TRANSIT website*]

Background

In the early part of the 20th century, the Delaware Lackawanna and Western Railroad constructed a level-graded route from Roxbury, NJ to just over the Delaware River to serve as a faster, more direct route between existing rail lines in Pennsylvania and New Jersey. The Lackawanna Cutoff, as this route came to be known, includes a series of unique structural features, viaducts and massive fill embankments through the deep valleys of this region. In the 1970s, Conrail, the eventual receiver of this property, abandoned the right of way and the track was removed. The objective of the Lackawanna Cutoff project is to reinstitute passenger rail service on the abandoned rail right of way of the Lackawanna Cutoff and over existing freight right of way in Pennsylvania. The reinstituted rail line would provide service from Scranton to Hoboken and New York Penn Station via transfer to MidTown Direct service by connecting to the existing NJ TRANSIT Montclair-Boonton and Morris & Essex Lines.

Project Scope

The project includes complete reconstruction of the line including track and signal improvements to approximately 60 miles of right of way, new stations, parking facilities, a train storage yard and additional rail rolling stock. It is assumed that NJ TRANSIT would operate the new service. Proposed stations would serve Blairstown and Andover in New Jersey and Scranton,Tobyhanna, Mount Pocono, Analomink, East Stroudsburg, and Delaware Water Gap in Pennsylvania. The first phase of the project is a 7.3 mile segement from Port Morris Yard to a new passenger station at Andover, NJ.

Project Cost

$551 million (2006 Estimate). This estimate does not include property acquisition costs. The full project is not funded. The estimated cost of the first phase to Andover is approximately $37 million. The first phase is fully funded using a combination of Federal Transit Administration (FTA) and state Transportation Trust Funds funds.

Project Status

The Federal Transit Administration responded to an Environmental Assessment by approving a Finding of No Significant Impact (FONSI) in 2008 for the first phase, described as the "minimal operating segment", which would extend existing NJ Transit rail service to one additional station at Andover NJ. A Supplemental EA was then submitted for the remaining project through the Lackawanna Cutoff to Scranton. The FTA issued a FONSI for that assessment in 2009, clearing the way for completion of the entire project and restoration of passenger rail service between Scranton and Hoboken. Funding for the project has not been identified, and NJ Transit at this time is committed only to the Andover extension.

The Canadian Pacific Railway owns the track between Binghamton and Scranton, and has indicated the rail infrastructure on that segment is in good condition, and may only need modest capital investment to accommodate passenger service. The benefit for Greater Binghamton of this route choice is that the market feasibility calculation need only account for the incremental cost of the Binghamton-Scranton operation.

In 2008, Amtrak initiated a new passenger rail feasibility study at the request of NYSDOT. The scope covers an operational evaluation of passenger service connections both to Scranton/ NYC as described above, and to Syracuse. While the latter does not provide for a connection with New York City, it does link to Amtrak's Empire Corridor and primary east-west service. New York State is working with Amtrak to improve travel reliability and move toward high speed rail service on the Empire Corridor. Another

benefit is that track improvements to accommodate passenger rail service would boost freight train speed to 55 mph. Results of the Amtrak study have not yet been released.

Unresolved issues with respect to passenger rail service:

- Who will operate the service? This may be influenced by the eventual operator of the Scranton-New York City service, but there is no reason that there could not be a separate operator for Binghamton-Scranton or Binghamton-Syracuse.
- How will the service be financed? As demonstrated by Amtrak and other passenger operations, fare revenue is not sufficient to meet expenses. Subsidies will be required. The expectation is that these would be at the state or regional level.
- How will passenger service be accommodated on the freight rail system? With few exceptions, all passenger service in this country operates on tracks owned by freight railroads. With current demand to ship by rail growing, and limited rail system capacity, it can be a challenge to create passenger train schedules that do not conflict with freight service and provide a margin of safety.

In the context of this Plan, the question is the value of passenger rail service between Binghamton and New York City, or additional locations in New York or surrounding states, for the achievement of the vision of creating a sustainable region. The following factors are noted:

- Rail travel is far more energy efficient than other modes. Compared to intercity travel by car, there can be significant savings in GHG emissions and energy consumption.
- Being able to choose rail mode makes the region more attractive to many people, including those who are older and are unable or prefer not to drive longer distances; and low income individuals for whom the cost of car ownership and operation is a barrier.
- It may make Greater Binghamton more attractive to the young professional/new college graduate demographic. This is particularly true for those living in the New York City metropolitan area, where car ownership is atypical, and commuting by rail is the norm. Since jobs in the "knowledge economy" are not necessarily tied to a geographic location, they may choose to live in a place like Binghamton if it provides the lifestyle they want and convenient travel to desired destinations.

BMTS explicitly supports the efforts to establish passenger rail service between Greater Binghamton and New York City, as well as other potential destinations. The location of a passenger depot will be determined by the final service decision, as CP Rail and NYS&W have access to different Binghamton locations. To the extent that street and public transit improvements are needed to provide access to a train station when a location is determined, BMTS will consider those improvements part of this long range plan.

AIR SERVICE

Improvement to air travel is another positive benefit for the regional economy and regional sustainability, particularly in terms of business location decisions. Currently, the Greater Binghamton Airport is served by three airlines providing commuter flight access to their respective hubs: Delta Air Lines to Detroit, United Airlines to Washington DC, and US Airways to Philadelphia. This can be considered relatively robust service for a small metropolitan region.

Nonetheless, area residents often travel to airports in Syracuse, Albany, or Scranton in order to find lower fares, non-stop service to their destination, or larger jet aircraft. It has been suggested that it would be beneficial to construct a new Southern Tier Regional Airport that would replace those in Greater Binghamton, Ithaca/Tompkins County, and Elmira-Corning. The idea is that this could be centrally located in Tioga County, providing reasonably convenient access to all three communities.

Elmira-Corning Airport is served by Delta to Detroit, and US Airways to Philadelphia, United to Chicago and also has service by Allegiant Air. The latter flies only twice a week, non-stop service to Orlando/Sanford FL and St. Petersburg/Clearwater FL. Ithaca/Tompkins County Regional Airport is served by United to Newark, Delta to Detroit, and US Airways to Philadelphia. Total passenger usage, called enplanements, is gathered by the NYSDOT Aviation Division, and shown in the following table.

AIRPORT	ENPLANEMENTS	
	2009	2010
Greater Binghamton	98,090	108,988
Elmira-Corning	114,519	131,353
Ithaca/Tompkins	109,991	121,380
Total Southern Tier	322,600	361,721

Table 5 – Airport Enplanements

These figures help answer the question of whether a new Southern Tier Airport would attract more airlines, including a national low-cost carrier like Southwest or Jet Blue; and provide more convenient schedules and larger aircraft. Evidence suggests otherwise. The concern is that the total demand, even with the assumption that there would be less loss to competing larger airports, would not be sufficient to yield a significant change in air service. By way of comparison to the above, in 2010 Syracuse had over 1.0 million passenger enplanements, and Albany almost 1.25 million. It is not clear from these comparisons that the substantial investment that a new airport would require would create a justifiable level of benefit.

It is also well understood that decisions on air service are driven entirely by external market forces, and that domestic airlines continue to experience severe financial difficulty. This makes it extremely difficult to forecast the future of the domestic aviation market, much less specific factors like route and fare decisions.

While BMTS finds that intercity air travel is an important issue that merits examination in future long range transportation plans, there is not enough evidence to include in this Plan support for any proposal to consolidate airports in the Southern Tier.

APPENDIX A

PUBLIC PARTICIPATION

PUBLIC INVOLVEMENT

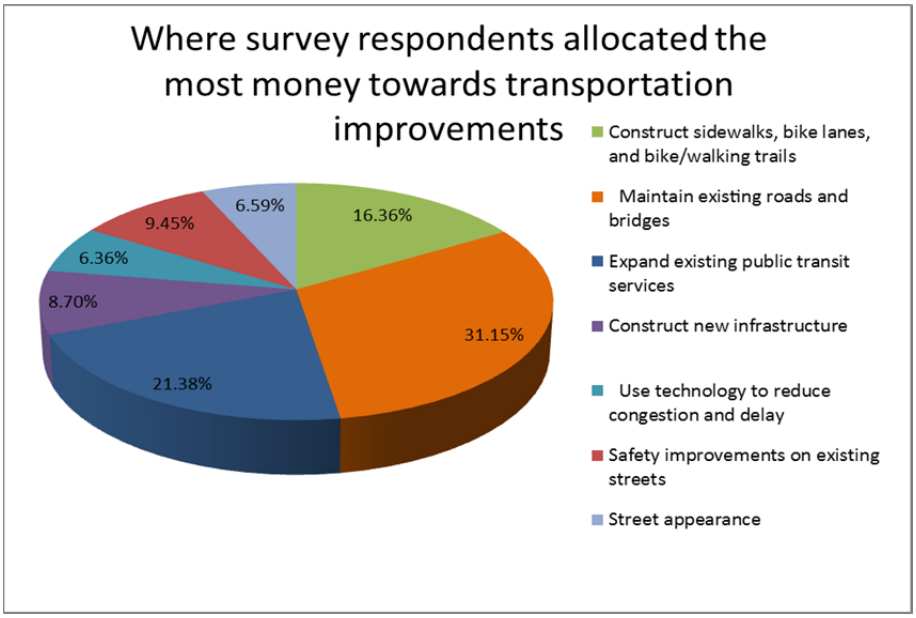
Public input for Looking Forward 2040 was achieved through a variety of different means. Information was solicited via the BMTS website (www.BMTSOnline.com), Social Media, an online transportation survey, and traditional public meetings.

Online Survey

BMTS published an online survey (shown above) to allow area residents to share their thoughts and opinons on local transportation systems. The survey was advertised through BMTS's Facebook page and flyer distribution, as well as word of mouth. This survey included a variety of questions regarding transportation in the area. For example, respondents could rank the significance of different aspects of transportation, rate the quality of current transportation systems, and contirbute their own thoughts and ideas on various topics. Survey questions and responses are summarized below. The survey can be found in a separate appendix (See Appendix E).

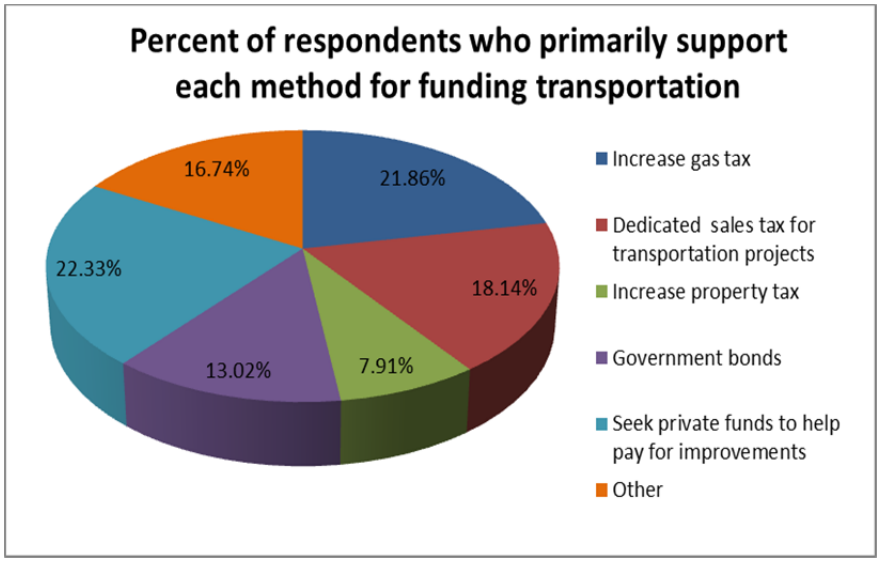
Question 1: If you had $100 to fund transportation improvements how would you spend it?

This figure shows where respondents chose to spend the most money.



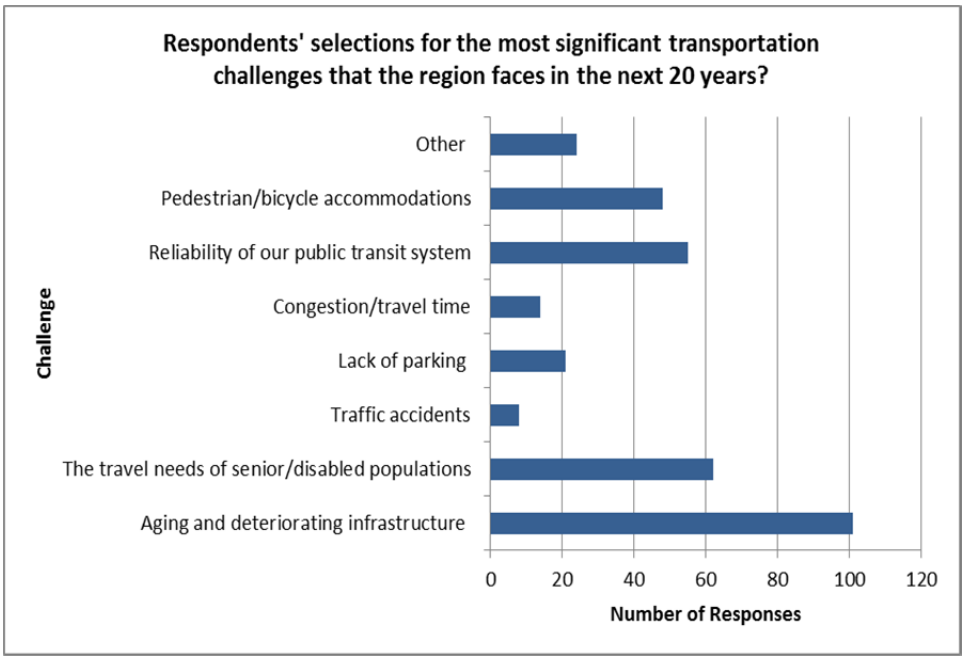
Question 2: If additional funding for transportation improvements were needed, would you support any of the following

For each funding method, the percentage of respondents who would primarily support that method of funding transportation projects if additional funding were needed. This means that of all the methods offered, the percent of respondent's choices shown below chose that method as the method they supported first and foremost.

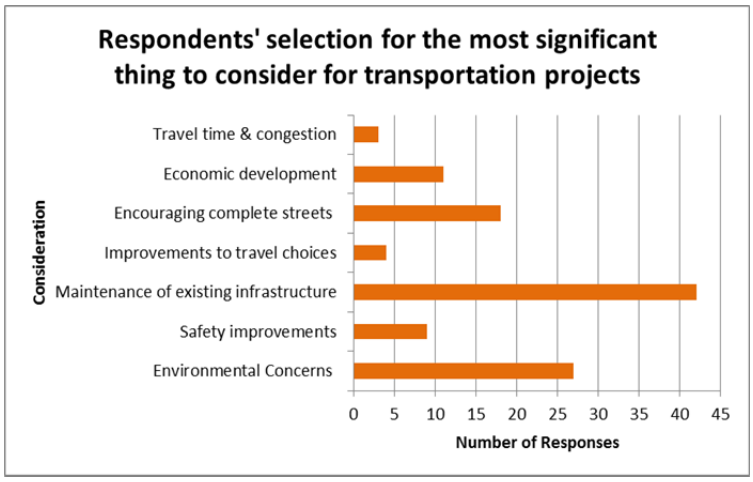


Question 3: What are the three most significant transportation challenges the Broome/Tioga County region faces in the next 20 years?

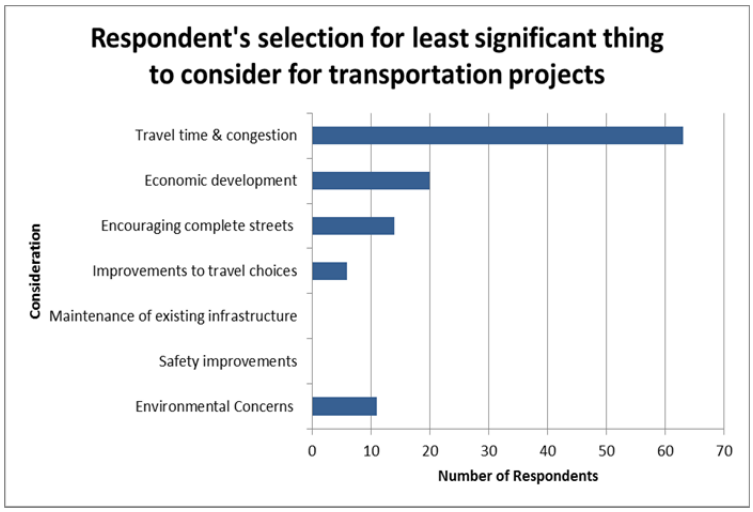
A summary of how many respondents chose each transportation challenge as one of the three most significant.



Question 4: What do you think is important to consider when selecting transportation projects? Please drag and rank (1st to 7th) the following in order of importance:



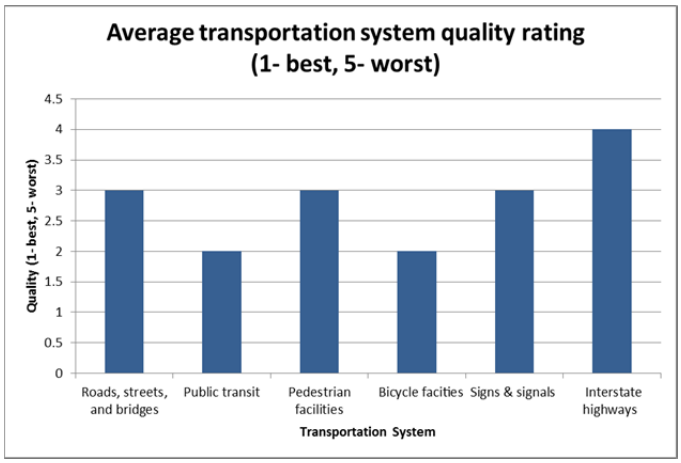
The rate at which each consideration was ranked 1st (most significant) to consider.



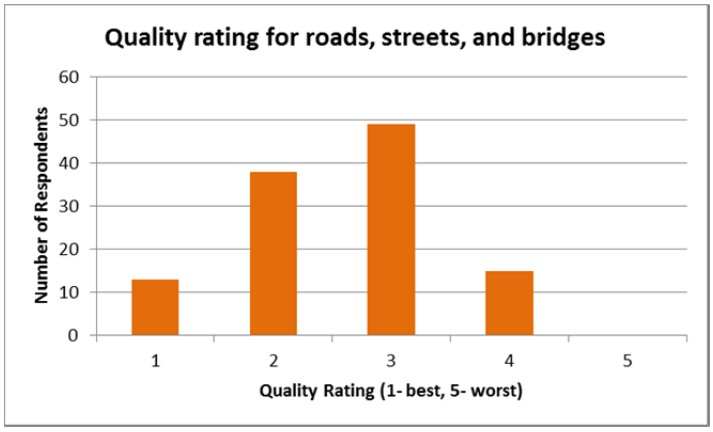
This chart shows the rate at which each consideration was ranked 7th (least significant) to consider.

Question 5: Please rate the quality of each transportation system in the Broome/Tioga Region.

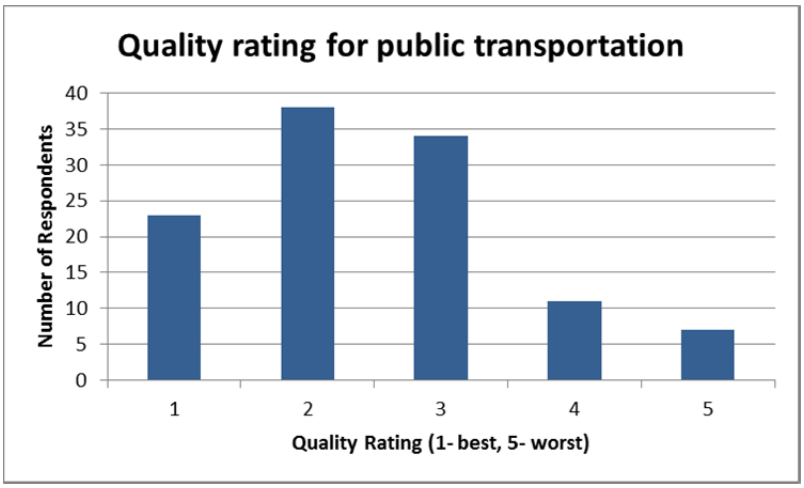
The following shows the respondents' average rating for each transportation system, where "1" represents the best quality rating and "5" represents the worst quality rating. On average, no transportation systems received the highest or lowest quality rating.



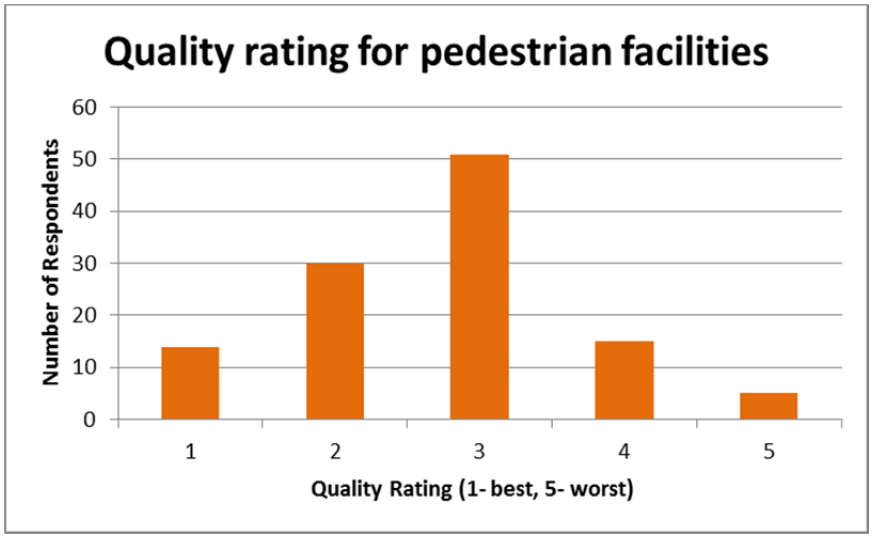
Respondents' quality rating for roads, streets, and bridges.



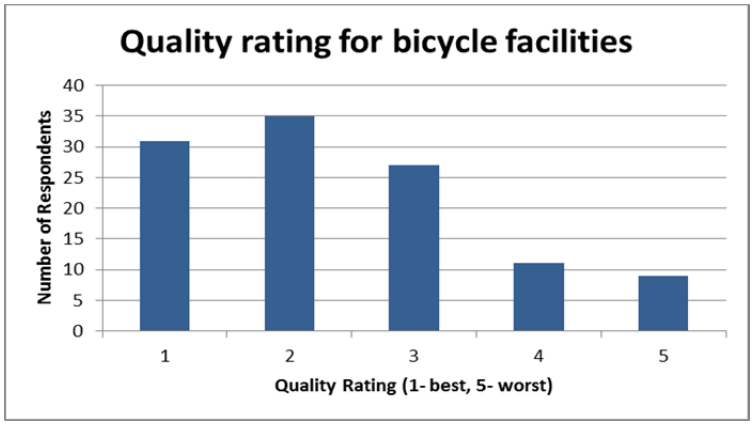
Respondents' quality rating for public transportation.



Respondents' quality rating for pedestrian facilities.

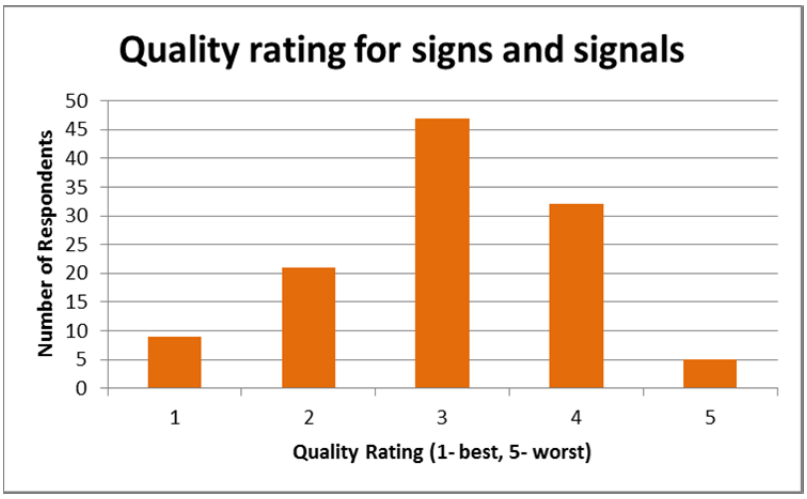


Respondents' quality rating for bicycle facilities.

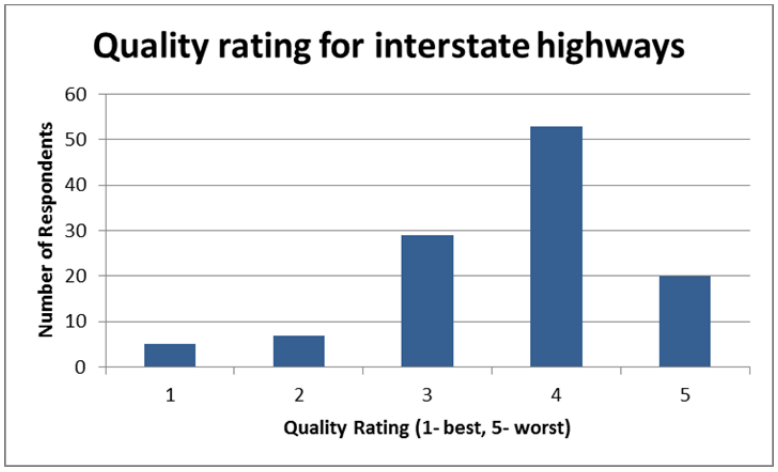


Respondents' quality rating for signals and signs

.

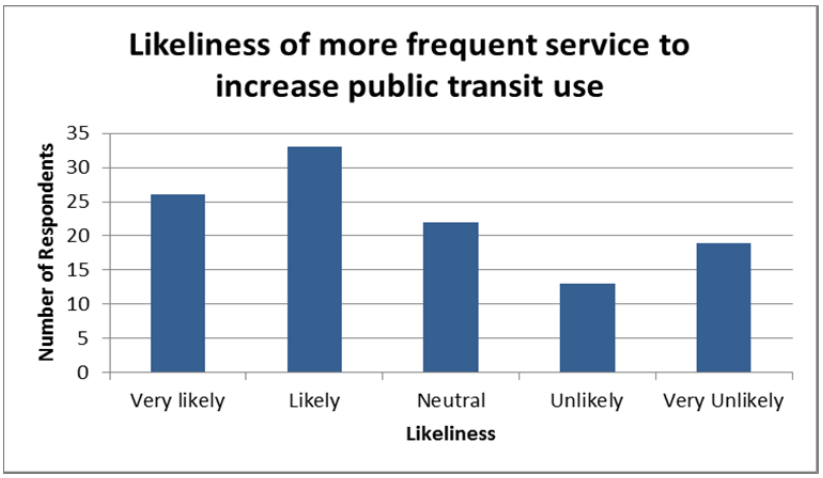


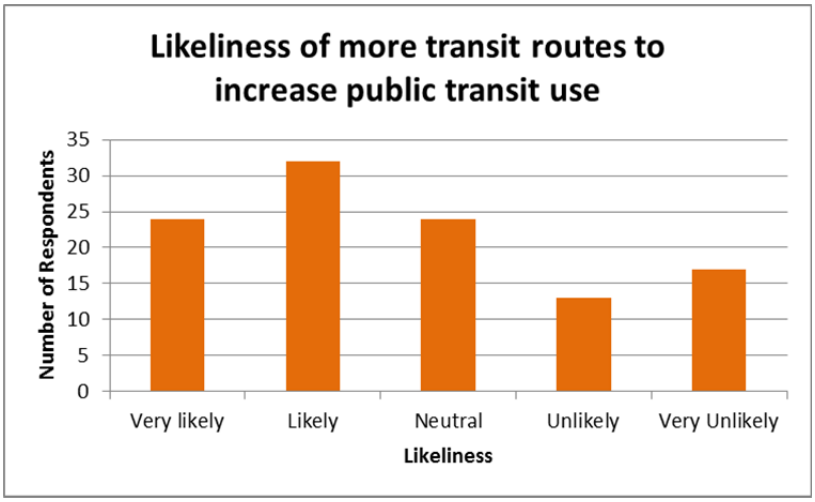
Respondents' quality rating for roads, streets, and bridges.



Question 6: How likely would the following improvements encourage you to start or increase your use of public transit?

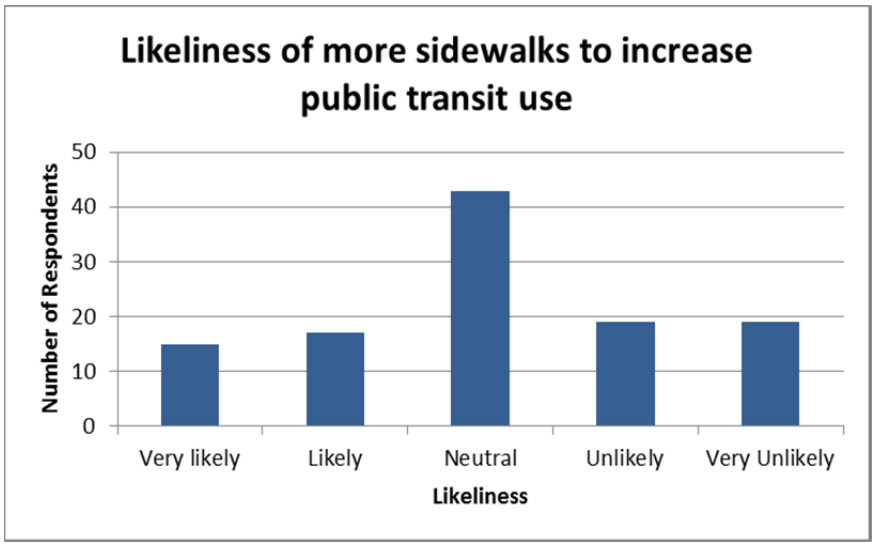
Respondents' answer to whether they would be more likely to use public transit if service was more frequent.



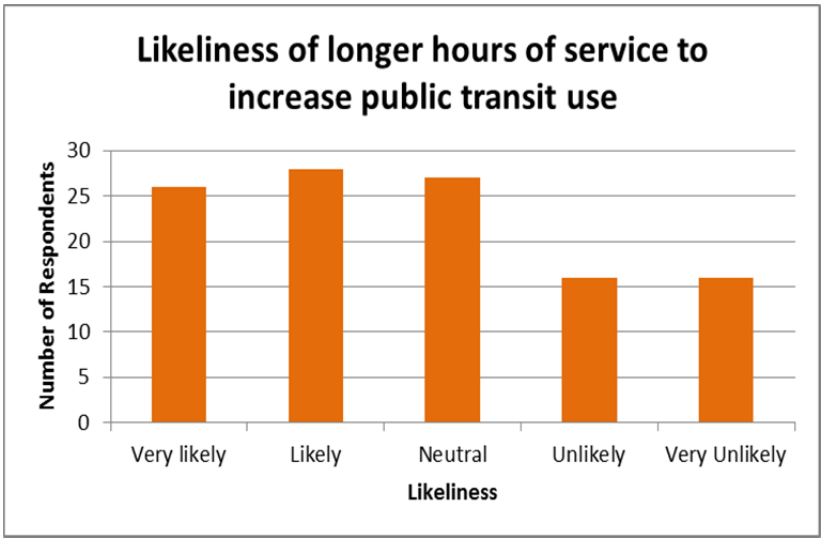


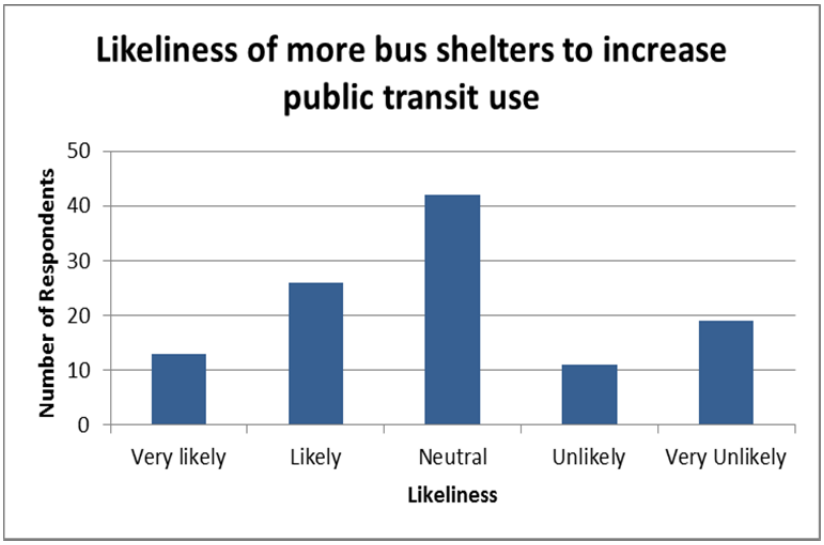
Respondents' answer to whether they would be more likely to use public transit if there were more transit routes.

Respondents' answer to whether they would be more likely to use public transit if there were more sidewalks to bus stops.



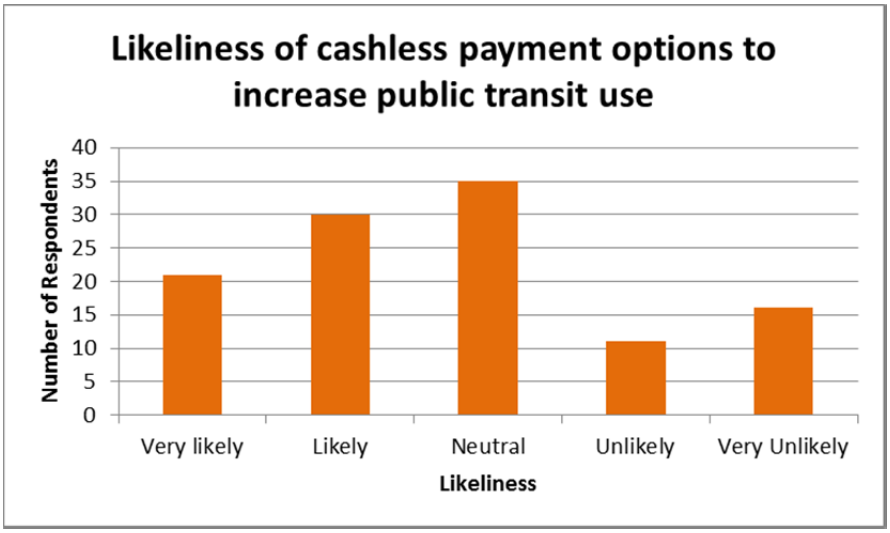
Respondents' answer to whether they would be more likely to use public transit if there were longer hours of service.



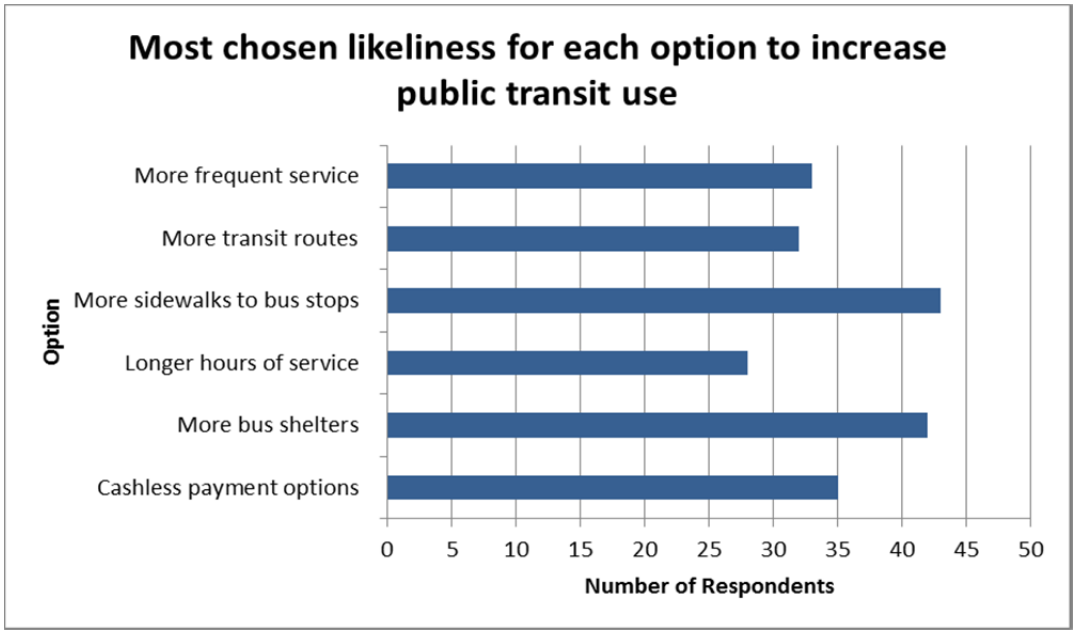


Respondents' answer to whether they would be more likely to use public transit if there were more bus shelters.

Respondents' answer to whether they would be more likely to use public transit if there were cashless payment options.

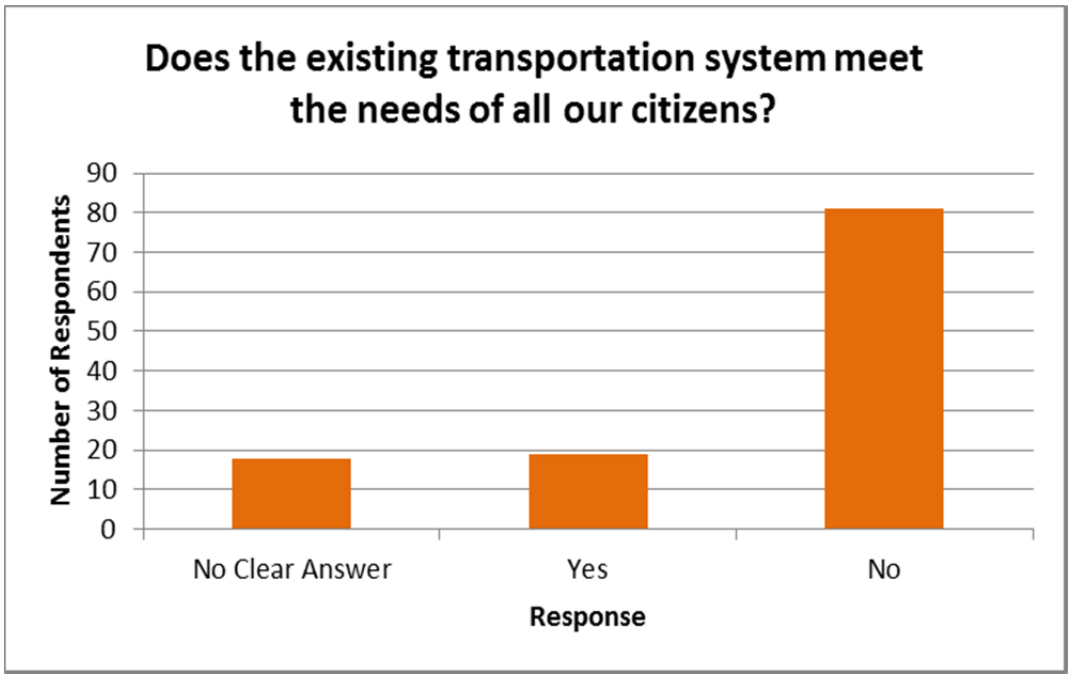


Most chosen likeliness for each option to increase public transit use.



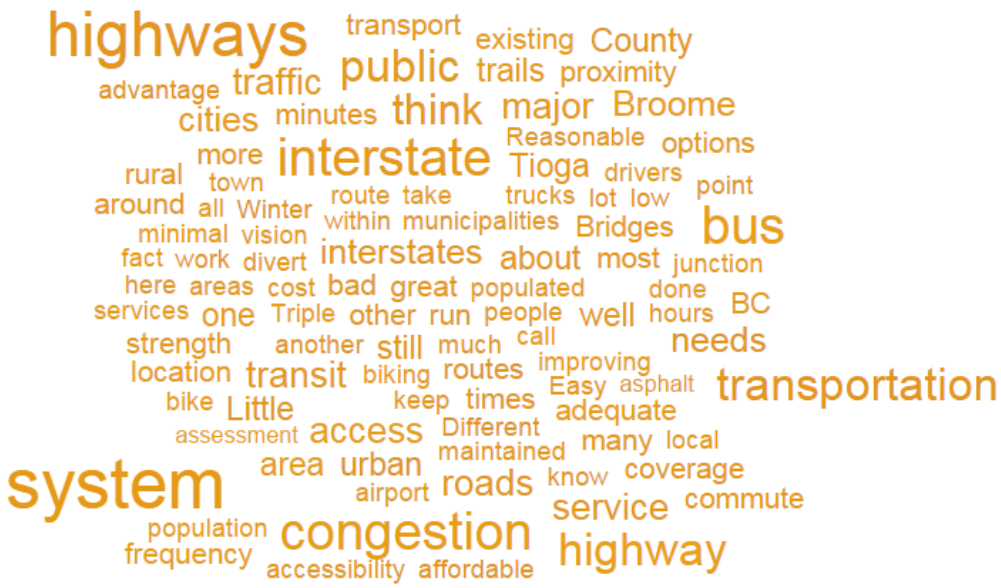
Question 7: Considering the diversity that exists in the community (lifestyles, income, age, etc.) do you think the existing transportation system meets the needs of all of our citizens?

Respondent's opinion of whether the existing transportation systems meet the diverse needs of all our citizens. The column "no clear answer" represents respondents who either left the field blank or did not provide a yes or no response.



Question 8: What would you consider to be the two greatest strengths and weaknesses of the Broome/Tioga region's transportation system?

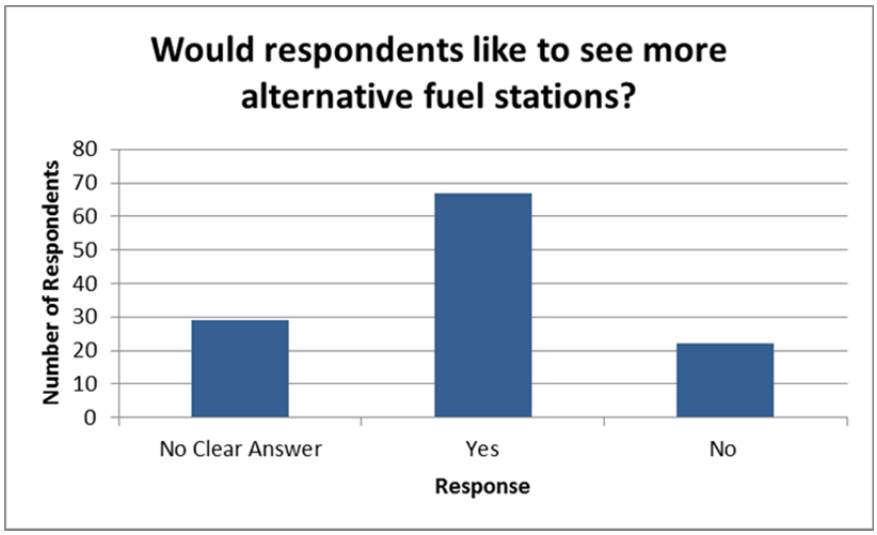
Reported strengths:



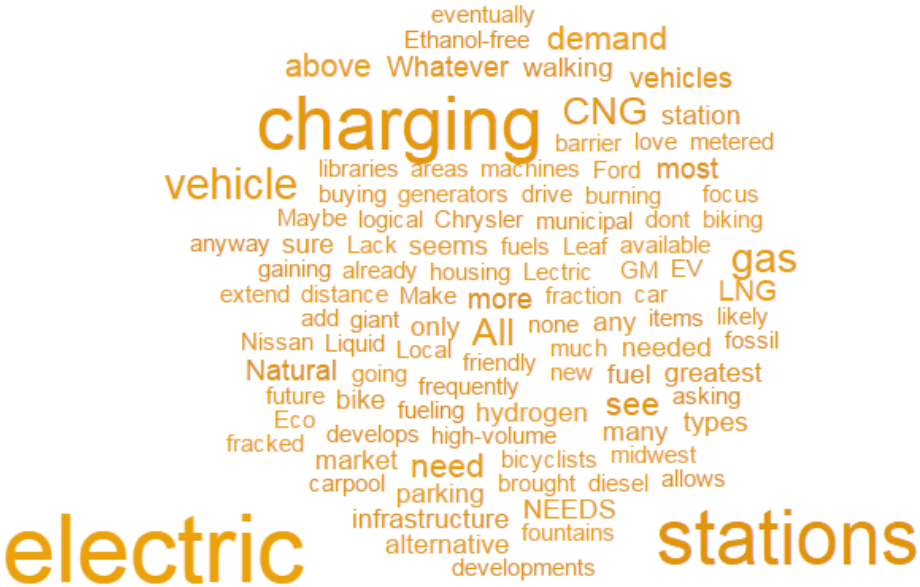
Reported weaknesses:

Question 9: Would you like to see more alternative fuel stations (ex. electric vehicle charging stations, Compressed Natural Gas, etc.). If so, which types?

Shows how many respondents indicated that they would or would not like to see more alternative fuel stations. The column "no clear answer" represents respondents who either left the field blank or did not provide a yes or no response.

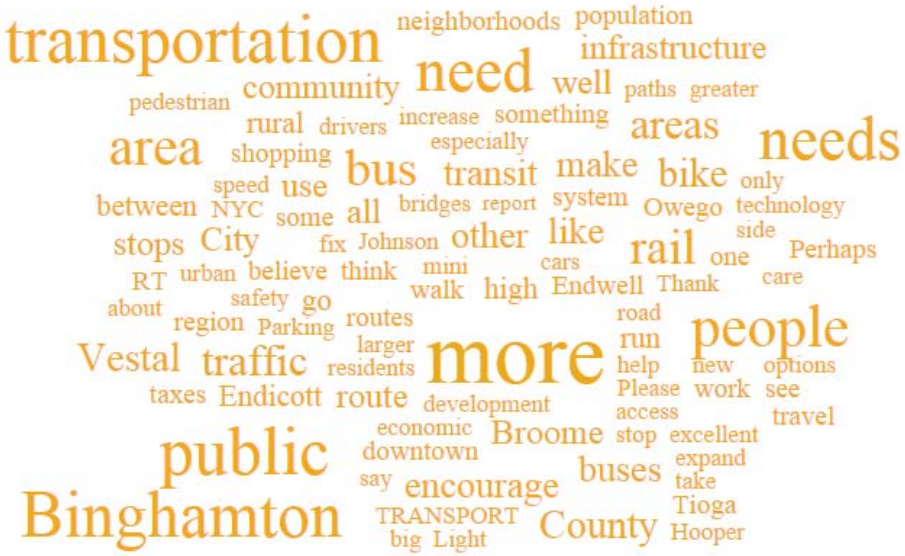


Word cloud of the second portion of Question 9, where respondents discuss which types of alternative fuel stations they would like to see. These were the most frequently used words:



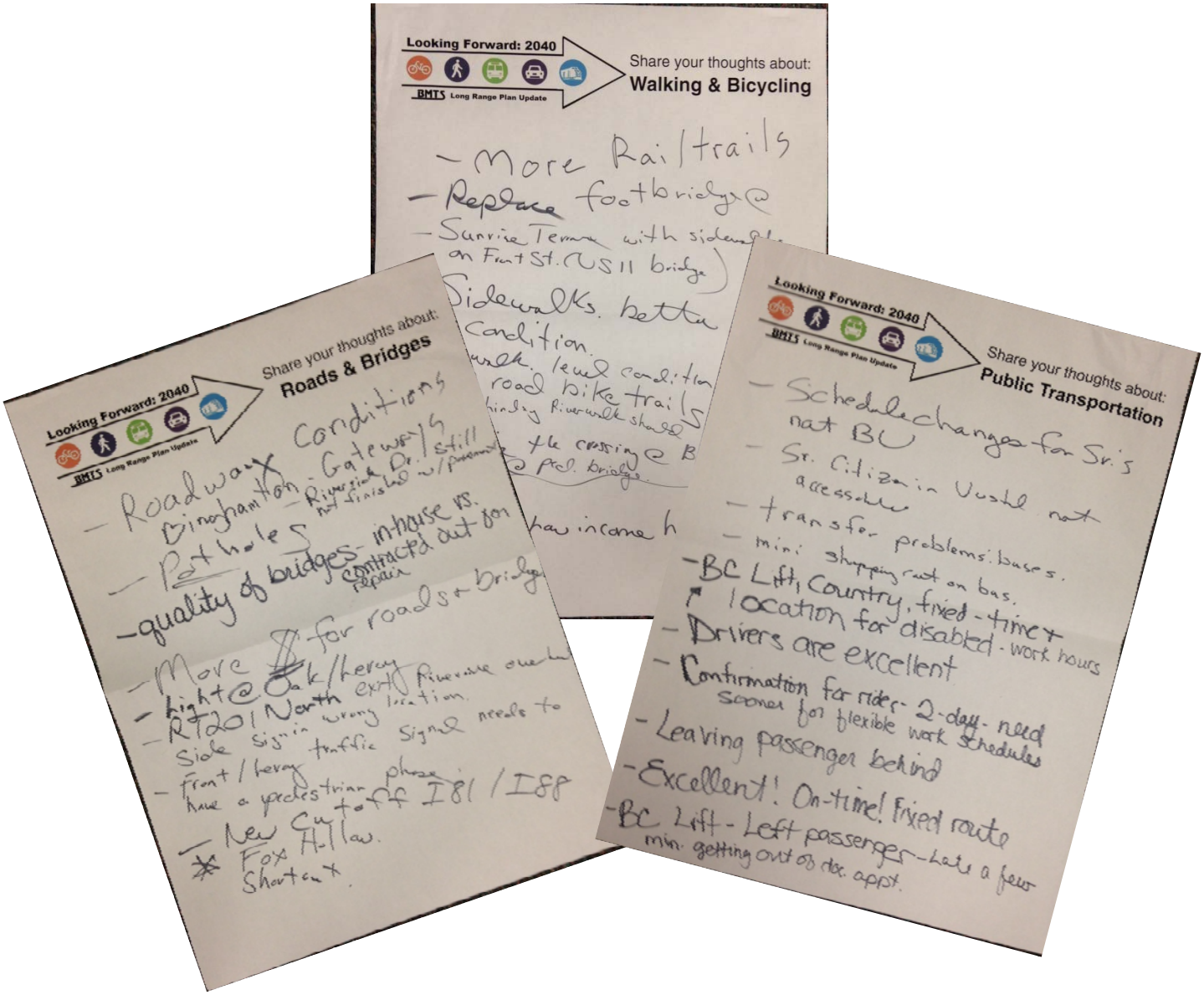
Question 10: We would like to hear your additional comments/suggestions regarding the transportation systems in the Broome-Tioga Region below.

This question provided an opportunity for respondents to share any further thoughts with BMTS. Many comments were thoughtful and extensive, so a word cloud is used below to summarize the most used words and most common topics.



PUBLIC MEETINGS

BMTS held three public meetings where area residents could come and speak directly with BMTS staff about transportation matters. At each meeting, community members came to talk about various topics. The discussions were categorized into three main groups: Bicycling and Walking, Roads and Bridges, and Public Transportation. Below are photos of select discussion boards from the meetings and the flyer showing when/where the meetings were held.



Looking Forward: 2040

BMTS' Long Range Transportation Plan Update

Tuesday, July 7th, 6-8pm
Tioga County Office Building
56 Main Street, Owego, NY

Wednesday, July8th, 6-8pm
Binghamton Univ. Events Center
4400 Vestal Parkway East, Vestal NY

Thursday, July 9th, 6-8pm
Town of Dickinson Town Hall
531 Old Front Street, Binghamton, NY

Join us as we kick off the update to our long range plan. This is an open house...Drop in for as little or as long as you'd like to discuss transportation issues in your community!

Provide suggestions and input about your community's transportation needs and priorities today and how those needs and priorities may change in the future.

Please take our survey at: **Lookingforward2040.questionpro.com**

*Interpretation services available upon request

BMTS

APPENDIX B

GREENWAY COMPLETION COSTS

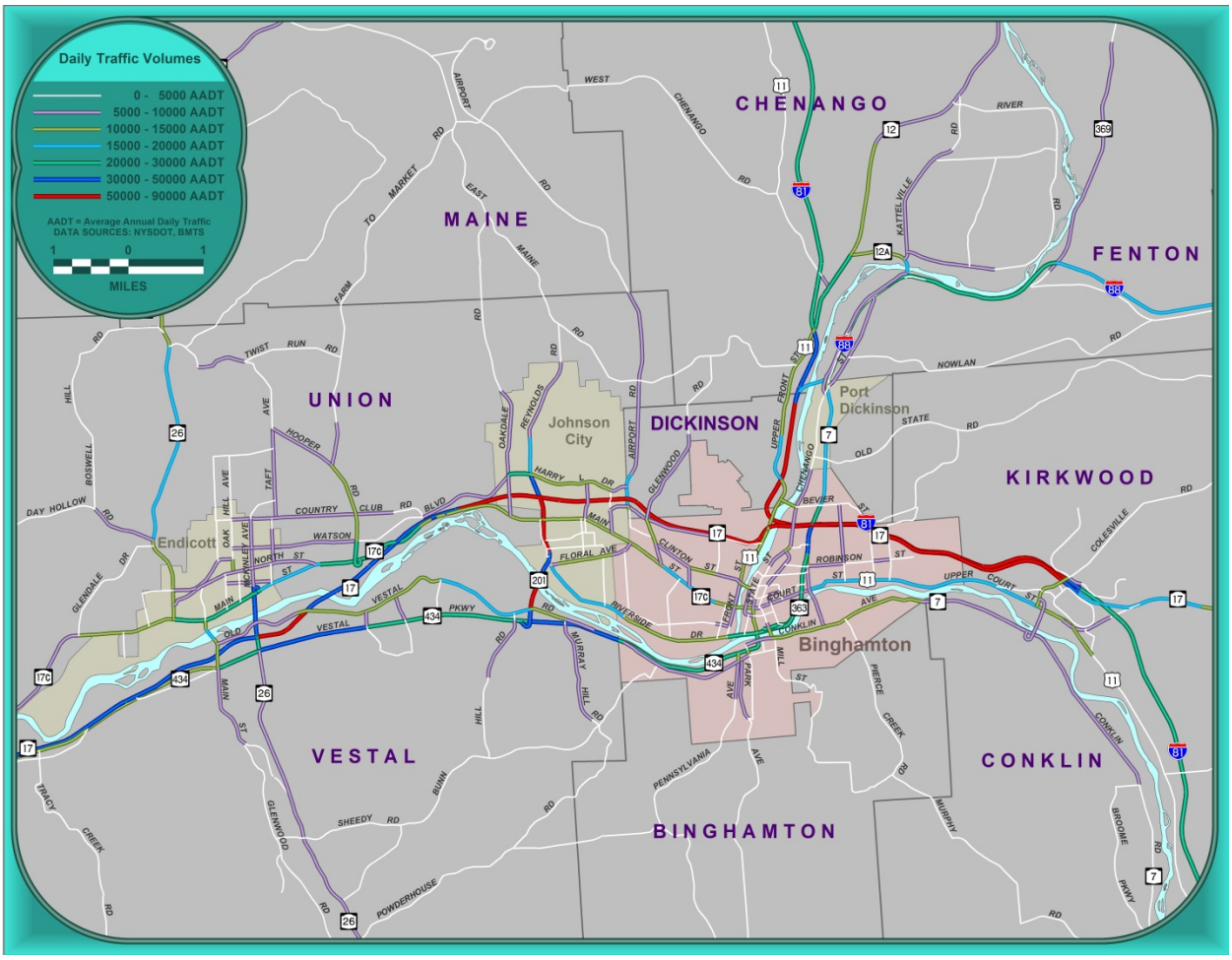
Summary of Estimated Cost of Construction

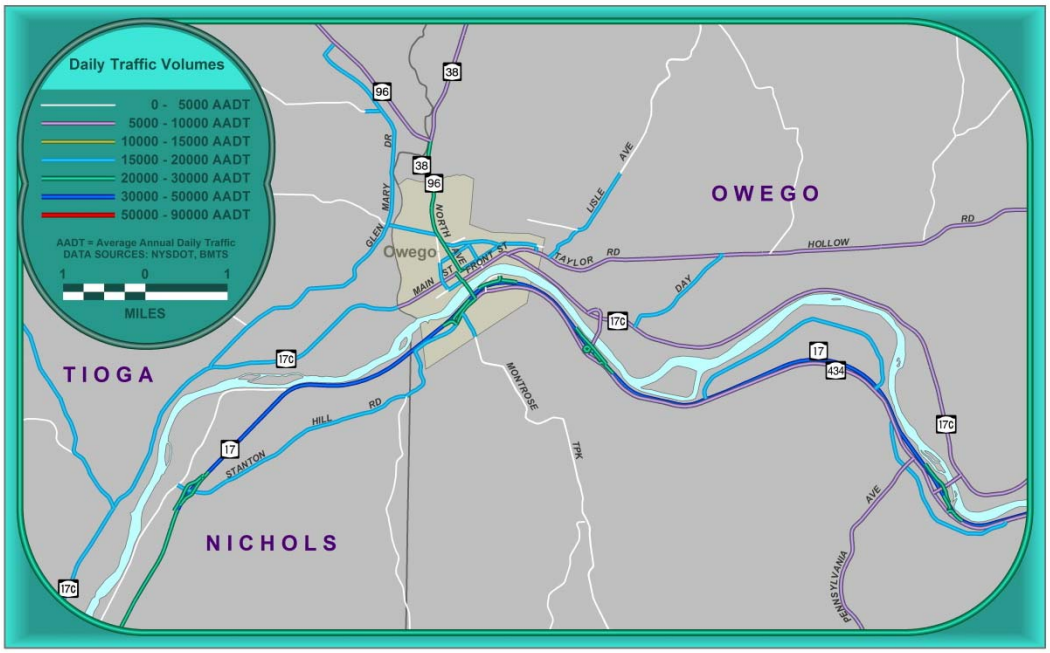
	Year 2000	Year 2010*	Year 2015	
Owego Trails	$ 760,000	$ 1,064,000	$ 1,276,800	**
Union Trails (Existing Chugnut Trail with proposed extensions west to Tri-Cities Airport and east to William Hill Park)	$ 2,800,000	$ 3,920,000	$ 4,704,000	**
I-86 Trail (Marshland Road Boat Launch to Castle Gardens)	$ 890,000	$ 1,246,000	$ 1,495,200	**
Vestal Trails (Planned Vestal Rail-Trail with Extensions west to Castle Gardens and east to Railway Bridge at Commerce Road)	$ 2,170,000	COMPLETED TO CASTLE GARDENS	$ 1,720,320	
Vestal Parkway Trail (Commerce Road to Washington Street Bridge)	$ 710,000	$ 5,000,000	$ 8,260,400	
City Center Trail - West Bank of Chenango River (Visitors' Center to Otsiningo Park)	$ 2,860,000	$ 4,004,000	$ 4,804,800	**
City Center Trail - East Bank of Chenango River (Washington Street Bridge to Bevier Street Bridge)	$ 290,000	FUNDED	FUNDED	
City Center Trail - South Bank of Susquehanna River (Washington Street Bridge to Tompkins Street (Route 7) Bridge)	$ 210,000	$ 294,000	$ 352,800	**
Otsiningo Park Trail Network (Existing Otsiningo Park Trails and Proposed Extension to Riverfront Park)	$ 390,000	COMPLETE	COMPLETE	
Chenango BridgeTrail (Riverfront Park to Chenango Bridge Park n' Ride Lot)	$ 690,000	$ 966,000	$ 1,159,200	**
Port Dickinson Park Trail Network (Existing Port Dickinson Park Trails with Porposed Extension through abandonned Gravel Pits to Route 4 Bikeway at Chenango Street)	$ 290,000	$ 406,000	$ 487,200	**
Schnurbush Park Trail Network (Porposed Trail Loop in Park and Extension to Woodcrest Way)	$ 270,000	$ 378,000	$ 453,600	**
Kirkwood Town Park Trail (Proposed Trail Loop in Park)	$ 160,000	$ 224,000	$ 268,800	**
Susquehanna River Crossings	$ 700,000	$ 980,000	$ 1,176,000	**
Chenango River Crossings	$ 2,410,000	$ 3,360,000	$ 4,032,000	**
TOTAL ESTIMATED COST OF CONSTRUCTION	**$ 14,840,000**	**$ 21,842,000**	**$ 30,191,120**	

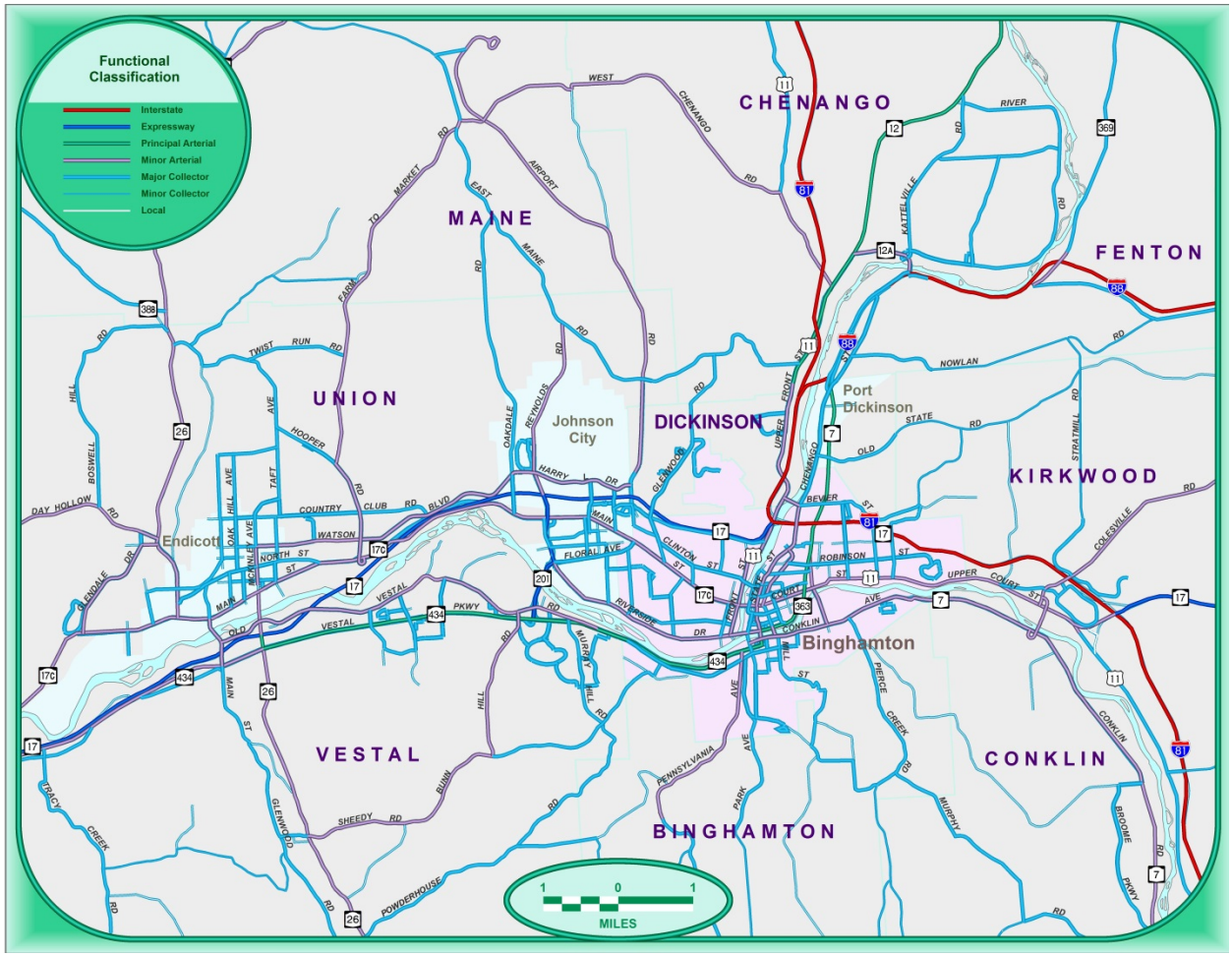
* Added 40% inflation to cost (4%/year)
** Added additional 20% inflation to 2010 estimate (4%/year).

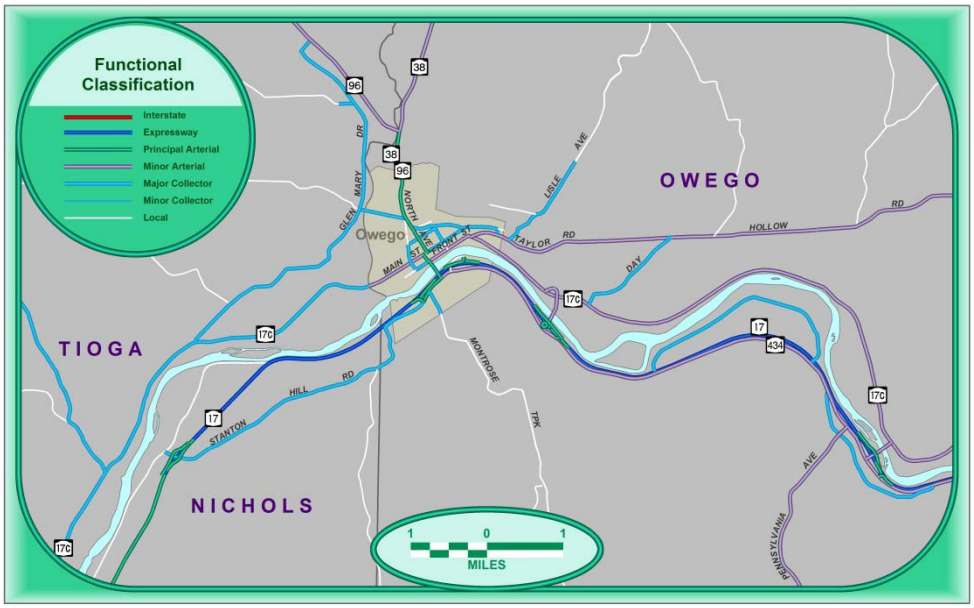
APPENDIX C

AADT AND FUNCTIONAL CLASS MAPS


Daily Traffic Volumes
0 - 5000 AADT
5000 - 10000 AADT
10000 - 15000 AADT
15000 - 20000 AADT
20000 - 30000 AADT
30000 - 50000 AADT
50000 - 90000 AADT
AADT = Average Annual Daily Traffic
DATA SOURCES: NYSDOT, BMTS
1 0 1
MILES
CHENANGO
MAINE
FENTON
UNION
DICKINSON
KIRKWOOD
Johnson City
Port Dickinson
Endicott
Binghamton
VESTAL
CONKLIN
BINGHAMTON


Daily Traffic Volumes
0 - 5000 AADT
5000 - 10000 AADT
10000 - 15000 AADT
15000 - 20000 AADT
20000 - 30000 AADT
30000 - 50000 AADT
50000 - 90000 AADT
AADT = Average Annual Daily Traffic
DATA SOURCES: NYSDOT, BMTS
1 0 1
MILES
OWEGO
Owego
TIOGA
NICHOLS


Functional Classification
Interstate
Expressway
Principal Arterial
Minor Arterial
Major Collector
Minor Collector
Local
CHENANGO
MAINE
FENTON
UNION
DICKINSON
KIRKWOOD
VESTAL
CONKLIN
BINGHAMTON
Johnson City
Endicott
Port Dickinson
Binghamton
1 0 1
MILES


Functional Classification
Interstate
Expressway
Principal Arterial
Minor Arterial
Major Collector
Minor Collector
Local
OWEGO
TIOGA
NICHOLS
Owego
1 0 1
MILES

APPENDIX D

ENERGY AND GREENHOUSE GAS ANALYSIS

ENERGY AND GREENHOUSE GAS ANALYSIS

Methodology

In order to comply with the New York State Energy Plan, BMTS conducted an analysis of Energy and Greenhouse Gas Emissions as they relate to the Long Range Plan (*Looking Forward 2040 Long Range Plan*). The methodology for this analysis is outlined in two documents published by the New York State Department of Transportation: *Development of Revised NYSDOT Energy Analysis Guidelines, Subtask 12a: Energy Analysis Guidelines for TIPS and Plans*; and *Development of Revised NYSDOT Energy Analysis Guidelines, Subtask 12b: Greenhouse Gas Emissions Estimates Guidelines for TIPS and Plans.*

The Energy and Greenhouse Gas Analysis was conducted for the future scenario using data derived from special population and land use forecasts as prepared by the economic forecasting firm Global Insight, for the New York State Department of Transportation. Both the base year and 2040 scenarios were evaluated for energy consumption and greenhouse gas emissions. The geographic extent of both analyses conforms to the area covered by the BMTS Travel Model i.e., the Binghamton Adjusted Urban Area (UZA).

The 2040 land use scenario was evaluated for a "build" condition, i.e., transportation improvements considered likely to be implemented within the time span of the Long Range Plan. In addition, the 2040 land use scenario was evaluated for "no-build" conditions, i.e., no change in the transportation network from base year (existing) conditions.

The Energy and Greenhouse Gas Analysis was conducted using an extension to the Motor Vehicle Emission Simulator (MOVES) software package developed by the United States Environmental Protection Agency, the MOVES Roadway and Rail Energy and Greenhouse Gas Analysis Extension (MOVES-RREGGAE). MOVES-RREGGAE is a travel demand model post-processor that uses output data, as derived from the BMTS travel model, to project Binghamton-area transportation energy consumption and greenhouse gas emissions, for both base year, and future year (2040) conditions.

The Energy Analysis consists of two basic sets of calculations. The first set of calculations is used to estimate the amount of energy consumed by vehicles using the road network, and is termed Direct Energy.

The Direct Energy analysis uses travel demand output data to estimate the amount of energy consumption. Vehicle-miles traveled and average speed data for each model network road segment are input into the MOVES-RREGGAE post-processor with the functional classification of each road segment as a basis for the emissions calculations. The vehicle type/fuel distributions used for these calculations were based on the default NYSDOT/NYSDEC determined vehicle distributions for the Binghamton region for the duration of the Long Range Plan.

The second set of Energy Analysis calculations addresses the amount of energy consumed in the course of constructing and maintaining a transportation system. This type of energy consumption is termed Indirect Energy.

In the analysis conducted for the *Looking Forward 2040 Long Range Plan*, the Indirect Energy consumption is calculated only for major transportation improvements likely to be implemented within the time span of the Long Range Plan, as it is assumed that maintenance and TSM type projects would occur under both build and no-build conditions.

The Indirect Energy figure is expressed in the amount of BTUs needed to complete each transportation construction project, and is determined by using the lane-mile construction calculations included in the MOVES-RREGGAE software package, in order to calculate the energy consumption projected to occur for a specific type of construction action. The figures for each construction project are then totaled to determine an area-wide figure for Indirect Energy consumption over the duration of the long range plan.

Greenhouse gas emissions (carbon dioxide) are also calculated for direct consumption and for indirect consumption, and are expressed in terms of carbon dioxide equivalent metric tons for carbon dioxide, nitrous oxide, and methane emissions, on a daily basis for Direct Greenhouse Gas emissions, and for the total of all projected construction for Indirect Greenhouse Gas emissions.

Results

The results of the energy and greenhouse gas analysis are presented in the tables that follow. The results indicate that the amount of direct energy consumed, and the amount of greenhouse gases produced, will be slightly less for the Build scenario relative to the No-build scenario, for the land use conditions projected for the 2040 Scenario.

Project Name: Long range Plan 2040 Scenario

PIN: 8888.77

New York State Department of Transportation

MOVES Roadway and Rail Energy and Greenhouse Gas Analysis Extension (MOVES RREGGAE)

Roadway Operation Detail Report: 8/30/2015 20:46

Scenario: Long Range Plan 2040 Scenario

Analysis Year: 2040-Long Range Plan 2035 Scenario G

Energy Consumption (in million BTU)

Pollutant Name	Running Exhaust	Start Exhaust	Extended Idle	Well To Pump	TOTAL (with Well To Pump)	TOTAL (no Well to Pump)
Total Energy Consumption	2.9788E+004	3.2080E+003	1.0371E+002	8.0428E+003	4.1143E+004	3.3100E+004
Petroleum Energy Consumption	2.8341E+004	3.0410E+003	1.0355E+002	3.5324E+003	3.5018E+004	3.1486E+004
Fossil Fuel Energy Consumption	2.9210E+004	3.1220E+003	1.0364E+002	7.9327E+003	4.0368E+004	3.2436E+004

Emissions Summary (mass in metric tons)

Pollutant Name	Running Exhaust	Start Exhaust	Extended Idle	Well To Pump	TOTAL (with Well To Pump)	TOTAL (no Well to Pump)
Methane (CH4)	4.3770E-002	5.1600E-002	0.0000E+000	3.5700E+000	3.6654E+000	9.5370E-002
Nitrous Oxide (N2O)	4.2000E-002	9.2000E-002	0.0000E+000	5.1000E-002	1.8500E-001	1.3400E-001
Atmospheric CO2	2.2590E+003	2.4089E+002	7.9300E+000	5.5900E+002	3.0668E+003	2.5078E+003
CO2 Equivalent	2.2591E+003	2.4103E+002	7.9480E+000	5.6262E+002	3.0707E+003	2.5081E+003

Note: The Summary Reports present only Fossil Fuel Energy Consumption, which is correlated with the CO2e increment. Total and Petroleum energy are presented here as additional information only.

Project Name: Long Range Plan

PIN: 8888.88

New York State Department of Transportation

MOVES Roadway and Rail Energy and Greenhouse Gas Analysis Extension (MOVES RREGGAE)

Roadway Operation Detail Report: 8/30/2010 19:12

Scenario: Long Range Plan

Analysis Year: 2015-Base Year

Energy Consumption (in million BTU)

Pollutant Name	Running Exhaust	Start Exhaust	Extended Idle	Well To Pump	TOTAL (with Well To Pump)	TOTAL (no Well to Pump)
Total Energy Consumption	2.1404E+003	3.0482E+002	7.6050E+000	5.8350E+002	3.0363E+003	2.4528E+003
Petroleum Energy Consumption	2.0470E+003	2.8985E+002	7.5955E+000	2.5496E+002	2.5994E+003	2.3444E+003
Fossil Fuel Energy Consumption	2.0910E+003	2.9718E+002	7.5997E+000	5.7405E+002	2.9698E+003	2.3958E+003

Emissions Summary (mass in metric tons)

Pollutant Name	Running Exhaust	Start Exhaust	Extended Idle	Well To Pump	TOTAL (with Well To Pump)	TOTAL (no Well to Pump)
Methane (CH4)	4.3542E-003	7.9617E-003	0.0000E+000	2.6191E-001	2.7422E-001	1.2316E-002
Nitrous Oxide (N2O)	4.0680E-003	8.5571E-003	0.0000E+000	3.9938E-003	1.6619E-002	1.2625E-002
Atmospheric CO2	1.6142E+002	2.2950E+001	5.8225E-001	4.0679E+001	2.2563E+002	1.8495E+002
CO2 Equivalent	1.6277E+002	2.5769E+001	5.8225E-001	4.7417E+001	2.3654E+002	1.8912E+002

Note: The Summary Reports present only Fossil Fuel Energy Consumption, which is correlated with the CO2e increment. Total and Petroleum energy are presented here as additional information only.

APPENDIX E

ONLINE TRANSPORTATION SURVEY

Survey: BMTS Long Range Plan 2040

LOOKING FORWARD 2040
Binghamton Metropolitan Transportation Study: Long Range Plan update

The Binghamton Metropolitan Transportation Study will be updating its long range transportation plan for the Greater Binghamton Region. We are required by federal law to update our long range plan at least once every five years. Our current plan, TRANSPORTATION TOMORROW 2035 ~ CREATING A SUSTAINABLE FUTURE, was adopted in September 2010. Our new plan is called *Looking Forward:2040*.

This plan will look at transportation needs for motor vehicles, as well as, bicycles, pedestrians, public transit and freight. It will look at the safety and efficiency of the current system and also make recommendations for future transportation projects over the next few years.

Public input is very important to this process so please take a few minutes to fill out this survey. If you have any questions about the survey, please contact BMTS at 778-2443 or at BMTS @co.broome.ny.us.

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1) If you had $100 to fund transportation improvements how would you spend it? (The dollar amounts must add up to 100) *

- Construct sidewalks, bike lanes, and bike/walking trails
- Maintain existing roads and bridges
- Expand existing public transit services
- Construct new infrastructure (roads and bridges)
- Use technology to reduce congestion and delays (improve timing of signals, variable message signs, NY 511 traffic info, etc.)
- Safety improvements on existing streets
- Street appearance (trees, lighting, planted medians)

0

Values must add up to 100

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2) If additional funding for transportation improvements were needed, would you support any of the following?

- ☐ Increase gas tax

- ☐ Introduce dedicated sales tax for transportation projects
- ☐ Increase property tax
- ☐ Government bonds (borrowing)
- ☐ Seek private funds to help pay for improvements
- ☐ Other (please specify)

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3) What are the three most significant transportation <u>challenges</u> the Broome/Tioga County region faces in the next 20 years? *(select 3)*

- ☐ Aging and deteriorating infrastructure (roads, bridges, bus fleet)
- ☐ The travel needs of our senior/disabled populations
- ☐ Traffic accidents
- ☐ Lack of parking
- ☐ Congestion/travel time
- ☐ Reliability of our public transit system
- ☐ Pedestrian/bicycle accommodations
- ☐ Other (please specify)

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4) What do you think is important to consider when selecting transportation projects? *Please drag and rank (1st to 7th) the following in order of importance:*

- Environmental Concerns (conservation of the natural environment, reduction of air pollution, reduce energy consumption)
- Safety improvements
- Maintenance of Existing roads and bridges
- Improvements to travel choices and reduction of congestion
- Encouraging development of complete streets (accommodates all transportation modes for users of all ages and abilities)
- Support for economic development
- Decrease travel travel time and reduce congestion

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5) Please rate the quality of each transportation system in the Broome/Tioga Region.

• Roads, streets, and bridges	☆ ☆ ☆ ☆ ☆
• Public transit	☆ ☆ ☆ ☆ ☆
• Pedestrian facilities (sidewalks, pedestrian signals, and walking trails)	☆ ☆ ☆ ☆ ☆

• Bicycle facilities (on-road bike lanes, designated routes bike trails, bike parking)	☆ ☆ ☆ ☆ ☆
• Signs & signals (traffic lights, directional, etc.)	☆ ☆ ☆ ☆ ☆
• Interstate highways	☆ ☆ ☆ ☆ ☆

6) How likely would the following improvements encourage you to start or increase your use of *public transit*?

	Very likely	Likely	Neutral	Unlikely	Very Unlikely
More frequent service	○	○	○	○	○
More transit routes	○	○	○	○	○
More sidewalks to bus stops	○	○	○	○	○
Longer hours of service	○	○	○	○	○
More bus shelters	○	○	○	○	○
Cashless payment options (ex. credit card, smart card)	○	○	○	○	○

7) Considering the diversity that exists in the community (lifestyles, income, age, etc.) do you think the existing transportation system meets the needs of all of our citizens?

8) What would you consider to be the two greatest strengths of the Broome/Tioga region's transportation system?

What would you consider to be the two greatest weaknesses of the system?

9) Would you like to see more alternative fuel stations? (ex. electric vehicle charging stations, Compressed Natural Gas, etc.)

If so, what types?

10) We would like to hear your additional comments/suggestions regarding the transportation systems in the Broome-Tioga Region below.

Online Survey Software Powered by QuestionPro