MEMORANDUM

TO: GTC Planning Committee Members & Alternates

FROM: James Stack, Executive Director /s/

DATE: August 2, 2018

SUBJECT: Proposed Council Resolution 18-54

The following items are provided for your consideration:

1.   **Proposed Council Resolution 18-54** (Accepting the *Genesee-Finger Lakes Regional Transportation System Management and Operations Strategic Plan* and the associated Regional ITS Architecture as evidence of completion of UPWP Task 5901) and the **Executive Summary** of the project.

GTC staff has completed UPWP Task 5901, Genesee-Finger Lakes Regional Transportation System Management and Operations Strategic Plan, and will discuss it at the August 9, 2018 Planning Committee meeting.

Recommended Action:

Recommend action by the GTC Board on proposed Council Resolution 18-54.

50 W. Main St • Suite 8112 • Rochester, New York • 14614-1227 • 585-232-6240 • Fax 585-262-3106 • www.gtcmpo.org   Chair: *Hon. John Marren*   Vice Chair: *Hon. Robert Bausch*

City of Rochester • Counties of: Genesee, Livingston, Monroe, Ontario, Orleans, Seneca, Wayne, Wyoming, and Yates
Genesee/Finger Lakes Regional Planning Council • Rochester Genesee Regional Transportation Authority • State of New York

GENESEE TRANSPORTATION COUNCIL

RESOLUTION

Resolution 18-54   **Accepting the *Genesee-Finger Lakes Regional Transportation System Management and Operations Strategic Plan* and the associated Regional ITS Architecture as evidence of completion of UPWP Task 5901**

WHEREAS,

1. The *FY 2018-2019 Unified Planning Work Program* includes Task 5901, Genesee-Finger Lakes Regional Transportation System Management and Operations Strategic Plan, for the purpose of updating the *Intelligent Transportation Systems (ITS) Strategic Plan for Greater Rochester* and the associated Regional ITS Architecture;

2. Said Task included collaboration among regional transportation systems management and operations stakeholders, identification of common objectives to guide stakeholder policies and initiatives, examination of current ITS deployments and gaps in coverage, identification of recommendations for implementing ITS technologies and associated management and operations activities, and prioritization of regional investments in ITS instrumentation;

3. Said Task has been completed and has resulted in the *Genesee-Finger Lakes Regional Transportation System Management and Operations Strategic Plan* which provides a strategy for the coordinated management and deployment of ITS instrumentation in the Genesee-Finger Lakes Region, as well as an update of the associated Regional ITS Architecture; and

4. Said Study has been reviewed by GTC staff and member agencies through the GTC committee process and has been found to be consistent with the goals, objectives, and recommendations of the Long Range Transportation Plan.

NOW, THEREFORE, BE IT RESOLVED

1. That the Genesee Transportation Council hereby accepts the *Genesee-Finger Lakes Regional Transportation System Management and Operations Strategic Plan* and the associated Regional ITS Architecture as evidence of completion of UPWP Task 5901; and

2. That this resolution takes effect immediately.

CERTIFICATION

The undersigned duly qualified Secretary of the Genesee Transportation Council certifies that the foregoing is a true and correct copy of a resolution adopted at a legally convened meeting of the Genesee Transportation Council held on September 6, 2018.

Date   _____

                                  _____

                                     KEVIN C. BUSH, Secretary
                                     Genesee Transportation Council

GTC

Genesee-Finger Lakes Regional Transportation System Management and Operations (TSMO) Strategic Plan

EXECUTIVE SUMMARY

Overview

The Genesee Transportation Council (GTC), in cooperation with partner agencies in the Genesee-Finger Lakes region, has developed this Transportation System Management and Operations (TSMO) Strategic Plan to guide future investments in and proactive operation of the multi-modal transportation system using Intelligent Transportation Systems (ITS) technology.

Regional stakeholders first developed a plan for the use of advanced transportation technology in 1996 (the *IMAGE Report*). The *IMAGE Report* was replaced by the *Intelligent Transportation System (ITS) Strategic Plan for Greater Rochester* in 2011 to reflect implementation progress, technological advances, national best practices, and regional needs, with an increased emphasis on operational objectives and roles in addition to technology.

This plan, the *Genesee-Finger Lakes Regional Transportation System Management and Operations Strategic Plan*, is intended to guide regional TSMO policies, partnerships, programs, and investments over the next decade.

This plan covers the entire GTC planning region encompassing nine counties, nearly 200 municipalities, 4,700 square miles, and 1.2 million residents. In recent years, the majority of TSMO programs have focused on the Metropolitan Planning Area (MPA) of urbanized Monroe County and this plan continues that emphasis.

The TSMO plan presents a strategy that is multi-agency, multi-jurisdictional, and multi-modal. It addresses:

- The Rationale for TSMO Investment ("Why?")
- Roles & Responsibilities ("Who?")
- Operational Strategies ("What?" and "How?")
- A Ten-Year Implementation Timeframe ("When?")

What is TSMO?

According to the United States Department of Transportation, Transportation System Management and Operations is defined as:

….integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system.

Fixing America's Surface Transportation (FAST Act), 2015

Why is TSMO Important to the Rochester-Genesee Region?

TSMO provides a relatively low-cost alternative to enhance safety, improve access and mobility, reduce congestion, and provide travelers with increased choice. The cost-effectiveness of TSMO is important given the many competing demands for the region's limited transportation funding.

The cost of technological and operational investments in TSMO programs are often a fraction of the cost of conventional infrastructure improvements, and typically TSMO solutions can be delivered in a far shorter timeframe.

Much of the traffic congestion in the Rochester-Genesee region is caused by "non-recurring" events including traffic incidents and weather. Because these events can effect different locations in the regional transportation network at different times, they cannot be cost-effectively solved through capacity expansion alone.

TSMO strategies such as incident management, traffic signal coordination, and traveler information can help mitigate the need for costly infrastructure expansion projects.

Effective use of data and technology also increases the convenience of accessing multi-modal transportation options, improves traveler decision making, and supports performance measurement. In short, TSMO complements the region's overall transportation investment strategy of focused improvements on maintaining and improving the performance and longevity of the region's existing infrastructure.

TSMO in the Rochester-Genesee Region Today

For nearly 20 years, regional agencies having been making investments in ITS technologies and partnerships to realize the benefits of TSMO in the region.

There are diverse examples of TSMO benefits in the Rochester-Genesee Region today, including:

- The **Regional Traffic Operations Center (RTOC)**, a regional traffic management and operations center staffed by personnel from the New York State Department of Transportation-Region 4, the Monroe County Department of Transportation, and the New York State Police.

- Traffic **incident management and response** programs involving transportation and emergency response agencies.

- The **New York State 511 Traveler Information System**, available through a website, mobile devices, and telephone.

- **RGRTA transit management systems** including computer-aided dispatch, real-time traveler information systems, electronic fare collection, and other systems to improve the efficiency, reliability, and convenience of public transportation.

The Rochester-Genesee region has long been recognized for its cooperative approach to transportation operations. The multi-agency Transportation Management Committee (TMC) and Traffic Incident Management (TIM) Committee are two examples of voluntary partnership initiatives to build and maintain an effective regional TSMO program.

Progress since the 2011 Plan

Substantial progress has been achieved in implementing the 2011 *ITS Strategic Plan* initiatives. Examples include:

- Operation and maintenance of core ITS field instrumentation and communications systems

- Infill ITS deployment to improve operational capabilities (e.g., CCTV coverage along the expressway network)

- Traffic and weather incident management programs and interagency coordination

- Traffic signal central system integration and select expansion

- Instrumentation of expressway detour/diversion routes

- Upgrade of the NY511 and other traveler information systems

- Advanced transit management systems, including wayside and online real-time passenger information

- Port of Rochester event management capabilities

- Expansion of communications infrastructure and development of a NYSDOT/MCDOT fiber sharing agreement

- Use of operations data for regional transportation analytics and performance measurement

Regional TSMO Vision

The regional vision for TSMO in the Rochester-Genesee Region was defined by the project Steering Committee as follows:

Transportation System Management and Operations (TSMO) in the Rochester-Genesee region improves the efficiency, safety, and convenience of the multi-modal transportation system through the use of advanced transportation technologies, free flow of information and data, and partnerships among public agencies and other transportation service providers."

The Transformative Impact of Emerging Transportation Technology

Since the *ITS Strategic Plan* was prepared in 2011, there have been significant developments in the public and private sectors related to deployment of advanced transportation technologies, including the emergence of Connected, Automated, Autonomous, Shared (i.e., Transportation Network Companies), and Electric vehicles at unprecedented scale and with increasing commercial viability.

In 2016, the City of Rochester, in partnership with community stakeholders, prepared a proposal in response to the USDOT's *Beyond Traffic* Smart City Challenge—one of 77 national responses to the prestigious competition. The region's proposal highlighted new possibilities and partnerships being forged by the future of mobility, as well as the integration of advanced technology into related smart cities sectors like energy, healthcare, and education.

These emerging technologies are generating a vigorous national dialogue and promise to reshape the transportation sector. Within the five to ten year timeframe of this plan, is it reasonable to anticipate deployment of these transformative technologies in the Rochester-Genesee region.

While the impacts and implications of these emerging technologies are just beginning to be understood, it is important that their potential impacts and benefits are recognized and incorporated into the regional TSMO strategy.
The Rochester-Genesee region has harnessed the opportunities presented by ITS technologies, mobile internet devices, and many other innovations in the past.

Agencies in the region are aware of the need to continue to monitor and embrace these opportunities for the benefit of the region. Doing so requires a willingness to explore new partnerships, infrastructure, policies, and business models.

Other Key Issues and Opportunities

In addition to the challenges and possibilities offered by emerging technologies, Steering Committee members identified other opportunities and challenges the regional TSMO program over the next five to ten years. Some of these issues are longstanding concerns of the region, including sustainable funding sources; other issues like asset management are of increasing importance as existing ITS field instruments reach the end of their useful life.

- **Focus on Core Capabilities and Corridors:** Progress towards the objectives in the 2011 plan was driven by priorities of the implementing agencies within available means and policy frameworks. When preparing this plan, stakeholders recognized the practical benefit of focusing on realistic and attainable strategies that align with agency needs, capacity, and available funding.

- **Asset Management for ITS and Communications:** Other areas of transportation, such as pavement and bridge management, have seen increased use of asset management tools and methods for quantifying and prioritizing needs for capital re-investment. As much of the ITS infrastructure in the region reaches the end of its useful life, there is a recognized benefit of applying an asset management approach for ITS and communications infrastructure to create a more systemic approach to TSMO capital planning. The reinvestment cycle for TSMO must reflect the relatively short lifespan of technology infrastructure (5-15 years) as compared to conventional transportation infrastructure.

- **Need for Sustainable Capital and Operating Funding:** While TSMO programs are relatively low cost compared to infrastructure expansion projects, sustained funding sources for TSMO-related capital and operational investments can by challenging to identify. Quantification of needs and benefits are seen as key to making the regional case for TSMO funding.

- **Performance Measurement:** Federal legislative requirements for transportation system performance measurement are spurring local investment in systems that leverage operations data to better understand regional transportation system performance. One of the greatest benefits of TSMO is addressing the impacts of nonrecurring congestion. There is a virtuous cycle between enhancing the ability to measure and quantify non-recurring traffic events and making the case for investing in TSMO strategies like incident management, improved signal control, and traveler information.

- **Awareness and Advocacy:** There is an ongoing need for efforts to raise awareness of TSMO benefits and needs in the region among decision makers and peer practitioners in the transportation profession. This will require concerted outreach by TSMO stakeholders to ensure that there is broad awareness of the impact of TSMO strategies as a means of cost-effectively meeting regional transportation goals.

Community Engagement

During the planning process, GTC engaged an extended group of community stakeholders representing public, private, and not-for-profit agencies involved in transportation and technology innovation in the region.

Two Community Symposia (December 2016 and June 2017) were held to engage these stakeholders and obtain input on regional issues and opportunities.

Participants in Rochester's application for the 2016 USDOT Smart City Challenge were involved in the outreach process to ensure continuity and cross-fertilization of Smart Cities ideas and innovation. Key feedback from the Community Symposia included:

- Shift focus from individual modes to **integrated mobility across modes**.

- Recognition of the potential of **emerging technologies**, including connected, automated, and autonomous vehicles; ride-sharing and ride-hailing; electric vehicles; big data; the Internet of Things, and Smart Cities.

- The need to develop **new partnerships and approaches** to leverage emerging technologies, including involvement by private sector entities driving standards and service investments.

- The **interconnectedness of smart cities and advanced technology** with other areas of public concern, including economic development, poverty reduction, and environmental stewardship. For example, new mobility solutions may help to address equity issues and access to opportunity.

- The need to **prepare infrastructure for emerging technologies**, such as traffic signals, communications, and data interfaces/standards, and physical infrastructure like autonomous vehicle drop off/pick-up zones.

- Awareness of unsolved challenges and public concerns such as **privacy and data ownership**.

Project Steering Committee

The TSMO Strategic Plan update was guided by an interagency Steering Committee representing multiple transportation modes and emergency management representatives drawn from federal, state, county, and local governments.

The Steering Committee was comprised of representatives of the following organizations:

- Federal Highway Administration (FHWA)-New York
- New York State Department of Transportation (NYSDOT) - Region 4
- New York State Police (NYSP)
- New York State Division of Homeland Security & Emergency Services
- Monroe County Department of Transportation (MCDOT)
- Monroe County Office of Emergency Management (MCOEM)
- Monroe County Sheriff
- Rochester-Genesee Regional Transportation Authority (RGRTA)
- City of Rochester
- Genesee Transportation Council (GTC)

Regional TSMO Objectives

The Steering Committee developed ten Regional TSMO Objectives that express the focus of TSMO activities and investments in the future. Rather than being agency- or modal-specific, they capture broader themes and opportunities for collaboration at the regional scale to address longstanding and emerging challenges and opportunities.

In the TSMO Plan, each of the following Objectives is associated with specific Initiatives to be undertaken in the region, as well as Targeted Outcomes.

1. **Improve the Safety and Efficiency of the Multi-Modal Transportation System through Coordinated Management and Operations**

2. **Maximize Transportation System Performance from the User Perspective**

3. **Implement TSMO as a Low-Cost Solution to Regional Transportation Needs**

4. **Target Investment in New ITS and Communications Infrastructure where Benefits and Value are Greatest**

5. **Prepare for Emerging Technologies with a Potential Transformative Impact on Regional Transportation**

6. **Promote Partnerships and Collaboration to Support Regional Operations**

7. **Integrate TSMO into Regional Planning and Policy Making**

8. **Maximize Program Efficiency through Resource and Cost Sharing**

9. **Support Long Term TSMO Operations and Capital Investments through Sustainable Funding and Asset Management**

10. **Promote Interoperability and Value-Add Services through Shared and Open Data**

Regional TSMO Corridors

The Steering Committee identified multi-modal TSMO corridors across the Rochester-Genesee region based on transportation characteristics (e.g. volume, congestion), available TSMO strategies, and agency capacity for ITS/communications infrastructure investment and sustained ongoing operations.

Regional TSMO Corridors have been categorized as Tier 1 and Tier 2:

• **Tier 1 Corridors** (Figs. ES-1 and ES-2) are priorities for investment based on regional operational significance. They includes regional expressways, major state highways, and key urban arterials. Many of these corridor have significant existing ITS investment, but may be due for renewal or replacement of aging assets or infill of gaps in the network.

• **Tier 2 Corridors** (Figs. ES-3 and ES-4) are corridors targeted for more focused investment based on the capacity of regional agencies to invest and sustain operations in additional corridors. Tier 2 corridors include NYSDOT and MCDOT-operated facilities of growing operational significance. Characteristics may include: multi-modal corridors; congestion, incident, and event management hotspots; localized development and traffic growth; and/or Interstate, Thruway, or expressway diversion routes.

Most of the TSMO corridors are located in the Metropolitan Planning Area (MPA); other key regional corridors, including the New York State Thruway, are region-wide. A notable feature of planned NYDOT growth is an increase in the number of secondary radial highways from Rochester into surrounding Monroe County and beyond, as well as non-radial corridors elsewhere in the region like the U.S. 20 corridor.

All Tier 1 and Tier 2 corridors are regionally significant from a TSMO perspective, and many contain existing ITS and communications infrastructure instrumentation. Future investment or infrastructure replenishment will be guided by demonstrable need, consideration of the cost-benefit of TSMO investment, and the agreement of the agency or agencies involved to support ongoing operation of one or more TSMO strategies.

Regional Implementation Priorities

The plan reflects the participating agencies' desire to focus on realistic and attainable goals that consider limitations in agency capacity and funding. Therefore the recommendations of the plan emphasizes core functions and selected functional and geographic expansions.

Regional implementation priorities over the next 1-3 years are categorized under the following themes:

- **Promoting Regional TSMO Coordination:** The foundation of the Genesee-Finger Lakes region's TSMO program will continue to be voluntary cooperation among transportation and emergency management agencies to plan, fund, implement, and operate TSMO programs that address common goals and fulfill the public's expectation for a seamless and efficient regional transportation system. As in the past, the Transportation Management Committee (TMC) will continue to provide a regional forum for interagency coordination, supplemented by focused working groups as the need arises.

- **Renewing and Expanding ITS Infrastructure:** Emphasis over the next several years will transition from widespread geographic and functional expansion of ITS and communications infrastructure to renewal and maintenance of existing assets. A new asset management approach is recommended to quantify infrastructure re-investment needs to sustain current capabilities and geographic coverage. Limited expansions of the ITS and communications network will be evaluated based on careful consideration of cost/benefit, as well as long-term operations and maintenance obligations incurred by expanded infrastructure.

- **Building New Partnerships for Smart Cities and Emerging Mobility:** Building on the momentum of the Smart Cities Challenge and the TSMO Community Symposia is important for harnessing the opportunities of Smart Cities and emerging mobility technologies. The next step is to continue the dialogue with interested non-traditional TSMO stakeholders working in related areas of government, private industry, and research institutions. Through partnership and coordination, the region will clarify its approach to adapting to these new technologies, and the specific roles that TSMO agencies might play in their implementation and operations.

- **Planning for Operations:** GTC and partner agencies will continue to emphasize TSMO as a potentially low-cost, high-impact transportation strategy through regional planning and policy, project development, and performance measurement.

- **Priority Initiatives Identified by Agencies:** Agencies involved in the TSMO plan development effort identified specific near-term priority efforts from their perspectives, ranging from ITS asset renewal, to improved joint management of expressways and urban arterials, to next-generation transit fare collection and more.

Sustainable Funding for TSMO Capital Investment and Operations

At the local, state, and national levels, Transportation System Management and Operations programs function within a constrained transportation funding environment.

This situation presents both an opportunity and a challenge. While TSMO presents a relatively low-cost opportunity to address many transportation challenges, it requires sustained capital and operational funding for personnel, training, technology deployments and upgrades, and other operational costs to maximize operational capabilities.

This plan emphasizes preservation and replacement of existing ITS and communications assets to maintain the existing operational capabilities of the region, such as expressway incident management and traveler information. Where warranted, system expansion should be based on careful consideration of costs and benefits. In certain cases, divestment of existing programs or assets may be the most appropriate option.

Regional ITS Architecture Update – ARC-IT

In conjunction with the plan update, GTC led the development of an updated Regional ITS Architecture. The purpose of the Regional ITS Architecture is to provide a common framework for multi-agency and multi-jurisdictional implementation of ITS services and infrastructure.

The Regional ITS Architecture is based on the National ITS Architecture (NITSA) developed by USDOT. The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) require that ITS projects implemented with federal transportation funding be consistent with the regional ITS architecture, which itself is consistent to NYSDOT's Statewide ITS Architecture.

Reflecting the increasing role of connected and autonomous vehicles, and the future need for integration with agency ITS systems and information flows, the current version of the NITSA (Version 8) has been rebranded as the Architecture Reference for Cooperative and Intelligent Transportation, or ARC-IT. ARC-IT combines elements of the former NITSA and the stand-alone Connected Vehicle Information Reference Architecture (CVRIA) into a single architecture.

The Regional ITS Architecture will be used going forward by ITS project teams and participating agencies to ensure the consistency of individual ITS deployment projects with the Regional ITS Architecture. As in the past, the Regional ITS Architecture will be maintained and periodically updated by the Genesee Transportation Council through the Transportation Management Committee.

Achieving the Vision

Over the next decade, agencies in the Rochester-Genesee region will face the challenge of maintaining existing TSMO programs within a highly dynamic technological environment.
Just as existing partnerships helped the region maximize the value of public investments in Intelligent Transportation Systems over the past 20 years, a coordinated and cooperative approach to TSMO will position the region to take advantage of the emerging mobility and smart cities opportunities of the future.

**Figure ES-1: TSMO Tier 1 Urban Area Implementation Corridors (Monroe County Urbanized Area)**

Tier 1 Urban Area ITS Corridor Map
Source: NYSDOT, MCDOT, MCDES, NYSTA, City of Rochester, August 2017
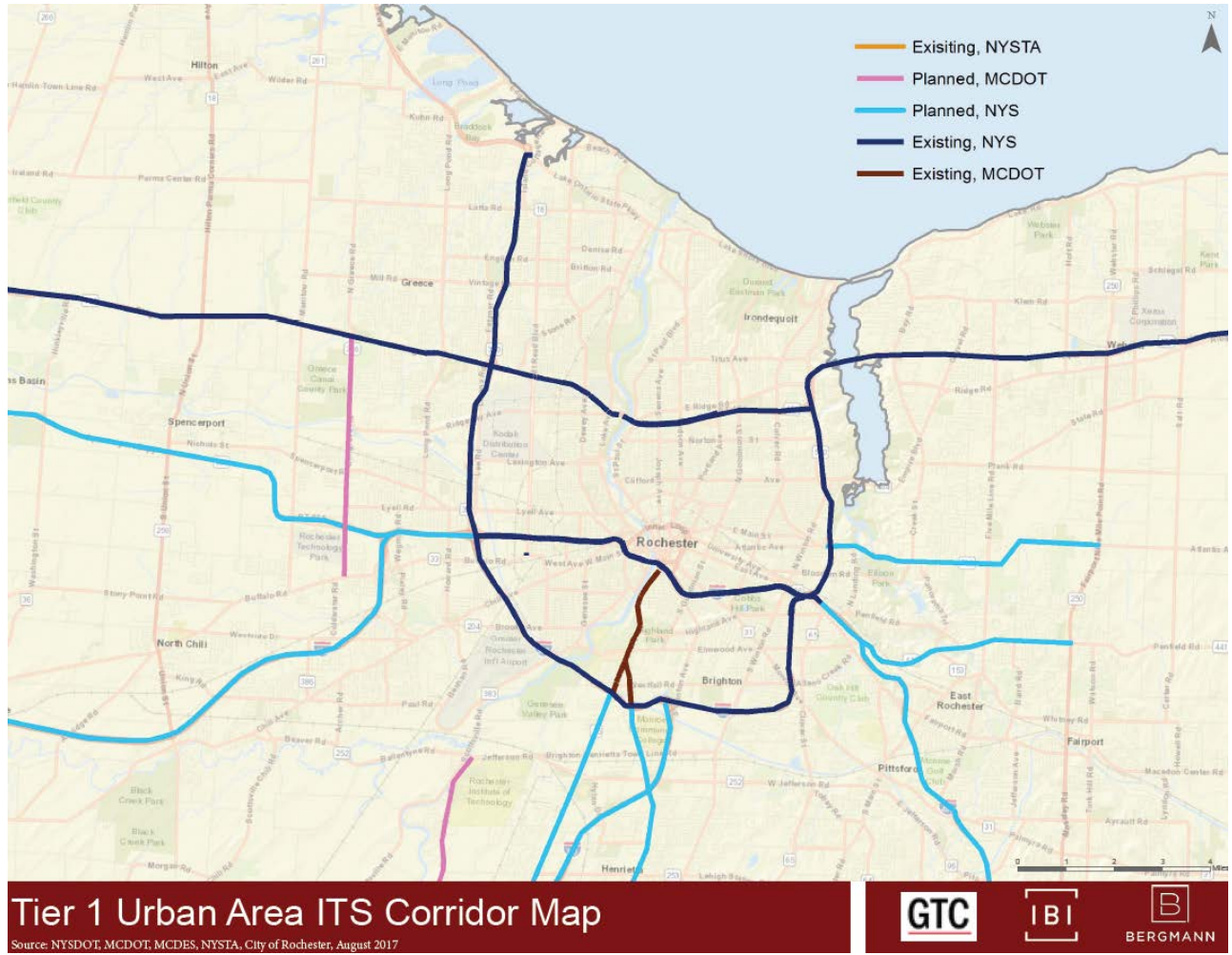
Figure ES-2: TSMO Tier 1 Regional Implementation Corridors (9-County GTC Planning Area)

Figure ES-3: TSMO Tier 2 Urban Area Implementation Corridors (Monroe County Urbanized Area)

Tier 2 Urban Area ITS Corridor Map

Source: NYSDOT, MCDOT, MCDES, NYSTA, City of Rochester, August 2017
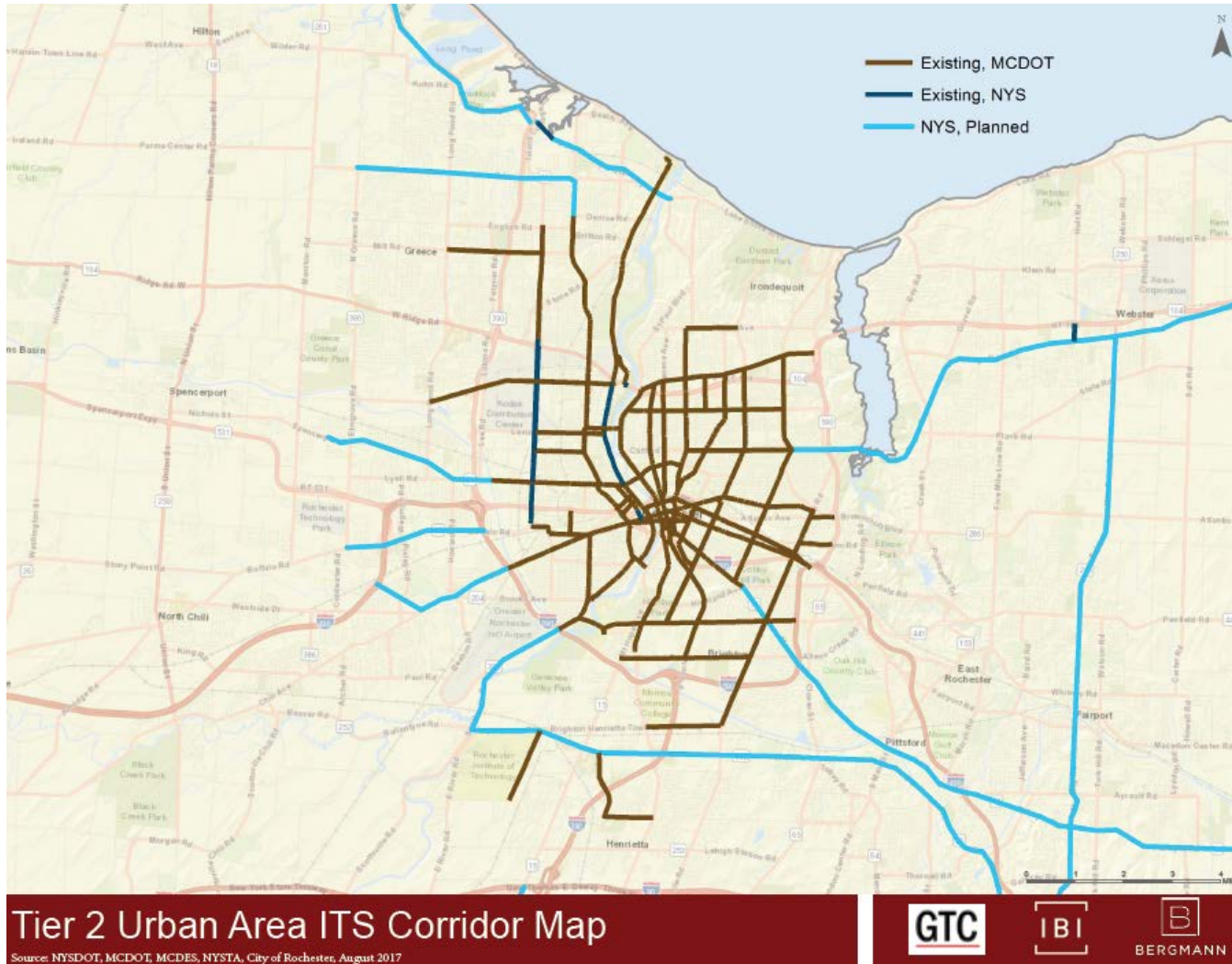
Figure ES-4: TSMO Tier 2 Regional Implementation Corridors (9-County GTC Planning Area)

Tier 2 Regional ITS Corridor Map

Source: NYSDOT, MCDOT, MCDES, NYSTA, City of Rochester, August 2017