

The I-81 Corridor Study



Prepared by New York State Department of Transportation

In partnership with the Syracuse Metropolitan Transportation Council and Federal Highway Administration

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Appendices

I-81 Corridor Study

A – Technical Memo #2: Strategy Development and Evaluation; July 2013

<http://thei81challenge.org/cm/ResourceFiles/resources/TechnicalMemorandum2.pdf>

B – Technical Memo #1: Physical Conditions Analysis; January 2011

http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

C – Case Studies Report http://www.thei81challenge.org/cm/ResourceFiles/resources/CaseStudiesReport_3-02-10.pdf

I-81 Public Participation Program

D – White Paper #3 (including May 21, 2013 public meeting) (to be developed)

E – Summary Report for Public Meeting held in May 2012; August 2012

http://www.thei81challenge.org/cm/ResourceFiles/resources/May%202012%20Public%20Meeting%20Summary_FINAL%208-20-12.pdf

F – Summary Report for Public Meeting held in May 2011; October 2011

<http://www.thei81challenge.org/cm/ResourceFiles/resources/I-81%20Public%20Workshop%20Summary.pdf>

G – White Paper #2: Describes and synthesizes findings from public participation program inception through fall 2011; December 2011 http://www.thei81challenge.org/cm/ResourceFiles/resources/White%20Paper%202_Final.pdf

H – White Paper #1: Public Participation; May 2009

<http://www.thei81challenge.org/cm/ResourceFiles/resources/PublicInvolvementWhitePaper.pdf>

Syracuse Transit System Analysis

I – Syracuse Transit System Analysis, Phase I, Executive Summary; May 2013

<http://thei81challenge.org/cm/ResourceFiles/resources/130515%20STSA%20Executive%20Summary%20Phase%201.pdf>

Regional Travel Demand Model

J – SMTC Travel Demand Model Version 3.023 Documentation; April 2012

<http://thei81challenge.org/cm/ResourceFiles/resources/SMTC%20Model%20Version%203.023%20Documentation.pdf>

I-81 Corridor Study

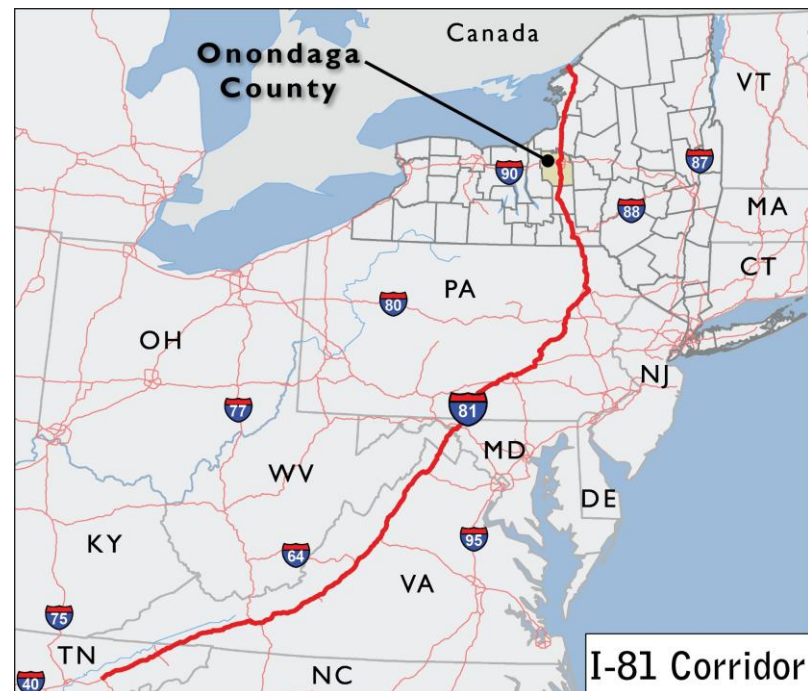
I. Overview

Interstate-81 (I-81) through Central New York was built approximately 50 years ago, at a time when the federal government was funding the construction of interstate highways throughout the country. During this era, several segments of the Syracuse area interstate system were constructed, including I-90 (New York State Thruway), I-81 and I-690, along with the I-81/I-690 interchange and then later I-481. Today the I-81 corridor in Onondaga County serves an important role on both the national and regional levels.

In the Syracuse metropolitan area, the I-81 corridor serves as the primary north-south travel and commuter route, providing direct access from suburban communities to downtown Syracuse and its hospitals, businesses, and universities. The Greater Syracuse Economic Growth Council reports that five of the region's ten largest employers are located next to I-81. I-81 also serves as a connection to I-90 (the NYS Thruway), which is a major east-west route that traverses upstate New York, and as an important link in a national and international north-south route that stretches from Tennessee to Canada.

Numerous portions of I-81 are severely deteriorated due to age and wear and are nearing the end of their useful service life. This is particularly evident at the highway's elevated viaduct sections located in downtown Syracuse where deterioration is severe.

Given the roadway's importance as a transportation corridor, action will need to be taken over the next decade to address I-81's deteriorated sections. NYS DOT and its partners, the Syracuse Metropolitan Transportation Council (SMTc), Federal Highway Administration (FHWA), and others, are at a critical juncture. We must plan for how best to address the area's future transportation in a way that supports the desires, concerns and ideas of the community in a sustainable manner.



The corridor study assesses a 12-mile corridor of I-81 and other elements of the transportation system in metropolitan Syracuse and provides a planning level analysis to identify transportation and community needs and a range of solutions, from a transportation perspective. The corridor study investigates the many opportunities and ideas for improvement to be considered in moving into the next stage of development and analysis: a comprehensive environmental review of potential solutions. This undertaking included an intensive level of public involvement in a thoughtful, deliberative manner. As public participation has been critical to the corridor study to date, it will continue to be central in the environmental analysis phase. NYSDOT, and its partners, will work to meet the community's transportation needs while enhancing sustainability and environmental stewardship.

Work that results from this corridor study will:

- Address the deteriorating I-81 corridor infrastructure and evolving transportation and mobility needs;
- Fulfill the NYSDOT mission to ensure that its customers - those who live, work and travel in New York State -- have a safe, efficient, balanced and environmentally sound transportation system;
- Support the city and county's sustainability visions;
- Plan, design, build and operate a safe, multimodal, efficient, cost effective and sustainable I-81 corridor transportation solution; and
- Consider the sustainability triple bottom line of economic competitiveness, social equity and environmental stewardship.

All work will be undertaken in a manner that supports a sustainable society, one which manages resources in a way that fulfills the social (community), economic, and environmental needs of the present without compromising future generations' needs and opportunities^{1 2}. As FHWA notes, "Sustainable transportation is safe, high quality, and accessible to all; ecologically sound; economical; and a positive contributor to regional development."³ This corridor study is undertaken to address both individual user and societal transportation needs to provide a system that is accessible and operates efficiently while offering choices of transport modes to support a vibrant economy.

The I-81 Corridor Study Report that follows summarizes the work done to date and identifies a variety of strategies that may be considered for further analysis in looking at ways to best meet the area's transportation needs.

¹ <https://www.dot.ny.gov/programs/greenlites/sustainability>

² World Commission on Environment and Development. (1987). "Our Common Future, Report of the World Commission on Environment and Development, Published as Annex to General Assembly document A/42/427, Development and International Co-operation: Environment August 2, 1987." (Nov. 14, 2007).

³ FHWA. (2001). "Sustainable Transportation Practices in Europe." <<http://international.fhwa.dot.gov/Pdfs/SustainableTransportation.pdf>>.

II. Study Purpose

The official I-81 corridor decision-making process begins with this study, which is led by NYSDOT with support from the SMTC and oversight from the Federal Highway Administration (FHWA). The corridor study's purpose is to consider the infrastructure needs in the larger context of the community it serves and the environment in which it operates. The study was undertaken to collect data to identify the region's transportation system condition and the environment, focusing mainly on I-81; to identify transportation and community needs; and to assess and identify potential strategies that are worthy of detailed evaluation. The intent is to consider a long-range outlook (2040) to determine the best strategies to serve existing and future travel demand in the I-81 corridor.

III. Study Process

To ensure that the planning effort for the I-81 corridor considers the infrastructure needs in the context of its community and its users, "*The I-81 Challenge*" involved four integrated efforts.

- A. *The I-81 Corridor Study* assesses and documents the highway's existing conditions and deficiencies, identifies multimodal transportation and community needs and priorities, analyzes potential strategies for the future of the corridor, evaluates such strategies, and recommends strategies for further study.
- B. *The I-81 Challenge Public Participation Program* develops, carries out, and documents the public outreach and involvement effort and gives residents of the City of Syracuse, as well as Onondaga, Oswego and Madison County, a mechanism to learn about I-81 and voice their ideas about the I-81 corridor.
- C. *The I-81 Travel Demand Modeling* effort is a technical project using computer modeling to forecast and display how future options could affect the regional transportation network.
- D. *Syracuse Transit System Analysis* documents and evaluates the regional transit system operated by Central New York Regional Transportation Authority (CENTRO) and identifies various transit strategies to address, enhance and promote transit use throughout the region.

A. I-81 Corridor Study

The corridor planning study and strategy development process involved extensive public participation and iterations of strategy evaluation and refinement. The various study areas of the corridor study are:

- Primary Study Area: I-81 from I-481 on the south to I-481 on the north along with the segment of I-690 from the West Street interchange to the Teall Avenue interchange. A detailed technical analysis was performed and documented for this area, including infrastructure condition, capacity, safety and operations.

- Capacity and Safety Study Limit: In the context of the Onondaga County interstate highway system, a network of freeways was studied for their safety and capacity operations. The limits include I-81, I-481, I-690 (Thruway to I-481) and Thruway Exits 39, 36 and 34A.
- General Social, Economic and Environmental Features Study Limit: Initial assessment and documentation of the social, economic and environmental features concentrated along the I-81 corridor and the adjoining municipalities, most prominently the City of Syracuse, and adjoining towns of Salina, Clay and Cicero on the north side of the corridor between the I-481 limits.
- SMTC Metropolitan Planning Area Boundary: The boundary encompasses Onondaga County and portions of Oswego and Madison Counties. This boundary corresponds with the official Metropolitan Planning Area (MPA) for SMTC and covers the limits of the public outreach efforts and regional travel demand model data.



As described in this study report and documented in more detail in technical reports, in general, the process steps included:

- 2008: Established the Study Advisory Committee (SAC)
- Spring 2009 – Spring 2011: Conducted physical condition and transportation system analyses; documented⁴ corridor existing conditions; and identified corridor needs
- Summer 2009: Developed study process; identified corridor limits; developed corridor community principles
- Fall 2009 -Summer 2010: Conducted 23 focus group meetings⁵ across the region
- Spring 2011: Formed the Community Liaison Committee (CLC) and the Municipal Liaison Committee (MLC)
- May 2011: Hosted a 3 day public workshop⁶ at the OnCenter in Syracuse
- Summer 2011 - Spring 2012: Developed initial strategies; pre-screened strategies; eliminated two major categories of strategies (I-81 relocation and stand-alone Western Bypass)

⁴ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

⁵ http://www.thei81challenge.org/cm/ResourceFiles/resources/Focus_Group_Summary_Sep_2010.pdf

⁶ <http://www.thei81challenge.org/cm/ResourceFiles/resources/I-81%20Public%20Workshop%20Summary.pdf>

- Spring 2012: Retained feasible strategies for further study (Rehabilitation Strategy, Reconstruction Strategy, Boulevard Strategy with capacity mitigation options (West Street arterial extension and the Western Bypass), Tunnel Strategy, Depressed Highway Strategy, Integration of enhanced transit, pedestrian and bicycle systems)
- May 2012: Hosted public meeting at the OnCenter in Syracuse
- Summer 2012 – Winter 2012: Further evaluated and refined feasible strategies
- Spring 2013: Defined limits of viaduct priority area; further refined strategies based on regional travel demand modeling; evaluated viaduct priority area strategies; eliminated strategies (western bypass, rehabilitation, tunnel, depressed highway) and retained Reconstruction Strategy and Boulevard Strategy
- May 2013: Held public meeting at the OnCenter in Syracuse; progress into NEPA scoping phase

B. I-81 Challenge Public Participation Program

Public involvement during the planning phase encourages meaningful discussions to assist in the process of exploring a sustainable, vibrant and healthy environment related to future transportation decisions. Over the past several years, NYSDOT, in partnership with SMTC, have led *The I-81 Challenge* to advance the community discussion about Syracuse’s I-81 corridor’s future. NYSDOT and SMTC engaged a broad cross-section of community members and have used a variety of methods in *The I-81 Challenge* public participation program. The public involvement process documents are found on *The I-81 Challenge* website⁷.

Educational and informational materials developed for this study are found on *The I-81 Challenge* website⁸, including a fact sheet; newsletters; electronic communications, including a blog launched in March 2011, a Facebook page created in April 2011, and “E-blasts” to a list of 1,200 email addresses starting in December 2010; videos on the history of transportation in the Syracuse region and case studies of other cities with urban freeways; and a Case Study Report (2010)⁹.

A Study Advisory Committee (SAC), consisting primarily of SMTC member agencies, was formed to provide input and guidance throughout *The I-81 Challenge*. Eleven SAC meetings were held to update members and obtain feedback on the study progress. As the study progressed, two additional committees were formed: a Community Liaison Committee (CLC) and a Municipal Liaison Committee (MLC). The CLC was comprised of individuals representing community organizations and the MLC was comprised of representatives of municipalities (town supervisors and village mayors) within the SMTC planning area. The CLC and MLC met prior to the 2011 and 2012 major public workshops for the project; the CLC also had an additional meeting in late 2011.

⁷ <http://thei81challenge.org/Home/SubMenuContent/StudyReportsAndDocuments>

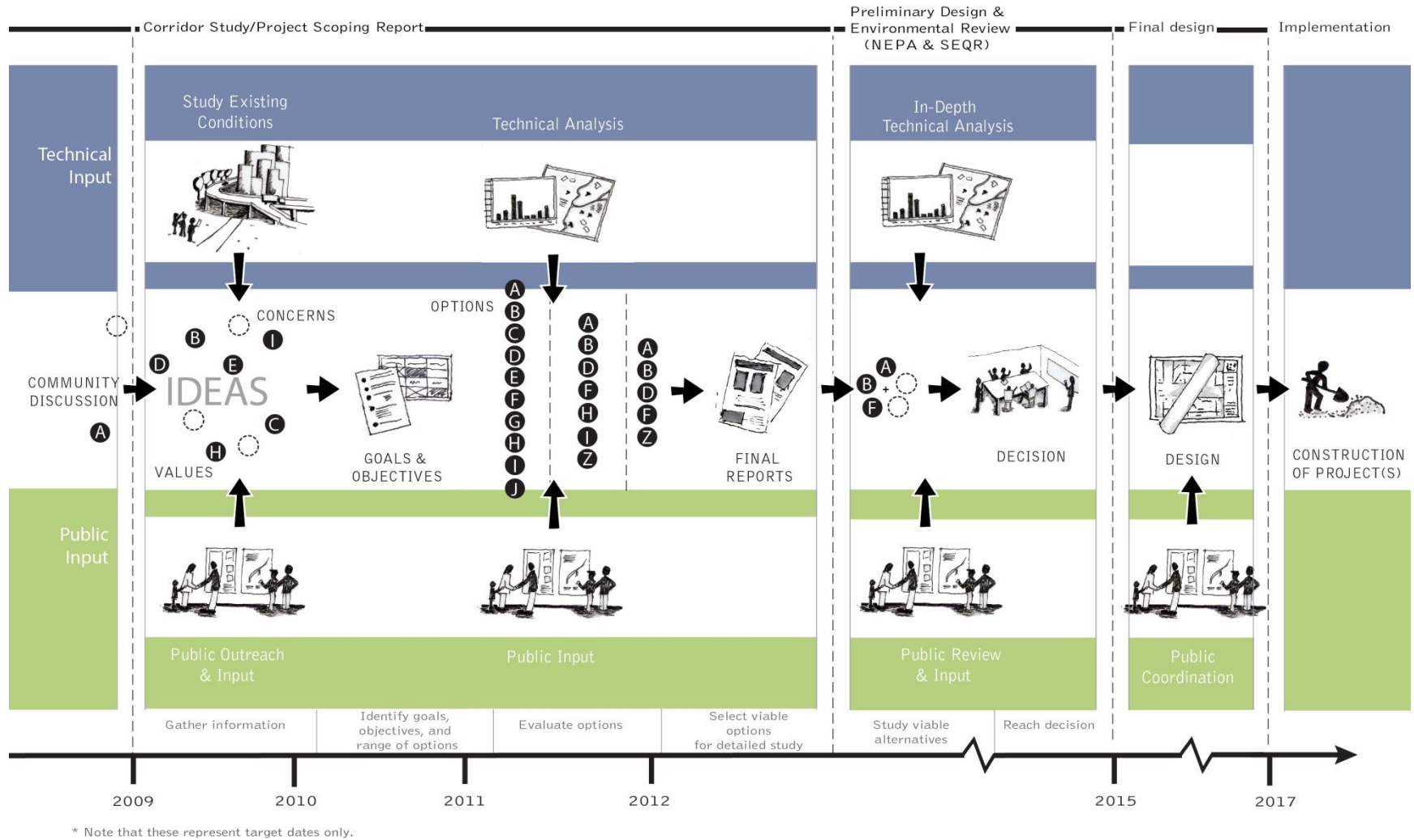
⁸ <http://thei81challenge.org/Home/MenuContent/Resources>

⁹ http://thei81challenge.org/cm/ResourceFiles/resources/CaseStudiesReport_3-02-10.pdf

Public input, combined with technical studies, has generated initial ideas, developed goals and objectives, developed evaluation criteria, and narrowed down the broad range of strategies. Based on input from stakeholders and further review and refinement, some strategies were determined not to be feasible. Other strategies were determined to be feasible; viable strategies will be advanced to the project development, design, and environmental review phase. The public involvement process will continue as strategies continue to be evaluated and refined.

Public Participation	Timeframe	Number of Participants	Primary Objective	Outcome
Questionnaires (2)	Summer 2009 through Spring 2010; and Spring 2011	Approximately 100 responses in 2009/2010; 990 responses in 2011	<ul style="list-style-type: none"> Learn how people currently use I-81 and their concerns about the future of I-81 	<ul style="list-style-type: none"> Raised awareness of project; used information about concerns and current use to develop goals and objectives.
Focus groups (23)	Sept/Oct 2009 and Feb/June 2010	176 participants	<ul style="list-style-type: none"> Initiate <i>The I-81 Challenge</i> Understand the range of interests, perspectives, uses, concerns and opportunities related to I-81 transportation needs and the future of I-81 corridor 	<ul style="list-style-type: none"> Identified community principles and community impact areas
Community meetings (more than 30)	Continuous (especially Dec 2009 - Sept 2011)	Nearly 500 attendees	<ul style="list-style-type: none"> Share information, gather community input about the process 	<ul style="list-style-type: none"> Raised awareness of project, educated the community about the process
Public workshops (3 days)	May 2011	700 in-person, 200 online	<ul style="list-style-type: none"> Educate public on study process, corridor existing conditions, project evolution, history, existing conditions and community principles Identify transportation needs and gather input of goals and objectives 	<ul style="list-style-type: none"> Input on deficiencies and needs of corridor Refined goals and objectives Initial step in strategy development process
Public workshop (1 day)	May 2012	480 in-person, 250 online	<ul style="list-style-type: none"> Evaluate and eliminate preliminary options, identify potential feasible strategies and examples 	<ul style="list-style-type: none"> Feedback on initial pre-screening Identified draft strategies Developed evaluation process and strategy evaluation matrix
Public meeting (1 day)	May 2013	720 in-person, 330 online	<ul style="list-style-type: none"> Present corridor study findings 	<ul style="list-style-type: none"> Bring feasible strategies into scoping, environmental review and preliminary engineering

The figure below illustrates the overall I-81 corridor study process.



C. Regional Travel Demand Model

The Syracuse Metropolitan Transportation Council (SMTC) maintains a travel demand model for their Metropolitan Planning Area. The model is an analytical tool used by the SMTC for a variety of planning level transportation projects. The SMTC model provides the best available tool for assessing, at the regional level, transportation strategies that were developed for the I-81 corridor study.

The model was significantly enhanced over the past few years to more accurately represent and analyze the restructuring of the interstate system in the region for this study, most notably in the City of Syracuse, I-81 viaduct area¹⁰. The model was updated to be consistent with the state of good practice procedures and to function properly with the more advanced strategies developed for the I-81 viaduct. Model refinements included updating housing and employment data via U.S. Census data and local knowledge, special generator (areas with unique travel characteristic such as universities, hospitals, malls, etc.) data via surveys and interviews, as well as highway and transit network updates via NYSDOT datasets and field verification.

Model validation was a crucial step in the process of updating the SMTC model. The model was validated using a variety of data sources including traffic counts, household travel surveys, travel speed survey, U.S. Census Transportation Planning Package (CTPP) data and NYSDOT vehicle miles traveled (VMT) estimates. Refinement and validation of the base year (2007) model was followed by the creation of a future year (2040) model. The future year model was used for this study to analyze the impacts that changes to the transportation network will have on future travel patterns. The results for each strategy can be compared to the no-build conditions to determine if the changes have a positive or negative impact on the regional transportation system. The model was run for the baseline strategies. The initial Regional Travel Demand Model output results were used for initial traffic analysis. Further modeling and traffic analysis will be refined under subsequent project phases.

D. Syracuse Transit System Analysis

As noted in the 2009 National Transportation Policy Project (NTPP)¹¹ report, while private automobiles account for the vast majority of intercity passenger movements, intercity bus and passenger rail can be time- and cost-competitive with other modes of transportation—and thus hold real potential for improving national connectivity while reducing energy and environmental externalities. To that end, as part of the I-81 corridor study, the Syracuse Transit System Analysis (STSA)¹² assessed the current

¹⁰ SMTC Travel Demand Model Version 3.023 Documentation; April 2012

<http://thei81challenge.org/cm/ResourceFiles/resources/SMTC%20Model%20Version%203.023%20Documentation.pdf>

¹¹ National Transportation Policy Project. (2009). "Performance Driven: A New Vision for U.S. Transportation Policy." A project of the Bipartisan Policy Center. <<http://www.bipartisanpolicy.org/sites/default/files/NTPP%20Report.pdf>>.

¹² Syracuse Transit System Analysis, Phase I Executive Summary; May 2013

<http://thei81challenge.org/cm/ResourceFiles/resources/130515%20STSA%20Executive%20Summary%20Phase%201.pdf>

transit system in the study area to develop a long-range vision that is consistent with the overall vision for the I-81 corridor. The STSA presents a series of short-term and long-term recommendations detailing how the Syracuse metropolitan area's transit system could be structured to meet identified needs in a cost-effective manner. The analyses and recommendations provided in the report are intended to be incorporated into the I-81 corridor study, as well as in other regional planning documents, including SMTC's Long Range Transportation Plan and the master plans of the City of Syracuse and surrounding municipalities.

The STSA presents a framework to assist the Syracuse metropolitan area in achieving a balanced transportation system that supports the goals and objectives of the corridor study, supports economic growth, improves quality of life, and supports the vision of the communities that it serves. Objectives of the STSA include:

- Reduce congestion within the city, particularly along corridors adjacent to I-81 and I-690;
- Facilitate sustainable economic development within the city, including the planned development in University Hill;
- Reduce parking demand in downtown and on University Hill;
- Examine the feasibility of increasing the frequency and number of hours per day that buses operate;
- Improve connectivity and integration of downtown with University Hill;
- Increase transportation options for young, elderly, disabled, and low-income populations;
- Decrease noise and air pollution generated from traffic; and,
- Improve transit travel times on commuter routes to be more competitive with vehicle travel time.



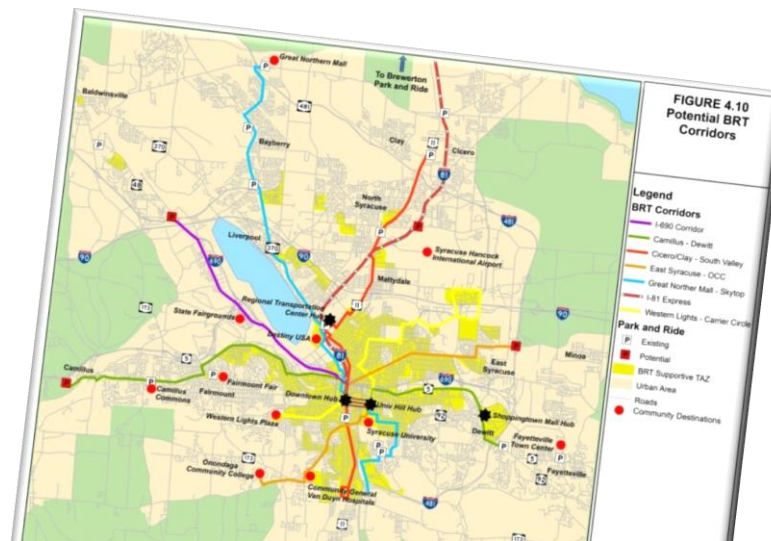
To meet the objectives of the STSA, several transit enhancement opportunities were identified for key transit corridors within the Syracuse metropolitan area. The features associated with each opportunity, as well as the selection of the key transit corridors, are based on field data collection, public outreach, stakeholder feedback, demographics, and existing reports and studies. The opportunities present various levels of investment in the transit system.

The recommendations and implementation plan included in the transit study could have a much larger impact on the region than just better and more attractive transit services. An increase in transit ridership could lead to a modal shift that would reduce peak hour vehicle trips, reduce the need for parking in downtown and on University Hill, and support smart economic growth, which will also support the vision of the overall I-81 corridor and resultant I-81 projects. In addition, smart economic growth along transit corridors would improve overall quality of life, improve the walkability of the city and region, and lead to new economic opportunities for area residents. Therefore, the recommendations and implementation plan will be integrated into the I-81 strategies where appropriate and do not preclude/inhibit future system improvements/expansion.

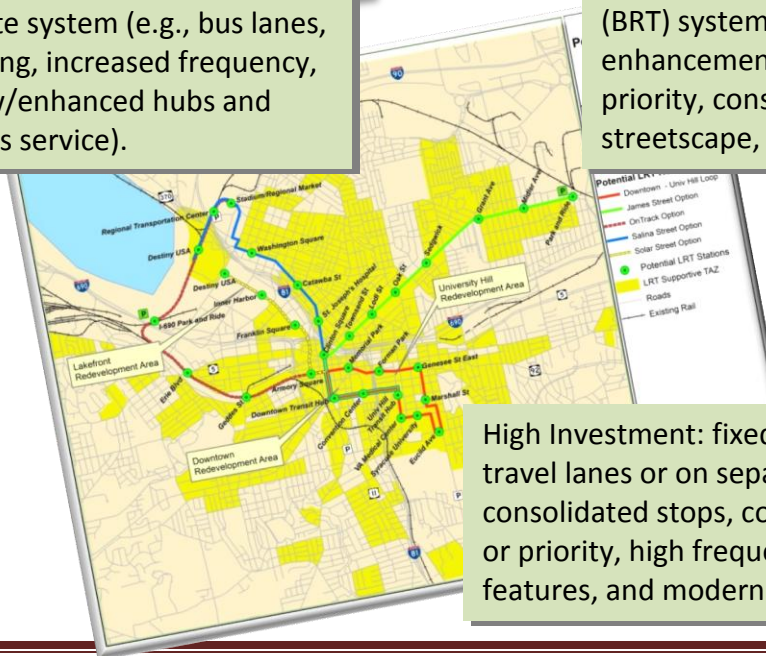
Transit Investment Opportunities



Low Investment: consolidated, simplified route structure based on the existing fixed-route system (e.g., bus lanes, queue jumpers, corridor branding, increased frequency, expanded operating hours, new/enhanced hubs and park- and-rides, and express bus service).



Moderate Investment: higher-intensity bus-rapid-transit (BRT) system along key transit corridors with enhancements such as bus lanes, queue jumpers, signal priority, consolidated stops, rider amenities, unique streetscape, increased frequency, and modern vehicles.



High Investment: fixed-route on-street rail service (within travel lanes or on separate lanes) that incorporates consolidated stops, corridor branding, signal preemption or priority, high frequency service, distinctive streetscape features, and modern vehicles.

IV. I-81 Today – Existing Conditions

A. Transportation system

1. Highway system

According to the American Association of State Highway Officials (AASHTO), “America’s transportation system has served us well, but now faces the challenges of congestion, energy supply, environmental impacts, climate change, and sprawl that threaten to undermine the economic, social, and environmental future of the nation.”¹³ Interstate 81 in downtown Syracuse, like many of the interstates of its era, is reaching the end of its useful life. This is particularly evident in the metropolitan Syracuse area, where the infrastructure is deteriorating and there are many highway design features that are non-standard by today’s standards.

Highway existing conditions are described in Technical Memorandum #1: Physical Conditions Analysis¹⁴. As noted in the report, between 1974 and 2003, traffic increased on I-81 at an annual rate of 3.3 to 5.4 percent; however, since 2003 growth in traffic has remained flat (or 0% per year) in the I-81 corridor. Average annual daily traffic (AADT) in the primary study area ranges from approximately 43,000 to 99,000, with high volumes getting on or off I-81 at the Adams/Harrison Street ramps for access into the City of Syracuse. Trucks and buses account for 9 percent of total traffic during the morning rush hour and 8 percent during the evening rush hour.



In general, the studies indicate that the system operates fairly efficiently and there is sufficient capacity for current traffic volumes. This means the corridor is generally not congested (operating at Level of Service (LOS) A, B or C) during morning and evening rush hours. Poor sight distance, sharp curves, and limited ramp spacing, found mostly in the general vicinity of the I-81/I-690 Interchange and at the adjacent interchanges on both I-81 and I-690, result in slower speeds during morning and evening peak hours or if there is

¹³ AASHTO. (2009). “Transportation: Invest in Our Future – A Vision for the Future.” <<http://www.transportation1.org/tif5report/intro.html>>.

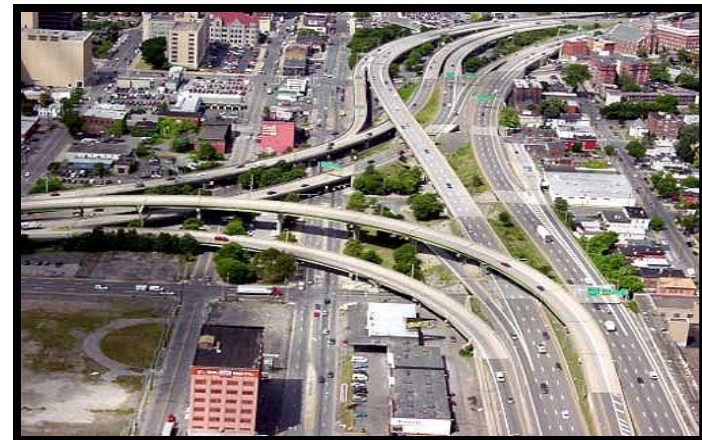
¹⁴ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

disruption such as accidents or maintenance activities. Consequently, there are certain areas along I-690 and I-81 in the downtown area that experience some congestion (LOS D/E/F) during peak periods; highway sections that involve merging traffic or traffic exiting also operate at LOS F.

As noted in Technical Memorandum #1: Physical Conditions Analysis¹⁵, overall, the I-81 viaduct section serves the travel needs of the citizens of the City of Syracuse and Onondaga County, while providing minor service to national and international traffic. An analysis revealed that approximately 12 percent of the vehicles traveling on the I-81 corridor are “through traffic” or those who continue to destinations beyond the study area. Given the low percentage of through traffic, diverting regional interstate through-traffic to I-481 or other alternate interstate routes would have little impact on traffic volumes or operations on I-81 within the primary study area.

NYS DOT surface rating survey analysis found the majority of the pavement in the primary study area to be in “good” condition. On the other hand, based on available inspection reports, of the 76 bridges located along I-81 and I-690 in the primary study area, 60 percent are classified as “functionally obsolete,” meaning the lane widths, load carrying capacity, clearance, or approach roadway alignments do not meet current bridge standards; 18 of these bridges are located in the viaduct section of I-81 in downtown Syracuse. Nine percent of the bridges in the corridor are classified as “structurally deficient” meaning they are in need of rehabilitation or are restricted to light vehicles; one of these bridges is located in the viaduct section of I-81.

Level of Service (LOS) is an indicator of congestion on road segments and at intersections. It measures delay experienced by drivers on a scale of A (short wait times) to F (long delays).

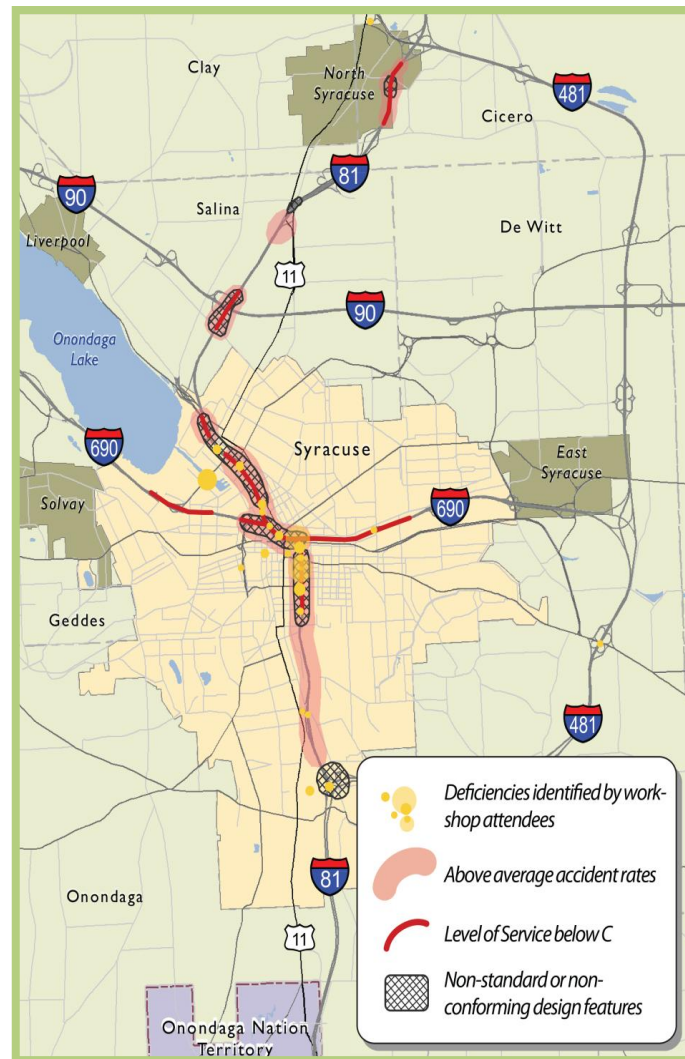


¹⁵ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

The one-mile raised roadway section within the City of Syracuse and the adjacent I-81/I-690 interchange, which has more than 11,000 feet of bridge length that equates to almost 1,000,000 square feet of deck area, poses the greatest concern. This section of elevated highway (viaduct) has Almond Street and its connecting ramps (Adams/ Harrison interchange) running parallel and underneath I-81 for most of its length. This area through downtown and the city has a combination of significant design deficiencies, re-occurring accident problems and traffic congestion. Based on a review and evaluation of the 76 bridges in the corridor, it is recommended that all bridges from the 1950's to 1960's era be replaced rather than rehabilitated due to their overall age and condition.

An accident analysis for the primary study area of I-81, I-690 and I-481 corridors and their associated on- and off-ramps was conducted using information obtained from the NYSDOT for the most recent three-year period available at the time (February 1, 2006 – January 31, 2009). The analysis and collision diagrams for the viaduct area are documented in the Technical Memorandum #1: Physical Conditions Analysis¹⁶. In addition, supplemental collision diagrams were completed for the Priority Investigation Locations (PILs). There were four fatalities in the corridor during the time frames assessed, including one at the Brighton exit (Exit 17), one at the Clinton/Salina exit (Exit 19) and two at the Route 11/Brewerton to Airport Exit. In summary, several areas of overlapping safety, congestion and geometric deficiencies were identified.

Based on NYSDOT collision data analysis, the highways in the primary study area have a relatively high rate of accidents when compared to statewide averages. This is especially true in the area around the I-81/I-690 interchange. For example:



¹⁶ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

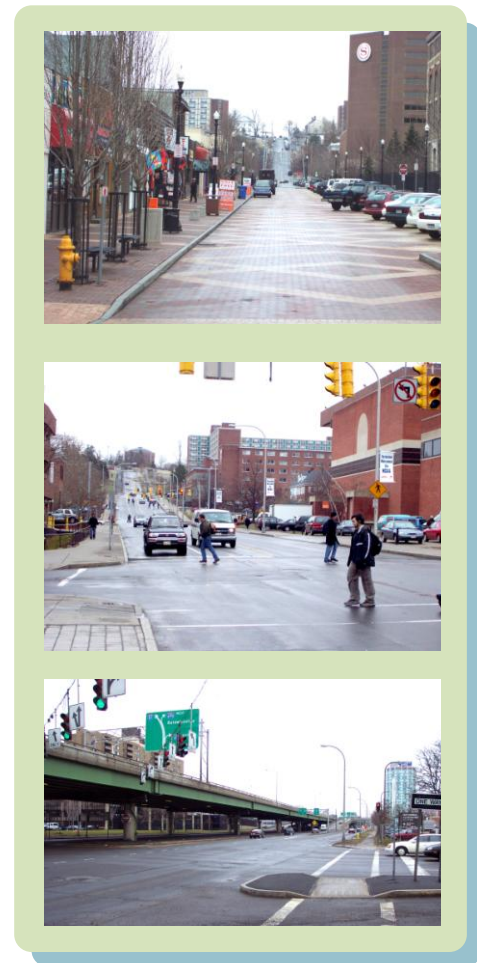
- I-81 north of the I-690 interchange, toward Carousel Center, has an accident rate approximately two times the statewide average.
- The northbound viaduct section of I-81 has an accident rate more than three times the statewide average.
- I-81 through the I-690 interchange has sections where the accident rates reach five times the statewide average.

2. Pedestrian and bicycle facilities

Pedestrian and bicycle facilities and multi-use trails in the I-81 study area are discussed in I-81 Challenge Technical Memorandum #1: Physical Conditions Analysis; January 2011¹⁷ and the Syracuse Metropolitan Transportation Council (SMTC) *Bicycle and Pedestrian Plan*¹⁸. Prominent pedestrian activity recorded in the study area is in the University Hill area; the City of Syracuse’s “Connective Corridor”¹⁹ is a notable recent project that improves pedestrian and transit connections between downtown Syracuse and the University Hill.

Though pedestrian and bicycle facilities exist in the I-81 study area, the following items are noted:

- The I-81 Interstate corridor presents a significant barrier to pedestrian and bicyclist mobility. The elevated highway and the collector/distributor streets associated with Almond Street under the highway, as well as traffic, poor visibility for drivers and bike riders, and lack of signage, contribute to the barrier effect. This area has poor visual quality due to the elevated highway and its numerous bridge piers along with the busy crossing roads and Almond Street. The length of time required to cross Almond Street is a concern due to the width of the roadway and signal timing.
- There are limited pedestrian crossing locations under I-81 at E. Genesee Street, Harrison Street, E. Adams Street, W. Castle Street and E. Colvin Street; these generally include multiple vehicular turning movements and poor visibility underneath the elevated highway.



¹⁷ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

¹⁸ Syracuse Metropolitan Transportation Council, *Bicycle and Pedestrian Plan*, March 2005.

¹⁹ <http://connectivecorridor.syr.edu/>

- Wide streets with unmarked crossings are common in the area. Pedestrians frequently use undesignated mid-block crossings.
- While most of University Hill has sidewalks, the conditions of the pedestrian streetscape are inconsistent, with missing sections of sidewalk, a lack of consistent street trees, lighting, or furnishings. Pedestrian crossings are generally not marked with high-visibility pavement markings, and ADA accessibility is lacking in many locations.
- Many intersections do not have up-to-date signage, pedestrian signals or pavement markings.

3. Transit system

As noted in the Syracuse Transit System Analysis report²⁰ developed for the I-81 Challenge, CENTRO, a subsidiary of the Central New York Regional Transportation Authority (CNYRTA), provides fixed route and call-a-bus (para-transit) bus services to Syracuse and Onondaga County as well as other municipalities in Central New York. In fiscal year 2010, the CENTRO transit system served 11.6 million riders. Based on the data analysis and observations, it was determined that the core ridership within the transit system is made up of transit-dependent markets such as densely populated and low-income neighborhoods, Syracuse University and other institutions. Average passenger loads remain at less than twenty people per bus on routes to and from suburban locations. Park-and-rides are not generating a significant number of riders. Commuters represent only a small portion of overall system ridership. Intermodal connections are in place for the Amtrak station, the CENTRO bus system and the airport. Recent initiatives like the Connective Corridor project promote multi-modal opportunities.

B. Environmental setting

The I-81 corridor is principally situated in the center of Onondaga County at the northeast corner of the Finger Lakes region of New York State. Technical Memorandum #1²¹ and Technical Memorandum #2²² describe land use and environmental resources in the I-81 study area. The existing land use structure is clearly defined by its transportation network (highways, rail and air) including the more recent suburban development to the north and southeast. Generally the existing land use displays a typical pattern of higher intensity commercial, tourist and industrial land uses at the confluence of major transportation corridors as well as following along these corridors. The urbanization pattern is very traditional and has a central city, Syracuse, located at the intersection of a major transportation corridor, with outlying towns and places located along major transportation corridors. The airport and a majority of industrial land are located predominately to the north of Syracuse along I-90 and between I-90 and I-81. The interstates offer

²⁰ Syracuse Transit System Analysis, Phase I Executive Summary; May 2013

<http://thei81challenge.org/cm/ResourceFiles/resources/130515%20STSA%20Executive%20Summary%20Phase%201.pdf>

²¹ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

²² Technical Memorandum #2: Strategy Development and Evaluation; July 2013 <http://thei81challenge.org/cm/ResourceFiles/resources/TechnicalMemorandum2.pdf>

accessibility and connectivity to the larger region. As such, it is a major influence on the location of employment, shopping and residential uses.

The City of Syracuse functions as the region's activity center and is home to a variety of universities, hospitals, institutions, cultural and civic uses. Beyond Syracuse, the towns and villages have well-defined edges, separated from one another by open space and rural lands. Recent development trends include single use, suburban development patterns to the north of Syracuse and along the urban edges of the towns and villages primarily in the form of suburban residential subdivisions and commercial strips along arterial roads.

Land use, demographic and economic trends within the study areas (presented in Technical Memorandum #1: Physical Conditions Analysis²³) provide a helpful context for understanding how I-81 fits into and affects development patterns in the region. The *Onondaga County Sustainable Development Plan*²⁴ identifies several important challenges to the region that will influence growth and development within the study area. Some of the county's identified challenges and opportunities over the coming decade may relate directly or indirectly to the potential I-81 project development strategies, including:

- A reduction in farmland that is 3.5 times the average of the 100 largest metropolitan areas in the US.
- A settlement pattern and transportation network that serves only a small proportion of the population via mass transit.
- A need to reduce a larger carbon footprint due to lower density, increasingly suburban development patterns, low transit use and increased vehicle miles traveled (VMT). Carbon emissions were reported to be over twice the average of the 100 largest metropolitan areas.
- A desire to increase demand for public facilities and services in growth areas.
- A need to deal with abandoned neighborhoods, buildings and employment centers.
- An effort to address known pockets of poverty.
- A goal to restore the area's economic competitiveness.

C. Community resources

Existing development in Onondaga County generally follows a traditional radial pattern. The urbanized area is centered in the City of Syracuse, where many of the region's jobs and approximately 30 percent of the population are located. This urbanized area has expanded over time to include first- and second-ring suburbs, which continue to develop along major commuter routes. Significant

²³ *Technical Memorandum #1: Physical Conditions Analysis; January 2011* http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

²⁴ Source: http://www.ongov.net/planning/documents/plan_presentation.pdf

housing and commercial development has occurred in these suburbs, while industrial uses, initially located in proximity to rail lines, can generally be found north of the city.

Salina, Cicero, and Clay, as well as the Village of North Syracuse, are mostly suburban towns located north of the City of Syracuse. Parts of each jurisdiction fall adjacent to the primary I-81 study corridor. Salina is located north of Syracuse along the I-81 corridor and consists of five small suburban communities. Land use in Salina is largely residential in the I-81 corridor. The Town of Cicero has access via I-81, I-481, I-90 and US 11. Similar to Salina, Cicero is largely residential with existing land use most dense or intense in the areas around I-81 and US 11. The Town of Cicero Comprehensive Plan identifies some land use changes along the I-81 and the I-481 corridor, mostly adding commercial and industrial uses along these corridors. The I-81 primary study area just barely crosses into the southeast corner of the Town of Clay; the Village of North Syracuse is bisected by the Towns of Clay and Cicero and by I-81 which runs through the far eastern edge of the village.

The City of Syracuse *Land Use Plan 2025*²⁵ (Draft) documents locations where land use in the future could be quite different than today. The plan notes trends in land development and spells out the vision that the city has for each TNT (Tomorrows Neighborhood Today)²⁶ areas. TNT is intended to create a comprehensive process for involving neighborhood residents, businesses, and organizations in planning for their neighborhoods. As presented in Technical Memorandum #1: Physical Conditions Analysis²⁷, demographic trends reflect development patterns, with population shifting from city to county and out of the county altogether.

Since 1990, the populations of the City of Syracuse and Onondaga County have steadily declined. The city population decreased by 15.7 percent from 1990 to 2008, while the county population decreased by 3.5 percent. Between 1980 and 2000, upstate New York lost roughly 20 percent of people aged 20 to 34. The largest increase in population for the City of Syracuse is among 55 to 64 year olds, up 30.8 percent since 2000, reflecting the large baby boom population entering this age bracket. Thirty percent of the City of Syracuse's population is under 19 years old.

There are five neighborhoods that are adjacent to the primary I-81 corridor study area: Downtown TNT/Syracuse, Eastside TNT, Southside TNT, Lakefront TNT and Northside TNT. The I-81 and I-690 highways define the edges of a number of adjoining neighborhoods. Most notably, I-81 physically defines the border between the University Hill and downtown neighborhoods. Downtown Syracuse is undergoing an urban renaissance with several new private developments that changed properties from

²⁵ City of Syracuse *Land Use Plan 2025* <http://www.syracuse.ny.us/uploadedFiles/Departments/CommunityDevelopment/Content/Documents/Full%20Report.pdf>

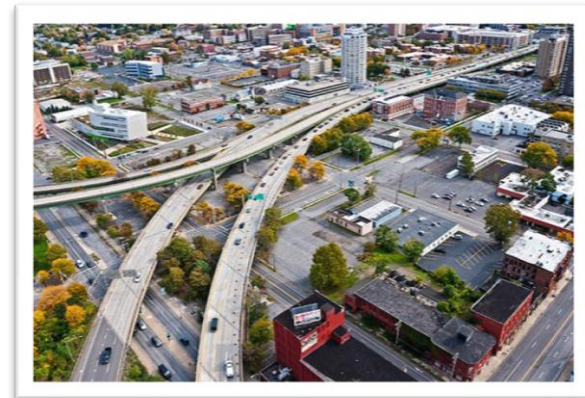
²⁶ http://www.syracuse.ny.us/TNT_Home.aspx

²⁷ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

mostly offices to a mix of housing and retail, consistent with the nation-wide renewed interest in urban living. Syracuse University worked to bring students and classrooms downtown by improving the linkages with University Hill through the Connective Corridor transit initiative. Land use patterns in the Eastside TNT sector are strongly influenced by the major medical institutions and universities located on University Hill. Residential areas mostly east of the institutions cater to the local student and professional populations along with the isolated business districts that are present in the center north of the neighborhood. This sector is in the midst of an economic boom with more than \$700 million in new capital projects planned to be completed in the near future. The Southeast Gateway in Southside has drawn widespread redevelopment interest due to its prime, central location and its proximity to heavily populated residential neighborhoods.

Vast tracts of underutilized land and buildings provide ample opportunities for redevelopment in the Lakefront sector. The City of Syracuse has developed a master plan for the Lakefront sector that envisions the Lakefront as a mixed-use New Urbanism community, one where there is a new town square with businesses surrounding it and a variety of high-density housing. The Inner Harbor is envisioned as a waterfront promenade with specialty retail shops and dining opportunities. Residential neighborhoods of varying densities exist across the Northside sector. Many of the neighborhoods are within walking distance to public parks or green spaces and include commercial uses such as small convenience stores and neighborhood dining establishments that contribute to the character of the neighborhood.

The I-81 corridor in the City of Syracuse is a significant visual element within the primary study area, as documented in Appendix B, Technical Memorandum #1, Chapter 4²⁸. It is particularly prominent in downtown where the I-81 / I-690 interchange rises well above the surface street network and most downtown buildings. The area of the viaduct has an elevated highway running between downtown and University Hill, with Almond Street running underneath. This area can be considered to be of poor visual quality due to the deteriorating infrastructure and its numerous bridge piers, along with the busy crossing roads.



The highways in the study area, as originally built, framed many of the City of Syracuse neighborhoods and created challenges for interaction among neighborhood residents. The presence of social interaction and connectivity barriers among neighborhoods, as

²⁸ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

well as opportunities to overcome them, will be further considered as the project alternatives are developed. In particular, the long standing presence of I-81 and I-690 has created physical barriers to neighborhood cohesion along the corridor study area:

- I-81 is a visual barrier between the downtown and Eastside TNT/University Hill neighborhood
- I-690 is a physical barrier between Eastside and Northside TNTs
- I-81, along with I-690, forms a physical barrier, thus isolating the Lakefront neighborhood from adjoining neighborhoods.

D. Economic conditions

The benefits of non-work travel that can have substantial economic benefits in an area, thus creating a safe, easy to navigate transportation system can have a positive economic impact in an urban area like Syracuse. Agglomeration, which refers to the dense co-location of people, jobs, and labor market, stimulates innovation and productivity. These effects are increased by more efficient transportation and impact economic productivity and global competitiveness²⁹. Land use and economic conditions are discussed in Technical Memorandum #1: Physical Conditions Analysis³⁰.



Photo courtesy of Syracuse Metropolitan Transportation Council

As described more fully in the technical memorandum, the housing availability in the Syracuse area is generally affordable. There is resurgence in development of vacant buildings for residential use though there are also vacant office buildings in downtown Syracuse which offer redevelopment opportunities as well. Some notable successes in residential development in the city include Franklin Square in the Lakefront neighborhood, which is completely occupied, and a 10 story building that is currently being converted into apartments. Salina Street, which is the “Main Street” of downtown Syracuse, has had recent high quality activity since the move of the Centro Common Center. Armory Square is considered a true success story of the most recent commercial redevelopment projects, with space completely occupied, offering retail and restaurant space, some smaller office uses, and some residential rental units.

National studies show that 77 percent of “Gen Y” (between the ages of about 18-32 years) say they want to live in an urban core (RCLCO 2008 survey³¹) and 75 percent of “Baby Boomers” say they want mixed-age and mixed-use communities (RCLCO 2009

²⁹ National Transportation Policy Project. (2009). “Performance Driven: A New Vision for U.S. Transportation Policy.” A project of the Bipartisan Policy Center. <<http://www.bipartisanpolicy.org/sites/default/files/NTPP%20Report.pdf>>.

³⁰ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

³¹ RCLCO 2008 Survey Report: http://www.rclco.com/archivepdf/general_Jun232008345_Growing_Demand_for_Walkable_Places.pdf cited in http://www.uli.org/wp-content/uploads/2009/10/Sustainable-Suburbs-Dunham_Jones.pdf

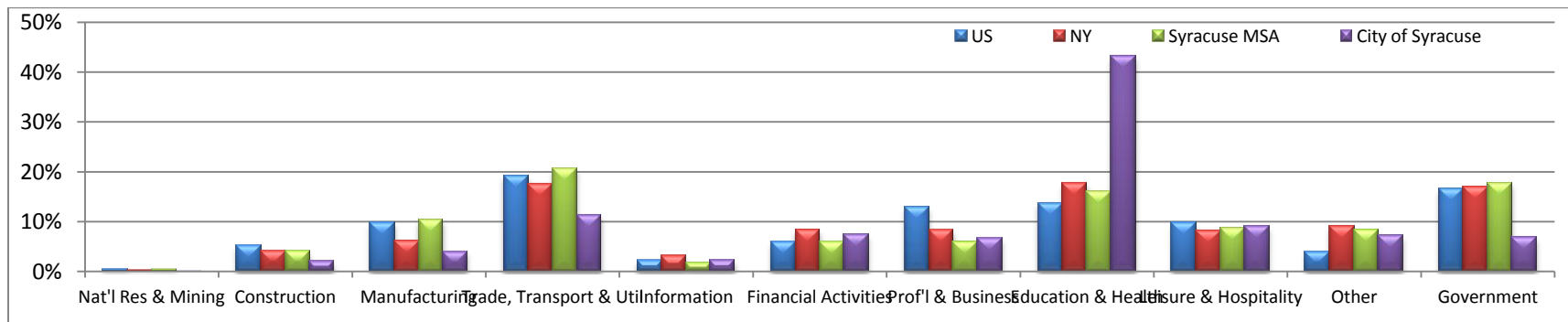
survey³²). Consistent with this finding, many of the individuals who choose to live in downtown Syracuse are “empty nesters”, young professionals or college students.

The Syracuse metropolitan area’s economy is characterized by a migration of jobs from the urban core to surrounding suburbs. Between 2002 and 2008, employment in the City of Syracuse dropped by approximately 11,000 jobs. Over the same period, employment in Onondaga County increased by almost 7,000 jobs.

A cluster of hospitals, universities and related businesses (aka, “Meds and Eds”) is located in the City of Syracuse, many on University Hill to the east of I-81. Some of these organizations are interested in expanding, but large building lots on University Hill are dwindling in number. Because this area is bordered on one side by I-81, development near the existing facilities is further constrained. Syracuse University (SU) has acquired space downtown, most notably the Warehouse building, to meet some of their expansion requirements and create a presence in the Downtown and Near Westside. SUNY Upstate Medical University and the SUNY College of Environmental Science and Forestry are both expanding; some of their development has occurred away from the traditional “University Hill” area of the City, stressing the need and importance of connectivity between University Hill and downtown, which is presently traversed by I-81.



Photo courtesy of Syracuse Metropolitan Transportation Council



Percent of Employment by Industry 2008

Source: 2008 preliminary data from Quarterly Census of Employment and Wages, State of New York and U. S. Bureau of Labor Statistics; <http://www.labor.state.ny.us/stats/ins.asp>.
 Note: “Other Services” includes Other Services, Unclassified, and Administrative & Waste Services.

³² Cited in Urban Land Institute report http://www.uli.org/wp-content/uploads/2009/10/Sustainable-Suburbs-Dunham_Jones.pdf

V. Corridor Transportation Needs

As emphasized in the National Transportation Policy Project (NTPP), this is a period of extraordinary opportunity for revitalizing America's surface transportation system. The investments of the interstate highway era, begun more than 50 years ago, are nearing or beyond their intended lifespan. Existing systems are dated, in many cases strained to (or beyond) capacity, and increasingly fall short of delivering transportation services at the level of quality, performance, and efficiency the American public demands³³. These demands and needs are evident in the 12-mile I-81 corridor. Specifically, the I-81 corridor study process has identified the need to:

a. Address capacity, reliability and safety problems associated with non-conforming highway features

Address the deficiencies in the transportation system geometry to improve traffic operations, flow and capacity, reducing congestion and accidents. The corridor study found that highway sections along the I-81 corridor that do not meet current design standards generally coincide with areas of increased congestion and high accident rates. Addressing design deficiencies in the corridor would improve capacity and reliability, and reduce accident patterns and rates.

b. Address deteriorating infrastructure

Address functionally obsolete and deficient structures within the I-81 study area. The major reason for the urgency of this planning effort is the condition of the viaduct and other bridges located on I-81 between the I-481 interchanges, as well as on I-690 in the vicinity of the I-81/I-690 interchange. Of the 76 bridges in this area, 60 percent are considered functionally obsolete and have narrow lanes, and no or reduced shoulders. NYSDOT frequently inspects these bridges and makes routine repairs to protect the traveling public. However, it is critically important to begin a serious effort to address these aging pieces of infrastructure to assure the safety and efficiency of the future regional transportation network.

c. Maintain traffic flow

Maintain and improve traffic flow to and within the City of Syracuse, surrounding communities, and the interstate system. Retain traffic flow to northern and southern outer segments of the corridor to ensure continued accessibility and mobility for all travelers to and from the area. Although I-81 is an important national trade route, recent data collected found that only about 12 percent of all vehicles traveling along the I-81 corridor pass through the Syracuse region. This information is useful for understanding how much traffic is using or could use alternative interstate routes to bypass the

³³ National Transportation Policy Project. (2009). "Performance Driven: A New Vision for U.S. Transportation Policy." A project of the Bipartisan Policy Center. <<http://www.bipartisanpolicy.org/sites/default/files/NTPP%20Report.pdf>>.

region and suggests that diverting regional interstate through traffic will have little impact on traffic volumes or operations on I-81.

d. Improve pedestrian and bicyclist access and safety

Improve accommodations for pedestrian and bicyclist use and system connectivity; reduce injuries and fatalities to pedestrians within the I-81 study area. Within the corridor study area there is an increased emphasis on the need to provide adequate access for pedestrians and bicyclists. Expanded transit system and improved or new pedestrian and bicyclist facilities will result in greater connectivity; improving mass transit options will assist in reducing congestion. In urbanized areas of I-81 corridor, there is a lack of pedestrian and bicycle facilities including sidewalks, lighting and bike lanes which decrease the safety for pedestrians and bicyclists. Specifically, there is a need to improve the connection between downtown Syracuse and the University Hill area. More desirable and safer pedestrian and bicyclist travel can in turn has a positive economic impact on local shopping, restaurants, and other non-work activities and enhance community “sense of place”.

e. Improve access to support community cohesion and economic competitiveness

Improve access to local businesses, medical facilities and connections to the local street network. From the surrounding areas and interstate travel, improve connectivity for the residential areas and minimize physical intrusions into commercial and residential areas within the I-81 study area. Stimulate economic development within the I-81 study area, including in the city and the suburban areas in the outer segments of the corridor. Maintain or improve economic development opportunities in collaboration with local businesses, including “Meds and Eds”, and retail in Syracuse and surrounding communities. In the downtown Syracuse area, there is public perception that the viaduct presents a barrier to community cohesiveness.

f. Support, coordinate and be consistent with regional land use plans and sustainable community principles

Address the transportation needs in a way that supports economic competitiveness, community cohesion, and environmental resource protection. These are three cornerstones of a sustainable community. Coordinate transportation needs with land use development plans within the I-81 study area, including the City of Syracuse and the towns north and south of the city. The Regional Economic Development Council (REDC) recognizes that “strong regions are built around strong municipal cores that develop centers of innovation and commerce...central element of our development strategy”.

VI. Corridor Study Goals and Objectives

As noted on the AASHTO Center for Environmental Excellence website³⁴, current and future transportation growth patterns and the way that we develop transportation systems are important factors in sustaining the world's limited economic, environmental, and social resources and capacity. Through *The I-81 Challenge* focus groups, community members and stakeholders developed an initial and important list of emerging community principles and community impact areas. The detailed summary of these activities is provided in Technical Memorandum #1: Physical Conditions Analysis³⁵ and in White papers and other public involvement documents on *The I-81 Challenge* website³⁶.

The initial emerging community principles and community impact areas developed with stakeholders and the public evolved into the corridor goals and objectives as shown below. These goals and objectives served as criteria for strategy evaluation, as presented in the assessment matrix for each strategy. The community goals are grouped into transportation assessment as well as the sustainability triple bottom line principles of economic competitiveness, social equity and environmental stewardship. Strategies were evaluated against the community-identified objectives.

In its 2011 Capital Program Update guidance, NYSDOT recognized that a sustainable approach to planning considers the relative and cumulative value of transportation assets as they benefit the public, economy and environment. In this way, the decision-making process looks broadly at the wider benefits of transportation improvements as they relate to sustainability³⁷:



Economic competitiveness: improve efficiencies in work/business travel and freight movement; improve tourism access and inter-modal connectivity; develop investments which complement or enhance the strategic investments proposed by Regional Economic Development Councils.

Social equity/community: improve accessibility for transit, recreation, education, health care; support smart growth, complete streets and livability; increase safety; weigh climate-associated risk to transportation infrastructure.

Environmental stewardship: increase energy efficiency and reduce greenhouse gas emissions; reduce resource consumption; limit impacts that encroach on the environmental footprint; improve air quality.

³⁴ <http://environment.transportation.org/>

³⁵ Technical Memorandum #1: Physical Conditions Analysis; January 2011 http://thei81challenge.org/cm/ResourceFiles/resources/Technical_Memorandum_s.pdf

³⁶ <http://thei81challenge.org/Home/SubMenuContent/StudyReportsAndDocuments>

³⁷ 2011 NYSDOT Capital Program Update Guidance

I-81 Strategies Evaluation Criteria		
Category	Goals	Objectives
Transportation	Enhance the Transportation Network	<ul style="list-style-type: none"> ▪ Eliminate structural deficiencies using treatment strategies which provide the lowest life cycle maintenance costs and restore bridge condition ratings, where applicable, to good condition for at least 30 years. ▪ Improve existing geometric design through the application of appropriate design standards and the reduction of non-standard elements and/or geometries. ▪ Identify alternative mode improvements in the vicinity of I-81.
	Enhance Region-wide Mobility	<ul style="list-style-type: none"> ▪ Improve peak period mobility and reduce delay on the highway system (primary, secondary and city streets) by providing acceptable operating speeds, improving level of service. Preserve regional mobility by maintaining travel times. ▪ Improve access to key destinations (i.e.: the airport, hospitals, and downtown businesses). Improve connectivity of alternative modes of transportation (pedestrian, bicycle, transit).
	Improve Public Safety	<ul style="list-style-type: none"> ▪ Reduce accident occurrences to at or below the statewide average for similar facilities. ▪ Improve the safety of alternative modes of transportation (pedestrian, bicycle, transit).
Economic Competitiveness	Maintain or Improve Economic Opportunities	<ul style="list-style-type: none"> ▪ Maintain or improve the overall economic environment and infrastructure. ▪ Maintain or improve economic opportunities by addressing multi modal access. ▪ Improve transportation system efficiency, reliability and reduce travel costs.
	Exercise Fiscal Responsibility	<ul style="list-style-type: none"> ▪ Minimize capital costs by ensuring that transportation system investments are cost-effective. Minimize long term operation and maintenance costs.
Social Equity/ Quality of Life	Support Community Quality of Life	<ul style="list-style-type: none"> ▪ Encourage sustainable land use patterns within the city and county. ▪ Enhance local connectivity (such as linking University Hill with downtown). ▪ Encourage smart growth: sustainable regional land use patterns that minimize suburban sprawl which increases demand for infrastructure and services. ▪ Improve the visual built environment through context sensitive design that contributes to roadside/street ambiance, community character and public safety. ▪ Promote other planning and development visions and initiatives (county, city, and region).
	Share Burdens and Benefits	<ul style="list-style-type: none"> ▪ Share the burden of impacts during construction and long term across stakeholders (e.g. suburbs, adjacent neighborhoods, low income communities, Onondaga Nation). ▪ Share the benefits across stakeholders (e.g. suburbs, adjacent neighborhoods, low income communities, Onondaga Nation).
Environmental Stewardship	Preserve or Enhance Environmental Health	<ul style="list-style-type: none"> ▪ Support local, regional and state environmental initiatives. ▪ Maintain or improve air quality (overall emissions and odor). ▪ Minimize air quality and noise impacts on adjacent neighbors. ▪ Minimize impacts on designated community landmarks and historic resources. ▪ Minimize storm water impacts and improve water quality.

VII. Priority Area Identification

The study covers a 12-mile stretch of I-81 in Onondaga County from the southern entrance to the City of Syracuse at the I-81/I-481 southern interchange (southerly limit), passing through the heart of the city and proceeding north, past Onondaga Lake, I-90 (NYS Thruway) and the Syracuse Hancock International Airport before intersecting with I-481 on the north side of the county (northerly limit). For evaluation purposes, the corridor was divided into the outer segments and the downtown viaduct area. The outer segments include the northern segment of I-81 from the I-481 northern interchange to Hiawatha (approximately 6.5 miles) and the southern segment of I-81 from about Castle Street south to the I-481 southern interchange (approximately 2 miles). The downtown viaduct area includes I-81 from Hiawatha Boulevard south to Castle Street along with I-690 from West Street to Teall Avenue.

For most of the I-81 corridor area, accident rates are above the statewide average for similar interstate systems. This is especially true in the area around the I-81/I-690 interchange. Accident rates through the I-690 interchange are four to five times the statewide average; and, the accident rate on the viaduct portion of I-81 (northbound direction) is more than triple the statewide average. The non-standard design features in this area contribute to above average accident rates.

The overall expressway system is operating at acceptable levels of service with the exception of the I-81/I-690 Interchange and their approaches to the city. I-81 from approximately Hiawatha Boulevard south to Harrison Street and I-690 from the State Fairgrounds east to Midler Avenue are approaching capacity during the commuter peak periods. The interchange of I-81/I-690 and the I-81 interchange with Harrison Street/East Adams Street are operating at or near failing conditions.

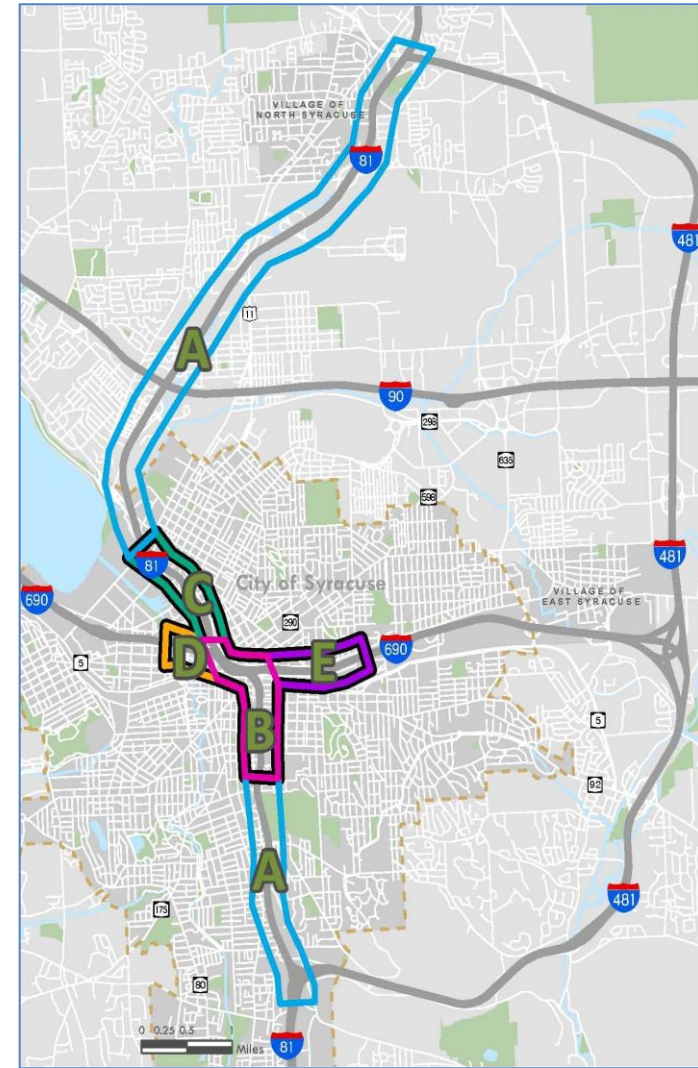


The primary corridor geometrics represent areas where significant deficiencies are evident. Nonstandard design features are particularly prevalent in and around the I-81/I-690 Interchange that include mainline geometry, ramp design and spacing, interchange spacing and road width (shoulders and medians). This includes I-81 from Hiawatha Boulevard south to Harrison Street and I-690 in the area between and including I-81 and the West Street interchange. The narrow shoulder width and high traffic volumes on I-81 pose significant operational challenges. It is difficult to conduct routine maintenance and, when accidents occur, the limited shoulder width creates backups and hazards for traffic. The tight curves and narrow shoulders on the viaduct and the adjoining I-81/I-690 interchange are very difficult for emergency responders.

There are 76 bridges built in the mid to late 1960's in the primary study corridor. Of the 76 bridges, seven are classified as "structurally deficient" and 47 are "functionally obsolete". Thirty-one of the 32 bridges in the viaduct and I-81/I-690 interchange area need to be replaced because of their overall age, condition and functionality.

Additionally, the I-81 interstate system in the viaduct priority area presents a significant barrier to pedestrian and bicyclist mobility and it is difficult to traverse I-81 through the City of Syracuse; the elevated highway and the collector/distributor streets associated with Almond Street under the highway contribute to this issue. The barrier effect is not consistent with ongoing downtown Syracuse initiatives to strengthen neighborhoods, to improve connectivity between the university/hospital complex and downtown, and to promote multi-modal usage.

The outer segments (labeled A) have minor capacity issues, isolated accident areas, and pavement in good condition. Based on the system's physical condition, the community's input, the social, economic and environmental conditions of the study area, and the identified needs, the area in the vicinity of the viaduct and I-690/I-81 interchange (labeled B/C/D/E) is determined to be a priority area for improvement (herein referred to as the "viaduct priority area").



VIII. Strategy Development

Through an iterative process, a wide range of strategies were developed and refined for the corridor, as presented in Technical Memorandum #2 – Strategy Development and Evaluation³⁸. Using information presented from the technical analyses, the public and stakeholder agencies identified strategies to be evaluated that evolved into potential solutions. Each idea which was raised through the technical and outreach processes was grouped into various categories and then screened for fatal flaws or determination of whether they met the identified needs, goals and objectives. Each strategy was then reviewed for feasibility, geometric design constraints, potential significant social, economic and environmental effects, and potential costs.

A. Initial Strategies

The initial strategies for the corridor were developed in response to the system deficiencies and future needs. The strategy development process was conducted in conjunction with *The I-81 Challenge* Public Participation Program. As noted in White papers and other public involvement documents on *The I-81 Challenge website*³⁹, the first major public workshop (May 2011) presented the transportation system deficiencies and needs that generally coincided with safety, congestion, and design problems identified through NYSDOT's ongoing analysis of the roadway system. The three-day public workshop provided a diverse and interactive environment for obtaining public input for future visions, ideas, and concepts for I-81. Though the specifics varied significantly, the visions developed by attendees for the future of the corridor generally fell into three major categories:

Rebuild the viaduct while addressing some of the fundamental flaws in the current design. The primary goals of these visions were to keep commuting times low, minimize traffic congestion, and provide a cost-effective solution.

Remove the viaduct and replace it with an urban boulevard or other thoroughfare integrated into the local street network. The primary goals here were to reintegrate downtown Syracuse with its surrounding neighborhoods, improve aesthetics, promote alternative modes of transportation, and lower long-term maintenance costs.

Replace the viaduct with a below grade highway – either in a tunnel or open trench – which would serve to reconnect the city, improve aesthetics, and maintain the mobility and accessibility offered by the interstate highway.

Screening of various initial strategies was conducted to narrow down the number of strategies to those warranting further study. Each stage increased the level of detail and refined each strategy in conformance with the corridor study needs and goals. As described in Technical Memorandum #2, the iterative screening process included: developing a variety of strategies within each

³⁸ *Technical Memorandum #2 – Strategy Development and Evaluation*, July 2013 <http://thei81challenge.org/cm/ResourceFiles/resources/TechnicalMemorandum2.pdf>

³⁹ <http://thei81challenge.org/Home/SubMenuContent/StudyReportsAndDocuments>

broad category; developing concept-level illustrations; reviewing engineering considerations; assessing social, economic, and environmental impacts; evaluating traffic conditions based on initial modeling; assessing impacts/benefits and quantifying order of magnitude costs; evaluating strategies compared to corridor needs and study goals and objectives; and recommending strategies to progress to the next stage of project development.

B. Strategies Considered and Eliminated

The strategies were screened to eliminate those that were fatally flawed or did not meet the corridor's needs and study goals and objectives. The strategies were reviewed for transportation system impacts/benefits, community impacts/benefits and general magnitude of cost. Several strategies involving I-81 relocation and bypass options were explored and dropped from further consideration based on the significant impacts, costs and failure to address the needs of the corridor.

I-81 Relocation - Three ideas to relocate I-81 evolved from the May 2011 public workshop, including a central alignment straightening I-81 from the south end to the north end of the corridor; relocation of I-81 along Salina Street; and relocation to western downtown perimeter along the OnTrack rail line or West Street extension. As noted in Technical Memorandum #2⁴⁰, each of these relocation strategies would involve extensive fiscal investment and provide little to no system benefits. The relocation options would have significant impacts to neighborhoods, schools, housing complexes, downtown areas, and/or rail lines. Consequently, the relocation strategy was eliminated from further consideration. The West Street corridor as a possible at-grade outer loop has merit, however, and will be further considered as part of the boulevard strategy to provide additional traffic capacity and possibly improve the overall street grid network and operations. Alterations to the local street network would, under this scenario, be coordinated with and designed in partnership with the City of Syracuse.

Western Bypass - The idea of extending I-481 as a western bypass was explored based on input from the May 2011 public workshop. The bypass would require extensive investment and have significant impacts to surrounding western communities without meeting the corridor needs. It would be generally located within built urban environments with significant impacts on property, community, economic and environmental resources and was therefore eliminated from further consideration as a stand-alone strategy.

Extension of I-481 to NYS Route 695 was considered as possible capacity mitigation for the boulevard strategy. The preliminary concept for the western bypass was considered geometrically feasible and was further assessed. It is anticipated that the bypass would serve mostly east-west traffic and may reduce congestion on I-690. However, this strategy would not provide a meaningful reduction in traffic through the viaduct and it would result in significant social, economic and environmental impacts on the

⁴⁰ Technical Memorandum #2: Strategy Development and Evaluation, July 2013 <http://thei81challenge.org/cm/ResourceFiles/resources/TechnicalMemorandum2.pdf>

surrounding community as well as significant costs with little to no benefit. Therefore, the western bypass was ultimately eliminated from further consideration.

IX. Strategy Evaluation

As noted previously, the strategy refinement process included review of geometric feasibility, geometric design constraints, and potentially significant social, economic and environmental effects for each strategy developed for the I-81 corridor. Each strategy was evaluated considering the corridor needs and study goals and objectives. As previously noted, for evaluation purposes, the corridor was divided into the outer segments and the viaduct priority area. The No Build and resulting five strategies identified were progressed for further study and evaluation, including Rehabilitation strategy, Reconstruction strategy, Boulevard strategy, Tunnel strategy, and Depressed Highway strategy.

A detailed evaluation was performed for each strategy and is documented in Technical Memorandum #2, Strategy Development and Evaluation⁴¹. The assessment matrix for each strategy included in this corridor study report provides a summary of findings of the evaluation relative to the corridor needs and study goals and objectives that were developed in cooperation with the community and stakeholders. Goals and objectives were grouped to assess the transportation system as well as the sustainability triple bottom line of economic competitiveness, social equity/quality of life, and environmental stewardship. Each of the strategies has been evaluated at a macro scale; some of the assessments completed were highly quantitative such as the geometric, bridge and traffic assessments, while others were more qualitative assessments. Additional environmental studies and analyses will be performed during the environmental review phase. Through this planning-level evaluation process, strategies were compared to the no-build conditions and at times to each other. Further evaluation of the strategies will continue as strategies are further refined.

The matrix also presents range of costs and determination of feasibility. The range of costs provided are considered a rough order of magnitude cost for planning purposes only and reflect costs by 2020. These preliminary ranges of costs include construction, maintenance and protection of traffic, contingency and an inflation adjustment. The construction cost estimates do not include costs for right-of-way acquisition, engineering, environmental issues and mitigation, or construction inspection; these unknown costs would add an estimated additional \$250-500 million, depending on the strategy.

⁴¹ *Technical Memorandum #2, Strategy Development and Evaluation, July 2013* <http://thei81challenge.org/cm/ResourceFiles/resources/TechnicalMemorandum2.pdf>

A. No Build Strategy

The No-Build strategy includes simply maintaining the current system as is. This would include cleaning, painting and standard maintenance efforts. Routine maintenance efforts include filling pavement cracks, patching holes in the bridge decks and maintaining the highway drainage system. This strategy is required to be considered as a benchmark comparison of possible build strategies under both federal (NEPA) and state (SEQRA) environmental regulations. It is clear, however, that this strategy does not address the I-81 long-term needs, in particular the most pressing need to address the bridge conditions. Bridge conditions would continue to deteriorate until bridges need to be posted for reduced loads, and eventually closed. The multiple design deficiencies would remain throughout the 12 mile I-81 corridor, including mainline curves, inadequate ramp spacing, lack of shoulders, high rates of superelevation and others that affect system operations, capacity and safety. Also, congestion and safety concerns would continue and may expand beyond existing limits if not addressed.

B. Rehabilitation Strategy

The Rehabilitation strategy would involve a long term program to address the entire 12 mile segment of I-81 from the I-481 south interchange to the I-481 north interchange, including the viaduct priority area. Bridge rehabilitation repairs all the deficient structural elements associated with the bridge (e.g., deck, railings, bearings, abutment, etc.) to improve their individual conditions and in turn extend the service life of the bridge. Pavement rehabilitation includes structural enhancements that extend the service life of an existing pavement and/or improve its load carrying capability, including restoration treatments and structural overlays.

In addition, specific area improvements in the I-81 corridor under this strategy would include:

- I-81 (Hiawatha Blvd to Butternut Street) – additional or improved auxiliary lanes, minor ramp closure and changes, and shoulder edge treatments.
- I-81/I-690 interchange – improved auxiliary lanes, provide standard shoulders.
- I-81 viaduct – wider interchange bridges to provide shoulders, and widen the Harrison Street off-ramp.
- All bridges built prior to 1970 (71 percent of the total bridges in the corridor) would be rebuilt due to their overall age and condition.
- Other minor safety improvements.

The rehabilitation strategy was evaluated for the entire corridor, including the 8.5 mile outer segments of I-81 as well as for the 3.5 mile segment in the vicinity of I-81/I-690 interchange and viaduct, identified as the viaduct priority area.

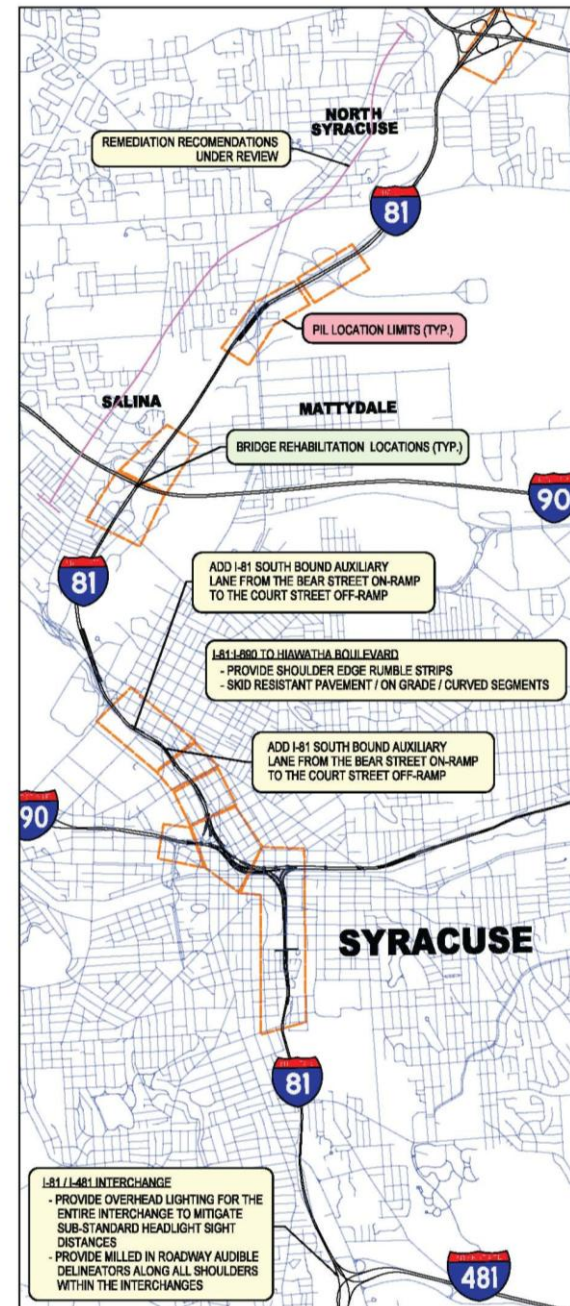
i. Corridor outer segments rehabilitation

The outer segments of the I-81 corridor have minor capacity issues, isolated accident areas, and pavement in good condition. To keep the interstate in a state of good repair, periodic treatments will be performed as well as appropriate bridge rehabilitation repairs. The outer segment improvements include improvements at the I-81/I-481 southern interchange, rehabilitation of 13 bridges, replacement of 13 bridges, and general safety improvements throughout the corridor.

Rehabilitation of the outer segments would generally maintain existing access points and travel patterns. The I-81/I-481 southern interchange improvements would include overhead lighting, audible delineators and high friction pavement. Rehabilitation treatments for the outer segments would provide shoulder edge rumble strips, skid resistant pavement on grade or curved segments, where needed.

Bridge analysis recommends that of the 26 bridges in the outer segments, 13 would be rehabilitated and 13 would be replaced due to their age or condition, they are functional obsolete or they are past their service life. Only 3 percent of the geometric deficiencies would be addressed in the outer segments, with limited safety enhancements.

The rehabilitation strategy is a feasible strategy for the 8.5 mile outer segments of I-81 and is retained for the northern and southern outer segments of the I-81 corridor.



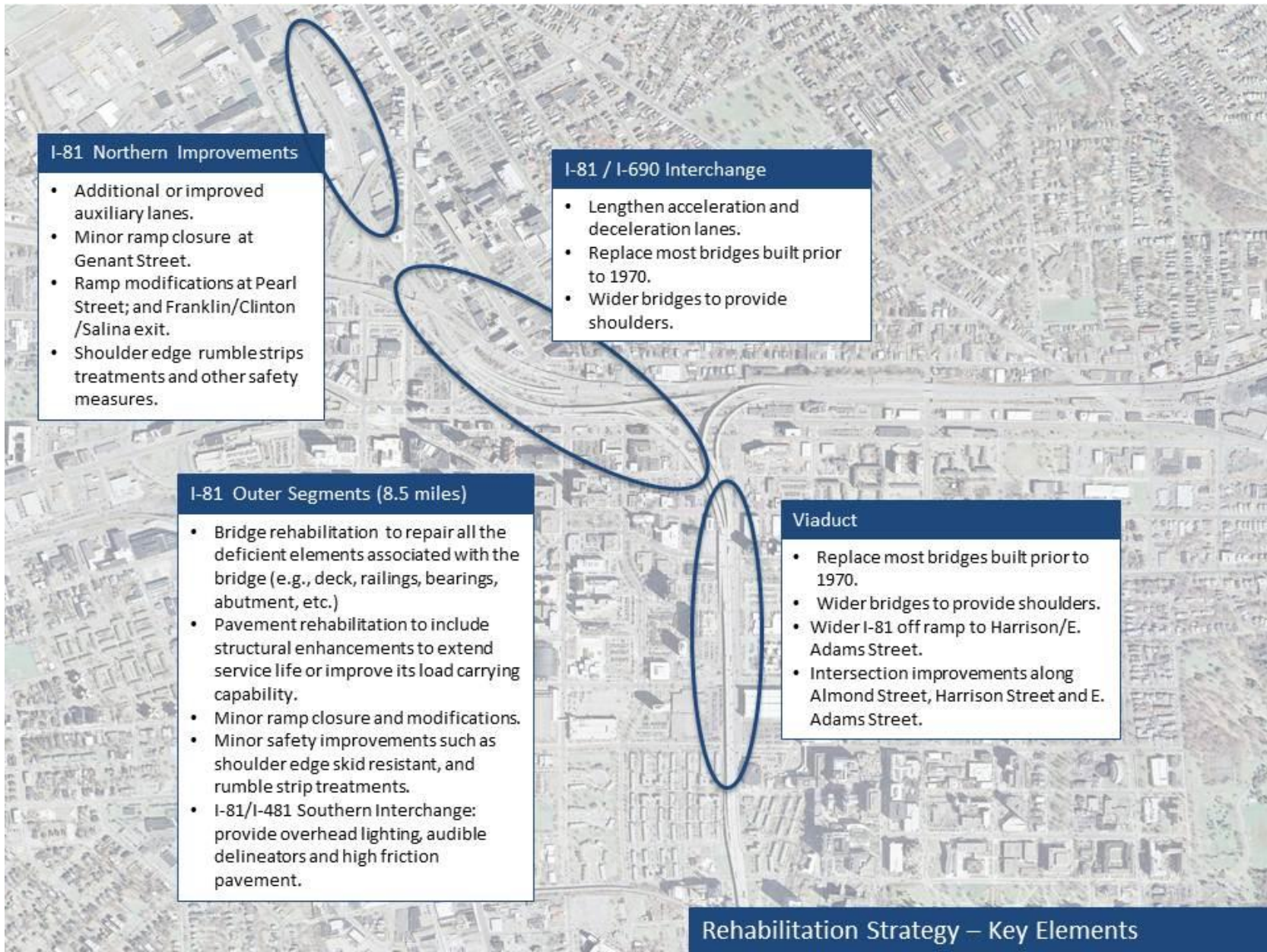
Rehabilitation Strategy (outer segments)

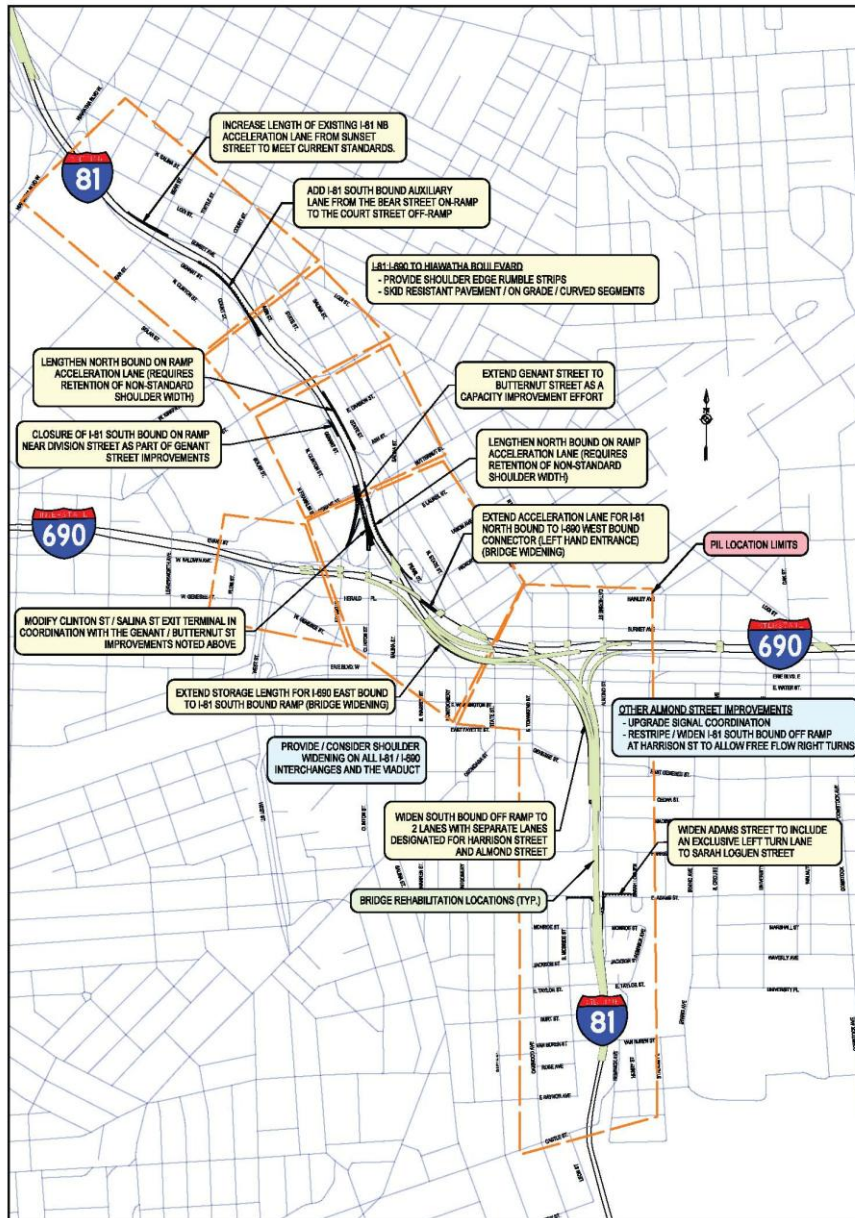
Rehabilitation restores the current bridges and pavement to a “state of good repair” that will last for the next 30-40 years.

Transportation	Economic Competitiveness	Social Equity/Quality of Life	Environmental Stewardship
<p>Enhance the Transportation Network</p> <ul style="list-style-type: none"> Addresses 3% of the geometric deficiencies. Maintains current infrastructure (bridges/pavement) in a state of good repair. Some safety improvements on curves and elevated surfaces. Replaces 13 of 26 bridges. No capacity improvements needed. No enhancements to alternative transportation modes. <p>Enhance Region-wide Mobility</p> <ul style="list-style-type: none"> Regional mobility is maintained, similar to no-build. No change in access to key destinations and no improvements to connectivity of alternative transportation. <p>Improve Public Safety</p> <ul style="list-style-type: none"> Limited safety enhancements to provide advance warning on curves and elevated surfaces to minimize accident occurrences. No improvements to the safety of alternative modes of transportation (pedestrian, bicycle, transit). 	<p>Maintain or Improve Economic Opportunities</p> <ul style="list-style-type: none"> Maintains current access to adjacent businesses. Maintains current multi-modal access and connections. Slight improvement to system efficiency, reliability and reduced travel time and costs. <p>Exercise Fiscal Responsibility</p> <ul style="list-style-type: none"> The most cost-effective method to address the pavement, bridge and safety needs in these areas. 	<p>Support Community Quality of Life</p> <ul style="list-style-type: none"> No impact or benefits to community resources. Little to no benefit to regional and local connectivity. Does not encourage smart growth. Maintains current visual built environment. No impacts to community character. Does not promote city or county long term vision and preferred future land use patterns. <p>Share Burdens & Benefits</p> <ul style="list-style-type: none"> Burden equally shared. No benefits to stakeholders as there are limited enhancements to the existing highway. 	<p>Preserve or Enhance Environmental Health</p> <ul style="list-style-type: none"> Does not affect local, regional or state environmental initiatives. Relatively no change in air quality. No improvement to existing noise levels. No change in benefits or impacts on designated community landmarks or historic resources. No change in stormwater or water quality.

Preliminary Construction Cost Range: \$300-400 million in north and south outer segments (8.5 miles).

Recommendation/Feasibility: The rehabilitation strategy is *feasible* in the northern and southern outer segments of the corridor (8.5 miles). Therefore, the rehabilitation strategy is retained in the outer segments. No additional strategies developed for outer segments.





ii. Viaduct priority area rehabilitation

Viaduct and interchange rehabilitation improvements would include northern improvements, West Street interchange improvements and a new I-690 exit east of I-81; as such, these improvements are grouped into the 3.5 mile “viaduct priority area”. In the viaduct priority area, 31 of the 32 bridges would be recommended for replacement (versus rehabilitation) because of their overall age, condition and functionality. Only 10 percent of the 102 geometric deficiencies in the viaduct priority area could be corrected through rehabilitation treatments.

The rehabilitation strategy would not address the major capacity, safety and geometric needs retained by the outdated 1960’s era design. For the 3.5 mile viaduct priority area, the rehabilitation strategy is not feasible, and therefore recommended to be dismissed from further consideration.

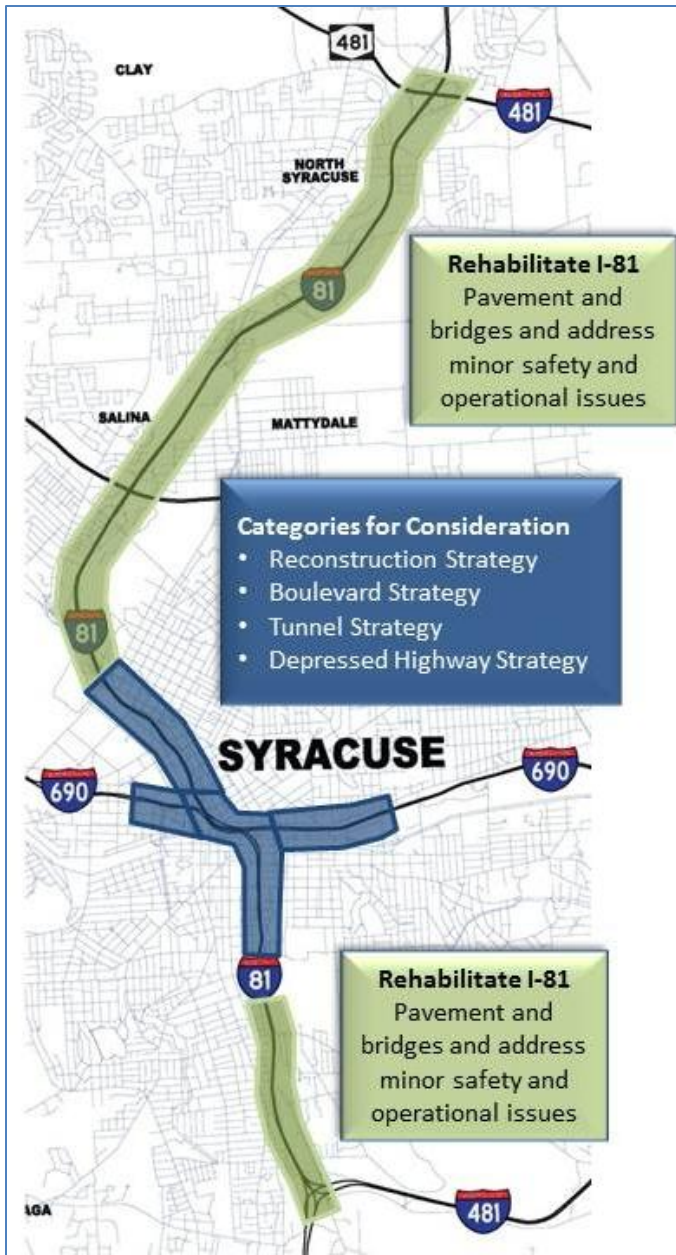
Corridor Design Constraints

Few of the existing geometric constraints can be addressed with rehabilitation (e.g. mainline radius values); some would require full reconstruction. This strategy, if applied in the entire corridor, would address only 10 percent of the deficiencies in the corridor in spite of including the replacement of 31 of the 32 bridges in the viaduct priority area and 13 of the 26 bridges in the outer segments.

Rehabilitation Strategy (viaduct priority area)

Rehabilitation restores the current bridges and pavement to a “state of good repair” that will last for the next 30-40 years.

Transportation	Economic Competitiveness	Social Equity/Quality of Life	Environmental Stewardship
<p>Enhance the Transportation Network</p> <ul style="list-style-type: none"> Addresses only 10 to 15% of the geometric deficiencies. Minor capacity improvements; only minor geometric improvements; replaces 31 of 32 bridges built prior to 1970. Access ramp eliminations may negatively impact key destinations. <p>Enhance Region-Wide Mobility</p> <ul style="list-style-type: none"> Regional mobility is maintained with slight increase in vehicle miles travelled. This increased congestion may impact access to key destinations. Minor enhancements to alternative transportation modes at a few intersection locations; add lighting, sidewalks, crosswalks, and bike lanes. <p>Improve Public Safety</p> <ul style="list-style-type: none"> Limited safety enhancements (mostly improves various ramps along I-81). Some aesthetic treatments address safety concerns under the viaduct. 	<p>Maintain or Improve Economic Opportunities</p> <ul style="list-style-type: none"> Elimination of 2 access ramps may adversely affect ease of access to adjacent businesses; diminishes economic competitiveness. Minor improvements to multi-modal access or connections that support foot traffic to businesses and business vitality. Perceived barrier remains but with aesthetic improvements that would support business attraction. No noticeable improvement to system efficiency, reliability or reduced travel time or costs. <p>Exercise Fiscal Responsibility</p> <ul style="list-style-type: none"> Not cost-effective - significant investment to replace most bridges with little capacity, operational or community benefits. 	<p>Support Community Quality of Life</p> <ul style="list-style-type: none"> No change in impact or benefits to community resources. Does not encourage sustainable land use patterns within city or county. Does not enhance connectivity between University Hill and downtown. Perceived barrier remains. Little to no benefit to regional and local connectivity to encourage smart growth. Does not change visual built environment. No benefits to community character. Not consistent with city or county long term vision and preferred future land use patterns. <p>Share Burdens & Benefits</p> <ul style="list-style-type: none"> Burden of poor access, visual barrier and poor connectivity equally shared. No benefits to stakeholders as there are limited enhancements to existing highway functionality and operations. 	<p>Preserve or Enhance Environmental Health</p> <ul style="list-style-type: none"> Does not support local, regional or state environmental initiatives. Relatively no change in air quality. No improvement to existing noise levels. No change in benefits or impacts on designated community landmarks or historic resources. No change in storm water or water quality.
<p>Preliminary Construction Cost Range: \$480-600 million in viaduct priority area (3.5 miles). Preliminary estimate for environmental, right-of-way acquisition, engineering, construction inspection: additional \$200-400 million.</p>			
<p>Recommendation/Feasibility: The rehabilitation strategy is <i>not feasible</i> in the viaduct priority area due to high cost for bridge replacements with little to no improvements in capacity, safety and reliability.</p>			



The rehabilitation strategy is retained for the northern and southern outer segments of the I-81 corridor; consequently, no further strategies were developed for these areas. The rehabilitation of outer segments is not integral to project(s) in the viaduct priority area nor does the need for this component occur in the relative time frame of the more immediate needs in the viaduct priority area. As such, rehabilitation of the outer segments is not included as a component of the priority area strategy assessments.

The rehabilitation strategy was determined to not be feasible and not cost effective and was therefore eliminated from further study for the viaduct priority area. “Build” strategies were further developed and evaluated in the I-81 viaduct priority area. These build strategies include reconstruction of the viaduct, viaduct removal with at-grade/boulevard, viaduct removal with tunnel, and viaduct removal with depressed highway.

C. Priority Area Strategies

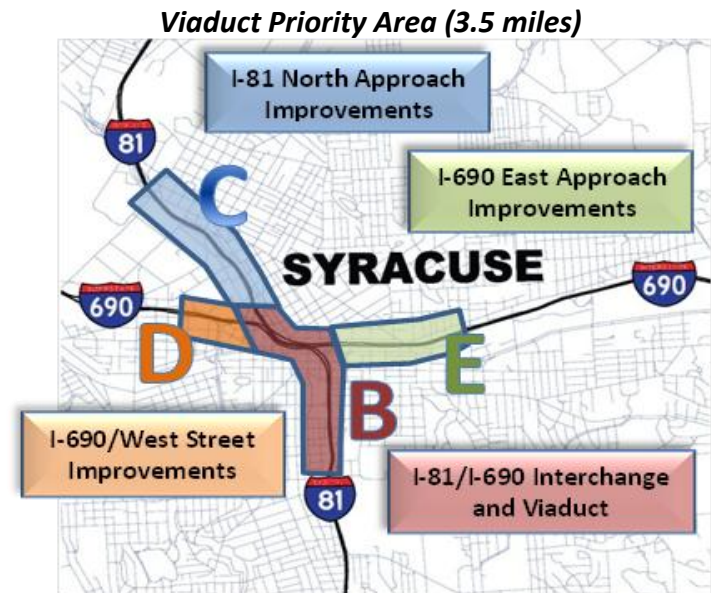
Viaduct and interchange improvements for the build strategies will include the northern improvements, West Street interchange improvements and a new I-690 exit east of I-81; as such, these improvements are grouped into the “viaduct priority area” and these elements are included in the strategies assessments and cost estimates. Street grid improvements and transportation system enhancements will vary with each build strategy and will be further developed in subsequent phases of project development.

SMTC’s Regional Travel Demand Model for planning-level analysis was used to determine impacts to regional mobility as one component of the feasibility assessment for each build strategy. Forecasts of changes to the region traffic were comparable (within approximately 2 minutes) for each. More detailed analysis to develop location-specific mitigation measures will be necessary during the next phase of this process.

i. Common Elements for all Priority Area Strategies

There are several common elements to all the build strategies for the viaduct priority area that affect the transportation operations. These improvements would reduce congestion, improve safety, address geometric deficiencies (ramp spacing, superelevation, etc.) and improve access.

- I-81 north approach improvements that consolidate Pearl Street/State Street ramps, consolidate Rt. 370 (Onondaga Lake Parkway) and Old Liverpool Road ramps, eliminate Genant Street on-ramp and the Salina Street off-ramp, and provide a full interchange at Court Street.
- I-690 east approach improvements that provides a new Interchange at Crouse Avenue, Comstock Avenue, or Walnut Avenue.
- I-690/West Street improvements that would be modified to either retain the existing interchange or rebuild as a single point urban interchange. These modifications may eliminate Herald Place off-ramp and the Butternut Street ramp to West Street.
- I-81/I-690 interchange improvements that vary based on strategy.

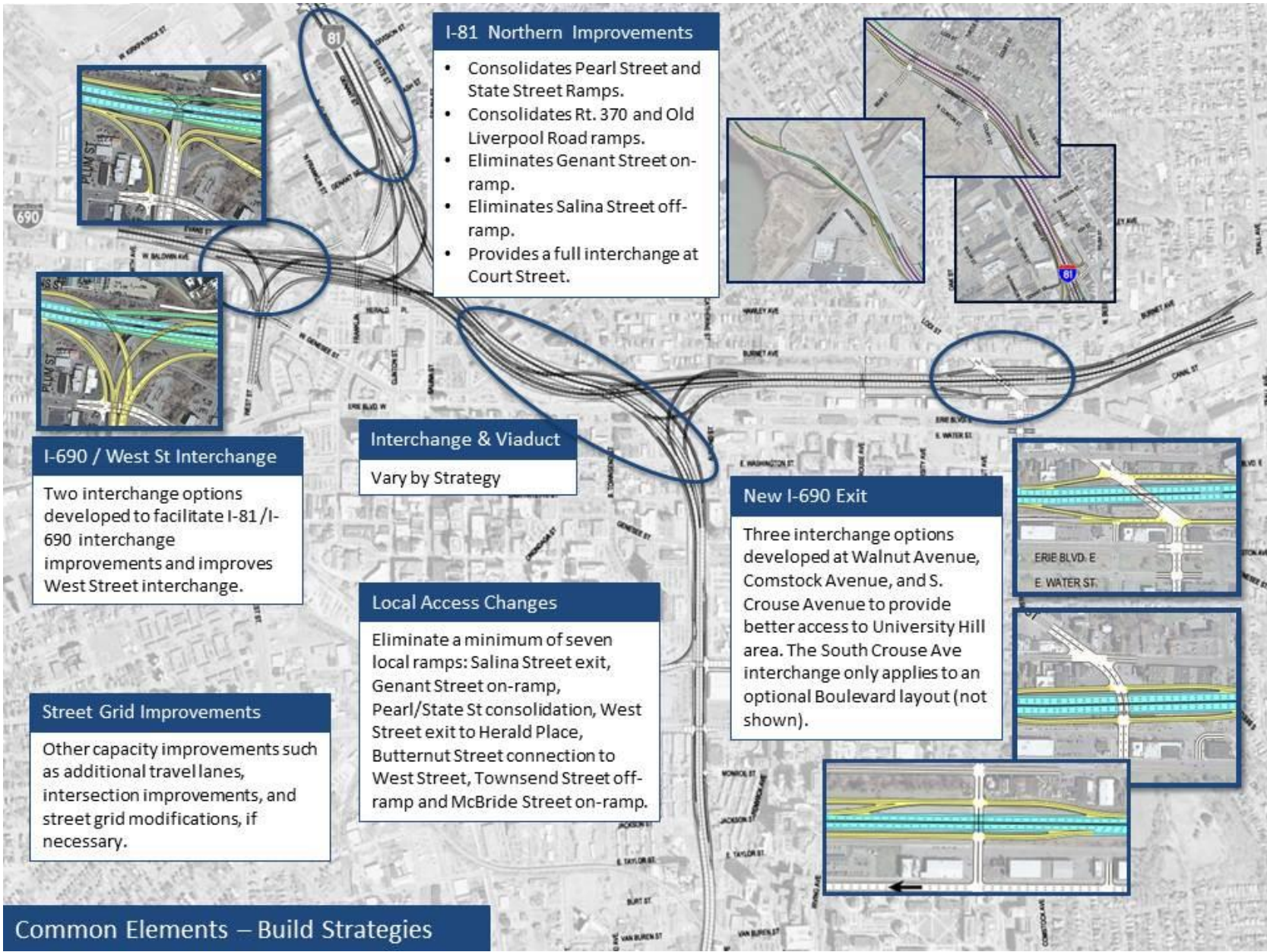


The common elements for the build strategies eliminate, at a minimum, seven (7) local ramps:

- Salina Street exit, but maintains Downtown access via Franklin/Clinton
- Genant Street on-ramp that would alter Northside and Lakefront neighborhood access
- Consolidates the I-81 Pearl Street and State Street on-ramps that would alter egress from downtown and Northside neighborhoods
- West Street exit ramp to Herald Place which would affect egress from Downtown and Westside neighborhoods
- Butternut Street connection to West Street which will affect access to Westside and Downtown neighborhoods
- I-690 Townsend Avenue and McBride ramps serving traffic from the east side of the city and county

The common elements have major design constraints:

- The I-81 north approach (Hiawatha Boulevard to I-690) is significantly constrained by an “S” curve alignment, heavy superelevation, steep ramp grades, ramp spacing and physical constraints. The ramp spacing requirements have limited the layout of this segment.
- I-690/West Street interchange: The close proximity to the I-81/I-690 interchange and the new system connections (missing links) limit the options for the proposed layout.



i. Reconstruction Strategy

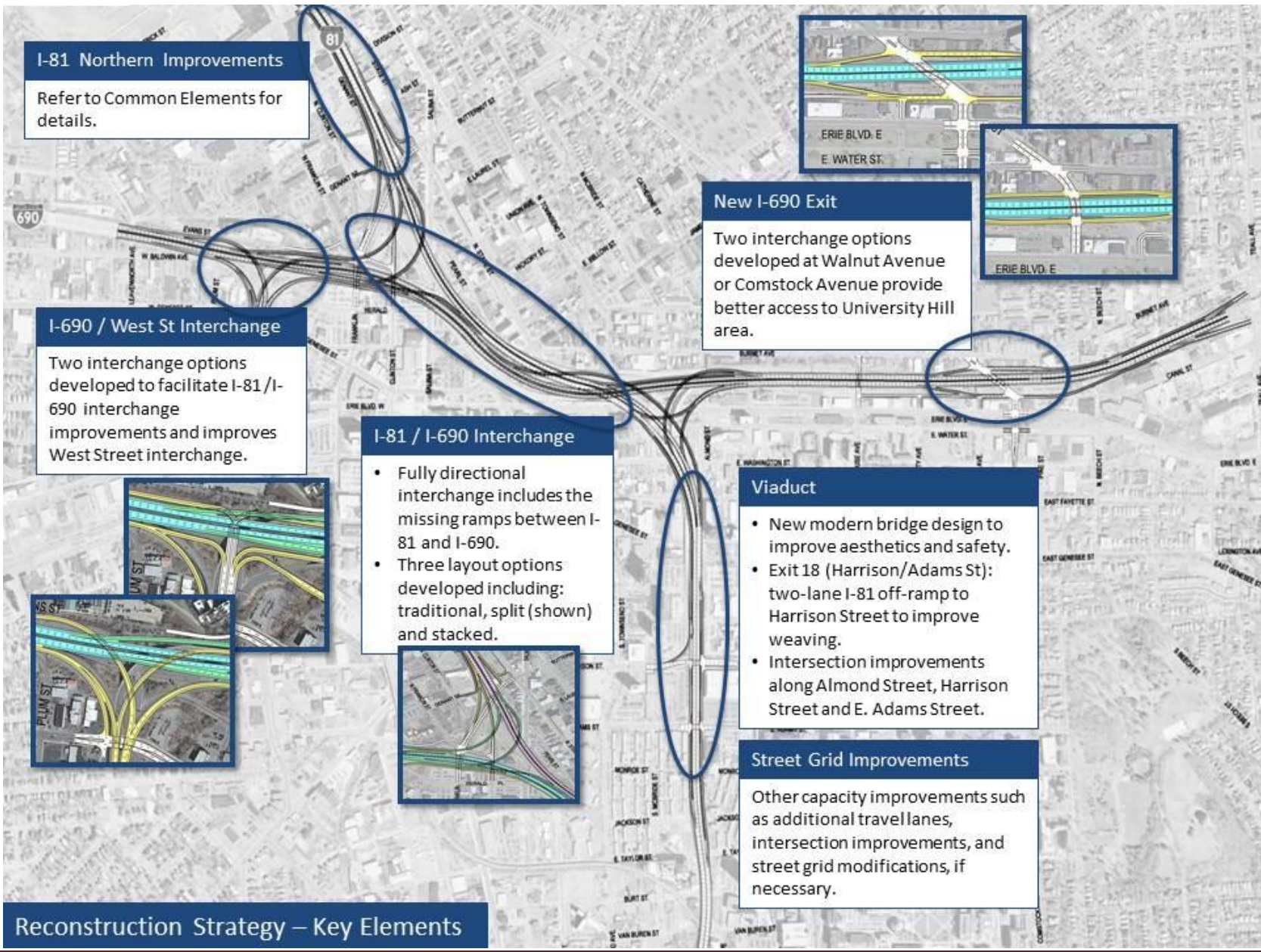
The Reconstruction strategy includes the common elements plus complete removal and replacement of the existing pavement and bridges in the viaduct priority area in downtown Syracuse. Reconstruction could include a higher elevation replacement structure and/or architectural and aesthetic treatments that could provide an iconic image for the community.

The reconstruction layouts for the interchange are fundamentally influenced by the placement of I-81 and I-690 within the existing interchange footprint (Clinton/Franklin Street to Almond Street) to minimize impacts to the city center. Three geometrically feasible layouts have been identified; these layouts plus others will be further assessed during subsequent project phases. The strategy also includes:

- I-81/I-690 interchange: fully directional interchange that includes missing ramp links (Bear St/ Hiawatha Blvd); this eliminates design deficiencies by improving geometry to current standards including no left hand entrance/ramps, appropriate merge/diverge lengths, ramp spacing and shoulders.
- Exit 18 (Harrison/Adams St): provides a two-lane I-81 off-ramp to Harrison Street to improve weaving conditions and capacity. In addition, at-grade intersection improvements would be included along Almond Street, Harrison Street and E. Adams Street.
- Additional capacity and access improvements, such as additional travel lanes, intersection improvements, street grid modifications, if necessary.

Design Constraints

The I-81/I-690 interchange area ramp spacing, in particular, the entrance-exit spacing (weaving) limits the location of system connections (interstate to interstate) along with the local access connections. For example, three of the four approaches to the interchange have local ramps too close to the interchange, forcing the closure of Townsend Street and McBride Street ramps. Interchange layouts are within the existing corridor in order to minimize community impacts. The new I-81/I-690 layouts would meet current design standards, thus eliminating significant geometric deficiencies that presently exist.



I-81 Northern Improvements

Refer to Common Elements for details.

I-690 / West St Interchange

Two interchange options developed to facilitate I-81/I-690 interchange improvements and improves West Street interchange.

I-81 / I-690 Interchange

- Fully directional interchange includes the missing ramps between I-81 and I-690.
- Three layout options developed including: traditional, split (shown) and stacked.

New I-690 Exit

Two interchange options developed at Walnut Avenue or Comstock Avenue provide better access to University Hill area.

Viaduct

- New modern bridge design to improve aesthetics and safety.
- Exit 18 (Harrison/Adams St): two-lane I-81 off-ramp to Harrison Street to improve weaving.
- Intersection improvements along Almond Street, Harrison Street and E. Adams Street.

Street Grid Improvements

Other capacity improvements such as additional travel lanes, intersection improvements, and street grid modifications, if necessary.

Reconstruction Strategy – Key Elements

Reconstruction Strategy (viaduct priority area)

Reconstruction completely removes and replaces the existing interchange and viaduct pavement and bridges in the downtown Syracuse viaduct priority area and builds a new viaduct within the same vicinity of the current highway. Strategy includes noted common elements.

Transportation	Economic Competitiveness	Social Equity/Quality of Life	Environmental Stewardship
<p>Enhance the Transportation Network</p> <ul style="list-style-type: none"> 85% of geometric deficiencies would be addressed. Reconstruct 63 bridges; restore all bridges to good condition or better. Improved lighting, crossings, sidewalks, and bike lanes where possible. Opportunity for transit integration. <p>Enhance Region-Wide Mobility</p> <ul style="list-style-type: none"> Regional mobility slightly better with slight increase in speeds. Reduces access by eliminating some local access ramps. Opportunity to enhance crossing locations and safety. <p>Improve Public Safety</p> <ul style="list-style-type: none"> Addresses design deficiencies and improves capacity to help reduce accident patterns and rates. Improved safety for pedestrians and bicyclists under viaduct by improving cross connections. 	<p>Maintain or Improve Economic Opportunities</p> <ul style="list-style-type: none"> Improved aesthetics, connectivity and system operations have potential to improve economic environment. Opportunity to integrate improvements to multi-modal travel with positive economic and social benefits. Notable efficiency, reliability, safety and capacity improvements to the regional transportation system. <p>Exercise Fiscal Responsibility</p> <ul style="list-style-type: none"> High investment with moderate community benefits and notable operational improvements. 	<p>Support Community Quality of Life</p> <ul style="list-style-type: none"> No change in impact or benefits to community resources. Moderate property impacts. Does not encourage sustainable land use patterns. Enhancements to connection between downtown and University Hill possible with more multi-modal capacity. Does not support regional land use patterns that encourage smart growth. Visual barrier would remain; potential to improve visual built environment with context sensitive design. Not consistent with city/county long term vision or preferred future land use patterns. <p>Share Burdens & Benefits</p> <ul style="list-style-type: none"> Unequal burden – more property impacts in immediate neighborhoods or EJ populations. Comparable benefits to EJ populations and to longer distance commuters. 	<p>Preserve or Enhance Environmental Health</p> <ul style="list-style-type: none"> Low consistency with local, regional or state environmental initiatives. Opportunity to support city bike plan or county sustainability plan. Air quality impacts unlikely; to be further analyzed. Noise impacts to be determined. Depending on height of rebuilt viaduct, may impact community landmarks or historic resources. Increased impervious areas would require stormwater management.
<p>Preliminary Construction Cost Range: \$800-900 million. Preliminary estimate for environmental, right-of-way acquisition, engineering, construction inspection: additional \$250-500 million.</p>			
<p>Recommendation/Feasibility: The reconstruction strategy in the viaduct priority area <i>is feasible</i> and recommended for further evaluation and review.</p>			

ii. Boulevard Strategy

The Boulevard strategy includes the common elements plus the removal of the viaduct and new construction of an at-grade urban arterial in the area of downtown Syracuse. This strategy covers broader regional highway limits (I-81, I-481 and I-690), as the boulevard strategy would involve re-designation of an interstate. This strategy also includes solutions to mitigate the effects of changes to address overall transportation mobility, accessibility and function.

The Boulevard

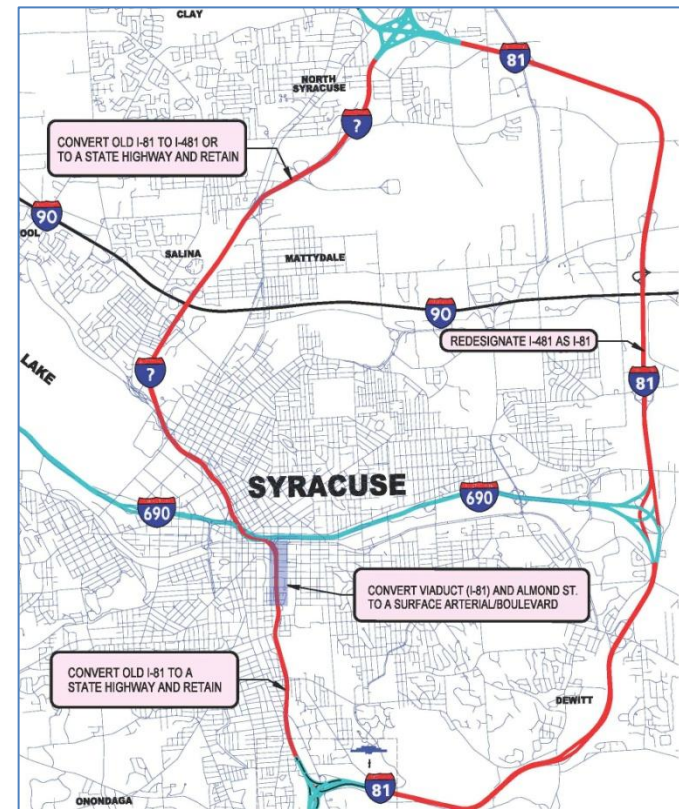
The boulevard is envisioned as a complete street containing an at-grade boulevard with pedestrian, bicycle, transit and parking facilities. The boulevard may include street grid modifications to improve east-west and north-south traffic flow. Alterations to the local street network would be coordinated with and designed in partnership with the City of Syracuse. There are various options for the north and south ends of the boulevard, including starting the boulevard at Erie Boulevard connecting to I-690 with a Single Point Urban Interchange (SPUI). The present I-81 travel lanes would extend to Erie Boulevard and Water Street, which would serve as an east-west connector between former I-81 and the new at-grade boulevard. The boulevard south terminus options vary depending on whether it extends over or under the New York, Susquehanna and Western (NYS&W) Railroad.

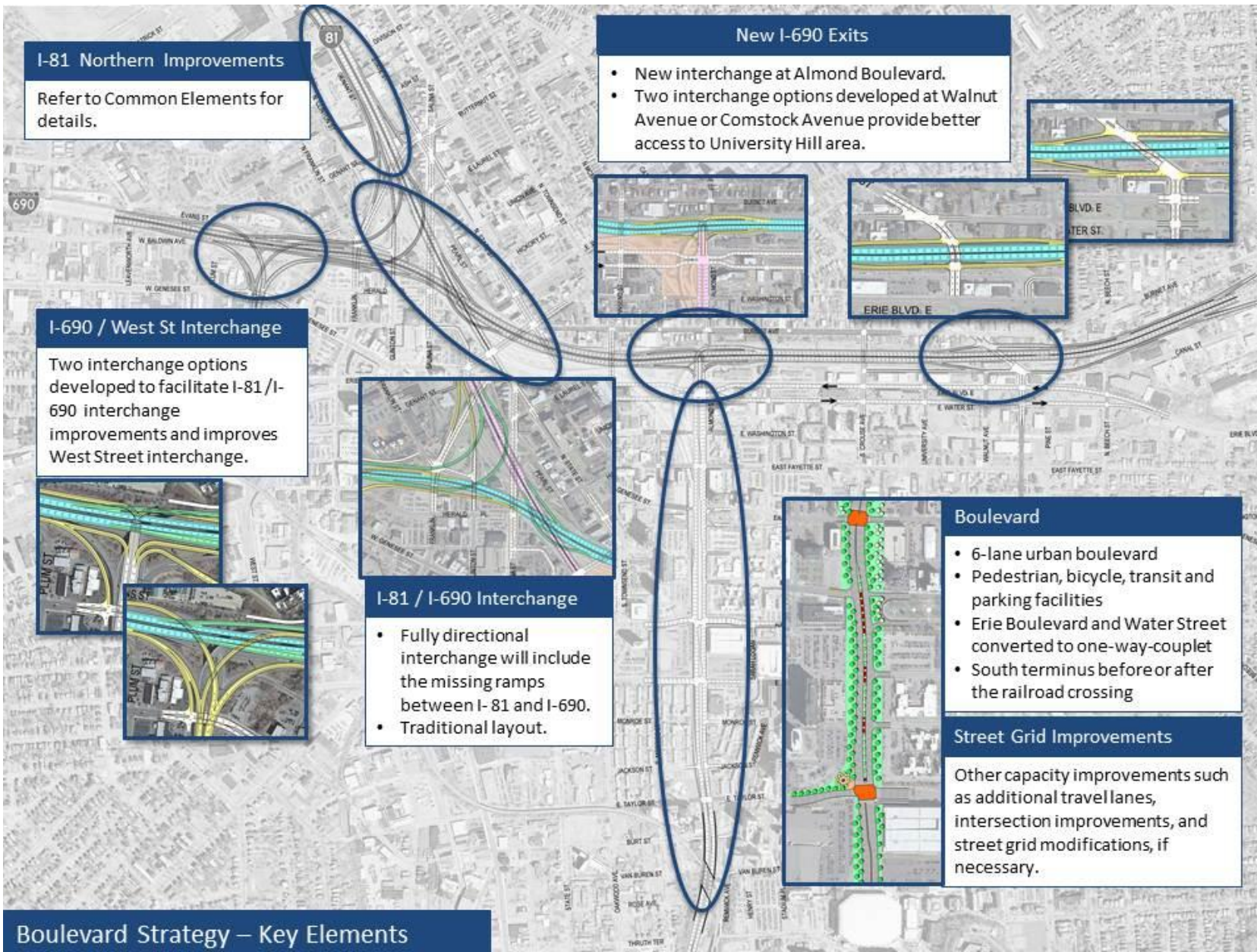
I-81 Redesignation (I-81 to I-481)

The I-81 route designation would be transferred to I-481 as noted on the graphic. These highways would continue to serve users in the northern and southern segments of the corridor. This re-designation would also require possibly changing the highway classification for part or all of the 12-mile corridor length; modifying the I-81 southern and northern interchanges (I-81/I-481S); and conducting additional capacity improvements on I-481 from I-690 to Kirkville Road.

Design Constraints

The boulevard width may be influenced by the existing right of way. The space available for travel lanes, median widths, parking, bicycle, pedestrian and transit access would be a constraint. Closely spaced intersections at the north end of the new boulevard may heavily influence the intersection treatments.





I-81 Northern Improvements
 Refer to Common Elements for details.

New I-690 Exits

- New interchange at Almond Boulevard.
- Two interchange options developed at Walnut Avenue or Comstock Avenue provide better access to University Hill area.

I-690 / West St Interchange
 Two interchange options developed to facilitate I-81/I-690 interchange improvements and improves West Street interchange.

I-81 / I-690 Interchange

- Fully directional interchange will include the missing ramps between I-81 and I-690.
- Traditional layout.

Boulevard

- 6-lane urban boulevard
- Pedestrian, bicycle, transit and parking facilities
- Erie Boulevard and Water Street converted to one-way-couplet
- South terminus before or after the railroad crossing

Street Grid Improvements
 Other capacity improvements such as additional travel lanes, intersection improvements, and street grid modifications, if necessary.

Boulevard Strategy – Key Elements

Boulevard Strategy (viaduct priority area)

The boulevard strategy removes the viaduct and constructs an at-grade non-interstate boulevard. This strategy involves re-designation of an interstate (I-481 to I-81). This strategy also includes changes to the I-81/I-481 interchanges. Strategy includes noted common elements.

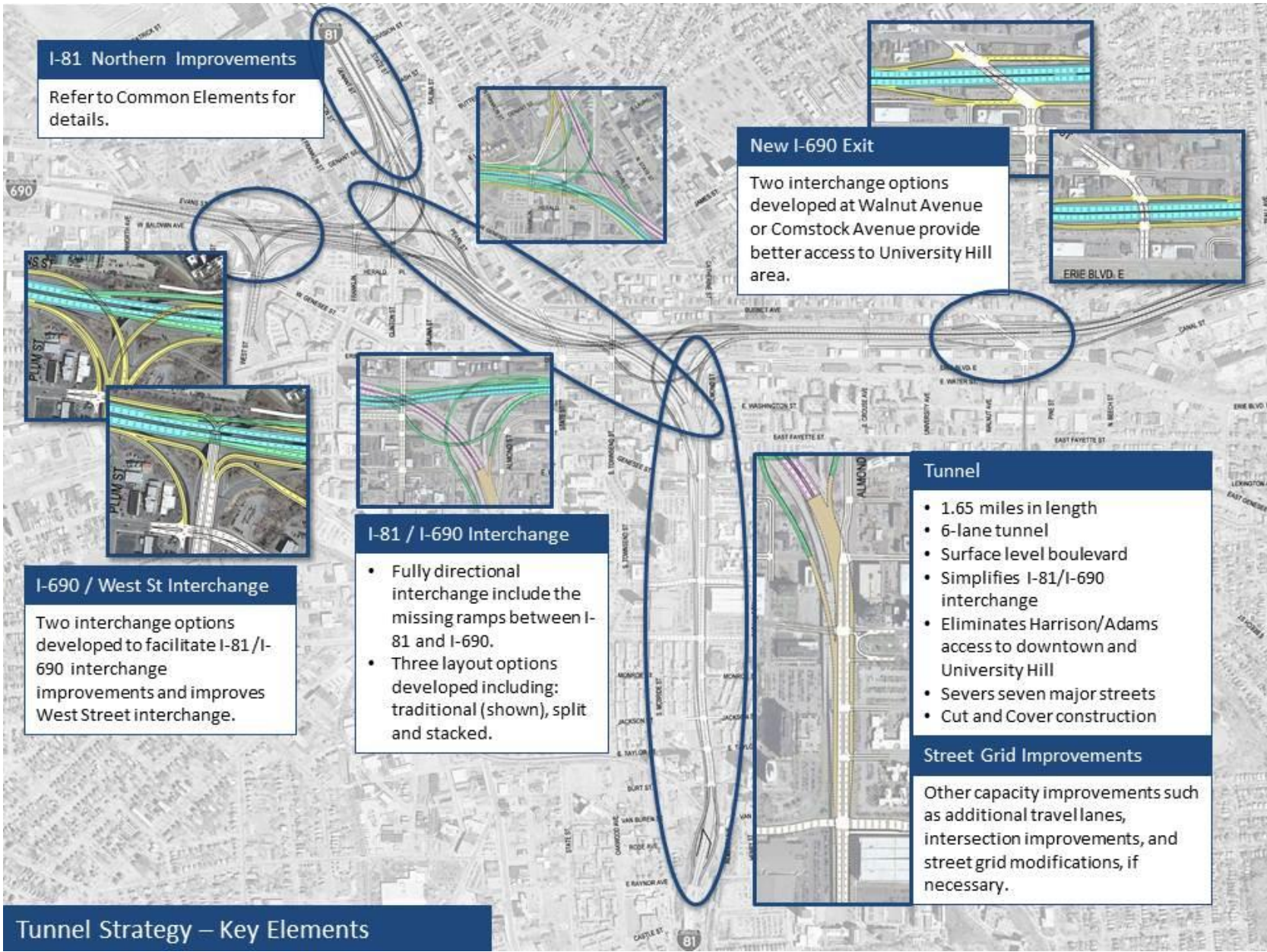
Transportation	Economic Competitiveness	Social Equity/Quality of Life	Environmental Stewardship
<p>Enhance the Transportation Network</p> <ul style="list-style-type: none"> 90% of geometric deficiencies would be addressed. Construct 53 new bridges; restore all bridges to good or better condition. Significant opportunity to enhance crossing location and safety. Improved lighting, crossings, sidewalks, bike lanes. Strong potential to integrate transit. <p>Enhance Region-Wide Mobility</p> <ul style="list-style-type: none"> Improved regional mobility; reduction in congested expressway lane miles. Diverted traffic may affect other streets and highway segments; congestion may increase at local intersections. Improved access to key destinations though potential adverse affects for emergency access. Bicycle facilities and opportunity for transit integration. <p>Improve Public Safety</p> <ul style="list-style-type: none"> Anticipated reduction in accidents. Improved safety for pedestrians and bicyclists under viaduct by improving cross connections. 	<p>Maintain or Improve Economic Opportunities</p> <ul style="list-style-type: none"> Potential to improve economic environment with improved aesthetics, connectivity and system operations. Could result in increased development opportunities. Opportunity to integrate improvements to multi-modal enhancements with positive economic and social benefits. Notable efficiency, reliability, safety and capacity improvements to the regional transportation system reducing travel costs and enhancing access to businesses. Better downtown and University Hill connections with improved access to jobs, retail, and commercial opportunities. <p>Exercise Fiscal Responsibility</p> <ul style="list-style-type: none"> Significant investment with significant community benefits and significant operational improvements. 	<p>Support Community Quality of Life</p> <ul style="list-style-type: none"> Long term benefit to city; anticipated property value increases; moderate property displacements. Encourages sustainable land use patterns within city or county. Enhances neighborhood multi-modal connectivity especially between downtown and University Hill. Supports regional land use patterns/smart growth. Improves visual character of the area. Highest opportunity for street trees and landscaping. Highly consistent with city and county long term visions and preferred future land use patterns. <p>Share Burdens & Benefits</p> <ul style="list-style-type: none"> Unequal burden with property impacts/construction impacts in immediate neighborhoods or EJ populations. Access improvements benefit EJ populations; longer distance commuters benefit. 	<p>Preserve or Enhance Environmental Health</p> <ul style="list-style-type: none"> Consistent with local, regional or state environmental initiatives. Opportunities for more green space; opportunities for non-motorized travel. Support city bike plan and county sustainability plan. Air quality impacts to be determined. Changes in noise levels to be determined. Potential impact to community landmarks or historic resources will be based on the footprint. Reduced impervious areas in viaduct area but increase in impervious areas at I-481 interchanges; opportunity to advance "save the rain" initiatives.
<p>Preliminary Construction Cost Range: \$650-800 million. Preliminary estimate for environmental, right-of-way acquisition, engineering, construction inspection: additional \$250-500 million.</p>			
<p>Recommendation/Feasibility: The boulevard strategy in the viaduct priority area is <i>feasible</i>; recommended for further evaluation and review.</p>			

iii. Tunnel Strategy

The proposed Tunnel strategy involves reconstructing the 3.5 mile segment of I-81 and burying I-81 from the general vicinity of Van Buren Street on the south along the present I-81 alignment and reconnecting to surface level just north of Butternut Street; the actual tunnel would include a 1.65 mile cut-and-cover tunnel with three travel lanes in each direction divided by a wall along its length. A surface-level boulevard over the tunnel is envisioned to provide local access and connectivity. The tunnel would be constructed using the cut and cover tunnel method due to the existing subsurface conditions (relatively weak mix of silt, sand, clay and some gravel) and the reasonably shallow depths of the tunnel (approximately 40 feet). It is anticipated that the tunnel would be constructed in segments with substantial challenges associated with maintaining Almond Street and the viaduct. The tunnel would require a complex mechanical ventilation system to address in-tunnel emission levels and to allow safe egress in the event of a fire. Although a tunnel ventilation system has not been identified, it would most likely require additional right-of-way and large mechanical ventilation buildings which would be difficult to site. Vehicular traffic entering and exiting the tunnel would result in elevated air pollutant and noise levels at the tunnel portals. Required lighting at the tunnel portal could result in adverse visual impacts. The Tunnel would also likely require a stormwater pumping station. The tunnel also introduces some major safety concerns regarding hazardous materials, access to accidents and terrorist type attacks.

Design Constraints

Providing system connections in the I-690/Almond Street area require major grade changes from the elevated I-690 highway (approximately 30 feet above grade) to a tunnel that would be approximately 40 feet below ground for a total drop of 70 feet. To meet acceptable grades, the current Exit 18 (Harrison/Adams) that provides access to Downtown would be eliminated. There is insufficient spacing from the I-690 interchange to this location to provide an interchange; full access to the tunnel is not feasible. The transition section between the tunnel portals and the existing elevated roadway segments would sever seven (7) major streets in the area, including: Erie Boulevard, Water Street, Washington Street, Fayette Street, Almond Street (to Northside), McBride Street (to Northside), and VanBuren Street at the south terminus area. This would significantly affect east-west and north-south mobility among a number of neighborhoods, resulting in the diversion of a significant amount of traffic to Genesee or South Townsend Streets and increased levels of congestion to those roadways. Long-term maintenance costs would be significant; additionally, these types of maintenance activities are not usually performed by NYSDOT staff, particularly maintaining the tunnel exhaust/ventilation system, maintaining the tunnel proper (lighting, signals) and maintaining a probable stormwater pumping station for tunnel drainage. Due to the excavation required for the tunnel, significant utility disruption/conflicts are anticipated by the tunnel construction including: sewer and water crossings; gas, telephone, cable and electric relocation; and potential impacts to major transmission facilities. Of particular note is the University steam plant located at Taylor/McBride; this includes three crossings of steam lines, chilled water lines and a very high pressure compressed natural gas (CNG) line.



Tunnel Strategy

The strategy removes the viaduct and lowers I-81 below grade in a tunnel. Requires the reconstruction of I-81 on either end of the tunnel. Common elements.

Transportation	Economic Competitiveness	Social Equity/Quality of Life	Environmental Stewardship
<p>Enhance the Transportation Network</p> <ul style="list-style-type: none"> 90% of geometric deficiencies would be addressed. Constructs 53 new bridges and a 6-lane 1.65 mile tunnel; major capital investment with highest life cycle maintenance costs. Connectivity moderately enhanced with surface boulevard over tunnel. <p>Enhance Region-Wide Mobility</p> <ul style="list-style-type: none"> Travel patterns to destinations in close proximity to the interchange would be altered; circuitous travel patterns, increased delay. Regional mobility slightly improved. Notable benefits would result to the regional system efficiency, reliability, and safety, capacity. Fewer exits would reduce downtown interstate access. Potentially adversely affects emergency access. Prominent pedestrian/bicycle facilities and options to integrate transit along the boulevard. <p>Improve Public Safety</p> <ul style="list-style-type: none"> Anticipated reduction in accident patterns and rates by addressing design deficiencies and improved capacity. Improved safety for pedestrians and bicyclists by improving cross connections. 	<p>Maintain or Improve Economic Opportunities</p> <ul style="list-style-type: none"> Notable negative impact to businesses and properties (displacements). Less convenient access to urban core. Multi-modal system connectivity moderately enhanced with surface boulevard over tunnel; improves multi-modal access and overall livability. Enhanced highway operations that may benefit region-wide population growth and job access. <p>Exercise Fiscal Responsibility</p> <ul style="list-style-type: none"> High investment with limited community benefits and significant operational improvements. 	<p>Support Community Quality of Life</p> <ul style="list-style-type: none"> Major property impacts; removal of numerous businesses and housing diminishing neighborhood cohesion. Does not encourage sustainable land use patterns within city or county; supports sprawl. Several major surface roads would be severed, negatively impacting connection between Northside, Downtown and Eastside. Does not support regional land use patterns or smart growth. Boulevard has high potential to improve visual character. Moderate consistency with city and county long term vision and preferred future land use patterns. <p>Share Burdens & Benefits</p> <ul style="list-style-type: none"> Higher burden. Greater number of property displacements in EJ neighborhoods. Benefits shared unequally among city neighborhoods. 	<p>Preserve or Enhance Environmental Health</p> <ul style="list-style-type: none"> Does not conflict with local, regional or state environmental initiatives. Limited integration with city bike plan where roads are severed. Air quality impacts to be determined. Anticipated elevated air pollutant levels at the tunnel portals. Noise levels to be determined. Anticipated elevated noise levels at the tunnel portals. Potential adverse Impact to community landmarks or historic resources depending on footprint. Construction complexity and costs for stormwater management highest among all strategies. Probable stormwater pumping station for tunnel drainage.
<p>Preliminary Construction Cost Range: \$1.6-1.8 billion. Preliminary estimate for environmental, right-of-way acquisition, engineering, construction inspection: additional \$250-500 million.</p>			
<p>Recommendation/Feasibility: The tunnel strategy in the viaduct priority area is <i>not feasible</i>. Very high investment to improve system operations, safety, capacity would have significant negative economic, social and environmental benefits; significant impacts.</p>			

iv. Depressed Highway Strategy

The Depressed Highway strategy includes all the common elements previously identified plus depressing the I-81 corridor through the downtown area. The Depressed Highway strategy involves burying I-81 from the general vicinity of Van Buren Street on the south along the present I-81 alignment and connecting to surface level near Butternut Street (1.65 miles). A depressed highway simplifies the interchange with I-690, as I-81 is below grade. A surface level boulevard or straddling service roads are envisioned to provide local access and connectivity.

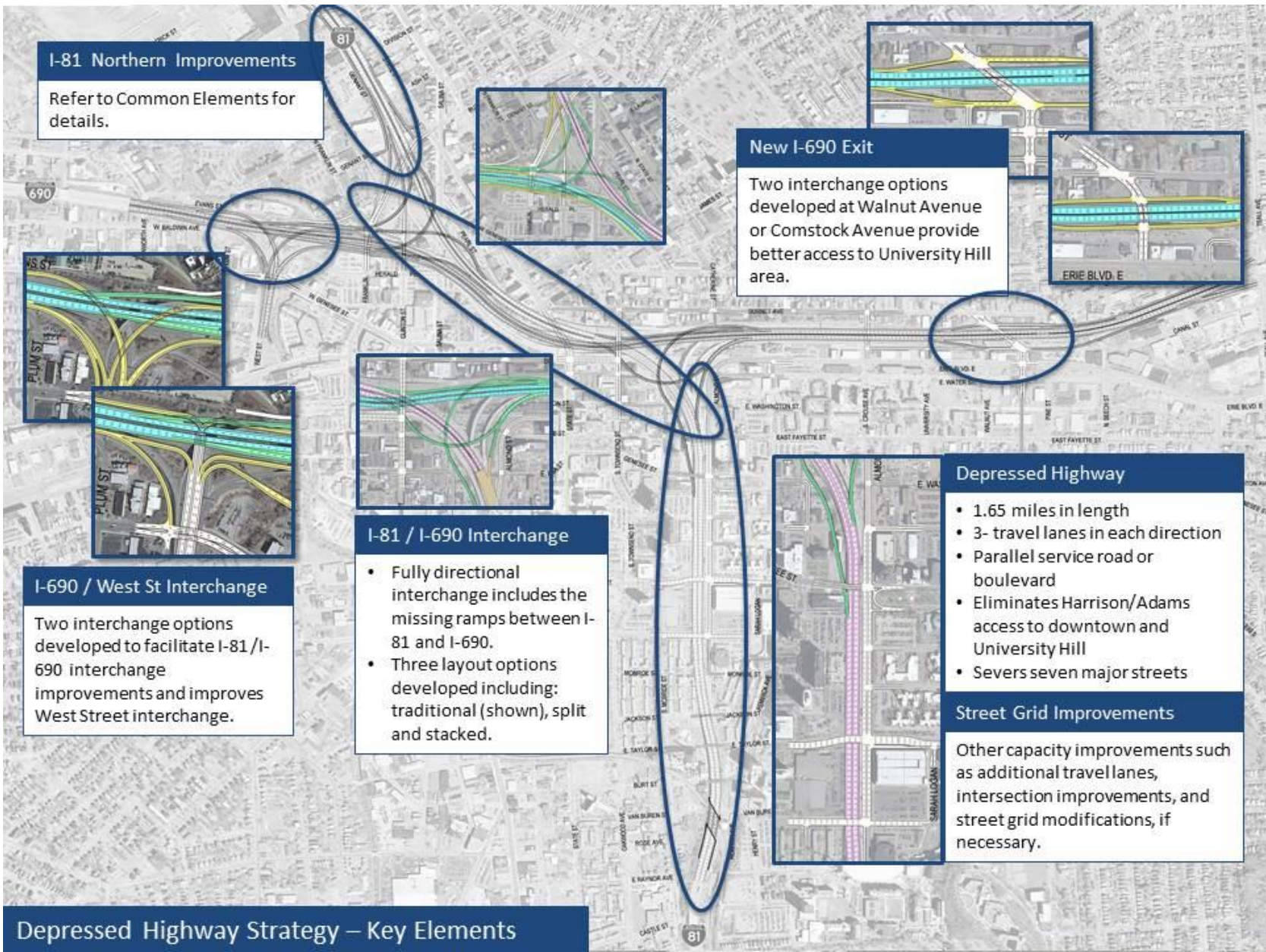
The depressed highway cross section would include three lanes in each direction wide enough for exit and entrance ramps. Access to/from depressed highway would be by service roads or a parallel boulevard. The northern limit of the depressed highway would be west of Butternut Street where it would connect to a similar depressed highway section on I-81 to the north. Multiple southern terminus options would be available depending on whether the highway would cross under or over the NYS&W railroad.

The depressed highway would be constructed using steel sheet piling to support the open cut excavations (25 feet) into what is a relatively weak subsurface soil condition. It is expected the depressed highway would be constructed in segments with significant challenges associated with maintaining local and regional access.

Design Constraints

The depressed highway strategy would notably alter existing access and travel patterns along the I-81 corridor. System connections in the I-690/Almond Street area require major grade changes from elevated highway to a depressed highway. Similar to the tunnel strategy, the depressed highway strategy would require severing seven (7) major streets in this area including: Erie Boulevard, Water Street, Washington Street, Fayette Street, Almond Street (to Northside), McBride Street (to Northside), and VanBuren Street at the south terminus area. The system connections require significant distance to go from one or two levels above grade (near I-690) to 25 feet below grade to tie into the depressed highway. This limits the geometric design and does not allow for an exit at Harrison/Adams area, as Exit 18 (Harrison/Adams) interchange is too close to the I-81/I-690 interchange.

The depressed highway strategy would have significant long term maintenance costs and significant utility conflicts including sewer and water crossings; gas, telephone, cable and electric relocation; and potential impacts to major transmission facilities. Of particular note is the University steam plant located at Taylor/McBride which provides steam heating and chilled water cooling for the University and most/all the hospitals on University Hill. As with the Tunnel strategy, the Depressed Highway strategy would require three crossings of steam lines, chilled water lines and a very high pressure CNG gas line.



I-81 Northern Improvements
 Refer to Common Elements for details.

New I-690 Exit
 Two interchange options developed at Walnut Avenue or Comstock Avenue provide better access to University Hill area.



I-690 / West St Interchange
 Two interchange options developed to facilitate I-81/I-690 interchange improvements and improves West Street interchange.



I-81 / I-690 Interchange

- Fully directional interchange includes the missing ramps between I-81 and I-690.
- Three layout options developed including: traditional (shown), split and stacked.



Depressed Highway

- 1.65 miles in length
- 3- travel lanes in each direction
- Parallel service road or boulevard
- Eliminates Harrison/Adams access to downtown and University Hill
- Severs seven major streets



Street Grid Improvements

Other capacity improvements such as additional travel lanes, intersection improvements, and street grid modifications, if necessary.

Depressed Highway Strategy – Key Elements

Depressed Highway Strategy

The Depressed Highway strategy removes the viaduct and buries I-81. This strategy requires the reconstruction of I-81 on either end of the depressed highway. Strategy includes noted common elements.

Transportation	Economic Competitiveness	Social Equity/Quality of Life	Environmental Stewardship
<p>Enhance the Transportation Network</p> <ul style="list-style-type: none"> 90% of geometric deficiencies are addressed. Constructs 54 new bridges; special structure with high retaining walls; high life cycle maintenance costs. Hinders alternative mode improvements. <p>Enhance Region-Wide Mobility</p> <ul style="list-style-type: none"> Regional mobility slightly improved. Increased hours of delay and congestion, especially at intersection locations. Connectivity compromised as it creates gaps in the street grid system. Fewer exits would reduce downtown interstate access and potentially adversely affect emergency access. Major highway improvements would improve access to key destinations. <p>Improve Public Safety</p> <ul style="list-style-type: none"> Anticipated reduction in accident patterns and rates. Reduced safety for vehicles and other modes - added width, complicated intersections, and difficult crossings. 	<p>Maintain or Improve Economic Opportunities</p> <ul style="list-style-type: none"> Alignment and construction would encroach on existing properties, negatively impacting businesses and residences. Access to urban core less convenient. Could create sense of disconnection between neighborhoods due to physical void between east and west acts as a disincentive to foot traffic to business and diminishes economic sustainability. Enhanced highway operations that may benefit region-wide population growth and job access. Acts as disincentive to foot traffic to business. <p>Exercise Fiscal Responsibility</p> <ul style="list-style-type: none"> High investment with limited community benefits and significant operational improvements. 	<p>Support Community Quality of Life</p> <ul style="list-style-type: none"> Major property impacts; removal of numerous businesses, housing, portions of a park and sports fields, and school, diminishing neighborhood cohesion. Does not encourage sustainable land use patterns within city or county; supports sprawl. Several major surface roads would be severed, negatively impacting connection between Northside, Downtown and Eastside. Does not support regional land use patterns or smart growth. Improved visual environment with viaduct removal. Moderate consistency with city and county long term vision and preferred future land use patterns <p>Share Burdens & Benefits</p> <ul style="list-style-type: none"> Greatest number of property impacts; burden to immediate neighborhoods, EJ populations. Benefits not shared equally among city neighborhoods. 	<p>Preserve or Enhance Environmental Health</p> <ul style="list-style-type: none"> Does not conflict with local, regional or state environmental initiatives. Limited integration with city bike plan possible where roads are severed. Air quality impacts to be determined. Noise levels to be determined. Potential impact to community landmarks or historic resources depending on footprint. Increases impervious area requiring stormwater management features. Construction complexity and costs for stormwater management system design high.
<p>Preliminary Construction Cost Range: \$1.3-1.5 billion. Preliminary estimate for environmental, right-of-way acquisition, engineering, construction inspection: additional \$250-500 million.</p>			
<p>Recommendation/Feasibility: The depressed highway strategy in the viaduct priority area is <i>not feasible</i>. Very high fiscal investment to improve system operations, safety, and capacity would have limited economic, social and environmental benefits and significant impacts. Complex construction process with significant impacts to local and regional travel, significant utility impacts; significant long-term maintenance costs.</p>			

v. Summary findings

The four build strategies in the viaduct priority area include reconstruction of the viaduct, viaduct removal with at-grade/boulevard, viaduct removal with tunnel, and viaduct removal with depressed highway. Viaduct and interchange improvements for the build strategies will include the northern improvements, West Street interchange improvements and a new I-690 exit east of I-81; as such, these improvements are grouped into the “viaduct priority area” and these elements are included in the strategies assessments and cost estimates. Each of the strategies in the viaduct priority area was evaluated against the corridor needs and study goals and objectives.

The Reconstruction and Boulevard strategies would strongly meet the transportation goals to enhance the transportation network, enhance region-wide mobility, and improve public safety; the Tunnel and Depressed Highway strategies meet the transportation goals to a lesser extent.

The Reconstruction and Boulevard strategies would strongly meet the economic competitiveness goals to maintain or improve economic opportunities and exercise fiscal responsibility. The Tunnel and Depressed Highway strategies moderately meet the economic competitiveness goals.

The Reconstruction and Boulevard strategies would strongly meet the social equity/quality of life goals to support community quality of life and share burdens and benefits. The Tunnel and Depressed Highway strategies do not meet the social equity/quality of life goals.

The intent of the four build strategies is to meet the environmental stewardship goal to preserve or enhance environmental health. Further studies will be conducted in the subsequent environmental review process to determine the strategies ability to meet this goal. An Environmental Impact Statement (EIS) will be prepared for the priority project(s) in the viaduct priority area to identify and describe the affected environment, analyze and document the construction-related and operational environmental consequences of the project alternatives, and identify opportunities and measures that mitigate any identified adverse impacts.

Based on the evaluation of the priority area strategies against the transportation, economic competitiveness, social equity/quality of life, and environmental stewardship goals and objectives, as well as consideration of cost, the Reconstruction and Boulevard strategies are considered feasible. The Tunnel and Depressed Highway strategies are considered to not be feasible. More in-depth evaluation of the strategies will continue as strategies are refined.

IX. I-81 Next Steps – Project Development and Environmental Review

This corridor study identifies problems and issues, transportation needs and possible strategies to address the future of the 12-mile I-81 corridor in the Syracuse metropolitan area. This planning study takes into account the community context and the environment in which I-81 exists. It is recommended that work associated with the viaduct priority area be progressed as the first priority. The overall project level program for the corridor includes:

- Priority project(s): I-81 viaduct replacement and I-81/I-690 interchange project along with I-81 north approach improvements to develop the Court Street interchange and modify ramps, I-690 east approach project to construct the interchange improvements, and I-690/ West Street project to construct the interchange improvements.
- I-81 northern segment rehabilitation: develop multiple contracts for rehabilitation of the 5.5 mile segment of I-81 from Hiawatha Boulevard to the I-81/I-481 northern interchange within the next 5 to 10 years to keep this segment in the state of good repair.
- I-81 southern segment rehabilitation: rehabilitate the two mile segment of I-81 from the south end of the viaduct to the I-81/I-481 southern interchange within the next 10 to 15 years.

These strategies will be further analyzed pursuant to a process set forth by the National Environmental Policy Act (NEPA) of 1969. The passage of NEPA marked an important point in protecting environment. Not only did Congress declare a national environmental policy: *“The Congress, recognizing the profound impact of man's activity on the interrelations of all components of the natural environment . . . declares that it is the continuing policy . . . to use all practicable means and measures . . . to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans.”*⁴² but rooted within NEPA are principles of sustainability that have become so important in recent years.

The results of this corridor study will be carried forward into the next phase of the development, NEPA scoping, which will continue to build upon the findings of this planning study. A purpose and need statement will be developed for any future projects related to the viaduct priority area. The NEPA scoping process provides the opportunity for public input into the purpose and need statement and to the selection of a reasonable range of alternatives. The NEPA process requires that alternatives which are being carried forward be thoroughly evaluated for their impacts to the environment, allowing for alternatives that are determined not to be reasonable or feasible or determined unable to meet the project purpose and need be eliminated from further study. Agencies are not required to consider every potential alternative; however, they are responsible for developing the reasonable range of alternatives within the identified feasible strategies. Agencies must provide opportunities for the involvement of participating agencies and the public in developing the alternatives and consider the input provided by these groups.

NYSDOT looks for opportunities to provide sustainable solutions throughout its projects. Sustainability concepts are incorporated into projects as they are developed following NYSDOT GreenLITES project design certification program and other guidance. Legislation has been enacted in New York State, including Smart Growth Infrastructure Policy and Complete Streets, which promulgates certain requirements in the project development process. These laws require NYSDOT as well as localities to fully consider the needs of their assets by non-automobile users, such as pedestrians and bicyclists, and to maximize the utility of the current built environment. NYSDOT is also considering the effects of projects on NYS Energy Plan and draft Climate Action Plan.

NYSDOT will encourage new and innovative approaches to sustainable design. NYSDOT's Context Sensitive Solutions (CSS)⁴³ program strives to balance environmental, scenic, aesthetic, cultural, natural resource, community, and transportation service needs. Project designs that are advanced under this philosophy recognize community goals and are designed, built, and maintained to be safe and sustainable while minimizing disruption to the community and the environment. CSS incorporates flexible, innovative solutions that result in the appropriate application of design details and criteria for the site.

Throughout the environmental review process, the lead agencies, FHWA and NYSDOT, will coordinate and work cooperatively with other federal, state and local agencies. Public participation will be conducted throughout the NEPA process, and public input will be considered thoroughly in the project development and decision-making process. There will be early opportunities for public input during project scoping meetings and during public hearings and meetings. Public outreach will be central in identifying and communicating social, economic, and environmental impacts, property relocations concerning individuals, groups, or institutions; reasonable notice will be provided to the public about public information meetings and public hearings. After an alternative has been selected and the appropriate NEPA document has received approval to proceed, the project will enter the final design stage and eventually be constructed.

Addressing the critical infrastructure issues in the I-81 corridor presents NYSDOT, SMTC and other regional planning partners a unique opportunity to not only address the existing transportation needs but to consider how to transform this transportation system to better support a more sustainable Syracuse and the surrounding region. Ultimately, the decisions made as a result of this and future actions will lay the groundwork for a sustainable future that supports economic prosperity, improved quality of life and a healthy environment.

Contact Information: New York State Department of Transportation, I-81 Corridor Study, 50 Wolf Road, Albany, New York 12232
181opportunities@dot.ny.gov